

Data Collection – Measurement of Progress and Methodologies

Tokyo, 17 October 2019

➤ Ship Data Collection---Background

➤ Global and Regional Data Collection Mechanisms

➤ Data Collection Methodologies

In order to undertake its fair share for GHG reduction to cope with the Global climate change, the shipping industry is taking actions.

IMO GHG Strategy – “Three-Step Approach”:

- Data collection;
- Data analysis;
- Decision making on further measures.



MEPC67: Agreement has been made on the development of a **Data Collection System (DCS)** for fuel consumption that can be readily used for voluntary or mandatory application of the system.



European Union:

Set out a **“three-step strategy”** towards reducing GHG emissions from the shipping industry in 2013.

- **Monitoring, reporting and verification (MRV)** of CO₂ emissions from large ships using EU ports;
- Greenhouse gas reduction targets for the maritime transport sector;
- Further measures, including market-based measures, in the medium to long term.



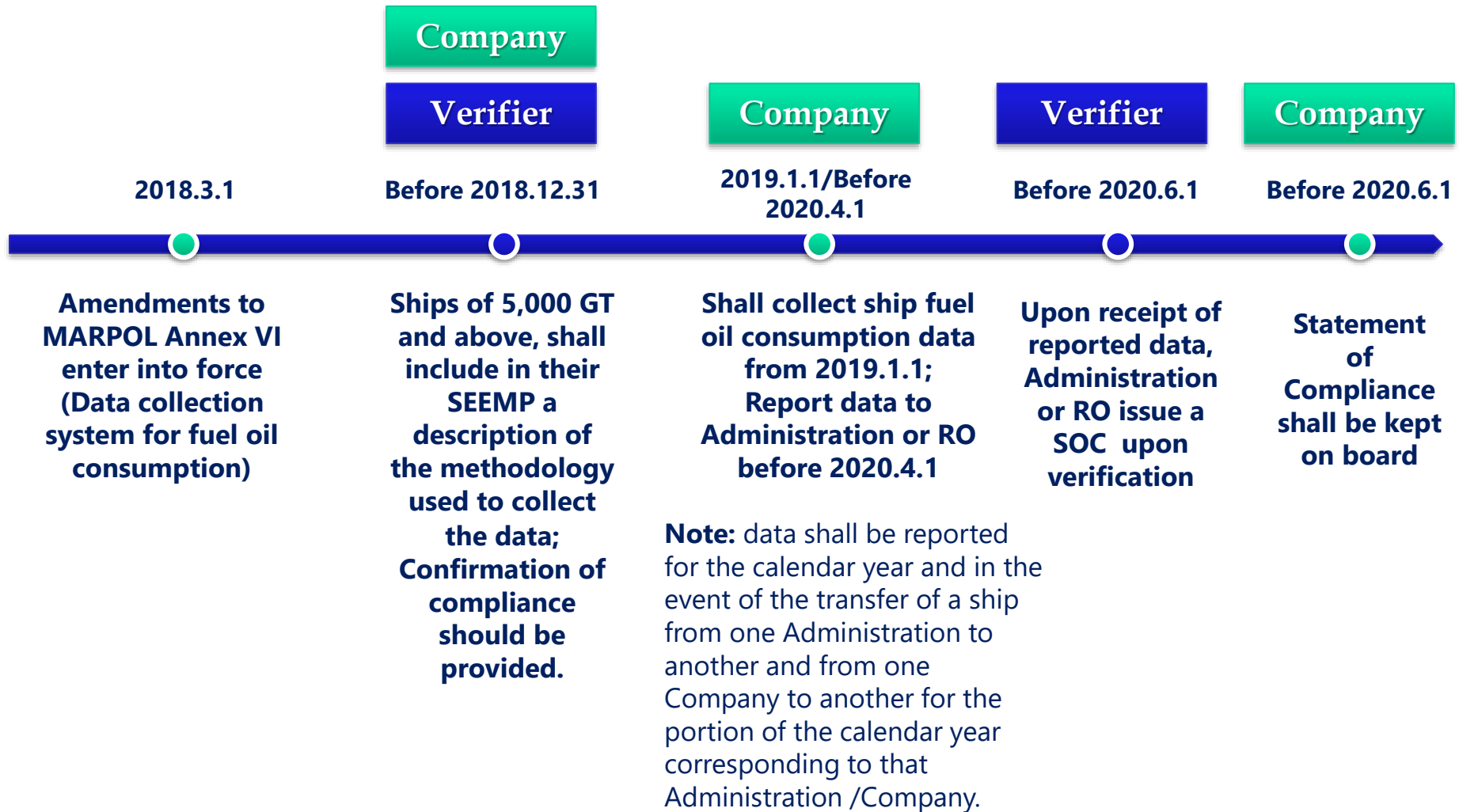
IMO DCS :

