

# Guidance on the EU MRV regulation and the IMO DCS for shipowners and operators

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# GLOSSARY AND ABBREVIATIONS

DCS	Data Collection System
DoC	Document of Compliance
EEDI	Energy Efficiency Design Index
EIV	Estimated Index Value
EIF	Entry into force
EU	European Union
EU MRV	European Union Monitoring, Reporting and Verification
FPSO	Floating Production Storage and Offloading
FSU	Floating Storage Unit
GHG	Greenhouse Gas
GT	Gross Tonnage
IMO	International Maritime Organization
IMO DCS	International Maritime Organization Data Collection System
MARPOL	International Convention for the Prevention of Pollution from Ships
Materiality	All assurance engagements involve sampling. Materiality provides the basis for the use of statistical sampling to ensure that any issues (i.e. errors, omissions or misstatements, etc.), either singly or in aggregate, are absent from the data that have not been sampled.
MRV	Monitoring, Reporting and Verification
PSC	Port State Control
Reasonable assurance	The level of confidence that data and information are not materially misstated. Verification involves sampling raw data as opposed to aggregate data.
SEEMP	Ship Energy Efficiency Management Plan

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# 1 OVERVIEW

Maritime transport emits around 1,000 million tonnes of carbon dioxide (CO<sub>2</sub>) annually and is responsible for about 2.5% of GHG emissions.<sup>[1]</sup>

Shipping emissions are predicted to increase by between 50% and 250% by 2050, depending on future economic and energy developments.

In December 2015 at the COP21 in Paris, under the United Nations Framework Convention on Climate Change (UNFCCC), nations committed to keeping the global mean temperature increase to well below 2°C of pre-industrial levels by 2100, while aiming for 1.5°C.

As a first step to reducing GHG emissions from shipping, *European Union (EU) Regulation 2015/757 on the monitoring, reporting and verification of carbon dioxide (CO<sub>2</sub>) emissions from maritime transport and amending Directive 2009/16/EC ('the shipping Monitoring Reporting Verification (MRV) regulation')*, adopted on 29 April 2015, created an EU-wide legal framework for the monitoring, reporting and verification of CO<sub>2</sub> emissions from maritime transport. The Regulation requires all ships over 5,000 GT calling at EU ports from 1 January 2018 to collect and report verified annual data on CO<sub>2</sub> emissions and other relevant information.

The IMO, in alignment with global CO<sub>2</sub> reduction objectives, has developed the IMO DCS. During the 70<sup>th</sup> session of the Marine Environment Protection Committee (MEPC 70), amendments were made to Chapter 4 of MARPOL Annex VI that require mandatory fuel oil consumption data to be collected for all ships of 5,000 GT and above engaged on international voyages and submitted to their respective Flag State Administration. Upon verification of the submitted data, the Administration will issue to the ships a Statement of Compliance (SoC) related to fuel oil consumption. The amendments will enter into force on 1 March 2018, with the first reporting period being for the 2019 calendar year.

This document contains an overview of the requirements of both the EU MRV regulation and the IMO DCS.

## 2 THE MRV REGULATION

### 2.1 Introduction to the EU MRV regulation

#### 2.1.1 What is MRV?

MRV is a standardised method for producing an accurate CO<sub>2</sub> emissions inventory through the quantification of CO<sub>2</sub> emissions. The key principles of the scheme are to generate robust results using a lean approach that consider parameters that are already monitored during normal operations.

The regulation covers the monitoring, reporting and verification of CO<sub>2</sub> emissions, cargo carried, miles travelled and time spent at sea. It is applicable to vessels of all flags conducting commercial voyages into, out of and between EU ports (including Norway and Iceland) and will require the submission of a verified ship annual emissions report to a central database and an annual public disclosure of the data on a ship basis.

The intent of this regulation is to provide an incentive for shipowners, through the monitoring of CO<sub>2</sub> emissions, to improve efficiency, reduce CO<sub>2</sub> emissions and provide transparency via the disclosure of annual verified ship data. Figure 1 below provides an overview of the scheme.

