

Internet-based Smart Energy Innovation



Overview

This review synthesizes a decade of research spanning AI-based forecasting and optimization, IoT-enabled monitoring, blockchain architectures, digital twins, interoperability standards, cybersecurity frameworks, and emerging models in the energy market. The rapid digitalization of power systems has transformed smart grids into complex cyber-physical energy networks driven by intelligence, interoperability, and innovation. As global decarbonization efforts intensify, the Energy Internet's core. Citation: IRENA (2026), Digitalisation and AI for transforming power systems: Case studies from IRENA Innovation Week 2025, International Renewable Energy Agency, Abu Dhabi. The International Renewable Energy Agency (IRENA) is an intergovernmental organisation that supports countries in their. In response, the rapid expansion of Internet of Things (IoT) devices offers a promising and innovative solution due to their adaptability, low power consumption, and transformative potential in energy management. This study describes a novel, integrative strategy that integrates IoT and Artificial.



Article Content

Full article: Beyond the grid: a decade of intelligence ...

Abstract The rapid digitalization of power systems has transformed smart grids into complex cyber-physical energy

Digital innovations for sustainable energy: A review of AI and IoT in ...

This paper is a systematized and in-depth review of AI and IoT enhanced green energy systems. The paper will first

Internet of Things Applications for Energy Management in ...

IoT applications for building energy management, enhanced by artificial intelligence (AI), have the potential to

Using the internet of things in smart energy systems and networks

Energy forecasting, state monitoring and estimation, anomaly detection, data mining and visualization are among the

IoT-Driven Intelligent Energy Management: Leveraging Smart ...

This study describes a novel, integrative strategy that integrates IoT and Artificial Neural Networks (ANNs) in a smart

Internet of Energy: Opportunities, applications, architectures and ...

The four opportunities that smart energy systems confront in the digital age are examined in terms of governmental

Enabling Sustainable Energy: Integrating NetZero IoT, Cloud

This study explores the integration of NETZERO-oriented Internet of Things (IoT) systems and Artificial Intelligence (AI)

A comprehensive overview of framework for developing sustainable energy ...

Abstract Energy Internet (EI) envisions a future energy system with sustainable concerns of efficiency, economy and

Smart Grid to Energy Internet: A Systematic Review of Transitioning ...

The concept of Energy Internet has emerged from the limitless possibilities of energy sharing networks formed by

Beyond the grid: a decade of intelligence, interoperability, and ...

This review synthesizes a decade of research spanning AI-based forecasting and optimization, IoT-enabled monitoring, blockchain

Internet of Things Applications as Energy Internet in Smart ...

Energy Internet (EI) has been recently introduced as a new concept, which aims to evolve smart grids by integrating

The Emerging Energy Internet: Architecture, Benefits, Challenges, and ...

Energy Internet is a concept proposed to harness, control, and manage energy resources effectively, with the help of

Emerging information and communication technologies for smart energy ...

The present work provides a comprehensive overview of the applicability of emerging information and communication

Integrating IoT and AI for Sustainable Energy-Efficient Smart ...

The global drive toward sustainability and energy efficiency has accelerated the development of smart buildings

What is the Internet of Things (IoT)?

What is the IoT? The Internet of Things (IoT) refers to a network of physical devices, vehicles, appliances,

Evolution of smart grids towards the Internet of energy: Concept and ...

The integration of smart grids (SG) and the Internet of Things (IoT) using new technologies such as cloud computing,

Smart homes, smarter grids: the "Internet of Energy" and

"In the Internet of Energy, all of our DERs can be connected and integrated for reliable

Unlocking the Potential of High-Renewable Power Systems with

From demand and pricing forecasting, flexibility and smart grid management, to informing predictive maintenance of

Digitalisation and AI for transforming power systems

Solutions include the reinforcement of electricity transmission and distribution infrastructure; integration of short- and long-term

Digitalization and Energy - Analysis

Digitalisation and Energy - Analysis and key findings. A report by the International Energy Agency.

Internet of energy: new scenarios, opportunities, challenges and ...

Technologies 4.0 have had disruptive innovation in various sectors, including the energy one. Smart electricity grids, leveraging

Advancing the Energy Internet: Innovations and Solutions for a ...

This Topic invites cutting-edge research on theoretical advancements, empirical case studies, and technological

Internet of Energy: Opportunities, applications, architectures and ...

Highlights • This paper aims to provide an overview of the Internet of Energy concept in the Industrial Internet of Things

Integration of IoT in building energy infrastructure: A critical review ...

Inspired by energy-proportional computing, the authors proposed an automated smart location-based network energy

What is Smart Energy and How It's Shaping the Future

From smart homes to smart cities, explore how smart energy enhances efficiency and

(PDF) Smart Grid to Energy Internet: A Systematic Review of ...

Secondly, a systematic review of literature related to state-of-the-art of Energy Internet is performed to outline its

Towards an Internet of Energy for smart and distributed generation ...

The future of energy essentially requires novel thinking and new systems to transform energy generation, distribution,

Internet of Things for smart energy systems: A review

The use of IoT in smart energy systems (SES) facilitates an ample offer of variety of

Advances in emerging digital technologies for energy efficiency and ...

This study provides a systematic and comprehensive review on emerging digital technologies for energy efficiency and

Full article: Beyond the grid: a decade of intelligence ...

This review synthesizes a decade of research spanning AI-based forecasting and optimization, IoT-enabled

(PDF) The Emerging Energy Internet: Architecture

The benefits of the energy Internet, along with the challenges of its implementation on a

Energy Internet, the Future Electricity System: Overview, Concept ...

The use of new technologies, smart sensors, photovoltaic panels, IoT-based wind turbines, smart grids supports the

Internet of Things Applications as Energy Internet in Smart Grids and ...

IoE is commonly referred to as an internet-based power system that integrates sources of energy and got all of the

IoT in energy: a comprehensive review of technologies, applications ...

The integration of IoT (Internet of Things) in the energy sector has the potential to transform the way it generates,

A review of IoT-enabled smart energy hub systems: Rising,

The Internet of Things (IoT) has emerged as a key enabling technology for Smart Energy Hubs (SEH). While IoT offers

Towards next generation Internet of Energy system: Framework and

The integrated internet-based smart grid and energy resources inherit all the security flaws of the current smart grid.

Energy Management Systems in Sustainable Smart Cities Based on

In this paper, we exploit state-of-the-art energy management in sustainable smart cities employing the Internet of

Advancing the Energy Internet: Innovations and Solutions for a ...

As global decarbonization efforts intensify, the Energy Internet's core components—including smart grid situational

Using the internet of things in smart energy systems and networks

Private businesses and policymakers are accelerating the deployment and advancement of smart grid technology

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