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

contact



Value throughout lifecycle

Unlocking the potential of existing assets 06 Providing lifecycle support and value added services Caterpillar India's energy expenses reduced by \$35,000 annually 11 Systematic approach delivers savings at its new paint plant







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Boiler fingerprint service to help improve performance

ABB identifies the improvement opportunities in captive power plants operations

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Bazmi Husain Managing Director ABB India Limited

Dear friends,

The extended climate of a slow economy has stifled new investments. This has placed greater emphasis on maximizing output from assets. Service is often the most cost-effective action that unlocks the potential in existing assets – by extending their life, reducing operational costs, optimizing performance, increasing efficiency and thus tangibly enhancing return on assets.

Products from ABB have life-cycles that span decades. While we ensure our hardware is built to survive this test of time, automation and electronics demand quicker upgrades. We believe our customers should have the combined benefits of decades of reliability and latest technology.

Today, service offerings from ABB is proactive, preventive and globally accessible. Our services team is responsive to your needs and can predict and prevent downtimes. They reduce risk with timely action, optimizing performance, efficiency, and safety. And they provide training, to help you extract the most from our experts.

We are working with our customers, identifying new areas to increase efficiency of processes, systems, equipment or enterprise level plant potentially coordination that can be game changers in business.

This issue of Contact presents some of our offerings in service, innovative solutions we have provided, and interesting projects we have been part of, in India and globally. Enjoy the read.

Best regards,

Bazmi Husain

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The past, present and future come together in India

New factories launched in Savli for manufacture and assembly of Gas Insulated Switchgear, PASS and dry-type and oil-immersed distribution transformers.



Top left – A view of the shopfloor. Top right – (R to L) Bazmi Husain, MD, ABB India, P Shivnani, President of Power Products, ABB India, Bernhard Jucker, Head of Power Products, ABB and S K Negi, MD, GETCO. Below – The new facility extends ABB India's distribution transformer range up to 10 megavolt amperes (MVA), 36 kV

n 1963, ABB India (erstwhile Hindustan Brown Boveri) established its Maneja production facility in Vadodara, Gujarat. The first product to roll out of this factory was a 25 kV (kilovolt) circuit breaker for the railways. 50 years later, the Maneja facility delivered a 1200 kV circuit breaker and power transformer– aptly, even the voltage level was 50 times higher!

Over the years, manufacturing facilities in Vadodara expanded to include power and distribution transformers, high-voltage air-insulated switchgear (AIS), instrument transformers, high-voltage machines, wind power generators, turbochargers and distribution automation equipment. On November 12, 2013, ABB India inaugurated two new manufacturing facilities for power products in Savli, on the outskirts of Vadodara. These new units are another example of ABB's 'in country for country' approach to bring manufacturing closer to customers.

The manufacturing units in Savli will produce high-voltage gas-insulated switchgear (GIS), PASS (plug and switch system) hybrid switchgear, and dry-type and oil-immersed distribution transformers. The units were built in 18 months at an investment of approximately \$50 million and cover an area of about 15,000 square meters. They are equipped with the latest production and testing technologies and will serve the urbanization driven domestic market and export demand.

By drawing inspiration from the past and acting in the present, ABB seeks to fortify its presence in India and take its operations from strength to strength.

In brief

ABB's new CEO



Ulrich Spiesshofer succeeded Joe Hogan as chief executive officer of ABB following the threemonth orderly transition period announced on June 17, 2013. Hogan will continue as advisor to the Board until the end of March 2014.

INMEX 2013

Themed "Providing solutions that really matter", ABB Turbocharging System's stall at INMEX 2013 – South-Asia's largest maritime exhibition – showcased products, future capabilities and technologies. The three day event was hosted by 40 industry leaders and drew over 7,000 participants from India and around the world.

Intersolar 2013



ABB India's wide portfolio from solar inverters to turnkey solutions for solar power plants drew more than 200 people over the three day exhibition starting November 12, 2013. The key attractions on display were the PVS800 central inverter, along with ABB's integrated string monitoring unit, and solar pump inverter.

Fast chargers for electric vehicles in Denmark



Leading Danish electric-mobility operator, CLEVER, selected ABB to supply 50 CCS (Combined Charging Systems) compatible DC fast chargers for its country-wide network. This order follows an earlier rollout of 50 ABB DC fast chargers at the beginning of 2013. CLEVER's network comprises both AC and DC chargers, supporting all EVs in Denmark.

CLEVER chose ABB's multi-standard DC fast charging station, Terra 53, equipped with a CCS connector, to support new electric cars equipped with the CCS fast-charging system, such as the VW e-UP! and BMW i3.

ABB provides chargers and industryleading software solutions for remote servicing as well as connectivity to subscriber management and payment systems. ABB supports all fast-charging standards and protocols such as CCS, which is critical to maintain compatibility between rapidly evolving cars and chargers in the years ahead. This compatibility will also allow CLEVER to maintain a reliable service and to upgrade its network as the technology evolves.

