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ENERGY EFFICIENCY OF SHIPS

Report of fuel oil consumption data submitted to the IMO Ship Fuel Oil Consumption Database in GISIS (Reporting year: 2023)

Note by the Secretariat

SUMMARY

Executive summary:	This document provides the report of the fuel oil consumption data for 2023 submitted to the IMO Ship Fuel Oil Consumption Database in GISIS, in accordance with regulation 27 of MARPOL Annex VI and the *2022 Guidelines for the development and management of the IMO Ship fuel oil consumption database* (resolution MEPC.349(78)).
Strategic direction, if applicable:	3
Output:	3.7
Action to be taken:	Paragraph 13
Related documents:	MEPC 68/INF.24/Rev.1; MEPC 70/18; MEPC 71/17; MEPC 76/6/1; MEPC 77/6/1; MEPC 79/6/1; MEPC 81/6; resolutions MEPC.278(70), MEPC.346(78) and MEPC.349(78)

Background

1 In accordance with regulation 27.3 of MARPOL Annex VI, except as provided for in paragraphs 4, 5 and 6 of the same regulation, within three months after the end of each calendar year, a ship in the scope of regulation 27 shall report to its Administration or any organization duly authorized by it, the aggregated values for the data specified in appendix IX of MARPOL Annex VI, via electronic communication using the standardized format set out in appendix 3 of the *2022 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)* (resolution MEPC.346(78)), hereinafter referred to as the "2022 Guidelines".

2 Upon receipt of the reported fuel consumption data, and in accordance with regulation 6.6 of MARPOL Annex VI, the Administration or any organization duly authorized by it shall determine whether the data has been reported in accordance with regulation 27 of MARPOL Annex VI and, if so, issue a Statement of Compliance not later than five months from the beginning of the calendar year.

3 In accordance with regulation 27.9 of MARPOL Annex VI, not later than one month after issuing the Statement of Compliance, by 30 June at the latest, the Administration shall ensure that the fuel consumption data reported by its registered ships of 5,000 GT and above and in the scope of regulation 27 of MARPOL Annex VI are transferred to the IMO Ship Fuel Oil Consumption Database (IMO DCS) in GISIS.

4 Regulation 27.10 of MARPOL Annex VI requires the Secretary-General to submit an annual report to the Committee, summarizing the data collected, the status of missing data, and such other relevant information as may be requested by the Committee.

5 Following the adoption of amendments to appendix IX of MARPOL Annex VI (resolution MEPC.362(79)) which entered into force on 1 May 2024, the Secretariat updated the IMO DCS, to allow for reporting of Attained Energy Efficiency Existing Ship Index (EEXI) and Carbon Intensity Indicator (CII) values at the end of the 2023 reporting period.

Report on the fuel oil consumption data submitted to the IMO DCS

6 In accordance with regulation 27.10 of MARPOL Annex VI and section 6 of the 2022 Guidelines, the Secretariat has prepared a summary report of the fuel oil consumption data for the 2023 reporting period, as set out in the annex to this document.

7 The Secretariat carried out a quality control and verification process of the data submitted to GISIS to identify missing ships and obvious errors in the submitted data.

8 Administrations can download non-anonymized data for the ships flying their flag for which data has been submitted to GISIS by that Administration or on their behalf. In accordance with regulation 27.12 of MARPOL Annex VI, Parties to MARPOL Annex VI also have access to the data of all ships submitted to GISIS in an anonymized format.

9 The following general findings with regard to the fuel consumption data for the 2023 reporting period are noted:

.1 Data was reported by 28,620 ships (28,834 for 2022 and 28,171 for 2021) with a combined gross tonnage of 1,301 million gross tonnes (1,289 million gross tonnes for 2022) by 105 Administrations out of 135 possible Administrations (compared to 108 out of 135 for 2022). The total number of ships and total gross tonnage is given in terms of the number of different ships which reported data, not the number of reports in GISIS. Ships with obvious errors in the submitted data were removed from these totals.

.2 By cross-referencing with data from the GISIS Ship and Company Particulars module, 28,620 ships out of a potential 35,143 ships (81.4%) (compared to 84.8% for 2022) that were estimated to fall under the scope of regulation 27 of MARPOL Annex VI[*], submitted data. On the basis of gross tonnage, the reported data represents 90.5% of the ships that are estimated to fall under the scope of regulation 27 of MARPOL Annex VI (compared to 93.1% for 2022).

.3 By 23 July 2024, the number of ships identified with potential errors was reduced to 229 ships (compared to 176 by 10 August 2023 for 2022). At the time of the report, these potential errors had not been modified by the

[*] The actual number of ships falling under the scope of regulation 27 of MARPOL Annex VI is lower than 35,143, for reasons described in paragraph 8 of the annex.

concerned Administration or recognized organization. Such ships can have a relatively large impact on the aggregated data and have not been included in the annexed report for the 2023 reporting period.

.4 211 million tonnes of fuel (213 million tonnes for 2022), on a quantity basis, were used by the aforementioned 28,620 ships. Total fuel used was slightly less in 2023 compared to 2022, as shown in figure 1 below.

.5 93.52% of the fuel used for the 2023 reporting period (compared to 94.65% for 2022) was either Heavy Fuel Oil, Light Fuel Oil or Diesel/Gas Oil. Fuels that are not in those categories present 6.48% of the fuel used in 2023 (compared to 5.35% in 2022).

.6 The majority of the reported fuel oil was consumed by the following three EEDI ship types: containerships, bulk carriers and tankers. Compared to previous years, containerships reported lower fuel consumption in 2023, while the number of containerships reporting slightly increased.

.7 For the 2023 reporting period, CII ratings were reported by 24,653 out of the 28,620 reporting ships (86.1%). Table 1 below summarizes the reported operational CII ratings, while table 4 in the annex summarizes the CII ratings for each EEDI ship type and size.

