



Supporting study for the implementation of the ETS Directive and MRV requirements for maritime transport

Report on MRV extension to vessels below 5,000 GT

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1. Introduction

1.1 The possible extension of the MRV Maritime Regulation to vessels from 400 GT to 5,000 GT

The EU Regulation (EU) 2015/757 sets out rules on the monitoring, reporting and verification (MRV) of GHG emissions from maritime transport. Pursuant to Article 22a of the Regulation, the European Commission has an obligation to review the Regulation 'inter alia, for the purpose of including ships below 5 000 gross tonnage but not below 400 gross tonnage within the scope of this Regulation with a view to a possible subsequent inclusion of such ships within the scope of Directive 2003/87/EC or to proposing other measures to reduce greenhouse gas emissions from such ships.' As such, Ricardo is undertaking work to assist the Commission in such review of the MRV maritime Regulation.

This report reviews supporting evidence to assist the Commission in evaluating outcomes of the existing Regulation and assessing impacts of regulatory adjustments under consideration, focusing on the options of extending the Regulation scope to smaller vessels (400 – 4,999 GT) for vessel types other than general cargo and offshore vessels, for which an extension has already been agreed and will apply from 2025.

There may be two main motivations for further expanding the scope to smaller vessels:

1. First, this would mean operators of smaller vessels will be required to track their greenhouse gas emissions and fuel consumption using a harmonised and robust monitoring, reporting and verification system. Armed with this knowledge and data, it will become easier for them to benchmark the GHG intensity performance of their ship and take informed decision to reduce emissions. In addition, public data disclosure will help shipowners gain the trust of stakeholders such as investors or customers looking for best in class green shipping services.
2. Second, the MRV extension can provide the foundation for the extension of the EU ETS and Fuel EU to include such smaller vessels, which would directly increase the environmental impacts of these important policies. In addition, carbon pricing would improve the business case of new low/zero GHG fuelled vessels that have to compete with fossil-fuel powered vessels. Revenues from the ETS can be used to further enable the roll-out of decarbonisation technologies and fuels which are often tested on smaller vessel scales first.

This report is structured as follows:

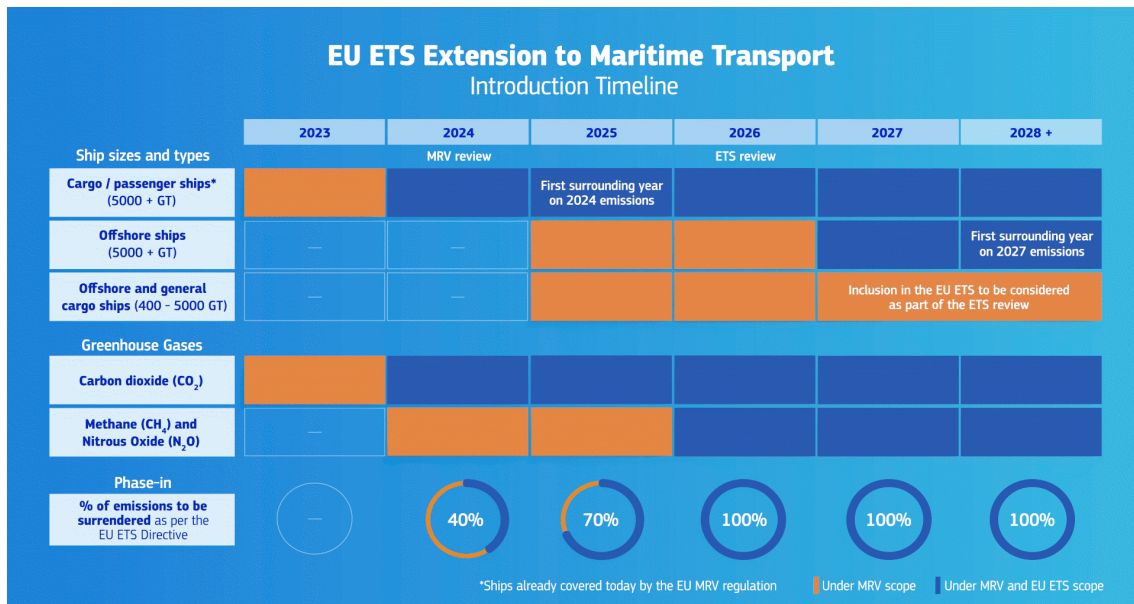
1. Overview of recent changes to the MRV maritime Regulation (section 1.2)
2. Analysis of activity and emissions from smaller vessels (section 2)
3. Review of the current scope of the MRV maritime Regulation (section 3)
4. Assessment of scenarios to extend the scope of MRV maritime Regulation to smaller vessels (section 4)
5. Stakeholder consultation (Appendix 1 and key findings embedded in sections 3 and 4)

1.2 Overview of recent changes to the MRV maritime Regulation

Regulation (EU) 2015/757 initially set out MRV rules on CO₂ emissions from maritime transport, as well as on other relevant information from large ships over 5,000 gross tonnage (GT) loading and unloading cargo or passengers for commercial purposes at ports in the European Union (EU)¹. This Regulation was amended by Regulation (EU) 2023/957 to adapt the MRV rules to the inclusion of maritime transport activities in the EU Emissions Trading System (ETS). It also included other related emissions, namely nitrous oxide (N₂O) and methane (CH₄) as of 1 January 2024. From 1 January 2025, the amended MRV maritime Regulation will also extend to general cargo vessels of 400 GT and above, and to offshore ships of 400 GT and above (see Figure 1-1).

¹ References to the EU as a region in this report include non-EU countries that are part of the European Economic Area (EEA) unless specified otherwise.

Figure 1-1 Timeline for the extension of the EU MRV and EU ETS to maritime transport



Source: European Commission, FAQ – Maritime transport in EU Emissions Trading System (ETS)

The MRV maritime Regulation, in effect from 2018, solely focuses on monitoring, reporting and verification (MRV) of emissions from ships undertaking all voyages to, from and between EU ports. The MRV maritime Regulation sets requirements for shipping companies to monitor and report their emissions for each of their ships each calendar year on a cyclical basis. All ships performing voyages within the scope of the MRV maritime Regulation, regardless of their flag state, must submit a monitoring plan detailing how they intend to collect emission data within two months of their first call to a port in an EU Member State. The monitoring plan must be assessed satisfactorily by an accredited verifier prior to data collection, and the collected data (the annual emission report) has to be verified at the end of each reporting period. Upon verification, a Document of Compliance is issued by the verifier and the reports are submitted to the Commission via the THETIS MRV portal (see main steps of the MRV process in Figure 1-2).

Figure 1-2 Main steps of the MRV process



Source: Fourth Annual Report from the European Commission on CO2 Emissions from Maritime Transport (period 2018-2021)

2. Analysis of activity and emissions data from smaller vessels

This analysis aims to provide information on the activity and emissions from smaller vessels (400 to 4,999 GT) focusing on the following indicators:

- Number of smaller vessels calling at EU ports, by vessel category;
- Number of port calls by year, differentiated by intra-EU and extra-EU voyages and by vessel category;
- Greenhouse gas (GHG) emissions for smaller vessels calling at EU ports, differentiated by intra-EU and extra-EU voyages and by vessel category.

The analysis relies on two main sources of information, as follows:

- **MARINFO information system from the European Maritime Safety Agency (EMSA).** This database contains voyages departing from and/or arriving at EU ports for vessels between 400 – 5,000 GT and covers data from 2020 to 2023. It is primarily used to characterise activity (in terms of number of port calls) from smaller vessels. It was also used to characterise shipowners and ISM companies² managing smaller vessels. Finally, this database was combined with emission factors from the 2022 European Commission report³ to estimate CO₂ emissions from smaller vessels calling at EU ports. However, the latter was not used a primary source for emissions data, but rather to complement AIS-based emissions data with further granularity (by year and vessel size).

Fuel consumption and GHG emissions model based on AIS data. This data is based on a fuel consumption and emission model merging AIS data with vessel registry data (please see more details on the model in

² ISM Company means the legal entity managing the Vessel in compliance with the International Safety Management (ISM) and International Ship and Port Facility (ISPS) Codes

³ Service contract to provide analytical support to the Commission's follow up work on its proposals for the revision and extension of EU emissions trading Assignment #4.9

- Text box 2-1 below). It covers GHG emissions (CO₂, N₂O and CH₄) from vessels 400 – 5,000 GT calling at EU ports in 2023, differentiated by intra-EU vs. extra-EU voyages and by vessel type. It also includes number of vessels by vessel type. It is used as the primary source to estimate both GHG emissions and number of vessels.

Text box 2-1 Overview of fuel/GHG emissions modelling and vessel categorisation

Fuel consumption and GHG emissions model from Marine Benchmark (MB)

This model combines AIS data with ship register data to produce fuel consumption and GHG emission estimates for a subset of the vessel fleet.

The ships data is primarily provided by S&P Global and is the formal UN supported IMO ship register. The data from S&P Global undergoes over 100 improvements steps when imported to the MB ships database.

The movements of ships come from AIS signals. The model includes a detailed mapping of IMO vessel numbers to the MMSI number of the AIS transponders, which is verified both by MB and S&P Global. This significantly reduces the risk of double counting vessels as it uses unique IMO numbers to identify vessels rather than MMSI numbers from AIS signals⁴. The MB ship database covers more than 99 % of vessels in the global fleet. From the AIS signals, latitude/longitude and draft data is extracted and distance, speed and intake between points are calculated. Weather and other parameters are added.

The model combines ship specific characteristics (fuel coefficient for each vessel's engine and primary fuel type) with environmental/operational data to estimate fuel consumption from the primary fuel along with auxiliary and boiler consumption.

GHG emissions were estimated based on standard MRV emission factors for CO₂, N₂O and CH₄, including methane leakage as well.

Offshore ships categories

Categories of offshore ships as covered under Marine Benchmark ('MB offshore ships') do not fully match the offshore ships categories from the recently adopted delegated act under EU MRV Maritime Regulation⁵ (that is still subject to scrutiny by the European Parliament and Council at the time of writing this report) ('MRV offshore ships'). "MRV offshore ships" category is broader than the "MB offshore ships" category.

Indeed, as per the Commission draft delegated act, 'MRV offshore ships' should encompass all 'MB offshore ships' (with the exception of offshore platforms but that have a marginal contribution to total emissions from MB offshore ships), plus dredgers (including hopper dredgers), cable layer and cable repair ships, research vessels, work/repair vessels, mining vessels,

⁴ This double counting issue with the use of MMSI data was identified in the EU ETS Impact assessment study (SWD (2021) 601 final), as vessels use multiple AIS transponders with different MMSI numbers.

⁵ [Delegated act details - Register of delegated acts](#)

wind turbine installation vessels, commissioning service operation vessels and service operation vessels, which are classified as “service – other” in the MB database. For the purpose of estimations made in this report, it is assumed that these *additional* vessels under the ‘MRV offshore ships’ category represent around half of vessels and emissions within the “service-other” category of the MB database.

For the purpose of this report, for simplification and consistency, the “MRV offshore ships” category is used by default (referred to as simply “offshore” across the report), unless specified otherwise.

Similarly as for MB offshore ships category, the offshore ships category used in MARINFO does not fully match with the ‘MRV offshore ships’ category. The ‘MARINFO offshore’ category largely matches ‘MB offshore’: the only difference is that ‘MB offshore’ includes offshore platforms whereas those are excluded from ‘MARINFO offshore’ category. For clarity, when data analyses are based on MARINFO categorisation in the study, the offshore category is labelled as ‘MARINFO offshore’ so as to make the distinction with the ‘MRV offshore ships’ category otherwise used throughout the report.

Other vessels categories

Throughout this report, ‘Service-other’ category includes anchor hoys, buoy/lighthouse vessels, crane ships, patrol vessels, pollution control vessels and utility vessels, among others.

‘Miscellaneous-other’ category includes naval vessels, hospital vessels, other non-merchant ships, pontoons, non-propelled barges and other leisure vessels, such as exhibition vessels.

2.1.1 Analysis of number of vessels and activity from smaller vessels

Number of smaller vessels (400 – 4,999 GT) calling at EU ports

As per AIS-based modelling data, 8,525 vessels between 400 – 4,999 GT called at EU ports in 2023. This compares against 12,344 vessels of or above 5,000 GT currently under MRV.⁶

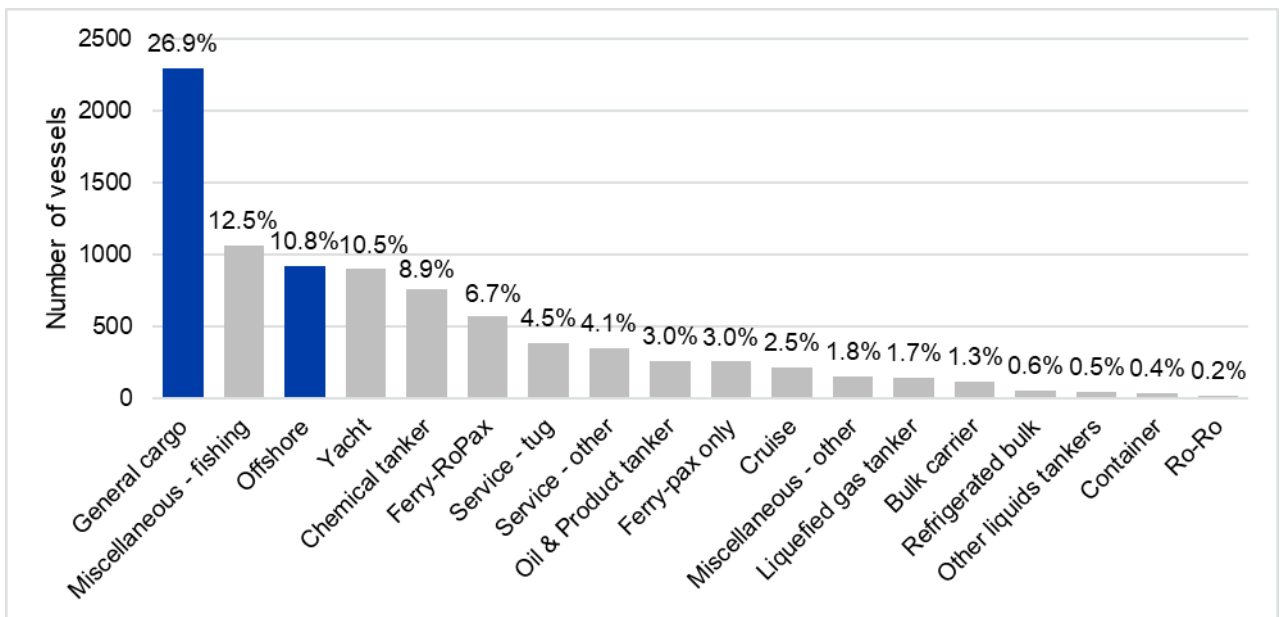
Some illustrations of different GT vessel sizes (RoPax and tankers) are provided in Appendix 2, so as to illustrate the type of vessels that are being considered here.

⁶ MRV 2023 data extract generated 19/09/2024

Figure 2-1 presents the split by vessel category. The highest number of vessels correspond to the ‘general cargo’ category, accounting for almost 27% of smaller vessels. Altogether, the smaller vessels covered under the MRV maritime Regulation from 2025 (i.e. general cargo and offshore) are estimated to account for a total of 38% of all the smaller vessels calling at EU ports.

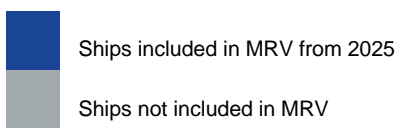
Among smaller vessels not included in MRV, the categories that account for higher share of smaller vessels (over 5% of total vessels) include fishing vessels, yachts⁷, chemical tankers and ferry-RoPax.

Figure 2-1 Number of vessels 400 – 4,999 GT calling at EU ports (AIS-based modelling data 2023)



Source: Ricardo analysis using AIS-based modelling data (2023)

Note: ‘Offshore’ category matches the MRV offshore ship definition (see more information on the vessel categorisation in Text box 2-1).



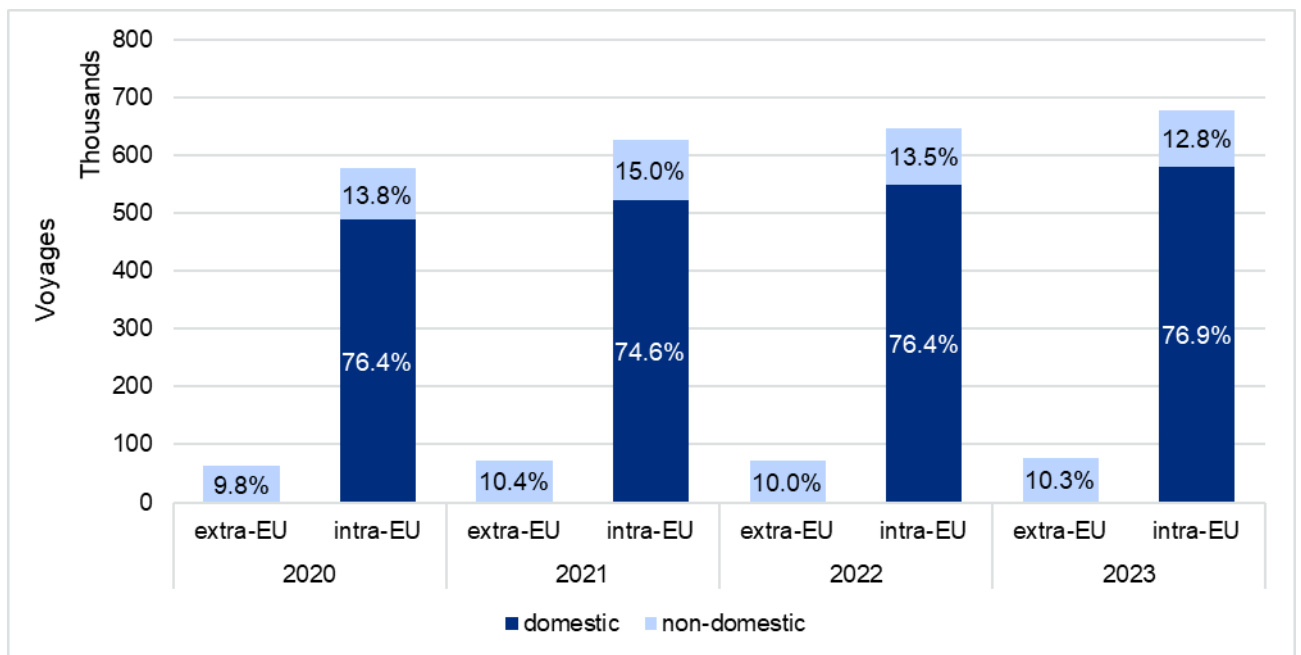
⁷ It is important to note that numbers corresponding to yachts include those performing commercial and private operations. Currently, only commercial voyages by yachts of and above 5,000 GT for transporting passengers are covered by the MRV. However, due to a lack of quantitative data, it has not been possible to determine the number or share of commercial (vs. private) operations over the total number of yachts of 400 GT and above. Therefore, Figure 2-1 presents total number of yachts for both commercial and private operations.

Analysis of port call data from smaller vessels (400 – 4,999 GT)

The analysis of port call data aims to characterise small vessels (category and size) performing extra-EU and intra-EU voyages and provides an overview of port calls from smaller vessels for the period 2020-2023. Extra-EU voyages are those between an EU and a non-EU port, while intra-EU refers to voyages between two EU ports. This analysis is based on MARINFO data.

Figure 2-2 below shows the number of voyages in the period 2020-2023, broken down by intra-EU and extra-EU. Intra-EU voyages are in turn split by domestic and non-domestic voyages. There has been a clear increase in the total number of voyages each year. The proportion of intra-EU versus extra-EU voyages has remained relatively stable over time, with around 90% being intra-EU voyages and about 10% associated to extra-EU voyages. It is important to note that the majority of intra-EU voyages are actually domestic voyages. Overall, domestic voyages represent around 75-77% of total voyages (both intra-EU and extra-EU) for smaller vessels.

