INTERNATIONAL MARITIME ORGANIZATION

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MARINE ENVIRONMENT PROTECTION COMMITTEE
82nd session
Agenda item 17

MEPC 82/17/Add.1
4 November 2024
Original: ENGLISH

REPORT OF THE MARINE ENVIRONMENT PROTECTION COMMITTEE ON ITS EIGHTY-SECOND SESSION

Attached are the annexes to the report of the Marine Environment Protection Committee on its eighty-second session (MEPC 82/17).

LIST OF ANNEXES

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ANNEX 1

RESOLUTION MEPC.392(82)
(adopted on 4 October 2024)

AMENDMENTS TO THE ANNEX OF THE PROTOCOL OF 1997 TO AMEND THE INTERNATIONAL CONVENTION FOR THE PREVENTION OF POLLUTION FROM SHIPS, 1973, AS MODIFIED BY THE PROTOCOL OF 1978 RELATING THERETO

Amendments to MARPOL Annex VI

(Designation of the Canadian Arctic and the Norwegian Sea as Emission Control Areas for Nitrogen Oxides, Sulphur Oxides and Particulate Matter, as appropriate)

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by international conventions for the prevention and control of marine pollution from ships,

RECALLING ALSO article 16 of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocols of 1978 and 1997 relating thereto (MARPOL), which specifies the amendment procedure and confers upon the appropriate body of the Organization the function of considering amendments thereto for adoption by the Parties,

HAVING CONSIDERED, at its eighty-second session, proposed amendments to MARPOL Annex VI concerning the designation of the Canadian Arctic and the Norwegian Sea as Emission Control Areas for Nitrogen Oxides, Sulphur Oxides and Particulate Matter, as appropriate, which were circulated in accordance with article 16(2)(a) of MARPOL,

1 ADOPTS, in accordance with article 16(2)(d) of MARPOL, amendments to MARPOL Annex VI, the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with articles 16(2)(f)(ii) and (iii) of MARPOL, that the amendments shall be deemed to have been accepted on 1 September 2025 unless prior to that date not less than one third of the Parties or Parties the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet have communicated to the Organization their objection to the amendments;

3 INVITES the Parties to note that, in accordance with article 16(2)(g)(ii) of MARPOL, the said amendments shall enter into force on 1 March 2026 upon their acceptance in accordance with paragraph 2 above;

4 REQUESTS the Secretary-General, for the purposes of article 16(2)(e) of MARPOL, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Parties to MARPOL;

5 ALSO REQUESTS the Secretary-General to transmit copies of the present resolution and its annex to Members of the Organization which are not Parties to MARPOL.

ANNEX

AMENDMENTS TO MARPOL ANNEX VI

(Designation of the Canadian Arctic and the Norwegian Sea as Emission Control Areas for Nitrogen Oxides, Sulphur Oxides and Particulate Matter, as appropriate)

ANNEX VI

REGULATIONS FOR THE PREVENTION OF AIR POLLUTION FROM SHIPS

Regulation 13
Nitrogen oxides (NO_x)

Tier III

1 A new sub-paragraph .3 is added to regulation 13.5.1.2 as follows:

".3 1 March 2026 and is operating in the Norwegian Sea Emission Control Area. For the Norwegian Sea Emission Control Area, "ship constructed on or after 1 March 2026" means a ship:

.1 for which the building contract is placed on or after 1 March 2026; or

.2 in the absence of a building contract, the keel of which is laid or which is at a similar stage of construction on or after 1 September 2026; or

.3 the delivery of which is on or after 1 March 2030."

2 Between paragraphs 5.1.2 and 5.1.3, the word "when" is added.

3 At the end of regulation 13.5.1.3, "." is replaced with ":" and a new sub-paragraph .1 is added as follows:

".1 that ship is constructed on or after 1 January 2025 and is operating in the Canadian Arctic Emission Control Area."

Emission control area

4 At the end of sub-paragraph.3 of regulation 13.6, the word "and" is deleted and at the end of sub-paragraph .4, "." is replaced with ";".

5 New sub-paragraphs .5 and .6 are added to regulation 13.6 as follows:

".5 the Canadian Arctic Emission Control area, which means the area described by the coordinates provided in appendix VII to this Annex; and

.6 the Norwegian Sea as defined in regulation 13.9.4 of Annex II of the present Convention."

Regulation 14
Sulphur oxides (SO_x) and particulate matter

Requirements within emission control areas

6 At the end of sub-paragraph .4 of regulation 14.3, the word "and" is deleted and, at the end of sub-paragraph .5, "." is replaced by ";".

7 New sub-paragraphs .6 and .7 of regulation 14.3 as follows:

".6 the Canadian Arctic Emission Control area, which means the area described by the coordinates provided in appendix VII to this Annex; and

.7 the Norwegian Sea as defined in regulation 13.9.4 of Annex II of the present Convention."

Appendix I
Form of International Air Pollution Prevention (IAPP) Certificate
(regulation 8)

SUPPLEMENT TO INTERNATIONAL AIR POLLUTION PREVENTION CERTIFICATE (IAPP CERTIFICATE)

RECORD OF CONSTRUCTION AND EQUIPMENT

7 Section 1.3 of the Supplement to the International Air Pollution Prevention Certificate is replaced by the following:

"1.3 Date of build

1.3.1 Date of building contract *(dd/mm/yyyy)* ……

1.3.2 Date on which keel was laid or ship was at a similar stage of construction *(dd/mm/yyyy)* ……

1.3.3 Date of delivery *(dd/mm/yyyy)* ……..…….**"**

Appendix VII
Emission control areas
(regulations 13.6 and 14.3)

8 Paragraph 1 is replaced by the following:

"1 The boundaries of emission control areas designated under regulations 13.6 and 14.3, other than the Baltic Sea, the North Sea, and the Norwegian Sea areas, are set forth in this appendix."

9 New paragraph 5 is added after paragraph 4 as follows:

"5 The Canadian Arctic area comprises two segments:

.1 starting at the Yukon mainland at 68°54'.00 N, 137°0'.00 W; following the coordinates listed below and ending at the north coast of Hans Island at 80°49'.91 N, 66°27'.40 W, connected by geodesic lines connecting the following coordinates in World Geodetic System 1984 (WGS84) datum:

POINT	LATITUDE	LONGITUDE
1	68°54'.00 N	137°0'.00 W
2	72°56'.58 N	137°0'.00 W
3	73°0'.42 N	136°21'.72 W
4	73°21'.72 N	136°20'.46 W
5	73°56'.34 N	136°57'.60 W
6	74°30'.18 N	137°13'.08 W
7	75°3'.42 N	137°7'.20 W
8	75°49'.26 N	136°32'.04 W
9	76°42'.18 N	136°57'.06 W
10	77°28'.26 N	136°34'.74 W
11	78°7'.26 N	135°28'.50 W
12	78°39'.72 N	133°44'.88 W
13	79°29'.58 N	131°24'.96 W
14	79°53'.16 N	129°32'.22 W
15	80°31'.44 N	127°33'.48 W
16	81°54'.36 N	118°36'.24 W
17	82°16'.32 N	116°28'.98 W
18	82°52'.86 N	115°29'.46 W
19	83°54'.54 N	112°7'.20 W
20	85°46'.14 N	97°16'.86 W
21	86°9'.78 N	89°14'.46 W
22	86°22'.56 N	78°59'.58 W
23	86°19'.18 N	60°10'.17 W
24	85°38'.92 N	58°10'.58 W
25	85°22'.29 N	57°59'.22 W
26	85°12'.04 N	57°54'.68 W
27	84°49'.56 N	57°13'.28 W
28	84°22'.15 N	56°43'.09 W
29	84°17'.32 N	56°35'.78 W
30	84°11'.05 N	56°29'.53 W
31	83°10'.79 N	57°0'.21 W
32	83°4'.29 N	57°27'.78 W
33	83°0'.95 N	57°32'.72 W
34	82°44'.71 N	58°0'.38 W
35	82°42'.57 N	58°6'.78 W
36	82°40'.69 N	58°11'.74 W
37	82°34'.95 N	58°25'.30 W
38	82°31'.25 N	58°38'.56 W
39	82°27'.52 N	58°50'.12 W

POINT	LATITUDE	LONGITUDE
40	82°22'.87 N	59°2'.00 W
41	82°20'.26 N	59°21'.38 W
42	82°18'.54 N	59°32'.25 W
43	82°17'.22 N	59°41'.31 W
44	82°14'.41 N	59°56'.06 W
45	82°12'.06 N	60°2'.23 W
46	81°51'.67 N	62°9'.60 W
47	81°17'.89 N	64°8'.73 W
48	80°50'.48 N	66°15'.33 W
49	80°50'.10 N	66°26'.97 W
50	80°49'.91 N	66°27'.40 W

.2 continuing from the south coast of Hans Island at 80°49'.29 N, 66°27'.04 W, following the coordinates listed below, and ending at the coast of Newfoundland and Labrador at 60°0'.00 N, 64°9'.60 W, connected by geodesic lines connecting the following coordinates in World Geodetic System 1984 (WGS84) datum:

POINT	LATITUDE	LONGITUDE
51	80°49'.29 N	66°27'.04 W
52	80°49'.19 N	66°26'.57 W
53	80°45'.43 N	67°3'.99 W
54	80°26'.16 N	68°14'.39 W
55	80°1'.79 N	68°46'.99 W
56	79°40'.38 N	69°4'.68 W
57	78°48'.09 N	72°52'.36 W
58	78°25'.05 N	73°45'.66 W
59	77°30'.83 N	74°38'.24 W
60	76°43'.47 N	74°56'.49 W
61	75°0'.00 N	73°16'.07 W
62	74°50'.67 N	73°2'.71 W
63	74°44'.20 N	72°52'.86 W
64	74°28'.67 N	71°45'.72 W
65	74°24'.02 N	71°25'.67 W
66	74°12'.42 N	70°33'.06 W
67	74°10'.03 N	70°23'.12 W
68	74°7'.50 N	70°12'.16 W
69	74°6'.15 N	70°6'.69 W
70	74°2'.53 N	69°51'.43 W
71	74°2'.25 N	69°50'.33 W
72	73°57'.54 N	69°31'.02 W
73	73°52'.27 N	69°10'.88 W
74	73°46'.73 N	68°51'.14 W
75	73°46'.17 N	68°48'.81 W

POINT	LATITUDE	LONGITUDE
76	73°41'.77 N	68°29'.65 W
77	73°37'.91 N	68°12'.34 W
78	73°36'.51 N	68°5'.42 W
79	73°31'.14 N	67°15'.52 W
80	73°25'.90 N	66°24'.99 W
81	73°18'.48 N	66°7'.91 W
82	72°50'.89 N	65°7'.52 W
83	72°47'.70 N	65°0'.63 W
84	72°45'.76 N	64°58'.22 W
85	72°43'.78 N	64°54'.27 W
86	72°36'.40 N	64°38'.74 W
87	72°30'.58 N	64°26'.04 W
88	72°24'.89 N	64°13'.11 W
89	72°10'.96 N	63°40'.55 W
90	72°6'.33 N	63°30'.42 W
91	72°1'.65 N	63°20'.73 W
92	71°52'.98 N	63°3'.86 W
93	71°47'.21 N	62°52'.67 W
94	71°44'.71 N	62°49'.41 W
95	71°32'.90 N	62°33'.35 W
96	71°31'.73 N	62°31'.66 W
97	71°29'.39 N	62°28'.99 W
98	71°25'.93 N	62°25'.37 W
99	71°18'.98 N	62°17'.45 W
100	71°12'.10 N	62°8'.98 W
101	70°51'.84 N	61°42'.53 W
102	70°48'.17 N	61°37'.62 W
103	70°35'.55 N	61°20'.28 W
104	70°33'.07 N	61°17'.10 W
105	70°13'.48 N	61°10'.49 W
106	70°8'.83 N	61°8'.67 W
107	70°7'.55 N	61°7'.92 W
108	70°1'.68 N	61°4'.08 W
109	69°55'.82 N	60°59'.85 W
110	69°55'.27 N	60°59'.41 W
111	69°49'.82 N	60°57'.99 W
112	69°29'.41 N	60°51'.36 W
113	69°12'.82 N	60°27'.40 W
114	69°10'.24 N	60°23'.47 W
115	69°6'.79 N	60°18'.33 W
116	69°0'.88 N	60°8'.99 W
117	68°56'.83 N	60°2'.21 W
118	68°38'.02 N	59°14'.43 W
119	68°37'.86 N	59°14'.01 W

POINT	LATITUDE	LONGITUDE
120	68°34'.02 N	59°4'.46 W
121	68°32'.88 N	59°1'.49 W
122	68°25'.25 N	58°42'.06 W
123	68°21'.67 N	58°38'.64 W
124	68°16'.07 N	58°33'.75 W
125	68°7'.40 N	58°26'.93 W
126	68°6'.87 N	58°26'.58 W
127	68°4'.26 N	58°24'.69 W
128	68°1'.89 N	58°23'.15 W
129	67°56'.94 N	58°19'.62 W
130	67°44'.25 N	58°9'.79 W
131	67°39'.77 N	58°6'.05 W
132	67°35'.33 N	58°2'.07 W
133	67°30'.76 N	57°57'.66 W
134	67°29'.16 N	57°56'.00 W
135	67°28'.21 N	57°55'.01 W
136	67°27'.27 N	57°54'.57 W
137	67°21'.52 N	57°52'.35 W
138	66°49'.47 N	57°42'.84 W
139	66°41'.71 N	57°40'.35 W
140	66°37'.88 N	57°39'.45 W
141	66°36'.02 N	57°38'.99 W
142	66°30'.27 N	57°38'.04 W
143	66°24'.50 N	57°37'.56 W
144	66°18'.68 N	57°37'.55 W
145	66°12'.84 N	57°38'.01 W
146	66°3'.50 N	57°39'.45 W
147	65°57'.62 N	57°39'.93 W
148	65°57'.50 N	57°39'.93 W
149	65°51'.75 N	57°40'.44 W
150	65°50'.81 N	57°40'.46 W
151	65°37'.59 N	57°41'.74 W
152	65°34'.74 N	57°42'.18 W
153	65°23'.33 N	57°44'.83 W
154	65°18'.08 N	57°45'.70 W
155	65°14'.52 N	57°44'.99 W
156	65°11'.49 N	57°44'.22 W
157	65°8'.79 N	57°43'.69 W
158	65°6'.04 N	57°43'.95 W
159	64°12'.06 N	57°48'.09 W
160	64°4'.20 N	57°49'.01 W
161	63°57'.36 N	57°53'.40 W
162	63°52'.57 N	57°56'.46 W
163	63°50'.05 N	57°57'.01 W

POINT	LATITUDE	LONGITUDE
164	63°43'.99 N	57°58'.60 W
165	63°37'.16 N	58°1'.00 W
166	63°35'.02 N	58°1'.86 W
167	63°28'.62 N	57°59'.62 W
168	63°22'.86 N	57°57'.29 W
169	62°47'.14 N	57°40'.83 W
170	62°11'.35 N	57°25'.12 W
171	62°3'.47 N	57°22'.15 W
172	62°2'.23 N	57°21'.62 W
173	62°0'.39 N	57°20'.92 W
174	61°24'.74 N	57°16'.16 W
175	61°10'.14 N	57°38'.70 W
176	60°43'.56 N	57°17'.64 W
177	60°15'.36 N	57°4'.56 W
178	60°0'.00 N	56°43'.02 W
179	60°0'.00 N	64°9'.60 W

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ANNEX 2

RESOLUTION MEPC.393(82)
(adopted on 4 October 2024)

GUIDANCE ON BEST PRACTICE ON RECOMMENDATORY GOAL-BASED CONTROL MEASURES TO REDUCE THE IMPACT ON THE ARCTIC OF BLACK CARBON EMISSIONS FROM INTERNATIONAL SHIPPING

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by international conventions for the prevention and control of marine pollution from ships,

RECALLING ALSO that, at its sixty-second session, it agreed to a work plan including an investigation of appropriate control measures to reduce the impact on the Arctic of Black Carbon emissions from international shipping,

RECALLING FURTHER that, at its seventy-seventh session, it approved updated terms of reference for further work on the reduction of the impact on the Arctic of Black Carbon emissions, starting with the development of guidelines on recommendatory goal-based control measures to reduce the impact on the Arctic of Black Carbon emissions from international shipping,

RECALLING that, at its seventy-seventh session, it also adopted resolution MEPC.342(77) on *Protecting the Arctic from shipping Black Carbon emissions* urging Member States and ship operators to voluntarily use distillate or other cleaner alternative fuels or methods of propulsion that are safe for ships and could contribute to the reduction of Black Carbon emissions from ships when operating in or near the Arctic,

ENCOURAGING Member States to continue addressing the threat to the Arctic from Black Carbon emissions, to engage with Arctic Indigenous Peoples with a view to including Indigenous knowledge in research and determining mitigation measures, and to report on measures and best practices to reduce Black Carbon emissions from shipping activities,

NOTING that, at its eighty-second session, it adopted, by resolution MEPC.394(82), *Guidelines on recommendatory Black Carbon emission measurement, monitoring and reporting*,

HAVING CONSIDERED, at its eighty-second session, draft guidance on best practice on recommendatory goal-based control measures to reduce the impact on the Arctic of Black Carbon emissions from international shipping, developed by the Sub-Committee on Pollution Prevention and Response,

1 ADOPTS the *Guidance on best practice on recommendatory goal-based control measures to reduce the impact on the Arctic of Black Carbon emissions from international shipping*, as set out in the annex to the present resolution;

2 INVITES Member States to take urgent action in applying this Guidance, including the dissemination thereof to the shipping industry and other interested parties and reporting to the Committee on any experience gained in their implementation;

3 AGREES to keep this Guidance under review in light of the experience gained.

ANNEX

GUIDANCE ON BEST PRACTICE ON RECOMMENDATORY GOAL-BASED CONTROL MEASURES TO REDUCE THE IMPACT ON THE ARCTIC OF BLACK CARBON EMISSIONS FROM INTERNATIONAL SHIPPING

1 Purpose

1.1 This Guidance is intended to assist ship operators/companies in their efforts to reduce Black Carbon (BC) emissions from their ships operating in or near the Arctic in measurable and concrete ways.

1.2 This Guidance is recommended for all ships and should be taken into account in pursuing reductions of their Black Carbon emissions in or near the Arctic.

2 Scope

2.1 This Guidance reflects a number of ways by which measurable and consistent reductions from ships of their BC emissions when operating in or near the Arctic can be achieved, as follows:

.1 supporting informed decision-making by ship operators/companies;

.2 supporting/guiding ship operators/companies in their consideration of how best to achieve reductions in BC emissions;

.3 supporting/guiding ship operators/companies in their consideration of how best to document reductions in BC emissions; and

.4 supporting/guiding ship operators/companies in their consideration of how to develop a holistic approach to BC emissions reduction without increasing the negative impact on the environment and which may achieve environmental co-benefits.

2.2 This Guidance further details how the ship operator/company can develop a BC Management Plan, setting up reduction targets of their choosing per device, ship, fleet and/or other entity, how to validate if targets are met, and how to maintain the plan.

2.3 Ship operators/companies are encouraged to share their annual reports on the BC Management Plan with their Administration with a view to gathering expertise within IMO.

3 Guidance on best practices/control measures for ships

3.1 As an initial step, the ship operator/company should conduct an initial inventory of those BC sources and undertake BC emission measurements from those sources (marine diesel engines). The ship operator/company should use the *Guidelines on recommendatory Black Carbon emission measurement, monitoring and reporting* (resolution MEPC.394(82)).

3.2 The ship operator/company may consider setting a voluntary BC emission reduction target threshold. In setting a reduction target threshold, the ship operator/company may consider using distillate or other cleaner alternative fuels or methods of propulsion that are safe for ships and could contribute to BC reduction as called for in resolution MEPC.342(77) and what BC emission reduction target threshold might be achieved, if applied.

3.3 After setting such target threshold, the ship operator/company should identify and consider what practices and/or control measures are available to the ship which could be implemented to achieve the set reduction target threshold for BC emissions. This may take into account the information on technology options, measures, applicability and other considerations for BC emissions reduction for existing ships as set out in the appendix.

3.4 The ship operator/company should consider developing a BC Management Plan taking into account the above and include periodic monitoring for managing and ensuring success in reduction efforts.

4 Framework and structure of the BC Management Plan

4.1 The BC Management Plan should be structured as follows:

Planning to determine the current status of the ship's BC emissions and the expected BC emissions reductions.

Establishing an implementation system to identify those measures to be implemented, developing the procedures for management, defining tasks associated with those procedures, and assigning those tasks to responsible personnel.

Monitoring – BC emissions reduction of a ship should be monitored quantitatively on a regular basis (e.g. weekly, monthly), taking into account the *Guidelines on recommendatory Black Carbon emission measurement, monitoring and reporting* (resolution MEPC.394(82)).

Self-evaluation and improvement – The purpose of self-evaluation is to, among other benefits, evaluate the effectiveness of the planned measures and their implementation and allow for improvements.

4.2 The Black Carbon Management Plan should include the following information:

.1 which period the ship will seek to control BC emissions;

.2 in which areas, while operating there, the ship will control BC emissions;

.3 list of chosen sources being controlled for BC emissions;

.4 list of the set BC reduction target per chosen source or for the ship in general;

.5 description of how BC emissions are controlled per chosen source or for the ship in general;

.6 description of how to monitor reductions of BC emissions, including frequency and method(s) used;

.7 description of how an assessment will be conducted to identify whether the set reduction target(s) has been met;

.8 description of which corrective actions will be exercised if the set reduction target(s) is not met, if any;

.9 identify what should be contained in the ship's BC records; and

.10 in case the ship wants to report back to its Administration on a yearly basis, identify the date on which a report will be made available.

APPENDIX

TECHNOLOGY OPTIONS, MEASURES, APPLICABILITY AND OTHER CONSIDERATIONS FOR BLACK CARBON EMISSION REDUCTION FOR EXISTING SHIPS[1]

Possibility to apply:

✓ possible
(✓) possible with constraints and associated with high costs/efforts
X virtually impossible, would require efforts like conversion to new

Effectiveness related to its BC reduction potential:

+++ to +: very high to good 0: neutral n/a: not applicable

Detailed technology	**Estimated BC reduction potential in relation to HFO**	**Possibility to apply the technology to ships**		**Effectiveness of the detailed technology** ATTENTION: Effectiveness related to its BC reduction potential		**Comments/constraints**
		Re-fit	*Existing*	*Re-fit*	*Existing*	*"Re-fit" means that a measure can be applied to an "existing" ship after modifications; "existing" means a ship as it is, with no (technical) changes.*
***Technology:* Exhaust after-treatment**						
DPF *(Diesel Particulate Filter)*	80-99%	(✓)	X	+++	n/a	Only in combination with appropriately controlled sulphur / ash content fuels.
ESP *(ElectroStatic Precipitator)*	70%	(✓)	X	+	n/a	Safety aspects yet unsolved, may hinder the application of ESP on board ships.
Wet EGCS *(Exhaust Gas Cleaning System, "scrubber")*	0-25%	(✓)	X	0	n/a	There may be local restrictions on the discharge of discharge water from EGCS.
SCR *(Selective Catalytic Reduction)*	0-35%	(✓)	X	+	n/a	SCR is a technology to reduce NO_x. In combination with fuel injection timing, the engine can be tuned to reduce PM and BC emissions by increasing NO_x emissions abated by the SCR.
DOC *(Diesel oxidation catalyst)*	0	(✓)	X	0	n/a	DOC is a technology to reduce CO and HC but has no effect on BC.[2]

[1] Annotation: BC reduction potential depends on engine load, type and working principle (2- or 4-stroke, mean engine speed) and deviations of fuel properties.

[2] DOC was often mentioned and listed as a technology to reduce exhaust emissions in the BC discussion.

Detailed technology	**Estimated BC reduction potential in relation to HFO**	**Possibility to apply the technology to ships**		**Effectiveness of the detailed technology** ATTENTION: Effectiveness related to its BC reduction potential		**Comments/constraints**
		Re-fit	*Existing*	*Re-fit*	*Existing*	*"Re-fit" means that a measure can be applied to an "existing" ship after modifications; "existing" means a ship as it is, with no (technical) changes.*
Technology: Cleaner fuels						
Distillates	30-45%	✓	✓	+	+	30% with a low aromatic content (high H/C ratio). A lower H/C ratio means an increase in unsaturated hydrocarbons which indicates an increase in aromatic content which results in higher BC emissions.
LNG *(Liquified Natural Gas)*	>85%	(✓)	X	++	n/a	
LPG *(Liquified Petroleum Gas)*	>85%	(✓)	X	++	n/a	
Methanol	>85%	(✓)	X	++	n/a	
OME *(Oxymethylene ethers)*	>85%	(✓)	(✓) *(up to 15% mixing ratio)*	+++	+	OMEs contain oxygen and their combustion is similar to LNG. However, not commercially available, yet. Can be used as drop-in fuel. BC reduction potential relates to mixing ratio.
Biofuels						BC emission reduction. potential largely varies and depends on the fuel production pathway, its property and quality.
Sustainable synthetic fuels, PtX *(Power to Gas or Liquid)*	20-80%	✓	✓	++	++	Since these are sulphur and ash free fuels, they would provide the necessary basis for allowing possible DPF application.
Fuels with high H/C ratio	10-60%	✓	✓	+	+	The H/C ratio provides information on the aromaticity of a fuel, decreased ratio means higher aromatic content and higher BC emissions (H/C ratio is not provided in ISO 8217).

Detailed technology	**Estimated BC reduction potential in relation to HFO**	**Possibility to apply the technology to ships**		**Effectiveness of the detailed technology** ATTENTION: Effectiveness related to its BC reduction potential		**Comments/constraints**
		Re-fit	*Existing*	*Re-fit*	*Existing*	*"Re-fit" means that a measure can be applied to an "existing" ship after modifications; "existing" means a ship as it is, with no (technical) changes.*
Others						
Fuel cells / batteries	100%	(✓)	X	+++	n/a	Effective only if energy or hydrogen is generated by renewable energy. In case of a hybrid solution (ICE engine and battery), the BC reduction is limited and dependent on the load capping, shaping and shifting strategy. However, might be highly effective during transients. Not applicable for long distances and presumably not applicable in polar waters (energy demand and reserve not predictable).
Check/ control of engine and after-treatment devices on maintenance intervals and TBO[3]	10-60%	✓	✓	+	+	Engine and after-treatment device maintenance is the basis to ensure consistent emission performance.

***

[3] Time Between Overhaul.

ANNEX 3

RESOLUTION MEPC.394(82)
(adopted on 4 October 2024)

GUIDELINES ON RECOMMENDATORY BLACK CARBON EMISSION MEASUREMENT, MONITORING AND REPORTING

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by international conventions for the prevention and control of marine pollution from ships,

RECALLING ALSO that, at its sixty-second session, it agreed to a work plan, including to consider measurement methods for Black Carbon and to identify the most appropriate method for measuring Black Carbon emissions,

RECALLING FURTHER that, at its seventy-seventh session, it approved the updated terms of reference for further work on the reduction of the impact on the Arctic of Black Carbon emissions, including the development of a standardized sampling, conditioning and measurement protocol, including a traceable reference method and an uncertainty analysis to make accurate and traceable (comparable) measurements of Black Carbon emissions,

RECALLING that, at its seventy-seventh session, it also adopted resolution MEPC.342(77) on *Protecting the Arctic from shipping Black Carbon emissions* urging Member States and ship operators to voluntarily use distillate or other cleaner alternative fuels or methods of propulsion that are safe for ships and could contribute to the reduction of Black Carbon emissions from ships when operating in or near the Arctic,

ENCOURAGING Member States to continue addressing the threat to the Arctic from Black Carbon emissions, to engage with Arctic Indigenous Peoples with a view to including Indigenous knowledge in research, monitoring and determining mitigation measures, and to report on measures and best practices to reduce Black Carbon emissions from shipping,

NOTING that, at its eighty-second session, it adopted, by resolution MEPC.393(82), *Guidance on best practice on recommendatory goal-based control measures to reduce the impact on the Arctic of Black Carbon emissions from international shipping*,

HAVING CONSIDERED, at its eighty-second session, draft guidelines on recommendatory Black Carbon emission measurement, monitoring and reporting, developed by the Sub-Committee on Pollution Prevention and Response,

1 ADOPTS the *Guidelines on recommendatory Black Carbon emission measurement, monitoring and reporting*, as set out in the annex to the present resolution;

2 INVITES Member States to encourage shipping operators to voluntarily apply these Guidelines when undertaking Black Carbon-related measurements from marine diesel engines on board any ship operating in or near the Arctic;

3 ALSO INVITES Member States to provide Black Carbon emission data to the Organization using the measurement reporting protocol set out in the appendix of these Guidelines and report to the Committee on any experience gained in their implementation;

4 AGREES to keep these Guidelines under review in light of the experience gained.

ANNEX

GUIDELINES ON RECOMMENDATORY BLACK CARBON EMISSION MEASUREMENT, MONITORING AND REPORTING

Introduction

1 The purpose of these Guidelines, hereinafter referred to as "the Guidelines", and Black Carbon referred to as "BC", is to specify the recommendations for the measurement, monitoring and reporting of BC emissions data from marine diesel engines or exhaust gas treatment systems, in combination or individually, in order to enhance development of recommendations and regulations to reduce the impact on the Arctic of BC emissions. Future reviews of these Guidelines, with a view to their continued enhancement, should take into account the latest information and best practices in the field.

Application

2 These Guidelines apply to marine diesel engines with a power output of more than 130 kW or other methods of propulsion. These can include an exhaust gas treatment system or the use of other cleaner alternative fuels, on board any ship operating in or near the Arctic.

3 Administrations should encourage shipowners and operators to collect relevant data. To this end, shipowners and operators are invited to measure and report BC emissions data.

Recommended procedure for BC measurements

4 BC measurements should be undertaken at least once for each period with a total duration of seven days, while operating in or near the Arctic, at the running load of the marine diesel engine in question and the result recorded in accordance with the annex to these Guidelines.

5 BC emissions should be sampled in accordance with ISO 8178 from a suitable connection downstream of any influencing devices or arrangements. The probe shall be installed in the exhaust gas pipe in a way that a representative sampling is possible.

.1 It should be ensured that there is no open supply connection of air or other such material which would have the effect of diluting the exhaust gas stream at the sampling point. This does not apply to any material consistently introduced into the exhaust gas stream as part of other emission control arrangements such as Selective Catalytic Reduction (SCR) or Exhaust Gas Cleaning System (EGCS). Sampling should not be undertaken during or shortly after cleaning events which could affect the exhaust gas stream such as turbocharger washing or soot blowing of exhaust gas heat exchangers.

.2 BC emission measurements in terms of Filter Smoke Number (FSN) should be carried out according to ISO 10054 and ISO 8178-3. BC emissions should be measured in accordance with the device manufacturers' recommendations at a time when the engine is operating under stable conditions.

.3 Three appropriate measurement methods have been recognized by the Organization: FSN, Laser Induced Incandescence (LII) and Photoacoustic Spectroscopy (PAS). In case an alternative to a recognized measurement method is used, an established correlation between that instrument should be provided against the equivalent BC concentrations reported by FSN instruments. These alternative devices should be operated in accordance with the device manufacturers' recommendations including sample conditioning and processing.

.4 The BC measurement instruments are to be maintained and calibrated/checked in accordance with manufacturer recommendations.

Reporting of BC emissions

6 Reporting of BC emissions by the shipowner to their Administration should be done on a yearly basis in accordance with the measurement reporting protocol given in the appendix. The Administrations should report to the Organization with a view to gathering expertise and for publication.

APPENDIX

**MEASUREMENT REPORTING PROTOCOL
FOR BLACK CARBON DETERMINATION**

BC data and information to be reported:

BC emission reduction plan including technology, fuels and/or operations to be implemented

Voluntary BC emission reduction goal: in FSN, g/kWh, or g/kg fuel, or % reduction

A Ship

Name

IMO number

Flag

B Engine – for each engine over 130 kW in use in or near the Arctic

Manufacturer

Model / type / rating designation

Serial number

Rated power (kW) and speed (rpm)

Date of installation

Details of any specially considered sampling position

Details of any documented emissions control arrangement fitted/applied

C BC data, if applicable – at each measurement occasion

Date and time UTC

Ship's position

BC measurement method (FSN, PAS, LII or alternative method)

FSN or BC mass concentration

Exhaust gas temperature at sample extraction point

Engine load and speed

Fuel type in use*

* Fuel grade type and designation and BDN sulphur content.

Emission control devices or arrangements in use at time of sampling (including devices for other than BC emission control including but not limited to SCR, Exhaust Gas Recirculation (EGR) or EGCS)

Further relevant information, as applicable and available

Specific fuel oil consumption

Brake power

Specific lube oil consumption

Hydrogen to carbon (H/C) ratio of the fuel in use

Fuel data from the Bunker Delivery Note (BDN), such as viscosity and density.

Date of latest engine maintenance on BC-related engine parts (e.g. injection equipment, turbocharger and air filter, as well as piston rings / liner overhaul)

***

ANNEX 4

DRAFT AMENDMENTS TO MARPOL ANNEX VI

(Use of multiple engine operational profiles for a marine diesel engine including clarifying engine test cycles and clarification of entries in data reporting required by regulations 27 and 28)

Regulation 2
Definitions

1 Paragraph 2.1.19 is replaced by the following:

".19 *Irrational emission control strategy* means any strategy or measure that, when a marine diesel engine is operated under normal conditions of use, reduces the effectiveness of an emission control system to a level below that expected from the applicable emission test procedures."

Appendix I
Form of International Air Pollution Prevention (IAPP) Certificate (regulation 8)

Supplement to the International Air Pollution Prevention Certificate (IAPP Certificate)

2 New rows are to be added to the table in section 2.2.1 as follows:

For Tier I (below 13.7.1.2) enter new row:

"

9f	Tier I	NTC 8 (Multiple Engine Operational Profiles)	☐	☐	☐	☐	☐

"

For Tier II (below 13.7.1.2) enter new row:

"

10g	Tier II	NTC 8 (Multiple Engine Operational Profiles)	☐	☐	☐	☐	☐

"

For Tier III (below 13.7.1.2) enter new row:

"

11e	Tier III	NTC 8 (Multiple Engine Operational Profiles)	☐	☐	☐	☐	☐

"

Appendix II
Test cycles and weighting factors (regulation 13)

3 The full text of appendix II is replaced by the following:

"The following test cycles and weighting factors shall be applied for verification of compliance of marine diesel engines with the applicable NO_x limit in accordance with regulation 13 of this annex using the test procedure and calculation method as specified in the revised NO_x Technical Code 2008.

.1 For a fixed pitch propeller propulsion engine or a propeller-law operated non-propulsion engine, test cycle E3 shall be applied in accordance with table 1.

.2 For a propulsion engine that does not operate with a fixed pitch propeller, including an engine fitted as part of a diesel-electric installation or an engine operated with a controllable-pitch propeller, test cycle E2 shall be applied in accordance with table 2.

.3 For a non-propulsion engine that is a constant-speed engine, test cycle D2 shall be applied in accordance with table 3.

.4 For a non-propulsion engine that operates as a variable-speed engine, not included above, test cycle C1 shall be applied in accordance with table 4.

Table 1 – Test cycle for a marine diesel engine as given by .1 above propeller-law-operated main and propeller-law-operated auxiliary engine application

Test cycle E3	Speed	100%	91%	80%	63%
	Power	100%	75%	50%	25%
	Weighting factor	0.2	0.5	0.15	0.15

Table 2 – Test cycle for a *marine diesel engine as given by .2 above constant-speed main propulsion* application (including diesel-electric drive and all controllable-pitch propeller installations)

Test cycle E2	Speed	100%	100%	100%	100%
	Power	100%	75%	50%	25%
	Weighting factor	0.2	0.5	0.15	0.15

Table 3 – Test cycle for a marine diesel engine as given by .3 above

Test cycle D2	Speed	100%	100%	100%	100%	100%
	Power	100%	75%	50%	25%	10%
	Weighting factor	0.05	0.25	0.3	0.3	0.1

Table 4 – Test cycle for a marine diesel engine as given by .4 above

Test cycle C1	Speed	Rated				Intermediate			Idle
	Torque	100%	75%	50%	10%	100%	75%	50%	0%
	Weighting factor	0.15	0.15	0.15	0.1	0.1	0.1	0.1	0.15

In the case of marine diesel engine to be certified in accordance with paragraph 5.1.1 of regulation 13, the specific emission at each individual mode point shall not exceed the applicable NO_x emission limit value by more than 50% except as follows:

.1 The 10% mode point in the D2 test cycle.

.2 The 10% mode point in the C1 test cycle.

.3 The idle mode point in the C1 test cycle. "

Appendix IX
Information to be submitted to the IMO Ship Fuel Oil Consumption Database (regulation 27)

4 The section of "identity of the ship" is replaced as follows:

"**Identity of the ship**

IMO Number .....

Period of calendar year for which the data is submitted .....

For the purpose of regulation 27:

Start date (dd/mm/yyyy) .....

End date (dd/mm/yyyy) .....

For the purpose of regulation 28:

Start date (dd/mm/yyyy) .....

End date (dd/mm/yyyy) ..... "

5 In the section on "Fuel oil consumption data", the term "Oil-fired Boiler(s)" is replaced by "Fired Boiler(s)".

***

ANNEX 5

DRAFT AMENDMENTS TO THE NO_x TECHNICAL CODE 2008

(Use of multiple engine operational profiles for a marine diesel engine, including clarifying engine test cycles)[1]

Chapter 1 – General

1.3 Definitions

1 Paragraph 1.3.2 is replaced by the following:

"1.3.2 *Substantial modification of a marine diesel engine* means:

.1 For engines installed on ships constructed on or after 1 January 2000, *substantial modification* means any modification to an engine that could potentially cause the engine to exceed the applicable emission limit set out in regulation 13. Routine replacement of engine components by parts specified in the technical file that do not alter emission characteristics shall not be considered a "substantial modification" regardless of whether one part or many parts are replaced. For the recertification of such an engine following a substantial modification, the version of the NO_x Technical Code that was used for the original certification will apply except if the engine was or is now equipped with an auxiliary control device or has multiple engine operational profiles. Where an auxiliary control device is fitted, the requirements of 2.5 and 3.3 of this Code will apply. Where there are multiple engine operating profiles the requirements of chapter 8 of this Code will apply.

.2 For engines installed on ships constructed before 1 January 2000, *substantial modification* means any modification made to an engine that increases its existing emission characteristics established by the simplified measurement method as described in 6.3 in excess of the allowances set out in 6.3.11. These changes include, but are not limited to, changes in its operations or in its technical parameters (e.g. changing camshafts, fuel injection systems, air systems, combustion chamber configuration, or timing calibration of the engine). The installation of a certified approved method pursuant to regulation 13.7.1.1 or certification pursuant to regulation 13.7.1.2 is not considered to be a substantial modification for the purpose of the application of regulation 13.2 of the annex. For recertification of such an engine following a substantial modification, 2.5, 3.3 and, where that engine has multiple engine operating profiles, chapter 8 of this Code will apply."

[1] Note: upon adoption by MEPC 83, the draft amendments set out in this annex are expected to enter into force in March 2027 (same entry-into-force date as that of the revised MARPOL Annex VI).