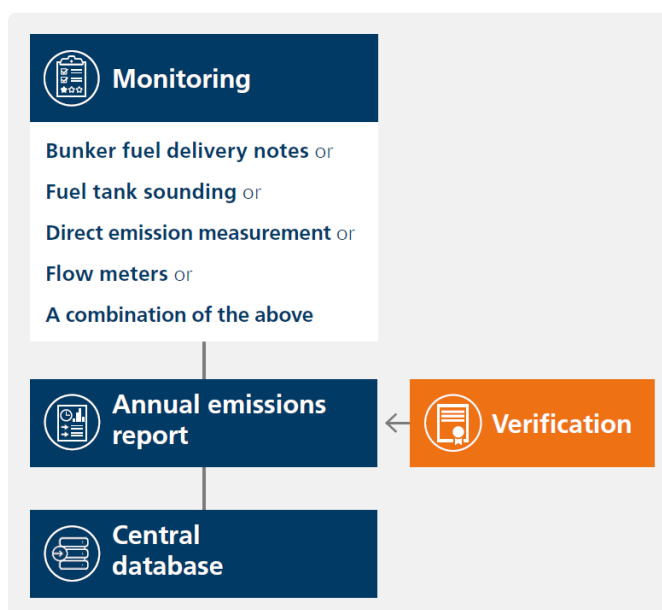


Figure 1: Overview of the MRV scheme

#### 2.1.2 To whom does it apply?

Irrespective of flag, the regulation applies to ships greater than 5,000 GT (with some exceptions as listed below) undertaking one or more voyages into, out of and between ports that are under the jurisdiction of a member state. It requires the per-voyage and yearly monitoring of CO<sub>2</sub> emissions, as well as the monitoring of other parameters, including the quantities of cargo carried, miles travelled and time spent at sea.<sup>[2]</sup> For the purpose of the EU MRV regulation, the member states are defined in Table 1.

EU Countries within the European Economic Area (EEA)				
Austria	Belgium	Bulgaria	Croatia	Cyprus
Czech Republic	Denmark	Estonia	Finland	France
Germany	Greece	Hungary	Iceland	Ireland
Italy	Latvia	Liechtenstein	Lithuania	Luxembourg
Malta	Netherlands	Norway	Poland	Portugal
Romania	Slovakia	Slovenia	Spain	Sweden
United Kingdom				

Table 1: EU countries within the European Economic Area<sup>[3]</sup>

Ports to be considered within the EU MRV regulation are within the above 'EU territories', where EU law fully applies. Ports of call in the nine EU outermost regions are also included, namely **Açores, Madeira, Canarias, Guadeloupe, French Guyana, Martinique, Mayotte, Saint Martin and Réunion**. Table 2 lists the countries and territories where the EU MRV regulation is not applicable.

EEA Member States Overseas Countries and Territories which do not qualify as EU ports of call
Greenland and the Faroe Islands
French Polynesia, New Caledonia, Saint Barthélemy, Saint Pierre and Miquelon, Wallis and Futuna
Aruba, Bonaire, Saba, Sint Eustatius, Curaçao, Sint Maarten
Anguilla, Bermuda, British Antarctic Territory, British Indian Ocean Territory, British Virgin Islands, Cayman Islands, Falkland Islands, Bailiwick of Guernsey, Isle of Man, Jersey, Montserrat, Pitcairn, Henderson, Ducie and Oeno Islands, Saint Helena, Ascension and Tristan da Cunha, South Georgia and the South Sandwich Islands, Turks and Caicos Islands, Akrotiri and Dhekelia
Svalbard

Table 2: EEA Member states' overseas countries and territories that do not qualify as EU ports of call<sup>[4]</sup>

Ships exempt from the EU MRV regulation include warships, naval auxiliaries, fish-catching or processing ships, wooden ships of a primitive build, ships not propelled by mechanical means and government ships used for non-commercial purposes.

The regulation applies to commercial voyages only, which means any movement of a ship that calls at an EU port to offload or load cargo, or travelling on a ballast voyage, or to embark or disembark passengers for commercial purposes. Voyages calling at an EU port for bunkering, relieving crew, supply stops, dry-docking, maintenance, safe harbour, etc., are excluded from monitoring and reporting requirements.

Offshore vessels fall under the category of 'other ship types' and in particular cover service ships, off-shore supply vessels, dredgers and drilling ships. It is recommended that MRV rules should not need to be developed for those ships under consideration to the extent that their movements and activities fall outside the scope of the EU MRV regulation. These ship types, although engaged in the transport of passengers and cargo, rarely follow the rules of 'traditional' maritime transport.

Ship movements and activities serving the purpose of supporting 'offshore activities' are not under the scope of the EU MRV regulation. In applying this interpretation, 'offshore activities' means activities in connection with the exploration of or extraction from the seabed or subsoil, or their natural resources. This also covers the actual task of exploring or extracting.

Monitoring and reporting requirements apply to ships at berth as well as at sea. This includes when a ship is anchored in an EU port and may not be involved in cargo operations but is using fuel for hotel purposes.