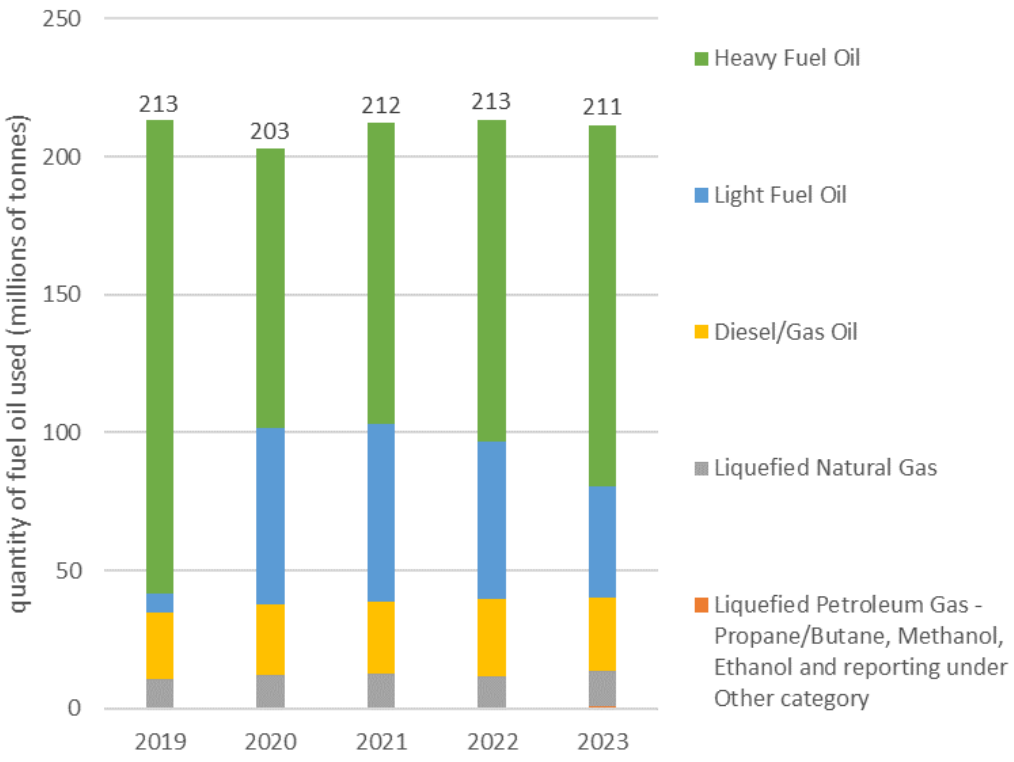

Figure 1: Aggregated annual amount of each type of fuel oil reported by all ships of 5,000 GT and above, from 2019 to 2023

Table 1: Summary of reported operational CII ratings

	A	B	C	D	E	Rating not reported
Total ships	5,528	6,028	7,625	3,931	1,541	3,967
Rating distribution (as a percentage of 28,620 reporting ships)	19.3%	21.1%	26.6%	13.7%	5.4%	13.9%

Improvements to the IMO DCS

10 MEPC 81 adopted resolutions MEPC.385(81) and MEPC.388(81), containing:

.1 amendments to MARPOL Annex VI on the inclusion of data on transport work and enhanced granularity in the IMO DCS, expected to enter into force on 1 August 2025, and inviting Parties to consider the early application of the amendments from 1 January 2025; and

.2 related amendments to the 2022 Guidelines, respectively.

11 With a view to allowing sufficient preparation for the entry into force of these amendments and to encourage reporting of transport work and added granularity in the full 2025 reporting year, if available, the Secretariat is currently testing and updating the IMO DCS GISIS module as follows:

.1 to include voluntary reporting parameters on transport work and enhanced granularity by 1 January 2025;

.2 to include mandatory reporting of transport work and enhanced granularity by 1 January 2026; and

.3 to ensure that ships report CII and transport work data together.

12 Similar to previous reporting years, biofuels reported with many different names and fuels incorrectly reported under the "Other" fuel category, instead of Heavy Fuel Oil, have been corrected.

Action requested of the Committee

13 The Committee is invited to consider the summary report of the fuel oil consumption data submitted to the IMO DCS for 2023 and relevant information in this document, and in particular to:

.1 approve, in principle, the summary of the fuel oil consumption data submitted to the IMO DCS for 2023 (annex);

.2 note the ongoing improvements to the reporting process in the IMO DCS module in GISIS, in particular the intended timeline and updates to report transport work and add granularity from 1 January 2025 (paragraph 11);

.3 approve, in principle, the reporting on carbon intensity developments on the basis of supply-based measurements, using AER and cgDIST indicators (annex, table 3);

.4 approve, in principle, the reporting of CII values (annex, table 4); and

.5 note that in the absence of cargo-related data, in particular transport work, the Secretariat intends to submit a separate document reporting on the demand-based carbon intensity of international shipping for the period from 2019 to 2023 (annex, paragraph 34).

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ANNEX

SUMMARY REPORT OF FUEL OIL CONSUMPTION DATA SUBMITTED TO THE IMO SHIP FUEL OIL CONSUMPTION DATABASE FOR 2022

Total number of ships for which fuel consumption data was reported

1 In accordance with paragraph 5.1 of the 2022 Guidelines, in January 2023 every Administration that had designated a contact person in the IMO DCS module in GISIS was sent an indicative list of their ships falling under the scope of regulation 27 of MARPOL Annex VI, totalling 35,143 ships (compared to 33,991 ships in January 2022) under 135 Administrations. The lists were produced by cross-referencing with data from the Ship and Company Particulars module in GISIS.

2 For the period from 1 January 2023 until 31 December 2023 (2023 reporting period), by 23 July 2024 fuel consumption data had been reported to the IMO DCS by 105 Administrations, consisting of 74 Parties to MARPOL Annex VI and 31 non-Parties, for 28,620 ships (compared to 28,834 ships for 2022) in total out of a potential 35,143 ships (81.4%) that were estimated to fall under the scope of regulation 27 of MARPOL Annex VI. The actual number of ships falling under this scope is lower, for reasons described in paragraph 8 below. On the basis of gross tonnage, the reported data represents 90.5% of the ships that fell under this scope in January 2022 (compared to 93.1% for 2022).

3 This summary report reflects the fuel consumption data in GISIS up until 23 July 2024; any changes made to the 2023 data in GISIS after this date are not reflected. Additional reported data in GISIS or changes made to the data after 23 July 2024 are not included in this report but will be available in the data directly downloadable from GISIS.

Measures to ensure the completeness of the database

4 In addition to the indicative list of ships falling under the scope of regulation 27 of MARPOL Annex VI, sent to every Administration in January 2023, in accordance with section 5 of the 2022 Guidelines, in July 2024 the Secretariat sent each Administration that had designated a contact person a list of ships identifying those missing ships for which data had not yet been submitted to the IMO DCS. Where applicable, Administrations were also sent a list of ships for which the analysis of the reported fuel consumption data pointed to potential errors.

5 The Secretariat did not modify any of the reported data in GISIS itself but, in the case of any identified missing ships or potential errors, contacted the relevant Administrations and recognized organizations so that they could correct and update the data in GISIS and provide further feedback in case of any discrepancies, as necessary.

6 This list of missing ships was created for each Administration by comparing the ships that had been reported by July 2024 to the list of ships under the scope of regulation 27 of MARPOL Annex VI that were sent to each Administration in January 2023. In July 2024, Administrations were requested to provide fuel consumption data for 9,066 missing ships (compared to 7,569 missing ships for the 2022 reporting year).

7 In response to the request by the Secretariat, a number of Administrations and recognized organizations corrected and updated the reported data in GISIS. The number of potential errors was slightly higher than in previous years, but lower than in 2019.

8 Some Administrations also informed the Secretariat on the status of missing ships for which no data had been reported. Some missing ships were still expected to report data for 2023 and were being investigated by the Administration concerned. The majority of Administrations stated that some of the missing ships were not falling under the scope of regulation 27 of MARPOL Annex VI. The reasons for this included ships operating domestically, ship types and types of propulsion not being relevant, and ships not having operated during the 2023 reporting period.

9 The feedback received from Administrations, indicating the ships not relevant to regulation 27 of MARPOL Annex VI, is used to assist the Secretariat in further updating the process of cross-referencing with the Ship and Company Particulars module in GISIS to produce the indicative lists of ships falling under the scope of the regulation.

10 The Secretariat has included data in GISIS up until 23 July 2024 in this report. Ships with errors have been removed from this report. Administrations and ROs may still submit 2023 data for missing ships and correct errors in GISIS after this date but the report to the Committee will not be updated. However, it is important that data for missing ships and errors is notified to the Secretariat to allow the data for these ships to be verified and used in future analysis.

