ALFA LAVAL

Marine & Diesel

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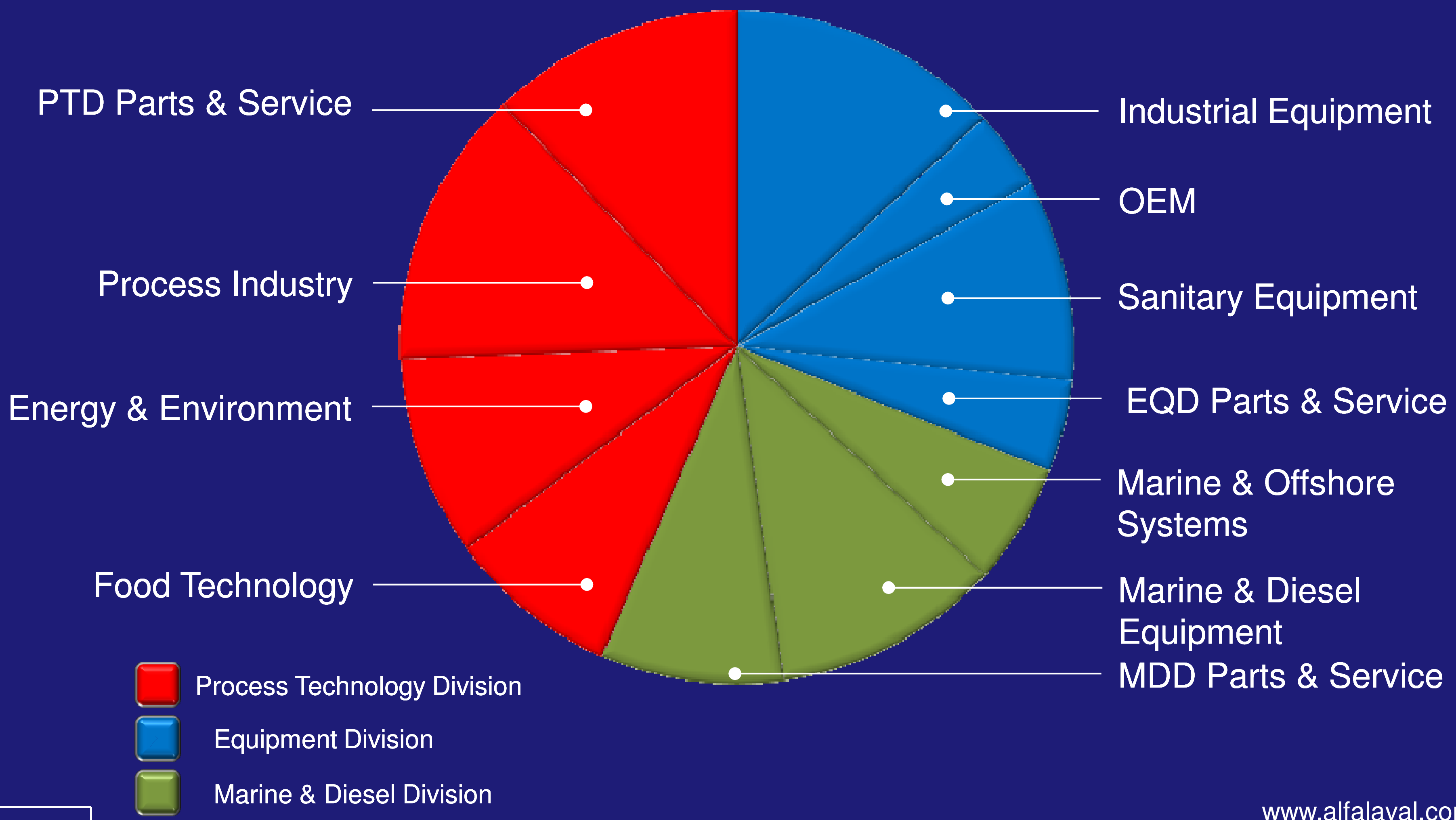
Segment manager
Marine & Diesel Equipment

Focus on customer segments

Orders received January – September 2011, Pro-forma



An extended offer – Marine & Diesel

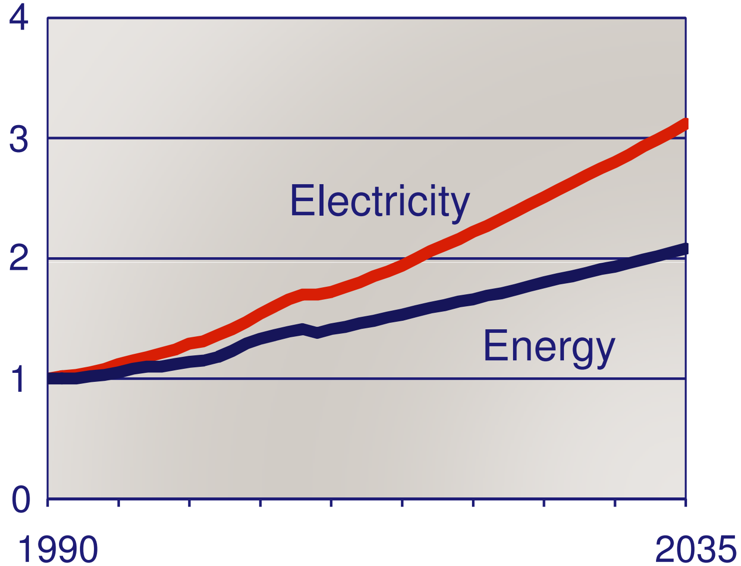
Marine market

Diesel power market

Diesel power

Power demand is growing

Growth in world electric power generation and total energy consumption, 1990-2035.



EIA, International Energy Statistics database (as of Nov. 2009), web site www.eia.gov/emeu/international.
Projections: EIA, World Energy Projection System Plus (2010).

