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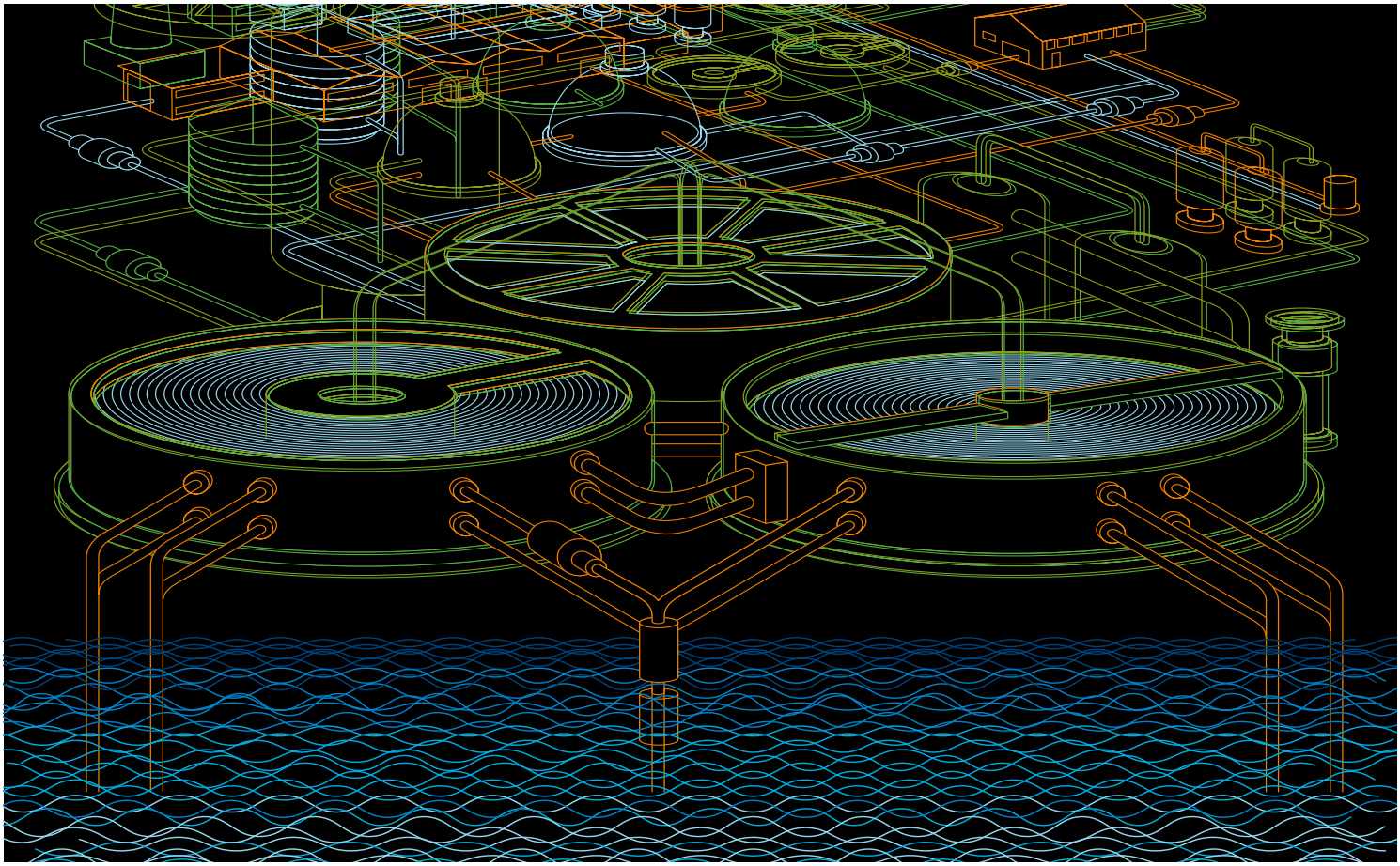
contact

The customer magazine
of ABB in India,
Middle East & Africa



Products and solutions for complete water cycle management

contact 3|11

Bazmi Husain
Country Manager and
Managing Director,
ABB Limited, India.

Dear friends,

As the world's population grows beyond the seven billion mark, the strain on our planet's limited natural resources is also increasing. How efficiently we use or reuse water determines how long we can enjoy this natural resource. Which is why, we at ABB have invested significant technologies to better water management systems, boost energy efficiency in power and industrial sectors and focus more on renewables.

This issue of CONTACT, features glimpses of some of the technologies that have been put to use to address these resource challenges. From irrigation systems in India to the world's largest reverse osmosis system, boosting efficiency of Europe's largest wind farm to harnessing the power of the sun in our own factories, ABB believes sustainable growth is the only way forward.

In September 2011, at Automation and Power World in Delhi, we showcased through our products and solutions, how ABB can partner with industry, government and utilities to build a low carbon economy. Going forward, you will hear and see more on several initiatives that ABB will undertake around giving a push to a low carbon economy.

On behalf of all of us at ABB, I wish you and your families a great 2012.

Best regards,

Bazmi Husain

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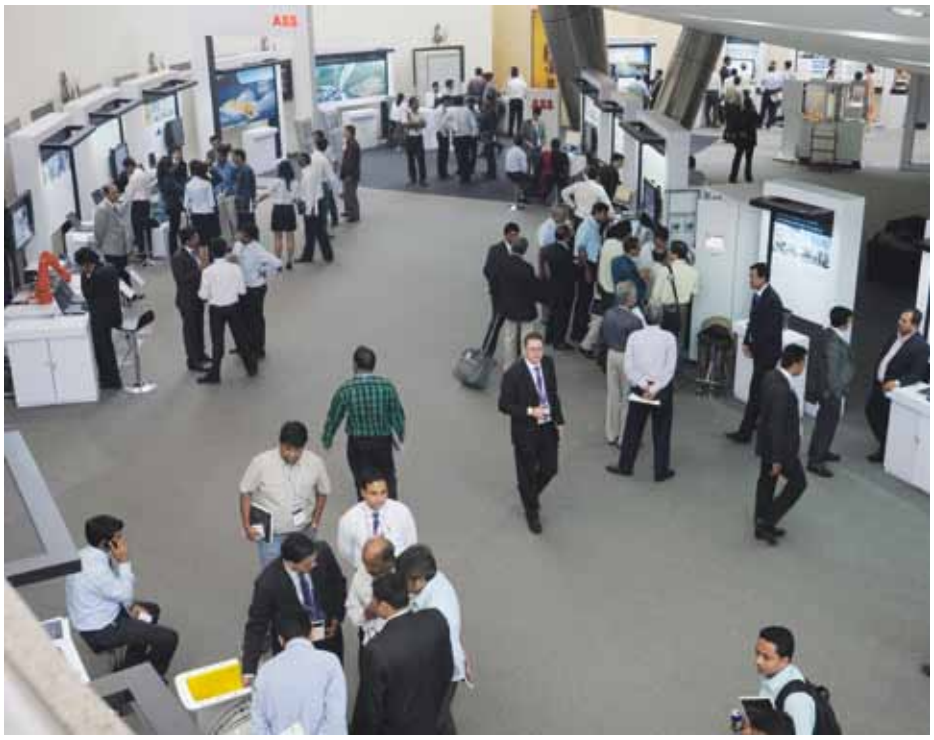

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Boosting power capacity in Bangladesh

Substations enhance transmission capacity, facilitate grid reliability and improve power stability

ABB has won an order that will help improve efficiency of a new 360 megawatt (MW) gas-fueled combined cycle thermal power plant being set up in Bangladesh. The power plant and substation will be located in Haripur, on the outskirts of the capital city, Dhaka and will help meet the growing demand for electricity in the Chittagong and Dhaka area. The plant is owned and operated by Electricity Generation Company of Bangladesh (EGCB), an enterprise of the Bangladesh Power Development Board (BPDB), entrusted to produce and sell electricity.

As part of the turnkey electrical balance of plant solution, ABB will design, supply, install and commission the 132 kV substation. Key equipment supplies include gas-insulated switchgear (GIS), generator transformer, auxiliary and distribution transformers, generator circuit breakers and medium-voltage switchgear. The project is scheduled for completion in 2013.

For more information: www.abb.com/substations

Ensuring grid reliability in central India

ABB will supply, erect, test and commission 500 megavolt ampere (MVA), 765 kilovolt (kV) autotransformers for the Jabalpur pooling substation, which will receive power from the eastern Indian state of Orissa and distribute to the central state of Madhya Pradesh. The transformers will be manufactured in India at the company's state-of-the-art manufacturing facility in Vadodara. Commissioning is scheduled for the middle of 2013.

ABB is making a significant contribution to India's ultrahigh voltage transmission network development, having supplied 765 kV transformers to National Thermal Power Corporation's Sipat project and Power Grid's Seoni project from Sweden. It is currently executing the Satna substation as a joint venture between ABB in India and Sweden.

ABB has also been entrusted with turnkey substation solutions for Power Grid's 765/400 kV Bilaspur, Agra and Wardha substations.

Remote monitoring services to benefit minerals and mining industry

ABB's latest offering of Minerals Remote Monitoring Center (MiRMC) solutions will help the minerals and mining industry improve availability while optimizing process and increase competitiveness.

MiRMC will provide value-based solutions for the dynamic and demanding needs of the minerals and mining industry with robust procedures and proven tools. The offerings help lower operating costs and increase productivity through improved availability and reduced down time and energy / process optimization. Quick turnaround time in resolving the customer issues and access to the global pool of system and process competencies are unique value propositions offered by MiRMC.

MiRMC will help customers minimize down time and plan periodic maintenance schedules through regular system health checks and process audits.

For more information: www.abb.com/minerals

MiRMC - offerings:

- Security patch updates
- System / OS patches
- System health check
- System back up
- Fault identification and fixing
- Preventive maintenance routines
- Operator training / troubleshooting
- Access to global best practices / solutions

Benefits of ABB MiRMC solutions:

- Secured environment
- SSL encrypted connection to plant system
- Actricity tool based case tracking
- Unique service ID generation
- Well defined automated workflow
- Plant access through approved work permit
- Audit trail for complete traceability
- Knowledge management for re-use

Complete quarry to lorry solutions for cement industry

Automatic sampling and preparation at the Dalmia Cement facility

Dalmia Cement Bharat Limited facility in Kadapa

Quarry to lorry solutions by ABB is helping enhance productivity with greater level of control and process monitoring.

