



Operational & Environmental Performance: Example of COME in Marine Application

Jakob Buus Peterson
Director, Client Support – Europe Division

Glasgow
8-9 April 2014

Energy Efficiency: Key Issues

- High fuel cost
 - Increased from \$140 to \$600 per ton
- Global economy (low freight rates)
- Overcapacity of tonnage
- New energy efficient tonnage supply
- Regulatory landscape
 - Ballast water treatment
 - ECA, SoX, NoX, LNG, scrubbers
 - EEDI, EEOI, SEEMP, MRV
- Many energy-saving technologies
- Financing



Industry Stakeholders: Changed Relations

- Change affects all players in the industry:
 - Shipowners
 - Cargo operators, including pool operators
 - Ship managers
 - Ship yards and ship designers
 - Investment funds, banks
 - Suppliers of hardware / software solutions
 - Classification societies
 - IMO, EU, USA, NGOs, society, etc.

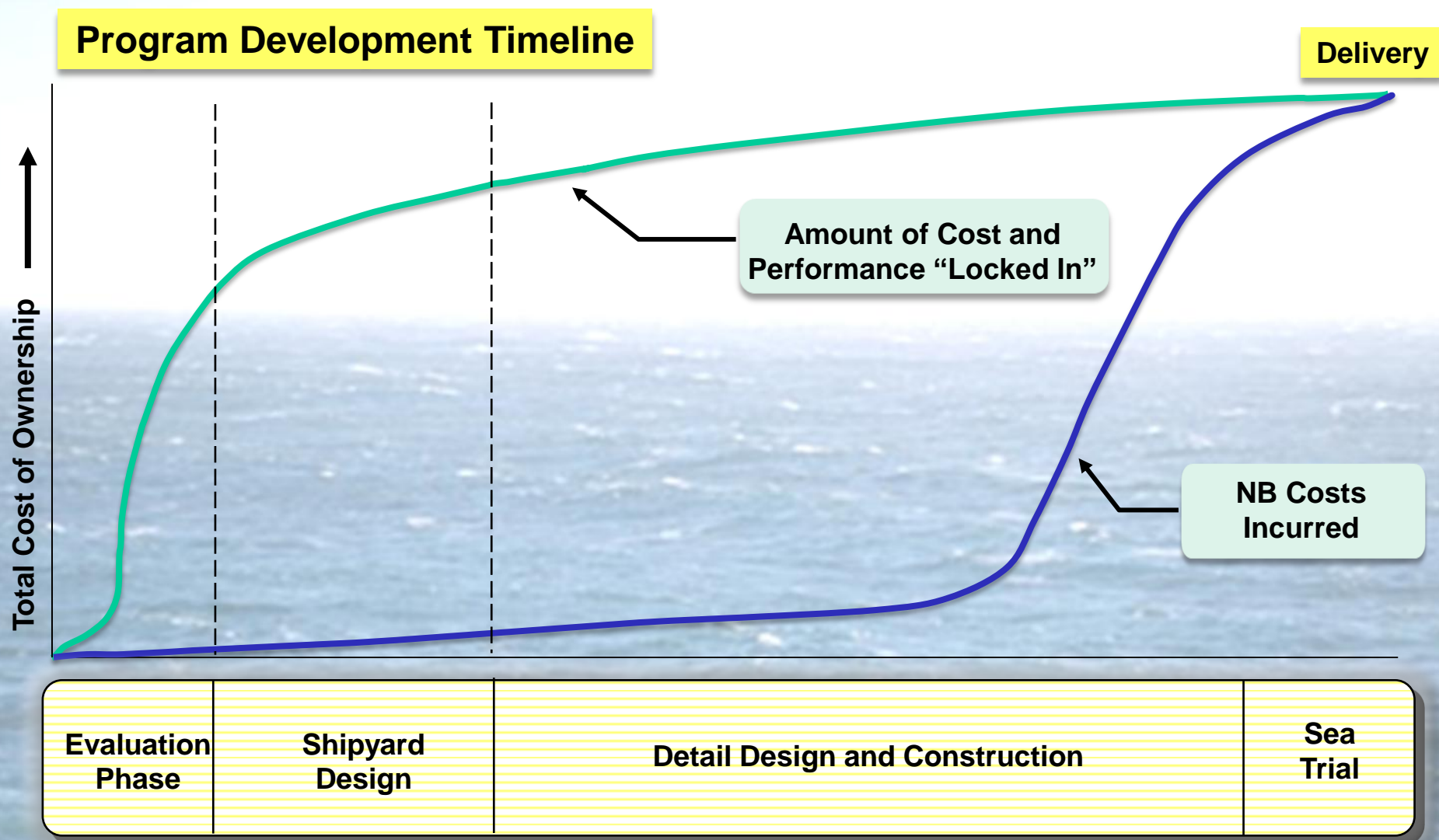


Fuel Efficient Vessel Operation

- Newbuilding
 - Design for operational profile
 - ECO-ships, yard spec., contract details
- Retrofit on existing fleet
 - Propulsion optimization, bow, propeller etc.
 - Machinery optimization for new operational profile
 - Energy-saving devices
 - Initiatives to improve capacity
- Operational vessel performance
 - Technical
 - Operational
- Environmental compliance
 - SEEMP, EEDI
 - SOx, NOx, ECA areas

