

FOR IMMEDIATE RELEASE

Agreement with Bonneville Power Administration, U.S. Department of Energy to Conduct Demonstration Project for Grid Stabilization

Online Testing of New System for Grid Control to Prevent Major Power Outages

Tokyo, November 11, 2014 --- Hitachi, Ltd. (President & COO: Toshiaki Higashihara) and Hitachi America, Ltd. (President & CEO: Masaya Watanabe) today announced an agreement on joint research with the Bonneville Power Administration (BPA) of the U.S. Department of Energy to continue the development of a grid stabilization system.

The goal of the project is to develop and conduct PoC^{*1} testing of an online demonstration system over the next 21 months, beginning in October, with the cooperation of Chubu Electric Power Co., Inc. (CEPCO). CEPCO is one of the major electric utility companies in Japan, with much experience in development and use of a similar comprehensive grid stabilization system^{*2}. This new research effort will focus on integrating phasor measurement units (PMU)^{*3} data for tuning and validation of the calculated results.

In December 2012, Hitachi was selected by BPA to participate in its fiscal year 2013 Technology Innovation R&D program for a research project entitled, "Research into Grid Stabilization Systems to Facilitate Introduction of Renewable Energy." That project was completed in February.

The North American electricity market in recent years has seen growing use of renewable energy from sources such as wind and photovoltaic power generation, which produce variable output. The joint research project was prompted by the growing effects that renewable energy may impose on the grid as it becomes a larger proportion of the total power generated.

In particular, conventional grid control schemes may not adjust quickly enough as the amount of variable renewable energy grows. Variable renewables can cause fluctuations in voltage, current and frequency, and have the potential to degrade power quality, potentially resulting in major outages. With greater integration of variable renewable energy sources likely in the future, this creates a need to investigate new grid stabilization systems.

Based on the concepts developed by Hitachi in the past research project, the new project will use data collected from the grid in real time to conduct PoC testing of the new grid stabilization system as a grid control technology for preventing large outages caused by phenomena such as the flow-on effects of grid faults. The system was developed by combining grid analysis techniques and information technology with PMU, which are widely adopted in the United States. It will be installed at a BPA research facility and operated in parallel with online systems to investigate possible reliability

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improvements, economic benefits and viability for practical implementation.

Hitachi has a history of supplying switchgear, transformers, and other power distribution products to BPA. By strengthening its ties with BPA through its involvement in this new project, Hitachi aims to implement a new comprehensive grid stabilization system for overcoming the challenges faced by grids, and also to achieve the practical utilization and wider adoption of renewable energy.

- *1: Proof of Concept (PoC): Demonstrating the ability to implement a new concept, theory, or principle. PoC testing aims to verify the practicality of the most important ideas embodied by the concept.
- *2: Comprehensive grid stabilization system: A comprehensive protection and control system for wide-area grids that maintains stability, frequency, and voltage at a suitable level to ensure a reliable supply of electric power. The system performs the control operations required to stabilize the grid in the event of a grid accident. Hitachi develops comprehensive grid stabilization systems that incorporate computer systems.
- *3: Phasor Measurement Unit (PMU): A measurement device used for power grid analysis. PMUs measure power flow parameters such as phasor, voltage, and current in real time.

About Bonneville Power Administration, U.S. Department of Energy

The Bonneville Power Administration (BPA), headquartered in Portland, Ore., is a nonprofit federal power marketing agency under the U.S. Department of Energy that sells wholesale renewable hydropower from federal dams in the Columbia Basin and operates three-quarters of the high-voltage transmission lines in the Northwest. BPA also pursues breakthroughs that can increase efficiencies, solves operational challenges and reduce costs — all of which help maintain affordable, reliable electric power for the Northwest and lessen impacts to the environment. www.bpa.gov.

About Hitachi, Ltd.

Hitachi, Ltd. (TSE: 6501), headquartered in Tokyo, Japan, delivers innovations that answer society's challenges with our talented team and proven experience in global markets. The company's consolidated revenues for fiscal 2013 (ended March 31, 2014) totaled 9,616 billion yen (\$93.4 billion). Hitachi is focusing more than ever on the Social Innovation Business, which includes infrastructure systems, information & telecommunication systems, power systems, construction machinery, high functional materials & components, automotive systems, healthcare and others. For more information on Hitachi, please visit the company's website at <http://www.hitachi.com>.

Information contained in this news release is current as of the date of the press announcement, but may be subject to change without prior notice.
