Solutions for Fossil Power Plants
The huge demand for new power plant capacities can only be met by high efficiency coal, oil and gas fired power plants. New technologies have been developed increasing the efficiencies of fossil power plants to more than 44% with the long-term target of crossing the 50% limit in converting fuel into electricity. Efficient advanced control of the plant must be adopted to meet these targets.

Modern fossil power plants meet emission rules by applying optimized combustion technologies and employing sophisticated flue gas cleaning lines. In this respect the instrumentation, automation and electrical systems also play an important role in meeting the targets required by authorities for emissions.

**Main Plant Components of a Fossil Power Plant**
A fossil power plant is divided into the following main sections:
- Civil works
- Boiler
- Turbine / Generator
- Flue gas treatment
- Mechanical Balance of Plant
- Electrical Balance of Plant
- Plant Automation System

ABB focuses on the integration and optimization of plant automation and electrical balance of plant. Thanks to our competitive and field-proven solutions for both new plants and rehabilitation projects, as well as our project services. ABB is an ideal partner for utilities, general contractors and plant/process equipment suppliers. ABB can provide instrumentation, control and electrical systems and create full-range solutions that have been optimized technically and economically – everything from a single source!

**ABB – One Reliable Partner Throughout the Plant Life Cycle**
In partnership with customers all over the world, ABB delivers what it takes so our customers can successfully run a fossil power plant - from design to operation and from the plant floor to the enterprise level. We combine in-depth knowledge of the process with extensive electrical and automation “know-how” to provide a best-in-class solution for your plant. ABB’s leading edge products support our customers in the production of highly reliable and available power. We design, implement and commission our scope of delivery by integrating the parts into one single solution that fully meets the specified requirements.

Our ability to execute complex projects has been proven in more than 750 fossil power plant installations world-wide.
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**Electrical Balance of Plant**
ABB has the engineering expertise, knowledge and advanced technology to deliver "turnkey" system integration of eBoP (electrical Balance of Plant) applications specifically tailored to different fossil fired power plants and their ancillary systems like FGD’s, (flue gas desulphurization), scrubbers, coal and ash handling systems.

We offer complete engineering, supply, manufacture, site delivery, installation, commissioning, and testing as well as ensuring the quality of eBoP integration with the complete plant automation system of your power facility. Direct control of all engineering and project management functions enables us to pledge the best performance and quality of engineering workmanship. Through innovative electrical power applications, we assist our customers to build and maintain reliable fossil power system installations safely and efficiently, offering cost-effective solutions.

**Plant Automation Systems**
ABB delivers all the systems required to successfully automate a fossil power plant: from the plant floor to the enterprise level, from system design to operation. Our automation platform, instrumentation, valves and drives are designed for the most stringent requirements of power plant automation and are highly suitable for fossil power plants.

ABB’s control systems combine innovation and broad functionality with established operational reliability. Development of our power plant control systems is ongoing, with the aim of further improving cost-effectiveness, functionality and quality.
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The advantages of these control solutions are:
- Future oriented platform for process and electrical systems
- Easy to use and consistent user interface
- Quick analysis of disturbances
- Simple plant and enterprise-wide access to information
- High engineering efficiency and quality
- Low operating and maintenance costs
- Simple system architecture
- State-of-the-art technology including fieldbuses and easy integration methods for existing systems

Years of experience in the field help ABB engineers to design control systems that cover all fossil power plant requirements involved.

An important feature of a plant automation system is total integration of all the main functional areas of the plant into one common system. This system incorporates a uniform operator interface throughout the plant. All data acquisition functions form an integral part of the system, including built-in sequence of events and extensive system diagnostics.

The ABB portfolio includes the necessary functions for the complete automation of all areas in a fossil power plant including:
- Boiler
- Turbine including BFPT (boiler feed pump turbine)
- Balance of plant
- Switchyard
- Coal and ash handling
- FGD
- Scrubber
- Water and effluent treatment

Typical DCS configuration for a fossil fired power plant
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**Boiler Protection / Burner Management Systems**
Meeting the highest possible standard of safety and reliability are among the most important requirements in power plant operation. Boiler protection and burner management systems are dedicated to ensuring boiler furnace safety and fuel shutdown. For the past 80 years, ABB has worked with customers and industry standards organizations to improve boiler safety, particularly during the most hazardous operating phases of start-up and low-load operation.