2 New paragraphs 1.3.21 to 1.3.37 are added as follows:

"1.3.21 *Engine operational profile* means a particular set of NO_x influencing settings applied in the base emission control strategy which influences the NO_x emission performance. Those settings may relate to, but are not limited to, fuel injection, inlet and exhaust valve operation, charge air management, exhaust bypass/wastegate or exhaust after-treatment controls and auxiliary control devices.

1.3.22 *Multiple engine operational profiles* means that more than one engine operational profile is available for selection on a marine diesel engine.

1.3.23 *Auxiliary control device* means a system, function or control strategy installed on a marine diesel engine that is used to protect the engine and/or its ancillary equipment against operating conditions that could result in damage or failure, or that is used to facilitate the starting of the engine. An auxiliary control device may also be a strategy or measure that has been satisfactorily demonstrated not to be a defeat device. An auxiliary control device includes any element of design that includes sensors, or other arrangements which, by an action of the control system, can activate, modulate, delay or deactivate the operation of any part of the base emission control system. Any device or strategy the activation of which causes a non-progressive change in emissions is also an auxiliary control device. An auxiliary control device not declared at the time of the first certification of a marine diesel engine shall be considered a defeat device.

1.3.24 *Defeat device* means a device that measures, senses or responds to operating variables (e.g. engine speed, temperature, intake pressure or any other parameter) for the purpose of activating, modulating, delaying or deactivating the operation of any component or the function of the emission control system such that the effectiveness of the emission control system is reduced under conditions encountered during normal operation, unless the use of such a device is substantially included in the applied emission certification test procedures. An auxiliary control device accepted as part of the Administration's review of the NO_x certification pack is not a defeat device.

1.3.25 *Base emission control strategy* means the emission control strategy active at any time an auxiliary control device is not active. It consists of any parameter, element of design, or operating control that is designed to modulate as a function of engine load and/or speed in a manner that affects the emission performance of the engine. The modulation of parameters is to be progressive and not result in disproportionate change in emissions.

1.3.26 *Rational emission control strategy* means the base emission control strategy applied to a marine diesel engine which ensures that the emission values at the individual mode points as used to give the weighted specific emission value are representative of the emission values during normal operation of the engine.

1.3.27 *Irrational emission control strategy* means any strategy or measure that, when a marine diesel engine is operated under normal conditions of use, reduces the effectiveness of an emission control system to a level below that expected from the applicable emission test procedures.

1.3.28 *Not to exceed emission limit value* means the maximum permitted NO_x emission value at a given operating condition as determined in accordance with 3.3 of this Code within the not to exceed zone of the engine.

1.3.29 *Not to exceed zone* means the power or torque and speed area of a marine diesel engine within the limit area of the not to exceed zone as declared by the applicant that the engine is certified to operate within under steady-state conditions. In the case of the C1 cycle, as given by 3.2 of this Code, the not to exceed zone corresponds to the whole of the limit area of the not to exceed zone.

1.3.30 *Limit area of the not to exceed zone* means the power or torque and speed boundaries of the not to exceed zone at and above 25% rated power for all test cycles as given by 3.2 of this Code except for the C1 cycle where it is at and above 50% engine load.

1.3.31 *Point emission value* means the NO_x emission value expressed in terms of g/kWh at the reference conditions of humidity and temperature given by this Code at a particular power or load and speed point.

1.3.32 *NO_x certification pack* means the package of information supplied by the applicant to the Administration as required to be submitted by 2.5 and 3.3 of this Code.

1.3.33 *Propulsion engine* means a marine diesel engine that is used for direct or indirect propulsion. A propulsion engine may additionally perform non-propulsion duties during or separately to propulsion duties.

1.3.34 *Non-propulsion engine* means a marine diesel engine that is not a propulsion engine. An engine that solely or in part provides athwartships movement of a ship is not a propulsion engine.

1.3.35 *Constant-speed engine* means a marine diesel engine that is limited to constant-speed operation.

1.3.36 *Constant-speed engine operation* means a marine diesel engine regulated by a speed control device that automatically controls the operator demand to maintain engine's nominal speed across the load range.[2]
Additionally, an idle speed setting may be provided that can be used during start-up or shutdown.

1.3.37 *Variable-speed engine* means an engine that is not a constant-speed engine."

Chapter 2 – Surveys and certification

3 A new section 2.5 is added as follows:

"**2.5 Rational emission control strategy**

2.5.1 In addition to 2.2, the requirements of this section shall apply.

2.5.2 A rational emission control strategy shall be applied to each marine diesel engine across the whole of its operating load and speed range. The means by which that is achieved shall be documented by the applicant to the Administration within a NO_x certification pack. The information included in that pack shall be such as to demonstrate to the satisfaction of the Administration that a rational emission control strategy is applied during normal operation of the engine.

[2] In service, such a speed control device may either maintain a fixed speed or a load dependent speed such that at maximum load the speed could be up to around 10% lower than at zero load.

2.5.3 For an engine where one or more auxiliary control devices are applied, each of those shall be declared to the Administration within the NO_x certification pack irrespective of whether those operate under steady-state or transient conditions. An auxiliary control device which is not so declared shall be considered a defeat device and hence invalidate the NO_x certification of an engine to which such an undeclared device is applied.

2.5.4 For screening of the base emission control strategy, the NO_x certification pack shall include:

.1 a list of all NO_x emission influencing setting and operating values controlled by an engine's base emission control strategy, for example, but not limited to fuel injection, inlet and exhaust valve operation, charge air management, exhaust bypass/wastegate or exhaust after-treatment controls;

2. a record of the reference values for the settings and operating values identified in 2.5.4.1 at each of the mode points of the applicable test cycle;

.3 documentation that whenever the engine is operating between two mode points as identified in 2.5.4.2, the emission control strategy interpolates progressively between the mode points;

.4 documentation to show that, along lines of constant power and varying speed from the line between the mode points to the limit area of the not to exceed zone of the engine, the base emission control strategy shall ensure that any variation in the point emission values is progressive and justified from the value at that power on the line between the mode points, unless rationalized by an auxiliary control device or explained by a physical limitation of the engine;

.5 a declaration that the engine's base emission control strategy only reacts to changes in engine load and speed;

.6 any other information the applicant considers relevant; and

.7 any other information the Administration requests.

2.5.5 For each auxiliary control device which may operate under steady-state conditions the NO_x certification pack shall include:

.1 a justification of the need for that device; and

.2 a description for that device, including:

.1 details of the conditions under which that device will operate and the functioning of that device;

.2 how each modulated parameter of the emission control system achieves the stated purpose of the base emission control strategy;

.3 the process used to ensure that the modulation is limited to the conditions where the stated purpose of the auxiliary control device operational strategy arises and to set the modulation to be the minimum necessary to achieve that stated purpose;

.4 the effect of the application of that device on the engine's base emission control strategy;

.5 for auxiliary control devices that operate above 25% engine power, the effect on the point emission values shall be documented;

.6 for auxiliary control devices that operate within the declared not to exceed zone, an estimate of the effect on the point emission values shall be documented;

.7 any other information the applicant considers relevant; and

.8 any other information the Administration requests.

.3 Auxiliary control devices that only operate during transient conditions need not be included in the NO_x certification pack for screening.

2.5.6 The technical file as required by 2.3.4 shall contain the following information:

.1 identification of those auxiliary control devices declared under 2.5.3;

.2 for those auxiliary control devices covered under 2.5.5, the operating conditions which will cause those devices to function;

.3 the means by which the operation of those auxiliary control devices under 2.5.5 may be verified as part of the onboard NO_x verification procedure; and

.4 where the provisions of 2.3.6 apply, the means by which it is to be verified that the required quantities of additional substance used are consistent with achieving the engine's intended base emission control strategy shall be included as part of the onboard NO_x verification procedure.

2.5.7 Where acceptable to the Administration, the documentation requirements of 2.5.4 and 2.5.5 may alternatively be made by reference to that in respect of marine diesel engines comparable, in terms of NO_x emissions characteristics, to the engine to be certified.

2.5.8 The provisions of this section only apply to a marine diesel engine which is installed in a ship as an identical replacement engine if the requirements of this section applied at the time the engine family or engine group to which that engine belongs was first certified."

Chapter 3 – Nitrogen oxides emission standards

3.1 Maximum allowable NO_x emission limits for marine diesel engines

4 Paragraph 3.1.4 is replaced by the following:

"3.1.4 In the case of a marine diesel engine to be certified in accordance with paragraph 5.1.1 of regulation 13, the specific emission at each individual mode point shall not exceed the applicable NO_x emission limit value by more than 50% except as follows:

.1 The 10% mode point in the D2 test cycle specified in 3.2.4.

.2 The 10% mode point in the C1 test cycle specified in 3.2.5.

.3 The idle mode point in the C1 test cycle specified in 3.2.5."

3.2 Test cycles and weighting factors to be applied

5 Section 3.2 is replaced by the following:

"**3.2 Test cycles and weighting factors to be applied**

3.2.1 For every individual engine or parent engine of an engine family or engine group, one or more of the relevant test cycles specified in 3.2.2 to 3.2.5 shall be applied for verification of compliance with the applicable NO_x emission limit contained in regulation 13. Appendix IX provides guidance on the selection of the appropriate test cycle but where discrepancies exist the text of chapter 3 takes precedence.

3.2.2 For a fixed pitch propeller propulsion engine or a propeller-law operated non-propulsion engine, test cycle E3 shall be applied in accordance with table 1.

3.2.3 For a propulsion engine that does not operate with a fixed pitch propeller, including an engine fitted as part of a diesel-electric installation or an engine operated with a controllable-pitch propeller, test cycle E2 shall be applied in accordance with table 2.

3.2.4 For a non-propulsion engine that is a constant-speed engine, test cycle D2 shall be applied in accordance with table 3.

3.2.5 For a non-propulsion engine that operates as a variable-speed engine, not included above, test cycle C1 shall be applied in accordance with table 4.

Table 1 – *Test cycle for a marine diesel engine meeting paragraph 3.2.2*

Test cycle E3	Speed	100%	91%	80%	63%
	Power	100%	75%	50%	25%
	Weighting factor	0.2	0.5	0.15	0.15

Table 2 – *Test cycle for a marine diesel engine meeting paragraph 3.2.3*

Test cycle E2	Speed	100%	100%	100%	100%[3]
	Power	100%	75%	50%	25%
	Weighting factor	0.2	0.5	0.15	0.15

Table 3 – *Test cycle for a marine diesel engine meeting paragraph 3.2.4*

Test cycle D2	Speed	100%	100%	100%	100%	100%
	Power	100%	75%	50%	25%	10%
	Weighting factor	0.05	0.25	0.3	0.3	0.1

Table 4 – *Test cycle for a marine diesel engine meeting paragraph 3.2.5*

Test cycle C1	Speed	Rated				Intermediate			Idle
	Torque	100%	75%	50%	10%	100%	75%	50%	0%
	Weighting factor	0.15	0.15	0.15	0.1	0.1	0.1	0.1	0.15

3.2.6 The torque figures given in test cycle C1 are percentage values that represent for a given test mode the ratio of the required torque to the maximum possible torque at this given speed.

3.2.7 The intermediate speed for test cycle C1 shall be declared by the manufacturer, taking into account the following requirements:

.1 For engines that are designed to operate over a speed range on a full load torque curve, the intermediate speed shall be the declared maximum torque speed if it occurs between 60% and 75% of rated speed.

.2 If the declared maximum torque speed is less than 60% of rated speed, then the intermediate speed shall be 60% of the rated speed.

.3 If the declared maximum torque speed is greater than 75% of the rated speed, then the intermediate speed shall be 75% of rated speed.

.4 For engines that are not designed to operate over a speed range on the full load torque curve at steady-state conditions, the intermediate speed will typically be between 60% and 70% of the maximum rated speed.

3.2.8 If an engine manufacturer applies for a new test cycle application on an engine already certified under a different test cycle specified in 3.2.2 to 3.2.5, then it may not be necessary for that engine to undergo the full certification process for the new

[3] There are exceptional cases, including large bore engines intended for E2 applications, in which, owing to their oscillating masses and construction, engines cannot be run at low load at nominal speed without the risk of damaging essential components. In such cases, the engine manufacturer shall make application to the Administration that the test cycle as given in table 2 above may be modified for the 25% power mode with regard to the engine speed. The adjusted engine speed at 25% power, however, shall be as close as possible to the rated engine speed, as recommended by the engine manufacturer and approved by the Administration. The applicable weighting factors for the test cycle shall remain unchanged.

application. In this case, the engine manufacturer may demonstrate compliance by recalculation, by applying the measurement results from the specific modes of the first certification test to the calculation of the total weighted emissions for the new test cycle application, using the corresponding weighting factors from the new test cycle."

6 A new section 3.3 is added as follows:

"**3.3 Not to exceed emission values within the limit area of the not to exceed zone**

3.3.1 The boundaries, in terms of power or torque and speed, of the not to exceed zone at or above 25% power are to be declared to the Administration by the applicant as part of the NO_x certification pack. Operation outside these not to exceed zone boundaries, within the limit area of the not to exceed zone, shall only be permitted during starting, stopping, accelerations, deceleration, load pick-up or load rejection. However, operation below 25% power and at or above 63% speed for the E3, E2, and D2 test cycles and below 50% load for the C1 test cycle shall be permitted subject to it being shown in accordance with the requirements of 2.5 that a rational emission control strategy continues to be applied.

3.3.2 The technical file as required by 2.3.4 shall additionally contain the following information:

.1 the power or torque and speed boundaries, as given by 3.3.1, within which the engine is certified to operate; and

.2 the onboard NO_x verification procedure shall include means to verify that the engine only operates within the power or torque and speed boundaries as given by 3.3.1.

3.3.3 Additional to the emission testing under 3.2 the Administration may, at its discretion, require that up to three point emission values be determined at load points within the not to exceed zone in order to verify that the not to exceed zone requirements are complied with. The load points to be tested shall be agreed between the applicant and the Administration as part of the review of the NO_x certification pack. Point emission values are to be determined in accordance with the procedures given by chapter 5 and appendix X. To be acceptable each of those point emission values so determined shall not exceed the respective not to exceed emission limit value, N_{Lz}, as determined using the procedure in appendix X.

Point emission value ≤ emission limit value, N_{Lz}, at that point

3.3.4 Alternative means by which it is to be shown that a point emission value may be determined or the not to exceed zone requirements are complied with may be used subject to their acceptability to the Administration.

3.3.5 For member engines of engine families or engine groups first certified prior to the entry into force of the requirements under this section, demonstration of compliance with the requirements of this section may be on the basis solely of documentation which is to be acceptable to the Administration."

Chapter 4 – Approval of serially manufactured engines: Engine family and engine group concepts

7 In paragraph 4.3.8.2, sub-paragraphs 4.3.8.2.12 to 4.3.8.2.14 are added, after the existing sub-paragraph 4.3.8.2.11, as follows:

".12 multiple engine operational profiles as covered by chapter 8.

.13 base emission control strategy.

.14 auxiliary control devices."

8 Paragraph 4.3.10.5 is deleted.

Chapter 6 – Procedures for demonstrating compliance with NO_x emissions on board

9 In paragraph 6.2.2.3, at the end of sub-paragraph 6.2.2.3.15, the word "or" is deleted, at the end of sub-paragraph 6.2.2.3.16, "." is replaced with ",", and new sub-paragraphs 6.2.2.3.17 to 6.2.2.3.19 are added after sub-paragraph 6.2.2.3.16 as follows:

".17 list of identification references of all engine operational profiles available for the engine and, if applicable, the conditions under which each is to be used (see chapter 8),

.18 list of auxiliary control devices accepted for the engine and the operating conditions under which those devices function, or

.19 the engine power or engine load and speed boundaries above 25% engine power within which the engine is certified to operate."

10 A new chapter 8 is added as follows:

"**Chapter 8 – Multiple engine operational profiles**

8.1 Acceptance of multiple engine operational profiles

8.1.1 The switching between engine operational profiles under onboard conditions is permitted, subject to the provisions of this chapter, in the following cases:

.1 for a marine diesel engine certified to be in-service switchable between emission Tiers;

.2 for a marine diesel engine certified to more than one test cycle application in accordance with 3.2 where the engine operational profile is in-service switchable based on the duty the engine is performing; or

.3 for a marine diesel engine certified to the same emission standard, the same rated power, same rated speed and the same test cycle which is in-service switchable between multiple engine operational profiles.

8.1.2 A marine diesel engine certified in accordance with 8.1.1.1 and/or 8.1.1.2 may additionally be switchable, at a particular tier and or duty, between multiple engine operational profiles in which cases the provisions of 8.1.1.3 also apply.

8.1.3 Each engine operating profile is to be identified in the technical file as required by 2.3.4 together with the conditions, if applicable, under which each engine operating profile is to be used.

8.2 Certification of multiple engine operational profiles

8.2.1 For a marine diesel engine to which 8.1.1.1 applies, the parent engine test report for each tier shall be included in the technical file as required by 2.4.1.5. The parent engine specific emission value for each tier shall be entered under 1.9.6 of the Supplement to the EIAPP Certificate.

8.2.2 For a marine diesel engine to which 8.1.1.2 applies, the parent engine test report for each test cycle shall be included in the technical file as required by 2.4.1.5. The test cycles for which the engine is certified shall be shown on the EIAPP Certificate. The parent engine specific emission value for each test cycle shall be entered and identified under 1.9.6 of the Supplement to the EIAPP Certificate.

8.2.3 For a marine diesel engine to which 8.1.1.3 applies:

.1 the engine test report for each engine with the parent engine features and characteristics identified in 4.3.9 or 4.4.8, for each engine operational profile, shall be determined in accordance with the provisions of chapter 5 of this Code. Where there is a mode point condition which is the same among the different engine operational profiles, that is not required to be repeated for each test cycle. The required testing may not necessarily be undertaken on the same physical engine;

.2 the specific emission value determined in accordance with 5.12.6.1 for each engine operational profile shall not exceed the applicable limit value as given by regulation 13;

.3 the multiple engine operational profile parent engine specific emission value shall be determined in accordance with 5.12.6.1 from the highest NO_x emission rate, q_{mgasi} as per 5.12.5.2, at each mode point across all the engine operational profiles for which the engine is to be certified;

.4 the parent engine test report for each engine operational profile for which the engine is to be certified shall be included in the technical file as required by 2.4.1.5 together with the determination of the multiple engine operational profile parent engine specific emission value;

.5 the multiple engine operational profile parent engine specific emission value shall be entered under 1.9.6 of the Supplement to the EIAPP Certificate; and

.6 Section 2.2.1 of the Supplement to the IAPP Certificate shall be completed to identify which engines installed on a ship are approved to operate with multiple engine operational profiles.

8.3 Use of multiple engine operational profiles

8.3.1 An engine operational profile shall only be used in accordance with the associated conditions as given in the technical file.

8.3.2 The identification reference of the engine operational profile in use shall be recorded as part of the onboard NO_x verification procedure together with data that demonstrates that the conditions attached to the use of that engine operational profile were being complied with.

8.3.3 On change from one engine operational profile to another, the date and time of the completion of that change shall be recorded as part of the onboard NO_x verification procedure for that engine."

Appendix V – Parent engine test report and test data

11 The title of appendix V is replaced by the following:

"**Parent engine test report, test data, and determination of the highest composite specific emission value**"

12 Title of section 1 is replaced by the following:

"**Section 1 – Parent engine test report**
(see 5.10 and 8.2 of the Code)"

13 Title of section 2 is replaced by the following:

"**Section 2 – Parent engine test data to be included in the technical file, additionally, for marine diesel engines to which 8.1.1.3 applies, the relevant test data for all engine operational profiles for which the engine is certified which are to be included in the technical file** *(see 2.4.1.5 and 8.2 of the Code)*"

14 A new section 3 is added after existing section 2 as follows:

"**Section 3 – Multiple engine operational profile parent engine, determination of the composite specific emission value to be included in the technical file for engines with those multiple engine operational profiles**
(see 8.2 of the Code)

Calculation of the highest composite specific emission value in accordance with 8.2.3.3."

Appendix VII – Checklist for an engine parameter check method

15 In paragraph 1, at the end of sub-paragraph 1.14.1, "." is replaced with ";", and sub-paragraphs 1.15 to 1.17 are added after existing sub-paragraph 1.14 as follows:

"1.15 list of identification references of all engine operational profiles available for the engine and associated conditions, if applicable, under which each is to be used (see chapter 8);

1.16 list of auxiliary control devices accepted for the engine and the operating conditions under which those devices function;

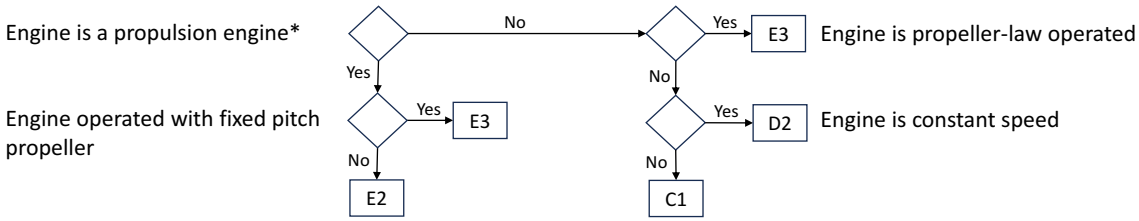
1.17 the engine power or engine load and speed boundaries within which the engine is certified to operate."

16 A new appendix IX is added as follows:

"**Appendix IX – Flow chart for engine certification test cycle determination**

(refer to 3.2 of the Code)

Test cycle selection flowchart



* A propulsion engine may additionally perform non-propulsion duties during or separately to propulsion duties. An engine that solely or in part provides athwartships movement of a ship is not a propulsion engine.

"

17 A new appendix X is added as follows:

"**Appendix X – Calculation of not to exceed emission limit value within not to exceed zone**

(refer to 5 of the Code)

1 This appendix describes the method for determining the not to exceed emission limit value, N_{Lz}, at any point within the not to exceed zone for comparison with a determined point emission value as set out in 3.3 of this Code.

2 Where engine test results are used to determine a point emission value, formula (1) shall be used to generate that value. At that point the tolerance requirements of 5.9.6.2 of this Code apply:

$$N_{Mn} = \frac{q_{mNOx}}{P_{Mn}} \quad (1)$$

where:

N_{Mn} = NO_x at the point *Mn* in g/kWh

P_{Mn} = Power at the point *Mn* (brake plus auxiliary) in kW

q_{mNOx} = Mass flow rate of NO_x in g/h – see 5.12.5.2 of this Code

q_{mNOx} is to be corrected for humidity and temperature consistent with the method used for the engine test from 5.12.4 of this Code.

3 Designation of not to exceed zone for E2, E3 and D2 test cycles in limit area of the not to exceed zone

3.1 The limit area of the not to exceed zone for engines certified to the E2 and E3 test cycles is defined by a speed boundary of equal to or greater than 63% and a power boundary of equal to or greater than 25%. The limit area of the not to exceed zone for the D2 cycle is defined by a power boundary of equal to or greater than 25%, at the nominal speed of the engine.

3.2 For the E3 and variable-speed application of the E2 cycle certified engines, the applicant is to define, in accordance with 3.3.1 of this Code, the not to exceed zone within the limit area of the not to exceed zone as wide or as narrow as applicable for their intended applications of the engine. The applicant-defined not to exceed zone shall encompass all normal steady-state speed load combinations within the limit area of the not to exceed zone for the applications of the engine.

3.3 The applicant's designated not to exceed zone can be defined by any mathematical formula(e), lists of coordinates or other method of defining the boundary. The not to exceed zone does not need to extend to the boundary of the limit area of the not to exceed zone.

3.4 For D2 and constant-speed E2 cycle certified engines, the not to exceed zone will be a line of power greater than 25% at the nominal speed.

4 Determination of not to exceed emission limit value for E2, E3 and D2 test cycles

4.1 The not to exceed emission limit value at each NO_x checkpoint shall be determined in accordance with the requirements of this section.

Note: if there is an auxiliary control device that causes a NO_x discontinuity within the not to exceed zone, follow the additional procedure in section 6 to insert proxy NO_x emission points to address the area(s) of discontinuity.

4.2 Interpolated NO_x value N_y at power P_y between mode points as determined using formula (2):

$$N_y = N_{Ma} + \left(P_y - P_{Ma}\right) \cdot \frac{(N_{Mb} - N_{Ma})}{(P_{Mb} - P_{Ma})} \quad (2)$$

where:

N_y = Interpolated NO_x value at power P_y

N_{Ma} = Measured point emission value according to formula (1) at nearest measured mode point at power below checkpoint power

N_{Mb} = Measured point emission value according to formula (1) at nearest measured mode point at power above checkpoint power

P_y = Power at checkpoint

P_{Ma} = Power at mode point below checkpoint

P_{Mb} = Power at mode point above checkpoint

4.3 Determine the not to exceed emission limit value at power P_y between the mode points, to the Tier, as applicable.

.1 For Tier II

The not to exceed emission limit value at power P_y is given by formula (3)

$$N_{Lv} = N_y \cdot 1.2 \quad (3)$$

where:

N_{Lv} = Not to exceed emission limit value at power P_y

N_y = Interpolated NO_x value at power P_y

.2 For Tier III

The not to exceed emission limit value, N_{Lv}, at power P_y shall be either set by 3.1.4 of this Code or as determined in accordance with formula (4), whichever is the lower.

N_{Lv} is the lower of N_{cap} or N_{LV},

with:

$$N_{LV}, = N_y + 0.25 \cdot N_{LC} \quad (4)$$

$$N_{cap} = 1.5 \cdot N_{LC} \quad (5)$$

where:

N_{LC} = NO_x cycle limit for engine

N_{Cap} = the maximum mode point value for the engine according to 3.1.4 of this Code

4.4 If the checkpoint power P_y is on the propeller law curve for an E3 certified engine or the nominal speed line for a constant-speed E2 or a D2 certified engine:

$$N_{Lz} = N_{Lv} \quad (6)$$

For this situation the determination of the not to exceed emission limit value, N_{Lz}, is complete for that checkpoint. Otherwise continue with 4.5.

4.5 For E3 and variable-speed application of the E2 cycle certified engines, where the checkpoint power P_y is located at a speed not on the line between the measured mode points, carry out the additional procedure in 4.5.1 to 4.5.4.

.1 Determine the NO_x limit at either edge of the not to exceed zone, N_{Le}, for the selected checkpoint power P_y along a line of constant power, in accordance with formula (7):

$$N_{Le} = N_y \cdot F_\beta \cdot 1.5 \quad (7)$$

with:

$$F_\beta = \frac{N_{LC}}{N_C} \quad (8)$$

where:

N_{Le} = NO_x limit at edge of not to exceed zone

N_{LC} = NO_x cycle limit for engine

N_C = NO_x specific emission value for the engine from 5.12.6.1 of this Code

.2 Determine the not to exceed emission limit value at a checkpoint power P_y which is on the constant power line between the mode point line and the edge of the not to exceed zone in accordance with formula (9):

$$N_{Lz\prime} = N_{Lv\prime} + (n_z - n_v) \cdot \frac{(N_{Le} - N_{Lv\prime})}{(n_e - n_v)} \quad (9)$$

with:

For tier II, $N_{Lv\prime} = N_{Lv}$ from formula (3)

For tier III, $N_{Lv\prime}$ is from formula (4)

where:

$N_{Lz\prime}$ = NO_x limit at required checkpoint

N_{Le} = NO_x limit at edge of not to exceed zone

n_z = Speed at required checkpoint

n_e = Speed at edge of applicants selected not to exceed zone at checkpoint power (may be on lower or higher side of mode line as required for value of n_z)

n_v = Speed on measured mode line at selected power

For engines certified to the E2 test cycle, the speed on the measured mode line, n_v, is the nominal speed

For engines certified to the E3 test cycle, the speed on the measured mode line, n_v, is determined by the cube law propeller curve:

$$n_v = n_{MCR} \cdot \sqrt[3]{\frac{P_y}{P_{MCR}}} \quad (10)$$

where:

n_{MCR} = Rated speed from 1.3.12 of this Code

P_y = Power at checkpoint

P_{MCR} = Rated power from 1.3.11 of this Code

.3 Determine the not to exceed emission limit value at power P_y as applicable:

.1 For Tier II

The NO_x limit is the interpolated result:

$$N_{Lz} = N_{Lz'} \quad (11)$$

.2 For Tier III

The not to exceed emission limit value at power P_y shall be set by 3.1.4 of this Code or as determined in accordance with 4.5.3.1 whichever is lower:

N_{Lz} is the lower of N_{cap} or $N_{Lz'}$

5 Determination of not to exceed emission limit value for the C1 test cycle

5.1 For the C1 test cycle within the limit area of the not to exceed zone, screening is conducted between the measured mode points of 100%, 75%, and 50% load at both intermediate speed (mode points 5, 6 and 7 respectively) and rated speed (mode points 1, 2 and 3 respectively).

This creates two zones, Zone A and Zone B, where double linear interpolation or extrapolation is carried out between the nearest mode points:

.1 Zone A uses mode points 5, 1, 6 and 2. Zone A may extend above the torque line from mode point 5 and mode point 1 or beyond the speed line from mode point 1 to mode point 5.

.2 Zone B uses mode points 6, 2, 7 and 3. Zone B may extend beyond the speed line from mode point 2 to mode point 3.

.3 The applicant may request that the Administration exclude operating points from the limit area of the not to exceed zone screening if the applicant can demonstrate that the engine is not capable of operating at steady state at those points when installed on a ship. Otherwise, the not to exceed zone consists of the entire limit area of the not to exceed zone.

5.2 Determine if the checkpoint is in Zone A or Zone B by determining if the checkpoint torque, T_z, is higher or lower than the torque on the boundary between Zone A and Zone B (75% load line) for the checkpoint speed.

$$T_v = T_{M6} + (n_z - n_I) \cdot \frac{(T_{M6} - T_{M2})}{(n_I - n_R)} \quad (12)$$

where:

T_v = Torque at checkpoint speed on a straight line between mode point 6 and mode point 2 (75% load line)

T_{M6} = Torque at mode point 6 (75% of torque at intermediate speed)

T_{M2} = Torque at mode point 2 (75% of torque at rated speed)

n_z = Checkpoint speed

n_I = Intermediate speed

n_R = Rated speed

5.3 Determine the interpolated/extrapolated NO_x value at desired checkpoint:

.1 If the checkpoint torque, T_z, is greater than T_v, use equation (13) and (14) for the interpolation or extrapolation.

$$N_z = N_u + (T_Z - T_u) \cdot \frac{(N_u - N_v)}{(T_u - T_v)} \quad (13)$$

with:

$$T_U = T_{M5} + (n_z - n_I) \cdot \frac{(T_{M5} - T_{M1})}{(n_I - n_R)} \quad (14)$$

where:

T_{M1} = Torque at mode point 1 (100% of torque at rated speed)
T_{M5} = Torque at mode point 5 (100% of torque at intermediate speed)

T_v = Torque at checkpoint speed on a straight line between mode point 6 and mode point 2 (75% load line) from formula (12)

T_u = Torque at checkpoint speed on a straight line between mode point 5 and mode point 1 (100% load line) from formula (14)

T_z = Torque at checkpoint

N_u = Interpolated NO_x at checkpoint speed on 100% load line

N_v = Interpolated NO_x at checkpoint speed on 75% load line

n_z = Checkpoint speed

n_I = Intermediate speed

n_R = Rated speed

.2 If the checkpoint torque, T_z, is less than T_v use equation (15) and (16) for the interpolation or extrapolation.

$$N_z = N_v + (T_Z - T_v) \cdot \frac{(N_v - N_w)}{(T_v - T_w)} \quad (15)$$

with:

$$T_w = T_{M7} + (n_z - n_I) \cdot \frac{(T_{M7} - T_{M3})}{(n_I - n_R)} \quad (16)$$

where:

T_{M3} = Torque at mode point 3 (50% of torque at rated speed)

T_{M7} = Torque at mode point 7 (50% of torque at intermediate speed)

T_v = Torque at checkpoint speed on a straight line between mode point 6 and mode point 2 (75% load line) from formula (12)

T_w = Torque at checkpoint speed on a straight line between mode point 7 and mode point 3 (50% load line) from formula (16)

T_z =Torque at checkpoint

N_v = Interpolated NO_x at checkpoint speed on 75% load line

N_w = Interpolated NO_x at checkpoint speed on 50% load line

n_z = Checkpoint speed

n_I = Intermediate speed

n_R = Rated speed

5.4 Determine the not to exceed emission limit value at checkpoint:

.1 For Tier II

The not to exceed emission limit value is given by formula (17):

$$N_{Lz} = N_z \cdot 1.2 \quad (17)$$

where:

N_{Lz} = Not to exceed emission limit value at checkpoint

N_z = Interpolated NO_x value at power P_z

.2 For Tier III
The not to exceed emission limit value shall be either set by 3.1.4 of this Code or as determined in accordance with 5.3, whichever is the lower:

N_{Lz} is the lower of N_{cap} or $N_{Lz'}$

with:

$$N_{Lz'} = N_z + 0.25 \cdot N_{LC} \quad (18)$$

$$N_{cap} = 1.5 \cdot N_{LC} \quad (19)$$

where:

N_z = Interpolated NO_x value at checkpoint

N_{LC} = NO_x cycle limit for engine

N_{Cap} = the maximum mode point value according to 3.1.4 of this Code

6 Method to address discontinuity in the operation zone due to an auxiliary control device

6.1 For each approved auxiliary control device, where there is operation in the not to exceed zone that causes a discontinuity in the NO_x emissions it can be necessary to introduce additional proxy mode points to account for the discontinuity in the area of engine operation where that auxiliary control device is active.

6.2 There will be two or more proxy mode points to cover the action of an auxiliary control device.

6.3 N_y is calculated in the same manner as 4.2 using the proxy points where necessary in the interpolation.

6.4 Use good engineering judgement that may include simulation or in-house testing to determine the appropriate NO_x level and location of the proxy points.

6.5 The engine power of the proxy mode points may overlap to account for hysteresis that may occur as a result of approaching the points from rising or falling power. The overlap should also take into account any variation in the operating point of the auxiliary control device based on engine speed.

6.6 Include the proxy mode points as part of the auxiliary control device documentation supplied to the Administration in the NO_x certification pack."

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ANNEX 6

DRAFT AMENDMENTS TO THE NO_x TECHNICAL CODE 2008

(Certification of an engine subject to substantial modification or being certified to a Tier to which the engine was not certified at the time of its installation)[*]

Chapter 7 – Certification of an existing engine

1 Chapter 7 is split into two sections with the following headlines:

"7.1 Certification of an existing engine under regulation 13.7"

and

"7.2 Certification of an engine subject to substantial modification or being certified to a Tier to which the engine was not certified at the time of its installation"

2 Existing paragraphs 7.1 to 7.6 are renumbered sub-paragraphs 7.1.1 to 7.1.6

3 New sub-paragraphs 7.2.1 to 7.2.12 are added as follows:

"7.2.1 Further to 2.1.1.4, 2.1.2.2 and 4.4.4, the procedures as given in this section shall be followed where an installed marine diesel engine:

.1 has been subject to substantial modification; or

.2 is to be certified to a Tier to which it was not certified at the time of its installation.

7.2.2 The requirements of this Code apply other than as specifically provided for by this section.

7.2.3 The procedures given by this section may be accepted for an Individual Engine or for an Engine Group represented by the Parent Engine. It shall not be accepted for Engine Family certification.

7.2.4 Where, as a result of the substantial modification, the rated power and/or the rated speed of the engine is altered from the original condition the engine nameplate shall be replaced accordingly.

7.2.5 In setting the load points of the test cycle to be followed the provisions of 6.4.6.7 shall apply. In the case of the 100% load point this shall, subject to the Engine Emission test plan, be allowed to be no lower than 85% of rated power. If that value cannot be achieved, then the test shall be deferred to such time that at least that power level can be achieved. The test cycle 100% power weighting factor under 3.2 shall be applied irrespective of actual power developed at that load point.

7.2.6 At each load point of a test cycle, the provisions of 6.4.6.8 shall apply rather than those of 5.9.6.2.

[*] Note: upon adoption by MEPC 83, the draft amendments set out in this annex are expected to enter into force in September 2026.

7.2.7 In the case of the E3 test cycle, if the actual propeller curve differs from the E3 curve, the load point used shall be set using the measured engine power.

7.2.8 Engine performance and ambient condition monitoring equipment requirements shall be in accordance with the requirements of 6.4.5.1.

7.2.9 In terms of the NO_x correction for humidity and temperature, the provisions of 6.4.13 shall apply.

7.2.10 The Engine Emission test plan as prepared by the applicant shall be agreed with the Administration before scheduling that test.

7.2.11 The certification of a Member Engine of the Engine Group as established following the provisions of this section shall follow the procedures specified in 2.2.2.

7.2.12 Guidance in respect of the certification of a marine diesel engine subject to substantial modification or being certified to a Tier to which the engine was not certified at the time of its installation is given by figure 4 of appendix II of this Code. Where discrepancies exist, the text of the NO_x Technical Code 2008 takes precedence."

Appendix II

Flow charts for survey and certification of marine diesel engines (refer to 2.2.9 and 2.3.11 of the NO_x Technical Code 2008)

4 The existing title of appendix II is replaced as follows:

"Flow charts for survey and certification of marine diesel engines (refer to 2.2.9, 2.3.11 and 7.2.12 of the NO_x Technical Code 2008)"

5 In the chapeau, a new line "Figure 4: Certification of an existing engine subject to substantial modification or being certified to a Tier to which the engine was not certified at the time of its installation" is added after the line of "Figure 3: Renewal, annual or intermediate survey on board a ship".

