Automation – taking customers’ performance forward

Tampere site visit
November 26, 2015

Sakari Ruotsalainen, Business Line President, Automation
History of Automation in Tampere

1920’s
An aircraft repair Workshop founded in Helsinki to repair aircraft instrumentation

1936
Division is opened in Tampere

1940’s
The first black box "Mata Hari" invented and produced in the State aircraft factory in Tampere

1944
Measurement and control instruments for the process industry begin to develop

1953
Precision mechanics division established, introduction of pneumatic measurement and control system

1968
Valmet Oy Instrument Works established in Rantaperkiö
History of Automation in Tampere

1960
The Airmatic, a pneumatic measurement and control system

1970
Elmatic-100 system, electronic instrumentation

1980’s
Domatic, the first Distributed Control System (DCS)

Domatic XD, modular second generation DCS

1990’s
PaperIQ, Quality Control System (QCS)

Metso Incorporated (the merger of Valmet Automation Inc. and Neles Controls)

metsoDNA, Dynamic Network of Applications

2000’s
IQInsight
IQProfilers (IQSteam Pro)
IQCaliper-L
PaperIQ Plus
Multivariable Model Predictive Controls (MPC)
metsoDNA CR
24/7 ProCenter for DCS
24/7 ProCenter for QCS
PaperIQ Select
IQCaliper-L
IQFiber

2010’s
IQ, web inspection system
Metso DNA
Metso IQ
Metso IQ for corrugators
Metso condition analysis services
Vapo, peat and water monitoring services

2015
Metso Process Automation Systems to Valmet

Valmet DNA

Valmet IQ

November 26, 2015
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Valmet today at Lentokentänkatu

Automation
• R&D
• Project operations
• Sales and Services
• Management and support functions

Pulp & Energy
• Product and technology
• Delivery operations
• Management and support functions

>480 employees

>540 employees
Automation business line

Contents

1. Automation is a strong business with great positions
2. Automation market drivers
3. We take our Customers’ performance forward
4. Strategy implementation through Must-Wins
5. Summary
Automation is a strong business with great positions
Automation business line overview

- Extensive range of process automation and information management solutions to take our customers’ business performance forward
- Global network of expertise close to our Customers
- Strong R&D investments across the automation offering

- Global market leader with #1 market position in pulp and paper
  Industry-leading product portfolio
  Comprehensive services

- Niche leader in Bio and Waste-to-Energy power plant automation

2014 figures

- Net sales: EUR 297 million
- Orders received: EUR 336 million
- Employees: 1,600

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Automation business line overview

Net sales (2014)

- Services business: ~55%
- Capital business: ~45%

- North America: 9%
- South America: 7%
- EMEA: 56%
- China: 19%
- Asia-Pacific: 9%

- Pulp & Paper: 67%
- Energy & Process: 33%
Orders received in Automation totaled EUR 78 million in Q3/2015

Orders received\(^1\) (EUR million)

- **Orders received EUR 78 million in Q3/2015**
  - Internal orders received amounted to EUR 8 million
  - EMEA accounted for ~50% and North America for ~30% of orders received
  - Pulp and Paper accounted for ~70% and Energy and Process for ~30% of orders received

- **Net sales EUR 72 million in Q3/2015**
  - Internal net sales amounted to EUR 6 million

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\(^1\) Q1/2015 orders received is calculated from Metso’s reported figures and pro forma figures excluding Process Automation Systems and are therefore indicative only. Q2/2015 and Q3/2015 figures are Automation business line figures.
Customer base

90% of business directly with Customers
Automation has a history of modest growth but high and resilient profitability

- Relative stable margins during the last 10 years, EBITA margin 10–12%
- Strong service business, based on large installed base and captive business model
- High-level technology and know-how business with high barriers to entry

Since 2006, Automation’s EBITA margin has exceeded 10% every year but two

**Modest growth in net sales**

**High and resilient profitability**

2006

2014

Net sales

~2% CAGR
Automation’s service business has grown steadily.

