ENVIRONMENTAL SOLUTIONS FOR AIR AND WATER

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Environmental issues need solutions

- Particulates
- SO$_x$
- NO$_x$
- CO$_2$
- Ballast water
- Waste water
- Bilge water
Cleaning the exhaust gases
Strict regulations have been set

Emission Control Areas (ECA) – Sulphur (SO\textsubscript{x}) limits

Emission Control Areas (ECA)
Options to meet legislation

- Low Sulphur Residual Fuel (LSFO):
  - Limited availability

- Low-Sulphur Distillates (MGO):
  - Similar to automotive fuel
  - Supply shortage in 2015
  - Significant price premium

- Liquid Natural Gas (LNG), Compressed Natural Gas (CNG)
  - Natural gas prices expected to remain low
  - Attractive option for some routes
  - Bunkering infrastructure needs developing

- High Sulphur Residual Fuel (HFO) with scrubbers is the cost effective solution for many customers
Significant market potential

- Market is in its infancy but set to develop as 2015 approaches
- Biggest market is retrofit
- Approximately 8,000 vessels affected by current ECA regulations
- Global cap in 2020 will effect an estimated 40,000 vessels
- Retrofit value between €1m to €5m per vessel
- Newbuilding market – estimate 5% of newbuildings likely to fit scrubbers
Wärtsilä is set to win

- With the acquisition of Hamworthy, Wärtsilä is now by far the market leader
- More marine references than the rest of the market combined
  - 8 systems installed/delivered
  - 7 systems on order
- Few competitors
- Sources of competitive advantage for Wärtsilä:
  - Highly developed sales channel
  - Global service organisation
  - Leading technologies
  - References

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Ballast water treatment to stop invasive species

Needed to stop the spread of non-indigenous invasive species via the management and treatment of ship ballast water and sediments

- 7,000 species can be carried in a ballast tank at one time
- 7 billion tonnes of ballast water are discharged each year
- One of the greatest threats to the world’s coastal waters
- Accelerating the spread of harmful organisms

Three of the top 10 most unwanted invasive species transported in ballast water:

- Zebra mussels
- Jellyfish
- Chinese Mitten Crab
Legislation driven

- Implemented globally one year after ratification
- Hurdle for ratification is 30 countries representing 35% of the world’s tonnage – currently 33 countries representing 26% have signed
- US has stated it will adopt IMO (International Maritime Organization) standards and is implementing legislation independently
Biggest market potential is retrofit

- Over 40,000 vessels affected by the legislation
- Newbuild market will be 1,000+ vessels per annum once market is mature
- Average equipment value per vessel circa €500k; retrofitting cost can be a similar value
- 2016 deadline may be relaxed spreading retrofit market over a longer timeframe
Wärtsilä is in good position

- Over 30 competitors in the market with also new entrants
- Few suppliers with credentials, resources and routes to market
- Technologies are concentrating around two alternatives
  - Filter + UV
  - Filter + Electro Chlorination
- “Fast-follower” strategy has allowed Wärtsilä to develop highly competitive solutions
- Wärtsilä is the only player to offer a technology choice
- Wärtsilä has a unique in-house ability to deliver turnkey solutions and lifecycle support
- Wärtsilä has an unrivalled sales network
Technology development of a global leader

- Wärtsilä UV based system developed in conjunction with Trojan, a global leader in UV water treatment systems
- Hamworthy has developed two alternate systems (UV and Electro-chlorination) to offer a portfolio approach
- Hamworthy land based testing complete and sea-trials virtually so
- Wärtsilä /Trojan system land based testing and sea trials underway
- We will have a Type Approved system on the market this year
Winner in growing environmental markets

- Exhaust Gas Cleaning and Ballast Water Treatment represent two new market opportunities
- Both markets are expected to develop from 2013 onwards
- Market value for equipment alone over next ten years expected to be in excess of €30bn
- The retrofit market offers the biggest potential and this will be the main focus area for us
- Wärtsilä is well positioned to win