Ships are exempt from the obligation to monitor this information on a per-voyage basis if they undertake more than 300 voyages within the reporting period or if all of their voyages during the period either start or end at a port under the jurisdiction of an EU member state.<sup>[2]</sup>

### 2.1.3 What is the timeline?

The key milestones and deadlines for companies to comply with are shown in Figure 2 below.

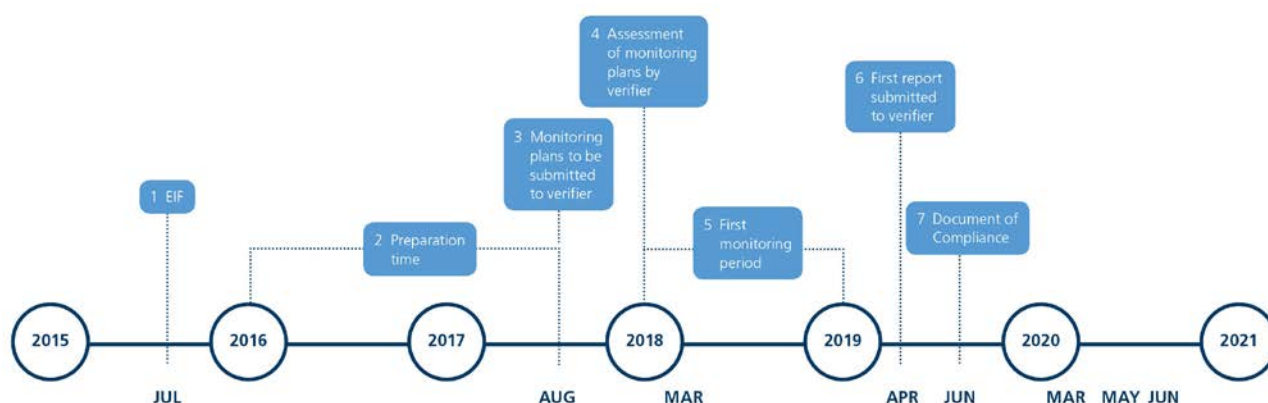


Figure 2: Timeline for EU MRV<sup>[2]</sup>

- July 2015 – entry into force
- Before 31 August 2017 – monitoring plan should be submitted for approval by a third-party accredited verifier
- Before 1 January 2018 – monitoring plan assessment should be completed
- 1 January 2018 to 31 December 2018 – commence per-voyage and annual monitoring for calendar year
- 2019 onwards – by 30 April of each year, submit a verified emissions report to the European Commission (EC) and relevant flag state
- 30 June 2019 onwards – carry a valid DoC relating to the relevant reporting period
- 30 June each year – ships' emissions reports made publicly available by the EC

Ships that have historically never visited an EU port and therefore do not have an approved monitoring plan or a DoC are still allowed to trade in the EU, but will need to prepare a monitoring plan within two months of their first visit and will need to submit a report of this voyage for the reporting period.

The PSC will check that there is a DoC on board. If a copy is not on board, the ship is not in compliance with the legislation and is thus liable for fines, or even detention, as determined by the member state. The final penalties provision should be notified by 1 July 2017.

## 2.2 M is for monitoring

Each company will be required to produce a ship-specific monitoring plan, which will be used to collect and monitor data on a per-voyage or annual basis, as applicable. The content of the plans could be similar or standardised across a fleet, and as such the plan can be separated into ship-specific and fleet-wide sections.

The monitoring plan is an electronic document in which the company describes the design of the management system that the ship has in place in order to monitor the required parameters and the ship-specific details. There is no requirement to hold the monitoring plan on board the vessel. The content of the monitoring plan is shown in Table 3.

Basic data	Activity data	Data gaps	Management
Ship identification	Methods and procedures for: fuel consumption monitoring, density and uncertainty	For fuel consumption	Check the adequacy of monitoring plan
Company details	Quality assurance of measuring equipment	For distance	Control activities, e.g. IT system
Emission sources and fuel types	Completeness of voyages and distance procedure	For cargo carried	Internal review of data
Emission factors	Cargo/passengers carried and time spent at sea	For time spent at sea	Corrective actions
Procedure for completeness	-	-	Outsourced activities and documentation

Table 3: The contents of the monitoring plan

The parameters to be monitored and reported include the following:

- Port of departure and port of arrival, including the date and hour of departure and arrival
- Amount and emission factor for each type of fuel consumed
- CO<sub>2</sub> emitted
- Distance travelled
- Cargo carried
- Time spent at sea (excluding anchoring)
- Transport work

It should be noted that the amounts of each type of fuel consumed at sea and at port (respectively) should be reported separately.<sup>[2]</sup>

### 2.2.1 How do we monitor CO<sub>2</sub>?

CO<sub>2</sub> will be monitored with reference to the following emissions sources on board:

- Main engines
- Auxiliary engines
- Gas turbines
- Boilers
- Inert gas generator



CO<sub>2</sub> emissions will either be calculated based on fuel consumption and use of IMO default emissions factors for the fuel type being consumed, or by direct emissions monitoring, with a back calculation of the fuel consumption using the relevant emissions factor. As part of the monitoring plan, companies will be able to choose one or more of the following four methods for monitoring fuel consumption in each monitored combustion source.