A complete quarry to lorry solution commissioned by ABB at the 4500 tpd (tones per day) Dalmia Cement Bharat Ltd facility in Kadapa, Andhra Pradesh India is helping boost productivity with higher levels of control and process monitoring. The solution for the cement producer includes design, engineering, supply, erection, testing and commissioning of automation, instrumentation and quality control system. The complete scope of the order was placed over a three year period starting 2007.

ABB has also installed a fully-automated AutoLab solution to improve the quality and consistency of the cement process. The complete cement plant is monitored and controlled by ABB's 800x that offers multiple benefits – improved process control, efficient information management, reliable and cost-effective operations that ensure consistent and quality cement.

The solution addresses major customer requirements like covered plant operation to be monitored and controlled from control rooms, process optimisation, quality control, reliable display of data, instrumentation and engineering, erection and commissioning.

Expert Optimizer brought benefits in terms of a more robust strategy and facilitating maintenance and operation.

ABB's automation, instrumentation and quality control system have been configured in a way that the entire Dalmia Cement plant can be monitored and controlled from the central control room 800xA distributed control system (DCS). The interfaces, which are a critical element, have been brought to universally accepted standards.

For more information: www.abb.com/cement

Powering India's first Formula-1 track

An artistic rendition of the pit building from main grandstand at BIC

Buddh International Circuit at a glance

Length: 5.14km
Turns: 16
Highest point of elevation: 14m
Width of the track: Between 18m – 20m
Top speeds on the circuit: About 320km/h, for an F1 car
Total seating capacity: About 120,000
Approximate cost of building the track: US$400 million
Distance from New Delhi: 40km approx.

ABB supplied 33 kV GIS (Gas insulated switchgear) panel switchboard to Jaypee Sports International Limited for its prestigious Buddh International Circuit (BIC) Formula 1 racetrack in India.

This large scale project in Noida, in the National Capital Region (NCR) envisaged building a world class motor racing circuit of 5.14 km. BIC is designed as one of the fastest, most exciting motor racing circuits in the world. It is well suited to the requirements of powerful, high-spec racing cars and motorcycles and will host some of the most challenging motorsports events on the planet.

ABB was awarded the contract for supply, installation, testing and commissioning of medium voltage GIS ZX solution of single bus bar design. The advanced technology and a strong reference base played a key role in acquiring the order.

The major customer benefits include high level of availability that ensures uninterrupted distribution and delivery of energy. The user friendly, space saving solution with no gas handling is highly cost effective and reduces the total cost of ownership.

GIS ZX, ABB's most modernized medium voltage solution in the market, comes with uniquely designed stainless steel tanks constructed in compartments and welded by robot, thus ensuring less than 0.1% Sulfur hexafluoride (SF6) gas leakage, and ruling out the requirement of refilling of SF6 gas for complete lifetime of the switchgear. The panels are factory filled and tested.

A unique plug-in busbar technology has been employed for coupling of panels which ensures that no gas handling is required at site and installation time is reduced to a great extent.

The SF6 tanks were delivered from global focus feeder factory in Ratingen, Germany. Subsequently the switchgear assembly was completed, tested and supplied from the ABB manufacturing facility at Vadodara, Gujarat, India.

The world's first renewable energy island

Scheduled for completion in 2011, the project is fast becoming a model for other communities striving to become self-sufficient in renewable energy.

A Spanish island in the Atlantic Ocean is set to become the first island in the world to be powered solely by renewable energy. The $87 million project will provide electricity for the island's 11,000 inhabitants using a combination of wind power and pumped water storage. ABB power and automation technologies are playing a leading role.

Located about 1,500 kilometers off the Spanish coast in the Atlantic Ocean, El Hierro is the smallest and most remote of the Canary Islands, an archipelago of sun-drenched Spanish islands and one of Europe's most popular tourist destinations. Like many remote islands, El Hierro generates electricity with diesel oil transported from mainland terminals by oil tanker. The carbon impact is significant - in El Hierro's case it amounts to 18,200 tons of CO_2 per year in power generation emissions alone, an impact that the renewable energy project will eliminate. The project consists of an 11.5 megawatt (MW) wind farm and an 11.3 MW hydroelectric pumped storage plant that will provide the island's 11,000 inhabitants with 80 percent of their energy needs. The remaining 20 percent will be generated by solar thermal collectors and grid-connected photovoltaic systems. ABB is playing a lead role in the project by providing a power and automation solution that will electrify and control the hydroelectric pumped storage plant, and integrate into the island grid the energy generated by wind and hydropower turbines.

Overview of the El Hierro renewable energy project showing the lower reservoir and hydroelectric plant near the sea, and the upper reservoir and wind farm higher up the hillside. The upper reservoir will have a capacity of 556,000 cubic meters of water, which can generate enough hydropower to meet the island's electricity needs for seven days.The solution comprises a new interconnection substation, equipped with UniGear and UniMix medium voltage switchgear, which will receive the power generated by the five wind turbines and the hydropower turbines, and deliver it to the island's main substation via distributed transformers and a Relion® REB 670 intelligent protection system. An important challenge for ABB was the installation of Automatic Generation Control (AGC), which maintains stable plant frequency and voltage by sharing active and reactive power demand in the generators and tie-lines. This is done in a way that allows the working points of the generator sets to operate with as much margin as possible, so that the plant can withstand bigger disturbances. At the two pumping stations, ABB motors, variable speed drives and dry-type transformers will power the pumps at high levels of reliability and ensure that the entire process is smooth and efficient, consuming minimal levels of energy and reducing equipment wear and tear.

For more information: www.abb.com

Boosting energy efficiency of Europe's largest wind farm

Whitelee near Glasgow, Scotland, is Europe's largest onshore wind farm. When the site extension is completed in 2011, its 215 turbines will produce enough energy to power 330,000 Scottish homes

ABB's power transformers increase the efficiency of wind farms and reduce the cost of generating electricity.

Other significant wind power projects

- Six 500 kV transformers for a 2,300 MW wind farm in China - the highest voltage wind farm substation in the country
- 325 kV high-voltage direct current (HVDC) Light power transmission link connecting three offshore wind farms in the North Sea to the German power grid

ABB is helping deliver low-loss power from a 271 megawatt (MW) extension of the Whitelee Windfarm to the Scottish power grid. Whitelee is already the largest onshore wind farm in Europe and will soon become one of the five largest in the world.

The solution comprises low-loss transformers and high-voltage substation equipment that will step up the power generated by the extension's 75 turbines and transfer it safely, reliably and with a high level of efficiency to the regional power grid.

Whitelee has 140 wind turbines producing 322 megawatts (MW) of electric power. When the extension is completed in 2011, the site's 215 turbines and 593 MW generating capacity will produce enough energy to power an estimated 330,000 Scottish homes and displace between 570,000 and 1.3 million tons of carbon dioxide emissions per year.

Located 32 kilometers from Glasgow, Scotland's largest city, Whitelee is one of the first large-scale wind farms to be built close to a large population center. The power from the wind park is fed directly into the greater Glasgow power network. ABB's solution transfers maximum amounts of power from an intermittent source (wind), and is crucial to reliable grid operations.

This is achieved with ABB low-loss power transformers, whose energy-efficient design and use of high-performance specialty materials enables them to transfer more energy, thus increasing the efficiency of the wind farm and reducing the cost of generating electricity. Each transformer rates 275/33 kilovolts (kV) 120 megavolts ampere (MVA).

Besides the three low-loss transformers, ABB is supplying circuit breakers, surge arresters, current transformers and capacitive voltage transformers to protect and control the power flow from the turbines to the grid.

ABB was awarded the contract by SP Energy Networks, a Scottish Power company that owns and operates the power transmission and distribution network in southern Scotland. Whitelee Windfarm is operated by ScottishPower Renewables.

For more information: www.abb.com/windpower

Seamlessly integrating solar power to the grid

Harnessing the power of the sun

The solar power plant in Lazio, central Italy will help reduce the carbon footprint by 25,000 tonnes annually.

ABB will deliver a 24 megawatt (MW) photovoltaic (PV) solar power plant in Lazio, central Italy in an order from Phenix Renewables.

Once connected to the grid, the Phenix solar plant will supply up to 35 gigawatt-hours (GWh) of electricity a year, avoiding the generation of over 25,000 tons of CO_2 emissions, equivalent to the annual emission of over 10,000 European cars.

ABB will be responsible for the design, engineering, erection, civil works and commissioning of the plant. ABB's modular eBoP (electrical Balance of Plant) concept will enable fast track execution within four months.

The 24.2 MW plant is based on single-axis trackers, which precisely follow the position of the sun to position PV panels at the best angle for maximum energy production.

ABB will also build a 150 kilovolt (kV) substation equipped with the latest monitoring and control system to facilitate reliable and efficient integration of the electrical power generated by the solar panels into the grid.

Key ABB products in this project include low- and medium-voltage switchgear, transformers, cables, the automation and control system and protection equipment.

The PV panels will be supplied by the Norwegian company, REC (Renewable Energy Corporation) in consortium with ABB.

For more information: www.abb.com/solar

Dynamic energy storage installation in UK

SVC Light with Energy Storage

ABB has commissioned the first DynaPeaQ energy storage installation for UK Power Networks at Norfolk, England. The system is based on ABB's SVC Light® technology, combined with Lithium-ion (Li-ion) battery storage and is located in an 11kV grid with considerable penetration of wind power. This is the first time an electrical energy storage device has been installed on an 11kV distribution network in the UK.

The integration of energy storage systems into transmission and distribution networks has the potential to provide significant benefits at all points in the supply chain. Increased penetration of distributed generation, particularly based on renewable energy resources, is driving the need for distributed energy storage to provide services that would allow existing network assets to continue to deliver reliable, high quality electricity.

The installation in UK will yield dynamic voltage control in the distribution system and at the same time enable dynamic storage of surplus energy from wind farms, which can be utilized to level out peaks in grid loading and increase grid stability. Using this strategy, the power harnessed from the wind can be put to more efficient use than would otherwise be possible.

The dynamic energy storage system deployed by UK Power Networks was designed and built as a turnkey project by ABB. The battery storage is an add-on to the well established SVC Light technology, a fast IGBT based converter used for tasks such as voltage control, flicker mitigation and active filtering.

Li-ion battery technology was selected for its long calendar lifetime, high power density and high round-trip efficiency. Safety and protection is ensured by interlocking and supervision and control from cell to system level.

