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MARINE ENVIRONMENT PROTECTION
COMMITTEE
59th session
Agenda item 4

MEPC 59/4/4
8 April 2009
Original: ENGLISH

PREVENTION OF AIR POLLUTION FROM SHIPS

Second IMO GHG Study 2009

Update of the 2000 IMO GHG Study – Status report from the Steering Committee

Note by the Secretariat

SUMMARY

| | |
|------------------------------------|---|
| <i>Executive summary:</i> | This document provides a final status report on the updating of the 2000 IMO Greenhouse Gas Study. The Steering Committee established to assist the Secretariat in undertaking the update agreed that the updated study should be titled: Second IMO GHG Study 2009 |
| <i>Strategic direction:</i> | 7.3 |
| <i>High-level action:</i> | 7.3.1 |
| <i>Planned output:</i> | 7.3.1.3 |
| <i>Action to be taken:</i> | Paragraph 37 |
| <i>Related documents:</i> | MEPC 45/8; MEPC 55/23; MEPC 56/23; MEPC 57/4/18 and Add.1, MEPC 57/21; MEPC 58/4/2, MEPC 58/4/4, MEPC 58/INF.6; MEPC 59/4/7 and MEPC 59/INF.10 |

Background

1 The Committee, at its fifty-sixth session, approved the Terms of Reference for the update of the 2000 IMO GHG Study and requested the Secretariat to initiate the update including the establishment of a Steering Committee. The updated Study was divided into two phases:

- .1 Phase 1, covering a CO₂ emission inventory from international shipping and future emission scenarios; and
- .2 Phase 2, also covering greenhouse gases other than CO₂ and other relevant substances in accordance with the methodology adopted by UNFCCC, as well as the identification and consideration of future reduction potentials by technical, operational and market-based measures.

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2 The terms of Reference, as approved by the Committee at its fifty-sixth session, is set out as annex 1 to this document.

Steering Committee

3 The Steering Committee was established in December 2007 under the Chairmanship of Ms Petra Bethge (Germany), with Mr. Bin Okamura (Japan) as Vice-Chairman and representatives from the following Member States: Australia, Canada, China, Denmark, Greece, India, Iran (Islamic Republic of), the Marshall Islands, Nigeria, Panama, the Philippines, the Republic of Korea, the Russian Federation, South Africa, the United Kingdom, the United States and Vanuatu.

4 The Steering Committee benefited from advisors from the secretariats of UNEP and the UNFCCC.

5 The Committee will recall that the progress of the updated study was reported to MEPC 57 (MEPC 57/4/18 and MEPC 57/4/18/Add.1) and also to MEPC 58 (MEPC 58/4/2). The progress reports provided information about the establishment of the Steering Committee, the outcome of the tendering process, a description of the Consortium that was awarded the contract, status of the contract, as well as information on the financing of the Study.

6 The Steering Committee has met seven times since its establishment in December 2007. Its meeting dates, which also provides the main purpose of each meeting, is set out in annex 2 to this document.

Reports to the Committee

7 The Committee will recall that the outcome of Phase 1 was reported to its fifty-eighth session. MEPC 58 noted with appreciation the introduction given by the coordinator of the international Consortium contracted to undertake the update of the Study, Dr. Buhaug of MARINTEK, who provided a summary of the main findings in documents MEPC 58/4/4 (executive summary) and MEPC 58/INF.6 (full report) with information on Phase 1 of the updated 2000 IMO Study on GHG emissions from ships (paragraph 4.23 of document MEPC 58/23).

8 The final report covering both phases is submitted to MEPC 59 as follows:

- .1 the executive summary in document MEPC 59/4/7; and
- .2 the full report in document MEPC 59/INF.10.

Final report

9 The preliminary draft report covering both Phase 1 and Phase 2 was submitted by the Consortium to the Secretariat on 1 February 2009 and forwarded to the members of the Steering Committee for technical and editorial review.

