

MARITIME

Environmental regulations – what is on the agenda?

Shippingforum medlemsmøte

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9 February 2017



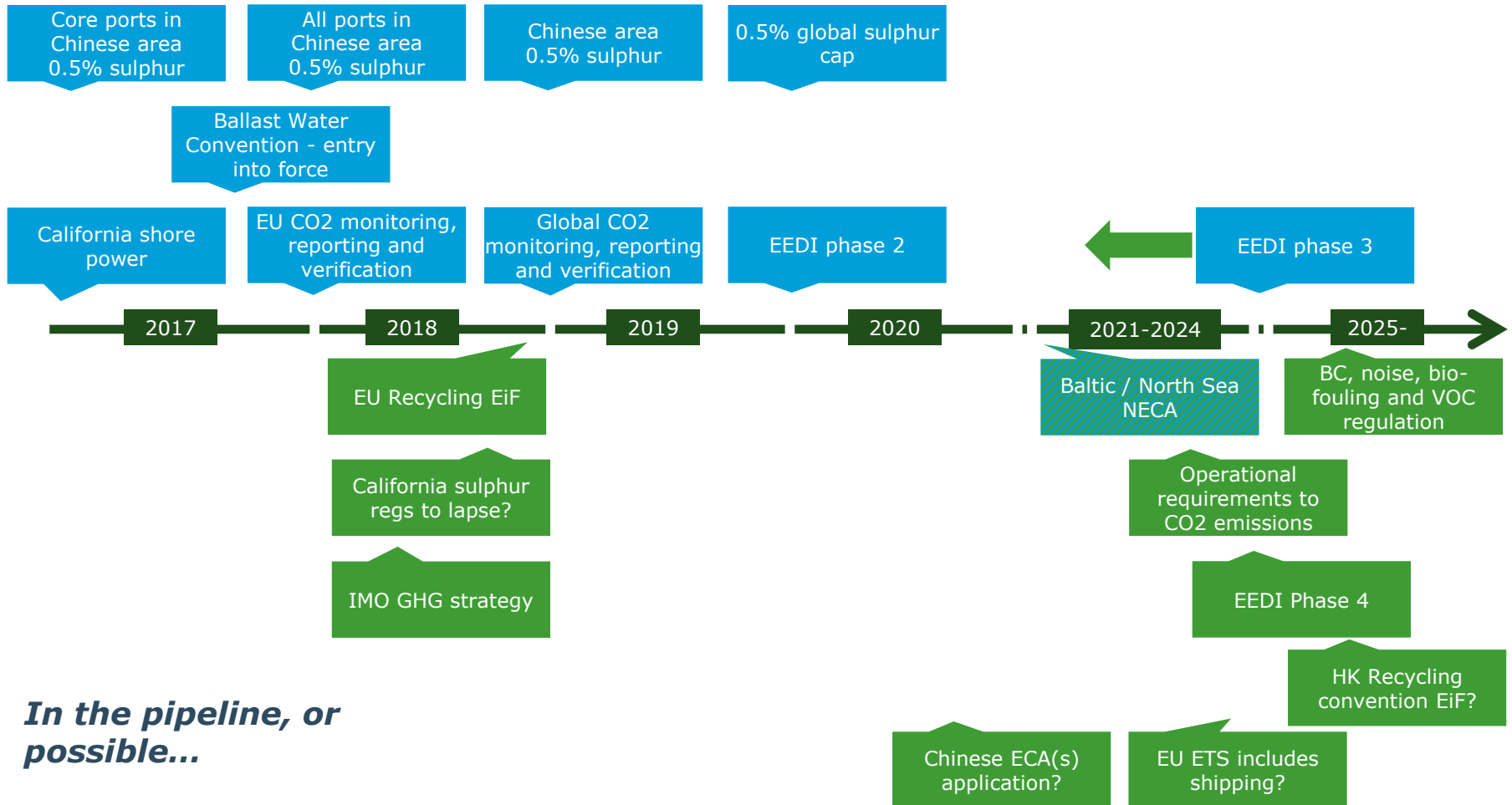
INTRO

REGULATORY UPDATE

SUMMARY

Timeline towards 2030

Adopted



In the pipeline, or possible...



