

A woman with long dark hair, wearing a yellow sweater, is pushing a shopping cart in a supermarket aisle. She is looking down at a box of tissues she is holding in her hands. The background is filled with shelves of various products, including colorful packages and boxes. A large green graphic element, consisting of two overlapping diagonal shapes, is positioned on the left side of the image.

# Valmet board and paper business

Mikko Osara

Vice President

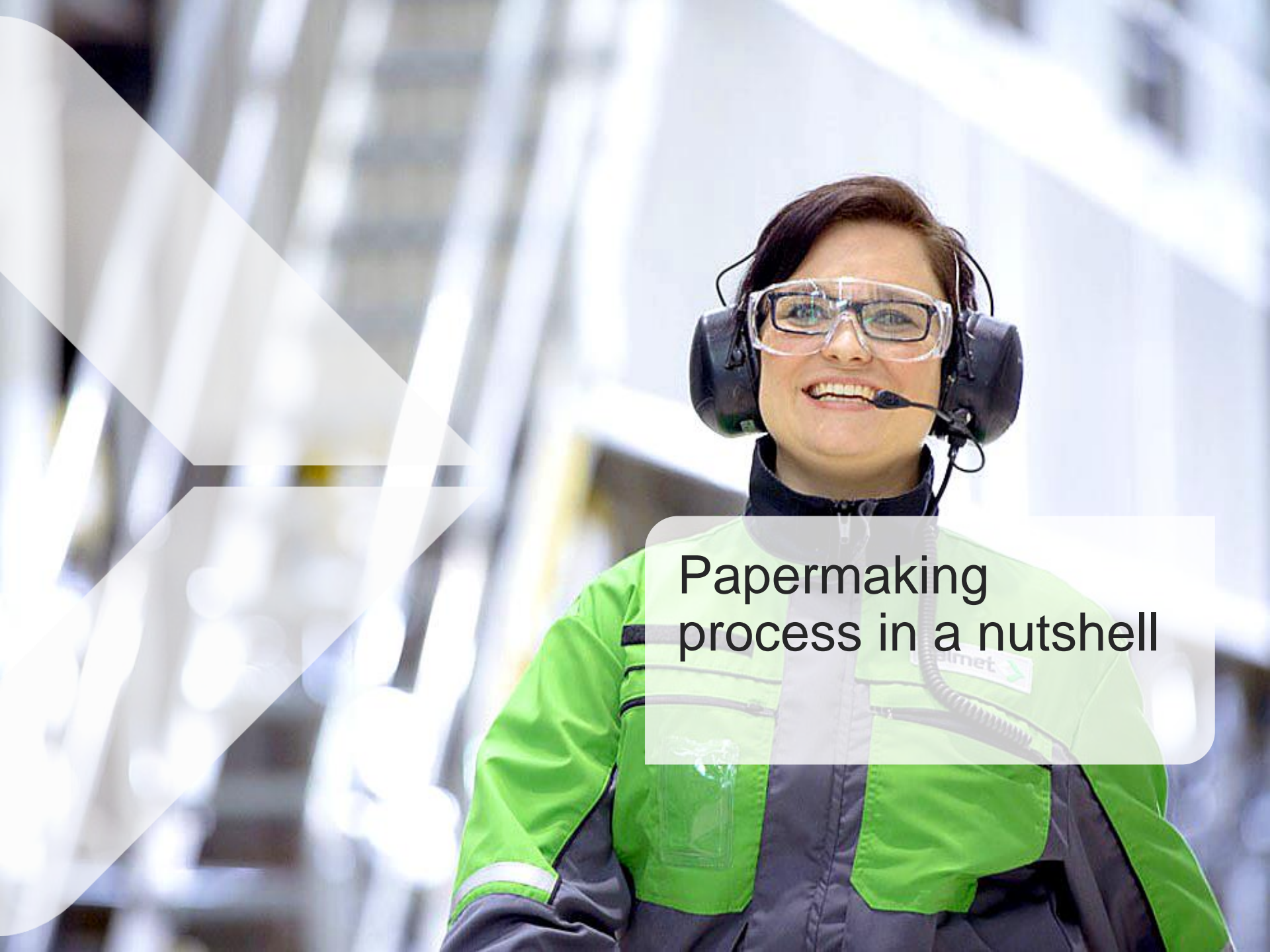
Head of Board and Paper Mills  
business unit

March 13, 2018

# Content

- Papermaking process in a nutshell
- Board and paper markets
- Competitors
- Trends in board and paper making
- Offering and R&D
- Customer cases





**Papermaking  
process in a nutshell**

# Papermaking process in a nutshell

## 1. Headbox

Squirts a mixture of water and fiber through a thin horizontal slit across the machine's width onto a forming fabric. Water content 99%.



