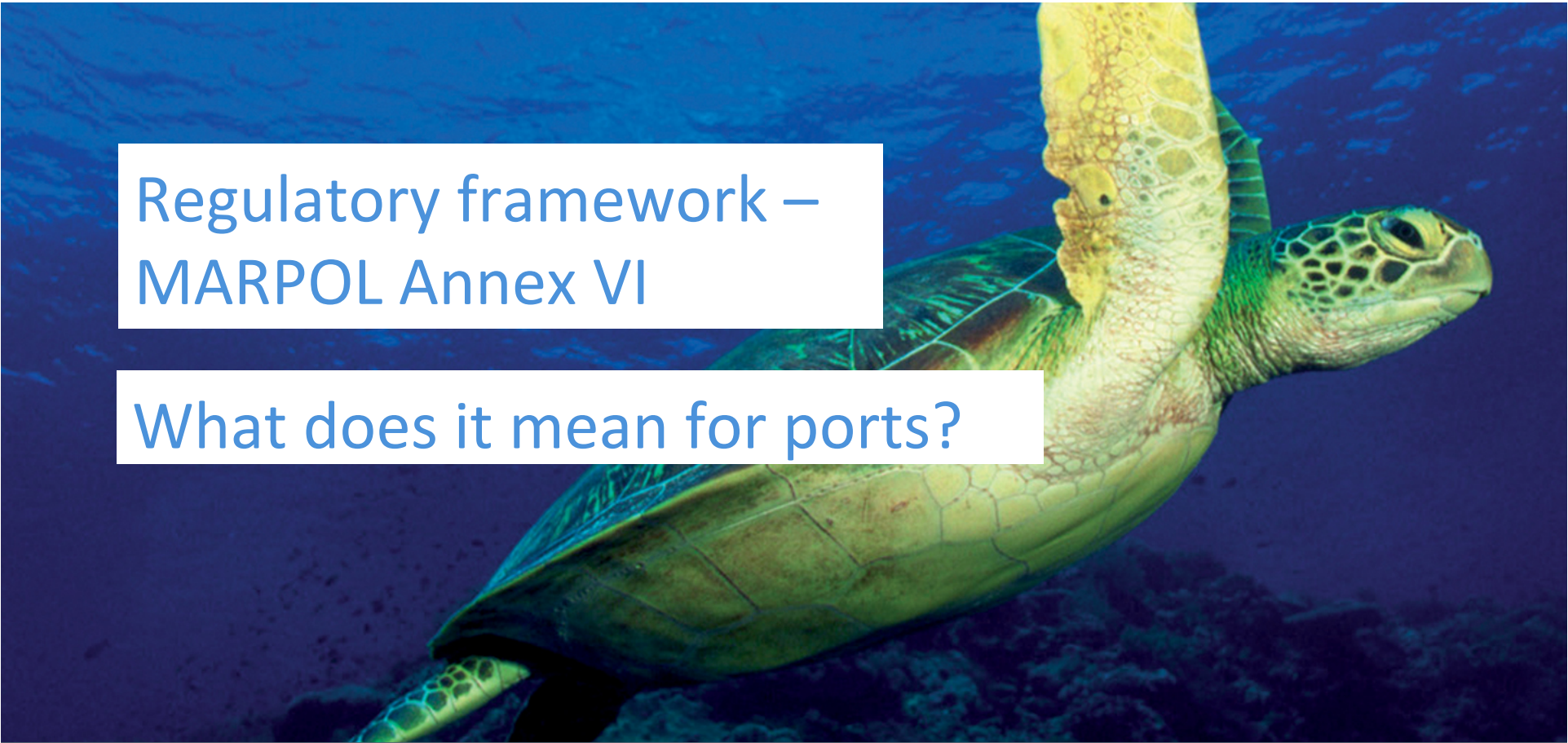




Regulatory framework – MARPOL Annex VI

What does it mean for ports?

Astrid Dispert
Marine Environment Division, IMO
21 May 2019

Contents

1. International Maritime Organization (IMO)
2. Regulatory framework – MARPOL Annex VI
3. On-shore power supply
4. Initial IMO GHG Reduction Strategy



International Maritime Organization (IMO)

- Specialized agency of the UN
- IMO Convention adopted in 1948 and IMO first met in 1959
- 174 Member States
- Develop and maintain a comprehensive regulatory framework for shipping
- Safety, **environment**, legal matters, technical co-operation, security and the efficiency of shipping



Safe, secure and efficient shipping on cleaner oceans



International Convention for the Prevention of Pollution from Ships (MARPOL)

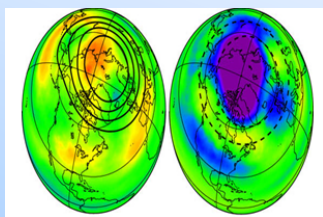
Air Pollution Conference 1997

- MARPOL: main international convention covering prevention of operational or accidental pollution of the marine environment by ships
- Air Pollution Conference 1997 adopted new Annex “Regulations for the Prevention of Air Pollution from Ships” through adding a Protocol to MARPOL 73/78
- Entered into force May 2005

Annex I	Annex II	Annex III	Annex IV	Annex V	Annex VI
Oil	Noxious Liquid Substances carried in bulk	Harmful Substances carried in Packaged Form	Sewage	Garbage	Air Pollution & Energy Efficiency

Regulatory framework – MARPOL Annex VI

Ozone Depleting Substances



Volatile Organic Compounds



Nitrogen Oxides (NO_x)



