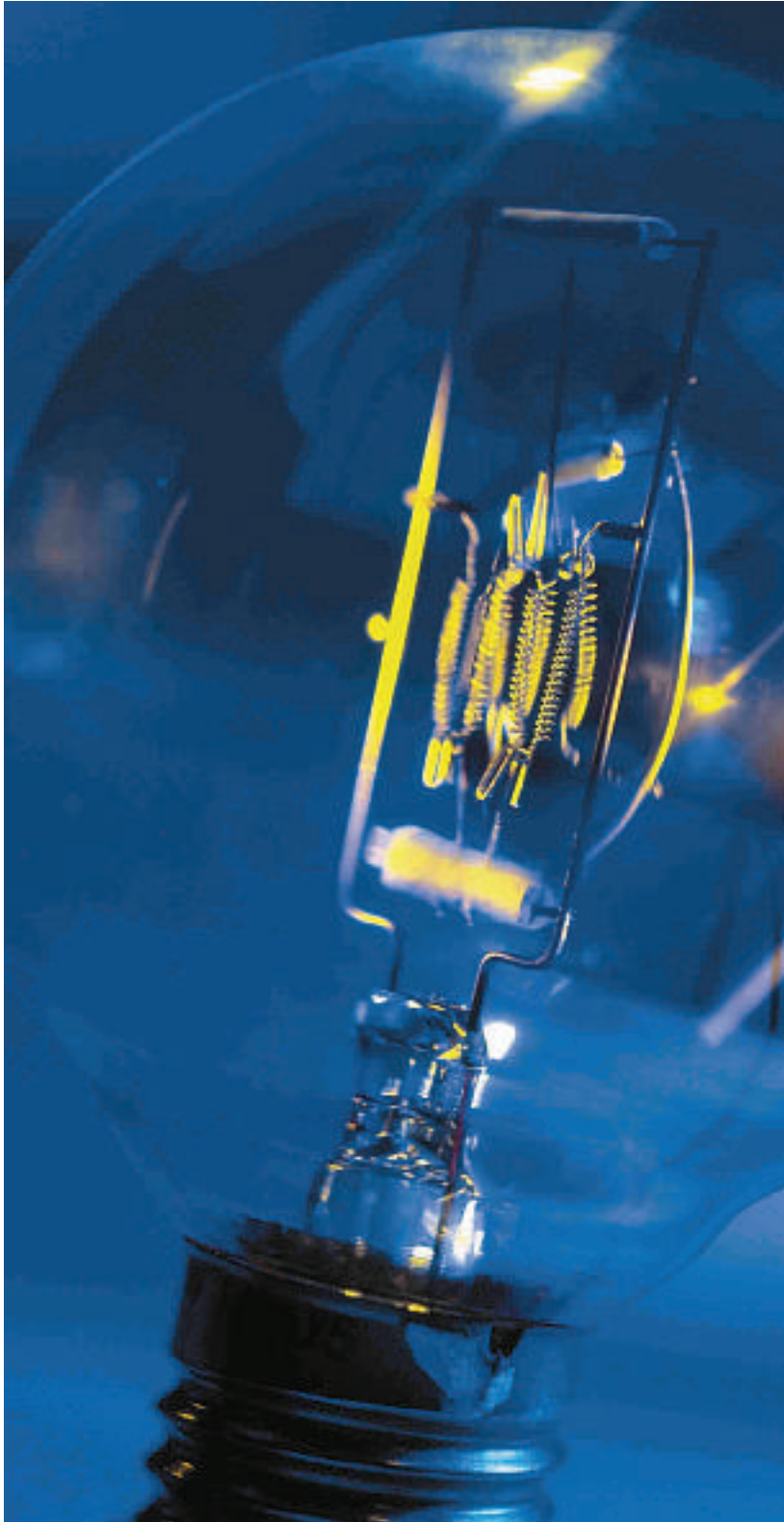


The electricity business



Georg Schett, Claes Ryttoft

The electricity industry has changed profoundly in recent years: deregulation, privatization, liberalization and even re-regulation are changing the way power is sold and distributed, while intensified competition is stimulating the search for new products to make the grid more reliable, cost-efficient and environmentally friendly.

Whereas availability is the main force driving the new economies, the mature economies are looking more for higher reliability and quality, largely because of their increasing dependence on process automation and Information Technology. The overriding aim of *all* electricity businesses, though, is better quality at lower lifecycle cost. The primary focus is still on up-front investment but, increasingly, lifecycle cost is considered in the specification of solutions and equipment.

