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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: 2019)

Note by the Secretariat

SUMMARY

Executive summary: This document provides a report of the fuel oil consumption data for 2019 submitted to the IMO Ship Fuel Oil Consumption Database in GISIS, in accordance with regulation 22A.10 of MARPOL Annex VI and the *2017 Guidelines for the development and management of the IMO Ship fuel oil consumption database* (resolution MEPC.293(71))

Strategic direction, if applicable: 3

Output: 3.7

Action to be taken: Paragraph 23

Related documents: MEPC 70/18; MEPC 71/17; resolutions MEPC.278(70), MEPC.282(70) and MEPC.293(71)

Background

1 Amendments to MARPOL Annex VI for the data collection system for fuel oil consumption of ships were adopted at MEPC 70 by resolution MEPC.278(70).

2 MEPC 71 further adopted resolution MEPC.293(71) on *2017 Guidelines for the development and management of the IMO Ship Fuel Oil Consumption Database* (hereinafter referred to as the "2017 Guidelines"). Paragraph 1.4 of the 2017 Guidelines identified that the database would be developed as a module within the Global Integrated Shipping Information System (GISIS).

3 In accordance with regulation 22A.3 of MARPOL Annex VI, except as provided for in paragraphs 4, 5 and 6 of the same regulation, within 3 months after the end of each calendar year, a ship in the scope of regulation 22A 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 resolution MEPC.282(70) on *2016 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)*.

4 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 22A of MARPOL Annex VI, and, if so, issue a Statement of Compliance not later than 5 months from the beginning of the calendar year.

5 In accordance with regulation 22A.9 of MARPOL Annex VI, not later than 1 month after issuing the Statement of Compliance, by 30 June at the latest, the Administration shall ensure that the reported fuel consumption data by its registered ships of 5,000 GT and above and in the scope of regulation 22A of MARPOL Annex VI are transferred to the IMO Ship Fuel Oil Consumption Database in GISIS.

6 Notwithstanding, due to COVID-19 a number of Administrations had experienced delays in issuing Statements of Compliance and/or in submitting fuel consumption data to the GISIS database. Hence, the Secretariat continued to observe the submission of considerable 2019 fuel consumption data after the 30 June 2020 deadline for reporting data.

7 Regulation 22A.10 of MARPOL Annex VI requires the Secretary-General to produce 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. The annual report for 2019 data is set out in the annex to this document.

Number of ships for which fuel consumption data has been reported

8 In January 2019, by cross-referencing with data from the Ship and Company Particulars module in GISIS, the Secretariat estimated that 32,511 ships, under 135 Administrations, could potentially fall under the scope of regulation 22A of MARPOL Annex VI.

9 Fuel consumption data for the period from 1 January 2019 until 31 December 2019 had been received from 107 Administrations, consisting of 72 Parties to MARPOL Annex VI and 35 non-Parties, for 27,221 ships in total out of a potential 32,511 (83.7%). On the basis of gross tonnage, the reported data represents 93.0% of the ships that were estimated to fall under the scope of regulation 22A of MARPOL Annex VI.

10 Administrations can download non-anonymized data for the ships flying its flag for which data has been submitted to GISIS by that Administration or on their behalf. In accordance with regulation 22A.11 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.

Measures to ensure the completeness of the database

11 In accordance with paragraph 5.1 of the 2017 Guidelines, in January 2019 every Administration that had designated a contact person in the Fuel Oil Consumption Database module in GISIS was sent an indicative list of all ships in their Administration falling under the scope of regulation 22A of MARPOL Annex VI (in total 32,511 ships were identified).

12 The Secretariat carried out a verification process of the data submitted to GISIS to identify missing ships for which no data had been reported as well as to identify obvious errors in the already submitted data, mainly by identifying ships with unrealistic characteristics or numbers in their reported data. The Secretariat did not modify any of the reported data in GISIS itself, but in the case of any identified potential errors contacted the relevant Administrations and/or recognized organizations so that they could update the data in GISIS, as may be necessary.

13 In July 2020, each Administration was sent another list identifying those missing ships for which data had not yet been submitted to the Ship Fuel Oil Consumption Database in GISIS, and where applicable, ships for which the analysis of the reported fuel consumption data pointed to potential errors. Administrations and recognized organizations were invited to correct and/or update the data in GISIS and to provide further feedback in case of any discrepancies.

14 In response to the aforementioned missing ships and ships with potential errors, a number of Administrations corrected and/or updated the reported data in GISIS. Some Administrations also informed the Secretariat on the status of missing ships. Approximately half of the aforementioned missing ships were still expected to report fuel consumption data for 2019; for the other half of the aforementioned missing ships, for which no data had been reported, Administrations stated that these ships were not falling under the scope of regulation 22A of MARPOL Annex VI for various reasons, such as the ship being laid-up or operating only domestically.

