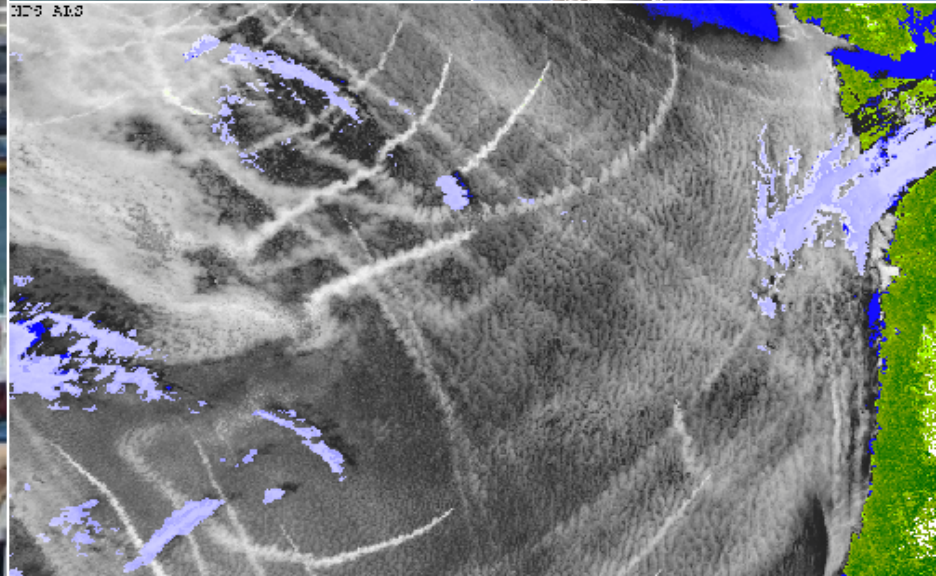


WÄRTSILÄ EXHAUST GAS CLEANING

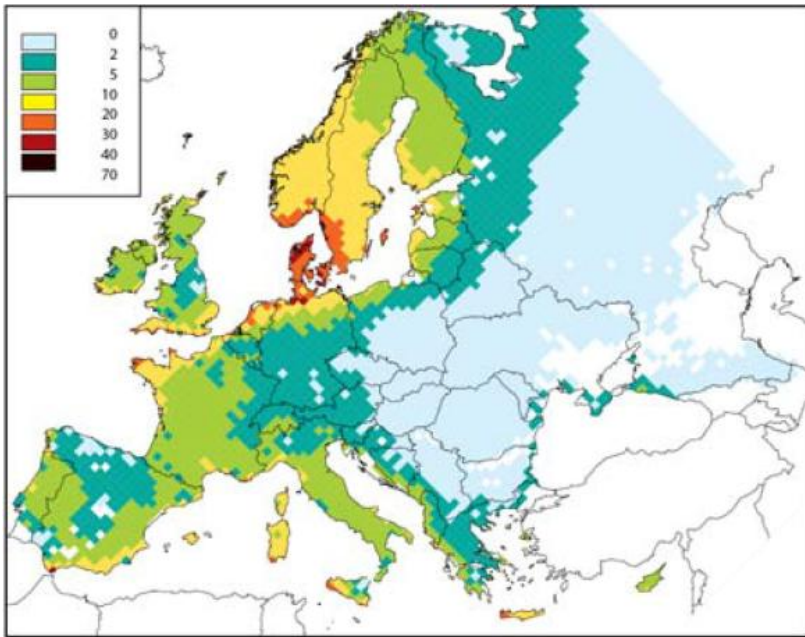
JUNE. 11TH, 2013

Exhaust Gas Cleaning - Why

