Smart microgrid based on wind and solar hybrid

It operates as a smart microgrid that optimally utilizes the public right-of-way and roadway infrastructure to provide cost-effective, highly efficient, and reliable wind/solar electric power ...

A microgrid (MG) is an independent energy system catering to a specific area, such as a college campus, hospital complex, business center, or neighbourhood (Alsharif, 2017a, Venkatesan et al., 2021a) relies on various distributed energy sources like solar panels, wind turbines, combined heat and power, and generators (AlQaisy et al., 2022, Alsharif, 2017b, Venkatesan et al., ...

This letter proposes a DC microgrid for sustainable power generation on the Mars/Moon for a human inhabitation base. The proposed microgrid includes: (i) A wind turbine (WT) system with a dual rotor generator (DRG) whose output is rectified using a passive rectification state and connected to the microgrid common DC bus with a fixed voltage using a ...

A hybrid PV-WT generation topology utilises both solar and wind to harvest maximum of the available energy. In addition, it is more reliable and efficient and requires less storage capacity than solar or wind alone making it more economical . The WT and PV are connected to generation bus via AC/AC and DC/AC converters, respectively.

The widespread popularity of renewable and sustainable sources of energy such as solar and wind calls for the integration of renewable energy sources into electrical power grids for sustainable development. Microgrids minimize power quality issues in the main grid by linking with an active filter and furnishing reactive power compensation, harmonic mitigation, and load ...

Rural electrification is an important measure for prompt and sustainable growth of the developing nations. Providing electricity access to extreme remote localities is a challenging task for distribution utilities. Microgrids with renewable energy based distributed generation using locally available energy resources may be one of the effective solutions. This paper presents a ...

Although hybrid wind-biomass-battery-solar energy systems have enormous potential to power future cities sustainably, there are still difficulties involved in their optimal planning and designing that prevent their widespread adoption. This article aims to develop an optimal sizing of microgrids by incorporating renewable energy (RE) technologies for ...

The hybrid system comprises solar photovoltaic modules, wind turbine, biomass generators with an electrolyzer-fuel cell-based storage system and can potentially replace the current kerosene-based ...

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A 6kW smart micro-grid system with wind /PV/battery has been designed, the control strategy of combining master-slave control and hierarchical control has been adopted. ... Smart microgrid is normally based on new energy generation technology and power electronics technology. It promotes the grid acceptance of various distributed generators ...

An efficient energy management system for a small-scale Hybrid Wind-Solar- Battery based microgrid is proposed in this paper. The wind and solar energy conversion systems and battery storage ...

Hybrid Wind/PV/Battery Energy Management-Based Intelligent Non-Integer Control for Smart DC-Microgrid of Smart University ... is still a hot topic due to the uncertainties in solar irradiance (SI) and wind speed (WS). The main objective of this research paper is to develop a RES-DG siting and sizing strategy for the discrete, nonlinear siting ...

A hybrid renewable energy-based power generation system, consisting of solar PV, wind turbine generators, diesel generator (DiG), bi-directional grid-tied charging inverter (CONV) and BESS, was ...

Global warming is one of the most common problems facing societies today. Therefore, green energy is the best solution to face this important issue (Baral and Xydis 2021).Wind, wave, solar and biomass sources are the most prevalent and fastest-growing sources at the present time, especially solar energy (Dawoud 2021).Wave energy is also one ...

Renewable MGs can be classified into five subgroups based on renewable sources: solar, wind, biomass, micro-hydro and hybrid MGs. ... A secured energy management architecture for smart hybrid microgrids considering PEM-fuel cell and electric vehicles. IEEE Access, 8 (2020), pp. 47807-47823. Crossref View in Scopus Google Scholar [9]

We design the Microgrid, which is made up of renewable solar generators and wind sources, Li-ion battery storage system, backup electrical grids, and AC/DC loads, taking into account all of the ...

The article discusses the best optimal configuration for the MG system, which is observed to be a solar-wind-hydro-based utility grid-connected network with a minimum LCOE of $0.056 kWh -1. The simulation results show that the effective utilization of RESs in the MG system has been a cost-efficient and reliable solution for power supply in remote communities.

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