The ABB energy storage system in UK includes eight stacks of battery modules housed in a 25 sqm building. The modules can store up to 200 kilowatt hours (kWh) of electrical energy.

For more information: www.abb.com/solar

Providing a superhighway to power India

The UHVDC link will transmit clean hydroelectric power from the North-East region of India to the city of Agra - a distance of 1,728 kilometers. The link will have a record 8,000 MW converter capacity, including a 2,000 MW redundancy.

UHVDC valve hall: The thyristor valves of the North East-Agra +/- 800 kV HVDC link to be constructed in India will resemble the one in this picture. The image shows a ultrahigh voltage valve hall of the Xiangjiaba-Shanghai +/- 800 UHVDC link in China, delivered by ABB to State Grid Corporation of China (SGCC)

ABB has been selected by Powergrid Corporation of India Ltd. to deliver the world's first multi-terminal UHVDC transmission link, called the ±800 kV, 6,000 MW HVDC Multi Terminal NER/ER - NR/WR Interconnector – I Project (NEA800 in short and also known as North East - Agra HVDC). The link comprises four terminals located at three converter stations with a 33% continuous overload rating and the power transmission system will thus have the possibility to convert 8,000 MW – which is the largest HVDC transmission ever built in the world.

This is the second multi-terminal HVDC link that ABB will build. Already in 1990-1992 a large scale three terminal transmission link was constructed in North America, the Québec - New England HVDC Transmission - the first of its kind in the world, transmitting 2000 MW.

ABB will execute the project together with its partner Bharat Heavy Electricals Ltd. (BHEL), who will deliver the remainder of the contract. The partners have a turnkey responsibility for execution, including system engineering, design, supply and installation of three HVDC converter stations. The first stage of the system is scheduled to be operational in 2014 and the second stage in 2015.

The North Eastern region of India has an abundance of hydro power resources, approximately 65,000 MW. The resources are scattered over a large area, whereas load centers are located several hundreds and even thousands of kilometers away. The power has to pass through the so called 'chicken neck area' a very narrow patch of land (22 km width x 18 km of length) in the state of West Bengal having borders with Nepal on one side and Bangladesh on the other side.

India plans to create power pooling points in the North-Eastern region, to collect power from several hydro power stations and to transport it on 800 kV DC bipolar lines to major load centers. HVDC is a excellent way to use the available right-of-way very efficiently. The current project is the first one.

NorthEast Agra UHVDC link

Map of the multi-terminal ultrahigh-voltage direct current system (UHVDC) project North-East-Agra, India, that will have a record converter capacity of 8,000 MW. The link transmits 6,000 MW over a distance of over 1,700 kilometers from the converter station Biswanath Chariali, passing the converter in Alipurduar and to the converter station in Agra.

The first pooling point (converter station) of the first Indian 800 kV HVDC link will be located at Biswanath Chariali in the state of Assam in North Eastern region, while the second converter station will be located near Alipurduar in the state of West Bengal in Eastern region. The other end of the DC line will terminate at Agra where there will be two bipolar converters connected in parallel.

As each converter pole has a nominal rating of 1,500 MW with a continuous overload rating of 2,000 MW, it is possible to compensate for loss of any converter pole and still transmit 6,000 MW.

The overall control and coordination of the converter poles in the multi-terminal HVDC link, including balancing of the power order to the converters will be performed by the master control to be located in Agra.

For more information: www.abb.com/hvdc

Main data

Commissioning year	:	2014 - 2015
Power rating (multiterminal)	:	6000 MW
No. of poles	:	Converter: 4
Line	:	2
AC voltage stations)	:	400 kV (all
DC voltage	:	±800 kV
Length of overhead DC line	:	1728 km
Main reason for choosing HVDC	:	Long distance, bulk power

‘Zero flare’ oil and gas order in Congo-Brazzaville

ABB executes all aspects of complex projects for the oil and gas industry

ABB will engineer, build and commission a new natural gas compression station and treatment plant for the energy company Eni Congo in the Democratic Republic of Congo (Congo-Brazzaville). The new plant will be located at the onshore M’Boundi oil field near the Atlantic coast, and will provide compressed natural gas to power the turbines at two nearby power plants in Djeno. These plants currently supply most of the country’s electricity.

ABB will provide overall project management, engineering, procurement, construction supervision, commissioning and start-up services, as well as performance testing of the gas compression and gas treatment processes. The plant is scheduled for completion in under two years.

The project is part of Congo’s ‘zero flaring’ program, set up to reduce emissions from the burning of excess fuel and use locally extracted energy more efficiently. Natural gas that was previously flared off and wasted at existing oil processing operations will instead be used to substantially increase Congo’s power generating capacity, and provide the country with a reliable source of electricity. Excess gas will be re-injected into the reservoir.

This contract underscores ABB’s ability to execute all aspects of complex projects for the oil and gas industry. In 2008, ABB won the contract to build a 320 megawatt (MW) power plant in Djeno. The plant started operations in 2010.

Eni Congo SA is a subsidiary of Italy’s Eni, an integrated energy company, committed to developing its activities in exploration, production, transportation, transformation and marketing of oil and natural gas.

For more information: www.abb.com/oilandgas

Strengthening transmission grid in Congo

FACTS enhance the capacity, security and flexibility of the power transmission systems

ABB has won an order from SNEL (Société Nationale d'Électricité), the national power utility in the Democratic Republic of Congo, to refurbish and expand three substations in the southern province of Katanga.

The turnkey solution includes design, engineering, supply, installation and commissioning of three 220 kV (kilovolt) air-insulated switchgear (AIS) substations and an associated load dispatch center. Commissioning is scheduled for 2012.

One substation will also be equipped with an SVC (static var compensator) unit to improve voltage stability and system performance. SVC is part of ABB's family of FACTS (flexible alternating current transmission systems), which enhance the capacity, security and flexibility of the power network and make an important contribution to the development of smarter grids.

Key ABB products in this project include power transformers, high- and medium-voltage equipment, disconnectors, instrument transformers, surge arresters and remote terminal units.

ABB will also install substation automation systems compliant with the global IEC 61850 communications standard and equipped with the latest protection and control equipment. A new SCADA (supervisory control and data acquisition) EMS (energy management system) for remote monitoring and control of the substations will be installed at the load dispatch center located in Likasi.

The project is part of SNEL's comprehensive grid rehabilitation program, supported by multilateral development funding. It aims to enhance power transmission capacity and meet the growing needs of the mining industry in the region.

ABB is also involved in the first phase of the project, which includes an order booked by ABB at the end of 2009 for the refurbishment of the 500 kV HVDC transmission link between the Inga power plant in the western part of the country and the Katanga district in the South. ABB has also successfully completed the upgrade of several other AIS substations over the past few years.

FACTS - Applying Flexibility to Electric Power System

The power industry term FACTS (Flexible AC Transmission Systems) covers a number of technologies that enhance the security, capacity and flexibility of power transmission systems. FACTS solutions enable power grid owners to increase existing transmission network capacity while maintaining or improving the operating margins necessary for grid stability. As a result, more power can reach consumers with a minimum impact on the environment, after substantially shorter project implementation times, and at lower investment costs - all compared to the alternative of building new transmission lines or power generation facilities. ABB is the worldwide market leader in the field of FACTS and has the full FACTS portfolio and in-house manufacturing of key components.

For more information: www.abb.com/facts

Reliable power for high speed railway in Saudi Arabia

Gas Insulated switchgear helps provide reliable power

ABB has won a power solution order from Al Fanar Construction Co. consisting of 380 kV indoor GIS (gas insulated switchgear) that are a key component of new substations powering the 444 km long high-speed Haramain rail line currently under construction in Saudi Arabia.

The scope of delivery includes design, supply, installation and commissioning of the GIS by the middle of 2013. The GIS-based solution will offer high reliability, ease of operation, low maintenance costs and environmental benefits.

Owned and operated by the Saudi Electricity Company, the country's national power utility, the substations are needed to supply electricity to high-speed (360 kph) electric trains that are expected to help transport about three million passengers annually. The railway will link the pilgrimage cities of Mecca and Medina via the King Abdullah Economic City, Rabigh, Jeddah and King Abdulaziz International Airport. The new rail line is expected to reduce traffic congestion on the roads, and will cut travel time between Medina and Mecca from six hours to two.

Increasing concern for the environment, rapid urbanization and the need to move more people and freight faster, make rail a key infrastructure sector. ABB provides a wide range of reliable, innovative and energy-efficient power and automation technologies for modern urban, conventional and high-speed rail networks.

For more information: www.abb.com/railway

ABB to boost generation capacity and efficiency of Az Zour power plant

ABB has won an order 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 megawatts (MW) of generation capacity is to be added to the Az Zour combined cycle power plant, about 80 kilometers south of Kuwait city. The additional capacity will help meet the growing need for power, especially during peak summer consumption periods. Electricity demand in Kuwait has been growing steadily, driven by construction activity and a rising population.

ABB will be responsible for the electrical balance of plant, the DCS (distributed control system), field instrumentation and generator transformer. The project scope also includes the extension of the 275 kilovolt (kV) GIS (gas-insulated switchgear) substation, medium- and low-voltage equipment and the substation automation system. The project is expected to be completed by March 2012 .

Managing a precious resource

An interview with Gian-Francesco Imperiali, global Head of ABB's Water Sector Initiative. He clarifies ABB's focus on helping enhance the complete water cycle energy efficiently.

The Mubarak pumping station, Toshka, Egypt

Gian-Francesco Imperiali, the global head of ABB's group Water Sector Initiative.

In the Middle East, Africa and Indian sub-continent, the most water scarce regions of the world, sustainable water management is very critical as the aquifers are over pumped, water and waste water quality is deteriorating, water contamination is increasing and water conservation is overlooked with dire consequences for human health, development and environment.

Water supply and quality is deeply linked with energy, food and health coupled with ongoing high population growth and industrial development is pushing many countries in this region towards a multi-pronged approach to ensure water sustainability in the region through developing new water resources, desalination, water reuse, water conservation programs and total water management strategies.

McKinsey's recent report on water shows that in the next 20 years, demand for water will be 40 percent higher than it is today, and more than 50 percent higher in the most rapidly developing countries in Asia and Africa. Historic rates of supply expansion and efficiency improvement will be able to close only a fraction of this gap. Unless local, national and global communities and companies come together and dramatically improve the way we envision and manage water, there will be many more hungry villages and degraded environment and economic development itself will be put at risk in many countries.

