Power Generation Service
Life Cycle Management for Power Plants
Power Generation Service is protecting your Investment by Step-wise Evolution and Updating of Instrumentation, Control and Electrical Systems.
Life Cycle Management for Power Plants

Today’s demands on network availability, efficiency and capacity are increasing continuously. In many cases, the systems from earlier technology generations can’t meet these new requirements. This is our challenge and we can solve it by utilizing our portfolio of upgrade and retrofit solutions, which includes consulting and engineering activities at all stages of an asset’s life cycle. It is important that maintenance activities or retrofits are carried out professionally according the actual needs for life cycle performance.

Continuous Access to Innovations
As partner to a large number of plant and main equipment suppliers, ABB has developed and carried out a comprehensive portfolio of relevant technologies and innovations. Extensive process know-how results from plant engineering, construction and commissioning over more than four decades.

Improvement of Operation
Owner/operators are forced to focus on their core activities and, due to a leaner workforce, rely more on external support and services, which may include consulting and engineering activities. Hence, customer support is evolving beyond a traditional supply and service business. In all stages of a plant’s life cycle the consulting, engineering, operation and maintenance services needed by customers to increase their operational and business performance are already available from ABB.

Lifetime-Extension
Beside new installation activities in many countries, existing power plants will continue for many years. The present-day political environment in many countries, regarding large fossil fired power stations, requires for example that their life will be extended, including improvement of efficiency and environmental conditions. Although the design-life of instrumentation, control and electrical systems can usually accommodate many of these requirements, the life cycle of operating and monitoring systems, in particular, is considerably shorter and they may be replaced several times over the plant’s life cycle. In today’s competitive market, there is a need for modular, scalable solutions that maximize the extent to which existing engineering can be reused and installed technologies can be gradually upgraded by a step-wise approach with a minimal impact on plant operation continuity.

Evolution and Integration of Existing Installations
Being active assets, older installations have to be integrated into the enterprise-wide operation, information and management systems for resource-planning, trading, maintenance management and other systems to enable real-time information and decision support.

ABB’s instrumentation, control and electrical systems are capable of controlling, protecting and monitoring all of the processes required in the operation of the various plant types involved. They have been installed in more than 4,000 power plants worldwide.
A Complete Portfolio of Services

ABB offers professional life cycle services for your products and systems, including component reliability analysis. Through our assessments you will gain the information required for cost effective long-term decisions concerning overall system operation and maintenance.

Evolution
ABB offers low-risk evolution strategies for a broad range of products and systems designed to ensure maximum return on investment while enhancing equipment availability and performance.

Upgrades & Retrofit
ABB focuses on step-wise programs to upgrade existing systems and equipment, integrating existing and new system and components to provide operational improvement.

Environmental Services
ABB offers recycling solutions for defective parts or systems. In line with regulations, ABB takes care of proper disposal or recycling of installed or returned parts.

Training
ABB offers comprehensive training for engineers, operators, programmers and maintenance personnel. Training is available at ABB facilities worldwide, at your plant site and online.

Troubleshooting
Our engineers are trained and certified to provide expert knowledge for troubleshooting and root cause analysis – bringing your plant quickly back to normal operation.

Support & Remote Services
Remote services extend assistance for a wide range of support needs. We provide real-time, on-line access to global service experts 24 hours / 7 days a week.

Service Contract & Asset Management

Diagnosis & Consulting
We develop and implement service solutions based on industry-specific technologies and competences to support customers improving the overall equipment effectiveness and return on investment.

Spare Parts
ABB manages spare parts through specific logistics to minimize capital investment and maximize systems utilization.

Repair
Our repair services are ISO 9001 certified and provide timely repairs and advanced logistic services to satisfy the specific needs.

Maintenance
Effective preventive and corrective maintenance maximizes the reliability of your plant equipment. Our service technicians utilize the most advanced diagnostic and repair practices to maximize equipment, performance and availability.
Reducing Costs and Emissions through Condition Monitoring and Plant Optimization

The key to energy efficiency is to reduce the cost of fuel and consumables. Industrial plants are huge energy consumers – a small percentage in savings can have a significant impact on their bottom line. System 800xA provides a suite of plant optimization solutions for the power and water industries, which enable plants all over the world to run at maximum efficiency while balancing the tradeoff between revenues, asset life cycle costs and emissions.

Maximize Performance and Efficiency

The OPTIMAX® monitoring and diagnostic tools issue equipment diagnosis, sensor validation and preventive maintenance and offer the capability to predict plant performance. The OPTIMAX® optimization tools offer solutions for utilities with complex generation portfolios that seek to minimize generation costs, for electrical or a combination of electrical and other forms of energy. In addition, deciding whether or not it makes sense to buy or sell power or fuel, start or stop a unit, save lifetime, or postpone a preventive maintenance outage can be easily answered.

