

Approaches for the large scale PV integration into the power grid

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Abstract

The use of the renewable energy is much more emphasized in present Japan because nuclear plants are hardly in regular operation due to the East Japan Great Earthquake though the expansion of the use of the renewable energy of the photovoltaic generation and wind power generation, etc. has been claimed so far for achieving the low carbon society.

In Japan, an aggressive target to integrate PV installed capacity into 28 million kW in 2020 and 53 million kW in 2030 was set up by the Government in 2009 and the foundation of the subsidy, the tax system measures, and the excess electricity purchase scheme etc. have been promoted. This year, a new bill for Feed-in-Tariff to obligate the whole amount purchase of renewable energy is under Diet deliberation to be enacted as a further integration plan. Consequently, this would accelerate the integration of renewable energy greatly.

The Kansai Electric Power Company has been taking the lead in the nuclear energy development as a low carbon energy source which doesn't depend on the fossil fuel, and technological development of the photovoltaic generation and wind power generation. Recently we have also made efforts to construct our own renewable energy power plants such as mega-solar power plant in advance of the electric power company in Japan and the wind farm by affiliate, etc.

We are now working aggressively to develop variety of technologies to ensure the stable electricity supply in case a large amount of renewable energy is introduced with the help of FIT scheme and connected to our power grid.

In this thesis, we introduce the development of precise prediction method of PV output, new demand-and-supply control system using battery system, and integrated battery SCADA system as well as the upgrading of the distribution automation system etc. as countermeasure technologies for a large scale integration of the photovoltaic generation.