Verification of the submitted data

11 While not specified in the 2022 Guidelines, the Secretariat carried out a quality control and verification process of the data submitted to GISIS to verify its accuracy, to identify missing ships for which no data had been reported and also to identify obvious errors in the submitted data. An automated process identified ships with obvious errors in the submitted data. This included ships with unrealistic characteristics that were not technically possible, checking for duplicate reporting, and ships that may have been categorized under an incorrect ship type, as defined by regulation 2 of MARPOL Annex VI. Ships with errors that were identified using this process were further examined to determine the cause of any errors. This information can then be provided to the Administrations and ROs concerned.

12 During the analysis of the reported data, as of 23 July 2024, 2,780 instances of multiple reporting entries for a single ship were found. This does not include errors in reporting, including instances of duplicate reporting, which were removed (see paragraph 13). The multiple reporting is mostly due to ships changing between different Administrations and ROs.

13 Following the correction of data in GISIS by Administrations and ROs, the number of errors in the submitted data was reduced. At the time of this report, i.e. 23 July 2024, the number of identified errors that could potentially have a large impact on aggregated data was reduced to 229 ships. These ships show errors that have not been corrected by the responsible Administrations or ROs and have not been included in the data analysis process in this report.

14 One hundred and forty ships out of the aforementioned 229 ships were excluded because they had reported "hours under way" which were more than the total number of hours in a year. In addition, 214 records were removed as they were duplicate reporting. The remaining 89 ships were excluded for reporting unrealistic ship parameters which had not been corrected by the submitters; this includes 34 ships that had an unrealistically large fuel consumption. The aggregated gross tonnage of those 229 ships removed from this report represents 0.75% of all ships which reported fuel consumption data, in terms of gross tonnage.

15 Overall, after corrections to the data, the number of errors identified in the submitted data in the 2023 reporting period, including the number of ships categorized incorrectly, was slightly higher than in 2021 and 2020 but significantly less than the 2019 reporting period.

Number of ships for which fuel consumption data has been reported

16 Table 1 shows a summary of the ships for which Administrations reported fuel consumption data for the 2023 reporting period and compares the total number of ships for which data had been reported with the indicative lists of ships falling under the scope of regulation 27 of MARPOL Annex VI, as sent to each Administration in January 2023.

Table 1: Number of ships reported by Administrations in the reporting period

	Total	**Party**	**Non-Party**
Ships contained in the lists of ships falling under the scope of regulation 27 as sent to Administrations in January 2023	35,143 ships estimated to fall under the scope of 135 Administrations	33,044 ships under the scope of 98 Administrations	2,099 ships under the scope of 37 Administrations
Total ships for which fuel consumption data was submitted	28,620 ships reported by 105 Administrations	27,306 ships reported by 74 Administrations	1,314 ships reported by 31 Administrations

17 Table 1 shows a high reporting rate; data was reported for 81.4% of the total number of ships that were estimated to fall under the scope of regulation 27 of MARPOL Annex VI. The reporting rate is also high in terms of the number of Administrations, both Parties and Non-Parties to MARPOL Annex VI, that reported data for their ships; in total, 105 Administrations out of a potential 135 Administrations submitted data. The number of Administrations in table 1 also includes national registries or sub-registries through which data was submitted.

18 Figure 1 below compares the total number of ships for which data had been reported to the lists of ships falling under the scope of regulation 27 MARPOL Annex VI, in terms of gross tonnage.

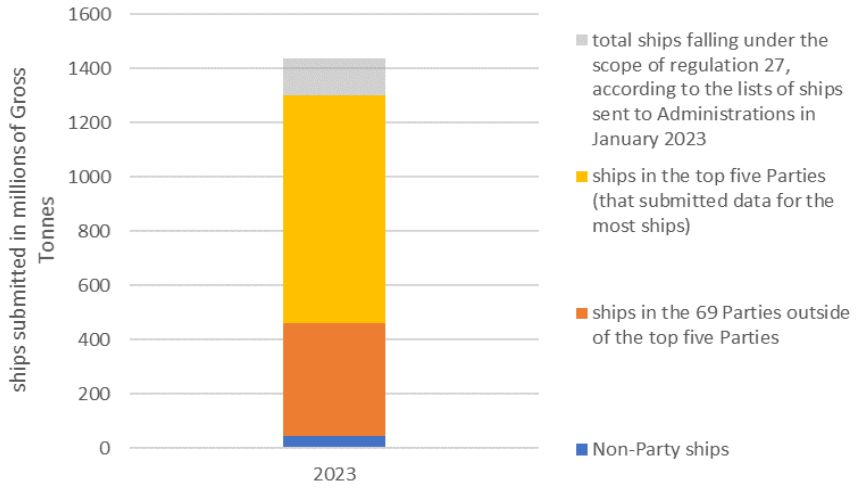

Figure 1: Gross tonnage of ships reported by Administrations

19 As shown in figure 1, the 35,143 ships that were estimated to fall under the scope of regulation 27 of MARPOL Annex VI in January 2023 represent a total of 1,438 million gross tonnes. The 28,620 ships for which fuel consumption data was reported for the 2023 reporting period represent a combined gross tonnage of 1,301 million gross tonnes (90.5% of 1,438 million gross tonnes).

Aggregated annual amount of each type of fuel oil consumed, distance travelled and hours under way for ships of 5,000 GT and above, by EEDI ship type and EEDI size category, "Others" and "Passenger ship" categories for ships not subject to EEDI

20 In total, on a quantity basis, 211 million tonnes of fuel was used in the 2023 reporting period (compared to 213 million tonnes for 2022). Figure 2 shows that 93.52% of the fuel oil used during 2023 was either Heavy Fuel Oil, Light Fuel Oil or Diesel/Gas Oil. The remaining fuels outside of these three fuel types amounted to 6.48% of the fuel used during the 2023 reporting period.

