Extension of EU-ETS to the offshore sector

Practicalities

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Summary

As of 2024, the EU Emissions Trading System (EU ETS) will be extended to maritime transport emissions. Ships transporting cargo or passengers will have to monitor and report their emissions on journeys to and from EU ports. As of 2025 *offshore ships* from 400 GT and above will also fall under the EU Monitoring, Reporting and Verification (EU MRV) regulation and from 2027 onwards, offshore ships of 5,000 GT or above will need to surrender emission allowances under EU ETS.

By extending EU ETS to offshore ships, also these non-transport ships will be incentivised to reduce their emissions. Around 20% of the 3,000 ships in the EU member states' fleet operating in offshore activities, are owned by Dutch shipowners. Therefore, it is highly relevant for the Dutch industry that the regulation is effective, workable and enforceable, keeping evasion and carbon leakage as low as possible and, the level playing field intact. The Dutch ministry of Infrastructure and Water Management identified several points in the amended EU MRV regulation and EU ETS directive that need to be addressed to overcome issues that arise when implementing the regulation. Therefore, the ministry of Infrastructure and Water Management requested CE Delft to describe the challenges and make suggestions how to improve the functioning of these instruments.

In the analysis two main concerns are addressed:
1. The lack of a clear definition which ships are classified as offshore ships in the regulation.
2. The definition of a port call for offshore ships based on a crew change.

What does the term 'offshore' include?

The first issue identified is the lacking definition of what is meant with offshore. Typically, offshore doesn't include for instance dredging. However, it is assumed that the legislator aims to incorporate all ships that are not typically involved in the transportation of goods and passengers. Another example is ships not propelled by mechanical means that are under the EU MRV-definitions specifically excluded. They can nonetheless be equipped with huge engines and be towed by tugs to execute activities at sea. In this report the different categories of non-transport activities and ships which are being used are identified and outlined. The following categories are identified:
- offshore production of fossil resources;
- offshore construction;
- dredging;
- research;
- services (e.g. tugs, supply of crew and supplies for offshore work at sea).

These maritime non-transport activities are concentrated at and around maritime worksites, supply crew, or provide services at worksites. The activities at the worksite are characterised by a high energy use and subsequent emissions compared to the energy use for propulsion. The supply of crew and services are characterised by a high total distance sailed per year and energy use is mainly for propulsion between worksites and ports.

Adding a definition for offshore can improve clarity for the sector, can maintain the level playing field, limit the risk of evasion and maximize the environmental impact. To that end

we propose a definition in which offshore ships are all ‘non-transport ship types’ and ‘other ship types’ (i.e. not included by other ship definitions in the regulation).

Port calls and voyages

The second issue identified is the definition of a port call for offshore as ‘where a crew change takes place’. In most cases within the maritime non-transport segments (especially for construction, production and dredging) a crew change doesn’t take place when the ship calls at a port. This raises the question whether a crew change port call is a suitable way to monitor and report emissions of offshore ships, or that offshore ships without crew changes are unintentionally excluded by the set definition. Again, this results in a high risk of evasion but also the effectiveness of EU ETS and the competitiveness of the EU on the long run are at risk.

Therefore, we explored, in consultation with key stakeholders, alternative designs of emissions monitoring and reporting protocols. In this report we reviewed two alternatives that could improve the effectiveness of the instruments and seem better adapted to the peculiarities of the industry. From the two alternatives, the proposed solution in which virtual ports linked to offshore worksites are created, based on legal permits for maritime projects, seems the most promising. The protocol using virtual ports for projects located within the European Economic Zone (of a EU member state) rates best in terms of fairness, proportionality, low risk of evasion and minimal erosion of level playing field. However, the legal feasibility of these alternative frameworks requires further investigation.

Recommendations

Next to the main identified issues, a number of issues following the analysis are required to be addressed:

- There is currently no trustworthy source that can provide clarity about the size of emissions of offshore ships that fall within the EU scope. It is highly recommended that these figures are gathered in order to establish a clear overview of the emissions in aggregate and per sub-segment.
- Policy makers should provide sufficient time for shipowners to change the monitoring systems, to be able to collect data for regulation in the EU MRV.
- If the regulatory protocol of voyages and port calls registration is to be adjusted for the regulation of offshore ships, the registration system Thetis should be able to make the adjustments accordingly in time.
- It needs to be investigated in what way ships can be regulated that have a high frequency of short trips, such as tugs. Regulating them on basis of every voyage they perform may lead to significant administrative cost.
- The regulation should be very clear on which party has to register. For example, when ships temporarily change flag through the commonly used bareboat charters.
- The risk of carbon leakage and/or evasion of EU ETS by ships placed in static position on legs on the seabed at worksites, is required to be investigated further.
- Even when the current regulation will be adjusted to the peculiarities of the industry, still the risk of evasion remains. The additional costs resulting from EU ETS could become an incentive for companies to investigate what the benefit would be when they would, for example, use the UK as location to prepare the ships for the work at sea.
- To prevent that investments in offshore renewable energy production become less attractive due to EU ETS, it might be worthwhile to investigate what the possibilities are for differentiating the regulation between activities around worksites related to renewable energy sources and worksites related to fossil fuels.

Content

1 Introduction

As of 2024, the EU Emissions Trading System (EU ETS) will be extended to maritime transport emissions. Ships transporting cargo or passengers have monitored and reported their emissions on journeys to and from EU ports for EU MRV regulation from 2018 onwards. In the amendment for the extension of EU ETS to the maritime sector, *offshore ships* were added to be included in EU MRV. The legal text states: "as of 2025 *offshore ships* from 400 GT and above will fall under the EU Monitoring, Reporting and Verification (EU MRV) Regulation. Additionally, from 2027 onwards offshore ships of 5,000 GT or above will need to surrender emission allowances under EU ETS."

The aim of the extension of EU ETS is to incentivise emission reduction in a larger part of the transport and non-transport ships performing activities inside the EU scope. However, the amended EU MRV regulation and EU ETS directive pose a number of issues and challenges for the sector:

1. The lack of a definition of offshore ships in the regulations creates uncertainty for the sector about what is and what is not included, both for ship owners and national regulators, which leaves room for interpretation and possibly circumvention of reporting.
2. The atypical fleet and sailing patterns off non-transport ships do not fit into the existing reporting protocols such as the reporting format of the EU MRV system Thetis. This means the scope determination of emissions can be perceived as unfair and lead to problematic monitoring and reporting of EU related emissions.
3. The set definition of port call for offshore ships, at crew changes, leaves room for circumvention and could possibly lead to significant carbon leakage, adverse impacts on the level playing field of European offshore shipowners, and consequent risk of movement of maritime activities (and employment) from the EU to adjacent non-EU countries.

The Dutch maritime non-transport sector, of which ships are active and competitive at a global level, accounts for a large share of European activities and share of ships in the non-transport fleet[1]. Therefore, it is highly relevant for the Netherlands that the regulation has to be effective and enforceable with a minimal possibility of evasion leading carbon leakage and without affecting the level playing field of the sector.

Following the abovementioned concerns, the ministry of Infrastructure and Water Management asked CE Delft to describe the challenges and to come up with potential definitions for offshore ships, port calls and voyages that fit with the characteristics of offshore operations, including also other (non-transport) ship types like dredging and towing and make the system workable.

In Chapter 2 we provide a description of the characteristics of the non-transporting marine activities to get an understanding of why the lack of a definition setting of offshore ships in the regulation could cause difficulties and undesired adverse effects to the European maritime sector. In Chapter 3 we describe the impact of offshore based on the set definition within EU ETS. Chapter 4 provides an alternative definition of ships to include. Chapter 5 introduces other potential frameworks to regulate emissions which provides a better fit with the characteristics of the activities. Chapter 6 deals with the conclusions and recommendations.

[1] Note that the Dutch maritime sector operates also outside Europe on a global scale.

2 Overview of the maritime non-transport sector

In this chapter we provide an overview of the ships performing *maritime non-transport activities* to get an understanding of the various activities of the sector. By outlining the characteristics of the sector, we will be able to analyse the impact of the regulation on these type of ships and on the sector as a whole. This also helps to examine if and how emissions from ships in the maritime *non-transport* segments could be regulated in a more effective way.

Section 2.1 presents the outline of the activities of the sector, categorised by activity cluster/segment. The ship types used by activity cluster, route patterns, and scope of energy use is outlined. In Section 2.2 we categorise the non-cargo/passenger fleet by the abovementioned activity clusters using the fleet database of Clarksons WFR and the IMO classification to obtain an overview of the size distribution of the non-transport fleet.

The IMO 4th GHG study >Faber, 2020 #4840< reports a classification of ships with the term 'workships' for which ships from the *vessel classes* offshore, and other non-transport are listed. It is unclear how the vessel classes are determined. The IMO 4th GHG study (Faber et al., 2020) reports a classification of ships with the term 'workships' for which offshore, and other non-transport ships

2.1 Maritime non-transport activities by segment

The EU MRV Regulation (Regulation EU 2015/757) as amended applies to ships of 5,000 gross tonnage (GT) and above concerning the greenhouse gas (GHG) emissions released during their voyages within and between in the European Economic Area (EEA), during port stays in the EEA, and on their voyages between EEA-ports and non-EEA ports for transporting cargo or passengers for commercial purposes. Ships are subject to the EU MRV Maritime Regulation regardless of their flag. The ship types which are explicitly excluded in the EU MRV are:

- warships;
- naval auxiliaries;
- fish-catching or fish-processing ships;
- ships not propelled by mechanical means;
- government ships used for non-commercial purposes.

In coordination with stakeholders from the sector we have created an overview of the characteristics and activities of the maritime non-transport sector. In this context non-transport ships are considered all ships that are not involved in the transportation of goods and passengers (and the above listed sub-sectors are excluded from the EU MRV-regulation). This means that all other type of workships are considered.

Excluding the abovementioned maritime segments, we have identified a number of sub-segments based on the **maritime non-transport activities**:

a Offshore production of fossil resources: related to extraction and production of oil & gas - (drilling), and deep sea mining.

b Offshore construction: Construction and decommissioning of oil and gas structures, laying pipes/cables, building of offshore wind turbine parks, other maritime infrastructure.
c Dredging.
d Research.
e Services (e.g. supply of crew and supplies for offshore work at sea).

In the following sections we outline the characteristics of each offshore sub-market to get an integral overview of their activities. The main aspects that are outlined are: type of ships used, typical movement of ships and location of performed work, port call frequency, and the scope of the emissions from the *maritime non-transporting activities*.

2.1.1 Offshore production of fossil resources

This sub-segment is active in drilling and extracting of fossil resources at sea, traditionally using drilling ships, stationary platforms and floating units for storage, production and transfer of oil, gas and mining products. Ship types include (not exhaustive list):

- drillship (example in Figure 1)
- well test ship
- floating production unit (various aims and configurations)
- oil transfer ship
- oilfield pollution control ship
- well stimulation ship

Figure 1 – Example of an offshore drillship

Source: Motorship.com

Generally, ships and units are active at a specified location at sea (determined by geographical coordinates). Ships depart from a port and may return to the same port or continue to another worksite at sea, which can be either in the EU or outside the EU geographical scope. The port call frequency of ships and units in this sub-segment varies: ships may be at sea for several months performing work, while crew are changed and supplies are delivered by service ships.

