

# Innovations



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## Dear Reader,

Technology is a defining aspect of modern society. To fathom how much we depend on individual technologies, we need look no further than the manufacturing processes on which we depend or the power-supply that keeps our lights burning. The extent to which tomorrow's world will be different from today's will depend to a significant degree on the technological progress and breakthroughs that will emerge between now and then.

Through its research and development labs, ABB is proud to play a central if not defining part in advancing some of the contributing technologies.

In this issue of *ABB Review*, 11 innovations selected from ABB labs across the globe are presented in short articles. Many of these are additionally discussed in greater depth in this, recent and upcoming issues of the journal.

One area that has led to huge changes in recent decades is power electronics. Compact and reliable semiconductor devices are permitting electrical power to be converted with an unprecedented degree of flexibility, efficiency and controllability. *ABB Review* dedicates three articles to drives and converters. One of these looks at the award-winning ACS 2000 drive, ABB's first transformerless medium-voltage drive.

Motors are important to virtually all manufacturing processes, and are customized for numerous different applications. One article looks at ABB's spark-free motors and their significance in explosion protection. In another article, we present ABB's low-loss synchronous motors. Zooming out to the broader picture of energy efficiency, a thought-provoking paper proposes that the CO<sub>2</sub> reduction from raising the efficiency of generating plants is equivalent to an alternative fuel, and shows how ABB products can achieve this.

Process plants use myriad sensors and actuators. Many of these require only small amounts of energy to function, but ensuring the continuity of this supply can present a significant challenge. An alternative to wires or batteries is extracting energy from their environment (eg, from thermoelectric effects or vibrations). *ABB Review* looks at this in an article on energy harvesting.

In the domain of transmission and distribution, ABB has played and is still playing a major role in the development of the IEC 61850 standard for substation communication. *ABB Review* dedicates an article to a significant milestone: the ongoing upgrade of a series of substations in Australia, representing the first commercial implementation of IEC 81850-9-2 LE. This subsection of the standard represents an important step forwards in digital communication in substations. Further articles look at different types of switchgear and at protecting transformers against lightning.

I trust that the innovations presented in this edition of *ABB Review* will raise your awareness of their potential and inspire you to find ways of putting them to good use.

Enjoy your reading!

A handwritten signature in blue ink that reads "Peter Terwiesch".

Peter Terwiesch  
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ABB Ltd.