Shipboard Incineration



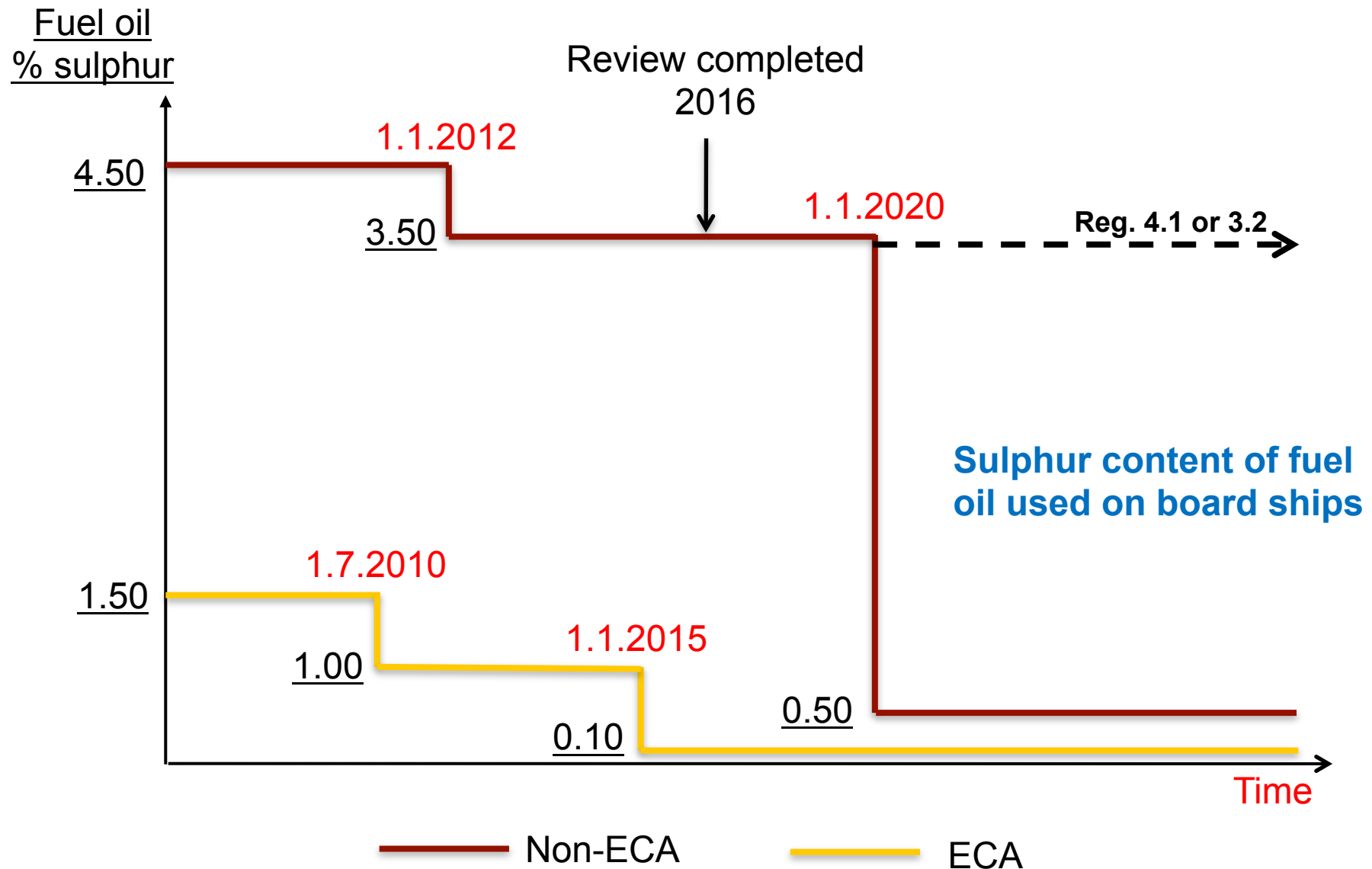
Sulphur Oxides (SO_x) and PM



Energy Efficiency



Regulation 14 – Sulphur oxides (SOx) and PM

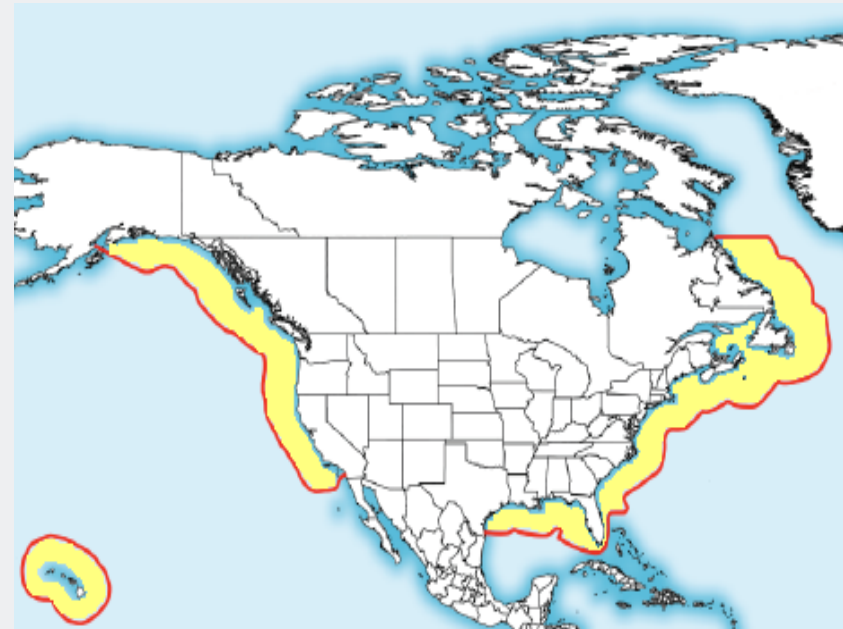


IMO designated Emission Control Areas – SO_x and PM

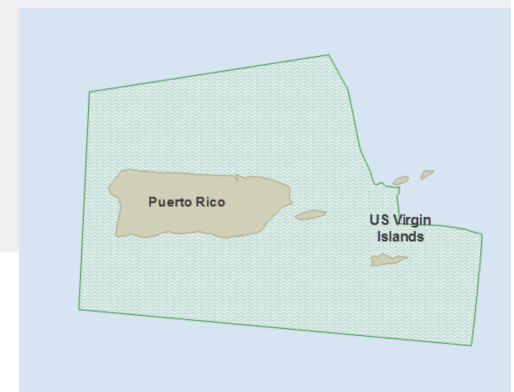
North Sea and Baltic Sea SO_x ECAs



North American SO_x and PM ECA



U.S. Caribbean SO_x and PM ECA



■ Baltic and North Sea **NO_x-ECAs** will enter into effect 1 January 2021. ⁷

Approaches to SOx compliance?

Use compliant fuel oil (regulation 14)

- Ultra-low sulphur fuel oil
- Marine Gas Oil, Marine Diesel Oil

Use an equivalent (regulation 4)

- E.g. Exhaust Gas Cleaning Systems (scrubbers)
- 2015 Guidelines on Exhaust Gas Cleaning Systems (currently under review)

Use alternative fuels (IGF Code)

- Gas (dual fuel or gas only)
- Biodiesel/methanol
- Other low flashpoint fuels?