10 The Steering Committee met on 23 February 2009 at the IMO Headquarters to consider the preliminary draft report and agreed on several comments to assist the Consortium. The Consortium submitted updated parts of the preliminary draft report on 16 March 2009, for the Steering Committee's further review.

11 The Steering Committee met again on 20 March 2009 to consider the updated parts of the preliminary draft report and provided some further comments and input to assist the Consortium in finalizing the report. The final draft report was received by the Secretariat on 31 March 2009 and forwarded to the members of the Steering Committee for their ultimate review.

12 The Steering Committee met on 6 April 2009 for its final meeting to consider the final draft report and whether or not it complied with the Terms of Reference (ToR) as adopted by MEPC 56 (see annex 1 to this document). The Steering Committee agreed that the final draft report met the ToR and unanimously accepted it, recognizing that the responsibility for the scientific content of the Study would rest with the authors.

Scientific reports and other input to the Consortium

13 The Consortium has, for Phase 1, gratefully received inputs and comments from the International Energy Agency (IEA), BIMCO and INTERTANKO.

14 For Phase 2, the Government of Greece has provided several relevant scientific studies and input on methodology has been provided by the Government of Australia.

Funding

15 MEPC 56, following its approval of the ToR and its request to the Secretariat to initiate the update, encouraged Member States and observers to contribute towards funding of the update of the 2000 IMO GHG Study (paragraphs 4.67.9 to 4.67.11 of document MEPC 56/23).

16 The Secretary-General made available an initial contribution of US\$19,625.57 from the balance of funds from the informal Cross Government/Industry Scientific Group of Experts, to undertake a comprehensive study to evaluate the effects of the different fuel options proposed under the revision of MARPOL Annex VI. The Secretary-General called upon Members and organizations to contribute towards the funding and remains grateful to those who responded positively to his request.

17 MEPC 57 noted that the update was not fully funded and urged Member States and observers that had not yet contributed financially to do so in order to complete the exercise as expected by the Committee (paragraphs 4.103 and 4.104 of document MEPC 57/21).

18 The Steering Committee, in its progress report contained in document MEPC 58/4/2, invited MEPC 58 to encourage further contributions, recognizing that follow-up activities would also need to be funded through voluntary contributions. Due to its heavy workload and time constraints, MEPC 58 did not act upon this invitation.

19 The work has been funded by voluntary contributions as shown in annex 3, totalling US\$478,308.26. The following Member States and organizations have contributed: Australia, Canada, Denmark, Germany, the Marshall Islands, the Netherlands, Norway, Sweden, the United Kingdom and the Japanese Shipowner Association.

20 Three of the involved institutes (MNMU, Republic of Korea, NMRI, Japan, and OPRF, Japan) were fully funded by their governments and could not accept external funding; this in-kind work has been estimated to US\$50,000 for each institute, a total of US\$150,000.

21 The Steering Committee is grateful to the Governments and organizations that have contributed financially or scientifically, and through in-kind contributions. Without such contributions it would not have been possible to undertake this work and the Steering Committee recommends that the Committee express its profound appreciation and wholehearted thanks to the donors that have made this vital study a reality.

Expenditure

22 The total cost of the Study was US\$562,150 including in-kind contributions.

23 The total payable cost to the Consortium was US\$399,960.

24 It may be noted that the administrative costs for the Consortium were covered by MARINTEK.

25 In finalizing the report, US\$5,168.48 was spent by the Secretariat in providing editorial and proofreading capacity to the Consortium. Travel costs totalling US\$6,500.00 in relation to the final meeting of the Steering Committee for five of the scientists of the Consortium was also debited from the contributed funds.

26 It may also be noted that additional costs of approximately US\$8,000.00 will be drawn on the balance to cover the direct travel costs for the scientist of the Consortium that will present the report to the Committee at MEPC 59.

27 Expenditures related to the update of the 2000 IMO GHG Study can be found itemized in annex 3 of this status report. The balance brought forward is US\$65,508.60. The balance will be transferred back to the Onassis Fund and used for follow-up work as described in the ensuing paragraphs.

