

AI in Energy Market to Hit \$14 Billion by 2029, Growing at 17.2% CAGR

Artificial Intelligence Reshaping Global Energy Market with Renewables and Smart Grids

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According to a new report published by Allied Market Research, the [AI in energy market](#) size was valued at \$5.4

billion in 2023 and is projected to reach \$14.0 billion by 2029, growing at a strong CAGR of 17.2% from 2024 to 2029. Artificial Intelligence (AI) is rapidly transforming how energy is produced, distributed, and consumed, driving efficiency, reliability, and sustainability across the global energy sector.

“

AI in energy market to hit \$14.0B by 2029, fueled by renewables, smart grids, predictive analytics, and carbon emission monitoring. ”

Allied Market Research

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□ Introduction

Artificial Intelligence in energy refers to the application of advanced computational algorithms, predictive analytics, and machine learning tools that optimize operations

across the power value chain. From [renewable energy integration](#) and grid management to demand forecasting and carbon emission monitoring, AI is becoming a cornerstone of modern energy strategies. With the growing transition toward clean energy, AI enables energy providers to address challenges such as fluctuating supply, grid resilience, and consumer energy optimization.

□ Market Dynamics

□ Key Drivers

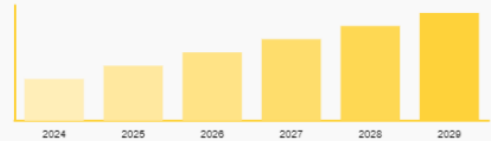
Report Insights

Market was valued at
\$5.4 Billion
2023

Projected to reach
\$14.0 Billion
2029

Growing at a CAGR
17.2% From
2024-2029

CAGR 17.2%



AI in Energy Market
Report Code: AI2587

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Rising Renewable Energy Adoption: The surge in solar, wind, and hydropower generation has made energy management more complex. According to the International Energy Agency (IEA), renewables are set to overtake coal as the largest source of electricity by early 2025, accounting for 95% of new capacity expansion. AI helps forecast renewable output, stabilize grids, and ensure seamless supply-demand balance.

Smart Grid Transformation: AI technologies, integrated with IoT and real-time analytics, make smart grids more responsive, adaptive, and efficient. This enhances grid stability while reducing downtime.

Operational Efficiency: AI optimizes solar panel positioning, improves wind turbine maintenance schedules, and enhances storage systems by predicting the best times for charging and discharging.

Energy Transition Goals: Governments and organizations worldwide are deploying AI tools to accelerate their shift toward low-carbon and net-zero strategies.

□ Challenges

Despite the promising growth, the high implementation cost of AI systems is a key restraint. Developing and deploying AI solutions requires substantial investment in infrastructure, hardware, software, and skilled talent. Energy companies often need to upgrade existing systems to fully leverage AI, which increases financial pressure, especially in developing economies.

□ Opportunities

Carbon Emission Monitoring: AI enables real-time monitoring of emissions across power plants, transportation, and industrial facilities. This allows for targeted interventions to reduce carbon footprints.

Energy Storage Optimization: AI enhances battery efficiency by predicting charging/discharging cycles, ensuring reliable renewable integration.

Predictive Maintenance: In wind and solar farms, AI-powered predictive maintenance reduces downtime, cuts operational costs, and extends equipment lifespan.

Decentralized Energy Systems: AI provides valuable insights for managing distributed generation systems such as rooftop solar and microgrids.

Procure This Report (300 Pages PDF with Insights, Charts, Tables, and Figures):

<https://www.alliedmarketresearch.com/checkout-final/68ef42b7e529cc77d7ac3ff7f12af492>

□ Segment Overview

The AI in energy market is segmented into component type, deployment type, application, end-use, and region:

By Component Type:

Solutions

Services

By Deployment Type:

On-Premise

Cloud

By Application:

Robotics

Renewables Management

Demand Forecasting

Safety & Security

Infrastructure

Others

By End-Use:

Energy Transmission

Energy Generation

Energy Distribution

Utilities

By Region:

North America

Europe

Asia-Pacific

LAMEA (Latin America, Middle East, Africa)

□ Regional Insights

North America leads the market with strong investments in renewable integration and smart grid technologies. U.S. utilities are deploying AI to modernize infrastructure and meet sustainability targets.

Europe focuses heavily on decarbonization, with AI enabling carbon reduction strategies, renewable integration, and emission tracking.

Asia-Pacific is projected to be the fastest-growing region, driven by rapid urbanization, increasing renewable adoption, and government-led AI initiatives in China and India.

LAMEA is gradually adopting AI to tackle grid inefficiencies and expand energy access across emerging economies.

□ Key Market Players

Major players shaping the [AI in energy industry](#) include:

Atos SE

Siemens Energy

Schneider Electric

GE Vernova

Terex Corporation

Vestas

Iberdrola, S.A.

JinkoSolar Holding Co., Ltd.

AutoGrid Systems, Inc.

Constellation

These companies are investing in AI-driven solutions, partnerships, and cloud-based platforms to strengthen their market presence and accelerate digital transformation in the energy industry.

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□ Future Outlook

The AI in energy market is on a rapid growth trajectory, supported by increasing renewable energy generation, global net-zero targets, and the digitalization of power networks. As energy systems become more decentralized and demand for sustainability rises, AI will serve as a critical enabler for predictive analytics, automation, and efficiency.

By 2029, AI is expected to be deeply embedded in every stage of the energy value chain, helping utilities, governments, and industries achieve greater resilience, profitability, and sustainability.

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Electrical Grid Market

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