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Hitachi Receives Order for Two Voltage-Sourced Frequency Converters for Chubu Electric Power Higashi Shimizu Substation

Contributing to the Stable Supply of Energy between Tokyo Electric and Chubu Electric Using the HVDC Technology of ABB

Tokyo, April 23, 2019 --- Hitachi, Ltd. (TSE: 6501, "Hitachi") today announced that it received an order from Chubu Electric Power Co., Inc. ("Chubu Electric") for the delivery of two Voltage-Sourced Frequency Converters (300,000 kW each; 1FC(1) and 3FC) for Higashi Shimizu Substation, equipment installation construction work and tests ("this Project").

In this Project, the system to be delivered uses Voltage Source Converter (VSC) High-Voltage Direct Current Transmission (HVDC)(2) power transmission technology, enabling interconnection between systems with different frequencies implemented by converting alternate current into direct current. Hitachi will construct the system with the combination of an ABB Ltd. ("ABB") HVDC converter together with control and protection sytem and Hitachi converter transformers based on the strategic partnership with ABB.

In the Great East Japan Earthquake that occurred on March 11, 2011, many large-scale power supplies were lost in areas where power was supplied by power companies in the Tohoku and Kanto regions. The situation required scheduled outages in some areas in the Kanto region because of the restricted capacity of the power interconnection lines on the amount of power interchange from other power company areas. To prevent this issue from reoccurring, the Organization for Cross-regional Coordination of Transmission Operators, Japan, which supervises the power interchange among power companies, has been advancing a priority project to increase the interconnection capacity between the 60 Hz area of Chubu Electric and the 50 Hz area of Tokyo Electric Power Grid ("TEPCO") from the current 1,200 MW to 3,000 MW. Chubu Electric has been developing an important project for increasing the interconnection capacity of the Higashi Shimizu Substation from 300 MW to 900 MW, which is scheduled to commence operation in FY2027.

This Project employs VSC-HVDC technology with fewer restrictions on the operation of system interconnection, which is capable of implementing a black start(3) even if one of the systems loses its power supply. Compared to Line Communicated Converter High-Voltage Direct Current Transmission (LCC-HVDC) technology that

has been used so far, VSC-HVDC technology can control the active power and reactive power in the system separately, which enables downsizing of peripheral devices such as the phase modifying equipment(4) and reduction of the installation area. It is a new technology that can be expected to stabilize effect on the power system.

In most HVDC projects(5) installed within Japan, Hitachi has taken charge of the technical development and arrangement of the projects, contributing to HVDC, which has operated to maintain Japan's high power quality and high availability(6)—one of the highest in the world. Hitachi also received an order for LCC-HVDC system for Hida Conversion Station in the Hida-Shinano DC Bulk Project between TEPCO's Shin Shinano Substation and Chubu Electric's Hida Conversion Station currently under construction; advancing system construction by using the phase modifying equipment of ABB. In this Project, by introducing ABB's top-class HVDC technology that delivers about 120 systems, which is about half of the world's DC power transmission systems for projects equivalent to the total of 130,000 MW, via Hitachi ABB HVDC Technologies, Ltd., established by Hitachi and ABB Ltd. for the HVDC business in Japan, in addition to Hitachi's accumulated technologies and knowhow from the power grid business and its findings in project management, frequency converters will be delivered that use world-class VSC-HVDC technology.

Atsushi Oda, Senior Vice President and Executive Officer, in charge of Nuclear Energy Business and Energy Business, said "Hitachi is scheduled to acquire the power grid business company from ABB through an 80.1% investment around the first half of 2020, and considers the HVDC business as one of Hitachi's main businesses. Moving forward, Hitachi will respond to the need for system interconnection equipment involved in enhancing system interconnection and the increased use of renewable energy that is predicted to occur in Japan in the future, contributing to the enhancement of system interconnection in Japan and overseas."

(1) FC: Frequency Converter
(2) HVDC: High Voltage Direct Current is a technology mainly for transmitting power between two power systems. The power from the power transmitting system is converted from alternate to direct current before transmitting power. The received power is again converted into alternate current in the power-receiving system to use the power. In this technology, electric loss, equipment installation area and construction costs can be reduced, making it suitable for use in long-distance power transmission and in interconnection between systems with different frequencies, and thus cannot be interconnected directly for alternate current power transmission.
(3) Black start: Startup from blackout
(4) Phase modifying equipment: Equipment for adjusting voltage and reducing voltage loss.
(5) Including FCs.
(6) Reported in "A Survey of the Reliability of HVDC Systems" at Conference Internationale des Grands Reseaux Electriques a Haute Tension (CIGRE).

About Hitachi, Ltd.

Hitachi, Ltd. (TSE: 6501), headquartered in Tokyo, Japan, delivers innovations that answer society's challenges, combining its operational technology, information technology, and products/systems. The company's consolidated revenues for fiscal 2017 (ended March 31, 2018) totaled 9,368.6 billion yen ($88.4 billion). The Hitachi Group is an innovation partner for the IoT era, and it has approximately 307,000 employees worldwide. Through collaborative creation with customers, Hitachi is deploying Social Innovation Business using digital technologies in a broad range of sectors, including Power/Energy, Industry/Distribution/Water, Urban Development, and Finance/Social Infrastructure/Healthcare. For more information on Hitachi, please visit the company's website at http://www.hitachi.com.

About Hitachi ABB HVDC Technologies, Ltd.

Hitachi ABB HVDC Technologies, Ltd. (HAB) for high-voltage direct current (HVDC) transmission business in Japan established in 2015. Hitachi own 51% of the joint venture and ABB own 49%.

HAB is based in Tokyo and provides ABB's latest technology to HVDC projects on which Hitachi is the prime contractor, taking full responsibility for all aspects of direct current (DC) systems from design to engineering and equipment supply as well as after-sales service. The intention is to contribute to wide-area electric power distribution networks in Japan by combining Hitachi's sales network, project management know-how, and quality assurance processes with leading-edge HVDC technology and system integration capability from ABB.

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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.