15 The Secretariat also identified a number of ships that were categorized incorrectly. After examining the data for hundreds of submitted ships, by comparing with data from IHS, the Secretariat created a list of ships in the "Passenger ships", "Ro-ro cargo ship" and "Others" categories that should be recategorized, as to better align them with the appropriate EEDI ship type categorization as defined in regulation 2 of MARPOL Annex VI; this included over 200 cruise passenger ships and over 400 tankers that should be recategorized. The aforementioned lists of ships, that should be recategorized, were sent to the relevant Administrations and recognized organizations to subsequently update the data in GISIS.

16 It was also found that the categorization of gas carriers and LNG carriers could be improved. Many ships in the "Gas carrier" category were found that can be categorized as "LNG carrier". This issue may require further consideration in the future.

17 The Secretariat has included data in GISIS up until 1 February 2021 in this report to allow time for Administrations and recognized organizations to update the data in GISIS, as discussed in the above paragraphs. By 1 February 2021 the number of ships for which data had been reported that potentially contained errors, which can have a large impact on the aggregated data, had been reduced to 166 ships. These ships have not been included in the report for 2019, set out in the annex to this document.

Report on the fuel oil consumption data submitted to the IMO Ship Fuel Oil Consumption Database in GISIS

18 In accordance with regulation 22A.10 of MARPOL Annex VI, and based on the data reported to the IMO Ship Fuel Oil Consumption Database in GISIS for a total of 27,221 ships, which includes fuel consumption data in GISIS up until 1 February 2021, the Secretariat has prepared a summary report of the fuel oil consumption data for the year 2019, as set out in the annex to this document. The report has been prepared in accordance with the 2017 Guidelines, in particular, taking into account section 6 concerning the annual report to the Committee.

19 Any additional reported data in GISIS or changes made to the data reported in 2019 after 1 February 2021 by Administrations or recognized organizations are not included in the report for the year 2019, but will be available in the data directly downloadable from GISIS.

20 The following general findings with regard to the fuel consumption data for 2019 can be noted:

- .1 data was reported by 27,221 ships with a combined gross tonnage of 1,187 million gross tonnes; the aforementioned total number of ships and total gross tonnage does not include ships for which data was reported to the database more than once and ships that contained errors in the submitted data, which can have a large impact on the aggregated data; by 1 February 2021 this was reduced to 166 such ships, which had not been modified by the concerned flag State or recognized organization;
- .2 213 million tonnes of fuel, on a quantity basis, was used by the aforementioned 27,221 ships with a combined gross tonnage of 1,187 million gross tonnes;
- .3 99.95% of the fuel used was either Heavy Fuel Oil, Light Fuel Oil, Diesel/Gas Oil or Liquid Natural Gas; and
- .4 the majority of the reported fuel oil was consumed by the following three EEDI ship types: containerships, bulk carriers and tankers.

Recommended improvements to the IMO Ship Fuel Oil Consumption Database module in GISIS

21 Following the analysis of the 2019 data, the Secretariat proposes the following improvements to the reporting process and the Ship Fuel Oil Consumption module in GISIS:

- .1 GISIS limits the type of data that can be entered and many parameters are checked during the data verification process. Nonetheless, obvious outliers were identified in the reported data under "hours underway". This is because GISIS does not limit the magnitude of the numbers that can be reported. However, when reporting "hours underway", the maximum hours in a calendar year is a clear constraint that is the same for all ships. Hence, to further minimize errors in future reporting, it is recommended that GISIS is updated to include an hourly limit of 8,784 hours when inputting "hours underway" in GISIS;
- .2 a number of ships were miscategorized, in particular over 200 cruise passenger ships were initially categorized in the "Passenger ship" category and over 400 tankers in the "Others" category. While these issues have been addressed for 2019, for future reporting it is recommended that GISIS be updated to provide additional instructions to Administrations and recognized organizations so they carefully check whether ships should be reported under the "Cruise passenger ship" or "Ro-ro passenger" ship category before reporting under the "Passenger ship" category, and to ensure that different types of tankers are reported under the "Tankers" category;
- .3 following the analysis of the fuels reported under the "Other" category in GISIS, 11 ships were reported as using ethane as a fuel and 2 ships used biofuels. Given that the use of ethane and biofuel is very low, it is recommended that ships using ethane or biofuel as a fuel continue to report under the "Other" category, specifying a user defined description and C_F value, in GISIS for the time being; however, in the future the Committee may wish to consider amending the *2018 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships*, as set out in resolution MEPC.308(73), to include ethane and biofuel; and

- .4 with regard to reporting biofuels under the "Other" category, user defined C_F values should be calculated based on their chemical properties and CO_2 emissions in operation (biofuels normally have similar C_F values to their equivalent fossil fuels). This would allow for comparisons with the C_F values defined in resolution MEPC.308(73).

