2:00 pm
Valmet’s Pulp and Energy business today
Bertel Karlstedt, Business Line President, Pulp and Energy

2:05 pm
Valmet’s Energy business - Long-term demand driven by the move to a carbon neutral world
Presentation followed by Q&A
Kai Janhunen, VP, Energy Business Unit

2:30 pm
Future growth in pulp driven by favorable megatrends
Presentation followed by Q&A
Jussi Mäntyniemi, VP, Recovery Business Unit

2:55 pm
The new normal - opportunities through digitalization and Valmet’s industrial internet
Tuomas Petänen, Head of Industrial Internet, Energy segment

3:10 pm
Summary of key messages
Presentation followed by Q&A
Bertel Karlstedt, Business Line President, Pulp and Energy

3:30 pm
Ending of the event

Presentation slides can be found at https://www.valmet.com/investors/reports-and-presentations/other-presentations/
Q&A

Please participate by asking questions!

- You can submit questions throughout the event using the question form
- Three Q&A sessions
  - After the Energy presentation
  - After the Pulp presentation
  - In the end of the event
- Questions are visible only to the moderator, who will address them to the presenter
Valmet’s Pulp and Energy business today

Bertel Karlstedt, Business Line President
Pulp and Energy at a glance

- World-class pulp mill offering and complete delivery capability
- Global technology and know-how leader in biomass and multifuel based energy production
- A natural growth platform for environmental systems and biomass conversion technologies
- Over 1,500 pulp and energy experts serving our customers globally
  - Finland 840 people
  - Sweden 450 people
  - India 160 people
  - China 40 people
  - Denmark 30 people
- Close cooperation with Automation and Services business lines in all projects. Including industrial internet offering and digitalization.
We are committed to moving our customers’ performance forward

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Valmet’s energy business: Long-term demand driven by the move to a carbon neutral world

Kai Janhunen
Vice President, Energy business unit
Contents

1. Energy business unit
2. Global market drivers
3. Order backlog
4. Key references
5. Summary
Energy business unit

Orders received (period 2017-2019)
- 32%-52% of P&E OR
- Average ~400 MEUR, ~40% of P&E OR
Personnel (Oct 30, 2020): 620
- White / blue collars: 481 / 139
Main locations are in Finland:
- Offices in Tampere, Vantaa, Raisio
- Production facilities in Tampere, Lapua
- R&D Center in Tampere
- Valmet Performance Center in Tampere

Solution offering
- Biomass to Energy plants
- Industrial residues and Waste to Energy (RDF) plants
- Air Emission Control technologies
- Automation
- Life-cycle services
  - Reliability services
  - Performance services
  - Performance centers
- Industrial Internet solutions

Customer segments
- Industrial
- Power generation
- Waste management
- Marine
Global market drivers – Climate actions

Resource efficiency

- Waste widely recognised as valuable resource
  - Increased recovery and recycling
  - Residual waste > Energy recovery
- Higher efficiencies

Environmental awareness

- Carbon neutral power supply by 2050 (Power generation, Industrial)
  - Coal phaseout
  - From fossil to renewables
- Tightening emissions legislation and stricter directives & norms

Japan

Japan's PM Yoshihide Suga: Climate change policy of carbon neutrality by 2050

China

President Xi Jinping: China will be carbon neutral by 2060

EU

EU Commission President Ursula von der Leyen: European Green Deal; No net emissions of greenhouse gases by 2050

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Ongoing energy projects / Order backlog

**EMEA**

- **Arauco MAPA, Chile**
  160 MW, biomass fired BFB
  Start-up 2021

- **Star Bracell, 2 x biomass gasifier**
  Start-up 2021

- **Bois & Biomasse, France**
  180 MW, biomass fired BFB
  Start-up 2020

- **Greenalia, Spain**
  190 MW, biomass CFB
  Start-up 2020

- **Boisei, Germany**
  35 MW, CFB, Flue gas condenser, ESP
  Start-up 2020

- **Stora Enso, Finland**
  145 MW, asphaltene fired CFB+AEC
  Start-up 2019

- **Borås Energi och Miljö, Sweden**
  120 MW, biomass BFB+AEC
  Start-up 2019

- **Mondi Syktyvkar, Russia**
  184 MW, biomass BFB, ESP
  Start-up 2019

- **HOFOR, Denmark**
  459 MW, biomass CFB
  Start-up 2019

- **Maren Maras, Turkey**
  185 MW, multifuel CFB+AEC
  Start-up 2020

- **Oulun Energia, Finland**
  194 MW, biomass CFB+AEC
  Start-up 2020

- **Weig, Germany**
  49 MW, BFB+AEC
  Start-up 2020

- **Kokkola Energia, Finland**
  191 MW, biomass BFB+AEC
  Start-up 2020

- **Zespół Elektrowni Płtnow Adamów, Poland**
  Conversion to biomass fired BFB+AEC
  Start-up 2021

- **Göteborg Energía, Sweden**
  130 MW, hot water plant+AEC. Wood pellet
  Start-up 2021

