

MARINE ENVIRONMENT PROTECTION
COMMITTEE
71st session
Agenda item 7

MEPC 71/WP.5
30 June 2017
Original: ENGLISH

DISCLAIMER

As at its date of issue, this document, in whole or in part, is subject to consideration by the IMO organ to which it has been submitted. Accordingly, its contents are subject to approval and amendment of a substantive and drafting nature, which may be agreed after that date.

REDUCTION OF GHG EMISSIONS FROM SHIPS

**Report of the first meeting of the Intersessional Working Group on
Reduction of GHG emissions from ships (ISWG-GHG 1)**

Introduction

1 The first meeting of Intersessional Working Group on Reduction of GHG emissions from ships (ISWG-GHG 1) met from 26 to 30 June 2017 and was chaired by Mr. S. Oftedal (Norway). More than 200 representatives from Member Governments and observer organizations participated.

2 The Group was attended by delegates from the following Member Governments:

ARGENTINA	INDIA
AUSTRALIA	INDONESIA
BAHAMAS	IRAN (ISLAMIC REPUBLIC OF)
BANGLADESH	ITALY
BELGIUM	JAPAN
BRAZIL	KIRIBATI
CANADA	LIBERIA
CHILE	MALAYSIA
CHINA	MALTA
COLOMBIA	MARSHALL ISLANDS
COOK ISLANDS	MEXICO
CYPRUS	NETHERLANDS
DENMARK	NEW ZEALAND
ECUADOR	NIGERIA
ESTONIA	NORWAY
FIJI	PANAMA
FINLAND	PERU
FRANCE	PHILIPPINES
GERMANY	POLAND
GHANA	REPUBLIC OF KOREA
GREECE	RUSSIAN FEDERATION

SAUDI ARABIA
SINGAPORE
SOLOMON ISLANDS
SOUTH AFRICA
SPAIN
SWEDEN

TURKEY
TUVALU
UNITED ARAB EMIRATES
UNITED KINGDOM
UNITED STATES
VANUATU

by a representative from the following Associate Member of IMO:

HONG KONG, CHINA

by a representative from the following United Nations and Specialized Agency

UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE
(UNFCCC)

by observers from the following intergovernmental organizations:

ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT
(OECD)
EUROPEAN COMMISSION (EC)

and by observers from the following non-governmental organizations in consultative status:

INTERNATIONAL CHAMBER OF SHIPPING (ICS)
INTERNATIONAL ASSOCIATION OF PORTS AND HARBORS (IAPH)
BIMCO
INTERNATIONAL ASSOCIATION OF CLASSIFICATION SOCIETIES (IACS)
ICHCA INTERNATIONAL LTD. (ICHCA)
OIL COMPANIES INTERNATIONAL MARINE FORUM (OCIMF)
COMMUNITY OF EUROPEAN SHIPYARDS' ASSOCIATIONS (CESA)
INTERNATIONAL ASSOCIATION OF INDEPENDENT TANKER OWNERS
(INTERTANKO)
SOCIETY OF INTERNATIONAL GAS TANKER AND TERMINAL OPERATORS LTD.
(SIGTTO)
CRUISE LINES INTERNATIONAL ASSOCIATION (CLIA)
INTERNATIONAL ASSOCIATION OF DRY CARGO SHIPOWNERS
(INTERCARGO)
WORLD WIDE FUND FOR NATURE (WWF)
THE INSTITUTE OF MARINE ENGINEERING, SCIENCE AND TECHNOLOGY
(IMAREST)
INTERNATIONAL PARCEL TANKERS ASSOCIATION (IPTA)
INTERNATIONAL MARINE CONTRACTORS ASSOCIATION (IMCA)
THE ROYAL INSTITUTION OF NAVAL ARCHITECTS (RINA)
INTERFERRY
INTERNATIONAL BUNKER INDUSTRY ASSOCIATION (IBIA)
INTERNATIONAL TRANSPORT WORKERS' FEDERATION (ITF)
WORLD SHIPPING COUNCIL (WSC)
CLEAN SHIPPING COALITION (CSC)

Terms of reference

3 The terms of reference for ISWG-GHG 1, as agreed by MEPC 70 (MEPC 70/18, paragraph 7.21), were as follows:

"The Intersessional Working Group on Reduction of GHG emissions from ships is instructed, with a view to implementing the *Roadmap for developing a comprehensive IMO strategy on reduction of GHG emissions from ships* approved at MEPC 70 (MEPC 70/18/Add.1, annex 11) and taking into account documents submitted, to:

- .1 consider how to progress the matter of reduction of GHG emissions from ships and advise the Committee as appropriate; and
- .2 submit a report for consideration at MEPC 71."

Opening of the meeting

4 Mr. Edmund Hughes, on behalf of the Secretary-General, welcomed the delegates and noted the importance of the meeting to the efforts of the Organization to further address GHG emissions from ships. The Group agreed that Mr. Sveinung Oftedal (Norway) would chair the Intersessional Working Group on Reduction of GHG emissions from ships.

Adoption of the agenda

5 The Group adopted the agenda for the meeting (ISWG-GHG 1/1) and agreed to be guided in its work by document ISWG-GHG 1/1/1, containing annotations to the provisional agenda and the provisional list of documents submitted to this session, and invited the Group to use it as a guide for the work ahead.

6 The Group also noted that the annotated agenda sets out proposed work arrangements in annex 1 to document ISWG-GHG 1/1/1 and a provisional indication of the timetable for discussion in annex 3 to document ISWG-GHG 1/1/1.

7 The Group further noted that submissions concerning the strategy, and that are distinct from submissions made to the intersessional meeting, had been made under agenda item 7 to MEPC 71 as set out in paragraph 2 of annex 2 to document ISWG-GHG 1/1/1. The sponsors of those documents were invited to introduce their documents in the Group as it was considered beneficial to the process and discussion during the meeting. However, the Group noted that it is the prerogative of the submitters of such documents to decline this invitation should they wish to wait until MEPC 71 to introduce their documents.

8 The Group, including the document sponsors, agreed to consider as part of its deliberations the distinct documents that had been submitted to MEPC 71.

Consideration of how to progress the matter of reduction of GHG emissions from ships

9 The Group recalled the *Roadmap for developing a comprehensive IMO strategy on reduction of GHG emissions from ships* (Roadmap) identifies a list of elements to be discussed by the first Intersessional Meeting as set out in annex 11 to document MEPC 70/18/Add.1.

10 The Group noted that these elements had been placed into five groups for consideration under agenda item 2 on "Consideration of how to progress the matter of reduction of GHG emissions from ships", as set out in paragraph 2.2 of annex 1 to document ISWG-GHG 1/1/1, and would be considered as follows:

- .1 emissions scenarios and assessment of the projected future demand for shipping;
- .2 levels of ambition and guiding principles for the strategy;
- .3 parameters/indicators on energy efficiency of ships (current status and long-term potential), emission reduction opportunities (near-, mid- and long-term actions), including alternative fuels and impact of EEDI;
- .4 capacity building and technical cooperation; barriers to emissions reductions and how to overcome them; and priority areas for R&D, including in relation to technology; and
- .5 costs and benefits; impacts on States, taking into account the HLAP (resolution A.1098(29)); and impacts of other regulations on GHG emissions.

11 The Group agreed to this order of discussion at this meeting and that documents, or relevant parts thereof, be introduced under each element, as identified in document ISWG-GHG 1/1/1.

