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Enhancing productivity through improved maintenance operations

Abstract

This paper explores how a global paper, packaging and forest products company created a partnership to improve plant operations through maintenance excellence, and enhanced focus on its core processes. Through this partnership, the manufacturer achieves significant process improvements, higher Overall Equipment Effectiveness, and lower Total Maintenance Costs. The partnership also resulted in the largest joint venture in the pulp & paper industry, with estimated annual revenues of $200-$270 million. This paper will give insights into how the pulp & paper manufacturer will increase efficiency and reduce maintenance costs in its mills.

Agenda

- Introduction to Efora Oy
- StoraEnso motivation to partnership
- Myllykoski Case Study
- StoraEnso benefits & challenges
- Conclusions

Efora Oy in brief

Joint venture covers maintenance at six Stora Enso pulp and paper plants

•Efora Oy, a joint venture with Stora Enso and ABB, provides all maintenance operations and improves efficiency at 6 pulp, paper and board mills in Finland.

• The joint venture is the largest of its kind in the pulp and paper industry, with estimated annual revenues of between $200-270 million.

•Stora Enso owns 51% and ABB 49% of the joint venture.

•Around 1,450 Stora Enso employees were transferred to the new company.

Efora Oy in brief

Stora Enso Paper Machines in the scope of the agreement

Imatra, Board, Paper and Coating machines
BM 1, Width 4,4 m, max speed 450 m/min
BM 2, Width 5,6 m, max speed 750 m/min
BM 4, Width 6,3 m, max speed 600 m/min
BM 5, Width 4,9 m, max speed 600 m/min
PM 6, Width 3,2 m, max speed 1200 m/min
PM 8, Width 6,4 m, max speed 1000 m/min
PM 7, Width 2,6 m, max speed 600 m/min

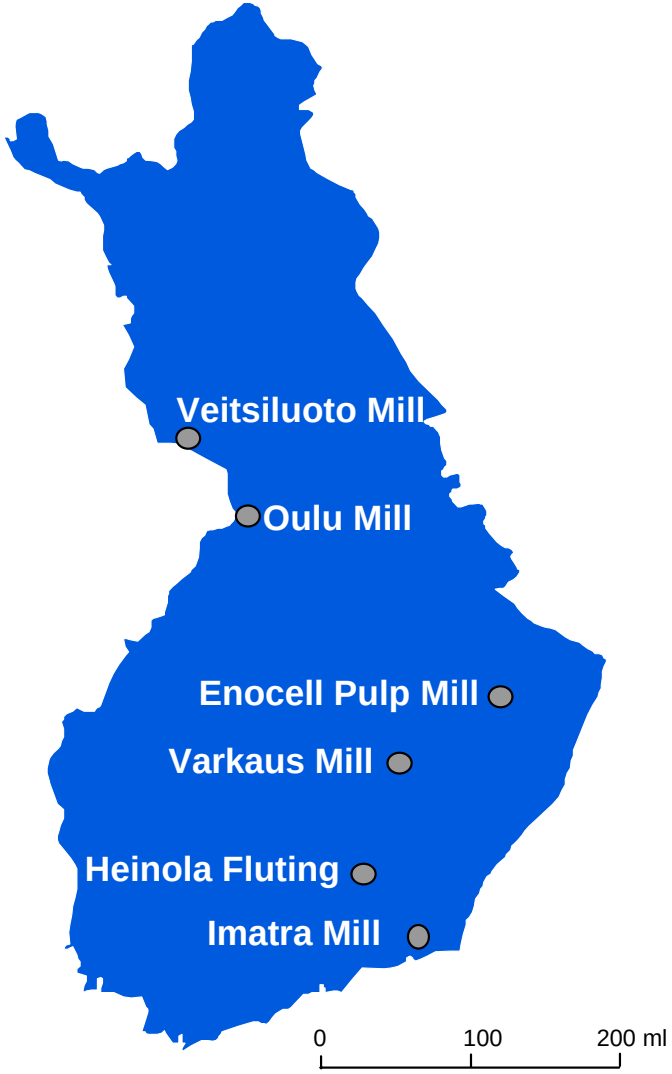
Varkaus, Fine Paper and Publication paper
PM 2, Width 5500 mm, max speed 940 m/min
PM 3, Width 7700 mm, max speed 1200 m/min
PM 4, Width 8500 mm, max speed 1250 m/min