- **Stora Enso, Finland**
  Flue gas scrubber
  Start-up 2021

- **Nordea Group, Austria**
  50 MW, RDF fired BFB+AEC
  Start-up 2022

- **BS Energy, Braunschweig, Germany**
  78 MW, CFB+AEC, waste wood
  Start-up 2022

- **Tampereen Sähkölaitos, Finland**
  Flue gas condensing plant
  Start-up 2022

- **Helen, Vuosaari, Finland**
  Flue gas condensing plant
  Start-up 2022

- **Confidential customers: several marine scrubber projects**

**South America**

- **Arauco MAPA, Chile**
  160 MW, biomass fired BFB
  Start-up 2021

- **Star Bracell, 2 x biomass gasifier**
  Start-up 2021

**China**

- **Beijing Environment Sanitation Engineering Group**
  120 MW, CFB, WtE
  Start-up 2020

- **Shanying Zhejiang**
  107 MW, CFB, sludge
  Start-up 2020

- **Shanying Anhui**
  92 MW, CFB, sludge
  Start-up 2020

- **Confidential customer**
  100 MW, sludge, reject
  Start-up 2020

- **Aituo Eco-Energy Co., Ltd**
  142 MW, CFB, sludge
  Start-up 2020

- **Asia Symbol (Shandong) Pulp & Paper, Rizhao**
  142 MW, CFB, sludge
  Start-up 2020

- **Confidential customers, Marine scrubber projects**

**Asia-Pacific**

- **JFEE, Kashiro Japan**
  112 MW, multifuel CFB+AEC
  Start-up 2019

- **JFEE, Onahama Japan**
  75 MW, multifuel CFB+AEC
  Start-up 2019

- **PT Citra Wood Listrindo, Indonesia**
  Biomass fuel feeding system
  Start-up 2020

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Key references 2020

**Energy turnaround towards renewables**

**Valmet scope:**
- Valmet CFB boiler plant: extends from the boiler silos to the existing Valmet Flue Gas Heat Recovery System
- Valmet Bag House Filter
- Value: EUR ~70 million

**Coal phaseout, reduce carbon footprint as part of green diversification initiative**

**Valmet scope:**
- Valmet BFB boiler plant
- Valmet Flue Gas Cleaning
- Valmet DNA Automation System
- Valmet Industrial Internet
- Value: EUR ~40 million

**Coal phaseout, the first Polish city that is heated with energy originating exclusively from renewable sources**

**Valmet scope:**
- Conversion of a lignite-fired boiler into a biomass-fired Valmet BFB Boiler
- Valmet Selective Non-catalytic Reduction Solution (SNCR)
- Value: EUR ~20 million

**Reduce carbon footprint**

**Valmet scope:**
- Valmet Flue Gas Condensing Plant: increases district heat production by an additional 69 MW
- Value: The value of these types of orders is EUR ~20–30 million
Valmet in Energy - Reliable technology partner in changing energy markets

- Resource efficient, flexible and clean solutions for energy and industrial customers
- Global trends and changing energy markets drive renewal and adaptation
- Our project portfolio shows global market coverage and strong offering (technology, automation, services)
- Innovative solutions created in collaboration with our customers
- Our solutions enable our customers’ initiatives for energy turnaround
Q&A Energy

Submit questions using the question form

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Future growth in pulp - driven by favorable megatrends

Jussi Mäntyniemi
Vice President, Recovery business unit
Contents

1. Our offering for pulp production
2. Project execution in a pulp mill project
3. Megatrends and pulp market
4. Future possibilities
5. Summary
Valmet has leading technology for all pulp mill islands and processes
Our unified project execution model ensures successful project delivery

Project length depends on the scope and size of the project, typically 1-3 years
Example: Mondi Steti
New recovery boiler to an existing mill

14-month site works in 14 seconds
Global megatrends impact also pulp production

**Resource efficient and clean world**

Climate change, environmental awareness and resource scarcity drive the need to improve resource efficiency and reduce emissions.

**Implications to pulp production**
- Need for best available technologies and advanced air emission control

**Digitalization and new technologies**

Digitalization, automatization and new high impact technologies drive efficiency and new business models.

**Implications to pulp production**
- Asset optimization and drive for autonomous mills

**Urban, responsible and global consumers**

Urbanization, increasing living standards, changing demographics, and globalization drive changes in consumer behavior.

**Implications to pulp production**
- Increasing demand for fiber-based products e.g. tissue and packaging
Paper demand and fiber consumption by grade 2017-2030

- **Long-term Paper Demand Growth by Product Area 2017-2030**
  - Tissue
  - Containerboard
  - Cartonboard

- **Papermaking Fibre Consumption by Grade 2017-2030**
  - Recovered paper
    - Average 1.3%/a
  - Mechanical
  - Sulphite
  - Non-wood

Source: Pöyry Management Consulting World Fibre Outlook 2018
Chemical pulp capacity by area and announced large projects

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- **Average technology age**
  - North America (NA): 18 years
  - South America (SA): 27 years
  - Asia-Pacific (AP): 11 years
  - Europe, Middle East, and Africa (EMEA): 22 years
  - China: 7 years

