

# A Review of Energy Storage Technologies for Enhancing Grid Stability in Renewable Energy Systems

Sujit Jalkote<sup>1</sup> and Dr. Rakesh Kumar Yadav<sup>2</sup>

<sup>1</sup>Research Scholar, Department of Electrical Engineering

<sup>2</sup>Professor, Department of Electrical Engineering

Glocal University, Saharanpur, U.P

**Abstract:** *Modern power systems have undergone tremendous change as a result of the quick integration of renewable energy sources like wind and solar. However, maintaining grid stability, dependability, and power quality is made more difficult by the sporadic and irregular nature of these energy sources. In order to improve grid flexibility, balance supply and demand, and guarantee uninterrupted power delivery, energy storage technologies have become an essential option. This review study looks at a number of energy storage technologies, such as flywheel storage, compressed air energy storage, pumped hydro storage, battery energy storage systems, and supercapacitors. The paper outlines their benefits, drawbacks, and uses in the integration of renewable energy. The study also explores how these technologies are used in load balancing, peak shaving, voltage support, and frequency control. According to the results, grid stability may be greatly improved and the shift to sustainable energy systems can be supported by the strategic deployment of hybrid energy storage systems.*

**Keywords:** Renewable Energy, Energy Storage Technologies, Grid Stability

