

# ABB Solutions for Power Generation

## Instrumentation, Control and Electrical Systems



**ABB**

# Serving the Power Generation Industry Worldwide

## Single Source Provider with Worldwide Presence

ABB has an unmatched portfolio of products and services for the power generation industry. A network comprising hundreds of sales offices, service centers and manufacturing facilities provides your power plants with world-class automation solutions. ABB is recognized as the largest independent system integrator for instrumentation, control and electrical systems in power generation – everything from a single source! These solutions have been applied to more than 4,000 power plants all over the world, ranging from small hydro plants to large fossil-fired plants.

## Experience, Innovation and Dedication

Modern power plants rely on sophisticated instrumentation, control and electrical systems, all working in harmony. ABB's dedicated scientists and innovative engineers ensure that your power generation system operates flawlessly, delivering reliable power. ABB's experts not only contribute their specialized knowledge in the field of instrumentation, control and electrical engineering, but also draw on a profound knowledge of power plant processes. This knowledge base is the foundation for a wide variety of optimization solutions which help power plant owners worldwide.

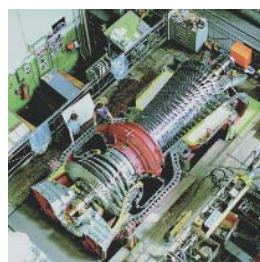
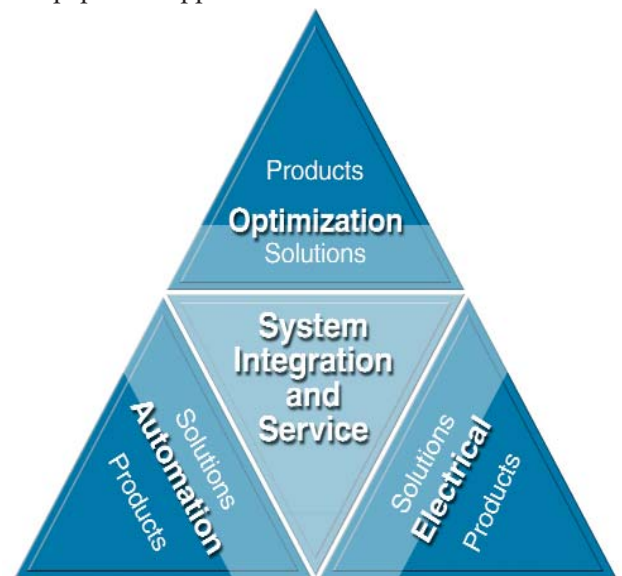
## Life Cycle Partner

ABB supports our customers throughout all stages of the plant's life cycle, from project development through the entire life of the plant. ABB's solutions help our customers to maximize their return on investment. Our advanced life cycle services help customers

generate extra value from their installed assets by maintaining a maximized level of plant availability and performance.

## Ideal Business Partner

ABB's core strength is our ability to consistently translate process and operational requirements into a harmonized and economical automation configuration and electrical single-line diagram. In doing so, we minimize and optimize the interfaces between instrumentation, control and an electrical systems. In this environment, ABB is also an ideal partner for utilities, general contractors, plant suppliers, and process equipment suppliers.





# Plant Electrical Systems

## Our Complete Portfolio

ABB delivers complete systems for electrical balance of plant (eBoP) based on a broad portfolio of our products, ranging from the high-voltage level down to the low voltage level. ABB has the engineering expertise to deliver "turnkey" system integration of eBoP specifically tailored to power plant types, such as combined cycle, fossil and hydro power plants.

We offer complete engineering, supply, manufacture, delivery to site, installation, commissioning, and ensure the eBoP integration into the complete instrumentation and control system. Direct control over all engineering and project management functions enables ABB to ensure the best performance and quality of engineering workmanship. Through innovative elec-

trical power applications, we assist utilities in building and maintaining reliable power system installations, offering cost effective solutions. Our system integration experience has permitted us to supply numerous turnkey eBoP systems to a variety of utilities throughout the world.

ABB offers system analysis and feasibility studies that include recommendations for action to achieve the desired power stability and reliability. ABB's integration of automation and eBoP systems, coupled with ABB's innovative products in low, medium and high voltage electrical equipment, generator excitation, protection and synchronizing systems cover all types of power plant designs.