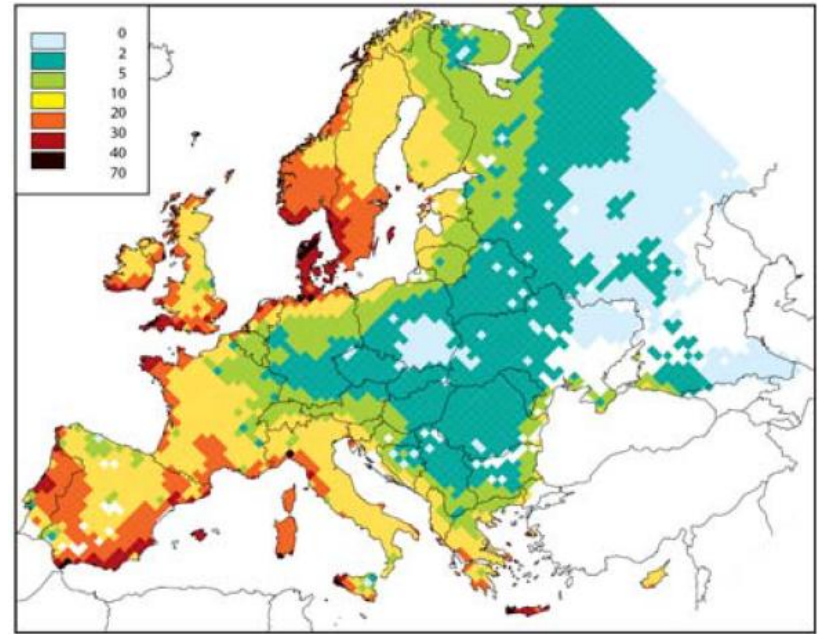


Business as usual is not an option

2000

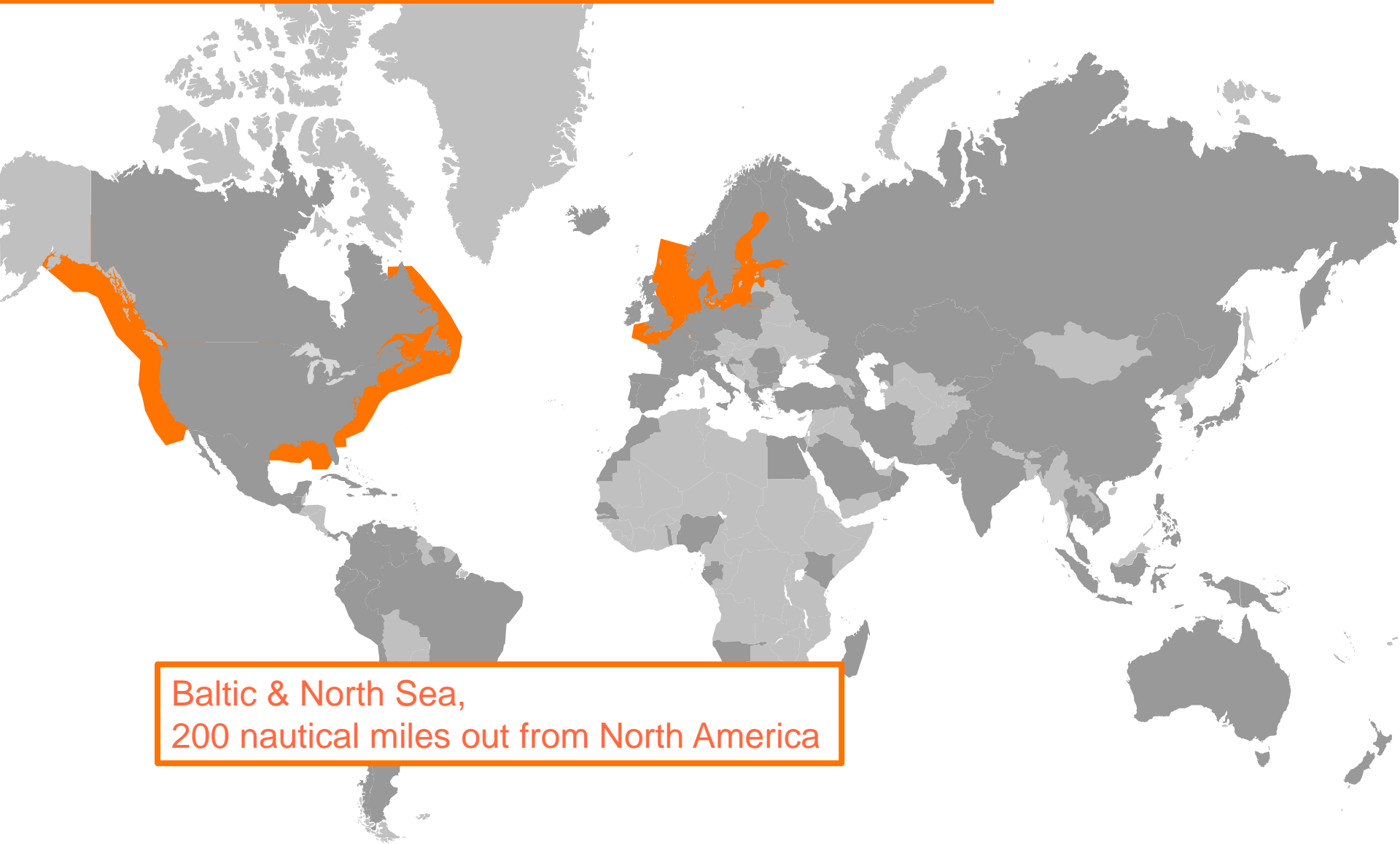


2020 – 1,5% ECA limit



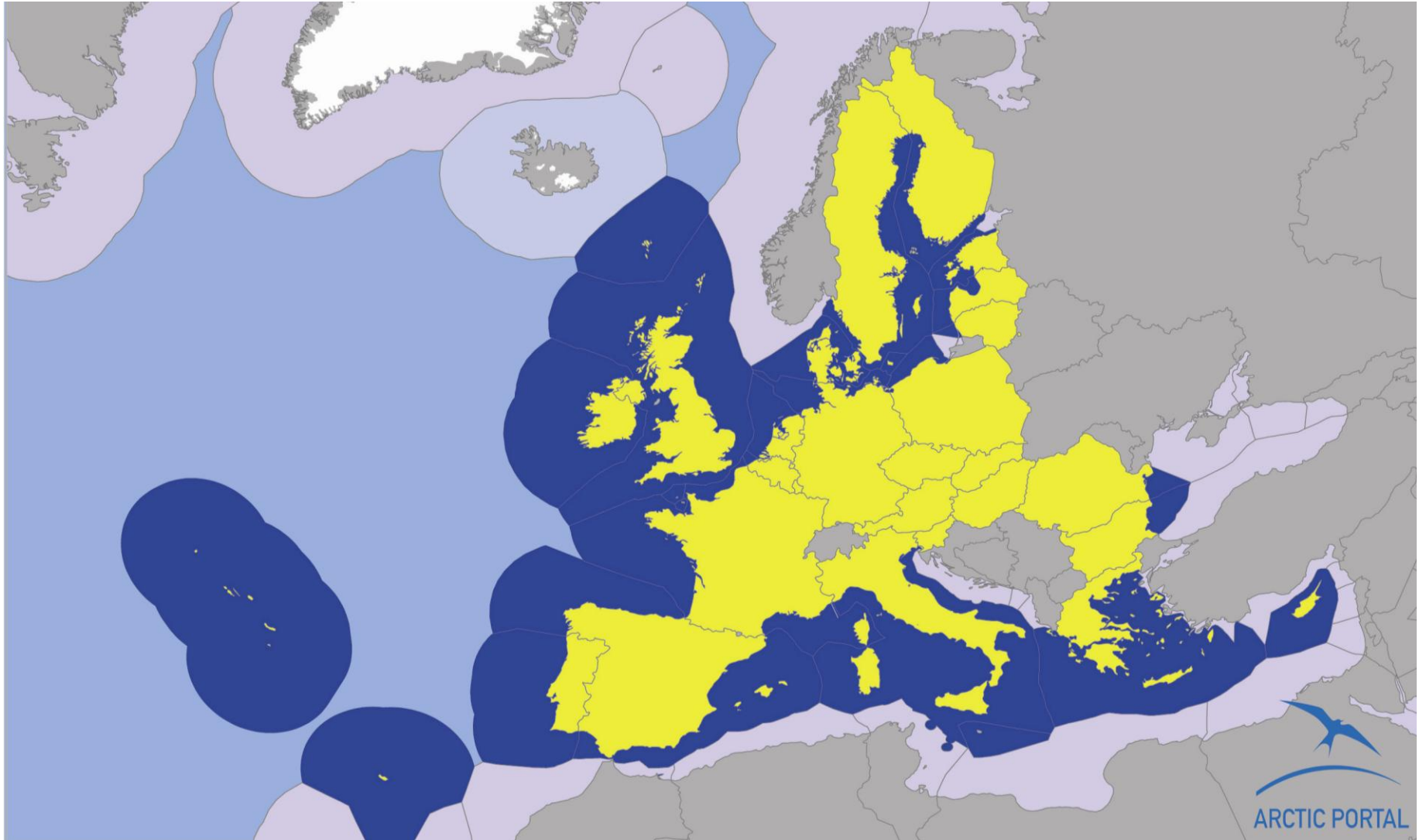
- ▶ Sulphur emissions is a recognised problem
- ▶ Shipping is a main contributor to SO_x emissions, especially in the most sensitive areas
- ▶ Business as usual will aggravate the situation