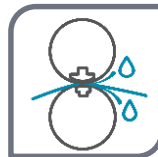
## 2. Forming

Water is removed and fibers start to bread and consolidate into a thin mat.



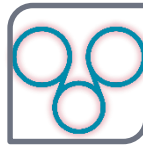
## 3. Pressing

Squeezes the web of wet paper and lowers water content to 50%



## 4. Drying

A series of heated cast-iron cylinders dry the web of sheet passing through the cylinders.



## 5. Sizing

Starch is applied onto the paper surface to strengthen the paper surface.



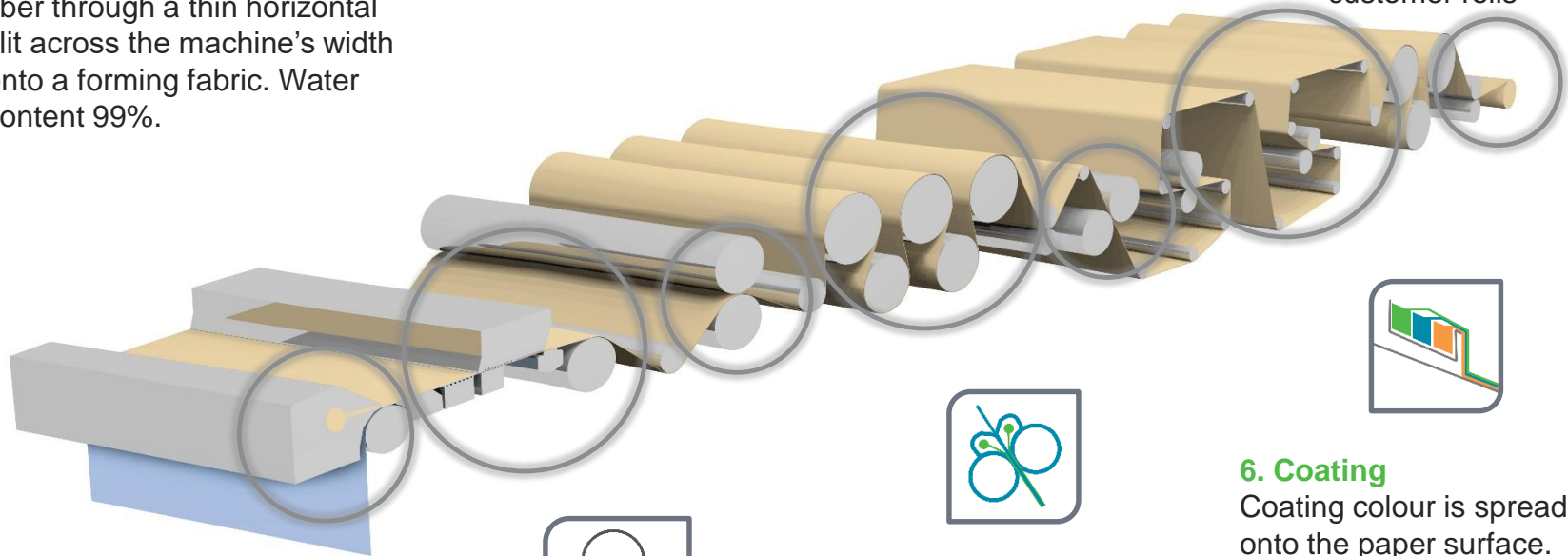
## 7. Reeling & winding

Paper is reeled into big jumbo rolls and cut after that to smaller customer rolls



## 6. Coating

Coating colour is spread onto the paper surface. Coating the paper several times improves printing properties.



