Solutions for the water industry

Reducing energy consumption in membrane desalination plants 10
ABB solution wins water award in Dubai
Transferring water through the Sahara Desert 11
Turnkey electrical, control, instrumentation and mechanical solution
Integrated water management for distribution networks 16
A comprehensive range of integrated functionality modules
Knowledge management – the mission of ABB University 19
Global training courses for power generation customers
Dear Reader,

In this issue of in control we continue our ‘Application focus’ series by highlighting ABB’s extensive portfolio of products, solutions and services for the water industry. In particular we look at how ABB technologies are helping to improve the output, operational efficiency and energy efficiency of pumping stations, desalination plants and water distribution networks.

Water is one of ABB’s top-priority industry sectors. It is an industry in which we possess specialist competence and in which we have a long and distinguished track record. Over the course of more than 50 years and hundreds of installations ABB has become a preferred partner for OEMs and EPCs, a trusted advisor to end customers, and a world leader in complete and fully integrated electrical, control and instrumentation solutions for water applications.

An example of this close working relationship with customers is illustrated by an interview with Mr. Mohand Bouam, operations general manager of ETRHB Haddad, one of Algeria’s leading infrastructure companies. ABB recently completed its first project with ETRHB Haddad, delivering a complete electromechanical and automation solution for the main pumping station of the Harrach-Douéra Water Transfer System in northern Algeria. This was the first time the two companies had worked together, and Mr Bouam has some interesting reflections and valuable input on how the relationship progressed and succeeded.

Also in Algeria, we present another integrated electrical and automation solution that ABB is providing for the ‘Réseau de Collecte’ water collection site that feeds the 750 km water transfer system that runs through the Sahara Desert between In Salah and Tamanrasset. Again, this is another instance in which ABB provided both the EPC customer and the end user with significant project execution and operational benefits respectively.

Although we are not featuring it in this issue, Algeria is also the location of the world’s largest seawater reverse osmosis desalination plant at Magtaa. The plant is currently under construction and scheduled for completion in 2012. ABB is supplying a complete electrical package that will power the plant at unprecedented levels of energy efficiency and significantly reduce the length of scheduled shutdowns for maintenance.

The same benefits that characterize the Magtaa solution are also part of a fully integrated electrical, control and instrumentation solution that ABB is providing for India’s largest seawater reverse osmosis desalination plant at Chennai. The solution is featured on page 7, and demonstrates how ABB provides fast delivery of a turnkey power and automation package for the customer, with compelling operational benefits for the end user.

ABB is also continually developing new products, technologies and functionalities for the water sector. For
instance, our Symphony Plus total plant automation system was designed specifically for the water and power generation industries. It is the latest generation of our Symphony Harmony and Melody automation platforms, and draws on a huge installed base of more than 4,000 water and power installations.

Another recent innovation is our membrane performance monitoring and optimization solution for reverse osmosis desalination plants. The product recently won a prestigious award for best energy efficiency technology in a water industry application (see page 10).

And for water distribution networks, ABB is extending its portfolio with an exciting new concept that addresses the most pressing challenges facing network operations today. The concept comprises a number of integrated modules that provide operational support for pressure, energy and leakage management. I believe that this innovative approach towards integrated water management will prove to be the new benchmark in the years to come.

With kind regards,

Franz-Josef Mengede
Head of ABB Power Generation
Application focus

Solutions for the

In the second part of our series on ABB’s value proposition for the power generation and water industries we highlight ABB’s portfolio of products, solutions and services for pumping stations, desalination plants and water distribution.

In addition to providing integrated electrical, control and instrumentation solutions for all three segments, ABB has tightly focused its offering on reducing the power consumption and operating costs of these energy-hungry applications. ABB also provides turnkey electromechanical and automation packages for pumping stations.

ABB has been delivering power and automation products, systems and solutions to the global water industry for the past 50 years. In that time we have equipped hundreds of plants all over the world and across the entire water cycle with solutions that perform at the highest levels of availability, reliability and energy efficiency.

ABB offers an unrivaled portfolio of power and automation technologies for all types of water processes – pumping stations, distribution networks, desalination plants, irrigation networks, water and wastewater treatment plants, and industrial water treatment plants.

The portfolio of ABB products and systems encompasses electrical balance of plant and grid connection, control and instrumentation, communication, optimization and asset management, as well as products developed specifically to improve the energy efficiency and performance of water applications.
ABB has a unique capability to integrate its water portfolio into solutions that span the entire electrical, control and instrumentation scope of supply, including design, engineering, installation, commissioning and optimization. This is supported by a comprehensive service portfolio to ensure that the products and systems continue to deliver peak performance throughout their life cycle.

In addition, ABB operates a global execution center for water projects with certified water-only project managers who have extensive international experience of implementing projects, including complex turnkey water installations. Our managers act as a single interface with the customer throughout the project life cycle, thus ensuring continuity, efficient project execution and on-time delivery.

Pumping stations

ABB combines in-house technology with process know-how to deliver complete and fully integrated electrical, control and instrumentation solutions (including mechanical balance of plant) for pumping stations. Our emphasis is on energy efficiency, process optimization and a life cycle approach that maximizes plant output, minimizes energy consumption and delivers the lowest possible cost of ownership.

