



A leading supplier for Pulp and Energy

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Capital Markets Day 2018

Pulp and Energy business line offering



Pulp

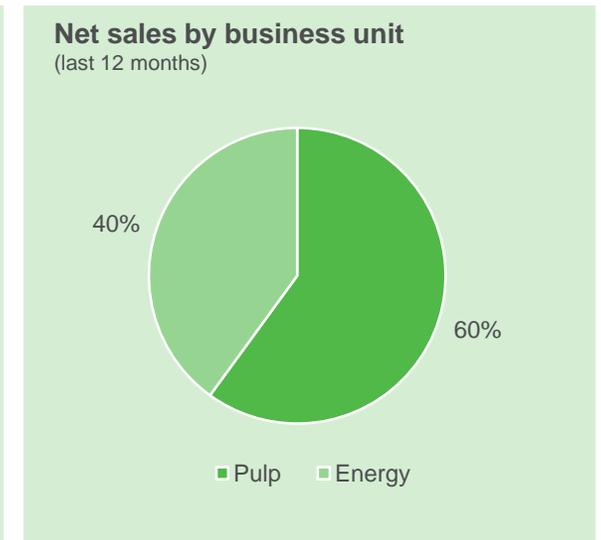
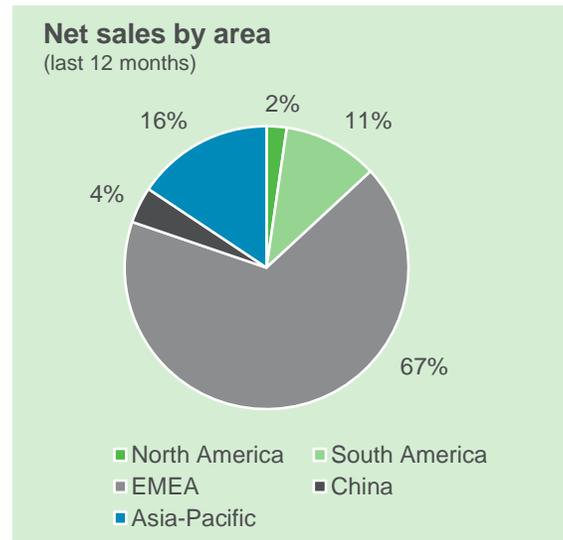
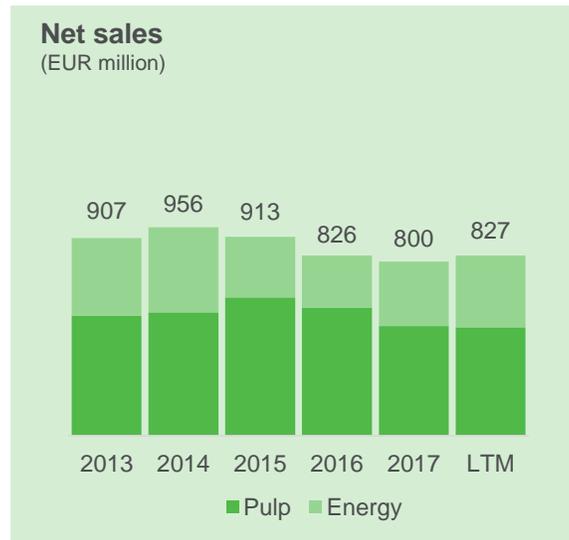
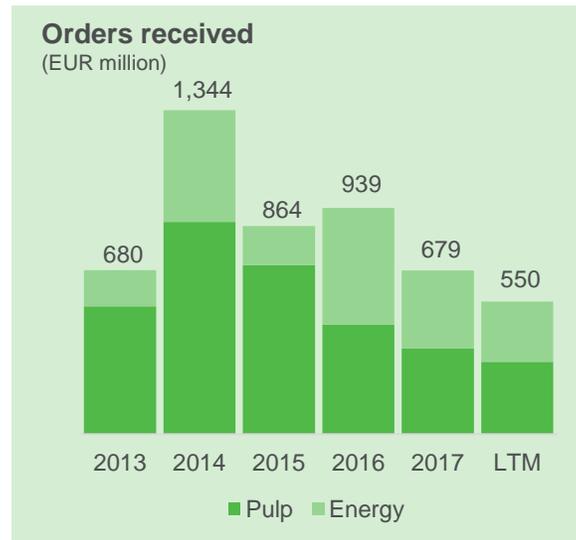
- Wood and pulp handling
 - Wood handling, fuel handling, pulp drying
- Fiber processing
 - Complete fiber lines, cooking systems, recausticizing
 - Mechanical pulping
 - Black pellet and pre-hydrolysis technologies
- Recovery
 - Recovery boilers, evaporation systems, lime kilns
 - Mill wide odorous gas handling, ash treatment
 - Sulfuric acid plants and lignin extraction



