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PREVENTION OF AIR POLLUTION FROM SHIPS

Comments on MEPC 60/4/8, "An International Fund for Greenhouse Gas emissions from ships"

Submitted by Japan

SUMMARY

Executive summary:	This document provides comments on the joint submission MEPC 60/4/8, by Cyprus, Denmark, Marshall Islands, Nigeria and the International Parcel Tankers Association (IPTA) "An International Fund for Greenhouse Gas emissions from ships"
Strategic direction:	7.3
High-level action:	7.3.1
Planned output:	7.3.1.3
Action to be taken:	Paragraph 17
Related documents:	MEPC 59/4/34, MEPC 59/4/35; MEPC 60/4/8 and MEPC 60/4/37

1 This document is submitted in accordance with the provisions of paragraph 4.10.5 of the Guidelines on the organization and method of work (MSC-MEPC.1/Circ.2) and provides comments on document MEPC 60/4/8 submitted by Cyprus, Denmark, the Marshall Islands, Nigeria and the International Parcel Tankers Association (IPTA).

2 Document MEPC 60/4/8 provides detailed information on the proposed International Fund for Greenhouse Gas Emissions. Moreover, Japan has proposed a Leveraged Incentive Scheme (MEPC 59/4/34), which is a modified version of the International GHG Fund as proposed by Denmark to MEPC 58 and MEPC 59. Japan also submitted further explanations on the detailed design of the proposed Leveraged Incentive Scheme to this session (MEPC 60/4/37).

3 Japan's idea on the Leveraged Incentive Scheme has many elements in common with the International GHG Fund, and the purpose of this document is not to highlight the differences between the Japanese proposal and the International GHG Fund proposed by Cyprus, Denmark *et al.*, nor to argue pros and cons of the proposals. By this document, Japan would like to draw the attention to a particular section of MEPC 60/4/8, namely, "Meeting a global reduction target", and make technical comments on the numerical figures quoted in the section, which in Japan's view may give a misleading impression regarding the feasibility of achieving the assumed global reduction target.

4 Document MEPC 60/4/8 illustrates "Expected growth and GHG emissions in 2020" in paragraph 43 and Table 1.

> "43 In the following examples, a global reduction target is set at 10 per cent, 15 per cent and 20 per cent, respectively, in 2020 compared to 2007. GHG emissions from international shipping are set at 870 million tonnes in 2007 and at *925-1,058 million tonnes a year, respectively, in 2020*, depending on the expected growth in the shipping sector[6]. (The rest of the paragraph is omitted.)
>
> [6] Source: the Second IMO Greenhouse Gas Study 2009 (MEPC 59/INF.10) using the middle base future scenarios B2 and A1F1. The base scenarios presuppose that the sector will become more energy efficient before 2020 and predict a 12 per cent reduction by 2020 achieved through a five per cent speed reduction, and improvements in technology due to market-driven changes and regulatory side effects affecting the energy efficiency of the sector."

Table 1: Expected growth and CO_2 emissions in 2020 (million tonnes CO_2)

Growth in shipping	Low	High
(Line 1) GHG emissions in base year 2007	870	870
(Line 2) GHG emissions in 2020	925	1058
(Line 3) A 15% reduction in 2020 achieved through technical measures	139	159
(Line 4) GHG emission in 2020 after implementing technical measures	786	899
(Line 5) Allowed emission in 2020 at a 10% global reduction target compared to 2007	783	783
(Line 6) **GHG emissions to be offset at a 10% global reduction target**	**3**	**116**
(Line 7) Allowed emission in 2020 at a 15% global reduction target compared to 2007	740	740
(Line 8) **GHG emissions to be offset at a 15% global reduction target**	**47**	**160**
(Line 9) Allowed emission in 2020 at a 20% global reduction target compared to 2007	696	696
(Line 10) **GHG emissions to be offset at a 15% global reduction target**	**90**	**203**

* Line numbers were added to Table 1 by Japan, for explanation purposes.

Table 1 is formulated in the following way, with the figures in the column "Low" (B2 scenario) being quoted:

> *(Line 4) GHG emissions in 2020 after implementing technical measures (786 million tonnes) =*
> *(Line 2) GHG emissions in 2020 (925 million tonnes)*
> *(Line 3) GHG a 15% reduction in 2020 achieved through technical measures (139 million tonnes)*

---- <Eq. 1>

5 Japan considers that the Line 4 figures "GHG emissions in 2020 after implementing technical measures" presented in Table 1 are lower than they should be, which thus may give a false impression that the assumed global reduction targets in Lines 5, 7 and 9 are more easily achievable than they are in reality.

6 Paragraph 44 of document MEPC 60/4/8 states that "a future GHG reduction potential through the implementation of technical and operational measures is estimated to account for a relative reduction of 15 per cent". Japan does not question this particular assumption, thus the figures in Lines 3 "a 15% reduction in 2020 achieved through technical measures", which is the potential of efficiency improvement, are not argued in this document, and should be used as they are assumed in the above Table 1. The problem lies in the formulation in Eq.1 itself.