Figure 2-2 Number of voyages and split by extra-EU and intra-EU (and within intra-EU voyages, by domestic and non-domestic voyages) (2020-2023)



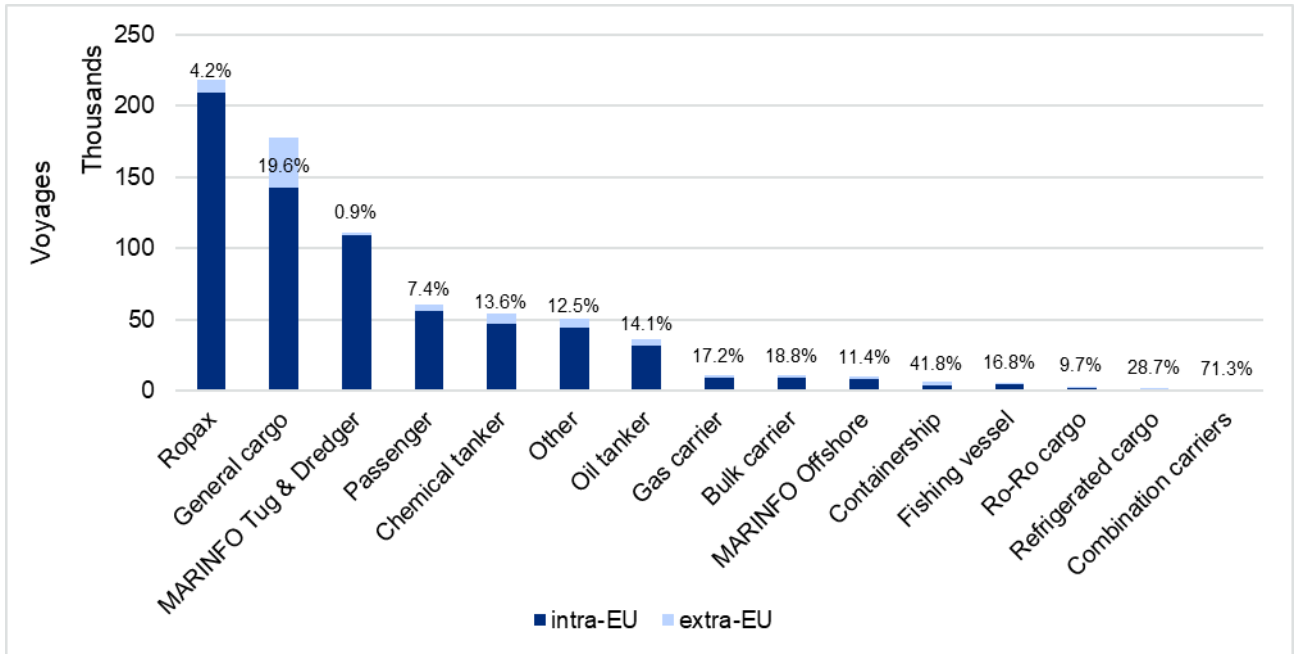
Source: Ricardo analysis based on MARINFO data from 2023

Note: Percentage value (%) corresponds to the share of total voyages

Figure 2-3 presents the total number of voyages from smaller vessels and the share of intra- and extra-EU voyages by vessel category. Of the total number of voyages, the vast majority are carried out by RoPax, General Cargo, and Tug and Dredger vessels (accounting for over 67% of the voyages). The share of extra-EU voyages significantly varies with the vessel category. For example, while the share of extra-EU vessels is significant for general cargo and

containerships (20 and 42%, respectively), it is marginal in other vessel categories such as RoPax or passenger vessels.

Figure 2-3 Number of EU voyages per vessel type and share of extra-EU voyages for 2023



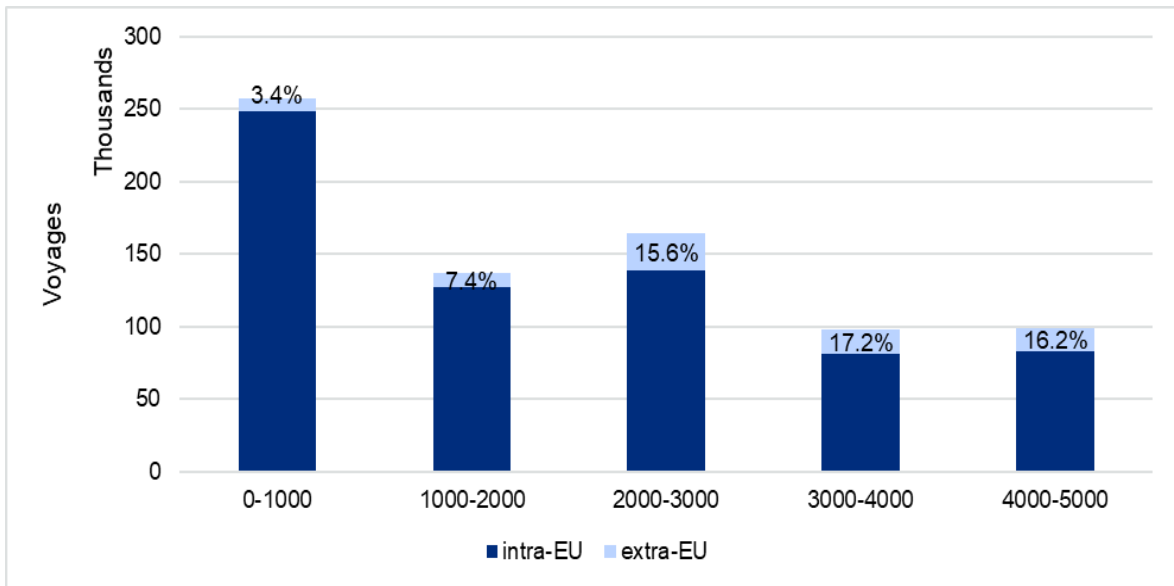
Source: Ricardo analysis based on MARINFO data from 2023

Note 1: Percentage value (%) corresponds to the share of extra-EU voyages

Note 2: Vessel categorisation as per the MARINFO database. MARINFO offshore category does not match the MRV “offshore ship” definition. Tugs and dredgers are merged into a single category, unlike the MRV categorisation, where dredgers fall under the MRV “offshore ship” definition (see more information on vessels categorisation in Text box 2-1). Yachts are included within the MARINFO “passenger” category.

Figure 2-4 shows that the share of extra-EU voyages tends to increase with vessel size. For vessels between 2,000 and 3,000 GT, the share of extra-EU voyages is above 10%, ranging from 15% for 2,000-3,000GT, 17% for 3,000-4,000 GT to 16% for 4000-4,999 GT. For vessels up to 2,000 GT, extra-EU voyages are less than 10%. At the same time, vessels within the smaller GT segments tend to perform more voyages, which is likely to indicate more frequent but shorter voyages.

Figure 2-4 Number of voyages per vessel size (2023)



Source: Ricardo analysis based on MARINFO data from 2023

Note: Percentage value (%) corresponds to the share of extra-EU

2.1.2 Greenhouse gas emissions from smaller vessels

Analysis of smaller vessel GHG emissions

An analysis of greenhouse gas emissions (GHG) was performed with Marine Benchmark's AIS-based modelling data from 2023. This provides an estimate of GHG emissions, including CO₂, CH₄ and N₂O as CO₂-equivalent emissions, from smaller vessels (400-4,999 GT) by vessel category and by type of voyage (i.e. intra- and extra-EU).

In total, smaller vessels calling at EU ports in 2023 are estimated to emit around 19.28 MtCO₂e (or 18.99 MtCO₂). This compares to 126.70 MtCO₂ for vessels of or above 5,000 GT under MRV in 2023⁸.

Figure 2-5 presents the results by vessel category. These results show the following:

- General cargo and offshore vessels are the two top emitters among smaller vessels. Altogether, these vessel categories, covered under MRV from 2025, are estimated to account for around 40% of total CO₂e emissions from smaller vessels.
- The next top emitters are miscellaneous-fishing vessels (noting though that these vessels are explicitly excluded from MRV scope⁹), chemical tankers,

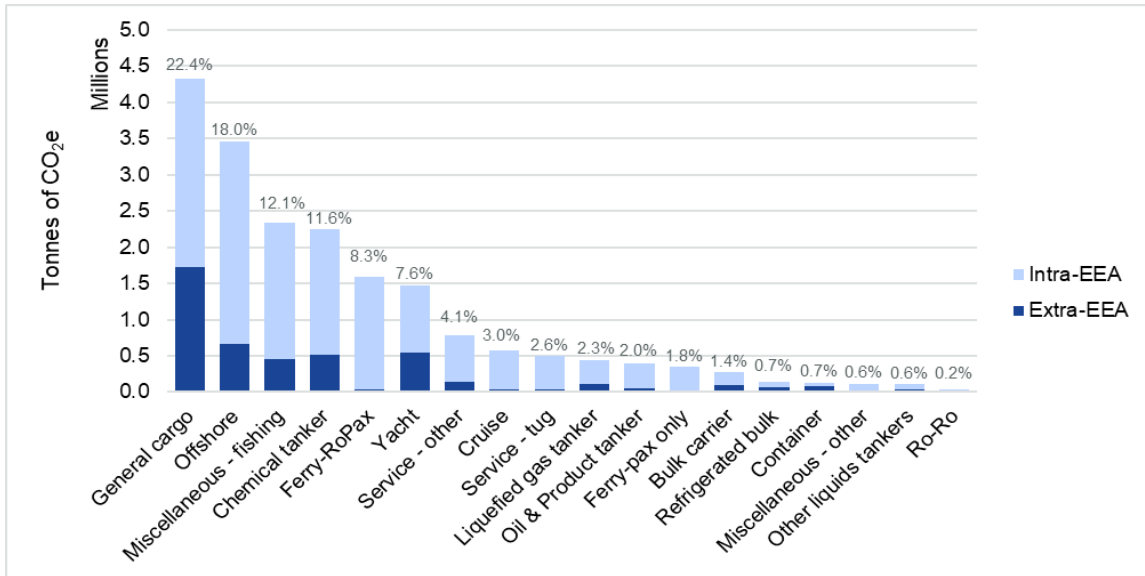
⁸ MRV 2023 data extract generated 19/09/2024

⁹ See Article 2(2) of the MRV Maritime Regulation

RoPax ferries, service-other vessels and passenger vessels (including yachts, cruises and pax only ferries).

- Emissions from other vessel categories (LNG/gas carriers, oil tankers, bulk carriers, containerships and RoRo vessels) have a much lower contribution (below 3%)

Figure 2-5 CO₂e emissions from vessels 400 – 4,999 GT by vessel category (AIS-based modelling 2023)



Source: Ricardo analysis using AIS-based modelling data (2023) – See more information on vessels categorisation in Text Box 2-1

Table 2-1 below presents a summary of key indicators for smaller vessels, compared to vessels of or above 5,000 GT currently under MRV. Since only CO₂ emissions were reported under MRV in 2023¹⁰, Table 2-1 presents CO₂ emissions (rather than CO₂e) for a like-for-like comparison with 2023 MRV data.

An important result is that smaller vessels not included in the MRV from 2025 (i.e. other than general cargo and offshore ships) represent 43% of the current MRV fleet but only contribute to 9% of total CO₂ emissions reported under MRV in 2023.

¹⁰ CH₄ and N₂O emissions included in MRV from 2024 only.

Table 2-1 CO₂ emissions from smaller vessels by vessel type compared to total MRV emissions in 2023

Type of vessel	Number of 400-4,999 GT vessels (2023)	Share of vessels compared to number of large vessels under MRV in 2023 ^[1]	Total CO ₂ emissions (MtCO ₂) (2023)	Share of CO ₂ emissions compared to total CO ₂ emissions under MRV in 2023 ^[1]	Total extra-EU CO ₂ emissions (MtCO ₂) (2023)
General cargo	2,296	18.6%	4.26	3.4%	1.69
Offshore	921	7.5%	3.41	2.7%	0.66
Miscellaneous - fishing	1,065	8.6%	2.30	1.8%	0.44
Chemical tanker	756	6.1%	2.21	1.7%	0.51
Ferry-RoPax	571	4.6%	1.57	1.2%	0.03
Yacht	896	7.3%	1.45	1.1%	0.13
Service – other	349	2.8%	0.77	0.6%	0.54
Cruise	217	1.8%	0.56	0.4%	0.04
Service - tug	385	3.1%	0.49	0.4%	0.03
Liquefied gas tanker	143	1.2%	0.44	0.3%	0.12
Oil & Product tanker	256	2.1%	0.38	0.3%	0.06
Ferry-pax only	253	2.0%	0.34	0.3%	0.02
Bulk carrier	111	0.9%	0.27	0.2%	0.10
Refrigerated bulk	53	0.4%	0.14	0.1%	0.07

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Type of vessel	Number of 400-4,999 GT vessels (2023)	Share of vessels compared to number of large vessels under MRV in 2023 ^[1]	Total CO ₂ emissions (MtCO ₂) (2023)	Share of CO ₂ emissions compared to total CO ₂ emissions under MRV in 2023 ^[1]	Total extra-EU CO ₂ emissions (MtCO ₂) (2023)
Container	38	0.3%	0.13	0.1%	0.09
Miscellaneous - other	154	1.2%	0.12	0.1%	0.02
Other liquids tankers	42	0.3%	0.11	0.1%	0.04
Ro-Ro	20	0.2%	0.04	0.0%	0.01
Total vessels 400 – 4,999 GT	8,525	69.1%	18.99	15.0%	4.59
Total vessels 400 – 4,999 GT excluding general cargo and offshore	5,309	43.0%	11.32	8.9%	2.24

Note [1]: 2023 MRV scope, hence excluding smaller (400-4,999 GT) general cargo and MRV offshore vessels to be incorporated from 2025

3. Review of the current scope of the MRV maritime Regulation

This section aims to respond to the general question on whether the scope of vessels under the MRV maritime Regulation (size thresholds and vessel types) has been appropriate so far and whether reasons to exclude certain vessels between 400 and 4,999 GT are still valid. This analysis, despite not being formally an ex-post evaluation as per the Better Regulation Guidelines, is structured into evaluation questions following standard evaluation criteria. This analysis focuses on 2023 data as the base year.

This review considers the agreed extension of the MRV scope to small general cargo ships and offshore ships from 2025, along with the extension to CH₄ and N₂O emissions from 2024 and evaluates the appropriateness of any scope changes beyond these.

The analysis builds on the data analysis for smaller vessels presented in Section 2 and inputs from consulted stakeholders, including shipping companies (via tailored interviews) and public authorities (via ad hoc data requests). Appendix 1 describes the approach and key results of the stakeholder consultation. Where relevant, insights from stakeholders are also presented in the main report to complement the analysis.

The results of this review inform the need for further consider changes to the MRV scope, as assessed under the assessment presented in Section 0 of this report.

3.1 Efficiency

At the time of the adoption of the MRV maritime Regulation (2013), the European Commission estimated that monitoring, reporting and verification (MRV) of emissions based on fuel consumption under the MRV maritime Regulation would lead to additional annual administrative costs for shipowners and ship operators of about EUR 5,545 per vessel per year for shipping companies if all vessels above 400 GT were considered and EUR 4,479 if only vessels above 5,000 GT were considered¹¹. Smaller vessels (400-4,999 GT) were thus excluded on the grounds that there would be an excessive administrative burden on companies operating them, compared to a relatively small contribution to total GHG emissions.

¹¹ The data from the MRV Impact Assessment (European Commission, 2013) has been updated to 2023 value for the analysis. GDP deflator of 1.28 has been applied to adjust the impact of inflation.

More recently, i.e. as part of the 2023 MRV revision, it was agreed to expand the scope to general cargo vessels between 400 and 4,999 GT and offshore ships of and above 400 GT as from 1 January 2025. The main rationale to include only general cargo and offshore vessels and no other vessel types within the 400-4,999 GT segment was that these vessel categories are the top emitters within this segment.

The assessment of efficiency aims to review recent evidence on this trade-off between GHG emissions coverage and administrative costs with respect to the MRV scope and to better understand whether companies managing smaller vessels (400-4,999 GT) would be facing higher administrative cost (in particular per tCO_{2e}) compared to companies already reporting under MRV. To complement this analysis, the size of companies managing smaller vessels and the extent to which they may be reporting already under MRV is analysed to judge their capacity to absorb additional administrative costs.

The administrative costs and the size of companies are calculated for 2023. These results are then compared to those for companies managing larger vessels (>=5,000 GT) that are already included in the scope of the MRV to understand if there would be a higher administrative burden imposed on companies managing smaller vessels. This assumption that companies with smaller vessels will incur more cost stems from the results of previous studies¹² which indicated a higher administrative burden for companies with smaller vessels. Qualitative input gathered from stakeholder engagement in this study indicated a similar understanding.

The analysis of efficiency considers the following questions and indicators:

Table 3-1 Questions and indicators for the analysis of efficiency

Questions	Indicators
What would be the recurrent administrative costs for smaller vessels and how these compare to additional GHG emissions covered?	<ul style="list-style-type: none"> - Total recurrent administrative costs for shipping companies managing smaller vessels by vessel category - Administrative cost for companies per tonne of CO_{2e}, by vessel category
Are companies managing vessels between 400 and 4,999 GT smaller on average than companies already reporting under MRV?	<ul style="list-style-type: none"> - Average number of vessels per reporting company (shipowner or ISM company) and vessel size segment

¹² Notably, the MRV impact assessment (European Commission, 2013)

Questions	Indicators
To what extent shipowners and ISM companies managing smaller vessels are already reporting under MRV?	- Share of shipowners and ISM of smaller vessels already registered in THETIS-MRV (hence already reporting for other vessels >5,000 GT)

What would be the recurrent administrative costs for smaller vessels and how these compare to additional GHG emissions covered?

As per administrative costs reported by consulted stakeholders (see Appendix 1 – Analysis of reported data on regulatory costs), the average recurrent administrative cost has been estimated at EUR 3,690 per year per vessel for smaller vessels. This value is slightly higher than the recurrent administrative cost for large vessels, estimated at EUR 3,390, as estimated in Table 6-4 of this report (Appendix 1 – Analysis of reported data on regulatory costs). Some stakeholders pointed to staff limitations and increased frequency of voyages as the main reasons for higher monitoring costs in smaller vessels, but a few expected similar costs to those of larger vessels.

Table 3-2 presents the estimated total recurrent administrative cost for shipping companies per year and by vessel size, which has been calculated considering the recurrent administrative costs for shipping companies (Appendix 1 – Analysis of reported data on regulatory costs) and the total number of smaller vessels (400-4,999 GT) by vessel size. Total recurring administrative costs account for EUR 31.5 million per year for all smaller vessels (400-4,999 GT), and for EUR 20.9 million when general cargo and offshore categories are excluded. For vessels currently reporting under MRV, these account for EUR 42.6 million per year.

Table 3-2 Total recurring administrative costs for shipping companies

Vessel category	Number of vessels (2023)	Recurring cost per vessel (EUR per year)	Recurring costs (million EUR per year)
Total vessels 400-4,999 GT	8,525	3,690	31.5
Total vessels 400-4,999 GT excluding general cargo and offshore	5,657	3,690	20.9
Total vessels above 5,000 GT	12,562	3,390	42.6

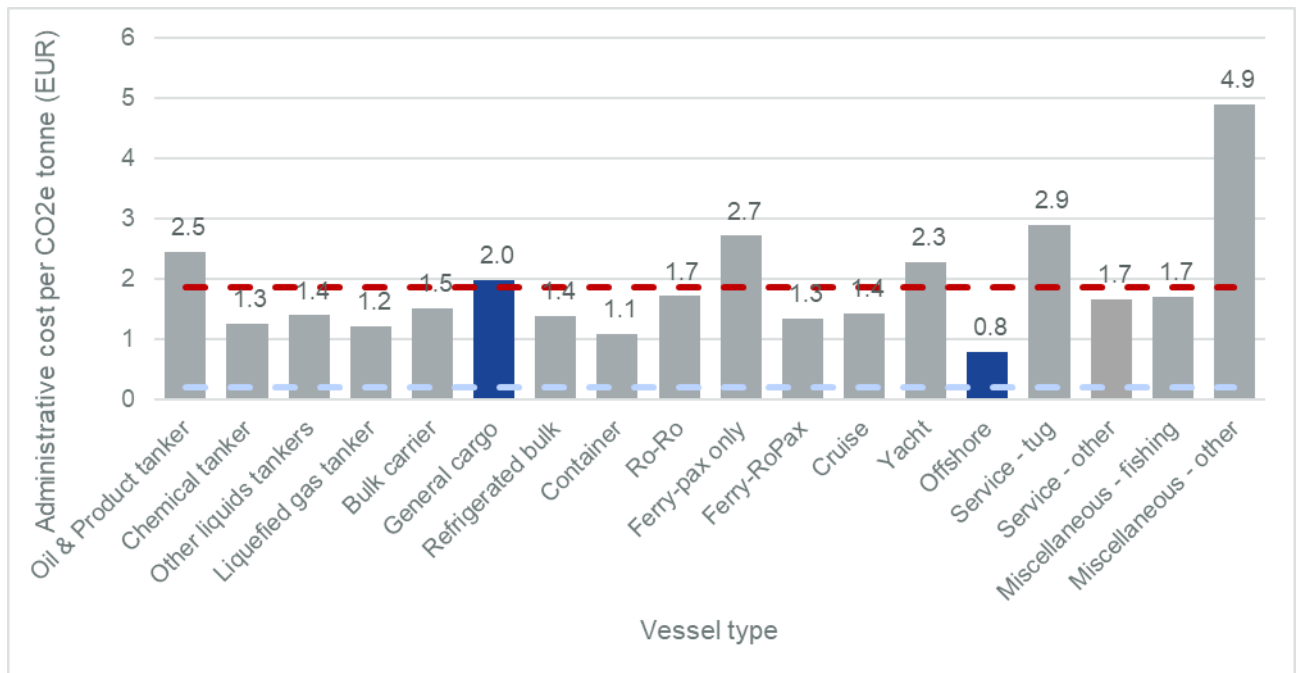
Figure 3-1 below shows the recurrent administrative cost per tonne of CO_{2e} for 2023, calculated as the results of total recurring administrative costs per the

total CO_{2e} emissions for each vessel category. The figure also presents the average cost per tonne of CO₂ (red line), which is calculated at EUR 1.9 per tCO_{2e}.