Energy typically accounts for 70–80 percent of the operating costs of a pumping station. As the world’s leading supplier of both motors and variable speed drives, we provide tailor-made motor and drive systems that significantly reduce pump energy consumption and mechanical wear and tear. We also have a suite of dedicated optimization products – including an online pump efficiency monitoring solution that improves the efficiency and reduces the power consumption of energy-intensive pumping equipment.

Among the many projects that ABB has provided solutions for are:
- A complete electromechanical package for Kuwait’s largest water pumping plant at Mina Abdullah. Scheduled for completion in 2013, the plant will pump about 1.5 million cubic meters of water a day from two desalination plants, more than doubling Kuwait’s potable water supply
- A complete electromechanical, automation and communication package for the main pumping station of the Harrach-Douëra Water Transfer System in Algeria (see customer interview on pages 8-9)
- A complete electrical, control, instrumentation and telemetry solution for phases 1 and 2 of the Shuweihat Water Transmission Scheme in Abu Dhabi, one of the world’s largest water transmission systems

Desalination plants

ABB provides complete power and automation packages for all types of desalination technologies, including reverse osmosis, multistage flash and multi-effect distillation. Our solutions have a proven
Application focus

track record in reducing the energy consumption and preserving the assets of plant operations. This translates into huge operational benefits for end users in the form of better plant availability, higher output, lower operating costs, sustainable production and affordable water for consumers.

For instance, the complete electrical package we are supplying for the Magtaa reverse osmosis desalination plant in Algeria – the largest seawater desalination plant in the world – was selected for its ability to reduce plant electrical losses below the customer’s benchmark target. In addition, the solution will speed up the long plant startup process after maintenance shutdowns, reduce the mechanical and electrical stress on the pumps and motors, and prolong membrane life.

Our innovative award-winning reverse osmosis performance monitoring and optimization solution, OPTIMAX® Membrane Performance, increases productivity by improving plant flow rate. This has a direct effect on operating costs by reducing energy consumption and chemical usage, in addition to extending the operating life and maintenance requirements of the membranes.

Notable ABB references in desalination include:
- A complete electrical and control solution for the Yanbu reverse osmosis desalination plant in Saudi Arabia
- A turnkey electrical, control and instrumentation solution for the Nemmeli seawater reverse osmosis desalination plant near Chennai – the largest plant of its kind in India
- A complete and fully integrated power and automation solution for the Salalah reverse osmosis desalination plant in Oman, the largest and most energy-efficient integrated water and power plant in the country

Water distribution

ABB offers complete instrumentation and control solutions for water distribution networks, including communication systems and the electrification of pumping stations. Our portfolio of process instrumentation and quality analyzers is complete and unrivaled in scope, and our experience of executing water distribution projects is extensive and global in reach.

ABB is extending its portfolio for water distribution with products that address the key challenges facing water network operations, namely leakage management, pressure management and energy management. This scalable and modular suite of products extends far beyond the limitations of conventional systems by providing an integrated operations environment. The modular design addresses individual customer needs and different optimization objectives. These include minimizing pressure levels in accordance with operational constraints and water demands; scheduling pumps, reservoirs and pressure control; online leakage detection and assessment; and support for tactical decision making.

ABB has executed numerous water distribution projects all over the world.
India’s largest seawater desalination plant

ABB is supplying a complete electrical, control and instrumentation solution for India’s largest seawater reverse osmosis desalination plant. Best technical fit, reduced energy consumption and rapid delivery were among the reasons why.

ABB was awarded the contract by VA Tech Wabag, one of the world’s leading companies in water treatment, for a turnkey electrical, control and instrumentation solution for the Nemmeli seawater reverse osmosis desalination plant near Chennai on the east coast of India.

The ABB solution was singled out for the extensive benefits it brings both to VA Tech Wabag during implementation of the project, and to the end user, Chennai Metro Water, in the form of energy efficiency and reduced operating and maintenance costs.

For VA Tech Wabag, ABB’s turnkey power and automation solution eliminates multi-ordering from different vendors and reduces lead times. ABB’s ability to complete the project in 18 months will be crucial to VA Tech Wabag delivering its largest desalination plant ever within just 24 months.

ABB’s scope of supply includes the electrical system for the desalination plant (motors, drives, switchgear, capacitor banks, transformers, cabling, lighting), a 110/11 kV substation that connects the site to the power grid, the plant’s distributed control system and wireless communication system, and the instrumentation for measuring, monitoring and analyzing the entire desalination process. ABB is also responsible for engineering, supply, erection and commissioning.

End-user benefits

ABB’s market and technology leadership in the products and systems that make up the integrated electrical, control and instrumentation solution will bring substantial operational benefits for Chennai Metro Water as well.
Pumping station for water transfer system in Algeria

ABB was selected by Algeria-based ETRHB Haddad in 2007 to provide the main pumping station for the Harrach-Douéra Water Transfer System between the Harrach river and Douéra dam in northern Algeria.

We asked Mr. Mohand Bouam, operations general manager of ETRHB Haddad, to describe his company’s experience of working with ABB.

The pumping station has a total installed power of 11 MW and a transfer capacity of 70 million cubic meters of water. It is equipped with two pumping lines: one line pumps the high flows from the river to the dam via a 23 km pipeline, and the second line pumps from the dam to the local distribution and irrigation network.