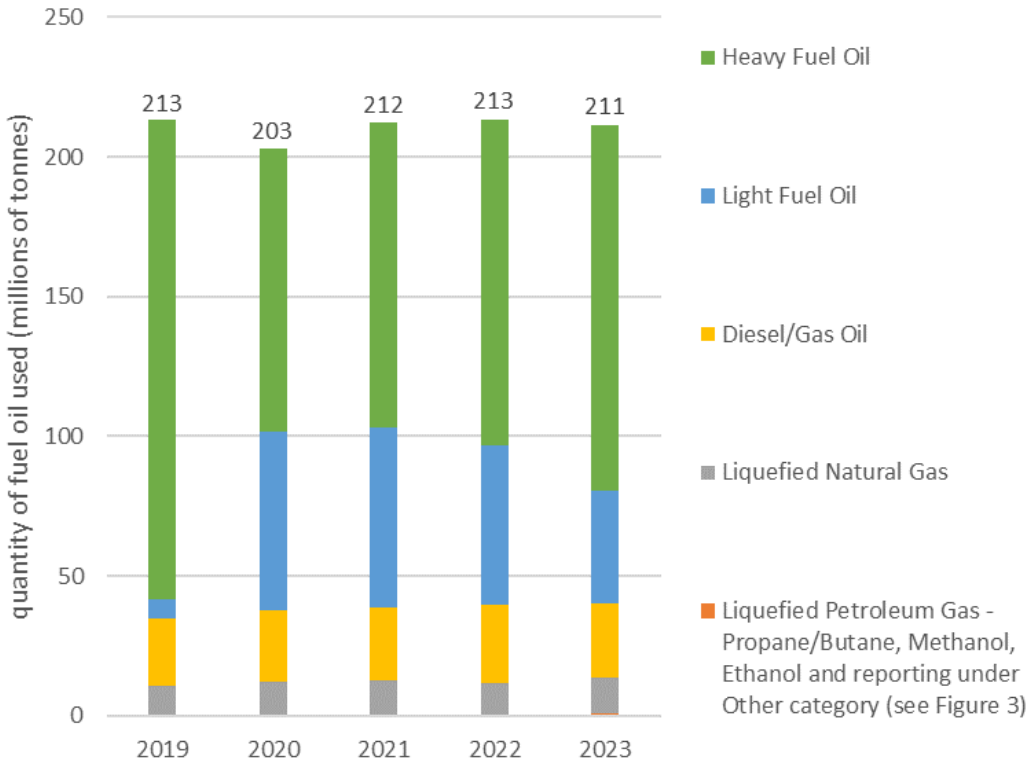

Figure 2: Aggregated annual amount of each type of fuel oil reported by all ships of 5,000 GT and above, from 2019 to 2023

21 Total fuel used by the reported ships was slightly lower during the 2023 reporting period when compared to the 2021 and 2022 reporting periods. The use of LNG increased slightly when compared to previous years, to 12,890,011 tonnes of LNG in 2023.

22 When analysing the submitted data it was also found that some fuel oil, such as VLSFO and LFO, was reported incorrectly under the "Other" fuel category. This issue was rectified by moving these ships under the Heavy Fuel Oil fuel category in-line with the Fourth IMO GHG Study 2020 in that Low Sulphur Heavy Fuel Oil has the same emission factors as conventional HFO.

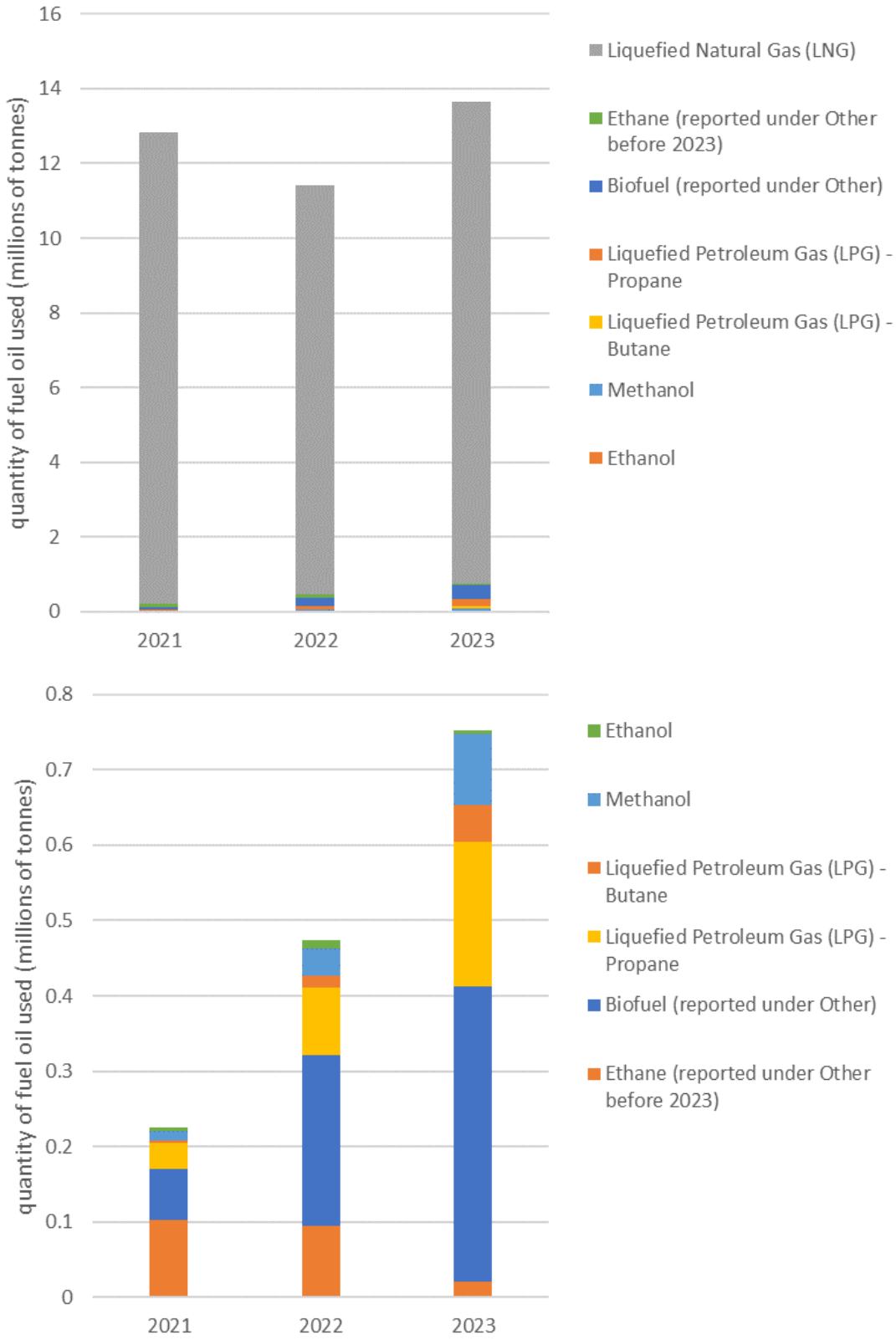

Figure 3: Aggregated annual amount of LNG, LPG, Ethane, Ethanol, Methanol, Ethanol and biofuel (reported under the "Other" category) consumed by all ships of 5,000 GT and above

23 Figure 3 above shows fuels which were used during the 2023 reporting period that are neither Heavy Fuel Oil, Light Fuel Oil nor Diesel/Gas Oil. In total the fuels in figure 3 amount to 6.48% of the reported fuel oil in 2023.

24 In figure 3, the reported amounts of fuel used for 2023 can be broken down as follows:

.1 12,890,011 tonnes of LNG (10,950,408 tonnes in 2022);

.2 192,405 tonnes of LPG – Propane (88,774 tonnes in 2022);

.3 49,887 tonnes of LPG – Butane (16,673 tonnes in 2022);

.4 93,876 tonnes of Methanol (35,523 tonnes in 2022);

.5 4,137 tonnes of Ethanol (10,890 tonnes in 2022);

.6 19,036 tonnes of Ethane (95,204 tonnes in 2022); and

.7 390,846 tonnes of Biofuel, reported under Other (226,378 tonnes in 2022).

25 Compared to previous reporting years, Ethane was made a separate category so that only Biofuels were reported under the "Other" category. 19,036 tonnes of Ethane and 390,846 tonnes of Biofuel were reported under the "Other" category (226,768 tonnes in 2022). In this regard, similar to the 2022 reporting period, biofuel was reported using many different names.

26 Following the adoption of the 2022 Guidelines, adding Ethane and an associated C_F value in section 2.2.11, Ethane and its associated C_F value were added as fuel to the IMO DCS in GISIS for reporting for 2023.