At berth

- Onshore power supply (MEPC.1/Circ.794)

2020 - Enforcement of 0.50% sulphur limit

- To address compliance and ensure consistent implementation of the 0.50% sulphur limit MEPC 73 (October 2018) adopted an amendment to MARPOL Annex VI to prohibit the carriage of non-compliant fuel oil for combustion purposes for propulsion or operation on board a ship so that regulation 14.1 of MARPOL Annex VI is amended to read as follows:

“ The sulphur content of fuel oil used or carried for use on board a ship shall not exceed 0.50% m/m.”

- This amendment is expected to enter into force on **1 March 2020**.
- The carriage ban on non-compliant fuel oil means that a **ship found by port State control to be carrying non-compliant fuel oil will provide ‘clear grounds’** for further investigation and possible enforcement action and so will significantly enhance high-seas compliance

On-shore power supply (OPS) - regulatory aspects

- Currently no IMO regulations on OPS.
- Proposal in the past to add new reg. to Annex VI:
- MEPC 64 (in 2012) considered standardization of OPS and agreed that mandatory requirements for OPS should not be developed at this stage.



Draft Regulation [xx]

ON-SHORE POWER SUPPLY FOR SHIPS IN PORT

MEPC 55/4/13
Submitted by
Sweden

(1) If connection to on-shore electrical power supply for ships during port stays is required in ports or terminals under the jurisdiction of a Party to the Protocol of 1997, the requirement shall be regulated in accordance with the provisions of this regulation.

OPS - International Standards



IEC/ISO/IEEE 80005-1

Edition 1.0 2012-07



INTERNATIONAL STANDARD

Shore-to-ship power standards

Utility connect
Part 1: High Voltage

IEC/IEEE 80005-1:2019

Utility connections in port -- Part 1: High voltage shore connection (HVSC) systems
-- General requirements

IEC/IEEE 80005-2:2016

Utility connections in port -- Part 2: High and low voltage shore connection systems
-- Data communication for monitoring and control

IEC/IEEE DIS 80005-3 [Under development]

Utility connections in port -- Part 3: Low Voltage Shore Connection (LVSC) Systems
-- General requirements

IEC/PAS 80005-3:2014

Utility connections in port -- Part 3: Low Voltage Shore Connection (LVSC) Systems
-- General requirements

<-- Currently being revised

OSP – IMO guidelines on operational safety

- SSE 6 Sub-Committee (3/2019) considered draft guidelines on Safe Operation of OSP Service in port for ships engaged in international voyages.
- Focus on operational aspects only.
- Technical requirements for the OSP system should be in compliance with relevant IEC/ISO/IEEE standards.
- Currently no consensus on whether SOLAS amendments needed.
- Correspondence Group to report to SSE 7 (Spring 2020).

Work in progress



Requirements for use of shore power by ships in ports

In December 2007, the Air Resources Board (ARB) approved the "Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At-Berth in a California Port" Regulation, commonly referred to as the At-Berth Regulation. The purpose of the At-Berth Regulation is to reduce emissions from diesel auxiliary engines on container ships, passenger ships, and refrigerated-cargo ships while berthing at a California Port. The At-Berth Regulation defines a California Port as the Ports of Los Angeles, Long Beach, Oakland, San Diego, San Francisco, and Hueneme. The At-Berth Regulation provides vessel fleet operators visiting these ports two options to reduce at-berth emissions from auxiliary engines: 1) turn off auxiliary engines and connect the vessel to some other source of power, most likely grid-based shore power; or 2) use alternative control technology that achieve equivalent emission reductions.

California

CHINA

- Starting July 1, 2019, ships (except tankers) equipped with shore power capability shall connect to shore power while berthing for more than 3 hours in Coastal ECA ports with available shore power supply or berthing more than 2 hours within the Inland Water ECA with available shore power supply.
- Starting January 1, 2022, cruise ships shall connect to shore power while berthing more than 3 hours at China ECA ports with available shore power supply.
- Use of clean energy, new energy and onboard battery can be treated as equivalent alternative measures to comply with the above two requirements.

L 125/38

EN

Official Journal of the European Union

12.5.2006

EC recommendation

COMMISSION RECOMMENDATION

of 8 May 2006

on the promotion of shore-side electricity for use by ships at berth in Community ports

(Text with EEA relevance)

(2006/339/EC)

Will sulphur 2020 →
lead to increase in OSP
uptake ?!

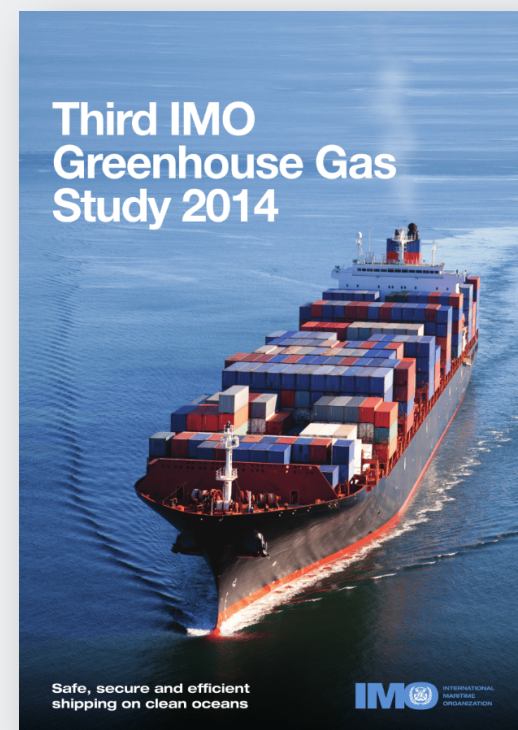
THE COMMISSION OF THE EUROPEAN COMMUNITIES,

- (6) Ship engine emissions are regulated at international level through the International Maritime Organisation (IMO). The evolution of these standards is insufficient to

GHG emissions from international shipping

- In 2012, international shipping CO₂ emissions were estimated to be 796 million tonnes accounting for **2.2% of global CO₂ emissions**
- By 2050, CO₂ emissions from international shipping could **grow by between 50% and 250%**, depending on future economic growth and energy developments
- Demand is the key driver for growth in emissions

(Third IMO Greenhouse Gas Study 2014)



Initial IMO Strategy on Reduction of GHG emissions from ships

ANNEX 11

adopted

RESOLUTION MEPC.304(72)
(adopted on 13 April 2018)

