

CIMAC Circle at SMM September 2016.

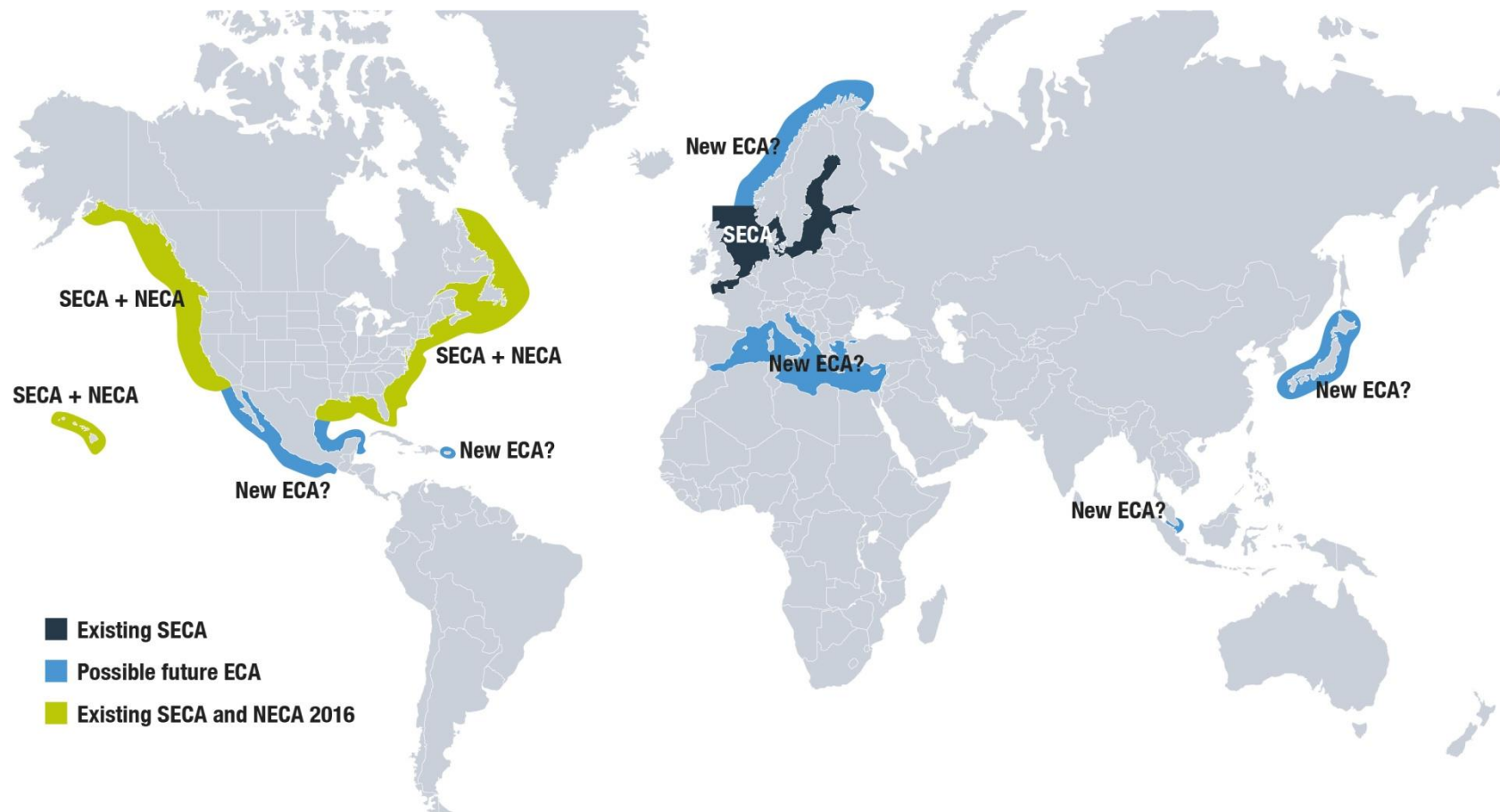


“IMO Tier III strategies under the light of changes in the oil market”