- Method A – use of bunker delivery notes (BDNs) and periodic stocktakes of fuel tanks (except for those vessels where cargo is used as fuel)
- Method B – bunker fuel-tank monitoring,
- Method C – flow meters (including a gas meter for LNG carriers) for applicable combustion processes
- Method D – direct emission measurements

A combination of these methods would improve the accuracy of the CO<sub>2</sub> emissions measurement for a given combustion source and is permitted. These monitoring methods are goal based and enable shipowners and operators to make use of existing systems on board ships where possible, avoiding the need for investment in new and potentially expensive equipment.

The density of the fuel also needs to be determined through either the BDNs or onboard measurement systems. Alternatively, the density from a company's independent fuel analysis can be taken.<sup>[2]</sup>

### 2.2.2 Cargo monitoring

The cargo parameters (by ship type) are shown below in Table 4.

Ship type	Cargo parameter
Chemical tanker/gas carrier/bulk carrier/refrigerated cargo ship/oil tanker/combination carrier	Mass
Vehicle carrier	Mass of the cargo on board – either actual mass or units or occupied lane metres multiplied by default mass per unit or per lane metre
General cargo ship	Deadweight carried (displacement deducted by the ship's lightweight and the amount of fuel on board)
Container ship	Total weight in metric tonnes of cargo or amount of 20-foot equivalent units (TEUs) multiplied by default values for weight
Ro-ro ship	Cargo carried defined as number of cargo units or lane metres multiplied by default values for weight
Container/ro-ro ship	Volume of the cargo, calculated as occupied deck area multiplied by deck height (for ro-ro cargo) and container volume (for container cargo)
Passenger ship	Number of passengers
LNG carrier	Volume on discharge
Ro-pax	Number of passengers on board and mass of cargo on board (either actual mass or calculated as units or occupied lane metres multiplied by default mass per unit or per lane metre)

Table 4: Cargo parameters for different ship types

### 2.2.3 Distance monitoring

The distance travelled may either be the distance of the most direct route between the port of departure and the port of arrival or the real distance travelled. The method used is to be described in the monitoring plan. The distance travelled should be expressed in nautical miles. Together, distance and cargo are used to express the transport work.

## 2.3 R is for reporting

Reporting periods are defined as calendar years. For voyages starting and ending in two different calendar years, the monitoring and reporting data is to be accounted under the first calendar year. For example, a voyage starting on 21 December 2018 and ending on 10 January 2019 would be included in the 2018 annual report.

At the start of the first monitoring period, it is recommended that a voyage that started in the previous year but concluded in the first monitoring period be included.

Annually, 'companies' (International Safety Management DoC holders) must provide a ship-specific emissions report for the previous calendar year's activity for each ship. This will include the technical efficiency of the ship (the Energy Efficiency Design Index (EEDI) or the Estimated Index Value (EIV) in accordance with IMO resolution MEPC.231(65), where applicable) and the aggregated data of the parameters outlined in Table 5. Table 5 shows the parameters to be reported annually.

Annual results of the monitoring	Technical information about the ship
Total aggregated CO <sub>2</sub> emitted	Name of the ship
Amount and emission factor of each type of fuel consumed (in total)	IMO identification number
Aggregated CO <sub>2</sub> emissions from all voyages between ports under a member state's jurisdiction	Port of registry or home port
Aggregated CO <sub>2</sub> emissions from all voyages that departed from ports under a member state's jurisdiction	Ice class of the ship, if included in the monitoring plan
Aggregated CO <sub>2</sub> emissions from all voyages to ports under a member state's jurisdiction	Technical efficiency of the ship (the EEDI or the EIV) – it is necessary to calculate the EIV for the reports if the ships do not fall under the EEDI in accordance with MEPC.231(65)
CO <sub>2</sub> emissions that occurred at berth within ports under a member state's jurisdiction	Name of the shipowner, address of the shipowner and the company's principal place of business
Total distance travelled	Name of the company (if not the shipowner), address of the company (if not the shipowner) and its principal place of business
Total time spent at sea (the time spent at sea and the time spent at port should be reported separately, and the manoeuvring voyage time should be counted as time at sea)	Address, telephone and email details of a contact person
Total transport work	The name of the verifier that assessed the emissions report
Average energy efficiency	Information on the monitoring method used and the related level of uncertainty (default values on uncertainty will be provided)

Table 5: Annual reporting requirements

The emissions report will be submitted to a third-party accredited verifier for verification. The verified report will be submitted to the EU THETIS MRV platform.