INTRO

REGULATORY UPDATE

SUMMARY

SOx

MEPC 70 - Global sulphur limits from 2020

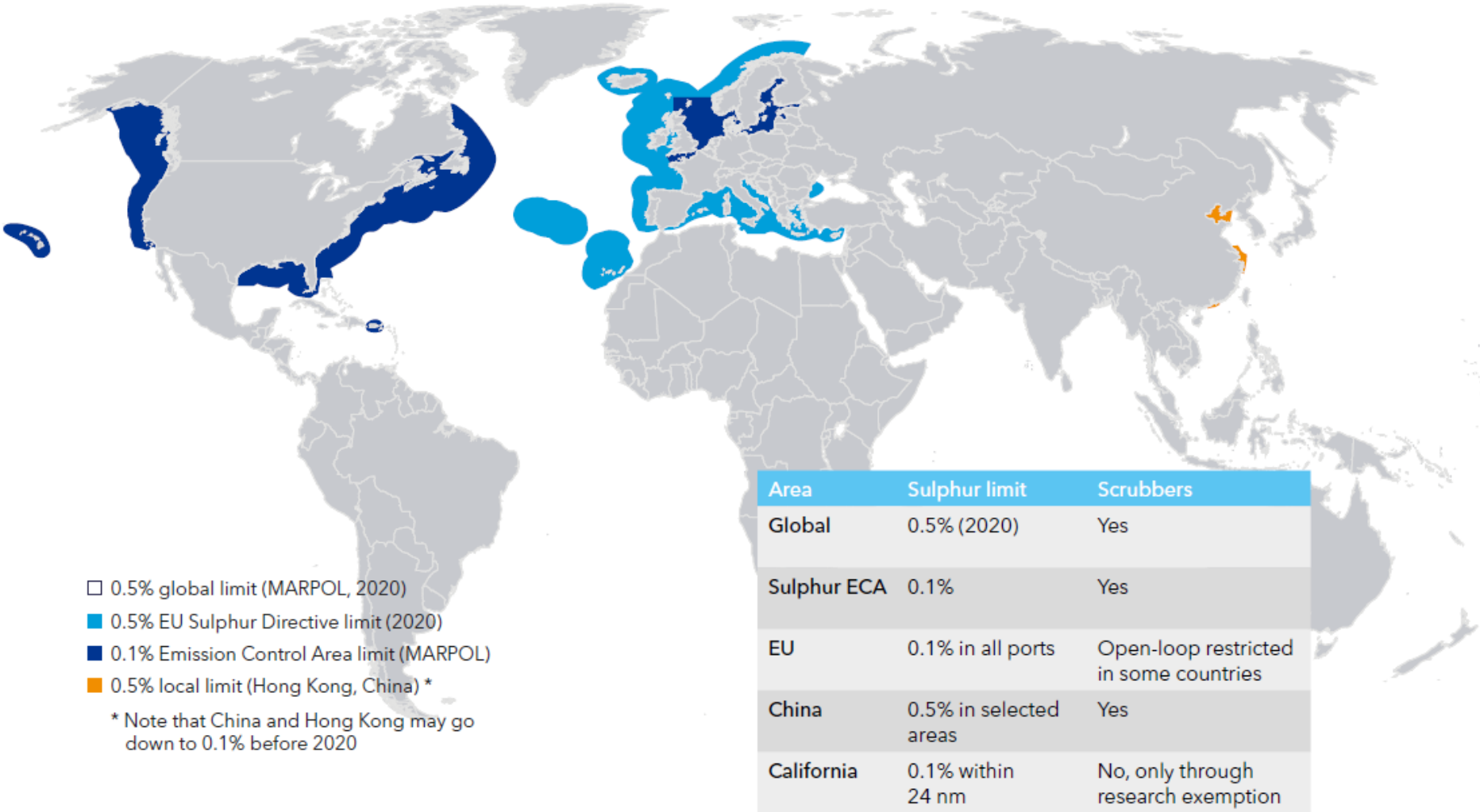
- The global 0.5% sulphur limit was confirmed to apply from 1 January 2020.
- PPR 4 in January 2017 will work on measures addressing implementation and enforcement



More information on the global sulphur cap 2020 can be found on a dedicated webpage, include a new brochure:

<https://www.dnvgl.com/maritime/download-global-sulphur-cap-2020.html>

Sulphur emission regulations



- 0.5% global limit (MARPOL, 2020)
- 0.5% EU Sulphur Directive limit (2020)
- 0.1% Emission Control Area limit (MARPOL)
- 0.5% local limit (Hong Kong, China) *

* Note that China and Hong Kong may go down to 0.1% before 2020

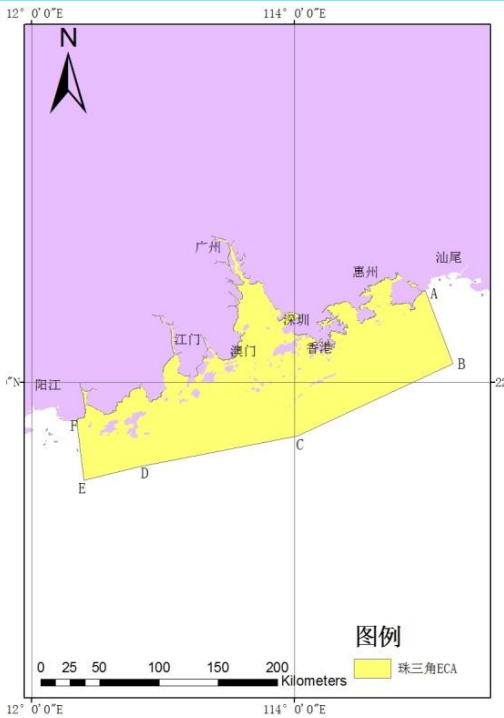
Area	Sulphur limit	Scrubbers
Global	0.5% (2020)	Yes
Sulphur ECA	0.1%	Yes
EU	0.1% in all ports	Open-loop restricted in some countries
China	0.5% in selected areas	Yes
California	0.1% within 24 nm	No, only through research exemption

EU Sulphur Directive issues

- Revised Directive sought alignment with MARPOL Annex VI, but;
 - 0.1% at berth and in inland waterways
- Future actions and consequences
 - Enforcement increasingly stringent
 - Acceptability of open loop scrubber discharge in doubt (e.g. Germany, Belgium), Water Framework Directive creating complications