Presented by Kjeld Aabo
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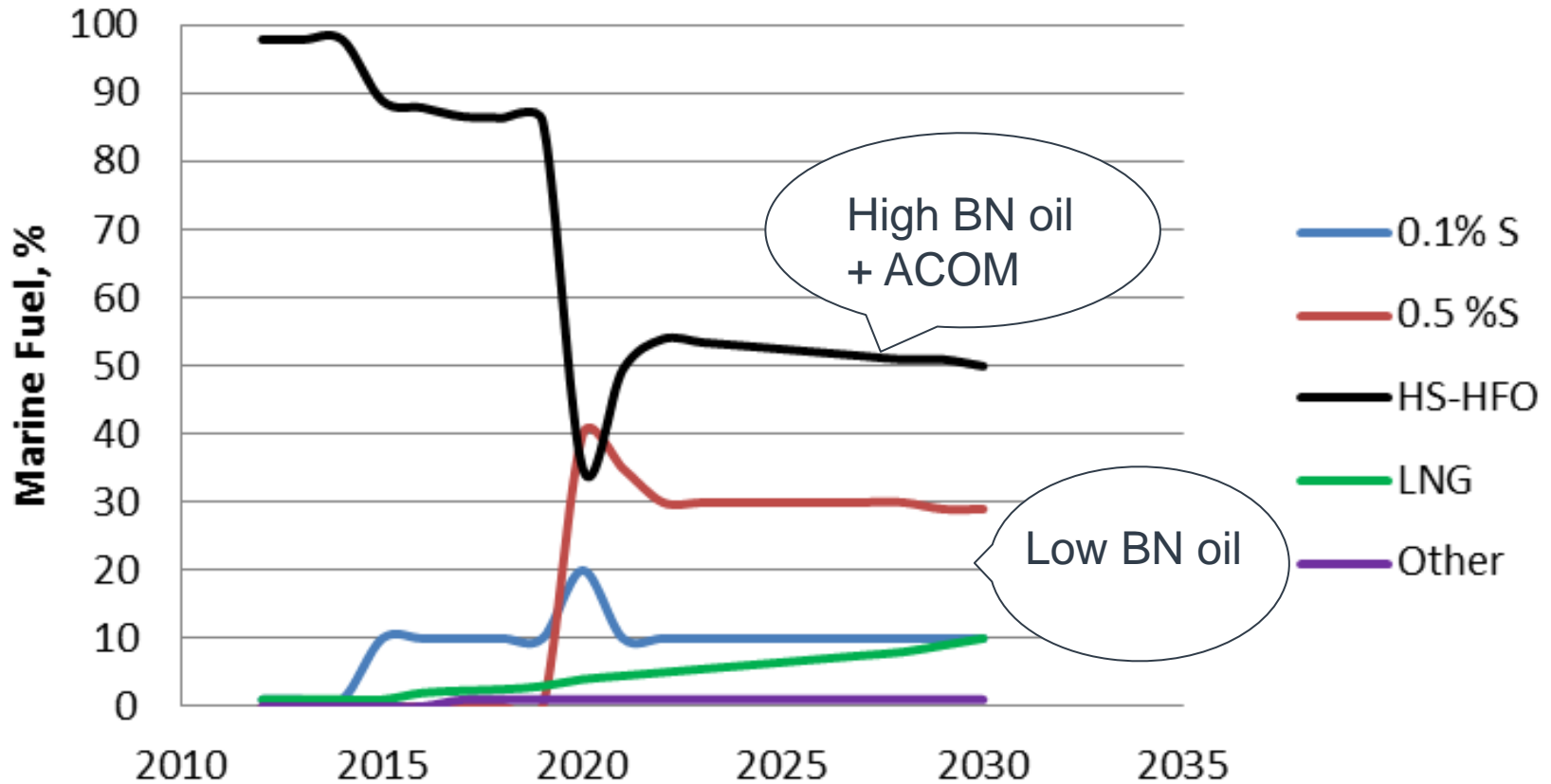
Existing and Future ECA Areas (DNV)



MDT Future Fuel Outlook, 2016



Marine fuel



0.5% Sulphur Limit in International Waters 2020 or 2025?



**Cimac
WG_7**
March 2016

Tell us *your* gut feeling!

“When will a max. 0.50% sulphur content in fuel be applied in international waters?”

