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Autumn 2003

FAST FORWARD WITH **ABB POWER TECHNOLOGIES**



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Focused factories

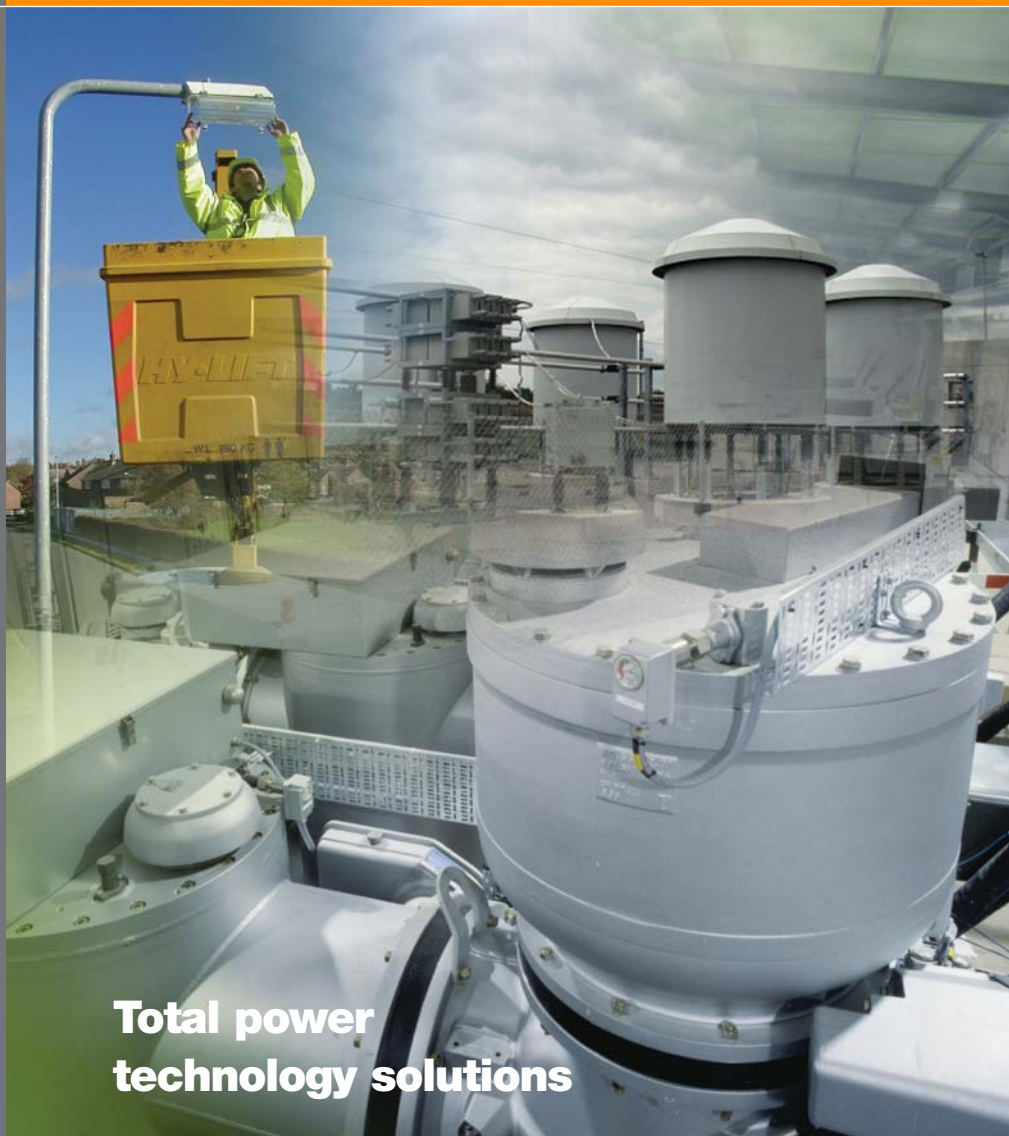
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**Total power
technology solutions**