# Typical dimensions of a paper machine

## Size

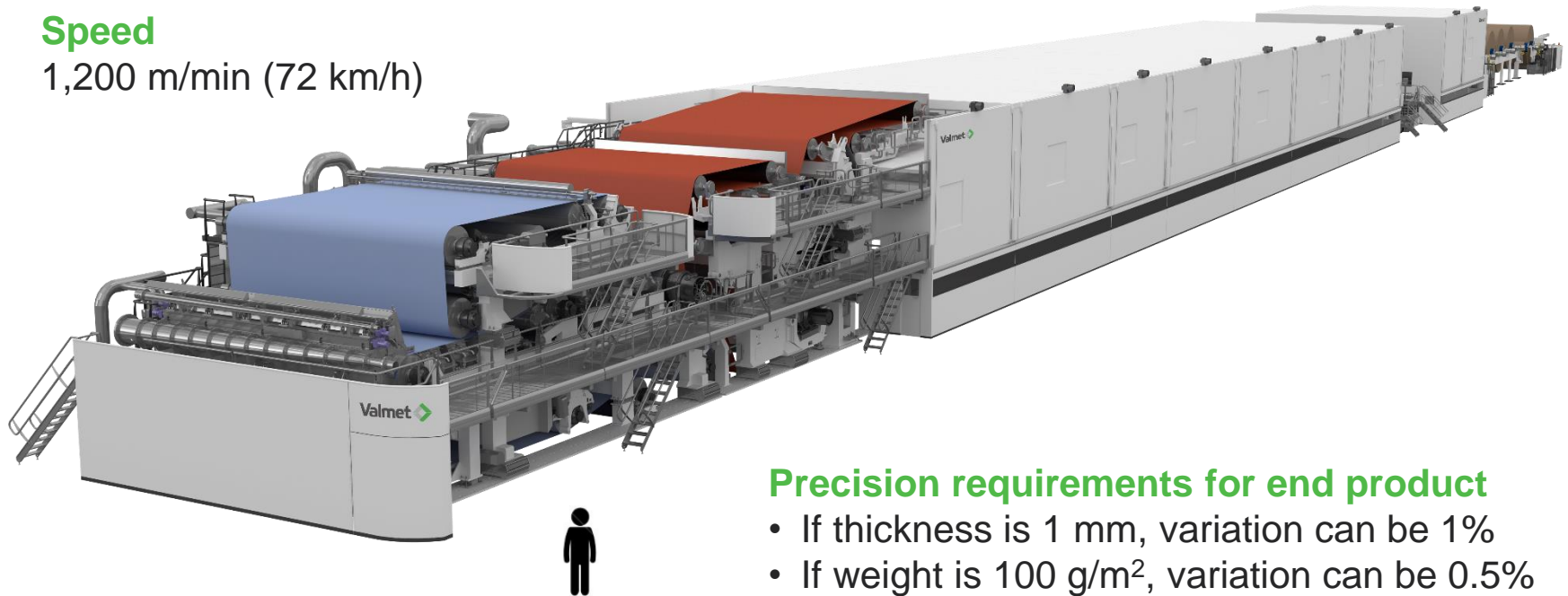
Width 7 m & Length 140 m

## Production

1,050 tons / day

## Speed

1,200 m/min (72 km/h)



## Precision requirements for end product

- If thickness is 1 mm, variation can be 1%
- If weight is 100 g/m<sup>2</sup>, variation can be 0.5%

