Flexible service solutions

Know your power plant!  8
Customer interview with ERG
One-stop shop  10
Remote service and O&M for renewables
Plant optimization and energy efficiency  12
Dynamic response, base load and renewables integration
Control system evolution  24
Seamless stepwise evolution to Symphony Plus
Dear Reader,

The power generation industry is in a period of change. The effects of the global economic slowdown are still with us, the future of nuclear power generation has yet to reach consensus, and the growth in renewables continues to escalate worldwide.

There are other changes at work as well. In some countries, the workforce is aging and their expertise is not being replaced. In others, conventional power plants that were built to operate at full load now have to adapt their output on a daily or hourly basis to the fluctuating input from renewable energy plants. And in yet other countries, the key to profitability is to squeeze more output from the plant by improving efficiency and reducing plant energy consumption.

All of these changes are in progress at this moment in time. They differ in intensity from one country or region to another. But they have one thing in common: they require power producers and power plants to be able to adapt quickly to change. Flexibility is the key to survival.

In this issue of In Control you can read how ABB has put flexibility at the heart of its service offering. First, in that customers can choose from a comprehensive range of service packages, so that they get a service solution that suits their precise requirements and budget. And second, in that ABB service solutions help power generators adapt to change and thrive in the energy markets in which they compete.

One of the pillars of our flexible service solutions is ServiceGrid, a new concept that has proved so popular with customers in the North America and China that we are now rolling it out worldwide. ServiceGrid is a comprehensive portfolio of many different service products and packages that plant owners can piece together into a contract that meets their plant needs. The portfolio ranges from service staples such as spare parts and repairs to advanced products and tools like plant optimization and energy forecasting.

Evolution is another pillar of our service offering. We apply the principle of stepwise evolution to our entire product and system offering. There are many examples of how ABB has protected the investments of its customers and extended the life cycle of its products throughout this issue of In Control.

Plant optimization and reducing plant energy consumption in conventional power plants are two of our most important services. You can read about some of the impressive savings we have registered for customers in Europe and the Middle East on pages 12-14.

For renewable energy plants we have probably the most comprehensive service offering on the market. It is a true one-stop shop, covering both remote service and operations and maintenance, as well as proven ABB tools such as day-ahead and week-ahead forecasting. As with all our service offerings it is scalable to enable plant owners to find a solution that meets their requirements.

Finally, I would like to thank Mr. Fabio Mezzetti, head of planning and control for ERG’s power generation business in Italy, for agreeing to take part in this issue’s customer interview. ABB was able to help ERG adapt to change – from being an operator of captive power plants for a refinery and industrial site to being a competitive participant in the Italian energy exchange. It’s a fascinating and impressive story.

With kind regards,

Massimo Danieli
Head of ABB Power Generation
Overview

4  Flexible service solutions
   A complete portfolio for diverse requirements
6  ServiceGrid
   Roll-out of new program of service solutions

Customer interview

8  Know your plant!
   Interview with ERG, Italy

Application focus

10  One-stop shop
    Remote service and O&M for renewables
11  Life cycle management for control systems
    Flexible and affordable software upgrades
12  Plant optimization and energy efficiency
    Dynamic response, base load and renewables integration

Projects

15  Case studies
    A selection of ABB service solutions worldwide

Technology and innovation

24  Control system evolution
    Seamless stepwise evolution to Symphony Plus

Product news

26  Procontrol P13 Modbus TCP coupler
    Flexible, easy to use and durable
Overview

Flexible service solutions

ABB offers a complete portfolio of flexible service solutions that meets the diverse requirements of customers, their plants and the market conditions in which they operate.

Flexibility is key in today’s power generation industry, where the effects of the global economic slowdown, the uncertainty surrounding the future of nuclear power generation, and the escalating growth of renewables are transforming many electricity markets.

There are other drivers of market change at work as well. In developed economies, power generators are extending the operating life of their plants longer than originally planned. Many of these plants were designed to operate constantly at full load; now their output has to be frequently adapted in response to the fluctuating production of wind and solar power. In many countries the workforce is getting older and their expertise difficult to replace; this puts a strain on maintenance staff and reduces the in-house knowledge they have to draw on. And the need to improve plant efficiency to counter the effects of new regulations, tariff restrictions or competition from new high-efficiency power plants is always present, regardless of region, fuel type or plant age.

As a result of these and other factors, power generation companies are under constant pressure to adapt to changing market conditions. They have to be flexible, and their power plants have to operate with flexibility as well.

ABB recognizes the need for flexibility. Our service portfolio is geared to providing customers with service products that meet their needs for flexibility.

Plant evolution packages
The strengths of our service portfolio are outlined on the adjoining page. They are based on our long history as an industry leader and service provider in power plant instrumentation, control and electrical systems.

Our offering is structured to meet the different needs of individual customers and individual plants, so that they can thrive in the markets in which they operate. It consists of flexible plant evolution service packages, with which we service and evolve the plant’s electrical and automation assets as the customer’s needs and budget dictate.

One example of these packages is ServiceGrid, which we recently launched in North America and China, where it is proving a great success. ServiceGrid is a comprehensive program of service products that enables customers to choose the number of products and level of support that best meets their requirements. These range from basic services like spare parts and repairs to advanced products like power plant tuning and software evolution.

New service products
Our service offering is never static. We are constantly developing and releasing new products. Recently we have enhanced our offering for combustion instruments, generator control, migration and optimization, variable speed drive applications, plant energy efficiency audits, cyber security, and operations and maintenance services for renewable energy plants.

Our philosophy of flexibility is well illustrated by our Symphony Plus total plant automation platform. Symphony Plus is the latest of several generations of the Symphony family of control systems. Each generation is backwardly compatible with its predecessors. This unique capability allows us to protect and enhance a customer’s previous investments in hardware, software and operator expertise, whenever we upgrade a Symphony control system to Symphony Plus. Many of the stories in this issue of In Control describe how we have saved customers the expense of investing in a new DCS by upgrading their aging Symphony or Infi 90 systems to Symphony Plus.

More than ever before, service is a principal contributor to a company’s balance sheet. By improving plant performance, we help our customers to improve their investment and plant returns.
Overview

1. ABB has been in the power generation industry for more than 125 years and in the water business for more than half a century.