ABB was responsible for the design, supply, installation and commissioning of the electrical, mechanical, control, instrumentation and communication equipment of the pumping station.

The project was completed in November 2009 and the project acceptance certificate was signed in March 2011.

Would you briefly describe your company’s operations and its role in the Harrach-Douéra water transfer project?

With the infrastructure opportunities that are currently available in the Algerian market, our Group strategy is to invest in all sectors of activity – water, rail, tram, large infrastructure, and concrete and steel pipe production. This makes ETRHB Haddad a company committed to the development and growth of the national economy.

This is the first time that ETRHB Haddad has worked with ABB. Why did your company select ABB for this particular project?

As a specialist company in the execution of pumping stations ABB gave us valuable technical assistance during the tender phase of the project and the submission of our tender to the end user, ONID (the Algerian National Office for Irrigation and Drainage). ABB’s ability to meet the requirements of the project, and its track record in providing similar water transfer schemes in Algeria and other countries, were a vital part of our bid. When we were awarded the contract, we retained ABB for having submitted the best technical solution and commercial offer.

ABB provided a complete mechanical, electrical, control and instrumentation solution for the pumping station. Was this comprehensive capability a key consideration in your selection of ABB?

Yes, indeed. In water transfer projects such as Harrach-Douéra, our company focuses on civil engineering and the pipelines, while relying on experienced partners like ABB for the turnkey execution of the pumping stations. ABB was able to provide an integrated and optimized solution that brought benefits not only to us, but to the end user as well. Infrastructure projects like Harrach-Douéra that consume large amounts of electric...
power require an integrated solution that meets the complex specifications of the project for efficiency. With ABB we had a technically competent partner who could develop the detailed design and find solutions to the problems we encountered on the way.

The project acceptance certificate was signed in March 2011. Did ABB’s execution of the project and your collaboration with ABB meet your expectations?

We are very pleased – and so too is our customer (the end user) – with our collaboration with ABB and for its technology and the involvement of its very competent local team.

Now that the project has been completed, what if any were the benefits to your company in selecting ABB and the ABB solution?

We developed a very good working relationship with ABB during the execution of the project. Their project management was structured, precise and very efficient, and their team showed flexibility when required. As a result they were able to adapt the solution to changing requirements and complete the installation in a shorter time than contracted. We also benefited from their technical expertise and hydraulic studies, which ensured an optimal design of the hydraulic system and the reliability of the power and water networks.

Are there any benefits to the end user with the ABB solution?

Harrach-Douéra is among the first in the Algerian water sector to use variable speed drives to regulate the hydraulic system. This has resulted in a large reduction in energy consumption and better control of network dynamics, compared to the traditional method of throttling valves. The pumping station is also one of the first in Algeria to be equipped with a state-of-the-art distributed control system. Operators find it easy and intuitive to use, and they can monitor and control the whole pumping process from any station.

Will Harrach Douéra be an important reference for your company?

Absolutely! This is a first for our Group, and it sets a benchmark of great importance for our future in the pumping station sector.
Reducing energy consumption in membrane desalination plants

ABB recently received an award for best energy efficiency technology in a water industry application at an awards ceremony in Dubai.

The H2O Water Awards celebrate outstanding achievements in the water industry.

ABB’s membrane performance monitoring software, OPTIMAX® Membrane Performance, won the Water/Energy Nexus category at the 2010 H2O Water Awards held in Dubai in December. The category recognizes the successful implementation of products and innovations that are specifically focused on energy consumption in water applications like desalination.

OPTIMAX Membrane Performance is part of ABB’s OPTIMAX family of solutions for improving economic performance and asset management in power generation and water applications.

Energy consumption is thus a major cost for desalination plants. In a membrane-based desalination process it represents between 30 and 50 percent of operational costs, based on a 20 year life cycle. In plants of this type a key issue is keeping unwanted elements from fouling the membranes, which reduces a plant’s productivity and increases its energy consumption.

The challenge for desalination plant operators and the focus of ABB’s solution is calibrating the membrane process so that it maintains the highest levels of energy efficiency and productivity. ABB’s model-based membrane performance monitor provides an online condition check of membrane fouling, schedules membrane maintenance such as chemical cleaning, and optimizes the operation of the high-pressure pumps for maximum productivity by proposing optimal setpoint schedules.

Judges’ motivation for the Water / Energy Nexus category

Winner: ABB
Nomination: Pilot for reverse osmosis performance monitoring and optimization solution

During the pilot, the solution provided fouling dynamics in real time and reflected the membrane condition. By gradually implementing the optimal set points, it was possible to achieve a 2 percent productivity increase and optimize the fouling rate. Productivity is maximized through higher product flow rates. Operational costs are minimized, energy efficiency is improved and chemical usage for cleaning is reduced, since the condition of the membrane system can be assessed. The membrane lifetime is increased as the risk of membrane damage is minimized. Unbudgeted membrane replacement can be avoided. Plant availability is increased by lowering maintenance activities, and thus reducing plant downtimes. Overall, the sustainability of desalination plant operation is ensured.
Transferring water through the Sahara Desert

ABB is providing a turnkey electrical, control, instrumentation and mechanical solution for the Réseau de Collecte water transfer scheme in Algeria, one of the largest water projects ever undertaken in the Sahara region.

