



Alfa Laval as the right BWTS partner

- Developments and lessons learned in the BWTS market

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AGENDA

1. Introduction

2. Alfa Laval's value offering

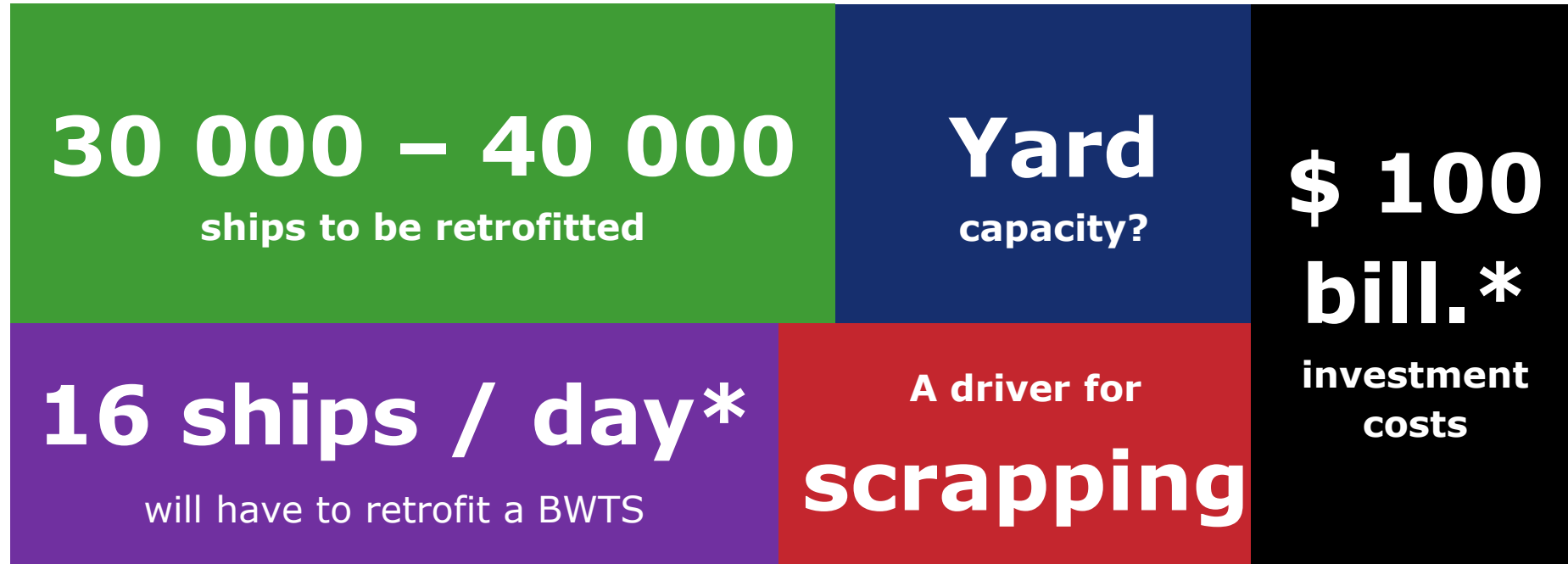
3. Retrofit Management
The Good, the Bad, the Ugly

4. Summary



INTRODUCTION

The industry challenge according to DNV GL



*estimates

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Alfa Laval's focus and ambition for our clients

LEADING provider of;

- discharge **COMPLIANCE**
- and ballast water **SYSTEM** solutions

REDUCE risks, providing customers with **PEACE OF MIND**

Leading in **ENVIRONMENTALLY** friendly solutions

Support short term needs; keep the **LONG TERM** in focus

PROTECT your crew, passengers, assets and brand

Deliver **INNOVATIVE** solutions to reduce total costs and increase efficiency

Support **DIGITALIZATION** initiatives



Alfa Laval's network will ensure consistent high quality deliverables throughout the lifetime of your vessel