ABB strictly complies with all industry standards, such as:
- US National Fire Protection Association (NFPA)
- German TRD/DIN
- IEC 61508 safety levels SIL1-3

As well as those of other governing agencies, including:
- Factory Mutual (FM)
- Industrial Risk Insurers,
- Underwriters Laboratories (UL)
and
- all appropriate governmental authorities.

The use of advanced boiler automation systems and the need to comply with the modern safety standards often means that state-of-the-art flame scanners and detectors must be used. For this purpose, ABB has developed specific products that meet all modern day industry standards.

**Steam Turbine Automation**
Over the last 40 years, ABB has proven its expertise in more than 1,200 turbine automation projects with most turbine OEMs. These solutions cover control, protection and turbine supervisory equipment. ABB’s turbine control solutions are tightly integrated into the plant automation system, ensuring advantageously seamless integration of operation, engineering and diagnostic functions.

ABB can supply turbine-specific electro-hydraulic and hydraulic products and solutions as well as design expertise and consulting for steam turbines. Our solutions incorporate universal products, and can be integrated into nearly any type of mechanical system used today.

As part of our portfolio, we have specific solutions for electrical generator auxiliaries such as
- Excitation system
- Synchronization
- Generator and unit protection

They are suitable for all common types of generators.
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**Plant Optimization**
We support the operations and maintenance of fossil power plants with a suite of dedicated OPTIMAX® solutions:

Combustion optimization solutions use model-based predictive control techniques to reliably find the most suitable setpoints for improving the heat rate and reducing emissions like NOx.

Sootblowing Advisor determines where and when to blow soot based upon changes in heat transfer data.

BoilerLife tracks life consumption, based on fatigue and creep of its major thick walled components.

Carbon-in-Ash indicates real-time carbon content in ash based on a non-extractive method.

PfMaster is an online pulverized coal flow monitoring system.

BoilerMax optimizes start-up times of boilers by determining optimal control actions, taking thermal and dynamic constraints into account.

Performance Monitoring continuously compares actual plant and equipment performance to expected performance.

**Combustion Management and Emissions Reduction**
As a result of international agreements like the Kyoto-protocol as well as national plans for reduced emissions and environmental friendly power generation the optimization of combustion systems gains growing importance.

The physical improvements in the combustion of coal and lignite are of specific interest. Instrumentation and advanced control methods like pulverized fuel monitoring and control, carbon-in-ash, combustion optimization with dynamic optimizers, advanced flame scanners and analyzers can produce significant improvements in this area. The diagram shows the ABB scope for combustion solutions and their impact on the pollutants.
Solutions for Fossil Power Plants

ABB Project Services
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.

PROJECT MANAGEMENT – ABB’s certified project managers take care of all relevant issues during your project – a competent partner for the entire ABB contribution.

ENGINEERING – ABB engineers are skilled in control and process technology and use well-proven tools, which allow project-wide consistent data storage with access from our office and from the site.

INSTALLATION – As part of our installation supervision we prepare the schedule for delivery and installation in close cooperation with our project partners. As required, we plan and procure the site facilities and provide the complete installation.

COMMISSIONING – We can handle all phases of commissioning, from I/O-check through plant start-up to acceptance testing.

CUSTOMER TRAINING – We offer training for operators, process engineers and maintenance staff on site as well as at ABB facilities.

Life Cycle Commitment
We support our customer base through global service contracts assisted by a strong localized service organization. This organization offers advanced and efficient services from a comprehensive and modular portfolio to provide: emergency remediation, preventive maintenance and remote diagnostic services. Additionally, we help our customers maintain their financial and intellectual investment in their assets through training programs, consulting services and comprehensive migration strategies for system upgrades and retrofits.

ABB is committed to being the world leader in providing total integrated automation solutions for power generation, allowing our customers to meet the complex automation challenges of today and tomorrow.