Energy use and thus the release of GHG emissions of ships and production units is highest while performing work at sea. Only a small share of total energy is used for propulsion to sail from a departure port to the worksite location at sea (and vice versa). From sources in the sector, we observed that the division of energy use for propulsion and work varies highly between different offshore ship types.

2.1.2 Offshore construction

Offshore construction entails the construction of all offshore infrastructure and (temporal) built structures at sea. This includes the construction of stationary drill platforms, laying of pipes and intercontinental cable infrastructure, the construction of wind turbines and other

(sub-)sea structures. Maintenance, inspection, repair and deconstruction of infrastructure and build structures are also included in the activities of this sub-segment (Heerema, 2023; PWC, 2023). Ship types include (list is not non-exhaustive):

- heavy lift/crane ship
- remotely operated underwater vehicle (ROV)/Submersible support ship
- semi-submersible heavy lift ship (Figure 2)
- transport heavy lift ship
- cable layer ship
- derrick/lay ship
- pipe layer ship

Figure 2 – Example of heavy lift ship

Source: Safety4sea.com

Also ships in this sub-segment depart from a certain port to a specific location at sea to perform construction work. Depending on the scope of the work as defined in the contract, the worksite can be very specific or defined as a boundary for infrastructural works. Pipe and cable layers lay the required infrastructure in a defined corridor. Ships used for the construction of wind turbines may be operating in a vast area at sea, performing work at a number of different locations, without anchoring (e.g. in case cables are being laid). Depending on the type of construction to be made, a ship or unit may be anchored or not – making use of dynamic position. During dynamic positioning a number of auxiliary engines is used to keep the ship in position.

Ships and units depart from a port and may return to the same port or another port after performing (multiple) work(s) at sea. Often ships and units related to construction are at sea for a longer period of time, from several months to over a year at sea depending on the size of the project. Onboard crew are changed and supplies are delivered by a service ship. Therefore, the frequency of port calls by ships and units in this sub-segment varies accordingly.

Similar to ships working in offshore energy production the energy use and thus release of GHG emissions of ships and production units active in the construction segment is highest at sea. The energy use for sailing to and from working sites is often a smaller share of the total energy use.

2.1.3 Dredging

The activities of the non-transport segment dredging entail the removal and relocation of sediments and other materials with the aim to develop, maintain, protect and reclaim land bodies, coastlines and waterways. A wide range of activities can be counted to dredging.

Type of ships used in the dredging segment include (list is not non-exhaustive):

- backhoe/dipper/grab dredger
- barge unloading dredger
- bucket ladder dredger
- cutter suction/bucket wheel dredger (Figure 3)
- dredger ship
- special equipment dredger
- suction dredger
- suction hopper dredger
- trailing suction hopper dredger

Figure 3 - Example cutter suction dredger

Source: Boskalis.com

Dredging ships depart from a port to a work location at sea to execute work. Generally, dredging ships have a site at sea where sand, gravel or other materials are gathered. Then, they either sail to the location at which the materials are to be delivered or directly load the dredged material onto another ship that will transport the material to the next destination. Dredged material may also be transported to the destination by floating pipelines. This gathering and delivery of material may take place at high frequency and for several days continuously during 24 hours. The worksite is not by definition fixed to one set of geographical coordinates, as dredging work may cover an extensive area (of a coastline). Depending on the type of dredging work, a ship may be anchored or not.

Depending on the portfolio, dredging ships and units can be at sea for a shorter or longer time period. This can be from several months to over a year at sea depending on the size of the project or if several projects are performed consecutively. In addition, refuelling takes place at sea as well as crew changes and intake of supplies. Service ships, crew boats or helicopters take care of the crew change and delivery of supplies to and from dredging ships.

Similar to ships working in other sub-segments, dredging ships use most energy while at work at the working site. Fuel consumption and thus release of GHG emissions of dredging ships are up to three times more while working at sea compared to sailing.

2.1.4 Maritime research

Offshore research entails the technological development and innovation of offshore activities and investigation of the marine environment. The activities of offshore research have a broad range and involve experiments for the development and safety of offshore structures, assessments of impacts of offshore activities, and non-commercial research on the status of the marine environment such as data collection and visualisation of maritime processes (Rayner et al., 2019; SDU, 2022). Research ships are often used for assistance in analysis of the marine environment to aid other offshore sectors to prepare their offshore projects. Ship types include (non-exhaustive list):

- geophysical survey
- hydrographic survey
- oceanographic survey
- research ship (Figure 4)
- seismic support

– seismic survey

Figure 4 - Example research ship

Source: Damen.com

Generally, research ships are active at a defined area at sea (determined by geographical coordinates). Ships depart from a port and may return to the same port or another port after performing work at sea. Compared to other sub-segments, research ships do often have a fixed home port. Research ships may be active at sea for shorter or longer periods, depending on the project.

Energy use of research ships is expected to be the highest for propulsion and stabilisation at a research location at sea, due to the absence of heavy physical work. There division of fuel consumption and the release of GHG emissions research ships varies according to the type, length, and distance of the project.

2.1.5 Maritime offshore services

The activities of the sub-segment offshore services entail the supply of goods and crew, on-site assistance, and medical aid for parties active in other offshore sub-segments.

Ship types include:
- accommodation ship (Figure 5)
- anchor handling tug
- construction service operations ship
- crew/supply ship
- diving support ship
- Emergency Response & Rescue Ship
- maintenance ship
- miscellaneous offshore service ship
- multi-purpose support ship
- offshore crew tender ship
- PSV/supply ship
- service operations ship
- standby safety/guard ship
- tugs[2]
- utility/workboat

[2] Note: These ships do not exclusively service offshore sector. Tugs can both service cargo/passenger ships and non-transport ships.

Figure 5 - Example accommodation support vessel,

Source: Actamarine.com

Service ships may have a wide varying route pattern at sea depending on the work activity. Service ships often perform so called *milk-runs*, providing supplies to several worksites and returning back to their home port. The main aim of service ships is to provide crew, supplies and assistance to offshore worksites and ships. This means most of the energy use and emissions of service ships result from sailing at sea. Service ships may be active at sea for shorter or longer periods, depending on the project.

Energy use of service ships is expected to be the highest for propulsion and stabilisation at the work location at sea. Depending on the task, a ship may use several generators to maintain position at sea (against the currents) near a worksite.

2.1.6 Overview maritime non-transport activities

Following the outline of maritime non-transport activities in the forementioned sections, we can extract a number of general characteristics concerning the movements of ships in these segments and extent of ships' activities and subsequent distribution of fuel use.
By taking a perspective of the distribution of energy use of ships we make a distinction for the ships which are active in maritime non-transport commercial activities at sea in two categories, outlined in Table 1. The distinction is based on the activity which causes the majority of their emissions, which is either:

- the majority of the emissions of a ship are from performing (physical) work at maritime worksites: fuel use not related to propulsion but physical work has generally the largest share when considering the ships yearly total fuel use;
- the majority of the emissions of a ship are from sailing to and from maritime worksites for the supply of crew, goods, and services (propulsion related fuel use has generally the largest share when considering the ships yearly total fuel use).

Table 1 - Main categories of offshore related activities by distribution of energy use

Activities concentrated at and around maritime worksites	**Activities concerning supply of crew and services**
– Generally lower frequency of voyages; – Generally lower total distances sailed per year; – Energy use and subsequent emissions highest/ concentrated at offshore worksites.	– Generally high frequency of voyages; – Generally higher total distances sailed per year; – Energy use mainly for propulsion to and from worksites and ports.
Ships generally used for activities related to maritime worksites	**Ships generally used for supply of crew and services to worksites at sea**
– Offshore ships for extraction of resources; – Offshore construction ships; – Dredging ships.	– Research ships; – Service ships.

2.2 Non-transport fleet

With use of the fleetbook of Clarksons World Fleet Register we could gather information on the European (and Dutch) fleet used for offshore activities. The categorisation is done using the IMO fleet database.

Table 2 - Number of non-transport ships of 400 GT and above (status 1 December 2022)

Offshore activity	Count of ships under EEA ownership	Count of ships under Dutch ownership	Share of ownership (Dutch)
Production of resources	105	18	17%
Construction	130	43	33%
Dredging	463	150	32%
Research	221	44	20%
Services	1,948	327	17%
Total number of ships	**2,867**	**582**	**20%**

The fleet analysis shows a relatively large part of ships active in offshore activities are owned by Dutch shipowners. The ownership of ships is based on the group owner under which the ship is registered. The registered address of the firm determines the country of the group owner. About a third of the European construction ships and a similar share of dredging ships is owned by Dutch shipowners and 20% of research ships is owned by Dutch shipowners. This underlines the importance for the Netherlands of clear regulation for the ships in these segments that is effective, workable and maintains a level playing field, both within the EU as well as between EU and third countries.

Figure 1 - Division of offshore related ships in size categories (European owned fleet)

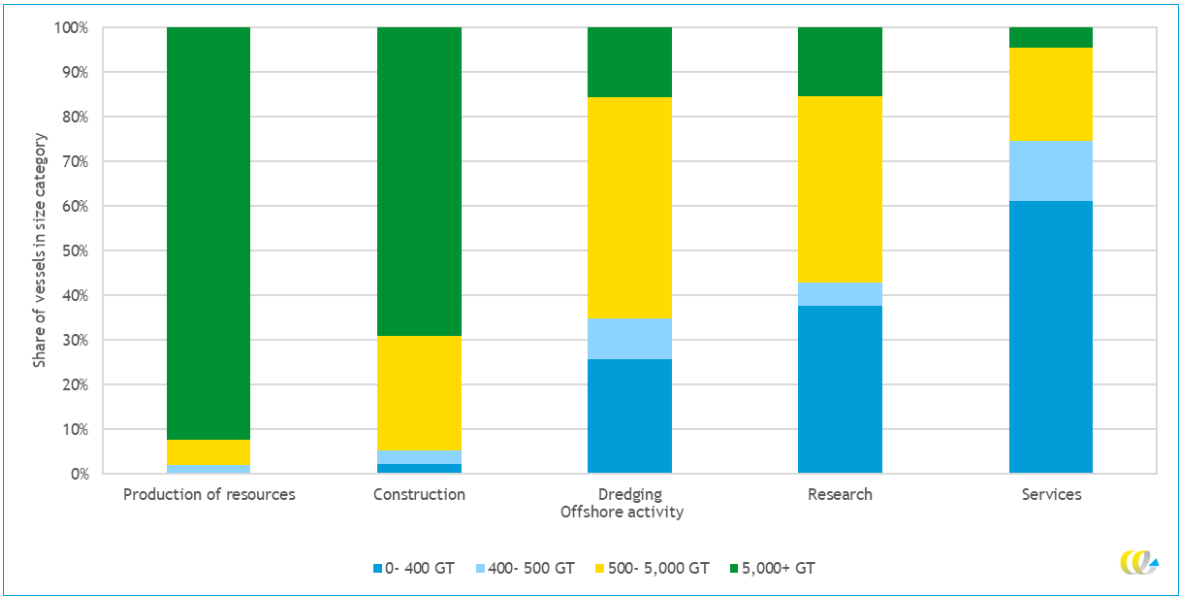
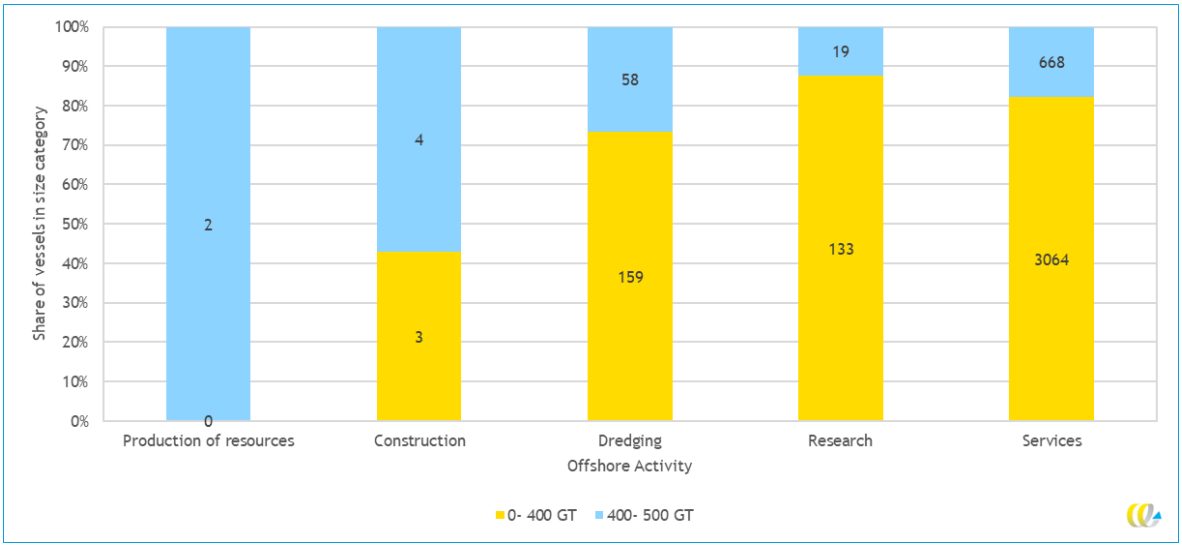