**MARKET LEADING
POSITION** – in both
newbuildings and retrofits

2500 – systems sold
1500 – systems installed

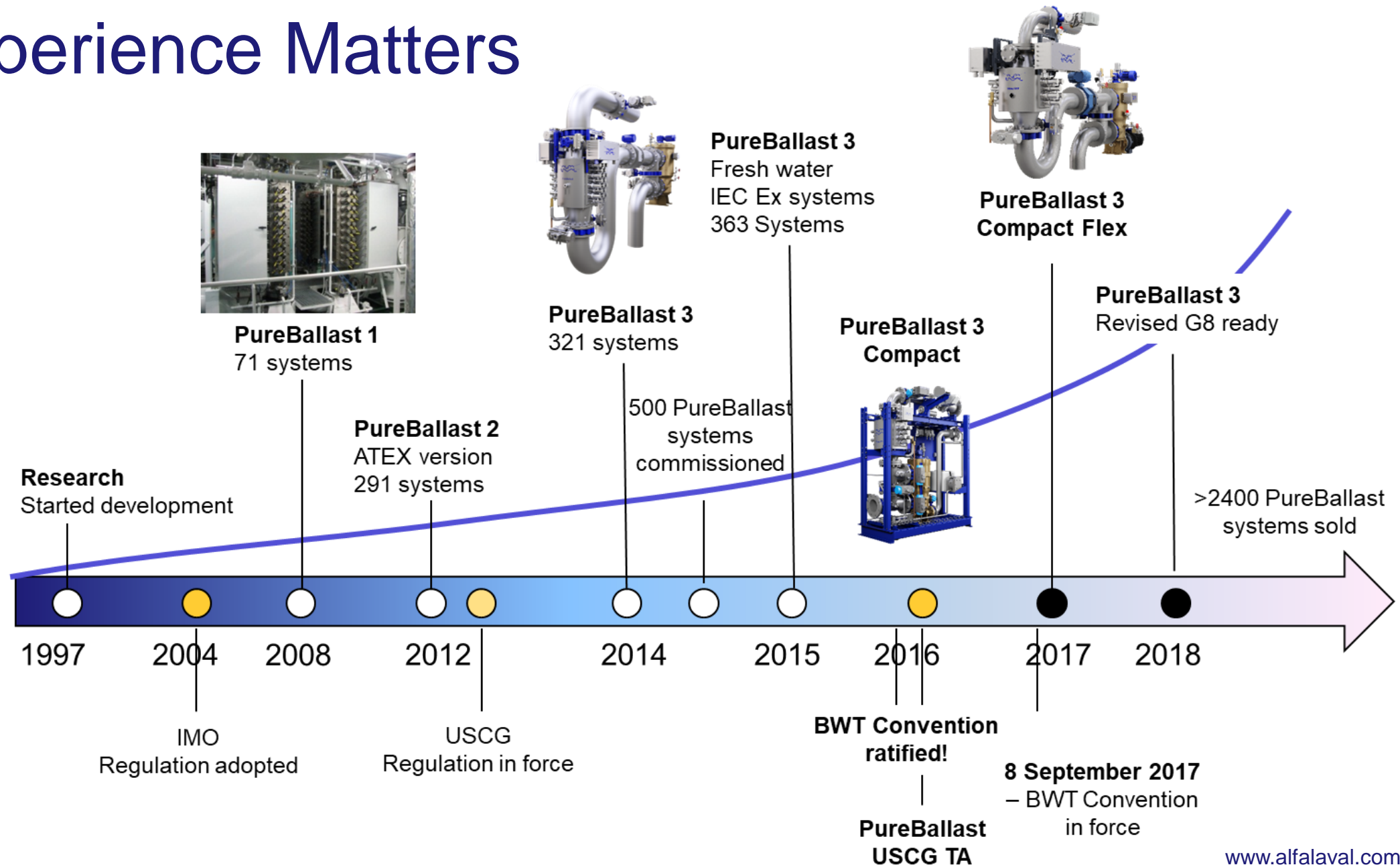
**LONGEST BWTS
EXPERIENCE** – A decade at
the forefront

