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## Feasibility Study of 1 MW Standalone Hybrid Energy System: For Technical Institutes

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### ABSTRACT

Hybrid energy system (HES) is a combination of different renewable resources such as wind, solar, biomass, small/micro hydro, with fossil fuel powered diesel generator to provide electric power. This paper gives the design idea of optimized Hybrid Energy System for a certain technical college over a conventional diesel generator for a particular site in eastern India (Kolkata). For this hybrid system, the meteorological data of Solar Insolation, hourly wind speed, are taken for Kolkata-Eastern India (Longitude 88° 22' and Latitude 22° 34' ) and the pattern of load consumption of technical college are studied and suitably modelled for optimization of the hybrid energy system using HOMER software. This paper gives the detail hypothetical study for standalone hybrid energy system for technical institute in five stages: (a) recent electric bill of the college for the year 2011. (b) Studying the load demand for every month in a year. (c) Calculating the maximum, minimum and the average load demand. (d) Introducing the solar data in HOMER software. (e) Designing the hybrid model. This system is more cost effective and environmental friendly over the conventional diesel generator. It should reduced approximate 70% - 80% fuel cost over conventional diesel generator and also reduced the emission of CO<sub>2</sub> and other harmful gasses in environments. The action plan is formed on the basis of cost effective modelling that is minimization of energy production cost in a long run.

### KEYWORDS

Hybrid Energy Systems; Technical Institute; PV-Solar; Optimization; DG Set

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### References

- [1] S. Ashok, " Optimized Model for Community-Based Hybrid Energy Systems," *Renewable Energy*, Vol. 32, No. 7, 2007, pp. 1155-1164. doi:10.1016/j.renene.2006.04.008
- [2] K. Katti and M. K. Khedkar, " Alternative Energy Facilities Based on Site Matching and Generation Unit Sizing for Remote Area Power Supply," *Renewable Energy*, Vol. 32, No. 8, 2007, pp. 1346-1362. doi:10.1016/j.renene.2006.06.001
- [3] M. J. Khan and M. T. Iqbal, " Pre-Feasibility Study of Stand-Alone Hybrid Energy Systems for Applications in Newfoundland," *Renewable Energy*, Vol. 30, No. 6, 2004, pp. 835-854. doi:10.1016/j.renene.2004.09.001
- [4] A. N. Celik, " The System Performance of Autonomous Photovoltaic-Wind Hybrid Energy Systems Using Synthetically Generated Weather Data," *Renewable Energy*, Vol. 27, No. 1, 2002, pp. 107-121. doi:10.1016/S0960-1481(01)00168-9
- [5] H. X. Yang, L. Lu and J. Burnett, " Weather Data and Probability Analysis of Hybrid Photovoltaic-Wind Power Generation Systems in Hong Kong," *Renewable Energy*, Vol. 28, No. 11, 2003, pp. 1813-1824. doi:10.1016/S0960-1481(03)00015-6
- [6] S. M. Shaahid and M. A. Elhadidy, " Opportunities for Utilization of Stand-Alone Hybrid (Photovoltaic +

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Diesel + Battery) Power Systems in Hot Climates," Renewable Energy, Vol. 28, No. 11, 2003, pp. 1741-1753. doi:10.1016/S0960-1481(03)00013-2

- [7] <https://analysis.nrel.gov/homer/>
- [8] M. A. Elhadidy and S. M. Shaahid, " Role of Hybrid (Wind + Diesel) Power Systems in Meeting Commercial Loads," Renewable Energy, Vol. 29, No. 12, 2004, pp. 109-118. doi:10.1016/S0960-1481(03)00067-3
- [9] P. Nema, R. K. Nema and S. Rangnekar, " Integrated Design Approach for Stand Alone PV-Solar and Wind Hybrid Energy System: For Rural Electrifications," International Conference on Advance Energy Systems (ICAER-2007), IIT Bombay, 12-14 December 2007, pp. 354-359.