# Plant Automation System

Power plant control systems from ABB combine innovation and broad functionality with established operational reliability. Enhancement of our power plant control systems is ongoing with the aim of further improving cost-effectiveness, functionality and quality. As a result of our many decades of experience with all types of power plants, ABB is consistently ranked as the number one DCS supplier worldwide. The advantages of our control solutions include:

- Oriented platform for power plant control and electrical systems
- Easy-to-use and consistent user interface
- Fast analysis of disturbances
- Simple plant and enterprise-wide access to information

- High engineering efficiency and quality
- Low cost of operation and maintenance
- Simple system architecture
- State-of-the-art technology and integration of existing systems

The automation of a unit's turbine and safety applications can be implemented in one common platform with the rest of the unit. The benefits of this technology are:

- Common look and feel in operations
- Seamless integration in hardware and software
- Common engineering and diagnostic tools
- Reduced spare parts
- Simplified maintenance and training



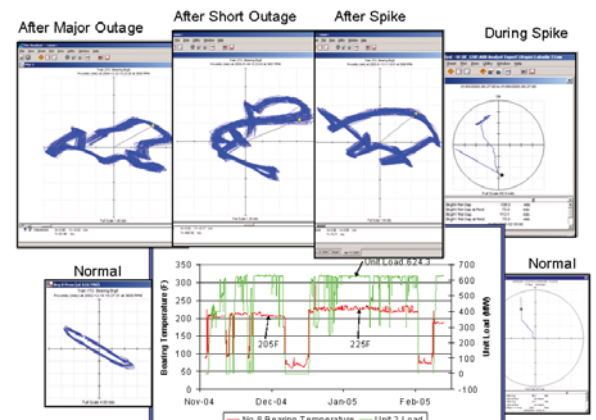
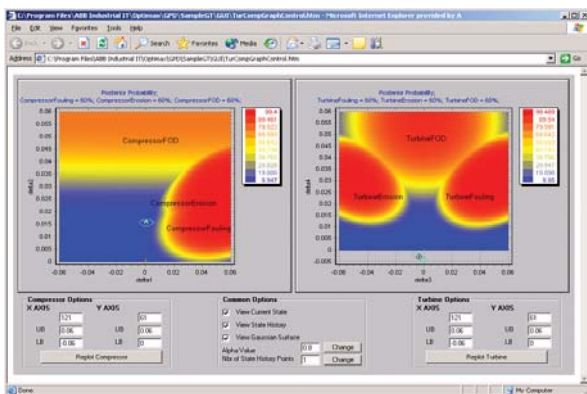
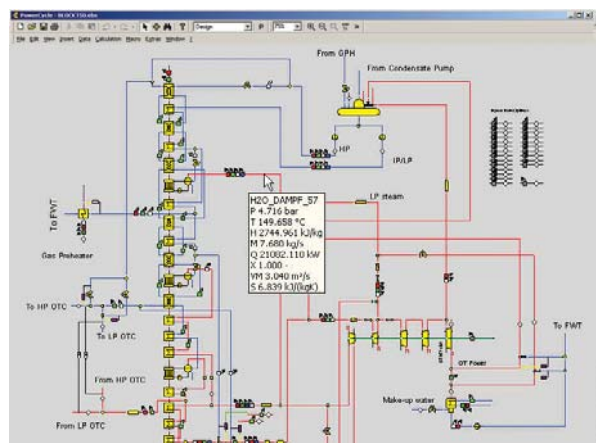
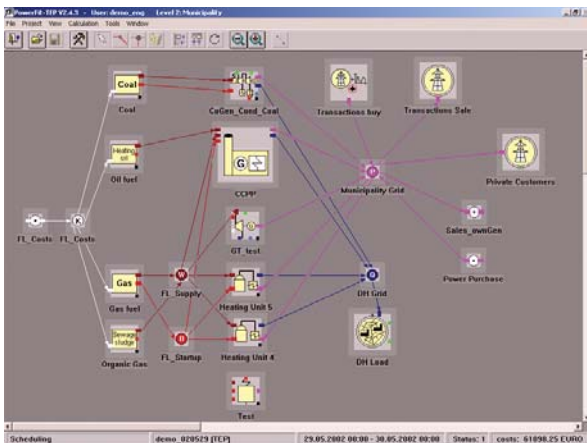


# OPTIMAX<sup>®</sup> Power Plant Optimization

ABB has used technological advances in the field of control and software engineering to develop innovative plant optimization solutions. The ABB OPTIMAX<sup>®</sup> suite of solutions consists of decision-support tools which continuously assess plant condition and provide root cause analysis in case of deviations.