27 Considering that biofuels are reported in small amounts, it may be better to continue the current reporting process by users reporting biofuels under the "Other" fuel category, which allows users to submit a custom name and associated C_F value.

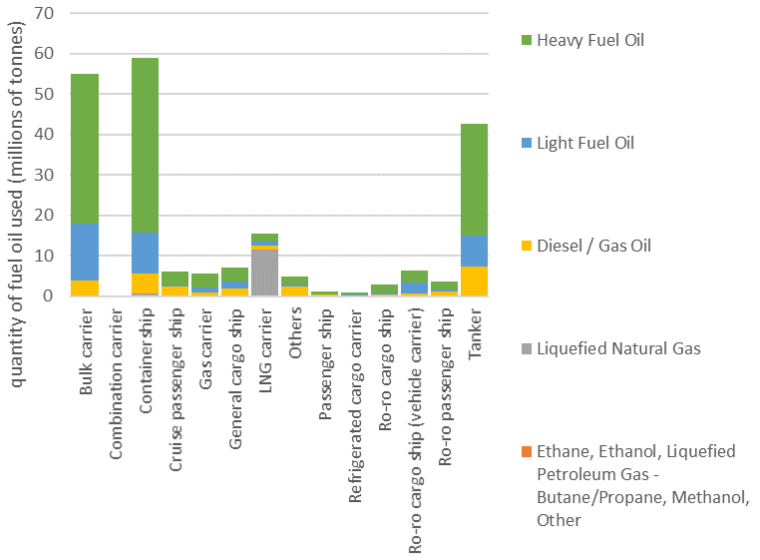

Figure 4: Aggregated annual amount of each type of fuel oil consumed for ships of 5,000 GT and above by EEDI ship type, including the "Others" and "Passenger ship" categories for ships not subject to EEDI for the 2022 reporting period

28 Figure 4 above shows how different fuels were used by different ship types during the 2023 reporting period. During the reporting period the majority of fuel oil was consumed by three ship types: containerships, bulk carriers and tankers.

29 In accordance with paragraph 6.2 of the 2022 Guidelines, table 2 contains the aggregated annual amount of each type of fuel oil consumed for ships of 5,000 GT and above by EEDI ship type and EEDI size category, including the "Others" and "Passenger ship" categories for ships not subject to EEDI.

30 In accordance with paragraphs 6.2 and 6.3 of the 2022 Guidelines, table 3 contains the number of ships that reported, including the aggregated gross tonnage, aggregated deadweight, and the aggregated annual amount of distance travelled and hours under way for ships of 5,000 GT and above by EEDI ship type and EEDI size category, including the "Others" and "Passenger ship" categories for ships not subject to EEDI.

Table 2: Aggregated annual amount of each type of fuel oil consumed for ships of 5,000 GT and above by EEDI ship type and EEDI size category, including the "Others" and "Passenger ship" categories for ships not subject to EEDI

	Diesel / Gas Oil (MDO / MGO)	Heavy Fuel Oil (HFO)	Light Fuel Oil (LFO)	Ethane	Ethanol	Liquefied Natural Gas (LNG)	Liquefied Petroleum Gas (LPG) - Butane	Liquefied Petroleum Gas (LPG) - Propane	Methanol	Other
Bulk carrier	**3,933,563**	**36,888,628**	**14,035,409**	**0**	**4,137**	**66,123**	**63**	**4,896**	**0**	**7,892**
Less than 10,000 DWT	37,066	31,762	39,523	0	0	0	0	0	0	0
10,000 ≤ DWT < 20,000	106,607	182,376	231,405	0	0	0	0	0	0	0
20,000 DWT and above	3,789,890	36,674,490	13,764,481	0	4,137	66,123	63	4,896	0	7,892
Combination carrier	**9,059**	**126,412**	**10,542**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Less than 10,000 DWT	0	0	0	0	0	0	0	0	0	0
10,000 ≤ DWT < 20,000	0	0	0	0	0	0	0	0	0	0
20,000 DWT and above	9,059	126,412	10,542	0	0	0	0	0	0	0
Containership	**4,858,186**	**43,113,643**	**10,182,858**	**0**	**0**	**468,540**	**20,064**	**3,990**	**0**	**310,050**
Less than 10,000 DWT	179,784	465,430	159,148	0	0	0	0	0	0	138
10,000 ≤ DWT < 15,000	387,670	1,668,478	573,355	0	0	3,467	0	0	0	1,417
15,000 ≤ DWT < 40,000	848,742	7,948,001	2,347,012	0	0	24,400	0	3,990	0	6,940
40,000 ≤ DWT < 80,000	1,288,696	10,344,054	3,161,549	0	0	13,898	0	0	0	73,723
80,000 ≤ DWT < 120,000	1,041,756	9,777,012	1,855,205	0	0	5,326	0	0	0	87,810
120,000 ≤ DWT < 200,000	978,610	10,415,009	1,832,604	0	0	271,426	0	0	0	137,286
200,000 DWT and above	132,894	2,495,583	253,985	0	0	150,023	20,064	0	0	2,736
Cruise passenger ship	**2,285,902**	**3,543,433**	**194,485**	**0**	**0**	**158,810**	**0**	**0**	**0**	**7,486**
Less than 5,000 GT	0	0	0	0	0	0	0	0	0	0
5,000 ≤ GT < 25,000	181,720	3,270	735	0	0	13,464	0	0	0	0
25,000 ≤ GT < 85,000	846,932	570,282	120,235	0	0	616	0	0	0	201
85,000 GT and above	1,257,250	2,969,881	73,515	0	0	144,730	0	0	0	7,285
Gas carrier	**640,003**	**3,523,942**	**1,276,417**	**20,977**	**0**	**76,887**	**28,396**	**160,986**	**0**	**31,897**
2,000 ≤ DWT < 10,000	0	0	0	0	0	0	0	0	0	0
2,000 ≤ DWT < 10,000	141,008	187,658	47,786	0	0	4,136	0	4,205	0	463
10,000 DWT and above	498,995	3,336,284	1,228,631	20,977	0	72,751	28,396	156,781	0	31,434

