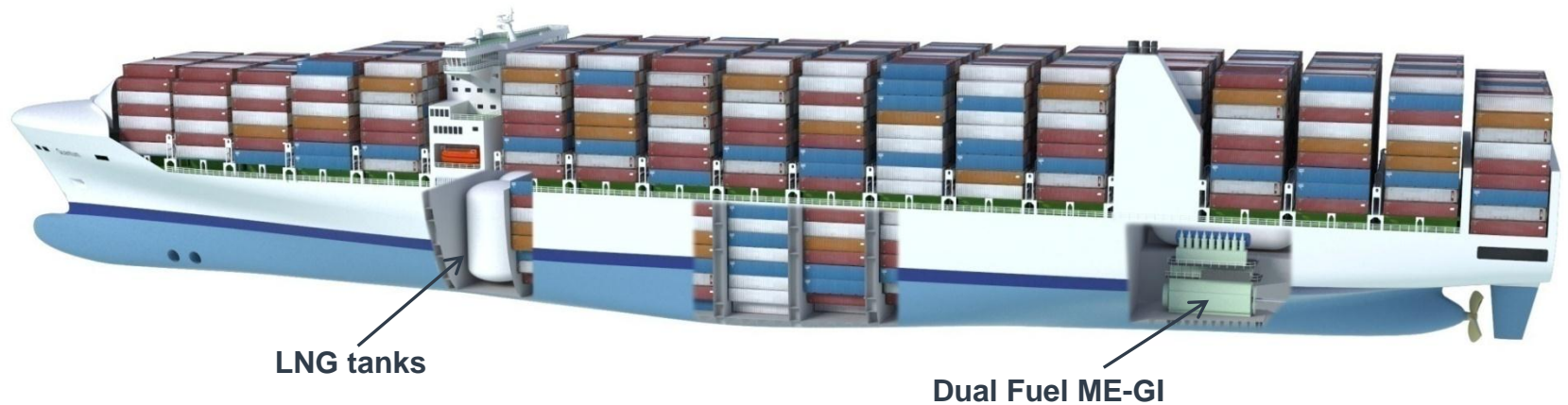


# MAN B&W Engines in ECA Areas



For internal use only



**9000 Teu Gas Fuelled Container Ship**

**DNV & MDT Project**



This series of slides is based on information  
from IHS-Fairplay  
Updated with information from other sources  
and own calculations.

