

Swedish CHP plant uses ABB's Industrial^{IT} automation platform



The Ängelholm CHP plant

Ängelholms Energi AB, a municipal utility, distributes district heat and electricity to the 37, 500 inhabitants and industry of the town of Ängelholm as well as to parts of the city of Helsingborg in southern Sweden. The utility has recently upgraded its CHP (Combined Heat and Power) plant and hot-water plants by installing a new automation system based on the ABB Industrial IT automation platform, the first of its kind to be used in a Swedish district heating system.



Central control room in the Ängelholm CHP plant, from where outlying hot-water plants, a pumping station and other facilities located within a radius of 15 km are monitored and controlled. The control system, based on ABB's Industrial IT automation platform, incorporates an environmental calculation function.



AC 800M controllers are using distributed I/O modules from the S 800I/O family for connection to the process



Ängelholm CHP plant in southern Sweden uses wood chips and natural gas as fuels.

General background

Ängelholms Energi's origins date back to 1911. The utility in its present form has been operating since 1988. Its mission is to distribute district heat and electricity as well as natural gas from the Danish sector of the North Sea. The present CHP plant was built in 1984. During a normal year it produces 215 GWh of district heat and around 90 GWh of electricity. Biomass in the form of wood chips and natural gas are the main fuels. The district heating network has a total length of 107 km. Several back-up hot-water plants also form part of the district heating system, located in outlying parts of Ängelholm to boost the supply of district heat.

A process control system was installed in the CHP plant at the time of its construction. Over the years the control system has been upgraded and modernized on a number of occasions. Kenneth Carlsson, Plant Manager, Ängelholms Energi, says: "We had now reached a limit and realized that the time had come to replace the control system by a new one." Ten different companies submitted tenders for a new automation system, with six of them meeting the stipulated requirements. ABB was finally awarded the contract after the evaluation of the tenders. "We evaluated above all the strength of the competing firms and their ability to install a new control system in an existing plant," continues Kenneth Carlsson. "ABB offered an open system. This meant that we

could purchase on the general market replacements for any items that might eventually malfunction. "We are consequently not tied to a specially tailored system."

Hot-water plants

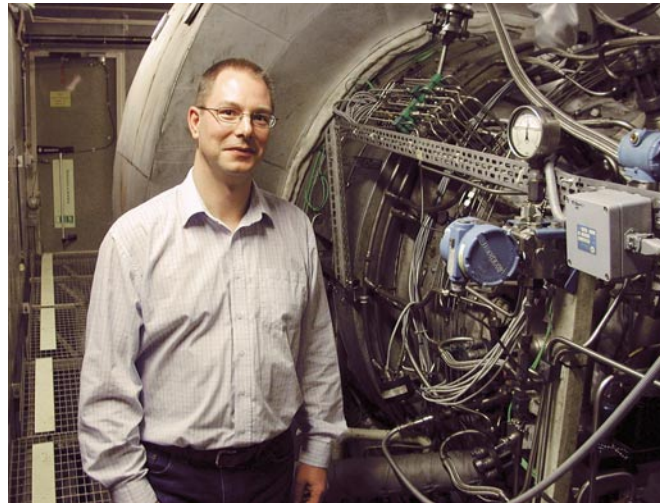
ABB's assignment was to supply a control system that monitors, controls and optimizes the hot-water plants and a pumping station, all located within a radius of 15 km of the CHP plant. In certain cases optical fiber cables were to be installed for the communication with the central control room of the CHP plant. Ängelholms Energi also wanted to integrate the environmental control function into the new control system instead of having a standalone system as previously.

"Experience has shown us that the old computer used to control emissions and generate reports is the apparatus that has most frequently given us problems," says Kenneth Carlsson. "By integrating it into the new control system, which is more reliable and has redundant functions, we reckon on being able to minimize disturbances in the future."

Removal of the old control system commenced in July 2002. The goal was that everything should be ready in November, a tough timetable. "Almost too tight," remarks Mikael Malmberg from ABB, who was among those responsible for ensuring that the proper functioning of the entire system.



Interior from the Luntertun pump station



“When we chose ABB as supplier of the new control system, our main criterion was that they had the competence and ability to integrate a new control system into an existing plant,” says Kenneth Carlsson, Plant Manager, Ängelholms Energi.

All functions included

“Our priority was to get the hot-water plants functioning,” says Bo-Anders Carlsson, ABB’s Project Manager. “Everything else had to wait. The major tasks were completed in time, but we have been working this year on a few remaining items and also on improving certain features at the request of the customer.”

“The new control system incorporates all the latest functionalities. What I like best is the possibility we have to add new software,” comments Kenneth Carlsson, who in general is satisfied with the refurbishment.

Industrial IT

The heart of the new control system is ABB’s Industrial IT automation platform. This includes the operator system Operate IT, with Process Portal and Process Panels; the control system Control IT with ten AC800M controllers and PlantControl IT library; and the information system Optimax Plant Connect. With this Industrial IT platform the operators work in a Windows environment.

The hot-water plants and pumping station are all normally unmanned and are monitored and controlled by the new automation system in the central control room of the CHP plant.

A number of AC800M controllers have therefore been installed locally in these and other facilities sit-

uated in different parts of the town, with Process Panels being used for the monitoring.

ABB was responsible for the programming of the new automation system. In addition, the utility’s operators and maintenance staff received special training.

The new control system uses the Ethernet MMS protocol. The communication between the hot-water plants and other outlying facilities and the central control room in the CHP plant takes place via Masterbus 300 and Modbus (Siemens).

Environmental calculations

The Optimax Plant Information Management System (PIMS) is used to collect data and archive them for a very long period of time as well as to perform environmental calculations and generate reports.

First in Sweden

“The Ängelholm CHP plant was the first in Sweden to install a control system based on an Industrial IT automation platform, at least in the power utility industry,” says Bo-Anders Carlsson, ABB. “One of its strengths is that it isn’t static. It can grow and be modified as required.”

The work on the first two stages of the Ängelholm CHP plant project has been completed and test running is currently taking place (May 2003). “I had



The Process Panel operator interface at one of back-up hot-water plants



Pumpstation for the Luntertuns town district

drawn up a plan for the project, which was to be executed in three stages,” says Kenneth Carlsson.

- 1) Replacement of the old control system.
- 2) Construction of a new accumulator to control and maintain a suitable balance of the hot water. The accumulator, which will also be able to intervene should any of the hot-water plants malfunction for any reason, will be linked to the new control system during the summer.
- 3) Replacement of two old hot-water plants by new ones, using wood chips as fuel. The new hot-water plants are still to be ordered.

The new Industrial IT-based automation system has already aroused considerable interest in the industry and a number of visits to the CHP plant have already taken place or are planned. For ABB this district heating project serves as a valuable reference of an Industrial IT application in the district heating industry.



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