6 A new figure 4 is added after figure 3 as follows:

"

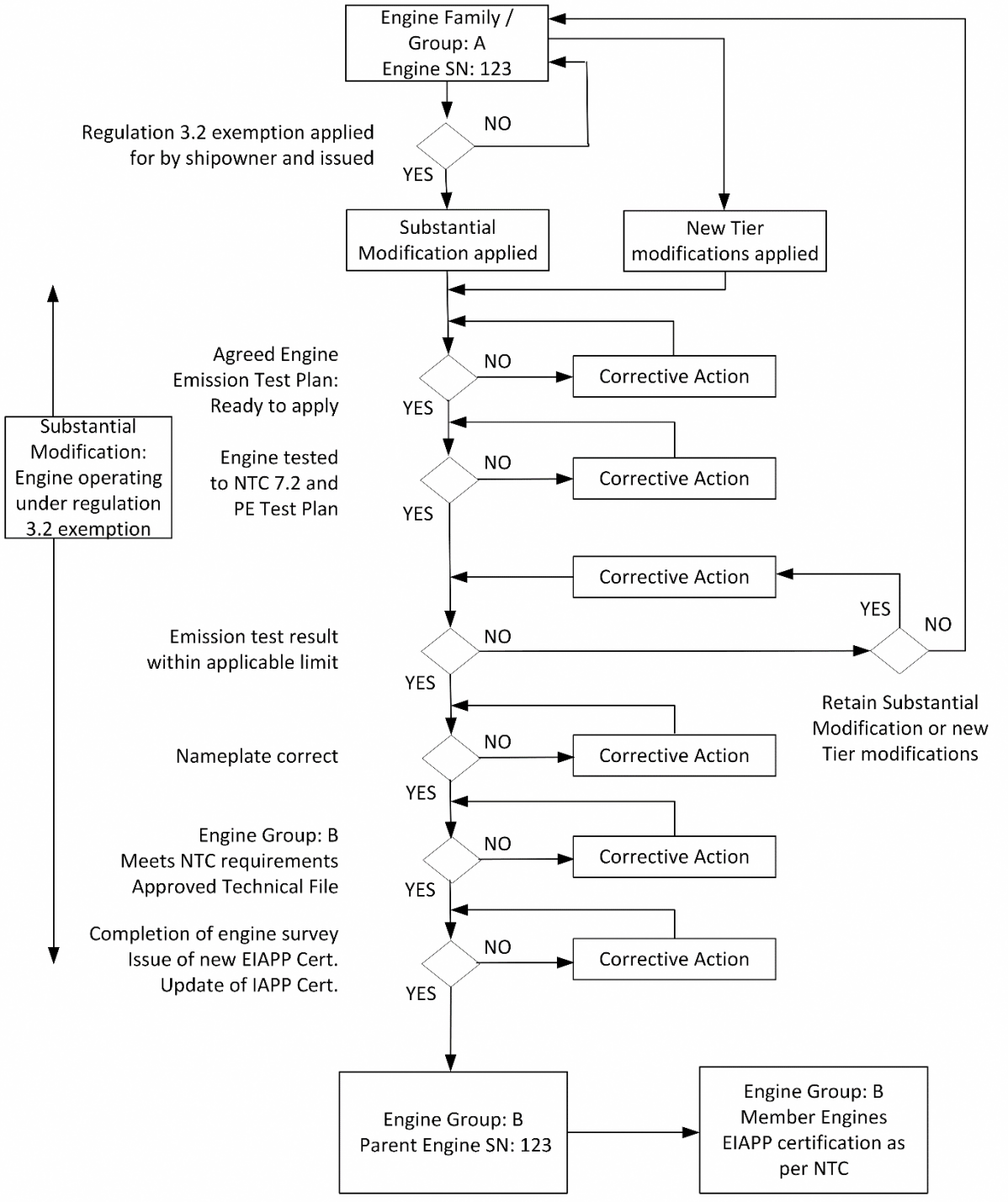

Figure 4: Certification of an engine subject to substantial modification or being certified to a Tier to which the engine was not certified at the time of its installation in accordance with 7.2 of this Code

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ANNEX 7

RESOLUTION MEPC.395(82)
(adopted on 4 October 2024)

2024 GUIDELINES FOR THE DEVELOPMENT OF A SHIP ENERGY EFFICIENCY MANAGEMENT PLAN (SEEMP)

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by international conventions for the prevention and control of marine pollution from ships,

NOTING that regulation 26 of MARPOL Annex VI requires each ship to keep on board a Ship Energy Efficiency Management Plan (SEEMP), to be developed and reviewed, taking into account the guidelines adopted by the Organization,

RECALLING that, at its seventy-eighth session, it adopted, by resolution MEPC.346(78), the *2022 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)*,

RECALLING ALSO that, at its eighty-first session, it adopted, by resolution MEPC.388(81), amendments to the *2022 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)*,

HAVING CONSIDERED, at its eighty-second session, draft amendments to the *2022 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)*, as amended,

1 ADOPTS the *2024 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)*, as set out in the annex to the present resolution;

2 REQUESTS the Parties to MARPOL Annex VI and other Member Governments to bring the annexed Guidelines to the attention of masters, seafarers, shipowners, ship operators and any other interested parties;

3 REVOKES the *2022 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)* adopted by resolution MEPC.346(78).

ANNEX

2024 GUIDELINES FOR THE DEVELOPMENT OF A SHIP ENERGY EFFICIENCY MANAGEMENT PLAN (SEEMP)

CONTENTS

APPENDIX 3 – SAMPLE FORM OF SHIP OPERATIONAL CARBON INTENSITY PLAN (PART III OF THE SEEMP)

APPENDIX 4 – STANDARDIZED DATA-REPORTING FORMAT FOR THE DATA-COLLECTION SYSTEM AND OPERATIONAL CARBON INTENSITY TO THE ADMINISTRATION

APPENDIX 5 – STANDARDIZED DATA-REPORTING FORMAT FOR THE PARAMETERS TO CALCULATE THE TRIAL CARBON INTENSITY INDICATORS ON A VOLUNTARY BASIS

1 INTRODUCTION

1.1 The *Guidelines for the development of a Ship Energy Efficiency Management Plan* have been developed to assist with the preparation of the Ship Energy Efficiency Management Plan (SEEMP) required by regulation 26 of MARPOL Annex VI.

1.2 Taken together, the aims of the SEEMP should assist the international shipping sector to achieve the goal of chapter 4 of MARPOL Annex VI set out in regulation 20, which is reducing the carbon intensity of international shipping. The aims of the SEEMP are threefold:

.1 To encourage companies to incorporate actions to improve the energy efficiency and carbon intensity of their ships and ship management practices.

.2 To specify the methodology the ship should use to collect the data required by regulation 27.1 of MARPOL Annex VI and the processes that should be used to report the data to the ship's Administration or any organization duly authorized by it.

.3 To specify the methodology the ship should use to calculate the attained annual operational carbon intensity indicator (CII) as required by regulation 28.1 of MARPOL Annex VI and the processes that should be used to report the data to the ship's Administration or any organization duly authorized by it.

1.3 There are three parts to a SEEMP:

.1 Guidance for Part I of the SEEMP required by regulation 26.1 of MARPOL Annex VI, is addressed in sections 3, 4 and 5 of these Guidelines. The purpose of this part is to provide an approach to monitor ship and fleet efficiency performance over time and describe ways to improve the ship's energy efficiency performance and carbon intensity. Part I of the SEEMP applies to any ship of 400 GT and above.

.2 Guidance for part II of the SEEMP required by regulation 26.2 of MARPOL Annex VI, is addressed in sections 6, 7 and 8 of these Guidelines. The purpose of this part is to provide a description of the methodologies that should be used to collect the data required pursuant to regulation 27 of MARPOL Annex VI and the processes that the ship should use to report the data to the ship's Administration or any organization duly authorized by it. Part II of the SEEMP applies to any ship of 5,000 GT and above.

.3 Guidance for part III of the SEEMP required by regulations 26.3 and 28.8 of MARPOL Annex VI is addressed in sections 9, 10, 11, 12, 13, 14 and 15 of these Guidelines. The purpose of this part is to provide:

.1 a description of the methodology that should be used to calculate the ship's attained annual operational CII required by regulation 28 of MARPOL Annex VI;

.2 the processes that should be used to report this value to the ship's Administration or any organization duly authorized by it;

.3 the required annual operational CII for the next three years;

.4 an implementation plan documenting how the required annual operational CII should be achieved during the next three years;

.5 a procedure for self-evaluation and improvement; and

.6 for ships rated as D for three consecutive years or rated as E, a plan of corrective actions to achieve the required annual operational CII.

1.4 Part III of the SEEMP applies to any ship of 5,000 GT and above which falls into one or more of the categories in regulations 2.2.5, 2.2.7, 2.2.9, 2.2.11, 2.2.14 to 2.2.16, 2.2.22, and 2.2.26 to 2.2.29 of MARPOL Annex VI.

1.5 Sample forms of the various sections of the SEEMP are presented in appendices 1, 2 and 3 for illustrative purposes. A standardized data-reporting format for the data-collection system and operational carbon intensity is presented in appendix 4. A standardized data-reporting format for the trial carbon intensity indicators on voluntary basis is presented in appendix 5.

2 DEFINITIONS

2.1 For the purpose of these Guidelines, the definitions in MARPOL Annex VI apply.

2.2 "Ship fuel oil consumption data" means the data required to be collected on an annual basis and reported as specified in appendix IX to MARPOL Annex VI.

2.3 "Safety management system" means a structured and documented system enabling company personnel to implement effectively the company safety and environmental protection policy, as defined in paragraph 1.1 of the International Safety Management Code.

2.4 "Carbon Intensity Indicator" means a performance indicator by which it is possible to measure the carbon intensity of the ship, as defined in the guidelines developed by the Organization,[1] taking into account data listed for reporting in appendix IX to MARPOL Annex VI.

2.5 "Consumer type" means a type of engine or set of engines, boiler, fuel cell or others used for the same purpose.

PART I - SHIP MANAGEMENT PLAN TO IMPROVE ENERGY EFFICIENCY

3 GENERAL

3.1 Regulation 26.1 of MARPOL Annex VI requires each ship of 400 gross tonnage and above subject to chapter 4 to keep on board a ship-specific SEEMP.

3.2 The purpose of part I of the SEEMP is to establish a mechanism for a company and/or a ship to improve the energy efficiency and reduce the carbon intensity of a ship's operation. Preferably, this aspect of the ship-specific SEEMP is linked to a broader corporate energy management policy for the company that owns, operates or controls the ship, recognizing that no two shipping companies are the same, and that ships operate under a wide range of different conditions.

[1] Refer to the *2021 Guidelines on operational carbon intensity indicators and the calculation methods (CII guidelines, G1)* (resolution MEPC.336(76)) and the *2022 Guidelines on correction factors and voyage adjustments for CII calculations (G5)* (resolution MEPC.355(78)).

3.3 Many companies will already have an environmental management system in place under ISO 14001, which contains procedures for selecting the best measures for particular ships and then setting objectives for the measurement of relevant parameters, along with relevant control and feedback features. Monitoring of operational environmental efficiency should therefore be treated as an integral element of broader company management systems.

3.4 In addition, many companies already develop, implement and maintain a safety management system. In such case, part I of the SEEMP may form part of the ship's safety management system.

3.5 This section provides guidance for the development of part I of the SEEMP, which should be adjusted to the characteristics and needs of individual companies and ships. Part I of the SEEMP is intended to be a management tool to assist a company in managing the ongoing environmental performance of its ships and, as such, it is recommended that a company develop procedures for implementing the plan in a manner which limits any onboard administrative burden to the minimum necessary.

3.6 Part I of the SEEMP should be developed as a ship-specific plan by the company and should reflect efforts to improve the energy efficiency and reduce the carbon intensity of a ship through four steps: planning, implementation, monitoring, and self-evaluation and improvement. These components play a critical role in the continuous cycle to improve ship energy efficiency management and reduce its carbon intensity. With each iteration of the cycle, some elements of part I will necessarily change while others may remain as before.

3.7 At all times safety considerations should be paramount. The trade a ship is engaged in may determine the feasibility of the energy efficiency and carbon intensity reduction measures under consideration. For example, ships that perform services at sea (pipe laying, seismic survey, OSVs, dredgers, etc.) may choose different methods of improving energy efficiency when compared to conventional cargo carriers. The nature of operations and influence of prevailing weather conditions, tides and currents combined with the necessity of maintaining safe operations may require adjustment of general procedures to maintain the efficiency of the operation, for example ships which are dynamically positioned. The length of a voyage and the need to avoid high risk areas may also be important parameters as well as trade specific safety considerations.

4 FRAMEWORK AND STRUCTURE OF PART I OF THE SEEMP

4.1 Planning

4.1.1 Planning is the most crucial stage of part I of the SEEMP, in that it primarily determines both the current status of ship energy usage and carbon intensity and the expected improvement of ship energy efficiency and reduction of carbon intensity. Therefore, it is encouraged to devote sufficient time to planning so that the most appropriate, effective and implementable plan can be developed.

Ship-specific measures

4.1.2 Recognizing that there are a variety of options to improve energy efficiency and reduce carbon intensity (e.g. speed optimization, confirming berth availability and arrival time with port of destination, weather routeing, hull maintenance, retrofitting of energy efficiency devices, and use of alternative fuels), the best package of measures for a ship to improve energy efficiency and reduce carbon intensity depends to a great extent upon ship type, cargoes, routes and other factors, which should be identified in the first place. These measures should be listed as a package of measures to be implemented, thus providing the overview of the actions to be taken for that ship.

4.1.3 During the planning process, therefore, it is important to determine and understand the ship's current status of energy usage. Part I of the SEEMP should identify energy-saving and carbon intensity reducing measures that already have been undertaken and should determine how effective these measures are in terms of improving energy efficiency and reducing carbon intensity. Part I also should identify what measures can be adopted to further improve the energy efficiency and reduce the carbon intensity of the ship. It should be noted, however, that not all measures can be applied to all ships, or even to the same ship under different operating conditions and that some of them are mutually exclusive. Ideally, initial measures could yield energy (and cost) saving results that then can be reinvested in more difficult or expensive efficiency upgrades identified by part I.

4.1.4 Guidance on best practices for fuel-efficient operation of ships, set out in chapter 5, can be used to facilitate this part of the planning phase. Also, in the planning process, particular consideration should be given to minimize any onboard administrative burden.

Company-specific measures

4.1.5 The improvement of the energy efficiency and the reduction of the carbon intensity of ship operation does not necessarily depend on single ship management only. Rather, it may depend on many stakeholders including ship repair yards, shipowners, operators, charterers, cargo owners, fuel suppliers, ports and traffic management services. For example, "just in time" – as explained in paragraph 5.2.4 – requires good early communication among operators, ports and traffic management services. The better the coordination among such stakeholders, the more improvement can be expected. In most cases, such coordination or total management is better made by a company rather than by a ship. In this sense, it is recommended that a company also establish an energy efficiency and carbon intensity management plan to improve the performance of its fleet (should it not have one in place already) and effect the necessary coordination among stakeholders.

Human resource development

4.1.6 For effective and steady implementation of the adopted measures, raising awareness of and providing necessary training for personnel both on shore and on board are an important element. Such human resource development is encouraged and should be considered as an important component of planning as well as a critical element of implementation.

Goal setting

4.1.7 The last part of planning is goal setting.

.1 For ships also subject to regulation 28 of MARPOL Annex VI, the goal setting should be consistent with the continuous CII improvements set out by that regulation, and should include the relevant information (see paragraph 9.7). These ships are also encouraged to consider setting ship-specific goals in addition to the applicable CII requirements that strive for additional energy efficiency improvements and carbon intensity reductions.

.2 For ships or companies not subject to regulation 28, there are no requirements to define a goal and to communicate it to the public, or to be subject to external inspection, surveys, or audits with respect to the SEEMP. Nevertheless, a meaningful goal should be defined to serve as a signal of a company's commitment to improve the energy efficiency and carbon intensity of the ship. The goal can be set using different indicators, including the annual fuel consumption, Annual Efficiency Ratio (AER), cgDIST, Energy

Efficiency Operational Indicator (EEOI) or other carbon intensity indicators (CIIs).[2] In all cases, the goal should be measurable and easy to understand.

4.2 Implementation

Establishment of implementation system

4.2.1 After a ship and a company identify the energy efficiency and carbon intensity measures to be implemented, it is essential to establish a system for their implementation. This is done by developing the procedures for energy management, defining tasks associated with those procedures, and assigning those tasks to responsible personnel. The implementation system should include procedures to ensure execution of measures and specify defined levels of authority and lines of communication. Also, it should include procedures for internal audits and management review, where relevant. In sum, part I of the SEEMP should describe how each measure should be implemented and who the responsible person or persons are. The implementation period (start and end dates) of each selected measure should be indicated. The development of such an implementation system can be considered as a part of planning, and therefore may be completed at the planning stage.

Implementation and record-keeping

4.2.2 The planned measures should be carried out in accordance with the predetermined implementation system. Record-keeping for the implementation of each measure is beneficial for self-evaluation at a later stage and should be encouraged. If any identified measure cannot be implemented for any reason, the reason or reasons should be recorded for internal use. It is recommended that events and operational conditions outside the control of the ship's crew (for example, waiting for berths, extended port dwell times, operation in severe adverse weather) which may affect the ships rating be documented.

4.3 Monitoring

Monitoring tools

4.3.1 The energy efficiency of a ship should be monitored quantitatively. This should be done by an established method, preferably by an international standard. In many cases, the monitoring tool should target the goal indicator set out in paragraph 4.1.7 (e.g. AER, cgDIST, EEOI, or other CIIs as agreed by the Organization). If a quantitative goal is not defined for a ship, a quantitative performance indicator developed by the Organization (e.g. AER, EEOI, CII) or another internationally established tool should be selected. A ship subject to regulation 28 is likely to use the CII as its monitoring tool.

4.3.2 If used, these CIIs should be calculated in accordance with the guidelines developed by the Organization,[3] adjusted, as necessary, to a specific ship and trade.

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[2] Refer to the *2022 Guidelines on operational carbon intensity indicators and the calculation methods (CII guidelines, G1)* (resolution MEPC.352(78)) and the *2022 Interim guidelines on correction factors and voyage adjustments for CII calculations (G5)* (resolution MEPC.355(78)).

[3] Refer to the *Guidelines for voluntary use of the ship energy efficiency operational indicator (EEOI)* (MEPC.1/Circ.684) and the *2022 Guidelines on operational carbon intensity indicators and the calculation methods (CII guidelines, G1)* (resolution MEPC.352(78)) and the *2022 Interim guidelines on correction factors and voyage adjustments for CII calculations (G5)* (resolution MEPC.355(78)).

4.3.3 Ships subject to regulation 28 may use other measurement tools in addition to the CII, if convenient and/or beneficial for a ship or a company. In the case where other monitoring tools are used, the reason for the use of the tool and the method of monitoring should be clarified at the planning stage.

4.3.4 It is highly advised to conduct monitoring at regular intervals for checking consistency of data and verification assistance. The ship's fuel oil consumption should be monitored using daily reporting, such as noon reports, or higher frequency data.

Establishment of monitoring system

4.3.5 It should be noted that whatever measurement tools are used, continuous and consistent and reliable data collection is the foundation of monitoring. To allow for meaningful and consistent monitoring, a monitoring system, including the procedures for collecting data and the assignment of responsible personnel, should be developed. The development of such a system can be considered as a part of planning, and therefore should be completed at the planning stage.

4.3.6 It should be noted that, in order to avoid unnecessary administrative burdens on ships' staff, monitoring should be carried out as much as possible by shore staff when the data can be automatically transferred, utilizing data obtained from existing required records such as the official and engineering logbooks and oil record books. Additional data could be obtained as appropriate.

Search and rescue

4.3.7 When a ship diverts from its scheduled passage to engage in search and rescue operations, and for which emissions are excluded pursuant to regulation 3, it is recommended that data obtained during such operations not be used in ship energy efficiency monitoring, and that such data be recorded separately.

4.4 Self-evaluation and improvement

4.4.1 Self-evaluation and improvement is the final phase of the management cycle. This phase should produce meaningful feedback for the coming first stage, i.e. planning stage of the next improvement cycle.

4.4.2 The purpose of self-evaluation is to:

.1 evaluate the effectiveness of the planned measures and their implementation;

.2 deepen the understanding of the overall characteristics of the ship's operation such as what types of measures can or cannot function effectively, and how and/or why;

.3 comprehend the trend of the efficiency improvement of that ship; and

.4 develop the improved management plan for the next cycle through identification of further opportunities for improving energy efficiency and reducing carbon intensity.

4.4.3 For this process, procedures for self-evaluation of the ship energy efficiency management plan should be developed. Furthermore, self-evaluation should be implemented periodically by using data collected through monitoring. In addition, it is recommended that time be invested in identifying the cause and effect of the performance during the evaluated period so lessons learned can be taken into account when revising and improving the next stage of the ship's energy efficiency management plan.

5 GUIDANCE ON BEST PRACTICES FOR FUEL-EFFICIENT OPERATION OF SHIPS

5.1 The search for energy efficiency and carbon intensity improvement across the entire transport chain takes responsibility beyond what can be delivered by the company alone. A list of all the possible stakeholders in the efficiency of a single voyage is long: obvious parties are designers, shipyards and engine manufacturers for the characteristics of the ship; and charterers, fuel suppliers, ports and vessel traffic management services, etc. for the specific voyage. All parties involved should consider the inclusion of efficiency measures in their operations both individually and collectively.

5.2 Fuel-efficient operations

Improved voyage planning

5.2.1 The optimum route and improved efficiency can be achieved through the careful planning and execution of voyages. Thorough voyage planning needs time, but a number of software tools are available to assist in voyage planning.

5.2.2 The *Guidelines for voyage planning*, adopted by resolution A.893(21), provide essential guidance for the ship's crew and voyage planners.

Weather routeing

5.2.3 Weather routeing has a high potential for efficiency savings on specific routes. It is commercially available for all types of ship and for many trade areas.

Just in time

5.2.4 Good early communication with the next port should be an aim in order to give maximum notice of berth availability and facilitate the use of optimum speed where port operational procedures support this approach.

5.2.5 Optimized port operation could involve a change in procedures involving different ship handling arrangements in ports. Port authorities should be encouraged to maximize efficiency and minimize delay.

Speed optimization

5.2.6 Speed optimization can produce significant savings. However, optimum speed means the speed at which the fuel used per tonne mile is at a minimum level for that voyage. It does not mean minimum speed; in fact, sailing at less than optimum speed will consume more fuel rather than less. Reference should be made to the engine manufacturer's power/consumption curve and the ship's propeller curve. Possible adverse consequences of slow speed operation may include increased vibration and problems with soot deposits in combustion chambers and exhaust systems. These possible consequences should be taken into account. For LNG carriers speed optimization means, quite often, a higher speed at the start of laden passages to control tanks pressure and at the end of ballast passages to use the operational LNG quantity needed for cargo tank cooling in propulsion instead of wasting in GCU or condenser steam dump. Charterers are generally aware of the improved efficiency of this speed pattern.

5.2.7 As part of the speed optimization process, due account may need to be taken of the need to coordinate arrival times with the availability of loading/discharge berths, etc. The number of ships engaged in a particular trade route may need to be taken into account when considering speed optimization.

5.2.8 A gradual increase in speed when leaving a port or estuary whilst keeping the engine load within certain limits may help to reduce fuel consumption.

5.2.9 It is recognized that under many charter parties the speed of the ships is determined by the charterer and not the operator. Efforts should be made when agreeing charter party terms to encourage the ship to operate at optimum speed in order to maximize energy efficiency.

Optimized shaft power

5.2.10 Operation at constant shaft RPM can be more efficient than continuously adjusting speed through engine power. The use of automated engine management systems to control speed rather than relying on human intervention may be beneficial.

5.2.11 When optimizing shaft power, due attention should be given to overall power system efficiency. For example, in some cases reducing load or shaft speed below the minimum necessary to operate energy recovery systems and shaft generators may increase overall emissions.

5.3 Optimized ship handling

Optimum trim

5.3.1 Most ships are designed to carry a designated amount of cargo at a certain speed for a certain fuel consumption. This implies the specification of set trim conditions. Loaded or unloaded, trim has a significant influence on the resistance of the ship through the water and optimizing trim can deliver significant fuel savings. For any given draft there is a trim condition that gives minimum resistance. In some ships, it is possible to assess optimum trim conditions for fuel efficiency continuously throughout the voyage. Design or safety factors may preclude full use of trim optimization.

Optimum ballast

5.3.2 Ballast should be adjusted taking into consideration the requirements to meet optimum trim and steering conditions and optimum ballast conditions achieved through good cargo planning.

5.3.3 When determining the optimum ballast conditions, the limits, conditions and ballast management arrangements set out in the ship's Ballast Water Management Plan are to be observed for that ship.

5.3.4 Ballast conditions have a significant impact on steering conditions and autopilot settings, and it needs to be noted that less ballast water does not necessarily mean improved energy efficiency.

Optimum propeller and propeller inflow considerations

5.3.5 Selection of the propeller is normally determined at the design and construction stage of a ship's life but new developments in propeller design have made it possible for retrofitting of later designs to deliver greater fuel economy. Whilst it is certainly for consideration, the propeller is but one part of the propulsion train and a change of propeller in isolation may have no effect on efficiency and may even increase fuel consumption.

5.3.6 Improvements to the water inflow to the propeller using arrangements such as fins and/or nozzles could increase propulsive efficiency power and hence reduce fuel consumption.

Optimum use of rudder and heading control systems (autopilots)

5.3.7 There have been large improvements in automated heading and steering control systems technology. Whilst originally developed to make the bridge team more effective, modern autopilots can achieve much more. An integrated Navigation and Command System can achieve significant fuel savings by simply reducing the distance sailed "off track". The principle is simple: better course control through less frequent and smaller corrections will minimize losses due to rudder resistance. Retrofitting of a more efficient autopilot to existing ships could be considered.

5.3.8 During approaches to ports and pilot stations the autopilot cannot always be used efficiently as the rudder has to respond quickly to given commands. Furthermore, at certain stages of the voyage it may have to be deactivated or very carefully adjusted, i.e. during heavy weather and approaches to ports.

5.3.9 Consideration may be given to the retrofitting of improved rudder blade design (e.g. "twist-flow" rudder).

Hull maintenance

5.3.10 Docking intervals should be integrated with the company's ongoing assessment of ship performance. Hull resistance can be optimized by new technology-coating systems, possibly in combination with cleaning intervals. Regular in-water inspection of the condition of the hull is recommended.

5.3.11 Propeller cleaning and polishing or even appropriate coating may significantly increase fuel efficiency. The need for ships to maintain efficiency through in-water hull cleaning should be recognized and facilitated by port States.

5.3.12 Consideration may be given to the possibility of timely full removal and replacement of underwater paint systems to avoid the increased hull roughness caused by repeated spot blasting and repairs over multiple dockings.

5.3.13 Generally, the smoother the hull, the better the fuel efficiency.

Propulsion system

5.3.14 Marine diesel engines have a very high thermal efficiency (~50%). This excellent performance is only exceeded by fuel cell technology with an average thermal efficiency of 60%. This is due to the systematic minimization of heat and mechanical loss. In particular, the new breed of electronic controlled engines can provide efficiency gains. However, specific training for relevant staff may need to be considered to maximize the benefits.

Propulsion system maintenance

5.3.15 Maintenance in accordance with manufacturers' instructions in the company's planned maintenance schedule will also maintain efficiency. The use of engine condition monitoring can be a useful tool to maintain high efficiency.

5.3.16 Additional means to improve engine efficiency might include use of fuel additives, adjustment of cylinder lubrication oil consumption, valve improvements, torque analysis, and automated engine monitoring systems.

5.4 Waste heat recovery

5.4.1 Waste heat recovery systems use thermal heat losses from the exhaust gas for either electricity generation, heating or additional propulsion with a shaft power take in.

5.4.2 It may not be possible to retrofit such systems into existing ships. However, they may be a beneficial option for new ships. Shipbuilders should be encouraged to incorporate new technology into their designs.

5.5 Improved fleet management

5.5.1 Better utilization of fleet capacity can often be achieved by improvements in fleet planning. For example, it may be possible to avoid or reduce long ballast voyages through improved fleet planning. There is opportunity here for charterers to promote efficiency. This can be closely related to the concept of "just in time" arrivals.

5.5.2 Efficiency, reliability and maintenance-oriented data sharing within a company can be used to promote best practice among ships within a company and should be actively encouraged.

5.6 Improved cargo handling

Cargo handling is in most cases under the control of the port or terminal operators and optimum solutions matched to ship and port or terminal requirements should be explored. However, in cases where ships use their own cargo handling equipment (e.g. cargo cranes, self-unloading booms, cargo pumps (tankers)), procedures should be in place to efficiently utilize the energy produced from any additional generators required to operate the equipment.

5.7 Energy management

5.7.1 A review of electrical services on board can reveal the potential for unexpected efficiency gains. However, care should be taken to avoid the creation of new safety hazards when turning off electrical services (e.g. lighting). Thermal insulation is an obvious means of saving energy. Also see comment below on shore power.

5.7.2 Optimization of reefer container stowage locations may be beneficial in reducing the effect of heat transfer from compressor units. This might be combined as appropriate with cargo tank heating, ventilation, etc. The use of water-cooled reefer plant with lower energy consumption might also be considered.

5.8 Fuel type

The use of emerging alternative fuels may be considered as a CO_2 reduction method, but availability will often determine the applicability.

5.9 Other measures

5.9.1 Development of computer software for the calculation of current fuel consumption, for the establishment of an emissions "footprint", to optimize operations, and the establishment of goals for improvement and tracking of progress may be considered.

5.9.2 Renewable energy sources, such as solar (or photovoltaic) cell technology, have improved enormously in recent years and should be considered for onboard application.

5.9.3 In some ports shore power may be available for some ships but this is generally aimed at improving air quality in the port area. If the shore-based power source is carbon efficient, there may be a net efficiency benefit. Ships may consider using onshore power if available.

5.9.4 Even wind-assisted propulsion may be worthy of consideration. Various systems are available for retrofit, including Flettner rotors, wing sails and aerofoil kites.

5.9.5 Efforts could be made to source fuel of improved quality in order to minimize the amount of fuel required to provide a given power output.

5.10 Compatibility of measures

5.10.1 These Guidelines indicate a wide variety of possibilities for energy efficiency improvements for the existing fleet. While there are many options available, they are not necessarily cumulative, are often area and trade dependent and likely to require the agreement and support of a number of different stakeholders if they are to be utilized most effectively.

Age and operational service life of a ship

5.10.2 All measures identified in this document as applied to part I of the SEEMP are potentially cost-effective in case of high oil prices. The financial feasibility of a specific energy efficiency enhancement can be evaluated by various means. One way would be to estimate the return on investment (ROI) time. However, while measures with lower ROI may have the lowest cost, this does not guarantee the best results in energy efficiency performance improvement. Clearly, this equation is heavily influenced by the remaining service life of a ship and the cost of fuel.

Trade and sailing area

5.10.3 The feasibility of many of the measures described in this guidance will be dependent on the trade and sailing area of the ship. Sometimes ships will change their trade areas as a result of a change in chartering requirements, but this cannot be taken as a general assumption. For example, certain types of wind-enhanced power sources might not be feasible for short sea shipping as these ships generally sail in areas with high traffic densities or in restricted waterways. Air draught limitations may also affect the feasibility of wind assistance technology and certain other emission reduction measures. Another aspect is that the world's oceans and seas each have characteristic conditions and so ships designed for specific routes and trades may not obtain the same energy efficiency benefits by adopting the same measures or combination of measures as other ships that operate in different areas. It is also likely that some measures will have a greater or lesser effect in different sailing areas.

5.10.4 The trade a ship is engaged in may also determine the feasibility of the efficiency measures under consideration. For example, ships that perform services at sea (pipe laying, seismic survey, OSVs, dredgers, etc.) may choose different methods of improving energy efficiency when compared to conventional cargo carriers. The length of voyage may also be an important parameter as may trade specific safety considerations. The pathway to the most efficient combination of measures will be unique to each vessel within each shipping company.

5.10.5 Environmental conditions and the nature of cargo carried also varies between regions. For example, some routes may carry greater volumes of goods requiring careful temperature conditioning, or some transit regions may be subject to frequent severe adverse weather conditions. This may lead to an increase in emissions of ships serving those routes and regions.

PART II - SHIP FUEL OIL CONSUMPTION DATA-COLLECTION PLAN

6 GENERAL

6.1 Regulation 26.2 of MARPOL Annex VI specifies that "in the case of a ship of 5,000 gross tonnage and above, the SEEMP shall include a description of the methodology that will be used to collect the data required by regulation 27.1 of this Annex and the processes that will be used to report the data to the ship's Administration". Part II of the SEEMP, the Ship Fuel Oil Consumption Data-Collection Plan (hereinafter referred to as "Data-Collection Plan") contains such methodology and processes.

6.2 With respect to part II of the SEEMP, these Guidelines provide guidance for developing a ship-specific method to collect, aggregate and report ship data with regard to annual fuel oil consumption, distance travelled, hours under way and other data required by regulation 27 of MARPOL Annex VI to be reported to the Administration.

6.3 Pursuant to regulation 5.4.5 of MARPOL Annex VI, the Administration should ensure that each covered ship's SEEMP complies with regulation 26.2 of MARPOL Annex VI prior to collecting any data.

7 GUIDANCE ON METHODOLOGY FOR COLLECTING DATA ON FUEL OIL CONSUMPTION, DISTANCE TRAVELLED AND HOURS UNDER WAY AND OTHER ITEMS

Total annual fuel oil[4] consumption

7.1 Fuel oil consumption should include all the fuel oil consumed on board including but not limited to the fuel oil consumed by the main engines, auxiliary engines, gas turbines, boilers and inert gas generator, for each type of fuel oil consumed, regardless of whether a ship is under way or not. Methods for collecting data on annual fuel oil consumption in metric tonnes include (in no particular order):

.1 method using bunker delivery notes (BDNs):

This method determines the annual total amount of fuel oil used based on BDNs, which are required for fuel oil for combustion purposes delivered to and used on board a ship in accordance with regulation 18 of MARPOL Annex VI; BDNs are required to be retained on board for three years after the fuel oil has been delivered. The Data-Collection Plan should set out how the ship will operationalize the summation of BDN information and conduct tank readings. The main components of this approach are as follows:

.1 annual fuel oil consumption would be the total mass of fuel oil used on board the vessel as reflected in the BDNs. In this method, the BDN fuel oil quantities would be used to determine the annual total mass of fuel oil consumption, plus the amount of fuel oil left over from the last calendar year period and less the amount of fuel oil carried over to the next calendar year period;

[4] Regulation 2.1.14 of MARPOL Annex VI defines "fuel oil" as any fuel delivered to and intended for combustion purposes for propulsion or operation on board a ship, including gas, distillate and residual fuels.

.2 to determine the difference between the amount of remaining tank oil before and after the period, the tank reading should be carried out at the beginning and the end of the period;

.3 in the case of a voyage that extends across the data-reporting period, the tank reading should occur by tank monitoring at the ports of departure and arrival of the voyage and by statistical methods, such as rolling average using voyage days;

.4 fuel oil tank readings should be carried out by appropriate methods such as automated systems, soundings and dip tapes. The method for tank readings should be specified in the Data-Collection Plan;

.5 the amount of any fuel oil offloaded should be subtracted from the fuel oil consumption of that reporting period. This amount should be based on the records of the ship's oil record book; and

.6 any supplemental data used for closing identified difference in bunker quantity should be supported with documentary evidence;

.2 method using flow meters:

This method determines the annual total amount of fuel oil consumption by measuring fuel oil flows on board by using flow meters. In case of the breakdown of flow meters, manual tank readings or other alternative methods will be conducted instead. The Data-Collection Plan should set out information about the ship's flow meters and how the data will be collected and summarized, as well as how necessary tank readings should be conducted, as follows:

.1 annual fuel oil consumption may be the sum of daily fuel oil consumption data of all relevant fuel oil consuming processes on board measured by flow meters;

.2 the flow meters applied to monitoring should be located so as to measure all fuel oil consumption on board. The flow meters and their link to specific fuel oil consumers should be described in the Data-Collection Plan;

.3 note that it should not be necessary to correct this fuel oil measurement method for sludge if the flow meter is installed after the daily tank as sludge will be removed from the fuel oil prior to the daily tank;

.4 the flow meters applied to monitoring fuel oil flow should be identified in the Data-Collection Plan. Any consumer not monitored with a flow meter should be clearly identified, and an alternative fuel oil consumption measurement method should be included; and

.5 calibration of the flow meters should be specified. Calibration and maintenance records should be available on board;

.3 method using bunker fuel oil tank monitoring on board:

.1 to determine the annual fuel oil consumption, the amount of daily fuel oil consumption data measured by tank readings which are carried out by appropriate methods such as automated systems, soundings and dip tapes will be aggregated. The tank readings will normally occur daily when the ship is at sea and each time the ship is bunkering or de-bunkering; and

.2 the summary of monitoring data containing records of measured fuel oil consumption should be available on board;

.4 method using LNG cargo tank monitoring on board:

LNG ships use the Custody Transfer Monitoring System to monitor/record the cargo volumes inside the tanks. When calculating the consumption:

.1 the LNG liquid volume consumed is converted to mass using the methane density of 422 kg/m^3. This is because LNG is transported at methane boiling point, while other heavier hydrocarbons have a higher boiling point and remain at liquid state; and

.2 nitrogen mass content is subtracted for each laden voyage from LNG consumption as it does not contribute to CO_2 emissions;

.5 method using cargo tank monitoring on board for ships using cargo other than LNG as a fuel:

.1 to determine the annual fuel oil consumption, the amount of daily fuel oil consumption data measured by tank readings which are carried out by appropriate methods to the cargo used as a fuel. The method for tank readings should be specified in the SEEMP Data-Collection Plan; and

.2 the tank readings will normally occur daily when the ship is at sea and each time the ship is loading or discharging cargo; and the summary of monitoring data containing records of measured fuel oil consumption should be available on board.

7.2 Any corrections, e.g. density, temperature, nitrogen content for LNG, if applied, should be documented.[5]

Fuel oil consumption per consumer type

7.3 For the collection of fuel oil consumption per consumer type (main engines, auxiliaries, boilers and others), the methods can include:

.1 method using flow meters:

This method determines the annual fuel oil consumption by measuring fuel oil flows on board by using flow meters. In case of the breakdown of flow meters, manual tank readings or other alternative methods will be conducted

[5] For example, ISO 8217 provides a method for liquid fuel.

instead. The Data-Collection Plan should set out information about the ship's flow meters and how the data will be collected and summarized, as well as how necessary tank readings should be conducted, as follows:

.1 annual fuel oil consumption may be the sum of daily fuel oil consumption data of each consumer type on board measured by flow meters;

.2 the flow meters applied to monitoring should be located so as to measure all fuel oil consumption for each consumer type;

.3 note that it should not be necessary to correct this fuel oil measurement method for sludge if the flow meter is installed after the daily tank as sludge will be removed from the fuel oil prior to the daily tank;

.4 the flow meters applied to monitoring fuel oil flow and their link to specific fuel consumer types should be identified in the Data-Collection Plan. Any individual consumer of a consumer type not monitored with a flow meter should be clearly identified, and an alternative fuel oil consumption measurement method should be included; and

.5 calibration of the flow meters should be specified. Calibration and maintenance records should be available on board;

.2 method using bunker fuel oil tank monitoring on board:

.1 to determine the annual fuel oil consumption of each consumer type, the amount of daily fuel oil consumption data measured by tank readings which are carried out by appropriate methods such as automated systems, soundings and dip tapes will be aggregated. The tank readings will normally occur daily when the ship is at sea and each time the ship is bunkering or de-bunkering; and

.2 the summary of monitoring data containing records of measured fuel oil consumption should be available on board;

7.4 If there is a consumer type whose fuel oil consumption cannot be determined directly according to one of the methods indicated in paragraphs 7.3.1 and 7.3.2, the annual fuel oil consumption of that consumer type should be determined according to one of the following methods. The method used to determine the annual fuel oil consumption of each consumer type should be described in detail in the Data-Collection Plan. Note that each consumer type may use a different method to measure fuel oil consumption.

.1 method using subtraction:

If the fuel consumption for only one of the consumer types is not available, the fuel consumption of this consumer type may be derived by subtracting the fuel consumption of the other consumer types from the total annual fuel oil consumption measured in paragraph 7.1; and

.2 method using estimated fuel oil consumption:

In cases where none of the above methods in paragraphs 7.3.1, 7.3.2 and 7.4.1 can be applied, an alternative method that is to the satisfaction of the Administration or any organization recognized by it may be used to estimate the annual fuel oil consumption of the consumer type, based for example on manufacturer data or actual historic fuel consumption for a specified period.