INITIAL IMO STRATEGY ON REDUCTION OF GHG EMISSIONS FROM SHIPS

THE MARINE ENVIRONMENT PROTECTION COMMITTEE

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

ACKNOWLEDGING that work to address greenhouse gas (GHG) emissions from ships has been undertaken by the Organization continuously since 1997, in particular, through adopting global mandatory technical and operational energy efficiency measures for ships under MARPOL Annex VI,

ACKNOWLEDGING ALSO the decision of the thirtieth session of the Assembly in December 2017 that adopted for the Organization a strategic direction entitled "Respond to Climate Change",

RECALLING the United Nations 2030 Agenda for Sustainable Development,

Vision:

IMO remains committed to reducing GHG emissions from international shipping and, as a matter of urgency, **aims to phase them out as soon as possible in this century.**

Ambitious GHG targets

.1 carbon intensity of the ship to decline through implementation of further phases of the energy efficiency design index (EEDI) for new ships

to review with the aim to strengthen the energy efficiency design requirements for ships with the percentage improvement for each phase to be determined for each ship type, as appropriate;

.2 carbon intensity of international shipping to decline

to reduce CO₂ emissions per transport work, as an average across international shipping, by at least 40% by 2030, pursuing efforts towards 70% by 2050, compared to 2008; and

.3 GHG emissions from international shipping to peak and decline

to peak GHG emissions from international shipping as soon as possible and **to reduce the total annual GHG emissions by at least 50% by 2050 compared to 2008** whilst pursuing efforts towards phasing them out as called for in the Vision as a point on a pathway of CO₂ emissions reduction consistent with the Paris

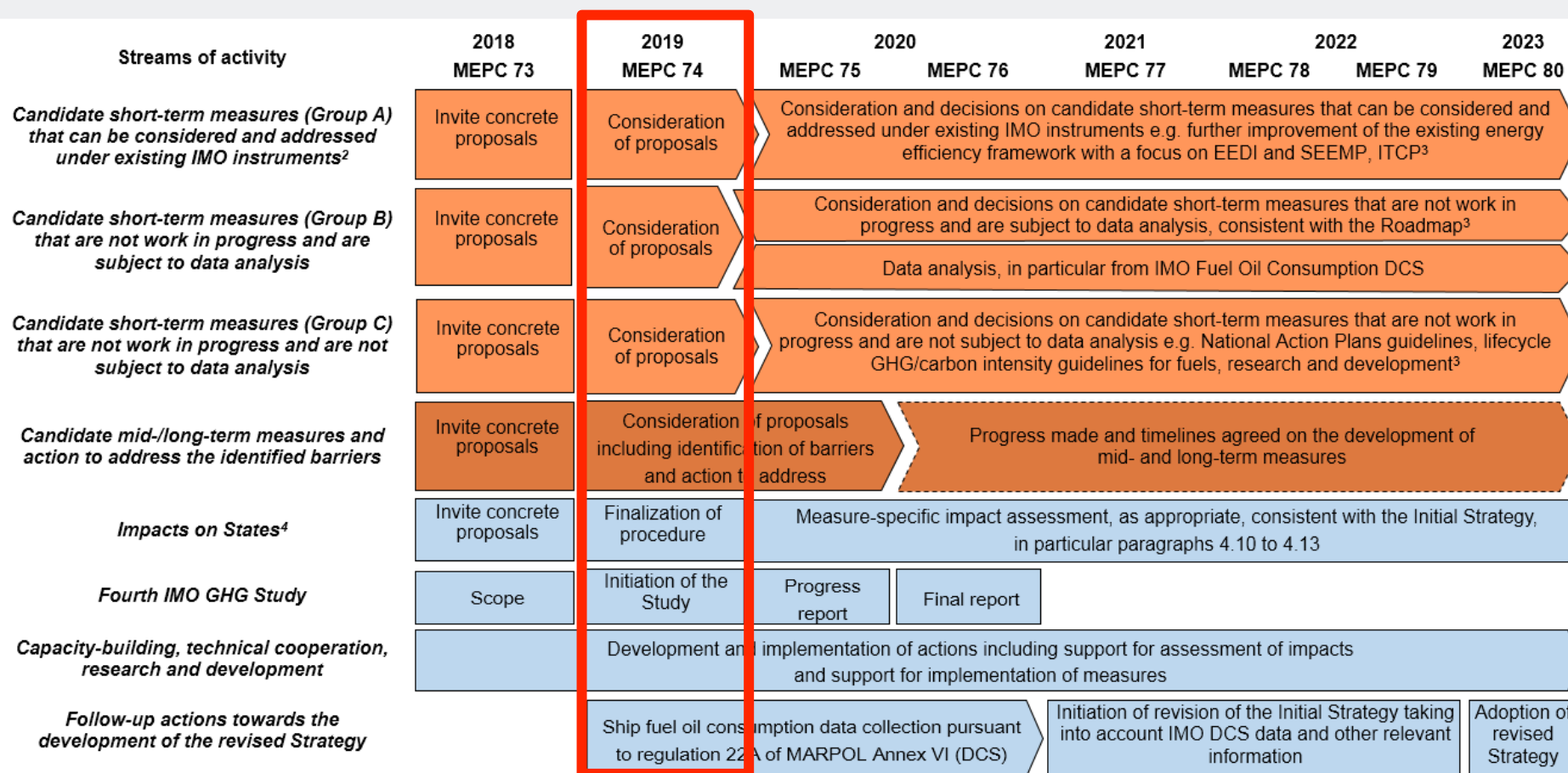
■ Agreement temperature goals.

Candidate short-term measures

- .8 consider and analyse measures to encourage port developments and activities globally to facilitate reduction of GHG emissions from shipping, including provision of ship and shoreside/onshore power supply from renewable sources, infrastructure to support supply of alternative low-carbon and zero-carbon fuels, and to further optimize the logistic chain and its planning, including ports;



Programme of follow-up actions of the Initial Strategy up to 2023



² Includes ongoing work pursuant to regulation 21.6 of MARPOL Annex VI.

³ "In aiming for early action, the timeline for short-term measures should prioritize potential early measures that the Organization could develop, while recognizing those already adopted, including MARPOL Annex VI requirements relevant for climate change, with a view to achieve further reduction of GHG emissions from international shipping before 2023" (paragraph 4.2 of the Initial Strategy).

⁴ Assessment of impacts on States to be undertaken in accordance with the procedure to be developed by the Organization.