Emissions scenarios and assessment of the projected future demand for shipping

12 The Group considered the following documents:

- .1 ISWG-GHG 1/2 (Secretariat) sets out past IMO GHG Studies and describes the methodology and findings of the Third IMO GHG Study 2014 which provided CO₂ emission estimates for international shipping from 2007 to 2012 and forecast emissions to 2050;
- .2 ISWG-GHG 1/2/3 (BIMCO) presents an update of the maritime GHG emission projections contained in the Third IMO GHG Study 2014, emphasizing CO₂ emission projections of shipping in three 1.6°C scenarios consistent with the Paris Agreement goal. New estimates for global seaborne trade have been developed that identify a reduction in BAU emission estimates for the period 2012 to 2050 in comparison to the Third IMO GHG Study 2014. The full report is provided in the annex;
- .3 ISWG-GHG 1/2/4 (Japan) proposes to identify essential elements to be contained in the initial comprehensive IMO strategy for adoption in 2018, and identifies that Annual Efficiency Ratio (AER) figures could be utilized to indicate the energy efficiency of the world fleet in specific years as the approach would allow consistency with past GHG studies and the IMO data collection system; and that Japan has undertaken a "real BAU scenario" analysis based on scenario 16 (RCP 2.6, SSP4) of the Third IMO GHG Study 2014, where the global economic development and GHG emissions pathway are consistent with 2°C temperature stabilization scenario. However, scenario 16 assumes a 40% energy efficiency improvement by 2050 relative to 2012. The "real BAU scenario" excludes the effect of energy efficiency improvement under the presumption that its improvement rate is constant each year, and finds that the

projection of GHG emissions is proportionate to that of maritime transportation demand since the energy efficiency of international shipping is constant since 2008 (figure 1, page 4 and annex 1);

- .4 ISWG-GHG 1/2/8 (Brazil) provides comments on the estimates and projections of the Third IMO GHG Study (2014) in view of the upcoming discussions on an IMO GHG Strategy. The document concludes that the Third IMO GHG Study 2014 is not sufficient by itself to serve as the basis for any possible reduction targets for GHG emissions from ships. Also, when viewed under the perspective of the total GHG emissions, international shipping emissions comprise only 1.6%, a smaller percentage than reported in the IMO study. Brazil expresses caution should be applied to future projections being used to set targets due to uncertainties including the limited range of RCP/SSP scenarios, which must be in line the Paris Agreement. Estimates though are useful when adopted with a view to indicating ways in which a problem can be solved, and conclude that future projections can identify the impact of efficiency improvement and emissions reductions whereas the impact of low carbon fuels was not clear. Brazil concludes that efficiency is the best way via which shipping can actively reduce its emissions;
- .5 ISWG-GHG 1/2/12 and ISWG-GHG/INF.2 (Belgium et al.) introduces a number of emissions scenarios and a potential scientific approach on how the international shipping sector can contribute to meet the temperature goal of the Paris Agreement by establishing a global level of ambition for future GHG emissions from international shipping. In order to meet a given target for CO₂ emissions, the model uses a carbon price for each year simulated, such that it enables a sufficient change with shipping, e.g. selection of appropriate low carbon technology, operation, fuel, or purchase of offset, so that the overall net emissions from shipping follow the required trajectory. Varying constraints are placed on the amount of CO₂ emissions that can be offset out of sector. A key assumption and important uncertainty is the evolution of transport demand to 2050. The co-sponsors conclude that the study could provide a useful scientific method for the further work of IMO, and that in all circumstances, the further work should be based on updated scientific projections to the highest extent possible; and
- .6 ISWG-GHG 1/2/13 (Antigua and Barbuda et al.) quantifies a global emissions pathway that is commensurate with the Paris Agreement temperature goal, the Representative Concentrated Pathway (RCP) 2.6 scenario, to keep the global temperature well below 2°C. RCP 2.6 is not policy prescriptive and does not differentiate across countries or sectors; it shows a way in which the goal of the Paris Agreement can be achieved. RCP 2.6 identifies that CO₂ emissions will need to decline shortly after 2020 and become negative in the second half of the century (figure 2, page 3) in order to obtain the temperature goals of the Paris Agreement, negative because emissions of some other GHGs cannot technically be reduced to zero.

13 In the ensuing discussion, the following comments were, inter alia, made:

- .1 the focus of a strategy should be on reducing CO₂ emissions rather than other emissions;
- .2 a general reference should be made to GHG emissions;

- .3 the view that future projections should be in line with the Paris Agreement is supported, and Nationally Determined Contributions and the methodology for the fourth IMO GHG Study should reflect the methodology proposed by Brazil in document ISWG-GHG 1/2/8;
- .4 the IMO strategy needs to reflect GDP growth rate, growth in maritime transportation, and in order to minimize uncertainty, needs to utilize data from the IMO data collection system;
- .5 it is important to include methane emissions and Volatile Organic Compounds (VOC) in the fourth IMO GHG Study;
- .6 nationally determined contributions are set out in the Paris Agreement and so for shipping, the contributions to the discussion from the shipping industry are significant and need to be reflected, such as in document ISWG-GHG 1/2/3;
- .7 there is a need to update the Third IMO GHG Study 2014 and a need for a quantified emissions objective in line with the well below 2°C goal of the Paris Agreement;
- .8 the International Council on Clean Transportation (ICCT) is preparing an updated global ship emissions inventory for the years 2013, 2014 and 2015. It analyses, among other things, trends in ship speeds, distance travelled, engine load factors, installed power, and cargo carrying capacity;
- .9 there are uncertainties in predicting maritime transport work and the update from the 2014 Study indicates lower growth and should be considered; there is a need to improve carbon intensity; pursuit of absolute reductions may lead to huge costs; the IMO data collection system will provide more accurate and concrete data; the IMO strategy should not limit growth of shipping which will assist in achieving the goals of the Paris Agreement;
- .10 uncertainties always exist due to measurements, verification, scope of data collected (ships of less than 5000 GT are not included in the data collection system); the Third IMO GHG Study provides an accurate view of GHG emissions from ships in 2012; uncertainty should not be a reason for no further action as this is required to stimulate development of technology;
- .11 a practical evaluation for fuel mix scenarios is required and industry is encouraged to provide such studies for consideration under the Roadmap;
- .12 the fourth IMO GHG Study should reflect all parameters such as growth in GDP, demand for shipping, technological developments, etc.;
- .13 there is a need to take into account uncertainty when considering possible measures for international shipping;
- .14 there is a need to agree on a pathway in the initial strategy and then adapt the pathway as data and information are received, as reflected in the Roadmap with the data collection system integrated;
- .15 the availability and accessibility of technology to Member States needs to be taken into account when setting emission reduction targets based on emission forecasts;

-
- .16 document MEPC 68/INF.3 provides information on uncertainty for fuel oil measurement as being 5%, whereas in the Third IMO GHG study 2014 uncertainty of 10% is identified; and
- .17 updated studies have identified uncertainty and so reliable data sources for further studies need to be identified.
- 14 Following discussion, the Group:
- .1 noted that all estimates of emissions from international shipping contain uncertainty due, for example, to the uncertainty in the future demand for shipping and technological developments;
- .2 noted that new estimates for global seaborne trade have been developed that identify a reduction in business as usual (BAU) emission estimates for the period 2012 to 2050 in comparison to the Third IMO GHG Study 2014;
- .3 agreed that there will be a need for future IMO GHG studies to estimate the GHG emissions from international shipping, in particular CO₂ emissions, especially in the period prior to the data collection system for fuel oil consumption coming into effect, and recommended that the Committee consider initiating the fourth IMO GHG Study at MEPC 74 in 2019;
- .4 noted that future IMO GHG studies, when making projections of emissions from international shipping, should note the update to the methodology, including assumptions and uncertainties, used in the Third IMO GHG Study 2014 as reported in documents ISWG-GHG 1/2/3, ISWG-GHG 1/2/4, ISWG-GHG 1/2/8 and ISWG-GHG 1/2/12; and
- .5 agreed that future IMO GHG studies, in addition to estimating CO₂ emissions, should continue to also estimate emissions of methane and volatile organic substances from international shipping.