- **Capacity, million tonnes per annum**
  - Market pulp
  - Integrated pulp

- **Announced projects (over 0.5 Mt/a)**
  - North America: 8 projects
  - South America: 7 projects
  - Asia-Pacific: 11 projects
  - Europe, Middle East, and Africa: 21 projects
  - China: 22 projects

Projects officially announced. Source: FisherSolve Next
Drivers and future possibilities

- Cost and production efficiency
- Improved safety and environmental performance
- Product differentiation
- New value-adding products and platforms for growth
New value adding processes – integrated to pulp mills

**Sulfuric acid plant**
- Integrated sulfuric acid production of mill’s NCG (odorous gases)

**Biomass gasifier**
- Bark, sawdust and forest residue gasified to produce biogas for e.g. lime-kiln

**LignoBoost**
- Lignin extraction from black liquor to produce biobased chemicals and materials

**Sugar extraction**
- Extraction of hemicellulose sugars to produce biobased chemicals
Unrivalled combination of technology, services and automation for pulp customers

Chemical pulp mills
- Complete mills and technology islands
  - Wood handling
  - Cooking and fiber line
  - Recovery
  - Drying and baling
  - Air emission control

Additional technologies
- Mechanical pulping
- Heat and power boilers
- CFB gasification
- Lignin extraction – LignoBoost
- Sulfuric acid production
- Biomass prehydrolysis

Services
- Spare and process parts
- Workshop and roll services
- Fabrics
- Maintenance development & outsourcing
- Field services
- Process upgrades
- Industrial Internet solutions

Automation
- Distributed Control Systems (DCS)
- Industrial applications
- Quality management
- Analyzers and measurements
- Industrial Internet solutions
- Automation Services
Q&A Pulp

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The new normal - opportunities through digitalization and Valmet’s industrial internet

Tuomas Petänen
Head of Energy Segment, Industrial Internet
Profitability can be improved with real-time data and analytics

**Energy**

- Is your plant running in optimal capacity right now?
- What are the upcoming risks for production downtime?
- Is the fuel economy on an optimal level?
- Own electricity consumption?
- Consumption of additives?

**Revenue:**
- Electricity
- Heat

**Costs:**
- Fuels
- Emissions
- Additives
- Maintenance

**Profit**

Every minute counts in plant profitability

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Profitability can be improved with real-time data and analytics

Pulp

- Does your mill have capacity limitations right now?
- What are the upcoming risks for production downtime?
- Is performance for each process area optimized?
- Own electricity consumption?
- Consumption of steam and chemicals?

Revenue:
- Pulp production
- Other streams

Maximize revenue

Costs:
- Raw material
- Chemicals
- Electricity
- Maintenance

Minimize costs

Profit

Every minute counts in mill profitability
Why is Valmet investing in Industrial Internet?

- **Move our customers’ performance forward**
  - Improved operation and maintenance
- **New insight with real-time process data**
  - Deep insight on performance of our deliveries
- **Digitalization improves our competitiveness**
  - Performance optimization
  - Asset reliability
- **Improved efficiency of our services**
  - Remote start-up support
Key elements of Valmet Industrial Internet - VII

**Industrial Internet applications**
From analytical applications for reliability and performance to Advanced Process Controls, information management and process simulators

**Valmet Performance Center**
Provides remote support, monitoring and data analysis and access to Valmet’s expert network

**Valmet Customer Portal**
A digital, personalized collaboration space between you and Valmet

**Intelligent machines and automation**
A solid data source for Industrial Internet solutions

**Solution ecosystem**
Brings leading industry players and innovative start-ups together to co-create new value-adding data driven services

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Opportunities through digitalization and Valmet’s Industrial Internet

**Predictive maintenance**

**Opportunity**
Improve plant availability and manage production limitations by predicting upcoming failures.

**Autonomous mills**

**Opportunity**
- Optimization of entire production processes
- Reduced manual work

**Fleet management**

**Opportunity**
Continuous benchmarking of performance in similar processes enables
- Fast recognition of failures
- Insight to improvement opportunities

**Corporation level transparency**

**Opportunity**
Real time follow-up of critical performance parameters and targets on plant level and corporation level.

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**CO₂ Emissions**
Year to date
8 900 tons/MWe
Summary of key messages

Bertel Karlstedt,
Business Line President
Pulp and Energy key messages

Pulp and Energy in good position

- Good order backlog for the coming years
- Global technology and know-how leader
- A natural growth platform for environmental systems and biomass conversion technologies

Global opportunities in pulp business

- Global demand for tissue and packaging is supporting pulp production growth
- Performance and sustainability strong drivers in pulp production
- Valmet has the full scope offering

Industrial Internet and digitalization

- Combination of technology, automation and services knowhow
- Solution offering meeting customer demands
- Sustainable way to operate, share knowledge and utilize our experts globally

Sustainability driving energy business

- Emission reduction targets and EU Green Deal impact national policies
- Resource efficiency and clean solutions driving forces for customer investments
- Europe remains our main market with growth opportunities in Asia
Q&A

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Feedback survey

Please respond!

We greatly appreciate your feedback

Thank you!