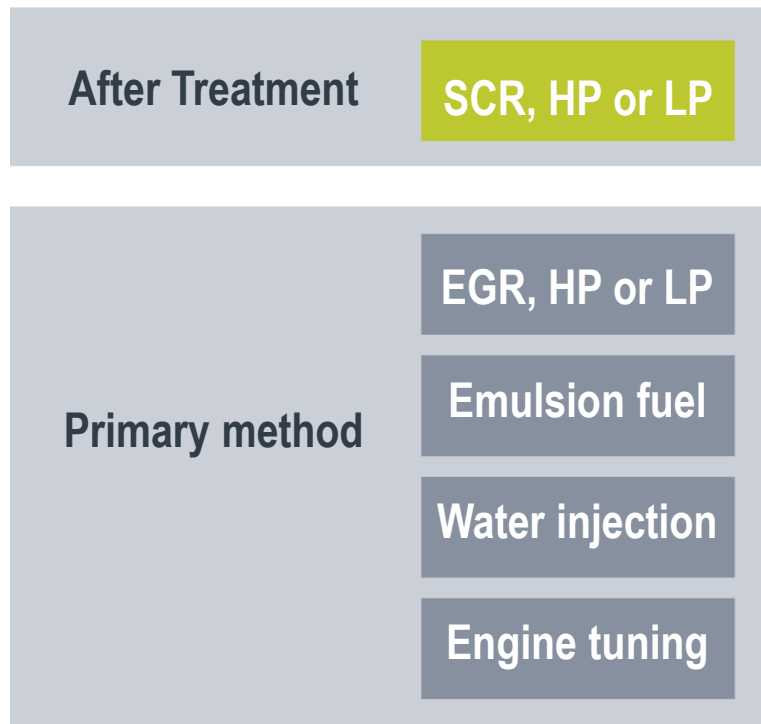
Place your pin



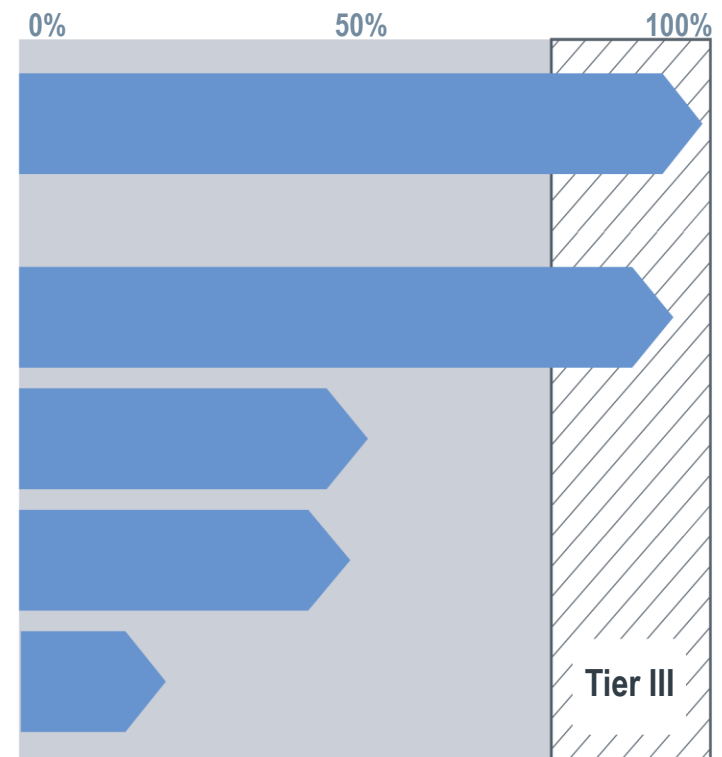
NO_x Reduction Technologies



Available Methods



Possible NO_x Reduction



SCR: Selective Catalytic Reduction System;

EGR: Exhaust Gas Recirculation System

Combination of Methods also being pursued

Tier III questions



How long time in NECA?

Space requirements in engine room?

Which fuels?

Which Tier III technology?

Logistical issues with bunkering and tank emptying of tanks?

