

## Battery State of Charge Management Algorithm for Photovoltaic Ramp Rate Control

**Authors :** Nam Kyu Kim, Hee Jun Cha, Jae Jin Seo, Dong Jun Won

**Abstract :** Output power of a photovoltaic (PV) generator depends on incident solar irradiance. If the clouds pass or the climate condition is bad, the PV output fluctuates frequently. When PV generator is connected to the grid, these fluctuations adversely affect power quality. Thus, ramp rate control with battery energy storage system (BESS) is needed to reduce PV output fluctuations. At the same time, for effective BESS operation and sizing the optimal BESS capacity, managing state of charge (SOC) is the most important part. In addition, managing SOC helps to avoid violating the SOC operating range of BESS when performing renewable integration (RI) continuously. As PV and BESS increase, the SOC management of BESS will become more important in the future. This paper presents the SOC management algorithm which helps to operate effectively BESS, and has focused on method to manage SOC while reducing PV output fluctuations. A simulation model is developed in PSCAD/EMTDC software. The simulation results show that the SOC is maintained within the operating range by adjusting the output distribution according to the SOC of the BESS.

**Keywords :** battery energy storage system, ramp rate control, renewable integration, SOC management

**Conference Title :** ICEMB 2017 : International Conference on Energy Management and Biofuels

**Conference Location :** Paris, France

**Conference Dates :** June 25-26, 2017