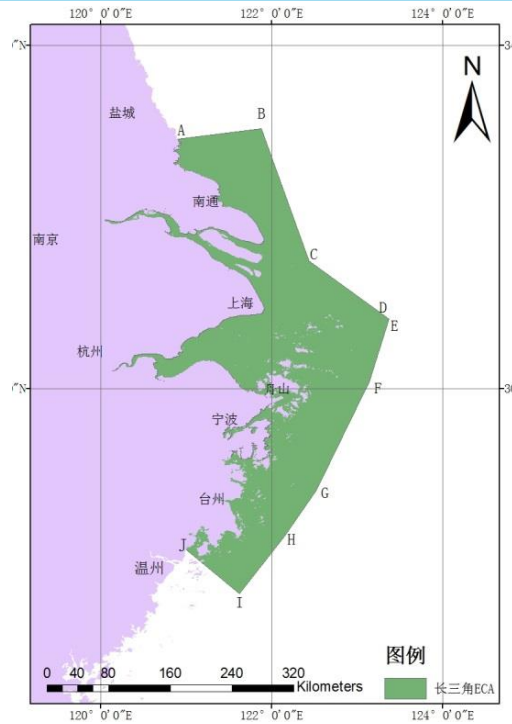
Sulphur limits in Chinese waters



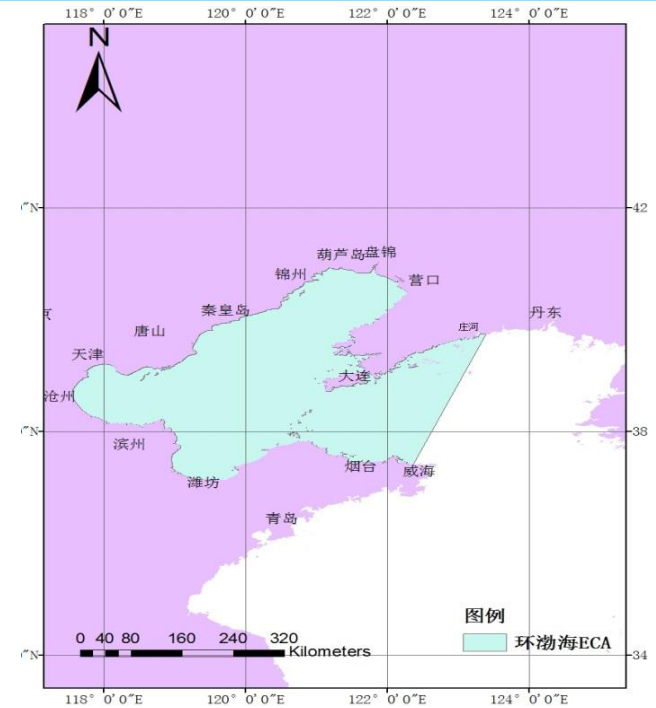
Hong Kong/Guangzhou

Impact:

April 2016: 4 ports voluntarily impose 0.5% sulphur limit;
 January 2017: Mandatory 0.5% S limit for core ports in areas
 January 2018: Mandatory 0.5% S limit for all ports in areas
 January 2019: 0.5% S limit in all sea areas, may decrease to 0.1% pending decision end 2019



Shanghai

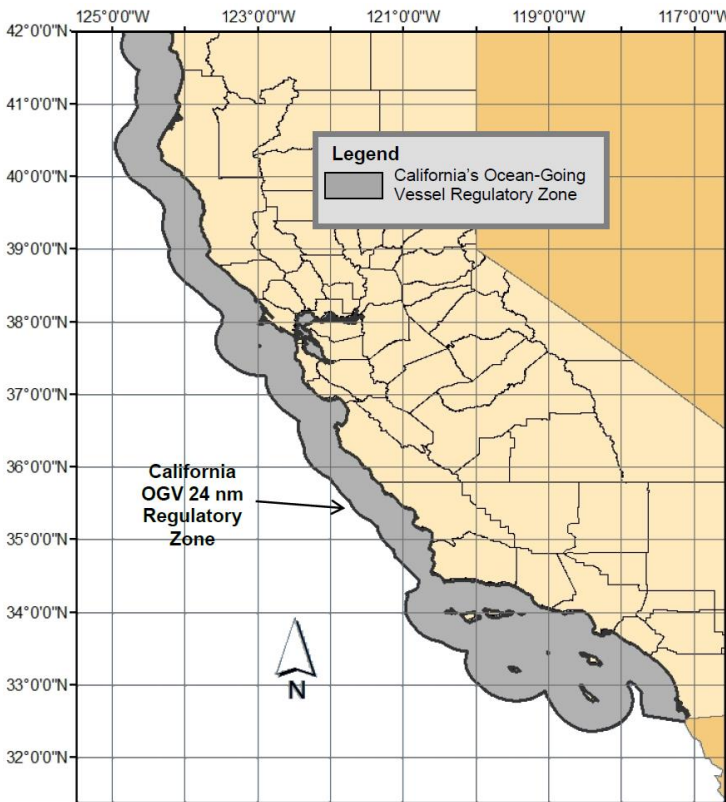


Tianjin/Dalian/Sea of Bohai

Outcome:

National Chinese regulations, applicable to all vessels in relevant areas.
 Effective 2016, increasingly stringent towards 2019