Figure 2 - European owned offshore related ships in the size categories around the ship size boundary of 400 GT



3 Impacts of the regulation of offshore ships

In this chapter we explore the practical meaning of extending EU MRV and EU ETS to 'offshore' ships in accordance with the present EU MRV and EU ETS amendments. Using the insights on the activities and route characteristics of the ships active in the maritime non-transport sector we can outline likely impacts of the definition as stated in the regulation.

We assume that the aim of the amendments to the EU MRV and EU ETS directives is to regulate the GHG emissions of all other ships similarly to the ship segments that transport goods and/or passengers, in a way that is effective, workable and minimises distortion of the level playing field.

In the first section of this chapter, we analyse the implication of the lack of a definition of 'offshore ships' – without examining the workings of the port call definition. In the second section we examine for the current definition of the port calls the advantages and disadvantages of the setting of the scope of emissions measurement for ships.

3.1 Emissions regulation offshore ships

The EU MRV applies to all ships within the EU scope[3] unless explicitly excluded. The ship types which are explicitly excluded in the EU MRV, and therefore also from the definition of offshore ships are:

- warships;
- naval auxiliaries (military supporting ships – non-commercial);
- fish-catching or fish-processing ships;
- ships not propelled by mechanical means;
- government ships used for non-commercial purposes.

The amended EU MRV regulation (EC, 2023b) states the following on the inclusion of the offshore sector:

- Article 2, Paragraph 1a:
  - *"From 1 January 2025, this Regulation shall also apply … to offshore ships below 5,000 gross tonnage but not below 400 gross tonnage in respect of the greenhouse gas emissions released during their voyages from their last port of call to a port of call …"*
  - *"From 1 January 2025, this Regulation shall apply to offshore ships of 5,000 gross tonnage and above in respect of the greenhouse gas emissions released during their voyages from their last port of call to a port of call …"*
- Article 3, Paragraph z:
  - *"port of call" means a port of call as defined in Article 3, point (z), of Directive 2003/87/EC of the European Parliament and of the Council.*
  - *"port of call" means the port where a ship stops to load or unload cargo or to embark or disembark passengers, or **the port where an offshore ship stops to relieve the crew**; stops for going into dry-dock or making repairs to the ship, its equipment or both, stops in port because the ship is in need of assistance or in*

[3] The EU scope is valid if a ship makes a port call in a port of an EU member state.

distress, ship-to-ship transfers carried out outside ports, stops for the sole purpose of taking shelter from adverse weather or rendered necessary by search and rescue activities, and stops of containerships in a neighbouring container transhipment port listed in the implementing act adopted pursuant to Article 3ga(2) are excluded "

The EU ETS directive (EC, 2023a) states the following on the inclusion of the offshore sector:

- Article 9:
  - *"From 1 January 2026 and 1 January 2027 respectively, the quantity of allowances shall be increased to take into account the coverage of greenhouse gas emissions other than CO_2 emissions from maritime transport activities and the coverage of emissions of offshore ships, based on their emissions for the most recent year for which data are available."*
- Article 3, Paragraph z:
  - *"port of call' means the port where a ship stops to load or unload cargo or to embark or disembark passengers, or **the port where an offshore ship stops to relieve the crew**; stops for going into dry-dock or making repairs to the ship, its equipment or both, stops in port because the ship is in need of assistance or in distress, ship-to-ship transfers carried out outside ports, stops for the sole purpose of taking shelter from adverse weather or rendered necessary by search and rescue activities, and stops of containerships in a neighbouring container transhipment port listed in the implementing act adopted pursuant to Article 3ga(2) are excluded"*

The above legal texts indicate how the EU aims to include the monitoring and reporting of emissions from offshore ships, with regulation of certain size classes earlier and later in time.

According to the earlier mentioned exclusion of certain ship types (and the regulation of cargo and passenger transporting ships), we can interpret the legislator aim to regulate al other non-transport ship types. For this, the legislator chose to use the word 'offshore ships' which appeared to be problematic for some segments of the maritime non-transport sector as the term *offshore* traditionally appoints to one specific segment of the sector. The mentioning and use of the term *offshore ships*, however, may imply the term *offshore ships* should be interpreted broadly for coverage of all non-transport ships.

However, a few issues arise with the regulation of offshore ships with the lack of a clear definition of *offshore ships*. This still raises the question which ship types and/or activities are to be included in the regulation. In Section 3.2 the implications concerning the ship definition is outlined and different definitions are explored.

The geographical scope of the emissions for offshore ships is also linked to their voyages, measured between *port calls in which the ship performs a crew change*. The regulation of port calls can be interpreted in different ways, with the result that it remains unclear what voyages are and are not included in the scope and the scope setting provides a risk of unintended effects. In Section 3.3 the expected implications concerning the port call definition is outlined and alternatives are explored.

Textbox 1 - Views from stakeholders concerning emission regulation of 'offshore ships'

Several sessions with stakeholders made clear there is a concern about the regulation in relation to the international level playing field. The current lack of definition for *offshore ships* and set-up of the EU MRV and EU ETS regulation protocol for offshore ships provides room for parties unwilling to comply to circumvent the regulation. The risk exist that (non-EU) parties may try to evade the regulation. This creates (unacceptable) risks for the European maritime sector.

In stakeholder consultations with parties from the sector, it became clear that the definition of offshore is perceived as too narrow when one tries to capture all non-transporting maritime activities at sea. In the sector and maritime regulation, the term offshore usually applies to the activities around the exploration of oil and gas at sea. Since the development of wind turbine parks at sea, some may also incorporate the building and maintenance of these parks under the term offshore. However, other non-transporting maritime activities such as dredging and maritime research are generally not called offshore activities. To make sure that these maritime sectors also know they are called upon, a clear definition of the ship types/activities would be beneficial.

3.2 Implications of a lack definition of 'offshore' ships

Assuming the intention of the legislator with the latest amendment of the EU ETS is to include all other ship types for monitoring and reporting of their emissions in the EU scope by naming them *offshore ships*. The aim seems to be improving the effectiveness of EU ETS by extending the scope to non-transport and other types of ships. However, the lack of a definition for offshore ships could lead to interpretation differences by the sector. In this section the situation with a lacking definition of offshore ships is outlined.

Problems that may arise with the lack of a definition of offshore ships: for some ships in the maritime sub-segments it is unclear whether they are included or not. Some ships such as tugs can perform work for other maritime sectors than for offshore, which leads to unclarity about regulation of their emissions.

Based on insights from industry stakeholders, a definition based on specific ship types may lead to continuous development and submission of new ship types (with minor adjustments to avoid regulation). This implies that setting a definition based on specific ship types poses also a risk for effectiveness and unwanted effects.

Stakeholders expressed that due to the lack of definition of offshore ships, it is for some non-transport segments questionable whether they have to comply to regulation. This is because in existing regulation the term offshore is not generally used to appoint all non-transport segments. The term offshore is specifically used by the maritime sector as those activities for fossil resources and maritime construction. If the aim is to include all other non-transport segments (such as dredging ships) the sector expressed the wish this should be clearly stated in the definitions, otherwise some segments are uncertain whether they are to be regulated.

Another example can be found in the services segment: a seagoing tug can be deployed in both the offshore sector and for other maritime segments. Shipowners of service ships might claim they are not part of the offshore fleet as their activity is not solely in the offshore segment.

Additionally, the lack of a specific definition may lead to situations where ships may opt to be regulated as a cargo transporting ship if the reporting protocol causes substantial

differences in the extent of emissions regulation. A concrete example for this is if an offshore ship departs from an EU port, works at a project in the North Sea (within the EU) and then transits to the UK to make a port call before returning to the EU port. If the ship has a possibility to be labelled as a transport ship the voyages are regulated for 50% instead of 100% which is a risk for evasion.

The lack of a definition for offshore ships in the regulation may lead to a situation in which a significant number of ships may try to evade regulation using the lack of a definition, and the environmental impact may be different than intended. The intention of the legislator is to regulate offshore ships under EU scope (with offshore ships defined as all non-transport ships). Because the type of ships and activities of *offshore ships* to be included in the regulation are unclear, the expected number of regulated ships is ambiguous.

Nonetheless, we can outline the expected types and number of ships that would be regulated under EU MRV following the proposed regulation. Table 3 contains an overview of the ship categories which can be expected to be included in the situation without a specific definition of offshore ships. Also, the table indicates which segments of ships may be sensitive for evasion due to a lack of a definition for offshore ships. This is because the lack of a definition may lead to claims about whether or not these ships are related to 'offshore'.

Table 3 – Overview of expected ship categories included by the definition *offshore ships*

Ship categories clearly included	**Ship categories for which inclusion is unclear**
– Offshore production ships; – Offshore construction ships; – Some service ships active for offshore projects.	– Dredging ships; – Research ships; – Other service ships (e.g. tugs).
Number of ships included	**Number of ships**
EEA: 235 Netherlands: 61	EEA: 2,632 Netherlands: 521

In short, even with the intention of the legislator to cover as much as emissions as possible in the offshore segment, only a part of the ships might be in practice be regulated due to the lack of the definition. In the maritime sector can be expected to (strictly) interpret offshore ships as those active in what presently offshore activities/projects are.
The number of ships under EU ownership that would be regulated under such a strict definition is 246 and 61 Dutch owned offshore related ships.

