

Energy Internet Layers



Article Overview

The Energy Internet is structured into three main layers—Physical, Cyber, and Business—enabling integrated, intelligent, and decentralized energy management.

Physical Layer

The Physical Layer forms the foundation of the Energy Internet, connecting diverse energy systems such as electricity, heating, cooling, gas, water, and transportation. It integrates distributed energy resources, energy storage, and energy hubs or routers to facilitate multi-energy interconnection and plug-and-play operation between suppliers and consumers. This layer supports hierarchical control and regional autonomy, allowing energy systems to operate efficiently while maintaining reliability and resilience. It also includes infrastructure for energy generation, transmission, storage, and conversion, forming the backbone of the network.

Cyber Layer

The Cyber Layer applies Internet technologies to energy systems, enabling ubiquitous intelligence, cloud-edge computing, and advanced communication networks. It allows real-time monitoring, control, and optimization of energy flows, supporting decentralized decision-making and dynamic balancing of supply and demand. Technologies such as IoT, digital twins, blockchain, and AI are integrated to enhance system openness, interoperability, and predictive capabilities. This layer ensures that energy systems can respond flexibly to fluctuations in renewable generation and consumption patterns....

Article Content

Oct 18, 2025

Energy Internet Technology | Springer Nature Link

Energy Internet refers to a combination of advanced power and electronics technology, information technology and

May 20, 2026

Internet Thinking for Layered Energy Infrastructure

With inspirations from the Internet, in this chapter, a layered infrastructure for the future Energy Internet system is

Aug 09, 2025

Key technology layers of the energy internet

Download scientific diagram | Key technology layers of the energy internet from publication: Some key issues in building a “source

May 25, 2026

Layers of the Internet | CS 168 Textbook

If, at lower layers, we built infrastructure for specifically transferring videos between end hosts, then email clients would have to build

Nov 22, 2025

ECIS: Energy-Computing Integrated System | Energy Internet

We provide a detailed overview of the functions and interactions within the four layers of the ECIS, discussing the

Jun 25, 2026

Architecture

The Energy Internet architecture is constructed by six layers, shown in Fig. 1. From top to bottom are Business Layer, Use Case

Jan 01, 2026

2026 IEEE Conference on Energy Internet and Energy System

EI² 2026 focuses on innovative technologies and practical applications in the fields of Energy Internet and Energy System Integration

Aug 19, 2025

OSI model

It was the foundation for the development of the Internet. It assumed the presence of generic physical links and focused primarily on

Jul 22, 2026

Overview of Energy Internet | Springer Nature Link

In 2004, The Economist first proposed the construction of an intelligent, automated, and self-healing Energy Internet

Jun 23, 2026

Key Technologies for the Energy Internet | Springer Nature Link

Energy Internet (often reflects Internet plus energy) is a novel energy network that interconnects the power system

Apr 27, 2026

ECIS: Energy-Computing Integrated System

We provide a detailed overview of the functions and interactions within the four layers of the ECIS, discussing the

Jun 15, 2026

Energy Internet

Energy Internet, sponsored by Chinese Society for Electrical Engineering (CSEE), and published by China Electric Power Research

Jan 29, 2026

A comprehensive review of Energy Internet: basic concept ...

Abstract With the intensifying energy crisis and environmental pollution, the Energy Internet and corresponding patterns of energy

Dec 10, 2025

Recent advancement of energy internet for emerging energy

Key features of the energy internet such as energy sources, communication technologies, data computation, energy

May 18, 2026

Energy Routing Challenges and Protocols in Energy Internet: A

Energy internet (EI) is a new concept that was proposed as a feasible solution to existing problems in power systems.

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What is OSI Model | 7 Layers Explained | Imperva

The OSI model describes seven layers that computer systems use to communicate over a network. Learn about it and

Feb 23, 2026

What is the Five Layers Model? The Framework of the Internet

On this layer, we don't really have a header, as it consists of single bits only. This way, every layer uses the services

Sep 04, 2025

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

Energy Internet represents a transformative energy-sharing network integrating renewable sources, storage, and electric vehicles.

Aug 23, 2025

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

Energy crisis and carbon emission have become two seriously concerned issues universally. As a feasible solution,

Dec 18, 2025

Energy Internet: Redefinition and categories

Energy Internet (EI) is an energy ecosystem, with physical layer, information layer and value layer combining energy

Sep 08, 2025

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

Sep 23, 2025

Background

Physical Layer: Internet-like energy systems. The physical layer breaks the barriers existing among energy

Aug 26, 2025

AI Is a 5-Layer Cake | NVIDIA Blog

AI is one of the most powerful forces shaping the world today. It is not a clever app or a single model; it is essential

Dec 22, 2025

Background

Cyber Layer: Internet technique applications for energy systems. The cyber layer promotes ubiquitous decentralized intelligence,

Sep 02, 2025

What is Energy Internet? Concepts, Technologies, and

Challenges and requirements for advancing the energy internet (EI) technologies; future researches can focus on

Mar 18, 2026

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

Unlike the OSI layer structure, which deals with transaction of data, Energy Internet architecture is a representation of

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