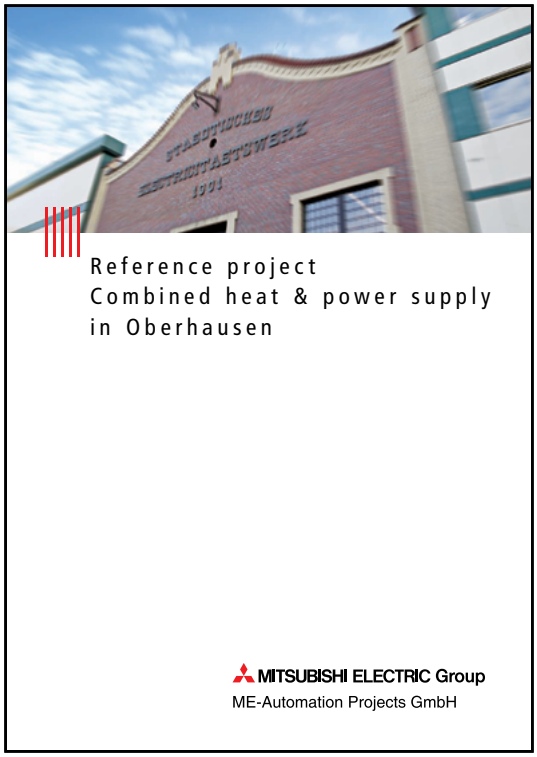
Application Story

Industry: **Power / Process**

Products: **Control Systems**

Combined heat & power supply in Oberhausen



Project of ME-Automation Projects GmbH, a member of the Mitsubishi Electric Group. First published in June 2014.

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Reference project
Combined heat & power supply in Oberhausen

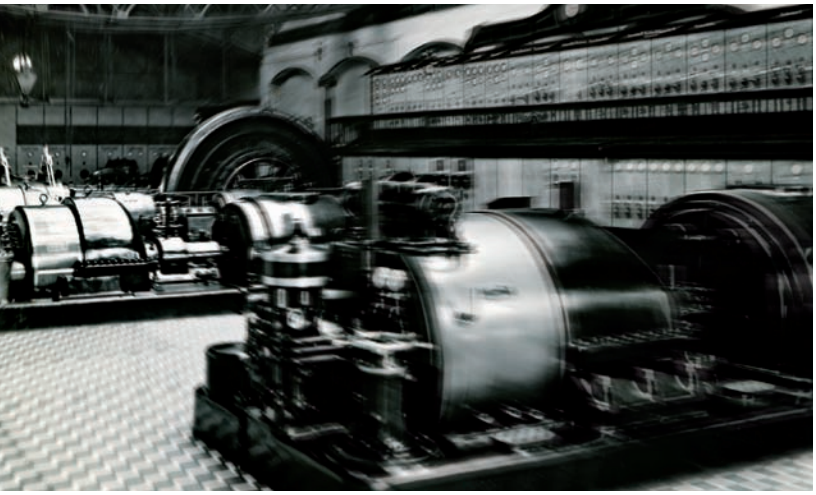
MITSUBISHI ELECTRIC Group

ME-Automation Projects GmbH

Customer:	Energieversorgung Oberhausen AG
Plant:	Cogenerating plant for district heating
Project value:	~ 13 million Euro
Project duration:	2008 – present (in discrete construction stages)

Description

In two locations – Oberhausen Mitte and Oberhausen Sterkrade – the company Energieversorgung Oberhausen AG operates cogenerating plants with separate district heating networks. However, the two networks are coupled by means of a connecting pipeline. The combined heat & power (CHP) plant in Oberhausen Sterkrade uses the waste heat from a chemical company to supply district heat to Sterkrade. The CHP in Oberhausen Mitte feeds the Alt-Oberhausen district heating network. Also in this location is the central control room, from which all heat generation and distribution systems of both locations as well as the combined network are monitored and controlled. Heat is generated mainly by means of combined heat & power plants. The process control equipment in both locations had been installed several decades ago. In order to ensure continued safe and economic CHP plant operation, a completely new and high-availability process management system was required. Another requirement was a significant increase in availability and operational safety of the heat generation and distribution in both locations by modernizing the internal and external process control & automation systems. Moreover, a considerably higher level of automation was demanded. In addition, the operating and monitoring facilities for the plant sections were to be optimized and made more transparent.



