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Abstract

Title: Green Transformation of Telecommunications Power Systems and VPP/DR Initiatives

Reducing greenhouse gas emissions, including CO_2, is one of the most critical global challenges. In parallel, the rapid growth of ICT services has significantly increased electricity consumption, leading to a strong demand for energy-efficient technologies in communication infrastructures.

In NTT DOCOMO, approximately 70% of total electricity consumption is attributed to nationwide mobile base stations. To address this issue, “green base stations” have been developed by introducing renewable energy sources such as solar panels along with large-capacity battery systems. These systems supply power to radio equipment, while surplus solar energy is stored in lithium-ion batteries for efficient utilization.

In recent years, the need for enhancing resilience against increasingly severe natural disasters and stabilizing the power supply-demand balance has become more important. In base stations, backup battery systems are installed to ensure continuous operation during power outages, and upgrading these systems from conventional lead-acid batteries to lithium-ion batteries is being considered. Furthermore, battery utilization plays a crucial role in peak load reduction by storing energy during low-demand periods and discharging it during peak demand, thereby reducing the burden on the power grid. In addition, solar power generation, which aligns with daytime peak demand, contributes further to peak shaving.

This presentation introduces technologies for applying renewable energy to mobile base stations, as well as control methods for charge and discharge of backup battery systems, aiming at achieving both energy efficiency and power system stability.