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FURTHER CONSIDERATION OF CONCRETE PROPOSALS TO ENCOURAGE THE UPTAKE OF ALTERNATIVE LOW-CARBON AND ZERO-CARBON FUELS, INCLUDING THE DEVELOPMENT OF LIFECYCLE GHG/CARBON INTENSITY GUIDELINES FOR ALL RELEVANT TYPES OF FUELS AND INCENTIVE SCHEMES, AS APPROPRIATE

Further consideration on development of the lifecycle GHG/carbon intensity guidelines for all types of fuels

Submitted by the Republic of Korea

SUMMARY

Executive summary:	This document provides the view of the Republic of Korea on the items to be further considered in developing the lifecycle GHG/carbon intensity guidelines for all types of fuels
Strategic direction, if applicable:	3
Output:	3.2
Action to be taken:	Paragraph 21
Related documents:	ISWG-GHG 4/2, ISWG-GHG 4/2/9; ISWG-GHG 5/4, ISWG-GHG 5/4/5, ISWG-GHG 5/4/8 and ISWG-GHG 5/4/10

Introduction

1 The Marine Environment Protection Committee, during its seventy-fourth session, instructed the Intersessional Working Group on Reduction of GHG Emissions from Ships to further consider developing concrete proposals to encourage the uptake of alternative low-carbon and zero-carbon fuels. It includes the development of lifecycle GHG/carbon intensity guidelines for all relevant current and future maritime fuels and incentive schemes, as appropriate, considering the *Initial IMO Strategy on reduction of GHG emissions from ships*, its programme of follow-up actions up to 2023, the *Procedure for assessing the impacts on States of candidate measures*, and relevant documents submitted to ISWG-GHG 5, ISWG-GHG 6 and MEPC 74.

2 The Republic of Korea submitted document ISWG-GHG 5/4/5, which suggests the items to be considered in developing the lifecycle GHG/carbon intensity guidelines for all fuel types. Although several delegations at ISWG-GHG 5 supported the development of the guidelines, the Group was unable to carry on detailed discussion owing to time constraints. Nevertheless, the Group noted related submissions and information regarding candidate short-, mid- and long-term measures based on documents submitted to ISWG-GHG 5 and MEPC 74, as set out in annex 5 to document MEPC 74/WP.6.

3 In light of the documents submitted to ISWG-GHG 5 and comments/views provided during the discussion at ISWG-GHG 5, the Republic of Korea would like to present additional elements worthy to be considered in developing the lifecycle GHG/carbon intensity guidelines for all fuel types.

Updated holistic approach in considering the development of the Lifecycle GHG/carbon intensity guidelines

4 In document ISWG-GHG 5/4/5, the Republic of Korea proposed a holistic approach for the development of these guidelines in order to facilitate the transition to low-carbon and zero-carbon fuels and to provide the shipping industry with better information for proper decision-making on selecting alternative fuels.

5 In document ISWG-GHG 5/4/10, the Society for Gas as a Marine Fuel (SGMF) proposed that a database of well-to-wake emissions for different fuel options and their production/end-use pathways should be developed. The proposal was supported by some delegations who spoke.

6 Given the support for the proposal, the Republic of Korea has further updated the holistic approach, taking into account SGMF's proposal, as follows:

.1 identify the possible marine fuels including alternative low-carbon and zero-carbon fuels based on existing technologies;

.2 standardize the lifecycle pathway modelling for all identified fuel types;

.3 <u>develop a database and standardize data format for the analysis</u>;

.4 analyse inventory – e.g. of CO_2 emission – for each lifecycle pathway;

.5 calculate lifecycle GHG/carbon intensity for all identified fuel types; and

.6 reflect lifecycle GHG/carbon intensity to conversion factors under existing IMO instruments, e.g. resolution MEPC.308(73) and resolution MEPC.282(70).

7 Consequently, the outcomes of the guidelines could be used:

.1 to identify key technological and operational factors that affect emissions in the "well-to-propeller" process;

.2 to evaluate the effectiveness of various fuels in achieving the IMO 2050 GHG reduction target, taking into account the lifecycle GHG/carbon intensity; and

.3 to determine the best approach in IMO regulatory work to facilitate the maritime application of alternative low-carbon fuels.

The way forward on the holistic approach in considering the development of the lifecycle GHG/carbon intensity guidelines

8 When identifying alternative low-carbon and zero-carbon fuels, a view worth noting is that the terminology for alternative fuels, such as "Low-carbon fuel", "Zero-carbon fuel" and "Fossil-free fuel", should be clearly defined as soon as possible to enhance the consistent approach, as proposed in paragraphs 5 to 10 of document MEPC 74/7/6 (CESA and EUROMOT). As a starting point, the proposal by CESA and EUROMOT should be used as a base to develop the definition to be included in the lifecycle GHG/carbon intensity guidelines.

9 Development of a database is likely to involve the work of quantifying the lifecycle emissions for various fuel types, which entails heavy workload and may turn out to be not useful in the long run. Moreover, IMO delegates may find it difficult to understand and manage the technical nature and the breadth of the information in terms of policy implications – not least given the IMO's minimal influence on upstream oil and gas processes.

10 Thus, the Republic of Korea is of the view that credible long-term marine fuels should be identified first and then the works for pathway modelling should be prioritized prior to developing a database.