Valmet’s installed base grows constantly.

Customers have less own maintenance resources.

Customers need to take process quality and performance forward.

Indexed: (2006 = 100)

CAGR 4.8%
Automation serves it’s customers across plant life cycle

Process plant life cycle

**Process plant**
- Design, construct and commission
  - Initial process investments
- Operate, maintain and optimize
  - Process availability
  - Process performance
- Refurbish and reconfigure
  - Change processes and technology

**Automation business**
- **Projects**
  - new mills, plants and production lines
- **Services**
  - Performance services
  - Agreement services
  - Field services
  - Spare parts & factory maintenance
- Projects
  - Augment automation level
  - Automation renewal
- Projects 1
  - Major system reconfigurations
  - Automation rebuilds

1) Considered as new installed base projects in this illustration

20% of net sales

80% of net sales
Our automation offering

Advanced automation and process monitoring solutions and services:

- Distributed Control System (DCS) – Valmet DNA
- Performance solutions
- Quality Control System (QCS)
- Profilers
- Analyzers and measurements
- Industrial internet solutions
- Automation services
- Process simulators
- Safety systems and solutions

Industry’s widest offering in pulp & paper
Valmet DNA DCS delivered to other industries as well
Valmet has delivered more than
4,500 automation systems
40,000 analyzers and measurements
Over 1,000 power plants worldwide utilize Valmet’s process automation

Valmet is
#1 in QCS, analyzers and measurements
#1 in pulp performance optimization using advanced controls.
#2 in pulp & paper control systems
Niche leader in Bio and Waste-to-Energy power plant automation
Customer results in pulp and paper markets 2010–2014

More than 60 new tissue and board lines automated

More than 600 new QCS and Profiler system deliveries

More than 200 QCS and Profilers competitor system replacements

More than 100 competitor DCS/PLC replacements

Market leader in analyzers
1,000 power plants worldwide utilize Valmet’s process automation.
Automation market drivers
### Market drivers and opportunities

**Market drivers**
- World trade, e-commerce and emerging markets growth
- Rise in purchasing power and living standards
- Ageing production assets

**Competition**
- **Pulp & Paper**
  - ABB, Honeywell, BTG
- **Energy, Process and Marine**
  - ABB, Emerson, Siemens, Yokogawa

**Automation’s short-term opportunities**
- Short term opportunities
  - Very large ageing competitor installed base of systems
  - Valmet synergies in new mills and lines as well as rebuilds
  - Healthy services demand
- Softness in short term opportunities, especially in new power generation projects
  - Power plant retrofit market active
- Marine: cruise market active
- Healthy services demand

**Implications for Valmet**
- Anticipated long-term market growth
- Estimated market size for the current offering (EUR)
- Valmet’s market share

<table>
<thead>
<tr>
<th>Market</th>
<th>Pulp &amp; Paper</th>
<th>Energy, Process and Marine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drivers</td>
<td>~1% p.a. 1.0 bn</td>
<td>~2% p.a. 1.0 bn ~10%</td>
</tr>
<tr>
<td>Market share</td>
<td>~20%</td>
<td>~1%</td>
</tr>
</tbody>
</table>
We take our Customers’ performance forward
We take our Customers’ performance forward

1. Expertise close to our Customers
2. Business model with flexibility and intimacy
3. Continuous innovation & renewal
4. Combining process technology, automation and services
5. Industrial internet delivered – every day
Strong global presence close to our customers

Over 100 locations in 33 countries

- Over 100 service centers
- 80 sales offices
- 15 project centers

Automation
1,600 automation professionals
Including
700 services engineers
Our business model is based on high customer intimacy with a flexible delivery system.

