

FEASIBILITY ANALYSIS OF A GRID CONNECTED PV/WIND OPTIONS FOR RURAL HEALTHCARE CENTRE USING HOMER

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ABSTRACT

Renewable energy system (RES) is the cost effective and reliable option for reducing energy bills and GHG emissions. The purpose of this study is to carry out a Feasibility Analysis of a Grid-Connected PV/Wind options for a Rural Healthcare Centre Using Hybrid Optimization Model for Electric Renewables (HOMER). The renewable energy feasibility study was conducted using HOMER optimization tool to evaluate the most appropriate renewable energy systems for the Clinic. Wind speed and solar radiations from NASA Surface Meteorology and Solar Energy web site are used along with the hourly load data for the Clinic to perform Simulation, Optimization and Sensitivity analysis for the RES. The RES feasibility study shows that the optimal grid-connected PV/Battery system is the most economically feasible option for the Healthcare Centre. The system consists of the Grid, 2kW PV Panels, two 6FM200D batteries and a 1kW converter. The Total Net Present Cost (NPC) for this system is \$8,901 with initial Capital Cost of \$2,800 and Levelized Cost of Electricity (COE) per kWh of \$0.096. This system will save 542.753kg (0.5427 tonnes) of carbon dioxide per annum. The result of this research shows that 43% of the electricity production is from renewable which means that the clinic will still get electricity supply even if the grid is interrupted for a long period of time.