Energy

- Heat and power generation
 - Fluidized bed boilers, bio-grate boilers, biomass and waste gasification
 - Boiler islands and small power plants
- Air emission control
 - Flue gas cleaning and heat recovery for boilers
 - Emission control for process industry and marine
- Biofuels
 - Pyrolysis plants with emission control and burners

Pulp and Energy key figures at a glance



Market drivers

Pulp

- Growth in board and tissue consumption
- Need for virgin wood pulp. Decreasing availability of recycled paper and limitations to recycling rates
- Increased size of pulp lines and mills
- New applications for bio based products
- Increasing environmental awareness and stricter regulations

Energy

- Growth in energy consumption
- Demand for sustainable energy and shutdowns of coal capacity
- Modernization of aging plants
- Incentives and regulation driven, e.g. SOx and NOx emissions

Pulp	Market position	Market share	Estimated market size	Long-term end market growth
	#1-2	~40%	EUR 1.4 bn	~1%
Energy	Market position	Market share	Estimated market size	Long-term end market growth
	#1-3	~20%	EUR 2.0 bn	~1%

2017 financials have been restated following the adoption of IFRS 15. LTM = Last 12 months, refers to the period July 1, 2017 – June 30, 2018

Recent development

Recent development

Customer

- Orders received from small and medium sized projects in Pulp
- Strong market share in dissolving pulp
- Growth in Asia-Pacific and China in Energy
- Breakthrough in marine scrubbers

Technology

- Competitiveness improvement programs for key products
- Industrial Internet offering: Valmet Performance Centers established and operational

Process

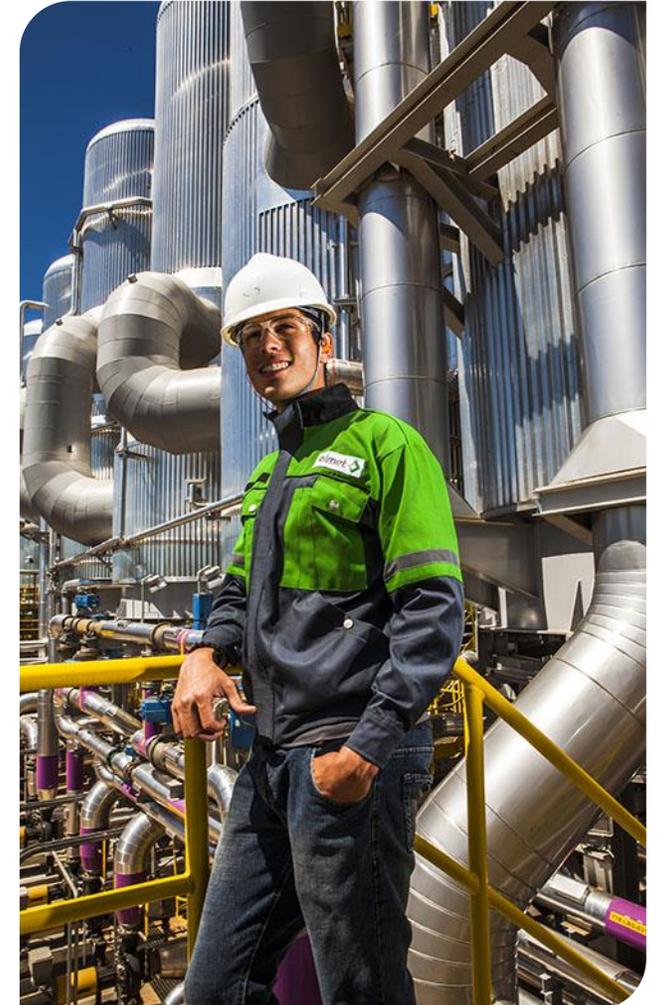
- Cost overrun in one project
- Capacity cost: increased flexibility and secured utilization rate

People

- Capabilities used flexibly between units
- Strengthening local capabilities to support growth initiatives