### Flexible
- **Project execution**
- **Product supply**

### Engineering
- **60%** Project management and lead engineering in-house
- **40%** Project engineering by external partners and service providers

### Supply chain
- **20%** In-house assembly and final testing
- **80%** Outsourced & externally purchased components, sub-assemblies

### Customer intimate
- **Sales & Service**
- **>90%** Direct sales and service network
- **<10%** Growing strategic partnerships
  Several partner business models applied

### Key Points
- **High degree of outsourced engineering and supply chain**
- **Net working capital (NWC) 8% of net sales**
- **‘Two-fold market model’ through direct sales and partnerships**
Continuous technology innovation & renewal to move our customers’ performance forward

**Automation foundation**
- Damatic "Classic"
- Damatic XD
- Damatic Xdi
- PaperIQ
- Kajaani analyzers

**Industry leading offering**
- Metso DNA (now Valmet DNA)
- Integrated condition monitoring
- Turbomachinery controls
- Virtualization
- Compact controllers
- High-density I/O’s
- Metso IQ (now Valmet IQ)
- IQ Fiber
- Image-based sensors
- New MD & CD Controls
- New IQ Profiler actuators
- IQ Induction Profiler
- Next gen Web Inspection systems
- Rotary
- OC, LC
- LS, Alkali R
- MR Moisture, FS5
- KappaQC
- Corrored
- Alkali C

**Introducing the next level in automation**
- Valmet IQ 2015 family launched
- Valmet DNA growth story continues
- Analyzer and measurement portfolio grows even stronger

... and in addition significant cost-out element in all new products launched
Valmet’s unique offering combines process technology, automation and services
Valmet’s key capabilities combined to take customers’ performance forward

<table>
<thead>
<tr>
<th>Challenging fuels in use or plan to change fuel diet</th>
<th>Boiler type: CFB, BFB &amp; grate boiler</th>
<th>Additives in use or plan to use</th>
<th>Occuring super heater corrosion</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="" /></td>
<td><img src="image2" alt="Boiler Image" /></td>
<td><img src="image3" alt="Liquid sulphate" /></td>
<td><img src="image4" alt="Solid sulphur" /></td>
</tr>
<tr>
<td>Process conditions with challenging fuels: Steam temp &gt; 420C Material temp -&gt; 450 C</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Valmet’s Solution
- Process, materials & fuel knowhow
- CorroRed analyzer + process sampler
- Additives injection
- Control system

Increased Superheater lifetime 3-10 yrs
Payback in 4-6 months
Valmet has a solid foundation for Industrial Internet

Customer’s process

Valmet’s competence network

Valmet’s remote center

Valmet-supplied lines with Valmet DCS
Valmet-supplied lines with Valmet DCS

350 Condition Monitoring (CM) references with over 70,000 I/O tags
350 Condition Monitoring (CM) references with over 70,000 I/O tags

Advanced process control installations
Advanced process control installations

Online connections
Online connections

Performance agreements with remote connections
Performance agreements with remote connections

Co-creation of advanced analytics with customers
Co-creation of advanced analytics with customers

738
750
70,000
320
440
78
Ongoing
Our unique offering can be fully integrated into Industrial Internet

Remote Services
- Advanced Analytics
- Performance optimization
- Remote Support
- Maintenance planning
- Remote condition monitoring

On-site visualization and analytics
- Process visualization
- Information and historian platform
- Energy management
- Control performance

Control and instrumentation
- Distributed control systems
- Advanced process control solutions
- Quality control solutions
- Data communication
- Vision systems, instrumentation and analyzers

Process technology and expertise
- Pulping and Recovery
- Heat and Power generation
- Board and Paper making
- Tissue making
Centralized control room
Undisclosed energy customer

**Background and Customer’s target**
- Energy customer with 26 plants
- Target to centralize operation control to one location to achieve cost savings in the plants and securing best operating competence to all plants

**Our Solution**
- Centralized Valmet DNA control room in one physical location – 11 plants now operational

**Benefits**
- Cost savings in the plants
- Accumulating the best operating competence
- Identifying best control strategies via benchmarking plant performance to central control room to boost plant performance
Predictive component lifetime modelling
Undisclosed paper mill