Turbocharger service station inaugurated in Bangladesh

Rolf Schweizer, Senior General Manager Service, ABB and Rajarshi Banerjee, Country Manager, ABB Bangladesh, recently inaugurated ABB Bangladesh's third and largest facility - a fully equipped Turbo Charger Service Station. The latest addition to the global ABB Turbocharger Service Network map is located in Gazipur, Dhaka.

This new facility aims to enhance the value proposition for customers by reducing response time and expediting delivery in and around the Dhaka area. Rolf Schweizer's presentation echoed this sentiment, as he discussed building trust and confidence with customers by understanding the importance of reducing downtime.

Underlining ABB's continued commitment to Bangladesh, Rajarshi Banerjee discussed strengthening local resources, deploying state of the art technical optimization solutions to maximize output from available energy sources. The new facility reflects ABB's customer focus and its commitment to a long innings in the country.

Unlocking the potential of existing assets

Maximizing output, achieving optimization and extending life expectancy command renewed focus as investments decline.

ince inception, service has been an integral part of ABB's customer oriented products and solutions. The services portfolio has evolved over time to meet the changing needs of customers. This holistic portfolio has helped ABB partner customers, across industries, to extract the best from their existing assets, with faster return on investment. At ABB, state of the art products and solutions are co-created keeping in mind seamless lifecycle support across the service value chain. While cutting edge products help win customers, service offerings help sustain the loyalty and relationship with them.

This engagement has oriented customer mindset to maximizing performance of installed capacity as a viable alternative to greenfield investments. The estimated installed capacity of ABB solutions in Indian utilities and industries of INR 500bn, built over the last three decades, drives the growth of our local service market. The current economic, political and regulatory uncertainties also make service offerings such as lifecycle extensions preferable to new investments or expansions. Service is often the most cost-effective action that unlocks the potential in existing assets by extending their life, reducing operational costs, optimizing performance, or increasing efficiency, servicing support and timely turnaround. Be it grid compliance, process optimization, retrofit and repair or energy efficiency, our service solutions have offerings to suit every purpose.

The changing nature of industries and utilities from generation or production to the last mile connect, has resulted in a ABB retrofit has helped improve performance of a turbine which now operates at 97% availability





paradigm shift in the nature of service offerings. From being limited to breakdown maintenance or troubleshooting to preemptive, predictive and globally accessible; customers rely like never before on service offerings to get the best value from their investment. ABB has been at the forefront of this evolution, developing and delivering future-ready service solutions. With a range of deployments through multiple channels to cater to customers across the country, the service portfolio comprises of more than 600 offerings - from analysis and monitoring studies, to diverse solutions for both on-site and remote, as per the requirements of various industries and utilities. We provide global expertise suited to local needs with over 1,000 certified and trained personnel providing round the clock servicing support and timely turnaround. Be

it grid compliance, process optimization, retrofit and repair or energy efficiency, our service solutions have offerings to suit every purpose.

The service business can be broadly viewed in three focus areas:

- Lifecycle services for ABB's installed base - includes traditional areas of service such as spare parts, support and maintenance services, engineering, retrofit and modernization, and training
- Value added support and extensions
 comprises technological upgrades such as LEAP (Life Expectancy Analysis Program) and process improvement or production optimization with cost reduction
- Evolution and future preparedness deals with technologically advanced solutions in emerging areas like data

ABB solutions offer proven solutions for auxiliary power consumption to 7-8%



Typical value add and complexity of portfolio offerings

centers, cyber security, solar projects and real estate development.

Lifecycle services

ABB delivers solutions which help customers optimize investments for best performance and results, which do not require a full replacement and can be achieved efficiently with a part upgrade. A recent case in point would be a two decade-old 50 megawatt steam turbine control system at a plant in Gujarat, India. To meet the requirements of a control system retrofit to improve plant availability and system reliability, ABB installed stateof-the-art Symphony™ Plus total plant automation system. This brought complete turbine control system onto a single platform with an inbuilt auto synchronizer. The retrofit by ABB has helped improve performance in a cost-efficient manner - the turbine now operates at 97% availability. Lifecycle services are all about availability, reliability and safety of core deliverables.

Value added support and extensions

Value added support is the key for captive and utility power plants as well as facilities like rolling mills to optimize production from aging processing systems. At a non-ferrous metal production facility in India, ABB service solutions helped optimize performance of high-accuracy and time critical control applications at the old plant with minimal mechanical changes. The customer had imported an existing mill that needed technological overhaul. The intent was to not only continue production at the existing mill but to also modernize the system to ensure uninterrupted processes, consistent quality and minimized rejection.