# Why worry about emissions ?



**NO<sub>x</sub>, CO, HC** and **SO<sub>x</sub>/PM** cause respiratory health problems

**NO<sub>x</sub>** and **HC** cause ground level ozone

**NO<sub>x</sub>** and **SO<sub>x</sub>** contribute to acid rain

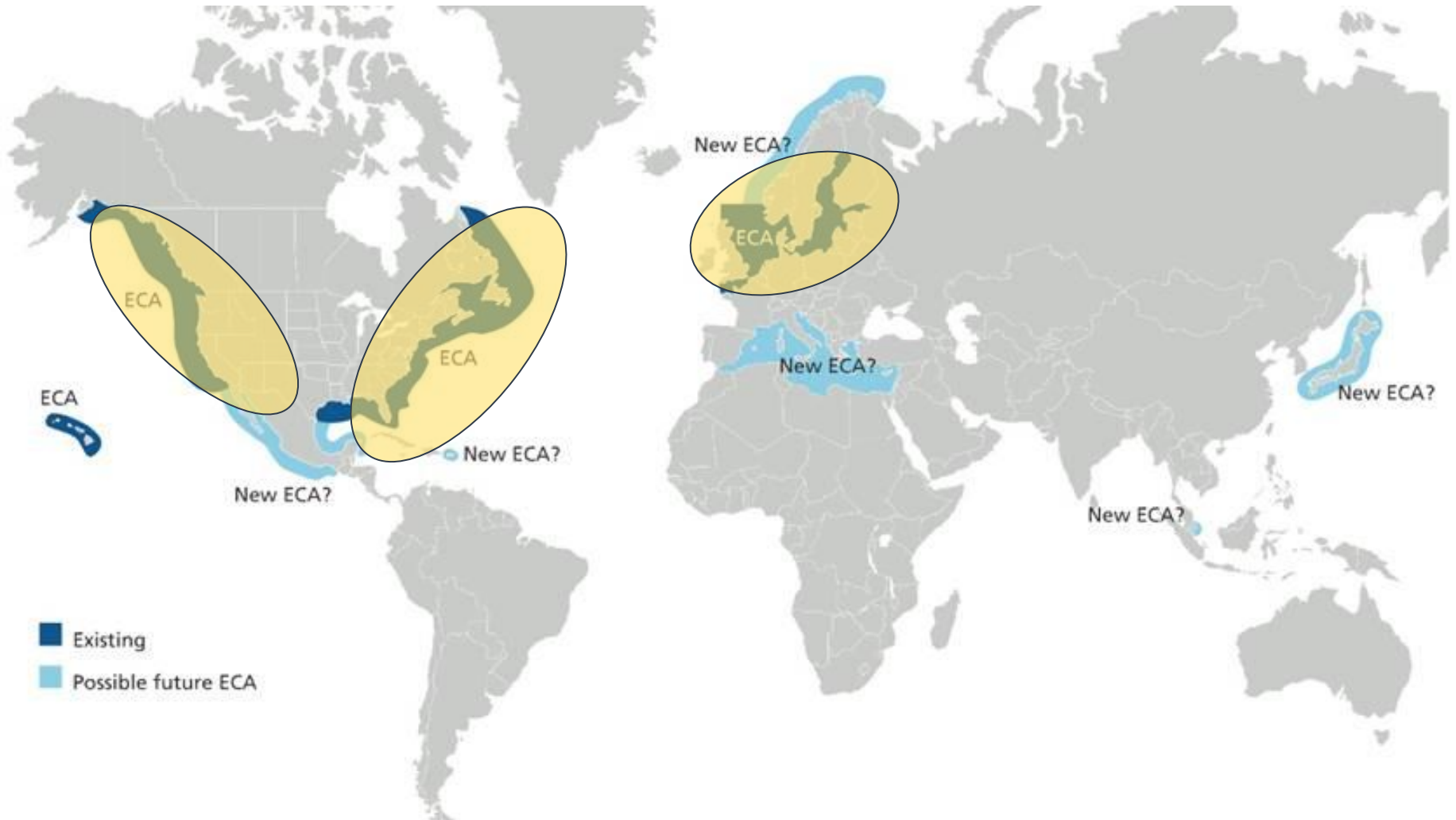
**NO<sub>x</sub>** cause eutrophication (nutrient pollution)



# 6. ECA: Emission Control Areas



Source: DNV ([http://www.dnv.com/resources/reports/greener\\_shipping\\_north\\_america.asp](http://www.dnv.com/resources/reports/greener_shipping_north_america.asp))



# Shipping Being Regulated



## Subject for our Meeting

- EEDI for CO<sub>2</sub> Control, New Ships
- Fuel spec. lower S % for SO<sub>x</sub> control for all ships
- ECA's for Tier III NO<sub>x</sub> control, new ships & for tighter SO<sub>x</sub> control for all ships

How many ships will be effected and how?

# Ship and Engine Population

## Ships larger than app 2,000 DWT/GT



In service end of November 2011

No. of Ships	Engine Type					
	MC	ME	Wärtsilä	Mitsubishi	Others	Total
-1960					27	27
1960 - 1969				6	216	222
1970 - 1979	2			63	898	963
1980 - 1989	884		536	583	1.527	3.530
1990 - 1999	3.446		1.105	832	323	5.706
2000 - 2009	7.286	266	1.045	853	190	9.640
2010 -2012	2.796	207	292	172	39	3.506
<b>All</b>	<b>14.414</b>	<b>473</b>	<b>2.978</b>	<b>2.509</b>	<b>3.220</b>	<b>23.594</b>