ABB

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Superpower cut



Trevor Gregory

Division Head, Power Technologies UK
Group Representative, UK

- > When the lights went out in the USA recently, it illuminated the utter reliance of high-tech nations on electricity. Whatever the precise trigger of the catastrophic power outages on the Eastern Interconnected Network, experts agree that the root of the problem is a transmission system that cannot meet the spiralling energy demands of cities bursting with new technology.
- > Power supply is a high-profile business. Quite apart from the regulator's pressure on reliability, there are image-related issues to consider as well. Bad press coverage affects a utility's reputation and can damage the share price.
- > So, what benefits can a utility expect from bringing in external specialists for infrastructure asset management and reliability planning in deregulated and competitive markets?
- > If the specialists are part of a global organisation, there are two particular benefits. One is the ability to draw on business and technical experience working with utilities in many different countries. The other is that they are more likely to be fully up to date with the latest technical practices.
- > Global presence is also interesting to utilities that are extending their geographical scale of operations through mergers and acquisitions in other countries.
- > ABB's asset management service is focused on helping maximise the return on system infrastructure assets by improving performance and raising profitability of transmission and distribution networks. Risk assessment, safety, environmental performance and service quality are key aspects of the service.
- > Whatever the scale of the project – network upgrade, new build project or long-term network development and operation contract – our approach is to combine strategic business consultancy with full technical planning and implementation. This integrated service approach avoids the cost, time and inefficiency problems that can occur when there are service handoffs from one supplier to another.
- > And, through our alliance with Accenture, we are able to undertake large-scale, integrated operations transformation programs for utilities. Applying ABB's IndustrialIT platform to achieve automation and information solutions that reach seamlessly across all areas of the utility's business, from boardroom to network plant.



Pat Osborne, general manager – power systems projects for ABB Power Technologies, explains how new gas insulated switchgear (GIS) technology is enabling urban transformer substations to be reduced in size dramatically, so that they can fit into the tightest of spaces, be housed indoors, or even underground

Substations shrink to fit with GIS

Until the 1970s air insulated switchgear (AIS) was the type most commonly in use for substations. AIS requires large distances between earth and phase conductors and therefore a good deal of space. This means that for higher voltages – typically above 36kV – this type of installation is only feasible outdoors.

This situation changed dramatically when ABB introduced SF6 (sulphur hexafluoride) as an insulating medium in switchgear enclosures in order to reduce phase to earth distances. The advantages of GIS compared to AIS are:

- > Less space requirements, especially in congested city areas, saving on land costs and civil works
- > Low visibility buildings designed to blend in with local surroundings
- > Less sensitivity to pollution, as well as salt, sand or even large amounts of snow
- > Increased availability and reduced maintenance costs
- > Higher personnel safety due to enclosed high voltage equipment and insignificant electromagnetic fields.

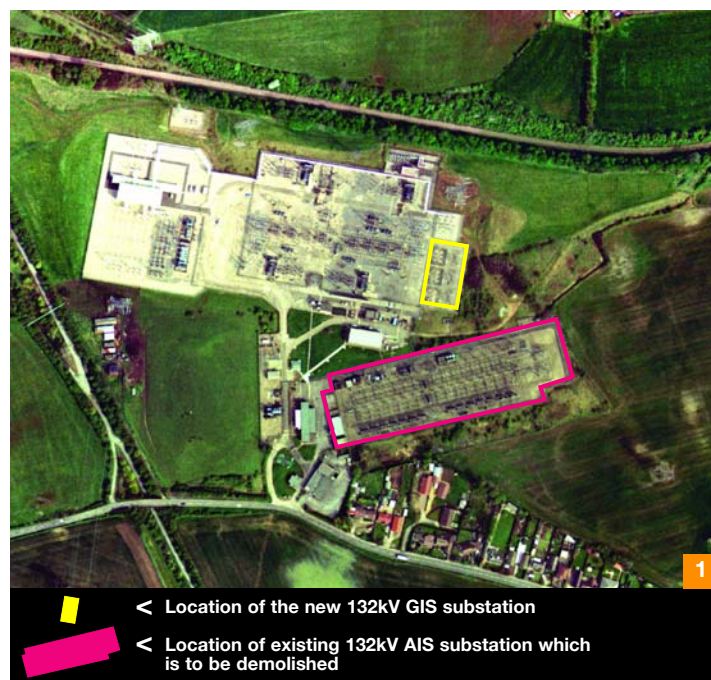
A direct comparison of the component investment for identical switchgear configurations

will suggest that the GIS variant is more costly than the AIS solution. However, this does not show the true story. The capability to install a GIS substation within a significantly smaller site – typically up to 80 percent smaller – enables it to be located close to the load centres, providing a far more efficient network structure at both the HV (high voltage) and MV (medium voltage) levels. As a result, both the investment and operating costs are reduced.

Sites large enough for new AIS substations are seldom available and when they are the cost is usually extremely high. But it is not just the smaller size of the site that makes GIS the lower-cost option: GIS is also the more economic alternative when expanding or replacing existing substations. An inner city site that has previously been used for an AIS installation can be sold or rented out and the income used to finance the new substation. The compact nature of GIS enables an HV transformer substation to be fully integrated in an existing building, which may only have to be increased in height or have a basement added.

NEDL'S NORTON SUBSTATION

GIS is proving its worth in a current ABB project for NEDL (Northern Electric's distribution business), which serves the fourth



largest geographic area of the 12 regional electricity distribution companies (RECs) in England and Wales.

