

A Review of Current Trends in Grid Balancing Technologies

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Abstract : While emerging as plausible sources of energy generation, new technologies, including photovoltaic (PV) solar panels, home battery energy storage systems, and electric vehicles (EVs), are exacerbating the operations of power distribution networks for distribution network operators (DNOs). Renewable energy production fluctuates, stemming in over- and under-generation energy, further complicating the issue of storing excess power and using it when necessary. Though renewable sources are non-exhausting and reoccurring, power storage of generated energy is almost as paramount as to its production process. Hence, to ensure smooth and efficient power storage at different levels, Grid balancing technologies are consequently the next theme to address in the sustainable space and growth sector. But, since hydrogen batteries were used in the earlier days to achieve this balance in power grids, new, recent advancements are more efficient and capable per unit of storage space while also being distinctive in terms of their underlying operating principles. The underlying technologies of "Flow batteries," "Gravity Solutions," and "Graphene Batteries" already have entered the market and are leading the race for efficient storage device solutions that will improve and stabilize Grid networks, followed by Grid balancing technologies.

Keywords : flow batteries, grid balancing, hydrogen batteries, power storage, solar

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