Follow-up activities

28 In the course of its work, it has been made obvious to the Steering Committee that further work and possibly commissioning of additional studies, will be useful and may be needed before the Committee is able to conclude all aspects of the GHG work. The follow-up activities, as may be agreed by the Committee or initiated by the Secretary-General, will require additional voluntary funding outside IMO's regular budget.

29 The cost benefit analysis presented in the Study, including environmental and public health impacts, could not be fully quantified or monetized as the policy options are still under development and a range of assumptions would need to be made complicating the exercise further and reducing the value of its outcome. Formally, a full cost-benefit analysis should calculate the financial value of environmental and health impacts. However, for policies affecting a global sector like maritime transport, doing so would imply making assumptions that could not be supported by other studies, literature or economic theory. Furthermore, assessing the health impacts would require making projections of population densities of coastal areas, of the development of shipping routes and background concentrations of air pollutants in affected areas. This was well beyond the time frame and budget of this study. The benefits of lower greenhouse gas emissions related to the different policy options are estimated and expressed in CO₂-equivalents or in relative terms (%) while other benefits are assessed qualitatively.

30 The Steering Committee recommends that as soon as the policy options are adequately matured, a more comprehensive cost benefit analysis, monetizing the financial value of environmental and health impacts; should be considered undertaken.

31 Follow-up activities may also include commissioning of studies and reports on the design and development of specific reduction measures, as well as feasibility and impacts studies for their possible implementation.

32 Presentation to the broader audience of the Second IMO GHG Study 2009 and circulation of the report, or its executive summary, outside IMO, and in particular to delegations at COP 15 in Copenhagen in December 2009, will also require additional voluntary funding.

33 The Steering Committee recommends that MEPC 59 encourages Member States and Observers to contribute financially towards the follow-up work, such as a more comprehensive cost-benefits analysis, feasibility and impacts assessments of proposed measures or other activities as agreed by the Committee or initiated by the Secretary-General.

Conclusions

34 The Steering Committee recognizes that, although it was given the tasks, *inter alia*, to assist the Secretariat, provide general oversight to the authors and to confirm whether the final Study met the ToR as approved by MEPC 56 before submission to the Committee, the responsibility for the scientific content of the study rests fully with the authors.

35 The “Second IMO GHG Study 2009” will constitute a significant document and will be the paramount reference point in developing IMO’s strategy to limit and reduce GHG emissions from international shipping. In the same manner as the 2000 IMO GHG Study has until now been the most comprehensive and authoritative assessment on the contribution made by international shipping to climate change, as well as the potentials for its limitation; so will the “Second IMO GHG Study 2009” be in the future.

36 The Steering Committee welcomes and appreciates the significant undertaking of updating the 2000 IMO GHG Study and congratulates the Consortium for providing a comprehensive and balanced study. The Steering Committee has no doubt that this study will truly support the Committee in its consideration of how best to address maritime greenhouse gas emissions and will assist IMO to maintain its leading position on this issue. It is quite remarkable that such a comprehensive study has been produced in the available time, and this is an achievement the Steering Committee recognizes and welcomes.

Action requested of the Committee

37 The Committee is invited to consider the information provided and take action as appropriate, and in particular to:

- .1 note that the Steering Committee agreed that the final report meets the Terms of Reference as adopted by MEPC 56 and unanimously accepted it, recognizing that the responsibility for the scientific content of the study rests with the authors;
- .2 congratulate the Consortium for providing a comprehensive and balanced study;
- .3 note that the Steering Committee agreed that the updated 2000 IMO GHG Study should be titled: “Second IMO GHG Study 2009”;

- .4 note that the study has been funded through voluntary contributions and agree that the balance should be transferred back to the Onassis Fund and used for follow-up activities as agreed by the Committee or initiated by the Secretary-General;
- .5 express its profound appreciation and wholehearted thanks to the donors (Australia, Canada, Denmark, Germany, the Marshall Islands, the Netherlands, Norway, Sweden, the United Kingdom and the Japanese Shipowner Association);
- .6 encourage Member States and observers to contribute financially towards the follow-up activities; and
- .7 note that the Steering Committee has completed its work for the second IMO GHG Study 2009.

