Marine – energy savings in reach

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Transport has a large potential
– Marine is an important part

Source: IEA. Possible scenario in 2035 if we act on both implemented and announced policies.
Marine market drivers
– Fuel cost as % of freight cost has increased significantly

Bunker prices

Fuel cost as % of freight cost

End 90s
15-30%

Today
50-70%

Source: Alfa Laval analysis
Marine market drivers
– IMO’s energy savings regulations

World fleet – Average scenario: A1B and B2-1

World fleet CO₂ level projections (average of A1B-4 and B2-1 scenarios)

Source: “Estimated CO₂ emissions reduction from introduction of mandatory technical and operational energy efficiency measures for ships” (2011) by Lloyds Register and DNV.
Market behavior
– Shipowners searching for energy savings

* Slow steaming and more
  – Shipowners adjust operations to save energy

* Eco-ships
  – Shipowners buy energy efficient ships

* Refurbishing ships
  – Shipowners rebuilds ships and retrofits equipment to save energy

Source: Maersk
Alfa Laval saves energy

Savings in a wider perspective

Fuel line:
- Fuel cleaning
- Fuel conditioning
- Waste fuel recovery
- Oily water cleaning

Steam line:
- Steam production
- Waste heat recovery, main engines
- Waste heat recovery, auxiliary engines
- Freshwater generation

2-3%

>10%

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Fuel line

Waste Fuel Recovery
Waste fuel recovery

- Up to 2% fuel lost on-board

The problem

- Up to 2% of the fuel oil never reaches the engine. It ends up in a waste oil tank
- Normal procedure is to pump this on-shore in the harbour
Waste fuel recovery
– Alfa Laval Pure Dry

The solution
✿ Alfa Laval Pure Dry – a unique combination of separation technology

Superdry solids

Savings up to ~1 000 €/day for a large ship
Waste fuel recovery
– Alfa Laval Pure Dry

*Savings up to ~1 000 €/day for a large ship*

* 100 units sold in 2013 and growth continues in 2014.

* Over time this product will be attractive to most ocean-going vessels.

* Price level = EUR 120,000.

* Alfa Laval is alone in the market with this product.
Steam line

Waste Heat Recovery
Waste Heat Recovery
– >50% of fuel is wasted

Standard diesel engine, example

Shaft power
49.3%

Exhaust gas
25.4%

Scavenge air
14.1%

Jacket water
6.3%

Lubricating oil
4.3%

Radiation
0.6%

Fuel input
100%
(171 g/kWh)

Shaft power increased from 49% to 55%

The solution

>50% of fuel burned is wasted and not converted into shaft power

Standard diesel engine, example
WHR for main engines
– Alfa Laval holds leading position in the market

- Pay-back is approx 3 years for large ships
- Attractive for large vessels and ship owners with a long term perspective
- Improves the EEDI (energy legislation index)
WHR for auxiliary engines
– Alfa Laval holds leading position in the market

- Unit price approx. EUR 70,000 with pay-back approx. 1 year
- 100 units sold in 2013 and growth continues in 2014.
- Attractive for large part of the ocean-going vessels
- Improves the EEDI (energy legislation index)
Summary

* Energy efficiency is a top priority for shipowners
* Alfa Laval has through innovations and acquisitions taken a leading position in energy savings, and more will come.
* Alfa Laval saves fuel and lower costs for major shipowners