

What is Intelligent Energy Management?

1. Introduction Over the last few years, the term intelligent energy management, also called smart energy management, has emerged as a growing idea in the power systems literature. This is due to the rapid increase in energy consumption in today's applications, ranging from industrial to commercial (Ni?eti? et al., 2020).

Can intelligent energy management systems save energy?

Forecasts show that, over the next two decades, the world's electricity production is expected to increase by over 40 per cent and its demand by approximately 85 per cent (Newell and Raimi, 2020). This has prompted the researchers and vendors to develop various intelligent energy management systems (IEMSs) for saving energy.

Can intelligent energy management systems fill the existing gaps?

New perspectives in the field are proposed to fill the existing gaps. In the last decade, there have been significant developments in the field of intelligent energy management systems (IEMSs), with various methods and new solutions proposed for managing the energy resources intelligently.

What are the benefits of a smart energy management system?

Together, these technologies & intelligent solution patterns offer a powerful combination to track energy consumption, optimize energy usage, predict demand, demand response and demand-side management, micro-grid management, prevent power thefts and improve the efficiency of systems in real-time.

How can computational intelligence be used in energy management systems?

One way to do this is to integrate computational intelligence in energy management systems while enabling technologies, such as machine learning and deep learning, can be used to read the dynamic behaviors of energy consumers.

What are the challenges in implementing intelligent energy management systems?

Challenges in implementation of intelligent energy management systems. The output of an energy management systems is dynamic in nature and difficult to predict because of the dynamic behaviors of consumers and utilities (Yu et al., 2020).

Intelligent energy management is the basis for economical and low-emission operation of decentral energy systems. This presentation gives a brief overview on the basics of an intelligent energy ...

The surging demand for energy has, correspondingly, increased the need for energy management. The primary objective of this study is to investigate the employment of ...

Capable of storing and redistributing energy, thermal energy storage (TES) shows a promising applicability in

energy systems. Recently, artificial intelligence (AI) technique is ...

Microgrids are industrial technologies that can provide energy resources for the Internet of things (IoT) demands in smart grids. Hybrid microgrids supply quality power to the IoT devices and ...

Considering the use of the building, the idea of Building Energy Management Systems (BEMS) is now being used. BEMS can be described as a combination of strategies ...

Energy management controllers (EMCs) are pivotal for optimizing energy consumption and ensuring operational efficiency across diverse systems. This review paper ...

Artificial intelligence (AI) and machine learning (ML) can assist in the effective development of the power system by improving reliability and resilience. The rapid advancement of AI and ML is fundamentally transforming ...

The utilization of AI in the energy sector can help in solving a large number of issues related to energy and renewable energy: (1) modeling and optimizing the various ...

Over the last few years, the term intelligent energy management, also called smart energy management, has emerged as a growing idea in the power systems literature. This is ...

Smart management systems play a crucial role in optimizing energy storage and usage by employing advanced technologies like the Internet of Things (IoT), Artificial ...

An intelligent battery management system is a crucial enabler for energy storage systems with high power output, increased safety and long lifetimes. With recent ...

Researchers have studied the integration of renewable energy with ESSs [10], wind-solar hybrid power generation systems, wind-storage access power systems [11], and ...

Preventive maintenance (PM) activities in battery energy storage systems (BESSs) aim to achieve a better status in long-term operation. In this article, we develop a reinforcement learning ...

One area in AI and machine learning (ML) usage is buildings energy consumption modeling [7, 8]. Building energy consumption is a challenging task since many factors such as ...

The Intelligent Smart Energy Management Systems design, as seen in Fig. 1, is for demand-side energy management that prioritizes renewable energy sources. The three ...

This paper presented the three most relevant enabling technologies for industrial energy

management--software defined energy network, explainable trustworthy AI-based network sensing, and resource allocation methods--that can provide ...

The new hybrid AI optimal management method proposed in this study presents an end-to-end approach that takes as input the recorded energy features and outputs the ...

An intelligent battery management system (BMS) with end-edge-cloud connectivity - a perspective ... The widespread adoption of electric vehicles (EVs) and large-scale energy storage has necessitated advancements in battery ...

By using advanced machine learning techniques, AI can analyze detailed historical performance data, real-time energy prices, and forecasted usage to determine the most ...

Learning Objectives Understand how intelligent energy management solutions can improve operational efficiency and reduce energy costs in industrial settings. Learn about real ...

In the context of China's ongoing industrial revolution and technological transformation, there is a growing demand for advanced energy management solutions and ...

Huijue's BESS feature cutting-edge battery technology, modular design, and intelligent management systems, ensuring seamless integration and cost-effective operation. Trust ...

The improved management system, enabled by the proposed algorithms, facilitates informed operational decisions, enhancing the system's installed capacity and ...

Hydrogen is seen as an important renewable energy source as it can play a role in energy storage as well as in industrial and transport sectors where direct electrification is not ...

Download scientific diagram | The framework for intelligent industrial energy management. from publication: Intelligent Demand Response for Industrial Energy Management Considering ...

As the smart grid advances, the current energy system moves toward a future in which people can purchase whatever they need, sell it when excessive and trade the buying ...

Computationally intelligent energy forecasting methods for appropriate energy management at the consumer/producer side have a positive impact on the preservation of energy and play a constructive role in tackling global climate ...

The integration of renewable energy sources with microgrids using IoT and energy management technologies has become a promising solution for achieving sustainable and efficient energy systems.

This paper proposes an intelligent energy management system based on multiple renewable energy sources. The intelligent energy management system is defined as a flexible energy management system built by integrating ...

1. Various industrial energy storage models are vital for enhancing energy management systems and ensuring reliability in energy supply. 2. Commonly utilized models ...

This paper introduces an innovative fuzzy control system that employs teaching-learning-based optimisation (TLBO) in the energy management strategy domain of a ...

Fortunately, advanced multidisciplinary integration with artificial intelligence (AI), big data analysis, machine learning, data-driven, automation control, and other system design, ...

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