Conversion factor C_F

7.5 If fuel oils are used that do not fall into one of the categories as described in the *2022 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships* (resolution MEPC.364(79)), and have no C_F-factor assigned (e.g. some "hybrid fuel oils"), the fuel oil supplier should provide a C_F-factor for the respective product supported by documentary evidence.

Distance travelled

7.6 Appendix IX of MARPOL Annex VI specifies that distance travelled should be submitted to the Administration and:

.1 distance travelled over ground in nautical miles should be recorded in the logbook in accordance with SOLAS regulation V/28.1;[6]

.2 the distance travelled while the ship is under way under its own propulsion should be included in the aggregated data of distance travelled for the calendar year; and

.3 other methods to measure distance travelled accepted by the Administration may be applied. In any case, the method applied should be described in detail in the Data-Collection Plan.

7.7 Laden distance should be calculated as the distance sailed when the ship is loaded.

Hours under way

7.8 Appendix IX of MARPOL Annex VI specifies that hours under way should be submitted to the Administration. Hours under way should be an aggregated duration while the ship is under way under its own propulsion.

Data quality

7.9 The Data-Collection Plan should include data quality control measures which should be incorporated into the existing safety management system. Additional measures to be considered could include:

.1 the procedure for identification of data gaps and correction thereof; and

.2 the procedure to address data gaps if monitoring data is missing, for example, flow meter malfunctions.

[6] Distance travelled measured using satellite data is distance travelled over the ground.

Total amount of onshore power supplied

7.10 The total amount of onshore power supplied should be calculated as the sum of the amount of onshore power supplied in kWh. The amount of onshore power supplied should be recorded based on a relevant document from the power supplier. The document should be stored. This information as shown on the bill from the port or electricity provider could be included in the electronic record.

Total transport work

7.11 Total transport work is the annual sum of each voyage's transport work, which is distance sailed multiplied by cargo carried during a voyage. Relevant transport work metrics per ship types are provided in table 1 below.

Table 1: Transport work to be reported per ship type

Ship type	Transport work metric
bulk carriers, tankers, combination carriers, gas carriers, LNG carriers, general cargo ships, ro-ro cargo ships (vehicle carriers), ro-ro cargo ships	$\sum_v (cargo\_mass_v \times distance_v)$
containerships	$\sum_v ((cargo\_mass_v + container\_mass_v) \times distance_v))$ and $\sum_v (No\_of\_TEU_v \times distance_v)$
cruise passenger ships	$\sum_v (No\_of\_passengers_v \times distance_v)$
ro-ro passenger ships	$\sum_v (No\_of\_passengers_v \times distance_v)$ and $\sum_v (cargo\_mass_v \times distance_v)$

A standardized data-reporting format

7.12 Regulation 27.3 of MARPOL Annex VI states that the data specified in appendix IX of the Annex are to be communicated electronically using a standardized form developed by the Organization. The collected data should be reported to the Administration in the standardized format shown in appendix 4.

8 DIRECT CO_2 EMISSIONS MEASUREMENT

8.1 Direct CO_2 emission measurement is not required by regulation 27 of MARPOL Annex VI.

8.2 Direct CO_2 emissions measurement, if used, should be carried out as follows:

.1 this method is based on the determination of CO_2 emission flows in exhaust gas stacks by multiplying the CO_2 concentration of the exhaust gas with the exhaust gas flow. In case of the absence or/and breakdown of direct CO_2 emissions measurement equipment, manual tank readings will be conducted instead;

.2 the direct CO_2 emissions measurement equipment applied to monitoring is located so as to measure all CO_2 emissions from the ship. The locations of all equipment applied are described in the monitoring plan; and

.3 calibration of the CO_2 emissions measurement equipment should be specified. Calibration and maintenance records should be available on board.

PART III - SHIP OPERATIONAL CARBON INTENSITY PLAN

9 GENERAL

9.1 Regulation 26.3.1 of MARPOL Annex VI specifies that, for certain categories of ships of 5,000 GT and above, on or before 1 January 2023, the SEEMP shall include:

.1 a description of the methodology that will be used to calculate the ship's attained annual operational CII required by regulation 28 of MARPOL Annex VI and the processes that will be used to report this value to the ship's Administration;

.2 the required annual operational CIIs, as specified in regulation 28 of MARPOL Annex VI, for the next three years;

.3 an implementation plan documenting how the required annual operational CIIs will be achieved during the next three years; and

.4 a procedure for self-evaluation and improvement.

9.2 Sections 9 to 15 of these Guidelines provide guidance for ships to which regulation 26.3 of MARPOL Annex VI applies for the following purposes:

.1 to assist them in developing part III of the ship's SEEMP, including guidance on developing a ship-specific method to collect necessary data;

.2 to describe the methodology that will be used to calculate the ship's attained annual operational CII value and report this to the ship's Administration;

.3 to determine the ship's required annual operational CII for the next three years;

.4 to develop and apply an implementation plan documenting how the required annual operational CIIs will be achieved during the next three years;

.5 to define a procedure for self-evaluation and improvement; and

.6 to develop corrective actions, as applicable.

9.3 The required annual operational CII is to be calculated in accordance with regulation 28 and taking into account the guidelines developed by the Organization.[7]

[7] Refer to the *2022 Guidelines on the reference lines for use with operational carbon intensity indicators (CII reference lines guidelines, G2)* (resolution MEPC.353(78)) and the *2021 Guidelines on the operational carbon intensity reduction factors relative to reference lines (CII reduction factors guidelines, G3)* (resolution MEPC.338(76)).

9.4 In addition, pursuant to regulation 28 of MARPOL Annex VI, part III of the SEEMP is further to include calculation methodologies and a plan of corrective actions for ships that are rated D for three consecutive years or rated as E.

9.5 The ship's attained annual operational carbon intensity is to be calculated taking into account the guidelines developed by the Organization.[8]

9.6 Ships of 5,000 GT and above that are subject to regulations 26.3 and 28 of MARPOL Annex VI are strongly encouraged to review part I of their SEEMP to revise it as needed to reflect the actions taken to achieve the ship's CII requirements.

9.7 The goal setting, as referred to in paragraph 4.1.7 in part I, should be consistent with the requirements of regulation 28 of MARPOL Annex VI and should include the ship's required annual operational CII for the next three years following the updating of the SEEMP.

9.8 In addition, while ships subject to regulation 28 of MARPOL Annex VI may rely on the CII requirements when defining goals under part I of the SEEMP, they are encouraged to consider setting additional ship-specific goals that go beyond the applicable CII requirements and strive for energy efficiency improvements and carbon intensity reductions beyond such requirements.

9.9 Ships subject to regulation 28 of MARPOL Annex VI may consider voluntarily using one or more of the trial CIIs (EEPI, cbDIST, clDIST or EEOI), where applicable, for the purpose of providing supporting data for decision-making to support the review clause set out in regulation 28.11 of MARPOL Annex VI. A standardized data-reporting format for the parameters to calculate the trial carbon intensity indicators on a voluntary basis is presented in appendix 5. A description of the methodology that should be used to calculate the trial CII should be included in the SEEMP.

9.10 Part III of the ship's SEEMP should be updated in case of voluntary modifications or necessary corrective actions are involved (every three years).

10 ATTAINED ANNUAL OPERATIONAL CII CALCULATION METHODOLOGY, DATA-COLLECTION PLAN AND DATA QUALITY

10.1 Taking into account the guidelines developed by the Organization,[9] part III of the SEEMP provides detailed information on how the ship's attained annual operational CII should be calculated. Regulation 28 of MARPOL Annex VI states that the attained annual operational CII shall be calculated, using the data collected in accordance with regulation 27 (Fuel Oil Data-Collection System).

10.2 In describing the calculation methodology, part III of the SEEMP should include a detailed description of the data required for the calculation of the attained annual operational CII. The data collection should follow the relevant methodology and requirements on the Fuel Oil Data-Collection System pursuant to regulation 27 of MARPOL Annex VI (see part II of these Guidelines).

[8] Refer to the *2022 Guidelines on operational carbon intensity indicators and calculation methods (CII Guidelines, G1)* (resolution MEPC.352(78)) and the *2022 Interim guidelines on correction factors and voyage adjustments for CII calculations (G5)* (resolution MEPC.355(78)).

[9] Refer to the *2022 Guidelines on operational carbon intensity indicators and calculation methods (CII Guidelines, G1)* (resolution MEPC.352(78)) and the *2022 Interim guidelines on correction factors and voyage adjustments for CII calculations (G5)* (resolution MEPC.355(78)).

10.3 In case of transfer of the ship from one company to another according to regulation 27.5 or 27.6 of MARPOL Annex VI, all relevant data necessary for the calculation of the attained annual operational CII should be submitted by the former company to the receiving company within one month after the date of transfer. The data should have been verified by the Administration or any organization duly authorized by it according to regulation 6.7 of MARPOL Annex VI before they are transferred to the receiving company. The format of the transfer should be consistent with appendix 4 and such that the receiving company can use it in the calculations of the attained annual operational CII for the whole year in which the transfer takes place.

10.4 In case the former company does not transfer the required data, the Administration may make relevant data submitted to the IMO Fuel Oil Consumption Database available to the receiving company. In case of a transfer of both company and Administration concurrently, the incoming Administration may make a request to the Organization for access to the data according to regulation 27.11. If no such data is available, the attained annual operational CII can be calculated and verified using the available data covering a period of the preceding calendar year as long as practically possible.

10.5 In case of transfer of a ship from one Administration to another according to regulation 27.4 of MARPOL Annex VI the data needed for calculating the annual attained CII is already in the possession of the relevant company and no further exchange of data is needed.

11 REQUIRED ANNUAL OPERATIONAL CII FOR NEXT THREE YEARS

11.1 Part III of the SEEMP describes the required annual operational CII values for the ship for each of the next three years, calculated in accordance with regulation 28 of MARPOL Annex VI and taking into account the guidelines developed by the Organization,[10] as the basis for those calculations.

12 THREE-YEAR IMPLEMENTATION PLAN

12.1 The three-year implementation plan describes the measures the ship plans to take to continue to achieve the required annual operational CII over the next three-year period. These may include, but are not limited to, measures as outlined in section 5 of these Guidelines.

12.2 The three-year implementation plan is ship-specific.

12.3 The three-year implementation plan should be SMART (Specific, Measurable, Achievable, Realistic and Time-bound) to the extent envisaged and feasible. It should include:

.1 a list of measures that improve the energy efficiency and reduce the carbon intensity of the ship, with time and method of implementation necessary for achieving the required operational CII;

.2 a description of how, when the listed measures are implemented, the required operational CII will be achieved, taking into consideration the combined effect of the measures on operational carbon intensity;

[10] Refer to the *2022 Guidelines on the reference lines for use with operational carbon intensity indicators (CII reference lines guidelines, G2)* (resolution MEPC.353(78)) and the *2021 Guidelines on the operational carbon intensity reduction factors relative to reference lines (CII reduction factors guidelines, G3)* (resolution MEPC.338(76)).

.3 the company personnel responsible for the three-year implementation plan, and for monitoring and recording performance throughout the year for the reviewing of the effectiveness of the three-year implementation plan; and

.4 identification of possible impediments to the effectiveness of the measures for improving the energy efficiency and reducing the carbon intensity of the ship, including possible contingency measures put in place to overcome these impediments.

12.4 The three-year implementation plan should be monitored and adjusted when necessary, and the data to be monitored, identified.

13 PROCESS FOR SELF-EVALUATION AND IMPROVEMENT (IN ADDITION TO SECTION 4.4. OF THESE GUIDELINES)

13.1 The purpose of self-evaluation is to evaluate the effectiveness of the planned measures and their implementation, to deepen the understanding of the overall characteristics of the ship's operation, such as what types of measures can function effectively, and how or why, to comprehend the trend of the efficiency improvement of that ship, to understand trends in the ship's utilization in terms of cargo carried and areas of operation, and to develop an improved action plan for the next cycle. This evaluation should produce meaningful feedback based on experience in the previous period, to enhance performance in the next period.

13.2 Procedures for self-evaluation of the ship's energy usage and carbon intensity should be developed and included in this section of the SEEMP. Self-evaluation should be carried out periodically based on data collected through monitoring. It is recommended that the cause and effect of the ship's performance in the evaluated period be identified in order to identify measures for improving performance during the next period.

13.3 The process of self-evaluation and improvement could consist of the following elements:

.1 regular internal shipboard and company audits to verify implementation and the effectiveness of the system;

.2 improvement, i.e. implementing preventive or modifying measures (responsible personnel within the company should evaluate such audit reports and implement corrective actions including preventive or modifying measures); and

.3 periodical review of the SEEMP and associated documents, to update the SEEMP in a manner which minimizes any administrative and unnecessary burdens on company personnel and ship staff.

13.4 The content of the self-evaluation and improvement could include the following elements:

.1 criteria for evaluation, including elements to evaluate, such as quality of monitoring, record-keeping, effectiveness of implemented measures (including cause and effect) and achievement of the goal;

.2 the evaluation of the effectiveness of the different measures taken, in terms of energy efficiency and carbon intensity;

.3 which measures contribute the most and how much, which measures do not contribute and are therefore not efficient, which ship and/or company-specific elements adversely affect the CII and how these could be improved;

.4 timeline for starting the review process ahead of the end of the compliance period and for implementation of new measures in the subsequent year;

.5 measures identified to address deficiencies and discrepancies including correction of data gaps and system weaknesses, new measures to improve implementation (e.g. training) as well as new carbon intensity improvement measures as needed;

.6 where relevant, actions that will be taken to bring the ship into better CII ratings including estimated quantification of the additional expected reduction in carbon intensity;

.7 where applicable, if a plan of corrective actions is required, the plan should include items listed under 15.4.5 to bring the ship out of inferior performance; and

.8 where relevant, identification of critical factors that contributed to missing the CII target.

14 REVIEW AND UPDATE OF PART III OF THE SEEMP

14.1 Regulation 26.1 of MARPOL Annex VI provides that "Each ship shall keep on board a ship-specific Ship Energy Efficiency Management Plan (SEEMP). This may form part of the ship's safety management system. The SEEMP shall be developed and reviewed, taking into account guidelines adopted by the Organization". Regulation 26.3.2 of MARPOL Annex VI provides that "For ships rated as D for three consecutive years or rated as E, in accordance with regulation 28 of this Annex, the SEEMP shall be reviewed in accordance with regulation 28.8 of this Annex to include a plan of corrective actions to achieve the required annual operational CII".

14.2 The company should ensure that the SEEMP is reviewed and updated when necessary, as per paragraph 9.10.

14.3 The SEEMP should include a log for when it has been reviewed and updated and identify which parts have been changed.

15 PLAN OF CORRECTIVE ACTIONS

15.1 A plan of corrective actions is not required to be included in the SEEMP unless a ship has been rated D for three consecutive years or E for one year.

15.2 For a ship that is required to develop a plan of corrective actions in accordance with regulation 28.7 of MARPOL Annex VI, a revised SEEMP including the corrective actions for CII reduction shall be submitted to the Administration or any organization duly authorized by it for verification in accordance regulation 28.8 of MARPOL Annex VI. The revised SEEMP should be submitted together with the plan of corrective actions, but in no case later than one month after reporting the attained annual operational CII in accordance with regulation 28.2.

15.3 Regulation 28.9 of MARPOL Annex VI further provides that "A ship rated as D for three consecutive years or rated as E shall duly undertake the planned corrective actions in accordance with the revised SEEMP."

15.4 **Developing the plan of corrective actions**

15.4.1 The purpose of the plan of corrective actions is to set out what actions a ship that was rated D for three consecutive years or E for one year should take to achieve at least a C rating for the calendar year following the adoption of the plan of corrective actions and ultimately the required annual operational CII.

15.4.2 The plan of corrective actions is ship-specific.

15.4.3 Many of the approaches described in section 5 of these guidelines or any other suitable measure may be applied to a ship to improve its fuel efficiency and thus its CII rating.

15.4.4 The plan for corrective action should describe the actions that the ship plans to take, the timeline in which those actions will be applied, and the expected impact their application will have on the ship's CII rating. It should be demonstrated how the corrective actions will contribute to achieving the required annual operational CII, so as to ascertain the effectiveness of the corrective actions. Experience gained from previously taken corrective actions and their degree of effectiveness should be taken into account when selecting the proper corrective actions.

15.4.5 The plan of corrective actions should be SMART (Specific, Measurable, Achievable, Realistic and Time-bound). It should include:

.1 an analysis of the cause of the inferior CII rating;

.2 an analysis of the performance of implemented measures;

.3 a list of additional measures and revised measures to be added to the implementation plan with time and method of implementation necessary for achieving the required operational CII;

.4 designation of a company person to be responsible for the added and revised measures in the implementation plan, monitoring and recording performance throughout and reviewing of the effectiveness of the corrective actions; and

.5 identification of possible impediments to the effectiveness of the measures for improving the energy efficiency and reducing the carbon intensity of the ship, including possible additional contingency measures put in place to overcome and how these impediments will be overcome.

15.4.6 The implementation of the plan of corrective actions should be monitored and adjusted when necessary. Additional measures should be taken to strengthen corrective actions in case of insufficient intermediate results.

15.4.7 The company should ensure that it is in a position to perform the actions set out in the plan of corrective actions and confirm that it is able to do so when submitting its updated SEEMP.

APPENDIX 1

SAMPLE FORM OF SHIP MANAGEMENT PLAN TO IMPROVE ENERGY EFFICIENCY (PART I OF THE SEEMP)

Name of ship:		Gross tonnage:	
Ship type:		Capacity:	
IMO number:			

Date of development:		Developed by:	
Implementation period:	From: Until:	Implemented by:	
Planned date of next evaluation:			

Review and update log

Date/timeline	Updated parts	Developed by	Implemented by

1 MEASURES

Energy efficiency measures	**Implementation** (including the starting date)	**Responsible personnel**

2 MONITORING

Description of monitoring tools

3 GOAL

Measurable goals

4 EVALUATION

Procedures of evaluation

APPENDIX 2

SAMPLE FORM OF SHIP FUEL OIL CONSUMPTION DATA-COLLECTION PLAN (PART II OF THE SEEMP)

1 Review and update log

Date/timeline	Updated parts	Developed by	Implemented by

2 Ship particulars

Name of ship	
IMO number	
Company	
Flag	
Year of delivery	
Ship type	
Gross tonnage	
NT	
DWT	
Attained EEDI (if applicable)	
Attained EEXI (if applicable)	
Ice class	

3 Record of revision of Fuel Oil Consumption Data-Collection Plan

Date of revision	Revised provision

4 Ship engines and other fuel oil consumers and fuel oil types used

	Engines or other fuel oil consumer type	Power	Fuel oil types
1	Type/model of main engine	(kW)	
2	Type/model of auxiliary engine	(kW)	
3	Boiler	(…)	
4	Inert gas generator	(…)	
5	Others (Specify)	(…)	

5 Emission factor

C_F is a non-dimensional conversion factor between fuel oil consumption and CO_2 emission in the *2018 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships* (resolution MEPC.308(73)), as amended. The annual total amount of CO_2 is calculated by multiplying annual fuel oil consumption and C_F for the type of fuel.

Fuel oil type	C_F (t-CO_2 / t-Fuel)
Diesel/Gas oil (e.g. ISO 8217 grades DMX through DMB)	3.206
Light fuel oil (LFO) (e.g. ISO 8217 grades RMA through RMD)	3.151
Heavy fuel oil (HFO) (e.g. ISO 8217 grades RME through RMK)	3.114
Liquefied petroleum gas (LPG) (Propane)	3.000
Liquefied petroleum gas (LPG) (Butane)	3.030
Liquefied natural gas (LNG)	2.750
Methanol	1.375
Ethanol	1.913
Other (……)	

6 Method to measure fuel oil consumption

The applied methods for measurement for each consumer type of this ship are given below. The description explains the procedure for measuring data and calculating annual values, measurement equipment involved, etc.

Engines or other fuel oil consumer type	**Method**	**Description**
Type/model of main engine		
Type/model of auxiliary engine		
Boiler		
Others (Specify)		

7 Method to measure distance travelled including laden distance

Description

8 Method to measure hours under way

Description

9 Processes that will be used to report the data to the Administration

Description

10 Data quality

Description

APPENDIX 3

SAMPLE FORM OF SHIP OPERATIONAL CARBON INTENSITY PLAN (PART III OF THE SEEMP)

1 Review and update log

Date/timeline	Updated parts	Developed by	Implemented by
<1st time>			
<2nd time>			
Etc.			

2 Required CII over the next three years, attained CII and rating over three consecutive years

Name of the ship		IMO number	
Company		Year of delivery	
Flag		Ship type	
Gross tonnage		DWT	
Applicable CII		☐AER ; ☐cgDIST	

Year	Required annual operational CII	Attained annual operational CII (before any correction)	Attained annual operational CII	Operational carbon intensity rating (A, B, C, D or E):
<year -1>				
<year -2>				
<year -3>				

	Required annual operational CII
<year>:	
<year + 1>	
<year + 2>	

3 Calculation methodology of the ship's attained annual CII, including required data and how to obtain these data as far as not addressed in part II

Description

4 Three-year implementation plan

Description

Company personnel to be responsible for the three-year implementation plan, monitoring and recording performance

List of measures to be considered and implemented

<table>
<tr><th>Measure</th><th>Impact on CII</th><th>Time and method of implementation and responsible personnel</th><th>Impediments and contingency measures</th></tr>
<tr><td></td><td></td><td><table><tr><th>Milestone</th><th>Due</th><th>Responsible</th></tr><tr><td></td><td></td><td></td></tr></table></td><td><table><tr><th>Impediment</th><th>Contingencies</th></tr><tr><td></td><td></td></tr></table></td></tr>
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Calculation showing the combined effect of the measures and that the required operational CII will be achieved

Year	Required annual operational CII	Targeted operational annual CII	Targeted rating
<year>:			
<year + 1>			
<year + 2>			

5 Self-evaluation and improvement

Description

6 Plan of corrective actions (if applicable)

Analysis of causes for inferior CII rating

Cause	Analysis of effect	Actions

Analysis of measures in the implementation plan

Measure	Analysis of effect	Actions

List of additional measures and revised measures to be added to the implementation plan

Measure	Impact on CII	Time and method of implementation and responsible personnel			Impediments and contingency measures	
		Milestone	Due	Responsible	Impediments	Contingencies

APPENDIX 4

STANDARDIZED DATA-REPORTING FORMAT FOR THE DATA-COLLECTION SYSTEM AND OPERATIONAL CARBON INTENSITY TO THE ADMINISTRATION

Identity of the ship

Name of the ship	
Company	
Flag	
IMO number	
Period of the calendar year for which the data is submitted	
Start date for DCS (dd/mm/yy)	
End date for DCS (dd/mm/yy)	

Technical characteristics of the ship

Year of delivery		
Ship type, as defined in regulation 2.2 of MARPOL Annex VI or other (to be stated)		
Gross tonnage (GT)		
Net tonnage (NT)		
Deadweight tonnage (DWT)		
Power output (rated power) over 130 (kW)	Main Engine(s)	
	Auxiliary Engine(s)	
Attained EEDI (if applicable)		
Attained EEXI (if applicable)		
Ice class (if applicable)		

Fuel oil[1] consumption data

Total fuel oil consumption data		
Fuel oil type	Quantity in metric tonnes (t)	Method(s) used for collecting fuel oil consumption data (BDN / Flow meters / bunker FO tank monitoring / LNG cargo tank monitoring / Cargo tank monitoring other than LNG)
Diesel/Gas Oil (CF: 3.206)		
LFO (CF: 3.151)		
HFO (CF: 3.114)		
LPG (Propane) (CF: 3.000)		
LPG (Butane) (CF: 3.030)		
Ethane (CF: 2.927)		
LNG (CF: 2.750)		

[1] Regulation 2.1.14 of MARPOL Annex VI defines "fuel oil" as any fuel delivered to and intended for combustion purposes for propulsion or operation on board a ship, including gas, distillate and residual fuels.

Total fuel oil consumption data		
Methanol (CF: 1.375)		
Ethanol (CF: 1.913)		
Other (…….) (Cf: ……..)		

Total fuel oil consumption data per consumer type			
Fuel oil type	Consumer type	Quantity in metric tonnes (t)	Method used for collecting fuel oil consumption data (Flow meters / bunker FO tank monitoring / subtraction / estimated)
Diesel/Gas Oil (CF: 3.206)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
LFO (CF: 3.151)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
HFO (CF: 3.114)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
LPG (Propane) (CF: 3.000)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
LPG (Butane) (CF: 3.030)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler (s)		
	Others (specify)		
Ethane (CF: 2.927)	Main engines (s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler (s)		
	Others (specify)		
LNG (CF: 2.750)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
Methanol (CF: 1.375)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
Ethanol (CF: 1.913)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
Other(…….) (Cf: ……..)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler (s)		
	Others (specify)		

Fuel oil consumption data while the ship is not under way, per consumer type			
Fuel oil type	Consumer type	Quantity in metric tonnes (t)	Method used for collecting fuel oil consumption data
Diesel/Gas Oil (CF: 3.206)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
LFO (CF: 3.151)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
HFO (CF: 3.114)	Main engines(s)		
	Auxiliary engines		
	Fired Boiler(s)		
	Others (specify)		
LPG (Propane) (CF: 3.000)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
LPG (Butane) (CF: 3.030)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
Ethane (CF: 2.927)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
LNG (CF: 2.750)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
Methanol (CF: 1.375)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler (s)		
	Others (specify)		
Ethanol (CF: 1.913)	Main engines (s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		
Other (…….) (Cf: ……..)	Main engines(s)		
	Auxiliary engine(s)/Generator(s)		
	Fired Boiler(s)		
	Others (specify)		

Total distance travelled (nm)	
Laden distance travelled (nm) (on a voluntary basis)	
Hours under way (h)	
Total amount of onshore power supplied (kWh)	

For ships to which regulation 28 of MARPOL Annex VI applies:

Total transport work	
Applicable CII	□AER ; □cgDIST
Required annual operational CII	
Start date for annual CII (dd/mm/yy)[2]	
End date for annual CII (dd/mm/yy)[2]	
Attained annual operational CII before any correction (AER in g CO_2/dwt.nm or cgDIST in g CO_2/gt.nm)	
Attained annual operational CII (AER in g CO_2/dwt.nm or cgDIST in g CO_2/gt.nm)	
Installation of innovative technology, if applicable (refer to MEPC.1/Circ.896)	□A ; □B-1 ; □B-2 ; □C-1 ; □C-2
Operational carbon intensity rating	□A ; □B ; □C ; □D ; □E
CII for trial purpose (none, one or more on voluntary basis)	□EEPI ; □cbDIST ; □clDIST ; □EEOI
EEPI (gCO_2/dwt.nm)	
cbDIST (gCO_2/berth.nm)	
clDIST (gCO_2/m.nm)	
EEOI (gCO_2/t.nm or others)	

[2] In the event of any transfer of a ship addressed in regulations 27.4, 27.5 or 27.6, these dates should be completed consistent with regulation 28.3 of MARPOL Annex VI (i.e. full 12-month period from 1 January to 31 December in the calendar year during which the transfer took place).

APPENDIX 5

STANDARDIZED DATA-REPORTING FORMAT FOR THE PARAMETERS TO CALCULATE THE TRIAL CARBON INTENSITY INDICATORS ON VOLUNTARY BASIS*

Attained annual EEOI	
Metric of Cargo Mass Carried or Work Done in EEOI calculation (gCO_2/t.nm or others)*****	
Transport work*****	
Attained annual EEPI (gCO_2/dwt.nm)	
Laden distance travelled (n.m)	
Attained annual clDIST (gCO_2/m.nm) ****	
Length of lanes (metre) ****	
Attained annual cbDIST(gCO_2/berth.nm) ***	
Available lower berths***	
End date for trial CII (dd/mm/yy)**	
Start date for trial CII (dd/mm/yy)**	
IMO number**	
End date for DCS (dd/mm/yy)**	
Start date for DCS (dd/mm/yy)**	

* For reporting a trial CII, the data should be reported as applicable taking into account the information already provided in appendix 4.

** Consistent with appendix 4.

*** Only applicable to cruise passenger ships.

**** Only applicable to ro-ro ships.

***** As defined in section 3 of *Guidelines for voluntary use of the ship energy efficiency operational indicator (EEOI)* circulated by MEPC.1/Circ.684. The distance travelled shall be determined from berth of the port of departure to berth of the port of arrival and shall be expressed in nautical miles.

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ANNEX 8

ACTION PLAN FOR THE REDUCTION OF UNDERWATER NOISE FROM COMMERCIAL SHIPPING

1 Background

1.1 Commercial shipping is one of the main contributors to underwater radiated noise (URN), which has adverse effects on marine life, including marine mammals, upon which many coastal and Indigenous communities depend for their food, livelihoods and cultures. The issue of URN and impact on marine mammals was first raised at IMO in 2004. Since ships routinely cross international boundaries, management of such noise requires a coordinated international response from a broad range of stakeholders.

1.2 Recognizing the importance of preventing and further reducing URN from ships, the Marine Environment Protection Committee (MEPC) approved *Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life* (MEPC.1/Circ.833) ("the Guidelines") in 2014. This commitment was reinforced in 2021 when MEPC 76 tasked the Sub-Committee on Ship Design and Construction (SDC) with identifying barriers to uptake of the Guidelines, reviewing and revising them, if deemed necessary, and identifying a programme of action/next steps to further prevent and reduce URN, as well as encouraging action.

1.3 Based on the barriers to uptake (SDC 8/WP.8), the SDC Sub-Committee revised the Guidelines. In 2023, MEPC 80 approved the *Revised guidelines for the reduction of underwater noise from shipping* (MEPC.1/Circ.906), and encouraged interested Member States and international organizations to submit to the Committee lessons learned / best practices in the implementation of the Revised Guidelines, i.e. an "experience-building phase" (EBP). An update to the Guidelines was approved by MEPC 82 and a revision was issued as MEPC.1/Circ.906/Rev.1.

1.4 Recognizing the need for an action plan to address barriers to the uptake of the Guidelines in order to further prevent and reduce URN from ships, this Action Plan was prepared by the SDC Sub-Committee at its tenth session and submitted for endorsement by MEPC 81, with an invitation to interested Member States and international organizations to submit proposals on the Action Plan's implementation, beginning at MEPC 82.

2 Objective

The Action Plan to further prevent and reduce URN from ships has been developed to guide IMO’s continued work on this issue and provides a mechanism to identify specific outcomes and indicative actions to achieve these outcomes, in a way that is meaningful and measurable.

3 Time frame

The action items in this plan may be pursued in parallel with the Revised Guidelines' EBP. Time frames for measures are indicative and should be evaluated by MEPC, as deemed appropriate.

4 Implementation

The IMO organs identified below are recommendations based on the subject matter of each action. Based on the outcomes of the EBP and considering follow-up proposals and/or commenting documents by interested Member States and international organizations, MEPC should review the Action Plan at MEPC 85, as appropriate.

Reference	Timeline[1]	Priority	Tasks/subtasks	Main organ		
A	**Establish an experience-building phase (EBP) for the revised Guidelines** Gather experience implementing the Revised Guidelines to increase uptake and inform next steps.					
1	Short	High	Implement a 3-year experience-building phase of the Revised Guidelines,[2] to conclude at MEPC 85, to gain experience and develop best practices in the use of the Revised Guidelines, followed by a review to make any necessary amendments, with the possibility of an extension phase up to two years, if necessary, to be determined by the end of the third year. Therefore, any necessary changes to the Revised Guidelines may only occur after the completion of the EBP.	MEPC		
2	Short	Medium	Consider the development of a database for the results of the EBP with a view to further informing IMO actions to reduce URN from ships.	MEPC		
B	**Enhanced public awareness, education and seafarer training** Communicate widely the Revised Guidelines and Underwater Radiated Noise Management Plans, along with the *Guidelines for underwater radiated noise reduction in Inuit Nunaat and the Arctic* (MEPC.1/Circ.907) to increase awareness, uptake and implementation by the relevant stakeholders.					
1	Short	High	Develop or adapt as needed information/briefings or training to increase awareness, uptake and implementation of the revised Guidelines, including topics like the threat of URN on the marine life, mitigation options and potential co-benefits (e.g. ship strike reduction, energy efficiency).	SDC		
2	Short	High	Conduct a multi-stakeholder, cross-disciplinary workshop focused on the nexus of URN and energy efficiency in 2025, following the "Workshop on the Relationship between energy efficiency and underwater radiated noise from ships" (September 2023).	MEPC		

[1] Timeline: Short (less than 3 years / during the Experience-Building Phase), Medium (3-6 years), Long (6+ years), or Continuous

[2] Approved at MEPC 80: "Recommend to MEPC 80 to encourage Member States and observers to submit lessons learned/best practices in the implementation of the revised Guidelines by MEPC 85, including outreach and awareness efforts to support uptake with a view to identify necessary adjustments/modifications to the Guidelines"

Reference	Timeline[1]	Priority	Tasks/subtasks	Main organ		
3	Short	Medium	Conduct activities and develop learning tools under the Integrated Technical Cooperation Programme to build technical cooperation and improve implementation of the revised Guidelines, considering linkages with the GloNoise Partnership.	SDC/ TCC /MEPC		
4	Medium	Med-High	Add reference in the Polar Code Part II B to the revised URN Guidelines and the *Guidelines for underwater radiated noise reduction in Inuit Nunaat and the Arctic* (MEPC.1/Circ.907) and relevance to the polar regions and recommend that polar operators take into consideration these Guidelines and implement them, as appropriate.	MEPC		
5	Short	High	Develop training guidance for seafarers to raise broader awareness of Underwater Radiated Noise (URN), its adverse impacts on the marine environment, in particular on sensitive areas and best practices for reducing URN.	SDC/ HTW		
C	**Standardize Underwater Radiated Noise Management Planning process** Establish best practices for the development and review of URN Management Plans.					
1	Short	High	Continue to refine methodologies to establish a standardized and harmonized approach to determine baseline URN level and monitor URN levels based on vessel design and operational characteristics.	SDC		
2	Short	High	Pursue the work related to the harmonization of URN measurement standards and consider conducting a review of URN measurement methods and comparability through existing and/or new research initiatives.	SDC		
3	Short	High	Continue to develop and refine methodologies to establish a standardized approach of predictive methods of URN levels during the design and construction of all new-build ships, and operation of existing ships (computational marine engineering methods e.g. FEM, BEM, SEA, CFD) and consider conducting a review of URN prediction methods, including empirical methods and model tests, and comparability through existing and/or new research initiatives.	SDC		

Reference	Timeline[1]	Priority	Tasks/subtasks	Main organ		
4	Short	High	Standardize measurement methodology and metrics and support comparability among field measurements and onboard measurements for the prediction of cavitation inception speed to facilitate operational measures in noise management planning.	SDC		
5	Long	Med-High	Recommend research and development, demonstration, and standardization of onboard noise sensors and monitoring equipment.	SDC		
D	**Develop Underwater Radiated Noise Targets** Share lessons learned through implementation of URN goal setting exercises.					
1	Short	Medium	Commission studies to estimate URN emissions from the maritime sector and project possible future developments, to inform the development of URN targets.	MEPC		
2	Medium	High	Through relevant submissions to MEPC, continue to be informed by regional actions and Indigenous knowledge on URN targets (biologically relevant) in the development of IMO URN targets.	MEPC		
3	Medium	Med-High	Develop URN targets for vessels possibly taking into account various parameters, such as type (e.g. ice class), speed, size, etc., as well as existing URN data; and evaluate as necessary.	MEPC		
E	**Further develop policy for URN reduction** To further develop policy for URN reduction at IMO, coalesce potential future actions.					
1	Medium	High	Informed by the EBP, consider, as appropriate, the development of a road map for the reduction of underwater radiated noise from ships, to include the Organization's vision, guiding principles, list of actions with timelines and follow-up actions towards the development of a revised road map, with periodic review of the road map. This road map could include examination of existing IMO instruments that would be relevant to URN reduction and/or other appropriate actions.	MEPC		

F	Create IMO processes/technical groups to share information and take into consideration other IMO regulatory goals					
1	Continuous	High	Share the experiences gained within the Organization's competencies on URN reduction with Governments and competent organizations, including the Convention on Biological Diversity.	IMO		
2	Short-Med	Medium	Develop Supplementary Guidelines or update the Revised Guidelines after the EBP, as appropriate, with further information for Members States and other authorities in support of the Revised Guidelines with regard to URN regional monitoring, possibly setting biologically driven URN targets, defining noise sensitive areas, etc.	SDC/ PPR		
3	Short	High	Promote ship designs, technologies and operations that increase energy efficiency, and lower GHG emissions, while reducing URN. Also identify any technical and operational energy efficiency measures that increase URN and develop ways to inform and encourage ship owners and operators, and other relevant stakeholders to, wherever practical, avoid or minimize the use of such measures.	MEPC		

Actions to support IMO

IMO is an international forum that uses research to inform policy decisions. Therefore, Member States and relevant international organizations, Indigenous peoples, and other stakeholders are invited to lead the following actions and inform IMO of relevant results in order for the Organization to take actions, as appropriate, to further reduce URN.

Reference	Timeline	Priority	Tasks/subtasks
G	**Develop tools to collect data and share information**		
1	Short	Med-High	Package and make available to seafarers/operators the information on the location of URN sensitive areas within Marine Protected Areas, PSSA's, area of Indigenous use including Indigenous knowledge, and taking into consideration Articles 29, 41, 42 of UN Declaration on the Rights of Indigenous Peoples (UNDRIP) etc. among others and any recommended or required measures for use in voyage planning.
2	Short	Medium	Explore, develop and share experience on incentive programmes and other experiences related to URN mitigation and the application of the Revised Guidelines and the *Guidelines for underwater radiated noise reduction in Inuit Nunaat and the Arctic* (MEPC.1/Circ.907) to support their adoption.
3	Short	High	Develop an 'URN Reduction Best Practice Forum' to facilitate exchange of experience, knowledge, new technologies and to develop best practices related to implementation of the Revised Guidelines.
4	Short	High	Develop a 'how to' guidance for the *Guidelines for underwater radiated noise reduction in Inuit Nunaat and the Arctic*, which would ensure a clear understanding and further articulation of MEPC.1/Circ.907.
5	Medium	Med	Promote collaborations with underwater ambient noise or ambient sound monitoring programmes to unify and/or complement the development of underwater radiated noise objectives, determining, for example, sensitive areas, recommendations on measurement procedures, monitoring methodologies, etc.
H	**Encourage research on URN and GHG/URN and Biofouling** Continue research and development efforts addressing commonly used energy efficiency measures, including IMO GHG regulations (EEDI, EEXI, CIII) and their impacts on URN. Initiate research and development activities addressing innovative technologies that further enhance energy efficiency, address biofouling, and greenhouse gas and underwater noise reduction of ships, while assessing any implications for ship safety.		
1	Short-Medium	High	Conduct research for assessing any implication of such measures on ship safety, where appropriate.
2	Short	High	Conduct simulations and evaluations of URN measures and effects on stakeholders and international shipping.
3	Short	Med-High	Conduct research on the potential environmental effects of local speed reduction measures and/or slow steaming (URN/GHG combined).
4	Short	High	Conduct research on the possible effects of different types of anti-fouling systems on URN, particularly ultrasonic and consider developing recommendations as appropriate.
5	Short-Medium	High	Conduct research on the effect of cleaning propeller and hull on ship noise, in addition to other potential measures.