Levels of ambition and guiding principles for the strategy

- 15 The Group considered the following documents:
- .1 ISWG-GHG 1/2/2 (Marshall Islands and Solomon Islands) requests that IMO agrees, as part of the initial strategy proposed to be agreed at MEPC 72 that the level of ambition should be high and an overall target for shipping's reductions agreed consistent with a "fair share" of the global burden of reductions necessary to achieve a no more than 1.5°C target;
- .2 ISWG-GHG 1/2/4 (Japan) proposes to identify essential elements to be contained in the initial comprehensive IMO strategy for adoption in 2018, as contained in annex 2 to this document. A key part of the strategy is the development of aspirational goals in the short term (focus on energy efficiency) and long term (wider focus including on low carbon fuels but highly uncertain), and that the nine guiding principles adopted by MEPC in 2008 (MEPC 57/21, paragraph 4.73) should prevail when implementing the IMO strategy including any further measures;
- .3 ISWG-GHG 1/2/6 (BIMCO et al.) proposes that the IMO GHG strategy should facilitate emissions reduction whilst moving toward a decarbonized future while maintaining transport services that sustainable economic development

and that the strategy should identify specific mechanisms to achieve the objectives and be subject to a comprehensive review 10 years after its final adoption;

- .4 ISWG-GHG 1/2/7 (Singapore) sets out the elements which should be prioritized in order for IMO to successfully reach the Roadmap's goal of a comprehensive IMO strategy. Singapore considers that the strategy should embrace the common vision of holding temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, and must continue to uphold the principle of no more favourable treatment enshrined in the various IMO conventions. At the same time, there should be continued dialogue to explore ways to accommodate the UNFCCC principle of Common but Differentiated Responsibilities and Respective Capabilities in the international shipping context. This means that any measures arising from the strategy have to strike a balance between ensuring non-discrimination (i.e. no more favourable treatment) and avoiding penalization of Member States based on their high maritime transport dependency;
- .5 ISWG-GHG 1/2/9 (ICS et al.) shares some ideas on the elements for inclusion in the IMO strategy for CO₂ reduction, and the initial strategy to be adopted in 2018, including some ambitious "Aspirational Objectives" that the Organization might consider on behalf of international shipping. The co-sponsors emphasize that any objectives agreed should be non-binding in character and must not imply any kind of commitment or intention to place a binding cap on the sector's total CO₂ emissions, or on the CO₂ emissions of individual ships. Furthermore, as aspirational objectives they must be accompanied by an agreement to conduct a comprehensive review in 2033 of progress made with respect to the development of alternative fuels and propulsion technology, and that the IMO strategy may need to be adjusted on the basis of that review;
- .6 ISWG-GHG 1/2/11 (Canada) proposes that reaching an agreement on a collective level of ambition that will drive progress through targeted measures be included as part of the comprehensive strategy, and should explore complete decarbonization of the sector. Canada notes that while measures to support the achievement of a collective ambition should be transparent and equally applicable to ships under all flags to minimize the risk of competitive distortion and respect the principle of no more favourable treatment, flexibility for ship types may be required. In addition, consideration must be given to ensuring flag and port States have the necessary capacity to implement measures, including for effective and consistent application, oversight and enforcement;
- .7 ISWG-GHG 1/2/13 (Antigua and Barbuda et al.) proposes that in order to assess and select, as required, and measure the effectiveness of short-, mid- and long-term emission reduction measures, it will be necessary to establish an overarching objective of the strategy. The co-sponsors consider that this can be done by agreeing a global level of ambition by which the international shipping sector should reduce its greenhouse gas emissions;
- .8 MEPC 71/7 (China and India) proposes that the comprehensive IMO strategy on reduction of GHG emissions from ships should be durable, balanced and provide confidence, and that it should entail both top-down and bottom-up components. This document addresses issues such as drawing upon the

-
- experience from the Paris Agreement; what should be the objective for the initial IMO strategy; and how to embody the principle of "Common But Differentiated Responsibility and Respective Capabilities" (CBDR&RC) in the IMO strategy. The annex to this document puts forward a framework for the IMO strategy and its potential elements including the development of national action plans to address GHG emissions from international shipping;
- .9 MEPC 71/7/2 (Republic of Korea) proposes that considering the uniqueness of the international shipping industry, CBDR&RC principle of the Paris Agreement should be restricted to only specific circumstances such as in cases of providing financial support and technology transfers for SIDs and LDCs;
- .10 MEPC 71/7/6 (Argentina et al.) proposes guiding principles for the IMO strategy on reduction of GHG emissions from ships including, inter alia, coherence with the multilateral climate change regime, recognition of specific characteristics of maritime transport and avoidance of an absolute cap and trade barriers. With regard to the harmonization of CBDR&RC and NMFT, the co-sponsors argue that NMFT is related to equal treatment of ships of non-Parties and Parties, and that differentiation in favour of developing countries does not necessarily result in the more favourable treatment and the document identifies three key action points that the Committee is invited to consider;
- .11 MEPC 71/7/13 (Belgium et al.) provides comments on document MEPC 71/7 (China and India), specifically on the timing for a quantified level of ambition, the bottom-up and top-down approach, and the impact on States. In particular, while agreeing with China and India on overarching objectives, the co-sponsors of this document are of the opinion that a global top-down approach needs to be a cornerstone of the IMO's GHG reduction strategy and a quantified level of ambition has to be included in the initial IMO strategy rather than later; and
- .12 MEPC 71/7/14 (Greenpeace International et al.) commenting on documents MEPC 71/7, MEPC 71/7/2, MEPC 71/7/6, MEPC 71/7/7, MEPC 71/7/8 and MEPC 71/7/9, the co-sponsors stress the importance of quickly agreeing a long-term target and reduction pathway for GHG emissions from international shipping that is consistent with the goals of the Paris Agreement, the urgent need to identify and implement immediate near-term measures that will result in early peaking of emissions, the importance of including within the GHG strategy an overhauled EEDI consistent with decarbonization of the fleet in the second half of the century, and the need to assess the impacts on vulnerable States in parallel with the consideration of final measures.
- 16 In the ensuing discussion the following comments were, inter alia, made:
- .1 are emission scenarios tolerable for making a decision? Are uncertainties acceptable? IMO should be cautious about basing actions on a particular study, so needs to be ready to accept any new information at any time and adjust the strategy;
- .2 if the shipping sector is to decarbonize then there is a need to develop a long-term goal that sufficiently recognizes early movers in industry so that they are not penalized;

- .3 the role of shipping in development and trade needs to be recognized and so a balanced approach is needed between emissions reduction and what is achievable by the sector;
- .4 costs associated with GHG emission reductions for shipping need to be considered and include shore infrastructure, e.g. alternative fuels availability, onshore power (cold-ironing), etc. and should recognize that Common But Differentiated Responsibilities and Respective Capabilities (CBDR&RC) could be applied to shore side measures;
- .5 there is a need to respect IMO administration burden goals, reflect technology developments, but the development of national action plans is not supported;
- .6 can different principles be applied under the strategy? No More Favourable Treatment (NMFT) should be applied to all ships, but when it comes to climate change, States have agreed CBDR&RC under the Paris Agreement; also it is important to note the Sustainable Development Goals and the impact on Least Developed Countries (LDCs) and Small Island Developing States (SIDS);
- .7 the IMO principle of NMFT should be given primacy under the strategy, noting that CBDR/RCILDNC for the purposes of the Paris Agreement requires all countries to contribute;
- .8 no more favourable treatment should be a fundamental principle in the strategy;
- .9 it is important to recognize lessons learned with the development of new technology for shipping, for example, the challenges of implementation of the Ballast Water Management Convention;
- .10 there is a need to take into account the agreed three-step approach, and current technical and operational measures in MARPOL Annex VI;
- .11 there is a need for consensus on the guiding principles in the strategy, including CBDR&RC in light of different national circumstances;
- .12 the strategy should be based on evidence from the data collection system, and no absolute cap on emissions should be placed on international shipping as this could impact on the growth of trade;
- .13 the strategy should be SMART: Specific, Measureable, Achievable, Relevant and Time Bound; shipping cannot work in isolation from the Paris Agreement which gives nation States flexibility to achieve the goal, agree with Singapore principles in paragraph 2 of document ISWG-GHG 1/2/7, in particular that solutions are cost-effective, practical and easy to administer;
- .14 an absolute cap on emissions is required and aspirational goals will be insufficient;
- .15 objectives should be in line with the Paris Agreement, but there is a need to follow the nine principles for addressing GHG emissions from ships agreed by MEPC 57;