MEPC 74 - Port resolution adopted

ANNEX 3

DRAFT MEPC RESOLUTION ON INVITATION TO MEMBER STATES TO ENCOURAGE VOLUNTARY COOPERATION BETWEEN THE PORT AND SHIPPING SECTORS TO CONTRIBUTE TO REDUCING GHG EMISSIONS FROM SHIPS

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,

HAVING ADOPTED resolution MEPC.304(72) on the *Initial IMO Strategy on reduction of GHG emissions from ships* (hereinafter the Initial Strategy),

NOTING that the Initial Strategy calls for the encouragement of port developments and activities globally to facilitate reduction of GHG emissions from shipping, including provision of ship and shoreside/onshore power supply from renewable sources, infrastructure to support supply of alternative low-carbon and zero-carbon fuels, and to further optimize the logistic chain and its planning, including ports,

MEPC 74 - Port resolution adopted

2 INVITES Member States to facilitate the uptake of actions such as those identified in paragraph 1 through appropriate actions, which may include:

- .1 supporting the viability of business cases for ship and in-port renewable power-to-ship solutions and the use of these solutions;
- .2 encouraging cooperation between ports, bunker suppliers, shipping companies and all relevant levels of authority in addressing the supply and availability of alternative low-carbon and zero-carbon fuels, including the legal, regulatory and infrastructural barriers to the efficient and safe handling and bunkering of alternative low-carbon and zero-carbon fuels;
- .3 promoting incentive schemes that address GHG emissions and sustainability of international shipping and encouraging more incentive providers and shipping companies to join these; and
- .4 supporting the industry's collective efforts to improve quality and availability of data and develop necessary global digital data standards that would allow reliable and efficient data exchange between ship and shore as well as enhanced slot allocation policies thereby optimizing voyages and port calls and facilitating just-in-time arrival of ships;

Thank you for your attention

For more information please see:

www.imo.org

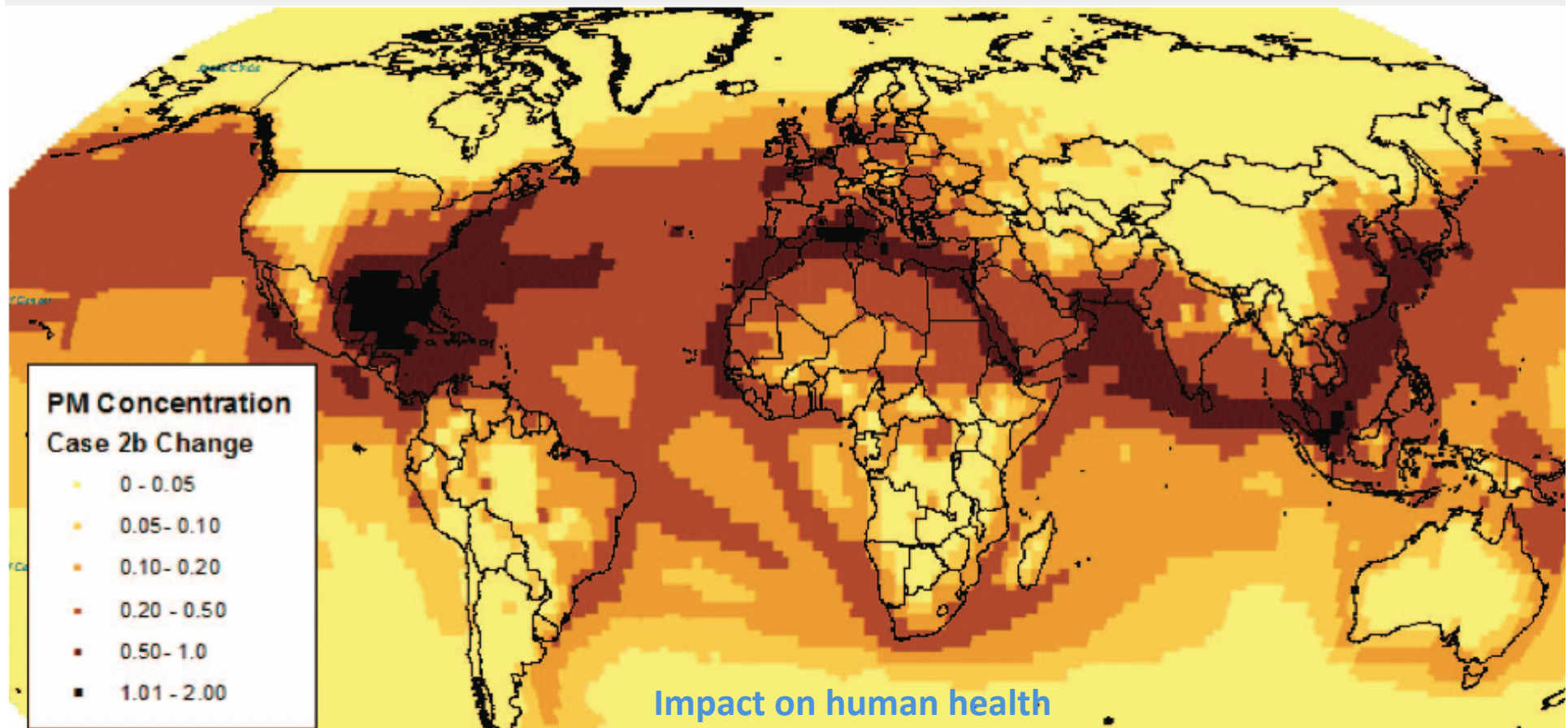


-- Extra slides --



Why regulate shipping emissions?

Air pollution



Annual average contribution of shipping to PM_{2.5} concentrations (µg/m³)