	Diesel / Gas Oil (MDO / MGO)	Heavy Fuel Oil (HFO)	Light Fuel Oil (LFO)	Ethane	Ethanol	Liquefied Natural Gas (LNG)	Liquefied Petroleum Gas (LPG) - Butane	Liquefied Petroleum Gas (LPG) - Propane	Methanol	Other
General cargo ship	**1,851,243**	**3,599,374**	**1,714,282**	**0**	**0**	**18,381**	**0**	**0**	**6,218**	**6,290**
Less than 3,000 DWT	96,473	20,611	199	0	0	0	0	0	0	0
3,000 ≤ DWT < 15,000	920,372	980,190	490,955	0	0	16,886	0	0	0	0
15,000 DWT and above	834,398	2,598,573	1,223,128	0	0	1,495	0	0	6,218	6,290
LNG carrier	**1,063,442**	**1,822,407**	**1,015,466**	**0**	**0**	**11,530,785**	**0**	**22,346**	**0**	**0**
Less than 10,000 DWT	6,255	1,074	354	0	0	25,204	0	0	0	0
10,000 DWT and above	1,057,187	1,821,333	1,015,112	0	0	11,505,581	0	22,346	0	0
Others	**2,351,630**	**2,030,239**	**584,122**	**0**	**0**	**35,563**	**0**	**0**	**0**	**4,061**
5,000 GT and above	2,351,630	2,030,239	584,122	0	0	35,563	0	0	0	4,061
Passenger ship	**309,350**	**629,823**	**86,126**	**0**	**0**	**94,300**	**0**	**0**	**0**	**0**
5,000 GT and above	309,350	629,823	86,126	0	0	94,300	0	0	0	0
Refrigerated cargo carrier	**136,810**	**662,977**	**196,482**	**0**	**0**	**37,570**	**0**	**0**	**0**	**0**
Less than 3,000 DWT	0	0	0	0	0	0	0	0	0	0
3,000 ≤ DWT < 5,000	126	2,203	0	0	0	0	0	0	0	0
5,000 DWT and above	136,684	660,774	196,482	0	0	37,570	0	0	0	0
Ro-ro cargo ship	**481,424**	**1,934,183**	**368,139**	**0**	**0**	**25,098**	**0**	**0**	**0**	**0**
Less than 1,000 DWT	0	0	0	0	0	0	0	0	0	0
1,000 ≤ DWT < 2,000	0	0	0	0	0	0	0	0	0	0
2,000 DWT and above	481,424	1,934,183	368,139	0	0	25,098	0	0	0	0
Ro-ro cargo ship (vehicle carrier)	**699,694**	**3,008,399**	**2,535,193**	**0**	**0**	**39,547**	**0**	**0**	**0**	**41,475**
Less than 10,000 DWT	43,187	130,400	17,169	0	0	0	0	0	0	3,760
10,000 DWT and above	656,507	2,877,999	2,518,024	0	0	39,547	0	0	0	37,715
Ro-ro passenger ship	**995,028**	**1,861,592**	**579,636**	**0**	**0**	**130,739**	**0**	**0**	**339**	**6,256**
Less than 250 DWT	0	0	0	0	0	0	0	0	0	0
250 ≤ DWT < 1,000	194,220	4,022	0	0	0	7,817	0	0	0	929
1,000 DWT and above	800,808	1,857,570	579,636	0	0	122,922	0	0	339	5,327
Tanker	**6,984,682**	**27,696,693**	**7,637,017**	**0**	**0**	**207,668**	**1,364**	**187**	**87,319**	**12,856**

	Diesel / Gas Oil (MDO / MGO)	Heavy Fuel Oil (HFO)	Light Fuel Oil (LFO)	Ethane	Ethanol	Liquefied Natural Gas (LNG)	Liquefied Petroleum Gas (LPG) - Butane	Liquefied Petroleum Gas (LPG) - Propane	Methanol	Other
Less than 4,000 DWT	152	0	3,431	0	0	0	0	0	0	0
4,000 ≤ DWT < 20,000	1,258,527	1,870,873	958,287	0	0	30,460	0	0	0	5,525
20,000 DWT and above	5,726,003	25,825,820	6,675,299	0	0	177,208	1,364	187	87,319	7,331
Total (211,137,491)	**26,600,016**	**130,441,745**	**40,416,174**	**20,977**	**4,137**	**12,890,011**	**49,887**	**192,405**	**93,876**	**428,263**

Table 3: The number of ships that reported, including the aggregated gross tonnage and aggregated deadweight, and the aggregated annual amount of distance travelled and hours under way for ships of 5,000 GT and above by EEDI ship type and EEDI size category, including the "Others" and "Passenger ship" categories for ships not subject to EEDI

	Number of ships	Gross tonnage	Deadweight tonnage	Distance travelled	Hours under way	CO_2 emissions	AER for each EEDI ship Size	cgDIST for each EEDI ship Size
Bulk carrier	**10,142**	**469,835,774**	**860,177,107**	**531,450,575**	**49,705,672**	**171,924,211**	**3.45**	**-**
Less than 10,000 DWT	69	482,094	565,402	2,456,353	263,746	342,277	16.93	-
10,000 ≤ DWT < 20,000	272	2,727,845	4,070,582	0	1,436	1,638,858	10.59	-
20,000 DWT and above	9801	466,625,835	855,541,123	0	585	169,943,075	3.43	-
Combination carrier	**25**	**1,059,101**	**1,731,583**	**1,481,644**	**132,273**	**455,908**	**4.39**	**-**
Less than 10,000 DWT	0	0	0	0	0	0	-	-
10,000 ≤ DWT < 20,000	0	0	0	0	0	0	-	-
20,000 DWT and above	25	1,059,101	1,731,583	1,481,644	132,273	455,908	4.39	-
Containership	**5,076**	**279,735,936**	**317,809,559**	**371,674,845**	**28,556,513**	**183,739,286**	**7.31**	**-**
Less than 10,000 DWT	242	1,675,570	2,043,832	12,773,831	1,154,197	2,527,550	23.31	-
10,000 ≤ DWT < 15,000	616	6,169,096	7,763,370	36,815,156	3,104,221	8,258,176	17.82	-
15,000 ≤ DWT < 40,000	1,634	36,141,260	45,221,966	110,166,487	8,731,001	34,956,815	11.34	-
40,000 ≤ DWT < 80,000	1,122	54,350,135	64,631,189	90,747,365	6,829,180	46,393,513	8.81	-
80,000 ≤ DWT < 120,000	668	59,680,995	67,352,581	56,778,551	4,082,967	39,764,038	6.90	-
120,000 ≤ DWT < 200,000	654	92,250,986	98,751,618	54,580,390	3,945,974	42,365,386	5.15	-
200,000 DWT and above	139	29,439,522	32,007,120	9,812,422	708,931	9,473,461	4.24	-