Diesel power – market drivers

Main electricity drivers

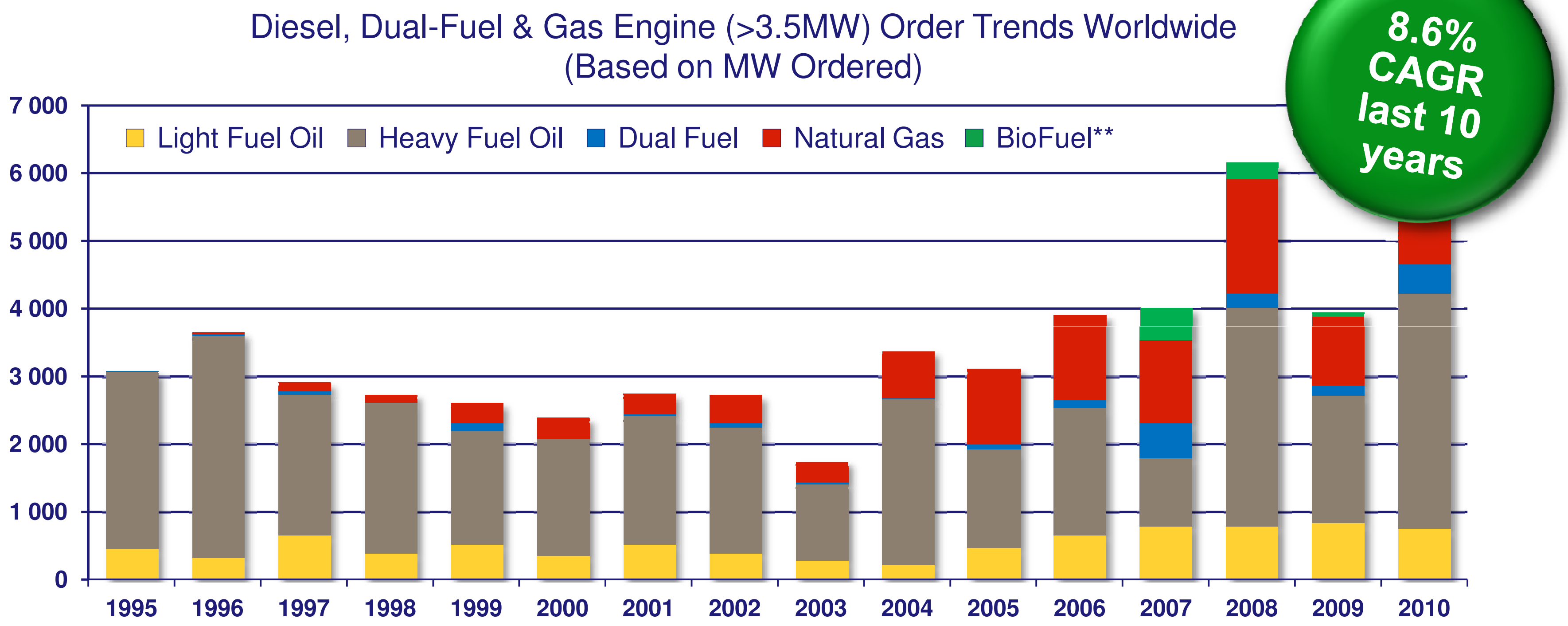
- Industrialization in fast-growing markets
- Increased living standard
- “Re-build” of electrical grids, e.g. Iraq and Japan
- Privatization of electricity distribution, e.g. Turkey

Diesel power drivers

- Electricity demand in remote locations
- Partial load and quick startup of plants (peak load)
- A diesel power plant can be built in relatively short time

”Diesel power” market is growing

– with natural gas



** Since 2006, BioFuel separated from LFO. Source: Diesel&Gas Turbine Worldwide.

Fuel trends for power plants

Stable demand

Heavy fuel oil (HFO) usage

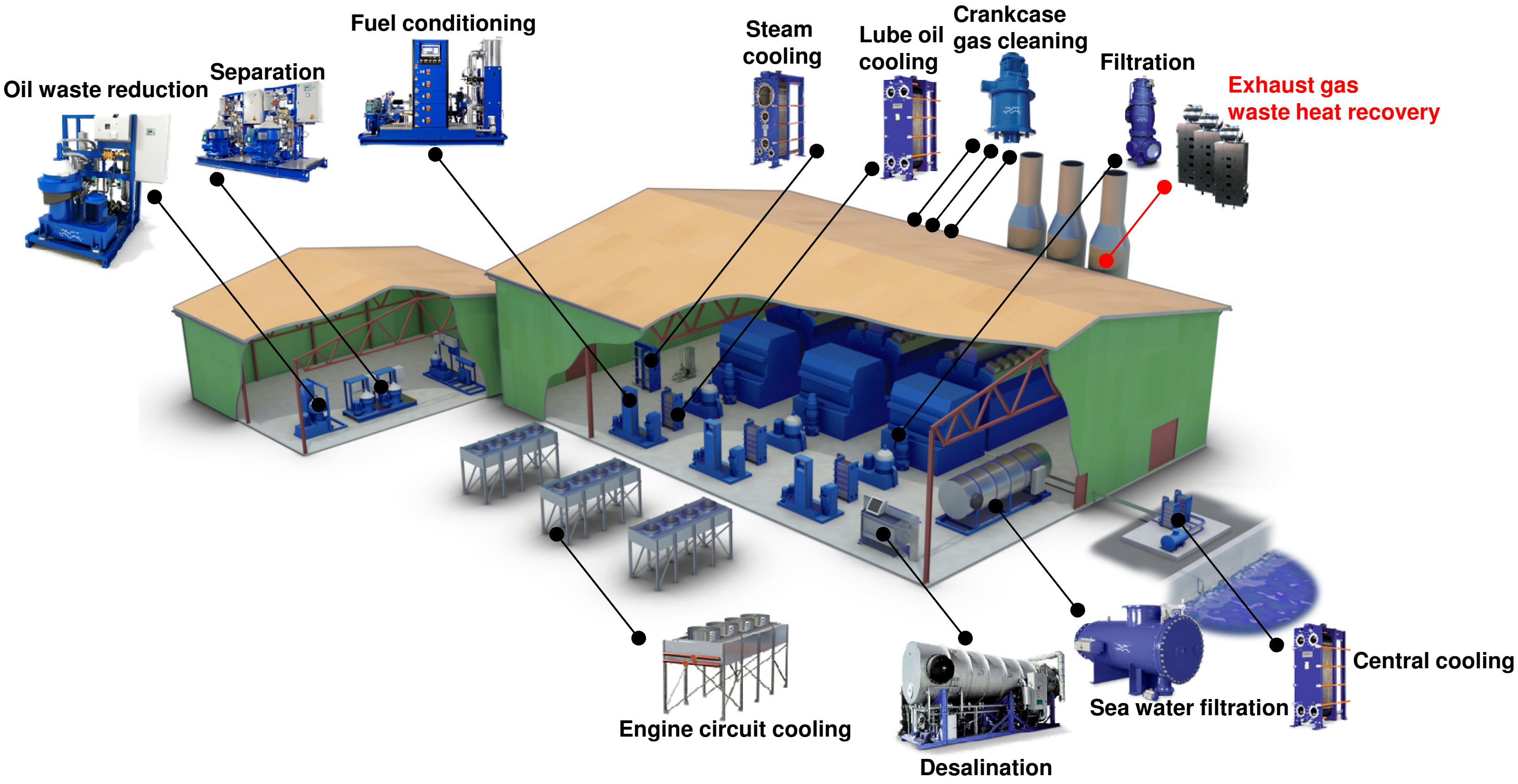
* Remote locations where gas is not available
* Duel fuel plants, e.g. transition until gas is available
* Middle East

