Innovation type:
New/improved functionalites, services and work processes

TRL: # 9

Year: 2021

Contact:
Lede (Signe Marie Oland)

Potential users:
Owners/operator of batteries

Pilot project: Fast frequency reserve

In this pilot project a battery energy storage system (BESS) was tested to identify its capability to perform fast frequency response (FFR) service. The main challenge was to fulfill technical requirements related to frequency response, and develop procedures related to plan, manage, activate, and deliver FFR service. The battery energy storage system has a capacity of 1 MW and is installed at Skagerak Arena football stadium in Skien, Norway. The pilot project was performed from May to October 2021. According to the requirements, the battery energy storage system should be activated within 1.0 seconds, and at 49.6 Hz, and for a duration of 30 seconds.

Challenge

Traditionally, ancillary services (FFR), have been delivered from large generation units, but it is also a potential to deliver such services from smaller flexible resources. The need for FFR is largest in periods with low consumption and generation, typically during the summer. In this pilot project technical requirements and important procedures required for a Battery Energy Storage System (BESS) to contribute with FFR service has been evaluated.

Solution

Experiences from the pilot show that a BESS can contribute with FFR service in combination with primary tasks for a battery. The primary task for Skagerak Energilab is to be back-up (as a microgrid) for the football station in case of a grid power outage. An additional benefit from the pilot was that using a Li-ion battery for FFR service has been verified and showing that value stacking for different services from a BESS is possible in practice. Prior to this pilot, the Norwegian TSO had limited experience with using a BESS for FFR services. This pilot project contributes with new knowledge for all the involved stakeholders, and also for further development of the balancing market.

Potential

The vendor of the BESS (Hitachi Energy) had to implement new functionalities to satisfy technical requirements for FFR provision. These functionalities of the pilot were further developed into a commercial solution, available for other owners of batteries from Hitachi Energy. The innovation was immediately taken into use, because after the end of the pilot period, Lede (DSO) entered into an agreement with the TSO to continue deliverance until the end of the year 2021, and perhaps further on.

Reference in CINELDI

Pilot sluttrapport: Fast Frequency Reserve (in Norwegian)