22 The Secretariat is also aware of the difficulties experienced in downloading the anonymized version of the data containing all the reported fuel consumption data in the GISIS module. In this regard, the process for downloading the anonymized version of the data is being rebuilt to make the download process quicker and more robust.

Action requested of the Committee

23 The Committee is invited to:

- .1 consider the information contained in this document and the summary report set out in the annex;
- .2 agree with the proposed recommendations in paragraph 21 with regard to further improvement to the IMO Ship Fuel Oil Consumption Database module in GISIS; and
- .3 take action as appropriate.

ANNEX**SUMMARY REPORT OF FUEL OIL CONSUMPTION DATA SUBMITTED TO THE
IMO SHIP FUEL OIL CONSUMPTION DATABASE FOR 2019****Total number of ships for which fuel consumption data was reported**

1 For the 2019 reporting period (1 January 2019 to 31 December 2019) fuel consumption data for 27,221 ships had been reported to the Ship Fuel Oil Consumption module in GISIS. This summary report reflects the fuel consumption data in GISIS up until 1 February 2021. Any changes made to the 2019 data in GISIS after this date are not reflected in this report.

2 During the analysis of the reported data 2,128 instances of multiple reporting entries for a single ship were found. This has been taken into account when aggregating the data. Upon investigation this appeared to be mostly due to ships changing between different Administrations and/or recognized organizations. At the time of this report, data reported for 166 ships were identified as containing errors. These are errors that have not been modified by the concerned flag State and/or recognized organization and could have a potentially large impact on the aggregated data. For this reason, these 166 ships are not included in the 27,221 ships that are subject to the analysis carried out in this report.

Number of ships for which fuel consumption data has been reported

3 In accordance with paragraph 5.1 of the 2017 Guidelines, in January 2019 every Administration that had designated a contact person in the Ship Fuel Oil Consumption module in GISIS was sent an indicative list of ships in their Administration falling under the scope of regulation 22A, totalling 32,511 ships, under 135 Administrations. The aforementioned lists of ships were produced by cross-referencing with data from the Ship and Company Particulars module in GISIS.

4 Table 1 shows a summary of the ships for which Administrations had reported fuel consumption data for the 2019 reporting period. Table 1 compares the total number of ships for which data had been reported to the indicative lists of ships falling under the scope of regulation 22A of MARPOL Annex VI, as sent to each Administration in January 2019.

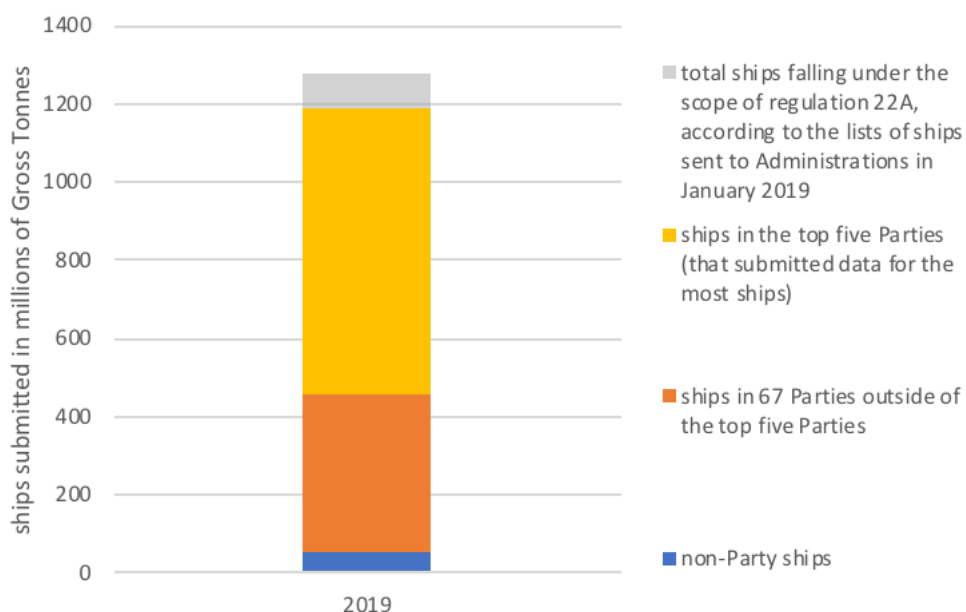
Table 1: Number of Ships reported by Administrations in the reporting period

	Total	Party	non-Party
Ships contained in the lists of ships falling under the scope of regulation 22A as sent to Administrations in January 2019	32,511 ships estimated to fall under the scope of 135 Administrations	30,337 ships under the scope of 87 Administrations	2,174 ships under the scope of 48 Administrations
Total ships for which fuel consumption data was submitted	27,221 ships reported by 107 Administrations	26,121 ships reported by 72 Administrations	1,100 ships reported by 35 Administrations

5 Table 1 shows a high reporting rate; data was reported for 83.7% of the total number of ships that were estimated to fall under the scope of regulation 22A of MARPOL Annex VI. The reporting rate is also high in terms of the number of Administrations and non-Parties to MARPOL Annex VI that reported data for their ships; in total, 107 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.