California sulphur regulations extended to 2018



Fuel Requirement	Effective Date	Percent Sulfur Content Limit
Phase I	July 1, 2009 ¹	Marine gas oil (DMA) at or below 1.5% sulfur; or Marine diesel oil (DMB) at or below 0.5% sulfur
	August 1, 2012 ²	Marine gas oil (DMA) at or below 1.0% sulfur; or Marine diesel oil (DMB) at or below 0.5% sulfur
Phase II	January 1, 2014 ³	Marine gas oil (DMA) or marine diesel oil (DMB) at or below 0.1% sulfur

1 No change from the existing requirements.

2 Marine gas oil sulfur limit reduced from 1.5% to 1%. No change in marine diesel oil limit.

3 Implementation delayed from 2012 to 2014.

■ CARB regulation extended to 2018

- Review indicatively by April 2018, regulation may then possibly be withdrawn
- Scrubbers and non-distillate 0.1% compliant fuel in principle not allowed as substitute
 - But temporary "Research Exemption" may be granted upon application prior to entering CA waters
- Until CARB regulation is withdrawn, **both MARPOL Annex VI and CARB requirements have to be complied with**

<http://www.arb.ca.gov/ports/marinevess/ogv.htm>

California shore power requirements

- In force January 1 2017
 - intended to reduce emissions of diesel particulate matter (PM) and oxides of nitrogen (NOx) from auxiliary engines on ocean-going vessels while at-berth at California ports
- Requires fleets of container vessels, passenger vessels, or refrigerated cargo vessels to satisfy the following two criteria
 - Visits: At least 70% of a fleet’s visits to a port must satisfy the following: for each visit, the auxiliary engines on the vessel cannot operate for more than three hours during the entire time the vessel is at-berth, and
 - Power Reductions: The fleet’s total onboard auxiliary engine power generation must be reduced by at least 70% from the fleet’s baseline power generation
- Alternatives to shore power accepted if NOx and PM are reduced by 70% or more through use of an ARB-approved technology

FINAL REGULATION ORDER

**AIRBORNE TOXIC CONTROL MEASURE FOR
AUXILIARY DIESEL ENGINES OPERATED ON
OCEAN-GOING VESSELS AT- BERTH IN A CALIFORNIA PORT**

Adopt new section 93118.3, title 17, chapter 1, subchapter 7.5, California Code of Regulations (CCR), to read as follows:

(Note: The entire text of section 93118.3 is new language.)

Section 93118.3. Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At-Berth in a California Port.

(a) *Purpose.*

The purpose of this section is to reduce oxides of nitrogen (NOx) and diesel particulate matter (PM) emissions from the operation of auxiliary engines on container vessels, passenger vessels, and refrigerated cargo vessels while these vessels are docked at berth at a California port. This section reduces emissions by limiting the time during which auxiliary diesel engines are operated on the regulated vessels while such vessels are docked at-berth in a California port, as well as by applying other requirements. This section implements provisions of the Goods Movement Emission Reduction Plan, adopted by the Air Resources Board (ARB) in April 2006, to reduce emissions and health risk from ports and the movement of goods in California. This section also helps achieve the goals specified in the California Global Warming Solutions Act of 2006, established under California law by Assembly Bill 32 (Stats. 2006, ch. 456) and set forth in Health and Safety Code § 38500 et seq.

(b) *Applicability and General Exemptions.*

- (1) Except as provided in this subsection (b), this section applies to any person who owns, operates, charters, rents, or leases any U.S. or foreign-flagged container vessel, passenger vessel, or refrigerated cargo vessel that visits a California port. In addition, this section also applies to any person who owns or operates a port or terminal located at a port where container, passenger, or refrigerated cargo vessels visit.
- (2) Nothing in this section shall be construed to amend, repeal, modify, or change in any way any applicable U.S. Coast Guard requirements. Any person subject to this section shall be responsible for ensuring compliance with both U.S. Coast Guard regulations and the requirements of this section, including but not limited to, obtaining any necessary approvals, exemptions, or orders from the U.S. Coast Guard.









Impact:

Installation of on-board shore power equipment or alternative abatement solutions is necessary from **1 January 2017**. Stringency increasing to 80% in 2020

Outcome:

Unclear implementation, but vessel investments likely required

Options in a post 0.5% World

HFO WITH SCRUBBER		DISTILLATE FUEL	
 <ul style="list-style-type: none"> Can use conventional HFO Possible for retrofit Reduces particulate matter as well as SO_x 	 <ul style="list-style-type: none"> Initial investment (US\$ 2-10 m) 3-5% fuel penalty Requires space for scrubber tower and supporting systems Requires chemicals (closed loop) Requires integration with ship's power management system Requires monitoring 	 <ul style="list-style-type: none"> Useable for most engine configurations 	 <ul style="list-style-type: none"> Higher fuel cost May create operational issues due to low viscosity of the fuel
NEW COMPLIANT FUELS		LNG AS FUEL	
 <ul style="list-style-type: none"> Useable for most engine configurations 	 <ul style="list-style-type: none"> Unknown fuel cost Not on the market (no track record) Uncertain availability May create operational issues due to off-spec fuel or incompatibility (ref. ECA hybrid fuels) 	 <ul style="list-style-type: none"> Has good environmental performance Can reach Tier III performance Positive impact on EEDI 	 <ul style="list-style-type: none"> High investment cost (US\$ 3-30 m) Costly to retrofit Large regional variations in LNG price Methane slip in exhaust Requires space for tank Some engines types need additional systems to reach Tier III