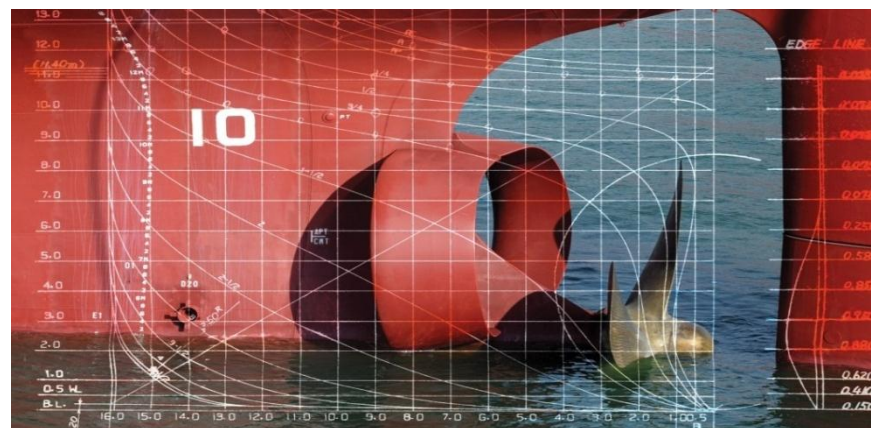


Newbuilding: Total Cost of Ownership vs. Time



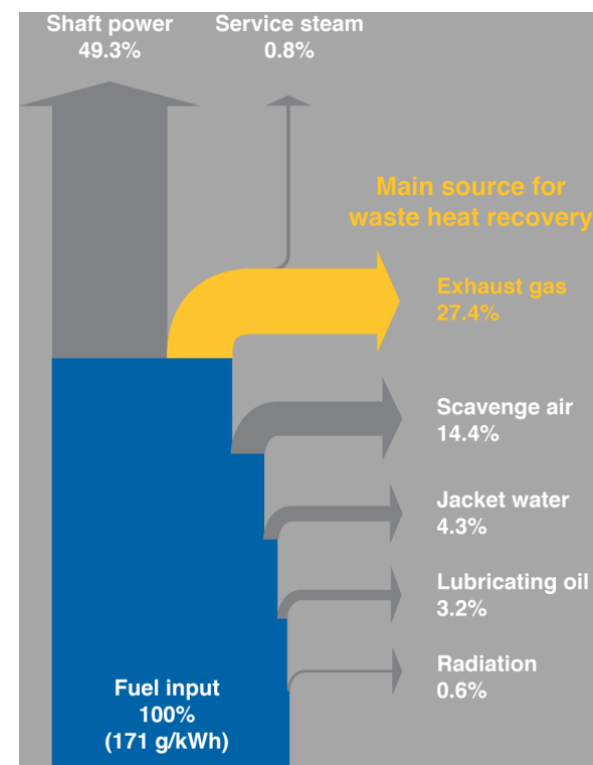
Fuel Efficient Newbuilds

- Assistance in initial design phase, pre-loi, pre-contract stage
 - Operational profile, trade route analysis
 - Evaluate hull lines, propeller, parametric optimization, benchmarking
 - Review of contract specifications
- Assistance with final design optimization