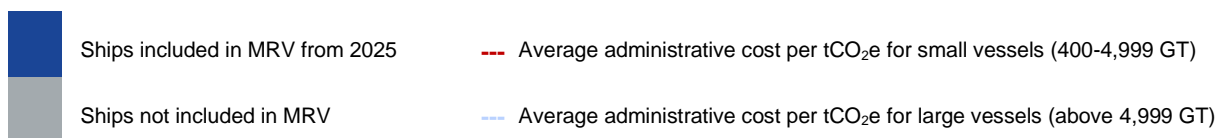
From these results, the following can be observed:

- The largest administrative cost per CO₂ tonne corresponds to vessel category ‘Miscellaneous – other’ (EUR 4.9), followed by tugs and ferry-pax only vessel categories.
- Offshore vessels – which will be included in MRV from 2025 – account for the smallest cost per CO_{2e} tonne (EUR 0.8), followed by containers (EUR 1.1), liquified gas tankers (EUR 1.2) and chemical tankers (EUR 1.3).

Figure 3-1 Recurring administrative cost per tonne of CO_{2e} covered for smaller vessels by type (2023)



Source: Ricardo analysis



Compared to the relevant values for larger vessels, it can be noted that the average cost per tCO₂ for smaller vessels is significantly higher than the cost per tonne of CO_{2e} for larger vessels, which has been estimated in this study at EUR 0.25 per tCO_{2e}.

In conclusion, the evidence presented suggests that **while the recurring administrative costs per vessel are generally expected to be slightly higher for smaller vessels (EUR 3,690 for smaller vessels and EUR 3,390**

for large vessels), the administrative cost per tonne of CO₂e is around seven times (7.6) higher for smaller vessels (400-4,999 GT) compared to larger ones (over 5,000 GT), given the much higher contribution of larger vessels in terms of GHG emissions.

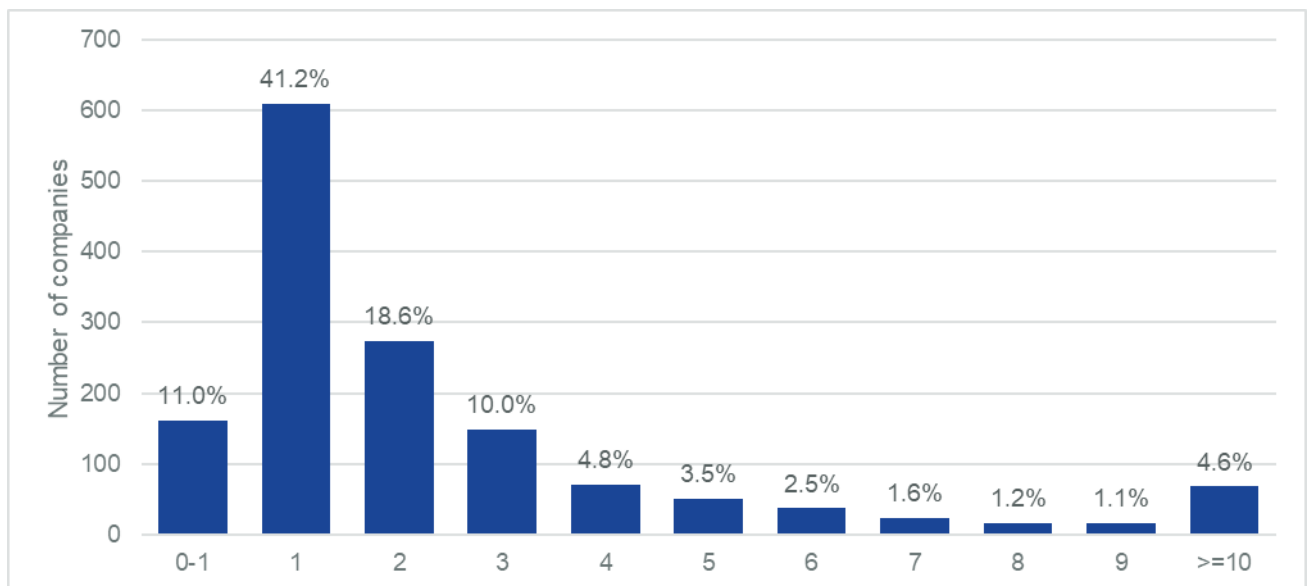
Are companies managing vessels between 400 and 4,999 GT smaller on average than companies already reporting under MRV?

This analysis looks into the size of the shipping companies using the average number of vessels per company as a proxy. Given expected economies of scale for companies when fulfilling MRV obligations, the size of companies (i.e. number of vessels they operate) is a significant factor of their capacity to absorb additional administrative costs.

Shipping companies responsible for MRV compliance are typically either shipowners or ISM companies¹³ and hence these two company profiles are analysed separately. Data on the number of vessels 400 – 4,999 GT per shipowner and ISM company, respectively, were extracted from the MARINFO database for 2023.

Data for small vessels (400 – 4,999 GT) indicates that most **ISM companies** (around 52%) managed 1 vessel in 2023, including the 11% share of the companies sharing the responsibility with other companies during this year (range 0-1). Companies managing up to 5 vessels per company represent 89% of the total.

Figure 3-2 Distribution of ISM companies based on the specific number of vessels they manage (total: 1,476 companies) in 2023



¹³ Legal entity managing the Vessel in compliance with the International Safety Management (ISM)

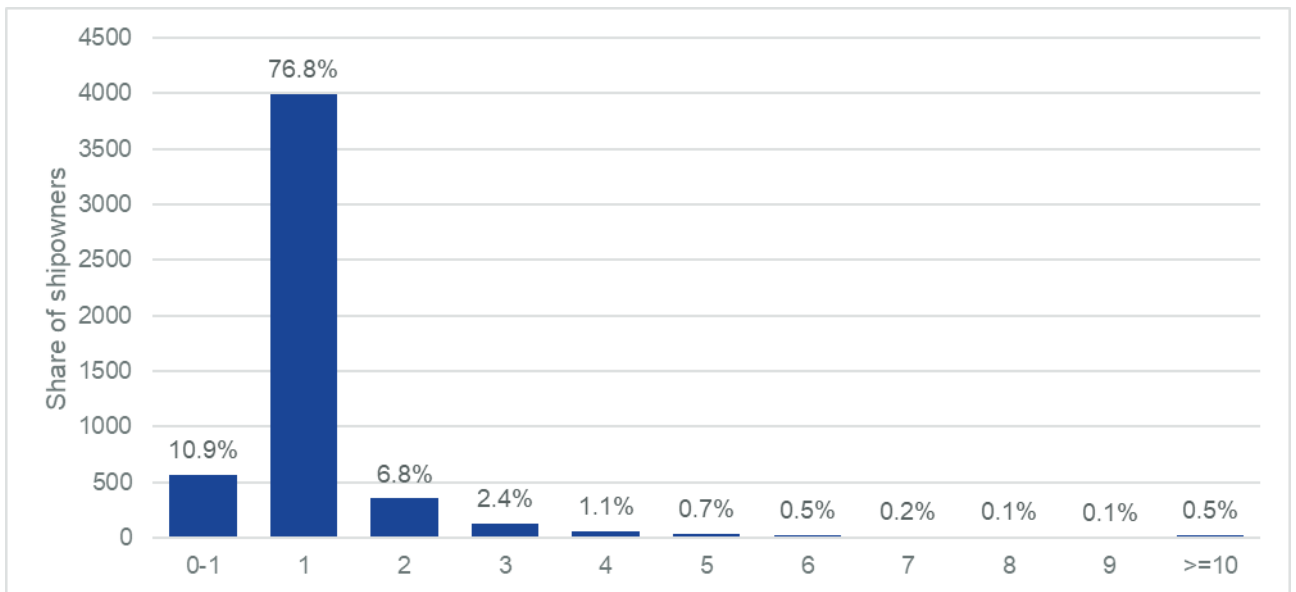
Source: Own elaboration with data from MARINFO 2023

Note: The range (0-1) includes vessels that, within the same year, are associated with more than one ISM company.

The analysis of same data for **shipowners** owning smaller vessels (with a total of 5,200 shipowners) (Figure 3-3) shows an even larger share of shipowners who manage only one vessel, representing around 76% of the total (including those not responsible for the vessel for the whole year). Approximately 94% of shipowners manage up to 2 vessels, and around 98% manage up to 5. Hence, shipowners tend to be smaller than ISM companies.

It is worth mentioning that shipowners could, in some cases, correspond to Single Purpose Vehicles (SPVs) established by a parent company for various purposes, such as financial isolation. Therefore, these results should be interpreted with a certain level of prudence as distinct shipowners might actually be linked to the same (parent) company.

Figure 3-3 Distribution of shipowners based on the number of vessels they manage (total: 5,200 shipowners) in 2023



Source: Own elaboration with data from MARINFO 2023

Note: The range (0-1) includes vessels that, within the same year, are associated with more than one shipowner.

Table 3-3 provides information on the average number of vessels per company and vessel category for ISM companies and shipowners, respectively. The average number of vessels for ISM companies is higher than that for shipowners, accounting for 2.0 and 1.2 vessels per company, respectively. Companies currently reporting under MRV (53% shipowners and 47% ISM companies¹⁴) are responsible for 2.6 vessels on average. Assuming the same

¹⁴ This information is based on THETIS-MRV extract from August 2024.

share of shipowners and ISM companies endorsing MRV responsibility for the smaller vessels, the average number of small vessels per company would be 1.6.

This suggests that **companies that would be responsible for MRV obligations for smaller vessels would also be expected to manage a smaller number of vessels on average compared to those already reporting under MRV, namely, to be smaller in size.** This also indicates that companies managing smaller vessels would be expected to benefit less from economies of scale associated with administrative costs, compared to those already reporting under MRV.

Table 3-3 Average number of vessels per ISM company and shipowner per vessel category in 2023

Vessel category	Average number of vessels per ISM company	Average number of vessels per shipowner	Weighted average per vessel type category ^(*)
RoPax	2.5	1.5	2.0
Gas carrier	2.8	1.1	1.9
Chemical tanker	2.7	1.1	1.9
Tug & Dredger	2.1	1.6	1.8
MARINFO Offshore	2.3	1.2	1.7
General cargo	2.4	1.1	1.7
Passenger	1.9	1.5	1.7
Refrigerated cargo	2.2	1.2	1.7
Bulk carrier	1.9	1.1	1.5
Other	1.9	1.1	1.5
Oil tanker	1.7	1	1.3
Containership	1.8	0.9	1.3
Ro-Ro cargo	1.6	1	1.3
Fishing vessel	1.3	1.2	1.2
Combination carriers	1.3	1	1.1
Total for smaller vessels	2.0	1.2	1.6
Total for companies under MRV	-		2.6

Source: Ricardo analysis

Note 1: (*) For the calculation of the weighted average, the split of shipping companies responsible for MRV obligations between ISM companies and shipowners was assumed to be the same as that of companies currently reporting under MRV as per 2023 data, 53% shipowners and 47% ISM companies.

Note 2: Vessel categorisation as per the MARINFO database. MARINFO offshore category does not fully match the MRV “offshore ship” category. Tugs and dredgers are merged into a single category, unlike the MRV categorisation, where dredgers fall under the MRV “offshore ships” (see more information on vessels categorisation in Text box 2-1). Yachts are included within the MARINFO “passenger” category.

To what extent shipowners and ISM companies managing smaller vessels are already reporting under MRV?

Shipowners and ISM companies managing smaller vessels that are already reporting under MRV (i.e. for vessels currently under scope) would benefit from synergies and economies of scale in their company-wide MRV processes. For these cases, the one-off administrative costs related to the set up and familiarisation with MRV process would be limited as the system would already be in place for larger vessels.

Table 3-4 provides an overview of the share of companies managing smaller vessels that are already registered in THETIS-MRV. These results show that **only 29% of the ISM companies and 3% of the shipowners are already registered on THETIS-MRV**. Assuming a 53/47% split between shipowners and ISM managers, respectively (as per the current proportion of companies in THETIS-MRV), it can be estimated that on average 15% of companies managing smaller vessels would be already in THETIS-MRV. This suggests that the large majority of companies managing smaller vessels (85%) would need to set up and familiarise with MRV processes as they are not already reporting under MRV.

Table 3-4 Number and share of ISM companies or shipowners of smaller vessels already registered on THETIS-MRV

	Companies registered in THETIS-MRV	ISM managers or shipowners identified in MARINFO for smaller vessels	ISM managers or shipowners of small vessels that are already registered on THETIS-MRV ⁽¹⁾	Share of ISM companies or shipowners of smaller vessels already registered on THETIS-MRV
ISM Manager	2,132	1,262	366	29%
Shipowner	2,390	4,014	109	3%
Average⁽²⁾	-	-	-	15%

Source: Ricardo analysis based on data from MARINFO 2023 and THETIS-MRV (received from EMSA in September 2024)

Note (1): A matching algorithm (cosine similarity with TF-IDF vectorization routine for matches above 80%) was used to match shipowners and ISM companies in the MARINFO database against companies registered in THETIS-MRV

Note (2): For the calculation of the weighted average, the split of shipping companies responsible for MRV obligations between ISM companies and shipowners was assumed to be the same as that of companies currently reporting under MRV as per 2023 data, this is 47% and 53%, respectively

3.2 Effectiveness/relevance

A key objective of the MRV maritime Regulation is to provide a dedicated set of robust GHG emissions indicators and other relevant information from vessels calling at EU ports, built on harmonised monitoring and reporting rules, which are verified and made available to the public. In this respect, the MRV maritime Regulation is expected to help address some of the market failures, especially around imperfect and asymmetric information, which can be attributed to the lack of uptake of operational and energy efficiency options as well as low-carbon solutions. These aspects have been extensively analysed in an earlier study on the MRV maritime Regulation (European Commission, 2019). The evaluation questions considered here analyse the extent to which the current scope (vessel size and type) may prevent some of these benefits from materialising for smaller vessels.

To what extent the current MRV scope (in terms of vessel size and type) provides sufficient information on GHG emissions for industry players to make financial/management decisions

This evaluation question aims to analyse if the current scope of the MRV maritime Regulation, in relation to vessel size and type, is sufficient to provide information on GHG emissions and allow industry players to make financial and management decisions. To address this, the following aspects have been analysed:

1. Market barriers addressed by the MRV
2. Current use of MRV data for financial/management decisions
3. Current monitoring of data on smaller vessels (400 – 5,000 GT)

Market barriers addressed by MRV

The MRV maritime Regulation can help to address several market barriers previously existing in the shipping sector. It is reported that market failures, specifically those relating to preventing the uptake of energy efficiency technologies, can occur due to informational issues (CE Delft, 2013). This includes imperfect information on energy efficiency technologies, whereby the lack of reliable information on technology costs and savings can cause a market failure.

Additionally, there could be imperfect or asymmetric information between a shipowner and the charterer, whereby different levels of information are held by contracting parties. For example, where one party does not have the relevant information on costs and benefits of an energy efficiency investment, they may be unwilling to pay a premium for energy efficient ships to the party that does have this information. This can lead to split incentive issues, that arise due to shipowners only being willing to invest in CO₂ abatement measures if they can consequently raise the charter rates to earn back investment costs; however, the charterers are only willing to pay higher charter rates if they can compensate the additional expenses by a reduced bunker bill (CE Delft, 2014). For that, the charterers require credible and reliable information on the fuel consumption of a ship.

The MRV maritime Regulation aims to provide a dedicated EU data set of robust GHG emissions indicators and other relevant information from maritime transport which is made available to the public. In this respect, the MRV can reportedly improve or address the mentioned market failures.

For example, the MRV can help companies invest in advanced monitoring systems to provide real-time information feedback to energy users, specifically shipowners or operators. This can provide real-time feedback on fuel use or emissions, which can offer the means for ship operators to train their crew to adopt fuel-efficient sailing methods and to optimise maintenance and hull cleaning schedules (CE Delft, 2013). With data and digitalisation on the rise, there are newer systems that use emissions data, in order to provide useful insights into operational efficiency in shipping (Global Maritime Forum, 2023). Data must be standardised in order to optimise vessel performance, which can be performed using standardised data points, naming conventions, enabled by more accurate software and models. Other useful systems include optimisation software, use of continuous monitoring technologies with advanced sensors, use of behavioural data, energy management systems, and hydrographic data for ports. The data transition is likely to be highly relevant in enabling the optimisation of emissions, increased safety and improved ship operations.

Additionally, the MRV enables the transparency and disclosure of relevant information, which allows potential users (e.g. charterers) to identify energy efficient ships and reward them (e.g. through premiums, or higher utilisation). This can result in shipowners changing their operational practices, taking up energy efficient and low-carbon technologies, alongside other benefits (e.g. competitions between shipowners). Through the certification of vessel fuel consumption, this is expected to allow for a consistent approach to measuring vessels' fuel consumption (CE Delft, 2014). Reliable information on the fuel consumption of ships can then make relative energy efficient vessels more attractive for charterers and buyers and enable shipowners to earn back investment costs for energy efficiency and low-carbon measures by charging charterers higher rates for more efficient ships. MRV data may be useful for charterers as the Regulation will ensure the reliability of the data; the public

availability of the data will allow charterers to benchmark and compare the performance of vessels as indicated in the charterparty. However, it is also mentioned that information on fuel consumption of ships that becomes available through MRV provides no additional insights to charterers compared to information already commonly included in charterer contracts. This would imply that MRV maritime Regulation has only limited effect on eliminating the split incentive barrier, as the MRV monitoring requirements are not extensive enough to produce useful new insights to charterers.

Nonetheless, despite these limitations to reduce the split incentive barrier, it can still be argued that the MRV maritime Regulation can help to lead to emission reductions if shipowners were to, either voluntarily or mandatorily, invest in advanced monitoring systems that would help implement the minimum monitoring requirements specified in the MRV maritime Regulation. A 2% CO₂ emission reduction has been estimated by the 2013 MRV Impact Assessment study (European Commission, 2013), as a result of introducing the MRV maritime Regulation, which is likely to be achieved, or exceeded, given these monitoring investments.

Another study reports that reducing market barriers mainly promotes the uptake of energy efficiency technologies (e.g. bulbous bow, rudder bulb, solar power, energy saving lighting), rather than leading to changes in the fuel mix or operational speed (European Commission, 2019). As a result, it is reported that the MRV can indirectly lead to reductions in fuel consumption and emissions; it is estimated to deliver potential energy savings and CO₂ emission reductions of roughly 0.7%, cumulatively over 2016 – 2040, compared to the IMO DCS, which is reported to not address any market barriers due to its limited transparency and less stringent monitoring (European Commission, 2019).

Overall, it can be argued that GHG emissions indicators reported under MRV provide insights that can reduce existing market barriers in the maritime sector and can enable the uptake of energy efficient and low-carbon technologies.

Current use of MRV data for financial/management decisions

A 2022 EC study asked shipping companies on their use of MRV data (European Commission, 2022). They reported that systematically measuring and documenting emissions provides a coherent baseline of environmental performance, providing the companies with knowledge and insights on their fleet emissions. These insights led to easier and simplified communication with their clients (shippers, forwarders, etc). Shipping companies reportedly mentioned that they can transfer emissions-related information to their clients, which raises awareness on the receiving end of the supply chain. Overall, the collection and presentation of data (voyage data, transport and fuel consumption) into one unified and transparent platform (THETIS-MRV) was reportedly experienced as a positive step.

Notwithstanding these positive steps, another study concluded that any significant CO₂ emission reduction could only be attributed to the MRV maritime Regulation if it prompted shipowners, either on a voluntary or on a mandatory basis, to invest in accurate and comprehensive monitoring and data analysis systems (CE Delft, 2014). Such measures include investments in data analysis systems, monitoring of other data and taking operational or technical measures to improve fuel efficiency.

Current monitoring and expected use of emissions data on smaller vessels (400 – 4,999 GT)

Through our stakeholder consultation with the public authorities and industry organisations, stakeholders discussed the extent to which they are already collecting and using emissions data on smaller vessels. (See more information on the stakeholder consultation in Appendix 1, including the list of respondents, alongside their responses).

The majority of industry stakeholders (seven out of nine) mentioned that companies are currently monitoring fuel consumption and emissions data on smaller vessels, e.g. for financial institutes, charters, who wish to know data on CO₂ emissions and fuel consumption, and also for shipyards who can use this information to optimise ship design. Several shipping companies mentioned that they already have a software for collecting data on energy efficiency for all vessels, with shipping associations also mentioning that their members are currently collecting and monitoring information on emissions from smaller vessels voluntarily, prior to the enforcement of the MRV maritime Regulation, for their own use.

