

INTERSESSIONAL MEETING OF THE  
WORKING GROUP ON REDUCTION OF  
GHG EMISSIONS FROM SHIPS  
16th session  
Agenda item 2

ISWG-GHG 16/2/7  
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**FURTHER CONSIDERATION OF THE DEVELOPMENT OF CANDIDATE  
MID-TERM MEASURE(S) IN THE CONTEXT OF PHASE III OF THE  
WORK PLAN FOR THE DEVELOPMENT OF MID- AND  
LONG-TERM MEASURES**

**Draft guidelines for the calculation of the attained Greenhouse Gas Fuel Intensity (GFI)  
and the Greenhouse Gas Fuel Standard (GFS) register**

**Submitted by Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia,  
Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania,  
Luxembourg, Malta, Netherlands (Kingdom of the), Poland, Portugal, Romania,  
Slovakia, Slovenia, Spain, Sweden and EC**

**SUMMARY**

*Executive summary:* This document contains draft guidelines for the calculation of the attained Greenhouse Gas Fuel Intensity (GFI) and the Greenhouse Gas Fuel Standard (GFS) register. It supplements document ISWG-GHG 15/3/1 (Austria et al.) which contained proposed amendments to MARPOL for the GFS and which referred in several places to guidelines.

*Strategic direction, if applicable:* 3

*Output:* 3.2

*Action to be taken:* Paragraph 5

*Related documents:* ISWG-GHG 15/3/1

**Introduction**

1 Document ISWG-GHG 15/3/1 (Austria et al.) contained draft MARPOL amendments for the Greenhouse Gas Fuel Standard (GFS) and its Flexibility Compliance Mechanism. These amendments refer in several places to guidelines. This document presents drafts of two of these guidelines:

- .1 a guideline to calculate the attained Greenhouse Gas Fuel Intensity (GFI) (annex 1); and
- .2 a guideline on the functioning of the Greenhouse Gas Fuel Standard Register (GFS Register) (annex 2).

2 The co-sponsors invite relevant experts and observer organizations to participate in the development of the guidelines.

3 The co-sponsors note that more guidelines may need to be developed for the GFS, such as guidelines on the calculation of the amount of energy delivered by on-board solar power systems and, potentially, wind propulsion systems. It is also noted that measurement of energy delivered by wind propulsion systems is technically complex and studies may need to be conducted before guidelines can be developed.

4 The co-sponsors also note that after completion of the Comprehensive Impact Assessment of the basket of mid-term measures, these or other guidelines, including possible guidelines relating to the economic element of the measure(s), might need to be revisited in order to address disproportionately negative impacts on States, as appropriate, as well as a level playing field, while ensuring the environmental integrity of the basket of measures.

#### **Action requested of the Working Group**

5 The Working Group is invited to consider the elements presented in this document and take action as appropriate.

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## ANNEX 1

### DRAFT GUIDELINES ON THE CALCULATION OF THE ATTAINED GFI

#### 1 Introduction

1.1 The *2023 IMO Strategy on reduction of GHG emissions from ships* (Resolution MEPC.377(80)) specifies that a goal-based marine fuel standard should be developed to regulate the phased reduction of the marine fuel's GHG intensity.

1.2 These Guidelines specify the method to calculate the attained Greenhouse Gas Fuel Intensity (GFI) of a ship to which chapter 4 of MARPOL Annex VI, as amended, applies, over a reporting period. This attained GFI shall be compared with the required GFI to assess whether a ship complies with the Greenhouse Gas Fuel Standard (GFS).

1.3 These Guidelines should be kept under review in order to address disproportionately negative impacts on States, as appropriate, as well as to maintain a level playing field, while ensuring the environmental integrity of the basket of measures.

#### 2 Definitions

2.1 MARPOL means the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocols of 1978 and 1997 relating thereto, as amended.

2.2 IMO DCS means the data collection system for fuel oil consumption of ships referred to in regulation 27 and related provisions of MARPOL Annex VI.

2.3 LCA Guidelines means the Guidelines on life cycle GHG intensity of marine fuels (LCA Guidelines) (Resolution MEPC 376(80)), as amended.

2.4 For the purpose of these Guidelines, the definitions in MARPOL Annex VI, as amended, apply.

#### 3 Application

3.1 These guidelines apply to all ships that are required to calculate the attained GFI, according to MARPOL Annex VI, Regulation [28bis].<sup>1</sup>

#### 4 Greenhouse Gas Fuel Intensity for ships for use of implementing Regulation XX of MARPOL Annex VI

4.1 The attained GFI is the total amount of GHGs emitted by a ship, as determined in accordance with the LCA Guidelines, divided by the total energy used by a ship. The unit of the  $GFI_{attained}$  is  $g\ CO_{2e}/MJ$ .