2. This, and the fact that we are a leading supplier of power and automation products and systems for utility and industry customers, means that we know the processes, the technologies and the applications.

3. Our philosophy is simple: We protect your investment through the stepwise evolution and upgrading of your electrical, control and instrumentation systems to minimize the consumption of energy, prolong asset operating life, and minimize the cost of ownership.

4. We do this by providing advanced and cost-effective services and solutions that preserve and increase the value of your facilities throughout their entire life cycle.

5. Our solutions and knowhow are deeply rooted in all applications: combined cycle, coal, hydro, nuclear, waste-to-energy, district energy, diesel, biofuel, solar, water and wastewater, desalination and pumping stations.

6. Our service spectrum covers the complete scope of the plant’s power and automation systems, from the distributed control and plant optimization systems to the instrumentation and emission monitoring systems. On the electrical side it covers the entire energy path, from electrical balance of plant to the substation and grid connection.

7. We offer a full portfolio of life cycle management services. It extends from repairs and spare parts to complete plant upgrades and equipment retrofits. And, it covers each phase of the plant life cycle, from first concept to decommissioning.

8. For all our products and systems, we offer low-risk evolution strategies that ensure maximum return on investment while enhancing equipment availability and performance.

---

Why choose ABB?

Eight reasons to choose ABB as your service partner.

1. ABB has been in the power generation industry for more than 125 years and in the water business for more than half a century.

2. This, and the fact that we are a leading supplier of power and automation products and systems for utility and industry customers, means that we know the processes, the technologies and the applications.

3. Our philosophy is simple: We protect your investment through the stepwise evolution and upgrading of your electrical, control and instrumentation systems to minimize the consumption of energy, prolong asset operating life, and minimize the cost of ownership.

4. We do this by providing advanced and cost-effective services and solutions that preserve and increase the value of your facilities throughout their entire life cycle.

5. Our solutions and knowhow are deeply rooted in all applications: combined cycle, coal, hydro, nuclear, waste-to-energy, district energy, diesel, biofuel, solar, water and wastewater, desalination and pumping stations.

6. Our service spectrum covers the complete scope of the plant’s power and automation systems, from the distributed control and plant optimization systems to the instrumentation and emission monitoring systems. On the electrical side it covers the entire energy path, from electrical balance of plant to the substation and grid connection.

7. We offer a full portfolio of life cycle management services. It extends from repairs and spare parts to complete plant upgrades and equipment retrofits. And, it covers each phase of the plant life cycle, from first concept to decommissioning.

8. For all our products and systems, we offer low-risk evolution strategies that ensure maximum return on investment while enhancing equipment availability and performance.
ABB’s new service program of comprehensive solutions for the power generation and water industries is proving a big success with plant owners.

ServiceGrid

ServiceGrid™, ABB’s new offering of life cycle management and support services for the power generation and water industries, enables customers to get maximum value from their ABB products and systems.

Launched in North America in mid-2011, this comprehensive portfolio of ABB service products and expertise has quickly become a huge success. Recent metrics show that it has boosted the already high levels of customer satisfaction that ABB is scoring in service. More significantly, almost 100 percent of customers who signed ServiceGrid contracts in the opening 18 months have opted to renew them.

As a result of this positive market response, ABB has made ServiceGrid its new service platform for the power generation and water industries. Global roll out will begin in early 2014.

Big benefits

ServiceGrid is probably the most comprehensive service program on the market. It covers the entire portfolio of ABB products and systems for power generation and water facilities – distributed control systems, electrical balance of plant, instrumentation, and automation products like motors, drives and low voltage systems. It brings this vast offering of critical plant technologies under a single service contract and with a single ABB point of contact.

ServiceGrid is geared to deliver five principal benefits:

- Maximize plant performance and efficiency
- Minimize the risk of unplanned and unexpected outages
- Extend the life cycle of ABB products and systems
- Complement the plant’s existing technical and service resources
- Protect the customer’s financial and intellectual investments in ABB technologies

It delivers these benefits through a comprehensive choice of four different levels of participation - Core, Select, ProActive, and Enterprise.

Core provides customers with a series of core service products for plants that are self-maintaining, have limited budgets or limited running time, but that still require services that only an OEM can deliver. These service products range from software updates and DCS on-site support to repairs and spare parts.

Select builds on the Core foundation and increases the extent of ABB’s support. It provides a range of services for customers who want to continue to work on their own but who also want the peace of mind provided by a global
OEM. In addition to the products and services provided by ABB in Core, it includes aspects like software upgrades and annual life cycle reports.

The third and fourth levels – ProActive and Enterprise – are premium programs for customers who recognize the benefits of a service partnership with a global OEM. Both levels include all the products available in Core and Select, with the addition of high-value services like a designated technical account manager (TAM), application/process support, and quarterly reports and reviews. ProActive is for customers who wish to partner ABB on a single plant; Enterprise for companies with multiple sites who want to reap the benefits of ServiceGrid across their entire fleet.

A comprehensive range of program options is available for each of the four levels. These include products like power plant tuning, energy efficiency assessments, cyber security services, and turbine control support and services.

Embedded in all ServiceGrid contracts is ABB’s life cycle support program for distributed control systems, Automation Sentinel. This enables customers to reap the full benefits of software maintenance through upgrading and evolving to newer ABB technology and control system products.

**Single point of contact**

A highly rated feature of the ServiceGrid program for ProActive and Enterprise customers is the designated technical account manager. This is the customer’s single point of contact with ABB.

The technical account manager’s role is to help the customer and ensure a quick, smooth and efficient response from ABB. Each TAM knows the customer’s site or fleet of sites and the operational requirements and targets of those sites. The TAM’s objective is to enhance the utilization and productivity of assets, processes and people to improve plant performance, increase uptime and reliability, and reduce total cost of ownership. Customer satisfaction and problem resolution are top priorities.

Each TAM has an extensive network of ABB power generation experts and a huge bank of expertise at his disposal. The network consists of around 1,500 dedicated power generation and water service engineers stationed in around 60 countries worldwide. And the expertise is contained in ABB’s market and technology leadership in power and automation technologies – from distributed control systems to motors, drives, transformers, generator circuit breakers, and instrumentation.

