

Technical and Cost Evaluation on SMES for Electric Power Compensation

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Abstract - RASMES (Research Association of Superconducting Magnetic Energy Storage) in Japan developed a roadmap of SMES for punctuating electric power compensation of renewable energy systems. Based on the progress of large superconducting coils, the technical status is already established to develop the several MWh class SMES for frequency control, load fluctuation compensation, and generation fluctuation compensation. With integrated operations of several dispersed SMES systems, it is expected that the 100 MWh class SMES for load fluctuation leveling (peak cut) can be introduced in the period of 2020-30, and the first 1GWh class SMES for daily load leveling can be installed in the period of 2030-40. From the results of Japanese national projects, experimental device developments and SMES design studies, if the output power of SMES is 100MW, the target cost of SMES can be evaluated with 2000USD/kW of the unit cost per output power (the unit cost per kW).

Index Terms – Cost estimation, power compensation, renewable energy, superconducting magnetic energy storage.

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