Member states (and flag states) will receive and/ or have access to the emissions report and DoCs of ships flying their flag

## 2.4 V is for verification

Verification involves the inspection and independent confirmation of information related to the:

- identification of the company, the ship and the monitoring and reporting system, including the design of processes, systems, risks and controls (this information is to be summarised and referenced in the monitoring plan), and
- monitoring and reporting of CO<sub>2</sub> emissions and transport work, including documents providing evidence for the reported data points for fuel, distance, time and cargo per voyage, documents demonstrating execution of internal controls, and documents demonstrating adequate calculations, aggregation and consolidation of data.<sup>[2]</sup>

### 2.4.1 Who is responsible for what?

The verifier is required to:

- be accredited by a national accreditation body,
- demonstrate their competence and their implementation of this to the accreditation body during a site visit to the company's head office and to a geographical location (accreditation will be for five years with an annual surveillance visit),
- assess the conformity of the monitoring plan,
- assess the annual emissions reports and verify that they are accurate and correct to a reasonable level of assurance,
- detail inconsistencies and give an opportunity to correct them,
- issue a verification report and DoC on the successful completion of the verification, and
- inform the flag state and EC that the DoC has been issued.

The company is required to:

- demonstrate compliance with the monitoring plan,
- demonstrate how they obtained, calculated and arrived at the final reporting information and data,
- rectify and correct the misstatements and omissions (if any) found by the verifier, and
- keep the ship-specific DoC on board for future PSC checks.

Verification will be to a level of reasonable assurance and with a materiality level to be agreed as a delegated act. The materiality levels are proposed to be as follows.

- CO<sub>2</sub> emissions: 5%
- Transport work: 5%
- Other relevant information: 5%

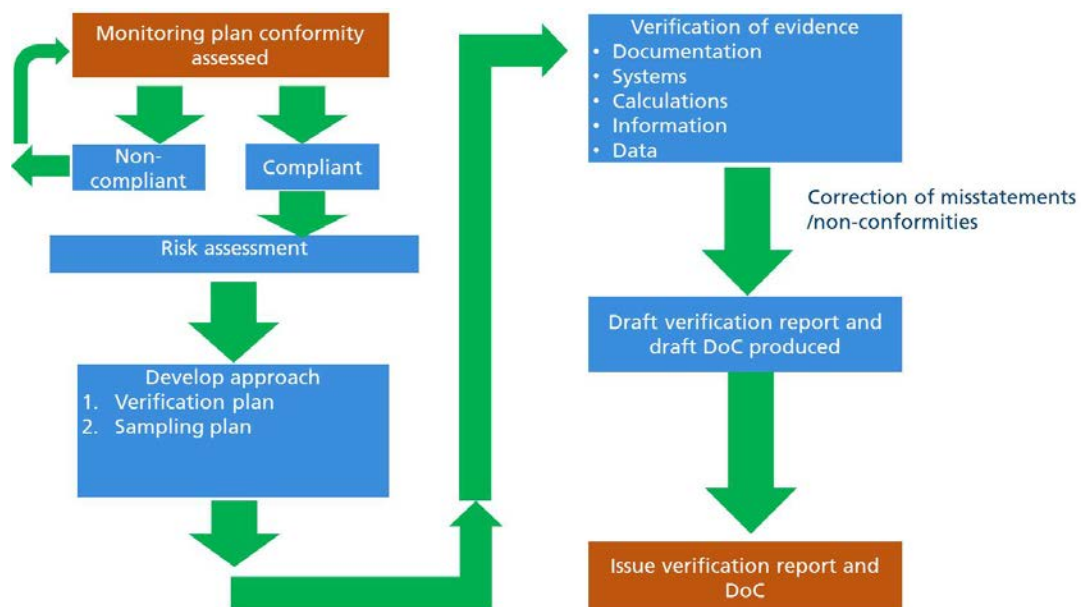


Figure 3: Verification overview

The verifier shall carry out a site visit to the company for the purpose of gaining a sufficient understanding of the company and the ship's actual monitoring and reporting system, unless the outcome of the risk assessment proves this unnecessary. The site is defined as the location of the critical mass of data. Onboard verification is not mandated by the regulation.

