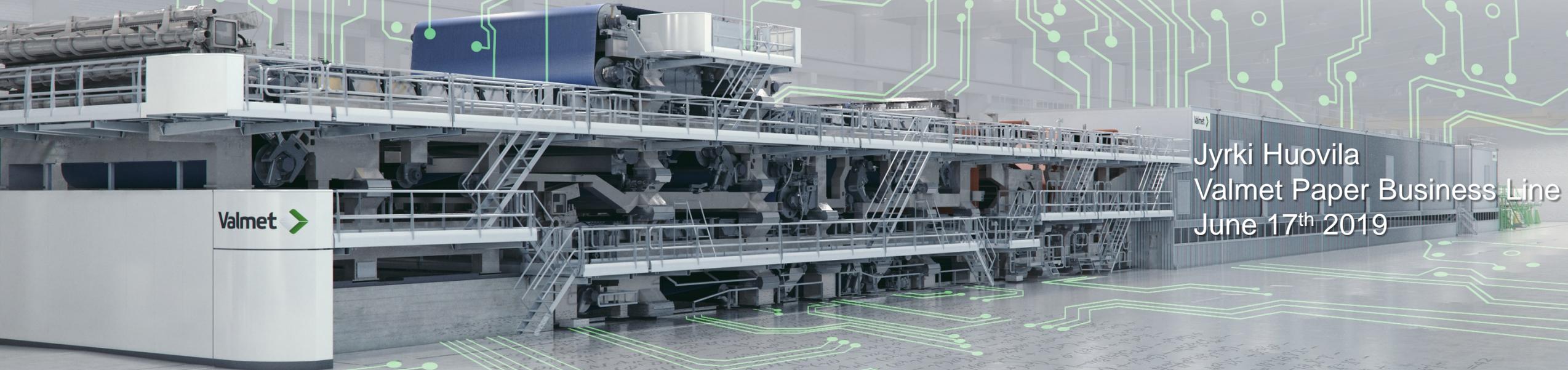


New concepts for fiber based packaging and energy efficiency



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Lower CO₂ emissions



- Low Energy & No Effluent Mill concept
- New technology PM unit processes
- Digitalization and Industrial Internet services for continuous optimized production

Increased need of packaging demands sustainable processes

Need for sustainable packaging



2017 - Total size of packaging business **€600 billion/a**
- Fiber based 36%
- Plastic 40%
Fiber based growing 3-6%/a

Increasing eCommerce



2017 - Global sales reached **US\$ 2.3tn**
forecasted to grow **141%**
between 2016 to 2021

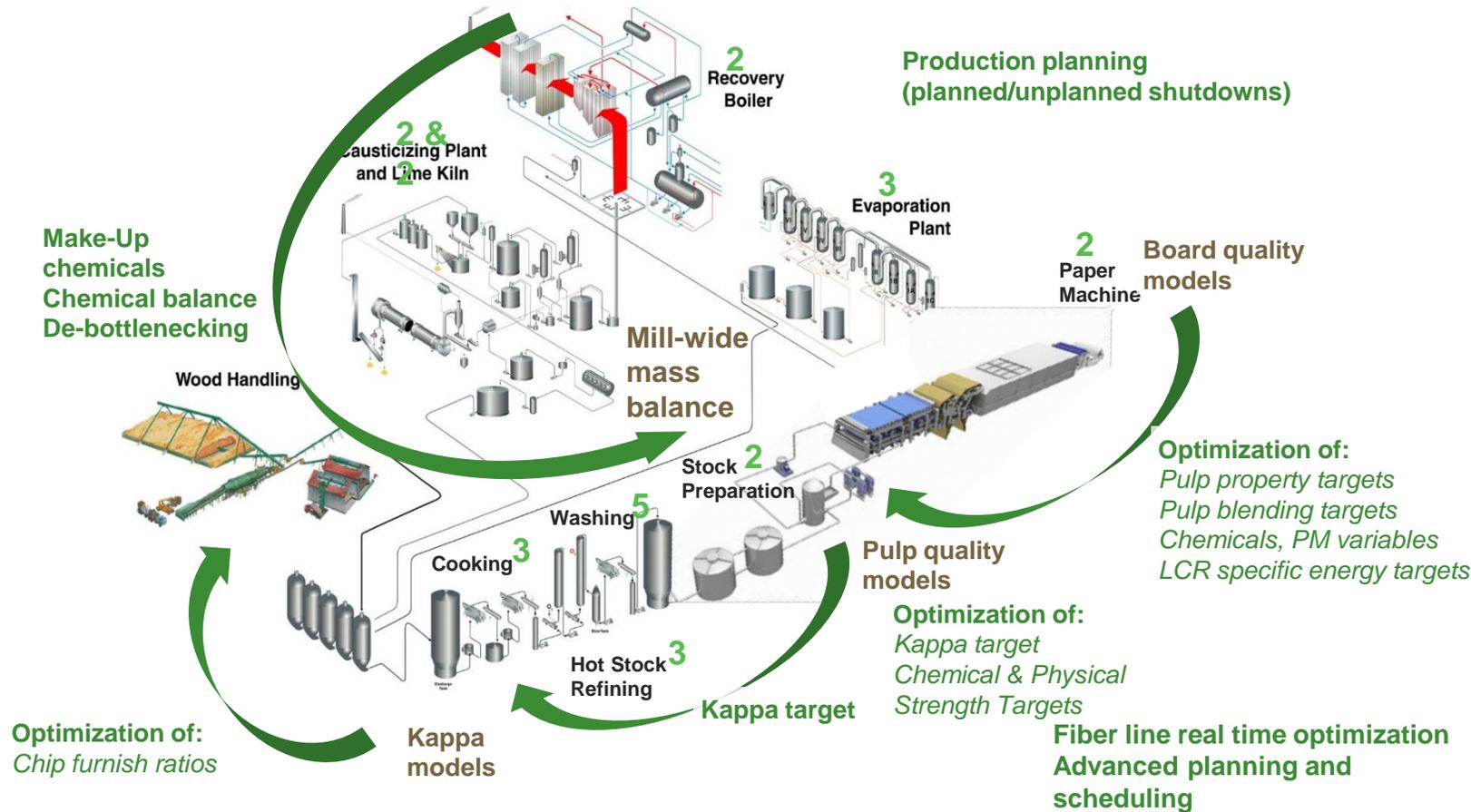
Demonstration needs

- Light weight packaging materials (MFC, special natural fibers, new production processes)
- Energy efficient processes
- End products with better recyclability
- CO₂ free PM processes

Possibility to 10-20% saving in specific energy consumption

Industrial Internet – mill-wide optimization through high level coordination

Automated decision making from chips to final product



Solution

- Mill Wide Optimization by Digitalization and Industrial Internet services enable keeping production continually at optimum energy- and raw material consumptions and optimum product quality

Energy saving potential

- Operating at optimum production continually has an annual saving potential of 20 Million MWh globally (saving 50 kWh/ton x 400 Mton/a)

Challenges

- Basic technologies exist
- System and sub-system maturity needs to be developed and demonstrated
- Mill Wide Digital Twin is a considerable up-front investment

