



UTILITY SCALE GRID ENERGY STORAGE

ANCILLARY SERVICES MARKET

- Frequency Regulation Services: The fast response characteristics of BESS (milli-second response) makes them especially suitable for frequency regulation (grid balancing)
- Voltage Support: BESS can compensate grid disturbances (e.g., voltage magnitude, harmonics, etc.) by pumping reactive energy into the system

PEAKER PLANTS

BESS along with natural gas and pumped hydro is well placed to cater to provide power during the ramping up phase of the duck curve. However limited availability of natural gas and long gestation periods for hydro plants make BESS an attractive proposition. BESS coupled with RE, can provide dispatchable power during periods of peak power requirement

ENERGY STORAGE

The energy storage requirement for deferring of distribution infrastructure upgrades especially considering rapid electrification of the automotive sector as planned by the Government of India. Rapid automotive electrification may strain the distribution grid if adequate planning is not carried out. Advanced energy storage can be deployed to defer the considerable cost associated with distribution Infrastructure by offering a solution that can be added to the grid incrementally, which coincides with the incremental increase in demand. Storage can also be permitted and placed close to load, thus relieving the complete delivery chain—from the original source of generation, through the T&D delivery chain and to the point of use.

CAPACITY FIRMING/ PV SMOOTHING

The Intermittency of solar, wind and other renewable energy sources can be a source of grid instability. The generation of renewable energy is growing at a tremendous pace aided by GOI target of 175 GW of solar and wind by 2022. BESS can be utilized for capacity firming for renewable energy sources. This functionality is extremely critical in areas where the grid is weak or RE percentage is a substantial mix of overall generation (example island grids)

REDUCING SCHEDULING AND FORECASTING ERRORS

Both utility-scale solar and wind have become increasingly better in scheduling and forecasting over the years. However, due to the unpredictability of hourly weather conditions (especially for wind); forecasting errors may lead to a substantial mismatch between scheduled energy and actual energy production. As the grid becomes predominantly Renewable Energy based; there is a trend towards increased penalty for such deviant behaviour. A BESS coupled with the RE plant can substantially reduce this error and help in grid stabilization.

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