



The term “plug and play” has been applied in various domains to express the ease with which new components can be added to systems. There are few areas, however, where the concept is truer to its name than in an electricity supply. When we plug in an electrical device, we expect the electricity to reach that device immediately – every time and at any time.

It is precisely because this electrical supply is so reliable that it is so easily taken for granted. This edition of *ABB Review* explores some of the technologies that make sure the electricity gets into your socket.



Powering progress – the fascinating world behind the plug

In its World Energy Outlook 2007, the International Energy Agency (IEA) forecasts a doubling of global electrical energy consumption by 2030. The share of electricity in final energy consumption is expected to rise from 17 percent today to 22 percent in 2030. These prognoses indicate that more than \$ 20 trillion of investment are required.

In the developed and highly industrialized countries, the electrical grid, with its power plants and transmission and distribution systems, has grown over a century to become a mature infrastructure now requiring both refurbishment and adaptation to new sources and concepts of power generation. In the emerging countries and rapidly growing economies, electrical systems have to be substantially expanded to fulfill the economic needs of these societies.

We, as the end users, obtaining our electrical energy from the plug in our house, rarely think about the extensive infrastructure behind this plug. For us, electricity is a commodity, like so many other things in our modern society.

The variety of devices and the breathtaking complexity of the whole system behind the plug is the focus of this issue of *ABB Review*. As a market and technology leader for almost all equipment involved, we want to give you a glance at the technical development and the challenges our engineers and researchers face.

The value chain served by ABB extends from the electrical plug itself and its corresponding house installations via medium-voltage distribution and high-voltage transmission systems to generation in the power plants. Moreover, ABB contributes to efficient provision and transport of the primary energy used in power plants.

New concepts of distributed generation pose serious challenges to the grid and require more elaborate control systems than ever before. In addition, new grid topologies, efficient means of energy storage and improved power quality are issues to be solved. SmartGrids, as they are

called in Europe, or IntelliGrids in the United States, are subject to broad research activities in joint university-industry teams in which ABB plays an instrumental role.

ABB technology is also pioneering applications in connecting offshore wind farms of increasing size via long subsea cables to the main grid, and our high-voltage direct current systems turn out to be a competitive alternative for the transport of energy from remote places to megacities – an ever-growing need in emerging economies.

While the grids and infrastructure systems require new control schemes and interconnections, the components in the grid, such as circuit breakers, measuring devices or transformers, experience technical progress that is rarely recognized by the public; and substations, the crucial spots in a grid, get more and more compact.

The driving forces behind this fast development stem from challenges of the modern global society: urbanization, industrialization, population growth, environmental challenges and legal constraints. ABB has built its business strategy and the technical vision on those long-term trends.

In ABB's strategy for the next five years, published in September 2007, we tackle these challenges and as part of our response increase research and development efforts to provide solutions for the future.

I invite you to join us in this issue of *ABB Review* to explore the fascinating world of technology "behind the plug."

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