Oulu, Fine paper
PM 6, trim width 813 cm, max speed 1200 m/min
PM 7, trim width 813 cm, max speed 1600 m/min

Veitsiluoto, Magazine and Office paper
PM 1, width 4400 mm, max speed 1250 m/min
PM 5, width 7450 mm, max speed 1300 m/min
PM 2, width 6500 mm, max speed 1200 m/min
PM 3, width 6500 mm, max speed 1200 m/min

Heinola, Fluting Mill
PM 1 trim width 6000 mm, max speed 850 m/min

Enocell Pulp Mill
Fiberline 1, Drying Machine, 580 ADt/d
Fiberline 2, Drying Machine, 1260 ADt/d



Introduction
Four key selection criteria:

Reduce Costs

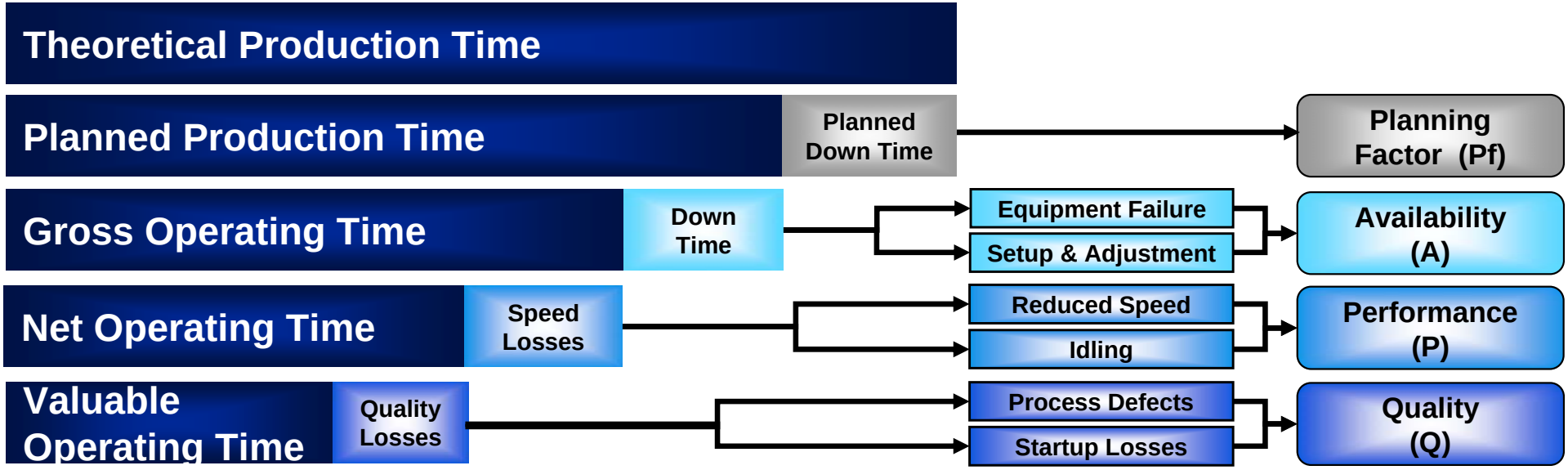
Improve OEE

Increase asset life-time

Deploy World Class Maintenance

- To ensure significantly lower and sustainable cost basis for maintenance operations.
- To improve mill Overall Equipment Effectiveness (OEE)
- To increase life-cycle of production assets
- To achieve world-class maintenance operations

What led to the partnership?
Continuous improvement of OEE



Manufacturing OEE

$$\text{OEE \%} = \text{Availability (A)} \times \text{Performance (P)} \times \text{Quality (Q)} = \frac{\text{Valuable Operating Time}}{\text{Planned Production Time}}$$

Business OEE

$$\text{Total Productivity} = \text{OEE \%} \times \text{Planning Factor (Pf)} = \frac{\text{Valuable Operating Time}}{\text{Theoretical Production Time}}$$