4.2 The general calculation of  $GFI_{attained}$  is given by equation (1). For the sake of clarity, it is noted that "j" represents any fuel and energy source used on-board the ship, including, in particular, fuel oil, electricity delivered from the shore and zero-emission energy source such as wind and solar.  $GHG_{WTW,j}$  represents the GHG intensity of any such fuel or energy source.

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<sup>1</sup> As set out in annex to document ISWG-GHG 15/3/1 (Austria et al).

$$GFI_{attained} = \frac{\sum_{j=1}^J GHG_{wtw,j} \times E_j}{\sum_{j=1}^J E_j} \quad (1)$$

where:

- .1 j is the fuel or energy source type;
- .2 J is the total number of fuels or energy sources used during the compliance period, as reported under IMO DCS;
- .3  $GHG_{wtw,j}$  is the GHG intensity of fuel or energy source type j, as determined by the methodology of IMO LCA guidelines; and
- .4  $E_j$  is the amount of energy used from energy source type j.

4.3 While the numerator in equation (1) is determined by the methodology of the LCA Guidelines, the denominator can be expanded to illustrate the different nature of the energy sources used onboard. Equation (1) can be rewritten as equation **Error! Reference source not found.** It is recalled that, as in equation (1), “j” represents any fuel and energy source used on-board the ship, including, in particular, fuel oil, electricity delivered from the shore and zero-emission energy source such as wind and solar.  $GHG_{WTW,j}$  represents the GHG intensity of any such fuel or energy source.

$$GFI_{attained} = \frac{\sum_{j=1}^J GHG_{wtw,j} \times E_j}{\sum_{f=1}^F (M_f \times LCV_f) + \sum_{k=1}^K E_k + \sum_{c=1}^C P_c} \quad (2)$$

where:

- .1 j is the fuel or energy source type;
- .2 J is the total number of different fuel or energy source types used during the compliance period, as reported under IMO DCS;
- .3 f is the fuel type;
- .4 F is the total number of different fuel types used during the compliance period, as reported under IMO DCS;
- .5  $M_f$  is the mass (in metric tonnes) of fuel type f;
- .6  $LCV_f$  is the lower calorific value (in MJ/t) of fuel type f;
- .7 k is the type of onboard non-fuel energy;
- .8 K is the total number of different zero-emission on-board non-fuel energy sources used during the compliance period;
- .9  $E_k$  is the amount of effective energy (in MJ) from zero-emission energy type k delivered to the ship;
- .10 c is the shoreside electricity supply point, including onshore-power supply or battery charging;
- .11 C is the total number of shore-side electricity supply points;
- .12  $P_c$  is the amount of electrical energy (in MJ) supplied to a ship by shoreside electricity in point c.

## 5 Determination of parameters related to fuels

[to be completed with necessary specification on how parameters f, F,  $GHG_{wtw,j}$ ,  $M_f$  and  $LCV_f$  will be determined, as appropriate and consistently with the LCA Guidelines.]

## 6 Determination of parameters related to non-fuel zero-emission energy sources

[to be completed with necessary specification on how parameters  $k$ ,  $K$  and  $E_k$  will be determined, as appropriate and consistently with the LCA Guidelines.]

**7 Determination of parameters related to shoreside power**

[to be completed with necessary specification on how  $c$ ,  $C$ , and  $P_c$  will have to be determined, as appropriate and consistently with the LCA Guidelines].

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## ANNEX 2

### DRAFT GUIDELINES ON THE GFS REGISTER

#### 1 Introduction

1.1 The *2023 IMO Strategy on reduction of GHG emissions from ships* (Resolution MEPC.377(80)) specifies that a goal-based marine fuel standard should be developed to regulate the phased reduction of the marine fuel's GHG intensity.

1.2 MARPOL Annex VI Regulation [28bis] established a Greenhouse Gas Fuel Standard (GFS) regulating the GHG intensity of fuels used by ships (GHG Fuel Intensity, GFI) and Regulation [28ter]<sup>2</sup> established a Flexibility Compliance Mechanism (FCM) for the GFS. The FCM requires a Register ('GFS Register' or 'Register') which allows for the generation, storage and handing-in of Flexibility Compliance Units (FCU) and Greenhouse Gas Remedial Units (GRU).

1.3 These Guidelines specify the functioning of the GFS Register.

#### 2 Definitions

2.1 MARPOL means the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocols of 1978 and 1997 relating thereto, as amended.

