

MARITIME

Green Shipping from a class perspective

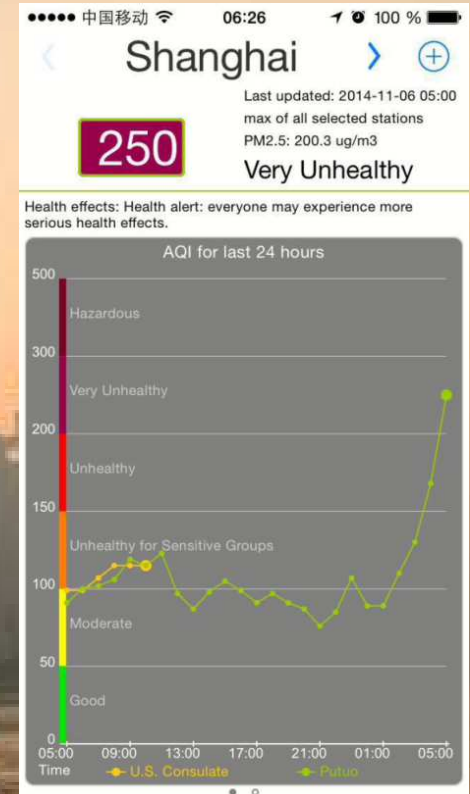
CIMAC Circle Nor-Shipping 2017

Stine Mundal

31 May 2017

Agenda and Motivation: Safe and sustainable future

- Increasing Energy Efficiency ↔ Reduction of CO₂ Emissions
- Reduction of NO_x and SO_x Emissions



Green Ship Designs – Decisions, decisions...



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**Different choices
Different challenges**

