DONG Energy selected ABB to supply Symphony Plus for the automation system for their Avedøre Power Plant Unit 1. By utilizing the excess heat from the power production for district heating, Avedøre Unit 1 attains an energy conversion efficiency of up to 91%. This makes Avedøre 1, one of the world’s most efficient coal fired power plants.

Since its commissioning 22 years ago, the combined heat and power plant (CHP) Avedøre 1, located to the south of the country’s capital Copenhagen, has been reliably automated with ABB Contronic 3/Procontrol P13 control systems. To further increase the efficiency and performance of the CHP plant this technology is now being replaced by the current ABB Symphony Plus system with AC 870P controllers. The main part of the automation system was supplied at the end of March 2012.

The power plant consists of two units, which produce both electricity and district heating for the city of Copenhagen using mainly coal and to some extent oil as primary energy. Avedøre 1 produces 250 MW of power without district heating, and 215 MW of power plus 330 MJ/s of heat in combined operation. The plant originally used the Contronic 3 system for boiler automation and the Procontrol P13 (Turbotrol 5) system for turbine automation. With the new concept, both boiler and turbine will be automated with Symphony Plus control system using AC 870P controllers. This harmonization provides significant advantages in the areas of operation, maintenance and spare parts inventory. In addition, the operator control system S+ Operations will be used in combination with AC 870P.

<table>
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<tr>
<th>Project name</th>
<th>Avedøre Power Plant Unit 1</th>
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<tr>
<td>Location</td>
<td>Avedøre Holme</td>
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<td>Customer</td>
<td>DONG Energy A/S</td>
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**ABB solution**
- Symphony Plus state-of-the-art control system solution to replace the existing legacy control system
- Symphony Plus will control the boiler, turbine, flue gas desulfurization (FGD) and pellet firing system
- ABB's unit optimization software packages such as Boiler Max

**System benefits**
- Integrated SIL3 boiler protection and management system as well as turbine control and protection system for reduced maintenance cost and time
- Customer benefits from the many advantages of Optimax BoilerMax, optimization packages, among others include shorter start-up and shut-down time which reduces fuel consumption
- By utilizing the excess heat from the power production for district heating, Avedøre Unit 1 attains an energy conversion efficiency of up to 91%
The combined generation of power and heat places high demands on the control technology which the new system is ideally suited to fulfil. In the course of the modernization of Avedøre 1, the existing Contronic technology will be completely removed from the control cabinets and replaced by the new system and extended by control technology for the auxiliary equipment and connections to third-party systems. The field cabling will remain so that the connecting cables for the field instrumentation can be reused. As the installation and connection of the new control system are perfectly adapted to the existing plant, the modification and testing effort can be considerably reduced.

This well-defined interface between “old” and “new” convinced the customer DONG Energy of the technical concept developed by ABB. The reuse of the existing cabinets including the voltage supply allowed the modernization costs to be significantly reduced.

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