Carbon Capture and its application in Maritime

Background:

The work to address greenhouse gas (GHG) emissions from ships has been undertaken by the Organization continuously since the adoption of Conference Resolution 8 on CO2 emissions from ships in September 1997, in particular, through the adoption of global mandatory technical and operational energy efficiency measures for ships under MARPOL Annex VI. It is also recognized that this is leading to new technologies, alternate fuels and accordingly safety and training related issues, thus work is happening at both MEPC and MSC on these aspects.

Additionally, the Assembly at its thirtieth and thirty-second sessions in December 2017 and December 2021, approved for the Organization a strategic direction to "Respond to climate change",

Also the United Nations 2030 Agenda for Sustainable Development, in particular SDG 13, requires to take urgent action to combat climate change and its impacts.

MEPC at its seventy-second session (MEPC 72) adopted, by resolution MEPC.304(72), the Initial IMO Strategy on Reduction of GHG Emissions from Ships (Initial IMO GHG Strategy), which also envisioned that a revised IMO GHG Strategy should be adopted in 2023, At MEPC 80 the draft 2023 IMO Strategy on Reduction of GHG emissions from ships was considered and the 2023 IMO Strategy on Reduction of GHG emissions from Ships (2023 IMO GHG Strategy) was adopted. Further an impact analysis was considered necessary as an economic element was being considered to facilitate the transition to "net zero" by 2050.To provide a way forward in accordance with MEPC.1/Circ.885/Rev.1, a work plan for five distinct but interrelated tasks comprised in the CIA assessment and of that Task 2 was entrusted to DNV - Task 2: Assessment of the impacts of the basket of candidate measures on the fleet (DNV).
One of the key findings of DNV as reported at MEPC 82 is that the results show a diverse mix of fuels and solutions both within and across scenarios where electrofuels (e-fuels) and onboard **carbon capture and storage (CCS)** appear to be the two most prevalent decarbonization solutions.

CARBON CAPTURE RELATED PAPER:

Considering the various discussions and progress at IMO on the technology of "**onboard carbon capture** ", prepare submissions considering the technical developments taking place in the maritime field as submission to MEPC or MSC:

i. For the consideration of the paper to MEPC note that MEPC 81 had established a Correspondence Group on measurement and verification of non-CO2 GHG emissions and onboard carbon capture, under the coordination of Norway, and for carbon capture aspect instructed it to further consider issues related to onboard carbon capture, using paragraph 31 of document MEPC 80/7/7, as well as comments made in the Air Pollution and Energy Efficiency Working Group, and develop a work plan on developing a regulatory framework for the use of onboard carbon capture systems with the exception of matters related to accounting of CO2 captured on board ships . This correspondence group will submit a written report to MEPC 83.

To assist in the following documents are being shared while the participants may also consider reading other submissions on the agenda 7 covering reduction of GHG emissions from ships:

a. MEPC 82/INF.8 Add1
b. MEPC 80/7/7
c. MEPC 80/17 (para 7.38 to 7.45 cover Carbon capture)
d. MEPC 81/16 (para 7.27 to 7.30 cover Carbon capture)

ii. For the consideration of the paper to MSC one must consider that for the safe use of Onboard Carbon Capture and Storage (OCCS) all aspects that is capturing and storing CO2, as well as handling the substances required for OCCS operation, need careful consideration. Specifically, essential safety measures should include early detection of leaks of these substances, prompt alarms, as well as crew safety measures such as segregation, ventilation, and timely response to ensure crew safety. To facilitate the following papers are attached. Further if any further research is desired it may be noted that the Agenda 4 of the Scientific Group under the London Convention and the London Protocol,(last meeting held from Monday, 15 to Friday, 19 April 2024) is CO2 sequestration in sub-seabed geological formations – details of same are available under the tab of **London Convention/Protocol – SG documents.**

a. MSC108/5
b. MSC108/5/1

Thus, while the background papers are intended to give the participants a view of how MEPC and MSC are progressing on this aspect of GHG reduction strategy and Carbon Capture's role in them and understand the progress made till date, the objective is to now develop documents which along those lines can guide further work at the MEPC and MSC as selected by the participating team. The team must clearly indicate that the paper is intended for MEPC or MSC.

