

## Cost Analysis of Hybrid Wind Energy Generating System Considering CO<sub>2</sub> Emissions

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**Abstract :** The basic objective of the research is to study the effect of hybrid wind energy on the cost of generated electricity considering the cost of reduction CO<sub>2</sub> emissions. The system consists of small wind turbine(s), storage battery bank and a diesel generator (W/D/B). Using an optimization software package, different system configurations are investigated to reach optimum configuration based on the net present cost (NPC) and cost of energy (COE) as economic optimization criteria. The cost of avoided CO<sub>2</sub> is taken into consideration. The system is intended to supply the electrical load of a small community (gathering six families) in a remote Egyptian area. The investigated system is not connected to the electricity grid and may replace an existing conventional diesel powered electric supply system to reduce fuel consumption and CO<sub>2</sub> emissions. The simulation results showed that W/D energy system is more economic than diesel alone. The estimated COE is 0.308\$/kWh and extracting the cost of avoided CO<sub>2</sub>, the COE reached 0.226 \$/kWh which is an external benefit of wind turbine, as there are no pollutant emissions through operational phase.

**Keywords :** hybrid wind turbine systems, remote areas electrification, simulation of hybrid energy systems, techno-economic study

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