-
- .16 the principles agreed by MEPC 57 can be considered but do not reflect current political compromises and so would not be appropriate as they are;
- .17 the need for a message on action by IMO to address GHG emissions from ships is recognized but a sectoral target cannot be supported due to the demand for shipping being interrelated with global emissions and methodology for reduction, as absolute targets are linked to carbon budgets and offsetting and so an aspirational target may be interpreted as implicit acceptance of a limit on carbon and the need for offsetting;
- .18 there is no objection to the goal of the Paris Agreement and pathways to achieve it; there is interest in the bottom-up approach but also in how it would significantly reduce GHG emissions from international shipping;
- .19 there is a need to consider combining IMO and UNFCCC principles as ships can readily change flag State, also aspirational objectives would not be supported as it is not clear how this could be interpreted by other sectors under the Paris Agreement;
- .20 there is a need to consider how principles can be put into practice. What is it that sector wishes to achieve?
- .21 the science is clear, unless 1.5°C is met many States are being put at risk and so ambitious targets are required, but CBDR&RC cannot be readily imported into the work of IMO; discussion on principles should not prevent discussion of substance;
- .22 apply the principle of NMFT to ships and the principle of CBDR&RC to shore-side developments; binding caps may make some routes uneconomic and need further consideration;
- .23 the Paris Agreement includes all anthropogenic sources of emissions, also Geneva Convention article 1b); the Paris Agreement does not include annexes identifying Member States allowing for a sophisticated interpretation of differentiation, for example, focusing differentiation on transport costs; equal treatment for all ships but differentiated by mitigating additional costs;
- .24 there is a need to discuss guiding principles for the level of ambition; what can be delivered by international shipping and what potential measures can be used;
- .25 CBDR&RC reflects that developing countries need support to fully implement and achieve the climate change goals;
- .26 IMO's GloMEEP project has identified that developing countries have difficulty in implementing current IMO provisions on energy efficiency which is problematic, and the GMN project being delivered by IMO with support from the European Union identifies there is significant need for further support to developing countries on implementation;
- .27 ambition must be effective; to achieve emission reductions maritime transport can either be reduced or those emissions offset, the latter increasing cost on shipping and both leading to a possible modal shift; if future maritime demand is either higher or lower, an absolute cap is not valid and so would not be effective in reducing GHG emissions, and so the focus should be on energy efficiency improvement and uptake of low carbon fuels;

- .28 Japan and ICS et al. express views on objectives/goals that could be used as a basis for going forward;
- .29 use the same approach as for EEDI i.e. a resolution addressing concerns of States, in particular developing States;
- .30 it is possible to derive carbon budgets from current research; these indicate that at current emissions levels there are approximately 15 years before the budget indicates that a temperature increase of 1.5°C will be exceeded, hence there is a need for emissions from shipping to peak as soon as possible;
- .31 there is concern over segregating ship from shore with regard to the applicable principles;
- .32 IMO must reflect the ambition of the Paris Agreement, and send a strong signal on IMO's intent; initial strategy to include a quantified objective and a pathway in which global emissions decline as soon as possible with an aim to achieve zero emissions by the second half of the century;
- .33 support evidence-based approach in line with the three-step approach and support aspirational objectives set out by ICS;
- .34 the Paris Agreement has clear provisions preventing reservations and so all Governments need to reflect that in coming to a consensus;
- .35 an explicit reference is made, and the Committee has already decided (MEPC 68/21, paragraphs 4.18 and 4.19), that the special needs of LDCs and SIDS need to be reflected and it is not whether they should be recognized rather at what level they need to be recognized; there is no dispute about the Paris Agreement and whether we agree but we need to find a way that the non-binding agreement can sit alongside practical, binding measures adopted by IMO, consistent with in-sector reduction of emissions already ongoing; inaccurate and misleading data has led to intransigence and lack of robust action;
- .36 there is a need to consider further the difficulty of having sector-specific targets, as there is a need to take into account all aspects of the logistics chain that serve shipping;
- .37 that an iterative process is required to provide the industry with a framework for action; the principle of no more favourable treatment is paramount but some concepts can be considered to address concerns over CBDR&RC; an aspirational objective is not the same as a cap; the signal that emerges from this week is required for IMO to demonstrate leadership that builds on past achievements;
- .38 there is a need to keep a balance between CBDR&RC and NMFT such as has been seen in ICAO where there was a phased introduction of measures, and such a balance is reflected also in resolution MEPC.229(65);

-
- .39 the key question is not whether but how to reduce GHG emissions, and means shipping must decarbonize going forward; the Paris Agreement is founded on all Parties contributing to emission reductions; no logic in having partial participation but can consider differentiating impacts and some States may have issues over capacity and resources that need to be addressed;
- .40 there is a need for a GHG emission reduction strategy to drive investment in research and development to support decarbonization of international shipping;
- .41 there is a need for quantified objectives to be included in the initial strategy to provide clear direction to industry and prevent stranded assets;
- .42 differentiation can only be applied on undesired impacts on States, and as these cannot be determined before ambition is identified, and measures are applied, then it should not be part of the strategy;
- .43 that it is not possible to allocate emissions on the basis of flag States and there is a need to consider new mechanisms, e.g. ship/shore differentiation, and a need to go further to support the goal of the Organization to achieve reduction of GHG emissions from ships;
- .44 there is a need to appropriately reflect sustainable development goals and there may be a need to revisit the Paris Agreement pathways for shipping to support those goals;
- .45 goals/objectives should be reviewed at regular intervals, for example, as in the Paris Agreement, every five years;
- .46 goals/objectives should be reviewed at regular intervals, and these reviews should take into account latest data available and relevant new information;
- .47 IMO has already adopted several measures without operationalizing CBDR&RC, and the Paris Agreement does not explicitly mention international shipping and aviation;
- .48 UNFCCC issued a report in 2016 that identifies that the declared intended nationally determined contributions, combined with ICAO's net zero growth emission goal from 2020 and the IMO BAU scenario for growth, does not result in a temperature increase of less than 2°C goal; article 4.1 of the Paris Agreement refers to the required global pathway, basis and context for the long-term temperature goal of the Paris Agreement; and
- .49 the Paris Agreement is an accord between States and, correctly, international shipping has its own forum for deliberation of measures.

17 The Group noted that the initial IMO strategy should include level of ambition and guiding principles, and that in addition to comments being reflected in the report of the Group a collation of elements to build upon towards the first draft of the initial strategy should be considered.

18 The Group considered a preliminary summary of the discussions on levels of ambition and guiding principles. In the ensuing discussion the following comments were, inter alia, made:

- .1 the task given to the Group by the Committee is how to progress the reduction of GHG emissions from ships, and so there is a need to have in mind the ultimate target i.e., zero GHG emissions in the future; in advising the Committee the Group needs to have a vision and objectives including way points but not at this stage; the Group should advise that the Committee should establish a vision, then establish the principles and objectives;
- .2 the summary should at this stage capture different views only and further explore common ground at a later stage;
- .3 the proposed principles should explicitly identify IMO instruments only;
- .4 only aspirational objectives and not legally binding objectives are identified;
- .5 the provisional summary seeks to capture views expressed by all delegations;
- .6 the strategy should not refer to "principles" but "overarching considerations";
- .7 the work on principles is not as developed as on ambition, and whether they should be separate is mute;
- .8 the provisional summary does not include a clear and unambiguous signal to the shipping industry and wider society, and this signal could be sent through mandatory binding measures;
- .9 the vision should be that IMO should continue to reduce GHG emissions from international shipping; mission is what the Organization is good at, what it has developed already including the development of technical and operational measures that provide tangible result;
- .10 there is a need to identify a baseline for any goal/objective but it is too premature;
- .11 the provisional summary does not reflect the SMART approach proposed;
- .12 there should be explicit reference made to a need to reconcile all principles;
- .13 there is a need to reflect that the shipping sector needs to progress to zero carbon emissions in the second half of the century; aspirational objectives do not send a robust signal and binding objectives, including a cap on GHG emissions, should be included;
- .14 the Organization should follow its standard practice, and the provisional summary accurately reflects the discussion, and aspirational objectives should be considered as an appropriate approach for the strategy;
- .15 resolution MEPC.229(65) includes the term "BEING COGNIZANT" of the principles of IMO and UNFCCC and this should be used again to reflect the principles;

-
- .16 the international shipping sector should not have an absolute cap on emissions as this may create a barrier to the growth of trade and development;
 - .17 an absolute cap on GHG emissions is required as it is imperative that emissions from the international shipping sector peak as soon as possible to ensure the GHG emissions pathway for the sector aligns coherently with the Paris Agreement;
 - .18 there is a need for an ambition to be included in the initial strategy, and that the goals/objectives should be consistent with the objective of the Paris Agreement to achieve a global temperature increase of well below 2°C and to pursue efforts to limit the temperature increase even further to 1.5°C; and
 - .19 that it is premature to develop a vision as further work is needed to define goals, objectives and measures.

19 The Group considered various options of how to collate the comments on levels of ambition and guiding principles but in accordance with the Roadmap needed further time to consider the content and structure.

20 The Group noted that a vision should be included in the strategy. Noting that this is work in progress, the delegation of the Bahamas proposed that a possible vision for international shipping could be as follows:

"The IMO is committed to the decarbonization of international shipping by the second half of the century."