ANNEX 1

Reproduction of Annex 9 to MEPC 56/23

TERMS OF REFERENCE FOR THE UPDATE OF THE 2000 IMO STUDY ON GREENHOUSE GAS EMISSIONS FROM SHIPS

As part of IMO's efforts to maintain its leading position, and recognizing the IMO's responsibility with regard to greenhouse gas emissions from the maritime sector, the MEPC has decided to undertake an update of the 2000 IMO Study on Greenhouse Gas Emissions from Ships. Taking the first study as a good starting point, the terms of reference for this update are as follows:

1 It is recognized that CO₂ is the most significant GHG emitted by ships. The updated study should be transparent, not policy prescriptive and include the issues below.

Current inventories and future scenarios of emissions of GHGs and relevant substances from international shipping

1.1 The study should include current global inventories of GHGs and relevant substances emitted from ships engaged in international transport, any methodological aspects and future emission scenarios, described as follows:

- (a) GHGs should be defined as the gases considered under the UNFCCC process: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆);
- (b) Other relevant substances that may contribute to climate change include: nitrogen oxides (NO_x), non-methane volatile organic compounds (NMVOC), carbon monoxide (CO), particulate matter (PM) and sulphur oxides (SO_x);
- (c) The inventories should include the annual emission series from 1990 to the year as far as statistical data are available;
- (d) CO₂ inventories should be estimated both by top down method and by bottom up method subject to data availability. Top down method is based on the statistical data on fuel delivered to international shipping and bottom up method is based on the transport activity such as fuel consumption by individual ships*. These two inventories should be compared and analysed for QA/QC and transparency of these data; and

* For example, the top down method should rely on existing statistical sources of fuel delivery data regarding marine uses of fossil fuels, such as international surveys (e.g., IEA) and national statistics on fuel deliveries for marine uses. The bottom up method could investigate fuel deliveries and ship manifest logs at ports.

- (e) Estimations of future shipping emission scenarios should be performed in base-case (business as usual) for the years 2020 and 2050. Economic growth and increased transportation amounts, as well as expected efficiency improvements should be considered as part of emissions scenarios. Effects of amendments to MARPOL Annex VI should be taken into account.

Current and future emission reduction potential of GHGs and other relevant substances

1.2 The study should identify progress made to date in reducing GHG emissions and other substances, including for example which options are available for further reductions based on current technologies and practices? What balances and potential trade-offs are involved in reducing GHG and other relevant substances? The answers should include consideration of the CO₂ index.

1.3 The study should identify possible future measures to reduce emissions of GHGs and other relevant substance and related potential for reductions, such as options for technological change, fuel switching, alternative power, changes in operational practices, market-based measures and other actions (e.g., labelling and certification).

1.4 The study should undertake a cost-benefit analysis, including environmental and public health impacts, of options for current and future reductions in GHG emissions and other relevant substances from international shipping.

Climate impacts of international shipping

1.5 The study should include identification of the impacts of emissions from shipping on climate change; taking into account GHGs considered by the UNFCCC process, and other relevant substances as identified above in paragraph 1.1(b).

1.6 A comparison of emissions from various modes of transport, based on tonnes-miles of cargo transported, should be included in the study. In this respect, consideration should also be given to different types of ships.

Organizational matters

2 While taking into account relevant new information, the authors should not duplicate existing studies that have already been completed. Therefore, in conducting the study, the authors may consult a broad range of reputable organizations, institutions and resources with relevant experience and/or expertise within areas of the terms of reference. Authors should validate the credibility of information obtained. The responsibility for the content of the updated Study would rest with the authors.