The challenge of accurate stand speed and interstand tension control was handled by installing drives communication over fibre optic and employing ABB control software for variable slope rate and suitable loss and inertia compensation to achieve the fast communication and better gauge tolerance during acceleration and deceleration. Fast IOs controlled the 2 msec loops for the roll gap control. Minimum thickness control of 0.045mm was achieved by installing thickness feedback control along with thickness feed forward and mass flow control blocks. Adaptive gain for Automatic Gauge Control ensured better gauge response for a range of material hardness.

Key benefits included simple and cost effective use of proven solutions to attain maximum output from an old mill, minimum commissioning time due to use of standardized solution; uniform exit thickness profile by accurate stand speed and interstand control; better adaptability due to adaptive gain for AGC; efficient deployment of manpower led by systematic development of Human Machine Interface.

Evolutionary and future preparedness

Today, the industry is more mechanized and automated. The huge demand for information services resulting from such advancements are catered to by servers and datacenters.

Contemporary assets are also

susceptible to potential hazards such as cyber-attacks, which can damage expensive capital investments. ABB's patented solutions from hardware to software enabled monitoring of these assets on an ongoing basis and are able to alert the customer and ensure timely provision of remote diagnostics. Emerging sectors like solar projects in renewables, sometimes in remote areas, require monitoring, analysis through remote diagnostics, making worldclass technology available at inaccessible regions for improved throughputs.

Improving energy efficiency

Process industries like cement are highly energy-intensive, accounting for almost 60 percent of the total production costs. ABB India's maiden industrial efficiency project was at the Indian plant of the world's largest cement manufacturer. Its medium voltage drives helped enhance plant efficiency and overall productivity replacing existing damper controls, while the variable speed drive solutions reduced energy consumption significantly by over 20% from 90 kWHs/tons to 70kWHs/ton. ABB is able to provide additional offerings like overall efficiency improvement through assessment services and fingerprinting of captive power plant.

Outlook

Machines and solutions often reflect the efficacy of those who operate them. Thus to ease the process at customers' end, ABB provides intensive training modules, onsite as well as at its worldInterview/ Tata Steel Limited

Quality electrical power is imperative

How important is quality power in Tata Steel's operations?

A capacity of 10 million ton per annum makes Tata Steel's plant in Jamshedpur one of the largest integrated steel plant sites in the world. This plant delivers large parts of Tata Steel's flat and long product segments. Flat steel caters to the automobile industry and long to the construction segment - we have a large presence in both these segments. Tata Steel is known for quality products, and to deliver this quality we must invest in processes and equipment. Modern techniques have meant more electrical equipment and higher energy consumption. To have safe and quality steel plant operating conditions we have to ensure reliability of power (near 100% availability within specified limits of voltage and frequency) and specially focus on keeping the energy efficiency. We stringently apply a performance indicator, powerrate, that calculates units of power consumed for each ton of steel produced, which is a measure of energy efficiency.

What key parameters are considered while deploying new equipment?

We view the operations of a steel mill with a 20-25 year horizon. The mechanical and the other hardware might have the longevity. However, the electronics and the electric automation equipment would not keep pace, and we have to go for upgrades and replacements. Hence, while planning for the equipment and technology we wish to implement at our plants, we focus on its lifecycle and support during the lifecycle.

What challenges are faced in sourcing energy and measures you have taken?

Quality electrical power is a critical energy requirement for an industry like steel. However, we operate in the eastern part of the country where reliability of power is low. So Tata Steel, along with the Jamshedpur units of our sister company Tata Power, provides for its electricity requirements. Apart from this, we are also connected to the grid - the Damodar Valley Corporation system. We have developed in-house power



Avneesh Gupta, Chief of Electrical Maintenance, Tata Steel Limited.

generation to provide for Tata Steel's base load requirements.

How does ABB partner towards securing dependable energy?

For a long time, ABB has been a very important partner of Tata Steel. ABB has proved to be a supplier that works on developing new high-end technologies for our processes, be it in drives, DCS, electrical switchgear, motors and other diversified areas. Recently, we are testing the viability of some technology-based services by ABB and are also experimenting remote diagnostic services for critical equipment and provision of on-site service support. We have received great support from ABB in the past, and hope we continue developing technologies together, based on the changing requirements of our customers. I am sure both companies can grow together.

Process industries like food and beverage have invested in power quality solutions from ABB which have resulted in ROI within a year. class training/experience centers. ABB is aware that service as a business model is a people function and ensures the right kind of people are assigned to ensure timely solutions. Multi-skilling of people is critical as are service hubs and we have a 15 process fingerprint in place to render efficiency in our offerings. We also have a dedicated customer care center, which directs queries and issues to the right contact person within the organization. We have an exhaustive feedback system known as Net Promoter Score (NPS) which helps give a reality check on where our strengths lie and the scope for improvement. With green shoots like urbanization creating opportunities in real estate, some less explored sectors like Railways are opening up new vistas. Going ahead, emerging areas like cyber security, data centers, solar project maintenance and hydro projects can provide the opportunity to work together and improve customer offerings in a muted economic environment.