6 Figure 1 compares the total number of ships for which data had been reported to the lists of ships falling under the scope of regulation 22A of MARPOL Annex VI in terms of gross tonnage.

Figure 1: Gross tonnage of ships reported by Administrations



7 As shown in figure 1, the 32,511 ships that were estimated to fall under the scope of regulation 22A of MARPOL Annex VI represent a total of 1,277 million gross tonnes. The 27,221 ships for which fuel consumption data was reported represent a combined gross tonnage of 1,187 million gross tonnes (this is 93.0% of 1,277 million gross tonnes).

Measures to ensure the completeness of the Database

8 In accordance with paragraph 5.1 of the 2017 Guidelines, in January 2019 every Administration that had designated a contact person in the Fuel Oil Consumption Database module in GISIS was sent an indicative list of ships in their Administration falling under the scope of regulation 22A, totalling 32,511 ships, under 135 Administrations.

9 Also, in accordance with section 5 of the 2017 Guidelines, at the end of July 2020 the Secretariat sent all Administrations a list of ships that had not yet been submitted to the Ship Fuel Oil Consumption module in GISIS. This list was created for each Administration by comparing the ships that had been reported by July 2020 to the list of ships under the scope of regulation 22A of MARPOL Annex VI that were sent to each Administration in January 2019. In July 2020, Administrations were requested to provide fuel consumption data for 8,912 missing ships.

10 Those Administrations that responded stated that for approximately half of the missing ships they were still intending to report data, but for various reasons, such as awaiting verification or further investigation, this had not been possible.

11 For approximately the other half of the missing ships, Administrations stated that these ships were not or no longer falling under the scope of regulation 22A of MARPOL Annex VI. A number of ships were excluded from chapter 4 of MARPOL Annex VI on the basis of regulation 19 of MARPOL Annex VI. Administrations stated the following main reasons for not submitting data for certain ships: not being (currently) engaged in international voyages; the ship type was not relevant, such as due to the ship having no propulsion; or the ship had been scrapped or laid up.

12 The feedback received from Administrations also assists 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 regulation 22A of MARPOL Annex VI.

Verification of the submitted data in GISIS

13 While not specified in the 2017 Guidelines, the Secretariat carried out a quality control process to verify the data that had been reported in GISIS. An automated process identified ships with characteristics and annual fuel consumption data that were not technically possible. Ships that were identified using this process were further examined to determine the cause of any errors. The Secretariat did not modify any of the reported data in GISIS itself, but in the case of any identified potential errors contacted the relevant Administrations and/or recognized organizations so that they could update the data in GISIS, as may be necessary.

14 In July 2020, the IMO numbers of ships with potential errors were sent to Administrations and recognized organizations for them to update and correct the data in GISIS and to provide further feedback to the Secretariat, as necessary. Following the correction of data in GISIS by Administrations and recognised organizations, the number of errors in the submitted data was reduced.

15 At the time of this report, the number of identified errors, that could potentially have a large impact on aggregated data, was reduced to 166 ships. These ships contain errors that have not been corrected by the responsible Administrations or recognized organizations and have not been included in the data analysis process in this report.

16 At the time of this report, 126 ships out of the aforementioned 166 ships were excluded because they had reported hours underway which were more than the total number of hours in a year, which had not been corrected by the submitters. In addition, 7 ships were removed for having an unrealistically high fuel consumption. The remaining ships were excluded for reporting unrealistic ship parameters which had not been corrected by the submitters. The aggregated gross tonnage of those 166 ships represents 0.74% of all ships which reported fuel consumption data.

17 In December 2020, the Secretariat also identified a number of ships that were categorized incorrectly. After examining the data for hundreds of ships by comparing with IHS data, the Secretariat created a list of ships in the "Passenger ships", "Ro-ro cargo ship" and "Others" categories that should be recategorized, as to better align them with the appropriate EEDI ship type categorization as defined in regulation 2 of MARPOL Annex VI. This included over 200 cruise passenger ships and over 400 tankers that should be recategorized. This list of ships that were identified as being categorized incorrectly were sent to the relevant Administrations and recognized organizations to subsequently update the data in GISIS.