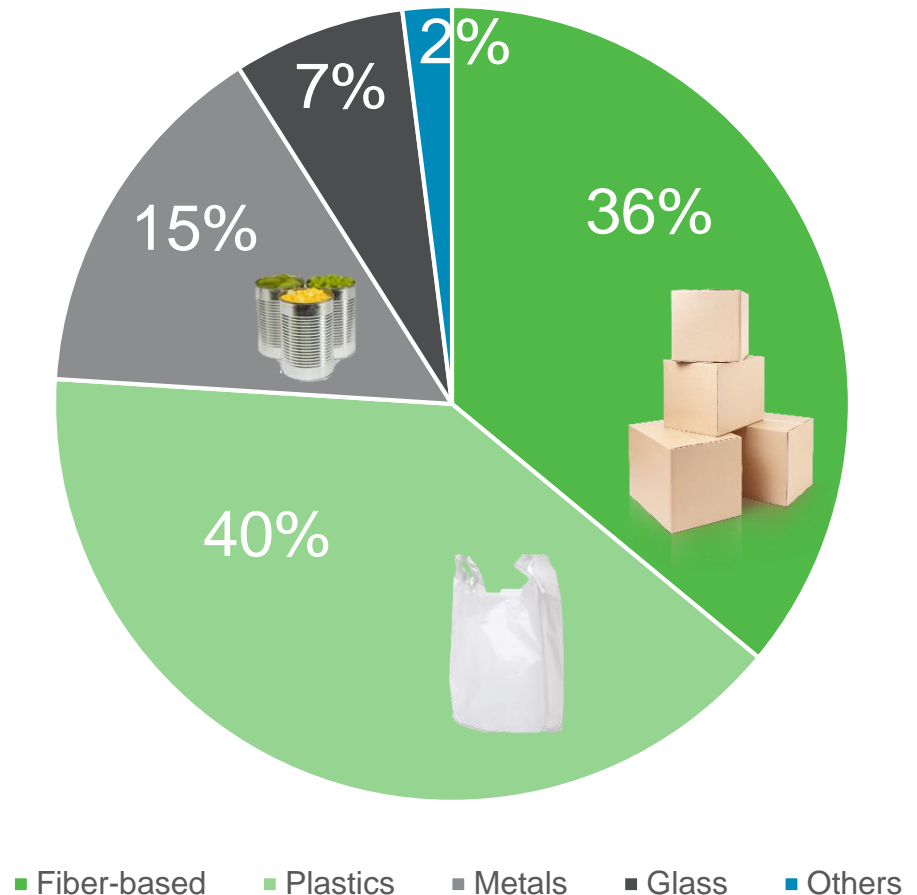
A close-up photograph of a person's hands holding a bright green, rectangular box and its lid. The person is wearing a white, short-sleeved shirt with a subtle pattern. The background is a plain, light color. A semi-transparent white diagonal shape is overlaid on the left side of the image. In the lower right, a semi-transparent light green rounded rectangle contains the text "Board and paper markets".

**Board and paper  
markets**

# Significant growth potential in packaging

Total size 600 billion EUR/a

- Packaging is a growing business
  - +3–6% annually
- **Fiber-based packaging** products are based on:
  - Coated boards
  - Containerboards
  - Packaging papers
- Fiber-based products are renewable and recyclable



# Board grade overview



**FBB**

Food, pharmaceuticals, cigarette etc.



**SBS**

Cosmetics, cigarettes etc.

**LPB**

Milk, juice, aseptic products



**Cartonboards**

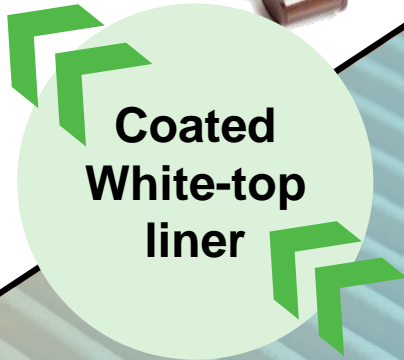
Relative price

**WLC**

Dry food, tools, electronics etc.



