

Solutions for Waste-to-Energy Plants



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Waste-to-energy plants reduce the municipal solid waste volume by about 80% and convert it into residue. The residue quality naturally depends on the burned waste quality and also on the combustion parameters. Hence, tighter control of the plant can improve the residue quality. The generated combustion energy is regarded as renewable energy and is typically used to feed a turbine to generate electricity. Waste-to-energy furnaces react slowly on changing waste charge, so they are not used for peak load generation. The generated electrical power is a plant by-product and is sold as base load generation. Usually the waste is burned on a grate which limits the plant size to about 160,000 tons of waste per year or 20 tons of waste per hour or about 28 MW. More recent technology utilizes fluidized bed combustion, which allows larger plant sizes up to 50 MW. Due to the unknown waste composition and stringent environmental standards involved, waste-to-energy plants employ sophisticated flue gas cleaning devices for emission control.

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 waste-to-energy plant - from design to operation and from the plant floor to the enterprise level.

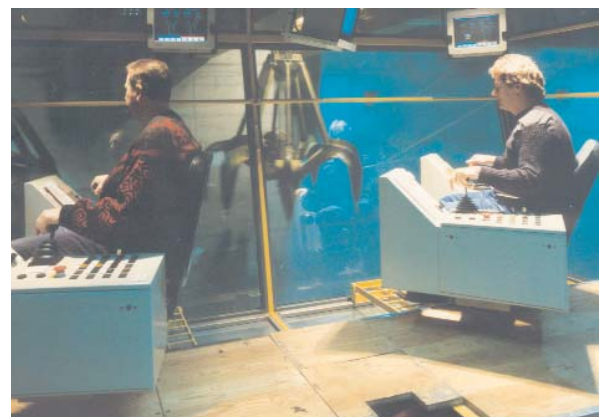
We combine in-depth knowledge of the process with extensive electrical and automation “know-how” to provide a best-in-class solution for your plant. ABB’s leading edge products support our customers in the efficient conversion of waste. We design, implement and commission our scope of delivery by integrating the parts into one single solution that fully meets the specified requirements. Our ability to execute complex projects has been proven in more than 130 waste-to-energy plant installations worldwide.