For more information on ServiceGrid, contact your local ABB sales manager.

### Long-term life cycle support

<table>
<thead>
<tr>
<th>Program services</th>
<th>Core</th>
<th>Select</th>
<th>ProActive</th>
<th>Enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software updates</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Security/anti-virus patch validation status</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Web access support</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Unlimited product technical phone support</td>
<td>Next business day</td>
<td>4 hours</td>
<td>1 hour</td>
<td>1 hour</td>
</tr>
<tr>
<td>Priority one-hour 24/7 technical phone support</td>
<td>O</td>
<td>O</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>ABB Automation University discount</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>DCS on-site support</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Spare parts and repair savings</td>
<td>★</td>
<td>★★</td>
<td>★★★</td>
<td>★★★★★</td>
</tr>
<tr>
<td>On-site support savings</td>
<td>★</td>
<td>★★</td>
<td>★★★</td>
<td>★★★★★</td>
</tr>
<tr>
<td>Customer loyalty offers</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Annual installed system life cycle report</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Annual usage report</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Software upgrades</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Remote connectivity</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Corporate/central engineering support</td>
<td>O</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Designated support leader/Technical account manager</td>
<td>O</td>
<td>O</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Quarterly report and review</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Application/process support</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Enterprise-wide report and review</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Mid-year on-site review</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

✓ = included. O = available as an option. ★★★★★ = increasing discount level.
Customer Interview

Know your plant!

An ABB service solution has helped Italian energy company, ERG, seize new growth opportunities by knowing precisely how well its plants are performing and why. Fabio Mezzetti, head of planning and control for ERG’s power generation business, explains how.

Please describe ERG’s business activities and your role within the company.

The ERG Group is an Italian group of companies that has been active in the energy industry for more than 70 years. It is the largest producer of wind power in Italy and the owner and operator of two thermoelectric power plants. ERG also maintains a strategic presence in oil marketing.

The two power plants are located in Sicily. One is a 532 MW integrated gasification combined cycle (IGCC) plant that generates electricity from syngas, which is obtained through the gasification of heavy residue from an adjoining refinery. The plant was commissioned in 2000, and is the largest IGCC plant in Europe and the third largest in the world. The second site is a 480 MW gas-fired combined cycle power plant that started operations in 2010. Part of its production is used to power a multi-company industrial site.

The two power plants constitute ERG’s power generation business. As the head of performance control, I am responsible for the technical and economic performance of the two plants.

In 2010 your company decided on a dramatic change of strategy. Would you describe that change and the reasons for adopting it?

At that time the refining market was shrinking, so we decided to branch out into the power sector. We saw good opportunities for growth in power generation. We had two power plants that were generating more than 8 terawatt-hours of electricity. But to be successful in the energy market we had to switch from being a captive power producer that generated electricity for the refinery and industrial site. Instead we had to become a commercial operator who generates and sells electricity in a tough and competitive market. That was a huge challenge and, as you say, a dramatic change in strategy.

How did the change in strategy affect the way you operate the plants?

To participate in the energy market it was imperative that the plants become more competitive. We had to improve efficiency and optimize the generation process at the plants as quickly as possible. The biggest challenge for a participant in the energy market is ‘to know your plant.’ By this I mean that you have to have detailed knowledge of your assets and the way they behave in the energy market in which you operate. The more information you have on your plants and their component parts – and how well or poorly they are operating – the more efficient and profitable you become. It’s not enough to know that the plant is efficient, you have to know why, by how much and in which items of equipment it is efficient as well.

You chose ABB to improve efficiency and optimize performance at the plants. Why ABB?

We had previous experience of working with ABB. They provided the distributed control system for our IGCC plant. The DCS controls the entire gasification and power generation process at the plant and has done so successfully for several years. But more importantly, we wanted a partner with the expertise and know-how to help us achieve our objectives. Whoever we chose had to have a track record in assessing and improving power plant performance, and a standardized and scalable approach to doing so. We felt that ABB was the obvious choice.

Can you briefly describe the main features of the ABB solution, how it works and what it does?

The conventional way to measure plant performance is simple and uninformative: Fuel enters the plant, power leaves the plant, and the ratio between the two is the plant’s
performance. This approach provides no information at all on why the plant is performing well or badly, nor on which parts of it require improvement or maintenance. It tells you nothing about whether you are competitive or not.

With the ABB solution we now know precisely how well the plants are performing and why. The solution continuously monitors 50 primary variables in 25 key factors in each of the plants’ main components – steam turbines, generators, gas turbines, condenser and the heat recovery steam generator. By measuring the actual performance of the variables in each of the 25 key factors and comparing those readings with reference figures, we know immediately whenever a deviation is occurring. This enables us to calculate the impact of the deviation on plant performance and when best to rectify it – immediately or at a future service interval.

What are the benefits of the ABB solution? How has it improved plant operations?

The most important benefit of the ABB solution is that we know precisely what it costs to generate power each hour. This means that we can calculate accurately the price that we can sell the power for on the exchange and at what level we should submit our bids.

The second benefit is that we can plan maintenance and determine when best to rectify a component variable that is showing a deviation. For instance, previously we replaced the air intake filters in the gas turbines three or four times a year. The ABB solution showed that this was unnecessary and that we could extend the filter life cycle by several months. This is just one example of many, but it has reduced our maintenance costs and increased productivity.

Third, we know what measures or investments are required to improve performance over the medium to long term, and we can plan when to implement them accordingly.

And fourth, we now have precise knowledge of the plants – we know that they are performing well, and we know why they are performing well.

“The most important benefit of the ABB solution is that we know precisely what it costs to generate power each hour. This means that we can calculate accurately the price that we can sell the power for on the exchange and at what level we should submit our bids.”
ABB offers a comprehensive and scalable one-stop service offering for renewable energy plants worldwide.

“ABB’s O&M team has proved competent, reliable, flexible and proactive to our needs. Their services have been crucial, not only to meet but to exceed our power plants’ expected performance ratios. After two years of successful operations, we can now say that ABB’s costs were more than compensated by actual performance.”

Davide Piazza, Actelios Solar, Italy

Actelios Solar owns three PV power plants for which ABB provides remote O&M services

Well as premium ABB products and expertise such as energy forecasting and business intelligence tools.

