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Participation in Smart Grid Demonstration Project in the Republic of Poland

Tokyo, February 23, 2015 – Hitachi, Ltd. (President & COO: Toshiaki Higashihara), Hitachi Chemical Co., Ltd. (President and CEO: Kazuyuki Tanaka), Sumitomo Mitsui Banking Corporation (President and CEO: Takeshi Kunibe), and The Japan Research Institute, Limited (Representative Director, President and CEO: Junsuke Fujii) today announced that they have been selected by New Energy and Industrial Technology Development Organization (NEDO) to undertake a feasibility study for a smart grid demonstration project, which is one of NEDO's demonstration project of international energy consumption efficiency technology and system, in the Republic of Poland. Hitachi will handle overall coordination of the demonstration project in its role as research leader, and will participate along with the other three companies in the preliminary survey, which will run from February to November 2015. The demonstration project is scheduled to run for approximately three years, following a review of the screening committee about the results of this study.

The demonstration project is a joint project between Japan and Poland. It will receive support from the Polish government and include participation by local companies. The preliminary survey will include site selection as well as determining which Polish businesses will participate and the scope of each sub-project.

As a member of the EU, Poland is increasing its wind power generation capacity to meet its ambitious target of supplying 15% of its electricity from renewable sources by 2020, and increasing this to 19% by 2030. Its installed capacity of wind power generation in 2013 was approximately 3.4GW, roughly half the 2020 target of 6.6GW. On the other hand, the country's electricity infrastructure is aging, with more than 50% of it having been constructed more than 40 years ago. Accordingly, it will be necessary to take steps; including upgrading and enhancing this infrastructure, in order to deal with this problem and to cope with the additional load that the installation of a large amount of wind power generation will impact on the power grid. Since this upgrading and enhancement will require major capital investment and will impose significant management challenges, there is growing interest in the use of Japanese technology for grid stabilization that can maintain reliable grid operation while also minimizing capital investment in parallel with achieving the targets for installing wind and other forms of renewable energy generation.

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The demonstration project aims to build grid stabilization control system (SPS^{*1}) that can both, minimize capital investment in the electricity infrastructure, and maintain stable grid operation at the same time, and to expand the use of renewable energy in Poland by adopting Japan's advanced technology for grid stabilization together with such technologies as energy storage systems and control techniques for the real time curtailment of wind power output.

The currently planned activities and participants in the demonstration project are as follows. The actual activities will be determined in more detail during the preliminary survey.

- (1) Demonstrate technology for keeping supply and demand in balance by connecting energy storage systems to the grid to curtail the output of wind power generation (Hitachi, Ltd., Hitachi Chemical Co., Ltd.)

This project aims to mitigate short-term fluctuations in the output of wind power generation during normal operation, and to utilize electric power that would otherwise go to waste during times of low electricity demand by using the excess power to charge energy storage systems. It also seeks to use the energy storage system to keep supply and demand in balance when curtailing the output of wind power generation. In particular, the project aims to demonstrate techniques that use the energy storage system that is highly efficient at both charging and discharging as a device for maintaining the balance of supply and demand.

- (2) Demonstrate grid stabilization technology for preventing overloads on transmission lines (Hitachi, Ltd.)

This project aims to demonstrate SPS-based grid stabilization technology that operates automatically to curtail the output of wind power generation and perform grid control when an overload occurs on a transmission line due to a grid fault or other reason. The SPS devises actions to take are based on simulations of how the grid will respond to a fault, calculated using online information from the grid. When an actual fault occurs, the SPS prevents transmission line overloads by using the results of these pre-calculated online simulations to perform automatic control.

- (3) Demonstrate hybrid energy storage system using lithium-ion batteries that is designed for use with wind power generation (Hitachi Chemical Co., Ltd.)

This project involves a hybrid energy storage system with excellent performance and economics that combines lead-acid and lithium-ion batteries. It aims to minimize the quantity of expensive lithium-ion batteries and reduce the total cost of the energy storage system by using high-output lithium-ion batteries that are able to mitigate short-term fluctuations in wind power generation. Furthermore, because of a concern that reducing the installed capacity of the batteries will adversely affect their operating life, the project also aims to ascertain the optimum capacity that balances battery life against installation cost.