Evaluation of the consequences of a strict interpretation of the term offshore in terms of advantages and disadvantages:

– **Evasion and level playing field:**
  - There is a risk evasion if the offshore sector is to be regulated if ships depart from or arrive to an EU port. This is due to the fact that if a ship is sailing and working from an EU port, all their emissions are regulated, while if the ship performs the same work at the same project and departs from a non-EU port, no emissions regulation takes place. This creates a large disbalance in the level playing field for European offshore ships. Consequence of this outcome may be the large-scale outflow of European offshore firms with the aim to maintain their competitive position.
  - Without a definition of what ships and/or activities are included under the term offshore, a part of the non-transport ships may claim they are not offshore ships.

For instance, ship operators might claim their ship type is in the *other ship* types segment – and do therefore not have to report/surrender emissions, as they are not involved in traditionally speaking *offshore* activities (such as oil, gas and wind energy extraction and production at sea).

– **Environmental impact:**
  - By applying the regulation strictly to *offshore ships* only, a significant share of ships active in non-transport work would be excluded from the present emissions regulation. Consequently, the other ship types have to be included in another amendment, which leads to emission reduction at a later point in time.
  - Due to the abovementioned risks concerning evasion, the environmental impact is uncertain under this definition. Thus, it is unclear what extent of emissions of the offshore fleet will be regulated (and reduced over time) and what part of the emissions are leaked to other jurisdictions where no emissions regulation exist.
  - A number of non-transport ships have the possibility to turn into a stationary object by attaching beams on the ship at the seabed. As stationary installations are regulated by EU ETS as well, but from a minimum installed power capacity (20 MW), it seemed this practice could be a risk for evasion and carbon leakage. However, stakeholders indicated that the legal status of the ship is not changed if a ship if put stationary. Thus emissions in both sailing and stationary position of the ship will be treated equally for the ship.

3.3 Implications of the regulation of voyages between port calls of 'crew changes'

The current EU ETS-text regulates 100% of the emissions of offshore ships (of 5,000 GT and above) within EU/EEA ports and on voyages between port calls at EU/EEA ports and 50% of the emissions on voyages between EU/EEA-ports and non-EU/EEA ports. From here whenever offshore ship is mentioned, a broad definition for all non-transport ships is implied.

In the EU ETS directive, the *'port of call'* for offshore ships is defined[4] as the port *'where an offshore ship stops to relieve the crew'*. The definition of port calls can be interpreted in different ways, which may lead to problems concerning the effectiveness of the regulation of offshore ships. In Table 4 an overview of the intended voyage regulation scope is presented.

Table 4 – Overview of proposed emissions regulation for offshore ships at EU voyages

Crew change port call takes place *inside* the EU/EEA zone		**Crew change port call takes place *outside* the EU/EEA zone**	
Offshore ship departs from/to EU port	Offshore ship departs from/to non-EU port	Offshore ship departs from/to EU port	Offshore ship departs from/to non-EU port
100% of emissions regulated	50% of emissions regulated	50% of emissions regulated	0% of emissions regulated

Using the table above, we can understand that the location of the port call in which the crew change is performed is an important determinant of the scope of regulated emissions, and thus consequent EU ETS cost for the ship owner. Given the fact ship owners operate at a global, competitive market the regulation may have substantial impact on the level

[4] From the legal text: *'port of call' means … the port where an offshore ship stops to relieve the crew.*

playing field. We can foresee a number of effectiveness issues and possible adverse effects with the proposed regulation setting which are examined in the following sections.

Feasibility and proportionality

The feasibility of reporting and verifying emissions during voyages based on crew change port calls depends on the route pattern of non-transporting ships. Some ships, primarily in the offshore service segment, perform port calls to relieve the crew from work at an offshore project or to take onboard to bring to the project, allowing for the present EU MRV methodology to be applied. However, ships in the other maritime non-transport segments (such as construction, production and dredging) do not always have port calls in which a crew change is taking place. This raises the question whether a crew change port call is a suitable way to monitor emissions of offshore ships, or that offshore ships without crew changes are unintentionally excluded by the set definition.

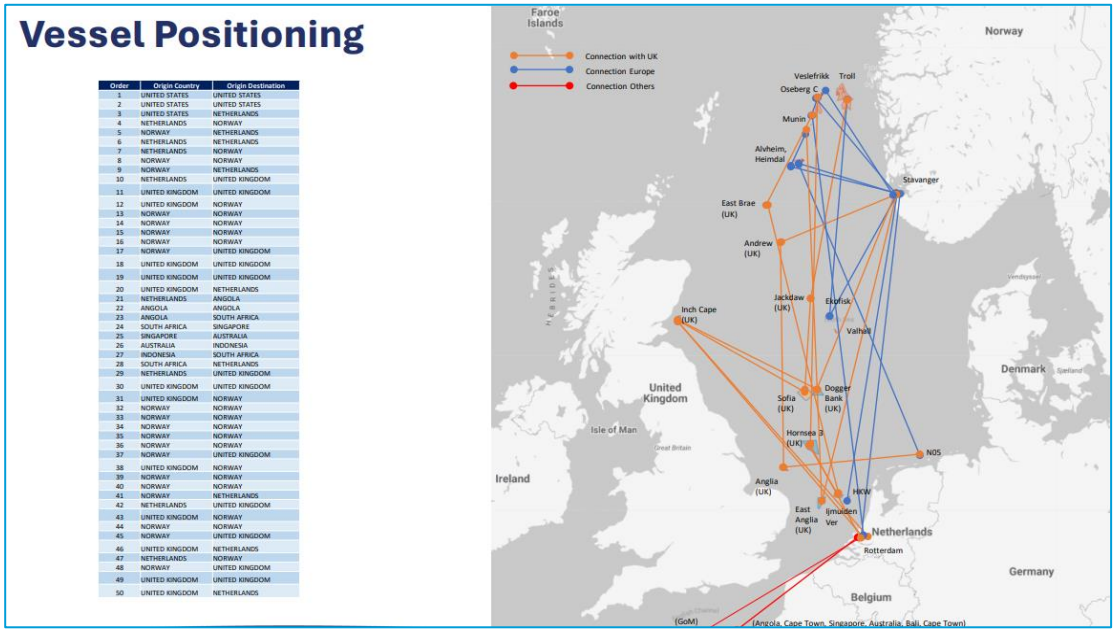
The above also stresses the issue the current format of the reporting system Thetis is not suitable for the work activities and route patterns of non-transport ships and this should be addressed by the legislator.

An important note of the definition in the regulation text is the mentioning of the crew. The term crew is usually understood as the crew required for the (safe) operation of the ship, not the crew required for the 'industrial' tasks for the offshore work/activities. The lack of a scope setting of ‘crew’ might lead to confusion.

Stops in a port for the purposes of carrying out maintenance and repair works are excluded. As the supply chain infrastructure for European offshore firms is currently located in European ports, the exclusion of stops in these ports may have different workings on emission regulation.

Another issue concerning the scope of regulation is that of fairness and proportionality: offshore ships have generally the highest use of energy and consequent emissions while at work at sea, rather than during the voyage from a port to the maritime worksite. If ships depart from a port in the EU to a worksite location in non-EU waters – at which work is performed – and later returns to an EU port, one can argue that the majority of fuel used is not within the EU scope. This indicates the regulation of emissions based on the voyage between port calls may be an unfair way to determine the scope of EU related emissions.

Figure 6 - Overview of route pattern of an offshore construction vessel with port calls in Norway and the Netherlands



Source: Heerema.

Figure 6 maps the voyages of an offshore construction ship during the course of one and a half year. It shows that ships primarily sail between projects both in and out of the EU. The present legislative text of the EU ETS, may lead to problematic and non-proportional allocating of emissions regulation during these voyages. The ship in this example is an offshore construction ship. The typical way to perform a crew change is by (smaller) crew boats and by helicopters. The ship may on paper never perform a crew change itself in a physical (European) port, which leads to the question whether the construction ship has to monitor emissions at all.

The other issue is – in case we assume a crew change is performed in both Stavanger (Norway) and Rotterdam (the Netherlands) - the emissions of all voyages and work activities are 100% regulated and for all emissions EU ETS allowances have to be surrendered, even though many of the worksite construction activities take place outside the EU (in the UK EEZ). The definition of the voyage is treating this example route as an intra-EU voyage disregarding the fact that a significant share of the emissions of the ship take place in non-EU waters with visits to non-EU ports. Depending on the operation and the ships' home port, ships may or may not have crew changes in non-EU ports.

Moreover, the large share of the emissions is from energy use for work at the worksites at sea (both at worksites in EU and non-EU waters), thus are not from sailing at the voyage. This results in the unintentional incentive for the shipowner to make an extra stop with a crew change in a non-EU port (e.g. in the UK) before starting the route of construction work at sea, or move all crew change to non-EU ports or performing the crew change only at sea. This example shows the issues and the risk of unintended effects and unfair treatment of voyages of non-transporting ships that the current regulation text can result in.

Ships in the maritime non-transport segments have for the major part a route pattern (different from transport ships) for which voyages between ports and crew change port calls are a less suitable measure to distinguish emissions borne inside the EU and outside the EU. A simple allocation of 100 or 50% of the emissions during a voyage between port calls appears to be a less suitable way to report EU and non-EU emissions of these type of ships.

Adverse effects

Other implications of the port call definition for maritime non-transport ships arise:

1. The scheduling of crew changes can be altered relatively easy. There is a **high risk of evasion** by performing crew changes in the future in non-EU ports to avoid regulation and operational cost increase by EU ETS.
2. The work ships with the highest energy use (and thus emissions) could **possibly avoid emissions regulation** by not performing crew changes in ports at all. The changing of the crew could be done by a small crew boat with relatively low emissions.
   Unclear setting of the definition allows ships to perform port calls in the EU without the obligation to monitor and report emissions.
3. Non-transport ships may work at a worksite outside of the EU area but depart and return to a port within the EU area and vice-versa. This implies that both the effectiveness of EU ETS could be harmed, as well as **the level playing** field for shipowners in the EU as their competitiveness could be impacted by the EU ETS cost compared to their non-EU based competitors, and both risk the effectiveness of EU ETS and the competitiveness of the EU in the long run.

These two major impacts are outlined below.

Risk of evasion

Linking 'port of call' to 'crew-change' for offshore ships may incentivise offshore ship operators to change their port calls, including the so-called mobilisation (preparation of offshore ships for the project at work at sea), to locations outside the EU. Crew changes might take place in closely located non-EU ports or by air. By avoiding ports within the EU zone for crew changes, shipowners could bypass the emission regulation requirements leading to lower overall cost.

The fuel use for most ships is for a large part coming from their work performed at sea, compared to a lower share for propulsion for sailing between port and worksite. Thus, cost or detour of crew changes are probably lower than carbon cost of the work emissions, implying a change of port for crew change is not impacting the operations significantly (in terms of cost). Therefore, there is a high risk of evasion. In addition, this type of evasion may in the long-term lead to a displacement of offshore firms and their accompanying supply chain to locations outside of the EU, with potential loss of employment and offshore fleet control. Depending on the new location of the offshore home port, the initial level of emissions may increase (or decrease) due to changed sailing distances to and from the project worksites at sea.

Offshore ship operators might use the proposed definition of port calls to evade emission regulation by avoiding crew changes of offshore ships in EU ports. If the definition is literally interpreted as ships being only regulated *if at a port call the crew is changed*, ship operators could perform crew changes outside ports by smaller crew boats or in adjacent non-EU ports, so the emissions of the offshore work ship are out of scope for regulation. By a strict interpretation of the port call definition, offshore ships could perform on- and offloading of equipment without their emissions being regulated – if no

crew is changed in the port call. The risk of evasion is high and could have a major impact at the effectiveness of emission regulation of offshore ships.

