



The development of a new product from the initial idea to the final delivery is often a long and complex journey calling for the right decisions and insights at every turn. A successful completion may sometimes also depend on the timely convergence of different factors such as enabling technologies, market conditions and economic, ecological and social aspects. This edition of *ABB Review*, pathways to innovation, presents some of the greatest successes of ABB's labs and research centers of 2009.



Innovating tomorrow's technologies

It is sometimes said that genius is 99 percent perspiration and 1 percent innovation. In showcasing selected breakthroughs in the end-of-year edition of *ABB Review*, we are recognizing the dedication and resolve of the company's scientists and engineers, while bearing in mind that such a brief presentation of the final product often does little justice to the real development work involved. It is thus fitting that besides celebrating selected innovation highlights of the year, *ABB Review* furthermore reports how one of these projects received a prestigious distinction: The Marcus Wallenberg Prize was awarded to three ABB researchers for their work in the area of direct drives: Permanent magnet motors are (in certain applications) able to deliver the required speed and torque directly to the load, so eliminating the intermediate gearbox. This reduces the installation footprint while raising reliability and efficiency.

Another area covered in this edition of *ABB Review* is solar energy. The underlying principle is far from new: In fact the photovoltaic effect was recognized by A. E. Becquerel as long ago as 1839 and predates the commercial use of electricity by several decades. It was not until the 1950s, however, that the effect advanced beyond being a mere curiosity. Following decades of progress in prices and efficiency, the technology is now moving in the direction of price parity – the point at which the cost per kilowatt-hour matches that of conventional generation – at least in advantageous situations. Although ABB is not directly involved in manufacturing photovoltaic cells, it can supply much of the auxiliary equipment for control, protection and grid connection. The new PVS800 converter fulfills the high demands on efficiency, reliability and safety that photovoltaics need in order to be an economically viable proposition.

On a more long-term perspective, *ABB Review* looks at the Desertec Industrial Initiative, an ambitious plan to build large-scale solar power plants in the Sahara and Middle East and link these to Europe with power superhighways – aiming to cover 15 percent of Europe's electricity demands by 2050. With 90 percent of the world's population living within 3,000 km of a desert – a distance over which economic transmission is feasible – the concept is equally applicable in other areas.

Addressing industrial productivity, *ABB Review* presents two new robots. The IRB 2600 sets new standards in terms of its working area and ingress protection, whereas the smaller IRB 120 takes compactness to new levels. A WirelessHART™ transmitter permits the retrofitting of installed fieldbus devices by plugging in to a standard interface, while an optical caliper breaks new ground in the measurement of paper surfaces.

Based on the fundamental developments ABB has undertaken to more closely integrate process and substation-automation subsystems, the company is currently completing a major integration project in a refinery using ABB's Extended Automation System 800xA and the IEC 61850 standard.

On the topic of transportation, two marine stories are presented: One introduces the new Azipod® XO propulsion system and the other a monitoring solution to improve maintenance and reliability. The section is rounded off by a report on ABB's traction transformers for high-speed trains.

In the area of connectivity, *ABB Review* looks at the X-Plug, which is set to take the woes out of wiring medium-voltage switchgear control cabinets. As a different, yet equally important form of connectivity, we present ABB's personalized Web platform, which gives customers instant access to the information they want.

I hope that by highlighting these outputs from ABB's innovation and development processes, we are contributing to their impact, and inspiring you to put them to their best use.

Enjoy your reading.

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