The 132kV substation at Norton, near Middlesbrough, which interconnects the National Grid and NEDL's distribution network, supplies power to Teeside and surrounding areas. It is now reaching the end of its useful life and is being replaced to ensure continued reliability of supply.

NEDL's original plan was to construct a new outdoor substation alongside the existing substation using similar air insulated switchgear. This would have required the purchase of additional land. When the project came out to tender ABB suggested an alternative based on its state of the art compact ELK-04 gas insulated switchgear housed in an indoor building. This has the advantage of requiring only one quarter of the space, so it will free up land for alternative usage when the existing substation is decommissioned.

Within a £9 million turnkey contract ABB is providing a complete design, construction and installation service for the new Norton substation, which will feature 20 bays of switchgear and provide a 132kV interconnection for eight incoming and outgoing circuits. It is scheduled to enter operation in early 2005.



1 Aerial view of NEDL's Norton Installation

2 The new Norton GIS substation takes shape.

3 GIS taken to its logical conclusion – an underground substation in the centre of Orenze, Spain.

Rail Trail

Britain's railways made the headlines recently with Eurostar breaking the UK train speed record on a section of the Channel Tunnel Rail Link (CTRL).

And there is good news for ABB as well. London Electricity Services (LES), the developer, owner and operator of the trackside electrical infrastructure within the Channel Tunnel Rail Link project has awarded ABB a £16.5 million contract for traction power distribution systems for section 2 of the CTRL project. This is in addition to substantial earlier contracts.

In a separate win ABB has been given an £8 million contract as part of Network Rail's West Coast Main Line power supply reinforcement programme. This is the latest in a run of contract successes with the company having won all the 400kV power upgrade orders placed to date for the north-bound section of the West Coast Main Line.

CHANNEL LINK

The latest Channel Tunnel Rail Link win is in addition to earlier contracts including the supply and installation of power transformers, Static Var Compensators (SVCs) and Load Balancers.

The ABB feeder substations and auto-transformer stations, tailored



specifically for trackside applications, will be a key element in the 25-0-25kV power distribution system which is being adopted for the CTRL. This system, which is already widely used in mainland Europe for high speed services, allows for a transmission voltage of 50kV, while the voltage seen by the train is 25kV. Compared with the conventional 25kV system involving booster transformers, this arrangement provides: fewer track feeding points with an increased distance between them; fewer connections to the distribution grid; reduced losses and unbalance

on the overhead catenary system; capability to support higher traction loads; reduced electromagnetic interference on communications and signalling circuits.

WEST COAST LINE

The creation of the new 25-0-25kV supply station at Rugeley, which is one of several planned for the West Coast Main Line programme, will enable Network Rail to upgrade its local trackside power supplies to the 50kV system required for high-speed rail services.

ABB will provide two 400/25kV connections to feed the line at Rugeley. This involves the installation of two new ABB supergrid transformers at the 400kV National Grid substation, one connected into an existing spare bay, the other into a new bay. Also included is the construction of a joint National Grid/Network Rail 25kV compound and associated switchgear, and the provision of 25kV XLPE cables and associated fibre optic pilots between the two sites.



Crisp Response For Walkers

A 3am call to an ABB duty engineer was the start of a series of rapid response events that went from shutting a production line at Walkers Snack Foods, in Leicester, to restoring power and production in very short order.

An explosion in the internal windings of a high voltage 1500kVA power transformer in the small hours had brought output to a halt. By 8am the problem had been inspected and a replacement transformer located.

An ABB engineer was able to by-pass the failed transformer and restore power to the production

line while the new one was on its way.

The new transformer was delivered and installed within hours. It was commissioned and up and running by 8pm on the same day, less than 18 hours after the original emergency phone call.

Terry Owen, Electrical Engineering Manager for the Walkers Snack Foods Group, says: "We were very impressed by the fast positive response to our emergency. ABB showed the real value of their maintenance contracts in the most practical way."



The New Staffordshire Lighting Standard

>> For the next 25 years ABB will be responsible for seeing that the streets of Staffordshire are always well lit.

The company is the County Council's private sector partner in a multi-million pound PFI (private finance initiative) project to maintain, replace and upgrade road lighting and illuminated traffic signs. Apart from raising the lighting standard, work within the £5 million per year contract should contribute to fewer accidents and lower crime on the streets.

ABB marked start of the contract by launching a community web site – www.lightingforstaffordshire.net – to provide information, progress

reports and enable residents to report problems.

BIG TASK

According to Councillor John Wakefield, Leader of Staffordshire County Council's Development Services, "Initially, the main work will involve the replacement of 25,000 street lights across the County in the first five years. The contract also covers maintenance of our entire stock of over 99,000 road lighting units and illuminated traffic signs and we expect more than 98 percent of them to be kept lit at any one time."

ABB is aiming to complete normal lighting repairs within five working days. However for emergencies, where there is a risk to life or property, it will be providing a two-hour response.