Strong growth

Natural gas usage

* Where gas is available, preferred over HFO
* Improved efficiency –> competing with gas turbine power plants

Alfa Laval in diesel power stations



Market leadership with core technologies

Separator

* Protect engines from particles
* Increase lifetime of lube oil

Air heat exchanger (radiator)

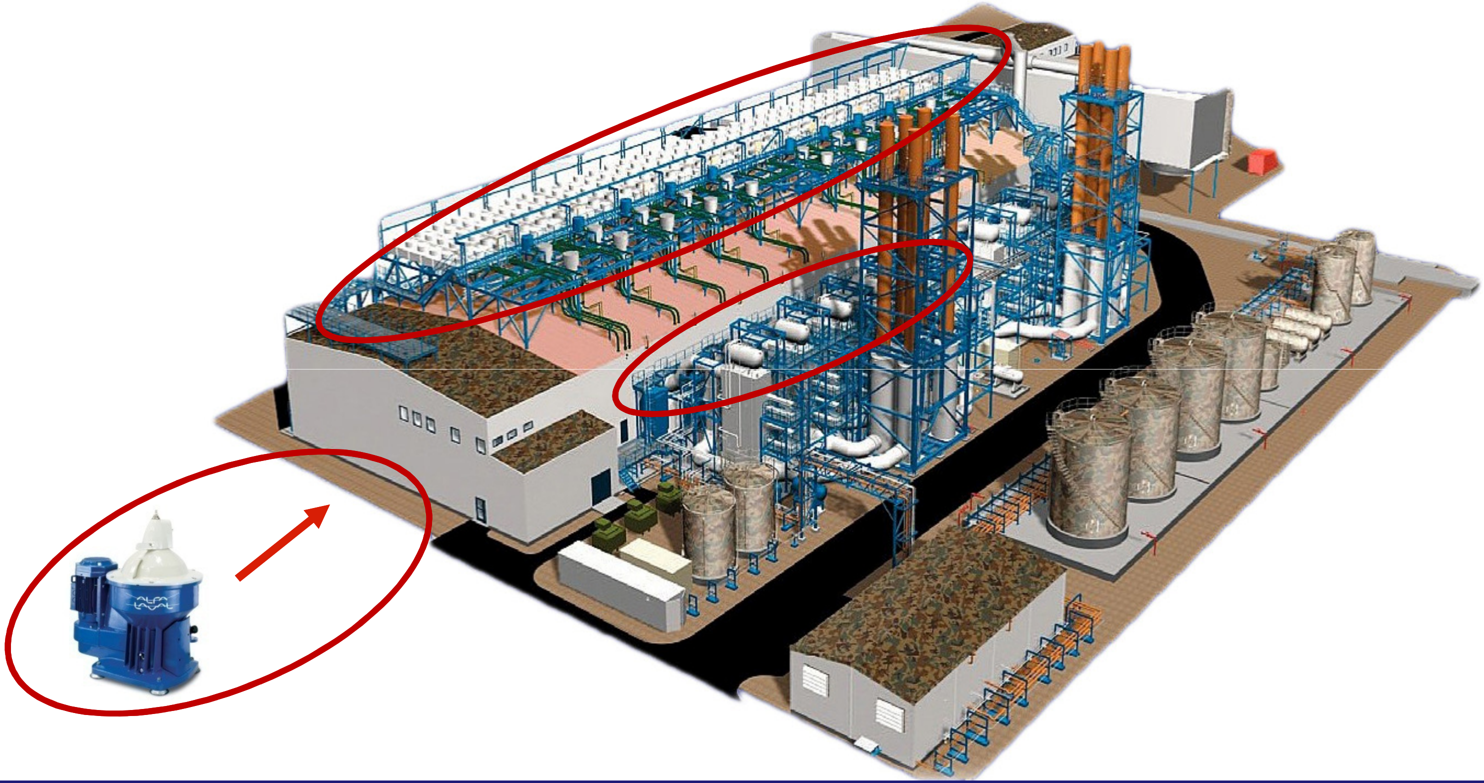
* Engine cooling

Waste heat recovery boiler

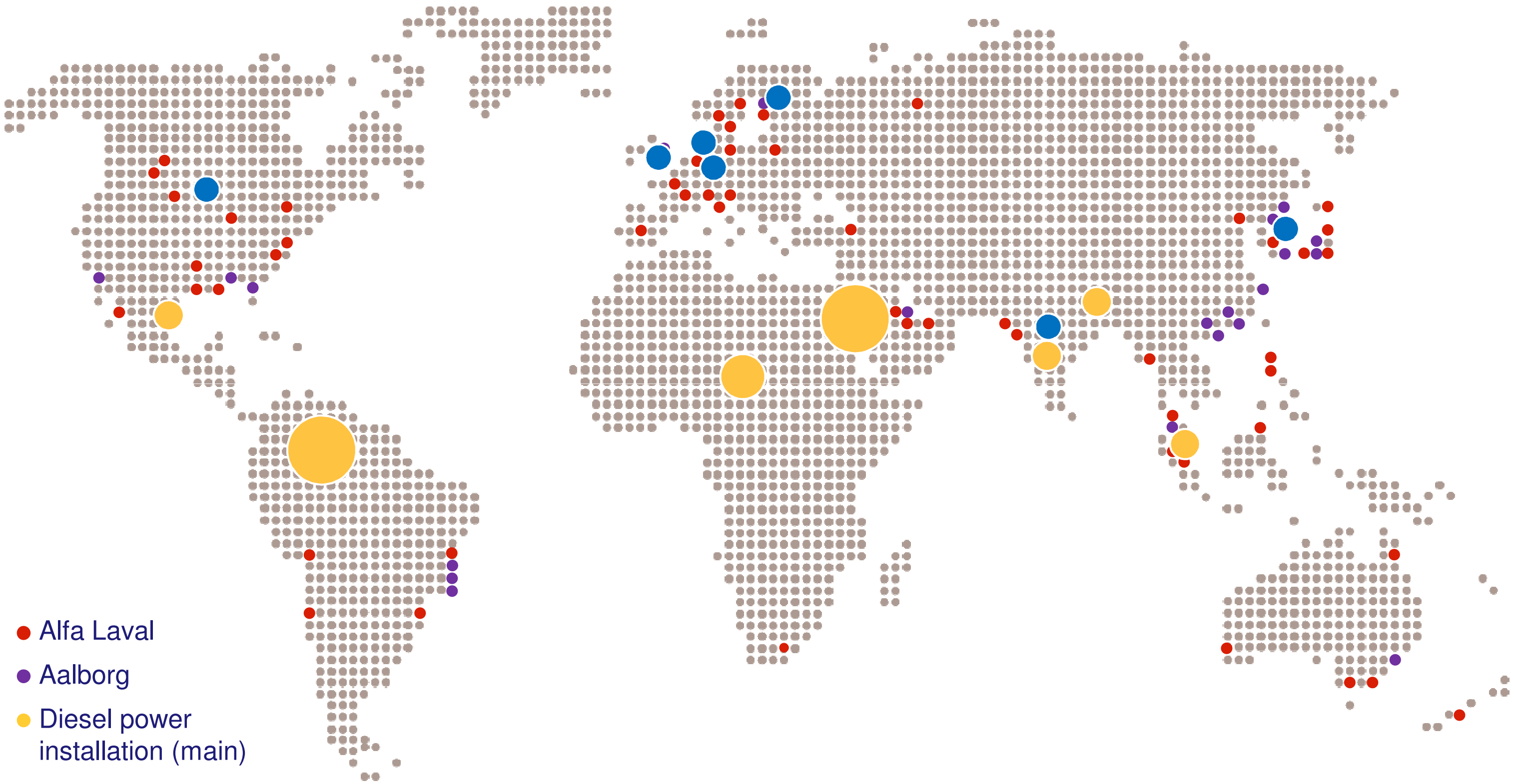
* Produces steam by using heat from exhaust gas

