ABSTRACT

Hybrid **(PV/Battery/Diesel Generator)** system based on photovoltaic is considered an effective option to electrify remote and isolated areas far from grid. This is true for areas that receive high averages of solar radiation annually.

Design of a hybrid system consisting of photovoltaic (PV) panels, a diesel generator as a backup power source and a battery system supplying a small community in remote area were presented in this paper. In this remote area the total average demand of the house is **153396.36 kwh/year,** available solar energy **1211.8 kWh/m2/year. 81kw size of PV, 25kw diesel generator**, **45kw converter and 200 number** of batteries are main parameters for this thesis .Other scenarios were also studied and analyzed in this paper to ascertain which of them the most appropriate considering cost and pollutant emissions. A simulation program using iterative approach is developed to optimize the sizes of PV system and battery bank. Specifications of the hybrid system components are then determined according to the optimized values. Solar radiation data is firstly analyzed and components of PV panels and diesel generator are modeled using **MATH LAB Simulink and ANSYS software and optimized using PVsyst and HOMER software.** Costs of different components, hourly solar radiation, primary load and ambient temperatures and other design considerations are inputs of the simulation program. It is found that electrifying rural small community using this hybrid system is very beneficial and competitive with other types of conventional sources as it decreases both operating costs and pollutant emissions.