As part of this special water edition in

Contact magazine, the global head of ABB's group Water Sector Initiative, Gian-Francesco Imperiali, talks about ABB's water strategy, focus and potential for growth in this crucial industry.

Why is water an important sector for ABB?

G-FI: ABB is not new to the water sector and we have thousands of successful references and a long standing track record in different water applications such as desalination, transportation and distribution, water and waste water treatment in municipal, industrial and irrigation sectors. ABB is one of the leading power and automation technology and solution providers in the entire water cycle while also providing water specific offerings such as consultancy, turnkey projects and advanced plant performance services.

We provide tailor-made solutions to complex and diversified water market where our customers range from municipal utilities, private operators and developers, Mechanical Original Equipment Manufacturers (OEM)'s, EPC contractors, system integrators and industrial customers in various sectors.

Our strategy in this sector is very clear, we want to continue our focus and strengthen our portfolios to effectively and efficiently manage the entire water cycle in all the above areas thereby contributing our part in environmental sustainability. ABB group's top management has entrusted me and my team with the strategic development of water sector by exploiting the synergies among various businesses, product lines, R&D and global and local markets. I am glad to share with you the results of this strategic initiative where since 2008 we have reaped benefits in terms of exponential business and portfolio growth through a dedicated and consistent approach to the end market serving our diverse customers.

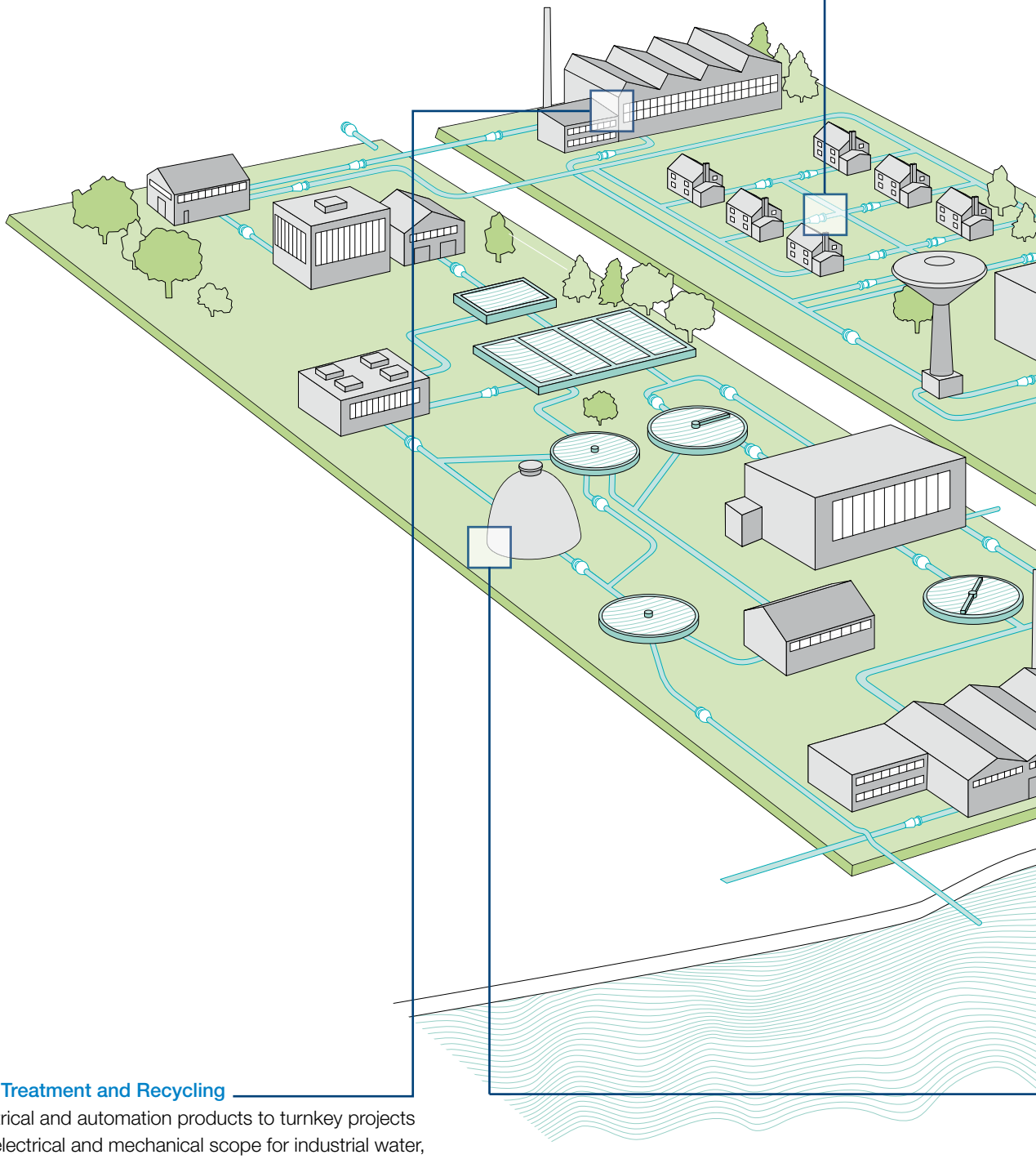
What are the specific challenges of water industry in this region?

G-FI: Historically, the focus for most of the countries in addressing water scarcity and challenges has been to consider additional supply, in many cases through energy intensive solutions such as desalination followed by over pumping of water resources

Complete solutions for all key processes

Distribution Networks

Network Management solutions for real-time monitoring and control of distributed water systems. Asset Management applications to help customers make decisions about plant operations.

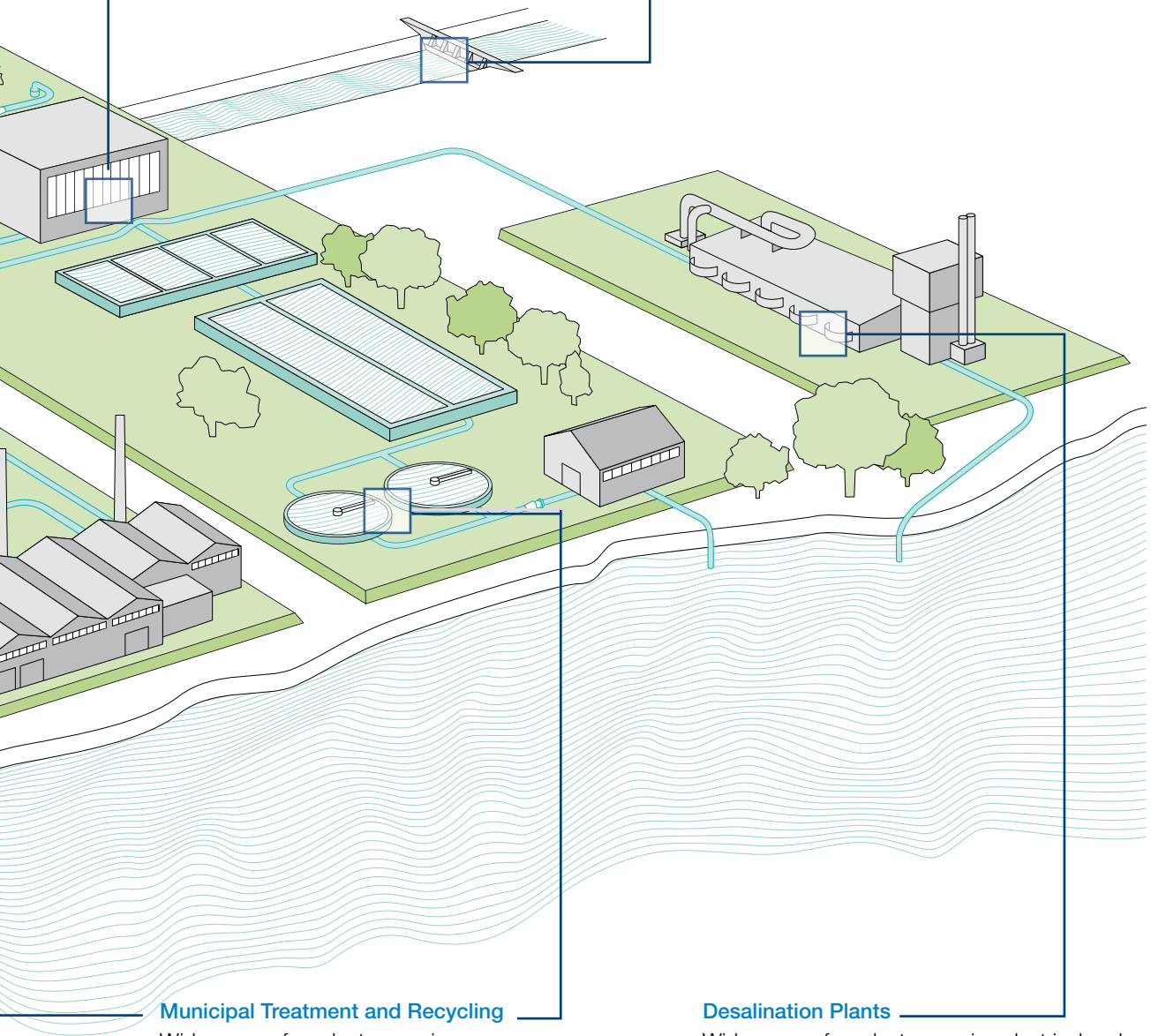


Industrial Treatment and Recycling

From electrical and automation products to turnkey projects including electrical and mechanical scope for industrial water, wastewater treatment and re-use/recycling application.

Pumping Stations
From electrical and automation product up to turnkey projects, including electrical and mechanical scope. Advanced drives and motors for energy savings.

Irrigation Networks
Integrated solutions, from plant automation to hydrant control, to completely manage energy and water resources in agricultural applications. Consumption and irrigation programs using wireless control.



Municipal Treatment and Recycling
Wide range of products covering electrical and automation processes for municipal water, wastewater treatment re-use/recycling application. Integrated ICE solutions (Instrumentation, Control and Electrification), including plant optimization.