The OPTIMAX<sup>®</sup> suite comprises of a variety of solutions, ranging from field instrumentation all the way to business solutions at the enterprise level. The OPTIMAX<sup>®</sup> suite of solutions address the following application areas:

- Operations: monitor and predict plant performance; issue early warnings for equipment diagnosis, sensor validation and preventive maintenance; improve plant efficiency by reducing fuel consumption and resulting emissions.
- Maintenance: reduce downtime and cost of maintenance activities; improve data access for daily inspections as well as planned outages.
- Environmental: optimize the combustion process and reduce emissions by monitoring flame quality, measuring coal flow and carbon in ash content; improving controls by implementing advanced process control solutions.
- Asset Lifecycle: schedule the most economical operation of different generating units trading-off income from sales against emissions and life cycle costs.



# Integration that works

ABB's core strength is our ability to consistently translate the process and operational requirements into a harmonized and economical automation configuration and electrical single line diagram. In doing so, we minimize and optimize the interfaces between instrumentation, control and electrical systems. The illustration provides an overview of the ABB's scope of solutions for a fossil power plant. ABB integration experts create value for customers by combining these solutions into complete power plant systems for instrumentation, control and electrical balance of plant.

## 11 Turbine/Generator

Excitation/AVR  
Transformers  
Static Starting Devices GT  
Instrumentation  
Turbine Control  
Turbine Hydraulics  
Protection Systems

## 12 Control Room

Data Recording  
DCS  
Optimization

## 13 Cooling Water System

Motors  
Instrumentation

## 14 Steam line

Instrumentation

## 15 Boiler

Motors  
Instrumentation  
Boiler Controls  
Boiler Management Systems

## 1 Stack

Instrumentation

## 2 Fuel System

Motors, Variable  
Frequency Drives,  
Instrumentation

## 3 Fuel Supply

(conveyor or  
compressor)  
Motors, Variable  
Frequency Drives

## 4 Scrubbers

Medium Voltage  
Breakers & Switch-  
gear, Motors, Variable  
Frequency Drives,  
Instrumentation

## 5 De-aerator

Instrumentation

## 6 Boiler Feedwater

Motors, Variable  
Frequency Drives,  
Softstart  
Instrumentation

## 7 Electrical Balance of Plants

Medium Voltage  
Breakers & Switchgear  
Motor Control Centers  
Auxiliary Transformers  
Low Voltage

## 8 Electric Power Output

Generator  
Circuit Breakers  
Generator leads  
Generator Steps  
Up Transformer  
Auxiliary Transformer  
High Voltage Breakers  
& Switchgear

## 9 Extraction Pump

Motors  
Instrumentation

## 10 Condensate

Motors  
Frequency Converter  
Instrumentation

# Project Execution and Life Cycle Services

ABB's experience goes back over 100 years and comprises some of the most prominent plants ever equipped with state-of-the-art solutions. Throughout this time span, ABB has applied the most advanced technology to provide the most effective solution.

ABB combines our knowledge of the power generation process with extensive engineering know-how to provide the best solution for our customer's plant. Years of experience in the industry enable ABB engineers to design electrical and control systems that cover all requirements of the power generation business. ABB has a large portfolio of proven solutions that fully integrate into the processes and structures of today's power plants.



## Partner for Handling Complex Projects

For decades, ABB has been the most experienced system integrator of instrumentation, control, and electrical solutions in all types of power plants. ABB is an ideal partner for utilities, general contractors, plant suppliers, and process equipment suppliers. Thanks to our competitive and field-proven solutions for both new plants and rehabilitation projects. ABB's project services support the customer with all necessary project services from conception through hand over:

- Consulting
- Feasibility study
- Risk and assessment management
- Project proposal
- Management and execution
- Procurement, installation and commissioning
- Training and service

## Service Support on a Partnership Basis – a Key to Success

ABB provides our customers with advanced and efficient services from a comprehensive and modular service portfolio. Our service contracts offer customers the flexibility to cover their maintenance needs by means of selectable modules. A support hotline, remote servicing and troubleshooting are service modules that ideally complement each other. Preventive maintenance, spare parts storage and software support services are also covered by independent service modules. Additional packages such as plant inspection, plant optimization, planning / execution of upgrade and extension projects complement our service offerings. Our long-standing international experience allows us to assist power plant owners in improving the efficiency and profitability of their facilities.



A complete portfolio of services



# ABB Solutions for Power Generation



**ABB Ltd.**  
**Business Unit Power Generation**  
P.O. Box 8131  
8050 Zürich  
SWITZERLAND  
Phone: +41 (0) 43 317-5380  
Fax: +41 (0) 43 317-5382  
E-mail: [PowerGeneration@ch.abb.com](mailto:PowerGeneration@ch.abb.com)  
Internet: [www.abb.com/powergeneration](http://www.abb.com/powergeneration)

**Note:**

We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents - in whole or in parts - is forbidden without ABB's prior written consent.

Copyright© 2006 ABB

All rights reserved