Making the perfect paperboard

An ABB solution is helping Stora Enso make perfect paperboard by detecting defects with millimeter precision at high speed.

M8 at Stora Enso's Skoghall mill in Sweden is the world's largest paperboard machine. Almost 300 meters in length, it produces up to 450,000 tons of paperboard a year, most of which is used to make liquid food cartons all over the world. About 20 percent of milk cartons worldwide are made from paperboard produced by the KM8.

Quality is key in the liquid food industry. The paperboard has to match the customer's requirements perfectly. It has to fold correctly into a customized carton that is stable, easy to hold, and has the correct printing properties for a colorrich carton design.

Quality is also key for Stora Enso, the world's second largest paper company and a market leader in paperboard. Recently, with its existing surface inspection system reaching the end of its operating life, StoraEnso approached ABB for a new solution that would take quality control to a new level.

Based on ABB's HDI800 web imaging system, the solution is the biggest surface

inspection system ever made. Its 100 cameras and ABB algorithms detect, photograph, analyze and classify the defects and alarm the operator whenever it finds an imperfection.

"Together with ABB we've developed a unique system that inspects every square millimeter of paperboard as it speeds through the paperboard machine at 800 meters a minute," says BjörnWikström, maintenance technician at Skoghall.

The system has not only enhanced quality and improved the operators' working environment, it has also significantly reduced the number of rejects.

"Previously, some customers might have rejected an entire shipment if there were blemishes in some of the rolls," says Leif Karlsson, project manager at Skoghall. "Now we can identify and remove those rolls that do not meet each customer's quality requirements. The cost savings are immense."

Another benefit of the ABB solution is that it enables operators to quickly detect repetitive flaws caused by a damaged roller or other component in the paperboard machine. The solution has also reduced the number of sheet breaks by 80 percent; these are usually caused by holes or other defects.

Recently, ABB developed another worldfirst capability for the Skoghall solution that detects shearing defects in the paperboard. These are small wrinkles that are invisible to the naked eye but cause many rejects and are time-consuming to troubleshoot.

Last but not least in the long list of benefits is improvement in energy efficiency. "Reducing the amount of rejects has resulted in significant energy savings" says Leif Karlsson. "Each meter of product that we have to reject due to defects and flaws result in waste of energy."

Caterpillar India's energy expenses reduced by \$35,000 annually

Systematic approach delivers savings at its new paint plant with zero capital investment.



aterpillar India sought to increase productivity, reduce costs, improve energy efficiency and reliability, ensure effective management of spare parts and improve the plant's operational performance. To this end it entered into a Performance Based Full Service contract with ABB India in 2011, for its manufacturing site in Tiruvallur, close to Chennai, India.

Caterpillar was looking for a professional maintenance partner who could bring value to its business rather than merely delivering 'lubrication' and 'wrench-turning' services. ABB Full Service® is a performance-based partnership agreement that is designed to improve overall plant performance while optimizing maintenance costs.

Around 1000 people work at Caterpillar's Tiruvallur site, which is home to several of the company's production lines, including those for Backhoe Loaders, Wheel Loaders, Quarry and Mining Trucks, and Off-highway Trucks.

The site's new paint plant was identified by ABB as having strong potential for energy saving. It is equipped with two compressors, the main one being a 250 kilowatt (kW) Atlas Copco unit. This 250 kW compressor was running for 23 hours a day, even though its only duty outside the normal eight-hour shift was to operate a paint mixture regulating pump. This extended running time represented a daily electricity consumption of 800kWh and a significant operational cost to Caterpillar India. After carrying out systematic and in-depth studies, ABB found that the compressor's control settings dictated that it would provide an output of 8 - 8.3 bar pressure throughout the day, irrespective of the number of hours of production. With the objective of reducing the running hours of the compressor, ABB adjusted the set points to maintain the pressure at a lower 6 – 7 bar during non-production hours, which was sufficient to meet the demands of the paint mixture regulating pump.

After modifying the control set points of the compressor, its running hours dropped significantly - from 23 to only 9 hours per day. This has cut energy consumption from 23000 kWh to 11000 kWh per month resulting in financial savings of about \$35,000 a year, without any capital investments. Additionally, this improved operational regime enabled Caterpillar India reduce its CO_2 emissions by more than 100 metric tons per year, and it has helped extend maintenance intervals and the service life of both the compressor motors and the compressors, which has led to longer and more efficient plant operation.

Responding to ABB's report on the improvement, P. Gnanaprakasam of Caterpillar India's Facility Engineering Service said: "We are very happy with the efforts taken by ABB to improve the efficiency of the Atlas Copco compressor. This is already having a positive impact on our productivity in the new paint plant."

