

Small Wind Turbine Hybrid System for Remote Application: Egyptian Case Study

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Abstract : The objective of this research is to study the technical and economic performance of wind/diesel/battery (W/D/B) system supplying a remote small gathering of six families using HOMER software package. The electrical energy is to cater for the basic needs for which the daily load pattern is estimated. Net Present Cost (NPC) and Cost of Energy (COE) are used as economic criteria, while the measure of performance is % of power shortage. Technical and economic parameters are defined to estimate the feasibility of the system under study. Optimum system configurations are estimated for two sites. Using HOMER software, the simulation results showed that W/D/B systems are economical for the assumed community sites as the price of generated electricity is about 0.308 \$/kWh, without taking external benefits into considerations. W/D/B systems are more economical than W/B or diesel alone systems, as the COE is 0.86 \$/kWh for W/B and 0.357 \$/kWh for diesel alone.

Keywords : optimum energy systems, remote electrification, renewable energy, wind turbine systems

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