ABB developed the concept specifically for unmanned renewable energy plants. It is widely proven and available for all types of renewable energy facility – photovoltaic plants, wind parks, hydropower plants and geothermal power stations - both for individual plants and fleets of multiple facilities.

ABB is currently managing remote services and O&M for around 45 renewable energy plants worldwide. These plants have a combined generating capacity of more than 360 MW. They range in size from a 0.25 MW roof-top photovoltaic installation in Japan to a 33 MW photovoltaic power plant in South Africa. The plants are located in all regions of the world – Europe, North America, India, Asia and Africa.
Life cycle management for control systems

Automation Sentinel enables ABB customers to actively manage the life cycle costs of their control system assets.

Symphony™ Plus is the latest generation of ABB’s Symphony family of distributed control systems – the world’s most widely used DCS in the power generation and water industries. For more than 30 years, ABB has evolved the Symphony family, ensuring that each new generation enhances its predecessors and is backwardly compatible with them – all in accordance with ABB’s long-held policy of ‘Evolution without obsolescence.’

ABB supports this strategy with the Automation Sentinel program. Designed to help ABB customers actively manage the life cycle costs of their control system assets, Automation Sentinel enables them to keep their installed software products up to date and maintain a flexible and affordable path to the latest system software. In some countries Automation Sentinel is embedded in ServiceGrid™ – the ABB Power Generation program of comprehensive service solutions for energy providers. Three Automation Sentinel subscription types are available:

Maintain
The customer maintains the system at its current version.

At this level the full support of ABB is available to maintain the system and to maximize the return on the original investment. It is ideal for customers focused on maximizing the availability of their system while minimizing the introduction of risk and/or changes.

Maintain Plus
The customer enhances the system with new versions and features while maintaining the core control system (in addition to the features of Maintain).

This level provides increased flexibility to those customers who wish to maintain their system but are able to tolerate a moderate amount of risk in exchange for improved functionality.

Maintain & Evolve
The customer evolves ABB heritage control systems to the latest ABB control system technologies including Symphony Plus (in addition to the features of Maintain Plus).

This level provides the greatest flexibility to employ leading edge productivity and enhancement improvements.

Automation Sentinel benefits include:
- Provides control system owners with the option to balance
  - Staying current with the latest technology products vs.
  - Need to mitigate risk and achieve return on investments previously made
- Maximizes the life of the control system by keeping system software up to date
- Improves the operational capability and productivity of the control system by employing the latest enhancements
- Yearly subscription provides predictability for plant budgeting
- Most cost-effective system evolution approach
- System owners gain peace of mind knowing that their automation system software is supported and maintained by ABB
Plant optimization and energy efficiency

ABB plant optimization and energy efficiency solutions enable power producers to maximize plant performance and achieve significant benefits and savings in all types of market – dynamic response, base load and renewables integration.
In mature markets the days of thermal power plants operating constantly at base load are over. Often these plants now have to operate as back-up to wind farms and solar power plants, running below their designed capacity and ramping up or shutting down several times over a 24-hour cycle. For power generators in these markets, the ability to respond quickly and cost-effectively to rapidly changing load requirements is crucial.

In developing parts of the world, where there is often a shortage of electric power, thermal power plants continue to operate around the clock at base load. Here there is scope for huge savings to be made by optimizing plant performance or improving the plant’s energy efficiency. The objective is to increase plant electrical output with a given and limited amount of resources.

In many countries – developed and developing - there is a need to participate in intra-day and day-ahead energy trading efficiently in order to maximize returns. This can be achieved by optimizing unit production in a multi-unit conventional power plant, or by integrating small renewable energy installations into one large virtual power plant in distributed generation.

ABB has a proven and comprehensive range of plant optimization and energy efficiency solutions that enable power generators to thrive in these diverse market requirements.

Throttle-free frequency control

MODAN and MODAKOND is a unit control solution that delivers the fast load ramps and frequency control required to meet the dynamic response schedules of load dispatchers in mature markets. It does this by coordinating the boiler, turbine and energy reserves by means of model-based set-point control and model-based feed forward control. This eliminates the need to throttle the turbine control valves. Whereas throttling usually achieves the desired results but lowers plant efficiency, MODAN and MODAKOND improve plant efficiency by 0.3 to 0.4 percent.

The two products can be installed as an integrated control solution in units running on ABB control systems or as an optimization solution to upgrade power plants running on non-ABB control systems. Installations at more than 80 power plants show that a typical 700 MW unit operating at an average load of 88% can reduce energy consumption on throttling by around 10,150 MWh a year. The annual cost savings for such a reduction are around $270,000.

Optimizing start-ups and shutdowns

Because of the increasing number of start-ups and shutdowns that thermal power plants have to perform – often several times a day - power generators need to know how long it will take from firing up to synchronization in order to meet the required load scheduling. They also need to keep the cost of these potentially budget-busting boiler start-ups as low as possible.

One example of many at which OPTIMAX® BoilerMax has achieved considerable savings is at the 840 MW Ingolstadt oil-fired power plant in Germany. The plant is operated by E.ON, one of Europe’s leading energy companies. OPTIMAX BoilerMax has reduced fuel consumption and greenhouse gas emissions at the plant by 20 percent. Ingolstadt is one of several E.ON plants in Germany that now benefit from lower fuel costs and a reduced carbon footprint thanks to BoilerMax.

OPTIMAX BoilerMax has reduced fuel consumption at boiler start-ups by up to 20% at an E.ON oil-fired power plant in Germany.

Actual vs. expected plant performance

ABB’s OPTIMAX PlantPerformance is an online plant performance monitoring system that continuously compares actual plant performance against expected performance. It does this by monitoring plant components and variables - such as turbines, generators, heat rate and efficiency - and comparing the actual values with set points. The performance data is displayed on an automatic, periodic or on-demand basis. Controllable losses show the cost impact of operating the plant beyond its design point, and what-if calculations reveal the cost benefit of improving those controllable losses.

OPTIMAX PlantPerformance provides early detection of wear and tear and improves plant availability and efficiency. It also provides real-time records of deviations from normal operating parameters, which help to establish, diagnose and predict performance trends. This type of information enables management to make more precise and cost-effective decisions on investment or maintenance activities. For instance, a decision to defer an investment thanks to precise information on component performance frees up capital for more pressing purposes.