INTERNATIONAL NEWS

US

Helping Alaska Avoid The Blackout
Alaska could escape the massive power blackouts which hit the eastern US and Canada recently thanks to the world's largest battery energy storage system which has begun operation in Alaska. ABB has supplied a power conversion system, metering, protection and control devices and service equipment.

The US\$30-million battery energy system, includes a nickel cadmium battery, and is run by Golden Valley Electric Association (GVEA), a cooperative serving the Fairbanks area of Alaska.

The battery will provide continuous voltage support during normal operation, and stabilise GVEA's system if power supply problems occur.

Asset management services track critical equipment

ABB is helping to manage the power transmission assets of International Transmission Company, a stand alone, independent electric transmission company responsible for operating and maintaining more than 2,500 miles of overhead and underground high-voltage transmission facilities in southeastern Michigan. Using the specially developed AdviseIT Asset Sentry system, ABB is tracking the condition of all International Transmission Company's critical substation equipment, including transformers, circuit breakers, batteries and relays.

INDIA

Reliable Inter-regional Power Transfer

Powergrid Corporation of India Limited has ordered a Flexible AC Transmission System worth US\$17 million from ABB. Under the contract ABB will build a fixed and thyristor-controlled series compensation scheme for Powergrid's 4000 kilometre long, 400kV double-circuit inter-regional tie line.

The line, along with the existing 1000MW HVDC back-to-back link in Chandrapur will ensure reliable power supply and stable inter-regional transfer of power from the Eastern to the Southern region in India.

POLAND

Good For Gdansk

ABB has won a 21 month turnkey contract worth US\$18 million to install a hybrid technology substation in Poland. The new plant will replace a substation built in 1959 and upgrade the electricity infrastructure around the city of Gdansk. The plant will have low operational and maintenance costs. The existing substation will remain in operation while the new one is built.

RUSSIA

Largest Power Technology Contract

A US\$22 million project to supply 500kV high-voltage gas insulated switchgear for the Bureyskaya hydropower station in eastern Russia will be undertaken by ABB.

Restricted Room Service



>> Compact Resibloc distribution transformers from ABB provided the right solution to restricted plant room access in Mowlem's £72 million refurbishment of the four star Cumberland Hotel near Marble Arch in London.

Electrical contractor, Lorne Stewart asked panel builder, Ridge Engineering to install two 1600kVA dry type distribution transformers in the new plant room. The problem was that not only would they have to fit through an overhead access hatch measuring just 1.6m x 1.2m, they were also required to meet a tight

lead time of just seven weeks from order placement. Lorne Stewart called in ABB Power Technologies to help explore the possible solutions.

The best solution according to ABB project manager Dave Swadling was the company's flexible Resibloc design. "Instead of the winding coils being cast in moulds they are manufactured on numerically controlled winding machines using glass fibre reinforced epoxy resin for encapsulation and insulation. This enabled bespoke winding coils to be produced to exactly the right size so that we could build the transformers to the correct overall dimensions to pass through the access hatch.

"The whole manufacturing and installation process went without a hitch. The transformers were delivered at 7.00 am on May 10 and installation was complete by 1.00 pm."

If there is one word that describes the ABB product range, that word is probably 'breadth'. One look at www.abb.com and you begin to see that the range of products and services, and more importantly the expertise behind them, can only be described as breathtaking.

Breathtaking Scope

» Another widely recognised hallmark of ABB is quality. But it is not quality just for the sake of it, it is quality focused tightly on performance and payback. There is no point in building in features or facilities that no one ever uses but adding value through extended life, resilience and low maintenance – these are very worthwhile.

ABB as a whole, and its Power Technologies business, in particular, provides a well balanced range of products and solutions. The word solutions has become somewhat overused. But

ABB really is adept at answering questions or 'finding solutions' to technical challenges. These solutions are not merely products that meet the spec, they draw on the experience and expertise of one of the finest teams in the business. A team dedicated to finding answers that cut costs, improve output or reduce risk and maintenance requirements.

HIGH VOLTAGE EQUIPMENT

In the world of high voltage ABB is one of the best known companies. And with good reason because its expertise and knowledge is unequalled. The total global knowledge pool is

vast but this is also reflected locally in the UK and elsewhere, drawing on experience of working with some of the world's most demanding companies.

ABB high voltage solutions include:

Circuit Breakers > Instrument Transformers > Gas Insulated Switchgear > High Current Systems > Operating Mechanisms - Integrated Switchgear Solutions > Power Capacitors > Power Cable Systems > Surge Arresters > Service support.

MEDIUM VOLTAGE PRODUCTS

ABB can meet a vast array of needs for reliable medium voltage switchgear and other apparatus. There is a global product portfolio backed up by a local focus including service and support with a full understanding of local customer needs. For individual users or OEM solutions ABB is fully equipped to supply and support its equipment.