Sulphur Emission Control Areas, SECA



Baltic & North Sea,
200 nautical miles out from North America

European Sulphur Directive



Compliance need not be expensive

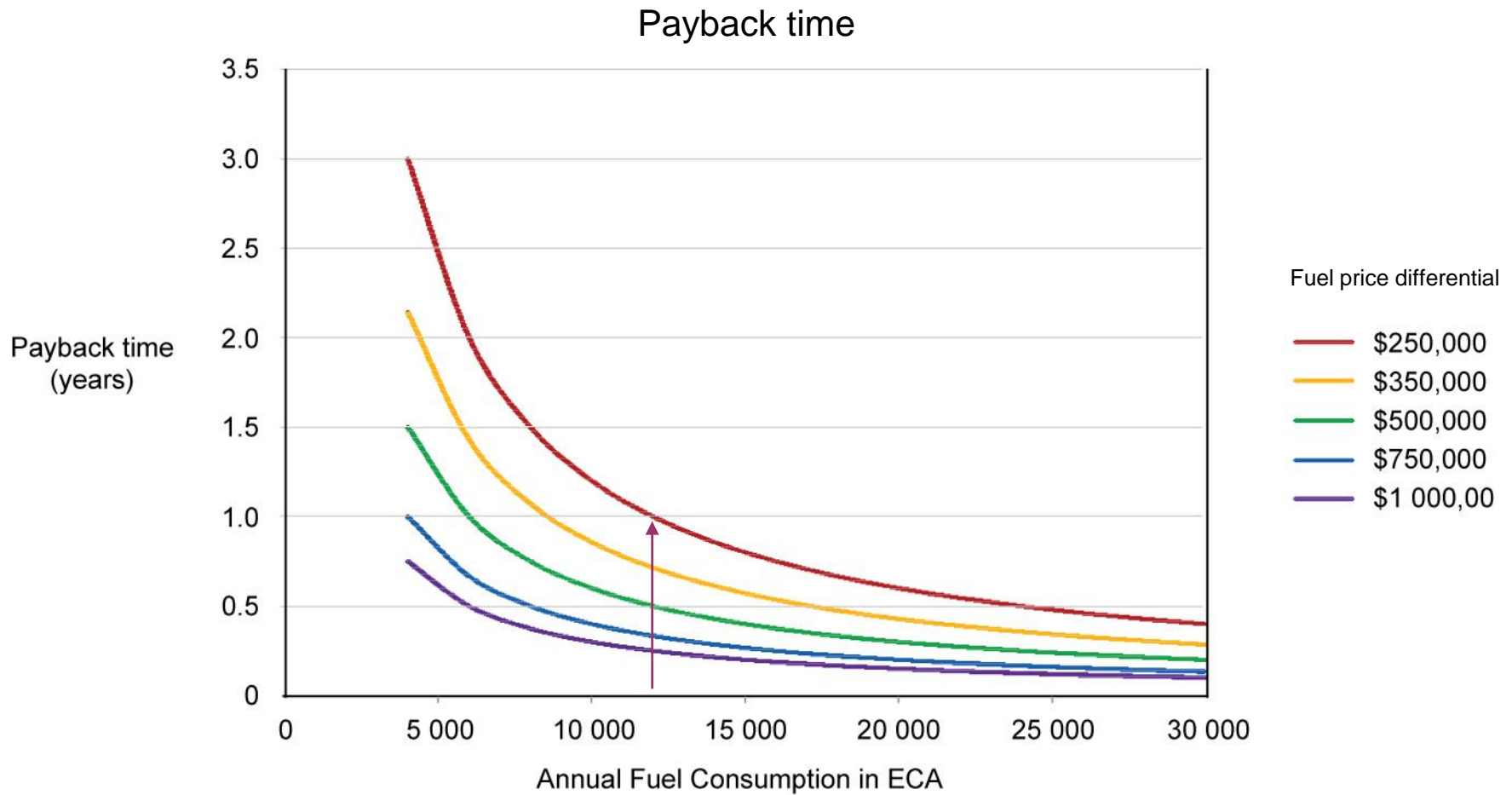
Switch Fuels or clean the exhaust

- Low Sulphur Residual Fuel (LSFO):
 - Limited availability
- Low-Sulphur Destillates (MGO):
 - Similar to automotive fuel
 - Expected European supply shortage in 2015
 - Current price premium: approx. 50%
- Gas (LNG/CNG):
 - Natural Gas prices expected to remain low
 - Limited but growing infrastructure for bunkering
 - Bunker cost currently on par with MGO
 - Higher equipment cost
 - Also reduces NOx emissions
- High Sulphur Residual Fuel (HFO) with scrubbing:
 - Business as usual
 - Low overall CO2 footprint



Scrubbing is a cost-effective solution

Return on investment



10 MW Main Engine, 3x0,5MW Aux. Engines, Total investment cost USD 3.000.000

Market potential