**Containerboards**



**Coated White-top liner**

**White-top Liner**  
- kraft recycled

**Liner**  
- kraftliner  
- recycled

**Corrugating Medium**  
- NSSC  
- recycled

**Specialty boards**

- core board
- plaster board
- sack paper
- wall paper

- Transportation containers
- Display containers
- Consumer packages





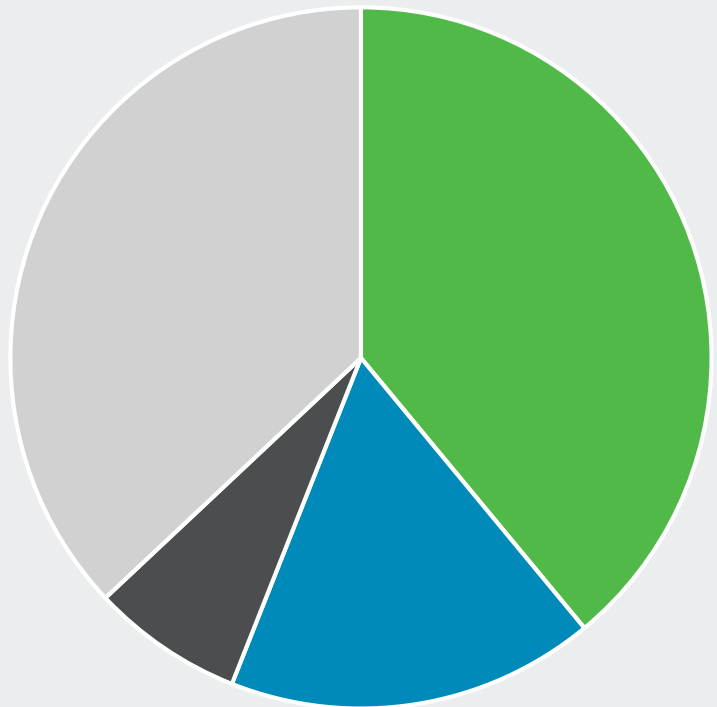


**Competitors**

# Valmet and main competitors

Operating machines by supplier globally

Relative paper & board production, kton/a



■ Valmet ■ Voith ■ Andritz ■ Others

**40%** of world's paper and board is manufactured with machines supplied by Valmet.



## Trends in board and paper making

# Current trends in paper and board making



**Lightweighting**  
Lighter packages with same strength properties



**Grade conversions**  
From printing papers to packaging board



**Specialty papers**  
Increased demand for food wrapping papers and labeling

# E-commerce is a significant driver for packaging material consumption growth

In 2017 global e-commerce sales reached **US\$ 2.3tn**

China and US account for **70%** of global e-commerce sales in 2017

Asia-Pacific e-commerce market is predicted to be **twice the size** of Western Europe and NA combined

Cross-border e-commerce sales set to grow **25%** per year on average (twice as fast as domestic e-commerce)

## Major e-commerce platforms



Global e-commerce sales forecasted to grow **141%** between 2016 and 2021

# Case examples



## Lightweighting

### Customer

Kartones Ponderosa, Mexico

### Results

Valmet's curtain coating and air impingement drying technology for reduced coating weight, increased opacity and coverage.



## Grade conversion

### Customer

Stora Enso Varkaus, Finland

### Results

Paper machine conversion into a linerboard machine to better meet the market need for renewable packaging.



## Specialty papers

### Customer

Thai Paper, Thailand

### Results

Rebuild to produce high value-added, high quality glassine paper to cater the growing demand for label papers.