In January 2021, Administrations and recognized organizations updated the data in GISIS to recategorize hundreds of ships in the "Passenger ships" category, which are included in this report. At the time of this report, Administrations were also sent a list of ships, for ships in the "Ro-ro cargo ship" and "Others" categories that were categorized incorrectly.

18 It was also found that the categorization of gas carriers and LNG carriers could be improved. Many ships in the "Gas carrier" category were found that can be categorized as "LNG carrier". This issue may require further consideration in the future.

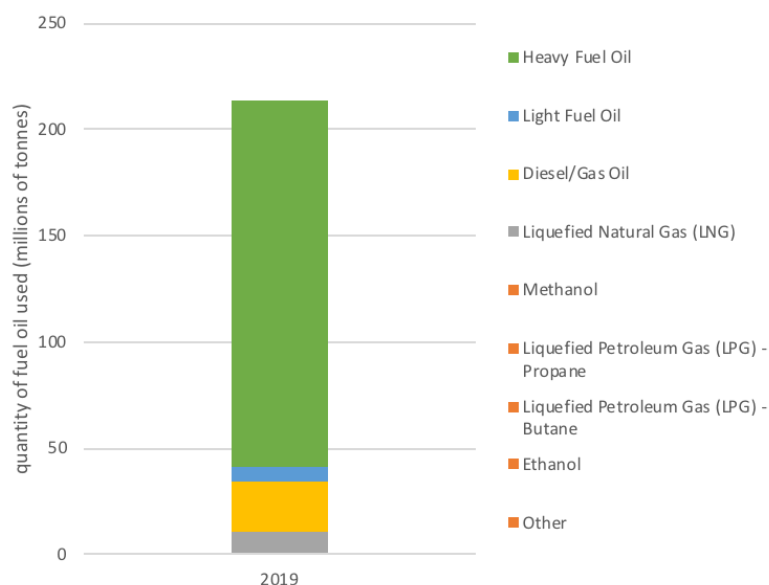
19 GISIS itself does limit the type of data that can be entered and many parameters are checked during the data verification process. However, GISIS does not limit the magnitude of the numbers that can be reported; these errors are found during the data verification process. However, when reporting "hours underway", the maximum hours in a calendar year is a clear constraint that is the same for all ships. Hence, to further minimize errors in future reporting, it is recommended that GISIS is updated to include an hourly limit of 8,784 hours when inputting "hours underway" in GISIS.

20 It is also recommended that GISIS be updated to provide additional instructions to Administrations and recognized organizations so they carefully check whether ships should be reported under the "Cruise passenger ship" or "Ro-ro passenger" ship category before reporting under the "Passenger ship" category, and to ensure that different types of tankers are reported under the "Tankers" category.

The aggregated annual amount of each type of fuel oil consumed, distance travelled and hours underway 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

21 In total, on a quantity basis, 213 million tonnes of fuel was used in 2019. Figure 2 shows that 95.03% of the fuel oil used during 2019 was either Heavy Fuel Oil, Light Fuel Oil or Diesel/Gas Oil. 99.95% of the fuel oil that was reported was either Heavy Fuel Oil, Light Fuel Oil, Diesel/Gas Oil or Liquid Natural Gas. The remaining fuels outside of these four fuel types amounted to 0.05% of the fuel used in 2019.

Figure 2: The aggregated annual amount of each type of fuel oil consumed by all ships of 5,000 GT and above