SOx compliance strategy



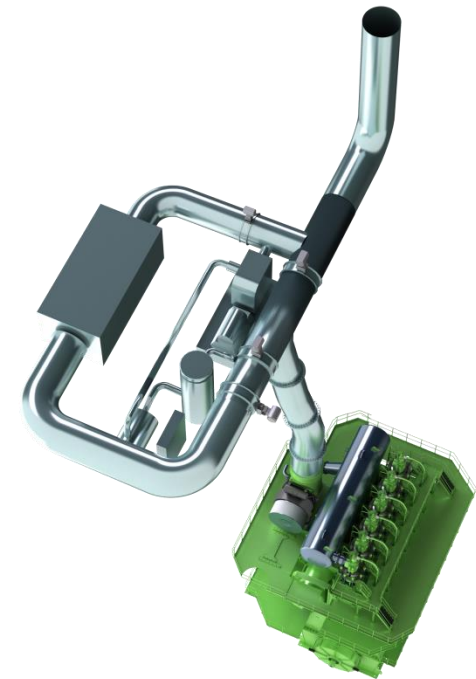
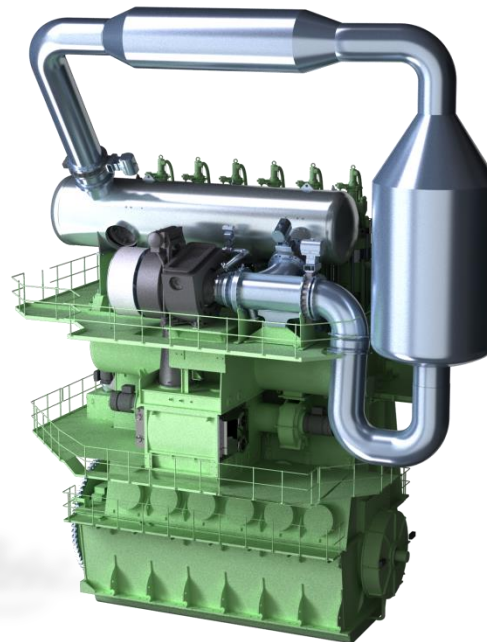
MDT Tier III Technologies



EGR

HP-SCR

LP-SCR



EGR = Exhaust Gas Recirculation

SCR = Selective Catalytic Reduction

EGR and SCR

Fully documented and specified



ERCS for EGR and SCR

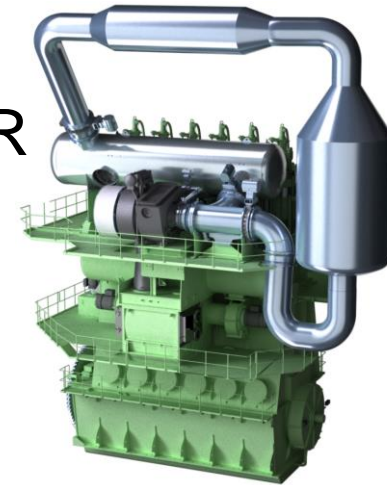
Emission Reduction Control System (ERCS)



EGR



HP SCR



- Control of all valves
- Measurement of O_2 in scavenging air
- Control of NO_x reduction through control of recirculation rate (EGR blower rpm), determining scavenging air O_2
- "Near limit" control of EGR to avoid smoke

- Control of all valves
- Measurement of NO_x in exhaust gas
- Control of NO_x reduction through control of NH_3 dosing (urea dosing signal)
- Limiters for high and low NH_3 in order to avoid NH_3 slip and ABS formation
- Too low reactor inlet $T \Rightarrow$ by-pass SCR