11 The research on the identification of marine fuels and the lifecycle pathway modelling for shipping's transition to zero-carbon that was released at the beginning of this year by Lloyd's Register* can be a good example. The study considered a range of possible pathways composed of fuel production and transportation, bunkering and ship storage. These potential pathways considered hydrogen, ammonia, methanol, gas oil and electricity as the final energy carriers on board ships. The primary energy sources considered to produce these fuels include: natural gas with capture and storage (CCS) for hydrogen and ammonia, biomass for methanol and gas oil and renewable electricity for hydrogen, ammonia, e-methanol, e-gasoil and electricity with batteries.

12 Regarding the analysis for inventory – e.g. in CO_2 emission – in terms of each lifecycle pathway, consideration should be given to the following elements, but not limited to:

.1 emissions associated with the production of these fuels based on locations and technologies – e.g. inland or offshore;

.2 emissions associated with the transport of these fuels based on transport means and locations of ports and refineries;

.3 emissions from the refining process modelled on a country-by-country basis based on the specific refinery types or applied technologies in each country. Then, the average can be calculated based on the proportion of each fuel going into each refinery type;

.4 an estimate of emissions associated with imported finished products;

.5 general fuel supply chains for each Member State; and

.6 emissions associated with the operation of ships based on types of engine systems.

* https://www.lr.org/en/insights/global-marine-trends-2030/zero-emission-vessels-transition-pathways/ "Fuel production cost estimates and assumptions"

Double-counting of emissions and the upstream emissions already accounted for under other regulatory bodies

13 During the discussion at ISWG-GHG 5, one delegation pointed out that, if IMO incorporates lifecycle assessment (LCA) into its framework (e.g. EEDI and DCS) to regulate or account for GHG emissions, coordination between shipping and in-land sectors should be sought to avoid any potential double-counting of emissions generated in the process of producing marine bunker fuels. The comment was considered reasonable and subsequently further consideration has been given by the Correspondence Group on Possible Introduction of EEDI Phase 4 established by MEPC 74.

14 The Republic of Korea is of the view that conceptual works and/or careful and thorough consideration on this issue are necessary before the actual calculation of C_{FLCA} – the conversion factor to be developed in lifecycle carbon/GHG intensity guidelines – in contrast to "C_F" used in resolutions MEPC.308(73) and MEPC.282(70) only accounting for CO_2 emissions on board released to the atmosphere in the combustion process, to avoid reaching the wrong conclusion and wasting time and resources invested into such a wide-ranging task.

15 In connection with the need to avoid double-counting, the Republic of Korea is of the view that currently available concepts on the conversion factors in the IMO instruments could be considered depending on the purpose of the conversion factor to be used.

16 For instance, given the aim of IMO data collection system (DCS) to evaluate the amount of CO_2 emissions emitted by international shipping, the conversion factor "C_F" only could be used in the calculation of CO_2 emissions within the DCS to avoid the double-counting.

17 As pointed out by several delegations, there is indeed no effective IMO mechanism that can be utilized to address the problem and introduce effective alternative fuels:

.1 a shift to low-carbon and zero-carbon fuel will be necessary in order to reach the 2050 targets;

.2 some synthetic fuels – e.g. methane and methanol, etc. – produced with renewable energy, which extracts CO_2 from the atmosphere in the well-to-tank process, have disadvantages when considering the conversion factor "C_F" under the current scheme; and

.3 only using the conversion factor "C_F" will pose the risk that IMO encourages stakeholders to use the alternative low-carbon and zero-carbon fuels – e.g. hydrogen with conversion factor "0" – that may deliver no net GHG emission benefit over their lifecycle.

18 Therefore, the new conversion factor "C_{FLCA}" can provide stakeholders with benefits in the process of calculating EEDI or operational indicators in their efforts to meet more stringent regulations for reducing GHG emissions from ships. The Republic of Korea believes that this mechanism could be utilized as one of the incentives for first movers trying to use alternative fuels. In doing so, the effective uptake of alternative low-carbon and zero-carbon fuels, which deliver net GHG emissions benefit over their lifecycle, could be achieved.

19 In light of paragraphs 13 and 18 above, the Republic of Korea would like to propose the following two concepts – to distinguish one from the other in terms of application – so that the concern about double-counting can be effectively resolved:

.1 the use of "C_F": calculation of the actual amount of the CO_2 emission from international shipping, which can be used for example within the DCS; and

.2 the use of "C_{FLCA}": calculation or evaluation of the ship's energy efficiency in existing/new ships. For example, C_{FLCA} could be taken into account in the calculation of EEDI and EEOI in the future. At least, the voluntary use of C_{FLCA} could be considered.

20 Additionally, the Republic of Korea is of the view that further consideration on how to incorporate C_{FLCA} into existing IMO instruments, including establishment of an alternative approach, is needed to come up with pragmatic approaches. In this respect, additional conceptual works can be also conducted to enhance the common understanding in the development of the lifecycle GHG/carbon intensity guidelines and facilitate the maritime application of alternative low-carbon fuels.

Action requested of the Working Group

21 The Group is invited to consider the above with a particular focus on the views provided in paragraphs 6, 8, 10, 12 and 19 and to take action as appropriate.