INTERNATIONAL MARITIME ORGANIZATION

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INTERSESSIONAL MEETING OF THE WORKING GROUP ON REDUCTION OF GHG EMISSIONS FROM SHIPS
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Agenda item 5

ISWG-GHG 6/5/2
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FURTHER CONSIDERATION OF CONCRETE PROPOSALS TO ENCOURAGE THE UPTAKE OF ALTERNATIVE LOW-CARBON AND ZERO-CARBON FUELS, INCLUDING THE DEVELOPMENT OF LIFECYCLE GHG/CARBON INTENSITY GUIDELINES FOR ALL RELEVANT TYPES OF FUELS AND INCENTIVE SCHEMES, AS APPROPRIATE

Setting the framework for shipping's new fuels

Submitted by the United Kingdom

SUMMARY

Executive summary:	This document identifies the need for short-term action to develop greenhouse gas (GHG) intensity guidance for new fuels. The document further outlines the need for consideration of lifecycle emissions in order to support the transition to low and eventually zero emissions fuels/energy sources and provides information on the key features of zero lifecycle emissions fuels.
Strategic direction, if applicable:	3
Output:	3.2
Action to be taken:	Paragraph 29
Related documents:	MEPC 74/7/6, MEPC 74/18; ISWG-GHG 3/2; ISWG-GHG 1/INF.2; ISWG-GHG 5/5 and ISWG-GHG 5/4

Introduction

1 The *Initial IMO Strategy on reduction of GHG emissions from ships* commits us collectively to peak and decline GHG emissions from international shipping as soon as possible and to reduce the total annual GHG emissions by at least 50% by 2050 compared to 2008 levels. Critically, it also commits us collectively to phasing out such emissions as soon as possible in this century.

2 The Strategy acknowledges the need for alternative fuels and/or energy sources, in order to achieve its objectives.

3 Document ISWG-GHG 5/5 (Belgium et al.) noted the urgent need to develop policies that incentivize shipping's transition away from fossil fuels and MEPC 74 agreed there was a need to focus on the effective uptake of alternative low-carbon and zero-carbon fuels.

4 Document ISWG-GHG 5/4 (Norway) additionally identified that guidance was needed to allow for the consistent accounting of the carbon content of these new fuels in line with existing international methodologies. The United Kingdom considers this work as an important step to enable the effective functioning of IMO's current EEDI and DCS regimes.

5 This document reflects on the discussions at MEPC 74 and:

.1 highlights the United Kingdom's view that IMO guidance in relation to the "tank-to-wake" GHG intensity of new fuels is needed in the near future to support the effective operation of current IMO regulations;

.2 highlights the importance of understanding wider lifecycle emissions from marine fuels/energy and the relationship between efforts to decarbonize shipping with wider efforts to decarbonize fuel/energy supply; and

.3 identifies some key features of fuel/energy sources that could be considered zero-emission in both use (tank-to-wake) and production (well-to-tank).

The need for early guidance on the carbon intensity of new fuels and energy sources

6 The United Kingdom considers that to achieve a transition away from fossil fuel, and at the scale required to meet the objectives of the Initial Strategy, there will need to be a series of significant changes both in the shipping sector and in wider fuel/energy supply.

7 In order to ensure those elements of the current IMO regime – including EEDI, EEOI and DCS, which operate on a ship-specific basis – function efficiently, there is a need to establish guidelines for low-emission and zero-emission fuels on a "tank-to-wake" basis in line with the approach currently taken for conventional marine fuels.

8 Some alternative fuels may have significant non-CO_2 GHG emissions. It is recommended therefore that any guidelines developed consider how non-CO_2 GHG operational emissions are quantified, and that these quantifications are incorporated into emission factors as soon as possible.

9 This work needs to be progressed as a priority as it underpins key elements of the current regime and the United Kingdom would suggest that this work be undertaken at ISWG-GHG 7.

Wider implications of IMO's work to decarbonize international shipping and its impact on marine fuels

10 There is a longer-term need to establish a shared understanding at IMO of what constitutes truly non-fossil fuel/energy sources, including an awareness of wider impacts across a fuel's lifecycle that reach outside of IMO's remit. This would give insight into the total climate and sustainability impact of different fuel options and enable objective comparisons as a basis for long-term investments. This would in turn mitigate the risk of stranded assets and delays in investment and action.