Boiler Fingerprint service to help improve captive power plant performance

Specialized hardware and software tools help diagnose problem areas and enable significant efficiency improvements.



oilers in captive power plant of process industries, such as cement, pulp and paper, metals, are subject to frequent changes in load. Unless process control systems are tuned properly, these load changes will reduce the boiler's performance, resulting in increased operational costs.

ABB's Boiler Fingerprint diagnostic service establishes performance baseline and identifies the improvement opportunities. The Fingerprint service uses specialized software tools to assess the dynamic and steady state performance of the boiler, along with review of instrumentation and control strategies to identify gaps, if any. The steady state data is analyzed to calculate the boiler efficiency at different loads and establish the performance benchmark. The dynamic data is used to assess stability and responsiveness of control loops. The issues related to control loop tuning, maintenance of the instrumentation and process disturbances are also identified.

The output of the Boiler Fingerprint is a detailed report that includes performance benchmark, optimization guide and action plan for improving performance. Typical benefits of the Boiler Fingerprint diagnostic service are:

- Action plan to reduce variation in process variables and improve performance
- Determine the source of process disturbances
- List of issues related to hardware and automation needs.

Based on Fingerprint report, ABB provides services that typically involve: re-tuning controls for optimal performance, modification or adding control logic and updating standard operating procedure. The combination of the boiler operation engineers and ABB's control and application expertise ensures that the identified improvement is achieved, with a payback of around six months.

As an example, we present a case study of one of our customer's plant. A study indicated that many control loops were operated in manual leading to more variation in process variables and lower performance of the boiler and turbine. The main steam temperature was found to be 10° C lower than the design value and with a standard deviation of 5° C. The main steam pressure was also found to be 2 kg/cm² lower than the design value with a standard deviation of 3 kg/cm². Lower value, with large variation in main steam temperature and pressure, reduces the efficiency of the boiler and steam turbine. The average value

and standard deviation of oxygen in flue gas was about 6 percent and 0.9 percent respectively. The air to fuel ratio was found to be on the higher side as compared to the design values and this would lead to lowering of the boiler efficiency. Operators kept the process variables at conservative targets leaving scope for improvement. Since many control loops were in manual operation considerable attention was required to handle the boiler during load changes. Few of the control valves were found to be sticky and need maintenance.

As part of implementation service, ABB used specialized loop tuning tools to develop mathematical models of control loops to obtain new PID parameters and enabled the manual loops to auto mode, updated the oxygen trim and combustion control logic to reduce standard deviation of percentage oxygen in flue gas, it was observed that tuning of control loops showed good load disturbance rejection behavior and optimal response to load changes. Overall, implementation of the Boiler Fingerprint study and implementation of proposed actions has resulted in up to 50 percent reduction in variation of process variables resulting in improvement of boiler efficiency by 0.5 percent.

Training India's third largest steel producer

Vizag Steel deploys ABB India's training services to maximize output from its assets.

ithin a year of commencing training of employees of the largest steel producer in the country, ABB India signed a two year extendable Memorandum of Understanding with Rashtriya Ispat Nigam Limited (RINL) to refresh and enhance the skills of its employees. This governmentowned steel producer, also known as Vizag Steel, is scheduled to undertake capacity expansion and modernization worth INR 16bn in 2014-15. And RINL sought the services of ABB India to facilitate this modernization.

RINL has deployed ABB's state-of-theart technologies in automation, and power systems and products, for modernization and upgradation of its facilities - sinter plant, blast furnace, steel melting shop, medium merchant structure mill, wire roll mills, thermal power plant and calcining and refracting material plant. The fullest advantage of these high technology, efficient equipment can only be extracted by informed personnel.

"Our company is committed to enhancing employee skills and building their competencies. For an organization to be successful it is imperative that all its stakeholders add value - a process that works both way," said Y.R. Reddy, Director Personnel, RINL. "We look forward to partnering with a technology leader such as ABB in our efforts to fulfill this vision."

Under the MoU, ABB India will train RINL executives and non-executives on various ABB products and systems – from ACS800 drives, 800xA control systems, instrumentation and analyzers, to high and medium voltage switchgear, gas-insulated switchgears (GIS) and substation protection and automation systems. While ABB will provide standard training to large employee pools at RINL facilities, specialized high level programs for targeted employees will be conducted at ABB's lead technology centers in Bangalore, Nashik and Vadodara.

It has been a year since Steel Authority of India has signed on with ABB India to train 4,000 employees over two years. The project is running successfully and our customers are fully discovering the wide scope of abilities in the products they invested in. "Ensuring our customers are well acquainted with the features and abilities of our products, is one of the best ways for them to extract maximum value from the technologies we develop, deliver and deploy," said Madhav Vemuri, Country Service Manager, ABB India. "Product abuse - intentionally or due to ignorance - is the prime reason for products not delivering to their fullest. Thus training ensures one gets the best value for the money they have invested."