2.2 GFS means the Greenhouse gas Fuel Standard as established by MARPOL Annex VI Regulation [28bis].

2.3 FCM means the Flexibility Compliance Mechanism as established by MARPOL Annex VI Regulation [28ter].

2.4 FCU means Flexibility Compliance Unit, as defined in MARPOL Annex VI regulation [2],<sup>3</sup> as amended.

2.5 GRU means Greenhouse Gas Remedial Unit, as defined in MARPOL Annex VI regulation [2], as amended.

2.6 For the purpose of these Guidelines, the definitions in MARPOL Annex VI apply.

#### 3 Application and responsibilities

3.1 These guidelines apply to all ships that are required to meet a required GFI and decide to participate in the FCM, according to MARPOL Annex VI, regulations [28bis] and [28ter].

3.2 The responsibilities of Administrations, ships and the GFS Register are set out in MARPOL Annex VI. These Guidelines do not create any new obligations nor alter existing provisions.

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<sup>2</sup> As set out in annex to document ISWG-GHG 15/3/1 (Austria et al).

<sup>3</sup> As amended in annex to document ISWG-GHG 15/3/1 (Austria et al).

## **4 Governance of the Register**

4.1 The IMO Secretariat shall act as the central administrator of the Register or assign an organization to do this on its behalf.

4.2 The central administrator shall ensure that the Register performs the functions provided for under these Guidelines. In particular, the central administrator shall operate and maintain the Register, including its technical infrastructure.

4.3 The central administrator may seek assistance from external service providers to carry out specific tasks under its supervision.

4.4 Ships shall use the Register when participating in the FCM of the GFS.

4.5 The central administrator shall ensure that the Register conforms to the hardware, network, software and security requirements set out in the data exchange and technical specifications provided for in chapter 6 of these Guidelines and the general terms as applicable for UN Organisations.

4.6 Administrations are allowed to inspect the accounts of their ships in the Register. Administrations should designate a contact person for the purposes of communication with the central administrator, if any matter arises with regard to the compliance of ships of that Administration with regulation [28bis and 28ter].

4.7 In order to cover its costs, the central administrator may charge account holders an annual fee. The sum of all collected fees shall not exceed the costs of the central administrator for establishing and operating the Register.

## **5 Functions of the Registry**

5.1 The main role of the Register is to ensure the accurate functioning of the Flexibility Compliance Mechanism of the Greenhouse Gas Fuel Standard, in order to deliver on the objectives set out in regulation [28ter] of Annex VI to MARPOL. In particular, the Register shall ensure that FCUs and GRUs can be generated, stored, transferred, submitted and annulled for compliance, as applicable.

5.2 The Register holds one account per ship to which regulation [28bis] applies and two accounts for the Register: a Unit Creation Account and a Unit Deletion Account, as specified in paragraphs 5.3 to 5.5.

5.3. Each ship has one unique account linked to its IMO number. Ship accounts can hold FCUs and GRUs. FCUs can be transferred between ship accounts at the request of the holder of the account where FCUs are transferred from. GRUs cannot be transferred between ship accounts. GRUs are issued for each specific ship upon its request and credited to its account upon receipt of payment. The account also holds information on the ship's verified attained GFI and its verified under- or over-compliance against the required GFI.

5.4 The Register has one Unit Creation Account. In this account, it can create FCUs and GRUs, assigning a unique unit identification code to each one upon its creation. FCUs are created in response to a verified report evidencing the compliance surplus of the ship for that reporting period, i.e. that a ship's attained annual GFI was below the required annual GFI, subject to the request of that ship. GRUs are created in exchange for a fee, subject to the request of a ship and payment of the fee.



5.5 The Register has one Unit Deletion Account. In this account, it can receive FCUs and GRUs from ship accounts, submitted for the purpose of compliance with regulation [28ter]. The Register will record these units as deleted. After checking that the number of units received from a ship corresponds to the verified compliance deficit for that reporting period, the Register will notify the Administration that it can issue a Statement of Compliance to the ship that has submitted the units.

5.6 The fees collected for creating GRUs shall be used to reduce GHG emissions within the boundaries of the energy system of international shipping, ensuring that one GRU results in the reduction of at least one tonne of CO<sub>2</sub>e without shifting the emissions to other sectors and ensuring that the emission reductions financed from this revenue stream are not double counted in complying with IMO regulations.