For example, one shipping company mentioned that all ships they manage, regardless of size, are reporting on a daily basis within the same program, with the full scope of emissions data being collected for all ships. They mentioned that their new-build designs are based on data collected from existing vessels, with new vessels expected to be 15-20% more energy efficient compared to previous builds. Another shipping company mentioned that they have been collecting data on smaller vessels since 2014, alongside implementing energy-efficient measures on smaller vessels even though there is no legislation currently enforcing this. They explained that they monitor the data to explain to other stakeholders how their vessels are utilised, and also see where profits lie. Using this data, they can implement efficiency measures, e.g. slow steaming, in order to reduce emissions.

Despite the monitoring of such data, an industry association mentioned that this is unlikely to be as closely monitored as the MRV requires. The association highlighted the potential benefit for big fleet owning shipping companies, in monitoring such data, as they may find the new information useful for decision making.

Regarding potential use of MRV data on smaller vessels, a shipping association mentioned that shipping companies owning large fleets may find MRV data on smaller vessels useful for decision making on energy efficient technologies, and mention that companies are likely to use this data. This was confirmed by several shipping companies who mentioned that they would likely use such data for decisions on energy efficient investments. One of the shipping companies mentioned that this would yield economic impacts and thus mitigate the cost required for the data to be monitored and analysed. Another company mentioned that they are making efforts to reduce their carbon footprint in line with their strategic pillars, through implementing measures on smaller vessels, even though there is no current legislation enforcing this; as such they are likely to use MRV data if such smaller vessels would be included in MRV.

Conversely, a shipping company mentioned that they do not currently monitor data on existing smaller vessels as it is reportedly difficult to add modern technology, especially for existing smaller vessels. As such, they stated that they would be unlikely to use MRV data. However, they have mentioned that they may consider collecting such data on newer vessels. Another shipping company also indicated that they would be unlikely to use MRV data; this is because they are already monitoring emissions data across all their vessels and are using this information internally. As such, as argued, the MRV data is unlikely to provide any added value.

Regarding public authorities monitoring such information, the majority of the Member States authorities mentioned that there is currently no reporting mechanism in place to monitor GHG emissions from ships currently excluded from MRV scope. Out of the 14 authorities who responded to the questionnaire only two indicated that there is a reporting mechanism in place. A few national authorities raised that fuel consumption and GHG emissions data collected for smaller vessels are more difficult to be standardized, which would create a need to develop a robust system like the MRV.

In conclusion, it is evident that **MRV data can play a role in providing information on GHG emissions of smaller vessels, in order to assist financial and management decisions**. MRV data is useful in eliminating market barriers in the maritime sector and has reportedly been used in providing external stakeholders with knowledge and insights on their fleet emissions. Several companies are voluntarily collecting emissions data from smaller vessels, with seven (out of nine) companies and associations that responded to the questionnaire reporting that this is the case, with some stakeholders (three out of nine) mentioning that they would likely use MRV data for investment decisions on energy efficient technologies. They consider this information relevant for energy efficiency, for reducing costs, and for the purpose of providing this information to stakeholders. Only one company considered this information irrelevant, as they stated that they do not believe that modern energy efficient technologies can be applied to older vessels. This information is also considered relevant to public authorities, given that many of

the Member States do not report that a reporting mechanism is currently in place to monitor GHG emissions from vessels currently excluded from MRV scope.

To what extent the current MRV scope (vessel size and type) contributes to bringing available low-carbon technologies into market and promotes operational energy efficiency measures

To respond to this question, the availability and maturity of low-carbon technologies has been reviewed along with the potential use of MRV data to promote their development and roll-out. The section also considers operational energy efficiency measures and how the availability of MRV data affects their adoption.

Technologies to reduce GHG emissions from ships fall in several categories, including:

- Powertrain technologies and energy storage technologies that can improve the fuel efficiency of the propulsion system and enable switching to alternative fuels.
- Energy efficiency measures such as on-board energy systems and energy efficient vessel design that can reduce fuel consumption.
- Digitalisation technologies that can increase the operational efficiency of vessels, thus reduce fuel use.

Several promising low-carbon technologies with high GHG emission abatement potential – such as electric propulsion or fuel cell systems – are currently trialled on small vessels (Global Maritime Forum, 2024). In addition to being most suitable to smaller vessels, the viability of these technologies concentrates on specific application cases, such as short-sea shipping, coastal trade, small ferries and riverine applications in case of battery electric ships .

In addition, operational energy efficiency measures are another way to reduce fuel use and GHG emissions from vessels. For example, slow steaming describes the practice of reducing operational vessel speed to lower fuel consumption. It is estimated that a 10% reduction of operation speed can reduce emissions by up to 27% (Transport & Environment, 2024). Operational energy efficiency measures have ample application opportunities in terms of vessel size or voyage type.

The MRV scope excludes small vessels (400-4,999 GT) of all types until 2025 and will only include small ships within the general cargo and offshore vessels categories thereafter. These scope exceptions for most small vessels may be considered a missed opportunity for supporting uptake of novel technologies suitable for small ships and for promoting operational energy efficiency measures.

The MRV maritime Regulation by itself does not incentivise emission reductions but can influence investment decisions if its reporting requirements make new information available to identify opportunities for efficiency upgrades with positive cost return. Insights under the previous section (3.2) presented estimates for related effects on GHG emissions savings and indicated that some operators of small vessels collect performance data regardless of MRV maritime Regulation requirements, which limits its role in facilitating additional investments for these vessels. However, for small vessels whose shipping companies do not monitor fuel performance at all or at lower granularity than under MRV, the Regulation with its current scope may fail to promote investments in cost-profitable abatement technologies and adoption of operational energy efficiency measures.

At the same time, the potential GHG emission savings could be larger for small vessels (400-4,999 GT) than for bigger vessels due to their higher viability for several technologies with significant abatement potential. However, the fact that these technologies only exist at demonstration stage and are viable only for specific application cases makes it unlikely that the MRV scope would – at least to this point and in the short-term - make a major difference for their market uptake. This is different for operational energy efficiency measures such as slow steaming. These do not require technology upgrades but their potential to save costs and emissions may remain untapped in absence of robust GHG emission data for vessels.

Emission reporting under the MRV maritime Regulation is used to implement the EU ETS, whose carbon market pricing mechanism aims to promote energy efficiency, low-carbon solutions. The MRV maritime Regulation could therefore be considered as an indirect contributor to emission reductions under EU ETS because it was conceived as a first step before including in-scope emissions in the EU ETS (European Commission, 2024). Similarly, certain scope extensions of the MRV are planned to be followed by subsequent scope extension of the EU ETS. For instance, offshore ships of and above 5,000 GT have been added to MRV scope as from 1 January 2025 and will automatically be added to ETS scope as from 2027. As a result, the MRV can be an enabler of emission reductions in the maritime sector under EU ETS with the reductions coming from vessels that are in scope of EU ETS. Another indirect contribution to investments is the provision of emission data for vessels that may be included in the EU ETS scope in future reviews. They could nudge precautionary investments in abatement measures and could also help informing policy-making. However, despite their strong link, the MRV maritime Regulation and the EU ETS are two separate frameworks, which precludes attributing such indirect contributions to emission savings to the MRV Regulation in the present assessment.

In summary, **with its current scope, the MRV maritime Regulation falls short of enabling emissions reductions technology investments on all small vessels and promoting adoption of operational energy efficiency**

measures, especially for those without existing fuel performance monitoring systems.

3.3 Coherence

Another key objective of the MRV maritime Regulation is to support the implementation of recently adopted climate policies in the EU maritime sector, particularly the EU ETS extension to maritime transport and Fuel EU Maritime Regulation, by setting specific requirements for companies to monitor, report and verify their emissions. In this regard, the following evaluation questions aim to assess whether the scope is appropriate to contribute to these specific climate policies. We also consider the coherence of expected policy developments with the MRV, namely, the potential expansion of the ETS2 on an opt-in basis to inland waterways and some smaller vessels as could be proposed by some Member States.

Furthermore, the IMO Data Collection System (DCS) is an equivalent, although simplified, monitoring and reporting system at global level. We assess the coherence of MRV with the scope of vessels under current IMO DCS requirements and expected developments at IMO level.

Is the MRV scope (vessel size and type) sufficient to support recently adopted climate policies for shipping (Fuel EU and EU ETS) and their expected developments?

The MRV Maritime Regulation integrates with the broader EU policy framework to reduce GHG emissions from the maritime sector and has paved the way for the implementation of the EU ETS (Emission Trading System) and Fuel EU Maritime. In-scope GHG emissions, vessel types and vessel sizes of MRV cover those included in EU ETS and Fuel EU Maritime and foster compatibility.

The MRV maritime Regulation is a crucial enabler for extending the EU ETS to the maritime transport sector because emission reports required under MRV are used as a basis to establish company-level requirements for compliance with EU ETS. Extending the scope of the MRV to additional types of small vessels would therefore facilitate their eventual inclusion in the EU ETS in the future and it would also provide meaningful data to inform future policy developments (e.g. estimation of the cap increase, estimation of the number of additional Maritime Operators Holding Account to be created, etc).

The ETS 2 created through the 2023 revisions of the ETS Directive is a separate system from the existing ETS even though it builds on the emissions trading architecture. This separate emission trading systems is set to become fully operational by 2027 and will cover CO₂ emissions from fuel combustion in buildings, road transport and additional sectors, not already covered by the existing EU ETS. Requirements for monitoring, reporting and surrendering

emission allowances will apply to fuel suppliers in relation to the in-scope sectors rather than to end-users as is case in the existing ETS.

Member States may opt to include under the scope of ETS2 fuel used by the shipping sector and that is not already covered by ETS1 obligations (such as for inland waterway navigation and/or for small vessels not included in ETS1). However, in such a case the requirements to monitor, report and surrender emission allowances would not fall on ship operators but on fuel suppliers, and therefore no adjustments of the MRV Maritime Regulation would be needed to enable such inclusions in the EU's ETS 2. Based on information available at the time of writing this report, three Member States have adopted – or are expected to adopt – such ETS2 'opt-ins' so far.¹⁵

The FuelEU Maritime regulation is a complementary regulation to EU ETS and its provisions apply from January 2025. It mandates a successively decreasing GHG intensity of maritime fuels and the use of shore power while at berth where infrastructure is available. It also addresses CH₄ and N₂O emissions. The FuelEU Maritime's scope is coherent with MRV and EU ETS in terms of voyages and vessel size, as it applies to vessels over 5,000 GT, 100% of intra-EU voyages, 50% of voyages involving just one EU port, and 100% of fuel consumed in European ports. Shipping companies will use the existing IT platform that is used under MRV, i.e. THETIS MRV system, in order to report the GHG intensity of used fuel under FuelEU. The use of the same reporting portal as for MRV reports reduces the administrative burden and is in line with the reporting-only-once principle.

Through making GHG emission data available needed for the implementation of EU ETS and through providing the reporting platform upon which Fuel EU Maritime builds, the MRV maritime Regulation has effectively supported the roll out of these climate policies for shipping in the EU. With regards to potential future ETS extensions, the MRV maritime Regulation would enable these for small (400-4,999 GT) vessels of the general cargo and offshore categories, which are already in scope of the MRV and therefore subject to GHG emission reporting that would be needed for an ETS extension. For small vessels of other types not included in the MRV scope, at present the Regulation could not support their adoption in the EU ETS. The MRV is less relevant for the potential inclusion of inland shipping to the ETS2, as reporting requirements would fall on fuel suppliers, not shipping companies.

¹⁵ Austria would cover emissions from fuels used to propel water-borne vessels, including hovercraft and hydrofoils, but excluding commercial activities on the Danube River and on the international lakes (Constance and Neusiedl). The Netherlands would cover emissions from fuels used to propel water-borne vessels on inland waters, including hovercraft and hydrofoils, but excluding fishing vessels. Sweden intends to cover emissions from fuels used in leisure boats, excluding commercial waterborne navigation.

Is the MRV scope (vessel size and type) consistent with the IMO DCS scope

The IMO Fuel Data Collection System (DCS) started in 2019 and requires ships to report emissions along other parameters. There are synergies between this global system and the EU MRV, and verification companies recommend ship operators to merge reporting processes to save costs. However, despite their similar scope, there are also differences between the frameworks, that include:

- Vessel size: EU Maritime Regulation and IMO DCS both used to apply to vessels of 5,000 GT or more. The vessel size scope will no longer be aligned from 1 January 2025, when the EU MRV maritime Regulation will also apply to small vessels (400-4,999 GT) of certain vessel types.
- Vessel types and activities: MRV maritime Regulation applies to all ships that carry passenger or cargo for commercial purposes, except for warships, naval auxiliaries, fish-catching or fish-processing ships, ships not propelled by mechanical means, and government ships used for non-commercial purposes. IMO DCS applies to all vessel types, except ships solely engaged in domestic voyages; ships not propelled by mechanical means; and platforms, rigs or fishing vessels).
- Geographical scope: The IMO DCS applies globally, while MRV maritime Regulation only captures voyages involving EU port calls.
- Data granularity: The IMO DCS requires annual aggregated data, while the MRV is based on a per voyage monitoring system.
- Data publishing: The IMO DCS published aggregate, anonymized data at fleet level, while the EU publishes non-anonymised data on the performance of individual ships.

Future adjustments of either framework could impact their coherence, for example, if the IMO DCS were to also include smaller vessels. Experts contacted during the stakeholder consultation mentioned that having to report data to two systems is burdensome and that further alignment of reporting requirements under IMO DCS and EU MRV would be desirable. However, the differences in scope in terms of vessel size and type were not identified as a particular concern in terms of increasing resources needed to complete reporting requirements.

3.4 Summary of findings of the review

Efficiency

The analysis of efficiency aims to review recent evidence on the trade-off between GHG emissions coverage and administrative costs with respect to the MRV scope. For this, the potential MRV-related administrative costs have been

estimated for smaller vessels and compared to those of vessels currently under MRV. This analysis reveals that **recurrent MRV-related administrative costs per vessel for smaller vessels would be similar or slightly higher than those of vessels currently subject to MRV obligations**. In cases where administrative costs are expected to be higher for smaller vessels, staff limitations and increased frequency of voyages are often quoted as the main reasons for higher monitoring costs.

However, the **trade-off between administrative costs and additional GHG emissions data would be clearly less favourable for smaller vessels**. The ratio between administrative costs and coverage of GHG emissions would be on average seven times higher for smaller vessels, compared to the vessels currently under MRV.

Examined data also suggests that companies managing smaller vessels tend to be on average smaller (in terms of number of vessels managed per company) than those already reporting under MRV. This means that the former would have a marginally lower capacity to leverage economies of scale in MRV processes. In addition, the majority of companies managing smaller vessels (either shipowners or ISM companies) are not already reporting under the MRV and would be facing some initial one-off costs linked to the setting up and familiarisation with MRV processes.

Effectiveness/relevance

The MRV maritime Regulation aims to equip shipping companies with robust GHG emissions data to allow them making informed decision and to provide public access to GHG emissions data for third-party stakeholders. This is expected to address some market failures related to imperfect information related to operational and energy efficiency options. Therefore, the effectiveness evaluation has aimed to understand the extent to which the current scope (vessel size and type) may or not prevent some of these benefits from materialising for smaller vessels.

The results of the analysis show that the **MRV data is expected to be valuable for informing financial and management decisions regarding smaller vessels by providing information on GHG emissions**. This could help eliminate market barriers and provide insights into fleet emissions. Several companies are voluntarily collecting emissions data, with some using it for investment decisions in energy-efficient technologies. However, these companies may still benefit from MRV in ensuring consistent and trustable monitoring and reporting processes across the board.

Coherence

The MRV maritime Regulation is a cornerstone for rolling out of climate policies for shipping in the EU through making GHG emission data available for the

implementation of EU ETS and providing the reporting platform for Fuel EU Maritime. With regards to potential future ETS extensions, the MRV maritime Regulation would enable these for small (400-4,999 GT) vessels of the general cargo and offshore categories, which are already in scope of the MRV. The MRV is less relevant for supporting the potential inclusion of inland shipping to the ETS2 by some Member States as opt-in sector, as requirements to forego emission allowances under ETS2 would fall on fuel suppliers, not shipping companies.

Further streamlining the reporting process under EU MRV and IMO DCS could reduce efforts from shipping companies. The European and global frameworks' scope are somewhat different in terms of vessel size and type falling under reporting obligations. However, this was not identified as significant concern to shipping companies.

4. Assessment of scenarios to possibly extend the scope of the MRV maritime Regulation to other smaller vessels

Following the results of the review, this section assesses impacts of potential regulatory adjustments related to the extension of the scope of the MRV maritime Regulation to smaller vessels (400 – 4,999 GT) for vessel types other than general cargo and offshore vessels. It follows the main principles and methods of the Better Regulation Toolbox. Evidence collected for this exercise is based on a combination of desk research sources and an ad hoc stakeholder consultation (see Appendix 1).

Different scenarios are assessed for the extension of the MRV scope to smaller vessels (400 – 4,999 GT), considering different vessel categories in scope and potential changes in monitoring requirements.

The default baseline for this assessment considers the current MRV scope, which covers small general cargo vessels and offshore vessels from 2025. The 2024 MRV scope (i.e. excluding small general cargo vessels and offshore vessels) is used as an additional point of comparison, where relevant.

This section is structured as follows:

- (1) Policy scenarios: description of scenarios related to the extension of the MRV scope for smaller vessels and additional adjustments to the MRV maritime Regulation and their rationale.
- (2) Assessment of impacts: qualitative and quantitative evidence supporting the assessment of environmental and economic impacts of the scenarios under consideration.

4.1.1 Policy scenarios

The adjustment under consideration for this assessment is the extension of the scope of the MRV maritime Regulation to vessels between 400 and 4,999 GT, for vessel types other than general cargo and offshore vessels. This aims to increase the share of GHG emissions covered by the MRV maritime Regulation and allow for an eventual integration of additional vessels between 400 and 4,999 GT into maritime decarbonisation policies such as the EU ETS and Fuel EU.

Potential scenarios for the expansion of the MRV scope to smaller vessels are defined in terms of the following dimensions:

- a) Vessel categories in scope
- b) Monitoring requirements for smaller vessels

A) Vessel categories in scope

Three scenarios are considered for the inclusion of additional vessel categories among smaller vessels (400 – 4,999 GT), with an increasingly wider selection of categories. While scenarios A.1 and A.2 consider vessel categories currently non-exempted from the MRV scope, scenario A.3 expands the scope to categories that are currently exempted such as fishing vessels.

Table 4-1 shows scenarios on vessel categories in scope and their main rationale.

Table 4-1 Scenarios considered for vessel categories in scope

Scenarios	Description	Rationale
A.1. Selection of the most emitting vessel categories	Scope expansion to tankers, RoPax ships and passenger ships between 400 and 4,999 GT	<p>This scenario prioritises non-exempted categories of smaller vessels with the highest contribution in terms of GHG emissions with the aim to optimise the trade-off between additional GHG emissions data and administrative costs.</p> <p>As shown in Figure 2-5 (Section 2.1.2), top three emitters among non-exempt categories are chemical tankers, RoPax ferries and passenger vessels (passenger only ferries and cruises). Other tanker vessels (liquefied gas, oil and other liquids), despite having a smaller contribution in GHG emissions, are added to this selection to avoid an uneven playing field between different types of tanker vessels and a potential evasion risk by reclassifying tanker vessels.</p>
A.2. All current MRV vessel categories	Expansion to all non-exempt categories for vessels between 400 and 4,999 GT (i.e. all ships transporting cargo/passengers for commercial purposes as well as offshore ships)	This scenario aims to expand the scope to smaller vessels while keeping a consistent treatment across non-exempt categories. This is consistent with the current approach taken for larger vessels and minimises level playing field issues between smaller vessels.
A.3. All current MRV vessel categories plus	Expansion to all non-exempt categories for vessels between 400 and 4,999 GT,	This scenario aims to maximise coverage of GHG emissions among smaller vessels by including additional vessel categories that are

additional categories currently excluded	plus fishing ships, any service and tug vessels not already covered, and voyages by yachts not already covered (i.e. those not carried out for transporting passengers for commercial purposes).	currently not subject to MRV, such as fishing vessels.
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B) Monitoring requirements for smaller vessels

Under current MRV maritime Regulation, a company is exempt from the obligation to monitor a specified ship on a per-voyage basis if, according to its schedule:

- all of the ship's voyages during the reporting period are EU-related voyages;
- the ship performs more than 300 voyages during the reporting period

In these cases, monitoring obligations can be carried out on an aggregate basis. In practice, this means that fuel consumption monitoring can largely rely on data from bunker delivery notes, limiting the need for periodic stocktakes of fuel tanks, which reduces monitoring costs for those vessels.

Scenario B.1 would keep this provision for smaller vessels, while scenario B.2 would extend this exemption to all vessels performing intra-EU activities only, regardless of the number of journeys per year and independently from pre-established schedule.