11 This is particularly important where a fuel may offer zero GHG emissions at the point of consumption, but can be produced using CO_2-intensive methods. In these cases, action to

decarbonize the process of production may be needed by Governments collectively, individually (possibly through National Action Plans for example), by the shipping sector, and by other industrial actors such as the fuel and power sectors.

12 For example, hydrogen in a fuel cell system offers zero-GHG emissions at the point of use, and would have a zero value for carbon/GHG intensity at the point of use. This hydrogen may have been produced using a renewable source, in which case it is zero-GHG across its full lifecycle, but may have been produced using natural gas effectively creating significant production of CO_2 emissions on a national level and having high lifecycle emissions.

13 In the latter case, the source of the hydrogen would ideally be transitioned to a renewable source, possibly through an interim step of Carbon Capture and Storage, to mitigate some of the production emissions if adequate renewable capacity was not immediately available.

14 As ships increasingly transition to zero-GHG energy sources, such pressures will increase and it is important that Governments and industry understand and respond to the need to address lifecycle emissions to ensure that the sector is achieving real global reductions, while ensuring wider consideration is taken for environmental impacts and sustainability.

15 Industry needs clarity on wider lifecycle GHG emissions, to provide confidence and to ensure that investments deliver real GHG reductions. Governments need this information to properly plan policies to support deployment. IMO is the right place to develop such guidance in order to support shipping's transition to zero emissions.

16 The United Kingdom does not believe this wider issue of fuel lifecycle can be addressed through the proposed guidelines at the next session, and consider that in the short-term the Group should focus on agreeing the factors for tank-to-wake emissions. The United Kingdom would instead suggest further work following on from this considering wider lifecycle emissions.

17 It must collectively be recognized that a lack of fully decarbonized fuels at the present time cannot be a case for inaction by international shipping. Instead there is a need to identify where steps need to be taken both inside and outside of IMO to deliver the transition, and act accordingly.

18 In support of this longer-term consideration, the United Kingdom has identified some key features of fully decarbonized fuels. This list is by no means exhaustive but is intended to stimulate thinking about what a fully decarbonized marine fuel entails.

Key features of zero GHG emissions (both production and use) fuels

19 Fully decarbonized fuels must have the capability to not add additional GHG to the global system through their production or consumption.

20 Fuels that do not contain carbon (such as ammonia and hydrogen) have an advantage in that they have no operational CO_2 emissions, but would need to be produced from renewable energy in order to be fully decarbonized across their lifecycle.

21 Battery systems would offer zero GHG emissions at the point of use, but would need to be charged from a zero-GHG power supply.

22 Fuels that continue to contain carbon can only be considered fully decarbonized if they are part of a closed-loop process that at all lifecycle stages has its energy requirements met using renewable/zero-GHG energy sources. This could include:

.1 bioenergy derived fuels;

.2 fuels where CO_2 emissions are wholly captured onboard a ship, and stored in a Carbon Capture and Storage system; and

.3 fuels produced from CO_2 captured directly from the atmosphere.

23 It should be noted that fuels that contain carbon that has been extracted from a land-side waste CO_2 stream would not be considered zero overall CO_2, as they would represent a form of carbon leakage.

24 Additionally, any such fuel should not generate waste products or outputs with global warming potential – for example unabated production of N_2O from high-temperature combustion of a nitrogen-rich fuel such as ammonia.

Final observations

25 The wider challenge of decarbonizing fuel/energy supply from well-to-tank must not delay IMO effort. Fuels such as ammonia and hydrogen are produced in small quantities from renewable sources today, and scaling up this work will allow widespread, global deployment of zero-emission fuels. These types of fuels have the potential to eliminate emissions from both production and consumption.

26 While alternative propulsion systems using these fully decarbonized fuels may be currently more expensive than traditional systems, experience from other sectors that have already sought to decarbonize shows that as the uptake of new renewable energy technologies increases, factors such as economies of scale allow cost reductions to levels competitive with traditional energy sources.

27 Substantial increases in deployment have meant that in most parts of the world today, renewable energies have become the lowest-cost source of new power generation, for instance[1]. Research done on behalf of the United Kingdom's Department for Transport notes that cost-reduction for alternative fuels used in the shipping industry will be a function of both scaling-up of production for a given technology's use in the shipping sector, and the scaling-up of the production for the technology's use in other sectors (for instance, ongoing cost reductions in production of renewable electricity or cost reductions in electrolysers)[2]. Experience from other sectors does suggest, however, that incentives may be needed in order to enable the entry of these alternative fuels and technologies into the market.

