

MARINE ENVIRONMENT PROTECTION
COMMITTEE
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Agenda item 7

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REDUCTION OF GHG EMISSIONS FROM SHIPS

Prediction and verification of CO₂ emission savings with wind propulsion systems

Submitted by Comoros and RINA

SUMMARY

Executive summary: This document presents the key findings of a Joint Industry Project on the performance assessment of wind propulsion systems and associated regulatory issues, including EEDI

Strategic direction, if applicable: 3

Output: 3.7

Action to be taken: Paragraph 7

Related documents: MEPC.1/Circ.815; MEPC 62/INF.34; MEPC 74/INF.39; MEPC 75/INF.26 and MEPC 76/INF.30

Introduction

1 Wind propulsion is an innovative mechanical energy efficiency technology (EET) that can reduce the fuel consumption and emissions of ships, including CO₂ and is considered a Category B-2 technology in the classification system adopted by the *2013 Guidance on treatment of innovative energy efficiency technologies for calculation and verification of the attained EEDI* (MEPC.1/Circ.815). Although MEPC.1/Circ.815 presents a framework for calculation and verification of wind assistance, the framework is in need of updating and application of the technology has not been covered extensively from a regulatory perspective.

2 In 2019, the Maritime Research Institute Netherlands (MARIN) and Classification Society ABS launched the "Wind assisted Ship Propulsion" Joint Industry Project ("WiSP JIP") focusing on methods to predict the performance of wind propulsion and on relevant rules and regulations. Document MEPC 75/INF.26 (Comoros) provides a general overview of wind propulsion applications and includes a reference to the WiSP JIP.

3 This document presents some key findings of the WiSP JIP in relation to improved performance calculation methods and verification of wind propulsion in the context of regulations on EEDI (and EEXI).

Key findings and recommendations

4 A key objective of the WiSP JIP was to develop improved and transparent performance prediction methods. The starting point was MEPC.1/Circ.815, which provides a framework for prediction of wind propulsion performance for EEDI purposes. The accompanying information document describes technical aspects of the approach in more detail. The findings can be summarized as follows:

- .1 MEPC.1/Circ.815 lacks sufficient details on how performance should be calculated, resulting in significant uncertainty of the results when following this framework.
- .2 By applying state-of-the-art tools, an improved methodology was developed, which makes use of thresholds to define the level of accuracy needed in the modelling of wind propulsion technologies/systems.
- .3 This methodology can be used in place of MEPC.1/Circ.815 and delivers better precision when predicting the delivered power and overall performance by a wind propulsion system.
- .4 The possibility of replacing the Global Wind Probability Matrix was investigated and it was found that one can replace this matrix by basing the analysis on only four wind conditions. This approach aims at considering wind propulsion at an equivalent level with other EET Category A (hydrodynamic) technologies, which are evaluated only at a single operational point and not over a vessel's operational profile.
- .5 Full scale trial procedures applied at a vessel's delivery are governed by the ISO 15016:2015 *Guidelines for EEDI determination*. These Guidelines do not work for wind propulsion evaluation as they relate to calm water ship powering performance. A preliminary methodology for adapting the sea trial procedures to include wind propulsion is proposed.

Follow-up Joint Industry Project

5 The partners of the WiSP JIP Phase I are now preparing Phase II of the JIP to continue the work on improved performance prediction and rules and regulations. It is anticipated to start in 2021.

6 One of the objectives of Phase II is to prepare proposals related to EEDI and EEXI performance prediction and verification methods. To this end an extension of the current WiSP recommendations and a potential submission to MEPC 77 (subject to sufficient progress being made) on improving MEPC.1/Circ.815 are planned, including validation on the basis of full-scale operational data.

Action requested of the Committee

7 The Committee is invited to note the information provided in this document and the associated document MEPC 76/INF.30.