Table 4-2 shows the two scenarios on vessel categories in scope and their main rationale.

Table 4-2 Scenarios considered for monitoring requirements

Scenarios	Description	Rationale
B.1. Same MRV requirements	MRV requirements for small vessels (and other vessel types) are the same as those	This scenario aims to ensure consistency with applicable monitoring requirements for larger vessels

	for vessels currently under MRV	
B.2. Lower threshold to be exempted from monitoring on a per voyage basis	Minimum threshold of 300 voyages does not apply to vessels below 5,000 GT, i.e. all ships performing intra-EU voyage only during a reporting period would be exempted from monitoring on a per voyage basis (regardless of the number of voyages)	This scenario aims to minimise administrative costs for smaller vessels performing only intra-EU voyages, which are likely to be managed by small companies.

4.1.2 Assessment of impacts of scenarios A

Among the included impacts, GHG emissions data, administrative costs, and enforcement costs are expected to be the most significant. Extending the scope of the MRV maritime Regulation to additional ships will directly increase the share of GHG emissions covered by the Regulation and increase the availability of GHG emissions data. Shipping companies may incur additional administrative costs from monitoring and reporting emissions and Member States may face additional enforcement costs from ensuring compliance.

At the same time, consideration of level playing field impacts focuses on the possibility that exemptions from MRV requirements could provide a competitive advantage to some small ships and therefore distort sector competition.

Impacts on GHG emissions are also taken into account since the MRV requirements will lead to improved data on fuel use, which can help ship operators take informed decision to optimise and reduce their fuel consumption, therefore reducing GHG emissions.

Net adjustment costs for shipping companies and operators would be the result of the difference between fuel cost savings and additional investment and operating costs associated with energy efficiency measures promoted by the MRV maritime Regulation. Direct fuel costs savings linked to MRV implementation are expected to be small (see section 4.1.2.1 – Energy and GHG emissions savings). At the same time, any fuel cost savings may be offset by the additional costs of energy efficiency measures. Overall, net adjustment

costs for shipping companies and operators are expected to be marginal and are not quantified in this study.

An extension of the MRV scope would likely facilitate the broadening of other maritime climate policies to cover similar vessels, including the EU ETS and Fuel EU, which build on MRV data. The environmental impacts linked to these future possible policy developments cannot be directly attributable to MRV requirements and are therefore excluded from this assessment. However, the study acknowledges in a qualitative discussion potential indirect impacts of expanding climate policies to smaller vessels, taking the expansion of EU ETS and Fuel EU scope as an illustration (see section 4.1.2.1 – Indirect economic impacts). It is worth mentioning, however, that equivalent measures other than integration within FuelEU and/or EU ETS scope might be envisaged – notably if this would enable a reduction of the administrative burden. Such measures could be taken at national level, including for instance taxation-related measures or ‘opt-ins’ within the ‘ETS2’ for buildings, road transport and additional sectors. As mentioned in section 3.3, some Member States have already decided to include within the scope of ETS2 emissions from smaller vessels and/or inland navigation. Alternative options at EU-wide level may include an expansion of the ETS2 scope to smaller vessels and specific amendments to the Energy Taxation Directive. These alternative measures may not necessarily build on MRV data (e.g. those that apply to fuel suppliers such as ETS2 or energy taxation). The expansion of the EU ETS for smaller vessels along with alternative measures are expected to be assessed as part of the 2026 ETS review for maritime transport.

Adjustments to the scope of the MRV Regulation are not expected to lead to any significant social impacts or and hence these are excluded from the assessment. Additional administrative costs are expected to be too small to generate any significant market distortion with social implications (e.g. on consumers or workers). For the same reason, this scope adjustment is not expected to lead to any significant impact on the transport costs to Outermost Regions (OMR) and hence any negative impacts on the connectivity and economic activity of OMR are disregarded. Any social or connectivity impacts would be related to the extension of the EU ETS scope or equivalent measures. As such, these aspects would need to be taken into account in due course when assessing these options as part of the 2026 ETS review.

4.1.2.1 Environmental impacts

GHG emissions data

Expanding the scope of the MRV maritime Regulation will increase the share of EU maritime emissions captured by the MRV requirements and directly impact GHG emissions data availability. The emissions for each scenario have been

calculated based on the vessel categories included and the emissions associated (tCO₂e)¹⁶ for the total number of vessels in each category.

As shown in Table 4-3, the emissions associated with scenario A.1 represent a 4.2% increase compared to what is included in the revised MRV scope (i.e. including also emissions general cargo and MRV offshore vessels between 400 and 4,999 GT to be added from 2025). Scenario A.2 would lead to a marginally higher emissions coverage compared to scenario A.1, with an increase of 4.6% compared to the MRV revised scope. The option to expand also to other categories (scenario A.3) would lead to a more significant expansion in the emissions coverage with an 8.4% increase.

Table 4-3 Additional coverage of GHG emissions (in million tonnes of CO₂ and CO₂e) for scenarios A.1, A.2 and A.3 with respect to revised MRV scope based on 2023 emissions data

	Additional CO ₂ emission coverage (MtCO ₂)	Increase with respect to revised MRV scope ^[1]	Additional GHG emission coverage (MtCO ₂ e)
Revised MRV scope (*)	134.37	-	-
Scenario A.1	5.61	4.2%	5.70
Scenario A.2	6.19	4.6%	6.29
Scenario A.3 ^[2]	11.32	8.4%	11.49

Source: Ricardo analysis based on AIS-based modelling data from Marine Benchmarking (2023)

Note [1] Revised MRV scope includes CO₂ emissions reported under MRV in 2023 plus 2023 CO₂ emissions from smaller vessels which will be included in MRV from 2025 onwards (general cargo and offshore).

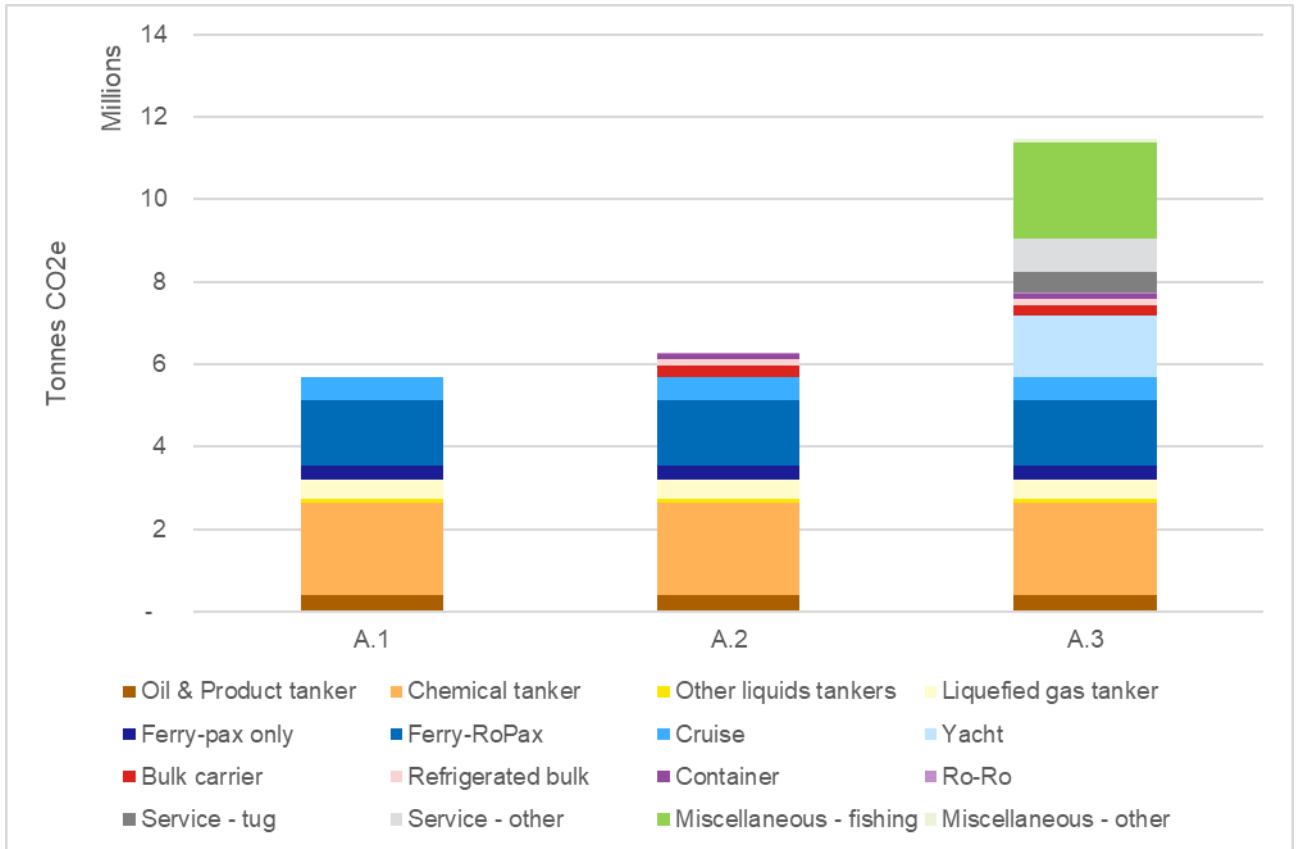
Note [2] Emissions from scenario A.3 only include additional emissions from vessels 400 – 4,999 GT. Additional emissions from including currently exempted categories (such as fishing vessels) also for vessels above 5,000 GT are not considered.¹⁷

Figure 4-1 below shows the additional emissions that would be included if the scope of the MRV were expanded by vessel category, based on 2023 emissions data. The vessel categories with the greatest impact in terms of emissions include Chemical Tanker, Ferry-RoPax, Yacht, Other, and Service-Other.

¹⁶ The emissions considered are based on 2023 data from AIS-based modelling as described in section 1.2

¹⁷ A recent study (Transport and Environment, 2022) estimated GHG emissions from fishing vessels above 5,000 GT at 0.17 MtCO₂e (2021 data). This means that GHG emissions from large vessels (excluded in this analysis) are more than 10 times smaller than those of fishing vessels between 400 and 4,999 GT (estimated at 2.3 MtCO₂e in this study). At the same time, the Transport and Environment study only identified 47 fishing vessels of or above 5,000 GT.

Figure 4-1 Additional coverage of GHG emissions for scenarios A.1, A.2 and A.3 by vessel category based on 2023 emissions data



Source: Ricardo analysis

Energy and GHG emissions savings

Even though the MRV maritime Regulation does not impose direct limits on emissions or mandate emission reducing practices, an expansion of the MRV scope could be expected to lead to reductions in fuel consumption and therefore GHG emissions due to the potential of fuel and emissions data to help overcome some of the existing market barriers related to the adoption of energy efficiency measures (European Commission, 2019).

The reporting of robust GHG intensity and energy efficiency indicators, as well as their public disclosure allows potential users, such as charterers, to identify better performing or energy efficient ships and reward these through higher utilisation. In turn, this selection bias towards more energy efficient ships may provide incentives for shipowners and operators to further adopt energy efficiency measures (e.g. operational measures such as reducing hull fouling, managing speed, virtual arrival or energy efficiency technologies or technical energy efficiency improvements). Additionally, the information on GHG emissions of ships may also be used by ports or other authorities in their incentivisation programmes and by financial institutions to inform their lending decisions (see further discussion in Section 3.1.1.2).

Following this logic, GHG emission savings for each scenario were estimated (see Table 4-4). GHG emissions in the baseline are assumed to grow following the Reference 2020 scenario modelled in PRIMES Maritime. A study looking into the benefits of MRV maritime Regulation (European Commission, 2019) modelled GHG emission savings of the MRV maritime Regulation and found a cumulative 0.7% saving in GHG emissions in the period 2016-2040 compared to the situation where MRV data is not available¹⁸. This cumulative reduction rate, which is deemed to be a conservative estimate on potential GHG emission savings, was assumed to apply to baseline GHG emissions from smaller vessels included in the MRV scope within the period 2025-2050 to estimate the level of savings that can be expected. GHG emission savings were then monetised using climate change avoidance costs included in the 2019 Handbook of external costs (EUR 100/tCO_{2e}). To estimate the present value of benefits in terms of monetised GHG emission savings, a 3% social discount rate was applied.

Table 4-4 Cumulative GHG emissions savings (2025-2050) and discounted GHG emission benefits from scenarios A.1, A.2 and A.3 (2025-2050, 3% discount rate)

	Cumulative GHG emission savings (MtCO _{2e}) 2025 - 2050	Discounted GHG emission benefits (million EUR)
Scenario A.1	1.51	2.8
Scenario A.2	1.67	3.1
Scenario A.3	3.06	5.7

Source: Ricardo analysis

Indirect environmental impacts from potential inclusion of smaller vessels into EU ETS

While GHG emissions savings solely attributable to the expansion of the MRV scope to smaller vessels are relatively marginal, the potential environmental impacts from the eventual inclusion of these smaller vessels into other climate mitigation policies, such as the EU ETS and Fuel EU maritime, would be significant.¹⁹

If smaller ships were to be included under the EU ETS following the expansion of the MRV scope, their emissions would be added to the cap that will be reduced each year following the linear reduction factor, which is set at 4.4% from 2028 onwards. As such, significant GHG emissions savings would be

¹⁸ In this study, this figure represents the CO₂ emission savings of scenario with full MRV requirements, compared to a scenario with IMO DCS requirements only. The latter is modelled as not addressing any of the market barriers (i.e. not bringing any additional energy efficiency measures), hence it is equivalent to a scenario without any MRV requirements for the purposes of the current study.

¹⁹ It should be noted that other climate policies could be envisaged for smaller vessels for instance taxation-related measures or 'opt-ins' within the 'ETS2', which may not build on MRV data.

expected, in line with the decarbonisation pathway expected for the ETS sectors.

The expansion of the MRV scope to additional smaller vessels would also complement legislation at global level. At the International Maritime Organization level, smaller vessels above 400 GT but less than 5 000 GT are included in technical energy efficiency measures (SEEMP part I, EEDI and EEXI) but they are excluded from operational energy efficiency measures (CII) and from the monitoring and reporting of fuel oil consumption data through the IMO Data Collection System (DCS).

4.1.2.2 Economic impacts

This section presents the results from the analysis of the economic impacts of policy scenarios A.1, A.2 and A.3 for shipping companies and for national and European competent authorities. The economic impacts considered included the following:

- Regulatory costs, including administrative costs for shipping companies (ship operators and shipowners) and costs related to enforcements activities for national and European competent authorities
- Level playing field

Regulatory costs

Administrative costs for shipping companies (ship operators and shipowners)

The analysis on administrative costs for shipping companies focuses on the additional costs from monitoring and reporting emissions that these companies could incur from the scope expansion of the MRV maritime Regulation to include additional smaller vessels (400-4,999 GT).

These administrative costs considered for shipping companies include both one-off and recurring costs relating to preparing and setting up a monitoring system, retrieving information from existing data, verifying, and reporting emissions to comply with the EU Maritime MRV maritime Regulation.

The additional one-off and recurrent administrative costs per vessel for smaller vessels are estimated as per information provided by shipping companies (see Appendix 1 - Analysis of reported data on regulatory costs). These are multiplied, for each policy scenario, by the number of vessels that would be added to the MRV scope. In addition, the number of ships related to the estimated share of shipping companies that would be already reporting under the MRV (estimated at 15% in section 3.1) are excluded from the calculation of one-off costs.

Table 4-5 presents the one-off and recurrent (annual) administrative costs for shipping companies for each policy scenario. Also, it includes information on the recurrent administrative cost per tonne of CO₂ based on the total GHG emissions added to the scope in each scenario. As shown, costs increase as the number of vessels included in each policy scenario increase. Therefore, scenario A.3 accounts for the largest recurring costs with EUR 19.6 million per year (5,309 vessels), followed by scenario A.2 with EUR 9.1 million per year (2,460 vessels). Scenario A.1 closely follows A.2 with EUR 8.3 million per year (2,238 vessels). One-off costs also increase from EUR 7.1 million for scenario A.1 to EUR 17.0 million for scenario A.3.

In terms of cost per tonne of CO₂, these are similar for all policy scenarios and significantly higher than those calculated for larger vessels in section 3.1 (EUR 0.25 per tCO₂). While smaller vessels account for a slightly higher cost per vessel than those for larger vessels, the emissions of smaller vessels are much lower than those of larger vessels. Therefore, the cost per tCO₂ is significantly higher for smaller vessels.

Table 4-5 Administrative cost for shipping companies for each policy scenario for 2023

	Number of vessels	One-off cost (total cost, EUR)	Recurring cost (cost per year, EUR)	Recurring cost per tCO ₂ (EUR/tCO ₂)
Cost per vessel	-	3,193	3,690	-
Scenario A.1	2,238	7.1 million	8.3 million	1.2
Scenario A.2	2,460	7.9 million	9.1 million	1.2
Scenario A.3	5,309	17.0 million	19.6 million	1.6

Source: Ricardo analysis

Costs related to enforcement activities for national and European authorities

The costs of enforcement activities for national authorities include those related to Port State Control activities and Flag State obligations. Appendix 1 provides insights on the different cost activities considered in the analysis, for which recurrent costs are included. The analysis of enforcement costs builds on current MRV costs for 2023 based on the information provided by Member State authorities, both qualitative and quantitative information.

Overall, three Member States indicated that they expected different and/or additional cost elements associated with the enforcement costs in case other smaller vessels (400-4,999 GT) are included in the MRV scope, compared to large vessels currently subject to MRV. Among those anticipating increased costs per vessel, the development of national enforcement procedures and ICT systems that are used for enforcement activities, such as inspections and

surveys, of domestic traffic ships, as well as to higher efforts related to guidance for small ship operators, due to their larger numbers and smaller company sizes were identified as key factors.

At the same time, the majority (15) of Member States indicated they expect additional costs due only to the increased number of vessels, without any increase in cost per vessel. These refer to overall costs, including those associated to Port State Control activities and Flag State related obligations.

As such, this analysis assumes that current costs per vessel for Port State Control and Flag State obligations (as reported in Appendix 1) would also apply to smaller vessels. As shown in Table 4-6, costs were estimated to be proportional to the number of vessels included in each policy scenario. Therefore, the difference between scenarios A.1 which account for a total cost of EUR 106,172 (total of 2,238 vessels) and A.2 with EUR 116,704 (total of 2,460 vessels) is lower than those with A.3, which account for a total of EUR 251,862 (total of 5,309 vessels). For the additional Flag State obligations²⁰, the share of EU-flagged ships (14% of total vessels under MRV as calculated in Appendix 1) is assumed to apply to additional smaller vessels under each policy scenario.

Table 4-6 Estimated additional costs related to enforcement activities for MS authorities by policy scenario (based on 2023 MRV estimated costs)

Type of cost	Policy scenarios		
	Scenario A.1	Scenario A.2	Scenario A.3
Additional Port State Control activities estimated cost			
Number of additional vessels under MRV	2,238	2,460	5,309
Estimated cost per vessel (EUR per year) for Port State Control activities	21.1	21.1	21.1
Port State Control cost (EUR per year)	47,307	51,999	112,221
Additional Flag State obligation estimated cost			
Number of additional flagged vessels ⁽¹⁾	316	348	750
Estimated cost per flagged vessel (EUR per year) for Flag State obligations	186.1	186.1	186.1
Flag State obligations cost (EUR per year)	58,866	64,705	139,641

²⁰ Flag State obligations refer only to those related to ships flying the flag of EU countries.

Type of cost	Policy scenarios		
Total estimated cost for MS authorities (EUR per year)	106,172	116,704	251,862

Source: Ricardo analysis

Note (1): The number of vessels considered in this calculation is the proportional share of EU-flagged vessels (14%) relative to each policy scenario, as calculated in Appendix 1 for 2023.

With regards to **European competent authorities**, EMSA and the European Commission are the European competent authorities relevant for the administrative costs described below.

The costs resulting from the additional activities related to the inclusion of smaller vessels (400-4,999 GT) in the MRV scope for European authorities are the following, as identified by the relevant authorities:

- One-off costs (total cost): IT adjustments and developments in THETIS-MRV
- Recurring costs (cost per year): additional human resources, from analysing information, helpdesk support and designing/updating information material

Information on these costs has been provided by EMSA and the European Commission (see Table 4-7) and have been estimated to represent a total of EUR 100,000 for one-off costs related to IT adjustments and/or developments in THETIS-MRV. The recurring costs related to the additional human resources required would notably be dependent on the number of vessels which would be included in the scope extension, varying from EUR 40,000 for policy scenario A.1 (2,238 vessels), EUR 42,891 for A.2 (2,460 vessels) and EUR 80,000 (5,309 vessels).

Table 4-7 Estimated additional costs related to enforcement activities for European competent authorities, per policy scenario

	Number of vessels	One-off cost (total cost, EUR)	Recurring cost (cost per year, EUR)
Scenario A.1	2,238	100,000	40,000
Scenario A.2	2,460	100,000	42,891 ⁽¹⁾
Scenario A.3	5,309	100,000	80,000

Source: Ricardo analysis

Note (1): The value for scenario A.2 is calculated as the proportionate value between scenarios A.1 and A.3., given the data provided by EMSA and the European Commission.

