Energy Internet Platform Architecture



Overview

In this paper, a holistic review of the energy Internet evolution in terms of the architecture, types of ERs, and the benefits and challenges of its implementation is presented.

Key Takeaways

Energy Internet architecture integrates distributed energy resources, smart grids, and communication networks into a multi-layered, flexible, and interactive energy system.

Overview

The Energy Internet (EI) is a dynamic, distributed network that combines traditional power systems with distributed renewable energy resources (DRERs), energy storage devices, and controllable loads, enabling real-time energy transactions and management through Internet-enabled communication technologies. It transforms energy production, storage, and distribution into an interactive, Internet-like system where households and businesses can act as prosumers, both consuming and producing energy.

Core Components

© 2026 CGWEB NETWORK INFRASTRUCTURE - All rights reserved

Distributed Energy Resources (DRERs): Small-scale renewable energy systems such as solar panels, wind turbines, and biomass units that feed energy into the network. Distributed Energy Storage Devices (DESDs): Batteries and other storage systems that balance supply and demand, enabling peak load management and energy trading. Energy Routers (ERs): Analogous to communication routers, ERs manage the flow of energy packets across the network, ensuring efficient routing and integration of AC/DC supplies.

Controllable Loads and Io

T Devices: Smart appliances and electric vehicle chargers that can adjust consumption patterns based on real-time pricing and grid conditions. Communication and Information Systems: Internet-based protocols and ICT infrastructure that enable real-time monitoring, data exchange, and secure energy transactions.

Layered Architecture

The Energy Internet is typically structured into six layers: Business Layer: Defines market roles, energy trading mechanisms, and economic interactions among participants. Use Case Layer: Specifies operational scenarios, such as demand response, energy sharing, and microgrid management. Operation Layer: Handles real-time energy management, scheduling, and control of distributed resources.

Communication Layer: Provides the ICT backbone for data exchange, monitoring, and coordination. Interface Layer: Connects physical devices to the network, enabling interoperability between appliances, ERs, and control systems. Appliance Layer: Includes end-user devices and energy-consuming or producing equipment that interact with the network.

Data flows from the Business Layer down to the Interface Layer, while appliances communicate with the network through standardized interfaces, ensuring seamless integration and coordination.

Operational Principles

Bidirectional Energy Flow: Energy and information flow in both directions, allowing prosumers to sell excess energy and participate in local energy markets.

Plug-and-

Play Integration: New energy resources and devices can be added without disrupting the network, supporting scalability and flexibility.

Real-

Time Monitoring and Control: Continuous data collection enables dynamic load balancing, peak shaving, and demand-side management. Security and Reliability: ICT protocols ensure secure communication, prevent cyber threats, and maintain system stability.

© 2026 CGWEB NETWORK INFRASTRUCTURE - All rights reserved

Applications and Benefits

Supports smart cities and buildings by integrating renewable energy and storage systems. Enables energy trading among households and microgrids. Enhances energy efficiency, reliability, and sustainability.

Facilitates AC/DC hybrid networks for diverse energy applications, including electric vehicles and nano-grids. The Energy Internet represents the next evolution of the smart grid, combining distributed energy, ICT, and market mechanisms to create a flexible, secure, and interactive energy ecosystem.

Article Content

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

In this paper, a holistic review of the energy Internet evolution in terms of the architecture, types of ERs, and the benefits and challenges of its implementation is presented.

EcoStruxure Platform

EcoStruxure Platform.The digital backbone connecting best-in-class operational technology (OT) solutions with the latest in IT technology to unlock trapped value

Construction of energy internet technology architecture based on ...

Based on general system structure theory, the technical system framework for the provincial power grid corporations to construct regional energy internet is constructed, and it

Internet of Energy (IoE): A Comprehensive Review of Design

LPWA is an Internet of Energy (IoE) structure that can provide a comprehensive stream of energy sector applications. The IoE with intelligent computing tools can dramatically enhance

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

First, a comprehensive overview of Energy Internet is presented along with its aptness as a future evolution of electricity system. Second, concepts, architectures, and features that underpin

Energy System Architecture Incorporating the Internet of Energy ...

The article provides an analysis of the concept of the Internet of Energy: the structural elements of the Internet of Energy system, the main components of the architecture and the main

© 2026 CGWEB NETWORK INFRASTRUCTURE - All rights reserved

A Survey on Energy Internet: Architecture, Approach, and Emerging ...

We also introduce a representative EI architecture, i.e., the future renewable electric energy delivery and management system. Four critical EI features are emphasized. Then, we

Research on Energy Internet Architecture Based on Cloud Computing

Aiming at the application of cloud computing technology in Energy Internet, this paper introduces the work and research on the theory and practice of Energy Internet from the current situation at home

(PDF) The Emerging Energy Internet: Architecture ...

In this paper, a holistic review of the energy Internet evolution in terms of the architecture, types of ERs, and the benefits and challenges of its implementation is presented.

Tech News | Today''s Latest Technology News | Reuters

Find latest technology news from every corner of the globe at Reuters , your online source for breaking international news coverage.

Fluence Advances Smartstack Energy Storage Platform with High

New system builds on Smartstack''s modular architecture, delivering industry-leading site-level density ARLINGTON, Va., June 23, 2026 (GLOBE NEWSWIRE) -- Fluence Energy, Inc.

Visual Paradigm

Online Productivity Suite Supercharge your productivity with our all-in-one online productivity suite. Visual Paradigm Online brings together your documents, presentations, PDFs, charts, and digital

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

The benefits of the energy Internet, along with the challenges of its implementation on a large-scale distributed architecture with the inclusion of renewable energy resources, is discussed.

Latest Technology Stock Investing Analysis | Seeking Alpha

Seeking Alpha''s latest contributor opinion and analysis of the technology sector. Click to discover technology stock ideas, strategies, and analysis.

A Survey on Energy Internet: Architecture, Approach, and Emerging ...

© 2026 CGWEB NETWORK INFRASTRUCTURE - All rights reserved

Energy crisis and carbon emission have become two seriously concerned issues universally. As a feasible solution, Energy Internet (EI) has aroused global concern once proposed.

Latest Press Releases

Highly Regarded Project Finance Partner Joins Latham & Watkins, Adding Further Depth to Global Energy Platform WASHINGTON, 3 hours ago Chris Hutchison bolsters the firm''s energy and

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

• Architectures, protocols and key technologies are reviewed and discussed in communication-oriented network. • Services and platforms are reviewed and discussed in service

(PDF) The Emerging Energy Internet: Architecture ...

The benefits of the energy Internet, along with the challenges of its implementation on a large-scale distributed architecture with the inclusion of renewable energy resources, is discussed.

Contact Us

Continue your research online:

Website: https://cgweb.co.za
Technical inquiry: https://cgweb.co.za/project-enquiry.html

This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

© 2026 CGWEB NETWORK INFRASTRUCTURE - All rights reserved