When completed later this year, the Réseau de Collecte water transfer scheme will pump and deliver 50,000 cubic meters of water a day via pipeline through the Sahara Desert from In Salah to Tamanrasset, a distance of almost 750 km.

In Salah is an urban community of 43,000 inhabitants located close to an aquifer, whereas Tamanrasset is a much larger city of 115,000 with inadequate water resources. Earmarked as one of the Algerian government’s key infrastructure projects, the capacity of the scheme is expected to triple to 150,000 cubic meters a day by 2030 to meet the needs of Tamanrasset’s rapidly growing population.

ABB is playing a key role in the project by supplying a turnkey mechanical, electrical, control, instrumentation and communications solution for the entire water collection system at In Salah.

The 25 square kilometer site consists of 24 wells, from which water will be pumped from a depth of 600 meters at a rate of 35 liters per second. The water will then be collected and stored in eight huge covered reservoirs, where it will be protected from evaporation, ready for transfer via the pipeline to Tamanrasset.

The ABB solution will power the whole water collection system and connect the site to the local power grid to ensure a safe and reliable supply of electricity to site operations. ABB instrumentation will measure the flow, temperature, pressure and quality of the water, and an ABB distributed control system will monitor and control the entire process.

Improved pump performance

ABB was able to use the breadth of its power and automation offering and water industry expertise to improve on the original specifications by adding ABB low voltage drives to each well pumping system. The drives significantly improve pump performance, availability and energy consumption by starting the pumps smoothly and by automatically adjusting them to rapid changes in operating conditions, thereby saving energy and reducing wear and tear.

ABB is executing the water collection system in conjunction with the Chinese joint venture MCC-SOCOM on behalf of Algérienne des Eaux (ADE), a state-owned utility under the management of the Algerian Water Resources Ministry.

The project is one of several that ABB is currently delivering or has recently handed over in Algeria. They include a complete and highly optimized electrical solution for the world’s largest seawater reverse osmosis desalination plant at Magtaaa in the city of Oran; and turnkey electrical, control, instrumentation and mechanical solutions for the Harrach Douéra, Oued Djer and MAO pumping stations.
ABB has developed a district heating forecasting solution that enables waste-to-energy (WtE) plants to position themselves as independent electricity providers and sell surplus electric power on the spot market at potentially higher prices.

The solution, known as WACS District Heating Forecasting, is based on ABB’s WACS advanced combustion control and optimization platform for waste-to-energy plants. Currently operating as a pilot installation at the KVA Turgi WtE plant in Switzerland, the solution has produced some highly successful results. KVA Turgi feeds 16 MW of heat to the local district heating network and delivers up to 9 MW of electricity to the power grid. The ratio between the amount of heat and electricity generated at the plant varies, with district heating always taking priority.

Keen to investigate new ways to improve plant profitability and benefit from the higher prices of the electricity spot market, KVA Turgi volunteered to act as a pilot for the new ABB software. The aim of the project is to quantify the potential revenues of selling surplus power on the spot market.

**Complex precision forecasting**

Precision forecasting of the electricity to be traded is a complex task. It is not enough to take the production capacity of the boiler and calculate the potential electricity that can be generated; the amount of thermal energy absorbed by the district heating system has to be calculated as well. Furthermore, whenever a WtE plant sells power on the spot market, it is exposed to higher price volatility. Over time, however, a higher yield can be achieved than is possible with long-term fixed-price contracts, as these usually contain extra charges for risk mitigation.

During the course of the pilot, WACS DHF successfully forecast with a high degree of accuracy the amount of residual thermal energy the plant could use to generate electricity and sell on the electricity spot market.

The only difference between the pilot installation and a fully operational system is that the WACS electricity forecasting module was restricted to calculations of the size of the revenues earned and penalties incurred. No sales were concluded as KVA Turgi is currently bound by a long-term contract with a local utility. However, the forecasts were so accurate that considerable revenues would have been earned under the conditions prevailing at the time.

The solution encompasses a complete WACS forecasting system comprising WACS District Heating Forecasting, WACS Electricity Forecasting and WACS Energy Spot Market.
Raising power plant efficiency for Dubai Aluminium

ABB has designed and installed a distributed control system in just 100 days for one of the world’s largest aluminum smelters in the United Arab Emirates.

Dubai Aluminium (DUBAL) owns and operates one of the largest single-site aluminum smelters in the world. The site has the capacity to produce more than one million metric tons of high-quality finished aluminum products a year.

In a bid to reduce maintenance costs and increase energy efficiency, DUBAL selected ABB to upgrade the distributed control system for one of the heat recovery steam generators located at the site’s 2,335 MW power plant.

The project was no ordinary upgrade; the system had to be modernized during a planned 100-day outage at the plant. During this timeframe, ABB had to perform the complete engineering, procurement, integration testing and installation of its PROCONTROL P14 distributed control system for the steam generator.

Reduced maintenance costs
One of the many benefits of the P14 system is the reduction in maintenance and inventory costs made possible by the minimal number of modules. The system is user friendly and offers uniform hardware for both the power plant DCS and the plant protection system. Furthermore, ABB’s solution features the Process Operator Station 30 – a computer interface for controlling, supervising, monitoring and analyzing the power plant process.