## 3 THE IMO DCS

### 3.1 Introduction

#### 3.1.1 The SEEMP and the IMO DCS

In January 2013, a new Chapter 4 was added to *MARPOL Annex VI*, providing regulations on energy efficiency for ships. Regulation 22 requires that a Ship Energy Efficiency Management Plan (SEEMP) be kept on board each ship. Further amendments to *MARPOL Annex VI*, adopted at MEPC 70, establish a mandatory IMO DCS for the collection and reporting of fuel oil consumption data for each type of fuel used by a ship (resolution MEPC.278(70)). As such, the SEEMP has to be developed in two parts, as described below.

- Part I – ship management plan that provides a possible approach for monitoring ship and fleet energy-efficiency performance over time, applicable to ships of 400 GT and above engaged on international voyages.
- Part II – methodologies used to collect fuel oil consumption data, applicable to ships of 5,000 GT and above engaged on international voyages.

The focus of this document is on the IMO DCS (i.e. Part II of the SEEMP) and, hence, for the purpose of this document, Part I of the SEEMP will not be further elaborated upon in the following sections.<sup>[5]</sup>

#### 3.1.2 To whom does it apply?

The regulation applies to ships of 5,000 GT and above, with the exception of:

- Ships engaged on domestic voyages;
- Ships not propelled by mechanical means; and
- Platforms, including FPSOs, FSUs and drilling rigs

In the case of a ship which is normally engaged on domestic voyages but which, in exceptional circumstances, is required to undertake a single international voyage, an exemption from any of the requirements in Chapter 4 of MARPOL Annex VI may be sought from the Administration. Please see MEPC.1/Circ.863 for guidance.

From the allowable data collection methods (refer to section 3.2), the IMO DCS requires the collection of data on the total annual fuel oil consumption. Apart from berthing and travelling at sea, this data consists of fuel consumption due to activities including but not limited to anchoring, drifting, bunkering/de-bunkering, supply stops, maintenance, cargo loading/offloading, and ballast and commercial purposes.<sup>[5]</sup>

### 3.1.3 What is the timeline?

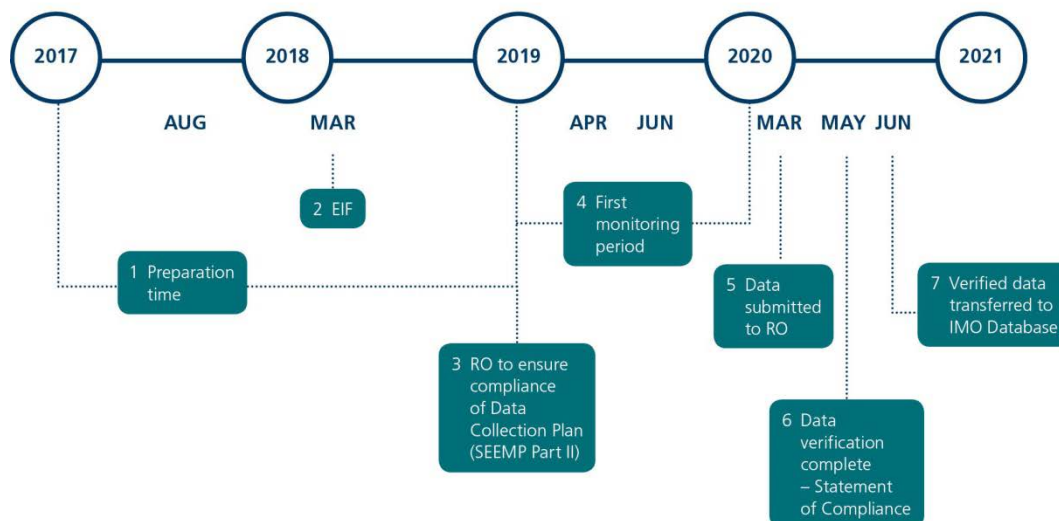


Figure 4: Timeline for IMO DCS

- 1 March 2018 – entry into force
- Before 31 December 2018 – new SEEMP Part II (data collection plan) included in SEEMP and flag/Recognised Organisation (RO) will ensure that Part II complies with the regulation
- 1 January 2019 to 31 December 2019 – commence annual monitoring for calendar year
- 2020 onwards – ships to submit data within three months after calendar year to the Administration or any organisation duly authorised by it (by 31 March at the latest)
- A SoC is to be issued within two months of receiving data by the Administration or any organisation duly authorised by it (by 31 May at the latest)
- Data will be submitted to the IMO by the Administration or any organisation duly authorised by it within one month of the issuance of the SoC