The Teams have to submit their paper as per the Role assigned to them in accordance with the Table below:

TABLE :

A	B	C	D	E
Developed Nation	**Developed Nation**	**Developing Nation**	**Developing Nation**	**NGO**
Large spending capability on infrastructure	Limited spending capability on infrastructure	Moderate spending capability on infrastructure	Large spending capability on infrastructure	International presence and very active both wrt environment and human element
Limited interest in Shipbuilding but some interest in engines	Large Interest in Shipbuilding and engines	Limited Interest in Shipbuilding and engines	Large Interest in Shipbuilding and engines	Not applicable
Huge reserves of fossil fuels	Moderate reserves of fossil fuels	Limited reserves of fossil fuels	Moderate reserves of fossil fuels	Not applicable
Limited R & D in the field of energy sources	Large R & D in the field of energy sources	Limited R & D in the field of energy sources	Moderate R & D in the field of energy sources	Extremely supportive of renewable

other than fossil fuels	other than fossil fuels	other than fossil fuels	other than fossil fuels	energy and critical of fossil fuels
Limited R & D in the field of ship design	Large R & D in the field of ship design	Limited R & D in the field of ship design	Large R & D in the field of ship design	Not applicable
Negligible exposure to supply of seafarers	Limited exposure to supply of seafarers	Large exposure to supply of seafarers	Reasonably exposed to supply of seafarers	Has immense concern for welfare of seafarers
Sea level rise impact on nation - moderate	Sea level rise impact on nation - immense	Sea level rise impact on nation - moderate	Sea level rise impact on nation – moderate	Sea level rise impact on nations – highly concerned and vocal regarding same
Level of ambition wrt zero carbon - moderate	Level of ambition wrt zero carbon - aggressive	Level of ambition wrt zero carbon - moderate	Level of ambition wrt zero carbon – moderate	Level of ambition wrt zero carbon – highly aggressive

Note: In order to inject realism and relevance into the exercise, the table has been drawn up on the basis of various aspects which influence the stands taken by various 'Parties' at the International Maritime Organization (IMO)

General guidelines:

1. The template for making a document for submission to IMO is available on the IMO website.
2. Teams are recommended to go through the circulars MSC-MEPC.1/Circ.5/Rev.5 dated 31st July 2023 ORGANIZATION AND METHOD OF WORK OF THE MARITIME SAFETY COMMITTEE AND THE MARINE ENVIRONMENT PROTECTION COMMITTEE AND THEIR SUBSIDIARY BODIES **(attached)** to guide them about the working of the committees at IMO and also in that the PROCEDURES FOR PREPARATION AND SUBMISSION OF DOCUMENTS.
3. The submission should be in Arial 11 and single spacing
4. The submission should be aligned basis points 1, 2 and 3 above.
5. Submitters are encouraged to familiarize themselves with the IMO Strategy on Reduction of GHG Emissions from Ships

Additional Guidance:

1. The Participants will additionally have guidance from Industry stalwarts (besides their own campus coordinators) who will act as Guides and be assigned to them. The Papers are to be prepared in the format similar to IMO (downloadable from the IMO website as a public user) and submitted as per schedule announced separately and available on the IMU website. After the last date of **Paper submission 1**, papers submitted by the Teams playing different roles will be shared, enabling participants playing a particular Role to understand the positions taken by the Teams playing other Roles, but not allowing them to see the Papers of teams playing the same role as their own. (For Example; the stream

is having 30 participating teams for their topic, thus there will be six teams per Role category. Now Teams of Role category A would get to see all papers of category B, C, D & E, but not the papers of category A. The rationale behind such disclosure is to make the participants to understand the viewpoints of the other categories of the same topic. Noteworthy part of the competition is that the papers of participants of the same category of same topic will not be subjected to the disclosure within themselves).

2. **Length of papers**: There is no restriction on the length of papers so as to encourage participants to do intensive research. However, it is strongly recommended to keep the contents relevant to the topic. Irrelevant information, duplication of information, plagiarism & copyright infringement may attract negative marking and in severe cases, papers may get disqualified.
3. After understanding the viewpoints of teams with different roles of the same Topic, each team can insert modifications, if any, to the contents of their Paper submission 1 (already submitted) and can submit a modified paper highlighting the changes as their **Final Paper**, (length of Final paper should not exceed by 2 pages from original paper submission 1), within the time prescribed in the schedule.