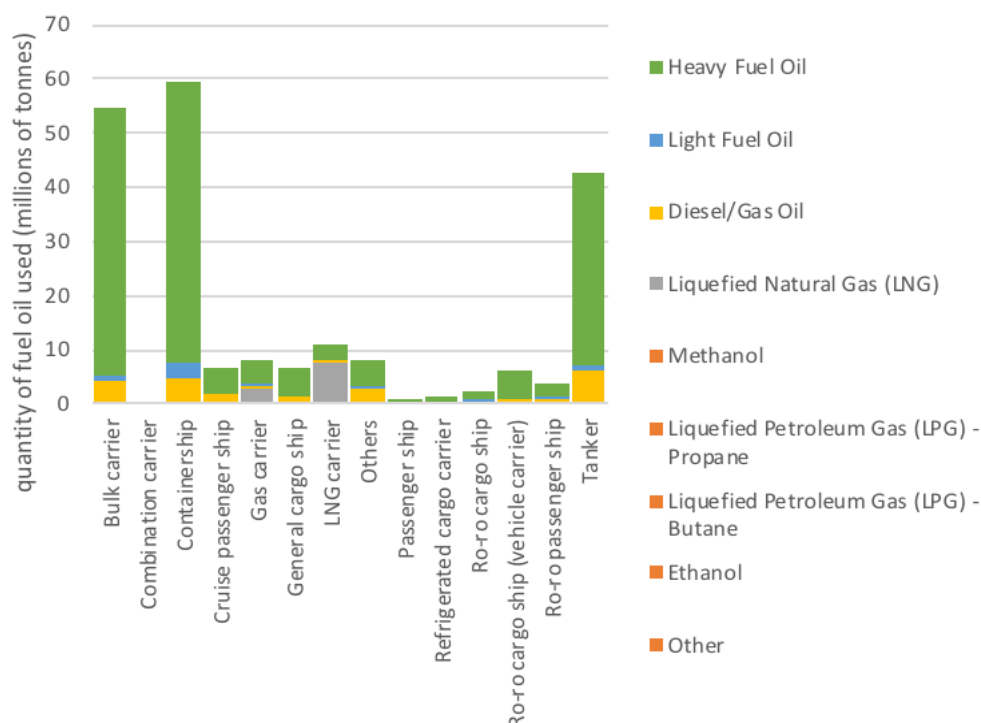


22 In 2019, 29,551 tonnes of methanol were reported for 9 ships under the category "Methanol". In the "Other" fuel type category in GISIS, 2,978 tonnes of biofuel, used by 2 ships, and 48,177 tonnes of ethane, used by 11 ships, mainly for ships that carry ethane as a cargo, were reported. These fuels, reported in the "Other" category, jointly represent 0.04% of global fuel usage, on a quantity basis.

23 Given that the use of ethane and biofuel is very low, it is recommended that ships using ethane or biofuel as a fuel continue to report under the "Other" category, specifying a user defined description and C_F value, in GISIS for the time being. However, in the future the Committee may wish to consider amending the *2018 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships*, as set out in resolution MEPC.308(73), to include ethane and biofuel.

24 With regard to reporting biofuels, many different biofuels and biofuel mixtures exist. For example, biogas and biodiesel are both types of biofuels. Diesel and ethanol mixtures are also common. Different C_F values can be reported; however biofuels should have C_F values that are based on their chemical properties and CO₂ emissions. Biofuels normally have similar C_F values to their equivalent fossil fuels. This would allow for comparisons with the C_F values defined in resolution MEPC.308(73).

Figure 3: The 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



25 Figure 3 shows how different fuels are used by different ship types. During the reporting period the majority of fuel oil was consumed by three ship types: containerships, bulk carriers and tankers. The aggregated data used to create figure 3 is also in table 2.

26 In accordance with paragraph 6.2 of the 2017 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.

27 In accordance with paragraphs 6.2 and 6.3 of the 2017 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 underway 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: 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

	Diesel / Gas Oil (MDO / MGO)	Ethanol	Heavy Fuel Oil (HFO)	Light Fuel Oil (LFO)	Liquefied Natural Gas (LNG)	Liquefied Petroleum Gas (LPG) – Butane	Liquefied Petroleum Gas (LPG) – Propane	Methanol	Other
Bulk carrier	4,439,407	0	49,427,538	871,288	0	0	0	0	5,883
10,000 ≤ DWT < 20,000	146,890	0	689,217	19,579	0	0	0	0	0
20,000 DWT and above	4,249,616	0	48,632,330	847,427	0	0	0	0	5,883
Less than 10,000 DWT	42,901	0	105,991	4,282	0	0	0	0	0
Combination carrier	13,194	0	100,701	4,191	0	0	0	0	0
20,000 DWT and above	11,725	0	99,305	4,191	0	0	0	0	0
4,000 ≤ DWT < 20,000	1,469	0	1,396	0	0	0	0	0	0
Containership	4,603,965	0	52,095,315	2,871,069	24,893	0	8	0	2,794
10,000 ≤ DWT < 15,000	384,566	0	2,043,007	162,345	2,367	0	8	0	0
15,000 DWT and above	4,022,126	0	49,472,834	2,604,727	22,526	0	0	0	2,794
Less than 10,000 DWT	197,273	0	579,474	103,997	0	0	0	0	0
Cruise passenger ship	1,688,243	0	4,950,051	6,015	23,209	0	0	0	0
25,000 ≤ GT < 85,000	677,328	0	1,586,170	3,179	0	0	0	0	0
5,000 ≤ GT < 25,000	101,806	0	68,304	2,836	0	0	0	0	0
85,000 GT and above	909,109	0	3,295,577	0	23,209	0	0	0	0
Gas carrier	608,368	0	4,692,209	166,454	2,733,961	0	0	0	44,900
10,000 DWT and above	475,980	0	4,460,811	157,590	2,724,598	0	0	0	44,900
2,000 ≤ DWT < 10,000	132,388	0	231,398	8,864	9,363	0	0	0	0
General cargo ship	1,294,802	0	5,341,618	170,615	8,025	0	1,576	0	685
15,000 DWT and above	522,223	0	3,028,937	79,415	2,586	0	0	0	685
3,000 ≤ DWT < 15,000	765,015	0	2,312,681	91,200	5,439	0	1,576	0	0
Less than 3,000 DWT	7,564	0	0	0	0	0	0	0	0
LNG carrier	412,077	0	2,953,889	293,183	7,494,993	0	0	0	326
10,000 DWT and above	401,337	0	2,941,228	293,183	7,486,794	0	0	0	326
Less than 10,000 DWT	10,740	0	12,661	0	8,199	0	0	0	0
Others	2,852,728	0	5,007,311	365,496	43,399	1,182	0	4,363	4,682

