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WORKING GROUP ON REDUCTION OF  
GHG EMISSIONS FROM SHIPS  
5<sup>th</sup> session  
Agenda item 4

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**CONSIDERATION OF CONCRETE PROPOSALS ON CANDIDATE SHORT-TERM  
MEASURES AND DEVELOPMENT OF FURTHER ACTIONS ON RESEARCH AND  
DEVELOPMENT**

**Why Research and Development is Critical to IMO's GHG Strategy**

**Submitted by  
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**SUMMARY**

*Executive summary:* The paper briefly describes why a research and development effort devoted to identifying the fuels, propulsion systems, and related technologies necessary to achieve zero or near-zero carbon emissions in the global maritime fleet is critical to achieving the vision and specific objectives of IMO's GHG Strategy.

The paper also emphasizes that while the environmental benefits of a focused maritime research and development effort will produce benefits in the mid to long-term, the discussions necessary to consider and initiate an R&D effort devoted to maritime applications of zero, near-zero emission, and low carbon technologies will need to be initiated in the short-term.

*Strategic direction:*

*Output:*

*Action to be taken:* Paragraph 11

*Related documents:* Resolution MEPC.304(72), MEPC 71/7/4, ISWG-GHG 4/2/9, MEPC 73/7/2, MEPC 73/19, and MEPC 74/7/1

**Background**

1 Resolution MEPC.304(72), MEPC 71/7/4, ISWG-GHG 4/2/9, MEPC 73/7/2, and MEPC 73/19 all identify the critical role that research and development will need to play in enabling the industry and the IMO to achieve the vision and objectives set forth in IMO's GHG Strategy. Moreover, numerous interventions by Member States, industry, and other stakeholders have stressed that while the principal environmental benefits of such a

programme would be realized in the mid and long-term, it is important that the Committee begin consideration of this matter well before 2023 because it will take time to consider how to structure an effective R&D programme and to debate the merits and issues associated with a concept of this magnitude. Should the Committee decide to proceed on this matter, it will also require further time to set in motion the actions necessary to establish an R&D programme.

### **Why R&D is Critical to IMO's GHG Strategy**

2 IMO's GHG Strategy calls for very significant emission cuts in a span of 30 years with a vision that the fleet will transition to zero or near-zero emissions as soon as feasible. If these goals are to be achieved, the technical pathways for the fleet must be identified and developed in a manner that allows commercial production of the propulsion systems and fuels that will be necessary to accomplish this transition in an expeditious manner. No such fuels or propulsion systems are available today for transoceanic ships. We have seen promising development and demonstration of battery and fuel cell applications, but current applications are largely limited to passenger ferries, small ships, and other specialized maritime operations that constitute a small fraction of ship emissions. It is an open question whether these technologies can be scaled up for use on larger vessels operating on much longer transoceanic routes, or whether different solutions will be required for these ships. These larger ships constitute the backbone of international maritime trade, and solutions for all ship types, sizes, and voyage durations are critical to reach the objectives laid out in IMO's GHG Strategy.

3 It will not be possible to achieve the ambitions envisioned by IMO's GHG Strategy without fundamental changes in marine fuels and propulsion systems. But development of such new fuels and propulsion systems is unlikely to occur within the schedule called for in the GHG Strategy absent a substantial and sustained research and development effort. Such a research and development effort is itself unlikely to be undertaken purely as a result of individual companies pursuing economic opportunities presented in the marketplace. In what is a very resource-constrained industry, it is unrealistic to think that any one company or even any single government will develop propulsion technologies and fuels capable of supporting low-carbon or zero-carbon operation of large ships that are sailing long voyages that encompass hundreds and thousands of miles in a single voyage segment.

4 To observe that the necessary research and development of commercially deployable low-carbon or zero-carbon fuels and propulsion systems will not occur spontaneously within the short time period foreseen by the GHG Strategy is not to say that the objective cannot be met. The point is simply that there needs to be a formal effort and a dedicated means of support to ensure that adequate resources and focus are brought to bear on the research and development challenges in the near term. The problem to be solved is a common global problem, and its solution requires a common and coordinated response.

5 The IMO is uniquely positioned to consider a coordinated R&D programme that is specifically tailored to deliver the necessary advances in maritime propulsion and fuel systems. Moreover, the co-sponsors firmly believe that such an effort is essential if we are to achieve the ambitions we have set forth for ourselves in this Organization.

### **R&D as Part of IMO's GHG Strategy**

6 As noted earlier, intensive research and development work that is specifically focused on zero-carbon emission marine technologies and fuels is a fundamental and critical component to achieving the objectives set forth in the IMO GHG Strategy. A successful maritime R&D effort can be expected to produce significant environmental results in the mid

and long-term time frame, but the discussions necessary to put such a programme in place must begin in the short-term. In the view of the co-sponsors, a focused effort on maritime R&D is not a “nice to have” or elective activity that we should expect to organically arise as a result of technology developments in other sectors. To the contrary, a well thought out and structured international R&D effort is a fundamental requirement if we expect to achieve what is set forth in the Initial IMO GHG Strategy.

7 The Initial IMO Strategy on Reduction of GHG Emissions from Ships identifies candidate short-term measures in paragraph 4.7. Moreover, paragraph 4.7.9 specifically draws attention to initiating “*research and development activities addressing marine propulsion, alternative 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 efforts;*”

8 Building on earlier submittals made to the Committee, paragraph 4.7.9 of the Initial IMO GHG Strategy, and views expressed in the GHG Working Group and Committee, the co-sponsors of this paper are presently considering ideas on how the Committee could best support a major research and development programme that would enable the industry, member states, and other stakeholders to fully achieve the objectives and vision of IMO’s GHG Strategy. Developing an R&D concept that is both effective and politically feasible is a complex undertaking, but pending further discussion the sponsors anticipate providing an update in advance of MEPC 75.

9 Recognizing paragraph 4.7.9 of the Initial IMO GHG Strategy and Annex 9 of MEPC 73/19/Add.1, the co-sponsors recommend that any R&D proposals made to MEPC 75 should be considered under Group A or C as well as paragraph 4.7 of Annex 9 as R&D is appropriately referenced under these activity streams.

10 Should the Committee decide to establish a dedicated standing technical group as proposed in MEPC 74/7/1, the co-sponsors suggest that the development of a formal maritime R&D effort be among those measures to be considered and discussed by the technical group.

**Action requested by the Committee.**

11 The Committee is invited to consider the proposal and comments presented in this submission and to take action as appropriate.

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