

Japan's 2010 Strategic Energy Plan emphasizes energy security, environmental protection, efficient supply, economic growth and reform of the energy industrial structure. ... Cloud Computing, Designing dependable and sustainable SMART GRIDS, Wireless Sensor Networking Architecture of Polytropon, Model Based Systems Engineering for Smart Grids ...

Grid stability has traditionally been one of the top priorities in Japan, and smart grids are considered a key measure that can contribute to grid resiliency. In 2022, the Japanese government started working with the IEC standard called the Smart Energy Grid Architecture Model (SGAM), as a model for a three-dimensional framework that enables ...

The competitive landscape among energy providers and distributors has empowered consumers to not only save money on their energy bills but also incorporate sustainable energy sources into the grid. To efficiently manage electricity distribution, deregulated power systems must include a smart grid and microgrid (MG).

We are proud to acknowledge that over 50% of the articles published in this journal in 2023 were related to one or more of the 17 Sustainable Development Goals (SDGs). Alfredo Vaccaro has been elevated to IEEE Fellow

Distribution for a Sustainable Energy Future Abstract This article explores the transformative potential of next-generation smart grids in revolutionizing power distribution for a sustainable energy future. Smart grids are intelligent power distribution networks that integrate advanced communication, control, and monitoring technologies to optimize

The global energy sector stands at a crucial juncture, grappling with the dual challenges of escalating electricity demand and the imperative for sustainable development [1]. Traditional power grids, designed around centralized generation and extensive transmission networks, are increasingly unable to cope with the dynamic and decentralized nature of ...

Renewable Machine learning (ML) has emerged as a vital tool in altering smart-grid inverter systems for sustainable electricity. As energy consumption grows, environmental issues also intensify.

Internet of Things (IoT) technology has emerged as a promising tool, particularly in the context of Smart Grids, enabling enhanced control, efficiency, and sustainability. This paper aims to delve into the potential of IoT in revolutionizing power systems, with a focus on IoT-enabled Smart Grids as a pathway towards sustainable energy systems.

In the current era, renewable energy sources (RESs) have become seamlessly integrated within smart grids on a widespread scale [1]. These sources encompass various forms of energy storage, including batteries, solar photovoltaics, wind, thermal, and hydrogen, and they hold a significant position within the framework of smart grids [2, 3]. Presently, the majority of ...

The energy system is transitioning to become more sustainable. One trend is for large-scale, centralized, and fossil-fuelled systems to change to the small-scale production of renewables, with implications for the ownership and operation of energy systems [4]. Decentralization is seen as a way to adapt the grid to better fit the needs of energy transition [5].

On the part of the Japan Smart Community Alliance (JSCA) which represents the views of the Smart Communities, an SG promotes greater use of renewable energy and idle energy resources and local generation of heat energy for local ...

This study focuses on smart grids and integration of renewable energy sources in Japan. It first elaborates on the current status of the Japanese power market, its electricity grid, and the

Despite their infrequency, natural disasters like hurricanes, tornadoes, and floods pose significant threats to power systems, with profound economic impacts on nations and individuals. This paper delves into enhancing power system resilience against such disruptions through techniques such as network reconfiguration, defensive isolation, and targeted ...

Even on small scales, the proposed benefits of the Smart Grid are substantial in maintaining sustainable energy use with growing demands. In this survey, we provide a comprehensive overview of Smart Grid technology, specifically focusing on the challenges presented by cybersecurity, interoperability, and renewable energy integration.

Despite its vision of a resilient, efficient, and sustainable energy system [1, 3], Japan remains heavily reliant on fossil fuels and ranks fifth on a global scale in terms of carbon intensity [1-3]. ... Flexibility from vehicle-to-grid and smart charging also play an important role in the later steps of transition, providing low-cost virtual ...

Advantages of RE sources are enormous as they are free from GHGs and related global warming effects. RE is defined as an inexhaustible and sustainable energy source, and particularly in this modern environment, it is associated with climate change initiatives [5, 6]. Therefore, policy makers, power system planners, researchers and power utilities are ...

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