## Offering and R&D

# Valmet's offering for board and paper makers

New production lines



Rebuilds



Stand-alone products



We offer cost-competitive, focused solutions



New production lines for paper and board making

- Tailor-made and modular production lines



Machine rebuilds

- Capacity increase rebuilds, grade conversions, quality improvements



Key components and individual machine sections

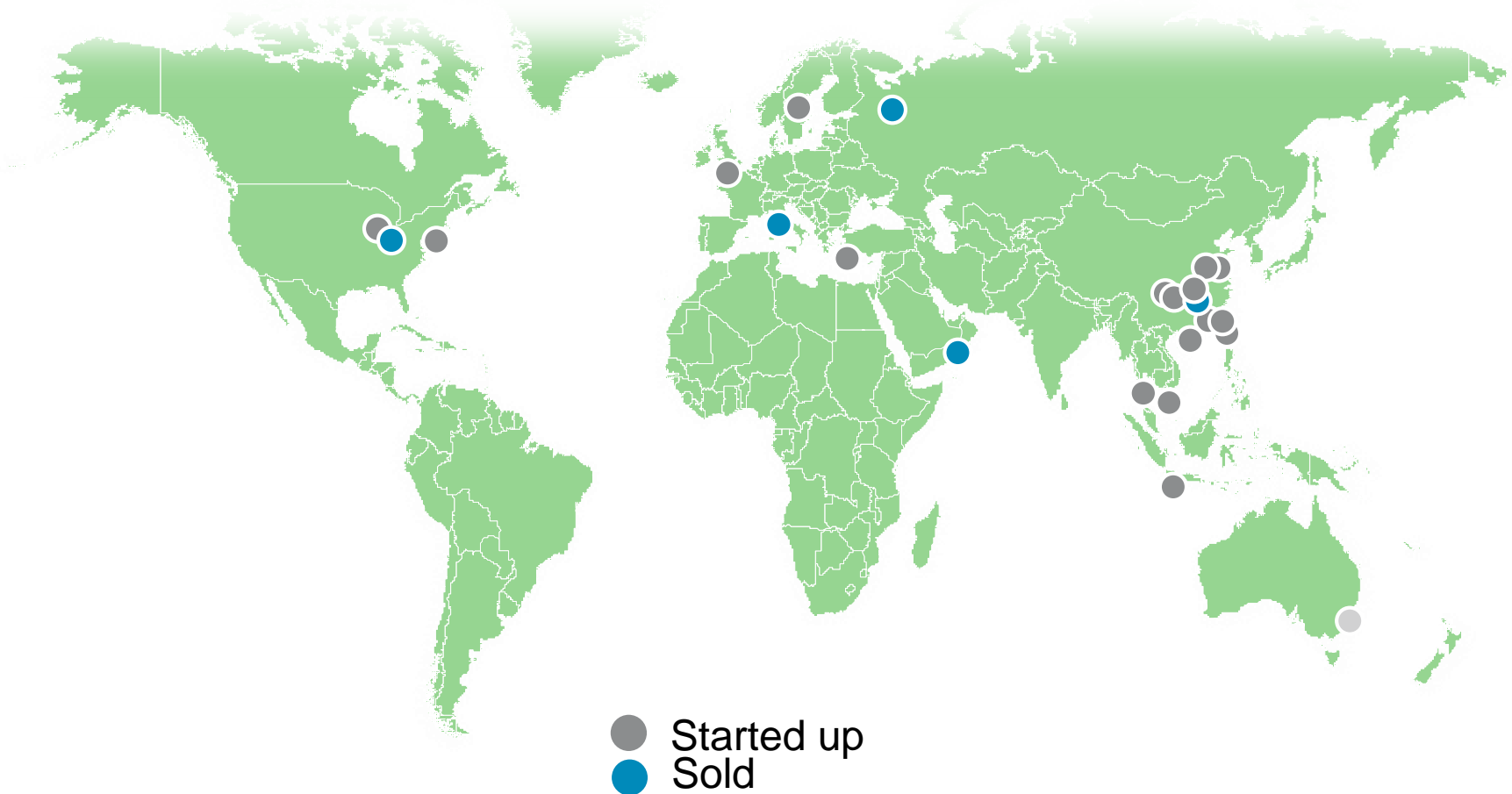
- From stock preparation to roll handling





# Valmet recent references

New line deliveries since 2012



# Customer focused research and development work

## Valmet's R&D focus areas

- Advanced and competitive technologies and services
- Raw material, water and energy efficiency
- Promotion of renewable materials

**16**

research and  
development  
centers

Research  
**partnerships**  
with leading  
global  
universities  
and research  
institutes