Power plant overview

Attock 160 MW power plant in Pakistan



Strong combined presence



Finland

WÄRTSILÄ

Germany

MAN

CAT MaK

FRERK AGGREGATEBAU GMBH

UK

Rolls Royce

FG WILSON

Cummins

Korea

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

Denmark

BWSC

The marine industry

Marine trends

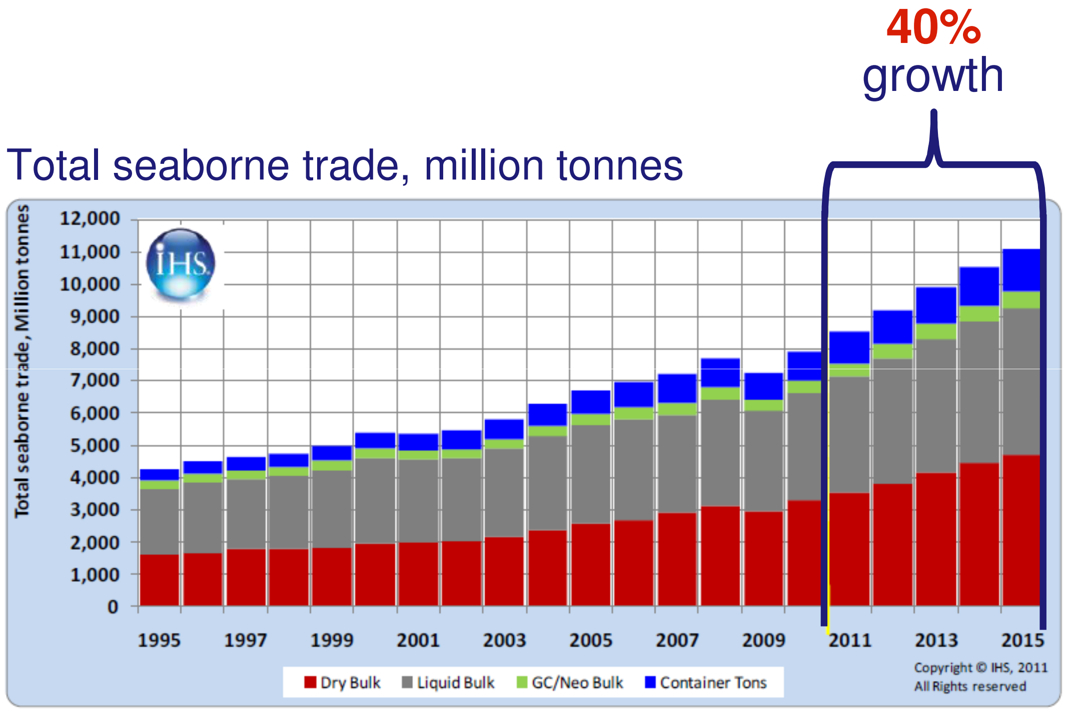
Shipbuilding

Fuel prices

Seaborne trade

Environmental legislation

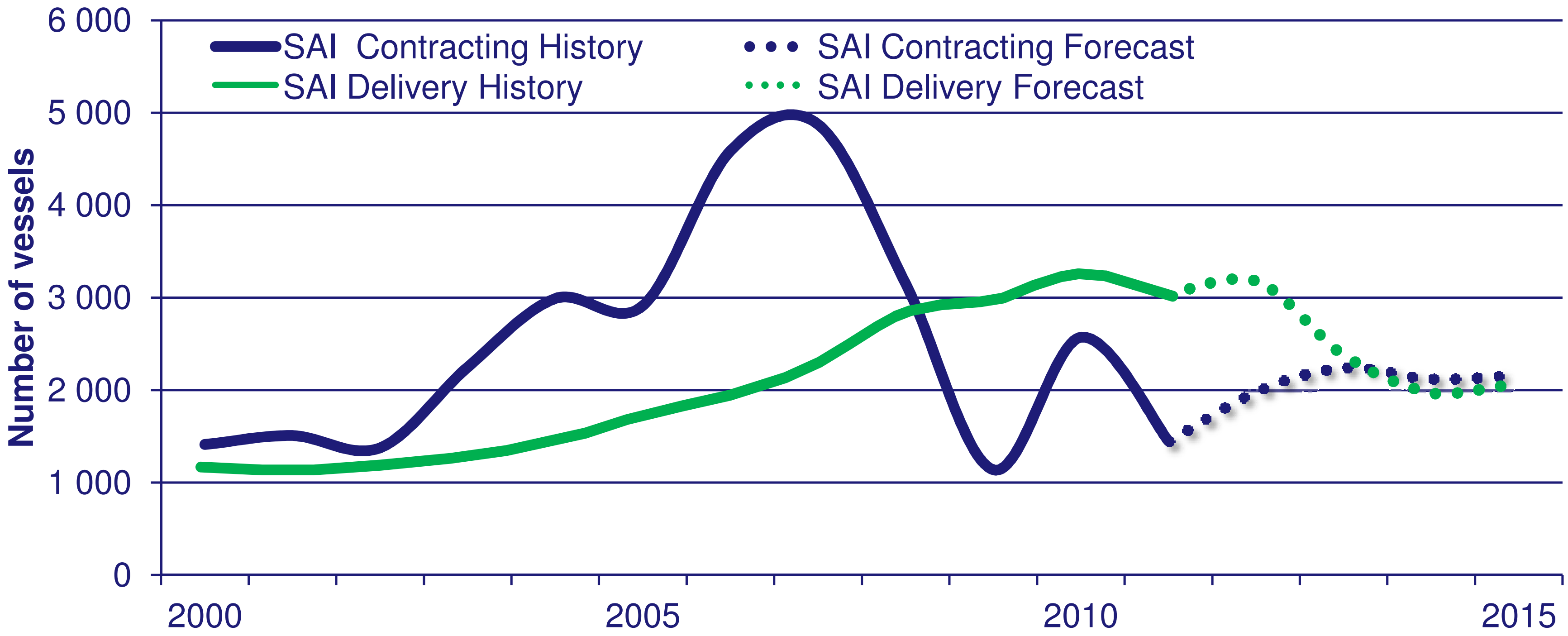
Seaborne trade growing rapidly



Source: IHS

Contracted and delivered vessels

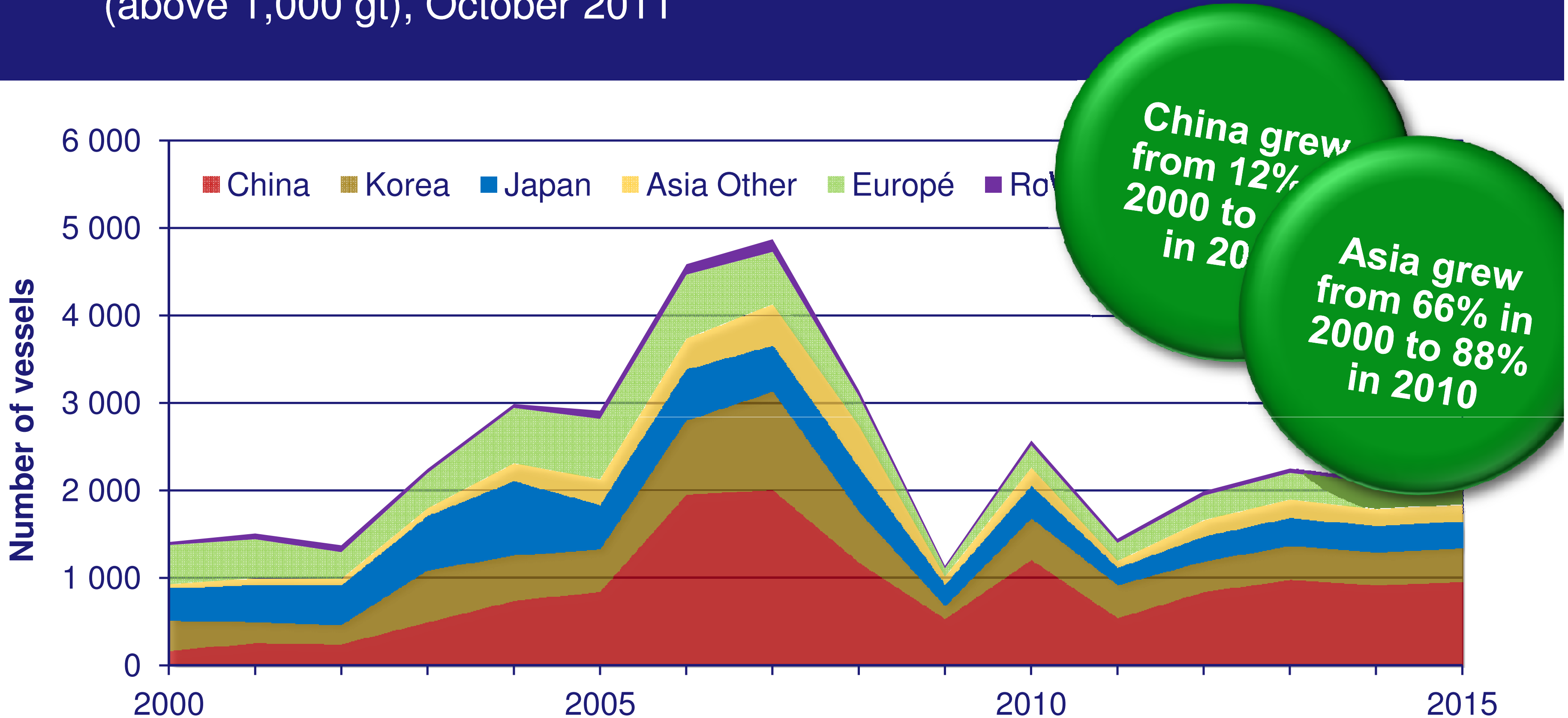
(above 1,000 gt), November 2011



Source: SAI (IHS)