I	Encourage research on impacts of URN on species and habitats		
1	Short-Long	High	Further collaborate on scientific research to define (noise) sensitive areas/species and harmonization of methodologies.
2	Continuous	High	Further collaborate on scientific research on the adverse impacts of URN on ecosystems, and marine and coastal biodiversity.
3	Long	Med-High	Further collaborate on standardizing biological monitoring to inform URN management.
4	Long	Medium	Further collaborate on developing real-time information systems for species monitoring to inform URN vessel management.

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ANNEX 9

GUIDANCE ON THE EXPERIENCE-BUILDING PHASE FOR THE REVISED GUIDELINES FOR THE REDUCTION OF UNDERWATER RADIATED NOISE FROM SHIPPING TO ADDRESS ADVERSE IMPACTS ON MARINE LIFE (MEPC.1/CIRC.906/Rev.1)

Main objectives

The main objectives of the experience-building phase (EBP) are to collect information on lessons learned and best practices in the application and the uptake of the *Revised guidelines for the reduction of underwater radiated noise from shipping to address adverse impacts on marine life* (MEPC.1/Circ.906/Rev.1) by ship designers, builders, owners, and operators to reduce the underwater radiated noise (URN) of any given ship and other stakeholders in establishing mechanisms and programmes through which noise reduction efforts can be realized, to further prevent and reduce URN from ships.

Key areas where experience-building is urgently needed

Member States and other stakeholders are invited to gather, prepare and submit experiences, data and research on the following key areas of the Revised Guidelines during the EBP under the agenda item "Experience-building phase (EBP) for the reduction of underwater radiated noise from shipping", taking into consideration the *Guidelines for underwater radiated noise reduction in Inuit Nunaat and the Arctic* (MEPC.1/Circ.907).

Key areas for the EBP (not in order of priority):

.1 URN Management Planning, including URN baselining, management plan development, and target setting;

.2 design and technical noise reduction approaches;

.3 maintenance and operational approaches;

.4 energy efficiency and URN reduction;

.5 evaluation and monitoring;

.6 incentivization; and

.7 training and raising awareness.

Process for updating the Revised Guidelines, if deemed necessary

The scope and status of the Revised Guidelines will remain unchanged for the period of the EBP. Any necessary changes may only occur after completion of the EBP, and after lessons learned and analysis of data have been considered by MEPC.

The Secretariat is requested to submit an information document to MEPC 85 providing a cumulative list of submissions relevant to EBP, for the interested parties to assess the progress made on the application and uptake of the Revised Guidelines. After assessing the progress made, it is anticipated that the Committee will decide whether it is necessary to extend the EBP duration for another two years to gather additional information on lessons learned.

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ANNEX 10

RESOLUTION MEPC.396(82)
(adopted on 4 October 2024)

DESIGNATION OF THE NUSA PENIDA ISLANDS AND GILI MATRA ISLANDS IN LOMBOK STRAIT AS A PARTICULARLY SENSITIVE SEA AREA

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by international conventions for the prevention and control of marine pollution from ships,

BEING AWARE of the ecological criteria, in particular relating to uniqueness or rarity, critical habitat, dependency, representativeness, diversity and fragility, and the social, economic and cultural, and scientific and educational criteria of the Nusa Penida Islands and Gili Matra Islands in Lombok Strait as well as their vulnerability to damage by international shipping activities and the steps taken by Indonesia to address that vulnerability,

NOTING the *Revised guidelines for the identification and designation of Particularly Sensitive Sea Areas* (*Revised PSSA Guidelines*), adopted by resolution A.982(24) as amended by resolution MEPC.267(68), and the *Revised guidance document for submission of PSSA proposals to IMO* set forth in MEPC.1/Circ.510,

HAVING AGREED that the criteria for the identification and designation of a Particularly Sensitive Sea Area (PSSA) provided in the Revised PSSA Guidelines are fulfilled for the Nusa Penida Islands and Gili Matra Islands in Lombok Strait,

HAVING NOTED that the Lombok Strait includes newly established routeing systems (Traffic Separation Scheme (TSS)), adopted by the Maritime Safety Committee, at its 101st session, as the Associated Protective Measures to improve the safety of navigation and the protection of the marine environment, and that the TSS entered into force on 1 July 2019,

1 DESIGNATES the Nusa Penida Islands and Gili Matra Islands in Lombok Strait, as defined in annex 1 to the present resolution, as a PSSA;

2 INVITES Member Governments to recognize the ecological, socio-economic and scientific criteria of the Nusa Penida Islands and Gili Matra Islands in Lombok Strait, set forth in annex 2 to the present resolution, as well as their vulnerability to damage by international shipping activities, as described in annex 3 to the present resolution;

3 ALSO INVITES Member Governments to note the Associated Protective Measures established to address the area's vulnerability, the details of which are contained in annex 4 to the present resolution.

ANNEX 1

DESCRIPTION OF THE NUSA PENIDA ISLANDS AND GILI MATRA ISLANDS IN LOMBOK STRAIT PARTICULARLY SENSITIVE SEA AREA[1]

Description of the Particularly Sensitive Sea Area

To minimize the risk of damage from ship groundings and pollution damage by international shipping activities, to protect the area's unique and endangered species, and to safeguard its critical habitat and diversity as well as significant economic and cultural resources, mariners should exercise extreme care when navigating in the area bounded by the geographical coordinates of the Particularly Sensitive Sea Area, provided below, and adhere to the Associated Protective Measures set out in annex 4.

The geographical coordinates of the Nusa Penida Islands and Gili Matra Islands in Lombok Strait Particularly Sensitive Sea Area are provided in tables 1 and 2 below; the location code and numbered list refer to figure 1. All geographical positions are based on WGS 84.

Table 1. Geographical coordinates of proposed PSSA Nusa Penida Islands in the Lombok Strait.

Location Code	Latitude	Longitude
A	8° 39' 14.43" S	115° 34' 37.10" E
B	8° 46' 25.54" S	115° 39' 41.36" E
C	8° 51' 39.59" S	115° 35' 32.77" E
D	8° 45' 46.33" S	115° 26' 06.53" E
E	8° 41' 05.82" S	115° 24' 13.28" E
F	8° 38' 34.63" S	115° 26' 42.52" E

Table 2. Geographical coordinates of proposed PSSA Gili Matra Islands in the Lombok Strait.

No.	Latitude	Longitude
1	8° 19' 51.00" S	116° 1' 23.00" E
2	8° 20' 34.00" S	116° 5' 42.00" E
3	8° 22' 28.00" S	116° 5' 29.00" E
4	8° 21' 59.00" S	116° 1' 11.00" E

[1] The text in this annex is taken from the information provided by Indonesia in document MEPC 82/12.

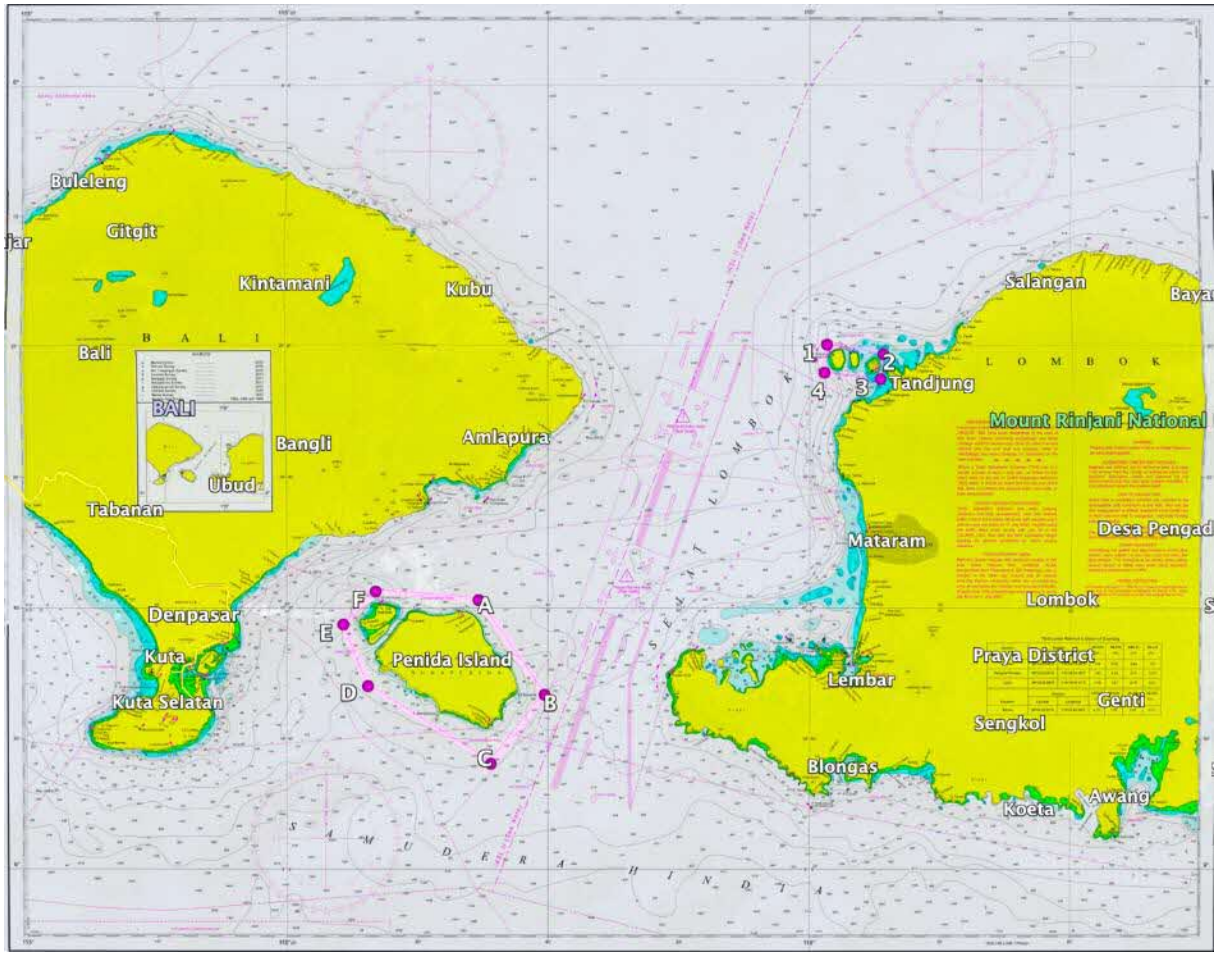


Figure 1: Map showing the location of the Nusa Penida Islands and Gili Matra Islands in Lombok Strait Particularly Sensitive Sea Area

ANNEX 2

ECOLOGICAL AND SOCIO-ECONOMIC CRITERIA OF THE NUSA PENIDA ISLANDS AND GILI MATRA ISLANDS IN LOMBOK STRAIT PSSA[1]

1 Introduction

The Lombok Strait

1.1 The Lombok Strait (in Indonesian: Selat Lombok), connects the Java Sea to the Indian Ocean, and is located between the islands of Bali and Lombok in Indonesia. The narrowest point of the Strait is at its southern opening, with a width of 18 km between the islands of Lombok and Nusa Penida. At the northern opening, it is around 30 km across with the Gili Islands on the north-west side of Lombok. The depth of the Lombok Strait reaches 250 metres; therefore, it is more suited to crossing large vessels if compared to the Malacca Strait which is only 200 metres in depth.

1.2 The Lombok Strait has significant traffic density of ships which serve national and international traffic at the IASL-II. Based on AIS data collected from Benoa VTS in 2023, the number of vessels passing through the Lombok Strait was 4,885 from a total of 77,147 trips. Those numbers are made up by the trips of IASL-II, inland ferries and fishing vessels, etc. The proportion of cargo vessels and tankers is 11% (8,791 trips) and 17% (13,028 trips), respectively.

1.3 The PSSA covers an area around the Nusa Penida Islands and the Gili Matra Islands. Nusa Penida is located south-east of Bali Island while the Gili Matra Islands are north-west of Lombok Island (see figure 1). The coordinates of the proposed PSSA of the Nusa Penida Islands and Gili Matra Islands in Lombok Strait are set out in annex 1.

Nusa Penida and Gili Matra ecosystem

1.4 The Nusa Penida Marine Protected Area (MPA), which covers Nusa Penida Island, Nusa Lembongan Island and Nusa Ceningan Island, was established in 2014 via Ministerial Decree Number 24/Kepmen-KP/2014 and subsequently expanded in 2018 (Decree Number 90/KEPMEN-KP/2018). It has a high biological diversity, with approximately 1,419 hectares of coral reefs and 296 coral species within the Coral Triangle, which is currently a world priority to preserve. The Nusa Penida MPA has in its area coral reefs, mangroves, sea grass meadows and almost all the important habitats of fish resources, including the manta ray (*Manta birostris*), and marine mammals such as whales and dolphins, across this region. Nusa Penida is famous for manta rays and Mola mola (also known as the ocean sunfish). In addition, there are two types of turtles, the green turtle and the hawksbill turtle. This area is also a known sunfish "cleaning" site, a place for deep-sea fish to surface and clean their bodies of parasites. The existence of this unique fish species is an important cultural symbol for local communities of Klungkung Regency, Bali Island.

1.5 The Gili Matra archipelago consists of three islands namely Gili Meno, Gili Ayer and Gili Trawangan and was formally established as a national MPA in 2009 (Ministerial Decree Number 67/Kepmen-KP/2009). This designation was reaffirmed and expanded upon in 2022 (Decree Number 34) by the Minister of Marine and Fisheries. The coral reef types surrounding the three islands are fringing reefs and these ecosystems are the main focus of marine tourism. The area of coral reefs in the three islands is 696.09 ha, that is 287.02 ha in Gili

[1] The text in this annex is drawn from the information provided by Indonesia in document MEPC 82/12. All references used in this resolution are set out in document MEPC 82/12.

Trawangan, 175.59 ha in Gili Meno, and 233.48 ha in Gili Ayer. Based on the biodiversity of coral reefs and the estimated number of all types of fish in the three islands, 1,664 individuals of target fish or the equivalent of 3,658 individuals can be found per hectare consisting of 54 species and nine tribes (Ministry of Marine Affairs and Fisheries, 2020).

1.6 Sea grass meadows provide some valuable ecosystem services of any marine habitat, such as those that store carbon, improve water quality, provide food and habitat, and act as biological indicators and spawning areas for several marine species (Short et al., 2016). The size of sea grass meadows in the three islands is 58.5 ha, that is 14.39 ha in Gili Trawangan, 32.83 ha in Gili Meno and 11.28 ha in Gili Ayer (Ministry of Marine Affairs and Fisheries, 2020). Among the three islands, Gili Meno is the favourite island for nesting sites for turtles and turtle foraging (feeding grounds), since it is covered with sea grass for more than half of its circumference.

1.7 In addition to these MPAs, the east coast of the island of Bali and the west coast of the island of Lombok support significant tourism operations. In 2022, after the COVID-19 pandemic had subsided, Klungkung Regency, including Nusa Penida, welcomed around 728,936 tourists from January to mid-December 2023. This number had increased compared to 2022, which saw only 312,872 tourists, whereas the number of tourist visits to North Lombok reached 278,519 in 2022 and increased significantly to 656,448 in 2023. Gili Matra, especially Gili Trawangan, contributes to the number of tourist visits in North Lombok with a total of 96% (Department of Tourism, North Lombok, 2022; Information and Documentation Management Officer, North Lombok, 2023).

2 Ecological criteria

Uniqueness or rarity

2.1 A 2008 Rapid Ecology Assessment by Gerry Allen and Mark Erdmann highlighted the astounding biodiversity of Nusa Penida's waters, revealing a remarkable 576 fish species. Among these is the Mola mola, or ocean sunfish, one of the world's largest bony fish. These elusive giants inhabit the deep-sea, reaching depths of 400 metres (Nyoman Darma et al., 2010). Notably, Nusa Penida is one of the rare locations globally where Mola mola are known to surface to clean themselves from various parasites with the help of reef fish as well as sunbathing to get sunlight to adjust body temperature due to being in the deep-water for a long time, making it a haven for marine life enthusiasts (CTC, 2019).

2.2 Nusa Penida's marine life extends beyond the Mola mola. Divers can also encounter a fascinating array of rays, including manta rays, frequently sighted near Batu Lumbung (Batu Kandik Village), which is also called Manta Point and, known as one of the three major manta sightseeing locations in Indonesia (Sari Hani, 2021). Records indicate sightings of up to eight manta rays at a time (Nyoman Darma et al., 2010). This marine life shares the waters with other threatened species classified as "Vulnerable" by the International Union for Conservation of Nature (IUCN). As detailed in table 1, the IUCN Red List of Threatened Species (www.iucnredlist.org) identifies several fish and turtle populations in Nusa Penida and Gili Matra facing vulnerability or endangerment.

Table 1: **IUCN Conservation Status for some species found in Nusa Penida.**

No	Species	Species Name	IUCN Conservation Status
1	Sunfish	• *Mola mola* • *Mola alexandrini (previously known as Mola Ramsayi)*	Vulnerable Unrecorded
2	Manta rays	*Manta birostris*	Endangered
3	Lumba-lumba hidung botol (*bottle nose*)	*Tursiops truncates*	Endangered
4	*Penyu sisik* (Hawksbill)	*Eretmochelys imbricata*	Endangered
5	*Penyu hijau* (Green Turtle)	*Chelonia midas*	Endangered
6	False killer whale	*Pseudorca crassidens*	Near threatened

Critical habitat

2.3 According to the Coral Reef Rehabilitation and Management Program – Coral Triangle Initiative, Asian Development Bank (COREMAP CTI ADB) conducted by the Indonesia Climate Change Trust Fund (ICCTF) and Ministry of National Development Planning Agency National Development Planning Agency in 2023, Nusa Penida Island, Nusa Lembongan Island and Nusa Ceningan Island have exceptionally high marine biodiversity. In the region, there are 1,419 hectares of coral reef, 230 hectares of mangrove forests, and 108 hectares of seagrass beds (Sari Hani, 2021) with more than 296 coral reef species and some 576 reef fish species, five of which are categorized as newly discovered species (Coral Triangle Center, 2011). The fringing coral reefs provide a critical habitat for marine biota hatching and serve as habitat for reef associated marine biota such as coral fish, shrimp, mollusca and various marine invertebrates (Hutomo and Moosa, 2005).

2.4 Nusa Penida Islands are also home to many residential and migratory cetacean species providing critical habitats. Species include the bottlenose dolphin (*Tursiops truncates*), the pantropical spotted dolphin (*Stenella attenuate*), and the spinner dolphin (*Stenella longirostris*). The deep seas of the Strait of Lombok form an important migratory route between the Pacific and Indian Oceans for whales, including the endangered blue whale (*Balaenoptera musculus*) and the vulnerable fin (*Balaenoptera physalus*) and humpback (*Megaptera novaeangliae*) whales. The presence of these species is providing a growing whale shark and dolphin watch industry in the Bali-Lombok waters including near Nusa Penida.

2.5 Gili Matra Islands serve as a critical habitat for manta rays and mobula rays. However, these magnificent creatures face significant threats. The IUCN Red List classifies *Mobula birostris* (giant manta ray) as "vulnerable" due to a concerning global population decline (Ministry of Marine Affairs and Fisheries, 2020). A similar fate befalls *Mobula alfredi* and *Mobula kuhlii*, both categorized as vulnerable due to dwindling populations. There is a Protection Zone covered 7.44 hectares in Gili Matra MPA, the purpose of which is to protect critical habitats, notably the blue coral colonies (Heliopora sp.) that occupy the shallow waters of Gili Matra (Rahmadyani et al., 2022).

Dependency

2.6 Nusa Penida's rich biodiversity of ecosystems, consisting of vibrant coral reefs, flourishing mangrove forests and extensive seagrass meadows, fosters a remarkable diversity with significance for resident and migratory cetacean species.

2.7 Bali Island, particularly through Nusa Penida, gracing the southern edge of the Coral Triangle, sits within the Lesser Sunda Ecoregion. This vital region serves as a major migratory corridor for cetaceans, facilitating the movement of 22 marine mammal species, including giants like blue and sperm whales, between the Indian and Pacific Oceans (Reef Resilience Network, 2022).

Representativeness

2.8 Indonesia's coral reefs account for 65% of the total area in the Coral Triangle, and Lombok Strait along with Nusa Penida and Gili Matra are included as part of the Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF) along with Malaysia, Papua New Guinea, the Philippines, Solomon Islands and Timor-Leste. The region sits within the heart of the Coral Triangle, a global hot spot of marine biodiversity. It boasts a stunning array of coral reefs, diverse marine life like manta rays and sea turtles, and unique geological formations. These islands exemplify the ecological richness of the Coral Triangle, making it a crucial area for conservation and a captivating destination for nature enthusiasts.

Diversity

2.9 Nusa Penida boasts exceptional biodiversity, exemplified by its extensive coral reefs. Encompassing a remarkable 1,419 hectares, these fringing reefs teem with life. A staggering 296 coral species and 576 fish species thrive in the shallow waters surrounding this 200-square kilometre island. Notably, live coral cover thrives, ranging from 70% to 75%, with a healthy balance between hard coral (averaging 40.3%) and soft coral (averaging 29.8%). Among the dominant coral genera are Acropora sp. and Montipora sp. for hard corals, and Xenia, Nephthya, and Sinularia for soft corals (Nyoman Darma et al., 2010). This vibrant coral ecosystem provides a haven for a diverse array of marine life, including sea anemones, algae, clams (tridacna), crinoids and starfish (linckia).

2.10 Nusa Penida Islands are positioned at the southern end of the Lombok Strait, which is within the "Coral Triangle", a centre of rich marine biodiversity. Coral Triangle is home to 76% of all known coral species, 37% of all known coral reef fish species, and 53% of the world’s coral reefs. The area is of ecological and scientific significance and has great natural beauty and diversity, as seen in its pristine islands and reefs. The Lombok Strait provides a multitude of transitional zones to the land, the sea and the freshwater environment, which is the basis for exceptional biodiversity.

2.11 Gili Air, Gili Meno and Gili Trawangan are surrounded by ecosystems coral reefs. The type of coral reef that covers the three islands morphologically is fringing coral reef covering 696.09 ha of coral reef. Coral reefs in Gili Matra are home for 1,664 individuals of fish target or equivalent to 3,658 individuals per hectare consisting of 54 types and nine tribes. Gili Matra is also very well known as an ecosystem for seagrass meadow. Seagrass meadow has a 12.2 ha area consisting of seven species (Ministry of Marine Affairs and Fisheries, 2020).

2.12 Blacktip shark and whitetip shark can be found in the Gili Water Tourism Park (TWP). In this conservation area, these fish are an attraction for tourists. Apart from that, many turtles can also be found, especially green and hawksbill turtles (Ministry of Marine Affairs and Fisheries, 2020).

Productivity

2.13 The Lombok Strait and Nusa Penida region are characterized by a unique upwelling phenomenon. This process brings cooler water to the surface, lowering sea surface temperature and enriching the environment with phytoplankton, as evidenced by increased

chlorophyll-a concentrations (Chl-a) (Tito and Susilo, 2017). This abundance of phytoplankton likely serves as a vital food source for gelatinous zooplankton, which in turn attracts the majestic ocean sunfish (Mola mola) – a key player in marine ecosystems due to its consumption of these zooplankton. The upwelling process further enhances the ecological significance of the area by attracting a wider range of large pelagic predators, including sharks and rays.

Spawning

2.14 Both Nusa Penida and Gili Matra, positioned within the Coral Triangle, hold immense significance as critical spawning grounds and nursery areas for a diverse array of marine life. The warm, nutrient-rich waters, diverse underwater structures and abundant food sources lay the foundation for the breeding of marine life. Some examples include manta rays, mobula rays, sunfish, green sea turtles, and a variety of reef fish species which all utilize Nusa Penida's waters for spawning and raising young in Nusa Penida (ICCTF, 2023).

2.15 The fringing coral reef ecosystem encircling Gili Matra plays a critically important role, particularly for a small island ecosystem. Due to its isolated nature, any disruption to this reef's functions has immediate consequences. The reef serves as the foundation of Gili Matra's biodiversity, providing essential ecosystem services. It acts as a nursery, habitat, and feeding ground for a vast array of marine life (Rahmadyani et al., 2022). This interconnectedness is exemplified by green sea turtles, which find Gili Matra's beaches ideal for nesting. The surrounding coral reef waters then nurture the young hatchlings as they mature (ICCTF, 2023).

Naturalness

2.16 Nusa Penida is a relatively remote island off the coast of Bali, with limited roads and infrastructure compared to the more developed mainland. This remoteness has helped preserve its natural beauty and reduce direct human impact. While tourism is increasing, tourism activities are strictly controlled to minimize impacts on the natural environment. There is a natural ecosystem in the waters of Nusa Penida, including on Virgin Island, which is maintained naturally. One example is the existence of Virgin Beach, which still has very clear water. The clear water at Virgin Beach is because this beach has not been touched much and has not been changed by interference from human hands.

2.17 Gili Matra's tourism industry prioritizes eco-friendly and sustainable practices, emphasizing waste reduction and environmental protection. This commitment ensures tourism does not significantly compromise the island's pristine character. A prime example lies in the ban on motorized vehicles across the three islands. Visitors may explore Gili Matra's charm on foot, by bicycle or via traditional horse-drawn carriages, fostering a deeper connection with the natural environment (ICCTF, 2021).

Integrity

2.18 Nusa Penida's status as an MPA necessitates effective zoning strategies. A crucial component of maintaining marine ecosystem integrity is designating dedicated sustainable fisheries zones, which help regulate fishing pressure and promote responsible practices.

2.19 Gili Matra embodies a unique geography, classified as a semi-open inner island and a coral island. This translates to a landmass fringed by a vibrant coral reef ecosystem (Kurniawan et al., 2016). The reef's rich marine biodiversity and stable seabed play a critical role in safeguarding the Gili Matra Islands, acting as a natural barrier and promoting long-term island stability.

Fragility

2.20 The vital Lombok Strait faces significant environmental threats from shipping activities. Oil spills, marine debris, accidental grounding, and anchor damage pose a constant risk. Coral reefs, classified as highly sensitive based on vulnerability indices (environmental sensitivity index value), are particularly susceptible to collision with ship hulls (Dewi et al., 2023). These threats underscore the urgency of implementing robust conservation measures to safeguard Nusa Penida's delicate ecosystem from the perils associated with international shipping in the Lombok Strait.

2.21 The Gili Matra MPA is characterized by a critical yet imperilled coral reef ecosystem. This vital underwater world faces significant threats, leading to a concerning decline in biodiversity. Symptoms of this degradation include a reduction in overall fish biomass, particularly in commercially targeted species. Additionally, encounters with the exotic marine fauna that define the Gili Matra experience have become less frequent (Rahmadyani et al., 2022).

3 Social, cultural and economic criteria

Social or economic dependency

3.1 Nusa Penida and Gili Matra is heavily dependent on marine tourism. Nusa Penida's coastal area is intensively used for economic activities such as seaweed farming, marine tourism and fisheries. Nusa Penida has 20 dive spots around Nusa Penida Island and 308 hectares of seaweed farming area with an average production of about 50 tons/month (Ruchimat et al., 2013).

3.2 Nusa Penida is one of the most popular marine tourism destinations in Bali. Marine tourism businesses in the Nusa Penida area are scuba and snorkelling, surfing, cruise and sailing and water sports (Rikardi et al., 2021). Based on data from the Klungkung Bali Tourism Office, the number of tourist visits to Nusa Penida reached 700,000 tourists by the end of 2023.

3.3 Gili Matra is a globally attractive marine tourism destination, bringing about 500,000 tourists yearly. The tourism revenue of Gili Matra contributes up to 70% of the North Lombok economy. More than 50% of the Gili Matra population works in activities related to the tourism industry. In addition, it also creates substantial employment opportunities for mainland communities (North Lombok District) (Rahmadyani et al., 2022).

Human dependency

3.4 The waters of the Nusa Penida area and its surroundings are part of the waters of the eastern region of Bali, which serve as a fishing ground for a lot of fishers, not only for local fishers but also for fishers from different regions such as Lombok, Sulawesi and Banyuwangi (Rikardi et al., 2021).

3.5 The major commodities are tuna, skipjack, snapper, grouper and mackerel. Nusa Penida's capture fisheries production is around 93,713 tons/year (2007), 103,378 tons/year (2008) and 105,469 tons/year (2009). Capture fisheries production in Nusa Penida is 919 tons, for tuna which has a value of IDR 9,462,473,000 or 45.2% of Klungkung Regency's fish production (CTC, 2018).

3.6 Apart from fish production, the Nusa Penida area also produces seaweed, which contributes 99.34% of the seaweed production in the Bali region (Department of Marine Affairs and Fisheries Denpasar, 2017).

Cultural heritage

3.7 The traditional structure that overlooks Pakraman villages in Nusa Penida is the Alit Assembly. The assembly coordinates, performs and supervises religious and customary rituals. The community of Nusa Penida also performs the Nyepi Segara ritual every year to honour the sea. The ritual is usually held on Sasih Kapat, which falls in October. During Nyepi Segara, fishing activity in the sea is not allowed for a full day (Ruchimat et al., 2013).

3.8 In Balinese and Lomboknese culture, mountains, lakes, *campuhan* (river confluence), beaches and seas are believed to have sacred values. Therefore, temples and holy places are generally built in those places, because in those places that is where holy people and Hindus have holy thoughts (revelations). In Nusa Penida there are several Kahyangan Jagat Temples, which are not only celebrated by the people on the island but also by the Hindu community throughout Bali. There are 15 temples in Nusa Penida, one of the largest being Sad-Khyangan Ped Temple, which is one of the central temples on the island of Bali. There are several large temples in Nusa Penida such as Batu Medau Temple and Giri Putri Temple. The highest peak in Nusa Penida, namely Puncak Mundi, also has a temple which is usually used by the people of Nusa Penida and the island of Bali for praying (Department of Marine Affairs and Fisheries Denpasar, 2017).

3.9 Apart from being known for their natural beauty, Bali and Lombok are also areas that apply strong religious principles, local wisdom and a philosophy of life. One of the principles that is widely known by the local community is Tri Hita Karana (three reasons for prosperity), which is based on efforts to maintain harmony with God, with fellow humans and with nature or the environment. This principle was then revealed in the form of an effort to maintain the purity of the six elements (Sad Kertih), namely *segara* (ocean), *wana* (forest), *danu* (lake), *jagat* (universe), *jana* (body) and *atma* (soul). This religious principle is a strong justification for efforts to protect the environment, especially the marine environment in the Bali region. (Wiana, 2018).

4 Scientific and educational criteria

Research

4.1 The Lombok Strait is one of the main exit routes for the Indonesian Throughflow (ITF) which connects Indonesian waters with the Indian Ocean. This strait is also an extraordinary Indonesian water zone because of the internal tides which often develop into internal solitary waves (Purwandana et al., 2021). There has been a lot of research on the characteristics of internal tides that occur in the Lombok Strait to find out the potential energy from ocean currents that can be converted into electrical energy.

4.2 ITF also produces upwelling from cooler seawater moving from the sea floor deeper to the surface and can produce strong currents when combined with tides. The presence of local currents and upwelling events makes Nusa Penida a suitable area for studying the relationship between oceanographic characteristics and fish shape. Oceanographic characteristics, including changes in sea surface temperature and current speed caused by vertical mixing, influence the distribution of coral reef fishery species on Nusa Penida. Research relating to the relationship between oceanographic characteristics and fish species will provide important information in decisions regarding marine spatial planning. Therefore, marine spatial planning in the Lombok Strait, especially Nusa Penida, is important (Sartori et al., 2021). Nusa Penida as an MPA also has two core zones where only researchers with certain permits are allowed to enter (Ruchimat et al., 2013). One core zone is located only two nm from the outer line of the western side of TSS Lombok Strait.

4.3 The Lombok Strait is also a biogeographic boundary between the fauna of western Indonesia and eastern Indonesia, which have very clear differences. Alfred Russell Wallace, a zoologist from England discovered this difference in his research and then drew an abstract dividing line called the Wallace Line from the South Philippines, the Sulawesi Strait, to the Lombok Strait (Desmonda, 2020; Van Welzen et al., 2011). Apart from that, research related to flora and fauna was also carried out on Nusa Penida.

4.4 Apart from being a research centre in the fields of ecology, flora, fauna and electric current energy potential, the land area in Nusa Penida has also been designated as a source area for breeding Bali cattle. Determination of Nusa Penida as a source area for Bali cattle breeding based on Decree of the Minister of Agriculture of the Republic of Indonesia No. 346 of 2016. Bali cattle as a native Indonesian livestock breed have been designated through Decree of the Minister of Agriculture Number 325/kpts/OT.140/1/201.

4.5 Sharks in Gili Matra at this location are one of the objects of research projects from various institutions. There are two types of sharks commonly found in Gili Matra, namely blacktip reef shark (*Carcharhinus melan-opterus*) and whitetip reef shark (*Triaenodon obesus*) (Ministry of Marine Affairs and Fisheries, 2020).

Baseline for monitoring studies

4.6 Gili Matra is also a location for satellite-based monitoring of turtle movements. This monitoring is important for providing technical recommendations for the management of conservation areas to have better insight into animal welfare and the sustainability of the ecosystem that supports the life of turtles on Gili Matra.

Education

4.7 Several sub-zones designed in the Nusa Penida MPA are zones intended for education. This educational activity supports the interests of water conservation in Nusa Penida. In 2020, Nusa Penida was designated a Hope Spot by Mission Blue. Hope Spots is a campaign that embraces unique ecological areas in the ocean and is designed for global protection and conservation campaigns. Furthermore, this MPA serves as a living laboratory for studying marine conservation and management methods on the ground (CTC, 2019).

4.8 Gili Matra has been used as a place for diving coaching and training. This activity was carried out at the diving school on Gili Trawangan, Lombok. This activity involved 15 participants seeking to obtain an international diving certificate by Scuba School International, which involved representatives from the ecotourism group, supervisory groups and representatives of marine conservation area managers at the Gili Matra MPA; it is noteworthy that 9 out of 15 participants in this training were women. This activity aims to support human resources so that people can become marine tourism guides who have ecotourism principles and improve the economy and a sustainable ecosystem.

ANNEX 3

VULNERABILITY TO DAMAGE BY INTERNATIONAL SHIPPING ACTIVITIES[2]

1 Vessel traffic characteristics

Operational factors

1.1 Fishing vessels, traditional vessels, local trade vessels, tourist and recreational craft can be encountered anywhere in the Lombok Strait, especially in the vicinity of the Nusa Penida Islands. There are currently no existing activities or foreseeable developments of offshore exploration or exploitation of the seabed.

1.2 One zone in Nusa Penida MPA, called a sustainable fisheries zone, is dedicated to traditional fisheries. This zone aims to protect fish habitat and populations, fishing using environmentally friendly tools and methods, tourism and recreation, research and education. Some environmentally sustainable methods of fishing such as bottom-line fishing, trawling line fishing, set net fishing, and free diving with spear fishing are allowed under the provision that any fauna, such as sharks, ocean sunfish, manta ray and endangered species, must be released. Shipping (cruising) is still allowed in this zone. Nusa Penida MPA also has two core zones where only researchers with certain permits are allowed to enter (Ruchimat et al., 2013).

1.3 The Core Zone in the Gili Matra MPA, which covers 94.81 ha of water, is a no-entry zone specifically designated to preserve marine habitat and populations. Except for research or educational purposes, utilization or extraction activities are not permitted in the zone.

Vessel types

1.4 Table 1 below provides a comprehensive overview of the number of vessels in each ship type traversing the Lombok Strait throughout 2023. Among the various vessel categories, passenger ships dominate the maritime traffic with a substantial count of 24,489, indicating the high volume of passenger transportation and maritime travel within the area of Bali and Lombok. In addition, pleasure boats also are seen to have a high traffic volume with 1,793 trips made. General cargo ships are also prominently represented, totalling 12,964 trips, underscoring the importance of goods transportation through this strategic waterway. Slightly less are the trips made by oil product tankers, which contributed to the maritime traffic with a substantial count of 8,772.

Table 1: Number of each ship type traversing the Lombok Strait in 2023

Ship type	Number of passing vessels
Chemical tanker	9
Crude oil tanker	10
Oil products tanker	8,772
Gas tanker	47
General cargo ship	12,964
Bulk carrier	528
Container ship	64
Other ship	5,654
Passenger ship, Passenger ship, Fast ferry	25,014

[2] The text in this annex is drawn from the information provided by Indonesia in document MEPC 82/12.

Ship type	Number of passing vessels
Pleasure boat	12,793
Support ship	8,382
Fishing ship	2,910

Traffic characteristics

1.5 According to the Indonesian Law Number 6 Year 1996 on Indonesian Waters and Government Regulation Number 37 Year 2002 on Rights and Obligations of Foreign Ship and Aircraft Exercising Archipelagic Sea Lanes Passage in Designated Archipelagic Sea Lanes, Lombok Strait is designated as IASL-II. This Strait serves as a domestic and international sea lane and is also crossed by ferries between Bali and Lombok Islands. The IASL was adopted by IMO through resolution MSC.72(69) in 1998.

1.6 Indonesia, as the Archipelagic State, has the rights to prescribe the TSS to enhance the safety of navigation on the Archipelagic Sea Lane, based on Article 53(6) of United Nations Convention on the Law of the Sea (UNCLOS) 1982 and also based on IMO's General Provisions for the Adoption, Designation and Substitution of Archipelagic Sea Lanes. The designation of the TSS will affect the ships which exercise the rights of Archipelagic Sea Lane Passage in the Lombok Strait.

1.7 The traffic in the Lombok Strait, as shown in figure 1, is comprised of the following vessel types: 11.5% tankers, 16.9% cargo ships, 32.6% passenger ships, 16.7% pleasure vessels, 10.9% support vessels, 3.8% fishing vessels, and other types of ships about 7.4% (LCT, barges, research vessels, etc.). The traffic pattern of IASL-II is obtained from the AIS data and shown in figure 2 below. The number of ships is obtained from the Benoa VTS data and other data which is reported by several local ports in the area of Lombok Strait (IASL-II). The number of voyages collected during 2023 in the vicinity of Lombok Strait, including IASL-II and several inland traffics movement, amount to 77,147 trips, which can be translated as 257 trips daily. This figure on a daily average basis consists of 37 navigating in the IASL-II and 220 trips made by either passenger ship, support vessel or others.