3 A Steering Committee should be established by the IMO Secretariat. The Steering Committee should be geographically balanced (e.g., with reference to the five UN regions) and equitably represent developing and developed countries. Relevant stakeholders should also be represented. The Steering Committee should:

- (a) have input into the tendering process for authors and approve the study outline;

- (b) monitor progress of the study and report on progress to the Marine Environment Protection Committee;
- (c) provide general oversight to authors as necessary; and
- (d) confirm that the study meets the terms of reference before submission to the Marine Environment Protection Committee.

3.1 The Steering Committee should, as far as possible, make decisions by consensus and make all efforts to ensure timely completion of the study.

4 The updated study should be submitted to the fifty-ninth session of the Marine Environment Protection Committee, if possible, but at the latest in 2010.

ANNEX 2

SECOND IMO GHG STUDY 2009

MEETING DATES FOR THE STEERING COMMITTEE

| Meeting - main items | Time | Venue | Comments |
|--|-------------------------------------|-------------------------------|--|
| GHG-SC 1 Establishing meeting | 17 December 2007 (14.00 – 17.00) | IMO temporary Headquarters | Fixed date |
| GHG-SC 2 Outcome of tendering, selection of consortium and approval of the Study outline Progress report to MEPC 57 | 3 February 2008 (14.00 – 17.00) | IMO temporary Headquarters | Date set at the establishing meeting |
| GHG-SC 3 Comments and input by the SC on the preliminary report on Phase 1 Progress report to MEPC 58 | 23 July 2008 (10.00 - 17.00) | IMO Headquarters | Date set at the February 2008 meeting |
| Presentation of report on Phase 1 | 6 October 2008 (MEPC 58) | IMO Headquarters | Chairman and Vice-Chairman present |
| GHG-SC 4 Meeting with the key scientist of the Consortium to provide input for the Phase 2 work | 7 October 2008 (13.00 – 14.30) | IMO Headquarters | Date set at the July 2008 meeting |
| GHG-SC 5 Comments and input on the preliminary report on phase two and the final draft comprehensive report Agree on presentation and publishing of the final report | 23 February 2009 (09.30 – 17.30) | IMO Headquarters | Date set by the Chair/ Secretariat |
| GHG-SC 6 Comments and input on parts of the final comprehensive report | 20 March 2009 (10.00 – 12.30) | IMO Headquarters | Date set by the Chair/ Secretariat |
| GHG-SC 7 Confirm that the Study meets the ToR Final status report to MEPC 59 | 6 April 2009 (09.30 – 17.30) | IMO Headquarters | Date set at the February 2009 meeting |
| Presentation of final report | 13 July 2009 (MEPC 59) | IMO Headquarters | Chairman and Vice-Chairman to be present |

ANNEX 3

SECOND IMO GHG STUDY 2009

FUNDING AND DISTRIBUTION OF FUNDS

Funding – 1 November 2007 to 24 November 2008

To strengthen and expedite the Organization's GHG work, the updating of the 2000 IMO GHG Study has been undertaken in two phases. Phase one, covering a CO₂ emission inventory from international shipping and future emission scenarios, was reported to IMO in August 2008 for consideration by MEPC 58 in October 2008. Phase two, also covering GHGs other than CO₂ and other relevant substances in accordance with the methodology adopted by UNFCCC, as well as the identification and consideration of future reduction potentials by technical, operational and market-based measures, was submitted to IMO in April 2009 for consideration by MEPC 59 in July 2009.