Contracted vessels per region

(above 1,000 gt), October 2011



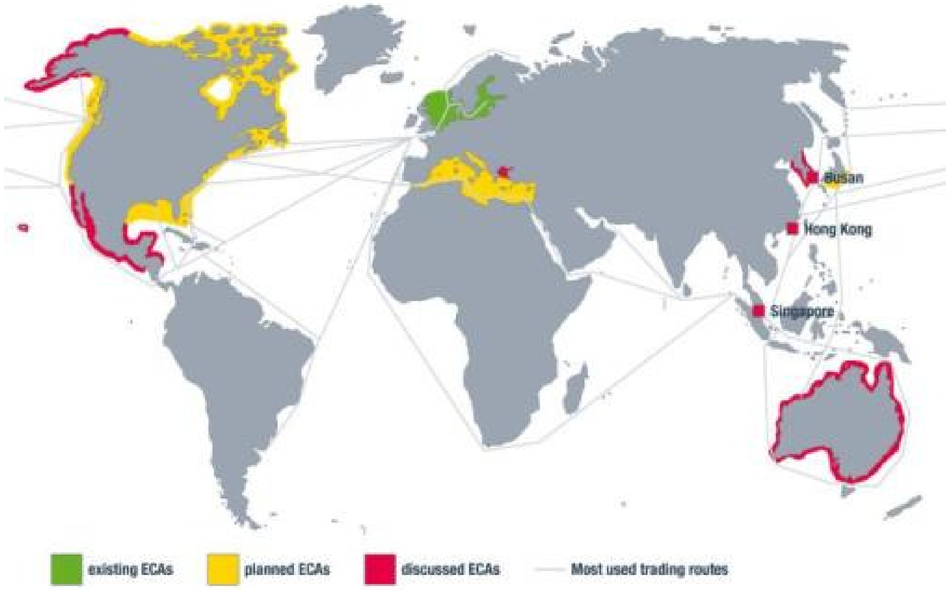
Source: SAI (IHS)

Environmental legislation

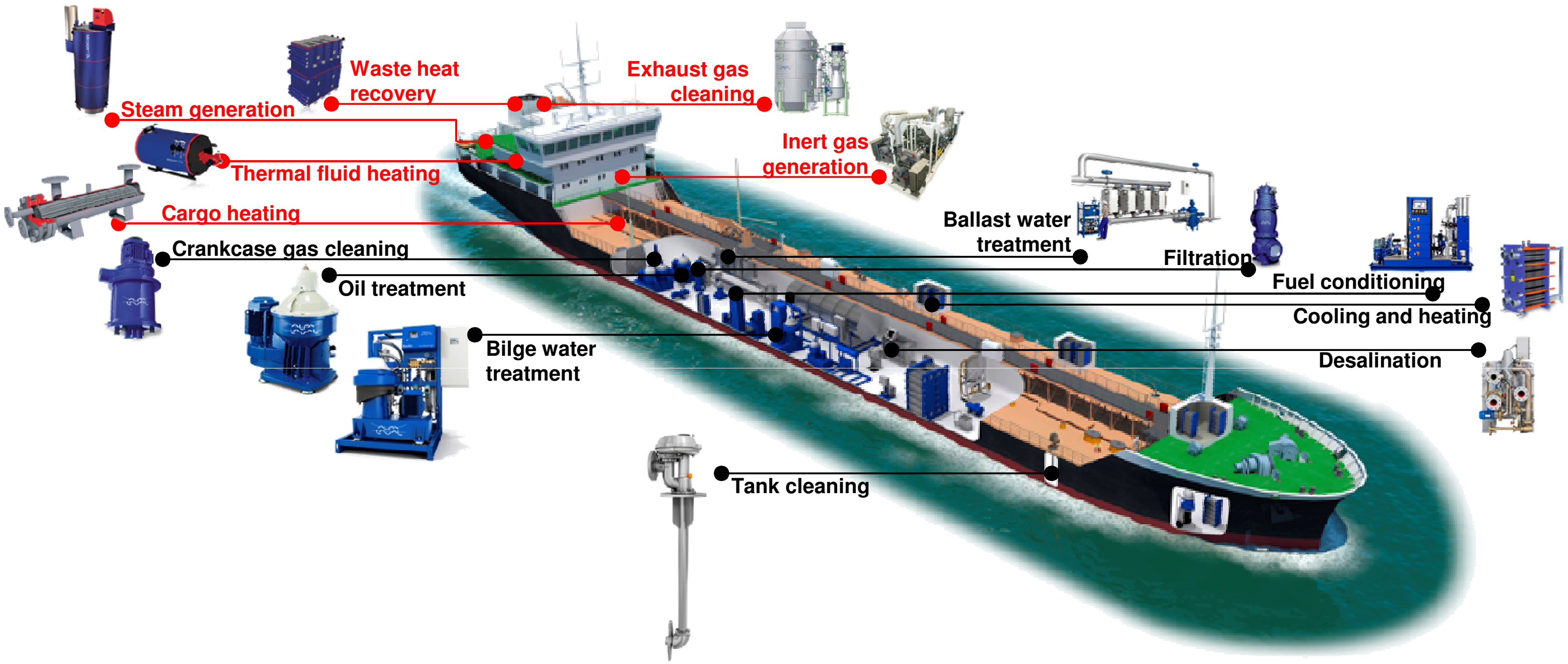
More legislation

INTERNATIONAL
MARITIME
ORGANIZATION

...and higher demands



Alfa Laval onboard a vessel



Market leadership with core technologies

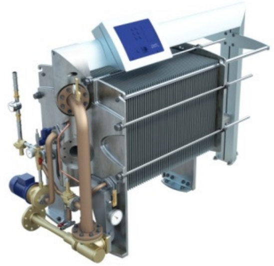
Separator

- Protect engines from particles
- Increase lifetime of lube oil
- Reduces oily waste
- Cleans oily water