- ❑ 2014: Open the discussion of ship fuel oil consumption data collection system;
- ❑ 2016: Amendments to MARPOL Annex VI (Data collection system for fuel oil consumption) were adopted at MEPC 70 and Guidelines for the development of Part B of the Ship Energy Efficiency Management Plan (SEEMP).
- ❑ 2017: 2017 Guidelines for administration verification of ship fuel oil consumption data

Conference	Content
MEPC70	<p>Adopted amendments to MARPOL Annex VI that introduce requirements on a ship fuel consumption data collection system with entry into force, March 1, 2018 (MEPC.278(70)).</p> <p>IMO DCS requirements are applicable to vessels of 5000 gross tonnage and above. Ship fuel consumption data collection program to be included in vessel SEEMP before December 31,2018.</p>

- Key stages for the adoption of a Revised IMO GHG Strategy in 2023 as set out in the Roadmap are identified in section 6 of the Initial Strategy adopted by MEPC72.

Spring 2018 (MEPC 72)	Adoption of the Initial Strategy ⁵ including, inter alia, a list of candidate short-, mid- and long-term further measures with possible timelines, to be revised as appropriate as additional information becomes available
January 2019	Start of Phase 1: Data collection (Ships to collect data)
Spring 2019 (MEPC 74)	Initiation of Fourth IMO GHG Study using data from 2012-2018
Summer 2020	Data from 2019 to be reported to IMO
Autumn 2020 (MEPC 76)	Start of Phase 2: data analysis (no later than autumn 2020) Publication of Fourth IMO GHG Study for consideration by MEPC 76
Spring 2021 (MEPC 77)	Secretariat report summarizing the 2019 data pursuant to regulation 22A.10 Initiation of work on adjustments on Initial IMO Strategy, based on Data Collection System (DCS) data
Summer 2021	Data for 2020 to be reported to IMO
Spring 2022 (MEPC 78)	Phase 3: Decision step Secretariat report summarizing the 2020 data pursuant to regulation 22A.10
Summer 2022	Data for 2021 to be reported to IMO
Spring 2023 (MEPC 80)	Secretariat report summarizing the 2021 data pursuant to regulation 22A.10 Adoption of Revised IMO Strategy, including short-, mid- and long-term further measure(s), as required, with implementation schedules



IMO DCS

Following data are required to be submitted to IMO data base:

- Ship identification information - IMO number;
- Calendar year, starting and ending date of monitoring;
- Ship technical specifications;
 - Ship type
 - Gross tonnage, Net tonnage, Deadweight (as cargo proxy)
 - Rated power output for main and auxiliary engines
 - EEDI (if applicable)
 - Ice class;
- Oil Consumptions, Fuel types, method used to measure fuel oil consumption;
- Distance travelled;
- Hours underway.

Identification of a specific ship and Administration will not be possible. Parties shall have access to the anonymized data strictly for their analysis and consideration.



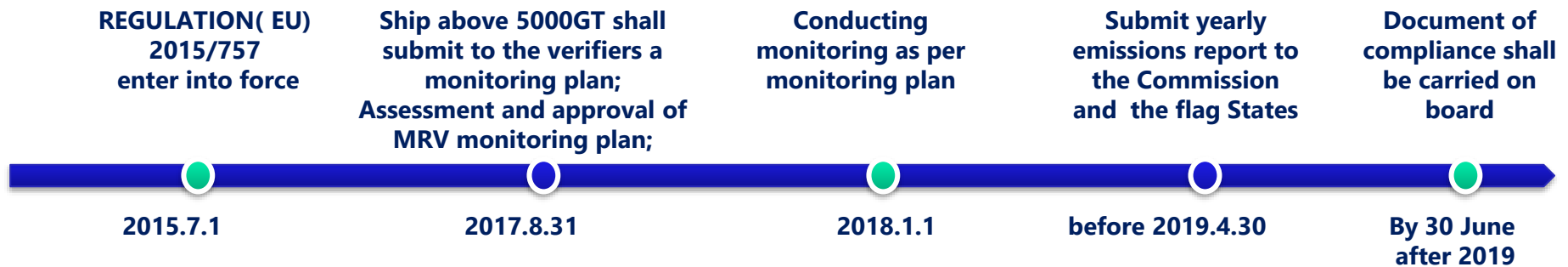
EU : 2015.5.19, Published 《REGULATION (EU) 2015/757 of the European Parliament and of the Council on the Monitoring, Reporting and Verification of Carbon Dioxide Emissions from Maritime Transport, and Amending Directive 2009/16/EC》

2016: COMMISSION DELEGATED REGULATION (EU) 2016/2071, **amending Regulation (EU) 2015/757**; Four other legal acts are also relevant.