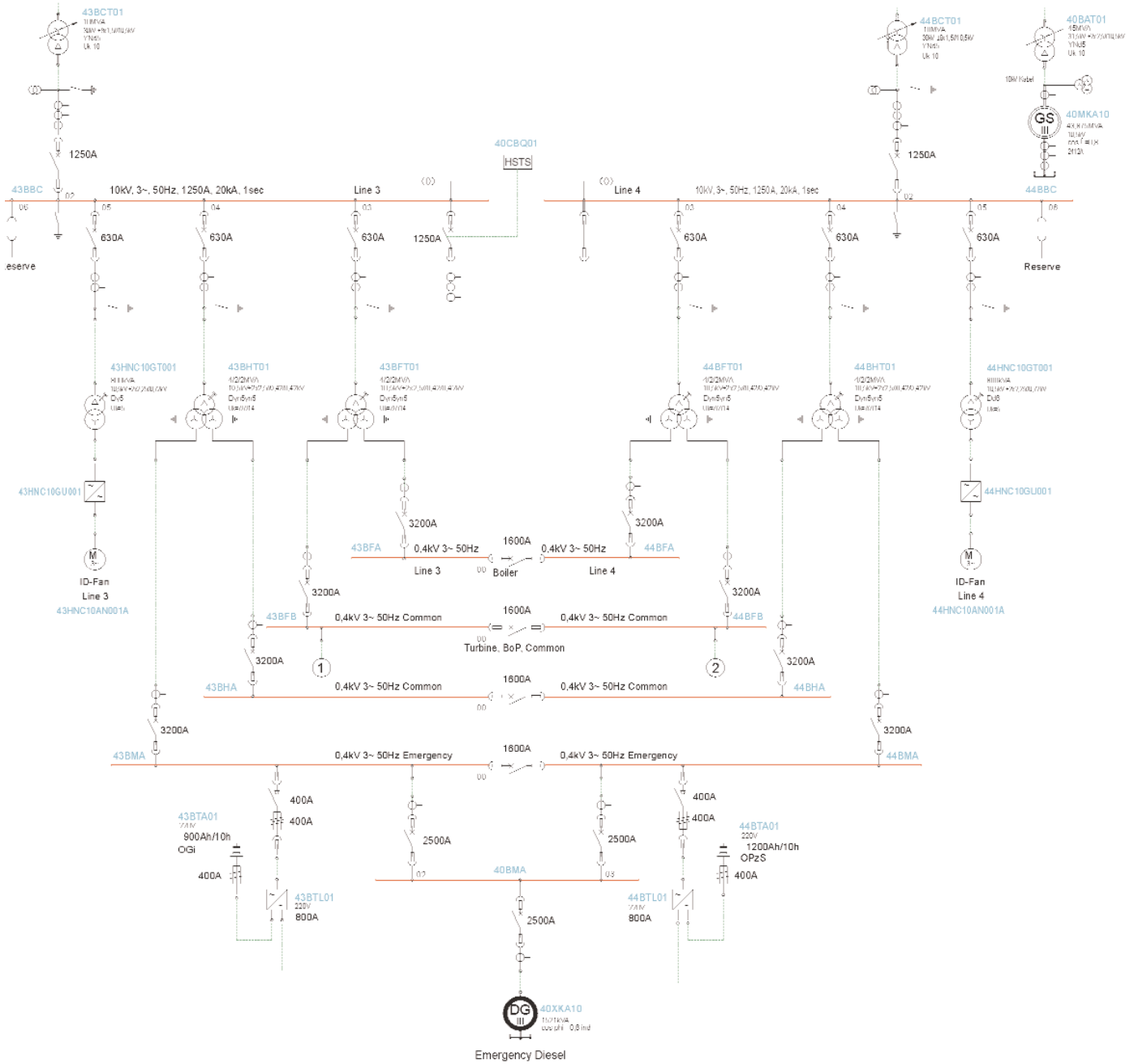
Electrical Balance of Plant

ABB has the engineering expertise, experience and our own advanced technology to deliver "turnkey" system integration of eBoP (electrical Balance of Plant) specifically tailored to different waste-to-energy power plants.

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



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Electrical Single Line Diagram (SLD) of a typical waste-to-energy plant

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Plant Automation Systems

ABB delivers all the systems required to successfully automate a waste-to-energy 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 waste-to-energy plants.

Control systems from ABB 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.

The advantages of these control solutions are

- Future-oriented platform for process 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 operating and maintenance costs
- Simple system architecture
- State-of-the-art technology including fieldbus and easy integration methods of existing systems



The ABB portfolio includes the necessary functions for the complete automation of all areas in a waste-to-energy plant including:

- Boiler
- Turbine
- Balance of plant
- Switchyard
- Waste and ash handling
- Flue gas cleaning systems
- Water and effluent treatment

Years of experience in the field help ABB engineers design control systems that cover all the waste-to-energy plant requirements.

One important feature of a plant automation system is the total integration of all the main functional areas of the plant into one common system. The 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.



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Boiler Protection / Burner Management Systems

Meeting the highest possible safety and reliability standards is 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)
- all appropriate governmental authorities

The use of advanced boiler automation systems and the need to comply with 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 industry standards.