Heat exchanger

- Engine cooling
- Heating of fuel oil
- Heating and cooling of cargo

Fresh water generator

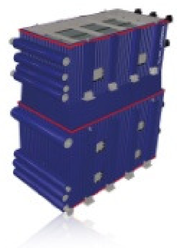


- Fresh water from sea water by using waste heat

Oil/gas fired boiler

- Generates steam by burning oil or gas

Waste heat recovery boiler

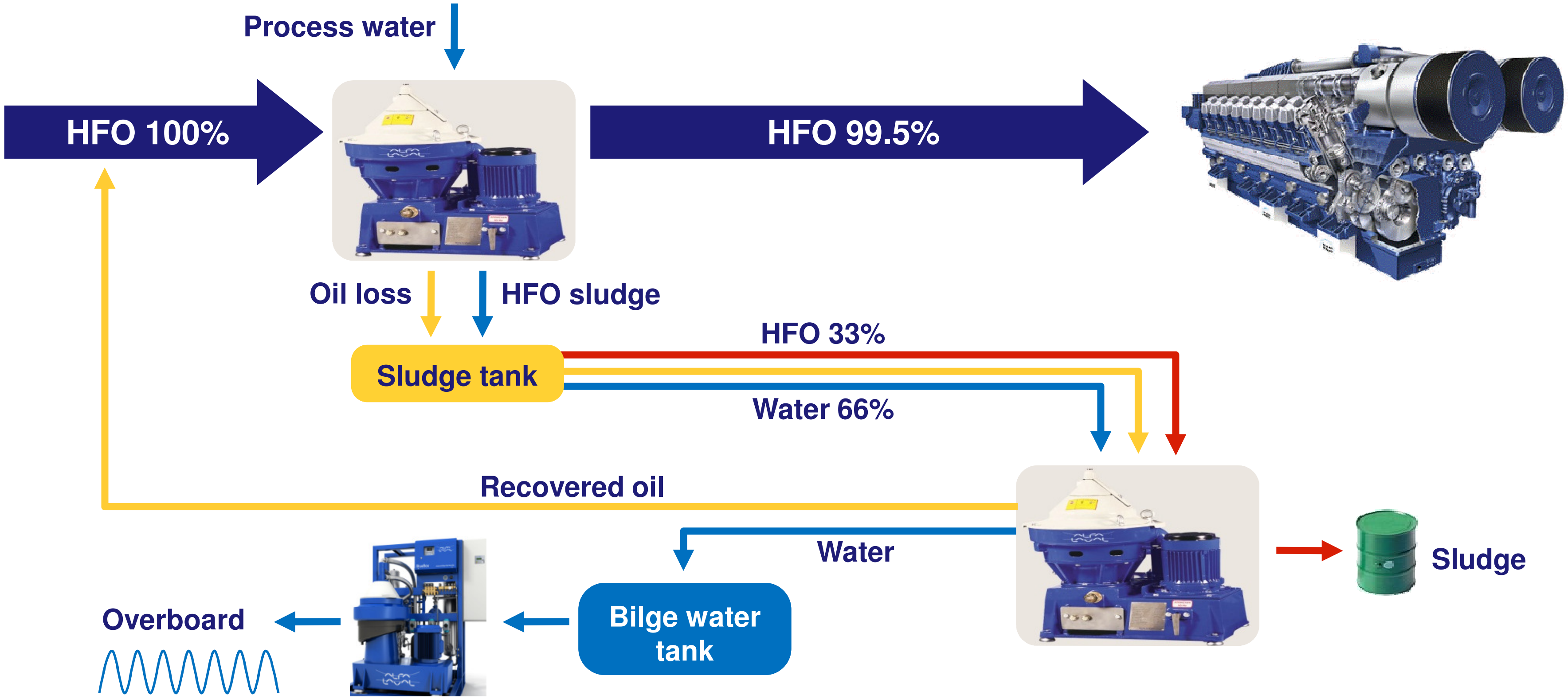


- Produces steam by using heat from exhaust gas

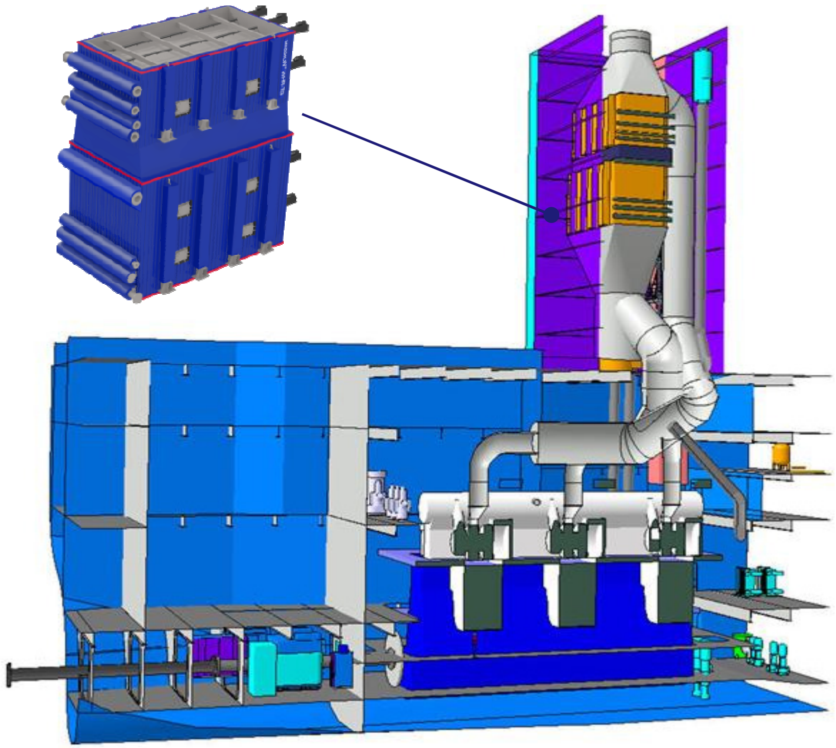
Inert gas system

- Creates inert gas for tanks

Separator performance saves fuel



Waste heat recovery system reduces fuel comsumption and emissions



Fuel savings >10% for large engines

Super heated steam for steam turbine

Steam for ship service

Pure thinking

Concern. Commitment. Contribution.

www.alfalaval.com

Leading position in environmental applications

Marine legislation, examples

November 2011

Focus	Legislation/Limitations	Newbuilt	Existing
Sulphur oxides (SO_x)	Stricter legislations in ECA* Stepwise changes. 2015 in ECAs* and 2020 on open ocean	X	X
Nitrogen oxides (NO_x)	Stricter legislations in ECAs* from 2016 (80% reduction)	X	
Bilge water	Overboard limit 15 ppm	X	X
Ballast water treatment (limits of invasive species)	Install Ballast water treatment system Enter into force when ratified by 30 states represented 35% of WST (currently 30 states, 26% of WST)	X	X
Energy efficiency design index (EEDI)	*IMO's initiative to stimulate more efficient shipping (design and operation)*	*Under development*	