Continued on page 14
Improving plant energy efficiency
For plants that operate at base load, the quickest and least expensive way to improve output and reduce operating costs is through energy efficiency. It not only generates more power and higher revenues, it reduces fuel consumption and greenhouse gas emissions.

ABB has a comprehensive portfolio of energy efficiency solutions that meets the strategic and operational requirements of all types of thermal power generation. They include:

- Plant energy efficiency assessments in which ABB identifies the efficiency improvements and savings that can be made in the plant’s main energy systems
- Plant and process optimization systems that improve the efficiency and lower the energy consumption of plant equipment and power plant units
- Electrical balance of plant upgrades that improve plant energy efficiency by modernizing selected areas of the plant electrical system and installing energy-saving technologies such as variable speed drives and actuators.

One of many examples where ABB has identified huge annual energy savings is at a large power and desalination complex in the Middle East. ABB conducted an energy efficiency assessment in 2011 and noted 32 energy-saving opportunities in various site systems. These were estimated to be worth up to 400,000 MWh a year and $11 million annually. One opportunity alone offered potential fuel savings of $1 million a year.

ABB identified 32 energy-saving opportunities worth up to 400,000 MWh/yr or $11 million annually for a power and desalination complex in the Middle East.

Multi-unit integration and optimization
The escalation in renewable energy generation has significantly increased the number of power production units that deliver electricity to the grid. Small renewable energy producers, as well as thermal power plants with multiple units, have to participate in intraday trading and maximize their revenues. OPTIMAX PowerFit makes this possible. It enables:

- Multi-unit power plants to optimize plant production and respond rapidly and efficiently to changes in load dispatch requirements
- Combined heat and power (CHP) plants to optimize and balance heat and power production
- Municipal energy storage facilities such as CHP plants and pumped storage plants to optimize production and participate in intraday energy trading
- Multiple small renewable energy production units to pool and optimize output and form a virtual power plant that can participate in the energy trading market.

OPTIMAX PowerFit has a proven track record in all four applications. One example is a solution for a German-based virtual power plant operator that trades on the national energy spot market.

PowerFit enables the company to pool and optimize around 600 MW of energy generated by some 300 wind farms, photovoltaic power plants and biogas plants located all over Germany. The power is traded on an intra-day and next-day basis, thereby providing many small-scale energy providers with the same market advantages as large conventional power plants.
ABB retains DCS market leadership

ABB is world’s leading supplier of distributed control systems by revenues.

In the latest version of ARC Advisory Group’s “Distributed Control Systems Worldwide Outlook,” ABB retained its leading worldwide market position based on revenues.

According to the study, ABB was also the market share leader for the Latin America, and Europe/Mid East/Africa (EMEA) regions. ABB remained the global market share leader for both service and software and the worldwide leader in key global verticals including oil and gas, mining and metals, and pulp and paper.

The report also notes that the DCS business has been and will continue to be primarily a services business, with combined project, engineering and operational services accounting for more than half of total project revenues. The shortage of qualified engineers will contribute to the growing need for these services.

ABB’s family of DCS solutions includes Symphony Plus, System 800xA and Freelance, as well as previous generation systems. All ABB control systems offer a secure evolution path forward to next generation technologies to protect and enhance the control system investment over its lifetime. ABB also offers an extensive portfolio of industry applications and services to complement these core automation systems.
The perfect upgrade

ABB has upgraded the Advant human machine interface at the Swanbank E power station in Australia with the latest control and virtualization technologies – a perfect solution that meets a long list of customer requirements.

Swanbank E is a highly efficient 385 MW gas-fired combined cycle power station in Queensland, Australia. It is owned by Stanwell Corporation Limited, Queensland’s largest power generator.

The Swanbank E control system consists of ABB Advant AC160/AC450 controllers for the gas turbine (Egatrol 8), steam turbine (Turbotrol 8) and all DCS applications, including the water-steam cycle and balance of plant. The original HMI solution from the late 1990s was built on Unix-based Advant OS500 operator stations and an information management system (IMS) with OPTIMAX performance monitoring functions included.

After 10 years of successful operation, Stanwell decided to upgrade the control system “to ensure continued reliability, availability, functionality, data security, and OEM hardware and software support of the operator interface until the end of the serviceable life of the station in 2023.”

Although the plant’s original control system hardware was meeting performance expectations and is actively supported by ABB, the Unix-based Advant OS500 operator stations and IMS Historian were nearing the end of their working lives.

Committed to Advant
ABB is strongly committed to evolving the Advant platform and protecting customer investments in it. As a result of this long-term strategy, ABB was able to propose an upgrade solution that met all Stanwell’s requirements. The solution is based on ABB’s System 800xA for Advant Master, combined with Power Generation Information Manager (PGIM).
ABB was selected because of its experience and expertise with the Advant control system, the MB300 bus and HMI graphics. One of the key drivers for a successful outcome of the project was the like-for-like transformation of the operator interface graphics. ABB was able to deliver this to an exceptional standard. It was one of the highlights of the project and the operators quickly adapted to the new interface.

One of the other key drivers of the project was to leverage the existing VMware ESXi environment at Swanbank. ABB was able to provide excellent technical support for the integration of this technology into our control system environment.

ABB was able to deliver the project on time and in full. ABB is continuing to support me through the Sentinel Program and plant support service level agreement.”

Peter Hoerlein
Senior Electrical Engineer
Stanwell Corporation Limited
Modernizing a 20-year-old control system

ABB has upgraded a 20-year-old Procontrol P13 system and its human machine interface at the Sardar Sarovar hydropower plant in India - protecting the customer’s original investment in hardware, software and expertise, while vastly improving plant operations.

The Sardar Sarovar Dam in Gujarat is one of India’s largest water resource projects, providing irrigation, drinking water, flood protection and up to 1,450 MW of electric power for five of the country’s states.

In 2010, ABB won an order from the plant operator, Sardar Sarovar Narmada Nigam Limited, to upgrade the control system for five of the power plant’s generating units. Each unit consists of a 50 MW Kaplan turbine with an ABB Procontrol P13/42 control system that dates back to the early 1990s.