 - Joint effort with owner, yard, and suppliers
 - Propulsion: operational profile, hull lines, propeller, rudder, main engine, machinery systems, ESDs; EEDI impact on design
 - Fuel: LNG, HFO-MDO, ECAs
 - Seakeeping:
 - Added resistance/speed loss
 - Lashing arrangements
 - Slamming loads and response



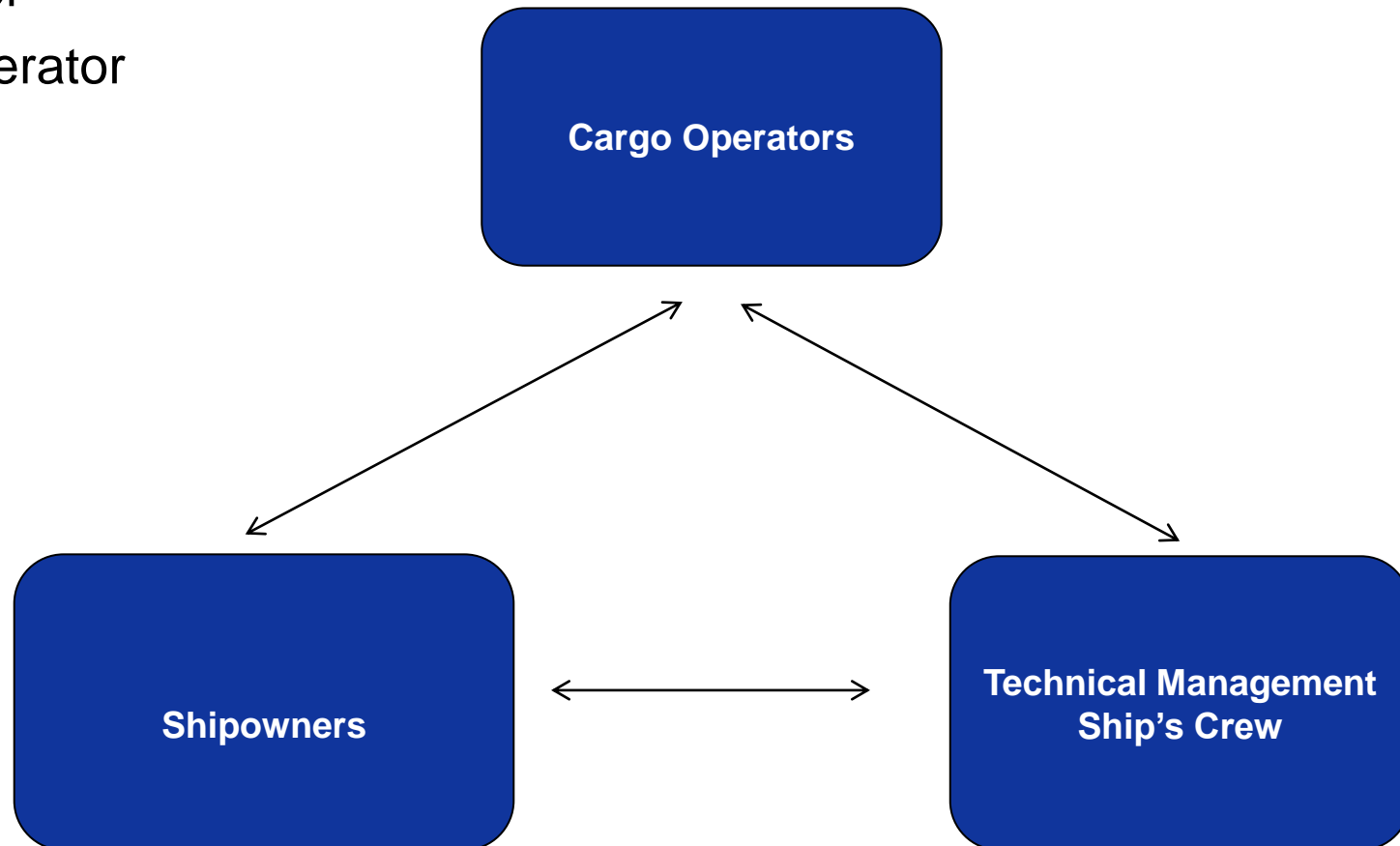
Existing Fleet: Improving Vessels in Service