EU MRV requires ships of 5000 GT and above to monitor and report their CO2 emission for:

- Voyages going into/out of EU;
- Voyages between ports of EU member states;
- Warships, fishing vessels, government vessels for non-commercial purposes etc. are excluded from this regulation.

	Monitoring on a per-voyage basis	Monitoring on an annual basis
1	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 in total
2	Amount and emission factor for each type of fuel consumed in total	Total aggregated CO ₂ emitted within the scope of this Regulation
3	CO ₂ emitted	Aggregated CO ₂ emissions from all voyages between ports under a Member State's jurisdiction
4	Distance travelled	Aggregated CO ₂ emissions from all voyages which departed from ports under a Member State's jurisdiction
5	Time spent at sea	Aggregated CO ₂ emissions from all voyages to ports under a Member State's jurisdiction
6	Cargo carried	CO ₂ emissions which occurred within ports under a Member State's jurisdiction at berth
7	Transport work	Total distance travelled
8	-	Total time spent at sea
9	-	Total transport work
10	-	Average energy efficiency



- 2015: EU commissioned the ESSF to research the MRV regulations and implementation requirements and introduce the authorization and implementation rules.
- 2017: Published a series of technical guidelines for the implementation of EU MRV regulations;
- 2019: European Commission makes verified data publicly available

Work carried out by IACS on data collection

- Established a JWG/MRV on a key issue for the maritime industry ;
- Actively participated in ESSF MRV subgroups ;
- Participation in the IMO Correspondence Group on the data collection system which reported to MEPC 70 and MEPC 71;
- Submitted documents to MEPC on related issues in terms of data collection implementation.
- Submitted proposal to MEPC 74 for the analysis of the data from IMO Ship Fuel Oil Consumption Database (MEPC 74/6/2 (IACS and OCIMF))

Trends on the data collection

1. IMO

- Unified interpretations of MARPOL Annex VI related to data collection system for fuel oil consumption
- Review appropriate proxy for transport work for ships not for carrying cargo
- IMO database & work after Phase 1

2. EU MRV

- Main difference between MRV and DCS.
- EU considering to align the MRV to IMO DCS.

3. others



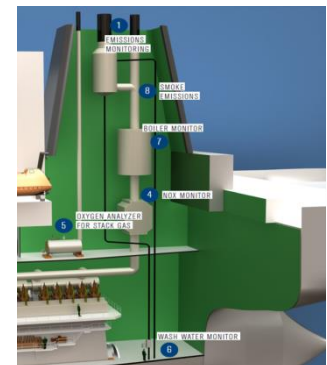
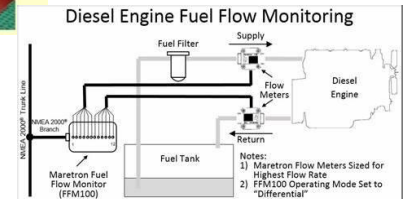
China Maritime Safety Administration (MSA) issued 《Measures for the collection and administration of energy consumption data of ships》 which came into effect on January 1, 2019.

- ◆ Applies to ships of 400 gross tonnage and above or powered by propulsion power of 750kW and above , when entering or leaving ports in China. In general, ships are required to report energy consumption data of the last voyage to MSA before leaving port.
- ◆ Warships and fishing vessels have been exempted from this regulation.
- ◆ The required data are provided in the standard forms .



There are various methods of monitoring shipboard emission:

- Fuel oil consumption monitoring, and then calculate the corresponding amount of GHG emission.
 - Bunker delivery note (BDN);
 - Tank monitoring ;
 - Flowmeter;
- Direct CO₂ emission monitoring. *[not required by regulation 22A of MARPOL Annex VI]*



The method of direct monitoring has a very high monitoring accuracy, nonetheless, the initial investment cost is also very high, the shipping industry has very limited using experience on this method for data collection.

Monitoring Methods	Accuracy levels and Estimated Overall Uncertainty Levels	Cost	Potential restriction	Risks
BDN	1) 1% -5% ¹⁾ 2) 5% or more errors ²⁾ 3) 3% for HFO and MGO/MDO ³⁾	Require almost no investment, the cost for reporting and verification however is relatively high.	Applies to annual emission monitoring. Not applicable for per voyage monitoring;	BDN requires third party verification. The risk of over calculation.
Tank Sounding	Manual: Accuracy is limited. Electronic: 1) 2%-5% ¹⁾ 2) 5% for HFO and MGO/MDO ³⁾	Estimated cost is around 1000\$per year per ship; There will be extra calibration cost.	Applies to both per annum and per voyage data monitoring.	In cases where electronic tank sounding is utilized, periodical calibration is required.
Flow Meter	1) Mass Flow Meter: 0.05%-0.2% ¹⁾ 2) Mass Flow Meter: 0.02% - 0.05% ²⁾ 3) Inferential Flow Meter: 3% ¹⁾ 4) 8% for HFO and 10% for MGO/MDO ³⁾	Initial investment will be high with a low reporting and verification cost.	Applies to both per annum and per voyage data monitoring.	Miss the oil consumption equipment.

