

Is there a cost-effective microgrid system for Saudi Arabia's Yanbu city?

This article aimed to construct a cost-effective microgrid system for Saudi Arabia's Yanbu city using five configurations using excess energy to generate hydrogen.

What is the world's largest microgrid?

The Red Sea Project, a key part of Saudi Vision 2030, is now the world's largest microgrid with 1.3GWh storage capacity. Huawei Saudi Arabia's Red Sea Project is making headlines with the construction of the world's largest photovoltaic-energy storage microgrid.

Is Saudi Arabia ready for a smart grid?

The abundance of renewable energy sources, especially solar PV has motivated the Saudi Arabian utility and legislation to harvest renewable energy sources. Therefore, a meticulous and accelerated roadmap for the realization of smart grid has been established.

Does Saudi Arabia need a modernized power grid?

Similar to the numerous challenges encountered globally in the process of smart grid transformation, the traditional power grid in Saudi Arabia faces challenges such as transmission losses, low efficiency, and limited ability to accommodate RESs. Therefore, there is a need for a modernized power grid.

Are hybrid microgrids necessary for rural electrification?

Hybrid microgrid systems (HMGs) have become critical for rural electrification. Numerous studies (e.g., [9,10,11,12,13,14,15,16]) have investigated and proposed a hybrid renewable energy system (HRES). These studies provide all the required information for designing isolated HRESs.

Are hybrid microgrids sustainable?

As a result, a parallel path to sustainability must be developed that uses both renewable and clean carbon-based methods. Hybrid microgrids are promoted to solve various electrical and energy-related issues that incorporate renewable energy sources such as photovoltaics, wind, diesel generation, or a combination of these sources.

To implement the IEEE 1547.4 and IEEE 2030 standards in the KSA, a feasibility study should be done on the actual conditions of the Saudi EPS and microgrids in order to adopt universal ...

Department of Electrical Engineering, Jouf University, College of Engineering, Sakaka 2014, Saudi Arabia. View all articles by this author. Metrics & Citations Metrics. Citations. ... Enhancement of load frequency control in interconnected microgrids ...

The PCC is at Bus-B1 on the LV side of the transformer, and the microgrid is interconnected using a static

switch (S 1). The 5.5 MVA diesel generator is connected to the microgrid at bus-B7 and performs the frequency and voltage control of the microgrid during the islanded operation. ... Saudi Arabia. Mohamed A. Abido. Authors. Muhammed Y ...

This study presents a novel method for optimal energy trading within microgrids considering renewable energy (RE) integration. The proposed approach uses the hybridization of particle swarm ...

2 MATHEMATICAL MODEL OF THE STUDIED TWO-AREA INTERCONNECTED MICROGRIDS. To validate the proposed controller and the modified MRFO optimization algorithms, a case study of two-area interconnected microgrids has been selected. The schematic diagram representation of the two-area interconnected microgrids is shown in ...

Microgrids encourage and facilitate the integration of the proliferating distributed energy resources. In this paper, we address the needs of the largely unexplored region of the Middle East and North Africa by proposing a microgrid testbed with resources from this geographical location. The locational and temporal importance of the testbed data is a ...

The world is undergoing an irreversible shift towards clean energy. Microgrids are recognized as a key technology that holds significant potential to make a substantial difference in this regard. The paper provides a ...

At present, renewable energy sources (RESs) and electric vehicles (EVs) are presented as viable solutions to reduce operation costs and lessen the negative environmental effects of microgrids (mGs). Thus, the rising demand for EV charging and storage systems coupled with the growing penetration of various RESs has generated new obstacles to the ...

The Kingdom of Saudi Arabia's (KSA) microgrids must make significant progress during the next five years, since the Saudi government published the Saudi Vision 2030 and the National ...

The world is undergoing an irreversible shift towards clean energy. Microgrids are recognized as a key technology that holds significant potential to make a substantial difference in this regard. The paper provides a comprehensive overview of how microgrids work and their impact on climate. The research presented in this paper focuses on reducing carbon ...

4 ???· Saudi Arabia's ambitious Red Sea Project, overseen by Red Sea Global, has launched the world's largest solar-powered microgrid. This initiative marks a significant milestone in the kingdom's journey towards sustainable ...

Extensive research has been conducted on protecting alternating current (AC) power systems, resulting in many sophisticated protection methods and schemes. On the other hand, the natural characteristics of direct ...

This paper carries a detailed and comprehensive economic analysis on a proposed hybrid AC/DC MG in the Kingdom of Saudi Arabia, a region where MGs are rarely studied. The aim is to find if such configurations are economically feasible in the region, and what incentives are needed to ensure feasibility.

Abstract: The Kingdom of Saudi Arabia's (KSA) microgrids must make significant progress during ... tions are interconnected with feeder lines to share loads [6,18,30 33]. 2. Overview of the ...

The main focus of the work presented in this paper is on the outage management of interconnected microgrids during islanded operation after being disconnected from the utility main supply. The proposed two-stage load restoration technique is formulated as a Mixed Integer Linear Programming (MILP) optimization problem with the sole objective of ...

The integration of renewable energy sources (RESs) into the electricity grid is becoming more difficult due to a number of issues with microgrid interlinking [1], [2], [3]. Since built facade and rooftop solar PV systems enable designers to incorporate solar energy at the building level, they represent a step to engage the creation of contemporary adaptable interconnected microgrids ...

Modified Frequency Regulator Based on TI 1 -TD µ FF Controller for Interconnected Microgrids with Incorporating Hybrid Renewable Energy Sources December 2022 DOI: 10.3390/math11010028

The optimal planning of the interconnected network of multi-microgrids is discussed in this paper. The interconnection planning will enhance the reliability and the economic operation of a ...

Optimized Non-Integer Load Frequency Control Scheme for Interconnected Microgrids in Remote Areas with High Renewable Energy and Electric Vehicle Penetrations April 2023 Mathematics 11(9)

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