SHIP POWER
YOUR SHORTER ROUTE
TO BIGGER PROFITS

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Group Vice President, Ship Power
Shipping has a future

90% of world trade is still done by sea

NO SUPRISE it doesn’t cost a thing

LESS THAN 1.0% of the price of coffee comes from the cost of sea transportation

Sea transports are still the MOST SUSTAINABLE means of transporting goods
Shipbuilding activity development

- 2011: a significant shift in contracting activity
  - Mix of vessels contracted favoured specialised tonnage
- Shipyard order books continue to decline
  - Order books continue to be high compared to historical levels, highlighting overcapacity in certain segments
- Deliveries peaked in 2010, after a massive expansion in capacity during 2004-2010
  - Shipyards will face tough competition to secure new orders and fill capacities

Source: Clarkson Research Services
Merchant: slow down and differentiation

- Strong niches and slow recovery
- Instability in Middle East drives up oil prices
- LNG demand boosted by oil supply uncertainty and increased anti-nuclear power sentiment
- Shale gas projects in US are flooding the market with cheap gas, leading to increased export potential
Offshore: good fundamentals

Fundamentals are good

- High global demand for oil and gas
- Increased concerns over tight supply/demand balances drive further offshore exploration and production
- Current oil prices support investments
- No over ordering (during boom years) for exploration and production vessels
- Good and vast list of projects (requiring newbuildings or conversions) in the pipeline

Offshore contracting activity

Contracting by vessel category

<table>
<thead>
<tr>
<th>Year</th>
<th>Drilling</th>
<th>Production</th>
<th>Support</th>
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<td>2011</td>
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Number of vessels / Units

Source: Clarkson Research Services
Special vessels market demand responding to global financial crisis

- Significant increase in fishing vessel contracting during Q1/2012
- Strong list of newbuilding projects in the pipeline, especially for dredgers, heavy-lift vessels, wind farm installation/support vessels, and inland waterways.

Cruise & Ferry fundamentals are good

- Stable demand for ferries and ROPAX vessels. Renewals of older tonnage is driving current investments.
- Some excessive ordering (during boom years) for certain vessel types, contracting levels are normalising
- Increasing number of Asian C&F projects in the newbuild pipeline

Source: Marine Market Database
Vessels included: Cruisers, ferries, passenger vessels, passenger & cargo vessels/ROPAX

Source: Marine Market Database
Vessels included: Inland vessels and service vessels (fishing vessels excluded)
Shipbuilding has moved to Asia

Contracting volumes (DWT): share by region

Source: Wärtsilä’s Marine Market Database
Future challenges and opportunities

The fundamentals show risks and opportunities
- Risks of downturn in global economy are tangible
- High oil prices represent a risk towards global economic growth, however they also stimulate investments in exploration and production for oil and gas
- Expansion of emerging economies continues to support growth of demand for transportation of raw materials and energy

Highlights about the present
- Earnings levels are comparable to all time low
- Overcapacity continues to cast shadows in the main merchant segments

The future brings interesting challenges!
- Ship owner base is shifting and increasingly Chinese
- Increasing interest in the market for gas applications
- Increasing focus on energy efficiency and environmental performance
- Increasing competition from Asia
Ship Power’s focus on growth

FOCUS ON GROWTH:
- Gas fuelled vessels
- Environmental compliance / efficiency optimised vessels

FOCUS ON EXCELLENCE:
- Operational Excellence and Flexibility
- People & Culture

Countries:
- China
- Brazil
- South Korea
- Russia
- India
Emission controlled areas will increase

Established Emission Controlled Areas
Emission Controlled Areas under consideration
Shipping critical points
Alternatives for decreasing emissions

**LNG**
- Simultaneous reduction of GHG / SO$_x$ / NO$_x$ / PM
- Market: mainly ships with regular routes and limited autonomy requirements operating in ECAs
- Infrastructure development is needed for larger uptake
- Conversion solution available

**HFO**
- NO$_x$: SCR or wet methods
- SO$_x$: scrubbers
- Market: mostly merchant ships operating a significant time in ECAs

**MGO**
- NO$_x$: SCR or primary methods
- Market: ships operating a limited time in ECAs, small ships

Wärtsilä is developing a multi-solution approach to meet requirements for different ship types and operational profiles
Natural gas reduces emissions