The range includes:

Circuit Breakers & Contactors > MV Fuses > Instrument Transformers & Sensors > Surge Arresters > Integrated Protection & Control Panel Kits & Parts MV Switches > Current Limiters > Vacuum Interrupters > Railway Power Supply > Primary Distribution Switchgear > MV Motor Control > Secondary Distribution Switchgear > Outdoor Distribution Products > Modular Systems > Special Products > Power Cables > Power Capacitors > Motors, Generators & Drives > Spare Parts, Retrofit & Services.

DISTRIBUTION TRANSFORMERS

ABB offers a full range of transformers for ANSI, IEC and other standards. Dry and cast transformers have primary voltages through 36kV. Liquid filled transformers have primary voltages through 72.5kV.



1



2



3



4

1 LTB Compact switchgear has enabled Birmingham University's 132kV substation to fit a very tight space.

2 Installing a 400/275kV substation transformer.

3 Dismantling of overhead lines for NEDL.

4 Damping system for the West Coast Main Line.

Dry type transformers are being increasingly specified for applications where environmental contamination and fire hazard must be kept to a minimum. They meet strict electrical system parameters and perform effectively in extreme climatic conditions.

The core and coil design is a unique feature of ABB's liquid-filled transformers giving them the reliability, durability, and space-saving economy required in utility, industrial, and commercial applications.

POWER TRANSFORMERS

As the world's leading maker of power transformers ABB offers a very broad range both of power transformers and reactors for voltages above 72.5kV together with full service and support across the world.

The range includes:

Power Transformers > TrafoStar > Power Transformers > Shell-type > Shunt Reactors > Phase-Shifting Transformers > HVDC Converter Transformers > Industrial Transformers > Traction Transformers > Transformer Components > Insulation Materials > Fibre Composite Materials.

LOOSE PRODUCTS

Loose products include a wide variety of protection relays from 440V up to 575kV.

UTILITY SERVICES – FROM PLANNING TO PERFORMANCE

ABB's Utility Services business specialises in the analysis of medium to large networks. It conducts traditional system studies (load flow, fault level, voltage regulation, protection, co-ordination etc) putting particular emphasis on performance optimisation using specialist software, Performance Advantage™.

The Power System Contracting business undertakes the construction of new substations as well modifying and extending existing systems. The in-house team can tackle projects from planned transformer changes and switchboard extensions to the construction management, installation and commissioning of 400kV GIS substations.

In the industrial market ABB engineers will undertake operationally sensitive work, integrating with production requirements to avoid disruption to production.

ABB's Distribution Services unit is expert in the operation, inspection, maintenance and

repair of electrical power distribution equipment and systems up to 33kV for both utilities and industrial organisations.

The Transmission Services business team is responsible for commissioning, gas handling, intrusive overhaul, condition assessment, planned maintenance and fault response. Their focus is on obtaining optimum performance and long life.

RAIL – STAYING ON TRACK WITH TECHNOLOGY

Recent contracts for the Channel Tunnel Rail Link and the West Coast Main Line (see pages 4 and 5) highlight ABB's capability in supporting the urgent upgrading of Britain's rail network.

ABB not only has the technology and equipment necessary for fast and cost effective deployment on the rail network it can support the application of cost-effective and minimal maintenance solutions.

Using powerful modelling tools the company can provide vital data on possible failure rates, meantimes between failures and associated downtime – all with a view to implementing the right technology and achieving minimal risk.

ABB's focused factory in Lodz, Poland, specialises in the manufacture of medium-sized distribution transformers from 250 to 2000kVA for industrial, commercial and utility customers throughout Europe. It is ABB's first fully Industrial IT-driven manufacturing plant and it is delivering real customer benefits.

Delivery in Weeks Rather Than Months

ABB's focused factory in Lodz, Poland, specialises in the manufacture of medium-sized distribution transformers from 250 to 2000kVA for industrial, commercial and utility customers throughout Europe. It is ABB's first fully Industrial IT-driven manufacturing plant and it is delivering real customer benefits.

At an international press conference held at the plant in May, Brice Koch, ABB head of Distribution Transformers business area, told journalists: "The dream of radically improved speed has become a reality in Lodz. We have cut cycle time for all products from 16 weeks to two weeks, production is being doubled and quality is consistently high."

HOW IS IT POSSIBLE?

Industrial IT is ABB's patented technology for providing users of power and automation products with fast access to all the information needed to install, operate and maintain them. In Lodz, Industrial IT links the transformer configurator, all the different systems and machinery in the plant, and provides real-time information.

As Trevor Gregory, head of ABB PTP (UK) explains: "The usual delivery time for a distribution transformer in the industry is five weeks. However, the actual production time is only five days. By making sure that all order interfaces and factory production systems are linked in real-time we have been able to cut that time drastically."