New products and applications

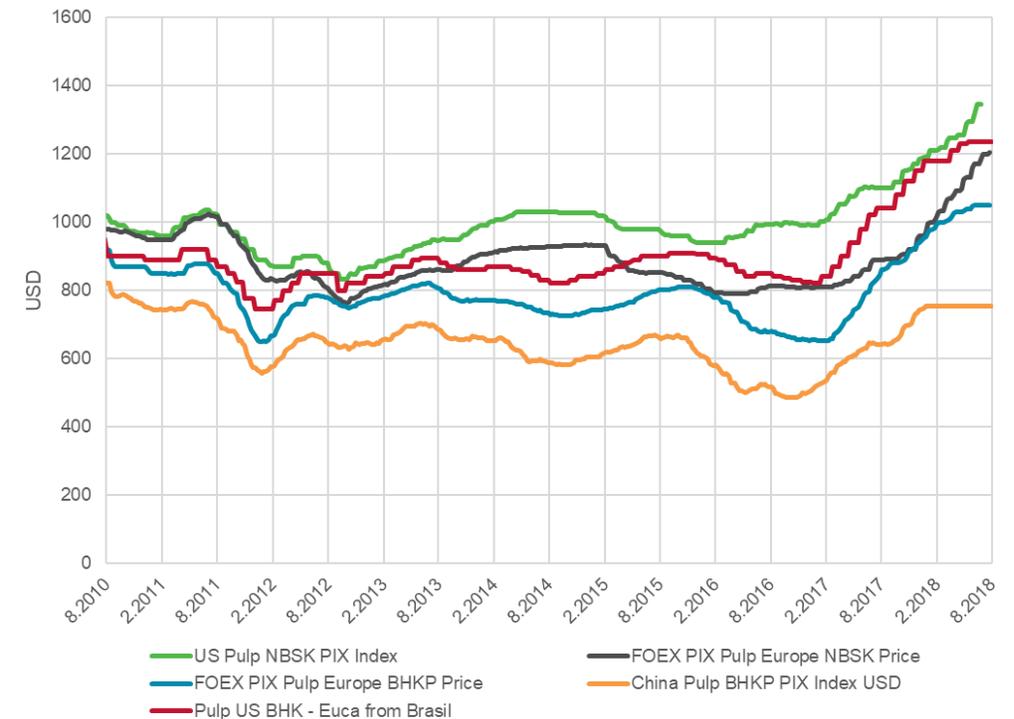
- RECOX+ high performance recovery boiler concept
- Biomass dryer and gasification for lime kilns and Energy
- SOx scrubbers for marine use
- BioCoal (black pellets) and BioTrac (prehydrolysis for 2nd generation bioethanol): first full-size references sold
- World record: pulp dryer daily production above 4,300 tonnes



Outlook Pulp

- Pulp prices expected to remain at high level
 - Demand continues to grow
 - No major new mills starting up
- Mega mill investments are picking up
 - Majority of new mega mills coming to South America
 - Demand for northern softwood driving investments in Finland, Sweden and Russia
- Smaller investments continue stable development
- Active dissolving pulp market
 - Sustainability in growing textile industry
 - New investments, grade changes and flexible production
- EU legislation driving towards new bio investments on longer term (e.g. plastics policy and circular economy)