Desalination Plants
Wide range of products covering electrical and automation scope for RO (Reverse Osmosis), MSF (Multi-Stage Flash) and MED (Multiple-Effect-Distillation) plants. Integrated ICE solutions (Instrumentation, Control and Electrification) including plant optimization.

which is not sustainable any more. Now the government and policy makers have realized the long term impact of fiddling with this critical resource and instead started applying a balanced approach in terms of right mix of supply enhancement, conservation, productivity improvement, and economical reallocation etc. in residential, commercial, industrial and agricultural end users. So the entire water industry is gearing up to this challenge through investments in advanced technologies and solutions for water conservation, water reuse, energy efficient desalination, smart water grids, energy efficiency, value recovery from water cycle.

How does ABB address the challenges in water industry?

G-FI: Let me try to provide a basic overview and summary of ABB's technologies, services and solutions.

Many of you may be aware that ABB provides state-of-the-art and most extensive standard technology products in power and automation like switchgears, protection devices, transformers, drives, motors, instrumentation, control systems, monitoring and control devices, optimization software for almost all industries. We continuously develop additional water industry specific products and solutions by adaptation and customization of the above to address the specific challenges in the water industry. Some examples of these are water specific flow meters used in metering/irrigation, water and waste water quality analyzers, dedicated drives for water, advanced control/optimization solutions for desalination, treatment plants and leakage and network optimization in water network. You can see our product or solution or service addressing every challenge encountered in water cycle. We provide combination of almost any control, instrumentation, analytical and electrical products, and solutions you can think of to measure, protect, monitor, control, optimize the water quality and quantity, but our biggest value addition is the tailor made services we provide on the top of this using our domain expertise and application knowledge gained over several decades. To give some examples on this, we are able to provide life-cycle optimized power and automation solutions in all water applications like desalination, transportation and distribution including turnkey pumping stations, water and wastewater treatment plants, irrigation solutions, oil-water separation plants as well as con-

ABB solutions for water industry

Water distribution networks

ABB provides advanced network control system solutions to allow real-time monitoring and control of distributed water systems. With ABB's integrated plant automation systems and field instrumentation, all the typical parameters (flow, pressure, level and quality) are under control. By combining field information with ABB's solution for leakage management, utilities can constantly monitor network performance and define their maintenance strategy.

Irrigation networks

About 80% of potable water is used for irrigation purposes, and a rational use of this precious resource is crucial. ABB integrated solutions ensure the complete management of energy and water resources in agricultural applications: primary network (main supply), secondary network (zone supply) and tertiary network (districts supply) up to the hydrants. Fully standalone remote stations enable complete management of the process – including irrigation programs, water consumption management and energy management – from the utility control center or from any kind of remote device.

Pumping Stations

ABB provides engineered packages and turnkey projects, including electrical and mechanical scope. Better management of pumping stations enables a significant saving in energy consumption. That is why ABB developed a complete range of products and solutions covering the electrical and automation processes

Desalination plants

Desalination plants play a more essential role in water production in those areas where increasing demand outpaces the availability of natural resources. In some cases combined desalination and power plants are the flexible solution to produce both water and energy. Hybrid desalination plants use two or more different desalination processes in one plant; these plants have a complex system structure, which allows multiple possibilities for optimization.

ABB's portfolio includes a wide range of products covering electrical, automation and optimization processes for RO, MSF, MED and hybrid desalination plants. ABB is the ideal partner for EPC contractors that are looking for engineered ICE solutions (Instrumentation, Control and Electrification).

sultancy services in industrial water and waste water cycle. All the challenges of this industry right from water scarcity, water conservation, water reuse, energy efficiency, water quality, waste water discharge compliance, environmental protection, irrigation efficiency, asset management of water utilities, smart water grid are being addressed through our mix of technologies, domain expertise and our ability to deliver integrated solutions.

What is ABB's commitment in this particular region for water segment?

India, Middle East and Africa is one of the key regions for water within ABB. In line with this market trend, the regional management meeting presided by our group executive committee member for global markets and regional manager of this region Frank Duggan allocated a special session on water on this annual event in June 2011 to have the feedback from the different country/sub regional managers of ABB group. We discussed in detail on different market, technology and demand trends of water sector in this region considering the group's global objectives and strategies in water sector. The feedback we had from the business leaders were highly enthusiastic and they unanimously and overwhelmingly expressed the necessity of ABB's deeper focus for the water segment and proposed dedicated country teams to serve this important and demanding market by having our ABB consultants, sales and service resources, solution providers closer to the market. The management team concluded with an ambitious and concrete business plan to increase our offerings and grow the businesses in water thereby providing value to our customers managing the efficiency, productivity, energy, quality, security and environmental compliance of water resources. Such is the level of commitment and dedication of our global and local management to this sector in spite of the fragmented and complex nature of water market and I am very much delighted to lead these teams to provide sustainable solutions to our diverse customer base and bring successful results for ABB.

For more information: www.abb.com/water

Municipal treatment plants

Wastewater coming from urban facilities, if well treated, can significantly reduce the impact of pollution on the environment and can also be re-used for agricultural, industrial or municipal purposes. Water and wastewater treatment plants in major cities across the world have benefited from ABB's advanced power and automation technologies: drives, motors, transformers, electrical distribution, control systems and instrumentation, including specific devices for on-line water quality measurement.

Industrial treatment plants

Many industrial applications need large amounts of water that is treated before and after use: oil and gas, petrochemical, pharmaceutical, pulp and paper, power generation, steel, mining, food and beverage and chemical industries are all water consuming. ABB products and solutions add value to all their water treatment activities, including filtering, de-oiling, desalting and water conditioning.

Advanced Optimization

Improving plant performances

ABB has developed solutions for all fields related to the water lifecycle. These solutions have been designed to optimize all main processes involved in a plant's management. The advanced optimization solutions from ABB address the need for real-time optimization of plants and networks. Supporting optimization of operations, lifecycle maintenance and utilization of capital assets.

Water leakage management

With ABB's approch to leakage management, losses throughout the water distributon network can be detected, located and managed. This forms a key element in reducing non-revenue water levels. Water utilities can efficiently detect any leakages thanks to comprehensive analysis related to process measurement including presure and flow data, allowing utilities to choose the right strategy to increase revenues and thus improve profits and to run operations in more sustainable way.

Pump efficiency and monitoring

The Pump Efficiency Metering System (PEMS) provides rapid and detailed real-time information on pump efficiency. ABB's solution, based on the thermodynamic measuring method with ABB patented components, integrates trend displays and uninterrupted long-time stor age. This allows the facility to optimize maintenance intervals and minimize the duration of plant shutdowns.

Power Solutions

Energy when needed

ABB is a worldwide leader for products and solutions related to power generation, transmission and distribution. Our staff provides the global know-how to build and update any kind of electrical system: from high-voltage substations and medium-voltage switchgears to low-voltage power centers and motor control centers.

Maximum efficiency

ABB is a leader for high efficiency motors; class EFF 1 motors – the most efficient category of motors – provide energy savings up to 20%.

To control the motor speed of pumps, ABB offers variable speed drives (VSD) that deliver from 30% to 60% energy savings and reduce mechanical and electric stress on pump components. Even pumps that operate at constant flow

benefit from the softstart and soft-stop functionality of a VSD, thereby placing less stress on the motor and pump.

More intelligence in plants and networks

The ABB portfolio includes a wide range of advanced and flexible automation and control products: variable speed drives and soft starters, programmable logic controllers (PLC), remote terminal

units (RTU), communication devices and human machine interfaces (HMI).

ABB can provide complex automation and control solutions from engineering to startup: distributed control systems (DCS), supervisory control and data acquisition systems (SCADA).

Measurements reliability

To control water, it is essential to adequately monitor all physical, chemical-physical and microbiological parameters. That is why ABB developed and sucessfully delivered over a long period a wide range of instrumentation, including flow pressure, level and temperature meters, recorders, controllers and on-line analyzers for parameters like pH, conductivity, turbidity, dissolved oxygen, residual chorine, ammonia, nitrate, fluoride, phosphate, chloride and silica.

The benefits of Integrated Management

A new level of performance

Operators of water utilities need to have the right tools to share all distributed information in a real time environment and to manage information centrally, thus efficient and more informed decision making.

Enhanced by ABB's new family of integrated software and hardware solutions, ABB's control and automation systems place companies in the best position to optimize their processes, plants and enterprise operations. Software and hardware solutions represent a complete line of high-quality products for data acquisition, automation, supervisory and control activities.

Products and systems for water are designed to work standalone or as part of a completely integrated and scalable solution, enabling enterprises to implement new functionalities as operational needs evolve.

ABB's commitment to open standards facilitates the integration of activities and the interface with existing automation components and information systems, creating an additional layer of investment protection.

For more information: www.abb.com/water

Fresh drinking water for the Sahara Desert

ABB is providing a complete power, automation and mechanical solution for a large water transfer project in a remote and rainless region of the Sahara Desert. The project will pump and store water from deep underground, ready for transfer to a city of 115,000 people that is 750 km away.

Currently under construction and scheduled for completion in 2011, the Réseau de Collecte water transfer scheme in Algeria is one of the biggest water projects ever undertaken in the Sahara region - one of the hottest and driest places on Earth, where temperatures can reach 50 degrees Celsius.

About 90 percent of Algeria's 35 million population lives on the northern coastal belt close to the Mediterranean Sea, but several million live inland in oasis towns and cities, where rainfall is rare and water resources are limited.

Tamanrasset and In Salah are two such oasis cities. Tamanrasset is a large city of 115,000 inhabitants that lies deep in the southern reaches of the Algerian Sahara. The city is located near an aquifer that faces shortages in water reserves, while In Salah, a small urban community of about 43,000 inhabitants, is located close to an aquifer with a surplus of water.

The Réseau de Collecte will help rectify the shortage of potable water in Tamanrasset. Earmarked as one of the Algerian government's key infrastructure projects, the water transfer scheme will pump and deliver 50,000 cubic meters of water each day via pipeline from In Salah to Tamanrasset, a distance of almost 750 km. By 2030, it is expected that 150,000 cubic meters of water per day will be needed, a tripling of water supplies to meet the needs of the city's rapidly growing population.

Map of Algeria showing In Salah and Tamanrasset. Both cities are located deep in the Sahara. In Salah is about 1,500 km from the capital Algiers. Remote desert communities pose logistical challenges for infrastructure projects like the Réseau de Collecte. ABB has a long track record in delivering large-scale solutions of this kind in Algeria.