ORDERS AND DELIVERY DATES ONLINE

"Customer benefits begin at the start of the process," continues Gregory. "Ordering a distribution transformer is carried out by 'CollaborateIT Quotation and Pricing System - Trafonet', an online configurator rather than



1 50 journalists from 16 countries participated at the first media viewing of ABB's Industrial IT factory in Lodz, Poland

2 No paper work anymore at the ABB distribution transformer factory in Lodz: the Industrial IT system provides the operators with everything they need to produce unique transformers.



the traditional, slower approach in which quotations and offers were produced from "hard copy" catalogues and price lists quoting standard lead times for delivery.

"With the latest technology, a salesperson meeting a customer can immediately configure

the technical data for a transformer on a laptop, quote a price, verify the factory's production capacity and schedule, place the order in the Enterprise Resource Planning (ERP) system at the factory, and confirm the delivery date."

Focused to meet UK needs

Customers requiring a particular UK specification should look no further than the ABB Waterford transformer facility in Southern Ireland.

Denis Casey, Marketing Manager at Waterford, explains. "Pole-mounted transformers are widely used by utilities in the UK and Ireland for overhead distribution networks. Following major investment in new technology, Waterford is now the ABB focused factory for single phase pole mounts in Europe.

"We are also the European centre of excellence for EATS (Electricity Association Technical Specification) ground mount transformers following the transfer of manufacturing from Dundee. And, we have been designated as the European focused factory for the development of single phase and three phase padmount transformers in the range 50kVA to 2MVA."

- > Single and three phase pole mounted transformers from 10kVA to 315kVA
- > EATS ground mount transformers from 200kVA to 2,500kVA
- > Single and three phase padmount transformers from 50kVA to 2MVA

AUTOMATIC ASSET INFORMATION

All asset information for finished transformers at Lodz is automatically organised in an "Aspect-Object" format enabling ABB to provide customers with a detailed electronic record of drawings, technical data, test results and other necessary data for managing their investment. .

"ONE GLOBAL FACTORY"

The Lodz Industrial IT model is scheduled to be copied at other ABB focused distribution transformer factories around the globe, making it possible to check capacities and provide an online answer about which factory can carry out an order quickest.

"We are in the process of implementing the 'virtual' global factory concept. Once completed, it will be an important breakthrough for ABB in the drive for increased speed and the full utilisation of capital resources," says Brice Koch. "With our focused factory approach and Industrial IT platform, it doesn't matter whether the transformer is manufactured in Poland, Germany, China or the United States. It will always be a top quality 'made by ABB' product. And you can be sure of a fast delivery."

Fire power under control

 Malaysia's newest coal-fired power station at Manjung is fully controlled by one of the largest control systems ever made by ABB.

Control of the station, which is fuelled by sub-bituminous and other low-sulphur grade coal for minimum pollution, involves some 25,000 I/O, plus 24 serial links for soft I/O. The £640 million plant has been constructed by a consortium consisting of Alstom Power and Peremba Construction, a local company.

The ABB automation system was specified by the end user following successful use at many of its other power stations. The system controls all areas of the power plant including boilers and burners on the three 700MW gensets, coal mills, flue gas desulphurisation and common services such as feed pumps.

As a starting point for future asset optimisation strategies, much of the instrumentation has been delivered with HART capability – ABB's Contrans 1 interface system allowing digital information to be accessed and

used for non-control purposes.


Another interesting feature is the human interface technology. Initially an operator interface for plant control, it can be used as a later stage for web-based plant management. This ties in with the trend towards ever-larger systems controlled from a central point, including initiate sequences and the gathering of maintenance and management information.

The Manjung plant is located 200 kilometres north of Kuala Lumpur on the west of Malaysian peninsula. It has been built for Janamanjung Sdn Bhd, a subsidiary of the country's electricity utility, in response to a fast-growing demand for power.



Cockenzie Power Station now BETTA prepared



 ABB Contrac actuators are helping Scottish Power's 300MW Cockenzie coal-fired power station on the Firth of Forth prepare for the advent of BETTA (the British Trading and Transmission Arrangements).

The original control system for the steam generators at the 35-year old station would not have been sufficient to cope with the new trading regime. However, when Andy Geddes, who manages the station's control system, discussed the fine points of actuators with Dave Pridgeon of ABB Power Technologies it became clear that the new Contrac actuators could provide the ideal cost-effective solution.

The Contrac actuator has the fineness of control necessary to modulate the output of a steam turbine to the precise levels required. As Andy Geddes says: "Embedding this new piece of equipment into the heart of the old system has preserved the original operating characteristics and protection functions. The flyweight governor still provides the crucially important first level of over speed function. But the Contrac actuator has removed the reliance on gearing that was the main source of inaccuracy and problems with backlash."