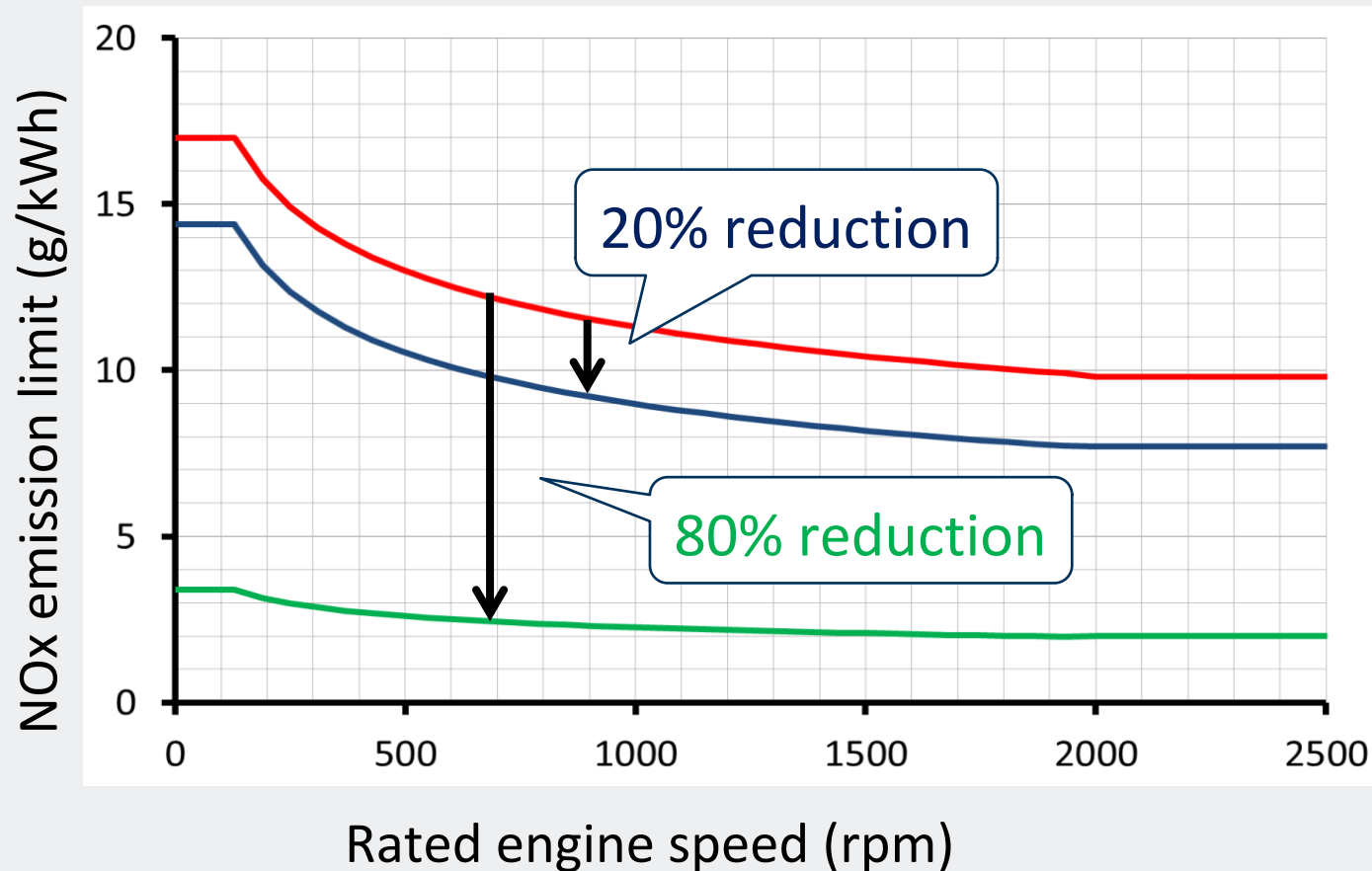
Source: Corbett et al. 2007, “Mortality from ship emissions: A global assessment”, Environmental Science & Technology

Regulatory framework – MARPOL Annex VI

- MARPOL Annex VI
 - 1997 Protocol adopted in 1997
 - Entered into force on 19 May 2005
- Revisions of Annex VI
 - Adopted in October 2008
 - Entered into force on 1 July 2010
- Chapter 4 on Energy Efficiency
 - Adopted in July 2011
 - Entered into force on 1 January 2013
- Number of Contracting States: 94 (as of 19 May 2019)
- The combined merchant fleets of which constitute **approximately 96.71 % of the gross tonnage of the world's merchant fleet**



Regulation 13 – Nitrogen oxides (NO_x)



Tier I

- Constructed on or after 1 Jan. 2000

Tier II

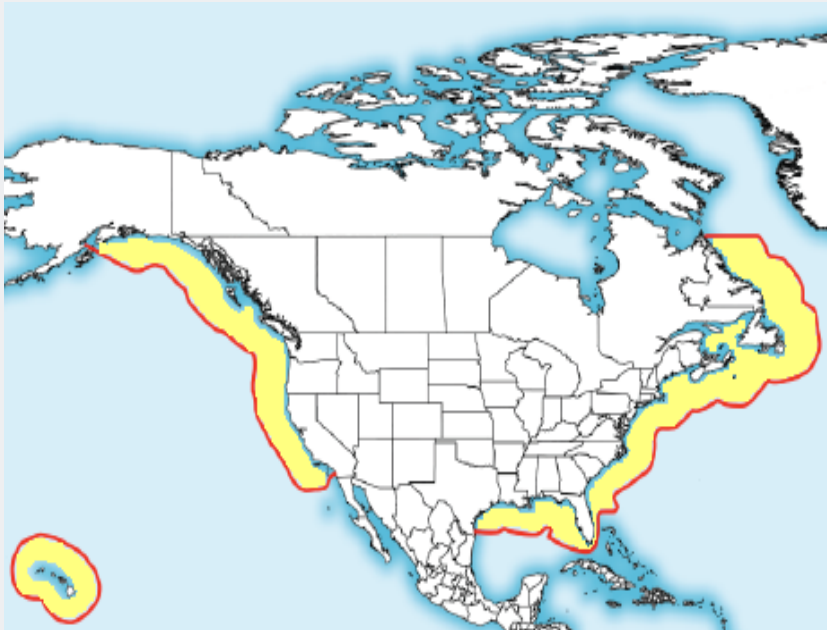
- Constructed on or after 1 Jan. 2011

Tier III

- Constructed on or after 1 Jan. 2016
- Applied in ECAs
- Tier II applied outside of ECAs

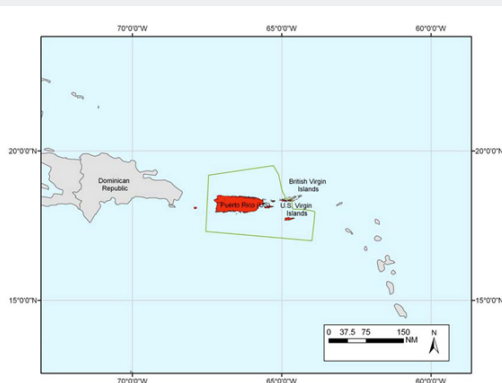
IMO designated Emission Control Areas - NOx Tier III

North American ECA –NOx



Baltic and North Sea NOx-ECAs will enter into effect 1 January 2021.