Gradual phase-in

- ▶ Approximately 8,000 vessels affected by current ECA regulations
- ▶ Fuel is a dominant part of the operating expense
- ▶ Range of compliance methods will be adapted
- ▶ Trading volumes will remain, may see shift in sailing patterns
- ▶ Newbuilding market
- ▶ Global cap will effect an estimated 40,000 vessels



Market is in place

Scrubber manufacturers

- 4 critical success factors
 - Know-how on scrubbing
 - Know-how on marine applications
 - Resources and manufacturing base to meet and serve expected demand
 - Market reach
- Only a few companies with sufficient resources and experience



Wärtsilä is the market leader

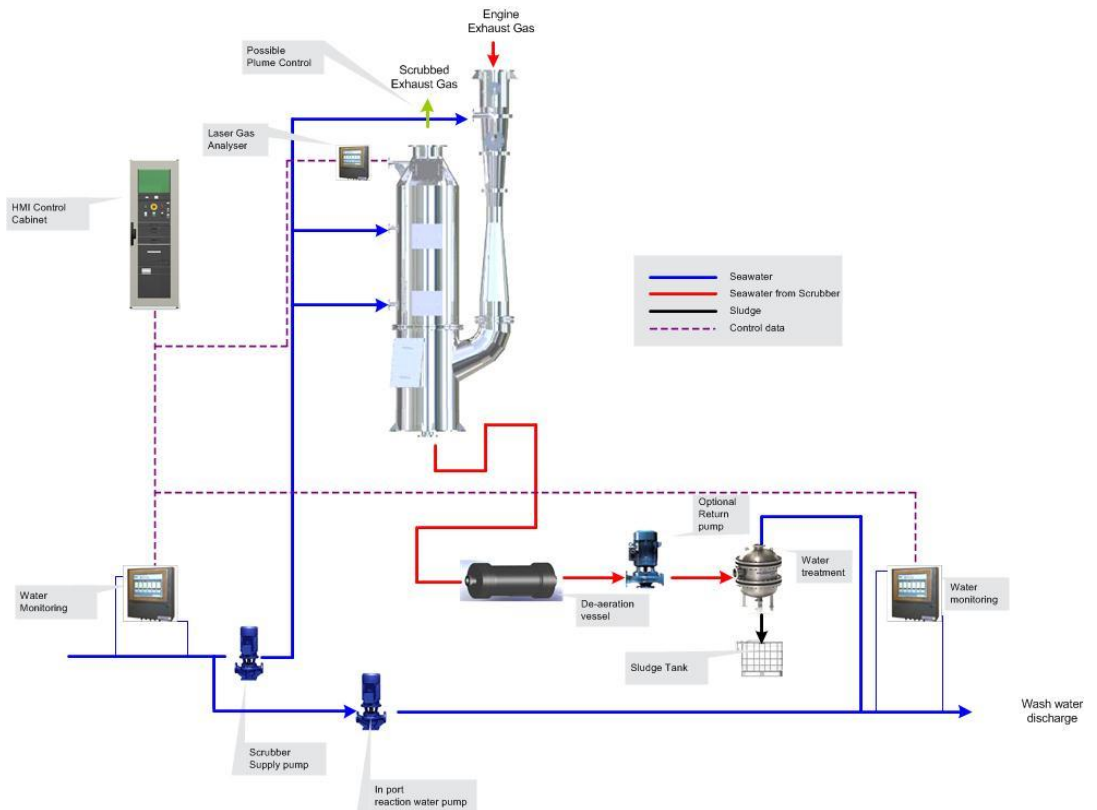
- Unique to Wärtsilä
 - Full-scale test and training centre
 - Full range of wet scrubbing technologies
 - Installed base
 - Operational experience
 - Engineering and Installation capability and experience
 - Running business