Improvements required by the customer included five stations for auto-sequencing the five units, one common station each for auxiliary control and switchyard monitoring, and a diagnostics station, all of which were to be connected via a P13/42 intra-plant bus. This was necessary because the old third-party HMI system and the intra-plant bus were no longer functional, which made it difficult to monitor and operate the plant. Synchronization was done manually. Operators had to walk nearly 300 meters to the switchyard to perform local operation of breakers, isolators and bus couplers.

New control system not necessary
ABB engineers conducted a detailed survey of the plant and held discussions with the customer to find solutions to these problems. This helped convince the customer that improvements to the control system’s reliability and availability could be achieved with small upgrades using ABB components and solutions, rather than by replacing the control system with a new one as the customer had originally planned.

ABB completed the project in 2011. The numerous customer benefits include a single integrated platform for plant operations that provides a single window from plant start-up to auto-sequencing and auto-synchronizing to the grid. Operation of the plant via HMI is possible for the first time with a revived intra-plant bus. Progress 3 - with its online monitoring capability of the functional logic - substantially enhances the P13 control system’s diagnostic features. And auto-synchronizing each unit with ABB’s Synchrotact 5 delivered a huge improvement in smooth plant operation.

This optimized upgrade solution has increased control system reliability, eased plant operations, increased plant availability, improved diagnostics and fault finding, improved online monitoring and simulation, and provided trouble-free synchronization. It also provides remote status updates and remote monitoring/operation of station auxiliaries and the switchyard with a state-of-the-art HMI. The remote client is located 5 km away from the hydro plant and is used for monitoring and diagnostics by plant personnel without their having to visit the plant.

ABB has been awarded an annual maintenance contract for continuous system services.
ABB has a huge installed base of Infi 90 and Symphony Harmony control systems in China. Two companies that recently benefited from upgrading their aging Infi 90 power plant control systems to state-of-the-art Symphony Plus systems are Huaneng Group and Shandong Zhonghua Power.

Evolving Infi 90 to Symphony Plus in China

Originally introduced in 1980 as Network 90, the Symphony™ family of plant automation systems has progressed through several evolutionary stages: INFI 90™, INFI 90™ Open, Symphony Harmony and now – the most advanced total plant automation system on the market – Symphony Plus.

As a result of ABB’s life cycle policy of ‘Evolution without obsolescence,’ this family of systems now represents one of the largest installed bases of distributed control systems in the world. Many of these systems are installed in power, water and process industry plants in China. Two power generation companies that recently decided to upgrade their Infi 90 power plant control systems to Symphony Plus come from different ends of the corporate spectrum.

Whereas Huaneng Group operates 85 thermal and hydro power plants in China and is one of the country’s largest electric utilities, Shandong Zhonghua Power runs three power plants and is considerably smaller. Irrespective of their size, both companies are benefitting hugely from their recent upgrades to Symphony Plus.

**Huaneng Group**

For Huaneng Group’s 1,200 MW coal-fired power plant at Hegang in Heilongjiang province, ABB recently upgraded the 15 year-old Infi 90 distributed control system at one of the plant’s three units.

In the unit’s old control system, the turbine was controlled by a separate system, and important functionalities such as bypass, the electrical control system and thermal signals were not integrated with the DCS. The customer required this to be rectified with an advanced distributed control system that would control all areas of the unit, including the turbine, and integrate all plant signals into a unified system.

ABB proposed and installed a Symphony Plus solution based on its high-performance BRC 410 controller, intuitive and easy-to-use S+ Operations human machine interface, and S+ Engineering’s Composer suite of engineering tools.

Thanks to the backward compatibility of the Symphony family, all the customer’s original control strategies could be retained, simply by transferring the configuration directly into the new controllers. This greatly reduced the project duration to just 30 days and significantly lowered the customer’s investment and training costs.

**Shandong Zhonghua Power**

Although Shandong Zhonghua Power Company (SZPC) operates only three plants, it is jointly owned by two giants of the Chinese power sector: China Guodian Corporation and Hong Kong-based China Light and Power. Unit 2 at the company’s Liaocheng Power Station in Shandong province has been operating with Infi 90 since 2002.

Even though the control system had been operating reliably and satisfactorily throughout its lifetime, SZPC wanted to be certain that the unit’s control system would continue to operate with the same high level of reliability for another decade. SZPC was also keen to reap the full benefits of a state-of-the-art plant automation system by upgrading to Symphony Plus.

ABB proposed a Symphony Plus solution that would retain as much of the existing Infi 90 hardware and data as possible. The solution consists of BRC 410 controllers, S+ Operations HMI, and S+ Engineering’s Composer engineering tools. The backward compatibility of the Infi 90-Symphony family enabled ABB to transfer all the original control strategies and graphics to the new controllers and retain all the existing control cabinets and cables without change.

This delivered a raft of significant benefits to the customer, including speedy project delivery within a scheduled plant shutdown, reduced project costs and training expense, and improved operator efficiency thanks to the highly integrated control environment.

Much impressed by the results of the upgrade and ABB’s smooth and speedy project execution, SZPC recently awarded ABB a second contract to upgrade unit 1 to Symphony Plus.
Rumford Paper Mill in Maine, USA, has a production capacity of 565,000 tons of paper a year. It is owned by New Page, a leading producer of printing and specialty papers in North America.

The mill can produce 100 percent of its energy (process steam and electricity) using multiple boilers and a 120 MVA steam turbine generator, which are controlled by an ABB Procontrol P13 distributed control system (DCS) and ABB TURBOTURN steam turbine controls.

Although the P13 DCS had worked reliably for 26 years since the day it was installed, even the most dependable systems need maintenance from time to time. In addition, the customer had upgraded the old HMI system with a third-party solution that did not produce the expected benefits. As a result Rumford asked ABB for a service solution for the entire control system.

Reliability for years to come
To ensure safe and reliable operation for many years to come, ABB proposed a full scope P13 upgrade as well as maintenance services over the course of two years, which commenced in 2012.

First, the existing engineering tools were upgraded to Progress 3, ABB’s latest Windows-based engineering and diagnostic solution. Progress 3 is a programming, documentation and service tool specifically designed to upgrade or replace older generation Procontrol engineering tools. It enhances the ability of plant operators to maintain the plant control system with a comprehensive range of functions for fault-finding, trip analysis and even preventive maintenance.