U.S. Caribbean Sea ECA



Regulation 4 – Equivalents

- The Administration of a Party may allow any fitting, material, appliance or apparatus to be fitted in a ship or other procedures, alternative fuel oils, or compliance methods used as an alternative to that required by MARPOL Annex VI, **if such fitting, etc. are at least as effective in terms of emissions reductions as that required by Annex VI.**
3. The Administration of a Party should take into account any relevant **guidelines developed by the IMO*** pertaining to the equivalent.

RESOLUTION MEPC.259(68)
(adopted on 15 May 2015)

2015 GUIDELINES FOR EXHAUST GAS CLEANING SYSTEMS

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 (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution from ships,

RECALLING ALSO that, at its fifty-eighth session, the Committee adopted, by resolution MEPC.176(58), a revised MARPOL Annex VI which significantly strengthens the

Currently
being
revised

MEPC 74 completes IMO 2020 guidelines

To support effective implementation of the 0.50% sulphur limit MEPC 74 approved:

- 2019 Guidelines for consistent implementation of the 0.50% sulphur limit under MARPOL Annex VI
- 2019 Guidelines for port State control under the revised MARPOL Annex VI
- Guidance for PSC on contingency measures for addressing non-compliant fuel oil
- MEPC Circular on the 2019 Guidelines for on board sampling for the verification of the sulphur content of the fuel oil used on board ships
- MEPC circular on Early application of the approved amendments to the verification procedures for a MARPOL Annex VI fuel oil sample
- MEPC circular on Guidance on indication of ongoing compliance in the case of the failure of a single monitoring instrument, and recommended actions to take if the EGCS fails to meet the provision of the Guidelines
- MSC-MEPC circular on Delivery of compliant fuel oil by suppliers, subject to approval by MSC 101 in June.

Regulation 17 - Reception Facilities

- Parties are obliged to provide facilities without causing delay for:
 - Reception of ODS in ship repair yards (Reg.17.1.1); and
 - Reception of Exhaust Gas Cleaning System residues (Reg. 17.1.2)
- Reception of ODS in ship breaking facilities (Reg.17.1.3)
- If unable to provide reception facilities, Party shall inform IMO (Reg.17.3 & 17.4).
- Each Party shall notify the Organization of all cases where the facilities provided under this regulation are unavailable or alleged to be inadequate.

MEPC 74 - Reception Facilities

MARINE ENVIRONMENT PROTECTION
COMMITTEE
74th session
Agenda item 14

MEPC 74/14/2
8 February 2019
Original: ENGLISH

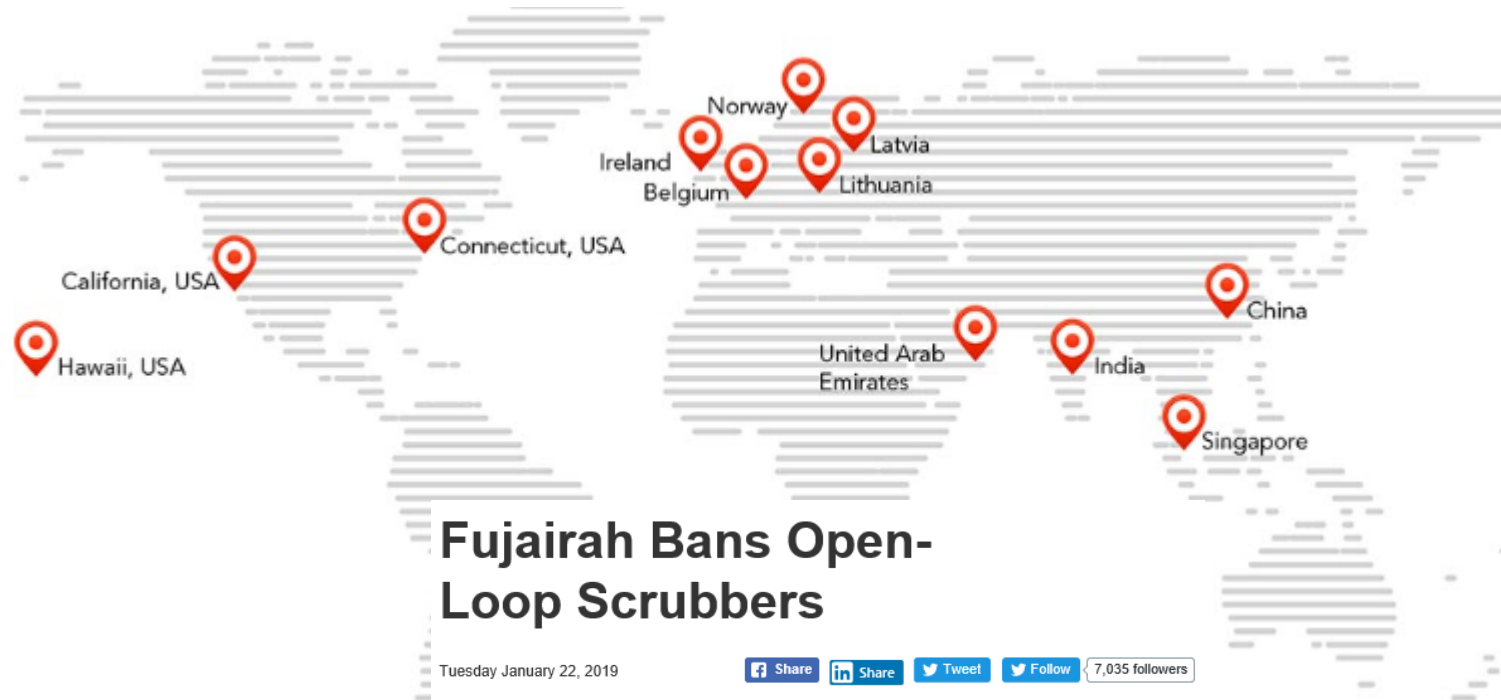
WORK PROGRAMME OF THE COMMITTEE AND SUBSIDIARY BODIES

Proposal for a new output to amend MARPOL to allow the establishment of regional arrangements in the Arctic

Submitted by Canada, Denmark, Finland, Iceland, Norway, Russian Federation, Sweden and United States

SUMMARY

Executive summary: This document proposes a new output to amend the relevant paragraphs in the MARPOL Annexes to allow for regional arrangements for Arctic port waste reception facilities