	Number of ships	Gross tonnage	Deadweight tonnage	Distance travelled	Hours under way	CO_2 emissions	AER for each EEDI ship Size	cgDIST for each EEDI ship Size
Cruise passenger ship	**267**	**21,865,821**	**2,082,354**	**20,173,489**	**1,451,796**	**19,426,595**	**-**	**10.66**
Less than 5,000 GT	0	0	0	0	0	0	-	-
5,000 ≤ GT < 25,000	45	554,529	75,558	2,414,468	239,076	632,119	-	19.70
25,000 ≤ GT < 85,000	95	5,061,976	549,417	6,580,511	477,524	4,872,199	-	13.45
85,000 GT and above	127	16,249,316	1,457,379	11,178,510	735,196	13,922,277	-	9.75
Gas carrier	**811**	**25,607,534**	**28,445,206**	**56,203,481**	**4,205,676**	**17,979,426**	**8.11**	**-**
Less than 2,000 DWT	0	0	0	0	0	0		**-**
2,000 ≤ DWT < 10,000	158	1,069,065	1,151,593	6,614,432	581,628	1,211,289	25.04	-
10,000 DWT and above	653	24,538,469	27,293,613	49,589,049	3,624,048	16,768,137	7.73	-
General cargo ship	**2,280**	**34,108,192**	**49,671,331**	**97,762,404**	**9,638,750**	**22,622,726**	**9.34**	**-**
Less than 3,000 DWT	16	123,269	37,346	165,495	40,180	374,102	910.79	-
3,000 ≤ DWT < 15,000	1,199	9,039,404	11,900,276	44,032,278	4,700,605	7,596,460	16.83	-
15,000 DWT and above	1,065	24,945,519	37,733,709	53,564,631	4,897,965	14,652,164	7.43	-
LNG carrier	**649**	**70,038,791**	**55,352,028**	**58,470,869**	**4,231,625**	**43,901,419**	**8.50**	**-**
Less than 10,000 DWT	17	152,830	98,234	341,257	51,600	93,811	49.34	-
10,000 DWT and above	632	69,885,961	55,253,794	58,129,612	4,180,025	43,807,608	8.49	-
Others	**1,126**	**18,041,375**	**17,854,865**	**36,643,234**	**4,943,456**	**15,802,592**	**25.58**	**-**
5,000 GT and above	1,126	18,041,375	17,854,865	36,643,234	4,943,456	15,802,592	25.58	-
Passenger ship	89	3,714,143	544,426	4,637,091	360,373	3,483,753	97.26	-
5,000 GT and above	89	3,714,143	544,426	4,637,091	360,373	3,483,753	97.26	-
Refrigerated cargo carrier	**209**	**2,219,904**	**2,384,141**	**11,662,471**	**869,498**	**3,225,556**	**20.01**	**-**
Less than 3,000 DWT	0	0	0	0	0	0	**-**	**-**
3,000 ≤ DWT < 5,000	1	5,566	4,695	24,348	2,240	7,264	63.55	-
5,000 DWT and above	208	2,214,338	2,379,446	11,638,123	867,258	3,218,291	19.98	-
Ro-ro cargo ship	**326**	**10,116,781**	**4,807,839**	**23,709,299**	**1,692,246**	**8,795,517**	**-**	**10.91**
Less than 1,000 DWT	0	0	0	0	0	0	-	-
1,000 ≤ DWT < 2,000	0	0	0	0	0	0	-	-
2,000 DWT and above	326	10,116,781	4,807,839	23,709,299	1,692,246	8,795,517	-	10.91
Ro-ro cargo ship (vehicle carrier)	**677**	**37,244,470**	**12,433,071**	**62,136,924**	**4,286,958**	**19,751,188**	**-**	**5.69**
Less than 10,000 DWT	45	727,535	256,948	3,008,113	244,869	602,322	-	11.91
10,000 DWT and above	632	36,516,935	12,176,123	59,128,811	4,042,089	19,148,866	-	5.60

	Number of ships	Gross tonnage	Deadweight tonnage	Distance travelled	Hours under way	CO_2 emissions	AER for each EEDI ship Size	cgDIST for each EEDI ship Size
Ro-ro passenger ship	**349**	**8,830,187**	**1,751,933**	**22,861,965**	**1,458,030**	**11,187,031**	**-**	**17.31**
Less than 250 DWT	0	0	0	0	0	0	**-**	**-**
250 ≤ DWT < 1,000	36	266,389	25,872	1,854,558	113,470	659,323	-	45.32
1,000 DWT and above	313	8,563,798	1,726,061	21,007,407	1,344,560	10,527,708	-	16.67
Tanker	**6,594**	**318,415,452**	**576,933,258**	**339,553,054**	**31,104,968**	**133,408,027**	**3.88**	**-**
Less than 4,000 DWT	1	8,627	1,379	49,564	6,492	11,298	165.31	-
4,000 ≤ DWT < 20,000	1,534	13,358,167	20,163,832	64,839,684	6,233,179	12,969,854	14.67	-
20,000 DWT and above	5,059	305,048,658	556,768,047	274,663,806	24,865,297	120,426,874	3.60	-
Total	**28,620**	**1,300,833,461**	**1,931,978,701**	**1,638,421,345**	**142,637,834**	**655,703,233**	**-**	**-**

Table 4: Operational carbon intensity rating and EEXI for each ship type and size under way for ships of 5,000 GT and above by EEDI ship type and EEDI size category, including the "Others" and "Passenger ship" categories for ships not subject to EEDI

	Number of ships	Reported operational carbon intensity rating							Ships that have reported attained EEXI	
		A	B	C	D	E	No reported CII	Reporting rate	Number of ships	Reporting rate
Bulk carrier	**10,142**	**1,612**	**1,967**	**3,054**	**1,853**	**641**	**1,015**	**90.0%**	**7539**	**74.3%**
Less than 10,000 DWT	69	21	15	14	5	10	4	94.2%	42	60.9%
10,000 ≤ DWT < 20,000	272	103	59	60	20	17	13	95.2%	213	78.3%
20,000 DWT and above	9,801	1,488	1,893	2,980	1,828	614	998	89.8%	7284	74.3%
Combination carrier	**25**	**8**	**11**	**6**	**0**	**0**	**0**	**100.0%**	**25**	**100.0%**
Less than 10,000 DWT	0	0	0	0	0	0	0	-	0	-
10,000 ≤ DWT < 20,000	0	0	0	0	0	0	0	-	0	-
20,000 DWT and above	25	8	11	6	0	0	0	100.0%	25	100.0%
Containership	**5,076**	**1,154**	**1,162**	**1,483**	**619**	**183**	**475**	**90.6%**	**3796**	**74.8%**
Less than 10,000 DWT	242	28	39	79	57	21	18	92.6%	156	64.5%
10,000 ≤ DWT < 15,000	616	150	101	132	113	62	58	90.6%	371	60.2%
15,000 ≤ DWT < 40,000	1,634	543	384	355	134	47	171	89.5%	1145	70.1%
40,000 ≤ DWT < 80,000	1,122	188	279	357	152	30	116	89.7%	898	80.0%

	Number of ships	Reported operational carbon intensity rating							Ships that have reported attained EEXI	
		A	B	C	D	E	No reported CII	Reporting rate	Number of ships	Reporting rate
80,000 ≤ DWT < 120,000	668	58	134	284	106	20	66	90.1%	552	82.6%
120,000 ≤ DWT < 200,000	654	160	177	216	54	3	44	93.3%	557	85.2%
200,000 DWT and above	139	27	48	60	3	0	1	99.3%	116	83.5%
Cruise passenger ship	**267**	**43**	**51**	**79**	**38**	**33**	**23**	**91.4%**	**210**	**78.7%**
Less than 5,000 GT	0	0	0	0	0	0	0	-	0	-
5,000 ≤ GT < 25,000	45	21	13	2	3	4	2	95.6%	29	64.4%
25,000 ≤ GT < 85,000	95	6	20	43	10	9	7	92.6%	77	81.1%
85,000 GT and above	127	16	18	34	25	20	14	89.0%	104	81.9%
Gas carrier	**811**	**228**	**213**	**172**	**105**	**45**	**48**	**94.1%**	**654**	**80.6%**
Less than 2,000 DWT	0	0	0	0	0	0	0	-	0	-
2,000 ≤ DWT < 10,000	158	55	31	25	30	11	6	96.2%	141	89.2%
10,000 DWT and above	653	173	182	147	75	34	42	93.6%	513	78.6%
General cargo ship	**2,280**	**587**	**515**	**487**	**188**	**86**	**417**	**81.7%**	**1325**	**58.1%**
Less than 3,000 DWT	16	0	0	0	0	0	16	0.0%	0	0.0%
3,000 ≤ DWT < 15,000	1,199	316	246	241	91	50	255	78.7%	587	49.0%
15,000 DWT and above	1,065	271	269	246	97	36	146	86.3%	738	69.3%
LNG carrier	**649**	**151**	**183**	**143**	**80**	**43**	**49**	**92.4%**	**454**	**70.0%**
Less than 10,000 DWT	17	1	0	1	2	10	3	82.4%	13	76.5%
10,000 DWT and above	632	150	183	142	78	33	46	92.7%	441	69.8%
Others	**1,126**	**13**	**17**	**34**	**24**	**17**	**1,021**	**9.3%**	**79**	**7.0%**
5,000 GT and above	1,126	13	17	34	24	17	1,021	9.3%	79	7.0%
Passenger ship	**89**	**6**	**14**	**19**	**9**	**12**	**29**	**67.4%**	**42**	**47.2%**
5,000 GT and above	89	6	14	19	9	12	29	67.4%	42	47.2%
Refrigerated cargo carrier	**209**	**30**	**41**	**87**	**24**	**13**	**14**	**93.3%**	**129**	**61.7%**
Less than 3,000 DWT	0	0	0	0	0	0	0	-	0	-
3,000 ≤ DWT < 5,000	1	0	0	0	0	1	0	100.0%	1	100.0%
5,000 DWT and above	208	30	41	87	24	12	14	93.3%	128	61.5%
Ro-ro cargo ship	**326**	**59**	**75**	**100**	**50**	**19**	**23**	**92.9%**	**194**	**59.5%**
Less than 1,000 DWT	0	0	0	0	0	0	0	-	0	-
1,000 ≤ DWT < 2,000	0	0	0	0	0	0	0	-	0	-
2,000 DWT and above	326	59	75	100	50	19	23	92.9%	194	59.5%

