

Design and Optimization of Diesel-Photovoltaic-Battery Hybrid System for Isolated Application

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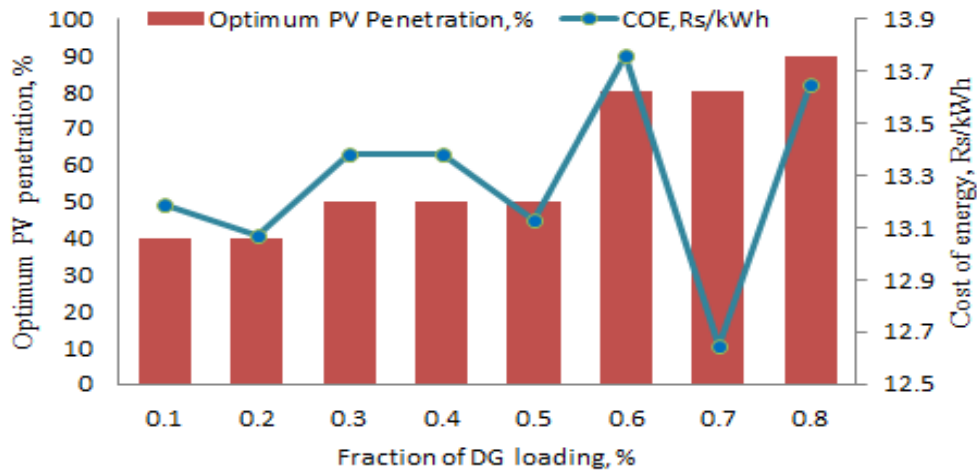


Fig. Variation of fraction of DG loading on optimum penetration & cost of energy

Solar based power supply system, like Photovoltaic (PV) Diesel Battery System is reliable and provide suitable attractive option for decentralized power supply as well as where sunlight energy is available abundant in nature to become more and more use of non-renewable energy like Pune. Average solar radiation in Pune is 5.2 kwh/m²/day and latitude is 18.52° and longitude is 73.85°. Such hybrid system plants help to fulfil demand which help in proving the economic environmental sustainability of renewable energy. It consists of a PV panel, diesel generator and backup power source and battery system. In this report, time step simulation model for sizing of battery and diesel rating, energy stored in battery evaluation of PV-DG Battery power system is calculated.

The model is employed to define design space for specified supply load, reliability and diesel energy dispatch strategies as well as the generator fuel consumption which depends on operation of system components. The output of model provides several important sizing of battery and DG with example of specific load profile and finds minimum battery capacity at rating of various feasible design spaces for entire system using deterministic approach. Sizing curve also represent variation in PV Penetration and battery rating for a constant DG rating. It also defines relationship between fuel consumption with respect to PV penetration.