Of these 1,669 are MAN B&W engines

**Total MAN B&W engines 16,556**

# Ship and Engine Population

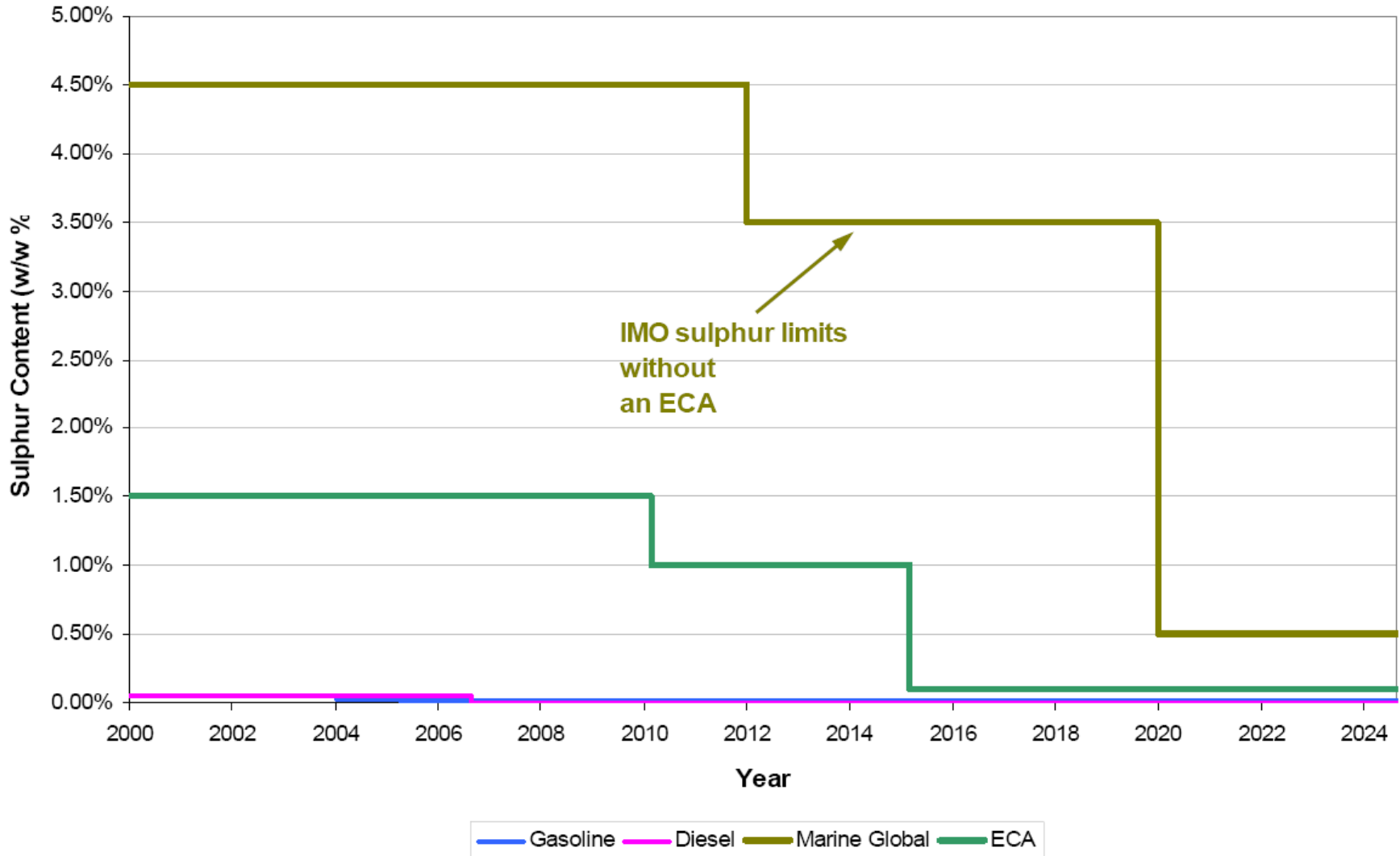
## Ships larger than app 2,000 DWT/GT



In service end of November 2011

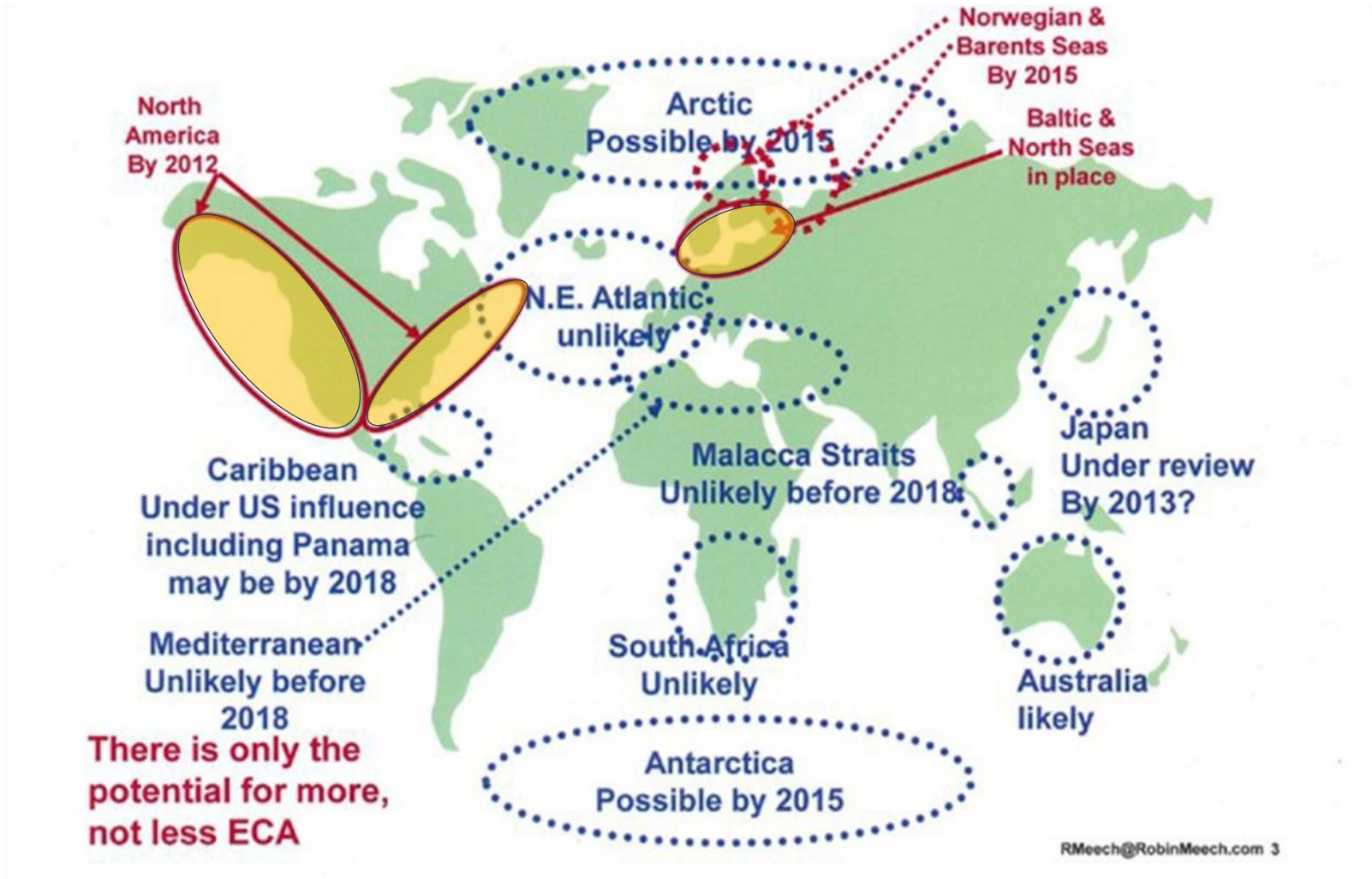
No. of Ships	Engine Speed			
	Low	Medium	Other	Total
-1960	27	69	444	540
1960 - 1969	222	455	609	1.286
1970 - 1979	963	2.324	1.211	4.498
1980 - 1989	3.530	3.066	1.196	7.792
1990 - 1999	5.706	3.163	633	9.502
2000 - 2009	9.640	4.809	1.651	16.100
2010 -2012	3.506	1.291	504	5.301
<b>All</b>	<b>23.594</b>	<b>15.177</b>	<b>6.248</b>	<b>45.019</b>