- Energy audits
- Benchmarking -> low hanging fruits
- Advise owners on modification of hull lines, e.g. bulbous bow, for actual operational profile
- Retrofitting of propeller and energy saving devices based on operational profile
- Machinery retrofit (main engine, auxiliary engines, ancillary systems, PTI/PTO, waste heat recovery, alternate fuels, new configurations)
- Increase cargo capacity
- ECA compliance: scrubbers, LNG and fuel switching
- Technical and financial assessment



Operational Performance: Ships in Service

- Energy efficiency, which factors of can be influenced by:
 - Ship management (including crew)
 - Shipowner
 - Cargo operator



Ship Management (including Vessel Crew)

- Classic ship management: no interest in fuel-savings, lube oil more interesting
- Today ship management companies realize that fuel-savings are important going forward
- Ship management makes decisions on:
 - Maintenance of equipment (main engine, auxillary, sensors, etc.)
 - Drydockings – hull treatment, antifouling, propeller
 - Hull cleanings, propeller polish
 - Newbuilding design
 - Crew composition



Ship Management (including Vessel Crew)

- The ship crew makes decisions on:
 - Optimize base load (minimize consumption, optimize production)
 - Vessel – shore communication
 - Voyage efficiency (speed profile, route optimization)
 - Maintenance and equipment optimization
 - Performance monitoring and engine testing
- In many cases, charter party conditions are important
- Monitoring, optimization and benchmarking are key