Minimize Maintenance Costs

Maintenance expenses are second only to fuel costs as variable costs. The key to optimizing assets is often having information that is accurate, timely and actionable. Clearly, the ability to act on reliable information is as essential as having access to the information in the first place. Decisions and actions taken have direct impact on operating performance, security of supply, equipment life time, power quality, and health and safety.

Work preparation and condition-based maintenance are increasingly important for reduction of downtime. The benefit of OPTIMAX® maintenance management solutions with System 800xA Asset Monitor is to achieve and maintain a high level of availability, quality and safety at the plant. This applies to current plant operation but is particularly valid for inspection, overhaul and service activities. For industrial users this leads to a higher return on assets (ROA) which is a key driver of shareholder value.

Reduce Emissions and Improve Control

Emission of greenhouse gases has measurable economic value and operators have a real incentive to lower these emissions. The OPTIMAX® environmental solutions reduce emissions by providing advanced process control (APC) which optimizes combustion, shortens boiler startup times and improves coordinated boiler-turbine control and unit frequency response.

Extend the Asset Life Cycle

From an economic perspective, plant managers seek to balance their investment in new assets against performance, risk and downtime. OPTIMAX® solutions for asset life cycle monitoring provide continuous evaluation of service life consumption of critical plant components. Additional optimization tools are able to schedule the most economical operation of different generating units and trade off income from sales against life cycle costs.

This approach is also capable of taking emission costs into account, i.e. more stringent CO₂ requirements may make plants that are still mechanically functional uneconomic to run. The advantage of these decision-support tools is the ability to include plant aging models to find the optimal operational strategy between maintenance outages, especially when operating under environmental constraints.

Increasing Demands

Today’s demands on plant availability, efficiency and maneuverability are increasing continuously. In many cases, older systems from former technology generations cannot meet these requirements.

State-of-the-art control systems provide more transparency and improved information for operating staff and faster elimination of disturbances.

ABB offers a wide range of automation technology – from local instrumentation through control systems and intelligent switchgear components to modern power plant management systems.

Numerous Benefits

- Modernization offers numerous benefits such as:
  - Enhanced functionalities by upgrading to the latest system version using
  - Protecting customers’ financial and intellectual investment by evolution of outdated systems while re-using existing engineering data and still usable hardware
  - Flexible concepts for step-wise or full-scale retrofit by replacing outdated equipment (if necessary)

Flexible Solutions

The wide variety of ABB solutions available to our customers provides high flexibility in the implementation of improvements. Depending on the customer’s needs, these improvements can be implemented in the form of a step-wise upgrade or a full-scale retrofit job.

As a leading supplier of instrumentation, control and electrical equipment, ABB possesses both the system technology and the process expertise required, as well as the qualified and skilled staff needed for successful implementation solutions.

Solutions for Life-Extension

Various Ways of Modernization

Modernization offers numerous benefits such as:

- Enhanced functionalities by upgrading to the latest system version using
- Protecting customers’ financial and intellectual investment by evolution of outdated systems while re-using existing engineering data and still usable hardware
- Flexible concepts for step-wise or full-scale retrofit by replacing outdated equipment (if necessary)
Market Challenges – Trends and Demands Analysis

Economic Climate
As a result of the current economic climate in the world, the number of new power plants being built is slowing down (this is valid for all fossil fired power plants). On the other hand the trend towards extending existing power plants’ life-time is strongly increasing.

Change of existing and Definition of new Operation Requirements
Key requirements are higher maneuverability of plants regarding MW output and load changes while maintaining high efficiency levels throughout the complete load range, i.e. also being efficient in lower load conditions. Primary measures for achieving these requirements concern adaptations of the mechanical and process part (i.e. boiler, turbine and valves). Secondary measures address implementation of efficient control of the combustion process, adaptations to instrumentation and control, process information and optimization programs.

Environmental Regulations
New stringent environmental regulations target emission reduction which require achieving of specific parameters, i.e. reduction of CO₂ and NOX.

Availability and Reliability
The requested availability and reliability of power generation remain on the high levels as during the previous years.

Lifecycle Management
Varying lifecycle periods of the many different components and systems must be managed while meeting performance targets and complying with law and regulations at the same time.

The sequence of the needed improvements is dependent on the life cycle of the questioned component on the one hand side and on the other side on changes requested from the operation. Typical intervals for improvements, changes, upgrades, evolutions (=exchange) are:
- Operator Station 4 years
- Control System 5–8 years
- Instrumentation 8–10 years
- Electrical Components 8–15 years

Thereby it must be considered that changes and improvements on the process/mechanical side may shorten these intervals whereas stable requirements will prolong the intervals respectively.