# Canadian Fuel Sulphur Content Timeline





# ECA area



# Ports investigated



Baltic		
Kotka	Helsinki	St. Petersburg
Tallinn	Klaipeda	Primorsk Oil Terminal
Riga	Ventspils	Kaliningrad
Gdansk	Gdynia	Lübeck
Gothenburg	Aarhus	

Other North Europe		
Bremerhaven	Hamburg	Rotterdam
Amsterdam	Antwerp	Zeebrügge
Le Havre	Dunkerque	Felixstowe
London	Fawley Oil Terminal	

North America		
Long Beach	Los Angeles	San Diego
San Fransisco	Seattle	New York
Savannah	Miami	Port Everglades
Port Canaveral	Houston	Corpus Christi
Baton Rouge	New Orleans	Hampton Roads
Lake Charles Oil Terminal	LOOP Terminal, US	
	Gulf	

# North America and European ECA



## Ships propelled by MAN B&W Brand Engines

Ship Calling ECA Port 2011	Ships	%
Baltic	1.604	10%
Other North Europe	4.130	25%
ALL North Europe	4.502	27%
North America	4.157	25%
ALL North Europe or North America	6.874	42%
Not Calling ECA Ports	9.682	58%
Both N. America and ALL N. Europe	1.656	10%
<b>ALL</b>	<b>16.556</b>	<b>100%</b>

- 4.500 ( 27% ) of all ships propelled by MAN B&W Diesel Engines have visited European ECA Area in the period Jan. 2011- Jan. 2012.  
Hereof have 1.656 (10% of all ) also visited North American ECA Area
- 4.157 (25 %) of the ships have visited North American ECA Area
- 6.874 (42 %) of all ships propelled by MAN B&W Diesel engines have visited one or both ECA Areas

# ECA Area Landings Ship Age Distribution



<b>Build Year</b>	<b>No of Ships</b>	<b>%</b>
<b>Before 1990</b>	<b>404</b>	<b>6%</b>
<b>1990-1999</b>	<b>1243</b>	<b>18%</b>
<b>2000-2011</b>	<b>5227</b>	<b>76%</b>
<b>Grand Total</b>	<b>6.874</b>	<b>100%</b>

Ships propelled by MAN B&W Engines, Jan 2011-Jan 2012,

# Ship Age Distribution

## All Callings



<b>No of Ships</b>			
<b>Build Year</b>	<b>Not called ECA</b>	<b>Called ECA</b>	<b>Grand Total</b>
Before 1990	2.039	404	2.443
1990-1999	2.302	1.243	3.545
2000-	5.341	5.227	10.568
<b>Grand Total</b>	<b>9.682</b>	<b>6.874</b>	<b>16.556</b>

<b>No of Ships (%)</b>			
<b>Build Year</b>	<b>Not called ECA</b>	<b>Called ECA</b>	<b>Grand Total</b>
Before 1990	83%	17%	100%
1990-1999	65%	35%	100%
2000-	51%	49%	100%
<b>Grand Total</b>	<b>58%</b>	<b>42%</b>	<b>100%</b>

Ships propelled by MAN B&W Engines, Jan 2011-Jan 2012

# ECA Area Landings Engine Type Distribution



Engine Type	No of Ships	%
MC	6347	92%
ME	274	4%
GFCA	70	1%
GB	46	1%
KZ	45	1%
DKRNF	42	1%
GF	27	0%
EF	9	0%
VT	1	0%
Not Registered	13	0%
<b>Grand Total</b>	<b>6.874</b>	<b>100%</b>