Turbine Automation

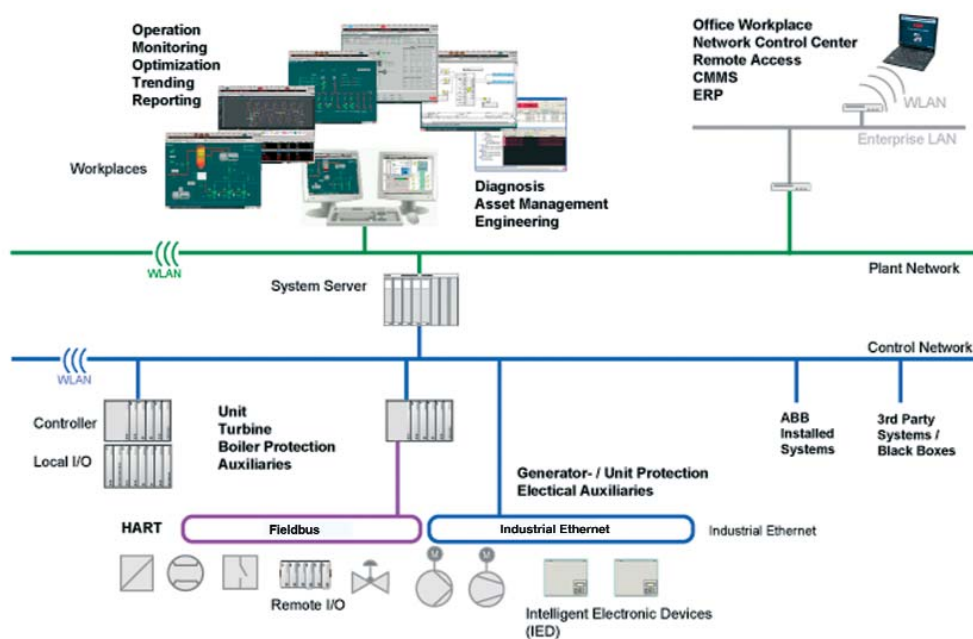
Over the last 40 years, ABB has proven its expertise in more than 1,200 turbine automation projects with most turbine OEMs. These solutions cover control, protection and turbine supervisory equipment. ABB's turbine control solutions are tightly integrated into the plant automation system with the advantage of 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 are universal products and can be integrated into nearly any type of mechanical systems used today.

As part of our portfolio, we have specific solutions for electrical generator auxiliaries:

- 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 Waste-to-Energy plants with a suite of dedicated OPTIMAX® solutions.

Performance Monitoring continuously compares actual plant and equipment performance to expected performance. This may include the online calculation of the waste calorific heat allowing operator decision support and automated control system responses. Dedicated reports offer detailed data on operations, maintenance and emissions to plant management staff.

ABB 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.

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

ABB solutions for emission monitoring, consist off:

- design according to local authority requirements
- selection of suitable instruments from the ABB portfolio
- considering proper flue gas extraction or and sensor location
- calibration according to certified measuring standards
- emission monitoring reports according to international norms



For optimized combustion control, ABB offers a PC-based multi-variable model-based predictive controller, which allows improved control of the:

- live steam flow allowing significantly increased waste throughput
- excess air allowing increased boiler efficiency while maintaining the emission limits

ABB delivers complete solutions for Waste-to-Energy emission monitoring. We:

- design according to the local authority's requirements
- select the suitable instruments from our portfolio
- pay attention to proper flue gas extraction or to the correct sensor location into the plant's flue gas ducts.
- achieve design approval by the public authority involved
- deliver, install and commission
- calibrate together with a certified measuring institute
- generate emission monitoring reports to provide evidence toward the authority



Solutions Waste-to-Energy 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.

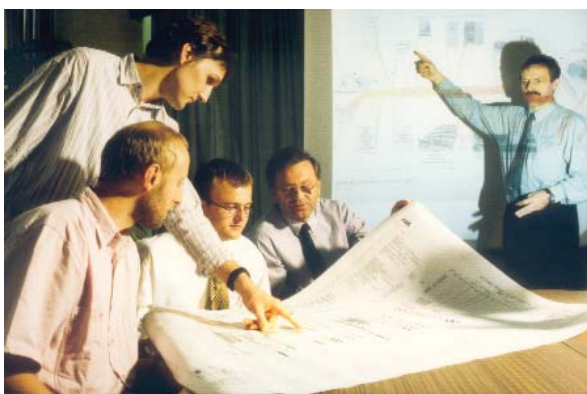
PROJECT MANAGEMENT - ABB's certified project managers take care of all relevant issues during your project - a competent partner for the entire ABB contribution.

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 of 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.



A complete portfolio of services

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