

Measuring the degradation of a power grid-connected BESS using a new data-driven indicator

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Abstract-

Large battery energy storage systems are increasingly used in power grid systems, electric vehicles, etc. and will continue to expand in industry in the imminent future. Knowing the state of health (SOH) of the batteries used in these BESS is critical to manage their maintenance and operation throughout their life, with the economic implications that this entails. This study presents a methodology that uses a health indicator, already tested with laboratory batteries, adapted to the type of operation of a BESS that operates in real life connected to the power grid, for primary frequency regulation, making it possible to know the evolution of the degradation of the BMS racks that integrate it. It is also possible to compare the SOH of these BMS racks using only two measurements employed in the monitoring, voltage and current. This has no impact on the performance of the BESS to measure its degradation and can be used in any BESS in operation. Furthermore, the results obtained with models developed in this study are presented and compared with actual data measured in BESS capacity tests over a year of life. Thus, this methodology makes for a powerful tool in the monitoring and maintenance of the BESS.

Index Terms- Battery energy storage system; Battery management system; State of health; Health Indicator; Degradation speed ratio

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