Total regulatory costs

Total regulatory costs were estimated by adding administrative costs for shipping companies and enforcement costs for competent authorities, as described above. One-off costs were assumed to be spent entirely in the first year of the implementation (assumed at 2025), while recurrent costs for shipping companies and competent authorities were assumed to proportionally increase with the number of vessels over the period 2025-2050. The growth rate for total vessels in the fleet was extracted from the Reference 2020 scenario modelled in PRIMES Maritime²¹. Regulatory costs across the evaluated period were discounted with a 3% social discount rate²² to calculate the present value of regulatory costs (Table 4-8).

Table 4-8 Discounted regulatory costs for scenarios A.1, A.2 and A.3 (2025-2050, 3% discount rate)

Policy scenarios	Discounted regulatory costs (million EUR)
Scenario A.1	17.6
Scenario A.2	17.6
Scenario A.3	41.8

Source: Ricardo analysis

Level playing field

Exemptions from MRV requirements for certain ships could possibly distort competition with regulated vessels especially in the same cargo segment and across similar vessel sizes. This could be the case of vessels that are just below the 5,000 GT threshold (e.g. between 4000 and 4,999 GT). Therefore, the analysis qualitatively assesses whether the scope extension could have an impact on the level playing field and, if so, the magnitude of this impact. This assessment is based on data from MARINFO and on the insights from the stakeholder consultation.

The majority of industry stakeholders considered that the exemption on smaller vessels (400-4,999 GT) in the MRV could lead to an uneven playing field (six out of eight), although mixed responses were provided with regards to the most impacted segment. In this regard, it was mentioned that the costs to implement the MRV monitoring requirements could yield competition between larger and smaller vessels, e.g. with regards to verification costs or manning hours to collect and monitor data but also relating to their engine efficiency in

²¹ Growth rate assumed at 1.65% 2025-2030, 1.13% 2031-2040, 1.97% 2041-2050.

²² Social discount factor recommended for EU policy analysis in Tool#63 of the Better regulation' toolbox 2023 [0d32ee11-92da-434d-9c86-fd4579d95dc6_en](https://ec.europa.eu/economy_finance/0d32ee11-92da-434d-9c86-fd4579d95dc6_en)

comparison to the cargo they transport. This has been identified to be the case for vessels just above 5,000 GT which are considered to be competing with those between 4,000 and 4,999 GT.

On the other hand, one company considered that there is currently an even level playing field, and two industry associations mentioned that the updated EU ETS could provide a level playing field by ensuring all vessels, regardless of size, operate under the same regulations. This could discourage larger vessels from transshipping and using smaller feeder vessels to avoid ETS compliance.

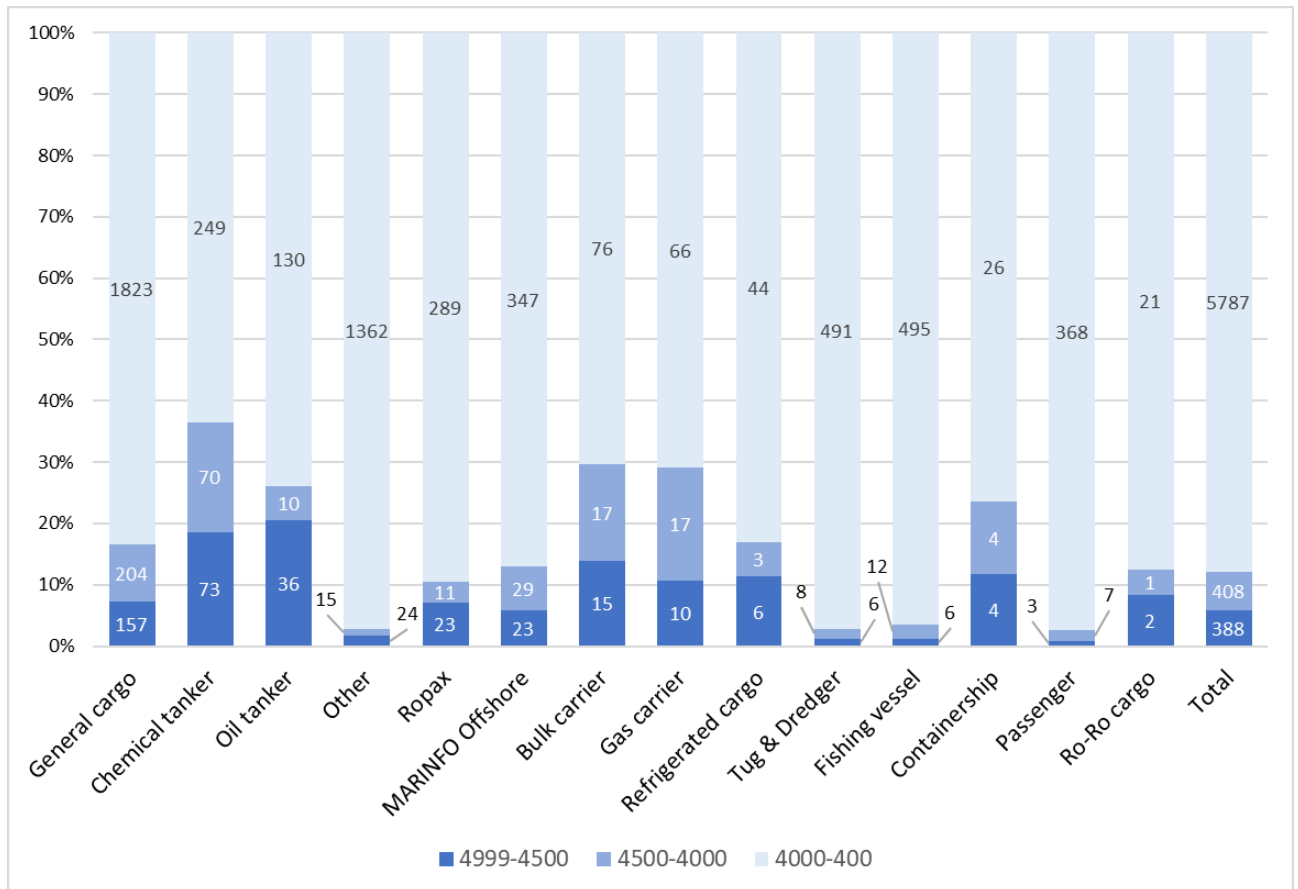
Therefore, it seems that the scope extension could potentially mitigate issues related to the level playing field. To understand the magnitude of the potential impact²³, the share of vessels near to the limit of 5,000 GT – being 5,000 GT the current threshold considered – has been analysed. Figure 4-2 presents the results of this analysis.

- **Vessels between 4000 and 4500 GT:** the largest share of vessels between 4000 and 4500 GT for the categories analysed corresponds to oil and chemicals tanks (20% and 19%, respectively), followed by bulk carriers (14%), fishing vessels (11%) and gas carriers (11%). In absolute numbers, the highest number corresponds to general cargo with 157 vessels (7%) followed by chemical tankers.
- **Vessels between 4500 and 4,999 GT:** chemical tankers and gas carriers accounts for the largest share of vessels between 4500 and 4,999 GT (18%), closely followed by bulk carriers (16%). With regards to the number of vessels, the largest numbers of vessels within this range corresponds to general cargo, followed by chemical tankers.

As seen in Figure 4-2, vessels between 4,000 and 4,500 GT do not exceed 20% of total vessels in all categories. The highest proportions are observed in the categories of chemical tankers, bulk carriers, and gas carriers. Furthermore, together the categories of 4,000–4,500 GT and 4,500–4,999 GT do not exceed 40% in any of the categories. The highest proportion is found in chemical tankers. A significant proportion of vessels in the 4,500–4,999 GT category is also observed in the oil tanker category.

²³ It is to be noted that, pursuant to Article 3gg(3) of the EU ETS Directive, the Commission will monitor and report on the implementation of the EU ETS in relation to maritime transport, in particular to detect evasive behaviour. This will include analysis on whether there is an increase in the use of vessels just below the MRV and ETS size threshold.

Figure 4-2 Share of and absolute number of vessels, by ship type and by categories 0-4000 GT, 4000-4500GT and 4500-4,999 GT



Source: Ricardo analysis based on MARINFO data

Note: The number of vessels in MARINFO does not match the number of vessels identified in the Marine Benchmark database reported in Section 2. The latter is considered to be more robust as it is based on AIS data mapped against unique IMO numbers. MARINFO data was used for this analysis as it differentiates vessel size.

Table 4-9 presents the share of vessels that would be in the range between 4000 and 4,999 GT for each policy scenario, as these would be expected to be the most impacted by a potential uneven playing field and competing with vessels in the 5,000 GT cargo segment.

Table 4-9 Number of vessels between 4000 and 4,999 GT and share out of total vessels included for each policy scenario

Policy scenarios	Total number of vessels 4000-4,999 GT	Share of total vessels included in each scenario
Scenario A.1	725	32%
Scenario A.2	751	31%
Scenario A.3	1,030	19%

Source: Ricardo analysis

Given the relatively high share of vessels between 4000 and 4,999 GT that would be included in the policy scenarios considered, these are expected to have a significant positive impact in ensuring a level playing field between vessels potentially competing for similar market segments (i.e. those just above and below the 5,000 GT threshold). That share is the highest for ship types considered under scenario A.1 (32%), followed closely by scenario A.2 (31%).

4.1.3 Assessment of impacts of scenarios B

This section assesses the implications of extending the exemption to report on a per voyage basis to all vessels performing intra-EU activities only (i.e. removing the 300 journeys threshold as currently required under MRV) on administrative costs. To do this, the number of vessels that operate exclusively on intra-EU voyages and perform more or less than 300 journeys per year was extracted from MARINFO data for 2023 (see Table 4-10). It can be observed that the vast majority of smaller vessels performing intra-EU voyages undertake less than 300 voyages per year. These represent 26% of the total fleet of vessels between 400 and 4,999 GT.

Table 4-10 Number of small vessels involved in intra-EU voyages only vs. small vessels involved also in extra-EU voyages

Category	Number of vessels	Share of total smaller vessels
Small vessels having carried out both intra and extra-EU voyages in 2023	4489	68%
Small vessels having carried out only intra-EU voyages in 2023	< 300 voyages	26%
	≥ 300 voyages	6%

Source: Ricardo analysis based on MARINFO 2023 data

This means that removing the threshold of 300 voyages per year (scenario B.2) would benefit a large proportion of vessels undertaking intra-EU voyages only, significantly expanding the scope of the exemption to report on a per journey basis. As above mentioned, reporting on an aggregate basis, rather than on a per journey basis, would allow companies under this exemption to use simpler monitoring systems (e.g. bunker notes with limited stocktaking), which would be associated with lower monitoring costs. Vessel categories with the highest share and absolute number of intra-EU voyages, such as RoPax, tug & dredgers and passenger vessels (as per Figure 2-3) are expected to benefit the most from scenario B.2.

Thus, scenario B.2 is expected to allow for a significant reduction in administrative costs compared to scenario B.1. However, this reduction is not

quantified due to lack of quantitative evidence of the difference in costs between monitoring on a per voyage and on an aggregate basis.

4.1.4 Comparison of scenarios

This section summarises the analysis of impacts for the policy scenarios considered by comparing relevant indicators for impact categories described in Section 4.

Scenarios A

Table 4-11 below summarises the key indicators for scenarios A.1, A.2 and A.3. Overall, impacts for scenarios A.1 and A.2 do not differ substantially both in terms of environmental and economic impacts. Scenario A.3 substantially extends the GHG emission coverage, compared to A.1 and A.2, but leads to a higher administrative cost per unit of GHG emission covered.

Table 4-11 Summary of the impacts of policy scenarios A.1, A.2 and A.3

	A.1	A.2	A.3
Additional vessels covered	2,238 14.4% increase to revised MRV scope	2,460 15.8% increase to revised MRV scope	5,309 34.1% increase to revised MRV scope
Additional GHG emissions coverage	5.61 MtCO _{2e} (2023 data) 4.2% increase to revised MRV scope	6.19 MtCO _{2e} (2023 data) 4.6% increase to revised MRV scope	11.32 MtCO _{2e} (2023 data) 8.4% increase to revised MRV scope
Cumulative energy/ GHG emission savings (period 2025-2050)	1.51 MtCO _{2e}	1.67 MtCO _{2e}	3.06 MtCO _{2e}
Regulatory costs for both shipping companies and authorities	EUR 1.2 /tCO _{2e} of recurrent administrative costs for shipping companies. Total regulatory cost (discounted) of EUR 17.9 million by 2050	EUR 1.2 /tCO _{2e} of recurrent administrative costs for shipping companies Total regulatory cost (discounted) of EUR 18.2 million by 2050	EUR 1.6 /tCO _{2e} of recurrent administrative costs for shipping companies. Total regulatory cost (discounted) of EUR 42.7 million by 2050

Source: Ricardo analysis

The social net present value (NPV) across all scenarios considered to expand the scope is negative (Table 4-12). This is because the present value of additional administrative costs for companies and competent authorities is

higher than the monetised GHG emission savings solely attributable to the MRV maritime Regulation.

It should be noted that the main environmental benefits from the MRV scope extension would be associated with GHG emission savings from the eventual integration of smaller vessels in other GHG mitigation policies such as the EU ETS and Fuel EU, as a consequence of their prior inclusion in the MRV. These possible additional indirect environmental benefits are not reflected in this social NPV below. It is expected that including costs and benefits from the integration of smaller vessels into EU ETS and/or Fuel EU, in conjunction with MRV, would be showing a very different picture, most likely a positive NPV²⁴.

Additional benefits related to air pollution mitigation attributable to the MRV maritime Regulation were also not quantified for this study. Such benefits are however expected to be relatively marginal. As an indication, in a recent modelling exercise on the application of the EU ETS for maritime transport (European Commission, 2021), air pollution benefits were estimated to be less than 10% of GHG emission benefits in terms of external costs savings.

Table 4-12 Social Net Present Value (NPV) of policy scenarios A.1, A.2 and A.3 compared to the baseline (million EUR) (3% discount rate)

	A.1	A.2	A.3
GHG emission savings	3.7	4.1	7.5
Regulatory costs	-17.6	-17.6	-41.7
Social NPV	-13.9	-13.5	-34.2

Source: Ricardo analysis

Note: GHG emission savings have been monetised using climate change avoidance cost included in the 2019 Handbook of external costs corrected to 2023 price levels (EUR 133/tCO_{2e} by 2030 and EUR 358/tCO_{2e} post-2030).

Overall, scenarios A.1 and A.2 would be more efficient than A.3 in terms of the relationship between additional GHG emissions coverage and increased regulatory costs when only considering the impacts attributable to the MRV maritime Regulation. Again, the relative NPV of scenarios considered would be different when considering potential benefits of the inclusion of smaller vessels within EU ETS and Fuel EU.

A sensitivity analysis was performed (Table 4-13) with a cumulative 2% GHG emissions reduction from MRV, as assumed in the 2013 impact assessment (European Commission, 2013), rather than the 0.7% reduction considered in this study by default (see Section 4.1.2.1). This increases expected benefits in

²⁴ For example the impact assessment of the expansion of EU ETS for maritime transport (European Commission, 2021) showed a clearly positive NPV

terms of GHG emission savings, but still leads to a negative NPV for all the scenarios considered.

Table 4-13 Sensitivity case for the Social Net Present Value (NPV) with higher GHG emission reduction potential (3% discount rate)

	A.1	A.2	A.3
GHG emission savings	12.5	13.9	24.9
Regulatory costs	-17.6	-17.6	-41.7
Social NPV	-5.1	-3.7	-16.7

Source: Ricardo analysis

Scenarios B

Table 4-14 compares scenarios B.1 and B.2 in terms of their capacity to mitigate additional regulatory costs for smaller vessels. As shown by the data analysed, scenario B.2 would extend the option to report on an annual basis (rather than on a per voyage basis) to a much larger share of the fleet (32%), hence potentially contributing to mitigating administrative costs of the MRV scope expansion.

Table 4-14 Summary of the impacts of policy scenarios B.1 and B.2

	B.1	B.2
Regulatory costs	Administrative cost savings from exemption to monitor on a per voyage basis would apply to 6% of smaller vessels	Administrative cost savings from exemption to monitor on a per voyage basis would apply to 32% of smaller vessels

Source: Ricardo analysis

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6. Appendices

6.1 Appendix 1: Stakeholder consultation

6.1.1 Overall approach

The stakeholder consultation for this study aimed to gather views of relevant stakeholders on the impacts of potential adjustments to the MRV maritime Regulation scope, both to public authorities and the shipping industry, including the following:

- Administrative costs under the MRV maritime Regulation (and estimates on costs for smaller vessels & other vessel types), both for enforcement by authorities, and reporting by industry
- Current monitoring of emissions data, and potential use of MRV emissions data
- Issues / opportunities from implementation of MRV to smaller vessels and/or other vessel types

Due to time and resources constraints, the consultation activities were limited and tailored to the most relevant stakeholder groups, according to their involvement in the Regulation and potential impacts on their stakeholder group.

6.1.2 Information requests to organisations

Information was collected from stakeholders of two main groups; public authorities and the industry organisations. The industry organisations were further divided into the shipping industry companies and business/trade associations.

For public authorities, a data request was developed and circulated to Member States in the EU (and EEA), to capture the views of authorities currently enforcing the MRV maritime Regulation and ensuring compliance. 22 Member States responded to the data request. Table 6-1 presents a list of the Member States who responded to the data request.

Table 6-1 Respondents to data request to Member States

	Member State represented
1.	Belgium
2.	Bulgaria
3.	Croatia

	Member State represented
4.	Cyprus
5.	Czech Republic
6.	Estonia
7.	Finland
8.	France
9.	Germany
10.	Hungary
11.	Ireland
12.	Italy
13.	Latvia
14.	Lithuania
15.	Luxembourg
16.	Norway
17.	Portugal
18.	Romania
19.	Slovakia
20.	Slovenia
21.	Spain
22.	Sweden

For industry organisations, a written questionnaire was developed, to capture views of companies affected by the monitoring and reporting requirements of the Regulation, with some of these organisations also interviewed to allow for them to elaborate on their response. A total of nine organisations responded, either via the questionnaire or the oral interview. Table 6-2 presents the list of industry respondents that completed the questionnaire, alongside those interviewed.

Table 6-2 Respondents to questionnaire & interview for industry organisations

	Stakeholder name	Stakeholder group	Provided questionnaire	Interviewed
1.	International Chamber of Shipping (ICS)	Business/trade associations	×	✓

	Stakeholder name	Stakeholder group	Provided questionnaire	Interviewed
2.	Intertanko	Business/trade associations	✓	✓
3.	European Community Shipowners' Association (ECSA)	Business/trade associations	✗	✓
4.	Royal Association of Netherlands Shipowners (KVNR)	Business/trade associations	✓	✓
5.	MF Shipping	Shipping industry	✓	✓
6.	Stolt Tankers	Shipping industry	✓	✓
7.	GEFO Shipping group	Shipping industry	✓	✗
8.	ABC Maritime	Shipping industry	✓	✓
9.	Wisby Tankers AB	Shipping industry	✓	✗

6.1.3 Analysis of reported data on regulatory costs

Administrative costs for shipping companies

Table 6-3 provides information on the administrative costs considered for shipping companies (ship operators and shipowners) for this analysis, and the type of cost (one-off or recurring). The analysis covers both recurrent costs from vessels currently under the MRV, based on the current experience, along with expected one-off and recurring costs for smaller vessels in the event that these would be included within the scope of the MRV maritime Regulation.

One-off costs are those related to the initial phase of implementation and include activities such as familiarising with the information obligation and preparing the ship's monitoring plan. Recurring costs are those related to the annual implementation of the monitoring and reporting requirements and may include costs for collecting the relevant information, analysing and verifying it, and then submitting this information for shipowners and ship operators for small vessels (400-4,999 GT).

Table 6-3 Administrative costs for shipping companies

Identified administrative costs	Related activities
One-off costs (total cost, EUR)	

Identified administrative costs	Related activities
Staff cost	<ul style="list-style-type: none"> • Familiarising with the information obligation • Preparation of the monitoring plan
Outsourcing costs	External services contracted to support activities related to the MRV obligations
Recurring costs (cost per year, EUR)	
Staff cost	Retrieving relevant information from existing data, adjusting existing data, filling in forms and tables (including recordkeeping), verification, submitting the information
Outsourcing costs	External services contracted to support activities related to the MRV obligations

Information on the administrative costs per vessel and per year for shipping companies has been collected through a stakeholder consultation (interviews and questionnaires) and compared to the estimations and calculations from previous studies, particularly from CE Delft, 2016), which is based on the administrative cost data from the 2013 MRV Impact Assessment (European Commission, 2013).