7 As explained in Japan's previous submission "Consideration of appropriate targets for reducing CO_2 emissions from international shipping" (MEPC 59/4/35), the amount of CO_2 emissions is determined by:

CO_2 emissions = Activity × Efficiency **----<Eq. 2>**

Where: Activity is the cargo transport volume (tonne mile)
Efficiency is the CO_2 emission divided by the unit of the (activity) cargo transported (g/tonne mile)

8 The CO_2 emissions after the reduction measures are taken in a certain target year (e.g., 2020) should be given as in the following formula:

(C) GHG emissions in the target year 2020 =
(A) CO_2 emissions in BAU (Business As Usual) in a target year (2020)
- (B) CO_2 reduction from BAU in the target year 2020 by the potential efficiency improvement between the base year (2007) to the target year (2020) through the application of technical and operational measures

---- <Eq. 3>

The above factors (A), (B) and (C) should be consistent with each other. When factor (B) is calculated as the potential efficiency improvement in the period between the base year (2007) and the target year (2020), factor (A) must be a "true" BAU figure, which keeps the present "base year" efficiency unchanged, being multiplied by the transport volume growth (B2 or A1F scenario).

9 The comparison of Eq. 1 and Eq. 3 can easily highlight the problems. As mentioned above, this document assumes the efficiency improvement by technical/operational measures to be 15%, therefore, factor (B) is identical to Line 3 of Table 1. The problem is that Line 2 is not equal to factor (A).

10 Line 2 figures have been quoted from the Second IMO Greenhouse Gas Study 2009 without modification. As mentioned in footnote 6 of MEPC 60/4/8, these figures from the above Study have *already included a certain degree of energy efficiency improvements from the present to the target year*. Therefore, *Eq. 1 has counted twice the efficiency improvement, firstly in Line 2, and secondly in Line 3*; thus, resulted in the outcome (Line 4) being lower than they should be. With such an inconsistent way of calculation, Table 1 gives emission figures after the reduction measures being applied (Line 4) close to the assumed global emission target (Lines 5, 7 and 9), and thereby gives the impression that such global targets are easy to achieve and the necessary offset volume is marginal, which is not the case.

11 Here is how to fix this problem and get the correct figures. If one keeps the assumption for Line 3 (factor (B)) as 15%, the Line 2 figures should be set as item (A), a "true" BAU, namely, the emission which is determined by the pure transport volume growth from the base year to the target year (2.1% per annum under B2 scenario), *keeping the present (base year) efficiency level unchanged.*

12 Japan had already provided, in the section on "Consideration of appropriate targets for reducing CO_2 emissions from international shipping" of document MEPC 59/4/35, the expected CO_2 emission curves. These curves followed the formulation of the above Eq. 3, which indicated:

.1 emission in BAU[1];

.2 potential efficiency improvement; and

.3 emission after the reduction measures,

taking into account .1 and .2. Figure 1 below illustrates such emission curves and its relation to Table 1 figures.

13 The estimated "true" BAU values under the B2 scenario (corresponding to "Low" case in Table 1) is 1100 Million tonnes in year 2020 as shown in Figure 1. Figure 1 also shows CO_2 emissions described in the Second IMO Greenhouse Gas Study 2009 (which is Line 2 of Table 1, 925 Million tonnes in 2020), as well as the emission after the reduction measures being applied (786 Million tonnes in 2020). The emission estimate by the Second IMO GHG Study 2009 of *925 million tonnes in 2020 has already included a 16% CO_2 emissions reduction (efficiency improvement) compared to BAU.* Therefore, the *786 million tonnes (Line 4),* after the reduction measures have been applied, which is supposed to account for a relative reduction (efficiency improvement) of 15 per cent (Line 3), *is in the correct term* representing *as much as a 29% reduction from a "true" BAU.* It should be noted that this 29% reduction must be the overall efficiency improvement as total fleet average (both new and existing ships), and thus it is an inappropriate assumption in view of feasibility. It should be noted that only half of the fleet would be replaced in 13 years from the base year (2007) to the target year (2020). This means that if the efficiency improvement for existing ships is assumed to be 10%, *all the new ships to be built in the 2007-2020 period, would have to have the efficiency improvement over the present level by as much as 48%, if the overall efficiency improvement is assumed to be 29%.*

14 It is easy to see that the emission prior to the reduction measures were applied (Line 2: 925 million tonnes in B2 scenario) is not a "true" BAU. If one compares the trend of seaborne transport volume shown in the lower part of Figure 1 with the line connecting the base year emission to 925 million tonnes, it can be noted that the inclination of the latter is unnaturally low.