ABB successfully installed the control system for the steam generator in the given timeframe. The ABB system was integrated online with other existing systems without shutting down other plant areas, thus ensuring that industrial productivity was maintained.

“ABB completed the job in a very challenging timescale and in a professional manner. We’re impressed by ABB’s commitment to speedy and high quality project execution.”

Leon Babaan
project engineer for DUBAL

The vast Dubai Aluminium complex, Dubai
In brief

Relocation of complete CCPP at Poryong, South Korea

The challenging task to relocate the complete combined cycle power plant KA 24 Unit 4 from Poryong to the city of Incheon in South Korea has been decided by the owner and operator Korea Electric Power Co. (KEPCO) in response to the growing power demand in this booming area. The Incheon Metropolitan City has led the economic development in Korea and grown to be the country’s third largest city with 2.76 million inhabitants. The city is located at the port close to Seoul about 180 km from Poryong. In 2014 the Asian Games will be held in Incheon.

ABB’s overall scope includes the relocation and recommissioning of the complete instrumentation, control and electrical installations of the existing plant. More relocations are planned in the near future.

Kuwait’s largest water pumping plant

ABB has won an order worth $148 million from the Ministry of Electricity and Water in Kuwait for the construction and rehabilitation of the Mina Abdullah water pumping plant. The civil works will be carried out by the Ahmadiah Group, the local consortium partner for the project. The plant will pump about 1.5 million cubic meters of water a day from two desalination plants, more than doubling the country’s fresh water supply. This increase in capacity will support the needs of urban developments and metropolitan areas planned for the area.

ABB is responsible for the engineering, supply, installation, commissioning and testing of the electromechanical package for the new pumping plant, which is expected to be completed by 2013. Some of the key products to be supplied include the control and instrumentation system, motors, low and medium voltage switchgear, transformers, telecommunications and fiber optic equipment, as well as the integration of 23 water facilities into a newly supplied national control center.

Service bundling project for Swiss WtE Plant

ABB has received a service bundling order for the vfa Buchs waste-to-energy plant in Switzerland.

The order includes life expectancy analysis of the stator windings of high voltage rotating machines, generator diagnosis and overhaul, functional check of the P13 control system and replacement of aging components, integration of P13 functionalities with a third-party plant control system, a new automatic voltage regulator and reactive power control, and updating of technical documentation.

The customer has expressed satisfaction with the bundling approach, as it reduces risk and makes maximum use of ABB synergies.

ABB’s Machinery Condition Monitoring module receives SIL 2 certification

ABB Symphony Plus’s condition monitoring module, the MCM800, received SIL 2 certification (IEC 61508:2010) in May 2011 from TÜV Rheinland. As a requirement for the Goliat oil and gas project in Norway, the MCM800 underwent 13 months of documentation review along with hardware, software and environmental testing. The certification includes all six protective functions available in the MCM800.

The MCM800 module is a third-generation product developed by ABB since 1995. The SIL 2 certification adds safety to the monitoring, protection and vibration diagnostics already available in the MCM800. Additionally, this certification provides new opportunities in various industries and applications that require the important safety factor. The DIN rail mounting and open communication protocols (PROFIBUS DP and Modbus) provide the application flexibility required in the power and process industries. As a result, one single product, the MCM800, can support all types of rotating machinery equipment, allowing for a single vibration monitoring solution across the entire plant.

ABB’s commitment to condition monitoring not only provides the monitoring and protection of rotating machinery, but also includes preventive and predictive maintenance to avoid the costly breakdown of equipment. The ongoing development of new software that utilizes the capabilities of the MCM800 will provide improvements in condition monitoring well into the future.

Service bundling project for Swiss WtE Plant

ABB has received a service bundling order for the vfa Buchs waste-to-energy plant in Switzerland.

The order includes life expectancy analysis of the stator windings of high voltage rotating machines, generator diagnosis and overhaul, functional check of the P13 control system and replacement of aging components, integration of P13 functionalities with a third-party plant control system, a new automatic voltage regulator and reactive power control, and updating of technical documentation.

The customer has expressed satisfaction with the bundling approach, as it reduces risk and makes maximum use of ABB synergies.

Relocation of complete CCPP at Poryong, South Korea

The challenging task to relocate the complete combined cycle power plant KA 24 Unit 4 from Poryong to the city of Incheon in South Korea has been decided by the owner and operator Korea Electric Power Co. (KEPCO) in response to the growing power demand in this booming area. The Incheon Metropolitan City has led the economic development in Korea and grown to be the country’s third largest city with 2.76 million inhabitants. The city is located at the port close to Seoul about 180 km from Poryong. In 2014 the Asian Games will be held in Incheon.

ABB’s overall scope includes the relocation and recommissioning of the complete instrumentation, control and electrical installations of the existing plant. More relocations are planned in the near future.

Service bundling project for Swiss WtE Plant

ABB has received a service bundling order for the vfa Buchs waste-to-energy plant in Switzerland.

The order includes life expectancy analysis of the stator windings of high voltage rotating machines, generator diagnosis and overhaul, functional check of the P13 control system and replacement of aging components, integration of P13 functionalities with a third-party plant control system, a new automatic voltage regulator and reactive power control, and updating of technical documentation.

The customer has expressed satisfaction with the bundling approach, as it reduces risk and makes maximum use of ABB synergies.