Second, critical electronic components like wet capacitors and fuses were refurbished in all the operating modules and spare parts to prevent premature card failures and avoid plant downtime.

Third, ABB concluded the project in 2013 by replacing the outdated third-party HMI with the latest ABB HMI, which includes a customized Procontrol P13 connectivity package based on the Procontrol P13 OPC server. The new HMI is connected redundantly to the P13 system via Modbus and new ABB bus coupling modules.

In planning the HMI upgrade ABB took care to ensure every customer requirement was fully met. Existing functionality was freshly implemented according to customer specifications. A unique feature of the solution is the integration of two touchscreen operator workplaces with the main control room operator panels. The touchscreen workplaces had not been functioning for some time. ABB’s flexible HMI solution put these workplaces back into service again, upgraded to the latest touchscreen technology.

Rapid project completion
One of the challenges of the HMI upgrade was the tight schedule – just eight weeks from receiving the purchase order to delivering the solution. ABB’s highly skilled and experienced engineering team kept to the schedule with no delays. Commissioning was completed in just two days during a scheduled outage with no additional downtime, ensuring minimal loss of production for the customer.
New Jersey’s Lakewood Cogen consoles upgraded with Symphony Plus

ABB performs the upgrade with no downtime or production disturbances.

Lakewood Cogen Plant is a combined cycle facility with a generating capacity of 246 MW, configured with two combustion turbines and one steam turbine. Lakewood Cogen’s primary fuel source is natural gas backed up by ultra-low-sulfur diesel fuel which operates during natural gas supply disruptions. When the plant’s owners, Essential Power, decided to modernize Lakewood Cogen’s control rooms, plant reliability was an essential requirement: the supplier was not only requested to provide a new human machine interface, but to implement its seamless integration with no system downtime.

The winning solution was ABB’s S+ Operations HMI, part of the Symphony Plus family, which is tailored to the specific needs of the power generation industry. Its many features include integrated operations, precise information and life cycle management, flexible and scalable design, and built-in security.

Critical components were shipped ahead of scheduled delivery time to allow a smooth migration without system disturbances. The new Symphony Plus HMI was installed in parallel while the old system continued to operate. This was made possible by ABB’s evolution strategy, which enables existing systems to be upgraded to Symphony Plus without incurring unit downtime.

Other benefits of S+ Operations are higher levels of plant efficiency, reliability and availability, thereby extending equipment operating life and reducing maintenance requirements and plant downtime. This is a key benefit of ABB’s “Evolution without obsolescence” policy, which supports customers in finding a balance between the introduction of new technology and maximizing the return on asset investments already made.

“ABB has a long history of helping our customers evolve their existing assets in a low risk manner,” said Massimo Danieli, head of ABB’s Power Generation business. “Our Symphony Plus solution brought Lakewood Cogen’s plant into a modern operating environment in the most cost-effective manner, maximizing the inherent advantages of our simple, scalable, seamless and secure Symphony Plus control system.”

Lakewood Cogen is one of the 120 plants in operation around the world that benefit from the high performance of S+ Operations in every aspect of plant control and monitoring.
Powering on in the Philippines

One of the world’s largest bunker-fueled diesel power plants upgrades to Symphony Plus.

ABB has been awarded a contract by 1590 Energy Corporation to upgrade the control system of the Bauang diesel power plant in the Philippines.

The plant has a generating capacity of 215 MW and is one of the largest medium-speed bunker-fueled diesel power plants in the world. It commenced operations in 1995 and provides much-needed power for the island of Luzon, which is the industrial and economic center of the Philippines and home to the country’s capital, Manila.

ABB is upgrading the plant in a step-wise approach to ensure minimum disruption of plant operations. The site’s existing OIS 41 VMS (virtual memory system) consoles, which have been in operation for nearly 15 years, are being replaced by S+ Operations, ABB’s powerful and ergonomic human machine interface (HMI) for Symphony™ Plus. Designed to empower operators to greater awareness, faster response and better decision-making, S+ Operations will be added on-line and in parallel to the existing consoles, thereby minimizing risk and loss of production.

Evolution without obsolescence
Thanks to ABB’s ‘Evolution without obsolescence’ strategy and commitment to earlier generations of the Symphony family, 1590 Energy Corporation will be able to reap the benefits of the latest Symphony Plus automation technology while safeguarding its previous investments in hardware, software and operator expertise. The Symphony Plus solution will enable the existing field-proven plant control configuration to be retained, thereby protecting the customer’s original intellectual capital investment. It will also support risk-free implementation during a tight plant shutdown schedule.

ABB is responsible for complete system design, engineering, project management, testing and installation supervision, and commissioning of the Symphony Plus control system. To ensure a smooth operational transition during the upgrade process, ABB will also provide training to enhance operator skills.

The customer has also subscribed to ABB’s Automation Sentinel, a life cycle support program that allows active monitoring of control system versions and software life cycle costs. Under the terms of the subscription, the customer has exclusive access to the latest software updates and patches of S+ Operations HMI and Composer for the next three years.

ABB has already successfully completed and commissioned phase 1 of the project (the HMI upgrade) and will complete phase 2 (upgrading the hardware modules) towards the end of 2013. On completion, 1590 Energy Corporation will have a highly flexible and efficient control system that will help improve plant reliability and stability, and enhance plant operations.
ABB has been making distributed control systems (DCS) for more than 30 years. In that time we have delivered thousands of control systems to customers all over the world in the power generation, water and process industries. So many in fact that ABB has long been the global market leader in distributed control systems, not only in software but in DCS service as well (source: ARC Advisory Group - Distributed Control Systems Worldwide Outlook 2013).

One of the reasons why ABB continues to lead the world in distributed control systems is our service philosophy. It was written in stone from the start and is now in its fourth decade. In it we undertake to protect our customers' investments in our control systems by enabling them to enhance and evolve those systems over time and without the risk of obsolescence.

ABB calls this philosophy ‘Evolution without obsolescence.’ It is a commitment that differentiates us from other DCS vendors and the ‘rip and replace’ approach to control system modernization.