The stakeholder consultation aimed to determine whether companies anticipated an increased financial burden due to the potential inclusion of smaller vessels (400-4,999 GT) within the scope of the MRV maritime Regulation, and if so, the magnitude of the additional costs.

Stakeholder interviews revealed mixed responses regarding the potential additional MRV-related administrative cost for smaller vessels compared to the current cost for larger vessels. Four out of seven companies interviewed anticipated an increased financial burden per vessel (based on expected costs) compared to costs related to reporting under the MRV for large vessels, while three indicated that monitoring costs would remain similar for smaller vessels.

Those indicating that administrative costs are expected to increase cited the challenges faced by smaller vessels. One of the shipping companies mentioned that smaller vessels have less staff on board due to limited space availability, which would result in an increased burden if this crew were balancing the safe navigation of the vessels alongside ensuring that monitoring is taking place. To operate the monitoring equipment, e.g. flowmeters and ensure the data is being monitored automatically would require senior crew members, who would require a higher salary. Another shipping company noted that the shorter distances and more frequent voyages typical of smaller vessels would require increased navigation and preparation, leading to higher monitoring costs. This could involve collecting and analysing for granular data on vessel operations, which can be time consuming and resource intensive. To avoid errors coming from manual input for MRV reporting, companies could include different solutions,

such as flowmeters to track fuel consumption and automate the reporting process. While these solutions can help streamline MRV processes, it is indicated that these also come with associated costs. However, there was no indication provided regarding the extent to which these solutions are being adopted across the industry.

On the other hand, three companies indicated that for most 400-4,999 GT ships, administrative costs are expected to be the same as for larger vessels. However, one of these shipping companies noted that, in order to reduce the associated administrative burden, data could be collected on a yearly basis, leaving cargo data out. Also, other options were considered, such as less stringent data requirements.

Further to the qualitative assessment, a data request was shared with shipping industry companies to which five responses were received. From those, four provided information for companies already reporting under the MRV, and one provided information for companies already reporting and for those not currently reporting under the MRV. From the data received, the total administrative cost related to MRV obligations has been estimated per year and vessel type for small vessels (400-4,999 GT), as shown in Table 6-4 **Error! Reference source not found.** The total cost per vessel per year (EUR) includes disaggregated information on the staff and outsourcing costs per vessel per year (EUR). The estimated value is the average of the five data points received; no outliers were identified.

Regarding the additional one-off costs, stakeholders reported four data points a range from a maximum of EUR 51,000 per vessel to a minimum of EUR 2,280. Notably, three data points fell within the EUR 2,280 to EUR 4,000 range. Consequently, the value of EUR 51,000 per vessel was considered as an outlier and hence excluded from the calculation of the average value for the purpose of this study.

In addition to the estimated cost of including smaller vessels (400-4,999GT), shipping companies also provided information on the current costs for shipping companies reporting under the MRV for large vessels, which are currently in scope. This was also calculated as the average of the five data points collected; no outliers were identified. This information is presented as well in Table 6-4.

Table 6-4 Estimated administrative costs for shipping companies (per vessel per year, in EUR) for smaller vessels (400-4,999 GT) and costs for larger vessels current in scope provided through the data request

Type of cost	Staff cost per vessel	Outsourcing costs per vessel	Total costs per vessel
<i>Reported estimates for smaller vessels (400-4,999 GT)</i>			

Type of cost	Staff cost per vessel	Outsourcing costs per vessel	Total costs per vessel
One-off administrative costs (total cost, EUR)	2,093	1,100	3,193
Recurring administrative costs (cost per year, EUR)	2,000	1,690	3,690
<i>Reported current costs for larger vessels (>5,000 GT)</i>			
Shipping companies reporting under the MRV for large vessels	1,800	1,590	3,390

Source: Ricardo analysis based on data provided by shipping companies consulted

As shown Table 6-4, the recurring administrative costs associated with MRV reporting for smaller vessels, which are reported to be EUR 3,690 per vessel per year, are slightly higher than the current recurring costs reported for larger vessels, which are reported to be EUR 3,390 per vessel per year. This is aligned with the responses received from stakeholders presented above.

It is also worth noting that the cost reported by shipping companies is lower than the total administrative burden per vessel per year reported in a previous study, which was EUR 6,700 (CE Delft, 2016). While the figures in the present study are based on a limited number of responses (five responses) and hence cannot be considered as being fully representative, they are considered more reliable. The reason is that costs reported in this study have been provided by companies already reporting under the MRV, and therefore, are not estimates but based on the experience of the reporting being done. In contrast, the previous study (CE Delft, 2016) was based on estimates from the Impact Assessment (European Commission, 2013).

Therefore, this study uses **EUR 3,690** as the reference value for additional recurring costs for shipping companies monitoring, reporting and verification for smaller vessels (400-4,999 GT).

Enforcement costs for national relevant authorities

For **national authorities**, MRV costs are mostly related to obligations for Member States as Flag States and as Port States. These costs are related to specific obligations laid down in the MRV Regulation, as follows.

Obligations for Member States as flag States:

- **Enforcement of the EU MRV maritime Regulation** including a penalty system for non-compliance with monitoring and reporting requirements, for ships flying their flag (Art. 20(1)).

- Obligation to **ensure that shipping companies flying their flag and falling within the scope of the MRV submit the emissions report (via THETIS-MRV)**. Emissions reports must be submitted for verification for, following a verification process, obtaining a DoC (document of compliance). This is to be checked by Member States for vessels flying their flag once the deadline for handing in the emissions has passed or once the Commission makes publicly available the information on the CO₂ emissions reported.
- **Communication and information exchange**, including potential communication with verifiers and other stakeholders.

Obligations for Member States as port States:

- **Inspection of vessels**, ensuring that all ships visiting their ports adhere to the regulation, by conducting inspections, verifying compliance, and reviewing required documentation (Document of Compliance, DoC).
- **Enforcement**, which includes implementing a system of penalties for shipping companies that fail to meet the monitoring and reporting requirements of the MRV maritime Regulation. Member States are responsible for establishing and enforcing these penalties.

National authorities were asked to provide data on total staff time, staff cost and other costs per year related to port state controls and flag state obligations, respectively, under the current (2023) MRV scope. 14 (out of 29) Member States provided staff cost data on flag state obligations and 10 (out of 29) Member States provided staff cost data related to port state control obligations. Other costs, such as equipment and outsourcing, were also reported in a few instances: two countries reported equipment costs and three reported outsourcing costs. For equipment costs (e.g. IT systems), only one Member State provided data for additional Port State Control activities and two Member States for Flag State obligations. All other Member States indicated no cost for these cost categories. In the case of outsourcing costs, which could replace some of the staff costs, no data was provided for Port State activities, and only two Member States provided information for Flag State obligations. Therefore, equipment and outsourcing costs are not included in the calculation of total costs for national authorities because they are not comparable or applicable in all cases.

Staff cost data reported by national authorities was used to calculate annual enforcement costs per (MRV or flagged, respectively) vessel for port state control and flag state obligations, as described in the text box below.

Calculation of enforcement costs per vessel

Cost per MRV vessel for Port State Control activities (2023)

1. Costs per port call for each Member State who reported data were computed by dividing total staff costs by number of port calls for each Member State in 2023, as per data extracted from the MARINFO database (for vessels of or above 5,000 GT)
2. Values of costs per port call above EUR 3.5 were identified as outliers (approximately percentile 90% of the sample)
3. EU-wide average cost per port call was computed, excluding outliers
4. Total costs at EU level were computed by multiplying EU average costs per port call by total port calls in 2023
5. Average cost *per MRV vessel* was computed by dividing total EU costs by number of vessels under MRV in 2023 (12,652)

Cost per flagged vessel for Flag State obligations (2023)

1. Costs per flagged vessel for each Member State who reported data were computed by dividing total staff costs by number of flagged vessels for each Member State, as per data extracted from the MRV database
2. Values of costs per flagged vessel above 400 EUR were identified as outliers (approximately percentile 90% of the sample)
3. EU-wide average cost per flagged vessel was computed, excluding outliers

Total costs for the EU for Port State Control activities and Flag State obligations for vessels currently under the MRV are presented in Table 6-5. For this, costs per vessel of port state control obligations are multiplied by total number of vessels under MRV in 2023 and costs per vessel for flag state obligations are multiplied by the number of EU flagged vessels. It can be derived that 14% of MRV vessels in 2023 are EU flagged.

Table 6-5 Current regulatory costs for national relevant authorities (per year) for vessels under MRV (2023)

Type of cost (EUR)	Cost per (MRV or flagged) vessel per year (EUR)	Number of (MRV or flagged) vessels (> 5,000 GT)	EU total cost (EUR)
Port State Control activities	21.1	12,562	265,534
Flag State obligations	186.1	1,775	330,415

Type of cost (EUR)	Cost per (MRV or flagged) vessel per year (EUR)	Number of (MRV or flagged) vessels (> 5,000 GT)	EU total cost (EUR)
Total cost	-	-	595,949

Source: Ricardo analysis based on data provided by national authorities consulted

When asked about additional costs for authorities from the potential expansion of the MRV maritime Regulation to smaller vessels, the majority of Member States (15 out of 18) indicated they expect additional costs due only to the increased number of vessels, without any increase in cost per vessel. These refer to overall costs, including those associated to Port State Control and Flag State related obligations. Only three Member States indicated that they expected different and/or additional cost elements associated with the enforcement costs in case other smaller vessels (400-4,999 GT) are included in the MRV scope, compared to large vessels currently subject to MRV. Among those anticipating increased costs per vessel, the development of national enforcement procedures and ICT systems that are used for enforcement activities, such as inspections and surveys, of domestic traffic ships, as well as to higher efforts related to guidance for small ship operators, due to their larger numbers and smaller company sizes were identified as key factors.

Considering responses above, it is assumed that current costs per vessel for national authorities (associated with both Port State Control and Flag State related obligations) would also apply to smaller vessels.

Costs for European competent authorities

With regards to **European competent authorities**, EMSA and the European Commission are identified as the European competent authorities relevant for the costs related to the MRV maritime Regulation. The analysis reviews the additional estimated costs resulting from the potential extension of the scope to include other types of smaller vessels (400-4,999 GT).

Table 6-6 presents the cost categories considered for the analysis, as identified by the relevant authorities. It also includes information on the estimated cost resulting from the additional activities related to the inclusion of smaller vessels (400-4,999 GT) in the MRV scope per year. Such estimations have been provided by EMSA and the European Commission in a consolidated form and, thus, is presented as such in this analysis.

As shown, the largest share of costs is related to the IT activities due to adjustments to the THETIS-MRV platform. These costs account for 67% to 77% of total costs for European competent authorities.

Table 6-6 Estimated additional administrative costs related to enforcement activities for European competent authorities in case of inclusion of additional smaller vessels within MRV scope

Identified types of administrative costs	Type of cost	Estimated cost (EUR)
IT adjustments/ developments in THETIS-MRV	One-off	100,000
Additional human resources (for analysing information, providing helpdesk support and designing/updating information material)	Recurring (per year)	40,000 – 80,000 (*)

Source: Ricardo analysis based on data provided by the European Commission

(*) The range depends notably on the number of ships that would be concerned by such an extension.

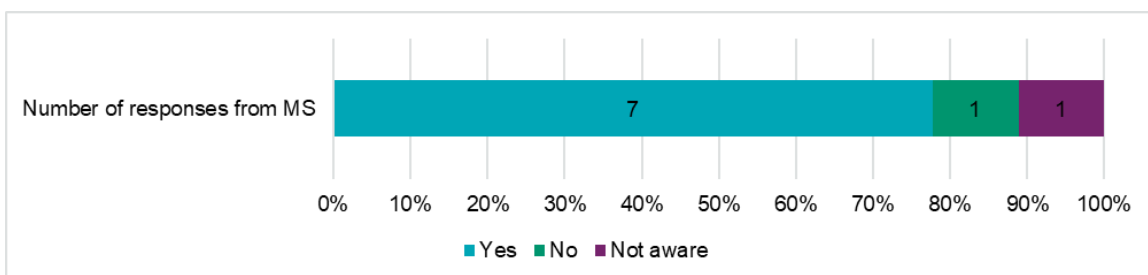
6.1.4 Summary of industry responses

The responses to the consultation were received in the form of questionnaires, and verbally through interviews. As there were nine participants in the consultation, the responses were analysed manually.

Current monitoring of emissions data, and potential use of MRV data

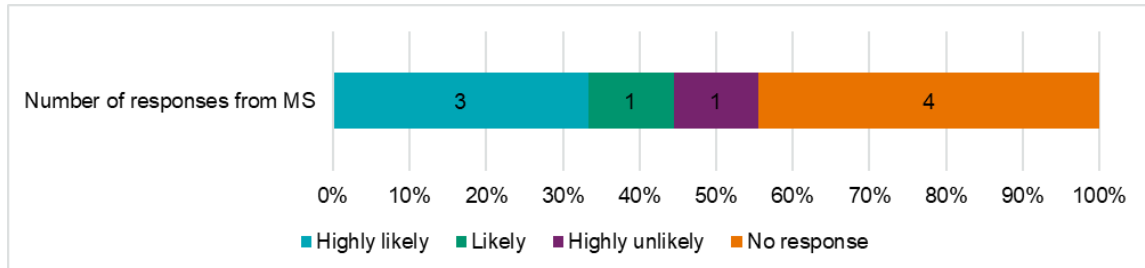
Does your organisation already monitor fuel consumption and/or GHG emissions from ships currently excluded from MRV scope? Does it have emissions data for these ships?

Figure 6-1: Industry responses on monitoring of fuel consumption and/or GHG emissions from ships currently excluded from MRV scope (n=9)



How likely are you/your organisation to use MRV data on additional smaller vessels or other vessel types for informing any decisions related to investments in more energy efficient and low carbon shipping technologies / operations?

Figure 6-2: Industry responses on likelihood of organisations to use MRV data on smaller vessels or other vessel types (n=9)



Majority of the stakeholders mention that companies are currently already monitoring fuel consumption and emissions data on smaller vessels, e.g. for financial institutes, charters, who wish to know data on CO₂ emissions and fuel consumption. One stakeholder mentions that all ships, regardless of size, report daily within the same program; they also mention use of this data to inform the design of new-builds which are 15-20% more energy efficient. Hence, they mention that they are also highly likely to use MRV data for energy efficient investment decisions.

Two stakeholders also mention that they already have a software for collecting data on energy efficiency for all vessels; One of them mention that they are likely to use also MRV data, as this will yield economic impacts and thus mitigate the cost required for the data to be monitored and analysed. The other explain that they need to collect emissions data in order to understand the operational profile of all vessels and explain to other stakeholders how these vessels are utilised, where their profits lie, and how costs can be reduced (e.g. slow steaming to reduce fuel consumption). They mention that they are currently collecting data on smaller vessels, however MRV implementation would likely modernise the way they collect the data, via automation, which would help to reduce mistakes. They mention that they are highly likely to use MRV data for energy efficient investment decisions, as they are currently making efforts to reduce their carbon footprint in line with their strategic pillars, through implementing measures on smaller vessels even though there is no current legislation enforcing this. One stakeholder mentions that shipping companies owning large fleet may find MRV data on smaller vessels useful for decision making on energy efficient technologies, and mention that companies are likely to use this data.

Shipping associations mentioned that some companies may be monitoring emissions on smaller vessels, on a voluntary basis, but not as closely as the MRV Regulation requires.

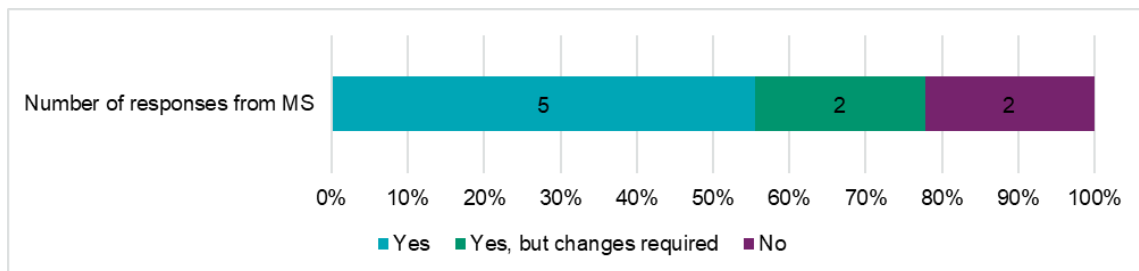
Conversely, one shipping company mentions that they do not currently monitor emissions for vessels excluded from the MRV scope. They collect some data on

smaller vessels, to keep shipowners updated and foresee collecting some information on newer vessels. They mention that their existing vessels are already at a good state with regards to energy efficiency and discuss difficulty in adding modern technology to older vessels, due to space constraints, and are thus unlikely to monitor emissions on such vessels. As such, they discuss that they are unlikely to use MRV data for investment decisions. Another company also mentions that they will not use MRV data for investment decisions, as they are already monitoring emissions data through software, and so only view the MRV Regulation as a statutory requirement, rather than to provide useful insights or enable decision making.

Appropriateness of MRV Regulation for smaller vessels

Is the addition of smaller vessels and/or other ship types in MRV scope appropriate? Do you/your organisation consider that the inclusion of additional smaller vessels and/or other ship types in MRV scope would be appropriate? If so, which one(s)?

Figure 6-3: Industry responses on considering the appropriateness of the addition of smaller vessels and/or other ship types in MRV scope (n=9)



Several stakeholders believe that the inclusion of smaller vessels and other vessel types in the MRV scope is appropriate, with a few stakeholders believing that focus should be on adjusting the current MRV Regulation before introducing changes.

One shipping association is in strong support of the MRV expansion to (all) smaller vessels, having previously fed back to the Commission that they wish to lower the MRV threshold to 400 GT, and so do not see the current thresholds as necessary. They believe that distinctions are trying to be made between the SMEs and larger shipping companies, by distinguishing by vessel size, however mention that there is no correlation between company size and ship sizes managed. They also mention that with the current regulation scope, some companies may attempt to circumvent the MRV by reclassifying ships from general cargo to another ship type which is currently out of scope, due to the increased administrative burden of the MRV Regulation. They believe that companies will foresee ETS charges as a result of the MRV inclusion, so they may start reclassifying now.

A shipping company mentions that all commercial vessels, regardless of size, have an environmental impact and thus the MRV Regulation reveals opportunities to minimise such impact. Another company also mentions that all vessels should be in scope, from an environmental standpoint. However, they do mention that they would ideally prefer for the MRV requirements to disappear and to be absorbed by the IMO DCS, so that only one set of reporting requirements are in place; but if the MRV Regulation is to stay, then they are of the opinion that all vessels should be covered under its scope.

Another shipping association believes that there should be a level playing field across all companies of the sectors, and so in this regard believe that the lowering the GT threshold for international trade of cargo and/or passengers under the Regulation is supported. They believe that ships which do not compete internationally, such as dredgers, domestic island ferries, tugs, and other specialised shipping services, should be exempted.

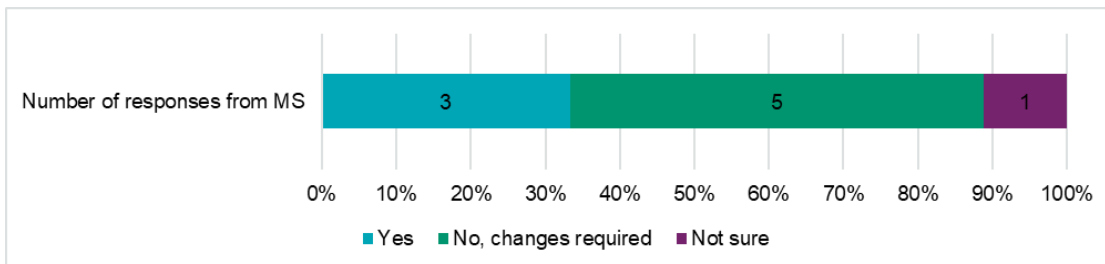
Another association argued that the MRV Regulation would need careful evaluation and consideration before expansion to include smaller vessels, in terms of ability of the regulated entity (owners/manager) to meet any emission reduction targets. They promote the harmonisation between IMO and EU regulations, and as such desire to keep the same MRV thresholds for now, as this is in line with IMO regulations. One shipping company also believes that the expansion should only be done once the MRV Regulation has been established to have a positive effect on the current vessel scope, and mention that it would be a benefit if the global reporting requirements could be aligned.

One association hopes that all countries will implement the IMO regulations, as they would prefer a universal system, rather than having an EU MRV and ETS. They foresee the MRV expansion to yield an expansion of the EU ETS, which will encourage regional equivalent trading schemes, which may make trading internationally more difficult and expensive.

Conversely, a shipping company considers the expansion of the MRV to be inappropriate. They mention that the reduced space onboard limits the expansion of crew to undertake these monitoring activities, and as such will jeopardise the safety of the vessel, as the crew will have an increased workload.

Are current MRV rules appropriate to cover additional smaller vessels? Please explain whether you believe that the monitoring, reporting and verification rules are appropriate to cover additional smaller vessels and if not, explain which changes would be appropriate to consider?