21 **The majority of those delegations that spoke supported the proposed vision**, noting that it remained work in progress and should be considered further. Other delegations did not support the proposed vision statement, noting it was premature to consider the text of the vision at this stage.

Parameters/indicators on energy efficiency of ships (current status and long-term potential), emission reduction opportunities (near-, mid- and long-term actions), including alternative fuels and impact of EEDI

22 The Group considered the following documents:

- .1 ISWG-GHG 1/2 (Secretariat) provides an overview of the energy efficiency measures adopted to date by the IMO, including the Energy Efficiency Design Index (EEDI), Ship Energy Efficiency Management Plan (SEEMP), and Data collection system for fuel oil consumption of ships that is expected to enter into force on 1 March 2018; identifies a study undertaken by LR/DNV in 2011 which estimates the impacts of EEDI and SEEMP; identifies work by the IMO on the reduction of GHG emissions from ships including consideration of market-based measures; identifies work by IMO to control emissions from ships including SO_x and NO_x emissions, and highlights the development of the International Code of Safety for Ships using Gases or other Low-flashpoint Fuels (IGF Code) and amendments made to MARPOL Annex VI to allow the use of gas as a fuel, and a work plan to address the impact on the Arctic of emissions of Black Carbon from international shipping;

- .2 ISWG-GHG 1/2/1 (Norway) presents findings of a technical evaluation of currently proposed parameters/indicators on energy efficiency of ships. These include quantitative parameters used to evaluate reference lines and indicators. Additionally to evaluate the different elements of a goal-based emission reduction mechanism principles are identified as follows: robustness (predictable/transparent); feasibility (attainable/reproducible); reduction potential; and applicability. The evaluation of indicators and possible reference lines is set out in annex 1; data quality for the four indicators discussed in annex 2; a case study to provide insight into the sensitivity of the proposed metrics with regard to various operational modes and annual profiles in annex 3; and an indicative timeline and work to be undertaken in the three-step approach set out in annex 4;
- .3 ISWG-GHG 1/2/4 (Japan) identifies four categories of measures for reducing GHG emissions from international shipping: ship design improvement; operational improvement; alternative low carbon fuel; and market-based measures, and considers the suitability of applying carbon offsets to shipping;
- .4 ISWG-GHG 1/2/5 (Japan) proposes that IMO carries out a study on policy actions to stimulate energy switching to alternative low carbon energy in international shipping as an essential element of the GHG strategy;
- .5 ISWG-GHG 1/2/6 (BIMCO et al.) proposes specific programmes designed to improve the near-term and long-term efficiency of international shipping in furtherance of the IMO GHG strategy to facilitate emissions reduction, including the establishment of an International Maritime Research Board with a mandate to direct and fund research and development of new and improved marine propulsion systems, electric generation plants, fuels and ship design; and an Existing Fleet Improvement Programme through investments in efficiency-enhancing technology. The document does not contain any specific proposals with regard to the funding of such initiatives but identifies that this would be subject to further discussion by the Committee;
- .6 ISWG-GHG 1/2/7 (Singapore) proposes a more detailed study of how to leverage or enhance existing operational and technical measures, such as the Energy Efficiency Design Index (EEDI), Ship Energy Efficiency Management Plan (SEEMP) and data collection. At the same time, for the medium to longer term, a more detailed study should be conducted on the opportunities for research, development and deployment of low-carbon emission technologies, carbon treatment/converter technologies as well as the move away from traditional marine fuel oils to less carbon intensive energy sources, some of which may not yet be widely available or ready to use. IMO should also look at the promotion of cleaner fuels, such as methanol, hydrogen, bio-fuels and LNG. The Organization could assist these efforts by facilitating public-private partnerships and information exchange. Singapore considers the development of the IMO strategy presents an opportunity for the feasibility of the various possible MBMs and their impact to be studied in more detail;
- .7 ISWG-GHG 1/2/8 (Brazil), identifies that improving energy efficiency as the most effective way for shipping to reduce its GHG emissions and assesses the potential energy efficiency improvements in international shipping and proposes that the economic feasibility should be assessed through a review

of the Marginal Abatement Cost Curves (MACC) up to 2100. Brazil identify that switching to lower carbon fuels provide a second option for shipping to reduce its emissions; however, identify the uncertainties in the possible future fuel mix and that as the use of LNG as a fuel could see increased fugitive emissions of CH₄, the Organization should discuss ways to reduce such emissions in future scenarios;

- .8 ISWG-GHG 1/2/9 (ICS et al.), identifies that one of the elements for inclusion in the final IMO strategy for CO₂ reduction to be adopted in 2023 should be a plan to promote and actively assist the development of alternative fuels and associated bunkering infrastructure. The intention to develop such a plan should also be highlighted in the initial 2018 strategy;
- .9 ISWG-GHG 1/2/10 (IMarEST and RINA) focuses on the potential of technical and operational methods for reducing CO₂ emissions. This is useful for future CO₂ emission targets. The document contains calculated EEOI values for three cargo ship types using different technical and operational methods at various operating speeds. This is an updated work of a study carried out for the Danish Shipowners' Association;
- .10 ISWG-GHG 1/2/11 (Canada), proposes that the strategy should include work in three areas: increasing energy efficiency in new ships; investments and operational efficiencies to yield reduction from the existing fleet; and opportunities for IMO efforts to support the reduction of emissions from all shipping; and
- .11 ISWG-GHG 1/2/12 and ISWG-GHG/INF.2 (Belgium et al.) introduces a number of emissions scenarios that result from the implementation of various fuel options, fuel price, technology cost, etc., market-based measures and includes in the annex to document ISWG-GHG/INF.2 an analysis of what EEDI is expected to deliver.

23 The Group recalled that the Roadmap specifically requires that the initial IMO strategy¹ to be adopted at MEPC 72 include, inter alia, a list of candidate short-, mid- and long term further measures with possible timelines, to be revised as appropriate as additional information becomes available.

24 The Group noted that there is a need to build on the energy efficiency framework already established, to consider further energy efficiency requirements and alternative low-carbon and zero-carbon fuels, and to consider innovative mechanism(s).

25 In the ensuing discussion the following comments were, inter alia, made:

- .1 there is a need to strengthen EEDI and make the EEDI revision part of the strategy; speed reduction is a key part of achieving further GHG emission reduction in both the short to medium term and requires additional and deeper analysis;
- .2 technical reviews for the enhancement of EEDI have been conducted intensively in the Working Group on Air Pollution and Energy Efficiency and the result of EEDI review should not be prejudged;

¹ Initial IMO Strategy is subject to revision based on DCS data during 2019-2021 and does not prejudice any specific further measures that may be implemented in phase 3 of the 3-step approach.

- .3 that short-term actions include effective implementation of the data collection system for fuel oil consumption, reducing barriers to implementation of energy efficiency regulations, accelerating investment in R&D and encouraging deployment of clean and renewable fuels, enhancing capacity building, promoting international cooperation and information exchange on best practice;
- .4 in the mid- and long-term there is a need for robust analysis of data collected from the data collection system before a decision on whether further measures, if any, are required, and additional GHG studies or other research are required to inform future decisions;
- .5 in the short and medium term there is potential to improve EEDI and consider speed reduction; in the short-term reinforce stringency and transparency of SEEMP; long-term measures include market-based measures after initial strategy;
- .6 that there is good convergence on potential for emission reduction, further improvements in energy efficiency, alternative fuels offer the potential for shipping to de-couple itself from GHG emissions growth especially if zero-carbon fuels become available, the Group should request documents on concrete measures for consideration at a future session;
- .7 that an innovative R&D programme for the maritime sector is required to be established in the short term to ensure benefits are realized in medium to long term and there is a need to consider the structure to support such a programme;
- .8 that there is a need for a basket of measures and to assess the efficacy and efficiency of those measures, including the impacts of such measures, and to focus on capacity building as required. The basket will include technical and operational measures, but market-based measures may be needed in the medium term whilst alternative fuels are developed;
- .9 in considering speed reduction measures, distortion of trade, particularly involving geographically remote countries, should be avoided;
- .10 there is a need for a study on alternative fuels and the barriers to their uptake;
- .11 there is a need for the development of operational energy efficiency indicators, this can be initiated with the development of guidelines in the short to medium term;
- .12 that in the medium to long term there is need for fossil-free fuels to achieve decarbonization and also in the medium to long term there is a need to consider MBMs as incentive mechanisms;
- .13 that there is a balance between speed reduction and potential increased fleet capacity that needs to be considered, along with safety issues that may result;
- .14 the EEDI applies to new ships whilst proposed operational energy efficiency indicators are affected by many external factors and so need to consider how requirements can be developed to appropriately reflect the variables impacting on the energy efficiency of existing ships;