‘Evolution without obsolescence’ is based on a simple principle. We realize that customers who select ABB control systems are making a significant capital investment in hardware, engineering tools and application software. They are also making a substantial investment in their personnel – the engineers, technicians and operators who become experts in its operation and engineering – and in the control strategies, procedures and graphics at each of the sites in which the system is installed.

This demonstrates trust on the customer’s part in ABB, a trust that we strive to repay with partnership and investment protection. We do this by extending the operating life of their control systems through seamless evolution. This enables them to upgrade the DCS in accordance with their business and plant needs, not because the components are facing obsolescence. Our stepwise approach means that we upgrade components or process areas individually as required, while leaving the rest of the system undisturbed. This alleviates the need for large capital investment and the resultant impact on cash flow that a ‘rip-and-replace’ approach causes.

**Partnership and planning**

Evolution is driven by the plant owner’s business goals. Planning is critical to its success; it improves the budgeting process and results in better system upgrades and more efficiently planned plant shutdowns.

ABB assigns each customer a designated technical account manager (TAM). This is the customer’s single point of contact with ABB, the person the customer calls for all service and system evolution issues. The TAM’s role is to work closely with the customer in a spirit of partnership and trust. Together they develop an evolution strategy for each plant DCS. That strategy is based on ABB’s audit of the existing DCS and on the customer’s business drivers. Once the evolution strategy has been determined, ABB:

- Submits a 3-5 year plan, which is reviewed and revised as necessary.
- ABB’s incremental and stepwise approach supports flexibility and allows for changes to the plan as required over time.
- Identifies the plant areas that are at greatest risk for production loss and those that have the greatest potential for increased production.
- Reviews the long-term plan periodically and updates it to reflect changing business needs and new ABB solutions. This takes the guesswork out of the budgeting process.

**Legacy systems supported**

ABB supports all its legacy systems with technology centers of competence and evolution pathways to Symphony™ Plus, the latest generation of ABB’s family of distributed control systems for the power generation and water industries. Like its predecessors, Symphony Plus is designed to meet the requirements of plant owners in all geographic markets and in all types of power generation and water treatment. It meets the performance objectives of its various users – in maintenance and operations, engineering, IT and management. And it addresses all the key focus areas of the power and water industries – plant productivity, energy efficiency, operation security, plant safety, and cost of ownership.
Evolution from a legacy system to Symphony Plus is accomplished at the customer’s own pace. It can be implemented quickly or it can be stretched over several years, with components from both system technologies – the legacy system and Symphony Plus – operating seamlessly in parallel. ABB can deliver evolution pathways that meet all customer needs and budgets.

An ABB control system is a vital and sustainable part of the customer’s business and can be enhanced and extended for years to come. ABB’s strategy of ‘Evolution without obsolescence’ provides customers with a proven platform to enhance and evolve their existing control system. This strategy of seamlessly integrating new technology with the existing system lowers the cost of ownership and increases the value that the system provides.

**ABB’s evolution approach to control system modernization versus the ‘rip and replace’ alternative**

<table>
<thead>
<tr>
<th>ABB’s evolution approach</th>
<th>‘Rip and replace’ alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retains proven control application software</td>
<td>Control code re-engineering or translation is required. New algorithms result in different process control behaviors and require retuning</td>
</tr>
<tr>
<td>Process control remains the same as before</td>
<td>Plant personnel need to learn a new system</td>
</tr>
<tr>
<td>Retains plant knowledge base, operations and maintenance philosophy</td>
<td>New documentation and new O&amp;M procedures are different and unfamiliar to plant personnel</td>
</tr>
<tr>
<td>Upgraded system hardware retains familiar maintenance procedures</td>
<td>Requires massive change-out of system hardware (I/O, controllers, communication infrastructure, HMI and, as a minimum, specialty I/O terminations)</td>
</tr>
<tr>
<td>Preserved investment in control system I/O</td>
<td>Minimal commissioning and start-up (no retuning of loops)</td>
</tr>
<tr>
<td>Minimal commissioning and start-up periods (reconfiguration and retuning of loops)</td>
<td>Results in:</td>
</tr>
<tr>
<td>- Minimal loss of production</td>
<td>- Greater loss of production</td>
</tr>
<tr>
<td>- Minimal risk</td>
<td>- Increased risk</td>
</tr>
<tr>
<td>- Lower project costs</td>
<td>- Higher project costs</td>
</tr>
</tbody>
</table>
The 70BK08a-E bus coupler is the latest generation of the Procontrol P13 bus coupler family. It features Modbus RTU with an additional state-of-the-art Ethernet interface providing Modbus TCP connectivity (both master and slave) and a flash-based memory (onboard and SD-Card) for storing configuration data.

Modbus TCP connectivity offers the easiest and most flexible solution available today for connecting Procontrol P13 to ABB’s broad range of HMI solutions by using the latest version of the Procontrol P13 OPC Server. The flash-based configuration memory overcomes the time-consuming configuration of custom PROMs while retaining the same flexibility and ease-of-use when replacing modules for maintenance.

Designed for maximum durability and low maintenance, the module offers the same reliability and quality as each of its predecessor modules within the Procontrol P13 family.

**Advantages**
- Ethernet-based connectivity
  (Modbus TCP master/slave)
- Flash-based configuration memory
  (onboard and SD-card)
- Fully supported by the Procontrol P13
  OPC Server (Modbus TCP and RTU)
- Seamlessly integrated with the Progress 3 engineering tool
- Designed for low maintenance and maximum reliability
- Easy to install and use
- Backward compatible with 70BK06a-E
ABB is a leading provider of integrated power and automation solutions for conventional and renewable-based power generation plants and water applications. The company’s extensive offering includes turnkey electrical, automation, instrumentation and control systems supported by a comprehensive service portfolio to optimize performance, reliability and efficiency while minimizing environmental impact.
Flexible service solutions that improve plant performance?

Certainly.

With more than 125 years of technology innovation and experience in conventional and renewable based power generation and water applications, ABB has the know-how and track record which makes us the ideal partner to rely on. Our portfolio includes integrated electrical, automation, instrumentation and control solutions that help optimize performance, improve reliability, enhance efficiency while minimizing environmental impact. A worldwide service capability supports your plant throughout its life cycle. [www.abb.com/powergeneration](http://www.abb.com/powergeneration)