Resistance reduction


Efficient Systems

Efficient Propulsion

Efficient Operation

A1 ↶

Design for 10% lower speed




- Reduces total resistance
- Improves propulsion efficiency

Cost (5 years) € € € €

Gains

B2 ↶

Tip modified propeller




- Larger propeller area allows better pressure distribution

Cost (5 years) €

Gains

C3 ↶

Wind assistance




- Harnesses wind power to generate additional thrust

Cost (5 years) € € €

Gains

D4 OP

Optimum maintenance

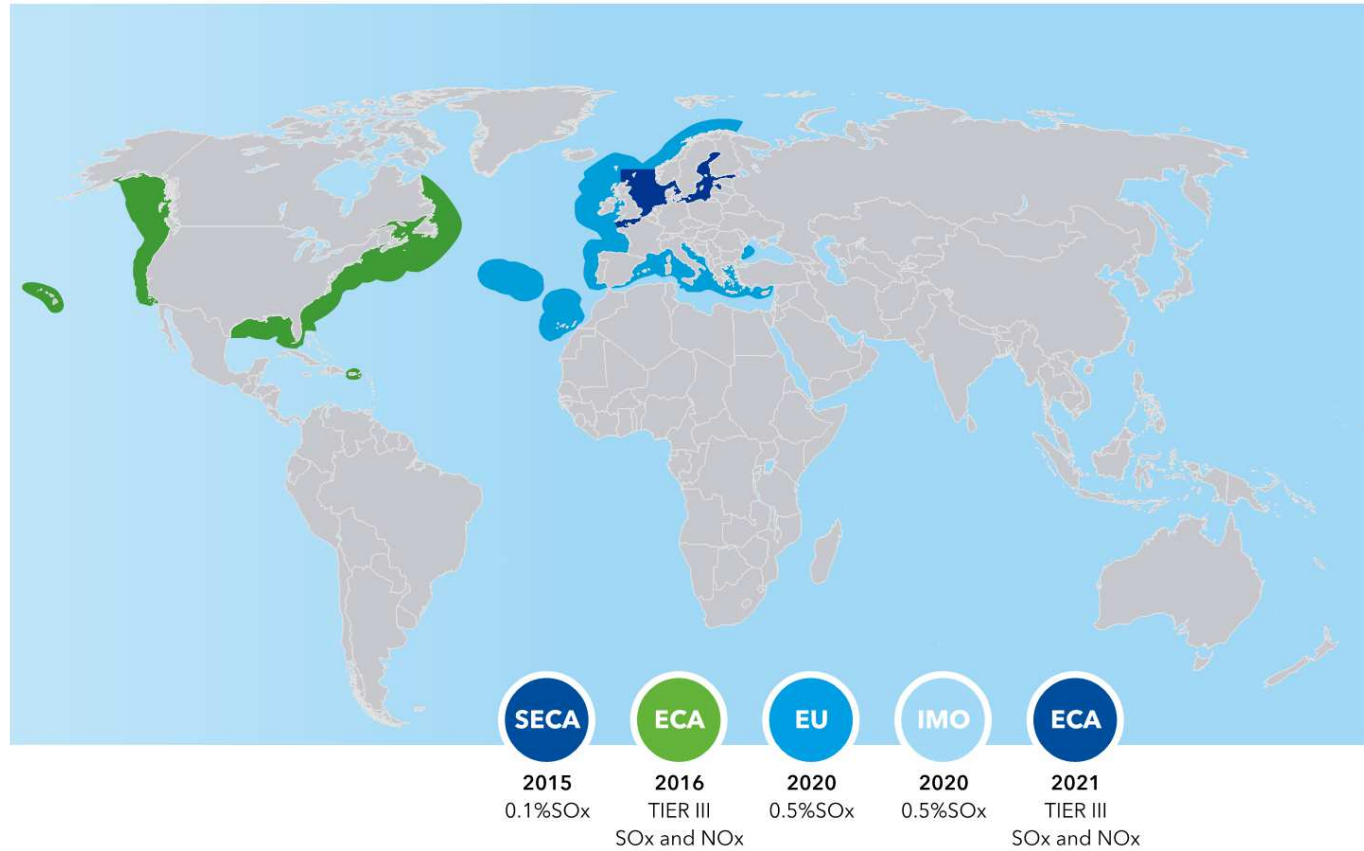


- Monitors engine performance