The extent of impact on emissions leakage due to evasion can currently not be examined due to a lack of verified emissions data from non-transport ships which can be linked to EU scope[5]. This is a first important step in implementing the emissions regulation.

Impact level playing field

The proposed definition also risks impacting the level playing field for offshore ship operators (or owners) from the EU. For example, the set definition could mean that emissions from an offshore ship leaving an EU port for a continuous project outside the EU (e.g. the UK) without visiting a port and returning to an EU port would count entirely under EU ETS. Conversely, an offshore ship performing work at sea in the EU maritime zone, having the departure and arrival at non-EU ports, would have no emissions regulated by EU ETS. This would lead to a competitive disadvantage of EU based offshore ships compared to their non-EU based competitors.

Given the fact that the risk of evasion is high, it is uncertain that the proposed regulation will be effective, in terms of incentivising emission reduction, as there may be a large part of the emissions leaked to non-EU scope, in which emissions are not regulated and priced.

Altogether the risk of evasion and degradation of level playing field under the proposed definition of port calls for emission regulation by EU ETS of offshore ships call for an alternative interpretation or definition of port calls and voyages for offshore ships.
In Chapter 5 different ways of regulating emissions of non-transport ships are explored, aiming to improve the effectiveness, while making sure this is done in a fair way with minimal adverse impacts to the sector.

Non-transport ship examples

Several stakeholders we have consulted were willing to provide a number of example ships with their voyage and activity characteristics with the aim to underline the challenges that arise with the current regulation design of voyages and port calls. In this section a few ships are outlined and in short, the consequences for the shipowner is mentioned.

[5] Non-transport ships of 5,000 GT and above have been reporting on their emissions since 2019 via IMO DCS. However, there is no adequate key to allocate emissions to the EU scope which leaves this question open.

Table 5 - Overview characteristics offshore installation vessel

Ship type	Offshore Installation vessel
Sailing area	Globally
Activities	Installation of wind turbines or others at sea
Distribution of emissions (estimated)	~30% sailing ~70% energy use for installation turbines
Example 'voyage'	– Departure from port A to project worksite at sea; – Performs activity: installation turbines; – Continues to other project worksite (can be either located in EEZ of EU or non-EU country); – Performs activity, etc.; – Returns to port A (or another port) to load new equipment for next project.
Peculiarities	– Possible for long time at same location active; – Bunkering possible at sea; – Supplying possible at sea; – Crew changes possible at sea.
Crew changes	– Normally at sea; – Possible in port.
Points of interest in relation to current emissions regulation framework	– Majority of energy use is for worksite activity, not at sailing during the voyage: does not suit voyages framework properly; – Avoidance of crew changes in EU ports may result in avoidance of emissions reporting altogether; – Possible shift of home port and supply chain to non-EU countries.

Table 6 - Overview characteristics Multi-purpose offshore support vessel

Ship type	Multi-purpose offshore support vessel
Sailing area	Europe
Activities	Accommodation ship for wind offshore personnel during construction and maintenance
Distribution of emissions (estimated)	All energy use is for sailing, hotelling and positioning (which is in fact sailing at low speed to counter the currents)
Example 'voyage'	– Departure from port A to project worksite at sea; – Delivery of personnel to turbines etc.; – Stays in position near worksite for personnel transfers (can be 24 hours continuously); – Sails within wind turbine project from one to next turbine; – Returns to port A (or another port) to replace personnel for next project.
Peculiarities	– Possible for long time at same location active; – Bunkering possible at sea; – Supplying possible at sea; – Crew changes possible at sea.
Crew changes	– Normally in port; – Possible at sea.
Possible reactions to current emissions regulation framework	– Avoidance of crew changes in EU ports may result in avoidance of emissions reporting altogether; – Possible shift of home port and supply chain to non-EU countries.

Table 7 – Overview characteristics Tug/working vessel

Ship type	Tug - working vessel
Sailing area	Mainly Europe, globally possible
Activities	Assistance at dredging projects: – Anchor handling; – Towing stationary equipment; – Seabed ploughing; – Towing trips; – Landing assistance for cable layers.
Distribution of emissions (estimated)	Highly dependent on type of activity performed. In general sailing is not the highest share of energy use.
Example 'voyages'	First example: – Departure from port A to perform work around the port; – Return to port A; – This 'voyage' could take place multiple times within one day. Second example: Departure from port A to perform work around the port – Return to port A; – Longer periods at sea on projects when assisting with windmills, offshore equipment or cable laying. Often from A to A with long periods in between or from A to B.
Peculiarities	– Possible for long time at same location active; – Bunkering takes place at worksite; – Can also supply bunker to other ships/stationary platforms at sea; – Crew changes possible at sea.
Crew changes	– Both in port and at worksites
Possible reactions to current emissions regulation framework	– High administrative burden due to high number of voyages; – Avoidance of crew changes in EU ports may result in avoidance of emissions reporting altogether; – Possible shift of home port and supply chain to non-EU countries.

Table 8 - Overview characteristics dredging ship

Ship type	Cutter Suction Dredger
Sailing area	Globally
Activities	A rotary cutter head loosens hard substrate to then be suctioned and moved at the surface without taking the material on board.
Distribution of emissions (estimated)	In general the cutting and suction of materials involves the large part of the energy use.
Example 'voyages'	– Departure from port A to worksite; – Performance of project work; – May involve many small movements at the project worksite; – May stay for long time at same project location; – Supplies and crew changed by other service ships; – Return to port (may not be always port A);
Peculiarities	– Possible for long time at same location active; – Bunkering takes place at worksite; – No transport of materials by the ship, only suppletion at sea; – Crew changes possible at sea.
Crew changes	– Both in port and at worksites
Possible reactions to current emissions regulation framework	– Ambiguous on necessity of reporting due to lack of port crew changes; – Possible shift of home port and supply chain to non-EU countries.

4 Definition of regulated ships under EU MRV and EU ETS

In this chapter we explore how the definition of regulated ships can made clear by examining definitions for the term offshore ships. We also outline what the implications are of a clear definition of offshore ships for the effectiveness of emissions regulation.

4.1 Alternative fleet scope definitions

Due to the fact the amended regulation (and directive) includes the term offshore ships, the (only) way to ensure the effectiveness of the regulation is by working out a clear definition in secondary legislation. A number of alternative definitions of the maritime non-transport fleet are proposed and analysed, which could be applied in EU MRV regulation and the EU ETS directive. The definitions are supporting the intended aim of the legislator to incorporate and regulate non-transport ships in a clear and plausible way. The advantages and disadvantages of alternative definitions are examined in terms of environmental effectiveness and impact on the level playing field.

In the setting of possible definitions of offshore as part of the maritime non-transport fleet, a variation of definitions are explored to examine the differences in impact. The scope of regulating ships of 400 GT and above is assumed for all alternative definitions as this is amended in the EU MRV regulation. Assumed is that the EU ETS directive will follow the EU MRV regulation with regulation of ships of 400 GT and above.

A. Definition offshore ships: all non-transport ships

An alternative definition for the regulation of non-transport ships is set as follows:

— *Offshore ships are defined as all non-transport ship types and including ships that are temporarily connected to the seabed (excluding ships that are defined elsewhere in this Directive).*

This definition captures both ships with the main activity to perform work at a maritime worksite, and ships supplying goods, crew and services to and from worksites at sea. Table 8 presents an overview of ship categories in the maritime non-transport segments included and excluded under the alternative definition.

Table 8 - Overview of ship categories under offshore definition A

Ship categories included	Ship categories excluded
— Offshore production ships (extraction of resources); — Offshore construction ships; — Dredging ships. — Maritime research ships; — Maritime service ships.	— No other ship types excluded
Number of ships included	**Number of ships excluded**
EEA: 2,867 Netherlands: 582	EEA: 0 Netherlands: 0

Following the before mentioned definition, all non-transport ships would be incorporated and thus regulated.

Below an evaluation of the definition in terms of evasion, level playing field and expected environmental impact is listed:

- **Evasion and level playing field:**
  - The risk of evasion is lower, due to the fact that all ships involved in maritime offshore, dredging and maritime services segments are regulated. This definition sets a clear scope for which ships are regulated. Risk of evasion remains via the combination of voyages and port call setting for offshore ships. In Chapter 5 this issue is addressed.
  - The definition is non-discriminatory to all ship types, regardless of their registered flag state and ownership characteristics.
- **Environmental impact:**
  - The environmental impact is expected to be higher, given the fact the emissions from all relevant ships are to be regulated.

B. Ships involved in worksite related physical activities

According to the maritime non-transport activities as described in Section 2.1, most offshore ships perform work at a specific worksite which is the main activity of the ship, rather than transporting goods between ports. Sector stakeholders provided insights on the distribution of energy use of the ships, which showed that the majority of the energy use and emissions are from the core activity of ships: the (physical) work performed, rather than propulsion to sail to and from the worksites at sea.

Given the fact the major part of emissions is caused by ships performing physical work at sea, and that the number of ships performing these activities represent a smaller share of the fleet of non-transport ships (see Table 1), we can draw a second definition for offshore ships for regulation with high effectiveness and a low number of regulated entities:

- *all non-transport ships involved in activities at sea in which the marine environment is changed.*

These activities include the extraction of (fossil) resources at or from under the seabed, the construction of offshore (infra)structures such as platforms, wind parks, laying of pipes or cables, and development and extension of land bodies (dredging). In Table 3 an overview of the ship categories included and excluded under the proposed definition are indicated, including their expected numbers.

Table 9 - Overview of ship categories under offshore definition B

Ship categories included	Ship categories excluded
– Offshore production ships (extraction of resources); – Offshore construction ships; – Dredging ships.	– Maritime research ships; – Maritime service ships (e.g. tugs, crew boats, etc.).
Number of ships included	**Number of ships excluded**
EEA: 698 Netherlands: 211	EEA: 2,169 Netherlands: 371

In the alternative definition B, all non-transport ships involved in physical work at sea are incorporated, entailing ships used for the offshore production of resources, offshore construction and dredging. Other non-transport ships which are excluded under this definition are the research and service ships which account for a relative high number of ships, with a relatively lower share of the total emissions of the non-transport fleet[6].

Below an evaluation of the definition in terms of evasion, level playing field and expected environmental impact is listed:

- **Evasion and level playing field:**
  - There is a low risk of evasion based on ship type because the listed segments have specific types of ships. Some ships from the included segments can be used for other activities than their listed main activity. Still, as these ships are categorised as such in the non-transport segment, they will be obliged to report emissions if performing work related to activities to, from and in EU ports. The risk of evasion could be in the fact that the categorisation of ship types can differ by flag state registry (and as a result also the category in which they might be included or excluded), as indicated by stakeholders. Still, it is unclear whether this could lead to significant evasion.
  - By excluding research and service ships, a level playing field is maintained within these segments. There are many ships within these categories above and under 400 GT, and regulation of ships of 400 GT and above could lead to adverse effects and evasion by using ships under 400 GT in the EU scope.
- **Environmental impact:**
  - The environmental impact of this definition is expected to be high, given the fact that the emissions from a high number of ships, with a larger ship size and higher installed power are regulated. However, a large number of ships with few emissions per ship are at an overall level significant and in this case excluded. The extent of included and excluded emissions are to be investigated.
  - A small number of ships with significant fuel use and thus emissions are regulated within the scope of this definition (because they perform physical work). On the other hand, a large number of small ships with little emissions are not to be monitored, providing the regulator lower administrative cost while excluding a small part of the emissions.