	Diesel / Gas Oil (MDO / MGO)	Ethanol	Heavy Fuel Oil (HFO)	Light Fuel Oil (LFO)	Liquefied Natural Gas (LNG)	Liquefied Petroleum Gas (LPG) – Butane	Liquefied Petroleum Gas (LPG) – Propane	Methanol	Other
5,000 GT and above	2,852,728	0	5,007,311	365,496	43,399	1,182	0	4,363	4,682
Passenger ship	210,449	0	583,761	1,385	0	0	0	0	0
5,000 GT and above	210,449	0	583,761	1,385	0	0	0	0	0
Refrigerated cargo carrier	168,138	0	1,230,226	63,545	0	0	0	0	0
5,000 DWT and above	168,138	0	1,230,226	63,545	0	0	0	0	0
Ro-ro cargo ship	393,117	0	1,859,403	310,136	6,167	0	0	0	0
2,000 DWT and above	391,827	0	1,855,789	310,136	6,167	0	0	0	0
1,000 ≤ DWT < 2,000	1,290	0	3,614	0	0	0	0	0	0
Ro-ro cargo ship (vehicle carrier)	779,788	0	5,226,774	146,343	0	0	0	0	0
10,000 DWT and above	689,303	0	5,029,811	122,669	0	0	0	0	0
Less than 10,000 DWT	90,485	0	196,963	23,674	0	0	0	0	0
Ro-ro passenger ship	755,592	0	2,153,461	625,112	69,381	0	0	0	0
1,000 DWT and above	564,941	0	2,153,461	621,538	69,381	0	0	0	0
250 ≤ DWT < 1,000	190,651	0	0	3,574	0	0	0	0	0
Tanker	5,905,242	149	35,805,879	1,035,229	78,714	0	4,618	25,188	8,390
20,000 DWT and above	4,902,174	149	32,866,373	867,597	57,180	0	4,618	25,188	8,379
4,000 ≤ DWT < 20,000	1,001,087	0	2,911,051	167,626	21,534	0	0	0	11
Less than 4,000 DWT	1,981	0	28,455	6	0	0	0	0	0
Total (213,070,793)	24,125,110	149	171,428,136	6,930,061	10,482,742	1,182	6,202	29,551	67,660

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 underway 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	Aggregated gross tonnage	Aggregated deadweight	Distance travelled	Hours underway
Bulk carrier	9,680	426,444,562	780,046,306	509,249,047	46,571,755
10,000 ≤ DWT < 20,000	343	3,647,700	5,049,564	14,436,807	1,364,217
20,000 DWT and above	9,250	422,233,721	774,278,192	491,344,653	44,861,244
Less than 10,000 DWT	87	563,141	718,550	3,467,587	346,294
Combination carrier	20	765,079	1,319,141	1,117,911	111,560
20,000 DWT and above	19	756,002	1,303,669	1,083,100	108,250
4,000 ≤ DWT < 20,000	1	9,077	15,472	34,811	3,310
Containership	4,456	233,971,213	261,010,301	344,843,744	24,865,606
10,000 ≤ DWT < 15,000	533	5,436,898	6,675,745	32,387,419	2,588,825
15,000 DWT and above	3,691	226,886,267	252,415,394	299,676,933	21,210,046
Less than 10,000 DWT	232	1,648,048	1,919,162	12,779,392	1,066,735
Cruise passenger ship	253	20,505,883	1,954,173	20,318,620	1,486,958
25,000 ≤ GT < 85,000	107	6,104,495	665,155	8,448,398	626,302
5,000 ≤ GT < 25,000	33	478,698	68,624	1,442,093	143,656
85,000 GT and above	113	13,922,690	1,220,394	10,428,129	717,000
Gas carrier	804	32,230,142	31,455,905	54,365,472	4,032,888
10,000 DWT and above	656	31,233,072	30,365,093	47,948,671	3,450,015
2,000 ≤ DWT < 10,000	148	997,070	1,090,812	6,416,801	582,873
General cargo ship	2,081	27,731,363	38,711,263	98,353,160	9,159,972
15,000 DWT and above	765	17,860,707	25,699,454	41,075,112	3,567,630
3,000 ≤ DWT < 15,000	1,315	9,854,966	13,010,864	57,188,450	5,585,707
Less than 3,000 DWT	1	15,690	945	89,598	6,635
LNG carrier	424	43,672,793	35,217,217	36,945,565	2,653,305
10,000 DWT and above	413	43,595,261	35,141,643	36,385,806	2,600,996
Less than 10,000 DWT	11	77,532	75,574	559,759	52,309
Others	1,583	36,395,699	46,037,759	58,212,490	6,792,422
5,000 GT and above	1,583	36,395,699	46,037,759	58,212,490	6,792,422
Passenger ship	65	2,426,696	296,113	3,464,474	281,335

