

Web based process calculation tool for a power plant

Problem Statement

The power plant needed an operation support tool for optimal selection of the operating mode, calculation of financial and operating parameters and for condition monitoring.

Improvement Approach

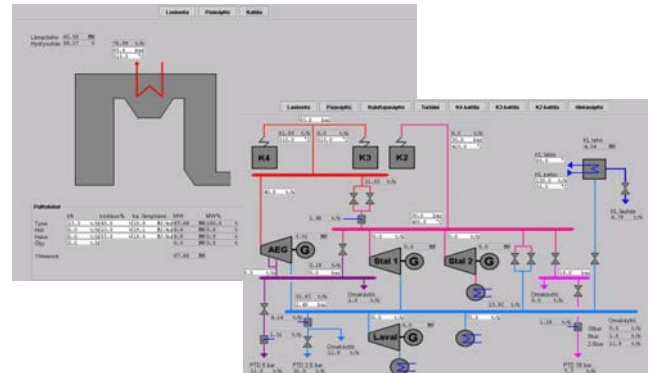
A web based simulation model of the power plant was created. The aim was to implement an easy to use interface that operators could immediately be familiar with.

Benefits

Save maintenance costs by identifying possible bottlenecks in the process before they need “on-the-job” maintenance. Optimise fuel consumption and emissions.

Contact Information

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Easy to use WebProsim user interfaces for quick calculation of processes.

PROBLEM STATEMENT

Mäntän Energia Oy, Mänttä, Finland is located close to Metsä Tissue’s Mänttä papermill. The power plant produces annually 65 GWh of electricity and 300 GWh of process steam for the Mänttä mill of Metsä Tissue Corp. Also 50 GWh of district heating energy is sold to Mäntän Kaukolämpö Oy, the company supplying the nearby community with district heating.

The power plant uses peat and wood as its main fuels in energy generation, paper mill residue and sludge are also used as fuels. The power plant is a combined heat and power plant using a fluidised bed boiler as its main boiler. The main turbine is a backpressure turbine. The power plant also has smaller boilers and turbines for backup operation.

Typical problems at power plants are cost of maintenance, cost of fuels, environmental costs and regulations.

To be able to perform pre-emptive maintenance and thus prevent unplanned outages is a very important factor in plant economy.

Calculating fuel costs to find the most economically feasible operational costs is essential in today’s free electricity market. Environmental regulations and future emissions trading directives in the EU set new requirements for power plant operators especially concerning CO₂ emissions. Therefore it’s essential to be able to calculate also the most economically feasible fuel mix from the viewpoint of emissions.

IMPROVEMENT APPROACH

WebProsim has been in operation for Mäntän Energia's power plant since June 2003.

It is going to be used for training new operators and also experienced operators in handling different types of plant operation. WebProsim can simulate the effects of changes in plant parameters on the whole process.

Operators can learn different operating modes by simulating them with WebProsim.

Supervising turbine parameters is one of the main applications of WebProsim. By tracking the parameters of the turbine it is possible to identify the degree of dirtiness. Also recognising maintenance needs in the process is an application field for WebProsim. Thus reducing the chance of unplanned outages.

WebProsim is useful in determining operating costs. The cost of generated energy from fuels is easily calculated with WebProsim as well as the amount of emissions from the fuels used.

It is possible to use WebProsim from any computer that has Internet access, with any browser. No client installations are needed.

BENEFITS

- Training operators to efficiently use the power plant and handle different operating modes
- Simulate changes in the process
- Reduce unplanned maintenance outages by tracking turbine processes
- Calculate operating costs accurately
- Optimise emissions and cost of used fuels

WebProsim offers the ability to use the process calculation tool from every Internet accessible computer. In user workstations no installations are needed because the software is used with a standard internet browser.

The calculation software is installed in a single computer. Software maintenance is simpler, when all application parts are placed in one place.

It's possible to host the service in client's own network or Endat's server.