C. Ships involved in non-transport maritime activities except service ships

The subgroup of offshore related service ships are not by definition always providing services to other offshore parties. Service ships fulfil various tasks within the maritime sector, also for the maritime transport segments. Also, service ships may have a similar voyage pattern as transport ships, depending on their contract, which could be an argument for regulating service ships differently. Therefore, we analyse the workings of a definition in which service ships are not listed as offshore ships but regulated as a transport ship.

The offshore fleet analysis in Chapter 2 provides an insight in the division of offshore and dredging ships regarding their size. Most of these ships have a size well above the proposed 400 GT regulatory limit. However, the service ships group shows a different picture. A rather large share of service ships have a size under 400 GT with a small, but still significant number of ships being in the size group just above the regulatory limit (400-500 GT).

[6] Estimation based on inputs from the sector for energy use of specific ship types for various non-transport segments – in combination with the scale of the fleet and distribution of ship sizes within each segment.

Service ships often perform so called *milk-runs*, providing supplies to several worksites and returning back to their home port. The main aim of service ships is to provide crew, supplies and assistance to offshore worksites and ships. This means most of the energy use and emissions of service ships result from sailing at sea.

This allows for an alternative definition for incorporating offshore ships in EU ETS regulation, excluding service ships. The service ships group could be regulated by a similar port call and voyage definition as cargo and passenger ships are regulated by EU ETS. However, this is expected to lead to higher administrative burden for the shipowners (and regulator) as the frequency of voyages is relatively high.

Definition C for offshore ships to examine is set as follows:
— *all ships of 400 GT and above designed to perform offshore work excluding service ships (which are related to the supply of goods, crew and services).*

Table 10 - Overview of ship categories under offshore definition C

Ship categories included	Ship categories excluded
— Offshore ships for production of resources; — Offshore construction ships; — Dredging ships; — Research ships.	— Service ships
Number of ships included	**Number of ships excluded**
EEA: 919 Netherlands: 255	EEA: 1,948 Netherlands: 327

Evaluation of the definition of in terms of advantages and disadvantages:
– **Evasion and level playing field:**
  - The regulated ships have a specific function in offshore work, and it will be difficult to perform (parts of) the offshore activities with other types of ships that are exempted from the regulation. However, stakeholders indicated that the ship type can differ per country (and as a result also the category in which they might be included). This could result in a risk of evasion if flag states would allow shipowners to register their ships under the excluded category. This can also impact the level playing field.
  - About 60% of the service ships are of a size under 500 GT, with almost 15% of these ships falling in the size category 400 to 500 GT. Given the fact that approximately 60% of the European service ships will be excluded by the size setting and the fact a significant number of ships are falling in the size category right above the minimum size, there is a risk ship operators may select a smaller ship for offshore operations and services within the (geographical) scope of the EU ETS, and for new to acquire ships to perform similar services with. Moreover, a shipowner with a high number of service ships smaller than 400 GT has a competitive advantage due to the exemption of regulation.
– **Environmental impact:**
  - The environmental impact of regulation of offshore ships under this definition is expected to be high given the fact the emissions from a high number of larger ships are regulated.

4.2 Additional considerations

Additional points raised by sector stakeholders came up during the desk research, which are of overarching relevance to the EU ETS regulation of non-transport ships. These are listed in this section.

- Applying regulation following activity based rules may give shipowners room to register ships under other purposes than the ship is mainly performing.
- About a quarter of the ships active in the dredging work field are of a size under 500 GT, with almost 10% of these ships falling in the size category 400 to 500 GT. This being the case, there is a risk that ship operators select a smaller ship for offshore operations and services within the (geographical) scope of the EU ETS, and/or to invest in smaller ships. To a larger extent this also counts for service ships. An alternative way of setting the boundary for regulated ships is by the volume of emissions (or fuel use): ships under 400 GT can have a significantly higher fuel use than ships in the 400 to 500 GT ship size group, depending on their main activity.
- The minimum regulation size of 400 GT may lead to some evasion in a few segments. However, other regulatory frameworks such as MARPOL apply a minimum of 400 GT for regulation and the setting of the EU MRV aligns with other legislations. Other international frameworks for the maritime sector such as SOLAS and ISM (international safety management) applies for ships of 500 GT and above.
- The majority of offshore shipowners should be able to provide relevant emissions figures from past few years which can be used to get an overview of total emissions of the fleet. This can be done with little additional administrative effort due to the fact all ships of 5,000 GT and above currently monitor fuel use (and emissions) for DCS reporting, which is verified by a recognised classification organisation.

5 Determination of offshore emission regulation

In this chapter we explore alternative options for measurement of emissions from non-transport ships under EU ETS. In consultation with sector stakeholders we sketch alternative ways to delineate emissions from offshore ships. To examine the impacts of the alternatives we look at their effectiveness, feasibility and impact on the level playing field for shipowners.

5.1 Alternative emission regulations protocols

In order to set a definition of port calls and voyages that minimizes the risk of evasion and the impact on the level playing field for EU shipowners, we explore a number of possible alternative definitions.

A. Virtual port calls at working sites

An alternative way to define a *'port of call'* is to implement virtual port calls, additionally to physical ports at land, at worksite location at sea, specifically for non-transport ships:

— *'where a non-transport ship stops to change crews, load or offload cargo or equipment, or starts or ends working activities at an offshore worksite'*.

Thus, besides existing ports in the EU member states, this definition adopts offshore worksites as virtual ports to be able to determine properly voyages to and from worksites, and work at maritime worksites as 'in port' activity. This is in addition to 'normal' port calls in actual ports at the (main)land of EU member states.

The treatment of worksites at sea as virtual ports (and port calls of non-transport ships at these virtual ports) would lead to a similar scope setting of emission regulation of transport ships as currently under EU ETS:

– The worksites as virtual ports are treated as ports for which departure or arrival would count as the start or end of a 'voyage'. For the voyage, if at any point an EU port is departed from or arrived at, relevant emissions are regulated.
  • Thus, if a worksite is located in the Exclusive Economic Zone (EEZ) of EEA countries, the arrival to or departure from the maritime worksite is considered a start or end of a journey to or from an 'EU port'.
– The emissions from activities at the work site can be considered to be emissions *'in port'* and regulated as such if the virtual port is located inside the maritime EU zone.
  • A worksite can be determined as an area in which ships are active[7] as part of their activity. As for certain ships/activities the number of these 'at worksite' movements

[7] This can be either performing physical work in/at the sea(bed), sailing between two or more locations at/around the worksite, or maintaining position at sea.

are high[8], in order to make regulation feasible for the shipowner the start and end of the work at the worksite should be perceived as a port call.

- using a virtual port call framework, all ships are regulated similarly regardless of origin on their movement to, from and within the EU (regardless of their flag of registration).

In Table 11 an overview of the determination of the scope of the voyages for non-transport ships using virtual ports is presented. Table 12 indicates the emission regulation of emissions by non-transport ships in/at the virtual port, meaning at the worksites.
The presented scope setting for the regulation of voyages also applies for sailing between virtual ports. For example, when a ship departs from offshore worksite (virtual port) inside the EU to a worksite outside the EU 50% of the emissions are regulated.

Table 11 - Overview of emissions regulation of voyages to and from offshore worksites - virtual ports

Virtual port (offshore worksite) located *inside* the EU/EEA zone		**Virtual port (offshore worksite) located *outside* the EU/EEA zone**	
Offshore ship departs from/to EU port	Offshore ship departs from/to non-EU port	Offshore ship departs from/to EU port	Offshore ship departs from/to non-EU port
100% of emissions regulated	50% of emissions regulated	50% of emissions regulated	0% of emissions regulated

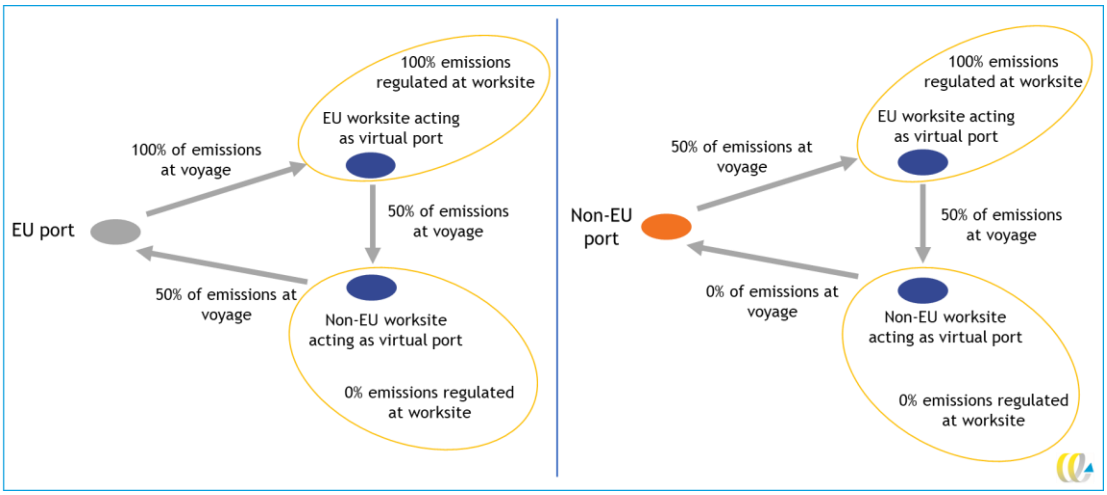
Table 12 - Overview of emissions regulation of emissions from non-transport ships at offshore worksites - virtual ports

Virtual port (offshore worksite) located in EU/EEA zone	**Virtual port (offshore worksite) located in non-EU/EEA zone**
100% of emissions at the offshore worksite regulated	No regulation of emissions at the offshore worksite

An example of how emissions allocation works under this reporting protocol is given in Figure 4. The figures indicates that at the worksite location (which is the location with the majority of fuel use and thus), emissions are regulated as 'in virtual port' and consequently ships from both EU and non-EU ports are treated equally.

[8] For ships active in assistance at offshore construction and research, and for dredging ships the number of small movements at or around worksites may be over 50 within 24 hours. This could mean 50 measurements of fuel consumption for one ship if all small movements in the regulation are perceived as distinct voyages.

Figure 4 - Allocation of emissions scope for an offshore ship using virtual port call emissions regulation



Feasibility and proportionality

It is considered feasible – after installation of suitable systems – for shipowners and the regulator to report and verify voyages based on movements to, from and in/around virtual port calls. This is valid for EU and non-EU shipowners, as is stated in current EU ETS regulation for shipping companies.

All contracts and permits for offshore activities have coordinates specifying the exact location at which a service or work has to be performed at sea. The legislator can investigate if the worksite location as given in the project permits/contracts (which the EU member states provide) could be used for the creation of virtual ports for EU MRV regulation. In that case the verifier could verify the emissions at voyages and in (virtual) ports.

This option of regulation is fair in the sense that all ship owners are treated equally regardless of their flag. Only for the port of departure (or arrival after work at a virtual port) a different treatment of emissions is made, as voyages to and from non-EU ports are considered for 50% under EU scope.