	Number of ships	Aggregated tonnage gross	Aggregated deadweight	Distance travelled	Hours underway
5,000 GT and above	65	2,426,696	296,113	3,464,474	281,335
Refrigerated cargo carrier	270	2,636,536	2,877,447	15,866,234	1,105,402
5,000 DWT and above	270	2,636,536	2,877,447	15,866,234	1,105,402
Ro-ro cargo ship	315	8,119,217	4,064,660	21,877,441	1,544,035
2,000 DWT and above	314	8,111,145	4,063,070	28,234	1,668
1,000 ≤ DWT < 2,000	1	8,072	1,590	21,849,207	1,542,367
Ro-ro cargo ship (vehicle carrier)	648	34,455,052	11,605,961	59,864,962	4,175,818
10,000 DWT and above	587	33,419,356	11,261,065	55,822,074	3,845,405
Less than 10,000 DWT	61	1,035,696	344,896	4,042,888	330,413
Ro-ro passenger ship	318	7,467,130	1,631,577	21,647,299	1,325,769
1,000 DWT and above	289	7,279,938	1,610,889	20,120,055	1,246,643
250 ≤ DWT < 1,000	29	187,192	20,688	1,527,244	79,126
Tanker	6,304	310,334,451	563,010,788	316,372,723	28,182,233
20,000 DWT and above	4,868	297,535,797	544,388,811	255,536,895	22,409,785
4,000 ≤ DWT < 20,000	1,434	12,477,447	18,621,350	60,707,129	5,761,598
Less than 4,000 DWT	2	321,207	627	128,699	10,850
Total	27,221	1,187,155,816	1,779,238,611	1,562,499,142	132,289,058

28 With regard to the ships that had been identified on the lists of ships to potentially fall under the scope of regulation 22A of MARPOL Annex VI, as submitted in January 2019, and for which no data had been reported, it was not possible to group those missing ships by EEDI ship type and EEDI size category, as requested in paragraphs 5.5 and 6.4 of the 2017 Guidelines. This is because it is not possible to determine whether those missing ships would indeed fall under the scope of regulation 22A and how these ships should be categorized. The EEDI ship type and EEDI size categories are only defined by Member States or recognized organizations acting on behalf of Member States when submitting fuel consumption data to the Fuel Oil Consumption Database module in GISIS. The Secretariat does not add or alter information by Member States, but can only suggest Administrations to review the data and amend, where appropriate.

29 The "Others" ship type category contains fuel consumption data for ships that use fuel while carrying out a wide range of activities that are not related to transporting cargo or passengers, such as dredgers and pipe-laying ships. However, the analysis of the fuel consumption data of ships not in the "Others" category has indicated that there are also ships that have a high fuel consumption compared to hours underway and distance travelled. For example, a few tankers in the "Tankers" category were identified that had a high fuel consumption compared to hours underway. Feedback received from Administrations and recognized organizations was used to verify that this data was correct. For example, in one situation a ship was mainly limited to cargo operations. This meant that a large amount of fuel was consumed whilst in port, which meant that this ship had a high fuel consumption compared to hours underway and distance travelled. Careful comparisons between ships, even in the same ship size and type category, are important to compare ships that carry out similar activities and/or a similar amount of activity during the year.

C_F, conversion factor between fuel consumption and CO₂ emissions

30 The IMO Fuel Oil Consumption Database 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 *2018 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships*, as set out in resolution MEPC.308(73). 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.

Table 4: 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
Liquefied Natural Gas (LNG)	2.750
Methanol	1.375
Ethanol	1.913

31 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 Fuel Oil Consumption Database in GISIS.

Downloading the data for 2019 from the Ship Fuel Oil Consumption module in GISIS

32 Administrations can download non-anonymized data for ships flying its flag. This is data that has been submitted to GISIS by the Administration or on their behalf. In accordance with regulation 22A.11 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.