COMPLIANCE in all waters
now and in the future

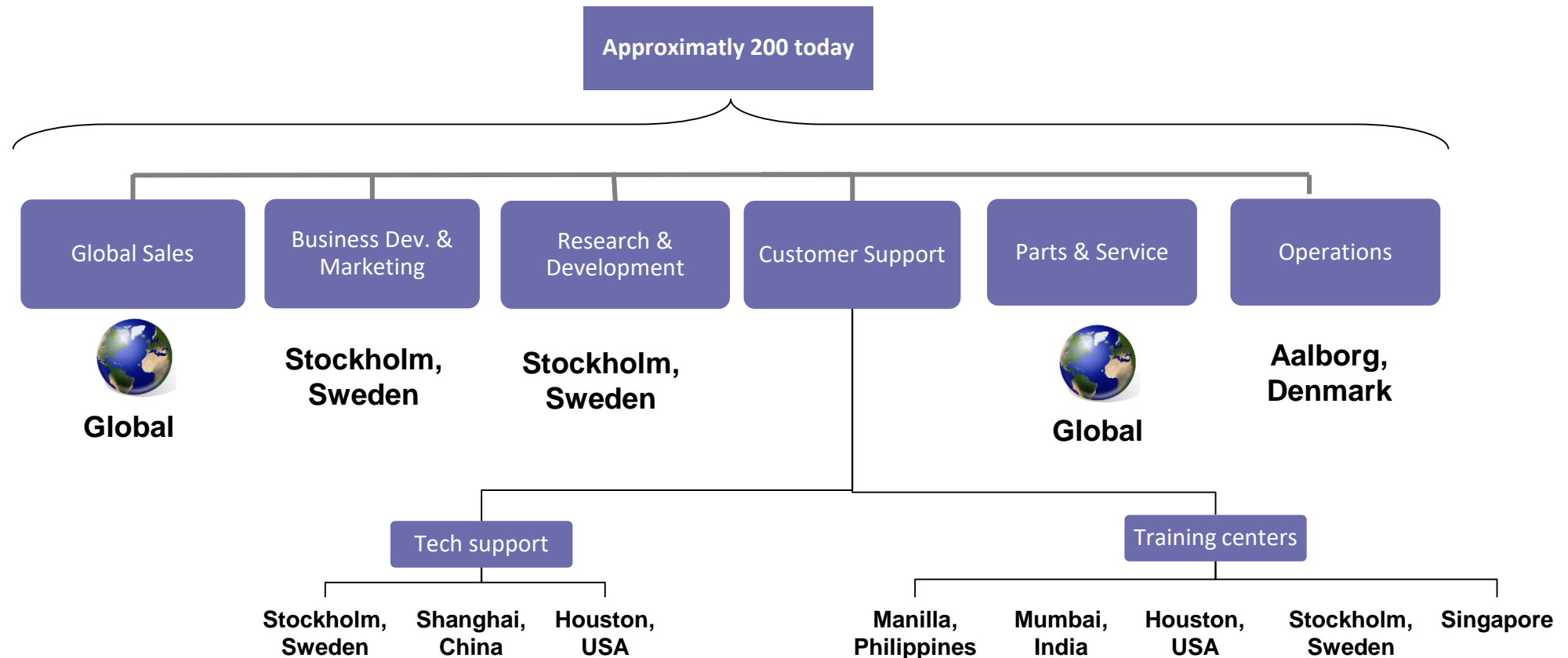


THE WORLD'S STRONGEST
BWTS SUPPORT NETWORK

Experience Matters



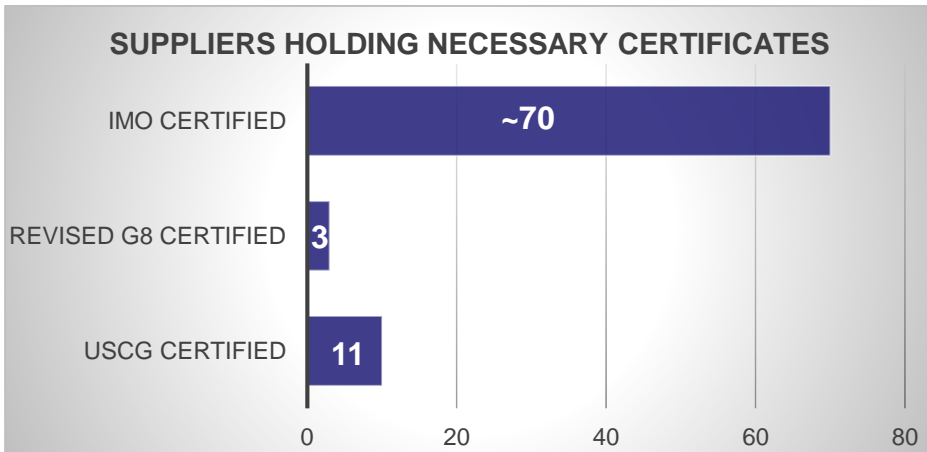
How we are organized



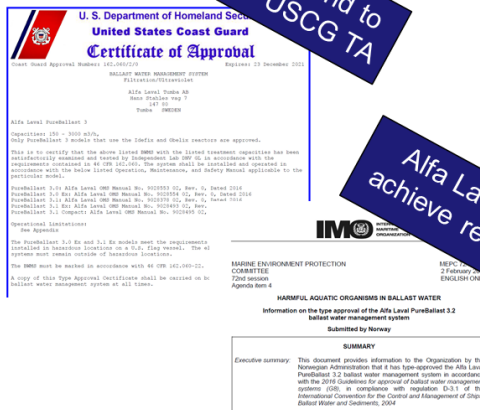
PureBallast is building a global organization for a lifelong commitment!

ALFA LAVAL'S VALUE OFFERING

Legislation - What do you need to know!



- **IMO** - By Sept 8th 2017
 - Newbuild
 - Retrofits
- **USCG** - Existing vessels without approved extensions need to install BWTS at next scheduled dry dock
 - New policy letter as of 14th February
- **Revised IMO G8** - Installations from 28th October 2020 and onwards should have revised 2016 G8 certification