Selection of Tier III Technology



EGR

On-Engine

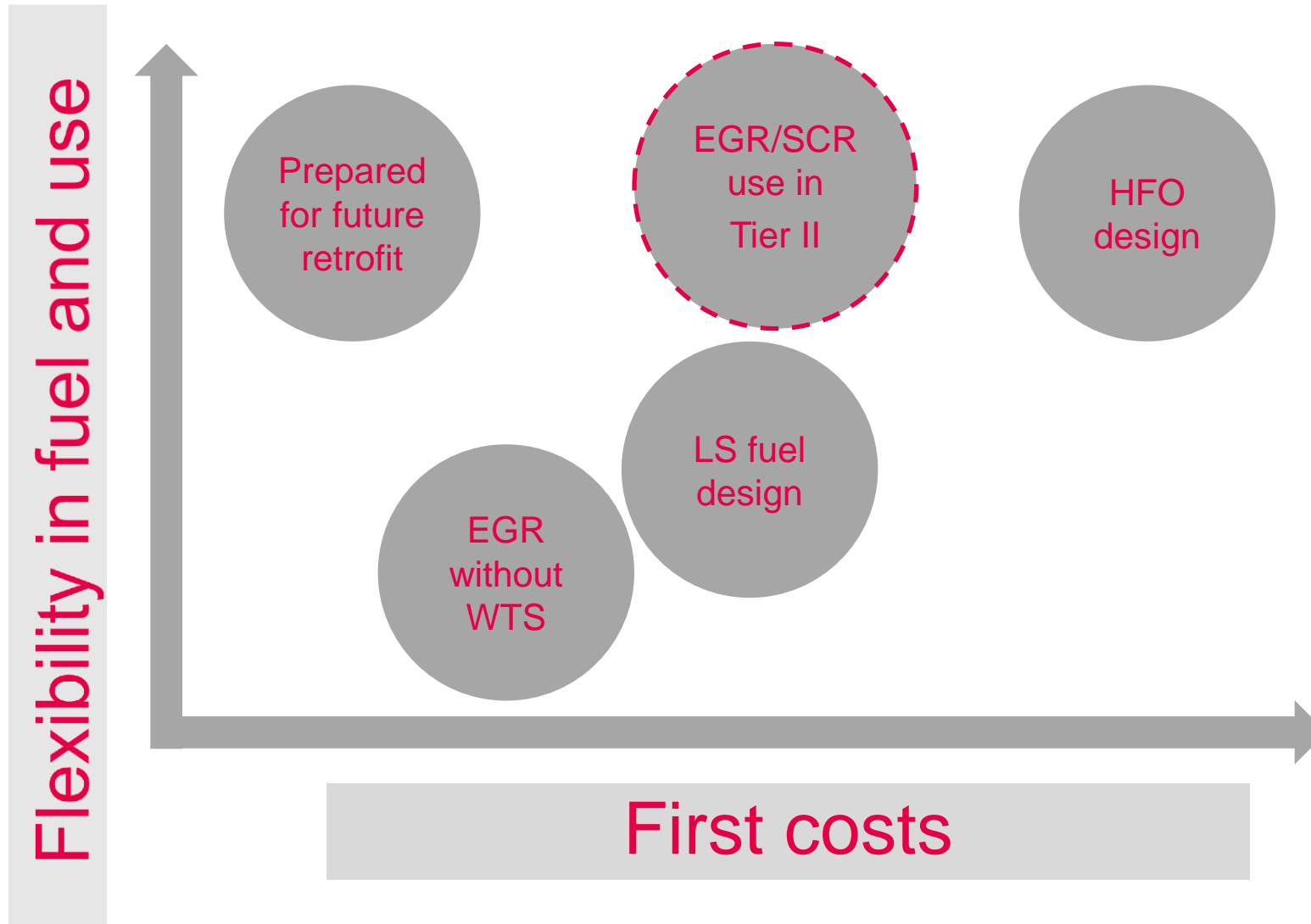
SCR

HP or LP

Deciding factors:

- Yard preferences
 - First cost (CAPEX)
 - Space requirements
 - Installation flexibility
- Owner preferences
 - Operation cost (OPEX)
 - Operation simplicity
 - Reliability
 - Maintenance cost
 - Waste disposal cost

Tier III Solutions Layout



Interested in more information?



MDT 2-stroke "Emission Project Guide"

Find it at www.mandieselturbo.com under:

"Marine Engines and Systems" /

"Two Stroke" /

"Project Guides" /

" Other Guides" /

" Emission Project Guide"

NOTE: this also includes info on:

- SOx scrubbers
- Combined EGR + SOx scrubber
- SFOC penalties
- All consumptions
- Installation issues
- Compliance



Emission Project Guide

MAN B&W Two-stroke Engines

Engineering the Future – since 1758.
MAN Diesel & Turbo



On Top of the World



With MAN B&W engines
Thank you for your attention



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