

# Improved Efficiencies, Reduced Emissions on Biomass Boiler

## Application Note

**Finnish paper mill deploys Honeywell Experion and Profit Controller to keep biomass boiler running steadily while achieving reduced emissions during steam load balance fluctuations.**

### Background

One of the leading paper, pulp and timber products manufacturer based in Finland has been applauded for its sustainability ethos and efforts: its products are made from responsibly sourced, renewable raw materials that offer alternatives to fossil-based products. In 2015, the mill sought an advanced process control (APC) solution to better manage the combustion and steam temperature capability of the biomass boiler at its paper mill in Finland. The project formed part of a wider energy optimization strategy in which the company sought to re-focus production around predicted electricity prices.



### Challenge

In recent years, the control burden of the electricity grid has shifted from production-side to load-side. Traditionally, control was achieved by adjusting energy production while load was considered a disturbance. Today, however, production – not load – is considered a disturbance. This explains why control of the grid is increasingly important to large energy consumers: the ability to manage and control

load has a significant financial implication. The revenue that could be made from grid load control was a key factor in the decision to deploy the Honeywell solution. The mill has long used an energy-intensive thermomechanical pulping process to make paper products. The downside to the process was that it was vulnerable to costly and frequent swings in electricity prices.

The new APC solution would correct that issue by making the mill's boiler more efficient.

This was an important step that would cut operational costs, reduce NOx emissions and introduce the capability to use more cost-efficient biomass fuels in the energy production process.

The project also specified improved management for the mill's superheater steam temperature.

This was important because the higher that steam temperature gets, the more energy can be captured from flue gasses. Hotter steam produces more electricity in the steam turbine, delivering greater efficiency.

Additionally, the mill wanted to achieve better load balancing within the steam management process. This yields benefits such as: keeping the boiler running steadily during steam load balance fluctuations; capturing and releasing energy from the steam accumulator during load changes; maximizing steam through the turbine and minimizing steam blow-out. As an existing Honeywell customer, the mill turned to Honeywell to help it meet its APC project objectives.

*Profit Controller is an integrated component of Honeywell's Profit Suite for Advanced Control and Optimization. It includes the tools necessary to design, implement and maintain multiple input/multiple-output (MIMO) advanced control applications. It has the unique ability to maintain superior process control even with significant model mismatches that result from underlying process changes.*

About Honeywell  
Experion

*Experion® Process Knowledge System (PKS) integrates an advanced automation platform and innovative software applications to improve users' business performance and peace of mind. Unifying people with process, business and asset management, this distributed control system (DCS) helps process manufacturers increase profitability and productivity.*

*The latest Experion PKS Orion is the world's most advanced, open and cyber secure control system in the market today. The new IIoT-ready release further optimizes LEAP™ project execution with automated device commissioning, which enables late binding of devices with loop configuration created in the cloud.*

## Solution

After consulting with Honeywell, it was decided the quickest and most efficient way to implement the APC would be to upgrade its existing Honeywell system to Honeywell's latest Experion® automation system for controlling processes, machinery and drives (PMD) and Profit® Controller, which allows easy implementation of multivariable control and optimization strategies and provides safe control of complex industrial processes.

The Honeywell solution integrated both Experion application and Process Knowledge System servers together with fault-tolerant redundant FTE communications. The APC solutions were implemented in two Profit Controllers – one for boiler control and the other for steam net control. The controllers were linked using load demand feedforward.

The APC installation was completed in the autumn of 2016.



Experion Operator Console

## Benefits

By the end of 2016, the Honeywell APC solution had delivered several early returns, most notably in emissions, where oxygen standard deviation was reduced, leading to a 7% reduction in NOx emissions. The efficiency of the biomass boiler improved by 0.25%, while boiler load change was better managed, stabilizing the mill's steam pressure and temperature.

Together with the improved boiler efficiency and controllability, the steam net management allowed the mill to adjust its production more flexibly, according to electricity market demands. Additionally, the mill is now able to be run on different types of biomass – depending on production circumstances – which has helped to lower operational costs.

## Summary

The Honeywell APC solution met all the objectives of fuel flexibility, improved efficiency and reduced emissions at the mill. Moreover, the project has introduced a new control philosophy that ensures that this site will be able to enjoy many more decades of operational success.

## For More Information

Learn more about how Honeywell can help improve efficiency at your plant - visit [honeywellprocess.com](http://honeywellprocess.com) or contact your Honeywell Account Manager, Distributor or System Integrator.

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