Fujairah Bans Open-Loop Scrubbers

Tuesday January 22, 2019

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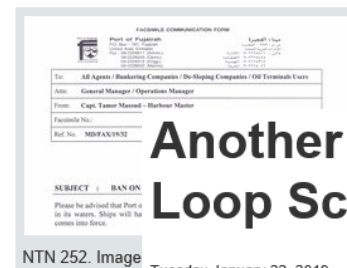
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7,035 followers

The **Port of Fujairah** has banned the use of open-loop scrubbers in its waters. The port's Master Capt. issued a Notice to Mariners.

port to make such a ban by Singapore last



NTN 252. Image

Another EU Port Bans Open-Loop Scrubbers

Tuesday January 22, 2019

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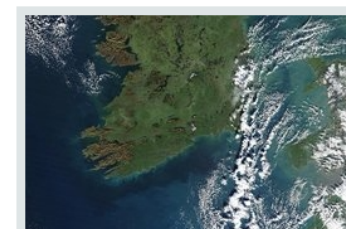
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The **Port of Waterford** in **Southeast Ireland** has put a ban on open-loop scrubbing in its waters.

The move comes amid a growing number global port states making the move, including the fellow Irish port of **Dublin** and bunkering heavyweights **Singapore** and **Fujairah**.

However, unlike Singapore and a number of other ports, Waterford's ban is effective from the start of January 2019.



Port of Waterford in Southeast Ireland. File Image / Pixabay

"This applies to all vessels berthed at any berth within the port's jurisdiction and vessels on transit to and from any berth or anchorage. Upon entering port limits any vessel fitted with exhaust gas scrubbers, must run on a "closed loop system" for the duration of the port stay," the port says.

IMO2020: Singapore Bans Open-Loop Scrubbing

Friday November 30, 2018

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From January 1, 2020 Singapore will ban the use of open-loop scrubbers in its waters due to environmental concerns over the technology.

"To protect the marine environment and ensure that the port waters are clean, the discharge of wash water from open-loop exhaust gas scrubbers in Singapore port waters will be prohibited," **Andrew Tan**, Chief Executive, **Maritime and Port Authority of Singapore** (MPA) said today at the Singapore Registry of Ships (SRS) Forum 2018.



Vessels calling at Singapore will not be able to use open-loop scrubbers from 2020. Image Credit: Ship & Bunker

of Fujairah has banned open-loop scrubbers in its waters. The port's Master Capt. issued a Notice to Mariners.

when the new rule he ban only covered

expand on why the in, the practice of

"**Fujairah** world's to biggest k

"Ships fitted with open-loop scrubbers calling at Singapore will be required to use compliant fuel. Ships fitted with hybrid scrubbers will be required to switch to the closed-loop mode of operation. Singapore, as a party to MARPOL Annex VI, will be providing reception facilities for the collection of residues generated from the operation of scrubbers."

MEPC 74 – EGCS discharge of washwater

- Use of EGCS started mainly from 1 January 2015 in SOX ECAs, as an alternative to the use of low-sulphur fuels.
- March 2015: number of ships with EGCS approx. 300.
- IMO fuel availability study (MEPC 70/INF.6) projection: approx. 3800 vessels equipped with EGCS by 1 January 2020.
- Potential further increase after 1 January 2020 due to the projected premium price of the 0.50% fuels entering the market.



MEPC 74 – EGCS discharge of washwater

MARINE ENVIRONMENT PROTECTION
COMMITTEE
74th session
Agenda item 14

MEPC 74/14/1
8 February 2019
Original: ENGLISH

WORK PROGRAMME OF THE COMMITTEE AND SUBSIDIARY BODIES

Proposal for evaluation and developing harmonized rules and guidance on the discharge of liquid effluents from exhaust gas cleaning systems

Submitted by Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom and the European Commission

SUMMARY

Executive summary: Regulation 4 of MARPOL Annex VI allows the use of equivalent devices, in particular for the application of regulation 14 of MARPOL Annex VI to reduce the sulphur content of marine fuels. As an alternative to the use of low sulphur fuels, exhaust gas cleaning systems (EGCS) have been developed and used by ships to achieve equivalent reduction of sulphur oxide emissions. However, the present knowledge on the composition and harmfulness to the marine environment of liquid effluents discharged by the majority of these systems into ports and sensitive sea areas lead States to take local or regional restriction or prohibition measures. It is proposed that the Committee consider the inclusion of a new output in its programme of work in order to evaluate and harmonize the development of rules and guidance on the discharge of liquid effluents from EGCS, including conditions and areas.

- New output adopted
- Target completion year 2021

Candidate measures

Timelines

4.1 Candidate measures set out in this Initial Strategy should be consistent with the following timelines:

- .1 possible short-term measures could be measures finalized and agreed by the Committee between 2018 and 2023. Dates of entry into force and when the measure can effectively start to reduce GHG emissions would be defined for each measure individually;
- .2 possible mid-term measures could be measures finalized and agreed by the Committee between 2023 and 2030. Dates of entry into force and when the measure can effectively start to reduce GHG emissions would be defined for each measure individually; and
- .3 possible long-term measures could be measures finalized and agreed by the Committee beyond 2030. Dates of entry into force and when the measure can effectively start to reduce GHG emissions would be defined for each measure individually.





UN agency launches new global project to tackle maritime GHG emissions

Briefing: 08 13/05/2019

A major international project to support the International Maritime Organization (IMO)'s [initial strategy](#) for reducing greenhouse gas emissions from shipping has been launched.

Entitled GreenVoyage-2050, the project will initiate and promote global efforts to demonstrate and test technical solutions for reducing such emissions, as well as enhancing knowledge and information sharing to support the IMO GHG reduction strategy.

GreenVoyage-2050 is a collaboration between IMO and the Government of Norway and will run for an initial two-year period. More than 50 countries in 14 sub-regions across the globe are expected to participate, including developed countries and strategic partners from the private sector, who will contribute expertise and experience.

The project will also build capacity in developing countries, including small island developing states (SIDS) and least developed countries (LDCs), to fulfil their commitments to meet climate-change and energy-efficiency goals for international shipping.

Initially, eight countries, from five high-priority regions (Asia, Africa, Caribbean, Latin America and Pacific), are expected to take pilot roles, to pursue and undertake actions at the national level. These pilot countries will



IMO Secretary-General Kitack Lim (left) and Mr Sveinung Oftedal, Specialist Director of the Norwegian Ministry of Climate and Environment, signed the GreenVoyage-2050 project. The project