-
- .15 that national action plans should be included in basket of measures and developed in accordance with IMO guidelines to ensure that they are neither considered, nor result in, unilateral action; non-Parties to MARPOL Annex VI should be encouraged to accede to the Convention;
- .16 the increased cost of fuel as a consequence of the 0.50% global sulphur limit in 2020 will be a driver for R&D and technical innovation for shipping; there is therefore a need for joined up thinking to ensure that the economic and environmental impacts of any measures are understood; mandatory speed limits are likely to impact on the market and could lead to increased emissions;
- .17 ports could be encouraged to develop and improve clean shipping programmes, and IMO could be used as a forum to promote collaboration;
- .18 encourage port developments globally to facilitate reduction of GHG emissions by shipping including provision of onshore power supply and to further optimize the logistic chain and its planning;
- .19 readily applicable technical energy efficiency measures for new ships have already been incorporated into design and therefore potential for significant further incorporation is limited;
- .20 speed reduction should be considered in terms of either design or operating speed, and it was the latter that was identified in the Third IMO GHG Study as leading to a reduction in GHG emissions, and as long as there is sufficient reserve power there would be no safety implications;
- .21 there is a need to consider barriers to the uptake of technology and that first movers are not penalized, and measures should not focus on new ships only as slow new building rates will mean a delay in reducing GHG emissions;
- .22 measures affecting the minimum power requirements for offshore service vessels needs careful consideration due to the specialist nature and service requirements of such ships;
- .23 technical issues have arisen with EEDI that have been addressed but need to consider that there are potential safety issues with further design developments;
- .24 analysis of sister ships managed by the same company has identified that there was no correlation between the ships' CO₂ emissions and their respective operational energy efficiency metrics over a given period;
- .25 there is a need to facilitate short- mid- and long-term measures to achieve the goals of the Paris Agreement and a feedback mechanism of lessons learned from implementing the measures should be considered;
- .26 energy efficiency measures alone will not achieve the required GHG emission reduction and work on alternative fuels is necessary;
- .27 technical cooperation, operational effectiveness and ship speed should be considered as part of the basket of measures, but an MBM will lead to market distortion and should not be considered;

- .28 speed limit reduction could have a negative impact to those States that are far away from its main trading partners due to their geographic location, and which depend mainly on its international trade, which is done predominantly through maritime transport;
- .29 measures need to be enforceable and ensure that they do not distort competition;
- .30 ship power requirements relate to more than speed of the ship and power for ship operational safety aspects in specific sectors need to be considered;
- .31 the Clean Development Mechanism (CDM) is a useful basis for further discussion and it is not appropriate to consider MBM proposals that are held in abeyance at this time; MEPC 69 identified that energy efficiency parameters should be considered under step three of the three-step approach; barriers to technology transfer need to be addressed to ensure effective, global implementation of the measures;
- .32 the timeline set out by Norway in document ISWG-GHG 1/2/1 should be followed, and the Organization should be more adamant in promoting the significant work to date to reduce emissions from international shipping;
- .33 short-term is 2017 to 2023 and focus should be on further energy efficiency measures, mid-term the focus would be on technology transfer and capacity building and development of national action plans, long-term is 2030 and beyond when alternative fuels is a priority;
- .34 document MEPC 69/INF.8 identifies that many energy efficiency technologies, including innovative technologies, have not been incorporated into new ship designs;
- .35 EEDI should continue to be considered a measure to support GHG emission reduction;
- .36 document MEPC 67/5 identifies that mandatory operational energy efficiency indicators have not been applied in other sectors and raises the question as to why would they be appropriate for shipping and how would fuel used for non-propulsion be considered;
- .37 the EEDI has been a success and a catalyst for innovative design; however, many of the innovations employed are "passive measures" that are not reflected in the IMO EEDI database and so caution is required on whether there is significant potential for further enhancement in energy efficiency of new ship designs; need enforcement of any measures and compliance with a speed limit would be problematic to enforce and lead to distortions;
- .38 a wide range of candidate measures is supported for inclusion in the initial strategy, and that no measure should be excluded, including MBMs;
- .39 measures to peak emissions in the near future are urgently required and cannot be addressed through energy efficiency alone;

-
- .40 timelines for short, mid- and long-terms should not be included in the possible list of candidate measures as they are specific to the measure, as it is not clear what the timeline refers to, is it when the measure is implemented or takes effect; and
 - .41 there is a need to know when and who will initiate and undertake the measure before a timeline can be determined.

26 Regarding a list of candidate short-, mid- and long term further measures with possible timelines, the Group considered a collation of elements to build upon towards the first draft of the initial strategy on reduction of GHG emissions from ships.

27 The Group noted that there was a need for a common understanding of the possible timelines identified in the Roadmap. Noting also an indicative proposal by the delegation of Liberia that possible timelines could be as follows: short-term to be 2018 to 2023, mid-term to be 2023 to 2030, and long-term beyond 2030. However, the Group could not reach an agreement as further consideration and clarification of the implication of such timelines was required.

28 The Group noted that for the list of candidate measures:

- .1 some measures would require global application whereas other measures would require individual national action only;
- .2 would need to be considered in relation to impacts on States, capacity building, transport costs, distortion of the market or to trade, and potential for GHG emission reduction; and
- .3 some short-term measures can be further applied and enhanced in later terms.

29 The Group also noted the following list of candidate measures².

- .1 possible short term measures may include but not be limited to:
 - .1 further improvement of existing energy efficiency framework with a focus on EEDI and SEEMP taking into account the outcome of review of EEDI regulations;
 - .2 encourage development and update of national action plans to develop policy and strategy to address GHG emissions from international shipping in accordance with guidelines to be developed by the Organization taking into account the need to avoid regional or unilateral measures;
 - .3 technical and operational energy efficiency measures for both new and existing ships including consideration of indicators in line with three-step approach that can be utilized to indicate and enhance the energy efficiency performance of shipping;
 - .4 continue and enhance technical cooperation and capacity-building activities under the ITCP;

² Initial IMO Strategy is subject to revision based on DCS data during 2019-2021 and does not prejudice any specific further measures that may be implemented in phase 3 of the 3-step approach.

- .5 initiate research and development activities addressing marine propulsion, alternatives low-carbon and zero-carbon fuels, and innovative technologies to further enhance the energy efficiency of ships and establish an International Maritime Research Board to coordinate and oversee these R&D efforts;
 - .6 establish an Existing Fleet Improvement Programme;
 - .7 undertake additional GHG emissions studies and consider other studies to inform policy decisions including the updating of Marginal Abatement Cost Curves and for alternative low carbon and zero-carbon fuels;
 - .8 consider and analyse measures to encourage port developments and activities globally to facilitate reduction of GHG emissions by shipping including provision of ship and shore-side/onshore power supply from renewable sources, infrastructure to support supply of alternative low carbon and zero-carbon fuels, and to further optimize the logistic chain and its planning including ports;
 - .9 consider and analyse the use of speed reduction as a measure taking into account safety issues, distance travelled, distortion of the market or to trade and that such a measure does not impact on shipping's capability to serve remote geographic areas;
 - .10 actively promote the work of the Organization to the international community, in particular, to highlight that the Organization, since the 1990's, has developed and adopted technical and operational measures that have consistently provided a reduction of air emissions for ships, and that measures could support the Sustainable Development Goals including SDG 13 on Climate Change;
 - .11 incentives for first movers to develop and take up new technologies; and
 - .12 consider and analyse measures to address emissions of methane and further enhance measures to address emissions of Volatile Organic Compounds.
- .2 possible mid-term measures may include but not be limited to:
- .1 further continue and enhance technical cooperation and capacity-building activities such as under the ITCP;
 - .2 implementation programme for effective uptake of alternative low carbon and zero-carbon fuels;
 - .3 development of a feedback mechanism to enable lessons learned on implementation of measures to be collated and shared through a possible information exchange on best practice; and
 - .4 new/innovative emission reduction mechanism(s), possibly including Market-based Measures (MBMs), to incentivize GHG emission reduction.