Despite recent turmoil, demand for electricity has continued to grow across the globe and can be expected to increase in the decades to come. Although the forecast growth in mature economies, related to anticipated investment in IT infrastructure such as large server farms, has been adjusted downwards, demand in the new economies, especially China, has grown at an unprecedented rate.

In most countries, the trend toward renewable energy sources has continued and growth targets have been formulated by political bodies. Strong growth has been seen in the wind energy

business, now complemented by other natural sources such as biomass and biogas. New business models for these natural resources have been developed and are being implemented. Smaller and medium-size companies are proving to be profuse sources of new ideas.

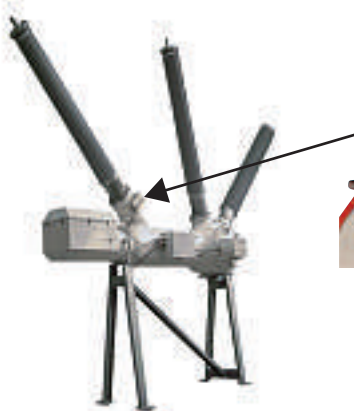
The challenge for power players like ABB is to help ensure continued supply and delivery in today's climate of deregulation and technological change.

It's a challenge ABB is embracing. In this issue, we hope to share the ways in which our knowledge and product development are evolving through ongoing research and a company organization that serves to inform us better of what it is our customers need and want.

ABB's organization

ABB is now organized into three divisions directly serving customer segments in utilities, industries and oil and gas. These, in turn, are served by products manufactured by a further two divisions, power and automation, which are also serving third parties such as other OEMs and EPC (Engineering Procurement Contracting) companies.

The task of the Utilities division is to develop solutions and services that address specific utility needs. This division has a very strong position in the transmission market, where it is a full-fledged supplier of all types of systems, from SCADA/EMS to HVDC and FACTS devices. Substantial research and development, as well as ongoing addition of product features, accommodate specific utility needs.



1 More and more power products are being fitted with integrated electronics

Significantly, the operating cost of a product over its lifetime keeps decreasing, largely thanks to progress in automation and its enabling software and information technologies. Because of the growing demand for process automation, ABB has hundreds of scientists in its Utilities division, developing and enhancing software solutions in the service of thousands of products. A similar picture is seen in the Power Technology Products division.

ABB's customers only have to deal with the division that serves its particular industry. The advantage for our customers is clear: simpler communication and a one-stop shop with a familiar contact person.

But the advantage for ABB is just as important: technology product managers, for example, will get much clearer feedback on the specific needs of each industry regarding power and automation products. ABB sales representatives in each industry division will facilitate this.

Charting the future

Three of the top priorities in power technology and the utility domains are: to create value by integrating power and

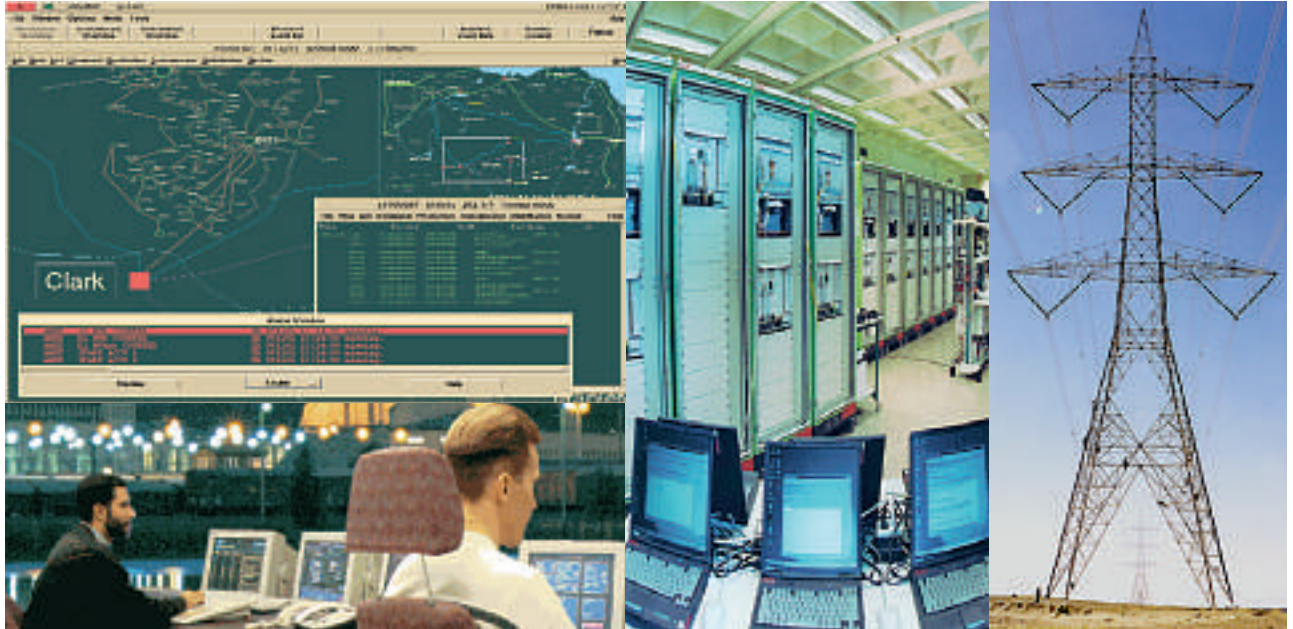
automation products; to rationalize and streamline product and solution offerings; and to establish the Industrial IT architecture as the backbone that seamlessly interconnects all our products and processes, leading ultimately to true 'plug and produce'.