**Background**
- Paper Mill with Valmet Paper Machine

**Challenge**
- To reduce total cost of ownership (TCO) for several significant components

**Our Solution**
- Mill connected to Valmet Advanced Analytics research environment
- Advanced Analytics performed on Mill data to investigate potential for TCO optimization
- Analytics allows TCO optimization through
  - Lifetime prediction
  - Model parameters
  - Model status
  - Expert recommendations

**Results:**
- Accurate lifetime predictions to Mill
- Enables fast learning of new component behavior
- Improved component lifetime

![Graph showing lifetime predictions](image)
Strategy implementation through Must-Wins
## Strategy implementation via Must-Win initiatives

<table>
<thead>
<tr>
<th>Must-Wins</th>
<th>Must-Win initiatives for Automation business line</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer excellence</td>
<td>• Further strengthen our capabilities close to customers</td>
</tr>
<tr>
<td></td>
<td>• Win market share through competitor replacements</td>
</tr>
<tr>
<td></td>
<td>• Grow partner business</td>
</tr>
<tr>
<td></td>
<td>• Provide customer benefits by combining process technology, automation and services</td>
</tr>
<tr>
<td></td>
<td>• Drive services growth</td>
</tr>
<tr>
<td></td>
<td>• Continue to renew and expand offering</td>
</tr>
<tr>
<td>Leader in technology and innovation</td>
<td>• Implement Lean to improve end-to-end performance</td>
</tr>
<tr>
<td></td>
<td>• Save 10% in procurement</td>
</tr>
<tr>
<td></td>
<td>• Improve health and safety</td>
</tr>
<tr>
<td>Excellence in processes</td>
<td>• Nurture shared values</td>
</tr>
<tr>
<td></td>
<td>• Drive high performance</td>
</tr>
<tr>
<td></td>
<td>• Continue globalization of our capabilities</td>
</tr>
<tr>
<td>Winning team</td>
<td></td>
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</tbody>
</table>
Summary
Summary

We have

- Delivered strong and stable business performance
- Great market positions
- Strong footprint of experts close to our Customers
- Market leading technology solutions
- Strategy to continue winning market share

We are

- Committed to taking our Customers’ performance forward
Energy and process automation – well positioned for long term growth

Tampere site visit
November 26, 2015

Jukka T. Pulkkinen,
VP, Energy & Process Systems
Energy and process automation

Contents

1. Our market focus and our position
2. Technology and services offering
3. Well positioned for long term growth
4. Valmet takes Customers’ performance forward in energy
5. Summary
Our market focus and our position
Valmet has a good position in energy and process industries, including marine

Energy and process industries
- We have consistently developed the energy automation system business for over 20 years
- Strong market position in bio and waste-to-energy
- Blue-chip partnerships based on our technology
- Long-term business cooperation with process industry customers

Marine industry
- We have a strong position with leading European shipyards as well as world’s leading cruise line companies and other ship owners

Solid energy and process industry business with good long-term growth opportunities
Technology and services offering
Automation offering for energy and other process industries

**Distributed Control System (DCS)**
- Process controls
- Information management

**Analyzers and measurements**

**Performance solutions**
- Advanced process controls
- Plant management applications
- Energy management solutions
- Condition monitoring