Value addition to processes is possible through continuous competency building with the right partners



MoU signing ceremony



Installing the world's most powerful offshore HVDC converter station

The offshore platform will collect power from wind turbines in the North Sea and feed it into the German grid. eighing more than 16,000 metric tonnes (the topsides being 9,300 tonnes), the platform is one of the main components in a grid connection project called DolWin1. The technology on the platform will convert alternating current (AC) from three wind farms into high-voltage direct current (HVDC) so that the electricity can be distributed with minimal losses and without disrupting the grid.

The 320 kilovolts converter station has an 800 megawatt power transmission capacity making it the world's most powerful installation of its kind.

ABB was awarded the turnkey responsibility for system engineering, design, supply and installation of the DolWin 1 offshore wind connection by TenneT a leading European transmission system operator. The project scope includes the offshore converter station, the sea and land cable systems, and the onshore converter station. The system features the latest generation of ABB power semiconductors, with increased performance that ensures higher availability and lower losses.

The platform – which is 62 meters long, 42 meters wide and 42 meters high – was transported by barge from Schiedam (near Rotterdam) to its destination 75 km off the East Frisian coast. The topsides built by Heerema Fabrication Group (HFG) at the Dutch Zwijndrecht fabrication yard, were then lifted by the world's largest crane vessel, Thialf, and positioned on top of an already installed jacket (the steel substructure). The lifting and placement operation was the most challenging part of the three-day operation.

Clean green energy

"The successful installation of the offshore station is an important milestone in the construction of our HVDC offshore wind connection, which will ensure efficient transmission of renewable energy to the onshore grid in Germany," said Hanspeter Faessler, Head of Grid Systems business at ABB, which is responsible for the construction of the platform and installation of the electro technical equipment.

The DolWin 1 offshore wind connection is expected to avoid 3 million tonnes of carbon dioxide emissions per year by replacing fossil fuel based generation.

A crucial platform

The technology on the platform will convert the electricity from the wind farms into direct current. The power will then be transported via 75 km of HVDC sea cables and 90 km of HVDC land cables to a converter station onshore, where it will be converted back into alternating current so that it can be fed into the grid. The power transmission line has a capacity of 800 megawatts.

"ABB is using HVDC Light, an evolution of HVDC technology that helps address the needs of long-distance underground and subsea transmission. It is increasingly being deployed across a range of applications including integration of renewable energies from land-based and offshore wind farms, mainland power supply to islands and offshore oil and gas platforms, city center in-feeds where space is a major constraint, and interconnections, often across the seas. ABB leads the way in this space, and has delivered 13 of the 14 commissioned HVDC links based on VSC technology.

Offshore wind power is a fast growing sector with significant potential and is estimated to contribute as much as 100 gigawatts (GW) of additional renewable capacity between 2011-2025, with Europe accounting for around 70 per cent. Many of these offshore wind farms will be located far from shore to benefit from higher wind speeds, lack of obstructions and minimum aesthetic impact. This requires the power generated by wind mill turbines out at sea to be collected on offshore platforms and then transmitted through cable connections to onshore stations for further distribution.

ABB has four large offshore wind connection projects - BorWin 1, DolWin 1, DolWin 2 and Thornton Banks - and is uniquely positioned with a complete in-house manufacturing portfolio that includes power semiconductors, high voltage sea and land cables as well as AC and DC converter stations.





Bringing power to the poor in eastern India

Solar charging station impacts social and economic conditions, and increases safety, in a hamlet in the Sundarbans, West Bengal, India.

ur latest Access to Electricity rural electrification project, part of the Corporate Social Responsibility initiative of ABB, in a remote marshland area of eastern India, has made a successful start. In partnership with WWF India, ABB has set up a solar-powered multipurpose battery charging station.

The station with capacity to generate 4.1 kilowat solar power is located in a hamlet on Satjeliais land in the Sundarbans area of West Bengal. Under the scheme, the villagers register and collect a fully-charged battery from the charging station. When exhausted, they return it at the station and receive a fully-charged replacement. The charging station controller keeps a record of all battery exchanges, and the villagers are billed on a monthly basis.

More than 50 households and 13 local stores have so far gained access to electricity, and are enjoying the social, economic and safety benefits. Access to reliable and cheap energy allows shops

to stay open late, evening classes to be held, and people to use electrical goods like telephones and televisions. In addition, electrical power avoids the negative health impacts of kerosene fumes.

Empowerment of women

Key to success has been local ownership of the project with WWF led training programs and public dialogue on the project to ensure buying from the villagers. A seven-member council, including five women, was set up to manage and administer the project, and collect the monthly dues.