NOx

NOx emissions – NECA status post-MEPC70

NOx

2011: NOx Tier 2, -20%
2016: NOx Tier 3, -80%*

* Applies to ships constructed on or after Jan.1 2016., only in existing North American / U.S. Caribbean NECA

NECA - Baltic

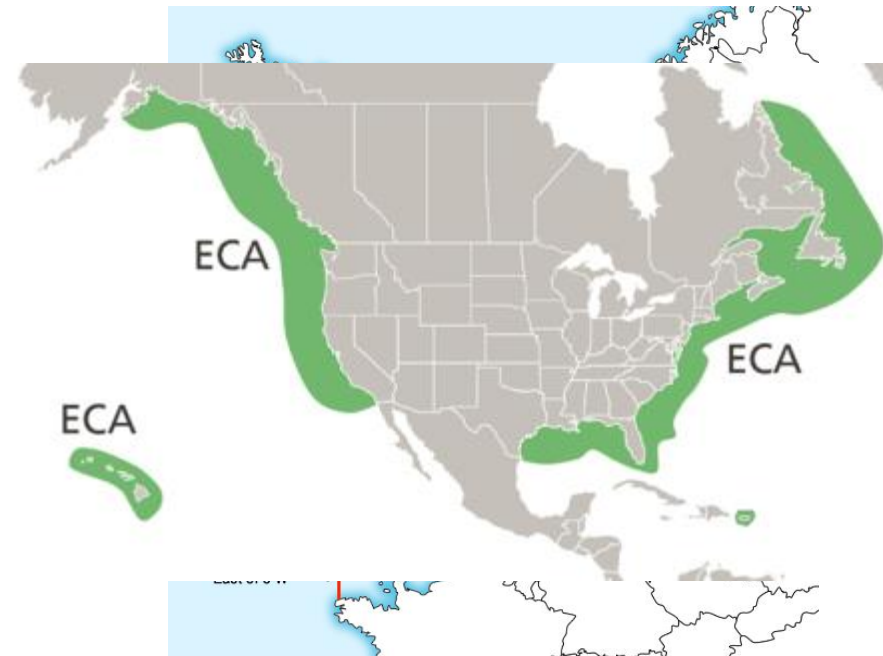
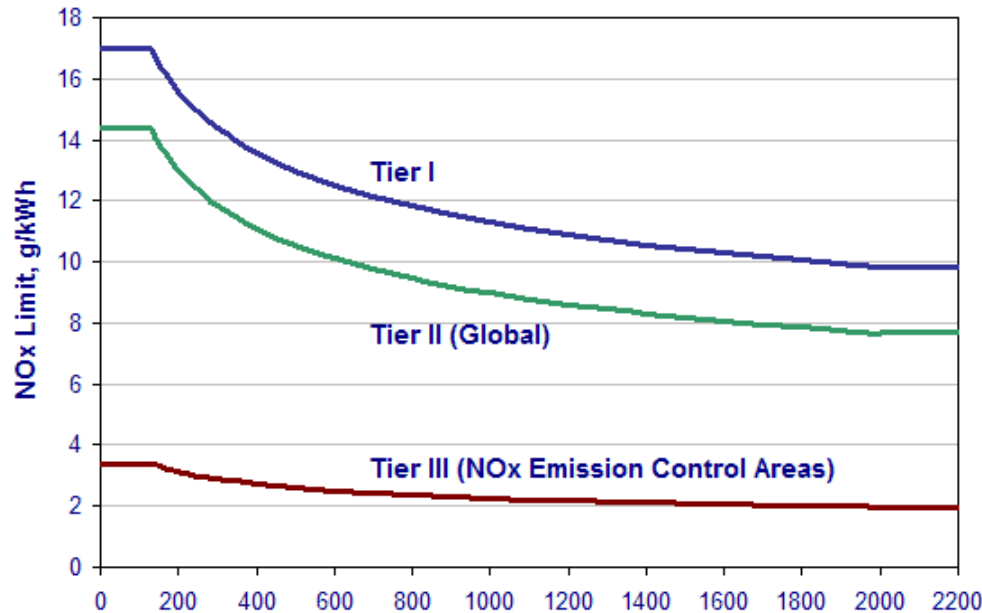
Agreed at MEPC 70

Adoption @ MEPC 71 expected, effective 1 Jan. 2021. Applies to ships constructed on or after Jan.1 2021.

NECA – North Sea

Agreed at MEPC 70

Adoption @ MEPC 71 expected, effective 1 Jan. 2021. Applies to ships constructed on or after Jan.1 2021.



Ballast water

Ratification by Finland September 8 2016

Global treaty to halt invasive aquatic species to enter into force in 2017

Accession by Finland has triggered the entry into force of a key international measure for environmental protection that aims to stop the spread of potentially invasive aquatic species in ships' ballast water.

The International Convention for the Control and Management of Ships' Ballast Water and Sediments ([BWM Convention](#)) will enter into force on 8 September 2017, marking a landmark step towards halting the spread of invasive aquatic species, which can cause havoc for local ecosystems, affect biodiversity and lead to substantial economic loss. Under the Convention's terms, ships will be required to manage their ballast water to remove, render harmless, or avoid the uptake or discharge of aquatic organisms and pathogens within ballast water and sediments

"This is a truly significant milestone for the health of our planet," said IMO Secretary-General Kitack Lim.