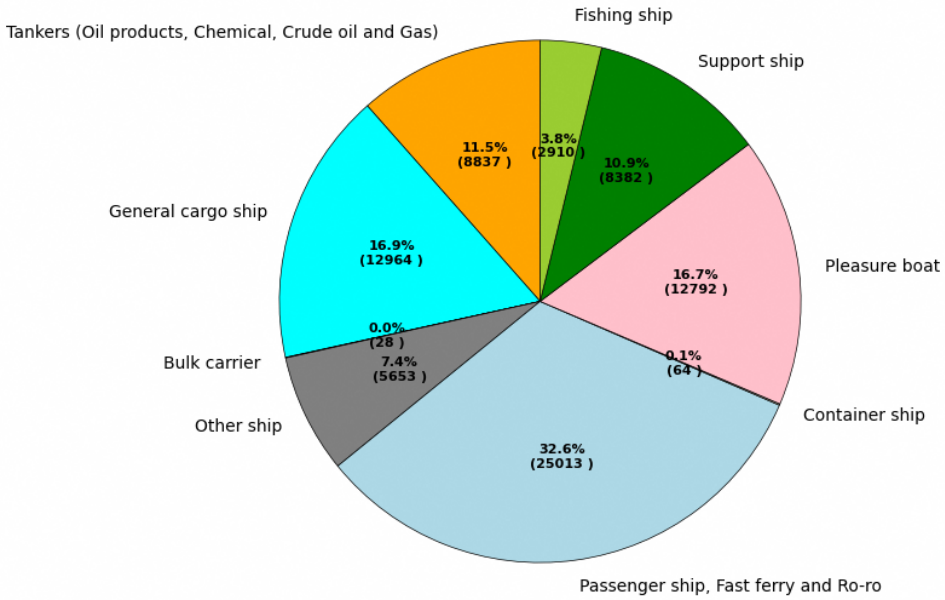
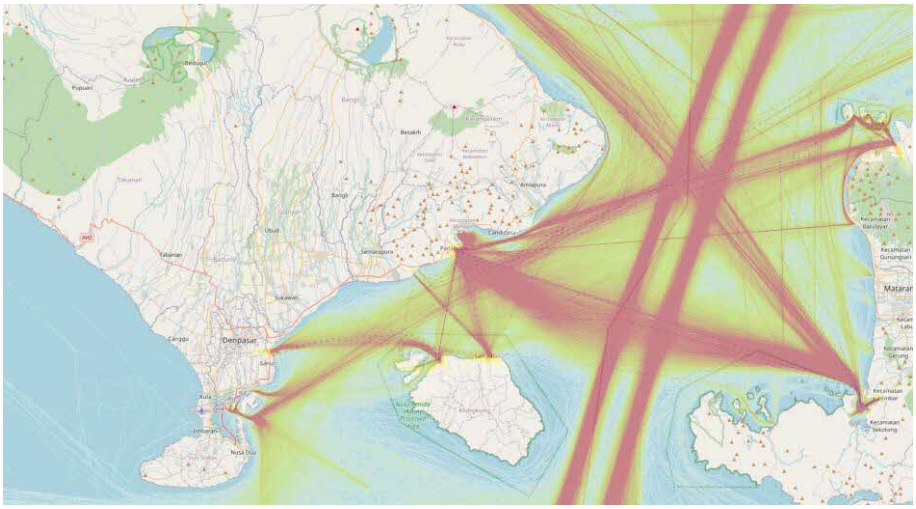
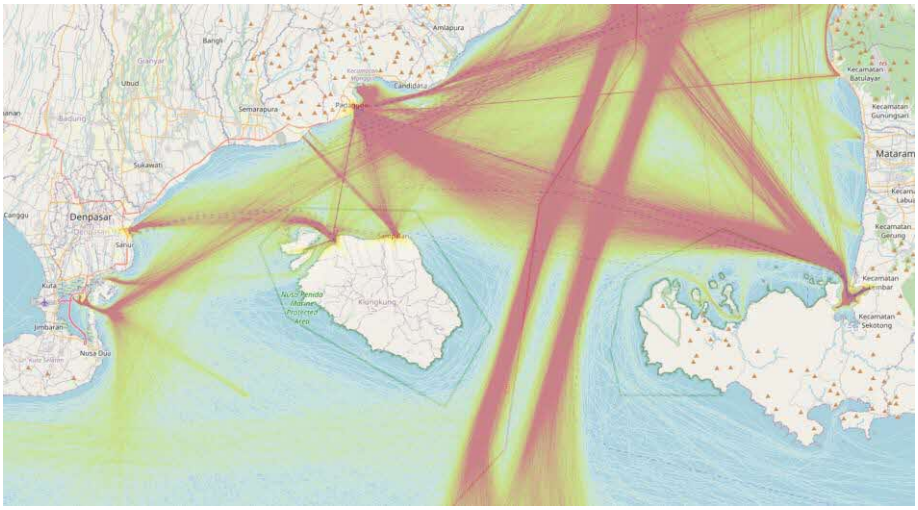


Figure 1: **The proportion of the traffic in the Lombok Strait by vessel types**

1.8 As shown in figure 2 (a-c) below, along with the existence of IASL-II in the Lombok Strait there is also a high-density crossing traffic line between Bali Island and Lombok Island that intersects IASL-II. This crossing traffic consists mainly of passenger ferry ro-ro and pleasure vessels as both Bali and Lombok Islands are well known as tourism destinations.



(a)



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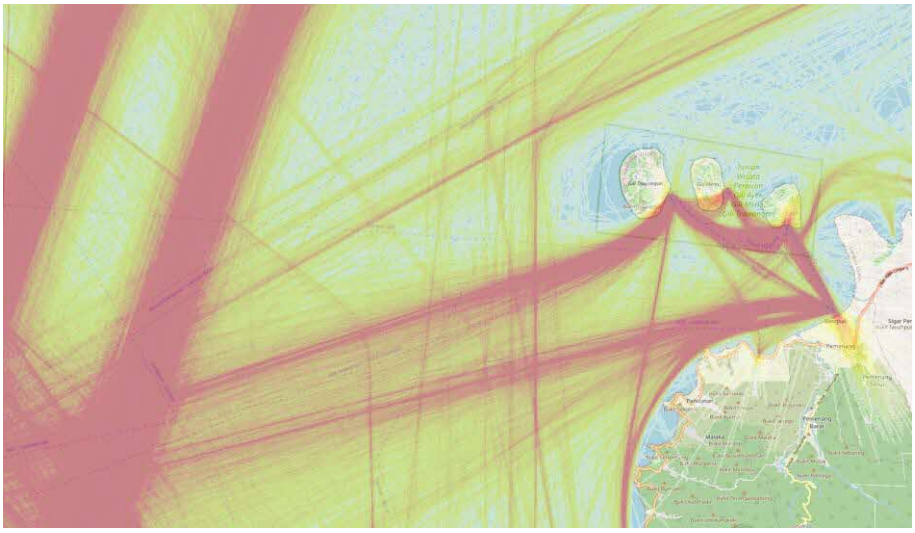


(c)

Figure 2: Traffic patterns in (a) Lombok Strait, (b) around Nusa Penida Islands, and (c) around Gili Matra Islands

1.9 The location of the TSS Lombok Strait, which is less than one nautical mile from the outer edge of Nusa Penida MPA, could pose a danger to the marine environment due to grounding or drifting. As shown in figure 3, it is found that the closest distance of ship trajectory to the core zone of Nusa Penida is MPA is only 0.6 NM. This is because the regulation of MPA does not forbid the activity of any passing vessel. While the traffic distribution in IASL-II is following a normal distribution (see figure 4).

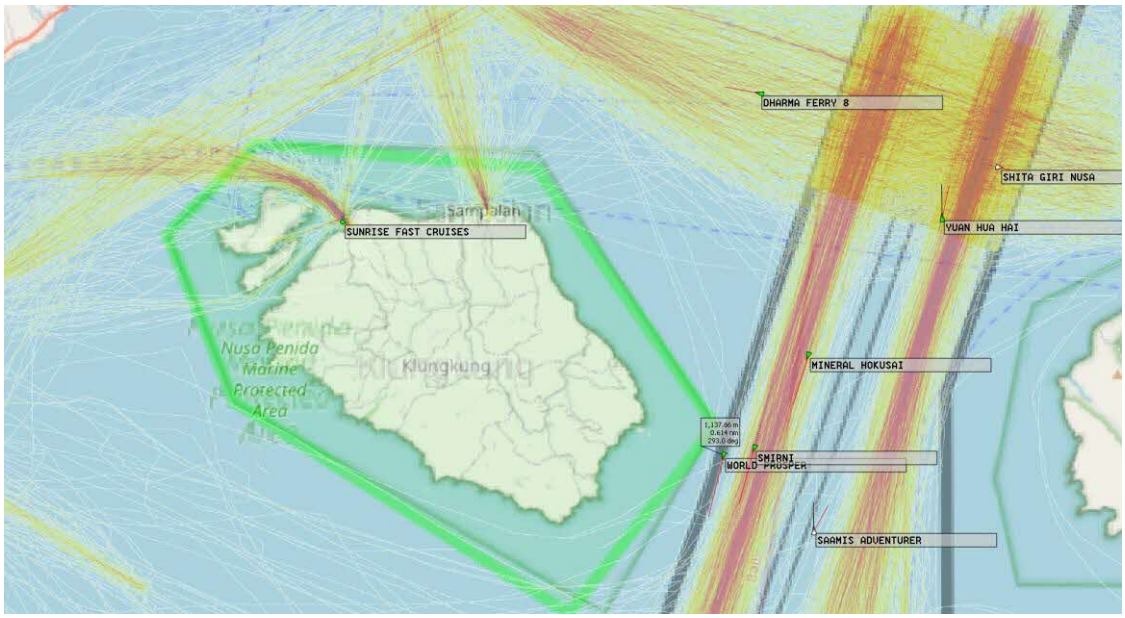


Figure 3: The closest distance of ship trajectory to the core zone of Nusa Penida MPA is approximately 0.6 NM or 1,100 m

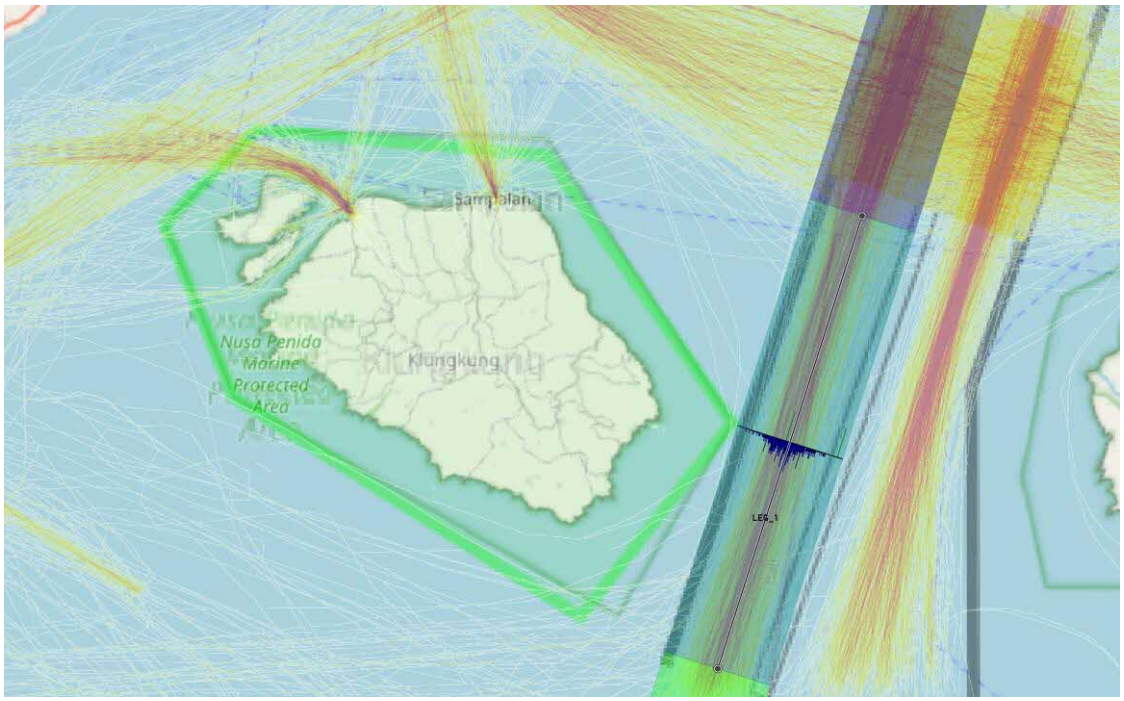


Figure 4: Traffic distribution in Lombok Strait follows the normal distribution

1.10 It is expected that the shipping activity in the vicinity of Lombok Strait will increase due to the growth of the traffic at the Straits of Malacca and Singapore and Sunda Strait and the economic development in East Asia. The traffic is also affected by the increasing number of yacht and cruise vessels which are expected to increase due to the adoption of Indonesian Presidential Decree Number 105 Year 2015 on Foreign Yacht Visits to Indonesia, and the Minister for Transportation Regulation Number PM 121 Year 2015 on Facilitation for Tourist Visits by Foreign Cruise Ship. Both regulations ease the requirements and facilitate better access of yacht and cruise vessels in the tourist destinations.

1.11 The increasing traffic also occurred in two main shipping routes which intersect in the middle of Lombok Strait. An international shipping route which lies on the north–south bound intersects with a national shipping route which lies on the east–west bound of Lombok Strait. The international shipping route traffic is increased since there is greater transportation of commodities between South-East and East Asia countries to Australia. Likewise, the national shipping route traffic is increasing due to the increased crossing traffic along shipping routes between Padang Bai, Sanur, Amed, Nusa Lembongan and Senggigi, Teluk Nare, Bangsal, and Gili Islands. Ship traffic density between these routes would be likely to be growing since the Indonesian Government are accelerating development especially for the eastern part of Indonesia including this area.

1.12 After the implementation of the TSS in the Lombok Strait, particularly in the IASL-II, a notable decrease in collision frequency has been observed. The introduction of designated lanes for maritime traffic has significantly enhanced navigational safety in this crucial maritime passage. By segregating inbound and outbound vessels, the TSS has reduced the risk of collisions and improved overall traffic management. The IALA Waterway Risk Assessment Program (IWRAP) is used and shows that the TSS Lombok Strait reduced the total frequency of ship collisions by 60.3%. AIS data from 2017 is used as the benchmark for calculating the collision frequency before the implementation of TSS and it is found to be 0.461 accident per year (Dinariyana et al., 2020). While the AIS data from 2023 is used to compare the calculation after the TSS implementation and the frequency becomes 0.0002634 accident per year.

Harmful substances carried

1.13 The heightened traffic of tankers within the IASL-II, particularly near Nusa Penida Island, increases the probability of ship grounding and drifting incidents in the region. Tankers, carrying large volumes of dangerous liquid cargo, face heightened risks of grounding due to factors such as strong currents, unpredictable weather conditions and the intricate geography of the area. The hazard of an oil spill could possibly take place due to grounding or drifting of those tankers. The number of chemical and oil tankers that navigated in the IASL-II in 2023 is recorded as high as 8,791 unique trips, which is 11% of the total traffic in the Lombok Strait. However, the TSS Lombok Strait as well as the Lombok Reporting System (LOMBOKREP) have reduced the collision frequency by separating the traffic as well as improving the voluntary ship reporting.

2 Natural factors

Hydrographical

2.1 The Lombok Strait is around 30 km wide in the northern and central parts. On the southern side of the Lombok Strait, which is the exit to the Indian Ocean, the width is narrowed to around 18 km due to the presence of Nusa Penida Island, the deepest part of which is only around 250 metres. With this depth, it can be said that this strait is deeper than the Malacca Strait which only has a water depth of 200 metres, so that the Lombok Strait is more suitable for large ships to pass through (Anwar, 2021).

2.2 The southern seabed bathymetry of Nusa Penida, which starts from Tanjung Bakung to Tanjung Sari is very steep at a depth of 20 m but beyond this depth of 20 m, the steepness of the seabed decreases, up to a depth of 500 m where the slope reaches a 4.2% gradient. The eastern sea waters of Nusa Penida from Tanjung Kerambitan to Batu Abah are also quite steep. The steepness of the seabed is high, especially at depths of 0-50 m (Department of Marine Affairs and Fisheries Denpasar, 2017).

Meteorological

2.3 The waters of eastern Indonesia, especially in the Lombok Strait, and the characteristics of currents south of Java are influenced by the annual cycle of monsoon winds. Lombok's waters are influenced by the east monsoon, which occurs in June, July and August with high air pressure over mainland Australia and low-pressure centres over mainland Asia. This causes the wind to move from east to west. Monsoons affect seawater circulation and climatology such as wind, rainfall and others. In equatorial areas, during the east monsoon, rainfall is very low, affecting salinity levels and the abundance of phytoplankton. Rainfall in eastern Indonesia is relatively low, less than 1.5 m/year. Rainfall is highest in Bali and Lombok from December to February, with rainfall of more than 1500 mm/year in 2023. Ships passing through the Lombok Strait must be alert due to navigational errors that could lead to accidents.

Oceanographic

2.4 Internal waves can be seen in the Lombok Strait as one of the outflow straits from ITF which flows water from the Pacific Ocean to the Indian Ocean. Due to the presence of multi-layered waters, rough topography and strong tidal currents, the Lombok Strait has the characteristics of intense internal waves. The wave speed between the islands of Lombok and Nusa Penida is 1.8-1.9 m/s (Susanto et al., 2005).

2.5 The Lombok Strait is one of the straits in Indonesian waters that has internal solitary waves with high amplitude. Waves are generated by stratified waters through the interaction between strong tidal currents, background currents (such as the Indonesian Throughflow), and rough bottom topography. Analysis of two consecutive satellite SAR images obtained on 23 and 24 April 1996 showed that internal waves were generated by the interaction of successive semidiurnal tidal currents with the southern sill of the Lombok Strait. The average propagation speed is 1.96 m/s (Susanto et al., 2005).

3 Other information

3.1 Several ship accidents have occurred in the Lombok Strait. Based on data from the National Transportation Safety Committee, there were at least seven accidents reported from 2006 to 2023. The most common type of accident was fire. Fires involving tankers occurred in 2014, 2017 and most recently in 2023, with a fire on the deck of the oil tanker **MT Christine**. Oil tanker fires could cause an oil spill that could damage the marine environment in the Lombok Strait. To mitigate the impact of the fire on the **MT Christine**, an oil boom was installed to prevent oil from spilling into the waters of the Lombok Strait. A ship fire involving a ro-ro passenger ferry also occurred in 2022. The location of the ship fire was in the waters north-east of Bali, near the TSS Lombok Strait and the ship drifted towards the TSS Lombok Strait.

3.2 If there is a maritime incident near Lombok Strait, the port authority in Padang Bai and Lembar has patrol boats available. It would take around three hours for a patrol boat to reach the precautionary area in TSS Lombok Strait.

3.3 Based on AIS data in January 2023, there were several ship trajectories in south-west bound traffic that were crossing the TSS line. It was also found that a vessel entered and immediately left the Nusa Penida MPA zone (see figure 5).

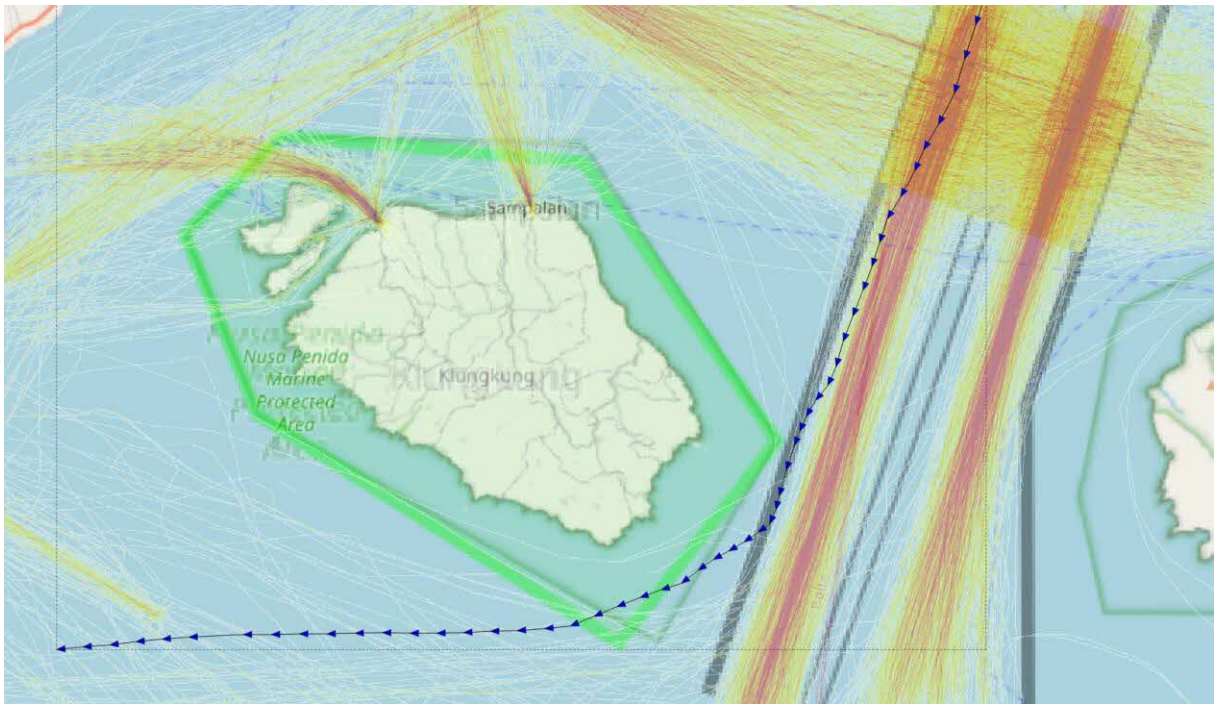


Figure 5: An oil products tanker, found inside the MPA area but outside the core zone

3.4 Oil spill simulations conducted for ship collision in Lombok Strait have been performed. The oil spill dispersion scenario is carried out by assuming that a collision involving a tanker and general cargo occurs in the crossing area between ships passing on IASL-II and ships crossing IASL-II from the Padang Bai side in Bali to the Lembar in Lombok. It is assumed that the point of occurrence of crossing collision is 8° 38' 91" S and 115° 44' 02" E. This scenario is based on the results of collision frequency calculations in IWRAP which show that the largest frequency values occur on the two types of ships. The tanker used in the simulation has a length of 261 m with a capacity of 150,000 dwt. The same data used by van de Wiel and van Dorp in 2011 is utilized. Based on their study, one tank with a volume of 14,561 m^3 is estimated to spill in the amount of 11,970 m^3. There are two conditions in the direction of the wind and sea current that are used, towards north-west and south-west. When the wind direction is north-westward, after 12 hours of simulation, spilled oil does not reach the MPA of Nusa Penida. After 12 hours, there was about 86.4% of the oil floating on the surface of the seawater, and 13.6% had dispersed into the air. Within 12 hours, the 86.4% oil that floated did not reach the shoreline. When wind and sea current were heading to the southwest from the point of impact, after 8 hours, the oil spill did reach to MPA of Nusa Penida. After 12 hours of simulation, there was about 70.6% of oil floating above the water surface, 15.9% of the spill would reach the MPA and 13.6% were dispersed into the air. Based on the results of the simulation, the response from the authorities in dealing with the spread needs to be done on the condition if a collision occurs in the crossing area while the wind and sea current are heading south-west (Dinariyana et al., 2020).

ANNEX 4

ASSOCIATED PROTECTIVE MEASURES FOR THE NUSA PENIDA ISLANDS AND GILI MATRA ISLANDS IN LOMBOK STRAIT PSSA

Associated protective measures (APMs)

The newly established routeing systems (traffic separation scheme (TSS)) at the Lombok Strait are the APMs, as follows:

.1 3.0 NM wide TSS separated by 0.3 NM separation zone in Lombok Strait as a main shipping lane for national and international route at the northern entrance of Lombok Strait. The total length of the TSS is approximately 4.9 NM, which lies between northern bound and proposed northern precautionary area;

.2 a northern precautionary area with recommended directions of traffic flow that lies on the proposed northern TSS. The length of the northern precautionary area is approximately 4.62 NM to the south;

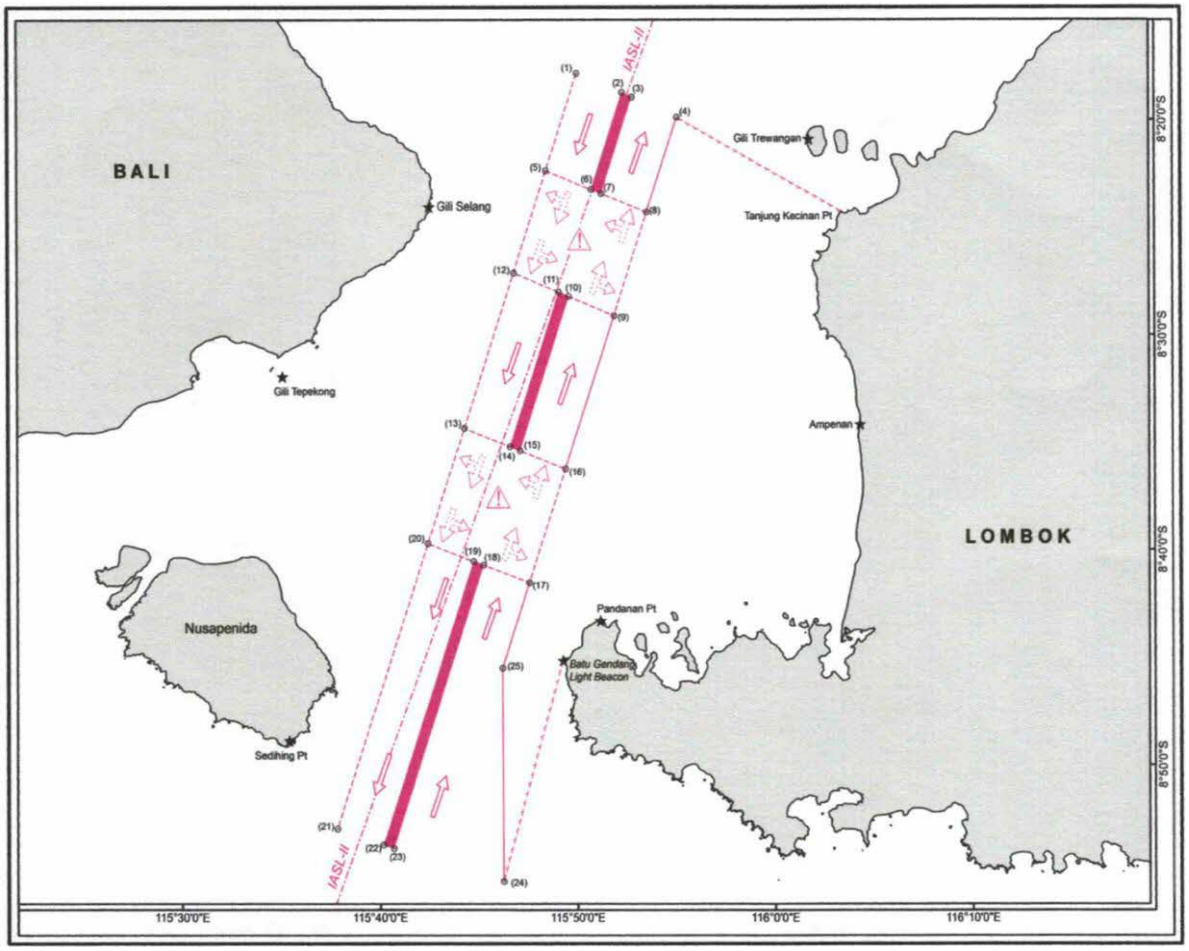
.3 3.0 NM wide TSS separated by 0.3 NM separation zone that lies between northern precautionary area and southern precautionary area. The total length of the proposed TSS is 8.2 NM;

.4 a southern precautionary area with recommended directions of traffic flow that lies on the proposed southern TSS with the length approximately 4.62 NM;

.5 3.0 NM wide TSS separated by 0,3 NM separation zone in the Lombok Strait as a main shipping lane at the southern entrance of the Lombok Strait. The total length of the proposed southern TSS is approximately 13.9 NM; and

.6 inshore traffic zone that lies from TSS to Lombok Island and Gili Trawangan Island.

(**Note**: These routeing systems were approved at the sixth session of the Sub-Committee on Navigation, Communications and Search and Rescue (NCSR 6/3/4), subsequently adopted by MSC 101 and entered into force on 1 July 2020. The establishment of the TSS in Lombok Strait is in COLREG.2/Circ.74 dated 14 June 2019 and the SN.1/Circ. 337 dated 14 June 2019.)



Charlet 1: Chart of the traffic separation scheme in Lombok Strait, approved by MSC 101.

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ANNEX 11

POLICY FOR CONSIDERATION AND APPROVAL OF UNIFIED INTERPRETATIONS

1 MSC 108 (15 to 24 May 2024) and MEPC 82 (30 September to 4 October 2024) agreed on the following policy for consideration and approval of unified interpretations (UIs) to be followed by all its subsidiary bodies and, preferably *in fine*, by all IMO bodies concerned, as set out in paragraph 19.6 of its report and reproduced below:

.1 with respect to the status of UIs:

.1 Conventions and associated mandatory instruments had higher legal weight than UIs; and

.2 UIs are not legally binding and, irrespective of whether a UI is approved, each Contracting Government maintains its right to interpret the Convention and associated mandatory instruments;

.2 UIs are useful in that they are meant to ensure uniform application of technical requirements containing vague expressions that are open to divergent interpretations, or to provide other more specific guidance;

.3 in order to ensure that UIs do not go beyond mandatory requirements and do not circumvent the development process of mandatory requirements, the following safeguards should be observed:

.1 UIs are not meant to amend mandatory requirements in Conventions and associated instruments;

.2 UIs should not go beyond the interpretation of requirements; and

.3 UIs should not contradict the text of requirements;

.4 consensus is to be applied to the decision-making process of UIs, and not unanimity, e.g. sub-committees should consider/discuss the UIs. If concerns are raised, sub-committees should discuss them and attempt to address them, and make a decision, which could include accepting the UI, amending it, rejecting it, asking the submitter to resubmit by taking into account the views expressed or requesting that a new output be submitted. The reports of sub-committees should include any concerns raised; and

.5 when considering UIs, due regard should be given to the following issues:

.1 effective date of UIs, taking into account the preparedness of the industry for implementing it; and

.2 the potential for practical consequences of not approving a UI, which could result in different interpretations by Member States.

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ANNEX 12

STATUS REPORT OF OUTPUTS OF MEPC FOR THE 2024-2025 BIENNIUM

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	**Output number**	**Description**	**Target completion year**	**Parent organ(s)**	**Associated organ(s)**	**Coordinating organ**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
1. Ensure implementation of IMO instruments supported by capacity development	1.2	Input on identifying emerging needs of developing countries, in particular SIDS and LDCs to be included in the ITCP	Continuous	TCC	MSC / MEPC / FAL / LEG		Ongoing		MEPC 81/16, section 12
1. Ensure implementation of IMO instruments supported by capacity development	1.4	Analysis of consolidated audit summary reports	Annual	Assembly	MSC / MEPC / LEG / TCC / III	Council	Completed		MEPC 81/16, paras. 2.20, 2.21 and 10.7
1. Ensure implementation of IMO instruments supported by capacity development	1.5	Non-exhaustive list of obligations under instruments relevant to the IMO Instruments Implementation Code (III Code)	Annual	MSC / MEPC	III		Completed		MEPC 81/16, para. 10.9
1. Ensure implementation of IMO instruments supported by capacity development	1.7	Identify thematic priorities within the area of maritime safety and security, marine environmental protection, facilitation of maritime traffic and maritime legislation	Annual	TCC	MSC / MEPC / FAL / LEG		Completed		MEPC 81/16, section 12

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	**Output number**	**Description**	**Target completion year**	**Parent organ(s)**	**Associated organ(s)**	**Coordinating organ**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
1. Ensure implementation of IMO instruments supported by capacity development	1.9	Report on activities within the ITCP related to the OPRC Convention and the OPRC-HNS Protocol	Annual	TCC	MEPC		Completed		MEPC 81/16, section 12
1. Ensure implementation of IMO instruments supported by capacity development	1.11	Measures to harmonize port State control (PSC) activities and procedures worldwide	Continuous	MSC / MEPC	HTW / PPR / NCSR	III	Ongoing		MEPC 81/16, paras. 10.5, 10.6 and 10.9
1. Ensure implementation of IMO instruments supported by capacity development	1.14	Development of guidance in relation to Mandatory IMO Member State Audit Scheme (IMSAS) to assist in the implementation of the III Code by Member States	2024	MSC / MEPC	III		Completed		MEPC 81/16, para. 10.8; MSC 108/20, para. 13.12
Note: MSC 108, having concurred with the decision of MEPC 81, approved MSC-MEPC.2/Circ.19 on *Guidance in relation to the IMO Member State Audit Scheme (IMSAS) to assist in the implementation of the III Code by Member States.*									
1. Ensure implementation of IMO instruments supported by capacity development	1.16	Experience-building phase (EBP) for the reduction of underwater radiated noise from shipping	2026	MEPC	SDC		In progress		MEPC 81/16 paras. 10.11 to 10.16; MEPC 82/17, section 9

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	**Output number**	**Description**	**Target completion year**	**Parent organ(s)**	**Associated organ(s)**	**Coordinating organ**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
Note: MEPC 82 approved the *Revised guidelines for the reduction of underwater radiated noise from shipping to address adverse impacts on marine life* (MEPC.1/Circ.906/Rev.1) and the *Action Plan for the reduction of underwater noise from commercial shipping* (MEPC 82/17, paras. 9.7 and 9.15). Furthermore, MEPC 82 agreed to change the title of output 1.16 from "Review of the 2014 Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life (MEPC.1/Circ.833) (2014 Guidelines) and identification of next steps" to "Experience-building phase (EBP) for the reduction of underwater radiated noise from shipping" and extended its target completion year from 2024 to 2026 (MEPC 82/17, para. 9.16).									
1. Ensure implementation of IMO instruments supported by capacity development	1.18	Development of guidance on assessments and applications of remote surveys, ISM Code audits and ISPS Code verifications	2024	MSC/ MEPC	III		In progress		III 9/19, section 12; MEPC 81/16, para. 10.1; MSC 108/20, para. 13.13
1. Ensure implementation of IMO instruments supported by capacity development	1.21	Development of guidance on matters relating to in-water cleaning	2025	MEPC	PPR		In progress		PPR 11/18, section 5; MEPC 81/16, para.15.23
1. Ensure implementation of IMO instruments supported by capacity development	1.23	Evaluation and harmonization of rules and guidance on the discharge of discharge water from EGCS into the aquatic environment, including conditions and areas	2025	MEPC	PPR		In progress		MEPC 81/16, paras.5.3, 5.4, 5.20, 5.21, 9.2 and 9.3; MEPC 82/17, paras. 5.2 to 5.11

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	**Output number**	**Description**	**Target completion year**	**Parent organ(s)**	**Associated organ(s)**	**Coordinating organ**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
1. Ensure implementation of IMO instruments supported by capacity development	1.24	Review of the BWM Convention based on data gathered in the experience-building phase	2025	MEPC			In progress		MEPC 81/16, section 4; MEPC 82/17, section 4
1. Ensure implementation of IMO instruments supported by capacity development	1.25	Urgent measures emanating from issues identified during the experience-building phase of the BWM Convention	2025	MEPC			In progress		MEPC 81/16, section 4; MEPC 82/17, section 4
1. Ensure implementation of IMO instruments supported by capacity development	1.26	Revision of MARPOL Annex IV and associated guidelines	2025	MEPC	III / HTW	PPR	In progress		MEPC 81/16, paras. 15.20 and 15.21; MEPC 82/17, para. 10.11
2. Integrate new, emerging and advancing technologies in the regulatory framework	2.2	Approved ballast water management systems which make use of Active Substances, taking into account recommendations of the GESAMP-BWWG	Annual	MEPC			Completed		MEPC 81/16, paras. 4.8 to 4.12; MEPC 82/17, paras. 4.8 to 4.10

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	**Output number**	**Description**	**Target completion year**	**Parent organ(s)**	**Associated organ(s)**	**Coordinating organ**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
2. Integrate new, emerging and advancing technologies in the regulatory framework	2.7 (New)	Development of joint FAL-LEG-MEPC-MSC guidelines on electronic certificates	2026	FAL	MSC/MEPC		In progress		MEPC 82/17, paras. 14.8 and 14.9
2. Integrate new, emerging and advancing technologies in the regulatory framework	2.11 (New)	Development of a comprehensive strategy on maritime digitalization	2027	FAL	MSC/MEPC		In progress		MEPC 82/17, para. 14.10
2. Integrate new, emerging and advancing technologies in the regulatory framework	2.13	Review of the IBTS Guidelines and amendments to the IOPP Certificate and Oil Record Book	2025	MEPC	PPR		In progress		PPR 11/18, section 11; MEPC 81/16, para. 9.1; MEPC 82/17, paras. 10.12 to 10.14
2. Integrate new, emerging and advancing technologies in the regulatory framework	2.15	Development of amendments to MARPOL Annex VI and the NOx Technical Code on the use of multiple engine operational profiles for a marine diesel engine and on the clarification of test cycles	2025	MEPC	PPR		In progress		PPR 11/18, section 8; MEPC 81/16, para. 9.1; MEPC 82/17, paras. 5.23 and 5.24

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	**Output number**	**Description**	**Target completion year**	**Parent organ(s)**	**Associated organ(s)**	**Coordinating organ**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
3. Respond to climate change and reduce greenhouse gas emissions from international shipping	3.1	Treatment of ozone-depleting substances used by ships	Annual	MEPC			Completed		MEPC 81/16, para. 5.14
3. Respond to climate change and reduce greenhouse gas emissions from international shipping	3.2	Further development of mechanisms needed to achieve the reduction of GHG emissions from international shipping	Annual	MEPC			Completed		MEPC 81/16, sections 6 and 7; MEPC 82/17, sections 6 and 7
3. Respond to climate change and reduce greenhouse gas emissions from international shipping	3.3	Reduction of the impact on the Arctic of emissions of Black Carbon from international shipping	2025	MEPC	PPR		In progress		MEPC 81/16, paras. 5.12 and 5.13; MEPC 82/17, paras. 5.12 to 5.22
3. Respond to climate change and reduce greenhouse gas emissions from international shipping	3.4	Promotion of technical cooperation and transfer of technology relating to the reduction of GHG emissions from ships	2025	MEPC			In progress		MEPC 81/16, section 7; MEPC 82/17, section 7

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	**Output number**	**Description**	**Target completion year**	**Parent organ(s)**	**Associated organ(s)**	**Coordinating organ**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
3. Respond to climate change and reduce greenhouse gas emissions from international shipping	3.5	Revision of guidelines concerning chapter 4 of MARPOL Annex VI	2025	MEPC			In progress		MEPC 81/16, section 6; MEPC 82/17, section 6
3. Respond to climate change and reduce greenhouse gas emissions from international shipping	3.6	EEDI reviews required under regulation 21.6 of MARPOL Annex VI	2025	MEPC			In progress		MEPC 81/16, section 6; MEPC 82/17, section 6
3. Respond to climate change and reduce greenhouse gas emissions from international shipping	3.7	Further technical and operational measures for enhancing the energy efficiency of international shipping	2025	MEPC			In progress		MEPC 81/16, section 6; MEPC 82/17, section 6;
3. Respond to climate change and reduce greenhouse gas emissions from international shipping	3.8 (New)	Development of a safety regulatory framework to support the reduction of GHG emissions from ships using new technologies and alternative fuels	Continuous	MSC	MEPC / CCC / HTW / III / SSE / SDC		No work requested by MSC		
4. Continue to engage in ocean governance	4.1	Identification and protection of Special Areas, ECAs and PSSAs and associated protective measures	Continuous	MEPC	NCSR		Ongoing		MEPC 81/16, section 11; MEPC 82/17, section 12