The Energy White Paper committed Britain to providing 10% of energy from renewable sources by the year 2010, and an aspiration to double that by the year 2020.

Peter Jones comments.

Our Energy Future

» In July, Trade Secretary Patricia Hewitt gave the green light for the next generation of offshore wind farms to provide up to 6GW (gigawatts) of new energy generation by 2010, enough to power one in six UK households. This, coupled with further plans to increase capacity from medium sized CHP (combined heat and power) and improve energy efficiency, means that significant steps are now in place to achieve the government's ambitious targets.



“Growing political pressure to reduce greenhouse emissions is driving a trend towards ‘distributed’ electricity production and supply,” comments Peter Jones, Business Development Manager ABB PT (UK). “While large power stations will continue to be vitally important sources of electricity, the aim is to have distributed power generation from combined heat and power plants, wind turbines, fuel cells, biomass and other small generating units closer to the point of demand. This power will be

actively managed to meet local needs and to feed surplus power into the national grid system.”

Described by industry experts and the UK government as the ‘Rewiring of Britain’, a considerable degree of new engineering effort will be required to achieve this as Jones point out.

“Putting energy generation and storage on the users’ doorstep requires an economic and environmentally sound way to adapt the current transmission and distribution network if we are to minimise investment, improve reliability and lower costs of generation connection and energy supply.

“Technological innovation has a key part to play in underpinning these goals and in delivering a low carbon economy cost-effectively,” he continues. “As the world’s number one supplier of innovative power system technologies, ABB is ideally placed to advise on and provide the technology to connect wind and other distributed sources to the grid and distribution networks, economically and efficiently.”

THE TECHNICAL CHALLENGE

The UK transmission and distribution power networks have been designed to carry power from centralised power stations via transmission lines to the distribution companies and then on to customers via the distribution network. The cost-effective accommodation of large offshore wind farms and embedded CHP units in mature distribution systems, whilst maintaining security of supply standards, demands innovative connection solutions.

“ABB is actively working with Distribution Network Operators, wind farm developers, government and regulatory bodies to bring existing global ABB technology and innovative solutions to address many of the embedded generation connection issues,” explains Jones.

“Our experience in installing power networks all over the world – many involving

small-scale generation in developing economies where large-scale transmission and generation infrastructure does not exist – is particularly relevant. It allows us to develop and deploy innovative solutions based on tried and tested installations.”

ABB INNOVATION

The operation of large-scale offshore wind farms presents a number of technical challenges particularly in the areas of subsea transmission and power system stability and security. ABB’s DC power transmission technology (HVDC Light) for the supply of large-scale electrical energy to offshore oilrigs, is the first of its kind. The adaptation and application of this technology will allow secure connection of the hundreds of UK wind farm turbines now planned to be positioned many miles out to sea.

Connecting small scale embedded generation into existing utility networks can increase local fault levels beyond the rating of existing switchgear, requiring expensive switchgear replacements which would make the cost of the generator connection too high for the project to remain feasible.

To address this problem, ABB has developed a technology that enables direct connection of generators to be made without the need to upgrade existing switchgear. “Its application will enable many new generator connections which otherwise would have not been economically viable,” comments Jones.

SUSTAINABILITY

ABB’s commitment to sustainable development is underscored by the development of eco-efficient state-of-the-art products and systems for distributed power.

Technologies which help reduce the cost of connection and of operating embedded generation whilst maintaining network security and reliability. Technologies that will help alternative and renewable forms of energy take centre stage.

SafePlus – the ideal compact secondary switchgear solution

The ABB SafePlus range of SF6 gas-insulated compact secondary switchgear provides a flexible, user-friendly, modular and fully extendable solution for a wide range of distribution applications up to 24kV including single panels, ring main units and switchboards.

Typical SafePlus installations will include building services, light industry, secondary substations, light mining, tunnels, underground railways and wind turbines.

SafePlus panel types available include fault make, load break

disconnectors at 630A, fault make, fault break circuit breakers at 630A and 200A. Air insulated metering panels can also be supplied.

An ideal application for SafePlus single panels is to isolate and earth down a single transformer for maintenance. Typically the transformer will be fed via a long radial cable, possibly from a switchboard owned by a utility company. Having a local 11kV isolator means that the transformer can be isolated and earthed without having to pay for the involvement and services of the local Regional Electricity Company (REC).



Stock answer for distribution transformers

For customers who need a transformer 'right now', then ABB's stock range of ONAN distribution transformers – available for delivery within one week – could be the answer.