 - The revised certificate gives vessel owners peace of mind in planning future-proof fleet retrofit installations



Alfa Laval 2nd to achieve USCG TA

Alfa Laval 1st to achieve revised G8

To succeed in being "**LEADING** provider of discharge **COMPLIANCE**" it is crucial to always be an early adapter

The PureBallast family

Standard & Ex



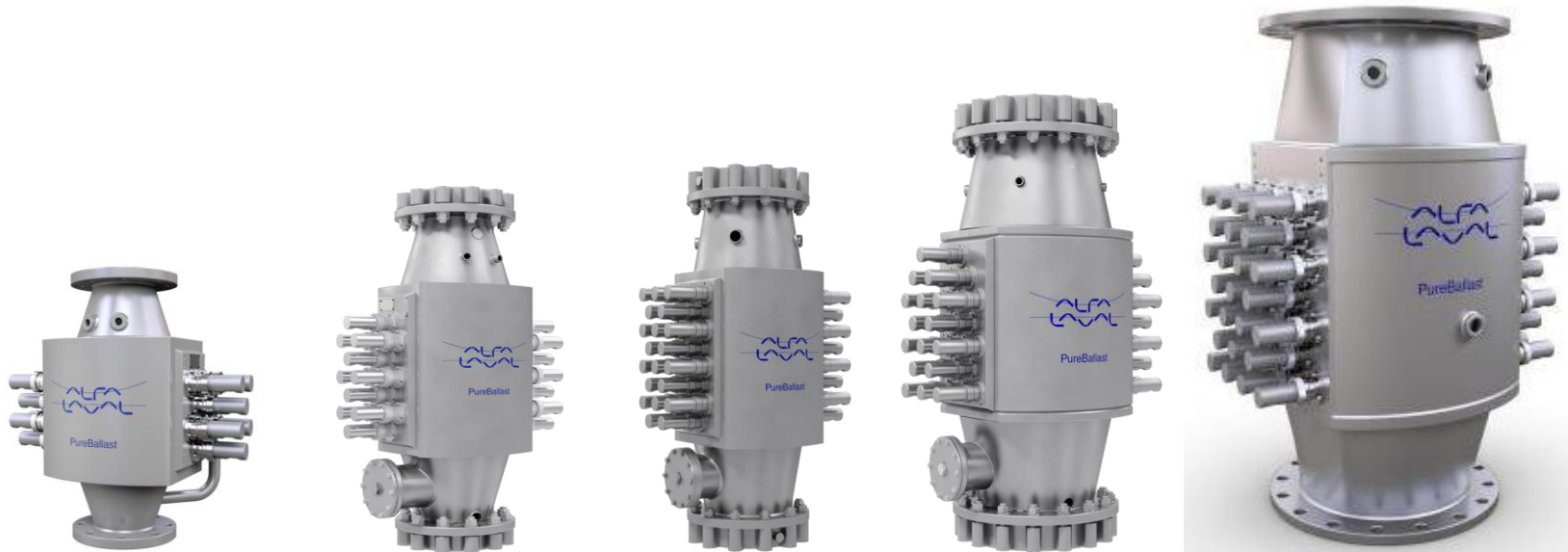
- **Pioneer** in BWTS
- Development started 2004
- UV/filtration system, **32 – 6,000 m3/h**
- **IMO & USCG Approved!**
- Handles UV-T down to **42% at full flow!**
- Works in **challenging** water
- **No limitation** in salinity or temperature
- Tested and **approved** in all three water qualities:
 - Fresh water
 - Brackish water
 - Marine water

