

ABB's Energy Management System tools provide total energy optimization at UPM-Kymmene



All information can be seen in the same form on the screen.

Efficient energy management is important for the pulp and paper industry, because of their extensive energy usage. Significant savings can be achieved by optimally planning, implementing, controlling and monitoring energy procurement and use.

UPM-Kymmene has been using ABB's Energy Management and Optimization System since the beginning of 1998. The corporate-wide Energy Management System includes interconnected systems at nine paper mill sites and a central corporate-wide control center at Jämsänkoski.

The systems at different sites are interconnected by the corporate data network. About 200 persons at various locations use the services from their desktop workstations. System functions include performance monitoring and reporting, tie-line monitoring, load forecasting and optimal load allocation, planning of hydropower usage, management of electricity sales and purchase, and electricity cost tracking.

Sophisticated tool for production management

"We are using ABB's Energy Management and Optimization System for the planning, monitoring and reporting of our energy intensive process and business and for the archiving of energy related information", says Mr. **Risto Viitanen**, Production Manager at UPM-Kymmene Energy. "We appreciate that all information, including historical and real-time data, and forecasts of the future can be seen in



Tervasaari Paper Mill in Valkeakoski, Finland.

the same form on the screen. Users can access system functions and information at office PCs linked into the company's data network or remotely through telephone connections", he notes.

The mills at different sites or the whole corporation can use the system's tie-line monitoring function to monitor their purchased energy according to internal tariff limits. The accumulation of the purchased quantity is shown on a display that presents the energy as an integral from the beginning of the current hour. The display also shows which resources are being used together with the costs of each resource and a prediction of the integral consumption at the closing of the hour. The production of certain energy intensive departments can be adjusted in order to avoid excess usage of expensive electricity during peak hours.

Enterprise-wide control and information system

Load forecasting and optimal load allocation support the planning of energy system operation on a time perspective of a few weeks. Accurate load forecasting is important, because knowing the future energy demand allows the dispatching of own generation units and purchasing electricity in an optimal combination that minimizes total costs. "With ABB's system the energy usage and production can be monitored and controlled enterprise-wide from the central control center and also from several other localities. The mills predict their energy use in accordance with production plans. The accuracy of the predictions is observed, and those mills with poor predictions will pay an extra fee in electricity price", says Viitanen.

The opening up of the energy industry for competition has created an operating environment, where electricity can be purchased and sold at market prices or through bilateral contracts. The Energy Management and Optimization System provides the tools to manage all the information relating to electricity trading. This includes registering new contracts into the system so that they can be taken into account in load forecasts and in optimal load allocation. It is also possible to simulate purchase and sales transactions at different prices and tariffs in

order to compare alternative scenarios and to select the best operating plan.

Control of hydropower and natural gas

The Energy Management and Optimization System supports the planning of hydropower dispatching in water systems with interconnected basins where the restrictions on basin levels and flow rates must be complied with. Viitanen reports that the Energy Management System has also been used by UPM-Kymmene for the remote control of hydropower plants. "Hydro-energy is one of the few possibilities to store energy, and by using hydro-energy storages the total energy procurement can be balanced to some extent by substituting the most expensive procured electricity".

Viitanen notes that the purchase of natural gas by UPM-Kymmene is also controlled by the Energy Management System, by applying the Tie-Line Monitoring function in an adapted form.

"The pay-back period of the investment has been less than the 3 years planned initially. Enterprise-wide resource optimization with Tie-Line control results in economic savings. The Energy Management and Optimization System enables us to be more independent in the changing energy markets", Viitanen concludes.

A short history

The Energy Management and Optimization System is ABB's toolbox for total energy system management in both mill-wide and corporate-wide solutions.

UPM-Kymmene was the first large-scale user of the system. Ordered in the summer of 1996, their system was commissioned site by site in several phases between December 1997 and September 1998. Subsequently ABB has delivered several Energy Management and Optimization System to pulp and paper and other industrial enterprises, including StoraEnso, Metsä-Serla, and Rautaruukki.



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