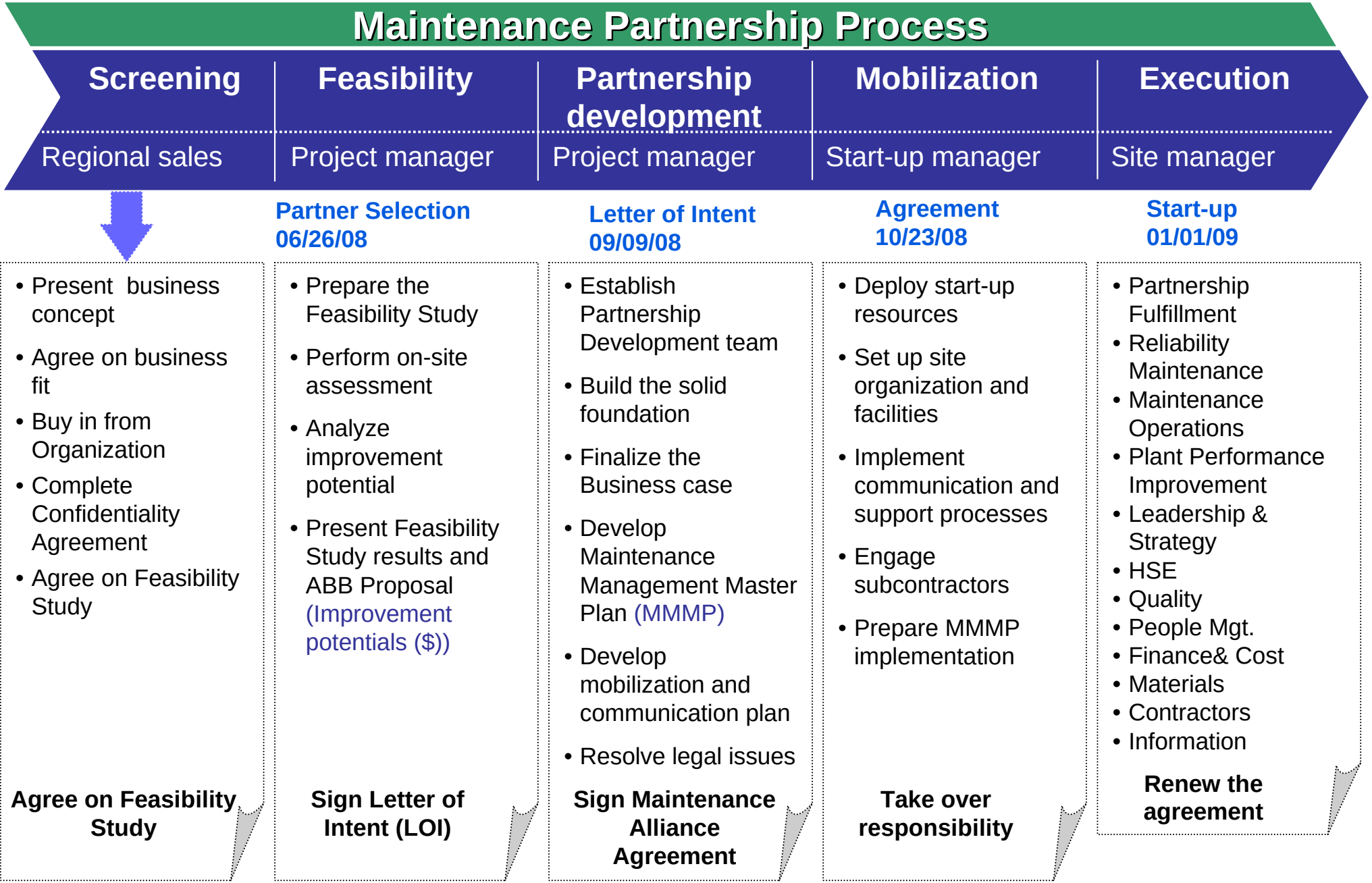
Myllykoski Paper
Case Study

"A decisive factor in the selection was that the partner should be capable of developing the operation of the mill. Other important criterion was broad experience in our sector and in other sectors, as well. When shifting maintenance responsibility, experience is also needed in implementing the change. ABB has a complete concept for that purpose and traditionally has strong expertise in electricity and automation processes and energy."

Myllykoski Group.

- Located in Anjalankoski, Finland
- Partnership started operations in 2007. Since then, Myllykoski has benefited from:
  - Decreased amount of accidents to maintenance personnel by 70% the first year and 66% the second year
  - Right-sized the maintenance organization by 21% during the first two years
  - Reduced Total Maintenance Cost by 10% each year (in total $6.5 MUSD of savings)
  - Improved OEE: PM4 +0,9%, PM6 +7,0%, PM7 +5,0%
  - Increased production and speed: nine different records set related to speed, overall tons, etc.