"The spread of invasive species has been recognized as one of the greatest threats to the ecological and



- Ratification by Finland brought the GT to 35.1441%, triggering entry into force on Sept 8 2017.
- The applicable date of compliance with D-2 standard will then be **first IOPP renewal survey after entry into force**, for all ships. Ships constructed after entry into force will be required to have a treatment system installed at delivery.

Ballast water decisions at MEPC 70

- There was no consensus at MEPC 70 on revising the implementation dates for the D-2 standard. **The current implementation dates still stand**
 - A proposal with new dates forwarded to MEPC 71 for possible adoption at MEPC 72 in 2018
 - The alternative proposal suggests to shift the D-2 requirement to the second renewal IOPP for those ships having their first renewal until 8 September 2019
 - Further proposals expected at MEPC 71

DNV GL recommends not to take alternative proposals into account yet. For the time being the implementation dates stay as they are

- Revised ballast water system type approval guideline (G8) was approved

Systems being installed on ships on or after **28 October 2020*** should be approved according to these revised guidelines

*) Contractual date of delivery of the BWMS to the ship

In the US...

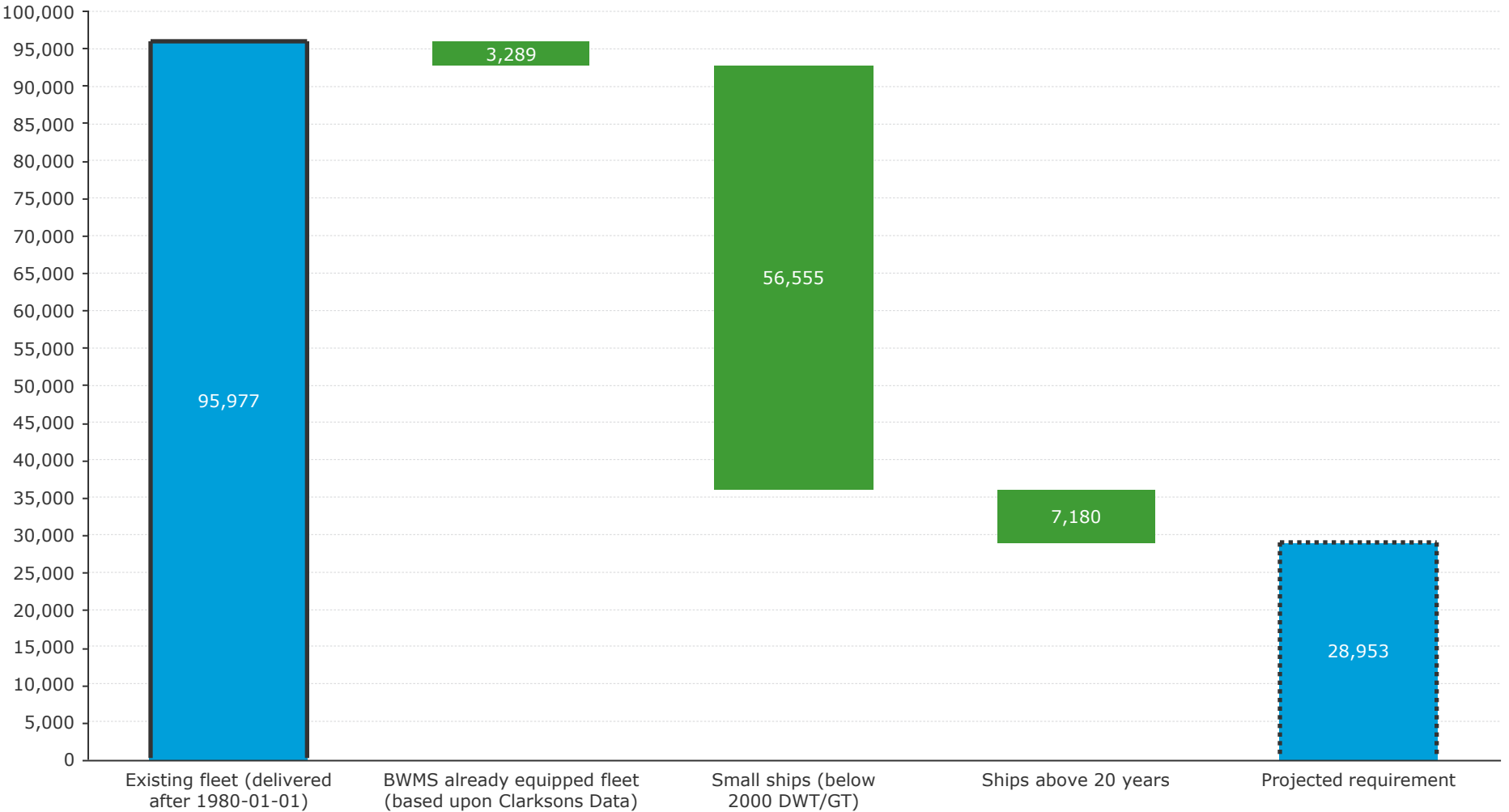
- USCG type approved BW systems required
- USCG applies same standard as IMO BWMC, but stricter system test requirements
- Three type approved systems on the market. Time limited equivalency mechanisms available; AMS (little used) and extensions (10 000+ granted, but criteria tightening)
- USCG has rejected use of MPN when approving UV based systems
- EPA VGP; overlaps with USCG but has additional technical requirements
- Court decision that EPA did not act formally correct when adopting USCG BWT discharge standard. New VGP in 2018 will take this decision into account
- Congress bill (VIDA) aimed at aligning and simplifying the overlapping frameworks failed again, 8th year running. Likely to be reintroduced in 2017...