Compact & Compact Flex



- Up to 40% **reduced footprint** compared to PureBallast 3.1
- **Skid** mounted or loose components
- **Market leading** disinfection performance
- Reduced power consumption through **UV-dosage** control
- Available flow rates: from **85** up to **1 000m3/h**
- Address the specific challenges with the retrofit on vessels – **space and flexibility**
- Delivered as **loose components**
- Same **market leading performance** as PureBallast 3.1 family

PureBallast UV reactor family



170 m ³ /h	300 m ³ /h	600 m ³ /h	1000 m ³ /h	1500 m ³ /h
6 x 3 kW	10 x 3 kW	20 x 3 kW	16 x 6 kW	24 x 6 kW

Reactor sizes developed to match our clients need!

Technology overview

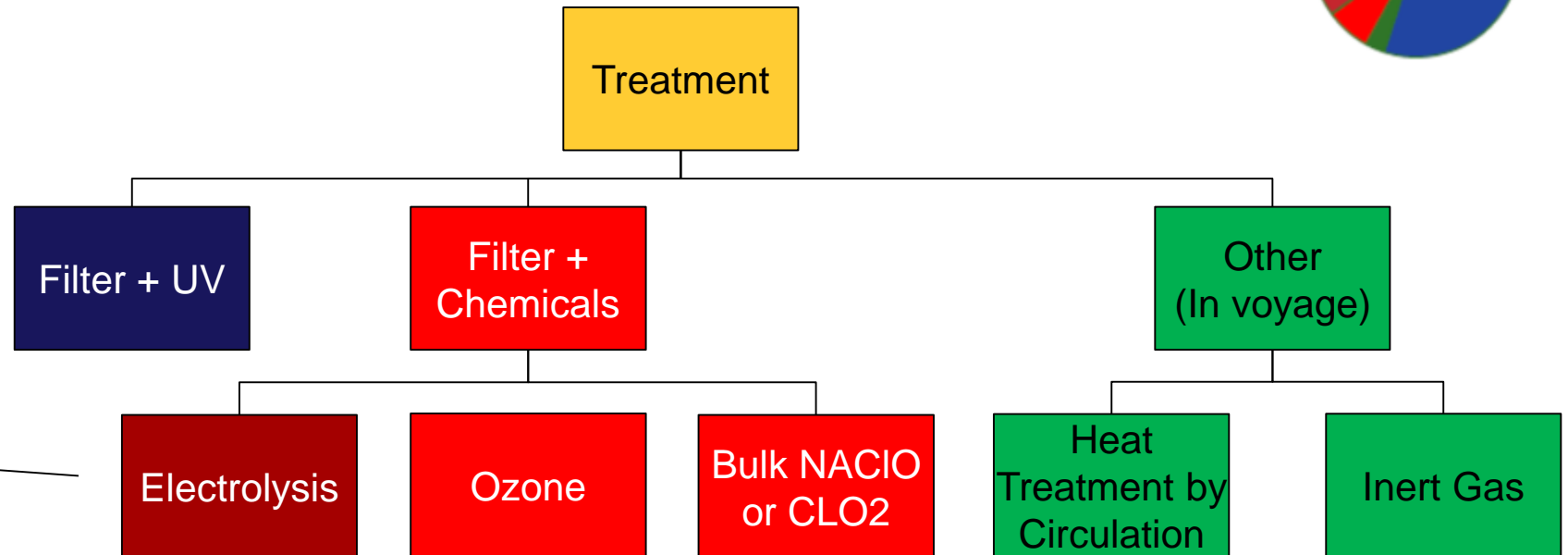
Market Share



Industry pre-conception

Mostly suitable for small flows

Mostly suitable for large flows



PureBallast – Large capacity systems



- Single system sizes up to 3000 m³/h / Ex
- No use of chemicals or active substances
- Independence of temperature and salinity
- Low OPEX
- Strong partner with global presence and experience
- Easy installation and operation
- No requirements for monitoring or reporting of TRO