Ships propelled by MAN B&W Engines, Jan 2011-Jan 2012

# Ships propelled by MAN B&W Diesel visiting ECA area in 2011



- 58.3 % of the ships have not visited an ECA harbour
- 41.7 % of the ships have visited an ECA harbour (ECA Ships)
- **Out of these ECA Ships have:**
  - 1.4% visited the ECA Harbours more than 50 times
  - 26.2% visited the ECA Harbours more than 10 times
  - 19,1% only called the ECA Harbours once in 2011

# Emission Control Areas

IMO defines ECA's, based on application from IMO states

## Current adopted ECAs:

Baltic Sea & North Sea: SOx ECA

North America: NOx and SOx ECA (from August 2012)

Our expectations on most **likely future new ECAs**, prioritised:

1. Baltic Sea NOx ECA
2. North Sea NOx ECA
3. Japanese NOx ECA
4. China ?
5. Mediterranean??





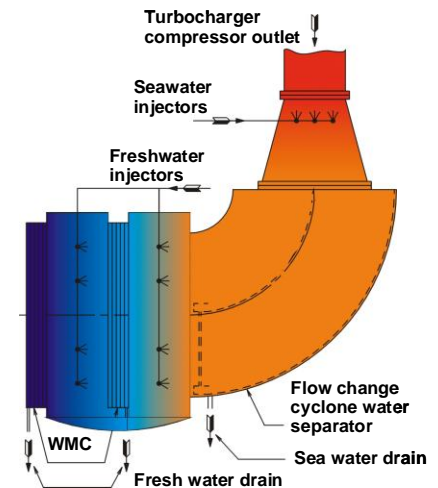
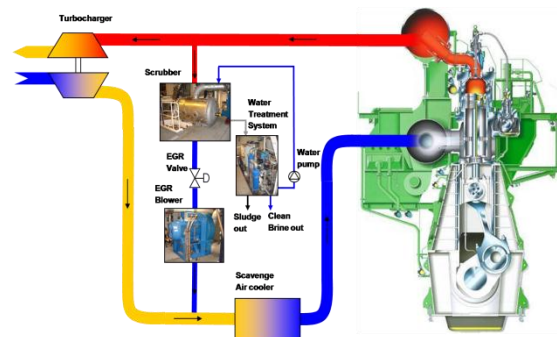
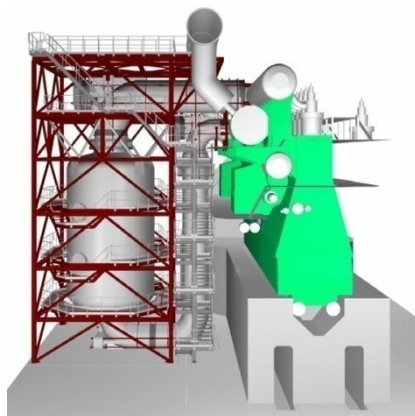
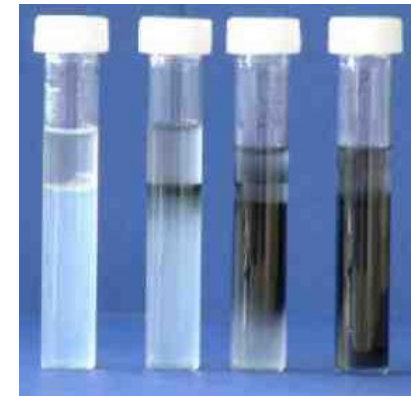
- ECA requirement may lead to increased newbuilding contracting
- World fleet is young. Half of the fleet is delivered since 2000
- Actual fleet still growing faster than demand for transportation
- ECA requirement may be met by alternatives to newbuilding

**Technically as well as by selection of fuel**

# Tier III candidate technology



Tier III candidate technology:  
WIF (Water in Fuel emulsion)  
SAM (Scavenge Air Moistening)  
EGR (Exhaust Gas recirculation)  
SCR (Selective Catalytic Reduction)



# ME-GI – The Dual Fuel solution



Thank you for your attention

# Disclaimer



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This data serves informational purposes only and is especially not guaranteed in any way. Depending on the subsequent specific individual projects, the relevant data may be subject to changes and will be assessed and determined individually for each project. This will depend on the particular characteristics of each individual project, especially specific site and operational conditions.