Shipowner

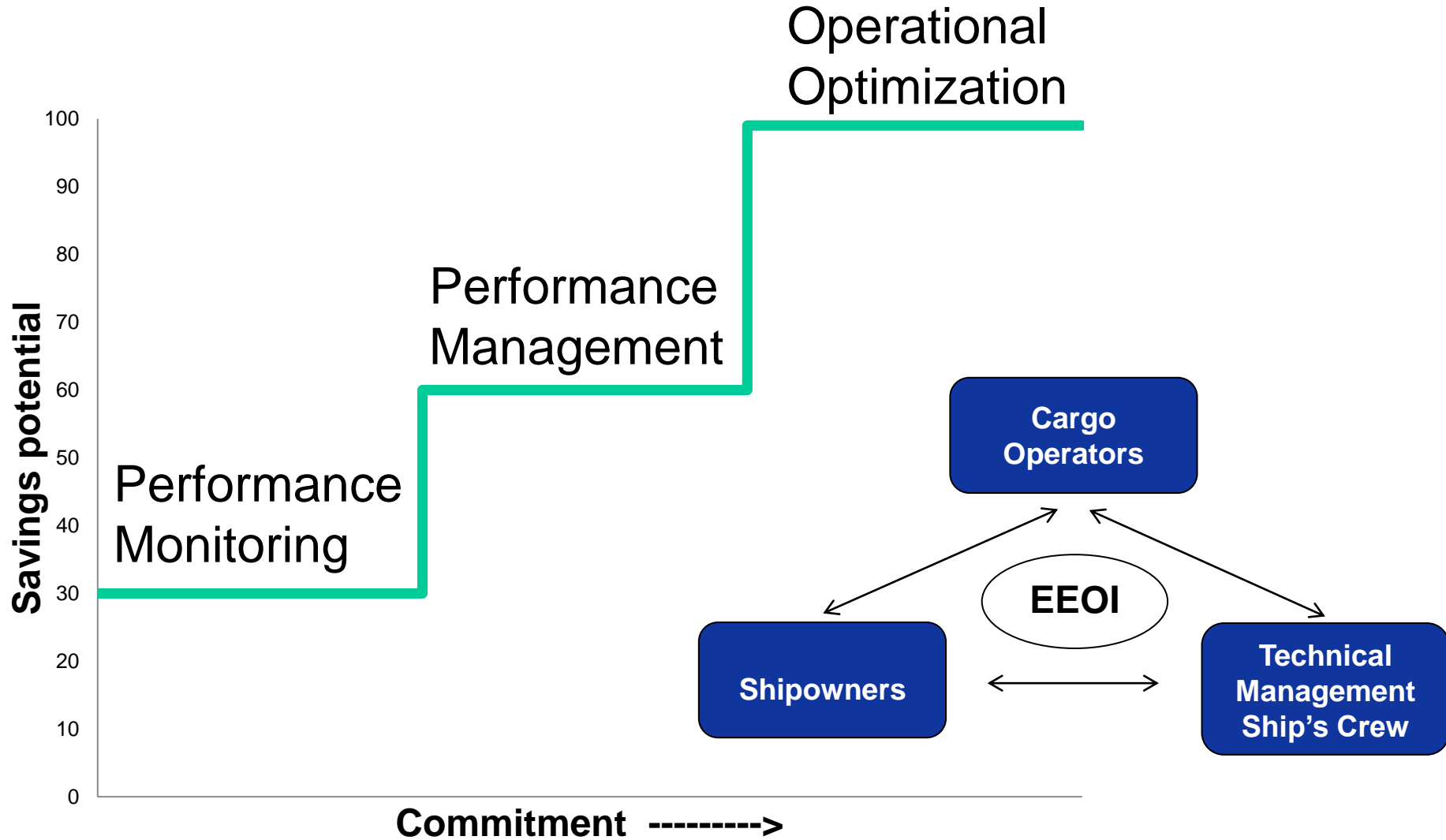
- The value of a vessel will become closely correlated to how fuel efficient it is (asset value, charter rates)
- Owner must know efficiency of each vessel class
- Owner must know current performance of each individual vessel
- Owner negotiates charter party conditions with cargo operator
- Closely work together with ship management
- Responsible for fleet composition, asset management:
 - Newbuilds, owner must know fuel efficiency of yard prospects – how to do that?
 - Retrofit – identify solutions with reasonable ROI – track improvement
 - Let go of less efficient tonnage?
- Monitoring, optimization and benchmarking are key

Cargo Operators: Ship Operations

- Fuel efficiency is important
- Fleet composition:
 - Cargo to match vessels
 - Seek fuel efficient tonnage
- Optimize operations:
 - Right ship for right cargo
 - Utilization
 - Speed and capacity optimization (slow steaming)
 - Harbor operations
- Fuel efficiency will become more important in chartering – long term and short term
- Improving processes around expected performance/charter parties
- Monitoring, optimization and benchmarking are key



Energy Efficient Vessel Operation



Conclusions

- The industry is facing new challenges
- Fuel savings (money) and new regulations are drivers in taking care of the environment
- Optimization and efficiency improvements are on-going; efficiency means less CO₂ per amount of transportation work
- Regulatory framework is becoming a major player
 - EEDI to improve CO₂ emissions, SEEMP, SO_x, NO_x regulations (ECA areas, low sulfur, LNG as a fuel)
 - Ballast Water Treatment and invasive species
 - Monitoring, Verification and Reporting (MRV) will happen, regulators are looking for an instrument
 - Under water noise is on the agenda in IMO
- The challenges will most probably only increase; there is a great need for skilled engineers



www.eagle.org