Commercial Pressure
Energy producers face commercial pressure for providing energy at reasonable price levels while meeting operational targets at the same time. Operational expenditures (OPEX) are under permanent observation and programs for cost reduction are constantly on the agenda. This results in the requirement to reduce total spending over asset lifetime.

Summary of Market Challenges
Summarizing the above mentioned stress fields, the current key market drivers are “lifetime extension” and “cost reduction”, i.e. the measure to be taken is active Asset Management. Overcoming the market challenges make parallel investments inevitable in order to optimize installed assets so that they can meet their requirements longer and more efficient. These investments will only be beneficial when flexible approaches for all equipment installed in power plants are available.

Life Cycle Index
Normal procedure is to plan improvements and evolution steps together while also taking the plant’s production plan into account. The time slots and preparation will be planned jointly with respective suppliers well ahead of the envisaged outage time. Purchasing, engineering and test procedures are performed in parallel to the normal operation to allow a short, precise upgrade/evolution of the questioned function. Utilization of site assessment tools help to exactly identify individual components’ or systems’ requirements for long term changes. The underlying basic idea is reducing cost and improving performance of the plan regarding reliability, maneuverability, efficiency in order to protect the complete investment of the plant.

Economic Climate
The sequence of the needed improvements is dependent on the life cycle of the questioned component on the one hand side and on the other side on changes requested from the operation. Typical intervals for improvements, changes, upgrades, evolutions (=exchange) are:
- Operator Station 4 years
- Control System 5–8 years
- Instrumentation 8–10 years
- Electrical Components 8–15 years

Thereby it must be considered that changes and improvements on the process/mechanical side may shorten these intervals whereas stable requirements will prolong the intervals respectively.

Commercial Pressure
Energy producers face commercial pressure for providing energy at reasonable price levels while meeting operational targets at the same time. Operational expenditures (OPEX) are under permanent observation and programs for cost reduction are constantly on the agenda. This results in the requirement to reduce total spending over asset lifetime.

Summary of Market Challenges
Summarizing the above mentioned stress fields, the current key market drivers are “lifetime extension” and “cost reduction”, i.e. the measure to be taken is active Asset Management. Overcoming the market challenges make parallel investments inevitable in order to optimize installed assets so that they can meet their requirements longer and more efficient. These investments will only be beneficial when flexible approaches for all equipment installed in power plants are available.

Life Cycle Index
Normal procedure is to plan improvements and evolution steps together while also taking the plant’s production plan into account. The time slots and preparation will be planned jointly with respective suppliers well ahead of the envisaged outage time. Purchasing, engineering and test procedures are performed in parallel to the normal operation to allow a short, precise upgrade/evolution of the questioned function. Utilization of site assessment tools help to exactly identify individual components’ or systems’ requirements for long term changes. The underlying basic idea is reducing cost and improving performance of the plan regarding reliability, maneuverability, efficiency in order to protect the complete investment of the plant.
Product Life Cycle Management Model

The life cycle management model divides a product’s life cycle into four phases: active, classic, limited and obsolete. Each phase has different implications for the end user in terms of services and support provided.

In the "active" phase the end user benefits from warranty options and a full range of life cycle services, spare parts and maintenance materials.

The transition to the "classic" phase is dependent on economical and technological reasons. During the "classic" phase the product is available for extensions and is still fully supported. In the "classic" phase end users may start to evolve with ABB support to new technology by using upgrade and retrofit solutions providing improved performance and extension of the life cycle. This phase ends when the production of a particular product ends and the "limited" phase starts.

In the "limited" phase the manufacturing of new hardware is no longer supported but hardware availability continues a certain time. Obsolete components will not be replaced with the same technology but with evolution solutions and throughout the course of time the use of reconditioned parts increases. Service support continues on special request and according availability. Half year before the end of the "limited" phase, an obsolete notice is distributed and the product goes obsolete after this period of time. ABB will not "Remove from Active Sales" any products or family of products until an equivalent replacement is available. Service will continue to support as long as possible in order to protect the investment and evolve to new technologies.

Benefits of Product Life Cycle Management

Product life cycle management maximizes the value of equipment and maintenance investments by:

- ensuring spare part and competence availability throughout the life cycle
- enabling efficient product support & maintenance for improved reliability
- adding functionality to the initial product by the following upgrade path
- providing a smooth transition to new technology at the end of a product’s life cycle
- helping the end user to decide when an upgrade, retrofit or replacement is required
Power Generation Service offers comprehensive support and professional consultancy in all the listed countries below. Our competent engineers are networked worldwide and they have access to all ABB technologies.