- Maintains high efficiency

Cost (5 years) € € €

Gains

Emission to Air

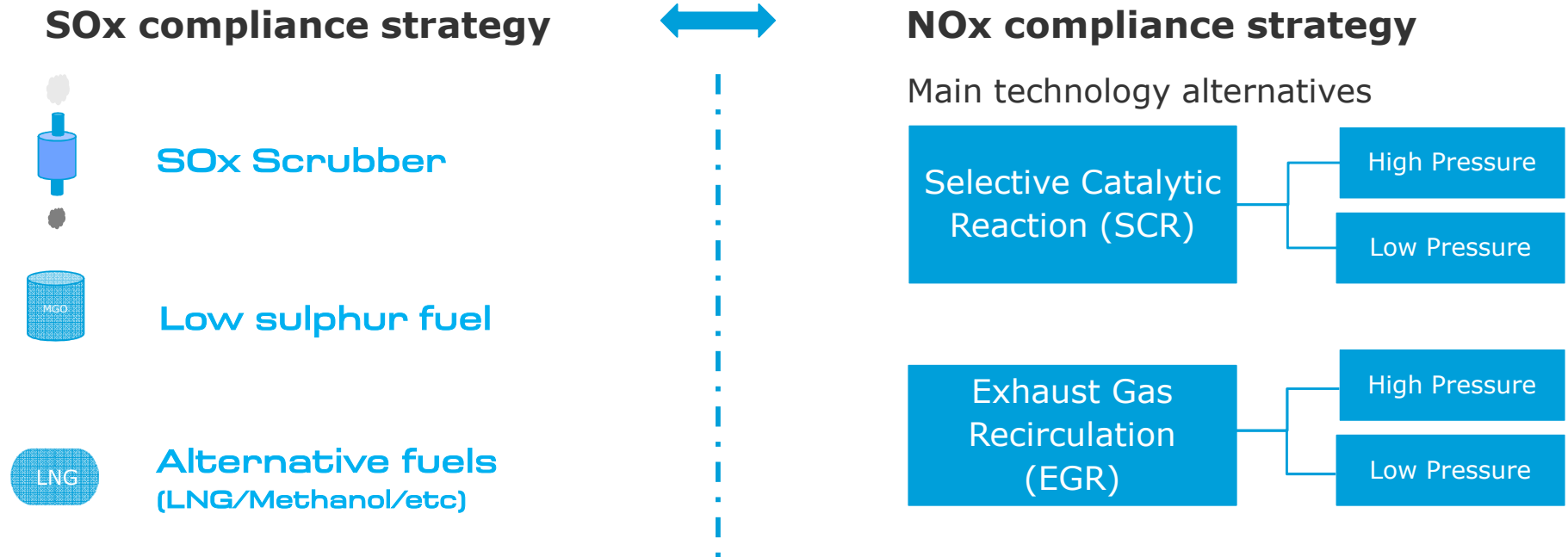


Regional „(D)ECA“ in China: Currently only SO_x



Choosing a compliance strategy

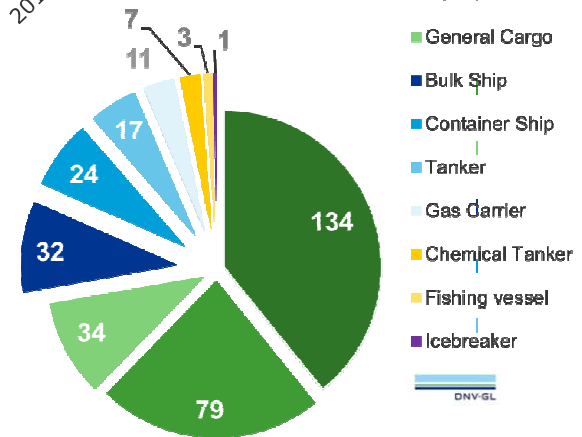
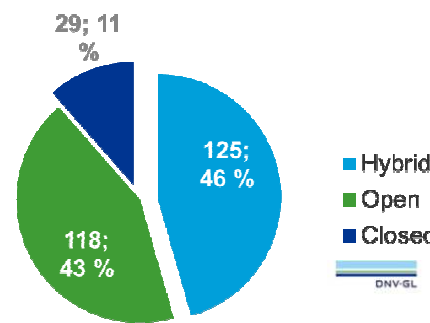
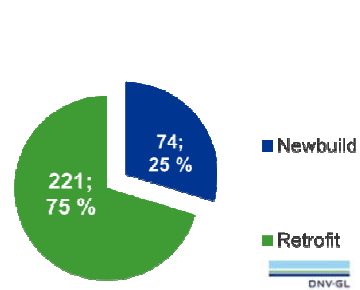
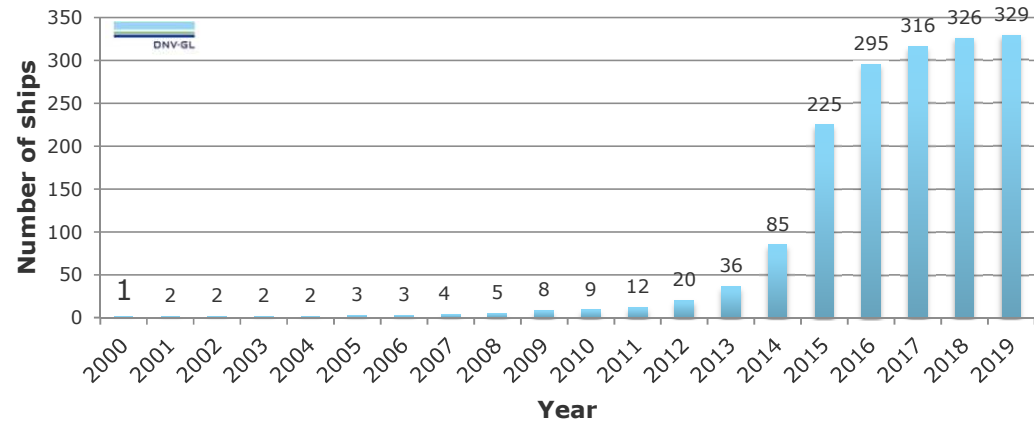
Present and possible future NOx-ECAs are also subject to the 0.1% Sulphur cap. Hence it is important to consider a total compliance strategy when choosing technology solutions.