Steps to partnership



Efora Oy
Benefits

- Full compliance with the customer's safety system
  - Actions are taking place to create an even safer work environment.
- Savings pressure is growing, but targets are being met
- Leadership and competence to deliver the jointly identified goals and respond to production challenges has been positive.
- TPM and other maintenance tools to improve productivity and enhance Stora Enso's business strategies are proceeding well.
- Results showing the development of targets will be available after operations have more traction.

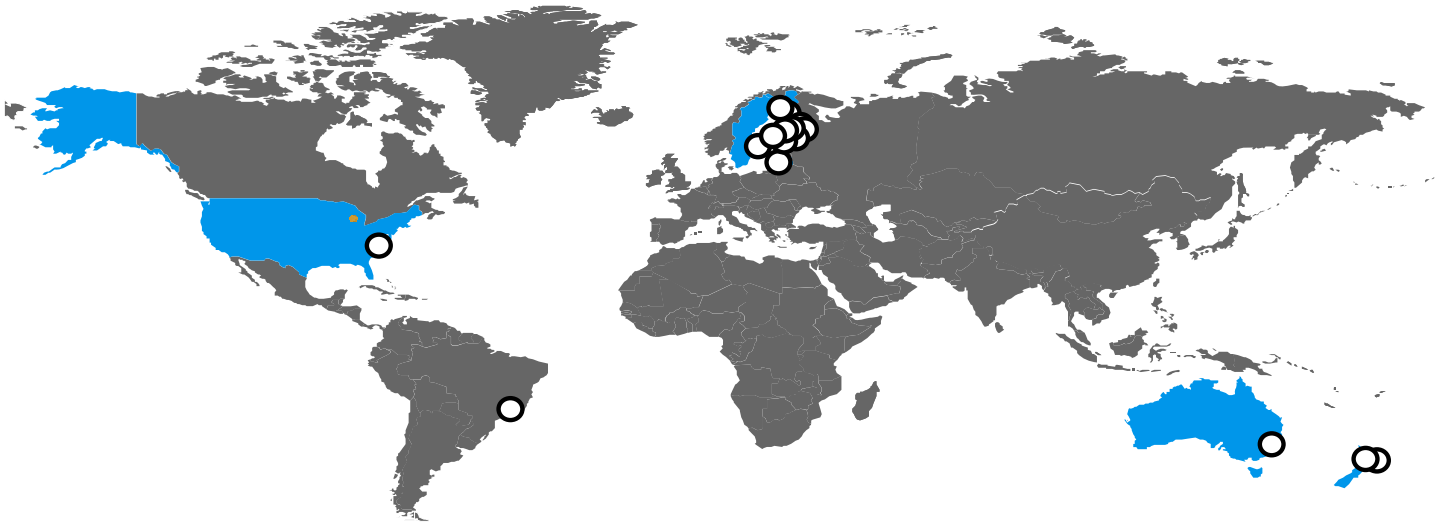
Efora Oy
Challenges for future success

- Cost effectiveness targets
  - The organization, structures and supply chain must be “right-sized”
- High-level resources
  - The present capability must be cross-pollinated while the change management process is properly supported
- Business environment changes
  - Adaption to changes that compromise the investment must be properly executed, so benefits do not whittle away

Conclusions

- Outsourcing allows manufacturers to focus on developing core businesses rather than maintenance and reliability functions
- This maintenance partnership allows Stora Enso to improve their cost competitiveness and effectiveness by implementing a long-term solution that will provide ongoing benefits by implementing world-class maintenance operations throughout several mills in Finland.

Reference Sites
Pulp & Paper



Amcor Packaging – Botany, Australia

Aracruz, Brazil

Carter Holt Harvey (CHH) – Kinleith, New Zealand

Carter Holt Harvey (CHH) – Tasman, New Zealand

Corenso United LTD Oy, Finland

Georgia Pacific, Finland

Huhtamäki, Finland

Myllykoski Paper Oy, Finland

Puhos Board, Finland

Stora Enso (Efora), Finland 6 mills

Heinola, Imatra, Oulu, Uimaharju, Varkaus and Kemi Mills

Stora Enso Packaging (2), Finland

Stora Enso Packaging, Latvia

Stora Enso – Skutskär, Sweden

Uniboard – Moncure, USA