Pulp price development 2010–2018



Source: Bloomberg, August 1, 2018

Outlook Energy

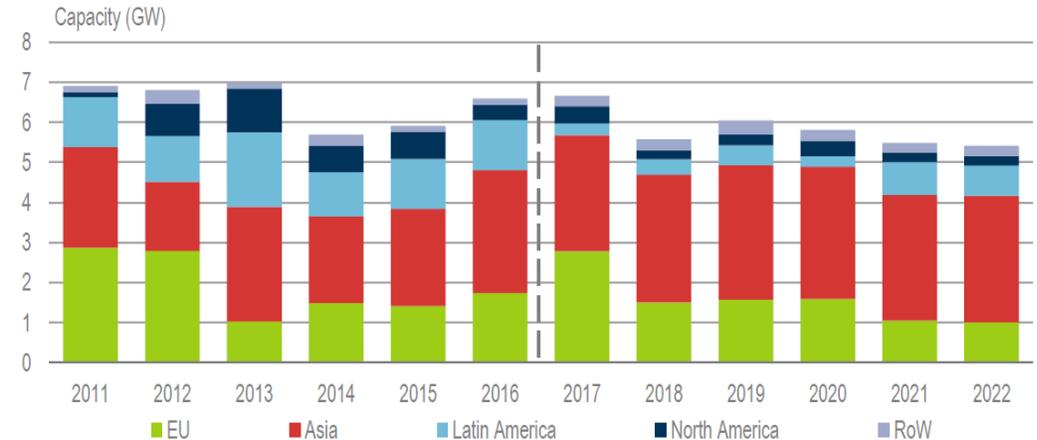
- Energy demand grows in developing countries
- Process steam in industrial segment mainly produced with thermal power
- Renewable biomass continues to have an important role in energy mix due to security of supply and ability to respond to demand
 - EU renewable energy directive (RED II to be confirmed in October 2018) sets clear sustainability criteria for biomass in energy production and supports CHP production
- Environmental solutions supported by tightening legislation on air emissions and stricter directives