EUR **64**

million

R&D spending  
in 2017

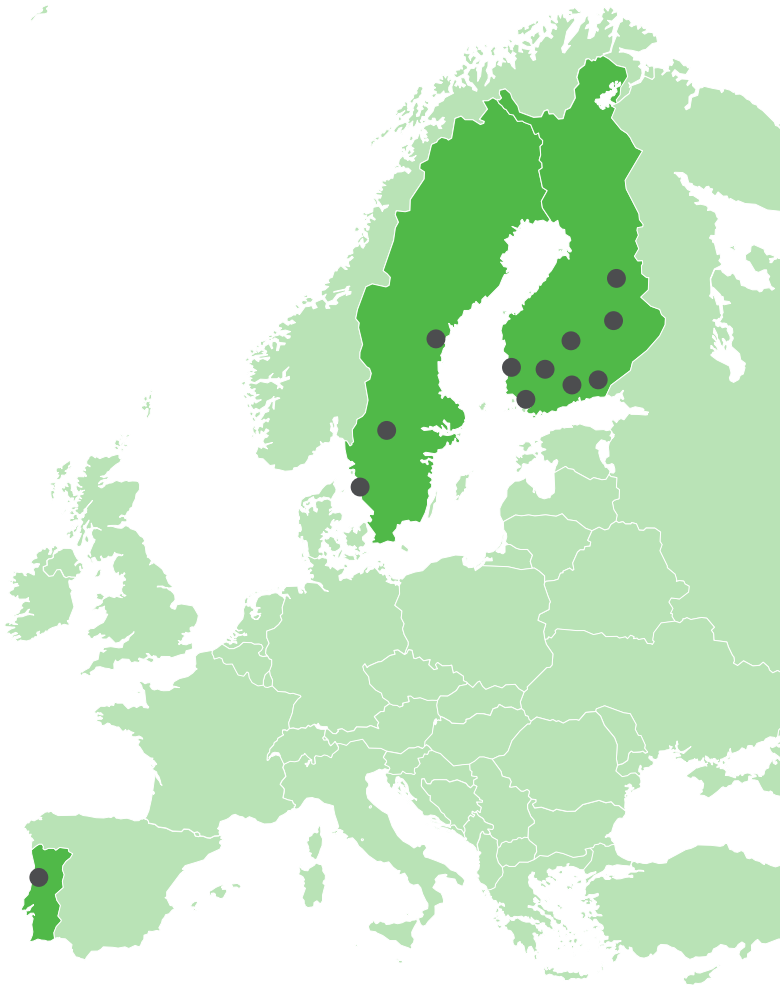
**1,400**

protected  
inventions



# Research and piloting in own R&D facilities

## Main locations



### Sundsvall

Fiberline and Biotechnology Center  
3D printing technology Center

### Karlstad

Cooking and Biotechnology Center  
Tissue Technology Center

### Kajaani

Automation R&D Center

### Juankoski

Fabrics R&D Center

### Jyväskylä

Paper and Board Technology  
Polymer and Hard Coating  
R&D Center

### Tampere

Energy and Biotechnology  
R&D Center  
Automation R&D Center  
Fabrics R&D Center

### Gothenburg

Evaporator Technology

### Ulvila

Cutter Technology

### Ovar

Filter Fabrics R&D Center

### Inkeroinen

Fiber Technology

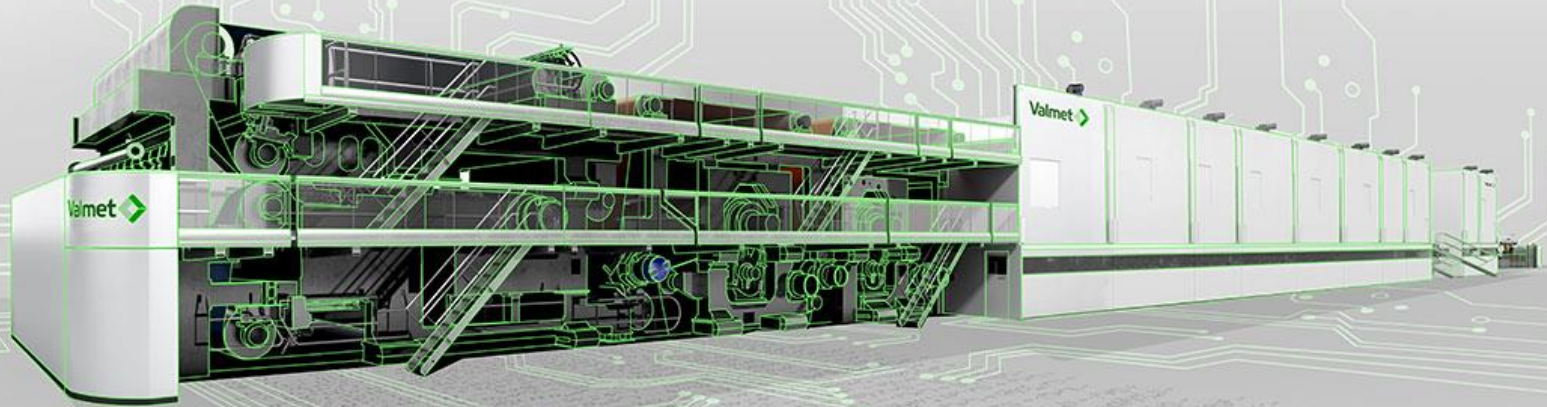
### Järvenpää

Finishing Technology

### Raisio

Air Systems Technology

# Valmet is technology leader in paper and board



Valmet has world's most comprehensive piloting environment for paper and board makers

Valmet provides unique combination of process technology, automation and services

New products represent 30% of paper and board business' total sales.