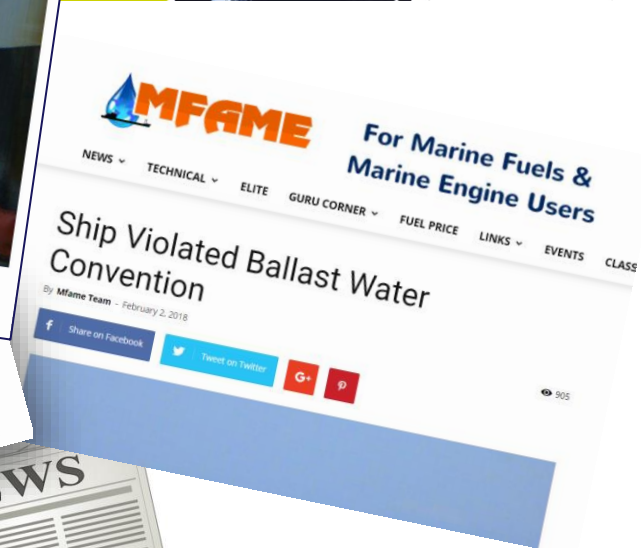
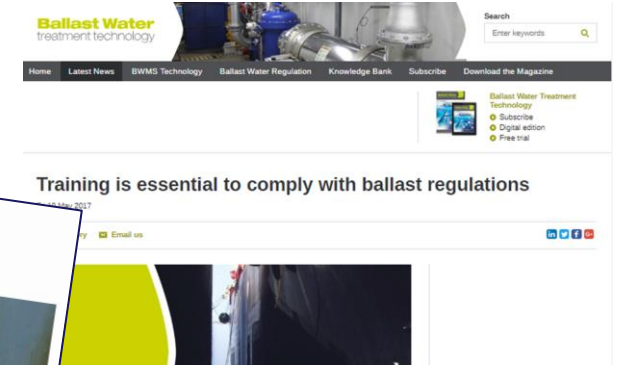
New 1500 m³/h reactor for Alfa Laval PureBallast 3 will handle large ballast water flows with even greater efficiency



RETROFIT MANAGEMENT

- the Good, the Bad, the Ugly

The importance of choosing the right partner!



The penalty

A security deposit of EUR 33,551 was paid by the Russian First Officer (52) for an unauthorized introduction of ballast water, reports Water Resources Act (WHG). In addition, a further security deposit of EUR 1,000 was ordered against him and the Greek captain (63) by the Federal Maritime and Hydrographic Agency (BSH), because in the so-called garbage diary no waste water disposal was registered for two years and the waste



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Lack of time invested in preparation leads to....

- Unclear responsibility for the project between involved companies
- Lack of project management
 - Misunderstandings, delayed delivery, wrong delivery and additional costs
- Late changes in scope of supply
- Only checking floor area lead to lack of maintenance height
- Not checking pump performance lead to insufficient back-flushing of filter
- Lack of BWMS knowledge lead to wrong installation and insufficient functionality



...mistakes in installations

**Lamps in UVR
not perpendicular
to inlet flow.**



**CIP unit installed
on a higher level
than UVR.**



**Air filter (V201-8)
installed upside down.**



Support missing.



A successful BWTS installation require preparation

- **Invest time in the beginning to set up the project**

- Establish project organization including representatives from involved parties
 - Agree on responsibilities
- Education of customer, engineering company and installation company
- Take enough time to execute the project