Stock is available in the following ratings:

- > 315kVA
- > 500kVA,
- > 800kVA,
- > 1000kVA,
- > 1250kVA,
- > 1500kVA
- > 2000kVA
- > 2500kVA

email distrans.sales@gb.abb.com

TEC monitors transformers' vital signs



 Power transformers are critical, high-value links in any power system. If they fail or have to be removed from service for maintenance, major parts of the grid may shut down.

Utilities need their transformers to work at optimum performance for as long as possible. This requires detailed knowledge of the transformers 'state of health', so ABB has developed the TEC (Trafostar Electronic Control) system to maintain complete, real-time control of transformers.

The TEC system is a significant advance over conventional transformer data displays, which are usually provided by monitoring instruments on a component-by-component basis wired into a control room. Instead, TEC collects all the information it needs from just a few multi-purpose sensors and transmits a constant stream of information over a single fibre-optic link back to the control room. And unlike other monitoring systems, TEC can intervene operationally and make decisions and recommendations based on available real-time data. For example, TEC can direct the cooling system to ensure different fans are used in rotation, switching coolers to manage usage, wear and efficiency. And it can control and operate the tap-changer. Discrepancies and potential malfunctions can be flagged, avoiding breakdowns and outages.

All new ABB power transformers are being delivered with TEC as standard.

ABB's new range of gas-insulated MV switchgear has gained technical acceptance from the EA and Network Rail

ZX1.2 switchgear now UK network approved

>> ABB's new ZX1.2 range of metal-clad gas-insulated medium voltage switchgear has successfully completed the rigorous testing demanded by the

Electricity Association (EA) and Network Rail in order to gain technical acceptance for use at 33kV for ratings up to 31.5kA and 2000A. As well as receiving the vital EA Notice of Conformity Certificate the ZX1.2 range has already been accepted for use on the prestigious Network Rail Southern Region Power Supply Upgrade project.

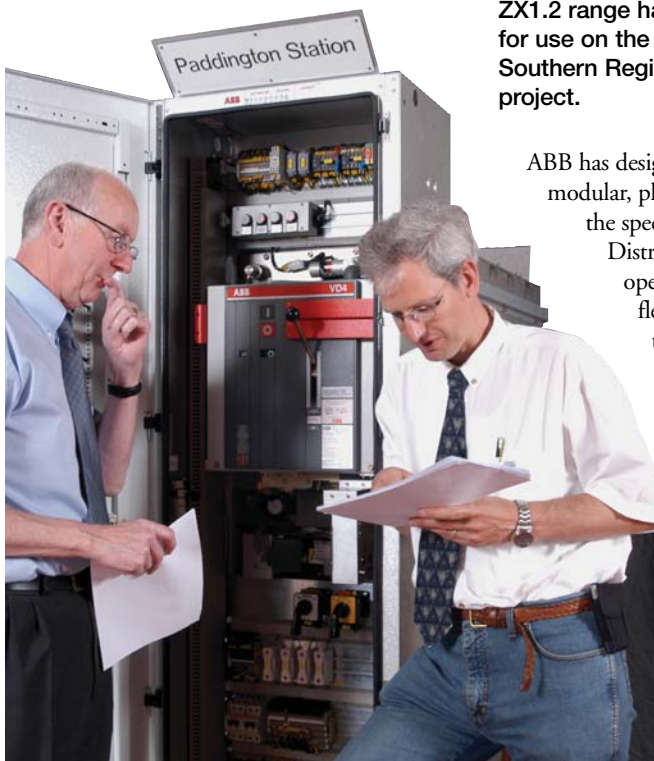


ABB has designed the ZX1.2 range with a modular, plug-in approach which meets the specific needs of Electricity Distribution Network owners and operators by providing compact, flexible substation configurations to offer reliable and cost efficient switchgear solutions for single busbar applications. ZX1.2 is also ideally suited to a wide variety of utility and industrial applications wherever electricity is generated or distributed.

The key features of the ZX1.2 design include laser welded stainless steel enclosures, compact modular construction and the introduction of plug-in technology which

facilitates simple, controlled connections of busbar, cable, test bushings and voltage transformer without the need for 'on site' gas handling equipment.

All maintenance-free live components, such as switching devices and busbars, are contained under SF6 in gas-tight enclosures, which eliminate the effects of ageing processes and environmental influences to ensure maximum operator availability and a long service life.

The ZX1.2 design also offers easy cable access at the rear with termination fixing at a convenient height of 1250mm, generous provision for conventional control and protection devices, dedicated cable test sockets and full mechanical interlocking between the disconnect/earthing selector and the circuit breaker.

Current transformers can be mounted either in the circuit breaker gas compartment or externally on the HV cables. Alternatively, options are available for current and voltage sensors.

ZX1.2 switchgear was assessed against Electricity Association Technical Standard (EATS) 41-36 "Distribution switchgear for service up to 36kV (cable and overhead conductor connected)" and has been issued with a Notice of Conformity (NOC) certificate number 1027.

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