	Number of ships	Reported operational carbon intensity rating							Ships that have reported attained EEXI	
		A	B	C	D	E	No reported CII	Reporting rate	Number of ships	Reporting rate
Ro-ro cargo ship (vehicle carrier)	**677**	**75**	**94**	**253**	**153**	**59**	**43**	**93.6%**	**586**	**86.6%**
Less than 10,000 DWT	45	9	12	15	4	2	3	93.3%	38	84.4%
10,000 DWT and above	632	66	82	238	149	57	40	93.7%	548	86.7%
Ro-ro passenger ship	**349**	**52**	**78**	**101**	**45**	**41**	**32**	**90.8%**	**145**	**41.5%**
Less than 250 DWT	0	0	0	0	0	0	0	-	0	-
250 ≤ DWT < 1,000	36	5	7	13	4	1	6	83.3%	5	13.9%
1,000 DWT and above	313	47	71	88	41	40	26	91.7%	140	44.7%
Tanker	**6,594**	**1,510**	**1,607**	**1,607**	**743**	**349**	**778**	**88.2%**	**4524**	**68.6%**
Less than 4,000 DWT	1	1	0	0	0	0	0	100.0%	1	100.0%
4,000 ≤ DWT < 20,000	1,534	315	380	394	179	115	151	90.2%	1071	69.8%
20,000 DWT and above	5,059	1,194	1,227	1,213	564	234	627	87.6%	3452	68.2%
Total	**28,621**	**5528**	**6028**	**7625**	**3931**	**1541**	**3968**	**86.1%**	**19702**	**68.8%**
Total (%)		**19.3%**	**21.1%**	**26.6%**	**13.7%**	**5.4%**				

Annual development in operational carbon intensity for each ship type and international shipping

31 In accordance with paragraph 6.5 of the 2022 Guidelines, as stated in paragraph 1.5 of the *2021 Guidelines on the operational carbon intensity reduction factors relative to reference lines* (CII reduction factors guidelines, G3) (resolution MEPC.338(76)):

> "The Organization should continue to monitor development in annual carbon intensity improvement using both demand-based and supply-based measurement in parallel to the annual analysis of the fuel consumption data reported to the IMO DCS."

32 In this regard, table 3 includes AER and cgDIST, supply-based measurements of carbon intensity. Either AER or cgDIST is calculated for each relevant ship type and size category. This has been calculated for each ship type and size category by dividing the total CO_2 emissions (paragraphs 35, 36 and 37 explain the use of C_F, conversion factor for calculating CO_2 emissions) by the sum of the Deadweight multiplied by Distance Travelled (AER) (or Gross Tonnage multiplied by Distance Travelled for cgDIST).

33 According to table 4 summarizing the reported CII ratings and EEXI for each EEDI ship type and size, 86.1% of the 28,620 ships reported a CII rating and 68.8% of ships reported Attained EEXI. For the ships that reported a CII rating, 19.3% reported an A rating, 21.1% a B rating, 26.6% a C rating, 13.7% a D rating and 5.4% an E rating.

34 It has not been possible to calculate demand-based measurements of carbon intensity from the data available in IMO DCS. In response to the request in the *2021 Guidelines on the operational carbon intensity reduction factors relative to reference lines (CII Reduction Factor Guidelines, G3)* (resolution MEPC.338(76)) to continue to monitor development in annual carbon intensity improvement using both demand-based and supply-based measurements, and in the absence of cargo-related or actual transport work related data reported in the IMO DCS, the Secretariat has procured data to estimate the demand-based measurements of carbon intensity and is preparing a separate report to the Committee.

C_F, conversion factor between fuel consumption and CO_2 emissions

35 The IMO DCS in GISIS automatically assigns a value for the carbon conversion factor (C_F) for each fuel that is submitted for each ship according to the type of fuel that has been entered by the user. The C_F values are consistent with the 2022 Guidelines.

36 Following the updated attained EEDI Guidelines, the list of fuels shown in table 5 has been updated in the GISIS module to include Ethane as a fuel option from the 2023 reporting year. A user can also select "Other" for fuel types that are not on the list, this allows a user to enter a user defined fuel name and C_F value. CO_2 emissions, in table 3, have been calculated by multiplying the quantity of fuel used by the corresponding carbon conversion factor (C_F).

Table 5: Types of fuels and C_F factors selectable in the IMO Ship Fuel Oil Consumption Database

Type of fuel	Carbon conversion factor (C_F)
Diesel/Gas Oil	3.206
Light Fuel Oil (LFO)	3.151
Heavy Fuel Oil (HFO)	3.114
Liquefied Petroleum Gas (LPG) - Propane	3.000
Liquefied Petroleum Gas (LPG) - Butane	3.030

Type of fuel	**Carbon conversion factor (C_F)**
Liquefied Natural Gas (LNG)	2.750
Methanol	1.375
Ethane	2.927
Ethanol	1.913

37 The C_F value of each fuel that is used for each ship is available in both the anonymized and non-anonymized data that can be downloaded from the IMO Ship Fuel Oil Consumption Database in GISIS. Ships reporting the use of Low Sulphur Heavy Fuel Oil may also report under the Heavy Fuel Oil fuel category in-line with the Fourth IMO GHG Study 2020 in that the emission factors for Low Sulphur Heavy Fuel Oil are the same as for conventional HFO.

Downloading data from the IMO DCS in GISIS

38 Administrations can download non-anonymized data for ships flying their flag, i.e. data that has been submitted to GISIS by the Administration or on their behalf. In accordance with regulation 27.12 of MARPOL Annex VI, Parties to MARPOL Annex VI also have access to the data of all ships submitted to GISIS in an anonymized format (ship-related data is rounded to two significant figures).