ABB is playing an important role in the project by supplying a turnkey solution that covers mechanical, electrical, control, instrumentation and communications equipment and know-how for the entire water collection system at In Salah.

The 25 sq km site consists of 24 wells, pumping water 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 connecting the site to the local power grid to ensure a safe and reliable supply of electricity to site operations. Once operational the solution will measure the flow, temperature, pressure and quality of the water, and distributed control system will monitor and control the entire process.

ABB was able to leverage the breadth of its power and automation offering and water industry expertise to improve on the original specifications by adding low-voltage drives to each well pumping system. The drives significantly improve pump performance, availability and reduce 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 Tamanrasset water collection solution 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.

Desalination solution in Saudi Arabia

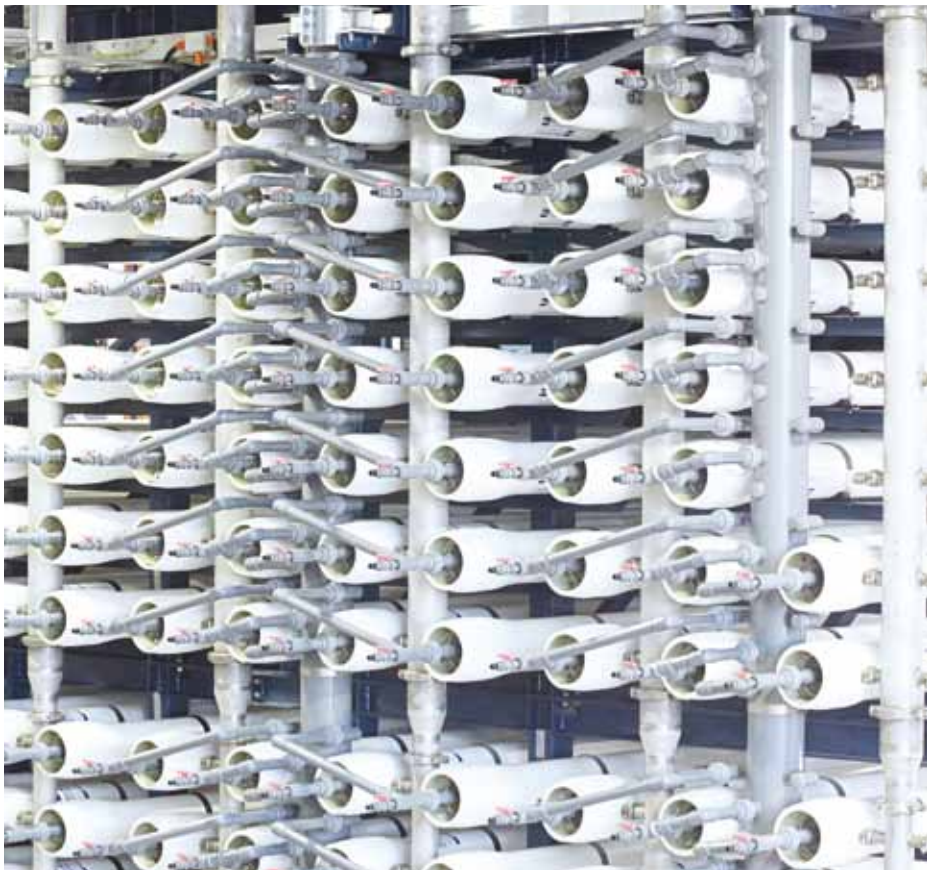
The Reverse Osmosis Desalination Plant No. R.O.-1 in Yanbu, KSA consisting of 6 trains with high pressure pumps has increased the installed desalination capacity in this area by 50,400 m^3 per day to a total of approximately 146,000 m^3 per day.

The complete desalination plant was contracted by Saudi SBG-PCM. SBG subcontracted the main electrical parts and the plant control system to ABB.The client was the Roya l Comission of Jubail and Yanbu.

ABB's scope included 4.16 kV switchgear (in total 24 feeders), 2 transformers 4160/480 V, 4000kVA, 480V main distribution and 480 V motor control centres, 480/120V UPS, 120V DC-system, distributed control system, plant operation training simulator. The project was completed in 2007.

Advanced membrane process to enhance efficiency of reverse osmosis plants

ABB has developed a new solution for advanced operation of membrane processes (OPTIMAX® Membrane Performance), specifically for Reverse Osmosis (RO) and Nanofiltration (NF). This helps in minimizing the membrane maintenance costs and reducing plant downtimes.



Reverse osmosis membranes

Drinking water scarcity and conservation has become one of the major issues of our times. Surface and ground water are the major potable water resources available on the earth. With the passage of time, more and more surface water sources are getting polluted by human and industrial activities. Moving forward, these sources will require extensive treatment to be re-used for human consumption. An additional challenge is that the ground water level is also receding rapidly due to the imbalance between the rates of consumption and replenishment. Hence, desalination of seawater is amongst the necessary options to support the world's growing demand for potable water.

Energy efficiency plays a major role in determining the production costs of an industrial process. In a Sea Water Reverse Osmosis (SWRO) plant, 50% of the energy is consumed by high pressure pump, and is even more where the plant is operated without energy recovery units. Therefore, the energy efficiency of a SWRO plant can be improved by minimizing high pressure pump energy consumption.

One of main challenges in SWRO plant operation is the membrane fouling and its impact on energy consumption. As the membrane gets fouled over a period of time, the specific energy consumption (i.e., energy consumption per m^3 of product water produced) of SWRO plant increases and the product quality decreases. The advanced operation of SWRO process provides a platform to monitor membrane fouling and energy efficient operation.

ABB has developed a new solution for advanced operation of membrane processes (OPTIMAX® Membrane Performance), specifically for Reverse Osmosis (RO) and Nanofiltration (NF). The developed solution consists of two modules, the first one to cover the functional scope of membrane performance monitoring, the second to cover membrane operation optimization.

The solution monitors the membrane fouling and calculates the optimal operational conditions to maximize the product flow rate or minimizes SEC by improving the energy efficiency. The membrane monitoring solution also helps in minimizing the membrane maintenance costs (i) by reducing the amount of chemicals required for cleaning, and (ii) by reducing the risk of membrane damage since they are dependent on the condition of the membrane system. In addition, the plant availability is increased by lowering cleaning and replacement activities and thus reducing plant downtimes. The solution is applicable to different membrane configurations such as hollow fiber and spiral wound, and can be used with existing or new installations without requiring additional measurements.

Overall, with this newly developed approach, the maintenance process for membrane systems can be changed from reactive, preventive to a predictive, condition based way of operation.

For more information: www.abb.com/water

Helping improve water supply in Sri Lanka

ABB industrial drive, ACQ810, drive modules

Nearly 55,000 households in the Kandy (main city in the central hills of Sri Lanka) area will enjoy an improved supply of water with ABB drives. Four ACQ810-04-550A-4 drives along with complementing low voltage soft starters and contactors to KIK Engineering in Sri Lanka for the JICA funded Greater Kandy water supply project Phase 1, Stage 2.

The order was awarded to ABB in 2010 November with a challeging delivery time of two months. The ABB drives and associated components will be installed in the control panels KIK is supplying to the project, with the drives controlling two each of 315 kW and 280 kW pump motors and ten soft starters controlling 132 kW, 95 kW and 75 kW pump motors, respectively.

Subsequently, a group of five engineers from KIK and KP Projects (the M&E contractor of the project), visited ABB's Bangalore facilities for a thorough theoretical and hands-on training session on the range of products ordered, which covered low voltage drives, contactors and soft starters.

The products will receive post sales warranty and service support from ABB's recently appointed local service partner HISL (Hayley's Industrial Solutions Limited).

It is expected that this new business channel will consolidate ABB's market positioning in Sri Lanka and establish the efficacy of application of the ACQ series of low voltage drives in the water sector across the India sub-continent.

KIK Engineering is a leading panel manufacturer and a long time OEM (Original Equipment Manufacturer) and channel partner of ABB for a range of low voltage breakers and switches. They are among the most renowned companies in Sri Lanka having won several Presidential and International awards for growth, volumes and quality.

For more information: www.abb.com/drives

Irrigation solutions that help increase agricultural productivity

ABB power and automation solutions for lift irrigation will provide local farmers with much-needed water to increase agricultural productivity and raise family incomes.

ABB is currently involved in several major lift irrigation schemes in India's fourth largest state, Andhra Pradesh, that together will irrigate almost 800,000 acres of farmland and help farmers increase crop yields and improve revenues.

Working in partnership with leading pump manufacturer Andritz, ABB's scope of supply for these projects includes pumps and associated mechanical equipment, large motors and variable speed megadrives to power and soft-start the pumps efficiently, and all the electrical and automation equipment needed power and run the irrigation site, including substations and supervisory control and data acquisition systems.

Recent lift irrigation projects involving ABB include Bhima, Kalwakurthy and Dummugudem, each of which will irrigate between 200,000 and 330,000 acres of parched land. Customers include major international contractors like Navayuga Engineering and Megha Engineering Infrastructure.

The most efficient technique is lift irrigation, in which water is pumped from a low-lying river to a reservoir on higher ground and from there is released and flows by gravity into a network of canals or channels to irrigate the surrounding fields.

ABB is a leading provider of complete power and automation solutions for the entire water cycle – from the point of entry into the raw water treatment or desalination plant to the point of exit in a wastewater treatment facility.

Dummugudum – Nagarjuna Sagar dam irrigation scheme is an important irrigation project to divert flood water from the River Godavari to Nagarjuna Sagar Dam, the tallest masonry dam in the world, and irrigate surrounding districts. To satisfy increasing demand, the scheme calls for 680 cubic meters of water per second to be lifted and transported about 300 kilometers to the dam site. ABB's turnkey solution includes synchronous machines (24 and 21 megawatt) with associated excitation equipment, LCI (Load Commutated Inverter) starting equipment, motor control and relay panels, instrumentation, SCADA system and low voltage switchgears.

Helping meet Abu Dhabi's drinking water need

ABB drives cut energy consumption of pumps at desalination plants significantly compared to traditional suction valve control. They reduce the mechanical stress on pumps and electrical stress on motors and improve membrane life.

A turnkey order for a major expansion of water transmission system in Abu Dhabi, UAE was secured from the Abu Dhabi Transmission & Despatch Company (TRANSCO). The project will increase the volume of water supplied by the Shuweihat Power and Desalination Plant to the city of Abu Dhabi by increasing the capacity of two pumping stations.