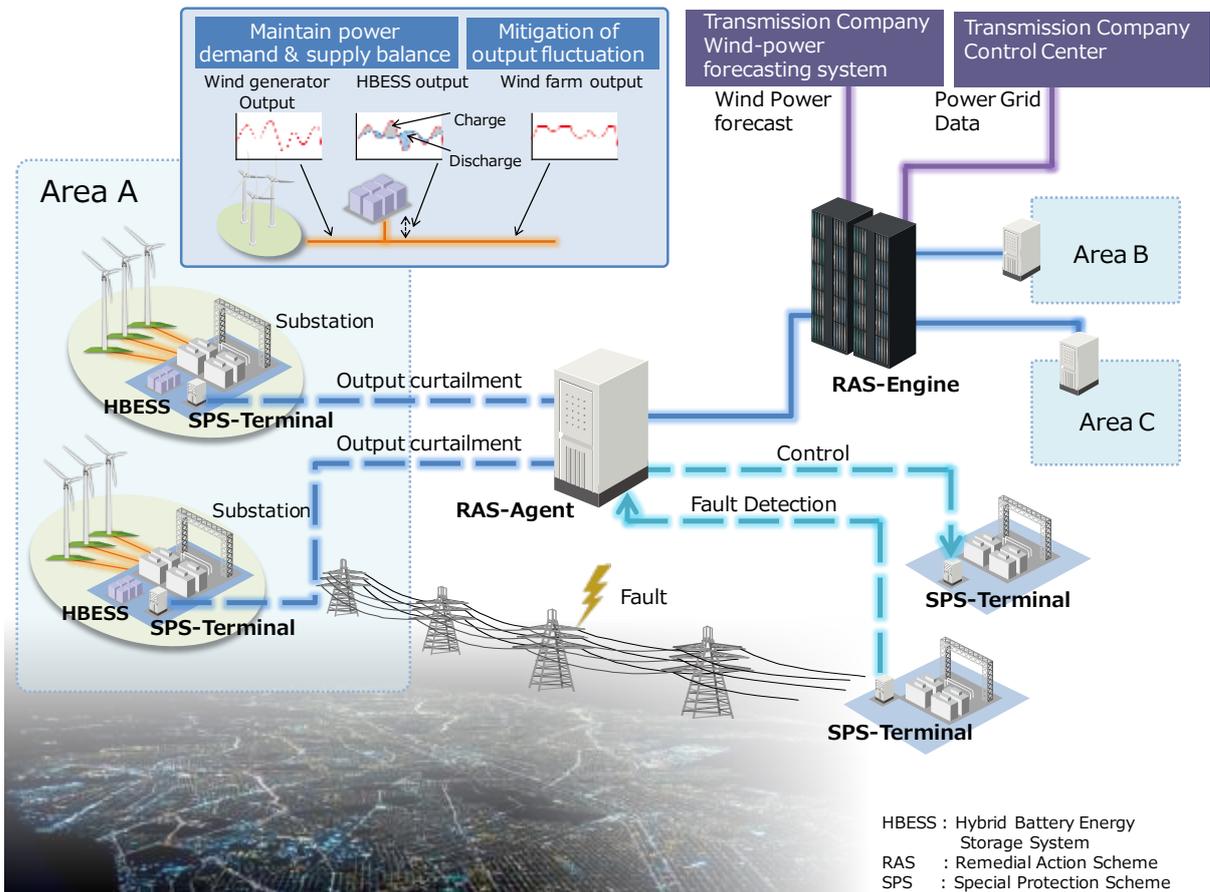
(4) Study of business models for SPSs and energy storage systems, and their potential for further penetration

(The Japan Research Institute, Limited, Sumitomo Mitsui Banking Corporation)

The Japan Research Institute will conduct the preliminary survey and demonstration project to study business models by identifying the stakeholders in SPSs and energy storage systems, and the benefits of their use. It will also study some issues such as support for policy making aimed at improving their economics, and measures for standardization that will enable further penetration. Sumitomo Mitsui Banking Corporation intends to explore various financial structures.

*1 SPS: Special Protection Scheme

■ Conceptual diagram



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