SOx Scrubbers



Number of ships with installed scrubber - cumulative



Low Sulphur Fuels

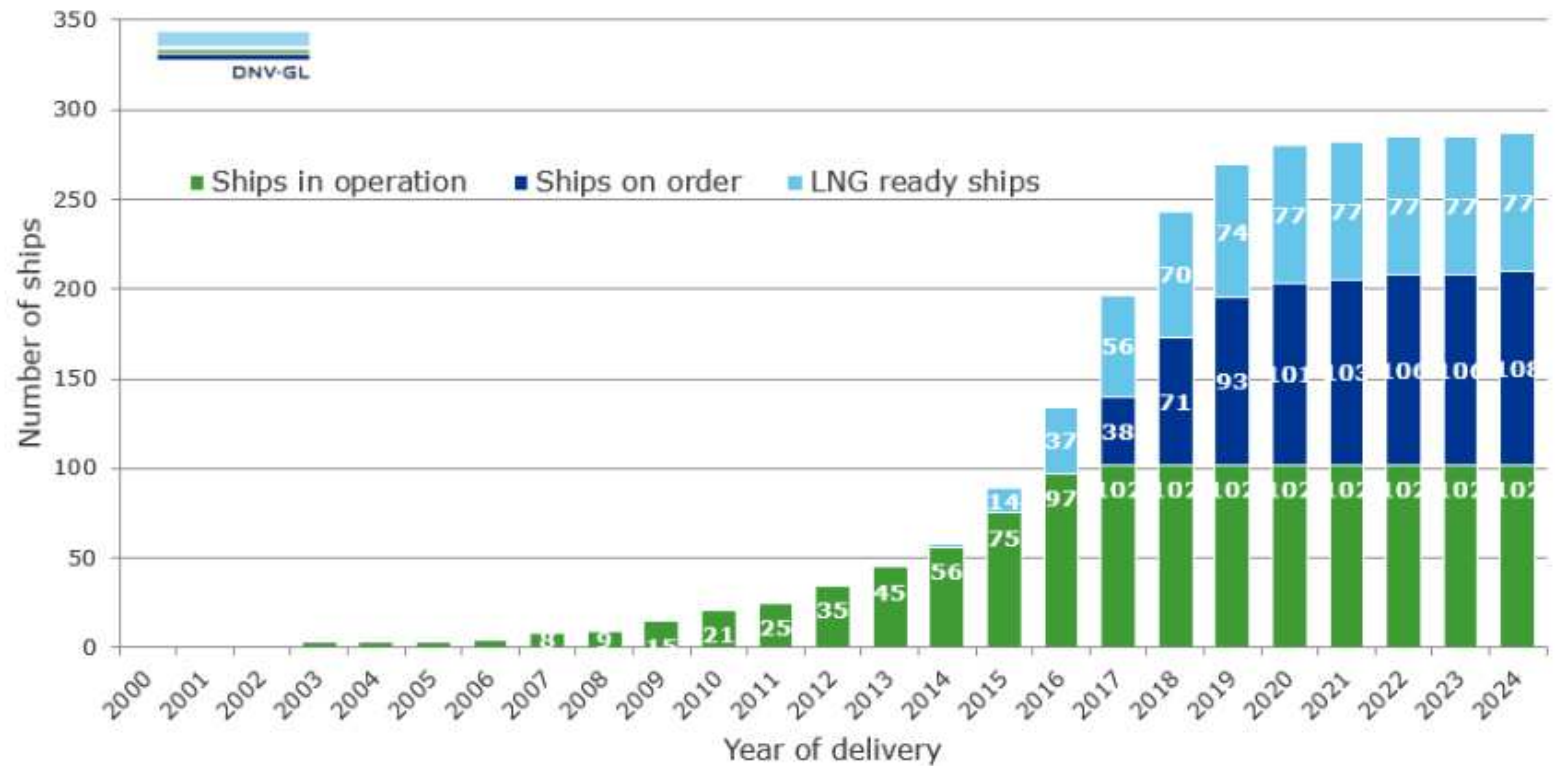
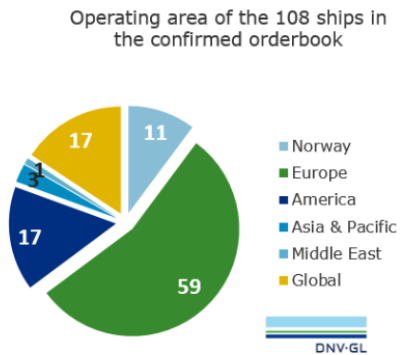
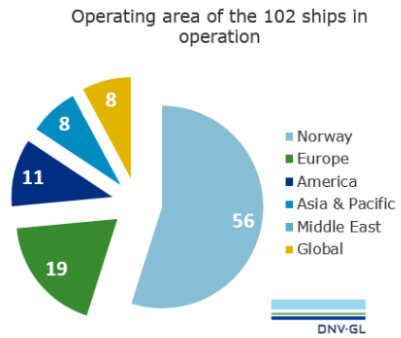