The work was funded by voluntary contributions as follows:

| Donors | Pledged contribution | Invoice | Received remittances |
|--|-----------------------------|----------------|-----------------------------|
| Australia | GBP 16,576 | IMO/08/074 | US\$ 32,694.34 |
| Canada | CAN\$ 95,000 | IMO/08/054 | US\$ 97,136.55 |
| Denmark | US\$ 10,000 | IMO/08/039 | US\$ 10,000.00 |
| Germany | EUR 25,000 | IMO/07/127 | US\$ 36,023.00 |
| Marshall Islands | GBP 3,192.19 | IMO/08/005 | US\$ 6,358.94 |
| Netherlands | EUR 28,000 | IMO/07/121 | US\$ 39,739.09 |
| Norway | NOK 200,000 | IMO/08/038 | US\$ 36,764.00 |
| Sweden | US\$ 20,000 | | US\$ 20,000.00 |
| United Kingdom | GBP 50,000 | IMO/08/023 | US\$ 99,601.50 |
| Japanese Shipowners Association | US\$ 100,000 | IMO/08/131 | US\$ 99,990.84 |
| Total voluntary contribution | ≈US\$ 460,000 | | US\$ 478,308.26 |
| Balance brought forward from Scientific Group of Experts project | | | US\$ 19,625.57 |
| Total | | | US\$ 497,933.83 |

The following three institutes involved in the Consortium (MNMU, Republic of Korea, NMRI, Japan, and OPRF, Japan) were fully funded by their governments and did not accept external funding; this work was estimated to US\$50,000 for each of the institutes a total of US\$150,000.

Costs

Payment for Phase 1 in three stages as follows:

| Item | Description | Payment |
|----------------------|---|------------------------|
| 1 | Signing the contract for consultancy services for Phase I | US\$ 33,500.00 |
| 2 | Receipt of the preliminary Phase I report | US\$ 99,500.00 |
| 3 | Receipt of the final Phase I report | US\$ 67,500.00 |
| Total Payment | | US\$ 200,500.00 |
| Balance | | US\$ 297,433.83 |

Payment for Phase II in 3 stages as follows:

| Item | Description | Payment |
|----------------------|--|------------------------|
| 1 | Signing the contract for consultancy services for Phase II | US\$ 33,500.00 |
| 2 | Receipt of the preliminary Phase II report | US\$ 99,500.00 |
| 3 | Receipt of the final Phase II report | US\$ 66,460.00 |
| Total Payment | | US\$ 199,460.00 |
| Balance | | US\$ 97,973.83 |

Reception after presentation of Phase I report during MEPC 58

| Item | Description | Payment |
|----------------------|-------------|-----------------------|
| 1 | Reception | US\$ 2,495.65 |
| Total Payment | | US\$ 2,495.65 |
| Balance | | US\$ 95,478.18 |

Production and printing of GHG brochure for COP 14 Conference in Poznan, Poland, 1 to 12 December 2008

| Item | Description | Payment |
|----------------------|-------------------------------------|-----------------------|
| 1 | Production and printing of brochure | US\$ 3,379.42 |
| Total Payment | | US\$ 3,379.42 |
| Balance | | US\$ 92,098.76 |

Costs in relation to finalization of the Second IMO GHG Study 2009

| Item | Description | Payment |
|----------------------|---|------------------------------|
| 1 | Recruitment of Proofreader for 19 days to edit the updated study | US\$ 3,831.12 (£2,666.46) |
| 2 | Proofreader contract extension for 9 days to continue editing the updated study | US\$ 1,789.04 (£1,263.06) |
| 3 | Estimated travel costs for five scientist of the Consortium at the 7th Steering Committee meeting on 6 April 2009 | US\$ 6,500.00 |
| 4 | Misc. | US\$ 70.00 (£50.00) |
| Total Payment | | US\$ 12,190.16 |
| Balance | | US\$ 79,908.60 |

Expected costs in relation to presentation of the Second IMO GHG Study 2009 at MEPC 59

| Item | Description | Payment |
|----------------------|---|-----------------------|
| 1 | Travel cost for the scientists of the Consortium | US\$ 8,000.00 |
| 2 | Reception | US\$ 6,400.00 |
| Total Payment | | US\$ 14,400.00 |
| Balance | Estimated balance following presentation of the Study at MEPC 59 | US\$ 65,508.60 |