The scope includes engineering, installation, testing, commissioning and overall management of the project and providing a turnkey mechanical, electrical and automation solution for the extension and modification of the Shuweihat and Mirfa pumping stations.

ABB's integrated power and automation technologies will help to provide a reliable and efficient water supply to meet growing demand for water and support sustainable development in the region. The products supplied will include pumps, with related surge vessels and piping, energy-efficient drives and motors, as well as the required extension of the electrical Balance of Plant (eBoP). The automation systems to manage the operation and monitoring of the water pipeline will use ABB´s state-of-the-art System 800xA control platform.

TRANSCO is a subsidiary of the Abu Dhabi Water & Electricity Authority (ADWEA), which is responsible for developing the high-voltage power and bulk water transmission network in the Emirate of Abu Dhabi in the UAE.

Reverse Osmosis - the water alchemist

Reverse osmosis is a process used to turn seawater into potable water. Seawater is forced, (ie, using a pump) through a fine-pored membrane. Water molecules pass through the membrane while salt and impurities are retained. Exerting pressure to reverse the flow is necessary because in regular osmosis, water molecules naturally flow in the direction of higher concentrations of salt and impurities, rather than away from them.

Expertise in desalination solutions

Desalination plants play an essential role where increasing demand for potable water outpaces the availability of natural resources.

ABB's portfolio includes a wide range of products and solutions for RO (Reverse Osmosis), MSF (Multi-Stage Flash), MED (Multiple-Effect) and Hybrid desalination plants, with a specific focus on energy efficiency:

- Motors & Drives
- Control products and systems
- Instrumentation and Analytics
- Electrical distribution
- Electrical substations
- Performance Monitoring and Optimization

For more information: www.abb.com/water

Solution for world's largest seawater RO plant

An ABB solution for the world's largest seawater reverse osmosis plant, Magtaa will boost energy efficiency and cut maintenance downtime from weeks to days compared to current industry benchmarks. The plant is currently under construction in Algeria.

The solution is a complete and highly optimized electrical package that will power the Magtaa desalination plant in Algeria at an unprecedented level of energy efficiency and significantly reduce the length of scheduled plant shutdowns for maintenance.

Located at Oran, Algeria's second largest city, the reverse osmosis seawater desalination plant will produce up to 500,000 cubic meters of drinking water a day, enough to meet the daily requirements of about five million people.

When completed, Magtaa will be the largest seawater desalination plant in the world using reverse osmosis technology - built, owned and operated for a period of 25 years by Asia's leading technology-driven environmental company, Hyflux.

Electrical power consumption is one of the biggest single running costs of desalination, so making the process more energy efficient directly translates into affordable potable water.

Desalination helps produce water in Arid lands

ABB is supplying a complete electrical solution for the entire desalination plant and a 220 kV outdoor substation that will connect the facility to the Algerian power grid and ensure that the plant receives a reliable supply of electricity without impacting grid stability.

The solution includes 33 medium voltage drives that will reduce plant electrical losses from the benchmark target of 5 percent to only 3 percent – a huge improvement in energy efficiency compared to accepted industry standards.

In addition the drives will speed up the long plant startup process after maintenance or power-failure related shutdowns, reducing the length of plant downtime compared with the more traditional method of mechanical control.

Over the expected 25-year operation time of the plant, the improvements in energy efficiency, plant productivity and reduced wear and tear enabled by the ABB solution, will provide a huge and sustained boost to plant profitability.

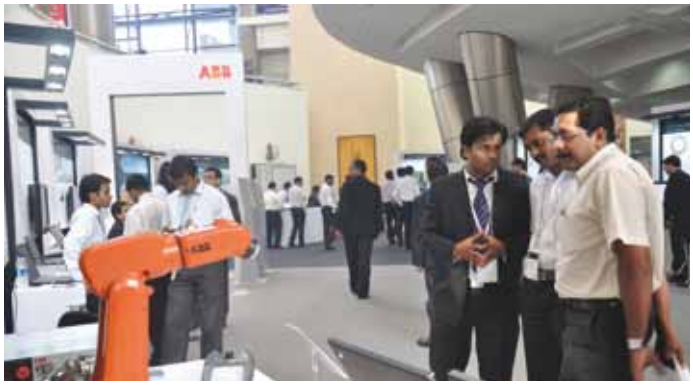
For more information: www.abb.com/water

World's largest seawater RO plant

Algeria is 95 percent arid land, of which 80 percent is desert. Rainfall is almost zero, but a reliable, cost-efficient desalination process and the Mediterranean Sea offer an abundant source of potable water. Once the Magtaa plant starts production in 2011, it will be the world's largest seawater desalination plant using reverse osmosis (RO) technology, delivering up to 500,000 cubic meters of drinking water per day to the city of Oran (pictured above) and surrounding region, enough to meet the daily needs of about five million people. ABB will electrify the plant and provide a 220-kV outdoor substation connecting it to the Algerian power grid.

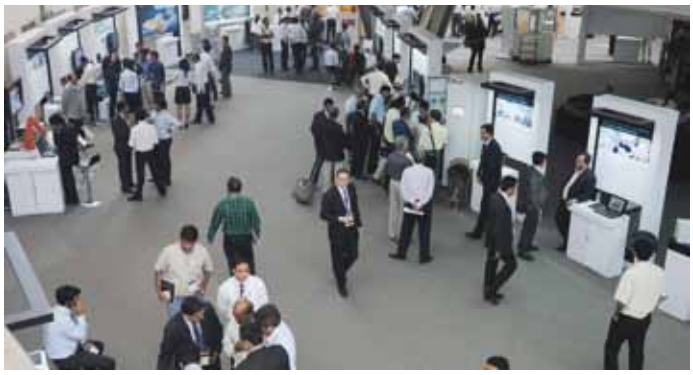
Automation and Power World, India 2011 Partnering to build a low carbon economy

Products and solutions in the grid reliability area



Robotics solutions on display

Technologies on display at the industrial productivity section of the exhibition area



Customers meet with ABB technology experts at the exhibition area

The first Automation and Power World was held in India from September 19 - 21, 2011. It received overwhelmingly positive feedback from customers, partners and ABB staff from around the globe. With over 2500 customers and more than 1000 employees participating in the event over three days, APW turned out to be one of the biggest exhibition cum conference of its kind. APW was organized around five topical themes, namely, grid reliability, industrial productivity, energy efficiency, environment and safety and life cycle management.

The stakeholders saw how power and automation technologies can make an important contribution towards climate protection and help build a low carbon economy. Whether it's for power generation, transmission and distribution, or the automation of applications in industrial facilities or buildings: practically the entire ABB portfolio helps to reduce CO_2 emissions. From the drill head to the power socket, ABB technologies help to minimize losses and increase efficiency. Intelligent solutions for utilizing renewable energy sources were showcased.

The exhibition had the widest range of ABB products, technologies and solutions on display. The three days of APW were packed with knowledge-sharing and networking opportunities allowing the delegates to connect, learn and succeed in achieving the common goal of building a low carbon economy.

For more information, please visit www.abb.co.in/a&pworld

- APW 2011 has been the largest event in ABB India History
- Display of exhibits over 2800 sq meters
- Over 40 tonnes of steel used and more than 2 lac Sq. ft. of wood used including an outdoor hanger
- 60 thousand sq ft. of carpet for flooring and walls
- 300+ products and solutions
- 175+ exhibits and 50+ live demos
- On display were products from switches in homes to the biggest, like the 765 kV circuit breakers and GIS / PASS
- There were 90+ sessions covering 35 verticals & technologies with 60 plus average session registration
- QR (Quick Response) code for customer registrations and RFID system to get feedback on sessions were employed

Innovative power system for marine applications

A new DC (direct current) electrical system for marine applications has been launched by ABB. The new system is part of a revival of power solutions using DC electricity, and will provide highly efficient power distribution and electric propulsion for a wide range of vessels. It is designed for ships with low-voltage onboard power systems, such as offshore support vessels, tug boats, ferries and yachts, and can reduce fuel consumption and emissions by up to 20 percent.

In traditional electrical propulsion vessels, multiple DC connections are made from the AC circuit to thrusters and propulsion drives, which account for more than 80 percent of electrical power consumption. ABB's onboard DC system represents a step forward in optimized propulsion by connecting all DC links and distributing the power through one main DC circuit.

With an onboard DC solution, generator speed can be varied to optimize fuel consumption and improve a ship's operational efficiency by up to 20 percent compared with traditional AC powered systems. This forward-thinking solution will help maximize the energy efficiency and power reliability in the midst of operating challenges like more stringent environmental regulations, higher fuel prices and the availability of new fuel sources.

ABB's onboard DC system incorporates proven products already operating on today's ships, such as AC generators, inverter modules, AC motors, etc, but eliminates the main AC switchgear and transformers.

The advantage of a DC power system is the ship's engines no longer have to run at a fixed speed. That means the engine's speed can be adjusted to optimize fuel consumption. It also reduces the footprint of the electrical equipment used by up to 30 percent by eliminating the need for bulky transformers and main switchboards. That leaves more space on the vessels for passengers or cargo, and also provides greater flexibility in the positioning of system components in the vessel.

In addition, ABB's onboard DC system enables supplementary DC energy sources such as solar panels, fuel cells, or batteries to be plugged directly into the ship's DC electrical system, for further fuel savings.

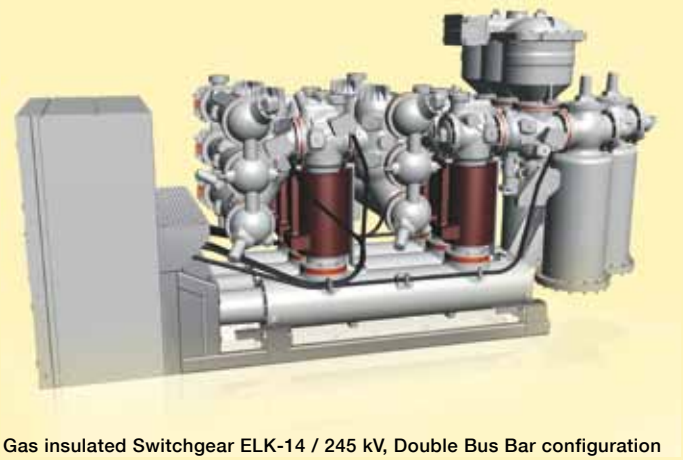
For more information: www.abb.com/marine

New generation 245 kilovolt

ABB has recently launched the latest generation 245kV (kilovolt) ELK-14 series of Gas Insulated Switchgear (GIS). The footprint of this latest GIS is 40 percent less than conventional designs and it uses 20 percent less SF6 gas compared to the previous generation, making it even more environmentally friendly than its predecessor.