-
- .3 possible long-term measures may include but not be limited to:
- .1 pursue the development and provision of zero-carbon or fossil free fuels to enable the shipping sector to assess and consider decarbonization in the second half of the century; and
 - .2 other possible new/innovative emission reduction mechanism(s).

30 Following discussion, the Group could not agree whether Black Carbon was in the scope of the strategy, and noted that it should not be included in the indicative list of measures.

31 Some delegations noted that MBMs should be possible long term measures.

Capacity building and technical cooperation; barriers to emissions reductions and how to overcome them; and priority areas for R&D, including in relation to technology

32 The Group considered the following documents:

- .1 ISWG-GHG 1/2 (Secretariat) provides information on existing IMO activity related to reducing GHG emissions in the shipping sector. Specifically, the document provides an overview of capacity building activities undertaken by the Organization, in particular on the promotion of technical cooperation and transfer of technology relating to the improvement of energy efficiency of ships including GloMEEP and GMN;
- .2 ISWG-GHG 1/2/5 (Japan) proposes that IMO carries out a study on policy actions to stimulate energy switching to alternative low carbon energy in international shipping as an essential element of the GHG strategy, as the penetration of new energy sources is considered to be a specific barrier, in particular the cost, quality and availability including the bunkering infrastructure on the supply side. Furthermore, the document identifies that organizational/structural, behavioural, market and non-market barriers need to be removed before renewables can make a meaningful contribution to the energy supply;
- .3 ISWG-GHG 1/2/6 (BIMCO et al.) proposes specific programmes designed to improve the near-term and long-term efficiency of international shipping in furtherance of the IMO GHG strategy to facilitate emissions reduction, including the establishment of an International Maritime Research Board with a mandate to direct and fund research and development of new and improved marine propulsion systems, electric generation plants, fuels and ship design; and an Existing Fleet Improvement Programme through investments in efficiency-enhancing technology. The document does not contain any specific proposals with regard to the funding of such initiatives but identifies that this would be subject to further discussion by the Committee;
- .4 ISWG-GHG 1/2/7 (Singapore), identifies that for the medium to longer term, a more detailed study should be conducted on the opportunities for research, development and deployment of low-carbon emission technologies, carbon treatment/converter technologies as well as the move away from traditional marine fuel oils to less carbon intensive energy sources, some of which may not yet be widely available or ready to use. IMO should also look at the promotion of cleaner fuels, such as methanol, hydrogen, bio-fuels and LNG. The Organization could assist these efforts by facilitating public-private

partnerships and information exchange. Further the document proposes that mechanisms for facilitating information sharing, technology transfer, capacity-building and technical cooperation be actively discussed towards finding effective ways to help countries in need bridge the capacity gap. These mechanisms can leverage off initiatives such as the Global Maritime Energy Efficiency Partnerships Project (GloMEEP), in accordance with resolution MEPC.229(65) on the promotion of technical cooperation and transfer of technology relating to the improvement of energy efficiency of ships. Singapore also stands ready to share its experiences in promoting maritime green initiatives and to facilitate discussions on such supporting mechanisms; and

- .5 ISWG-GHG 1/2/11 (Canada), the document identifies that the Ship Energy Efficiency Management Plan (SEEMP) regulations can help identify potential areas for improvement. However, due to the expense of retrofits and the wide range of ship types and so of technological possibilities, States may need to consider innovative alternatives to address barriers to uptake. An example of an innovative approach is found in efforts in a number of jurisdictions where funds have been established to offset the expenses tied to the uptake of new technologies. Norway, for example, implemented a NO_x Fund. Through this fund, industry can apply for financial support to implement measures to reduce NO_x emissions that go beyond regulatory requirements. In Canada, a provincial jurisdiction has created a fund into which companies with emissions above a certain level must make contributions. These funds are then used to finance research and development into new technologies.

33 In the ensuing discussion the following comments were, inter alia, made:

- .1 an explicit reference to resolution MEPC.229(65) – *Promotion of Technical Co-operation and Transfer of Technology Relating to the Improvement of Energy Efficiency of Ships* should be made in the strategy as a basis for future work;
- .2 the Organization already undertakes a significant amount of technical cooperation and capacity building and at the moment is difficult to identify new approaches, but should be reviewed and retained as part of the strategy;
- .3 MARPOL Annex VI amendments on energy efficiency identified the need for support for implementation of mandatory provisions, hence the adoption of regulation 23 of MARPOL Annex VI and resolution MEPC.229(65), and so for any further measures there is a need to provide capacity building and technical cooperation prior to adoption;
- .4 need effective technical cooperation that is not limited to training only and the IMO-EU GMN is a good example going forward; and need to consider sustainable development and take a regional approach to needs and actions to address climate change;
- .5 it is difficult to distinguish between technical assistance (equipment) and technical cooperation (training, policy) and so IMO TCD needs to consider this in its activities;
- .6 technical cooperation and capacity building needed to help States mitigate the impacts of measures to reduce GHG emissions from ships; and
- .7 a specific technical cooperation programme needs to be considered for implementation of the strategy.

34 Following discussion, the Group agreed that technical cooperation, including capacity building, needs to be part of the strategy.

Costs and benefits; impacts on States, taking into account the HLAP (resolution A.1098(29)); and impacts of other regulations on GHG emissions

35 The Group considered the following documents:

- .1 ISWG-GHG 1/2/4 (Japan), proposes use of Marginal Abatement Cost Curves (MACC) to analyse potential CO₂ emission reductions for 30 measures identified in table 1 and annex 3;
- .2 ISWG-GHG 1/2/7 (Singapore), proposes that the marginal abatement costs (MACC) for each proposed measure be ascertained and updated, and then ranked or compared. Such an analysis would inform discussions on how best to achieve international shipping GHG emission reductions. The proposed measures could then be comparatively assessed based on their (1) relevance, (2) desired impact, (3) cost-effectiveness and (4) ease of implementation;
- .3 ISWG-GHG 1/2/8 (Brazil), identifies the intrinsic characteristics of shipping lead to directional imbalances of trade, higher costs for developing countries and higher abatement costs, and that developing countries already pay more for trade according to UNCTAD Review of Maritime Transport; price sensitive goods and distance to market are a major determinant of competitiveness; document MEPC 62/INF.7 identifies energy efficiency measures are an economically reasonable path to reduce GHG emissions from shipping; a phased implementation or adjustments for geographically disadvantaged countries and consideration of how to reflect CBDR&RC are required for universality and any uniform approach would be unfair; the document proposes that the economic feasibility of potential energy efficiency improvements in international shipping should be assessed through a review of the Marginal Abatement Cost Curves (MACC) up to 2100; and
- .4 ISWG-GHG 1/2/14 (Belgium et al.) proposes a framework that links GHG reduction measures and transport costs with impacts on States, and uses existing literature to summarize what is currently known on this topic, concluding that a number of strategies to mitigate negative impacts would be available. The co-sponsors propose that consideration of how these strategies should be applied should be part of further work in the Roadmap as a contribution towards the revised IMO GHG strategy.

