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## From the Editor

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The business environment in which the electric power and energy market operates is undergoing major changes due to the emergence of challenges common to all parts of the world, such as greater use of renewable energy and hydrogen and the supply of electric power to cities where populations are increasingly concentrated, and those specific to particular nations or regions, such as electricity market reform and aging infrastructure.

Hitachi intends to contribute to society by operating solution-based businesses that work with customers to offer solutions to a variety of challenges and draw on information technology (IT) based on the technology and experience with power systems that it has built up over time.

This issue of *Hitachi Review* presents some of the work being undertaken by Hitachi on these electric power and energy solutions. In Expert Insights, Professor Akihiko Yokoyama of the Graduate School of Frontier Sciences at The University of Tokyo contributes an article about the adoption of smart practices in the electric power and energy sectors. Technotalk presents an overview of progress by Hitachi's technology development and solution businesses on the key energy sector issues of the environment, economic efficiency, and security of electric power supply, and looks at the outlook for the future.

Other articles deal with the electricity market reforms currently underway in Japan, describing work on the cross-regional operation system and self-commutated direct current (DC) transmission systems for the national grid, and solutions for electric power companies that are designed for use under the full liberalization of electricity retailing.

In an example of collaborative creation with customers outside Japan, an article describes grid stabilization solutions that incorporate wide-area protection control systems and ancillary services that use energy storage systems. There is also an overview of a smart grid demonstration project and a description of the IT platform that underpins it. Articles on work relating to the energy mix focus on a 5-MW downwind turbine demonstration project and the development of a floating substation for offshore wind farms, and on safety improvement for nuclear power generation. Another article gives examples of solutions that utilize IT, one of Hitachi's strengths, describing engineering work that has been enhanced by use of the latest IT, including an advanced equipment maintenance service based around a technique for using data mining methods to identify signs of equipment abnormalities, and the construction, upgrading, and maintenance of electrical plants.

I hope this issue of *Hitachi Review* will provide you with helpful information about Hitachi technologies and solutions for the electric power and energy sectors.

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"Electric Power and Energy Solutions" Issue



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