

Leading transmission and distribution



Since ABB is a global leader in electrical power transmission and distribution, it is not surprising that the level of technological innovation is very high in this part of our business. A closer look at the new ABB products and systems being introduced to the market reveals that this innovation is taking place in many different forms and in several different areas of application.

By investing in the continuous improvement of certain basic technologies, such as cables, capacitors and power electronics modules, we are laying the foundation for future generations of key products and systems in HVDC (High-Voltage DC) transmission, substations and distribution systems. Our R&D in these areas has produced several breakthroughs in recent years: for example, we have introduced high energy density capacitors which have a 300% larger storage capacity and offer a 50% cost saving, while also being environmentally friendly. Another recent R&D highlight was the successful launch of our extruded 400-kV AC and 150-kV DC cables. A further R&D achievement of which we are proud is our Lopak power electronics module, which combines extreme compactness with low losses and low costs.

In other R&D areas in this field, we are rapidly combining emerging technologies, such as power electronics, micro-electronics, wireless communication and web technologies, with our traditional primary products. Several of these today have built-in capability for remote diagnostics and monitoring through web-servers. These intelligent products offer our customers some significant benefits, among them increased safety, more efficient operation and extended functionality. And they will play a vital role in assuring a high power quality for the networks of tomorrow.

We are particularly happy to see that ABB's R&D efforts in some areas are changing the rules of the game and have encouraged radical innovations. An example is our high-voltage cable based, oil-free transformer, Dryformer™, which represents a new paradigm in environmentally friendly transformer design. Similarly, ABB's Windformer™ creates a completely new paradigm for the wind generator industry, and at the same time represents a major step towards strengthening our position in the renewable and distributed power generation sector. Together with our microturbine and the newly signed cooperation agreement with DuPont in the field of fuel cells, we believe that we are making a significant contribution to shaping the future of this fast-growing industry.

The above-mentioned achievements inspire us to maintain our strong commitment to investing in the future of the transmission and distribution industry through R&D. We take pride in presenting some of the results in this issue of *ABB Review*.

Markus Bayegan

Executive Vice President
Group R&D and Technology
Member of the Group Executive Committee

Power transmission and distribution at the threshold of a new era

Power to the People

ABB's power transmission and power distribution businesses offer system solutions and products for the optimum transportation of electricity from its point of generation right through to the end-user. Incorporation of the very latest



automation technology in these products and solutions enables electricity suppliers to control and monitor the power flow with maximum flexibility. ABB is the leading manufacturer of electrical power T&D equipment and the only really full-scope provider of products, modules and systems for all transmission and distribution applications, including decentralized, energy-friendly electricity production. Windformer™, pictured on the front cover, is one element in ABB's distributed and renewable power generation strategy. It enables electricity to be generated from wind at costs comparable with those of conventional sources.

The world is changing fast.

Everyone talks about globalization, deregulation and privatization, the merits, the risks, the pros, the cons, the speed. We are in a new age of borderless competition. But not just giants have opportunities – through the Internet, small but highly specialized companies can access a global market, and at low cost.

The electricity business, so far local, protected and safe, is one of the last to undergo fundamental change, and the changes now beginning are possibly the most profound ever seen in the history of the industry. Whether we like it or not, it's happening.

One trend, however, survives this turmoil: the growth in electricity consumption will continue, with demand expected to grow from the present 16 TWh per year to 25 TWh in 2020.

It is not only growth that we shall see in this business, but a fundamental change in the way electricity is generated, transmitted and distributed. This is because the computerization of nearly all processes in our society requires ever-higher reliability. At the same time, competition will drive down the cost of electricity, which is on its way to becoming a high-quality, low-cost, environmentally friendly commodity.

Globalization, privatization and deregulation will lead to restructuring. The thousands of utilities operating in the market today will join forces over the next 10 to 20 years to become giants that will serve the entire globe. In 1999 alone, 124 such transactions were carried out with a total volume of 38 BUSD. Global players need global suppliers.

There will be tremendous pressure to employ environmentally friendly methods to meet the growth in electricity demand. Power generation will be more decen-



tralized. Renewable energies will play an increasing role, given the fact that global warming will be visible to everyone in the years to come. Society will endeavor to mitigate the release of CO₂ into the atmosphere with all the means at its disposal.

We have chosen to develop and offer the solutions to tomorrow's problems. Our products and systems include, for example, flexible AC and DC transmission systems, new economical cable technologies to take power cables underground, and standardized intelligent products and solutions for transmission and distribution. In order to increase the efficiency of our customers' facilities in the new deregulated electricity business environment, we supply business management systems based on advanced information technology. And to cope with increased demand for environmentally friendly and socially compatible power generation, we offer solutions based on decentralized power generation, such as microturbines and wind power. All our activities and products will be linked through the Internet to best serve our global customers.

We believe that the new world offers a multitude of opportunities for our customers. I invite you to join me on a tour of some of the technology highlights in the ABB Transmission and Distribution segments which will enable our customers to take full advantage of these opportunities. I wish you a very pleasant journey.

Sune Karlsson

Head of T&D Segments

Member of the Group Executive Committee