- GHG: -20%
- NOx: -85%
- SOx: -99%
- Particulates: -99%

Dual-fuel engine in gas mode

Diesel engine
Gas fuelled vessels - market development & drivers

**Estimated new building market (contracting)**

- **Total newbuilding market forecasts-IHS Fairplay March 2012**
- **Gas fuelled vessels market - LNG price<HFO price**
- **Gas fuelled vessels market-LNG in current price level**

**Main drivers for the market are environmental legislation, fuel price and gas availability**

- **Environmental legislation**
- **Gas handling regulations**
- **Predictability of energy policies**

- **Cost of gas vs. abatement technology**
- **Gas price vs. alternative fuels (HFO)**
- **Gas availability & bunkering infrastructure**

- **Engine technology exists**
- **Onboard gas storage technology is improving, but feasible already today**
- **Further application engineering needed**

*IHS Fairplay/Lloyds Fairplay = SAI (Institute of Shipping Analysis)*

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Clear leadership in dual-fuel applications

~180 installations → >5,000,000 running hours

Power Plants
DF power plants
• 51 installations
• 186 engines
• Online from 1997

Merchant
LNG carriers
• 108 vessels
• 429 engines
Conversion
• 1 Chem. tanker
• 2 engines conv.
• Complete gas train
• Complete design

Offshore
PSVs/FPSOs
• 20 vessels
• 96 engines
• Online from 1994
New orders:
• Harvey Gulf; the first 4 LNG-PSVs to be operated in the Gulf of Mexico

Cruise & Ferry
LNG ferries
• 1+1 vessels
• 4 engines per vessel
• Complete gas train
• 2,800 passengers
• In service in 2013

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Solutions for LNG powered vessels

- A. Storage tanks
- B. Evaporators
- C. Dual-fuel main engine
- D. Dual-fuel aux engines
- E. Bunkering station(s)
- F. Integrated control system

LNGPac: a complete and modularised solution for LNG fuelled ships
Our low speed dual-fuel engines will comply with IMO regulations

- Program announced in February 2011
- Successful test announced in September 2011
- Dual-fuel capability
  - Fuel flexibility enables low emissions and the lowest operating costs
  - LNG – MDO – HFO
- Low gas feed pressure
  - Safety: no high pressure piping
  - Simple system: low installation and operating costs
- No secondary equipment needed to meet IMO Tier III or 0.1% sulphur limits
Hamworthy in a nutshell

- Specialist provider of fluid handling equipment and services for marine and offshore
- Leading position in key sectors
- Significant long-term growth opportunities driven by environmental legislation and energy demand
- Strong technology platform and R&D

FY 2010 revenue by sector

Marine: 50%
- LNG & LPG carriers
- Oil and product tankers
- Cruise ships
- Dry merchant marine
- Naval

Oil & Gas: 24%
- FPSOs
- Drilling rigs
- FLNG
- Onshore LNG
- Regasification
- CNG

Industrial: 22%
- Power generation

Services: 4%
- Marine
- Offshore
Flow solutions
- Deepwell cargo pump systems
- Pump room systems
- Fire fighting systems
- Seawater lift pumps
- Engine room pumps
- Ballast pumps
- Seawater valves

Oil & Gas systems
- LNG/LPG/Ethylene reliquefaction
- LNG regasification
- Small scale LNG plant
- LNG fuel systems
- Oil/water separation
- Hydrocarbon blanketing
- Flare gas recovery

Water systems
- Grey & black water treatment
- Vacuum toilet systems
- Fresh water generators
- Air and water cooled condensers
- High pressure compressors
- Ballast water treatment

Inert gas systems
- Exhaust gas cleaning
- Inert gas systems
- Nitrogen generators

Services
- Service
- Replacement
- Upgrades
- Spares
- Training
- Retrofit
Hamworthy will benefit from Wärtsilä footprint

- Wärtsilä sales & services
- Wärtsilä production (incl. JVs)
- Hamworthy sales & services
- Hamworthy production
Wärtsilä and Hamworthy: total offering

Automation

Power drives

Power distribution

Communication and control

Flow & Gas Solutions

Environmental Solutions

Service agreements

Ship Design

Engines

Seals & bearings

Propulsion
Supporting our customers in environmental compliance

Legislation → compliance with all requirements
• Wärtsilä’s solutions to receive early approval from all relevant authorities

Functionality → technical risks to be minimised
• R&D competences and capacity
• Testing and validation on land and onboard, partnership with customers
• Design/engineering support: ship design and system integration
• 24/7 support to customers

Costs → focus on minimal total costs
• TCO optimisation (capex, installation, operation and maintenance)

Delivery capacity
• Industrialisation ramp-up plans to manage rapid demand increases