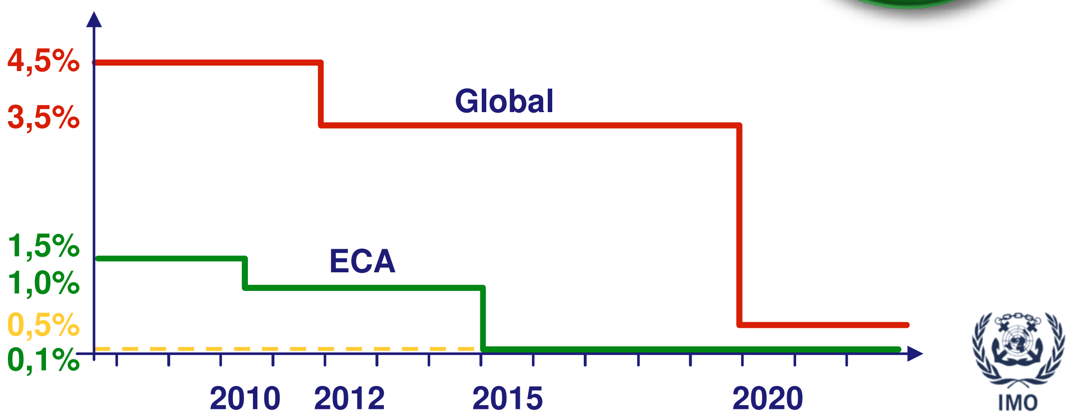
Emission Controlled Areas

Sulphur emissions (SO_X)

SO_X

Legislation: Sulphur in fuel

System tested on ferry/ RoRo



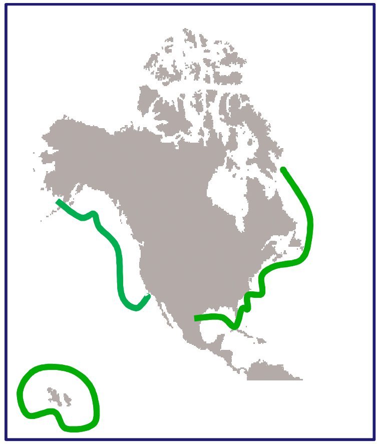
Nitrogen emissions (NO_X)

NO_X

3 systems sold

Legislation

- Emission control areas 80% NO_X reduction on new built vessels from 2016

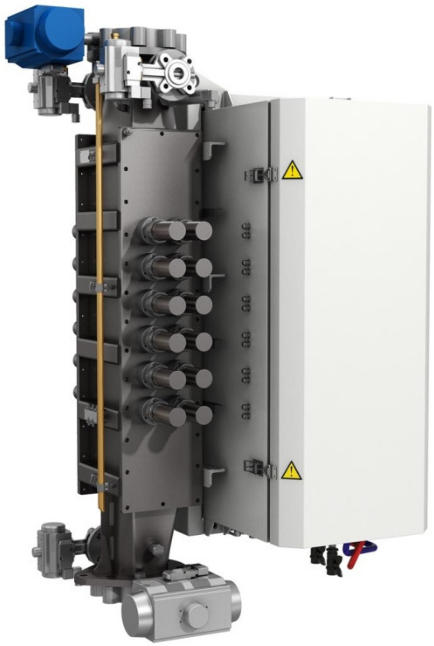


Ballast water treatment

Legislation

Treatment systems installed

- New built vessels from 2012
- Existing vessels from 2014/2016



>200 systems sold

Oily waste treatment

Legislation/market driver

PureBilge – bilge water treatment

- ✱ Overboard limit 15 ppm

Oily sludge treatment

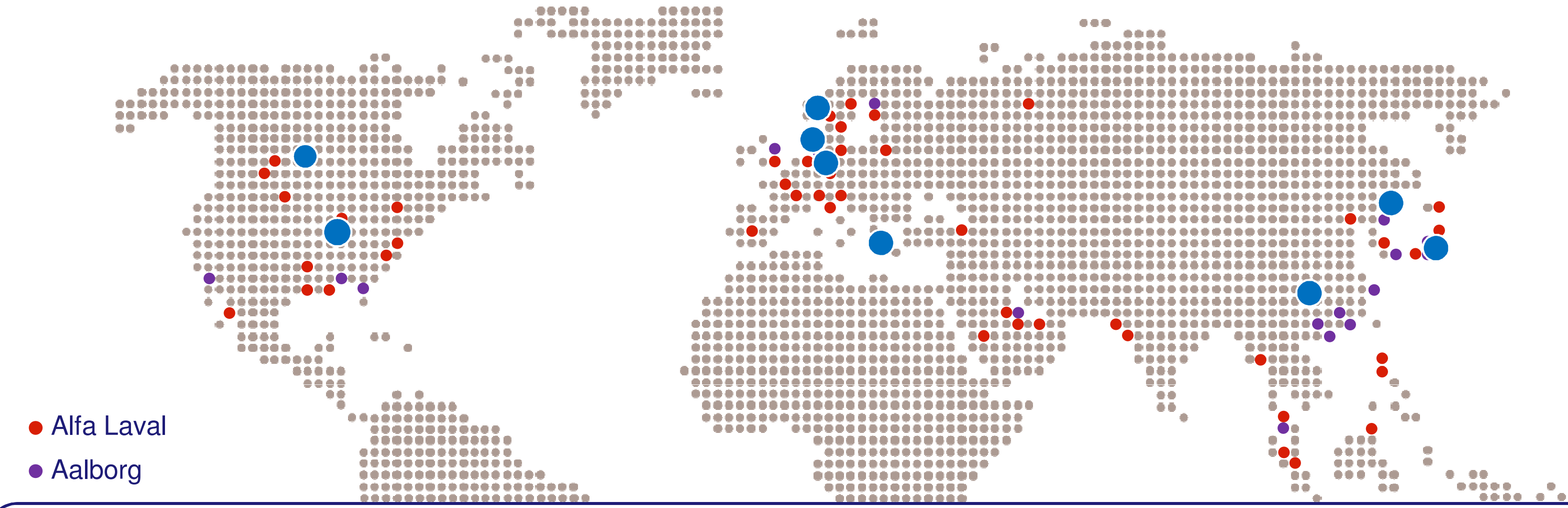
- ✱ Minimise waste onboard
- ✱ Fuel cost savings

>400 systems sold

IMO

Strong combined presence

– Shipyards and owners



Korea
HYUNDAI HEAVY INDUSTRIES CO.,LTD.
DSME
SAMSUNG

China
CSSC
CSIC 中船重工
NACKS
COSCO GROUP

Japan
MITSUBISHI HEAVY INDUSTRIES, LTD.
Kawasaki
Kawasaki Heavy Industries, Ltd.
NYK LINE

Canada
TEEKAY TANKERS LTD.

Greece
ELETSON

Norway
FRONTLINE

Germany
Hapag-Lloyd

Denmark
MAERSK LINE

USA
CARNIVAL CORPORATION & PLC
OSG

Summary

Diesel power growing with natural gas

Seaborne trade growing fast

Strong position of environmental solutions

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