Most of the women on the council cannot read or write, and had never seen a bank. But as a result of the project, the women have built up their awareness and understanding of financial institutions and savings mechanisms.

"This system has changed my life in many ways, I already see a positive impact on my small business of stitching," said Minati Aulia. "My eight-year-old daughter can study in the evening without inhaling kerosene fumes. I can also charge my cell phone, torch, run a small fan and power a small radio at home. Now I don't have to depend on the availability of kerosene in the local market."

The village is located across a river from the Sundarbans mangrove forest, a national wildlife park and a UNESCO world heritage site. The village lights also discourage tigers from straying from into habitations.





Designed for space, deployed on earth

In space no one can hear you scream, which might be one of the reasons why space agencies install reliable instruments from ABB on their satellites.

hen it comes to space, size matters. There may be plenty of space out there, but getting an object into orbit requires an enormous amount of expensive rocket power so miniaturization is at a premium. Supplying space agencies has therefore encouraged ABB's Measurement Products business to reduce even further the size and mass of instruments, and has benefitted the industrial sector here on Earth.

A few years ago, ABB combined the requirements for a new (terrestrial) industrial analyzer with that of the Canadian Space Agency's requirements for a Miniature (extraterrestrial) Interferometer (MINT) for use onboard a Mars/Moon rover. The analyzer has yet to operate in these alien environments, but ABB Measurement Products has sold more than 1,500 units for terrestrial use. The new design is about half the size of its predecessor, with better performance and lower service requirements. It includes, for example, a solid-state laser designed to operate in space, without servicing, for more than 20 years. Its predecessor needed servicing every three years.

Space systems are especially hardened to cope with vibrations, vacuum, radiation and thermal exchanges. (Grease cannot be used to provide mechanical lubrication in space and in the absence of air, electronic components can heat up tremendously, causing them to age rapidly.) To gain even greater dependability, redundancy is also factored into the design. This means that, even if a fault develops, the device can continue to function for extended periods, withstanding exposure to micrometeoroids, UV radiation, atomic oxygen, atmospheric drag, and a host of other debilitating conditions, more harmful than those found on Earth, even in harsh industrial environments.

Testament to the success of ABB's hardened instrument design principles was the recent 10-year anniversary of ABB's high-resolution spectrometer (ACE-FTS). This instrument was installed in the CSA's SCISAT satellite and, in 2003,

embarked on a contractual mission of two years. A decade later, the satellite and its spectrometer are still going strong. It continues to gather data, helping scientists to better understand the Earth's atmosphere, and the dynamics of ozone depletion and climate change. Thanks to its robust instrumentation, the SCISAT project has detected chemicals in the atmosphere never previously identified from space.

The design adaptations made by ABB Measurement Products for instruments in space go beyond those needed for terrestrial applications, but by understanding the requirements of operating in space, ABB can solve some of the toughest terrestrial industrial challenges.



Coal-seam gas provides the same energy as coal at 40 percent less CO₂ emission

Ensuring the world's first coal-seam gas project runs seamlessly

The \$33 million agreement will help improve plant productivity and availability at the world's first coal-seam gas project - Queensland Curtis LNG by QGC.

GC, a wholly owned subsidiary of BG Group, is embarking on the first commercial venture in the world to convert coalseam to liquefied natural gas. ABB has signed a long-term service agreement with QGC to provide planned and unplanned maintenance for the upstream and midstream facilities at Queensland Curtis Liquefied Natural Gas (QCLNG). The project is located in Queensland, Australia.

Coal-seam gas is natural gas extracted from coal beds. It provides the same amount of energy as coal, at 40 percent less carbon dioxide emissions. QCLNG is a priority project for QGC because it involves expanding exploration and development in southern and central Queensland. The upstream facilities stretch across the Surat Basin, where the coal-seam gas is collected and transported along a 540 kilometer underground pipeline, to the LNG plant on Curtis Island near Gladstone.

As a partner, ABB will provide comprehensive services including an on-site team to maintain ABB's Extended Automation System 800xA Integrated Control and Safety Systems (ICSS). The contract value is \$33 million over four years, with potential for extending the service term up to a period of 10 years. The contract also covers spare parts management for QCLNG's upstream collection and transportation facility as well as for the midstream liquefaction and export facility. "This important contract affirms our strong and long-standing relationship with QGC - one of our key customers," said Veli-Matti Reinikkala, Head of ABB's Process Automation division. "We are proud to continue working for this important oil and gas project, and one of our key priorities will be to help our customer reach its production targets flawlessly."

In 2011, ABB was awarded a \$58 million order from QGC to provide, as main automation contractor (MAC), integrated automation, safety and telecommunications systems and related equipment for the upstream coal-seam gas project.