## 3.2 SEEMP Part II: Fuel oil consumption data collection plan

### 3.2.1 Fuel oil consumption

Part II of the SEEMP shall include a description of the methodology used to collect the data required by Regulation 22A.1 of *MARPOL Annex VI* and the processes used to report the data to the ship's Administration. Fuel oil consumption includes all fuel oil consumed on board (regardless of whether the ship is underway or not), including but not limited to the following:

- Main engines
- Auxiliary engines
- Gas turbines
- Boilers
- Inert gas generator

Various methods that by ships can use for annual fuel oil consumption data collection are stipulated in resolution MEPC.282(70) – *2016 Guidelines for the Development of a SEEMP*, as detailed below.

#### 1) Method 1 – Bunker delivery notes (BDNs)

BDNs, the standard document required by *MARPOL* that contains information on fuel oil delivery (e.g. name of receiving vessel, port, date, quantity and characteristics of fuel oil), can be used to determine fuel oil consumption, as illustrated in Figure 5. According to *MARPOL Annex VI*, BDNs have to be retained on board for three years.

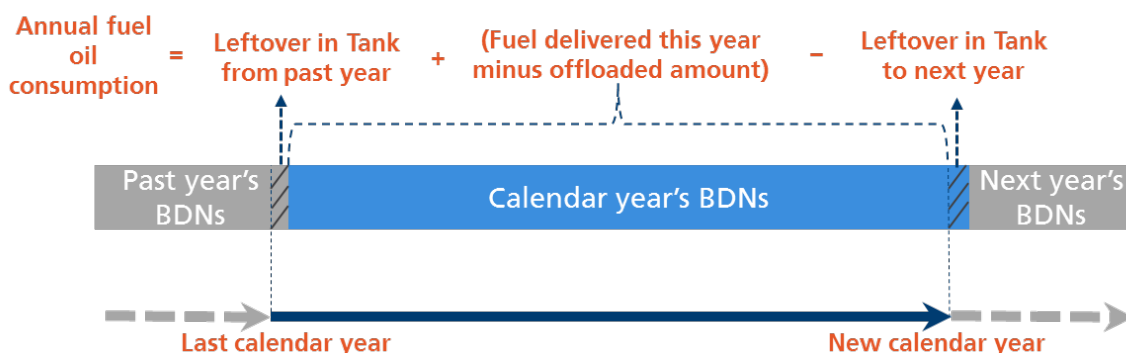


Figure 5: Method 1 (BDNs)

#### 2) Method 2 – Flow meters

Through the use of flow meters on board that measure the daily fuel consumption of all relevant fuel oil consuming processes, the annual fuel oil consumption can be tabulated. For this method, the data collection plan should include a description of the flow meters and their link to specific fuel oil consumers, and the calibration of the flow meters. Method 2 is illustrated in Figure 6.



### 3) Method 3 – Bunker fuel oil tank monitoring

Daily fuel oil consumption data measured by tank readings are aggregated, including bunkering and de-bunkering. A summary of the monitoring data should be kept on board. Method 3 is illustrated in Figure 6.<sup>[5]</sup>

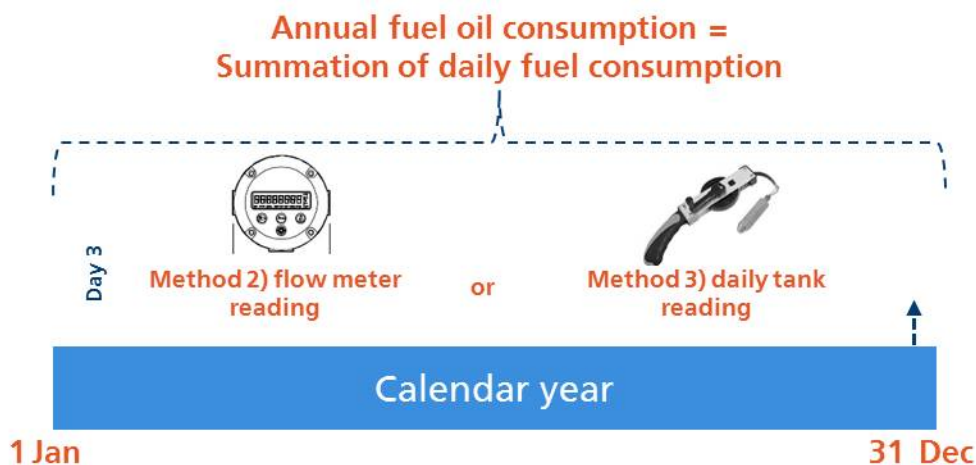


Figure 6: Method 2 (flow meters) and Method 3 (bunker fuel oil tank monitoring)

#### 3.2.2 Travelling distance and hours

Distance travelled over ground in nautical miles should be recorded in the logbook, whereas distance travelled while the ship is underway under its own propulsion should be included in the aggregated data of the distance travelled for the calendar year.