The legality of regulating and implementing virtual ports is unclear. Performing work at maritime worksites are only allowed by the permission of the government inside the Exclusive Economic Zone (EEZ) which is the area up to 200 nautical miles from the main land[9]. Countries have the right to construct and use artificial islands, installations and facilities[10] (Rijksoverheid, 2023). If such an island or installation is defined, the national (and EU) laws are valid. However, shipping activities are free at sea in this area (outside territorial seas), and therefore it is yet unclear whether a determination of a port call can be set as such in the EEZ. This is to be examined further at a legal level.

[9] The EEZ could also extend less far from the coastline if the EEZ borders another countries' EEZ.

[10] The exact legal text confirms the following for the Netherlands: "*The Kingdom, subject to the limits set by international law, has jurisdiction in the exclusive economic zone over the construction and use of artificial islands, installations and establishments, marine scientific research and the protection and preservation of the marine environment.*"

Adverse effects

Implications of the port call definition using virtual ports are:
1. Ships active at worksites in non-EU waters that are starting their voyage in an EU port (or EU located virtual port) may be less competitive as their voyages requires emissions regulation.
2. The creation of virtual ports outside the EEZ of EU member states could be used to evade emission regulation which may lead to carbon leakage.

Possible adverse effects of regulating based on a virtual port framework is that activities at and around maritime worksites in the EU may become more expensive compared to worksites at seas in other territories. In practice this may mean that the operation of an offshore wind energy production site in the EU may have higher cost associated compared to a similar sized offshore wind production site in non-EU waters (e.g. in UK waters).

Another issue prevails if other non-EU states are willing to give worksite permits for projects in their EEZ. Offshore ships could submit voyages with a worksite acting as a virtual port just outside the EU exclusive economic maritime zone, thereby *splitting* voyages to and from the EU in order to minimize the amount of regulated emissions. Failure to resolving this risk, the use of virtual port calls may lead to carbon leakage.

However, stakeholders from the industry indicated that the above risk might be limited when a virtual port can only be based on a valid contract, signed between the contractor and the client. In addition, construction ships are always named under the contract and if a change is allowed this must be communicated to the client. This limits the risk of creation of other virtual ports.

B. Regulation of activities related to maritime projects within the EU geographical scope

An alternative way to set the scope for the regulation of emissions of non-transport ships in the EU is by considering all emissions from activities related to project worksites located at sea in the EU[11]:

— *'sailing and work activities of non-transport ships related to offshore worksites within the EU, regardless the port of departure'.*

This definition implies that emissions of all activities by non-transport ships that sail to and work at offshore worksites are regulated. If the worksite is in the EU, emission reporting and regulation is necessary. Regulation of emissions related to EU worksites may be feasible by linking licensing by an EU member state to the obligation of reporting.

Ideally, the regulator can apply an instrument for the precise allocation of emissions. This in order to make a clear distinction in emissions for sailing to and from worksites, and determining the emissions emitted by activities at the project worksite. However, there is no instrument available which could be of aid for trustworthy allocation[12], and can be verified by the regulator. The only option for this comes close to a virtual port call, which is outlined in the preceding section. Thus, at this point setting a regulation based on

[11] Within the EEZ of an EU member state.

[12] AIS data of ships cannot be used by regulators for determination of location and activities as per stakeholders statement.

the project location results in 'voyages' for which emissions from the sailing and work parts cannot be distinguished.

By setting maritime projects as the determining factor for EU related voyages and activities the difference in impact for ships having port calls in EU ports and ships having port calls in non-EU ports is minimal:

- All voyages and work activities related to specific worksites located in the EEZ of EU member states voyage are included in emission regulation. If a ship commences a journey for a new project, from the port of departure fuel use can be tracked, until the ship is either:
  - making a port call at the end of the activity for the ongoing project; or
  - departing from an EU worksite to another worksite which is not located in the EU.
- A project is determined as a period in which ships are active for the purpose of a specific maritime project, which holds a set location and a permit by the relevant member state. As for certain ships/activities the number of these 'at worksite' movements are high[13], in order to make regulation feasible for the shipowner measuring emissions can be done over a longer period of time, counted into one voyage.
- Non-transport ships performing work for EU offshore projects would be regulated based on their movement to, from and at the project worksite, regardless of their flag of registration and port of departure.

In Table 13 an overview of the determination of the scope of emission regulation for activities of non-transport ships related to EU worksites. The presented scope setting for the regulation of voyages also applies for sailing between EU and non-EU worksites.
For example, in case a ship departs from an offshore worksite outside the EU to a worksite in the EU zone 100% of the emissions are regulated starting at the departure from the first worksite. However, if a ship departs to a non-EU project worksite from an EU project worksite, 0% of the emissions are regulated.

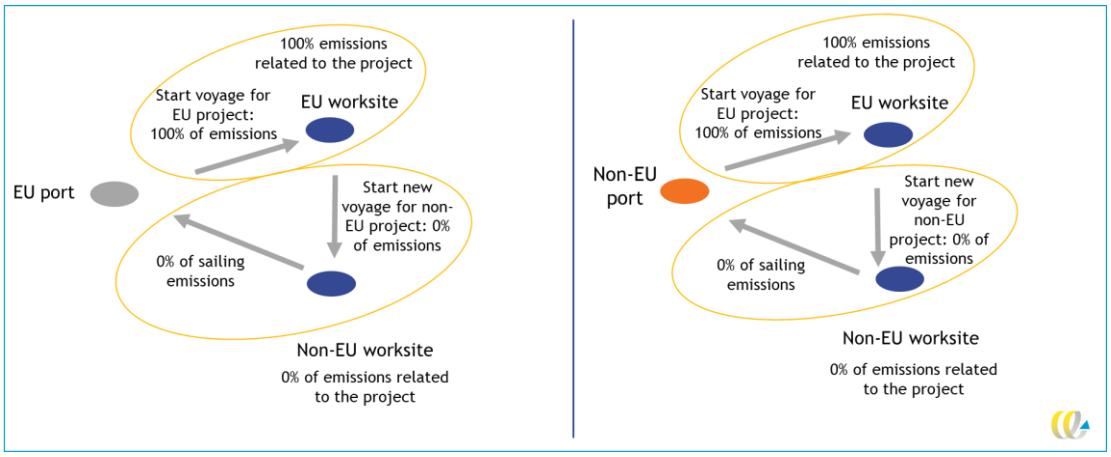
Table 13 - Overview of emissions regulation of voyages to and from maritime worksites

Maritime worksite located *inside* the EU/EEA zone		**Maritime worksite located *outside* the EU/EEA zone**	
Offshore ship departs from EU port/worksite	Offshore ship departs from non-EU port/worksite	Offshore ship departs from EU port/worksite	Offshore ship departs from non-EU port/worksite
100% of emissions regulated	100% of emissions regulated	0% of emissions regulated	0% of emissions regulated

An example of how emissions allocation works under the project related reporting protocol is given in Figure 5. This gives the indication that the departure location of the ship is highly relevant for the extent of emissions regulation for EU (and non-EU) projects.

[13] For ships active in assistance at offshore construction and research, and for dredging ships the number of small movements at or around worksites may be over 50 within 24 hours. This could mean 50 measurements of fuel consumption for one ship if all small movements in the regulation are perceived as distinct voyages.

Figure 5 - Allocation of emissions scope for an offshore ship using project related emissions regulation



Feasibility and proportionality

The feasibility of this regulation design is similar to that of virtual ports: maritime worksites are known by the permissions member states provide for offshore projects (both public and private projects). This could be a legal basis for the connection of activities to EU offshore projects. However, the legality might be a challenge for the regulator. This option is also different from the scope setting of the EU ETS of the maritime transport segment,
and additional proof is needed to validate the first and last port call related to a project.

Due to the fact that a project often involves multiple ships in different stages of the project, and the monitoring and reporting responsibility is with the ship owners, it might be difficult to track and verify all project related emissions. Ships of the executing firm of the project are clearly related to the project, but it might be difficult for e.g. suppliers to monitor emissions for every project they supply to. The contracts for these suppliers may be with the project executor and not involve permits. This practice may lead to difficulties in the verification process for the regulator.

All ships from any flag state that work for a maritime EU project have to monitor emissions, regardless of their port of departure. This option of regulation is fair in sense that it treats all ship owners equally regardless of their flag. Only for the port of departure (or arrival) the scope of emissions is set at a different share, as voyages to and from non-EU ports are considered for 50% under EU scope.

The scope setting is in this monitoring option odd for service ships that are not related to a project, such as tugs working in and around ports. Under this option, for these type of ships tugging itself could be qualified to be a maritime project to regulate emissions similarly.

Still, at some aspects of the protocol it remains unclear how feasible the option is in practice. There is no direct solution to what instrument the regulator can apply to determine and verify at which point the work for one projects ends, and a new ‘voyage’ departs to another project worksite. Specifically, how the allocation in fuel use is determined. Also, certain ships may be deployed at several projects at the same time, providing services for several projects within the same day. This can potentially lead to significant reporting burden for shipowners. It is advised this is investigated too in further

detail. A possible solution is, if the work at the project worksite involves many movements, the on-site movements could be reported aggregated.

Adverse effects

The competitiveness of ships departing from EU ports and non-EU ports are affected equally by this regulation protocol. Therefore, there are no substantial adverse effects expected concerning distortion of the level playing field. However, some may argue this regulation protocol implies some carbon leakage as emissions at voyages between EU ports and non-EU project worksites are not regulated.

5.2 Comparison of alternative regulation designs

In this section we compare the current and alternative emissions regulation protocols in order to rate their feasibility, proportionality of emissions allocation, administrative burden, risk of evasion and impact on the level playing field. The previous sections provide the relevant information for the comparison as presented in Table 14.

Table 14 - comparison of the current and alternative regulation designs

Aspect	Current emissions regulation design: by voyages based on crew change port calls	A. Fuel use to, from and in virtual port calls	B. Fuel use related to activities at EU maritime worksites
Proportional allocation of EU related emissions of non-transport ships	Poor (--)	Comprehensive (++)	Comprehensive (++)
Administrative burden of reporting for shipowners	Lower (+)	Higher (-)	Higher (-)
Administrative burden of emissions verification for regulators	Medium (0)	**Higher (-):** *The expectation is this reporting design causes a higher number of separate entries and thus data to verify*	**Higher (-):** *The verification of emissions between worksites (EU to non-EU) can be an issue*
Risk of evasion	High (-)	Lower (+)	Lower (+)
Impact on level playing field	**High impact (+):** *Ships departing from EU ports will be impacted in competitiveness by higher operational cost and consequent decreased competitiveness*	**Lower impact (+):** *All ships related to commercial activities of maritime worksites in the EU zone are impacted, regardless their registered flag. Still, for work at non-EU projects EU shipowners may be impacted slightly more for regulation of emissions at the voyages to and from the project worksites.*	**Lowest impact (++):** *Ships departing from EU ports will be impacted in competitiveness by higher operational cost and consequent decreased competitiveness*

Given the fact that we explored alternatives that have to perform better on the considered aspects, the current regulation design ranks lower for most aspects compared to the alternative regulation options. In short, the regulatory option that adds virtual ports for the creation of voyages to and from maritime worksites allows for emissions regulation of ships at worksites in a proportional way for EU and non-EU ships, with a relatively low expected risk of evasion and adverse impact of the level playing field of offshore ships.