**Industrial internet solutions**

**Automation services**
Well positioned for long term growth
Well positioned for long-term growth

<table>
<thead>
<tr>
<th>Target market</th>
<th>Automation’s proven opportunity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomass and multifuel power plants</td>
<td>Valmet is a market leader in solutions for biomass industry. Use of biomass for power generation has its place in the global energy mix. Valmet is a market leader in European waste-to-energy. Recovery of energy from waste by incineration is part of any modern waste management system.</td>
</tr>
<tr>
<td>Waste-to-energy plants</td>
<td></td>
</tr>
<tr>
<td>New power generation capacity in China and India</td>
<td>Rapid power generation new capacity growth. Market commanded by state owned or controlled entities. Automation’s approach with strategic partnerships.</td>
</tr>
<tr>
<td>New power generation capacity in other Asia-Pacific</td>
<td>Several Asia-Pacific countries such as Indonesia, Thailand and Vietnam adding power generation capacity. Automation works with key EPC’s and other partners in the region.</td>
</tr>
<tr>
<td>Marine</td>
<td>Valmet in a leading position in cruise vessel automation. Overall, &gt;160 vessels of an average 2500-berth capacity estimated to be needed up to 2025 from nearly 70% global cruise passenger growth</td>
</tr>
<tr>
<td>Solid process industry business in selected countries</td>
<td>Valmet has established long term business co-operation in process industry automation in CIS (oil and gas) and Finland.</td>
</tr>
<tr>
<td>Growing installed base of our own technology</td>
<td>Installed base with Valmet’s automation’s technology has grown steadily over the years. Growing installed base converted into service agreements.</td>
</tr>
</tbody>
</table>
Market leader in European waste-to-energy automation

UK
- Ineos Runcorn, Manchester phase 1
- Ineos Runcorn, Manchester phase 2
- MES Environmental, Dudley
- MES Environmental, Wolverhampton
- Waste Recycling Group, Lincolnshire
- Veolia Environmental Services, Staffordshire
- SITA Suffolk
- Viridor Oxfordshire Ardley
- Viridor Cardiff
- Cory Environmental, Riverside London
- Veolia Environmental Services, Newhaven
- Sita, Cleveland 4 & 5
- SSE Ferrybridge Multifuel project
- Buckinghamshire
- Dundee Energy Recycling, Dundee
- RWE Markinch, Glenrothers
- London Waste, London

Norway
- BIR Avallsenergi, Bergen

Sweden
- Åmotfors Energi Ab

Finland
- Westenergy Oy Ab, Vaasa

Estonia
- Eesti Energi AS, Tallinn

UK
- A.S.A., Zistersdorf
- AVE Wels II
- AVE Wels I
- AVE Lenzing

Over 60% market share in UK

Italy
- Trattamento Rifiuti Metropolitani, Turin
- Veolia, Piacenza
- Veolia, Energounet

Poland
- Bialystok
- Krakow

Other Technology or Automation Replacement
We have automated world’s largest multifuel FBB plants

Alholmens 240MW – World’s largest multifuel boiler

Nacogdoches 100MW – Largest biomass boiler in US

Neyveli Lignite 250MW – India’s largest FBB

Sha Lang Tan 300MW – China’s largest FBB

Lagisza 460MW – World’s largest FBB – OT CFB
India’s leading power plant EPC trusts Valmet’s automation technology

India’s leading power plant EPC and equipment manufacturer BHEL trusts Valmet automation technology (>360 deliveries)

- State-owned and largest power plant equipment manufacturer in the closed Indian power market operating as an engineering and manufacturing company
- BHEL has over 70% market share in India
- Several technology licensing agreements with major western technology providers including Valmet for process automation
- TCA (Technology Collaboration Agreement) with us since year 2000
JV with SAC Guodian Nanjing Automation to address Chinese thermal power market

China Huadian Corp, China’s second biggest power producing company with 130GW installed base trusts Valmet’s technology

- JV between Valmet and SAC Guodian Nanjing Automation Co. Ltd
- SAC Guodian Nanjing Automation Co. Ltd is a power automation company majority-owned by China Huadian Corp.
- Provides DCS technology to complement digital power plant offering in turn-key deliveries for Huadian Corp’s thermal power plant projects
Valmet DNA automation system on board flagship cruise liners

Valmet DNA systems sold to 31 vessels including flagship cruise liners since 2011

- >600 ships sailing with Valmet’s technology on board
- Automation system for a cruise liner is the same size as for a big pulp mill
Valmet takes Customers’ performance forward in energy
Minimizing safely our customer’s fuel costs with Valmet combined capabilities for biomass use

Kuopion Energia Oy, Finland

Background

- Kuopion Energia Oy produces electricity and district heat for the residents of the city of Kuopio, thus production reliability is in high priority
- Long term partnership with Valmet