Hours underway – the aggregated duration of time that the ship is underway under its own propulsion – should be submitted to the Administration.<sup>[5]</sup>

#### 3.2.3 Direct CO<sub>2</sub> emissions measurement

Direct CO<sub>2</sub> emissions measurement is not required by Regulation 22A of *MARPOL Annex VI*. However, if this method is used, measurement equipment and its locations should be described in SEEMP Part II, and calibration and maintenance records of this equipment should be kept on board.

## 3.3 Reporting and verification

For the purpose of the IMO DCS, an Administration may authorise an organisation to carry out the following:

- Receive a ship's data
- Verify the data for compliance with requirements
- Issue SoC
- Submit the data to the IMO

In reference to section 3.1.3, the first monitoring period for the IMO DCS will be the calendar year 2019. At the end of this year (and subsequent calendar years), each ship shall aggregate the data collected annually. Within three months of the end of the calendar year, the ship shall report the required information as stipulated in Appendix IX of *MARPOL Annex VI* (i.e. identity; period of calendar year; technical characteristics of ship; fuel oil consumption data and data collection methodology; distance travelled; and hours underway) to the Administration or authorised organisation.

Verification of the reported data will be carried out by the Administration or authorised organisation. Additional documentation to facilitate the verification process may include the data collection plan, BDNs, disaggregated data, resolution of data gaps and other documents (e.g. logbook or arrival reports). Through the verification process, the Administration or authorised organisation confirms the following:

- Consistency of the reported data and calculated values
- Completeness of the data
- Reliability and accuracy of the data as described in the data collection plan as part of the SEEMP

Upon receipt of the reported data and on the satisfactory completion of the verification, the Administration or authorised organisation will issue an SoC. Within one month of the issuance of the SoC, the Administration or authorised organisation will submit the verified data to the IMO Secretariat, where it will be anonymised and form part of the IMO Ship Fuel Oil Consumption Database.<sup>[5]</sup>

## 4 THE EU MRV REGULATION AND THE IMO DCS – A COMPARISON

Both the EU and the IMO have different mandated processes to reduce GHG emissions. Table 6 provides a high-level comparison between the EU MRV regulation and the IMO DCS:

	EU MRV for CO <sub>2</sub> emissions	IMO DCS for fuel oil consumption
Entry into force	1 July 2015	1 March 2018
First monitoring period	Calendar year 2018	Calendar year 2019
Applies to	Ships of 5,000 GT and above on commercial voyages into, out of and between EU ports	Ships of 5,000 GT and above on international voyages
Monitoring plan	Yes – standardised template	Included in SEEMP
To be included in the reported data	<ul style="list-style-type: none"> <li>Fuel oil consumption</li> <li>Direct CO<sub>2</sub> emissions measurement acceptable</li> <li>Cargo monitoring</li> <li>Distance travelled</li> <li>Time at sea and in port</li> <li>Transport work based on actual cargo</li> <li>CO<sub>2</sub> emissions calculated/tabulated</li> <li>Port of departure/arrival</li> <li>Separate data to be collected for berthing and voyage</li> </ul>	<ul style="list-style-type: none"> <li>Fuel oil consumption</li> <li>Direct CO<sub>2</sub> emissions measurement not required</li> <li>Design deadweight used as cargo proxy</li> <li>Distance travelled</li> <li>Hours underway</li> </ul>
Reports to	European Commission (EC)	Flag state (or authorised organisation)
Verification	Third-party independent accredited verifier to a materiality level of 5%	Flag state (or authorised organisation) No materiality level
Disclosure	Public	Confidential
Data reporting format	Standardised format for annual emissions report provided as set out in implementing act	Standardised format set out in Appendix 3 of the <i>2016 Guidelines for the Development of a SEEMP (MEPC.282(70))</i>
Reporting platform	EU THETIS MRV	No global reporting platform for shipowners
Voluntary reporting	Yes, various data are voluntary	No

Table 6: Comparison between the EU MRV regulation and the IMO DCS <sup>[2],[5]</sup>

As observed in Table 6, the metrics included in the EU MRV regulation are more detailed than those required for the IMO DCS. Between the two schemes, there are similarities in the data required for submission. However, the two schemes are expected to run in parallel for some time.

## REFERENCES

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