 - Large potential in marine scrubbers due to International Maritime Organization's SOx regulation effective from 2020 globally

CHP = combined heat and power

Global bioenergy capacity additions relatively stable



Gross annual bioenergy electricity capacity additions by region 2011-22



An acceleration of bioenergy deployment over the forecast period is not anticipated. While Europe has led deployment historically, Asia is forecast to drive growth in the forecast.

© OECD/IEA 2017

Source: IEA

Actions to improve flexibility, profitability and market share

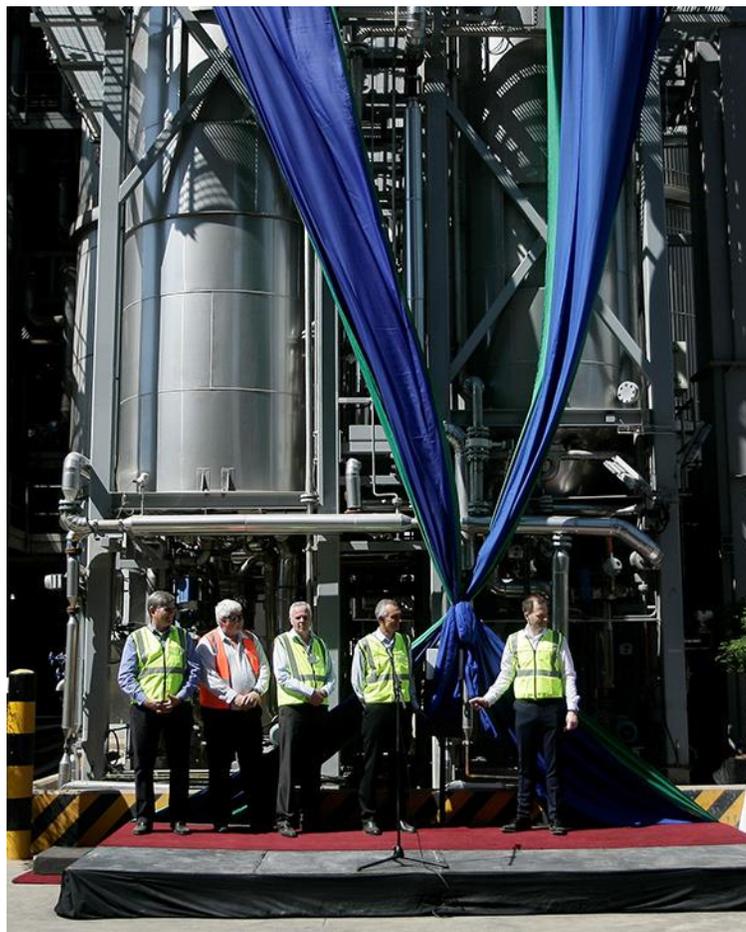
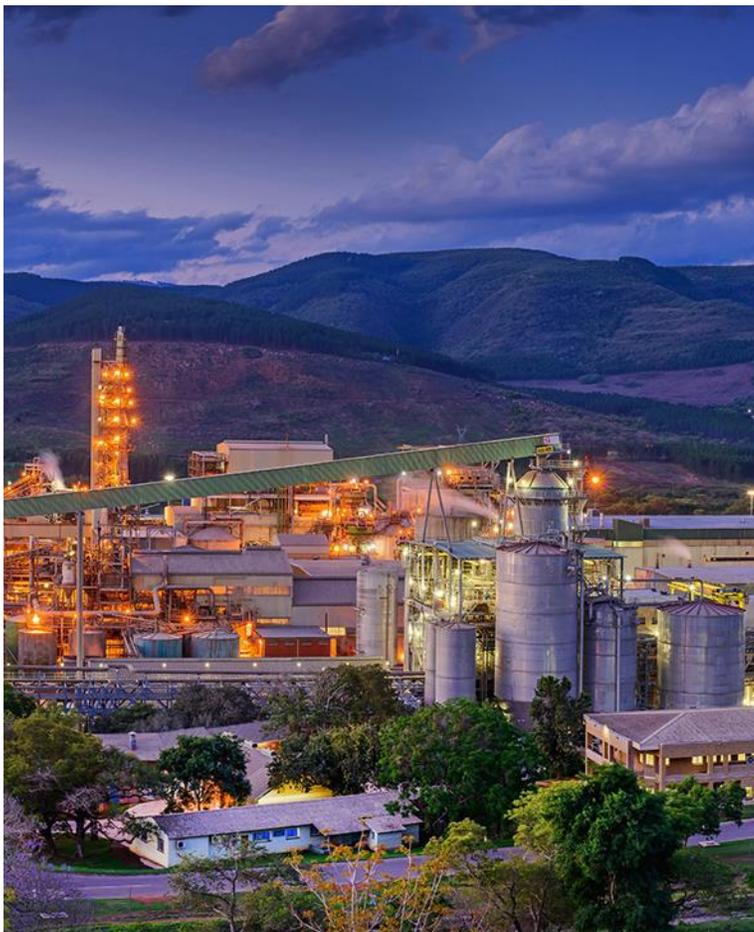
Actions to improve flexibility, profitability and market share