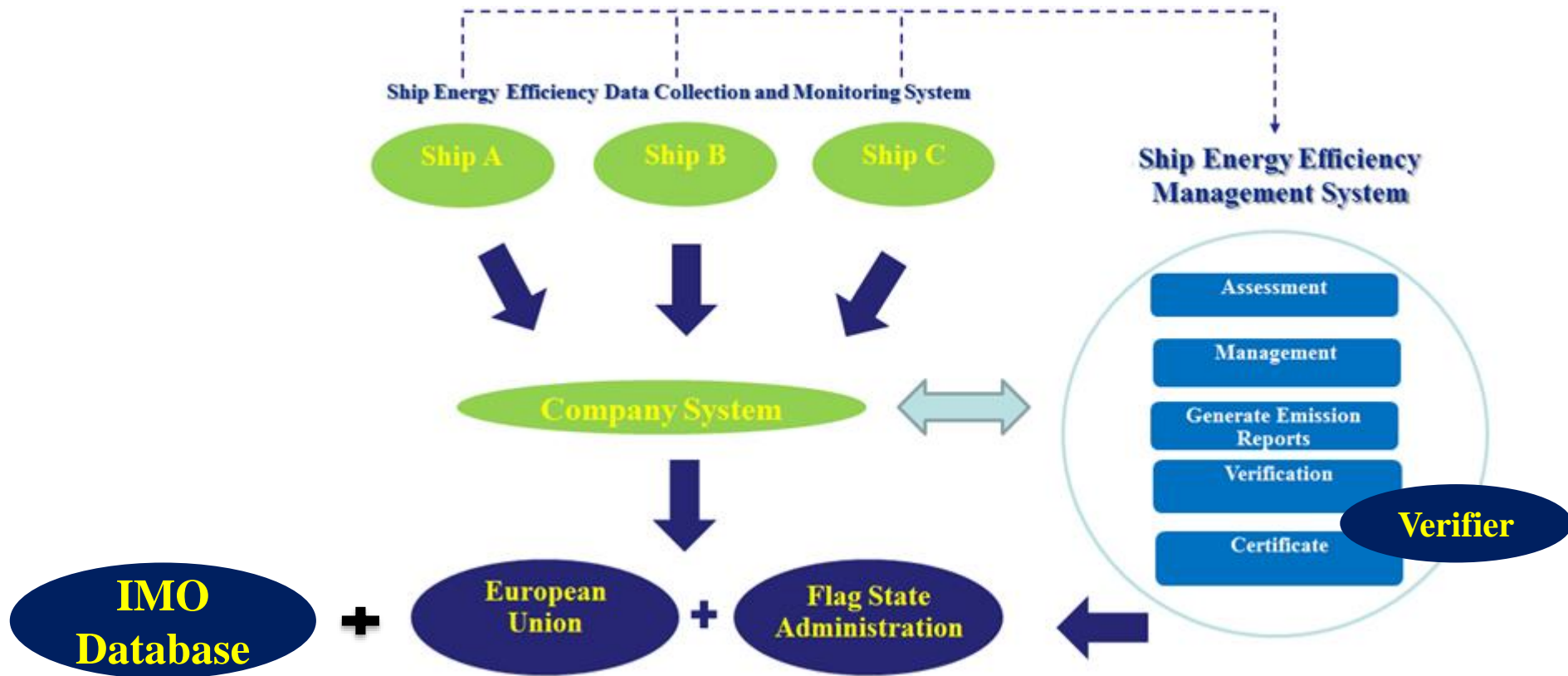
Source :

1)Accuracy Levels : "Monitoring of bunker fuel consumption, Delft, CE Delft, March 2013"

2)Accuracy Levels: Source 1 (mentioned above) and feedback on the practice of monitoring of fuel consumption from shipping industries.

3)Estimated Overall Uncertainty: "MEPC 72/INF.10 Uncertainty Analysis of Methods Used to Measure Ship Fuel Oil Consumption"

Trend on the practices taken by companies



Proposals on analysis of the data

1. MEPC 73 agreed, in principle, that a method for conducting the future data analysis of the IMO Ship Fuel Oil Consumption Database needs to be developed as a priority.
2. IACS and OCIMF Submitted proposal (MEPC74/6/2) to MEPC 74 for the analysis of the data from the IMO Ship Fuel Oil Consumption Database.
 - Proposed 6 possible Performance Indicators (PIs) that could be used in the data analysis to be undertaken by the Organization.
 - Suggested that ship speed is necessary for a more accurate analysis of the energy efficiency of the existing fleet.
3. Due to time constraints, MEPC74 deferred the consideration of this document.

Thanks!