## Customer cases

# Unique coated board with Valmet coating technology – Case Kotkamills in Finland

Grade conversion from printing paper to coated board 150–450 g/m<sup>2</sup>

Consumer board machine  
**400,000**  
t/a of board



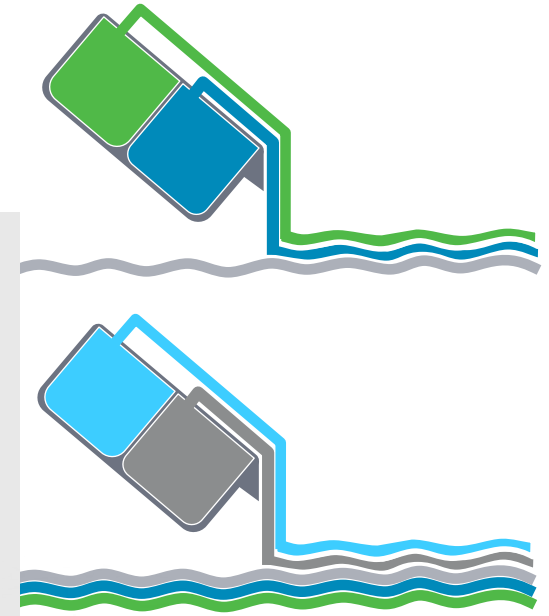
Unlike other generally used plastic-coated boards, the barrier board of Kotkamills is recyclable, repulpable and renewable.

# Valmet innovation: curtain coating technology

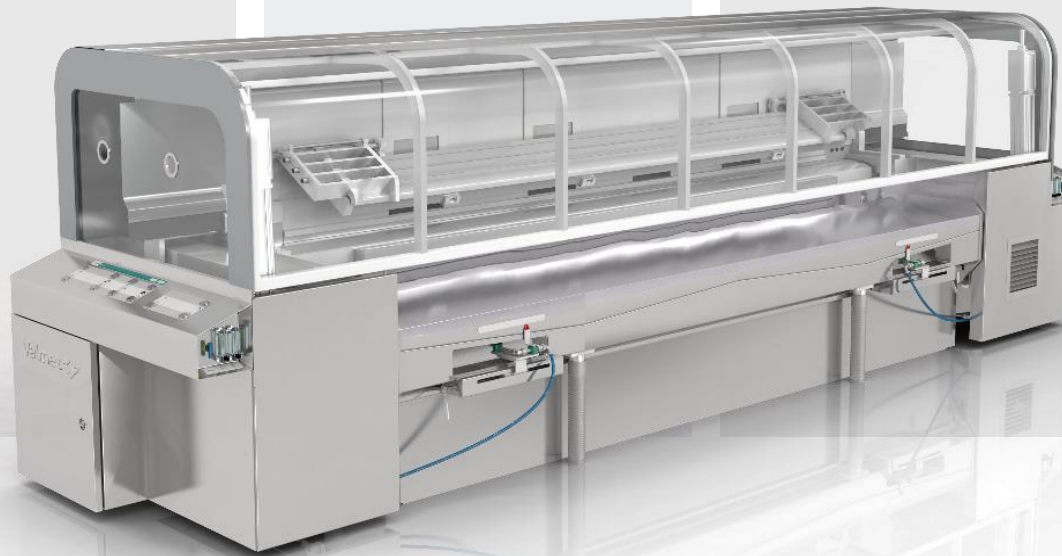
Compact  
in size

Good coverage

Two layers  
simultaneously



Different functions  
for each layer



© Valmet | Customer Days 2016

# Energy optimization with remote support – Case Siam Kraft in Thailand



- New containerboard machine with extended scope of supply
- Production of lightweight fluting board from 100% recycled fibers
- World-class energy efficiency

## Results

**15%**

energy savings in electricity

**16%**

energy savings in steam

**3M€**

value

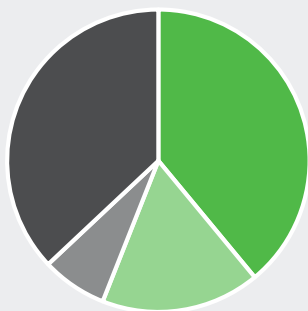
- Valmet's experts tuned the process both remotely and on-site:
  - Machine direction moisture control
  - Steam pressure and pressure difference control loops
  - Former vacuum controls



# Summary

## Operating machines by supplier

Relative P&B production, kton/a



40%  
by Valmet

■ Valmet ■ Voith ■ Andritz ■ Others

Source: Fisher International

## Customer driven R&D work

Continuous flow of new products  
Best pilot facilities in industry  
Strong IPR portfolio  
Industrial Internet



Growing demand for sustainable packaging materials brings business opportunities for Valmet