Figure 6-4: Industry responses on considering the appropriateness of current MRV rules to cover additional smaller vessels (n=9)



Majority of stakeholders believe that the current MRV Regulation rules should be adjusted if it was decided to expand the scope to other types of smaller vessels. It is believed that some modifications should be made to account for the differences with smaller vessels, with the regulation evaluated prior to roll out.

Several companies believe that reduced monitoring and reporting should be in place for smaller vessels. One shipping company believes that total GHG emissions per year is considered to be a sufficient level of monitoring, rather than reporting on a voyage basis. An association also aligns on this, discussing that data can be collected on a yearly scale, alongside the exclusion of cargo data (as this is not considered relevant), in order to reduce the administrative burden. Another company also mentions that simplified reporting or tiered compliance requirements based on vessel and type could be envisaged, to facilitate participation.

One shipping company mentions that smaller vessels have relatively high port operation, yielding a large emissions impact in port operation, where vessel owners have less influence on reducing emissions, and so may be difficult to enforce the Regulation. They also mention that vessel categories should be appropriately defined by the MRV Regulation to ensure there will be a level playing field; it is discussed that comparing large vessels with smaller vessels is not easy and required knowledge of segments in order to update the MRV appropriately for smaller vessels.

Another shipping company also mentions that a substantial portion of emissions lie with the port, who should take a greater responsibility for the energy used, with another company also mentioning that planning at terminals should be optimised. This company mentions that changes need to accommodate the differences with smaller vessels, for example, with smaller vessels being able to discharge their own cargo as opposed to large container vessels, which uses more fuel and thus affects emissions. One association also mentions that some parts of the regulation may not be appropriate for smaller vessels, e.g. on

energy efficiency measures. They believe that energy efficiency is important, however such devices, e.g. Carbon Capture and Storage (CCS) technologies, may be difficult to be fit onto smaller vessels; it is mentioned that such impacts should be evaluated before updating the threshold.

Another association mentions that there are several issues with the current MRV Regulation which should be fixed first before extending the scope to other types of smaller vessels. It is mentioned that there is a big learning curve with the regulation and data collection, with problems only realised when companies are trying to implement the regulation. Another association also aligns with this, mentioning that it would be appropriate to monitor, report and verify emissions of certain types of smaller vessels for some time prior to expanding the scope of the MRV to other smaller vessels not currently included in the MRV 2025 scope extension. They mention that smaller vessels undertake more complex trades when compared to larger vessels, i.e. operating inside or close to ports, which should be accounted for.

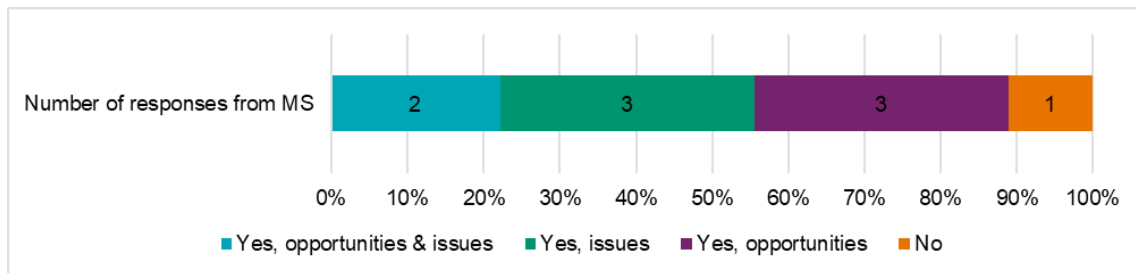
Two associations have a similar view, whereby they would like for the MRV and ETS regulations to be assessed before lowering the thresholds. They discuss recently entering a discussion on size thresholds with members, relating to the IMO regulations (CII and DCS), where members were initially in favour of lowering thresholds, but after further consultation, mentioned that the threshold should not be contemplated before the review of the regulations were complete and working as intended, i.e. 100% accurately and incentivising correct decarbonisation behaviours; their members also indicated concern over fitting of energy efficiency devices on smaller ships, with limited feasibility due to space constraints. One association had not consulted members with regards to potential expansion of the MRV and ETS scope, however, expect their consensus to be similar to that of lowering thresholds for the IMO regulations. Problems faced by members under the current MRV and ETS regulations include issues with setting up accounts, with submission of monitoring plans, and inconsistencies of approach in different administrations.

Another shipping company, whose vessels are mostly just below the 5,000 GT size, believes that the current MRV rules are appropriate to smaller ships. They mention that all their vessels are trading the same area within Europe without any major differences. However, it was also mentioned that there should be a fair limit on the basis on which vessels are required to report, considering that smaller vessels are trading only within EU waters; they mention that the MRV expansion should consider the economic impact on operators of smaller vessels and diverse ship types, and that participation can be facilitated through simplified reporting or tiered compliance requirements based on vessel size and type.

Issues / opportunities from implementation to smaller vessels & other vessel types

Do you/your organisation foresee any other issues or opportunities resulting from the potential expansion of the MRV Regulation to additional smaller vessels (400 – 5,000GT) or other vessel types?

Figure 6-5: Industry responses regarding issues or opportunities resulting from expanding the MRV Regulation (n=9)



Stakeholders are fairly divided on the issues and opportunities resulting from a potential MRV expansion to additional smaller vessels and other vessel types. Some stakeholders are generally of the view that the MRV expansion is positive, e.g. one association mentions that it is fair to owners of general cargo ships below 5,000 GT to be included in the regulation. They are in strong support of reducing the thresholds, in order to prevent ships using smaller vessels with a view to avoid being covered by MRV. Several shipping companies are also in support, with one company mentioning that the potential expansion would eliminate the present imbalance and prevent trading of vessels just below 5,000GT due to being foreseen as cheaper to maintain compared to vessels just over 5,000 GT. They also believe that expanding the MRV scope will allow for better assessment and comparison across different segments of the maritime industry, and can improve the completeness of maritime data, providing a more accurate picture for policymakers and stakeholders.

One shipping company mentions that the MRV can reveal options to minimise environmental impacts of smaller vessels. However, it mentions concerns over the resulting increased pressure on their crew, due to the numerous vessel movements by smaller vessels and increasing port calls; it was argued that smaller crews and short-sea shipping are not ideal for the amount of administration required. Despite this, they see more opportunities with the MRV Regulation, as it can provide useful vessel data which can be sent to shipyards who can utilise this when building new vessels, in order to optimise vessel design and improve energy efficiency. Another company does not foresee any practical issues with implementing the MRV Regulation on additional smaller vessels, as they are already collecting such information.

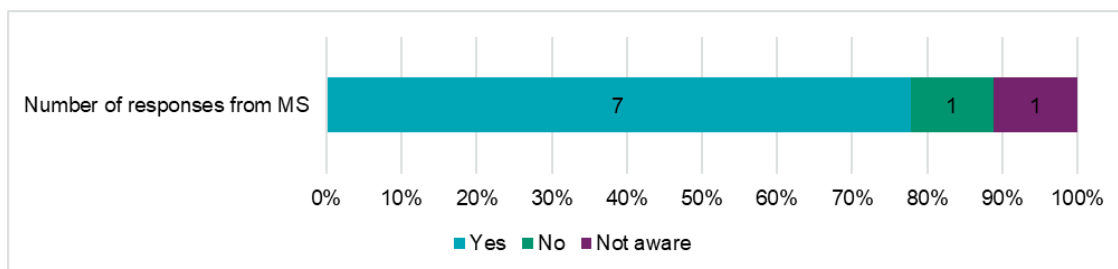
One association mentions that the MRV reporting requirements are partly linked with FuelEU Maritime, and as such organisations may be able to reuse some MRV data for FuelEU purposes, as both regulations cover a similar scope.

Several other companies mention potential issues with managing the additional workload with an expanded scope, as previously discussed. One association mentions that this burden is enhanced for companies not currently reporting under the MRV Regulation, as they will need to implement completely new systems and familiarise themselves with the requirements. A shipping company mentions that if such administrative burden is not managed well, it will lead to a bureaucratic system that will prevent recruitment to the industry. Another association is concerned with companies having to deal with two different regulations, and two separate thresholds (IMO and MRV); not in regard to companies confusing the two, but more so the increased burden of having to monitor and report under two regulations.

Unlevel playing field

Do you consider that there is an unlevel playing field related to the current exclusion of some smaller vessels between 400 and 4,999 GT (other than general cargo and offshore vessels) from the MRV Regulation? Do some of these smaller vessels compete with vessels above 5,000 GT within the same market segment?

Figure 6-6 Industry responses to whether there is an unlevel playing field related to the current exclusion of some smaller vessels from the MRV Regulation (n=9)



Several stakeholders agree that there is currently an unlevel playing field between smaller and larger vessels resulting from the exclusion of smaller vessels from the scope of the MRV Regulation. One association, whose majority of members own or manage smaller vessels, mentions that there is competition between larger and smaller vessels, driven by the extra costs to implement the MRV Regulation for larger vessels (i.e. verification costs, staff costs to collect and monitor data) which companies will avoid paying if they can. They mention that there are market distortions between different ship types and sizes, even within the same ship type, i.e. with vessels just above 5,000 GT being in competition with those just below 5,000 GT in short-sea shipping. Another company also mentions that the competition is only surrounding the boundaries of the thresholds, such that those directly above and below the limits facing an unlevel playing field. An association agrees, mentioning that

smaller vessels should play their part in the MRV Regulation, otherwise this may distort the size of ships being built i.e. companies building vessels of 4,999 GT. One shipping company mentions that competition is faced by larger vessels, being displaced by smaller vessels, but not the other way round; it was said that the segment does not compete upwards.

Another company also agrees that shipping companies may find it more cost effective to use smaller vessels for certain routes to avoid MRV compliance costs, specifically for companies operating both smaller and larger vessels, despite potentially yielding per-unit emissions.

A company mentions that smaller vessels operating in short sea shipping may compete with other modes of transport, i.e. road and rail in particular, as a result of the MRV expansion, however, do not indicated any views on the competition between smaller and larger vessels.

Another shipping company conversely mentions that larger vessels have a competitive advantage in that they are more fuel efficient per volume of cargo transported, compared to smaller vessels. As such they are mentioned to perform better under the MRV system.

One company interviewed believes that there is an uneven playing field for smaller vessels, due to such vessels being cheaper than larger vessels. However, they state that smaller vessels do not compete with larger vessels within the same market segment, as they consider chartering costs to be smaller for this segment. Upon further enquiry, they mentioned that they expect no advantage for smaller vessels over larger vessels; the reason for this was not explained further.

6.1.5 Summary of Member State responses

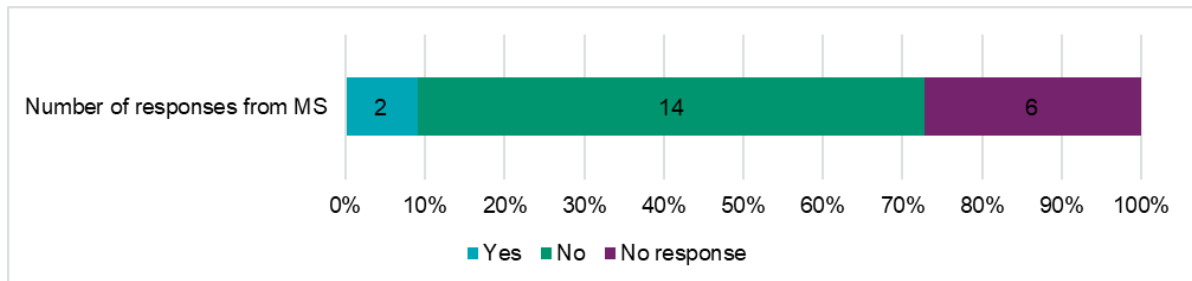
Member States provided inputs in the form of questionnaires. In addition to administrative and enforcement costs data discussed above, following questions were asked qualitatively. Responses were received from 22 Member States.

Does your Member State have any reporting mechanism in place to monitor GHG emissions from (some) ships currently excluded from MRV scope? Does it have the emissions data for these ships?

As seen in Figure 6-7, most of the Member States (MS) (14 out of 22) responding to the data request indicated that there is currently no reporting mechanism in place to monitor GHG emissions from ships currently excluded from MRV scope, while six did not provide a specific response to this question. Only two indicated having a reporting mechanism but limited to specific ship types; one Member State reported that icebreaker vessels (currently excluded from MRV scope) report to the IMO database on CO₂ emissions, with another

reporting that a mechanism has recently been approved to monitor emissions from offshore wind vessels.

Figure 6-7 Member States' responses on existing reporting mechanisms to monitor GHG emissions from ships currently excluded from MRV scope (n=22)



For most of the countries that responded that they do not have a reporting mechanism outside MRV scope, they indicated that they are either only operating mechanisms under the current scope or do not have a reporting mechanism at all. However, some MS provided more details about the limitations of their current reporting mechanism or similar regulations they have.

For instance, one MS currently does not have a mechanism to monitor GHG emissions from smaller vessels beyond the MRV scope. It is considering building a domestic MRV framework, however, the main data for this is managed by the Customs and there is no comprehensive or standardized reporting. Its port authorities may already have programs to monitor and reduce emissions from vessels, but it is not robust yet. In another MS, there is no reporting mechanism for GHG in place, but it is considering reporting requirements for ships sailing between its ports to use in its national inventory of GHG. In another MS, there is no reporting or monitoring obligation, but the Port Authority tracks incoming smaller vessels outside the MRV scope. One MS reported that there is an ongoing project for the implementation of EU Directive 2016/2284 on national emissions ceilings although it does not have additional reporting mechanisms.

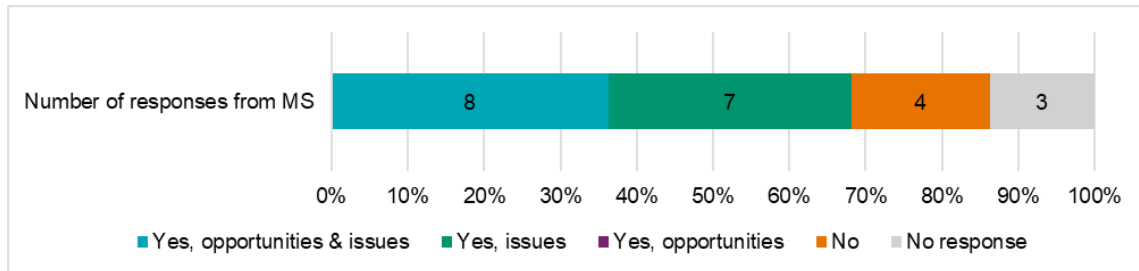
One of the two Member States with a reporting mechanism has approved a mechanism to monitor GHG emissions from the ships that will be used to construct the offshore wind power bank. The other has a mechanism for icebreakers to report to the IMO's database, which are excluded from the MRV scope.

Does your Member State/your authority foresee any issues and/or opportunities resulting from the enforcement of any potential expansion of the MRV Regulation to other smaller vessels (400 – 5,000GT) and/or other vessel types?

The majority of the Member States responding to the data request indicated that there would be either opportunities or issues from the enforcement of the potential expansion of the MRV Regulation. 15 raised concerns around potential

issues and 8 of them identified opportunities at the same time. 4 of them responded the influence would be insignificant, and 3 Member States did not respond to that specific question.

Figure 6-8 Member States' responses to foreseeing issues and/or opportunities resulting from the enforcement of any potential expansion of the MRV to other smaller vessels (400-4,999 GT) and/or other vessel types (n=22)



There are main opportunities identified by a few member states in common. Firstly, the quality and coverage of emissions monitoring data would be improved. The expansion collects additional data from smaller vessels, and this would allow a comprehensive assessment of emissions in the maritime sector. Secondly, the expansion would be an opportunity to achieve the level playing field and ensure equal terms for all vessels, regardless of the size. This also aligns with what one MS underlined, that this would give less incentive for larger vessels to perform transshipment and use small feeder vessels to carry the cargo to EU ports, thereby reducing or avoiding ETS surrendering obligations, if smaller vessels were also to be included within ETS scope subsequently. Thirdly, the expansion will eventually lead to further leverage for the decarbonisation of shipping and adoption of greener practices. Smaller vessels will be more incentivised to invest more in energy efficient technology and fuels. This will allow a more cost-effective transition in the maritime sector.

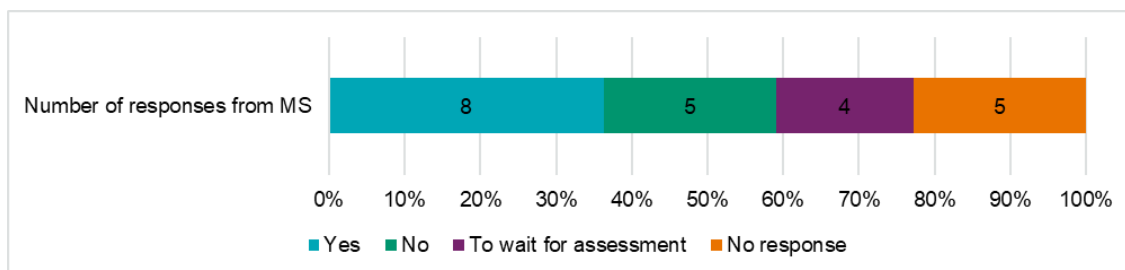
On the other hand, Member States also raised concerns about potential issues. Firstly, the majority of respondents were concerned about the potential increase in administrative burden and MRV compliance cost for both national authorities and smaller vessel operators. The enforcement procedures and systems would need to be developed following the expansion. This then would be instructed to smaller vessel owners, which was considered as being extra costly if they are currently not operating under MRV. There are further barriers that were mentioned, like a relatively high number of smaller vessel operators, and the tendency that they have fewer personnel in the business. Due to this administrative burden, many respondents questioned the effectiveness – the amount of additional emissions to be included following the expansion – compared to against that potential additional burden. Secondly, there was concern raised about the quality of data collected by smaller vessels. Data collected by smaller vessels are more difficult to be standardized. This was mentioned as a reason possibly harming the consistency and reliability of data as a whole, which would create a need to develop a robust system to collect,

verify and analyse data. Furthermore, concerns around alignment with other regulations have been raised. The EU (MRV) and the IMO (DCS) should be further aligned in order to have a common level playing field, together with ETS. Additionally, a few countries raised concerns about possible issues in defining ship types that would fall within or outside of the scope, as well as potential enforcement problems for certain types of ships that are not subject to port state control (e.g. fishing vessels).

Does your Member State/authority consider that the inclusion of other smaller vessels and/or other ship types in MRV scope would be appropriate? If so, which one(s)?

For the question regarding the inclusion of other smaller vessels or other ship types in MRV scope, answers varied a lot. Eight responded it is appropriate, five said it is not, and four did not provide a concrete answer, highlighting the need for further assessment.

Figure 6-9 Member States' responses on considering appropriate inclusion of other smaller vessels and/or other ship types in MRV scope (n=22)



For those who responded that the inclusion is appropriate, most answers simply agreed that the currently announced scope of smaller vessels (i.e. offshore ships and general cargo ships) is appropriate. However, a few member states made suggestions beyond the scope. One mentioned that it seems appropriate to include all other ships (GT 400-4,999) within MRV scope, in addition to small general cargo ships and offshore ships. Another MS also underlined that the inclusion of further types of vessels is desirable. Further, one MS highlighted that while the inclusion is appropriate, the decision would need to be based on a thorough assessment of technical feasibility, regulatory burden, and the characteristics of vessel types. Including other types of vessels could be beneficial but there could be challenges for each type of vessel to be addressed. That MS also emphasised that a phased approach, which starts with vessel types that have the greatest environmental impact, could be practical.

All the member states which responded the inclusion is inappropriate or that there should be further assessment had a concern around the effectiveness of GHG emission coverage. Some MS assessed the inclusion as inappropriate because the current scope of vessels only above 5,000GT already covers the

majority of GHG emissions. The other countries underlined the need for the potential assessment to compare the additional administrative burden and the amount of additional emissions to be covered by MRV Regulation. One MS further suggested that it may be appropriate to only assess the emissions of smaller vessels in firms which have a large fleet. As these companies would already have implemented MRV/ETS system or have their own green strategies, it was argued they might find it easier to absorb financial burden from monitoring.

6.2 Appendix 2: Illustration of vessel sizes

This appendix aims to illustrate the size of vessels within the range of smaller vessels (400 to 4,999 GT) and compare them against large vessels already in MRV. This is illustrated for specific RoPax vessels and tankers, as an illustrative example of passenger and freight vessels, respectively.

RoPax ~500 GT (Flyingcat 5)



RoPax ~5,000 GT (Superrunner Jet II)



RoPax ~30,000 GT (Hellenic Spirit) – Large ferry



Tanker ~500 GT (HOUSEI MARU)



Tanker ~5,000 GT (YULIY MAKARENKO)



Tanker ~160,000 GT (Adamantios) - Typical VLCC tanker



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