Hybrid solar and wind systems Egypt

Techno-enviro-socio-economic design and finite set model predictive current control of a grid-connected large-scale hybrid solar/wind energy system: A case study of Sokhna Industrial Zone, Egypt

A reliable methodology based on mine blast optimization algorithm for optimal sizing of hybrid PV-wind-FC system for remote area in Egypt. Renew. Energy, 95 (2016), pp. 367-380, 10.1016/j.renene.2016.04.030. View PDF View ... Optimal sizing of hybrid solar/wind/hydroelectric pumped storage energy system in Egypt based on different meta ...

DOI: 10.1016/j.energy.2023.129816 Corpus ID: 265557204; Techno-enviro-socio-economic design and finite set model predictive current control of a grid-connected large-scale hybrid solar/wind energy system: A case study of Sokhna Industrial Zone, Egypt

This study presented a two-stage research method for techno-enviro-socio-economic design optimization and model predictive control of large-scale-grid connected hybrid solar/wind energy systems. The hybrid system is supposed to provide the electricity demand of residential and industrial loads located in Sokhna Industrial Zone, Suez city, Egypt.

A MATLAB/Simulink code has been built to simulate these systems under the climatic conditions of two solar and wind-dominant locations in Egypt. ... Techno-enviro-socio-economic design and finite set model predictive current control of a grid-connected large-scale hybrid solar/wind energy system: A case study of Sokhna Industrial Zone, Egypt.

A hybrid system composed of a 1 kW PEM, a 1 kW solar system, and a 1 kW wind turbine was experimentally investigated by the authors. The investigated system was capable of generating up to 140 ml/min of hydrogen with an average solar irradiance of 200-800 W/m 2 and a wind speed of 2.0-5.0 m/s.

Optimal sizing of a hybrid microgrid system using solar, wind, ... Egypt. The developed system evaluates the cost of electricity, renewable fraction, and loss of power system probability through HOMER Pro simulation by assessing the feasibility and determining the optimal size. The outcomes results are then compared with five configurations of ...

Fig. 3 shows the flow chart of hybrid solar-wind resource map of Egypt determined by mesoscale modeling (Wind Atlas for Egypt, 2006), Fig. 4 shows a design of hybrid solar-wind resource, Fig. 5 shows the displays the atlas of the ...

Hence, the better choice is to install a hybrid solar wind system. The cost might be more than installing a single system, but it will be a one-time investment and better in the long run. How Does The Hybrid Solar

Wind System Work? Solar wind hybrid systems are needed to generate electricity during the summer and winter seasons.

Downloadable (with restrictions)! This article offers a cohesive design optimization and control framework of a large-scale grid-connected battery and battery-less hybrid solar/wind system. Primarily, a techno-enviro-socio-economic design optimization and feasibility analysis were performed for eight distinct energy alternatives. Secondly, a finite-set model predictive current ...

A hybrid polygeneration system based on renewable energy sources can overcome operation problems regarding energy systems where only one energy source is used (solar, wind, biomass) and allows one ...

a Wind resource map of Egypt: mean wind speed at 50 m a.g.l. determined by mesoscale modeling (Wind Atlas for Egypt 2006 (Mortensen et al.)). b Egypt"s solar potential. c Annual variation of ...

Optimal sizing of hybrid solar/wind/hydroelectric pumped storage energy system in Egypt based on different meta-heuristic techniques Environ Sci Pollut Res Int. 2020 Sep;27(26):32318-32340. doi: 10.1007/s11356-019-06566-0. Epub 2019 Nov 7. Authors Ahmed A Zaki Diab 1 ...

Evaluation of green hydrogen production using solar, wind, and hybrid technologies under various technical and financial scenarios for multi-sites in Egypt ScienceDirect

TABLE 3: SYSTEM ARCHITECTURE OF THE OPTIMIZED SYSTEM 150 kW PV Array 20 x 10kW-Siemens Wind turbine 100 kW Generator 1 Battery: 1 piece Trojan T-105 200 180 5 Lifetime throughput 845 kWh 1,000 kW Grid Inverter 200 kW Rectifier 200 kW TABLE 4: COST SUMMARY OF THE OPTIMIZED SYSTEM Biomass Generator 50 kW 20,000 18,000 1 $/hr ...

whereP WT represents the output power from the wind turbine (W), C P is the coefficient of performance, ? is the air density (kg/m 3), A is the swept area of the wind turbine rotor blades (m 2), and U is the wind speed normal to the hub of the wind turbine (m/s). Similarly, other forms of RES, such as photovoltaic power, are susceptible to fluctuations of solar ...

Given Egypt"s position in the global Sunbelt region and its abundant solar and wind resources, there is a significant opportunity to implement a Hybrid Microgrid Energy System (HMGES) for the generation of electricity from these renewable and clean sources. This presents an excellent prospect for electrifying residential communities.

A methodology to perform the optimal sizing of an autonomous hybrid PV-wind system is discussed considering the fact that the potential of the wind and solar energy is not equal in...

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Some recent research studies have focussed on studying the use of hybrid (solar and wind) RE systems to power desalination systems in Egypt. ... The case study of the hybrid system in Egypt, 24th European Photovoltaic Solar Energy ...

Techno-economic energy analysis of wind/solar hybrid system: Case study for western coastal area of Saudi Arabia. Renew. Energy, 91 (2016), pp. 374-385. View PDF View article View in ... A reliable methodology based on mine blast optimization algorithm for optimal sizing of hybrid PV-wind-FC system for remote area in Egypt. Renew. Energy, 95 ...

50. Conclusion It is cleared from this study that, this solar-wind hybrid power generation system provides voltage stability. Though it"s maintenance & fabrication cost is low, consumers can get the power at low cost. From the results, it indicates that the system has better dynamic behavior and it"s satisfying the requirement of battery storage application at any ...

Compared to the cost of installing wind turbines and PV systems, the LCOE for the hybrid system is the lowest. The LCOE for the hybrid model is $0.3387, whereas it is $0.7046 for the solar system and $0.3437 for the wind system. These findings validate the practicality of a hydrogen-based energy storage system.

The obtained results show that the hybrid system with 15% of photovoltaic and 30% of wind turbine penetration found to be the optimal system for 500 kW average load with initial cost of $4,040,000 and total net present cost of $14,504,952 over 25 years.

This paper explores a predictive control-based energy dispatching approach for a Hybrid Renewable Energy System (HRES) in Ras Ghareb, Egypt. The goal is to efficiently manage energy flow while considering regional conditions, load demands, and battery/hydrogen tank constraints. Using Model Predictive Control (MPC) in MATLAB-Simulink, the HRES ...