Relocation of complete CCPP at Poryong, South Korea

The challenging task to relocate the complete combined cycle power plant KA 24 Unit 4 from Poryong to the city of Incheon in South Korea has been decided by the owner and operator Korea Electric Power Co. (KEPCO) in response to the growing power demand in this booming area. The Incheon Metropolitan City has led the economic development in Korea and grown to be the country’s third largest city with 2.76 million inhabitants. The city is located at the port close to Seoul about 180 km from Poryong. In 2014 the Asian Games will be held in Incheon.

ABB’s overall scope includes the relocation and recommissioning of the complete instrumentation, control and electrical installations of the existing plant. More relocations are planned in the near future.

Service bundling project for Swiss WtE Plant

ABB has received a service bundling order for the vfa Buchs waste-to-energy plant in Switzerland.

The order includes life expectancy analysis of the stator windings of high voltage rotating machines, generator diagnosis and overhaul, functional check of the P13 control system and replacement of aging components, integration of P13 functionalities with a third-party plant control system, a new automatic voltage regulator and reactive power control, and updating of technical documentation.

The customer has expressed satisfaction with the bundling approach, as it reduces risk and makes maximum use of ABB synergies.

Relocation of complete CCPP at Poryong, South Korea

The challenging task to relocate the complete combined cycle power plant KA 24 Unit 4 from Poryong to the city of Incheon in South Korea has been decided by the owner and operator Korea Electric Power Co. (KEPCO) in response to the growing power demand in this booming area. The Incheon Metropolitan City has led the economic development in Korea and grown to be the country’s third largest city with 2.76 million inhabitants. The city is located at the port close to Seoul about 180 km from Poryong. In 2014 the Asian Games will be held in Incheon.

ABB’s overall scope includes the relocation and recommissioning of the complete instrumentation, control and electrical installations of the existing plant. More relocations are planned in the near future.
Franz-Josef Mengede elected new EPPSA President

“Combining a reliable power supply with environmentally compatible generation is the most important task for the power industry,” said Franz-Josef Mengede, head of ABB’s global power generation business at the annual conference of the European Power Plant Suppliers Association (EPPSA) in Brussels earlier this year.

Mengede was elected the new EPPSA president at the conference, succeeding Andreas Wittke, the head of Alstom Germany. Mengede intends to use his new function to position technology companies as solution providers for the increased use of renewable energies.

“CO₂ emissions must be halved by the year 2050,” said Mengede, quoting estimates from the International Energy Agency (IEA). “The viability of this is demonstrated by the fact that 75 percent of this decrease could potentially be achieved simply through improved energy efficiency and the use of renewable energies.

“The precondition for the restructuring of the energy system is acceptance in society,” he continued. “Achieving political objectives in fighting climate change must not be at the cost of the quality and reliability of the power supply.”

In this context, Mengede welcomed the fact that the European Union had placed energy matters at the top of the political agenda. “EPPSA is prepared to work even more closely with institutions on the implementation of measures that will lead to more energy security and less climate change.”

EPPSA:
The European Power Plant Suppliers Association (EPPSA) is the voice, at European level, of companies supplying power plants, components and services. EPPSA members, located throughout Europe, represent a leading sector of technology with more than 100,000 employees and annual revenues of around $30 billion. EPPSA actively promotes technologies for highly efficient and sustainable power generation in a carbon-constrained world. EPPSA believes increased investment in research, development and demonstration is a key factor in driving EU competitiveness as well as ensuring affordable near-zero emission power supply. Virtually all power plants in the EU are built by members of EPPSA, or equipped with their components.

Electrical solutions for Kuwait power plant

ABB has won an order worth about $22 million to supply electrical equipment and power systems for the Az Zour South power plant upgrade project in Kuwait.

The order was placed by Alghanim International General Trading and Contracting, an EPC (engineering, procurement and construction) company appointed by the Kuwait Ministry of Electricity and Water as the main power plant contractor. As part of an expansion plan, 400 MW of generation capacity is to be added to the Az Zour combined cycle power plant. ABB is responsible for the electrical balance of plant, the distributed control system, field instrumentation and generator transformer, as well as the extension of the 275 kV gas insulated substation, medium and low voltage equipment, and the substation automation system. The project is expected to be completed by March 2012.
Integrated water management for distribution networks

ABB is extending its portfolio for water distribution networks with a comprehensive range of integrated functionality modules that address the key challenges facing water network operations today.

Example of leakage detection in a water distribution network

Leakage detection using advanced pattern recognition algorithms in a water distribution network. The leak has been identified much earlier than would be possible with conventional methods. This could lead to a faster repair, a better supply quality and reduced water losses.

The modules provide an innovative and uniquely effective solution to the main challenges facing distribution networks – leakage management, pressure management and energy management. They also address the need for fast and efficient operational decision support and the integration of intuitive GIS-based (geographic information system) visualization technology.

Each functionality module is integrated and exchanges data with the network control system, which acts as an integration platform and provides operators with the information they need to make speedy and correct decisions. Together, the modules form a new ABB concept.
of integrated water management – one that has the potential to set a new benchmark by improving productivity and operator efficiency, reducing leakages and energy consumption, and lowering operating costs.