High-voltage eco-efficiency

ABB is committed to lowering its environmental footprint at every step of the way.

s the world's population grows so does demand for electricity. With more electricity being generated far from population centres, there is an even greater need for high-voltage products to deliver it safely and with efficiency. As a pioneer and experienced supplier of high-voltage transmission networks, ABB in addition, strives to reduce the environmental impact of its high-voltage products to improve the eco-efficiency of power grids.

To this end, ABB aims to use the most energy efficient manufacturing processes, helping reduce the embodied energy of its products. Embodied energy is the sum of all the energy required to produce goods or services, including raw material extraction, transport, manufacture, assembly, installation, deconstruction and decomposition.

ABB's HV Disconnecting Circuit Breaker in which SF_6 gas has been replaced by CO_2 as arc interruption medium to reduce the embodied energy of ABB's products, greater use has been made of recyclable and disposable materials, which generally makes them less energy intensive to make or decommission. Some components, however, have higher global warming potential (GWP) than others and are more difficult to recycle.

One such component, used extensively in high-voltage equipment for insulation and current interruption, is the inert gas known as sulfur hexafluoride (SF₆), which is a greenhouse gas with 22,800 times the global warming potential of carbon dioxide (CO₂).

 SF_6 gas is extensively used in the electrical industry for dielectric insulation and current interruption due to its physical properties. Pressurized SF_6 gas is used for the safe and reliable operation of gasinsulated switchgear as it has a much higher dielectric strength than other insulation media. This makes it possible to significantly reduce product footprint and enable installation in constrained spaces. However its lifecycle management is a challenge for utility and industrial users and the cost of handling it in a compliant manner can also be substantial, particularly when decommissioning aging substations.

ABB is fully aware of the GWP of SF_6 and goes to great lengths to ensure that the gas is not allowed to escape into the atmosphere when equipment is manufactured, commissioned, serviced or scrapped. Continuous supervision through online monitoring of equipment helps detect leaks early, enabling the fast dispatch of repair teams. Furthermore, since the life cycle of SF_6 gas is longer than the high-voltage products in which it resides, ABB's patented technology is used to reclaim the gas at more than 99.9 percent purity when equipment is decommissioned so that it can be reused.



Just launched

Designing from the ground up or re-engineering for a custom fit, ABB products and systems consistently offer considerable energy and cost savings.

Low Voltage Products

OTDC

Discrete Automation

ACS880 drives



ABB introduced the first switch disconnector with two-pole that enables smaller physical footprint, flexible capacity and reliable performance. The OTDC 500 switch disconnector is designed for direct current (DC) photo voltaic (PV) applications. The dual air gap contacts provide quick and reliable isolation in a compact frame.

Advantages

 Reliable DC breaking power at all current levels

- Symmetric pole design means connections are independent of polarity
 the user can make connections both ways
- Only DC switch in the market with visible contacts
- The operation of the switch is not vulnerable to voltage peaks and it is independent of the user (quick make, quick brake)



ACS880 series is built on ABB's allcompatible drives architecture designed to simplify operation, optimize energy efficiency, and maximize output. Encompassing single drives, multidrives and drive modules, the architecture enables the drives to control virtually any type of alternating current motor

Advantages

 Common user interfaces and engineering tools across the drives portfolio

- Scalable control performance from basic to applications demanding with direct torque control (DTC)
- Drives' built-in energy efficiency information helps analyze and optimize energy use
- Integrated and certified safety features provide safety for machine operators

Low Voltage Products

AF contactor range



The Contactor range from ABB is set to be the new benchmark in motor control and switching. Industry applications include renewable, offshore, onshore, rail and buildings. With a single contactor coil to fit all standard networks and global distribution and service network in over 100 countries, the cost of ownership is optimised.

Advantages

- Wide voltage range
- AC and DC in one product
- Built-in surge suppression
- Reduced energy consumption by up to 80%
- 90% fewer product variants
- Dependable functionality



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Sustainable mobility

Mankind has come a long way since the invention of the wheel.

With the advent of motorized transportation, we have been able to travel faster, with more comfort and greater efficiency.

With natural resources such as oil getting more expensive, a need for sustainable mobility is gaining relevance.

As a global leader in power and automation technologies, ABB plays a vital role in the development of sustainable mobility, providing innovative and efficient technologies for EV charging infrastructure. The future of mobility is electric.



Substations that can hide in a city?

Certainly.

Bustling urban centers need efficient and reliable electricity, but have little room to accommodate large electrical installations. ABB's gas insulated switchgear (GIS) technology can shrink the size of an electrical substation by as much as 70 percent, so it can be located in the middle of cities and other space-restricted areas, even indoors or underground, minimizing environmental impact. We offer a range of products, systems and services for power generation, transmission and distribution to help increase power capacity, enhance grid reliability, improve energy efficiency and lower environmental impact. With a 125 year heritage of technology innovation ABB continues to shape the grid of the future. For more information please visit us at www.abb.com

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Power and productivity for a better world[™]