Customer	<ul style="list-style-type: none">• Win and secure mega mill cases in Pulp• Continue China and Asia-Pacific driven growth in Energy• Focus on single island, and small and medium scale deliveries• Strengthen position in Environmental solutions and Marine (IMO regulations)
Technology	<ul style="list-style-type: none">• Launch new cooking and fiberline concept• Leverage strengths for specialty grades (e.g. dissolving)• Industrial Internet: develop offering and customer value through Performance Centers• New value added products and revenue streams; Bioproduct Mill concept
Process	<ul style="list-style-type: none">• Implementing the new ERP• Secure a positive project margin deviation• Secure resource utilization through insourcing where needed and doable• Maintain and improve world class HSE performance
People	<ul style="list-style-type: none">• Ensure success in new business engagements through cooperation with Services and Automation• Continue cross-utilization of our capabilities over organizational borders



Growing demand for dissolving pulp: Case Sappi Ngodwana

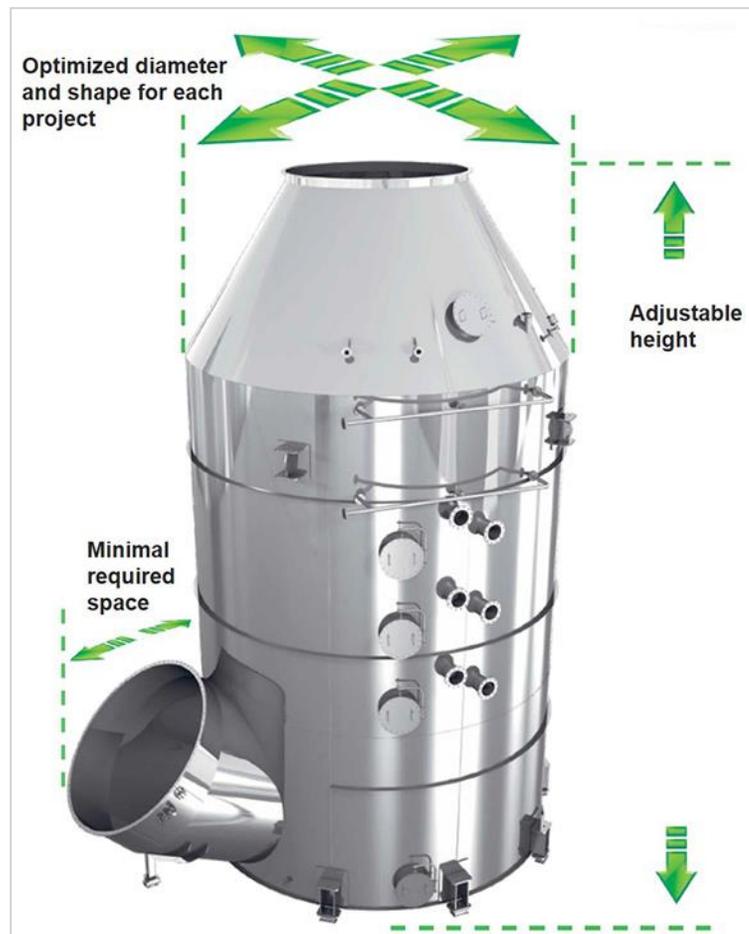
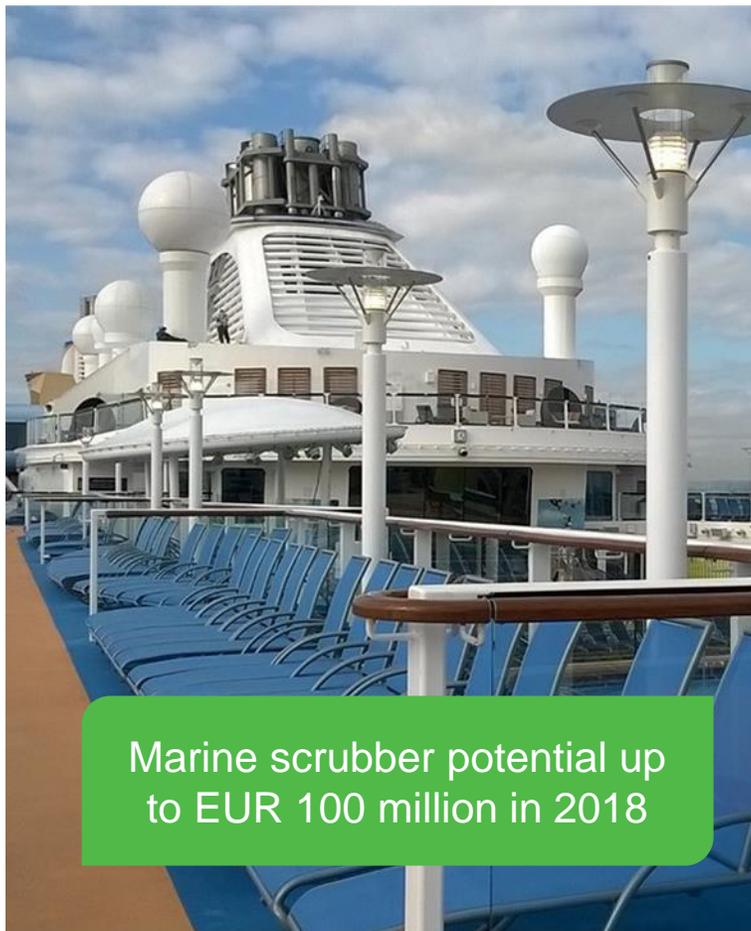
210,000 ADt/a dissolving wood pulp in South Africa



- Increased demand for dissolving pulp, both textile and specialty uses
 - Driven by megatrends: population growth and higher purchasing power in emerging markets
 - Wood based fibers increasingly preferred for their sustainability and performance characteristics
- New cooking plant, new fiberline and rebuilds in other parts of the mill
 - Very quick and smooth start-up in 2013
 - Produced high-quality product immediately
 - 97% A-grade product in 1st year of operation
- Near industrial size sugar extraction demo plant at the Ngodwana mill
 - Inauguration in April 2017
 - Industrial scaled-up version of the technology jointly developed by Sappi and Valmet

New markets with marine scrubbers

Addressing the IMO SOx regulation



- IMO has set a global limit for sulfur fuel oil used on board ships from January 1, 2020
- There are three primary options to comply with the regulation
 - Operate with old high sulfur fuel oil and use exhaust gas cleaning system, i.e. scrubber
 - Operate with low-sulfur compliant fuel oil
 - Operate with gas as a fuel (LNG/methanol)
- Valmet's solution meets all upcoming emission regulations with traditional marine fuel
 - Suitable both for newbuilds and retrofits
 - Customizable design with several optional features to find good fit for all vessels
 - Automation package included
 - First delivery in 2010
- Strongly applicable market for us is 3,000-6,000 ships of the global 98,000 ships
 - One ship needs 2-4 scrubbers, with order value of about EUR 2-5 million