28 As global focus on GHG emission reduction and eventual elimination grows, greater provision of renewables and renewably sourced fuel will follow. IMO has sent the signal that the industry is moving beyond carbon, and Governments and the fuel supply sector will need to take further action to support the sector's transition.

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1 See https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/May/IRENA_Renewable-Power-Generations-Costs-in-2018.pdf?la=en&hash=99683CDDBC40A729A5F51C20DA7B6C297F794C5D and annex 1 to this document.

2 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/816018/scenario-analysis-take-up-of-emissions-reduction-options-impacts-on-emissions-costs.pdf.

Action required of the Working Group

29 The Group is requested to:

.1 support the establishment of a workstream to develop carbon intensity guidelines at ISWG-GHG 7, with an initial focus on the "tank-to-wake" emissions of fuels/energy used on board ships;

.2 invite submissions reporting studies on low-carbon and zero-carbon fuels/energy, especially those measuring/reporting/verifying wider lifecycle emissions to be considered as part of longer-term work on lifecycle emissions; and

.3 invite Member States and industry to share actions taken in the development and deployment of low-carbon and zero-carbon fuels, and any measures taken to incentivize the production of such fuels for use in shipping.

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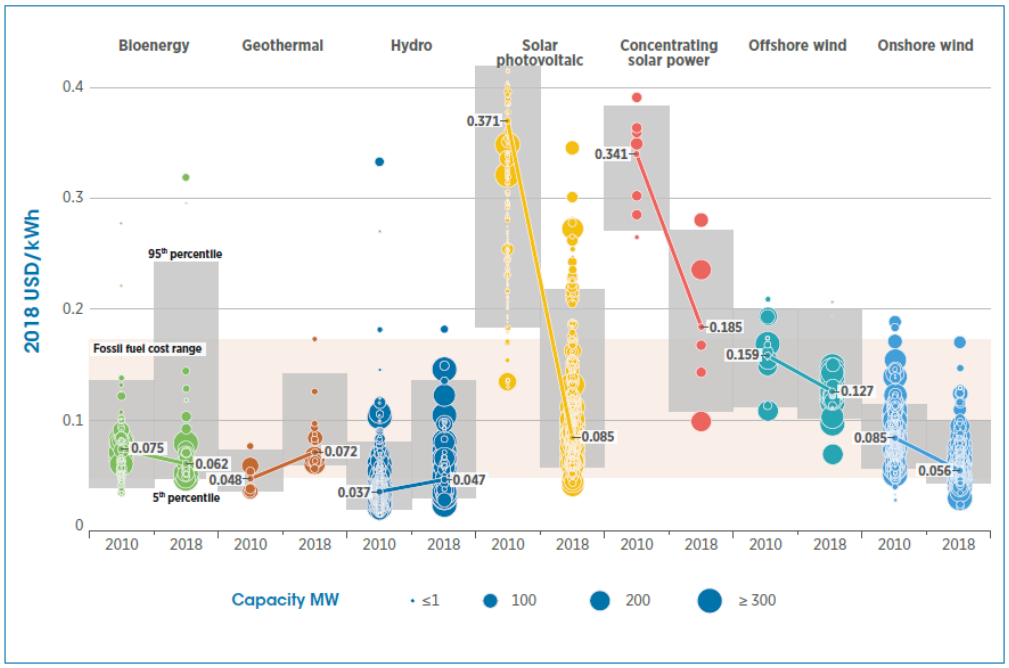
ANNEX

FIGURE: GLOBAL LEVELIZED COST OF ENERGY OF UTILITY-SCALE RENEWABLE POWER GENERATION TECHNOLOGIES, 2010 – 2018

Figure S.1 Global LCOE of utility-scale renewable power generation technologies, 2010–2018



Note: This data is for the year of commissioning. The diameter of the circle represents the size of the project, with its centre the value for the cost of each project on the Y axis. The thick lines are the global weighted-average LCOE value for plants commissioned in each year. Real weighted average cost of capital (WACC) is 7.5% for OECD countries and China and 10% for the rest of the world. The single band represents the fossil fuel-fired power generation cost range, while the bands for each technology and year represent the 5th and 95th percentile bands for renewable projects.

From: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/May/IRENA_Renewable-Power-Generations-Costs-in-2018.pdf?la=en&hash=99683CDDBC40A729A5F51C20DA7B6C297F794C5D

This figure demonstrates that the Levelized Cost of Energy (LCOE) of many renewable power generation technologies is now within the fossil fuel cost range.