And other exciting new things are being created by ABB, like integrated IT solutions that exploit the strengths of the Industrial IT architecture to improve workflow, and technology to manage assets over their entire lifecycle.

ABB is also continuing to develop solutions for transmission interconnections based on HVAC and HVDC technologies, as well as new solutions to manage congestion.

Combination of power and automation technology products

With a complete portfolio of power and automation technology products, ABB is able to serve all its customers' needs, from high-voltage AC and DC transmission systems through distribution and low-voltage systems to power electronics-based drives, automated as well as remote-controlled. There is virtually no customer in the power business that does not need both power and automa-



tion technology. Putting them together makes a lot of sense.

Increasingly, power technology products are equipped with integrated electronics devices, for control and protection or monitoring and diagnostics **1**. They are connected to higher-level systems by means of fiber optic buses. Substation automation has been rationalized over time and thousands of hard-wired connections on all levels have been gradually replaced by a few optical fibers.

ABB is actively promoting international standardization of such connections in order to open access to third party equipment. The first part of just such an IEC standard is available (IEC 61850-9-1). Based on this new standard, interoperability tests between ABB and other vendors have been successfully passed at KEMA. ABB's Industrial IT is

the architecture which will structure and organize real-time data and which will convert these data into meaningful packages of information, customized for specific functions.

Rationalization of ABB's product portfolio

ABB is simplifying its processes and standardizing its products in order to tap a global market and meet consumer expectations.

Historically, the power manufacturing business has tended to be very local, even protected, and this resulted in a range of products specific to individual countries and regions and in substantial overlaps in function, with standardization conspicuously absent.

Buying patterns, however, have changed profoundly. Today, global markets are demanding global products.

In fact, the power technologies business is challenged by the same consumer expectations that drove the PC market years ago: Customers want a product to be compatible with whatever state-of-the-art technologies they may use, irrespective of where the new product was made or purchased. And they want the product made for the lowest possible cost.

Consequently, ABB is in the throes of streamlining and harmonizing its product portfolio. Together with the streamlining of production centers with dedicated markets, such as those producing products for a specific region, ABB will manufacture certain products in specific factories which are intended to serve global markets. Thus, ABB factories can focus on one specific type of product for the global market and capitalize on economies of scale.

The obvious benefits for our customers will be much better product and solution transparency, better quality and shorter delivery times, and product uniformity across countries.

ABB's R&D activities in the Power Technology area are focusing on the development of global platforms in technologies and components to provide base modules for a streamlined, but global, product portfolio. An example of such a technology platform can be seen in **2**. For customers, this approach makes long-term maintenance easier and favors long-term availability of parts and components.

The platform should be flexible enough to meet special local requirements, without complete re-engineering and redesign, as was the case before. For customers this approach suggests substantial improvements in long-term maintenance strategies and long-term availability of parts and components.

New and improved solutions from the Utilities division

As well as combining products and services into solutions that address specific utility needs, ABB's Utilities division is also developing new directions with a focus on asset management. Among other things, we offer resources for asset management consulting, as well as services and tools for asset assessment, asset planning, etc.

The Utilities division is active in other areas, too:

■ Power plant automation and optimization. It is less well-known that, with

a market share of over 30%, ABB is by far the market leader in this field. One of the more exciting solutions soon to be offered is a system to predict the life-cycle of components in a combined cycle power plant, taking into account how the plant is operated.