Cost-efficient system

Key Features

- Full portfolio of technologies
- More than 2000 scrubbers delivered for Inert Gas
- Low running costs
- Simple and reliable
- Module based
- Flexible
- Standardised designs
- Tried and tested



Wärtsilä's unparalleled reference list

- Pride of Kent
- Zaandam
- Jolly Diamante (Ignazio Messina)
- Jolly Perla (Messina)
- Jolly Cristallo (Messina)
- Jolly Quarzo (Messina)
- APL England
- HHI Hull 2516 TBN (Solvang)
- HHI Hull 2517 TBN (Solvang)
- MV Tarago (Wilhelmsen)
- MT Suula
- Containerships VII
- Nantong Mingde / Algoma (8 vessels)
- Passenger vessel (2 vessels)
- Mein Schiff 3 & 4
- Passenger Vessel

- From 1-40 MW
- Single and Combined scrubbers
- Open, Closed and Hybrid solutions



Wärtsilä set to win

Far ahead of the competition

- Legislation is in place
- Abatement is an economical solution
- Large market growth, both near and long-term
- Wärtsilä is the clear market leader
- Prepared for aggressive growth



References

Owner: Ignazio Messina & C S.p.A.

Vessel: DSME NB Hull 4465/66/67/6

EGCS System:

New building, Operate Italy,
along African coast & Middle East

20 scrubber units

Open loop system

“MV Jolly Diamante” delivered Dec. 2011

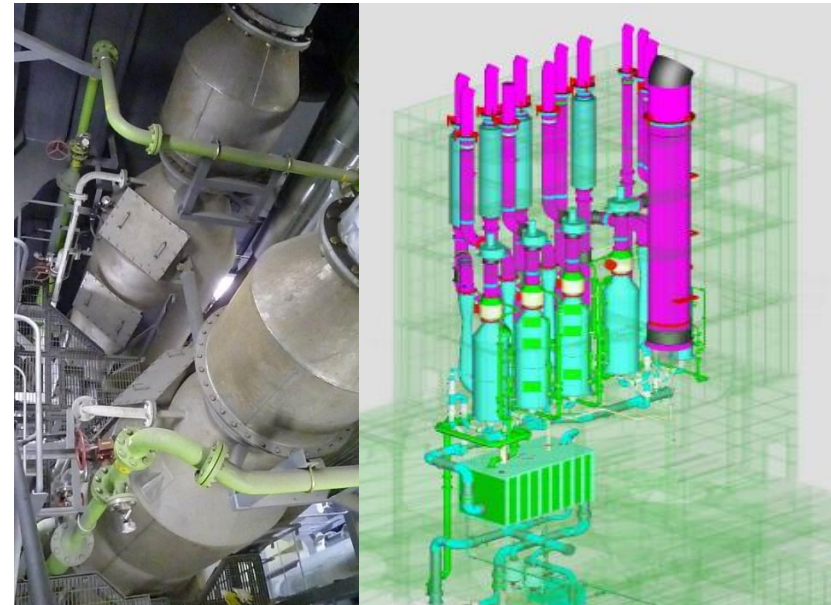
EGCS onboard DNV/RINA approved

Performance :

Cleaning 4.5%S fuel down to 0.1,%S

60-80% Particulate Removal

Prepared for main engine scrubbing



References

EGCS hybrid system for

1 x 22.89 MW main engine
4 x 1.84 MW auxiliaries
1 x 2 500 kg/h boiler

- **Owner:** Ignazio Messina & C SPA
- **Yard:** STX Offshore & Shipbuilding Co. Ltd
NB no: S3027/3028/3029/3030
- **Delivery:**

September 2013	October 2013
February 2013	February 2013



References

Owner: Wilh. Wilhelmsen ASA

Vessel: MV Tarago

EGC System:

Retrofit during dry-dock

Operate Europe, America and Asia

1 x 25 MW 3 inlet scrubber

for main engine and auxiliaries

1 x 6MW 1 inlet scrubber for auxiliaries in port

Hybrid system

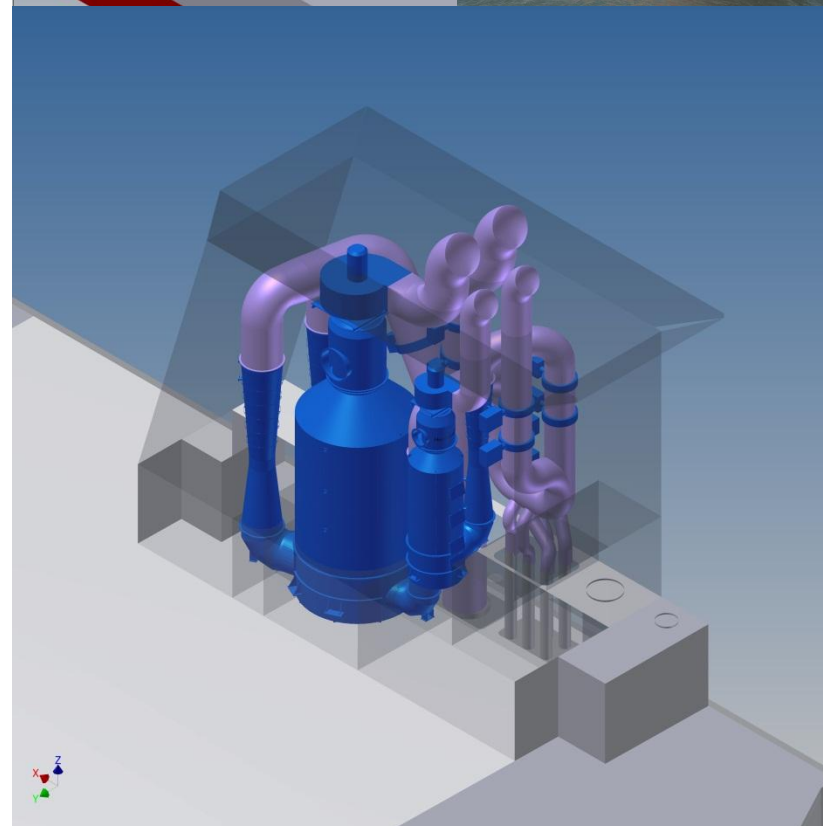
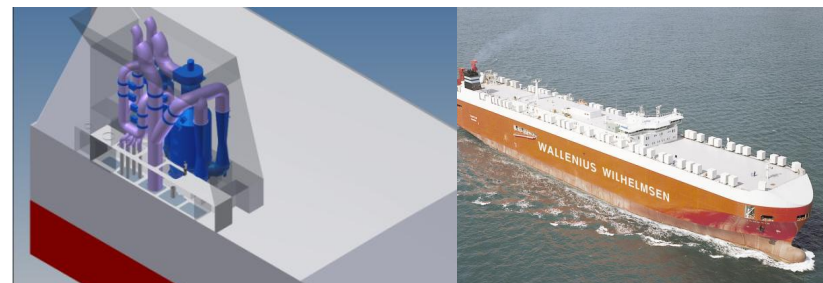
Delivery equipment: Q4 2012

Ship in dock: Q1 2013

Performance :

Cleaning 3.5%S fuel down to 0.1,%S

Up to 85% Particulate Removal





WÄRTSILÄ

IR Contact:

Natalia Valtasaari

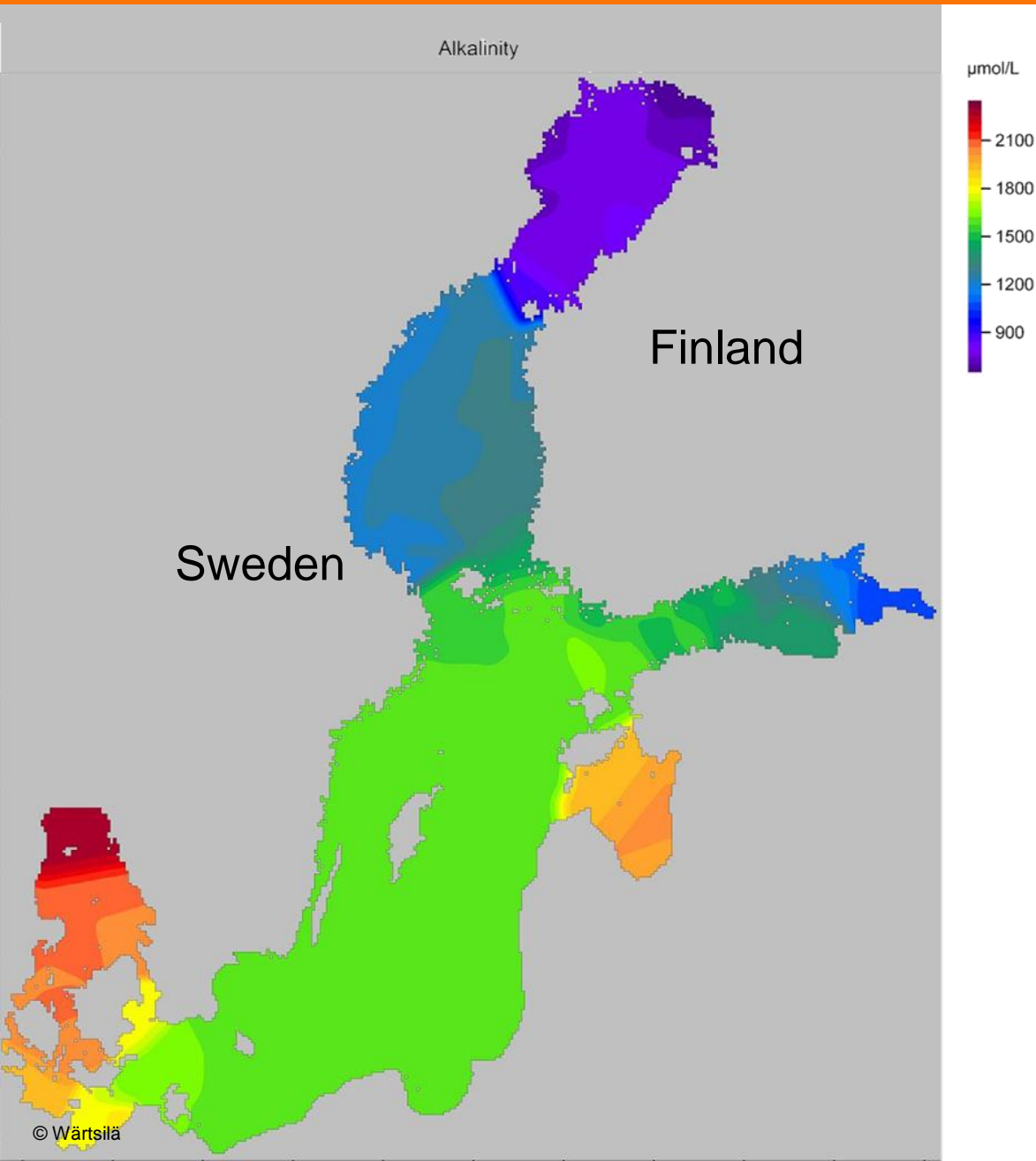
Director, Investor Relations

Tel. +358 (0) 40 187 7809

E-mail: natalia.valtasaari@wartsila.com

WARTSILA.COM

Example alkalinity in the Baltic Sea



- Open sea alkalinity
- Surface data (0... 15 m)
- Data from 2001-2005

- Typical open sea alkalinity outside Baltic Sea is ca. 2200 – 2400 µmol/L

References

Owner: Solvang ASA

Vessel : HHI hull 2516 / 2517
(VLGC)



EGC System:

New build at Hyundai Heavy Industries
1 x 15 MW 1 inlet scrubber for main engine
1 x 4MW 3 inlet scrubber for auxiliaries

Open loop system, but prepared for hybrid retrofit

Delivery equipment: Q1 2013
Q2 2013

Ship delivery: Q4 2013
Q1 2014

Performance :

Cleaning 3.5%S fuel down to 0.1,%S
Up to 85% Particulate Removal



References

Owner: APL

Vessel : APL England –
Container vessel

EGC System:

Retrofit during dry-dock
Operate between America and Asia
1 x 8 MW 3 inlet scrubber for auxiliaries
Open loop system

Delivery equipment: January 2011

Ship in dock: Summer 2011

Performance :

Cleaning 3.5%S fuel down to 0.1,%S
Up to 85% Particulate Removal