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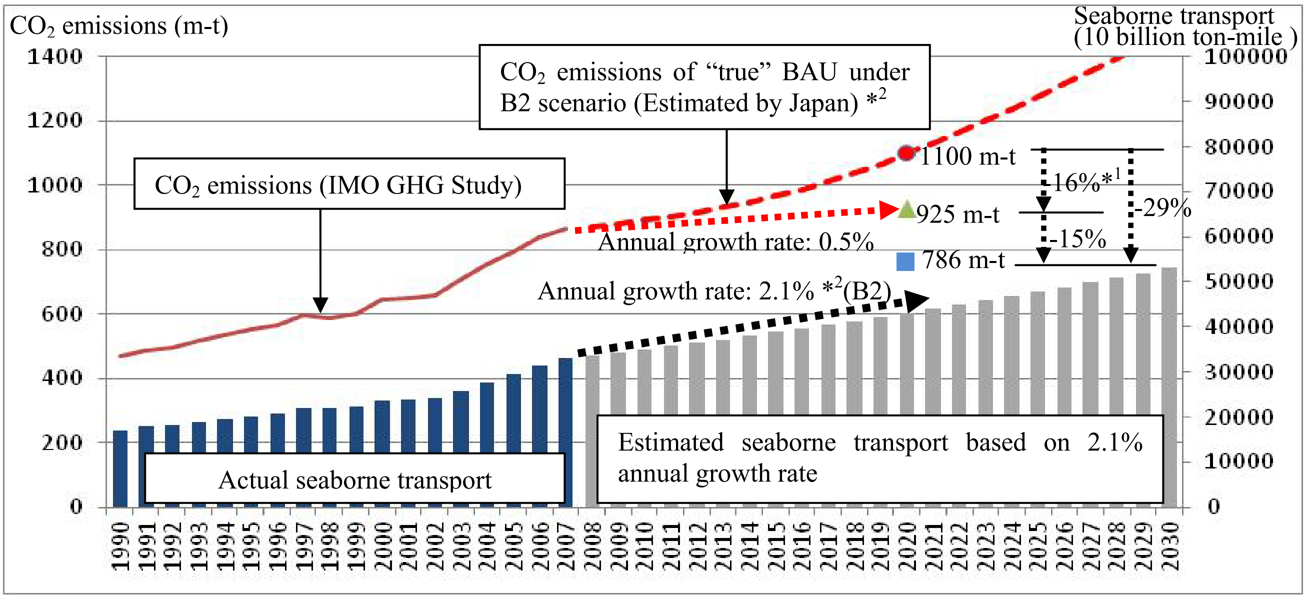
[1] The BAU was estimated by calculation model developed using the same ship categories that in the Second IMO Greenhouse Gas Study 2009, as well as the same category-specific assumptions such as average engine output, SFC and yearly operation hours. The model also takes into account different timing of ship replacement by ship type. The effects of speed reduction have been incorporated in the model as the increased number of ships necessary for transporting the same volume (tonne mile) of cargoes.



Source: - Seaborne transport (1990-2007): Fearnleys Review

*[1] "Updated Study on Greenhouse Gas Emissions from Ships Phase 1 Report (MEPC 58/INF.6)" shows that aggregate improvements in efficiency of Ocean-going shipping, Coastwise shipping and Container are 12%, 12% and 21%, respectively.

*2 Estimated seaborne transport volume is calculated by simply applying 2.1% annual increase (B2 scenario). CO_2 emissions of "true" BAU is more complicated than the seaborne transport volume although the same scenario (B2) is applied and "average" annual growth is the same (2.1%); it takes into account the changing composition of different ship types as analysed in the Second IMO Greenhouse Gas Study 2009. Specifically, increasing share of containerships, of which emission is higher than other ship types, would lead to a higher emission level than a simple annual growth of 2.1%.

Figure 1: Illustration of emission curves, trend of seaborne transport volume, and its relation to Table 1

15 With the above analysis, the "correct" Table 1 (document MEPC 60/4/8) should be understood as follows:

Table 2: Modified Table 1, estimated by Japan

Growth in shipping	Low	High
GHG emissions in base year 2007	870	870
GHG emissions in 2020	~~925~~ 1100	~~1058~~ 1260
A 15% reduction in 2020 achieved through technical measures	~~139~~ 165	~~159~~ 189
GHG emission in 2020 after implementing technical measures	~~786~~ 935	~~899~~ 1071
Allowed emission in 2020 at a 10% global reduction target compared to 2007	783	783
GHG emissions to be offset at a 10% global reduction target	**~~3~~ 152**	**~~116~~ 288**
Allowed emission in 2020 at a 15% global reduction target compared to 2007	740	740
GHG emissions to be offset at a 15% global reduction target	**~~47~~ 195**	**~~160~~ 331**
Allowed emission in 2020 at a 20% global reduction target compared to 2007	696	696
GHG emissions to be offset at a 15% global reduction target	**~~90~~ 239**	**~~203~~ 375**

16 The scope of this document is limited to the analytical points relating to Table 1 of MEPC 60/4/8 and the method of correctly calculating:

.1 BAU emission;

.2 efficiency improvement; and

.3 emission after the reduction measures being applied.

Meanwhile, Japan would like to iterate its view, as also explained in document MEPC 59/4/35, that a cap on the total CO_2 emissions from international shipping is not an appropriate approach. The seaborne transport is a variable dependent on the global economic activity, which is unpredictable, and uncontrollable by the maritime industries. The regulatory package to be developed by IMO should use efficiency improvements as targets.

Action requested of the Committee

17 The Committee is invited to consider the information and comments provided in this document and take action as appropriate.

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