Scalable and modular, the concept has the flexibility to meet individual utility needs and different optimization objectives. These include minimizing pressure levels in accordance with operational constraints and water demand; scheduling pumps, reservoirs and pressure control systems; online leakage detection and monitoring, early incident analysis, network status, and condition assessment.

The modules, all of which are monitored and controlled in a single integrated operational environment, do this through the extensive use of online and historical process data – including pressure and flow data, events such as customer contacts or work orders, data correlation, signal processing, hydraulic modeling and mathematical optimization techniques.

Anomaly analysis and leakage management

The module uses advanced algorithms to continuously scan and analyze actual and historical process data, and combines it with event data to detect pattern changes. This enables operators to identify and respond to a leak at the earliest possible moment in time, even before the impact of the leak has been noticed by the network’s customers. Once a leak has been identified, the intelligent way of analyzing data enables operators to quickly pinpoint the zone or sub-zone in which the leaking pipe is located. In addition, the module automatically generates an estimate of the size of the leak.

Operational decision support and leak localization

The decision support functionality supports operators in near real time to improve their response in abnormal situations and failure conditions. Locating a leak, evaluating its impact and making operational decisions – quickly and correctly – is a very complex process and includes many different parameters. The operational decision support module automatically calculates the likelihood of a leak occurring in any pipe segment in the network and evaluates its potential impact. The results are presented in an intuitive color-coded map of the pipe network according to the spatial likelihood of leak location and impact. Operators can thus prioritize alarms, which are generated for identified anomalies, according to their potential impact and focus their attention on the important high-risk alarms.

Pump scheduling and energy management

The energy management module provides a cost-optimized operating schedule for network field assets over a given period, such as 24 hours. The module optimizes and integrates a complex system of producers (water sources), storage facilities (tanks and reservoirs), active components (such as pumping stations and pressure reduction valves) and consumers, and prepares a schedule according to the realtime status of the network, water demand forecasts and energy tariffs. The schedule shows – among other things – how much water should be drawn from each source, when pumps in the network should be run and at which set points and speed (if equipped with variable speed drives) they should be operated – thus minimizing pumping and energy costs, while meeting operational constraints and water demand.
**Pressure management**

Pressure management is closely connected to energy and leakage management. By lowering the pressure in the distribution network to the optimal level, the amount of water lost in leakages is reduced, the probability of new leakages occurring is minimized, and the amount of energy wasted by pumping at unnecessarily high levels of pressure is also reduced. The pressure management module does this by controlling and optimizing the set points of the pressure reduction valves, while ensuring that the pressure is always at the correct level to meet actual and forecasted demand. Pressure levels are optimized by the module, and mechanical wear and tear are minimized.

**Intuitive and integrated GIS visualization**

By integrating the various functionality modules into a single control system with GIS visualization, ABB has made it possible to combine spatial and temporal data in a context-relevant and situation-sensitive way. Operators can access control system functionalities from the GIS, enabling them to quickly respond to the information displayed in the GIS.

**Strategic ABB application**

ABB has been developing the concept and modules in a strategic partnership with several water utilities and university partners over the past few years. The release of the modules will enhance ABB’s portfolio for the water distribution segment, which is one of ABB’s strategic applications in the water industry.
Knowledge management – the mission of ABB University

Reliability, availability and efficiency are key factors in the power generation business. To achieve the highest possible levels in all three requires not only high-quality products, but well-trained personnel who can maximize power plant output in all conceivable operating scenarios.

ABB offers extensive education and training programs for power generation customers and ABB personnel at locations all over the world. Courses range from process and product theory to engineering and software development. They include hands-on training for operators and for engineering, commissioning and maintenance personnel.

Training can be structured according to specific customer requirements – as refresher courses for experienced personnel, basic training for new staff, or training for new platform solutions and products. Our training staff are experienced in engineering and commissioning, and have passed an ABB train-the-trainer program. The learning centers’ modern classrooms are equipped with training models and simulators to provide hands-on training and ensure successful knowledge transfer.

ABB University provides training and classes in the following countries: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Czech Republic, Denmark, Egypt, Finland, France, Germany, India, Italy, Japan, Mexico, Netherlands, Norway, Peru, Portugal, Saudi Arabia, Singapore, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, United Arab Emirates, United Kingdom and the United States.

ABB also provides practice-oriented on-site and off-site courses covering specific customer needs and requirements.

Please find the full course schedule and updates including administrative details for all ABB University activities at www.abb.com/abbuniversity.
S+ Operations
Designed for improved operator effectiveness

S+ Operations, the Symphony Plus system’s human machine interface (HMI), is now available for sale. Designed for improved operator effectiveness, S+ Operations is a secure and powerful ergonomic HMI used to facilitate process monitoring and control, fault mitigation and optimization. S+ Operations system architecture provides flexible and scalable configurations with redundancy options at all levels. With user-specific information presentation, easy navigation to data, and alarm management based on EEMUA 191 guidelines, S+ Operations delivers reliable and consistent plant operations. Integrated information management features present pertinent, easy-to-understand information in intuitive desktop displays to all levels of the organization. To protect the investments of users of previous Symphony consoles, S+ Operations retains their existing operator graphics displays, faceplates and tag database.