■ Automation and control of water plants and pipelines. ABB is very active here, especially in large water plants, and we will enhance our offerings considerably as we migrate to the new Industrial IT based automation platform

■ Central markets (RTO/ISO). Deregulation has entered a period of uncertainty lately. For example, in the USA a decision by Congress/FERC is pending which will probably create a number of RTOs. ABB is well positioned to be a supplier in this market thanks to our experience with the California

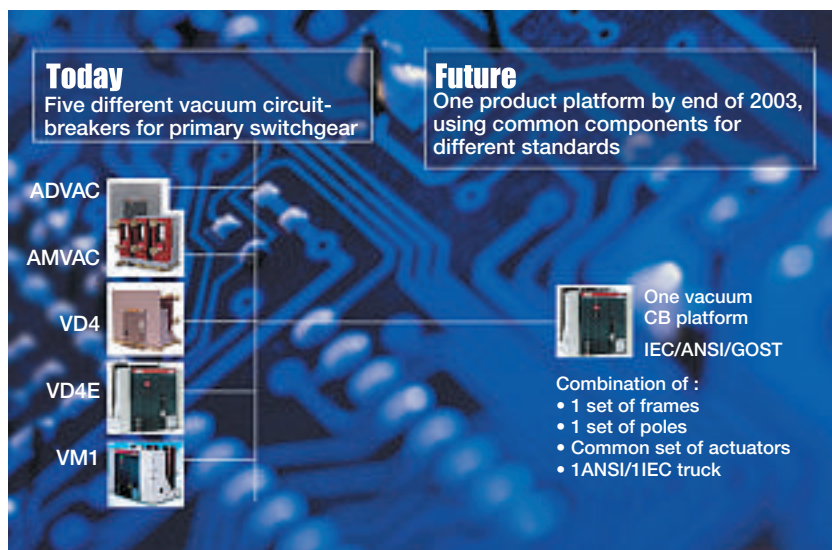
ISO, Alberta power pool, Ontario IMO, etc.

Industrial IT

Industrial IT is to be the architecture that will seamlessly interconnect all our products, solutions and processes, and allow our customers, service partners and third parties to connect with them too.

Such seamless integration has existed in the office for some time, allowing data exchange and reference between programs and documents, but has been absent in industry until fairly recently. The reason for this has been the wide range of completely different target applications, such as CAD, ERP, document management systems, real-time control and protection tools, Maintenance Management Systems, monitoring and diagnostics, engineering tools, and so on.

2 Medium-voltage breaker technology platform





The consequence will be a substantial increase in the efficiency of utility businesses.

The basic level of Industrial IT is documentation. All of our Power Technology products are already certified and provide all documents in a digital format, which can be accessed through AIP.

ABB is working on software that will integrate more Industrial IT applications, with the eventual goal of enabling *all* ABB power technology products to communicate with each other. Products connected to AIP in this way will deliver real-time status data enabling optimal ordering, use, maintenance scheduling, service processes and many other functions.

In traditional utilities, for example, software systems such as SCADA, office automation, asset management and billing were completely separate. Most operating manuals, drawings and diagrams have been stored on paper. This has made it difficult in the past to find and update specific information.

ABB has led the move to rectify this situation, with an innovative software platform, based on Microsoft Windows, called AIP for Aspect Integration Platform. AIP is the foundation of Industrial IT, enabling the interconnection and simultaneous operation of the many and varied applications mentioned above, and much more.

Industrial IT enables the *total* integration of business processes with real-time and lifetime data management.

Renewables

Electricity is extremely important for economic development and social welfare. However, the consumption-related release of CO₂ appears to affect global climate, which is why ABB is manufacturing products and developing technologies that reduce the environmental impact of electricity generation, transmission and distribution.

As the world's number one supplier of wind power generators, transformers and controls, ABB is also in the ideal position to provide the technology needed to connect wind, and, indeed, other distributed sources such as biogas and solar, to the grid.

And ABB is working toward a more diversified system of power generation and distribution. We are leading the

development of underground and subsea transmission using HVDC and HVDC Light technology. HVDC Light, based on IGBT technology, makes environmentally sound DC transmission economical for shorter transmission distances and lower power ratings.

To keep our own house in order, ABB is applying ISO 14000 certification standards in all its factories, earning environmental certificates for our products and systems based on assessments of their full lifecycle.

In this issue of *ABB Review*, we invite you to take a closer look at some of the important power technology products and utility solutions ABB is developing.

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