The modernization and expansion measures were to be implemented in several stages, as the supply of heat to the customers had to be ensured at all times.

ME-Automation Projects, formerly known as KH-Automation Projects, received the order from Energieversorgung Oberhausen to supply a turnkey solution consisting of installation, commissioning, trial operation, and documentation of the modernization and renewal project. Operation, monitoring, and process control of the two cogenerating plants is done by means of a PMSX® pro process management system located in a central control room in Oberhausen Mitte. Thanks to the plant's horizontal structure in function units with clearly assigned process management areas, an exceptionally high level of operational safety and flexibility is achieved. As the availability of the control system has a direct influence on overall plant availability, the demands placed on system reliability are particularly high. By means of active redundancies, and by avoiding "single points of failure" in the architecture, it is possible to achieve the high availability demanded for the control system. Moreover, the system's distributed architecture, and the use of modern switch technology prevent overloading the system bus. Similarly, distribution of the process control & automation tasks in several process servers, together with redundant data storage, ensure utmost operational safety and highly efficient plant operation. All process data are cyclically stored in an integral backup system, so they are available redundantly throughout the system. Apart from the internal control & automation equipment for the CHP plants, also the external process management system will be renewed and modernized. In particular, this involves renewal of the burner controls, replacement of electrical actuator drives, installation of new measurement and signalling equipment, and increasing the number of actuators and sensors to achieve a higher level of automation.

In another construction stage the central control room was rebuilt and modernized.

Technical requirements

Process management of both CHP plants from a central point

Significant increase of the automation level

Vertical and horizontal data consistency

Highly available automation stations in redundant architecture

Distributed system architecture with redundant local process servers

System-wide engineering from a central engineering workplace

Data acquisition via distributed I/O modules

Time stamping of relevant signals in distributed modules

Plant-wide redundant fieldbus using optic fiber technology

Consistent data coupling with office network

Archiving of all incoming alarms & messages

Archiving of all relevant measurement values in appropriate compression stages

Strict data consistency in all software tools

Access to all process values from the office environment

Function plan documentation acc. to VGB-R 170 C

Dynamic function plans

Standardized software tools

Scope of delivery

- General contractor for electrical and process control equipment
- Process management system PMSX®pro
- Automation technology – redundant
- Local process servers – redundant
- Burner control systems
- Network using switch technology
- Renewal of actuators and control equipment
- Renewal of field instrumentation
- Low-voltage switchgear
- Installation & wiring
- Target specifications / engineering / programming
- Documentation
- Factory tests with plant simulation
- Commissioning / trial operation / training

Process management characteristics

Process management system	PMSX®pro
Topology	distributed system
Network	Ethernet fiber optic – single-fault tolerant
Automation system	Mitsubishi System Q, Siemens S7
Data points	about 40 000
Automation stations	24 (partly redundant)
Operating stations	7
Process servers	10 (also redundant)
Large-screen display	3 full-HD 70˝ TFT

Excerpt from our reference list

Waste incineration plant Frankfurt

Waste incineration plant Iserlohn

Waste incineration plant Weißenhorn

Wastewater treatment plant Erdinger Moos

Wastewater treatment plant Bad Homburg Ober-Eschbach

Milk production Regensburg

Energy supply center Dresden

Energy supply center Oberhausen

Pellet production plant Offenbach

Biomass CHP plant Wiesbaden

Energy supply center Munich Airport

Waste incineration plant Frankfurt

Drinking water plant Haltern

Sewage network and wastewater treatment plant Hamburg

Pellet production plant Dotternhausen

Wastewater treatment plant Düsseldorf-Nord

Waste incineration plant Frankfurt

Waste incineration plant Hamm

Waste incineration plant Frankfurt

Facility Management Control System Dresden

Facility Management Control System Nijmegen

Tank terminals Rotterdam

Barthel Pauls Söhne AG Biomass CHP plant

Wastewater treatment plant Stuttgart-Mühlhausen

Wastewater treatment plant Nuremberg

Wastewater treatment plant Nidderau

Wastewater treatment plant Landshut

Drinking water plant Friesland

Tank terminal Botlek

Sewage network Wuppertal

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