6 Conclusions and recommendations

In this report we explored the challenges and issues that the current emissions regulation of 'offshore' ships bring to the sector and the regulator. In this final section, we take stock of the challenges, potential problems and risks for the sector and the environmental effectiveness resulting from them. First, we stress the challenges and the importance of adequate measures to address them by outlining the risks for adverse effects. Second, we outline alternative reporting protocols for a more proportionate regulation of offshore ship emissions and to minimize the risk of adverse effects. Finally, we provide recommendations for further exploration of regulation options and related issues for the legislator to arrive at an effective regulatory framework.

The challenges are the lack of a definition of offshore ships (in EU regulation) leaving involved parties in uncertainty about which ships are and are not regulated. Moreover, the reporting protocol and consequent scope allocation for EU related emissions do not suit the fleet and sailing patterns of offshore ships. We proposed few definitions for offshore ships, including the pros and cons concerning effectiveness and level playing field. Also, we have explored other types of determination (of port call and voyages) for fair and effective emissions monitoring for offshore ships.

Within the non-transport maritime sector a number of segments can be distinguished. Among these are the traditional offshore sector, dredging, maritime services and research. We found the lack of a definition of the term offshore ships in the regulation leads to a lack of clarity and possible evasion according to sector stakeholders. Given the fact not all non-transport ships perform work for the (traditional) offshore sector, ship owners may rely on this fact and argue that their ships cannot be perceived as an offshore ship.

The existing reporting protocol of voyages for offshore ships relies on port calls in which a crew change takes place. This approach, however, is weak in terms of fairness and proportionality regarding the EU scope of emissions of such voyages. The current monitoring and reporting protocol for voyages can lead to significant adverse impacts for the maritime offshore sector. For instance, as a result of high cost if ships depart from EU ports to work on international projects without additional port calls outside of the EU. Consequently, there is a high risk of large scale evasion and deterioration of the level playing field for European-based (offshore) shipowners.

Alternative definitions for offshore ships were outlined with the aim to bring clarity, assuming that the legislator aims to regulate as many emissions as possible of other ship types not yet regulated. A clear and wide definition of the term offshore ships is preferred for a sector-wide implementation of emissions regulation, leaving no room for exemptions other than those already existing. This also maintains the level playing field for European shipowners in the maritime non-transport sector.

We explored, in consultation with key stakeholders, alternative designs of emissions monitoring and reporting protocols. There are few alternatives which can provide a more fair and proportional allocation of emissions of maritime offshore activities for the EU and non-EU scope. Alternative options are the adoption of virtual ports linked to offshore project worksites which are connected to legal permits for maritime projects; the determination of emissions by maritime project. The feasibility in practical terms and robustness seems sufficient for both shipowners and regulators. However, the legal feasibility of these alternative frameworks requires further investigation. The protocol using virtual ports for projects located within the EEZ (of a EU member state) rates best in terms of fairness, proportionality, low risk of evasion and minimal erosion of level playing field.

This report underlines the importance of a clearly defined definition for offshore ships in the EU MRV regulation (and EU ETS directive), as well as an alternative emissions reporting protocol. There are serious risks of carbon leakage and (unwanted) adverse effects for the European offshore sector such as deterioration of level playing field if the amended regulation is implemented in the current state. A definition for offshore ships that includes *all non-transport ships of 400 GT and above* results in a situation that creates most clarity and minimises the impacts on the level playing field of the sector.

There are possible alternative frameworks in which the allocation of emissions of offshore ships can be done in a more proportional (fair) way. We recommend the legislator to investigate the two alternative reporting protocols we outlined in further detail. Emissions from voyages to, from and at maritime worksites located within the EU can potentially be regulated in a way that is suitable for the pattern of activities of offshore ships.

Finally, a number of issues following the analysis are required to be addressed:

- There is currently no trustworthy source that can provide clarity about the size of emissions of offshore ships that fall within the EU scope. It is highly recommended that these figures are gathered in order to establish a clear overview of the emissions in aggregate and by offshore/non-transport segment.
- The legal basis of the alternative regulation protocols and how these could be made workable should be investigated further. Specifically:
  - The use of maritime project contracts for the creation of virtual ports should be investigated. Virtual ports should not be arbitrary, but based on existing, contractually delimited worksites at sea.
  - The legal status of a virtual port call in non-EU territorial waters and the issue for ships of having a ‘port call’ in the other country (e.g. US Jones act). A solution that is to be investigated is to label the scope non-EU virtual port calls as ‘non-EU’, even if the worksite is within the EEZ of a non-EU country.
  - The legal workings of the worksite/project approach for emissions monitoring. Whether the location of worksites can be a legal basis for differentiation in scope of emissions.
- Policy makers should provide sufficient time for shipowners to change monitoring systems to be able to collect data for regulation in the EU MRV. In the current proposal the reporting of offshore ships should start in 2025, however currently systems are not yet suited for such type of registration thus have to be adopted or set up.
- If the regulatory protocol of voyages and port calls registration is to be adjusted for the regulation of offshore ships, the registration system Thetis should be able to make the adjustments accordingly in time.
- It needs to be investigated in what way ships can be regulated that have a high frequency of short trips such as tugs. Regulating them on basis of every voyage they perform may lead to significant administrative cost.

    - In the current maritime EU ETS regulation the following is valid (and could thus also imply to port-bound tugs and other service/emergency ships: A company is exempt from the obligation to monitor a specified ship on a per-voyage basis, if according to schedule; 1) all of the ship's voyages during the reporting period are EEA-related voyages; **and** 2) the ship performs more than 300 voyages during the reporting period. Both conditions need to be met.
- The regulation should be very clear on which party has to register. So called bareboat charters are quite common in the offshore and dredging segment. Bareboat is the chartering of a ship to another operating parties, in which the use of the ships is given to the charterer and as a consequence the registration flags might temporarily change.
- The risk of carbon leakage and/or evasion of EU ETS by ships placed in static position on legs on the seabed at worksites is required to be investigated further. The size of the risk and extent of potential evasion could not be analysed within the scope of this analysis. By reviewing the sectors' practices and given the fleet, the impression is that the risk and size of evasion is rather small.
- Even when the current regulation will be adjusted to the peculiarities of the industry, still the risk of evasion remains. The additional costs resulting from EU ETS could become an incentive for companies to investigate what the benefit would be when they would, for example, use the UK as location to prepare the ships for the work at sea.
- To prevent that investments in offshore renewable energy production become less attractive due to EU ETS, it might be worthwhile to investigate what the possibilities are for differentiating the regulation between activities around worksites related to renewable energy sources and worksites related to fossil fuels.

A Detailed overview of fleet analysis

An overview of Dutch offshore related ships is given in Table 15, based on the fleet registry in Clarksons World Fleet Register, a globally recognised maritime fleet data provider. The categorization does not have a legal status.

Table 15 - Overview Dutch non-transport ships (offshore and other types)

Offshore submarket Fleet type Ship type	Number of ships	Self-propelled
Construction	**43**	-
Offshore ships	**43**	-
Cable, Umbilicals & FP/Flowline Lay	9	Yes
Heavy Lift/Crane Ship	10	Yes
ROV/Submersible Support	3	Yes
Semi-Submersible Heavy Lift	16	Yes
Transport (Heavy Lift)	5	Yes
Dredging	**150**	-
Dredgers	**150**	-
Backhoe/Dipper/Grab Dredger	29	Yes
Barge Unloading Dredger	5	Yes
Bucket Ladder Dredger	2	Yes
Cutter Suction/Bucket Wheel Dredger	18	Yes
Dredger (Unspecified)	1	Yes
Dredgers (Stone Dumping, Fallpipe)	6	Yes
Other Dredger	2	Yes
Special Equipment Dredger	7	Yes
Suction Dredger	5	Yes
Trailing Suction Hopper Dredger	75	Yes
Production of resources	**18**	-
Offshore ships	**18**	-
FPSO	18	No
Research	**44**	-
Offshore ships	**41**	-
Geophysical Survey	12	Yes
Hydrographic Survey	8	Yes
Oceanographic Survey	1	Yes
Research Ship	18	Yes
Seismic Support	2	Yes
Other non-cargo ships	**3**	-
Marine Research	3	Yes
Services	**327**	-
Offshore ships	**193**	-
Accommodation Ship	12	Yes
AHT	71	Yes
Crew/Fast Supply	4	Yes

Offshore submarket Fleet type Ship type	Number of ships	Self-propelled
Diving Support	7	Yes
ERRV	45	Yes
Maintenance	1	Yes
Multi-Purpose Support	18	Yes
PSV/Supply <2,000 DWT	6	Yes
PSV/Supply 2-3,000 DWT	2	Yes
PSV/Supply 3-4,000 DWT	12	Yes
PSV/Supply 4,000 DWT+	9	Yes
Standby Safety/Guard	3	Yes
Utility/Workboat	3	Yes
Other non-cargo ships	**18**	-
Buoy/Lighthouse Tender	3	Yes
Floating Crane	3	No
Icebreaker	1	Yes
Pile Driving Ship	1	Yes
Training Ship	1	Yes
Work/Repair Ship	9	Yes
Tugs	**116**	-
Ocean-going Salvage Tug	1	Yes
Ocean-going Tug	1	Yes
Tug	111	Yes
Tug, Anchor Hoy	3	Yes
Grand Total	**583**	-

B Other regulation designs

In this appendix we list other regulation designs which have been explored and considered, but are inferior in their design, application and feasibility.

B.1 Regulation of yearly fuel use at ship level within the maritime EU zone

Regulating emissions of non-transport ships by measuring the yearly bunkered fuel to capture total fuel consumption of a ship seems at first sight easy and practical. This could be performed by measuring the quantity bunkered from 1 January to 31 December in each year, summing the total bunkered quantity and determining the share of fuel used inside the EU scope. To get the share of fuel used (and by that emissions) within the EU zone, shipowners need a method to distinguish between EU and non-EU fuel use.
The determination of fuel use and emissions within the maritime EU zone can be done by looking at the departure and arrival ports of the non-transport ships, similar to the regulation of transport ships.

Feasibility and proportionality

The current regulatory framework states that emissions at journeys to and from the EU are regulated for 50%. Emissions at voyages outside the EU zone are not regulated, while emissions at intra-EU voyages are regulated for 100%. In case the total fuel use is known, a share of the fuel needs to be allocated to the intra-EU and extra-EU voyage scope. By counting the number of voyages within each scope, the share of intra-EU and extra-EU voyages can be calculated. However, the energy use and thus emissions are not similar every voyage, as some voyages may be longer than others and involve more (or less) physical labour with high energy demands.

Most voyages from non-transport ships do not follow the normal route from port A to another port B, thus measuring the number of intra-EU and extra-EU voyages and applying shares for the allocation to voyages scope is questionable method[14]. Moreover, the regulator has no instrument to verify the reported shares in this way. Tracking of ships by AIS may result in very detailed data and precise reports on the location of voyages, however it is unclear whether such devices are legally permitted as a means of verification and this method could bring high cost in data processing due to the necessity to gather and process a large amount of data.

In conclusion, the method for determining the share of fuel use for intra-EU and extra-EU voyages by a calculated percentage is not a fair method.

[14] If, for example, a non-transport ship that departs and arrives in an EU port emits the majority of its emissions at a worksite near the UK coast, then allocating (and enforce EU ETS compliance for) these emissions to the EU scope seems not fair.

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