Advantages
— Based on proven PGP/PGIM technology
— Industry standards-based look and feel and ergonomics
— Integration of operations, information and optimization applications
— Horizontal and vertical navigation to areas, graphics, alarms groups, etc
— Bi-directional navigation between Operations and Engineering
— User profile recognition/user centric information presentation
— Failure analysis support (display cross navigation: graphics, trend, alarm)
— EEMUA 191 based alarm and event management

Automation Sentinel has now been expanded to support Symphony Plus. Automation Sentinel is ABB’s control system life cycle management and support program that assists system owners to actively manage their control system life cycle, support and maintenance. With this program, system owners can keep control software up-to-date and maintain a flexible path forward to new system software technology. The program provides the fundamental software support deliverables required to maintain operation and maximize the availability of the installed ABB control system. Through this program, Symphony Plus software users have the ability to maintain their present software or upgrade to the latest available Symphony Plus software version. Also for previous Symphony generation users, Automation Sentinel provides a cost-effective evolution strategy to Symphony Plus.

Advantages
— Lowers system software life cycle cost and risk
— Extends the life of ABB automation systems
— Protects intellectual property investments
— Delivers control system software services to match operational needs
— Supports life cycle management of control system software assets
— Provides comprehensive software support
WACS Grate Combustion Optimization

Innovative solution for new and retrofit installations

WACS Grate Combustion Optimization (GCO) is a solution for the optimization of waste incineration on moving grates. WACS GCO processes plant data (i.e., process measurements) and provides a set of optimal setpoints for the plant actuators in order to reach given targets (steam flow rate, oxygen concentration in the flue gases, etc) while minimizing plant costs and greenhouse gas emissions. This multi-objective optimization is achieved thanks to the use of the most advanced control techniques based on model predictive control.

The benefits of the solution stem from the fact that a properly controlled combustion process leads to an increase in steam production, a more stable temperature profile, a longer plant operating life and a reduction in plant downtime. Moreover, the process can be run at the plant’s operational limits, thereby increasing energy efficiency. WACS Grate Combustion Optimization helps, therefore, increase the revenues of the waste incineration plant.

Advantages
— Increased, stable and reliable steam and power supply
— Optimization of operating targets with reduced operating costs
— Higher energy efficiency, reduced emissions
— Optimal temperature profile, better burnout
— Around-the-clock optimal process control

Generator Control

Optimized solution for new and retrofit installations

Generator Control is an optimized solution that covers all the main components required to protect, synchronize and control an electrical generator. The high level of standardization and modularity provides the maximum flexibility to fully meet customer requirements and house all components in one cabinet.

Advantages
— Reduced risk thanks to single ABB point of contact with customers
— Maximum synergies between protection, synchronization, excitation and control
— Common electrical interface for all components – CT / VT connections, indication and control signals, and AC / DC distribution
— Proven standardized concept means minimal risk for customers
— Competitive price and shorter delivery times thanks to high level of standardization
— Common commissioning for complete cabinet
Upcoming events 2011

<table>
<thead>
<tr>
<th>2011</th>
<th>Event</th>
<th>City</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>September</td>
<td>VGB Congress Power Plants 2011</td>
<td>Bern</td>
<td>Switzerland</td>
</tr>
<tr>
<td>September</td>
<td>Electric, Power &amp; Renewable Energy Indonesia 2011</td>
<td>Jakarta</td>
<td>Indonesia</td>
</tr>
<tr>
<td>September</td>
<td>Power-Gen Asia</td>
<td>Kuala Lumpur</td>
<td>Malaysia</td>
</tr>
<tr>
<td>October</td>
<td>WEFTEC</td>
<td>Los Angeles, CA</td>
<td>USA</td>
</tr>
<tr>
<td>October</td>
<td>Hydro 2011</td>
<td>Prague</td>
<td>Czech Republic</td>
</tr>
<tr>
<td>October</td>
<td>Solar Power International</td>
<td>Dallas, TX</td>
<td>USA</td>
</tr>
<tr>
<td>December</td>
<td>Power-Gen International</td>
<td>Las Vegas, NV</td>
<td>USA</td>
</tr>
</tbody>
</table>
in control
The customer newsletter of ABB Power Generation.

Editor
newsletter.incontrol@ch.abb.com

In control is published twice a year in English and is available in printed and electronic versions. In control is free of charge to those with an interest in ABB’s power generation and water business.

Circulation
Electronic issue  2,900
Printed issue     3,700

Subscription
For a printed or electronic subscription, please contact the editor or subscribe online at www.abb.com/powergeneration

Publisher
ABB Ltd
Business unit Power Generation
P.O. Box 8131
8050 Zurich / Switzerland
Phone   +41 (0) 58 585 39 56
Fax     +41 (0) 58 585 66 16

Application focus in the next issue:
Service and life cycle management
Energy-saving, reliable water pumping solutions?
Absolutely.

Everywhere around the world, an astounding amount of energy is used everyday for water pumping: a huge consumption that could be saved by treating water the way we do. ABB develops complete solutions for large and long-distance water transfers, acting as ideal partners for design, engineering, supply, installation, commissioning, testing and maintenance. And we offer products covering the entire electrical and automation scope of any water pumping activity: from drives and motors to instrumentation, control and management tools, as well as engineered packages including turnkey pumping stations. Discover how ABB can help reduce your costs significantly, and let us pump new life into all your projects. www.abb.com/water