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	**Output number**	**Description**	**Target completion year**	**Parent organ(s)**	**Associated organ(s)**	**Coordinating organ**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
4. Continue to engage in ocean governance	4.2	Input to the ITCP on emerging issues relating to sustainable development and achievement of the SDGs	Continuous	TCC	MSC / MEPC /FAL / LEG		Ongoing		MEPC 81/16, section 12
4. Continue to engage in ocean governance	4.3	Follow-up work emanating from the Action Plan to Address Marine Plastic Litter from Ships	2025	MEPC	PPR / III / HTW		In progress		MEPC 81/16, section 8; MEPC 82/17, section 8
6. Address the human element	6.1	Role of the human element	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	HTW	Ongoing		MSC 89/25, paragraphs 10.10, 10.16 and 22.39 and annex 21; MEPC 78/17, paras. 10.4 and 13
6. Address the human element	6.2	Validated model training courses	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	HTW	Ongoing		MSC 107/20, paras. 13.3, 13.4 and 14.32
6. Address the human element	6.10	Development of an entrant training manual for PSC personnel	2025	MSC / MEPC	III		In progress		MEPC 81/16, para. 10.1
7. Ensure the regulatory effectiveness of international shipping	7.1	Unified interpretation of provisions of IMO safety, security, environment, facilitation, liability and compensation-related conventions	Continuous	MSC / MEPC / FAL / LEG	III / PPR / CCC / SDC / SSE / NCSR		Ongoing		MEPC 81/16, paras. 3.17, 6.1, 6.7, 6.37 and 6.38 MEPC 82/17, paras. 13.5 and 13.6

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	**Output number**	**Description**	**Target completion year**	**Parent organ(s)**	**Associated organ(s)**	**Coordinating organ**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
7. Ensure the regulatory effectiveness of international shipping	7.3	Safety and pollution hazards of chemicals and preparation of consequential amendments to the IBC Code	Continuous	MEPC	PPR		Ongoing		PPR 11/18, section 3; MEPC 81/16, para. 9.1; MEPC 82/17, paras. 14.1 to 14.3
7. Ensure the regulatory effectiveness of international shipping	7.4	Lessons learned and safety issues identified from the analysis of marine safety investigation reports	Annual	MSC / MEPC	III		Completed		MEPC 81/16, para. 10.4
7. Ensure the regulatory effectiveness of international shipping	7.5	Identified issues relating to the implementation of IMO instruments from the analysis of data	Annual	MSC / MEPC	III		Completed		MEPC 81/16, para. 6.3 to 6.12 and 10.3; MEPC 82/17, section 6
7. Ensure the regulatory effectiveness of international shipping	7.7	Consideration and analysis of reports on alleged inadequacy of port reception facilities	Annual	MEPC	III		Completed		III 9/19, section3; MEPC 81/16, para. 10.1
7. Ensure the regulatory effectiveness of international shipping	7.8	Monitoring the worldwide average sulphur content of fuel oils supplied for use on board ships	Annual	MEPC			Completed		MEPC 81/16, paras. 5.3 and 5.4; MEPC 82/17, paras. 5.2 to 5.11

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	**Output number**	**Description**	**Target completion year**	**Parent organ(s)**	**Associated organ(s)**	**Coordinating organ**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
7. Ensure the regulatory effectiveness of international shipping	7.11	Development of measures to reduce risks of use and carriage of heavy fuel oil as fuel by ships in Arctic waters	2024	MEPC	PPR		Completed		PPR 11/18, section 10; MEPC 81/16, para. 9.1; MEPC 82/17, para.10.10, 16.10 to 16.13
Note: MEPC 82 approved MEPC.1/Circ.915 on *Guidelines on mitigation measures to reduce risks of use and carriage for use of heavy fuel oil as fuel by ships in Arctic waters* (MEPC 82/17, para. 10.10).									
7. Ensure the regulatory effectiveness of international shipping	7.16	Development of a guide compiling best practices to develop local-level marine spill contingency plans to aid States, particularly local governments and key institutions, in implementing the OPRC Convention and OPRC-HNS Protocol	2025	MEPC	PPR		Completed		PPR 11/18, section 9; MEPC 81/16, para. 9.1; MEPC 82/17, para. 10.9
Note: MEPC 82 approved the *Guidelines for developing a local oil/hazardous and noxious substances marine pollution contingency plan* (PPR 11/18/Add.1, annex 7) (MEPC 82/17, para. 10.9).									
7. Ensure the regulatory effectiveness of international shipping	7.27	Updated Survey Guidelines under the Harmonized System of Survey and Certification (HSSC)	Annual	MSC / MEPC	III		Completed		MEPC 81/16, para. 10.9

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	**Output number**	**Description**	**Target completion year**	**Parent organ(s)**	**Associated organ(s)**	**Coordinating organ**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
7. Ensure the regulatory effectiveness of international shipping	7.28	Consideration of reports of incidents involving dangerous goods or marine pollutants in packaged form on board ships or in port areas	Annual	MSC / MEPC	III	CCC	Completed		CCC 9/14, section 9; CCC 10/16, section 9
7. Ensure the regulatory effectiveness of international shipping	7.38	Amendments to MARPOL Annex II in order to improve the effectiveness of cargo tank stripping, tank washing operations and prewash procedures for products with a high melting point and/or high viscosity	2025	MEPC	PPR		In progress		PPR 11/18, section 4; MEPC 81/16, para. 9.1; MEPC 82/17, para. 10.4
7. Ensure the regulatory effectiveness of international shipping	7.43	Revision of regulation 13.2.2 of MARPOL Annex VI to clarify that a marine diesel engine replacing a boiler shall be considered a replacement engine.	2024	MEPC		PPR	Completed		MEPC 81/16, section 3
Note: MEPC 81 adopted the *2024 Guidelines as required by regulation 13.2.2 of MARPOL Annex VI in respect of non-identical replacement engines not required to meet the Tier III limit* (resolution MEPC.386(81)) (MEPC 81/16, para. 3.35)									
7. Ensure the regulatory effectiveness of international shipping	7.46	Amendments to the *2017 Guidelines addressing additional aspects of the NO_X Technical Code 2008 with regard to particular requirements related to marine diesel engines fitted with Selective Catalytic Reduction (SCR) systems* (resolution MEPC.291(71), as amended by resolution MEPC.313(74))	2025	MEPC		PPR	In progress		MEPC 82/17, paragraph 14.11.

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	**Output number**	**Description**	**Target completion year**	**Parent organ(s)**	**Associated organ(s)**	**Coordinating organ**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
Note: PPR 11 agreed to include the above output in the proposed provisional agenda for PPR 12 and invited MEPC 82 to endorse the transfer of the output to the Committee's 2024-2025 biennial agenda from its post-biennial agenda. Subsequently, MEPC 82 approved the biennial status report of the PPR Sub-Committee for the 2024-2025 biennium and the provisional agenda for PPR 12.									
8. Ensure organizational effectiveness	8.1	Endorsed proposals for the development, maintenance and enhancement of information systems and related guidance (GISIS, websites, etc.)	Continuous	Council	MSC / MEPC / FAL / LEG / TCC		Ongoing		MEPC 81/16, paras. 6.3 to 6.7, 10.2, 10.4, 15.2 to 15.8; MEPC 82/17, sections 5 and 6
8. Ensure organizational effectiveness	8.3	Analysis and consideration of reports on partnership arrangements for, and implementation of, environmental programmes	Annual	TCC	MEPC		Completed		MEPC 81/16, section 12
8. Ensure organizational effectiveness	8.9	Revised documents on organization and method of work, as appropriate	Annual	Council	MSC / FAL / LEG / TCC / MEPC		Completed		MEPC 81/16, section 13; MEPC 82/17, section 13
8. Ensure organizational effectiveness	8.12	Consideration for the enhancement and improvement of multilingualism and the language services at IMO	Continuous	Council	MSC / MEPC / FAL / LEG / TCC		Ongoing		MEPC 81/16, para. 15.25
OW. Other work	OW.3	Endorsed proposals for new outputs for the 2024-2025 biennium as accepted by the Committees	Annual	Council	MSC / MEPC / FAL / LEG / TCC		Completed		MEPC 81/16, section 14; MEPC 82/17, section 14

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	**Output number**	**Description**	**Target completion year**	**Parent organ(s)**	**Associated organ(s)**	**Coordinating organ**	**Status of output for Year 1**	**Status of output for Year 2**	**References**
OW. Other work	OW.8	Cooperate with the United Nations on matters of mutual interest, as well as provide relevant input/guidance	Continuous	Assembly	MSC / MEPC / FAL / LEG / TCC	Council	Ongoing		MEPC 81/16, paras. 7.1 to 7.3, 15.1 and 15.9 to 15.19; MEPC 82/17, paras. 7.1 to 7.3, 16.1 to 16.9 and 16.17
OW. Other work	OW.9	Cooperate with other international bodies on matters of mutual interest, as well as provide relevant input/guidance	Continuous	Assembly	MSC / MEPC / FAL / LEG / TCC	Council	Ongoing		MEPC 81/16, section 7; MEC 82/17, section 7

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ANNEX 13

POST-BIENNIAL AGENDA OF MEPC

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)

ACCEPTED POST-BIENNIAL OUTPUTS				Parent organ(s)	Associated organ(s)	Coordinating organ	Timescale	Reference
No.	**Biennium**	**Reference to strategic direction, if applicable**	**Description**					
1	2024-2025	2. Integrate new, emerging and advancing technologies in the regulatory work	Review and development of NO_x emission requirements in MARPOL Annex VI and the NO_x Technical Code 2008	MEPC	PPR		2 sessions	MEPC 82/17, paragraph 14.7**
2	2016-2017	7. Ensure regulatory effectiveness	Development of amendments to regulation 19 of MARPOL Annex VI and development of an associated Exemption Certificate for the exemption of ships not normally engaged on international voyages	MEPC	III		2 sessions	MEPC 71/17, paragraph 14.15
3	2022-2023	7. Ensure regulatory effectiveness	Revision of the *Revised guidelines and specifications for pollution prevention equipment for machinery space bilges of ships* (resolution MEPC.107(49))	MEPC	PPR		2 sessions	MEPC 79/16, paragraph12.8
~~4~~	~~2022-2023~~	~~7. Ensure regulatory effectiveness~~	~~Amendments to the *2017 Guidelines addressing additional aspects of the NO_x Technical Code 2008 with regard to particular requirements related to marine diesel engines fitted with Selective Catalytic Reduction (SCR) systems* (resolution MEPC.291(71), as amended by resolution MEPC.313(74)~~	~~MEPC~~	~~PPR~~		~~1 session~~	~~MEPC 80/18, paragraph 14.2~~
Note:	PPR 11 agreed to include the above output in the proposed provisional agenda for PPR 12 and invited MEPC 82 to endorse the transfer of the output to the Committee's 2024-2025 biennial agenda from its post-biennial agenda. Subsequently, MEPC 82 approved the biennial status report of the PPR Sub-Committee for the 2024-2025 biennium and the provisional agenda for PPR 12.							

** Taking into account comments regarding the urgency of this matter, the Committee instructed the PPR Sub-Committee to start work on the matter at PPR 13 (i.e. in the first year of the 2026-2027 biennium) (MEPC 82/17, paragraph 14.7).

ACCEPTED POST-BIENNIAL OUTPUTS				Parent organ(s)	Associated organ(s)	Coordinating organ	Timescale	Reference
No.	**Biennium**	**Reference to strategic direction, if applicable**	**Description**					
5	2022-2023	7. Ensure regulatory effectiveness	Amendments to the NO_X Technical Code 2008 with regard to recertification procedures of existing marine diesel engines on board ships	MEPC	PPR		1 session	MEPC 80/18, paragraph 14.2

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ANNEX 14

ITEMS TO BE INCLUDED IN THE AGENDA OF MEPC 83

No.	Item
1	Adoption of the agenda
2	Decisions of other bodies
3	Consideration and adoption of amendments to mandatory instruments
4	Harmful aquatic organisms in ballast water
5	Air pollution prevention
6	Energy efficiency of ships
7	Reduction of GHG emissions from ships
8	Follow-up work emanating from the Action Plan to Address Marine Plastic Litter from Ships
9	Experience-building phase for the reduction of underwater radiated noise from shipping
10	Pollution prevention and response
11	Reports of other sub-committees
12	Identification and protection of Special Areas, ECAs and PSSAs
13	Application of the Committees' method of work
14	Work programme of the Committee and subsidiary bodies
15	Election of the Chair and Vice-Chair for 2026
16	Any other business
17	Consideration of the report of the Committee

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ANNEX 15

STATEMENTS BY DELEGATIONS AND OBSERVERS*

ITEM 1

Statement by the delegation of the Islamic Republic of Iran

"Distinguished Chair, Secretary General, esteemed delegates,

I stand before you today to address a matter of grave concern of the Islamic Republic of Iran. The United Kingdom, as a Host State, has failed to execute its obligations under the Agreement Between the International Maritime Organization (IMO) and the Government of the United Kingdom of Great Britain and Northern Ireland regarding the Headquarters, by denying visas to members of the Iranian delegation. This action is a clear breach of the Agreement and an unjustifiable impediment to the smooth functioning of this organization.

I would like to draw your attention to a part of the mentioned agreement. Under Article 7, paragraph 2 of this Agreement, the United Kingdom is legally obliged to authorize the entry of:

(a) representatives of Member States; and
(b) members of delegations;

without delay to participate the meetings of IMO.

Furthermore, Article 7, paragraph 3 ensures that this obligation applies irrespective of the political relations between the UK and the government of the individuals concerned, making it clear that no delegation should face barriers due to political considerations.

Also, Article 2 states that the provisions must be interpreted in light of the primary objective: enabling the IMO to fully and efficiently discharge its responsibilities and fulfil its purposes and functions. This violation not only undermines the integrity of the Agreement, but it also hampers the IMO's ability to function as an inclusive and impartial international body.

In response to this ongoing breach of international commitments, we demand that the Secretary-General of the IMO continues his efforts and we expect from IMO to take all appropriate measures to ensure compliance.

I request that this statement be included in the final report.

Thank you for your attention."

ITEM 2

Statement by the delegation of Australia

"Australia – like Spain on behalf of the EU, the US, the UK and others – has grave concerns over the number of incidents that are still occurring in the Red Sea and the Gulf of Aden. The

* Statements have been included in this annex as provided by delegations/observers, in the order in which they were given, sorted by agenda item, and in the language of submission (including translation into any other language if such translation was provided). Statements are accessible in all official languages on audio file at: http://docs.imo.org/Meetings/Media.aspx

recent attacks on the **MT Sounion, MT Cordelia Moon** and **MV Minoan Courage** and the hijacking of the **MV Galaxy Leader** are such examples.

The implications of these attacks relate directly to the work and interests of the IMO. Seafarers have died and environmental damage has been wrought because of this violence. Iran's support to the Houthis directly contributes to this. We ask all countries with influence on the belligerents to use this influence to stop attacks on civilian shipping.

Australia draws the attention of member states to United Nations Security Council resolutions 2216, 2722 and 2739. All member states should adhere to their obligations under the targeted UN arms embargo and take the necessary measures to prevent the direct or indirect supply of arms and related material of all types to the Houthis.

On the Black Sea: Russia's illegal invasion of Ukraine has created substantial risk and resulted in damage to civilian shipping, seafarers, maritime training institutions, and the marine environment in the Black Sea and the Sea of Azov. It has also contributed to global food security challenges.

Australia specifically condemns the 11 September missile attack on the **MV Aya**, carrying grain from Ukraine to Egypt. This incident, on a Turkish-operated, St Kitts and Nevis-registered vessel, in Romania's EEZ, is a flagrant disregard of IMO Assembly Resolution A.1183(33). The incident also threatened the lives of seafarers. This direct targeting of a civilian ship goes against everything the IMO stands for."

Statement by the delegation of the Bahamas

"Thank you Chair.

Secretary-General, excellencies, distinguish delegates present and online, NGO's and IGO's observers, interpreters,

Greetings.

Chair, the Bahamas stands in solidarity with all Member States suffering from extreme weather events including floods, drought, typhoons, hurricanes and forest fires and extends our profound sympathies over the loss of lives, Infrastructure, property and crops.

Chair, unfortunately the list of countries are extensive and growing, this is in keeping with the scientific prediction caused by global warming. This Industry and us, in particular, cannot depend on help and assistance from elsewhere; we will have to put our heads and hearts together and work towards achieving the 2023 IMO GHG Strategy targets.

Chair, the Bahamas sadly acknowledge all lives lost at sea and inland waterways, including numerous deaths from illegal and unregulated crossings. Chair, we thank the Secretary-General, for his continuous outreach and updates on the situation in the Red Sea corridor and his active and ongoing engagement with the UN Security Council, its relevant agencies, the regional states and all other parties to eliminate attacks on international shipping and restore safety and security to this vital shipping region.

Chair, this is important not only because of the high percentage of world goods and equipment that passes through this region but because the Suez Canal route reduce the distance and therefore emissions, compared to the longer route around Southern Africa and the Cape of Good Hope. It is therefore a key driver in aiding the IMO to achieve its 2023 IMO GHG Strategy targets, and therefore, assist in the mitigation of global climate change.

Chair, the MSC resolution passed is a first of its kind resolution to be adopted by IMO Member States on the issue of safety in the Red Sea corridor since the Houthis seized the **MV Galaxy Leader** and its crew on 25 November 2023. The resolution stated that the Houthis' reckless actions are putting innocent lives at risk, disrupting the delivery of needed humanitarian aid to those who need it most, increasing the cost of this humanitarian assistance, and destabilizing the region.

The Committee called for peaceful dialogue and diplomacy to resolve the crisis. It urged all parties that may have influence in this area to seek a peaceful cessation of attacks on international shipping, and we thank all involved.

Chair, the Bahamas whole-heartly supports the Secretary General's initiative to highlight the plight of the crew of the **MV Galaxy Leader** held in captivity by the Houthis, by inviting some of their family members to the IMO Headquarters in November to bring renewed attention to the plight of their husbands, fathers and providers.

This action will demonstrate to them—and to the world—that these seafarers have not been forgotten and will serve as a call for their immediate release.

The Bahamas reiterates UN resolution 2722 (2024) which calls for the immediate and unconditional release of the **Galaxy Leader** and its crew. Kindly affix this statement to the meeting's report."

Statement by the delegation of Canada

"Thank you, Chair.

Canada thanks the Secretary General for his statements and leadership regarding the ongoing situation in the Red Sea.

The continued attacks by the Houthis on merchant vessels transiting in this region, including the two most recent attacks which took place earlier this week, continue to pose a direct threat to the freedom of navigation in one of the world's most critical waterways and are causing major disruptions to regional and global trade and are killing innocent seafarers. Of direct relevance to the work of this Committee, these attacks are also directly destroying the marine environment.
These attacks must stop. In this regard, we call on Iran, as a member of this organization, to stop providing support to the Houthis, which enables these very attacks.

In short, Canada aligns with the statement of the Bahamas, Philippines, Spain on behalf of the EU Member States, the US, Panama, and others, and condemns these attacks and repeats its call on the Houthis to immediately release all hostages.

On the situation in the Black Sea and the Sea of Azov, Canada reiterates its solidarity with Ukraine and continues to strongly condemn Russia's war of aggression against Ukraine. The ongoing threats this war poses to maritime safety, seafarer safety, and the protection of the marine environment is unacceptable and a clear violation of international law and the rules and principles of this organization.

On this issue, and to be brief, Canada wishes to align with the statement by Spain on behalf of the EU Member States, the US and the UK.

We ask that our statement be attached to the final report."

Statement by the delegation of Cyprus

"Cyprus aligns with the statement of the delegation of Spain on behalf of the EU Member States for both of the issues of the Red Sea and of the intervention by Ukraine.

As always, we express full solidarity with Ukraine and the Ukrainian people but specifically we would like to remind the Committee of IMO Assembly resolution A. 1183(33) which among others, supports the territorial integrity and sovereignty of Ukraine. The resolution also reiterates the fundamental principles embedded in international law which are crucial for the sustainability of international shipping, in order to provide stability, security and welfare to all humans on this planet.

The Republic of Cyprus thanks the Secretary General and the Secretariat for the actions taken to implement the Assembly resolution in the best possible manner and we would encourage to continue on this path.

In accordance with the resolution 1183, Cyprus calls on Member States to inform their vessels, shipowners, operators and all other relevant stakeholders, the need to refrain from violating the regime of closed ports as declared by the Government of Ukraine. Such violations should be investigated and action should be taken to minimise and eliminate illegal grain smuggling.

Safety and security of international shipping, safety of lives at sea and of our seafarers, freedom of navigation, and the protection of the marine environment, this is what we want, what we need, what we deserve.

Thank you Chair, and we would kindly request that this statement is annexed to the report of the Committee."

Statement by the delegation of Greece

"Thank you Chair and good afternoon to all distinguished delegates.

At first, we would like to align ourselves with the statement made by the distinguished delegation of Spain.

Furthermore, Greece would like to shortly refer to the incident of the Greek-flagged **MT Sounion**, which was attacked by the Houthis on 22 August 2024. In particular, the crude oil tanker was attacked by two small boats and struck by three projectiles in the Red Sea off the coast of Yemen. On the same day, thanks to the EUNAVFOR ASPIDES operation, a French frigate successfully thwarted another drone attack and safely transferred the tanker's 25 crew members to Djibouti. However, after the evacuation of the vessel, Houthis boarded the vessel and placed explosives thus setting on fire the tanker, which was loaded with 150,000 tons of crude oil. The tanker has been on fire for almost one month, posing a serious environmental risk to the marine environment of the Red Sea, thankfully with no obvious signs of an oil spill.

After the first attempt of two tugboats that were initially mobilized to tow the tanker, **MT Sounion** was successfully towed by the Greek-flagged rescue vessel to a safe location without an oil spill, under the protection of EUNAVFOR ASPIDES operation. Greece condemns the attack on MT Sounion and calls on IMO Member States to join efforts in restoring maritime security in the south Red Sea. There can be no excuse for putting the lives of innocent seafarers at risk, imperil the vibrant maritime ecosystem in the Red Sea and the Gulf of Aden and jeopardise the livelihoods of poor people in coastal areas. We would also like to thank the countries that stood by Greece on this occasion and helped to save the crew and avoid an environmental disaster. Greece would also like to note the significance of the presence of

EUNAVFOR ASPIDES operation for the merchant shipping and thank them for their invaluable help with this incident.

We would like this statement to be impended to the final report of this Committee."

Statement by the delegation of Ireland

"Thank you Chair.

Ireland wishes to align itself with the supporting statements made by Spain and so many other delegations, and to also commend the IMO Secretary General and the Secretariat for their work in supporting the safety of shipping, seafarers' welfare, and the maritime environment in the Red Sea, the Black Sea and the Sea of Azov.

Ireland extends our condolences to the families of the seafarers who have been injured and have tragically lost their lives, and strongly condemns the ongoing attacks by Houthi forces on merchant shipping in the Red Sea.

We call for these illegal military actions in the Red Sea to be ceased and will always actively support the protection of seafarers, maritime security and marine environmental protection.

Chair, with your permission, I would like to continue with a statement on Ukraine regarding the horrific losses they have suffered and regrettably, continue to suffer.

The continuing Russian military action against Ukraine is illegal and immoral. The destruction caused throughout that country, to its ports, the surrounding infrastructure and the maritime environment is massive in scale and will have long reaching consequences for the region.

A full and comprehensive cessation of hostilities and the withdrawal of the Russian military from Ukrainian territory, including its territorial waters, is immediately required to ensure the safety and welfare of its civilians, and the protection of the Marine environment. Ireland is unwavering in our solidarity with the people of Ukraine and in our support for Ukraine's sovereignty, territorial integrity, and right of their citizens and of all people live in peace.

We would request that Ireland's statement is included in the report of this Committee.

Thank you, Sir."

Statement by the delegation of the Islamic Republic of Iran

"Distinguished Chair, Secretary-General, and esteemed delegates,

I would like to express congratulation to all delegations for their national day in this week and also thank China for the coffee break this morning.

First, I must address the unfounded accusations that have been made against my country. I want to emphasize that all these allegations are baseless, and the Islamic Republic of Iran categorically rejects. These accusations, which are primarily put forward by few countries, particularly the United States, are aimed at exploiting the international platforms and mechanisms, especially the International Maritime Organization.

I also emphasize that these States are attempting to politicize this international organization in pursuit of their unlawful interests and objectives, particularly in support of the Israeli regime.

The people of Yemen act based on their own independence, will, and decisions, and any claims of support from the Islamic Republic of Iran regarding these matters are baseless and rejected. Iran remains committed to all its international obligations.

In this regard, the Islamic Republic of Iran is committed to the relevant resolutions of the Security Council including resolutions 2140 and 2216 and has never taken any measures in violation thereof, such as sales or transfer of arms. My country highlights its dedication to ensuring and promoting maritime security and freedom of navigation.

However, in order to address these issues, we must return to the root causes. The root of all these crises in the region lies in the brutal, unlawful, and egregious actions of the Israeli regime, which, unfortunately, have been carried out with the support of the United States.

As a Member State of the IMO, the Islamic Republic of Iran reiterates its commitment to international law, principles of the United Nations Charter, IMO purposes mentioned in Article 1 of the IMO Convention, that highlighted the maintenance of international peace and security including in the field of maritime and shipping.

I would be grateful if you would annex these comments to the final report.

Thank you Chair."

Statement by the delegation of Japan

“Japan thanks the Secretary-General and the Secretariat for continuously making efforts to address this extraordinary situation.

First of all, Japan is seriously concerned about the attacks on two vessels yesterday and sincerely prays for the safety of the crews on those vessels
.
Japan is also seriously concerned about the recent attack on **MV Sounion** by the Houthis raising major threat on the marine environment due to a possible oil spill, and we welcome the assistance by the EU’s EUNAVFOR ASPIDES operation in the successful towing of the vessel to safety without any oil spill. Japan is also heavily concerned about the sinking of the vessel MV Tutor attacked by the Houthis.

In addition to the direct marine pollutions caused by those attacks, Japan is also concerned about the increased GHG emissions as a consequence of diversion of shipping routes to avoid the unjustifiable attacks by the Houthis. Furthermore, we should not forget that **MV Galaxy Leader** and its innocent crew are still being captured. Japan strongly calls for early release of **MV Galaxy Leader** and its crew.

Japan cannot tolerate any actions, including these attacks by the Houthis, that impede the free and safe navigation of vessels, and we firmly condemn such actions. Japan recalls that the UN Security Council adopted the resolutions 2722 and 2739, and that this Organization adopted a resolution MSC.564(108) concerning this matter. In this regard, Japan strongly urges all parties to act in a good faith in accordance with these resolutions.

Japan welcomes the achievements made by Ukraine to address the safety of marine transport in the region, and reiterates its support to all actions to implement the calls from the Assembly resolution A.1183(33).

Russia's aggression against Ukraine is an attempt of unilateral change of the status quo by force and an infringement of Ukraine's sovereignty and territorial integrity, which constitutes a clear violation of international law, and is a grave breach of the United Nations Charter.

Furthermore, we are severely concerned with the recent incident in which a Russian missile struck a St. Kitts and Nevis-registered ship carrying grain from Ukraine in the Black Sea. This incident is in violation with the IMO's Assembly resolution A.1183(33), and it clearly demonstrates how the Russian Federation`s aggression against Ukraine impacts the safety of ships and innocent seafarers in international shipping.

All these actions, including the latest missile attack, that shake the very foundation of international order are absolutely unacceptable, and Japan condemns Russia's actions in the strongest terms.

In light of that, Japan urges Russia to cease its ongoing aggression and to withdraw its troops and military equipment immediately, completely and unconditionally from the entire internationally recognized territory of Ukraine.

We kindly ask you that our statement be annexed to the report."

Statement by the delegation of Norway

"Thank you Chair,

Let me start by thanking the Secretary-General for his continuing focus on the situation in the Red Sea.

Norway remains deeply concerned about the situation in the Red Sea and strongly condemns the illegal and unwarranted Houthi attacks on commercial ships in the area. The constant attacks have caused the loss of innocent lives and have severely and negatively impacted free passage at sea in the Red Sea area. The attacks have also had a huge negative impact on commercial shipping and world trade.

With regard to the war in Ukraine, Norway aligns with the statement of the United States, the United Kingdom, Spain on behalf of the EU, and joins other IMO Member States in condemning Russia's attack on Ukraine in the strongest possible terms.

We ask that this statement to be attached to the report of this meeting.

Thank you."

Statement by the delegation of the Philippines

"Thank you Chair and good day excellencies and distinguished delegates.

Behind every voyage lies a reality we have too often overlooked. Long away from their homes and their families, the weight of isolation of unpredictable conditions counts as threats to the seafarers' safety and security. This past year, ships in the Red Sea and other areas have been attacked, and seafarers have become victims of these attacks. We consider these not just occupational hazards; they are actual human experiences.

We thank the Secretary-General for his tireless efforts to promote the safety and wellbeing of seafarers. We continue to call for the unconditional release of the crew of **MV Galaxy Leader**, the majority of which are Filipinos. We maintain the view that the safety of seafarers must at

all times remain paramount. We cannot overemphasize this especially after the attack on **MV True Confidence** resulting in the tragic death of two Filipino seafarers and the attack on **MV Tutor** with 22 Filipino seafarers where one Filipino crew member remains unaccounted for.

Finally Chair, we wish to inform you that following the adoption by the United Nations Human Rights Council in Geneva of the Philippine-initiated resolution on promoting and protecting the enjoyment of human rights of seafarers, at its 56th session, the Magna Carta for Filipino Seafarers was signed into law by President Ferdinand Marcos, Jr. on 23 September 2024 as a collective acknowledgment to address the sacrifice of our seafarers. As our President said when he signed this vital piece of law:

"Safe working conditions are not just about compliance. They are about ensuring that every overseas seafarer who sets sail will come home safely."

Thank you, Chair.

Statement by the delegation of Spain

“Muchas gracias, señor presidente.

España, en nombre de los Estados miembros de la Unión Europea y la Comisión Europea, condena enérgicamente los ataques de los huzíes contra buques comerciales, que constituyen violaciones inaceptables del Derecho internacional y del Convenio de la OMI, y representan una amenaza para la seguridad marítima y la paz en la región.

Estos ataques ponen en peligro la vida de los marinos inocentes al tiempo que perturban el comercio mundial y tienen importantes consecuencias para el clima y el medio ambiente marino, por lo que deben cesar inmediatamente.

España condena los ataques del lunes contra los buques **Cordelia Moon** y **Minoan Couraget**, así como el ataque contra el buque tanque de bandera griega **Sounion** mientras transitaba por el sur del mar Rojo. Se trata nuevamente de ataques inaceptables contra el transporte marítimo internacional.

Continuamos exigiendo la liberación inmediata e incondicional del **Galaxy Leader** y de su tripulación la cual lleva muchos meses como rehén y ofrecemos nuestras más sinceras condolencias a las familias de la gente de mar que perdieron la vida como consecuencia de los brutales ataques perpetrados en la región.

Acogemos con satisfacción la adopción de la resolución 2739 (2024) del Consejo de Seguridad de las Naciones Unidas, de 27 de junio, que reitera su exigencia de que los huzíes pongan fin de inmediato a todos los ataques contra buques mercantes y comerciales y de que liberen inmediatamente al **Galaxy Leader** con su tripulación.

También recibimos con satisfacción la adopción de la resolución MSC.564(108) sobre la situación de la seguridad en el mar Rojo y el golfo de Adén a consecuencia de los ataques huzíes contra los buques mercantes y la gente de mar.

Defender la libertad de navegación en el Mar Rojo es vital para la libre circulación del comercio mundial y la seguridad regional. Como recuerda la resolución 2722 del Consejo de seguridad de Naciones Unidas, los Estados tienen derecho a defender sus buques contra estos ataques de conformidad con el derecho internacional.

Instamos a los huzíes a que actúen con moderación para evitar una nueva escalada en el Mar Rojo y en la región en general. En este contexto, recordamos la obligación de todos los Estados de respetar el embargo de armas en virtud de la resolución 2216 (2015) del Consejo de Seguridad de las Naciones Unidas.

El 19 de febrero se inició la operación defensiva EUNAVFOR ASPIDES en respuesta a la necesidad de restablecer la seguridad marítima y la libertad de navegación en un corredor marítimo altamente estratégico. La operación desempeña un papel clave en la salvaguardia de los intereses comerciales y de seguridad, no sólo por el bien de los Estados miembros de la UE y de la comunidad internacional en general, sino también para proteger a la gente de mar y salvaguardar la libertad de navegación.

Solicitamos que esta declaración se incluya como anexo en el informe final del comité.

España en nombre de los Estados Miembros de la Unión Europea y de la Comisión Europea desea expresar la plena solidaridad de la UE y de sus Estados Miembros con Ucrania y el pueblo ucraniano y condena en los términos más enérgicos posibles la agresión ilegal no provocada e injustificada de la Federación de Rusia contra Ucrania.

Con la resolución A.1183 (33), la Asamblea de la OMI en su 33º periodo de sesiones condenó, en los términos más enérgicos posibles, la violación por parte de la Federación de Rusia de la integridad territorial y la soberanía de Ucrania, al mismo tiempo que destacó que las acciones de la Federación de Rusia son incompatibles con los principios y objetivos de la OMI expuestos en el artículo 1 del Convenio constitutivo.

La guerra de agresión de la Federación de Rusia contra Ucrania sigue amenazando la paz y la seguridad en Europa y en todo el mundo, y ha tenido graves consecuencias mundiales, entre ellas, el aumento de la inseguridad alimentaria y la subida de los precios de la energía.

La Federación de Rusia también debe tomar medidas para respetar el derecho internacional, en particular la Convención de las Naciones Unidas sobre el Derecho del Mar (CNUDM), y evitar acciones desestabilizadoras que amenacen la libertad de navegación y sobrevuelo en el Mar Negro y Mar de Azov, que también ponen en peligro la navegación y la seguridad de la gente de mar.

España apoya los esfuerzos encomiables de Ucrania para continuar operando el corredor marítimo especial a pesar de las graves dificultades, como demuestra el incidente de principios de septiembre en el que un misil impactó en un buque que transportaba grano procedente de Ucrania en el Mar Negro con destino a Egipto.

España acoge con satisfacción los logros significativos alcanzados por Ucrania desde el establecimiento del corredor marítimo, que reflejan la resistencia y el compromiso de Ucrania con la seguridad alimentaria mundial.

Solicitamos que esta declaración sea incluida como anexo en el informe final del comité.

Muchas gracias."

Statement by the delegation of Ukraine

"Chair,

Last Thursday, our organization, together with all Member States, celebrated World Maritime Day, an international initiative that highlights the vital role the seas play in sustaining life on

Earth. This day provides not only an occasion to recognize the contribution of maritime routes to the global economy but also a powerful reminder of our collective responsibility to protect these waters.

The primary goal of World Maritime Day is to draw the international community's attention to the irreversible harm inflicted upon our seas and oceans due to overfishing, water pollution, and climate change. Among its key objectives are improving maritime safety and preventing marine pollution, as our oceans are fundamental to sustainable development and the well-being of future generations.

However, no force destroys the seas more severely than war. For over two years, the Russian aggressor has not only taken the lives of Ukrainians but has also threatened vulnerable marine species, bringing the entire Azov-Black Sea region to the brink of ecological disaster. The Ukrainian part of the Sea of Azov, including the Meotida Nature Reserve, remains under occupation, while the Black Sea is under constant threat from Russian Kalibr missiles. Explosions have killed dolphins, fish, and seabirds, while Russian military actions, underwater activities and mines continue to pollute the sea, making its coastal areas hazardous.

In this regard, we must highlight the trilateral agreement signed on January 11, 2024, between Bulgaria, Romania, and Turkey, aimed at countering the threat of drifting sea mines in the Black Sea. This agreement is a powerful example of regional cooperation in addressing unprecedented maritime security challenges. Additionally, we commend the proactive efforts of neighbouring countries, such as Moldova and Romania, which have implemented monitoring systems to track environmental damage caused by Russia's aggression. This collaborative approach is crucial in ensuring that, once the conflict ends, the Russian Federation will be held fully accountable for the environmental and economic destruction it has caused.

We extend our heartfelt gratitude to the members of the IMO Council for their deliberations and decisions during the 132nd session, particularly in relation to the issues raised in paragraph 13 of document MEPC 82/2/4. The continued support of the IMO and its commitment to addressing the challenges arising from the invasion of Ukraine are invaluable. The solidarity of the international community is essential in upholding the principles of maritime security and environmental protection.

Chair,

The marine environment is our shared heritage, and its protection is our collective responsibility. We urge the IMO community to remain vigilant and proactive in addressing the threats posed by Russia's unlawful actions.

In this regard we must also draw attention to the concerning rise of the so-called "grey fleet" — vessels operating under ambiguous or falsely declared flags, often employed to bypass sanctions and conduct illicit activities. This trend poses a significant threat not only to maritime security but also to environmental protection, as these ships frequently disregard international safety and environmental standards. The reckless actions of these vessels contribute to the degradation of marine ecosystems, particularly in conflict zones such as the Black Sea. Ukraine calls on the international community to strengthen monitoring and enforcement mechanisms to combat the dangers posed by the "grey fleet" and ensure that the seas remain safe, secure, and sustainable for all.

Thank you, Chair, and I request that this statement be reflected in the Committee's report and attached to its annex."

Statement by the delegation of the United Kingdom

"Thank you, Chair.

As others, the UK thanks the Secretary-General for his leadership regarding the ongoing situation in the Red Sea. The Houthi attacks in the Red Sea are illegal, unacceptable and resolutely condemned by the UN Security Council.

Protecting the safety of seafarers and the freedom of navigation is fundamental to our work at the IMO and to international shipping. The UK fully supports previous interventions, in particular the statements from Bahamas, Spain and US, and we once again call on Iran, a member of the IMO, to cease their support for Houthi attacks.

In particular, we condemn recent attacks on the **MT Cordelia Moon** and on **the MV Minoan Courage**. These attacks have led to the deaths of innocent seafarers and risk significant damage to the marine environment.

The UK remains determined to hold those responsible accountable and remains strongly committed to the international rules-based order, defending the freedom of navigation and safe passage at sea.

I would also like to respond to the statement of Ukraine, if I may:

The UK continues to support the Ukrainian government in its defence against Russia's unprovoked, unjustified, and illegal attack. We stand united with our international partners against the actions of the Russian government which are an egregious violation of international law and the UN Charter.

Freedom of navigation for commercial shipping in the Black Sea must be upheld. Russia's attempts to stifle the economy of Ukraine by disrupting the Black Sea Grain Initiative are cynical and cowardly. We have spoken this morning about food security - with the world now further away from its goals to eliminate world hunger and malnutrition, Ukraine's exports through the Black Sea ports are crucial to global food security.