- **Need for Low Sulphur Fuels**
 - In the ECAs
(30-50 Mt/year today)
 - Globally after 2020
(≈ 300 Mt/year)

- **Consideration of alternative fuels**
 - availability
 - safety
 - cost



LNG as fuel: Ships



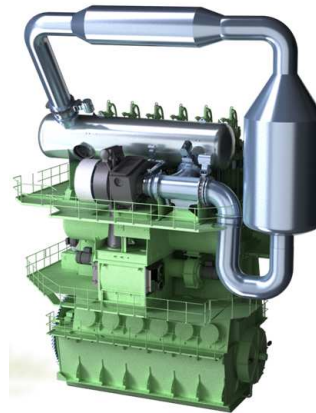


EGR

Relatively new technology for marine use

SCR

+300 installations (but mainly for 4-stroke)



SCR has been the preferred NOx reduction technology so far

however..

EGR orderbook is increasing

Expected outcome of MEPC 71 (July 3-7 2017)

Adoption of Baltic Sea and North Sea as NOx ECAs

Start of next EEDI review, and consideration of EEDI requirements for ro-ro cargo and ro-ro passenger vessels

Finalization of fuel consumption data collection verification guidelines

GHG draft strategy – intersessional meeting to be held the week before

Consideration of ballast water implementation dates – uncertain outcome

0.5% sulphur implementation and enforcement



Regulations on the horizon?

Increasing societal and regulatory pressure will force shipping to lower its environmental impact, resulting in a **more demanding operational framework** with higher expectations.