Challenge

- Main fuels are peat, woody biomass and other bio based fuels
- During summer bio based fuels are up to 100 % and all year around 50% of the fuel consumption
- Heading for more cost efficient fuel mix will add risks of corrosion of the super heater

Solution

- Software for reporting, controlling and predicting high-temperature corrosion & optimizing the fuel diet
- Corrosion Reduction Analyzer – online measurement unit analyzing the corrosiveness of flue gases
Summary
Summary

Solid energy, process industry and marine business with good long-term growth opportunities

- Market leader position in biomass & multifuel market – can strengthen further in Valmet
- Leverage strong position in Waste-to-Energy market in Europe to new geographic areas
- Marine cruise market is active and we have strong position in Europe, new geographies such as China will grow in the near future
- We have strong position in India and China with our partners and continue to penetrate to other Asian markets with EPC contractors
Valmet – world leader in pulp and paper automation

Tampere site visit
November 26, 2015

Juha Koistinen,
VP, Control & Measurement Systems
Pulp and paper automation

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2. Technology and services offering
3. Pulp and paper market is a growth market
4. We take our pulp and paper customers’ performance forward
5. Summary
Strong market position
Automation has a strong position in pulp and paper

- Pulp and paper is globally a niche segment, where Valmet is the #1 player
- Very high entry barriers limits number of potential new entrants
- Competitors have been losing focus
- Very strong offering due to continued R&D investments
- Global customer reach
- Captive service business model

Valmet is the only supplier in market with process technology, services and automation

Addressable market:
~EUR 1 billion
Market growth rate:
~1%
Valmet’s market position:
#1-2
Main competitors:
ABB, Honeywell, BTG
Technology and services offering
## Unique and market leading automation offering

<table>
<thead>
<tr>
<th>Scope/product</th>
<th>Market position in pulp and paper</th>
<th>Main competitors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Distributed Control Systems (DCS)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• DCS for process and machines controls</td>
<td>#2</td>
<td>• ABB</td>
</tr>
<tr>
<td>• Condition monitoring</td>
<td></td>
<td>• Honeywell</td>
</tr>
<tr>
<td>• Information management</td>
<td></td>
<td>• Emerson</td>
</tr>
<tr>
<td>• APC (Advanced Process Controls)</td>
<td></td>
<td>• Siemens</td>
</tr>
<tr>
<td>• Paper analyzers</td>
<td></td>
<td>• Yokogawa</td>
</tr>
<tr>
<td>• Pulp analyzers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Pulp consistency measurements</td>
<td>#1-2</td>
<td></td>
</tr>
<tr>
<td>• Conductivity measurements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Power analyzers</td>
<td>#1</td>
<td></td>
</tr>
</tbody>
</table>

**Quality Management Systems**
- QCS (Quality Control Systems)
- Profilers
- Web inspection and web break analysis systems

**Analyzers and measurements**
- Paper analyzers
- Pulp analyzers
- Pulp consistency measurements
- Conductivity measurements
- Power analyzers

Source: Management estimates
Completely renewed market leading Quality Management System product family launched

2015 Valmet IQ 2015

2015 New IQ Quality Vision

2012 Metso WMS and WIS

2012 Metso IQ system

2008 PaperIQ Select – intelligent scanning

2004 One Source IQ Profilers

2004 PaperIQ Plus – fast scanners, MPC controls

2001 IQInsight – non-scanning measurement

1995 PaperIQ – modular, intelligent sensors

1990 First fully integrated QCS and DCS system
Pulp and paper market is a growth market
Pulp and paper is a growth market for Automation

**Driver**
- Growing paper demand in emerging markets
- Growing demand for tissue and packaging board globally
- A lot of ageing mill capacity worldwide with >15 years old automation installed base
- Customers’ continuous need to invest in performance improvements
- Growing installed base

