

Power station tuned up

for energy efficiency makes clear money savings



We will overhaul your operational economy. We will raise your output. We will reduce your emissions. These are the promises of Fortum Ecotuning®. In addition to all this, the client is guaranteed savings of EUR 500 000 or additional income in the power station's energy efficiency within one year. What is going on here?

The financial result of a power station is largely decided by its performance capacity. When the aim is better performance capacity, both the power plant's energy efficiency and its availability come under the magnifying glass.

"Ecotuning® is a year-long project in which we investigate the weak links in the operational economy of the power station, and tune the station to its peak performance by optimising processes and procedures and by training the staff. In this way we get energy efficiency to where it should be," states **Kari Lahti**, who is responsible for product sales at Fortum.

Ecotuning® is based on years of experience of similar projects in power stations – both Fortum's own, and those of other clients where Fortum is responsible for operation and maintenance. One good example is the 1 000 megawatt natural gas power plant where Fortum trained the power plant's personnel, analysed and optimised energy efficiency and supervised the introduction of new working models.

"Our client's annual savings were over a million euros. No investments were needed at all."

Ecotuning® project is carried out in close cooperation with the client. Its component areas include a power station energy-saving survey covering process, instrumentation, emissions, pieces of equipment which are critical from the aspect of operating efficiency, and regulations for the operational economy, plus the remote support which allows an operational economy analysis of the plant and a training programme for the plant personnel.

Where do the real costs savings for energy production lie?

"Energy production costs can be reduced decisively by improving the power plant's operating efficiency, i.e. its energy efficiency. In this way we have a direct impact on the production's largest expense item, i.e. fuel, which accounts for about half of total costs. Often this gets forgotten, and expense items with a much smaller share come under cost scrutiny," states Kari Lahti.

Better operating efficiency in a power plant leads to a reduction in fuel consumption, which in turn reduces emissions, and so savings are also generated in the costs of emission rights. Nor does the environment suffer.

Many methods – all vindicated by experience

According to Kari Lahti, the energy efficiency of a power station can be affected by structural changes, by systematic and preventative maintenance and by training the personnel in the optimal running of the plant and in the monitoring of the operational economy.

"Structural changes can mean for example changing the heat exchangers for more efficient ones, changing pump control methods, or the addition of entirely new devices to the process. We use Solvo®, a very reliable balance calculation tool which was developed inhouse and which allows us to calculate the impact of any changes on the operational economy. In this way we obtain reliable data as a basis for decision-making," states Fortum product manager **Ilkka Salmensaari**.

All these elements were needed when Fortum improved the operational economy in a power plant which

produced about 800 gigawatt hours of electricity and about 1 700 gigawatt hours of district heating, and used natural gas and coal as its main fuel. When the heat exchangers were replaced, the capacity of the flue gas fan increased and the emissions brought into line, improvements were experienced in the power station's availability, the efficiency of the flue gas fan and elsewhere.

"Thanks to Ecotuning®, the client can save half a million euros over the course of a year. The payback time on the investment is less than four months," states Kari Lahti.

Getting under the hood – at a distance

In the Ecotuning® project, the performance of devices, instrumentation and controls is continuously monitored using remote support: measurement data for analysis is collected on the plant's heating technology performance, technical condition and hydrochemistry. In this way it is possible to give recommendations on maintenance measures and to discover failures before they have a chance to affect the availability of the plant – cost savings are generated via the optimisation of maintenance and the avoidance of unplanned shutdowns.

"In remote support and on-the-spot, we survey the condition of (for example) a turbine by measuring changes in the operating efficiency and the level of vibration – in this way we are able to calculate what, in terms of the overall economy of the plant, is the correct moment for servicing procedures or investments," states Ilkka Salmensaari.

In addition, remote support leads to the achievement of other factors which are important from the aspect of efficient operational economy, such as reduced fuel consumption and optimised working of the plant.

"The Ecotuning® project also allows us to establish the plant's power output increase potential. For example, we also aim to ensure that the plant maintains its maximum performance by training its personnel."

Staff expertise and motivation is the decisive factor

With all due respect to calculation programmes and Excel spreadsheet calculations, the final result will in reality be decided by the people who work at the power station. Therefore, in improving the operational economy and energy efficiency the emphasis is on the training, direction and motivation of operational personnel.

"By our training programme, we ensure that the power station personnel understand the main factors influencing the profitability of operation, and how they can influence these and run the plant optimally in the context of their own work," states Ilkka Salmensaari.

Procedures for the efficient use of the plant are laid down via a programme which matches the training needs of the staff. Staff know-how and new ways of working will reduce costs, improve availability and facilitate the optimisation of efficiency, which in turn will ensure that the power station will operate continually at its peak. In order to obtain the best result, the staff needs to be motivated to use new ways of working and new procedures – and once again the Ecotuning® project provides the solution here.

Fortum Ecotuning® is a year-long tuning project in which we investigate the weak links in the operational economy of a power station. It includes the optimisation of the power station's processes and procedures, and the training of its personnel. We guarantee that during the one-year review period a saving of at least 500 000 euros in the power station's energy efficiency or additional income, will be achieved.

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