	Ballast water capacity	Construction date	Compliance date
New ships	All	On or after 2013-12-01	On delivery
Existing ships	Less than 1500 m ³	Before 2013-12-01	First scheduled drydocking after 2016-01-01
	1500 m ³ to 5000 m ³	Before 2013-12-01	First scheduled drydocking after 2014-01-01
	Greater than 5000 m ³	Before 2013-12-01	First scheduled drydocking after 2016-01-01

Vessel's management may apply for extension of implementation schedule, ref CG-OES Policy Letter No. 13-01 found at [Homeport USCG](#)

Potential projected requirement of installing BWMS

Number of vessels

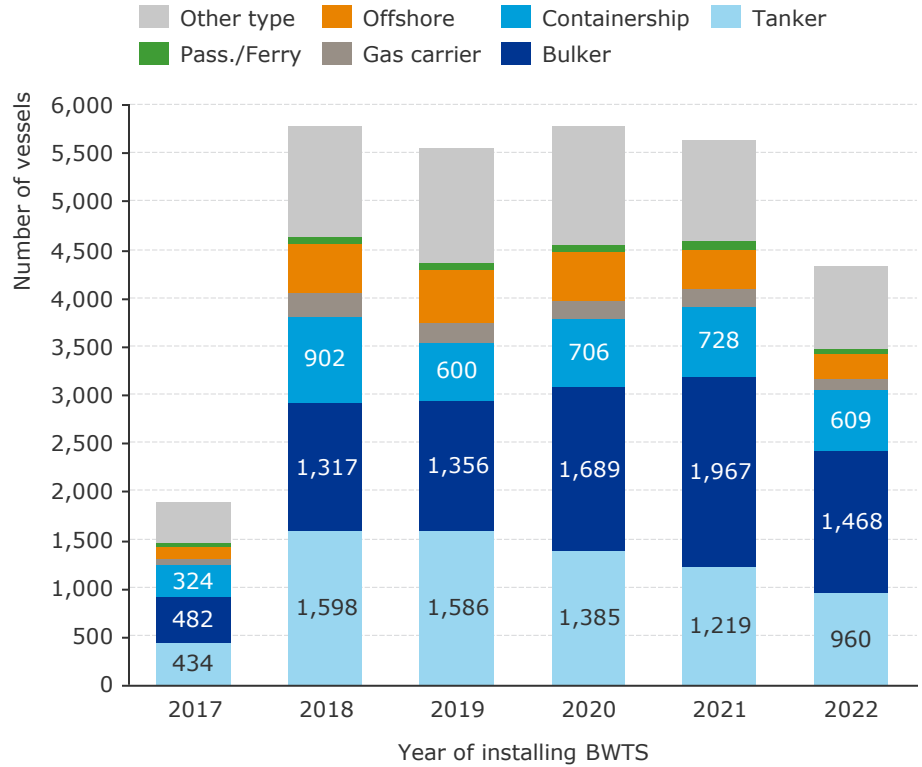


Source: Clarksons Research & IHS Fairplay

Projected compliance schedule: Scenario

- **Uncertainty:** Possibility of de-coupling IOPP certificate with renewal survey? Re-flagging? USCG approved systems?
- **Cost?** (example for 3 million USD)
 - 820 USD/day (10 years of service left)
 - 1640 USD/day (5 years of service left)
- **Finance?**
 - Own pocket deep enough?
 - Bank?
- **CAPEX impact of the BWM convention and other forthcoming regulation (global sulphur cap) could increase scrapping numbers**
 - *Is it worth installing compliant technology on older tonnage...*

Scenario: Need for BWT retrofit



Year of renewal survey	Bulker		No		DWT		Total
	3rd renewal	4th renewal	3rd renewal	4th renewal	3rd renewal	4th renewal	
2017	45	63	108	2 344 031	3 378 817	5 722 848	
2018	159	143	302	11 504 801	7 147 902	18 652 703	
2019	250	157	407	18 834 308	10 441 172	29 275 480	
2020	303	165	468	22 865 495	11 358 845	34 224 340	
2021	306	296	602	24 828 623	19 035 808	43 864 431	
2022	321	221	542	24 397 343	13 756 923	38 154 266	

Source: Clarksons Research & IHS Fairplay

CO₂

MEPC 70 - IMO fuel consumption data collection system

- MEPC 70 adoption of data collection system for fuel consumption
 - Covers all ships above 5000 GT
 - Fuel consumption and distance sailed to be **monitored and aggregated by ship**, then verified, and reported annually to IMO database
 - Design deadweight as general cargo proxy in efficiency calculations, GT in special cases (passenger ships)
 - **Flag responsible** for verification and reporting to IMO, **RO role expected**
 - **Carriage requirement**; Statement of Compliance confirming that data for the preceding year was reported and verified
- Data collection and reporting methodology shall be described in a new part 2 of the SEEMP **assessed** by the Administration
- SEEMP part 2 agreed at MEPC 70, verification guideline for approval at MEPC 71



Impact:

Entry into force date **1 January 2019**

Covers all ships above 5000 GT with **2019** as first year of reporting. SEEMP verification then starts spring 2018

Outcome:

Amendments to MARPOL adopted at MEPC 70 in 2016
Guidelines still under development

Fuel consumption data collection adopted at MEPC 70

- All vessels above 5000 GT need to report fuel consumption with data collection starting **1 January 2019**.
- A plan for the data collection (SEEMP Part 2) to be included in the SEEMP latest **31 December 2018**
- An annual fuel consumption report (covering 1 January to 31 December), should be submitted and verified within **1 June in the subsequent year**.
- A confirmation of compliance will be provided after the SEEMP is updated and a Statement of Compliance will be issued after the annual report is verified and submitted to the Administration
- Guidelines under development

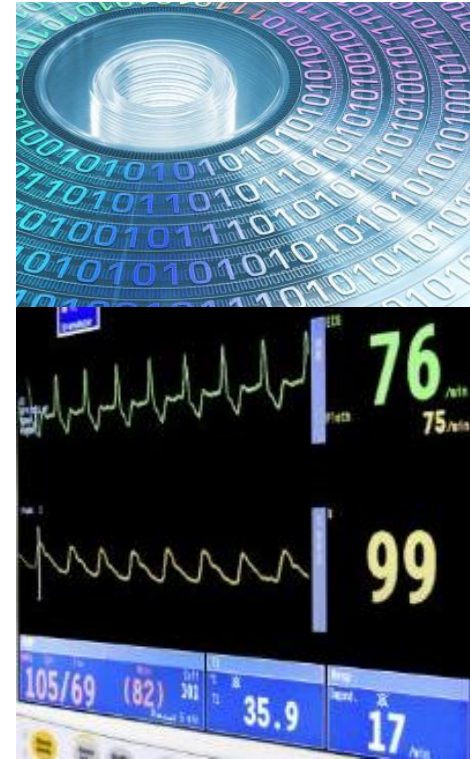
To be reported:

- IMO number
- Ship type
- GT, NT, DWT,
- Power output engines (engines over 130 kW)
- EEDI (if applicable)
- Ice class
- Fuel oil consumption, by fuel oil type
- Distance travelled
- Hours underway
- Methods used for collecting fuel oil consumption data

EU MRV - The essentials

- Ships above 5000 GT (all flags) have to annually report CO2 emission on voyages to, from and between EU ports
- 4 ways of measuring fuel consumption
- Extensive reporting, including distance sailed, time at sea, transport work and efficiency data (e.g. CO2 per tonne-nm)
- All ships to submit reporting plans by August 31 2017, monitoring starts January 1 2018
- Verified emission reports to be submitted to EC by April 30 2019, EC to make aggregated data public by June 30 2019
- All legal text published
- Complex and rigorous mechanism; additional guidelines needed, to be published by summer 2017

- Seen by the EU as a step towards a global MRV system



CO2 – regulations and policy developments

- EU system becoming effective in 2018 (“EU MRV”)
- IMO system becoming effective in 2019 (“Fuel consumption database”)
- Ships must collect voyage data under both systems, allowing for monitoring, reporting and verification of CO2 emissions and vessel efficiency data
- Similarities, but also significant differences between systems, with technical, commercial and enforcement implications. EU MRV close to finalisation, IMO system in progress
- **Key question for industry – will systems be harmonised?**
 - Politically difficult both inside EU and in the IMO
 - Several years of overlapping systems expected
- IT systems for monitoring and reporting becoming a practical necessity
- Sharply increased focus on both energy efficiency and absolute CO2 emissions – will increasingly drive designs





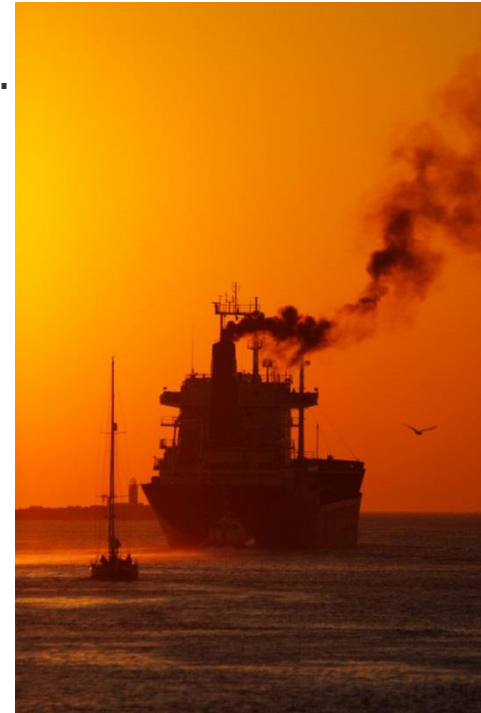
INTRO

REGULATORY UPDATE

SUMMARY

Wrapping up

1. CO₂ MRV for the EU in 2018. IMO fuel consumption reporting in 2019. Dual reporting systems for some years.
2. IMO GHG strategy by 2018, CO₂ MBM likely in the mid-2020's.
3. EEDI review likely to lead to more stringent requirements and/or tighter timeline
4. Global sulphur 0.5% in 2020
5. NECA Tier III requirements in North Sea and Baltic from '21
6. Additional Chinese ECAs possible
7. Ballast water management convention enters into force Sept 8 2017. Effective implementation dates to be discussed again at MEPC 71, highly uncertain outcome
8. US ballast water situation remains complex – but expect extension policy to become stricter



Thank you!

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