The impact on the marine environment as a result of Russia's military aggression is severe, and the ecological fallout of widespread pollution is immeasurable, with marine life and habitats bearing the brunt of actions such as the reckless deployment of sea mines – as set out so powerfully by previous speakers.

The Russian Federation's actions show a flagrant disregard of IMO resolution A.1183(33) and are inconsistent with the principles and purposes of IMO as set forth in Article 1 of the IMO Convention.

The UK would like to reiterate its full solidarity with Ukraine and the Ukrainian people. On both these issues the UK is clear – we will stand united with others in standing up for international law.

We kindly ask that this statement is annexed to the final report of the Committee.

Thank you, Chair."

Statement by the delegation of the United Republic of Tanzania

"Thank you Chair.

Distinguished delegates,

Good afternoon to you all. We would like to thank China for sponsoring tea this morning and congratulation to Guinea on your National Day.

Chair, as a proud member of the Djibouti Code of Conduct, this delegation stands strongly to condemn the ongoing attacks to vessels navigating in the Gulf of Aden and the Red Sea. Tanzania appreciates the efforts taken by the IMO Secretary-General to end the attacks against international shipping in the Red Sea area, as he has always insisted that seafarer safety is paramount.

These unprovoked attacks not only threaten the safety and security of our maritime personnel but also disrupt vital international shipping routes, impacting global trade and economic stability. The seizure of the **MV Galaxy Leader** and other vessels is a stark reminder of the urgent need for collective action to safeguard our seafarers and ensure the free and safe passage of vessels in these critical waterways.

We call upon all IMO Member States and stakeholders to unite in demanding the immediate release of the **MV Galaxy Leader** and its crew. Furthermore, we urge the international community to take decisive measures to prevent further attacks and to hold those responsible accountable. Let us reaffirm our commitment to maritime security and the protection of our maritime environment.

Chair, our delegation believes that together, we can ensure that the Gulf of Aden and the Red Sea as important shipping route remain safe and secure for all who navigate these waters.

Thank you Chair."

Statement by the delegation of the United States

"The United States deplores the Iran-backed Houthis' continuing attacks on seafarers and commercial ships in the Red Sea and Gulf of Aden, including yesterday's reported attacks on the **MT Cordellia Moon** and the **MV Minoan Courage**. There is no justification for these attacks, which have killed innocent seafarers and threatened environmental catastrophe to the region.

We stand with the crews and families of all those affected by these senseless acts, and those victimized by previous Houthi attacks, including the attacks on the **MV Tutor** and on the **MV True Confidence** which took the lives of innocent seafarers.

We further condemn the recent attacks on the **MT Delta Sounion**, which forced the crew to abandon ship. We welcome the news that **Sounion** has been towed to safer waters for salvage and oil removal operations, and highlight the risk of environmental catastrophe still posed by the vessel's 150,000 tons of crude oil until that operation is complete. Despite the environmental threat posed by the Sounion, the Houthis have continued these deplorable attacks.

We further call on the Houthis to immediately and unconditionally release the **MV Galaxy Leader** and its crew whom they have held captive since illegally seizing the ship in November 2023. We recall UN Security Council resolution 2722, which underscores support

for the navigational rights and freedoms of vessels in the Red Sea, condemns these Houthi attacks, and demands that they cease.

Iran makes no secret of its support to the Houthis. It provides them weapons in violation of the UN arms embargo. Iran has trained the Houthis to carry out attacks like these. Iran also provides the Houthis extensive financial support. Without Iran's support, the Houthis would struggle to track and strike commercial ships.

Additionally, Member States that engage in illicit purchases of Iranian oil sold by the Quds Force are indirectly financing the Houthi attacks. In line with the resolution adopted by the Maritime Safety Committee, we urge IMO Member States – especially those with direct channels to Iran – to press Tehran to stop providing the Houthis weapons and support before more seafarers are killed or environmental disasters are caused by their abhorrent actions.

The United States remains committed to restoring stability in the Red Sea and Gulf of Aden, protecting seafarers and commercial ships from Houthi attacks, and upholding the principle of freedom of navigation.

Russia's full-scale invasion of Ukraine, a blatant violation of international law, has shattered peace and stability in the region; resulted in substantial risk and damage to innocent merchant ships, seafarers, and the marine environment; and gravely undermined global security.

The US specifically condemns the incident earlier this month in which a missile struck a ship carrying grain from Ukraine in the Black Sea. This incident, on a St. Kitts and Nevis-registered grain ship with cargo bound for Egypt, is a flagrant disregard of IMO resolution A.1183(33) and an attack on global food security. The incident also threatened the lives of innocent mariners and expanded the scope of this conflict by targeting a merchant ship flagged in a state not involved in the conflict exercising navigation freedoms in the Exclusive Economic Zone of Romania, who is also not a party to the conflict.

We reaffirm our unwavering solidarity with the people of Ukraine in the defence of their nation as Ukraine fights for its independence, sovereignty, and territorial integrity, in accordance with Assembly resolution A.1183(33). Russia must immediately stop this war and completely and unconditionally withdraw all its forces from Ukraine. The United States further urges all countries not to provide any kind of assistance to Russia's aggression and condemns all those who are facilitating and thereby prolonging Russia's war against Ukraine.

The United States thanks the Secretary General and the Secretariat for the actions taken to implement the Assembly resolution and looks forward to continued progress in this regard. We deplore Russia's war of aggression and its continued threat to the safety and security of international shipping, the lives and safety of seafarers, freedom of navigation, and the marine environment.

Thank you, Chair."

ITEM 5

Statement by the observer from FOEI

"Thank you Chair,

The latest science now shows that humanity has exceeded seven of nine planetary boundaries with the ocean rapidly acidifying and Arctic acidifying faster than the global ocean as a whole. Furthermore, the Arctic ice is currently at the 4th lowest in extent since monitoring started, and

in the last 18 years, Arctic ice - a crucial global climate tipping point - has experienced the 18 lowest ice extent records. It is clearer than ever that action must be taken now to protect what remains of the ice in the Arctic.

To this end, and following discussions earlier this year during the PPR sub-committee, document MEPC 82/5/2 develops the concept of polar fuels, and I would just like to clarify that the paper proposes that the Committee consider and support the development of a new regulation in MARPOL Annex VI addressing emissions of ship black carbon in and near the Arctic. Such a regulation should be developed by PPR to kick-start black carbon emission reductions by requiring shipping operating in the Arctic - north of 60oN - to move to widely-available distillate fuels, such as DMA and DMZ, while also allowing the use of cleaner alternatives fuels in the Arctic.

This proposal would not preclude the future development of a polar fuel standard but would exclude those fuels known to result in high levels of black carbon emissions. It is widely agreed that the impact of short-lived climate pollutants must be reduced as a matter of urgency, and that reductions in emissions of black carbon where black carbon has a disproportionately greater impact - that is in the Arctic - is essential today.

Thank you."

ITEM 7

Statement by the Executive Secretary of the United Nations Framework Convention on Climate Change (UNFCCC)

"Thank you, Mr. Chair.

Greetings to all, both those present here and joining remotely.

On behalf of the UNFCCC secretariat, I would like to share a summary of relevant outcomes at SBSTA60, key prospects for COP29 and expectations for MEPC82. A full version of the statement will be forwarded to the secretariat for inclusion in the report.

I wish to start by reporting the outcomes of negotiations on "Emissions from fuel used for international aviation and maritime transport" at SBSTA 60, last June. We appreciate IMO secretariat's contribution to the UNFCCC process through its submission to and statement at SBSTA 60. They informed UNFCCC Parties on recent progress of IMO work, including IMO net-zero framework.

SBSTA organized a constructive dialogue between Parties and the IMO secretariat, fostering an exchange of views and questions on the submission from IMO Secretariat. Discussions included the implication of the progress in carbon intensity reduction for total GHG emission reductions and the necessity of adequate support for developing countries to implement the 2023 Strategy.

Parties deepened their understanding of the progress in emission reduction efforts in this crucial sector and agreed to further consider this matter at SBSTA 61 in Baku.

Moving on to the key prospects for COP29, distinguished delegates, although we made good progress in Dubai with UAE consensus, the reality is that we are not moving fast enough to keep 1.5ºC within reach. We need bolder climate action from all nations.

The COP29 Presidency announced two pillars of Vision for COP29: **Enhancing Ambition** and **Enabling Action**. These pillars are mutually reinforcing. Progress on each sends a signal in support of the other.

Key to the **Enhancing Ambition** pillar will be for the Parties to signal their determination to act with ambitious and comprehensive **NDCs in 2025**. As agreed in Dubai, all Parties are encouraged to come forward with their next round of NDCs that are 1.5ºC -aligned and cover all GHGs and sectors. These are due by 10 February next year. NDCs should be informed by science and the Global Stocktake outcome, in light of different national circumstances. The Global Stocktake outcome included global efforts for doubling energy efficiency improvement by 2030; transitioning away from fossil fuels, in a just, orderly and equitable manner; and accelerating efforts towards net zero emission energy systems, utilizing zero- and low-carbon fuels, well before or by around mid-century.

The other pillar, **Enabling Action**, involves putting in place the means of implementation – finance, technology and capacity building. The COP29 Presidency's top negotiating priority is agreeing a fair and ambitious **New Collective Quantified Goal on climate finance** adequate to the urgency and scale of the problem. We know the challenges countries face when financing their climate plans – especially the least developed and most vulnerable - which are facing massive economic headwinds, including debt crises. Three presidencies of COP28-30 are closely collaborating to significantly enhance international cooperation and enabling environment to stimulate ambition in the next NDCs to keep 1.5ºC within reach.

COP 29 is scheduled to take place from 11 to 22 November in Baku. We warmly welcome your participation.

I look forward to working with you during this week to collectively keep 1.5°C alive in a just, orderly and equitable manner.

We kindly request the statement to be included in the report of the Committee.

Thank you, Mr. Chair."

Statement by the delegation of Fiji

"The Secretary-General of the International Maritime Organisation, His Excellency, Mr. Arsenio Dominguez, honourable ministers, Chair of the Marine Environment Protection Committee, Dr. Harry Conway, Excellencies, and distinguished delegates,

Bula vinaka and warm Pacific greetings from Fiji. As we gather here, the Pacific region—home to many Small Island Developing States (SIDS)—continues to confront the severe impacts of climate change. This moment is pivotal in our fight against climate change, and the decisions we make this week will have lasting implications that extend far beyond our immediate shores.

Fiji firmly supports the implementation of a universal carbon levy aligned with the "polluter pays" principle, as well as a global fuel standard (GFS) that excludes flexibility mechanisms to ensure a just and equitable transition for all, leaving no one behind.

We would like to acknowledge the diligent work of the Steering Committee members, observers, and organizations such as the World Maritime University (WMU), DNV, UNCTAD, and Starcrest for the literature review and in evaluating the impacts of various candidate measures on fleets and states. In this regard, we agree with action item 7 of document 82/7/4 and believe the report presented to GHG-EW 5 is appropriate for the further development of the basket of candidate measures. Consequently, we cannot support the proposals outlined in

documents MEPC 82/7/14, MEPC 82/7/15, and MEPC 82/7/16, as they do not align with MEPC.1/Circ.885/Rev.1.

We recall the extensive discussions and hard work that went into MEPC.1/Circ.885 and its revision, which provided a crucial framework for the impact assessment process. While we heard many calls for further work, it was clear that those requests did not indicate disagreement with the fulfilment of the Steering Committee's terms of reference (ToR). We can support additional studies, but they must occur outside the established process set forth in MEPC.1/Circ.885/Rev.1.

Fiji remains dedicated to collaborating with all stakeholders to ensure that international shipping contributes its fair share to global climate goals. We look forward to continuing constructive discussions at MEPC 83 and beyond, working towards a just and equitable pathway to a net-zero shipping industry.

We would also like to express our appreciation for the contributions made to the VMDTF, which have enabled the participation of one of our delegates in this significant meeting.

Finally, we kindly request that our statement be appended to the final report. Vinaka Vaka levu and thank you, Chair."

Statement by the delegation of India

"Thank you, Chair.

Good day to all.

We also take this opportunity to thank Malaysia for their hospitality in the coffee break.

India would like to thank the Secretariat, the Steering Committee Coordinator, members and WMU, DNV, UNCTAD and Starcrest Consulting who conducted the studies on behalf of IMO for doing a huge task in the limited time frame available. India has been actively engaging during the work of steering committee and fully acknowledge the divergent views on the CIA.

Chair we would now like to focus on the way forward taking into account the knowledge we have gained from the comprehensive impact assessment while taking into account the limitations.

It is quite clear that the shift to green shipping will come with a transition cost. Bridging the gap between conventional and green fuels must be a shared global responsibility, however India reiterates that the principle of common but differentiated responsibilities and respective capabilities (CBDR-RC) must remain at the core of any mid-term measure adopted by this Organization in addressing environmental issues and the needs of developing countries especially SIDS and LDC's must be suitably addressed to ensure a just and equitable transition.

On the economic measures, India emphasizes the need for clarity and focus regarding the objective of such measures— transition of shipping to net zero by 2050. The economic measures must ensure provision of sufficient resources for continual research and development on one hand and for the development of a robust infrastructure to supply affordable alternate fuels to the shipping industry globally on the other hand and also ensure suitable addressing of the human element aspect – our seafarers - in this transition. This transition requires well-designed financial support mechanisms and strategic, equitable distribution of resources to projects which support the transition. India has presented its views

in its submission MEPC 82/7/12 to develop a balanced policy scenario for economic measure refining the current proposals and taking the best features from each, and establish a robust framework and necessary guidelines for the collection, allocation, utilization and monitoring of the revenues generated from any considered economic measure, taking into consideration the need for a project-based revenue distribution as identified under a focused revenue distribution mechanism.

In conclusion Chair, India is committed to supporting global initiatives that drive the decarbonisation of the shipping industry. We insist that these measures be designed and implemented in a manner that is just, equitable, and based on the principles of CBDR-RC. By focusing on infrastructure development, capacity building, and fair resource distribution, we are confident that the transition to greener shipping will be able to fulfil the 2023 IMO GHG Strategy.

Thank you, Chair.

We will forward the statement to the Secretariat for appending to the report."

Statement by the delegation of Malta

"This delegation thanks the Steering Committee and the entities that have conducted the various tasks of the comprehensive impact assessment for their extensive work to produce the report, which we welcome.

The results presented in the report on the impacts on states are aggregated by groups of economies, but we are notably interested in the detailed results at the level of states - such as Malta being a small island state completely dependent on shipping for the imports of most essential goods. In this regard it is important to also consider this impact at state level, taking into account that countries may have increased negative impacts compared to their broader economic grouping due to their particular circumstances such as geography, as islands, their particularly small size and population, and dependence on shipping imports."

Statement by the delegation of Nigeria

"Thank you, Chair.

Secretary-General, Mr. Chair, distinguished colleagues,

I bring greetings and goodwill from the Federal Republic of Nigeria.

On behalf of the Federal Republic of Nigeria, I am honoured, under the instructions of the Director-General of the Nigerian Maritime Administration and Safety Agency (NIMASA), to announce Nigeria's contribution of £5,000 to the GHG Trust Fund.

This contribution underscores Nigeria’s commitment to ensuring that no nation is left behind in the global journey towards a just and equitable transition as we work to decarbonise international shipping. We recognise that this is a complex and challenging process, one that requires mutual trust and cooperation. While we are all at different stages of development and capacity, it is imperative that we stand together, watching out for one another, to ensure a safe and sustainable passage forward.

Progress in this endeavour will depend on our ability to find common ground, working hand in hand and shoulder to shoulder in true partnership.

We kindly request that our statement be included in the official records.

Thank you, Chair."

Statement by the delegation of the Marshall Islands

"Secretary-General of the International Maritime Organisation, Mr. Arsenio Dominguez, Chair of the Marine Environment Protection Committee, Dr. Harry Conway, excellencies, distinguished delegates,

Iakwe aolep, good afternoon!

The Republic of the Marshall Islands has been honored to take part in the important negotiations last week, at the Intersessional Working Group on the Reduction of Greenhouse Gas, and this week at the Marine Environment Protection Committee. We wish to sincerely thank all those who made donations to the IMO Voluntary Multi-Donor Trust Fund to enable some of our delegation members to attend this important meeting, and ensure its greater inclusivity.

We, and our Pacific Island colleagues have been hard at work with others to develop solutions towards ensuring a just and equitable transition.

We feel that a lot of trust has been built throughout these meetings. We have witnessed a coming together of Member States, and the building of bridges between those who do not necessarily agree on issues. This is the environment we need to develop lasting solutions to global issues of concern to all of us, most fundamentally, climate change and its impacts.

We hope that we can continue with the spirit of trust we have built here, and to ensure that we achieve our goal to deliver on a just and equitable transition.

Chair, we all know that boats come in many shapes and sizes. Some are built to deal with the roughest weather, others are not. The same goes for the member states represented here in London this week.

We need to make sure that the transition lifts all boats, and takes all along with it, otherwise we risk leaving some members behind, including developing countries, in particular SIDS and LDCs.

We thank the Secretariat and the Secretary General for their tireless and dedicated work, and we thank the Chair of the MEPC for his efficient chairing and would like this statement included in the report.

We wish all delegates fair winds and safe travels back to your homes.

Kommol tata! Thank you, Chair."

Statement by the delegation of the Solomon Islands

"Thank you, Chair.

Thank you, Secretary general, for your remarks.

Good day to all distinguished delegates, this is the first time I participate in the MEPC as the Minister responsible for shipping matters. I would like to reaffirm on the floor of IMO, our

commitments and tireless engagement to ensure all sectors respond to the absolute necessity of taking measures aligned to the 1.5ºC and contribute to address the impact of climate change which is an existential threat to our nations and our people in the pacific islands region.

In this context, we appreciate and support the statement by the British Prime Minister at the United Nations General Assembly that "we must put a price on the true cost of emissions through a new levy on global shipping, with the proceeds going to tackle climate change and cut emissions even further." I invite us all to follow this leadership. I am also here to convey our instrument of accession to MARPOL Annex VI.

In our submission MEPC 82/7/7, I would like to present our national action plan for a sustainable maritime future that is commitment and engagement to decarbonization and modernization of our maritime sector. It requires large-scale investments and genuine partnerships that rely on the adoption of the basket of measures that was debated last week in the working group. we must agree on MARPOL measures that will fulfil the goals of the strategy. It is essential for a just and equitable transition of shipping and ports. We will continue to advocate for a universal contribution putting a high price on ghg emissions integrated with a GHG fuel standard.

I call for a finalization of this basket of measures now and their approval in 2025. We have no more time to lose. I note that there are still debates and negotiations with some proposals restricting the extent of measures and limiting their effect. We all know it is a short-term approach with lower immediate costs and higher long-term costs that will fail to meet the targets we have set. we have before us the best available science. We must adopt now a universal levy with a fuel standard that will have the lowest negative impacts and lowest overall cost.

An incomplete energy transition of shipping will leave us behind which is unacceptable. But I am confident and trust that at the end of this week we will be able to say that we have lived up to the commitments we took when adopting the 2023 IMO GHG Strategy. My delegation will continue to work closely with all delegations, listen to others that have differing views, share our issues and commitments we made in the pacific. I am here to speak for my people and people from the Pacific calling on IMO to deliver on its Strategy and phase out GHG emissions from international shipping in a just and equitable transition. Thank you, Chair."

Statement by the delegation of Tuvalu

"Excellencies, distinguished colleagues,

It is a great honour to represent the voice of my people and Government at this crucial meeting. We come together with a shared commitment to decarbonizing the global shipping industry in a manner that is fair, just, and inclusive of all nations. Our goal is to ensure that no country is left behind in this vital transition towards a sustainable future.

The 2023 IMO GHG Strategy represents an ambitious step forward. Its targets to reduce emissions and ultimately achieve net-zero by mid-century align with the urgency of the climate crisis. But as we take these critical steps, we must ensure that the transition we envision does not place undue burdens on the most vulnerable among us.

The introduction of a universal carbon levy is a powerful tool that can accelerate this energy transition. This is not just about making the industry greener; it's also about how the resources generated from this levy can be strategically used to advance the broader objectives of the 2023 IMO GHG Strategy.

This includes fostering a fair and equitable transition that ensures a level playing field for all stakeholders. Proper allocation of these funds is essential to ensure that climate action supports everyone, particularly those who have contributed the least to emissions but are most vulnerable to their consequences.

Emissions from shipping impact not only the marine environment but also critical sectors such as agriculture, fisheries, infrastructure, and local communities. The economic challenges we face are wide ranging, and the solutions must be equally broad.

Rising sea levels threaten our very existence, while higher shipping costs risk making essential goods and services unaffordable. But we do not seek to delay this transition. We seek to ensure that it is carried out in a manner that uplifts us all. The findings of the Comprehensive Impact Assessment reassure me that the proposal for a universal carbon levy is the most effective solution for ensuring a just and equitable transition.

We acknowledge the need for further study on specific issues related to the economic impact of the proposed measures on states. This includes critical issues like food security, which is especially vital for atoll nations like Tuvalu, where survival depends on timely vessel rotations. Tuvalu also emphasizes that there is no formal requirement for the MEPC to "accept," "agree," or "adopt" these reports. Scientific and technical evaluations stand on their own merit and do not require diplomatic endorsement to hold validity.

The economic measures' key role is to cut emissions by pricing pollution, and MARPOL is the right tool to address this. Tuvalu is concerned by suggestions otherwise at this late stage of negotiations.

Climate change is a cross-cutting issue that touches every sector, community, and individual, and we cannot address it with a siloed or narrow approach. The argument that the shipping industry contributes only a small fraction to global emissions and should thus have a limited response fails to recognize the interconnectedness of this global crisis. Climate change affects us all, regardless of our individual contributions, and it demands collective responsibility from every stakeholder.

As we engage in these critical negotiations, my final appeal is that we approach them with an open mind, balancing our national positions against the bigger picture of solving this global challenge. Climate change knows no borders, and we cannot let narrow interests hinder the progress we so urgently need. I believe the maritime sector can lead the way, demonstrating how collaboration, cooperation, and compromise can drive meaningful action. Together, we can create a path that benefits not just our nations, but all of humanity.

Thank you Chair."

Statements by the delegation of the United Republic of Tanzania

"Thank you Chair.

Distinguished delegates,

Good afternoon.

We would like to start by thanking the Malaysian delegation for their hospitality in sponsoring the coffee this morning and GloLitter this afternoon.

Our gratitude goes to the Voluntary Multi-Donor Trust Fund (VMDTF) for supporting one of the delegates to attend this meeting and Intersessional Working Group on GHG.

Tanzanian delegation strongly supports the call made by Egypt, Bangladesh, Togo and other like-minded countries for an in-depth analysis of all eight impact criteria set out in the 2023 IMO GHG Strategy. It is imperative that we conduct a thorough assessment of the impacts on States, particularly focusing on developing nations.

Chair, the maritime sector is critical to the economies of many developing nations, including those in geographically remote areas. For countries like Tanzania, maritime transport serves as the backbone for importing essential goods, especially food supplies. If the cost of shipping increases due to GHG reduction measures, we foresee significant economic challenges that could intensify food insecurity. Regions dependent on imports will likely experience price inflation, directly impacting access to affordable food.

The food security criterion is of paramount importance. Many developing and least-developed countries rely on maritime transport to feed their populations. Without a comprehensive assessment of how the GHG measures will affect food import costs, we risk creating unintended consequences for millions of people already vulnerable to food insecurity. Rising shipping costs could destabilize fragile supply chains, particularly in island and land-linked nations.

Further Chair, as Tanzania stands in solidarity with Bangladesh, Egypt and Togo, we emphasize that an assessment of the impacts on States cannot be considered complete without an evaluation of all eight criteria, with a particular focus on Food Security. This criterion must be at the center of our discussions to ensure that the 2023 IMO GHG Strategy does not unintentionally place additional burdens on developing nations. An inclusive, equitable approach is essential to achieving sustainable decarburization without compromising the welfare of vulnerable populations.

In conclusion, we urge the IMO to prioritize the comprehensive analysis of all impact criteria, ensuring that food security and other essential needs of developing nations are protected as we move toward a more sustainable future for maritime transport.

Thank you Chair.

Distinguished delegates, good afternoon to you all. Our delegation would like to extend our deepest appreciation for your exemplary leadership and unwavering dedication. Your efforts in steering the discussions on the reduction of GHG have been nothing short of extraordinary.

We believe your commitment to fostering collaboration among member states and stakeholders has been instrumental in achieving significant progress towards our shared goal of mitigating the environmental impact of maritime activities.

We have all witnessed contributions from the UAE, Saudi Arabia, ZESTAS, and Nigeria, which we hope will be followed by others in contributing to the basket. Chair, we believe that the contributions made here today will support the Organization in leading the world towards a more sustainable and environmentally responsible maritime industry. With these few remarks, we wish everyone a Bon Voyage back home. Thank you."

Statement by the delegation of Vanuatu

"Thank you Chair, and good afternoon.

We have found this meeting to be a valuable opportunity to further our understanding of each other's positions, and to work collaboratively towards the achievement of the common goal of the 2023 IMO GHGH Strategy, to achieve a result that leaves no one behind.

Chair, I want to insist on the standard that this distinguished Committee has set for itself, which is a decarbonization of international shipping that leaves no one behind. "To leave no one behind" is the minimum standard that is applicable to our efforts, and it is an obligation that is incumbent on us all, as well as on each of us.

As indicated this week, Vanuatu is on the forefront of many initiatives in relation to climate change, and we will continue to do so until the global community decides to come together, united, to address this existential issue as one.

Considering the progress of the GHG working group this week, we are hopeful that this can be achieved, as we sense a genuine willingness to move forward together, as a group. In that respect, we must commend the group for establishing a good basis for this discussion moving forward. It is now critical that we deliver on this fully, and without delay.

We want to thank all distinguished delegations as well as the secretariat of the IMO that assisted you, Chair, as well as the Chair of the GHG working group, for their tireless commitment to an ambitious outcome. Vanuatu acknowledges that many challenges still lie ahead, and we are committed to continue to work together with all groups on various issues to find common ground for all, leading up to the next MEPC meeting.

Finally, we wish to thank all donor partners and member states through the IMO Voluntary Multi-Donor Trust Fund that enabled some of our delegation members to attend this important meeting. In that respect, we echo the call made by the Secretary General calling for donations in support of the fund, and thank Saudi Arabia, the UAE and others for your pledges made. On that note, I wish you all safe travels, and would appreciate it if our statement is appended to the report.

But before leaving the floor, Chair, on behalf of the Pacific, we wish to beg your indulgence to allow our representative to take the floor to bid our customary traditional farewell to all delegates."

Statement by the observer from CSC

"Thank you chair

CSC would like to first express our gratitude to the secretariat of the convention on biological diversity for submitting document MEPC 82/INF.35, as well as attending this week's meeting to speak to the importance of more concretely linking the work of the global biodiversity framework with the work of the IMO and this Committee.

We feel the recommendations in MEPC 82/INF.35 would be well served by the creation of a high-level task force which CSC and co-sponsors recommended in document MEPC 82/7/10. In MEPC/82/7/10, we highlight the urgent need for shipping solutions that address the interconnected planetary crises of pollution, climate change, and biodiversity loss. The co-sponsors call for a new IMO net-zero framework – one that elevates biodiversity and pollution concerns to the same level of urgency as climate actions. At the core of this "nexus" approach is the recognition that a clean and healthy ocean abundant with a diversity of life is an essential partner in tackling climate change. The ocean has the ability to soak up 31% of global CO2 emissions, and it produces half of the planet’s oxygen. As Secretary General Mr. Arsenio Domingez emphasized for World Maritime Day, the ocean is indispensable for the

continued existence of humanity—providing food, jobs, recreation, and regulating our climate. Protecting it is not just an environmental obligation but essential for our collective well-being.

A high-level task force could be modelled after the IMO's Maritime Just Transition Task Force, which could explore these critical issues and propose actionable steps forward. This task force could link the various targets and initiatives in the CBD's Biodiversity Framework with IMO measures, conventions, solutions, and strategies to begin to make progress towards our shared goal of safeguarding biodiversity. A co-benefits solution space is needed at the IMO to further the recommendations in MEPC 82/INF.35 and make urgent progress on addressing the triple planetary crisis.

Thank you Chair and we would appreciate this statement being included in the final report."

Statement by the observer from ICC

"Thank you Chair.

Inuit Circumpolar Council expresses its support of FOEI, Pacific Environment and CSC, and others' statements.

To begin, Inuit Circumpolar Council remarks that today is Truth and Reconciliation Day today in Canada. This is an officially recognized day for all citizens of Canada, bringing together mutual efforts to ensure that Indigenous peoples of Canada participate in the governance of all matters relating to them, including in climate change and marine governance.

The 2023 IMO GHG Strategy can be the catalyst of action towards shipping practices that minimize the cumulative impacts of climate change. Arctic ship traffic has increased dramatically by 25% from 2013-2019. If an equally concerted and well-resourced approach and vision were to be actioned for marine pollution and biodiversity, we'd be much closer to the goal of limiting global temperature rise to 1.5ºC.

For us Inuit, our Arctic region is disproportionately impacted by climate change. We inhabit the Arctic and must take part in protecting our homeland. Including us in implementing the strategy and utilizing our Indigenous Knowledge are crucial aspects of IMO work. IMO should consider developing an IMO biodiversity framework with goals, milestones and indicators that incorporate Indigenous values, experiences and knowledge. The United Nations Declaration on the Rights of Indigenous Peoples should be foundational for this work."

ITEM 8

Statement by the delegation of the United Arab Emirates

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كما أشارت الوثيقة MEPC 82/8، فإن وفد الإمارات العربية المتحدة، بدعم من وفد المملكة العربية السعودية، أشار إلى أن المقترحات الخاصة بتعديل الصكوك الإلزامية بخلاف المرفق الخامس من اتفاقية ماربول فيما يتعلق بنقل حبيبات البلاستيك قد قُدِّمت إلى PPR 11 وأن اللجنة الفرعية دعت إلى تقديم مقترحات مكتوبة أخرى تتناول الخيارات المحتملة للتدابير الإلزامية. وبعد ذلك، طلب الوفد توضيحًا بشأن ما إذا كان نطاق العمل الخاص بالناتج 4.3، كما هو منصوص عليه في خطة العمل بشأن القمامة البلاستيكية البحرية من السفن (القرار MEPC.310(73)) والاستراتيجية بشأن القمامة البلاستيكية البحرية من السفن (القرار MEPC.341(77))، يمكن أن يستوعب مثل هذه المقترحات أو ما إذا كانت هناك حاجة إلى مخرجات جديدة للنظر فيها. ووافقت MEPC 81 على معالجة هذه المسألة أثناء مراجعة خطة العمل.

وبالإضافة إلى ذلك، يود هذا الوفد تسليط الضوء على العمل الجاري الذي تقوم به لجنة التفاوض الحكومية الدولية لتطوير أداة دولية ملزمة قانوناً بشأن التلوث البلاستيكي، بما في ذلك في البيئة البحرية، وأنه ينبغي إحالة المناقشات المتعلقة بالحبيبات البلاستيكية إلى لجنة التفاوض الحكومية الدولية لتجنب أي إجراءات يتم الاتفاق عليها في المنظمة البحرية الدولية والتي من شأنها أن تقوض أو تعقد الحلول الشاملة التي يتم تطويرها من خلال لجنة التفاوض الحكومية الدولية.

وبالتالي فإنه من الأفضل التريث حتى يتم الانتهاء من مراجعة خطة العمل المتعلقة بالبلاستيك. كما نطلب أيضًا من الأمانة العامة إطلاع اللجنة على التقدم المحرز فيما يتعلق بلجنة التفاوض الحكومية الدولية."

ITEM 9

Statement by the delegation of Malaysia

"Thank you, Chair.

Malaysia would like to express our appreciation to the International Maritime Organization, the Global Environment Facility, and the United Nations Development Programme for their continued efforts in addressing the reduction of underwater radiated noise (URN) through the GloNoise Partnership Project. We are especially grateful to India, our lead country, and other pilot countries for their collaboration and leadership in this vital initiative.

As one of the Twinning Partner Countries, Malaysia fully recognizes the urgency of mitigating the adverse impacts of underwater noise on marine ecosystems and marine life. We acknowledge the important steps taken and is committed to supporting and participating in these capacity-building activities to further strengthen our national frameworks and contribute to global efforts.

Malaysia supports the Committee's efforts to advance this initiative and believes the continued work under the GloNoise Partnership will be instrumental in fostering meaningful changes in the maritime sector, both for developing and developed nations. We remain committed to further cooperation and look forward to the upcoming capacity-building workshops and the rollout of the noise assessment toolkit, which will enhance our ability to monitor and reduce underwater noise effectively.

Once again, Malaysia would like to thank all the project partners and most notably, our lead country, India, for their dedication and leadership in advancing this important work. We stand ready to collaborate with all stakeholders to achieve the shared goal of reducing the harmful impacts of underwater noise from shipping on our precious marine ecosystems.

Thank you, Chair."

ITEM 12

Statement by the delegation of Ecuador

"Gracias señor presidente,

Buenas tardes con todas las distinguidas delegaciones.

A la delegación de Ecuador le gustaría destacar la preocupación creciente sobre el impacto de las bioincrustaciones en la introducción de especies acuáticas invasoras, una de las principales amenazas para la biodiversidad marina en todo el mundo, particularmente en las Zonas Marinas Especialmente Sensibles (ZMES) y Áreas Marinas Protegidas (AMP).

Las especies invasoras introducidas a través de la bioincrustación en los cascos de los buques y otras estructuras marinas móviles, como plataformas y embarcaciones recreativas, representan una amenaza real, para el equilibrio de nuestros ecosistemas marinos más vulnerables. Estos organismos pueden alterar significativamente la estructura y función ecológica de estas áreas, afectando no solo la biodiversidad, sino también los medios de vida de muchas comunidades costeras que dependen de un entorno marino saludable, sustentable y sobretodo sostenible.

Frente a esta realidad, Ecuador, en colaboración con el proyecto de Asociaciones GloFouling promovido por la OMI, ha tomado un papel proactivo organizando varios talleres siendo el primero de ellos, el realizado en julio del 2023 en las Islas Galápagos. Este evento reunió a gestores y expertos en bioseguridad marina para desarrollar estrategias específicas de prevención y control de la bioincrustación. Los resultados de este taller se traducen en un conjunto de recomendaciones claves que pueden ser adoptadas por los Estados Miembros, con el objetivo de mejorar la gestión de las bioincrustaciones en sus propias jurisdicciones, y de esta manera minimizar el riesgo de la introducción de especies invasoras.

Es fundamental que los Estados Miembros renoven su compromiso con la protección de las ZMES y AMP mediante la implementación de estas recomendaciones. Al fortalecer nuestras capacidades para detectar y prevenir la propagación de especies invasoras a través de la bioincrustación, estaremos dando un paso decisivo en la protección de la biodiversidad marina a nivel global.

La delegación de Ecuador así como las delegaciones que han copatrocinado el documento MEPC 82/12/1 “Gestión de las incrustaciones biológicas en zonas marinas especialmente sensibles y zonas marinas protegidas”, instamos a los Estados Miembros a incorporar medidas específicas de gestión de bioincrustaciones en sus planes de manejo de ZMES y AMP y en particular a lo estipulado en el párrafo 9 de dicho documento así como en sus anexos donde consta información sumamente relevante, sobretodo en el Anexo 1 donde se incluye nuestra experiencia como país referente al taller realizado en las Islas Galápagos; con el fin de continuar colaborando en proyectos internacionales sostenibles que promuevan la preservación de nuestros mares y océanos, ya que solo mediante el esfuerzo conjunto podremos asegurar la protección efectiva de nuestros ecosistemas marinos más valiosos.

Le agradeceríamos a la Secretaría que esta declaración quede registrada en el informe final.

Gracias señor president."

ITEM 14

Statement by the delegation of Japan

"Japan thanks the proponents for proposals in document MEPC 82/14/1, and supports initiation of new work output to review and amend as appropriate MARPOL Annex VI and the NO_x Technical Code, and inclusion of the proposed output in the Committee's current biennial agenda.

Japan would like to take this opportunity to share information regarding the inappropriate measurements at shop tests confirmed in some engine manufacturers in Japan. Through investigation by the Government of Japan, it was found that several engine manufacturers had improperly measured specific fuel consumption rates and other factors at shop test.

Many of the inappropriate measurements identified were intended to reduce variation in specific fuel consumption rates between engines, and also have an impact on NO_x emissions.

The Japanese government is deeply concerned that some engine manufacturers in Japan have been found in such inappropriate cases, and we take this situation very seriously.

In light of that situation, Japanese government immediately conducted an investigation to check for similar cases not only at the engine manufacturers that found the cases, but also at all 22 engine manufacturers that produce marine engines in Japan.

As a result, no inappropriate cases have been confirmed at 18 companies, but inappropriate cases have been confirmed at four companies, including one that was reported in advance.

The Japanese government has conducted an investigation into all NO_x emission test conducted to date by engine manufacturers where inappropriate cases have been confirmed. As a result, it has been confirmed that, although the number of cases were quite limited, there are some cases in which compliance with the NO_x regulations is affected.

The Government of Japan has already begun to take corrective measures such as ordering those manufactures to adjust and repair the engines.

In addition, all engine manufacturers where inappropriate cases were confirmed have been forced to correct their measurement sites under government supervision, and the issuance of EIAPP certificates, which had been temporarily suspended, has now been resumed.

Furthermore, The Japanese government has already instructed the engine manufacturers where inappropriate cases were found to take appropriate action to the shipowners, and will also thoroughly check the content of measures to prevent recurrence to ensure that similar cases do not occur again.

We kindly ask you that our statement be annexed to the report."

ITEM 16

Statement by the observer from CSC

"SC would like to first express our gratitude to the secretariat of the convention on biological diversity for submitting MEPC 82/INF.35, as well as attending this weeks meeting to speak to the importance of more concretely linking the work of the global biodiversity framework with the work of the IMO and this committee.

We feel the recommendations in MEPC 82/INF.35 would be well served by the creation of a high-level task force which CSC and co-sponsors recommended in MEPC 82/7/10. In MEPC/82/7/10, we highlight the urgent need for shipping solutions that address the interconnected planetary crises of pollution, climate change, and biodiversity loss. The co-sponsors call for a new IMO framework – one that elevates biodiversity and pollution concerns to the same level of urgency as climate actions. At the core of this “nexus” approach is the recognition that a clean and healthy ocean abundant with a diversity of life is an essential partner in tackling climate change. The ocean has the ability to soak up 31% of global CO2 emissions, and it produces half of the planet’s oxygen. As Secretary General Domingez emphasised for World Maritime Day, the ocean is indispensable for the continued existence of humanity—providing food, jobs, recreation, and regulating our climate. Protecting it is not just an environmental obligation but essential for our collective well-being.

A high-level task force could be modelled after the IMO’s Maritime Just Transition Task Force, which could explore these critical issues and propose actionable steps forward. This task force could link the various targets and initiatives in the CBD’s Biodiversity Framework with IMO measures, conventions, solutions, and strategies to begin to make progress towards our shared goal of safeguarding biodiversity. A co-benefits solution space is needed at the IMO to further the recommendations in MEPC 82/INF.35 and make urgent progress on addressing the triple planetary crisis.

Thank you Chair and we would appreciate this statement being included in the final report."