- **Involvement of supplier**

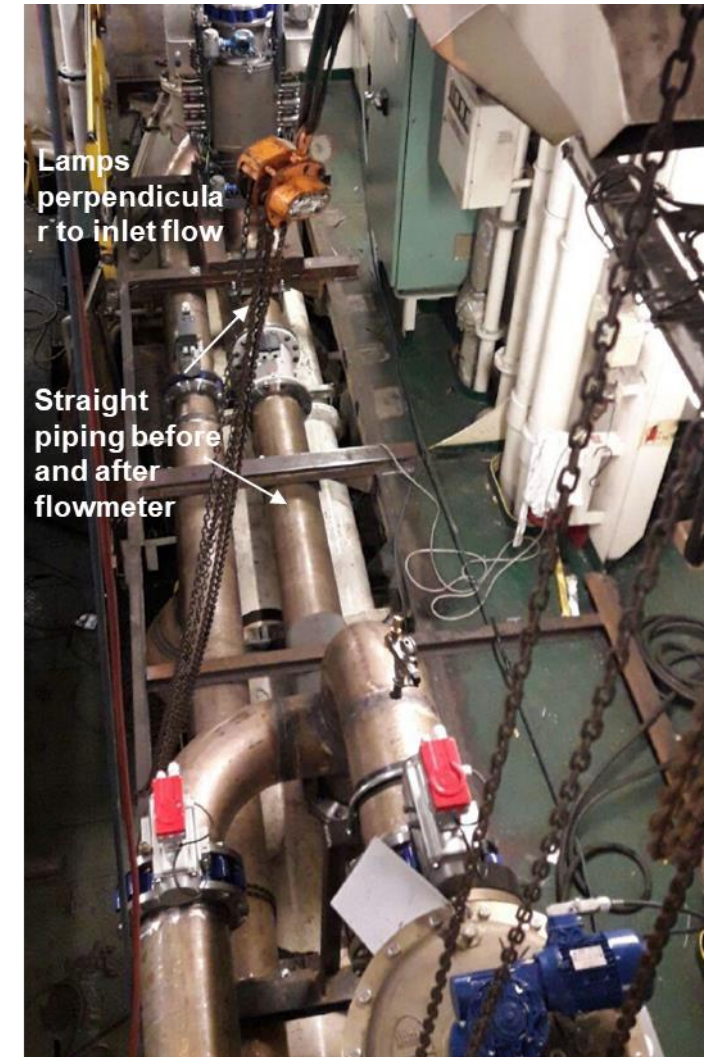
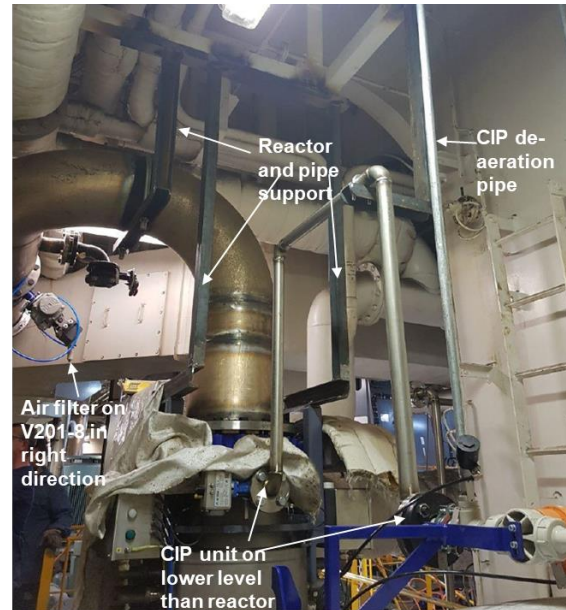
- Education
- Verification of engineering
- Installation support



**No customer is the same
No ship is the same
No project is the same**

Example of good installation

- Free space left for maintenance.
- Pipes and components properly supported.
- Air filter on control valve correctly installed.
- CIP on lower level than reactor
- CIP de-aeration pipe approx 2 m above reactor.
- Flowmeter installed on a low level (filled pipe) with straight pipe before (5xDN) and after (2xDN).
- UV lamps perpendicular to reactor inlet flow.
- Pressure monitoring device installed in vertical direction on a horizontal pipe



SUMMARY

When evaluating alternatives one should use the Total Cost of Ownership (TCO) approach

Decisions should not be made
by simply comparing the
acquisition price.

There are other component that needs to be considered such as:

Actual power consumption

Survivability of the company after retrofit
period

Consumables

Repair and Maintenance cost

Warranty

Availability of replacement parts

Expected lifespan

After-sales service (eg technical support)

Training of crew

Summary

- The BWTS installation phase is all over us
- Early planning and partnering with the right supplier is crucial for a sustainable installation.
- Compliance with current and future regulations is key.
- Project management key to successful retrofit project execution
- Service part of long term co-operation between supplier and shipowner essential to keep system operable over time.



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Questions?