**Automation’s proven opportunity**
- Greenfield production lines
  - Emerging markets (APAC)
  - Tissue & board
  - Pulp
- Automation replacement market expected to be active
- Automation degree increases (QCS, analyzers)
  Performance gaps in pulp and paper adjacents, e.g. corrugators
- Automation’s technology installed base has grown steadily over the years
  Project to service agreement conversion is high
Global paper demand expected to grow

Paper consumption by area (thousand metric tonnes)

Paper consumption by paper grade (thousand metric tonnes)

- Emerging markets: +3.1% 2015–2025 CAGR
- Developed markets: -0.2% 2015–2025 CAGR
- North America: +2.0%
- Western Europe: +2.9%
- Japan: +2.9%
- Eastern Europe: +3.7%
- China: -0.5%
- Rest of Asia: -3.3%
- Latin America: +1.8%
Pulp and paper automation replacement market expected to be active

Papermaking lines in developed markets are getting old

Weighted average PM capacity, 1,000 t/a

Weighted average technical age 19 years

Strong

Weak

Large ageing competitor installed base is a major opportunity

Number of pulp and paper DCS systems installed before year 2000

South America 253
Asia-Pacific 395
China 188
EMEA 886
North America 944

Number of pulp and paper QCS systems installed before year 2000

South America 152
EMEA 595
Asia-Pacific 570
North America 555

Automation has replaced >300 competitor DCS, QCS and Profiler systems 2010-2014
We address pulp and paper makers’ challenges

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>• High energy utilization per ton of production</td>
</tr>
<tr>
<td>Production</td>
<td>• Maximize tonnage by eliminating process downtime and increasing speed</td>
</tr>
<tr>
<td></td>
<td>• Brain-drain</td>
</tr>
<tr>
<td>Quality</td>
<td>• Ever stricter end-customer requirements for product quality</td>
</tr>
<tr>
<td>Costs</td>
<td>• Commodity grades compete on price - costs are critical</td>
</tr>
<tr>
<td></td>
<td>• Minimize use of expensive fibers and other raw materials</td>
</tr>
<tr>
<td></td>
<td>• Less manpower related costs</td>
</tr>
</tbody>
</table>

Technology and services offering addressing all major customer challenges
How can improvements in production efficiency and cost savings be achieved

- Minimized costs
- Increased production rate
- Decreased rejects
- Increased production time

Source: N.Airola, Valmet

Full calendar

Design/max speed
Monthly average speed

Unused Machine Speed Potential
Saleable Production
Profit

Increased production rate
Decreased rejects
Increased production time

Time available
Time not available

Increased production rate
Minimized costs

Increased production rate
Minimized costs
Earning model: Fiber savings via improved stability - target level shift in MD or CD

"Good product" acceptance high limit (dry weight)

Target shift = benefit

"Good product" acceptance low limit (dry weight)
Continuously growing installed base turns to service business

300 to 400 new systems installed every year

>70% project to service agreement conversion
We take our pulp and paper customers’ performance forward
Combining Valmet’s strengths to take Customers performance forward

Background

• Stora Enso Heinola mill’s target was to improve broke refining with a refiner rebuild
• Re-fitted refiner from Varkaus mill to Heinola

Path to the solution

• Customer’s inquiry included refiner refit and automation elements
• Collaboration with Customer leads to turn-key Valmet solution including also process engineering, equipment and installations as well as project management

Valmet Solution

Turn-key delivery of broke refiner rebuild including e.g.
• Electrical, instrumentation and automation engineering and installation
• Process equipment, fittings and piping
• Valmet DNA system and applications
• Project management
• Process training

The Results

• Significant tensile stiffness increase immediately after start-up

“When Valmet offered to not only refurbish the refiner, but provide us with a turnkey delivery of the whole project it was an excellent option. It’s easy to work when there is only one partner.”

“No need to run trials for the performance guarantee, we could see the results in normal operation”

Mr. Tero Karvinen
Production Superintendent, Stora Enso Heinola

Several follow-up performance improvements since this project
Summary
Summary

- Market leader in pulp and paper automation
- Pulp and paper is a growth market for us
- Committed to taking our customers’ performance forward