36 In the ensuing discussion the following comments were, inter alia, made:

- .1 further studies are key for developing the strategy, some countries have significant distances to market for their goods and a significant volume of trade dependent on maritime transport; MEPC 61/INF.2 identifies that the impacts of measures could lead to an increase in transport costs;
- .2 regional trade imbalances exist and have an impact on transport costs; however, it costs less to transport to developing countries than to developed, not so much the level of development that determines transport cost but "connectiveness" to international trade routes; large economies irrespective of whether developing or developed have lower transport costs than smaller economies such as SIDS and LDCs; need to look at it on a country by country basis and caution against over-simplification as it would not reflect economic reality;

- .3 MACC by their nature analyse the cost effectiveness and abatement potential of existing technology and represent the state of the art, take the form of a long, stable beginning with costs rising steeply at the end when rapid progress is required; indicates need to push technical frontier in shipping in order, so not take current MACC to not be bold and provide incentives; to improve need to incentivize technological development to push towards a zero-emission ship;
- .4 MACC indicate that costs of zero-carbon fuels plateau but it is not yet clear what that cost is;
- .5 MACC is crucial for application of GHG reduction and energy efficiency measures. This means technology cooperation and technological transfer will play an important role in technology promotion globally, given the differentiation of capability of countries;
- .6 impacts will be nation specific and measures specific and are not binary; burdens on SIDS and LDCs are recognized; distortion of trade must be avoided; a need for evidence base applies to impacts as much as measures; avoiding impacts through design of measure or addressing impacts as a result of the measures; impacts should not be avoided as this is the point;
- .7 research and investigations should take into account the impact of technological development in reducing transport costs;
- .8 costs of failing to act on climate change will be higher than additional transport costs;
- .9 speed reduction is featured in MACC in a positive way, need to understand further, will have benefits in reducing emissions but also could have benefits transport costs;
- .10 encouraged that SIDS are acknowledged at both the forefront of the impact of climate change and are subject to high transport costs; need to continue in such a collaborative and cooperative spirit to achieve the goal;
- .11 distance travelled will not change so potential energy efficiency and the fuel used are critical to consideration of the impact on States;
- .12 most developing countries in Africa and South America are not well connected to trade routes, SIDS and LDCs are not the only ones negatively impacted and the impacts on developing States should be reflected in the strategy;
- .13 the amount of carbon allocated to the carbon budget will impact States and this is defined by the level of ambition and will directly impact States;
- .14 the role of technology breakthrough will determine the cost of transport; the criteria to select measures could use the MACC;
- .15 the conclusion that GHG measures will have a relatively small impact on transport cost raises a concern as it does not reflect the challenges of SIDS, e.g. there is no cabotage, the problem of getting goods transported in the first place, and many of the identified technical measures come with significant costs which would be difficult for SIDS to bear;

-
- .16 there is a need to address transport costs with full attention to equity, but this should not reduce ambition to address climate change and the consideration of types of measure to achieve that ambition;
- .17 archipelago are highly dependent on maritime transport and so impacts on SIDS and LDCs, and the costs on those States especially those in remote geographical locations need to be considered;
- .18 a regular review of the measures will permit updating of the MACC; rebate mechanisms apply to States not ships and identify a way forward; level of ambition has an indirect effect on impacts and it is the measures that have the impact, and as such an iterative, interactive approach to achieve a mode of differentiation should be adopted and this is reflected in the fact the roadmap has an initial and then revised strategy;
- .19 all States will be impacted by the application of measures and so need to review undesirable impacts for all States when reviewing the measures; there is no direct link between level of ambition and impacts and so ambition should be set by the pathways under the Paris Agreement;
- .20 any action should recognize Article 55 of the UN Charter and regulation 23 of MARPOL Annex VI;
- .21 there is no question of action being taken on further reduction of GHG emissions from international shipping but before any measures are adopted the impacts on SIDS need to be addressed; vulnerabilities of SIDS should not be used to drive through the agenda of other States;
- .22 it is not only measures that will have impacts, the level of ambition will determine those impacts, for example, a cap on emissions; agree SIDS and LDCs are in the frontline but the special circumstances of developing countries also needs to be recognized and has already been recognized by the Organization in paragraph 3 of resolution MEPC.229(65) so why is it still being deliberated;
- .23 how can you practically assess impacts on States without having the specificity of the measure, and would lead to such uncertainty as to delay consideration, the iterative approach is supported whereby ambition and measures are identified, costs then appraised allowing impacts to be assessed;
- .24 impacts, negative or otherwise, need to be assessed using an iterative approach; need to refer to the Paris Agreement to consider CBDR&RC; need to critically examine the economic impacts on States as part of any further consideration;
- .25 there is a need to take every effort to keep the costs of international shipping low in order to support developing countries, in particular, SIDS and LDCs;
- .26 further studies and analysis on international trade is required;
- .27 UNCLOS, article 266, identifies transfer of technology to developing countries; the discussion on impacts has a bearing on the discussion on principles; distance travelled needs to be considered as a parameter when considering impacts;

- .28 the order of consideration should be ambition, measures and then economic impacts on States, and there is a need for short, medium and long term goals but now we need a direction;
- .29 MEPC 70 had reaffirmed the view of MEPC 68 that the special circumstances of SIDS needed to be carefully considered to ensure SIDS are not penalized by any measures developed and adopted;
- .30 the Roadmap refers to "levels of ambition" and is linked to measures and so more than one ambition should be considered to assess a range of impacts; and
- .31 the referenced UNCTAD study indicates that in the general case the impact of transport cost is limited for the majority of States but that some States are significantly impacted which indicates the need for State by State analysis of impacts.

37 Following discussion, the Group agreed:

- .1 there is a need for information and updates on the MACC to have an understanding of the cost and development of technology and low-carbon fuels; and
- .2 ambition and measures need to be considered in relation to costs and benefits and impacts on States.

Any other business

Draft terms of reference for the Working Group on Reduction of GHG emissions from ships expected to be established at MEPC 71

38 The Group recalled that the Roadmap identifies that the initial IMO strategy on reduction of GHG emissions from ships be adopted at MEPC 72, scheduled to take place in April 2018.

39 The Group agreed to recommend to the Committee that the draft terms of reference for the Working Group on Reduction of GHG emissions from ships expected to be established at MEPC 71 could be as follows:

"The Working Group on Reduction of GHG emissions from ships is instructed, taking into account the comments and decisions made in plenary [and the documents submitted (MEPC 69/6/6, MEPC 71/7, MEPC 71/7/1, MEPC 71/7/2, MEPC 71/7/3, MEPC 71/7/4, MEPC 71/7/5, MEPC 71/7/6, MEPC 71/7/7, MEPC 71/7/8, MEPC 71/7/9, MEPC 71/7/10, MEPC 71/7/11, MEPC 71/7/12, MEPC 71/7/13, MEPC 71/7/14, MEPC 71/INF.23, MEPC 71/INF.34, MEPC 71/INF.35),] and on the basis of the work of ISWG-GHG 1 (MEPC 71/WP.5), to:

- .1 further consider how to progress the matter of reduction of GHG emissions from ships and advise the Committee as appropriate; and
- .2 prepare draft terms of reference for the second and third meetings of the Intersessional Working Group on Reduction of GHG emissions from ships."

Scheduling of the second meeting of the Intersessional Working Group on Reduction of GHG emissions from ships (ISWG-GHG 2)

40 The Group recalled that the Roadmap identified that the second meeting of the intersessional Working Group on Reduction of GHG emissions from ships should take place in September 2017, but that the Roadmap was approved by the Committee prior to the dates for MEPC 71 being confirmed as 3 to 6 July 2017, and that the Committee's report reads as follows: "In addition, the Committee agreed that a further intersessional working group should be held in autumn 2017." (MEPC 70/18, paragraph 7.22).

41 The Group noted that proceeding with the second meeting of the intersessional working group in September 2017 would mean that submissions would need to be made by 4 August 2017 at the latest, assuming that meeting would take place from 18 to 22 September 2017, the only dates available due to other meetings scheduled at IMO.

42 The Group also noted that, in order to provide sufficient time for delegations to review the outcome of the first intersessional meeting and MEPC 71 and then prepare submissions for the second intersessional meeting, the Group should consider whether the second intersessional meeting should be scheduled later than September 2017.

43 The Group further noted that the UNFCCC Climate Change Conference (COP 23) is scheduled to take place from 7 to 17 November 2017, Council (C/ES 29) is scheduled to take place from 20 to 24 November 2017, and Assembly (A 30/C 119) is scheduled to take place from 27 November to 8 December 2017.

44 The Group agreed to invite the Committee to consider and decide when to hold the second meeting of the intersessional Working Group on Reduction of GHG emissions from ships, and to note the view of the Group that it should be either the 18 to 22 September 2017 or 11 December to 15 December 2017.

Action requested of the Committee

- 45 The Committee is invited to approve the report in general and, in particular, to:
- .1 note that the Group, including document sponsors, had agreed to consider as part of its deliberations the distinct documents that had been submitted to MEPC 71 (paragraphs 7 and 8);
 - .2 note the consideration of elements specifically identified to be considered under the Roadmap and note the progress made, including on the identification of a list of candidate measures (paragraph 29);
 - .3 consider the draft terms of reference for the Working Group on Reduction of GHG emissions of ships, expected to be established at MEPC 71 (paragraph 39); and
 - .4 decide on the dates for the second meeting of the Intersessional Working Group on Reduction of GHG emissions from ships (ISWG-GHG 2), taking into account the views of the Group (paragraph 44).