## 6 Methods to determine FCUs and GRUs to be issued and submitted

6.1 FCUs are created at the request of a ship with an attained annual GFI below the required annual GFI. The amount of FCUs created is equal to the verified compliance surplus for that reporting period, as defined in MARPOL Annex VI regulation [28ter]. The number of FCUs to be created is given by equation 1.

$$N_{FCU,a} = |(GFI_{attained,a} - GFI_{required,a}) \times E_a| \quad (1)$$

where:

- .1  $N_{FCU,a}$  is the number of FCUs created because of over-compliance during reporting period a;
- .2  $GFI_{attained,a}$  is the attained GFI during reporting period a;
- .3  $GFI_{required,a}$  is the required GFI of reporting period a; and
- .4  $E_a$  is the amount of energy consumed by the ship during reporting period a.

6.2 FCUs can be used for compliance in the [five] reporting periods following immediately after their creation.

6.3 The fee per GRU is set annually by the IMO Secretariat and is linked to the price of zero- or near-zero GHG fuels (hereafter: sustainable fuels) according to equation 2.

$$P_{GRU} = \frac{P_{sustainable\ fuel} - P_{VLSFO}}{EF_{VLSFO} - EF_{sustainable\ fuel}} \quad (2)$$

where:

- .1  $P_{GRU,a}$  is the price of a GRU, expressed in USD per tonne CO<sub>2</sub>e, in reporting period a;
- .2  $P_{sustainable\ fuel,a}$  is the average global price of sustainable fuels, delivered to a ship in port, in USD per MJ of sustainable fuels in compliance period a, determined according to [placeholder for a reference to a guideline on establishing definitions and prices of sustainable fuels and VLSFO];
- .3  $P_{VLSFO,a}$  is the average global price of VLSFO, delivered to a ship in port, in USD per MJ of VLSFO in compliance period a, determined according to [placeholder for a reference to a guideline on establishing prices of sustainable fuels and VLSFO];
- .4  $EF_{VLSFO}$  is the emissions factor of VLSFO, expressed in the mass of CO<sub>2</sub>e emissions on a WtW basis per MJ of VLSFO based on the default values of the LCA guideline; and

- .5  $EF_{\text{sustainable fuel}}$  is the emissions factor of sustainable fuels, expressed in the mass of CO<sub>2</sub>e emissions on a WtW basis per MJ of sustainable fuels based on the default value from the LCA guideline.

6.4 The number of GRUs that can be purchased by a ship for a reporting period is unlimited. The validity of GRUs is limited to the reporting period for which they are issued.

6.5 After their creation, FCUs and GRUs are immediately transferred to the account of the ship that requested their issuance.

6.6 The number of FCUs or GRUs to be submitted by ships with a verified compliance deficit, i.e. an attained GFI higher than the required GFI is given by equation 3.

$$N_{FCU/GRU,a} = (GFI_{\text{attained},a} - GFI_{\text{required},a}) \times E_a \quad (1)$$

where:

- .1  $N_{FCU/GRU,a}$  is the number of FCUs or GRUs submitted to make up for under-compliance during reporting period a;  
.2  $GFI_{\text{attained},a}$  is the attained GFI during reporting period a;  
.3  $GFI_{\text{required},a}$  is the required GFI of reporting period a; and  
.4  $E_a$  is the amount of energy consumed by the ship during reporting period a.

## 7 Technical requirements of the Register

7.1 The central administrator shall take all reasonable steps to ensure that:

- .1 the Register is available for access by ships and Administrations 24 hours a day, 7 days a week;  
.2 there is backup hardware and software necessary for the event of a breakdown in operations of the primary hardware and software;  
.3 the Register incorporates robust systems and procedures to safeguard all relevant data and facilitate the prompt recovery of data and operations in the event of failure or disaster.

7.2 To encourage consistency in the submission of data by ships and Administrations and to improve the usability of the Register, automatic notifications and reminders concerning the transferring, generation and submission of FCUs and GRUs and any other relevant events should be incorporated as features in the Registry.

7.3 [Placeholder for Security]

7.4 [Placeholder for access to accounts]

7.5 [Placeholder for confidentiality]

7.6 [Placeholder for review of data quality, auditing of the Register data by the IMO Secretariat and/or third parties.]

## **8 Reporting**

8.1 The central administrator shall submit a report to MEPC annually, providing an overview of:

- .1 The number of ships in the Register;
  - .2 The number of FCUs created;
  - .3 The number of FCUs submitted;
  - .4 The number of FCUs transferred between ship accounts;
  - .5 The number of GRUs created;
  - .6 The number of GRUs submitted;
  - .7 The total amount of revenues collected from the use of GRUs;
  - .8 The use of revenues from GRUs;
  - .9 The cost of maintaining the Register;
  - .10 The total amount of fees collected;
  - .11 Any incident, failure or unusual event during the reporting period; and
  - .12 An overview of the result of reviews and audits of the Register undertaken during the reporting period, if any.
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