Its compact design also enables the unit to be delivered as a completely assembled bay, reducing installation time by more than 60 percent compared to traditional construction. The bays feature single-phase isolation, and are delivered fully tested and mounted on a frame. The intelligent control and protection equipment installed in the control cubicle directly at the bay is also a smart grid enabling feature.

The bay arrangement is highly flexible, so that all system



Gas insulated Switchgear ELK-14 / 245 kV, Double Bus Bar configuration

Symphony™ Plus control system launched

Symphony™ Plus is the latest generation of ABB's highly successful Symphony family of control systems. With more than 6,000 systems installed worldwide, over the past 30 years, Symphony represents one of the largest installed bases of distributed control systems (DCS) in the world. Many of them are operating in the power generation and water sectors.

The benefits of the new Symphony™ Plus distributed control system (DCS) include improved plant productivity and energy efficiency, as well as enhanced operational security, plant safety, and a lower total cost of ownership.

Symphony™ Plus is envisaged to take total plant automation to a level that is simple, scalable, seamless and secure. It helps balance performance objectives like asset availability, operational reliability and production efficiency with business goals like asset life extension, carbon reduction and regulatory compliance, thereby providing plant owners with an essential tool for achieving sustainable and profitable growth.

Symphony™ Plus meets a broad spectrum of plant configurations and applications, especially in the power and water industries. It is flexible and scalable, designed to serve the needs of small and server-less applications as well as large multi-system, multi-server architectures. It supports the seamless integration of field devices, process and turbine automation systems, electrical and SCADA (Supervisory Control and Data Acquisition) solutions as well as business and maintenance systems. Symphony Plus provides users with a secure, reliable control environment and built-in security features that prevent unauthorized system access.

Symphony Plus controllers

ABB recently announced the extension of its life cycle commitment to the Symphony Harmony and Symphony Melody range of control systems as part of the company's 'evolution without obsolescence' approach. This approach is based on introducing new technology while protecting the long-term investment of customers by ensuring that each new generation not only offers enhanced benefits, but is also fully compatible with its predecessor. ABB's commitment to continue investing in the development of the Symphony product range enables customers to effectively manage life cycle requirements and at the same time, lower their total cost of ownership.

For more information: www.abb.com/controlsystems

gas insulated switchgear

configurations, including subsequent expansions, can be easily and quickly implemented. The systems have been designed for a rated voltage of 253 kV, and can handle rated currents of up to 3,150 A (Amperes). The versions conforming to the IEC and IEEE standards have been designed to protect power networks up to a rated short-circuit (fault) current of up to 50 kA (kiloamperes). The new ELK-14 design also facilitates more convenient accessibility to the operating mechanisms located in the front of the bay and positioning of the current transformers outside the gas compartments.

ABB is the global leader in high-voltage GIS technology, with more than 20,000 bays installed and operating reliably around the world. ABB pioneered high-voltage GIS in the mid 1960's and continues to drive technology and innovation. In 2009, ABB commissioned a GIS rated to handle more than one million volts (1,100kV), with a switching capability of 6,900 megawatts, reaching new heights in terms of global voltage levels.

SF6 (sulfur hexafluoride) gas is extensively used in the electrical industry for dielectric insulation and current interruption in high-voltage circuit breakers, switchgear, and other electrical equipment. SF6 gas under pressure is used in gas insulated switchgear (GIS) because it is much more dielectric (non-conductive) than air or dry nitrogen, making it possible to significantly reduce the footprint and enable installation in constrained spaces.

Powering deep sea exploration vessels

Reliable power for marine and shipping industry

ABB will supply electrical power and propulsion systems for two next generation 'Ramform' vessels, capable of three-dimensional (3D) seismic data acquisition for sea bottom resource exploration.

The ships will be constructed by Mitsubishi Heavy Industries, and delivered to Norway's Petroleum Geo-Services ASA (PGS), a leading company in marine seismic and reservoir data acquisition, processing and analysis/interpretation services. Oil and gas companies then use this data to explore for hydrocarbon accumulations, to develop new oil and gas fields, and to manage their producing fields.

The 'Ramform W-class' vessels are the newest generation in the Ramform series, featuring advanced 3D seismic data acquisition/analysis capability. At 104 meters long, the ships will feature an exceptionally wide breadth of 70 meters. For quiet operation, they will feature diesel electric main propulsion.

ABB will supply an advanced complete power and diesel electric system package, consisting of medium voltage switchboards including power management systems, generators, transformers, frequency converters and motors. The systems will provide reliable and fuel efficient propulsion for the ships.

With delivery due in 2013, the Ramform W-class vessels will employ multiple streamer cables, each several kilometers in length, towed from the vessel's stern. The cables will contain a vibration sensor ('hydrophone') to detect echoes of sound waves em itted from sound sources and bounced back from the sea bottom and stratum boundaries. The echoes are used for 3D seismic analysis, to determine geological composition and natural resource location.

For more information: www.abb.com/marine

Innovative energy storage solution in Sweden

Clean, renewable wind power

ABB has won an order from the Swedish utility Falbygdens Energi (a subsidiary of Göteborgs Energi) to supply an innovative dynamic energy storage solution for its power distribution network.

The storage solution is based on a new technology that uses a battery storage device to provide stability to the grid. The equipment will be installed as part of an existing substation in the city of Falköping and will enable the storage of locally produced energy from wind turbines. Storage capacity will be 75 kilowatts (kW) in cycles of up to 60 minutes.

This will help to balance peak loads during the day and enhance grid stability. It will be the first such low-voltage dynamic storage solution of its kind in the country, and is part of a partnership agreement between the two companies to collaborate on developing technologies to facilitate the integration of renewable energies and the evolution of smarter grids.

This innovative storage solution will make it possible to store wind energy during the night when demand is low and distribute it to users during the day, allowing the use of this clean renewable energy more efficiently and minimizing the need for fossil fuel-based electricity generation.

Clean and renewable energy sources like wind are also unpredictable and intermittent. Storage technologies can help balance loads, while maintaining stability as power grids and networks become smarter and more flexible.

Greener transformers to lower VOC levels

The reduced VOC paint initiative covers all ABB transformer products - from the smallest units to the giant 800 kilovolt UHVDC power transformer pictured above

ABB is taking significant steps in its transformer operation to reduce emissions of volatile organic compounds (VOCs) by replacing the solvent-based paint used on transformer tanks with water-based and high-solid paints, which are more environmentally friendly. Conventional solvent-based paints emit toxic VOCs as vapor. The VOCs react with other pollutants and sunlight to produce harmful ground-level ozone and other oxidants known as smog.

In terms of VOC emissions, the benefits of the switch are clear: typical traditional solvent-based paints can contain 50 percent VOCs, while the alternatives chosen contain from 8 to15 percent. The targeted VOC reduction with this initiative is about 274 metric tons, which is equivalent to the yearly VOC emissions from about 25,000 US cars.

ABB leads the way in the shift to use environmentally-friendly paints on a global scale, involving 50 transformer factories and 28 service centers. The plan is that all ABB transformer tanks including those from sub-suppliers will use the new reduced VOC paint alternatives by 2012.

ABB has been using reduced VOC paints on some of its power and distribution transformers for over 10 years, with good results. Building on this experience and in cooperation with qualified suppliers, ABB researchers have developed reduced VOC painting systems based on the ISO standard 12944-2. In addition to reducing harmful solvent emissions, lower VOC paint provides additional benefits, like reduced manufacturing and delivery times, as well as a robust finish that provides proven protection.

Contrary to popular belief, the shift to the new environmentally friendly paint systems does not compromise performance or robustness and will not have an additional cost impact. The switch also lowers energy costs involved in the application and drying of paints.

ABB has developed a variety of environmentally innovative transformer solutions as part of its green transformer program, conceived to reduce energy losses, improve energy efficiency, increase the overload capacity and minimize environmental impact of ABB transformers.

For more information: www.abb.com/transformers

Power of the sun: Towards a greener future

Harnessing the power of the sun at the Nelamangala facility, Bangalore, India

- The LV System factory has LV systems, PCC, MCC Panels, MNS iS cabinets – intelligent MCCs
- The Power Electronics factory consists of HCR system and static excitation system
- The MV drives factory has MV drives and Traction drive systems
- The Breaker factory has low voltage ACB (Air Circuit Breaker), MCCB (Moulded Case Circuit Breaker) and SFU (Switch Fuse Units) facilities

ABB is at the forefront of green technologies and innovations. In addition to helping integrate green energy into the power grid, ABB is also integrating green energy into its own operations. The ABB facility at Nelamangala in Bangalore which manufactures a range of ABB products starting from drives and power electronics to low voltage systems, breakers and switches.

The Drives facility consists of LV drive cabinet manufacturing, test field with safe design, remote inspection system with capacity for future expansion.

Apart from manufacturing there is a big focus on sustainability which is reflected in the use of renewables and helping reduce the carbon footprint.

ABB in India has installed its first photovoltaic solar plant at the Nelamangala facility near Bangalore. The initiative enhances energy efficiency by reducing environmental impact. Entire electrification of the system from engineering to installation and commissioning was done using ABB product line components, including a solar inverter, miniature circuit breaker, surge protection devices, and switch-disconnectors.

Apart from having a 22 percent area reserved for greenery there is a an effort made to conserve rainwater by water harvesting. This process helps in trapping the rainwater which would have gone waste and using it in the facility and helping raise the water table.

New production line for MCBs inaugurated

A new line of miniature circuit breakers (MCB) has been inaugurated at Nelamangala campus in Bangalore, India. The semi automated line will produce various breaking capacity MCBs such as 6kA, 10kA and 25kA MCBs with an annual production capacity of 12 million poles. ABB's Low Voltage Products division in India has delivered 25 million poles to the domestic market through wholesalers and a network of channel partners.

The new line would double the existing manufacturing capacity of MCBs in India. The line will produce two new ranges of MCBs - System Pro M Compact and Compact Home. These protection devices will be used in residential and commercial buildings, industrial and renewable energy applications.

New miniature circuit breaker (MCB) line inaugurated

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