Mr Juha Kosonen, Power Plant Manager of Stora Enso Oyj's Imatra Mills:

A power plant producing energy for a pulp and paper mill must operate efficiently

A model on the power plant's energy analysis was published in 2002. Stora Enso Oyj tested the analysis model to survey the saving potential of the Imatra Mills. At the same time, Stora Enso Oyj wanted to create a model of its own for analysing its other mills.

"In the processing industry, a power plant operates on the terms of production. As production increases, the power plant produces more heat and electricity – as production decreases, vice versa.

Stora Enso's Imatra Mills produce more than 900,000 tons of chemical pulp and more than one million tons of paper a year.

Measured by steam, the production of our power plant approaches 20,000 TJ, of which more than 90 % are produced by wood-based fuels. Our annual electricity production amounts to approx. 800 GWh.

We have, e.g., massive chemical circulation, two recovery boilers, one solid fuel-fired boiler, as well as four auxiliary natural gas-fired boilers.

Saving potential exceeds one million euros

After the completion of the previous energy analysis, the operation of the Imatra Mills was tuned up and a new fibre line was started up.

We wanted to upgrade the energy data and apply a completed model designed for the energy analysis of a power plant to our own needs. In an ordinary power plant, efficiency may be analysed on the level of pumps and fans, whereas in a paper mill the focus must be on overall optimisation.

The energy analysis revealed a total annual saving potential of more than one million euros. The proposed measures would improve the power plant's total efficiency by approx. 1.5 percentage units.

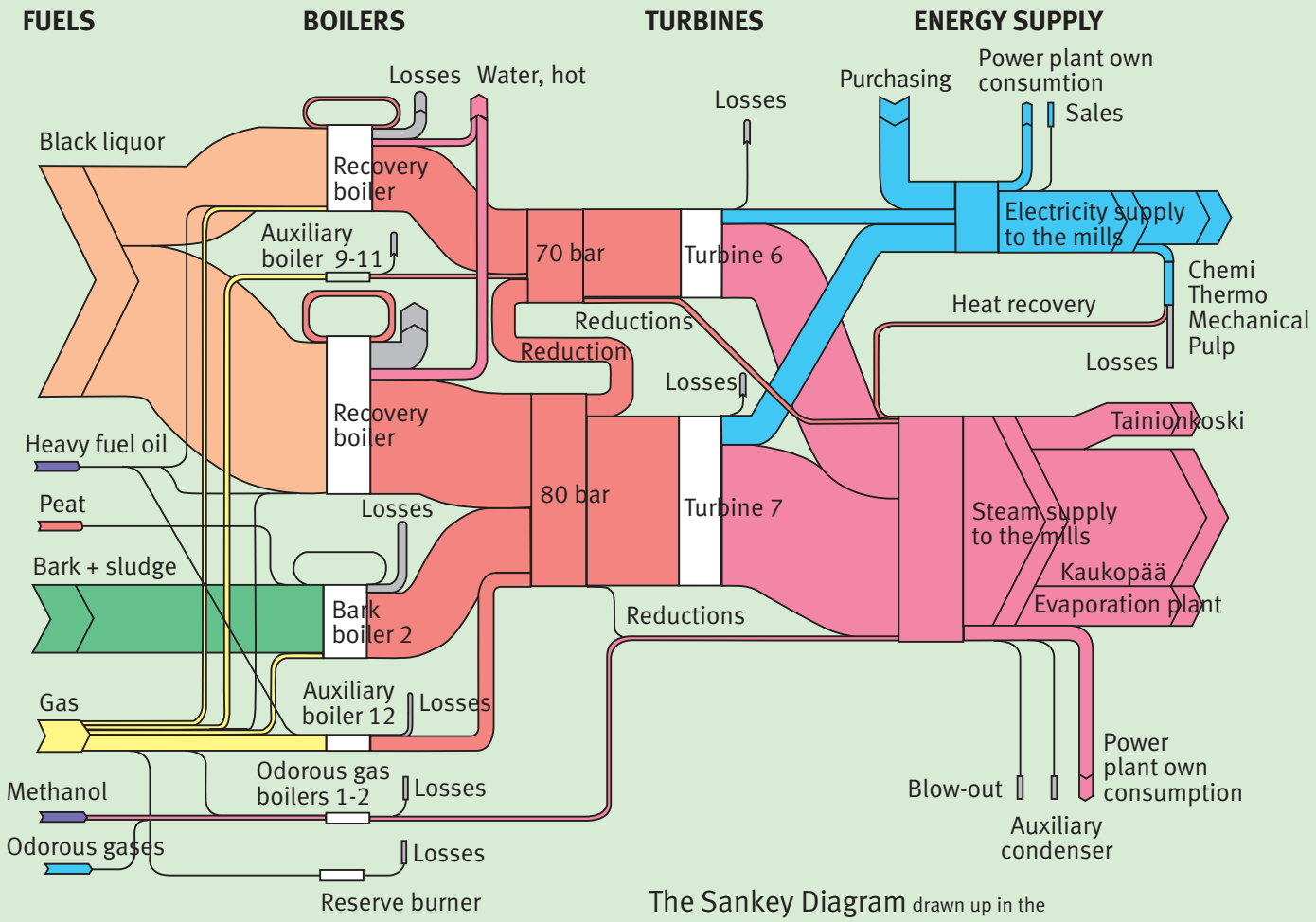
The most substantial savings will accumulate from heat conservation and the fact that natural gas has been replaced with bark, which is a low-priced fuel for us.

Carbon dioxide emissions were analysed as well

The energy analysis did not result in any real surprises, but various possibilities to increase the efficiency of operation were found, from the pressure and temperature adjustments of high-pressure steam to a variety of investments.

One of the first investments to be implemented as a result of the energy analysis will intensify the utilisation of the secondary condensate originating from black liquor evaporation in the heating of the make-up water supplied to boilers. At the same time, we can reduce the amount of energy used to heat the water as well as the excess heat hampering the operation of the wastewater treatment plant.

Carbon dioxide emissions were also investigated during all stages of the energy analysis. The analysis model will have a positive impact on emissions balance sheet management."



The Sankey Diagram drawn up in the energy analysis shows the energy flows.

The objective of the energy analysis of a power plant is to investigate the present situation in regard to energy consumption and production, together with possibilities to increase efficiency. The objective is to increase the overall energy efficiency and economy and to reduce carbon dioxide emissions.

When the focus of investigations is on the overall energy efficiency, the plant-specific modes of operation and fuel alternatives are analysed. In condensing power plants, the focus is on changes in specific heat consumption, and in combined heat and power (CHP) plants, on changes in the level of power to heat ratio.

In industrial power plants, the economic potential for increasing the overall efficiency is estimated to be 1–2 percentage units.

Additional information:

Motiva (www.motiva.fi)

- audit and analysis models, results and state subsidies for energy-efficiency

Significant saving areas identified in the analysed power plants

Potential for improvement of fuel supply and heat production and use
Improvement of fuel drying
Substituting imported fuels with bio-fuels
Improvement of insulations
Sealing of equipment / repair of leakages
Utilisation of secondary heat in preheating
Changes in the controls of ventilation equipment

Potential for increasing the efficiency of electricity production and use
Raising the pressure and/or temperature of live steam
Optimisation of the turbine process
Using the conveyor as needed
AC inverters for the feedwater pumps and flue gas fans
Optimising pumping and increasing efficiency
Improvements in the compressed air system

Potential for increasing the efficiency of water use
Increasing the efficiency of condensate return
Changing cooling water systems to closed systems
Repair of water leakages

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