Emission Control Areas

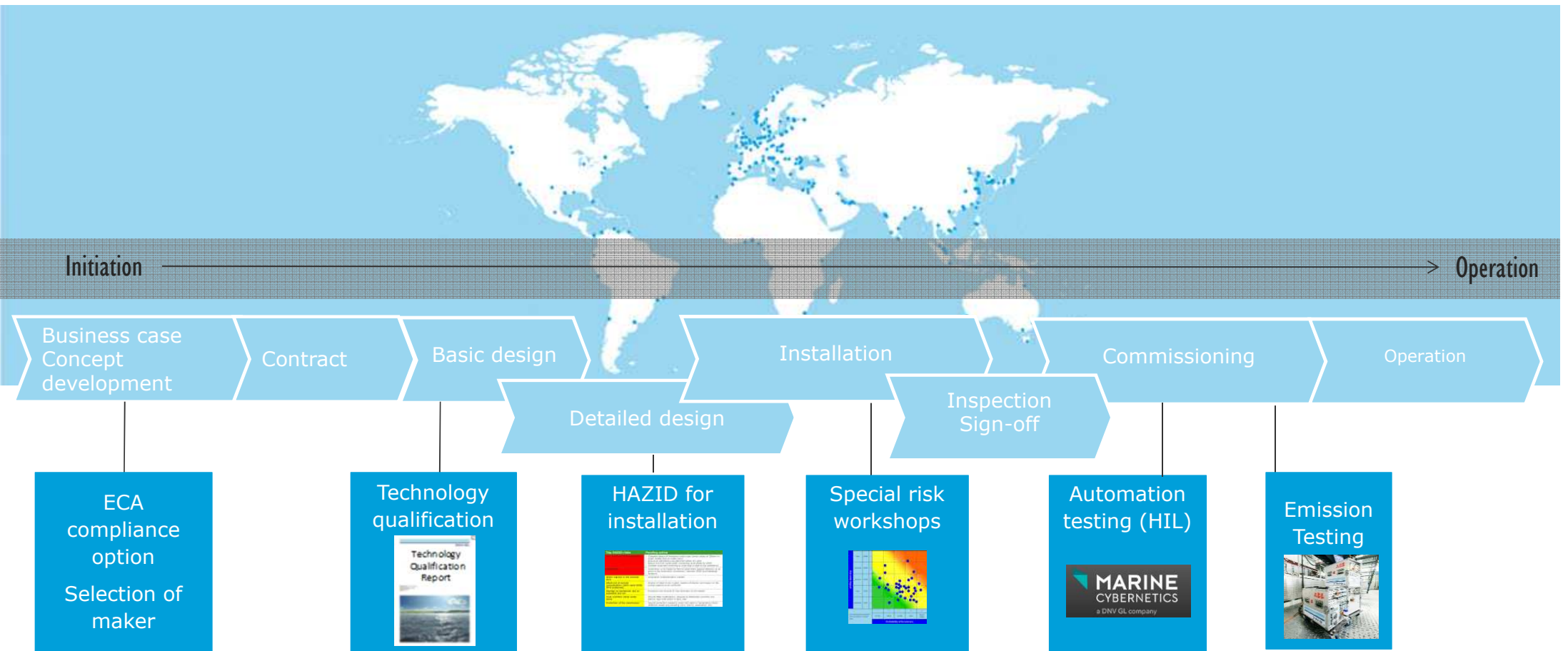
Hull Bio-fouling

Particulate matter (PM)
"Black Carbon"

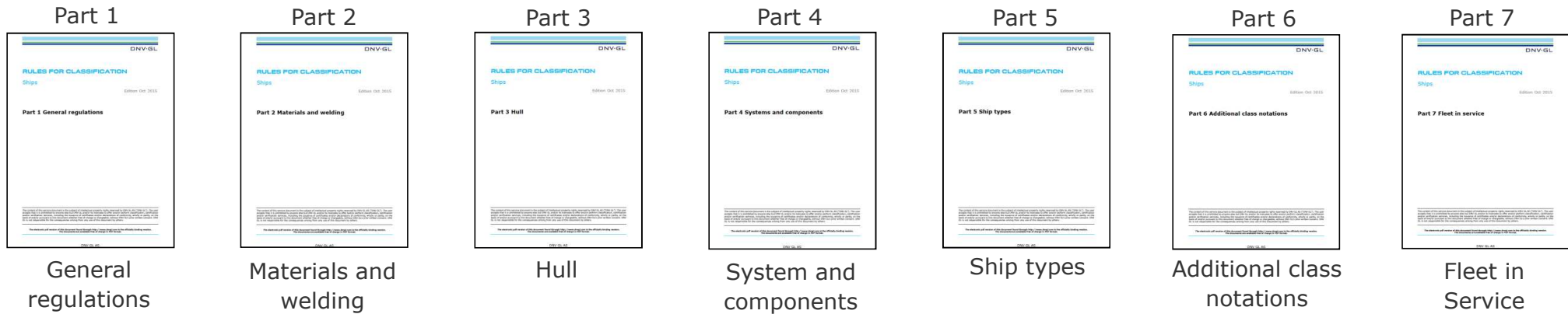
Underwater noise



How to get ready?



DNV GL Classification - Supporting Green Ship Designs




■ DNV GL Rules and Class Notations for

- CLEAN and CLEAN DESIGN Notation
- LNG READY Notation
- SCRUBBER READY Notation
- Exhaust Gas Aftertreatment NOx and SOx
- Recycling
- Shore Power
- Underwater Noise
- ...



Find more information in our DNV GL Brochures


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MARITIME
MANAGING SULPHUR LIMITS
Updated guideline to ensure compliance

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MARITIME
GLOBAL SULPHUR CAP 2020
Know the different choices and challenges for on-time compliance

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MARITIME
DNV GL NO_x TIER III UPDATE
Choices and challenges for on-time compliance

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MARITIME
EU MRV REGULATION
Get the details on Monitoring, Reporting and Verifying in line with the new EU MRV regulation - the smart way to comply

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MARITIME
EXHAUST GAS EMISSION MEASUREMENTS FROM DNV GL'S ENVILAB
Flexible on-site emission measurement support

SAFER, SMARTER, GREENER

DNV GL @ Nor-Shipping 2017



- **DNV GL stand**
Hall D: D02-12
- **DNV GL goes virtual**
Disruptive hall A1-39
- **DNV GL Forum @ Nor-Shipping**
Thon Hotel Arena, Room Rogaland
31 May and 1 June 2017
11:00 – 16:00

DNV GL offering the Broader View on Green Ships

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