

## **Design and Analysis of 1.4 MW Hybrid Saps System for Rural Electrification in Off-Grid Applications**

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**Abstract :** In this paper, optimal design of hybrid standalone power supply system (SAPS) is done for off grid applications in remote areas where transmission of power is difficult. The hybrid SAPS system uses two primary energy sources, wind and solar, and in addition to these diesel generator is also connected to meet the load demand in case of failure of wind and solar system. This paper presents mathematical modeling of 1.4 MW hybrid SAPS system for rural electrification. This paper firstly focuses on mathematical modeling of PV module connected in a string, secondly focuses on modeling of permanent magnet wind turbine generator (PMWTG). The hybrid controller is also designed for selection of power from the source available as per the load demand. The power output of hybrid SAPS system is analyzed for meeting load demands at urban as well as for rural areas.

**Keywords :** SAPS, DG, PMWTG, rural area, off-grid, PV module

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