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AI-Based Energy Demand Forecasting Market Forecasts to 2034 – Global Analysis By Forecasting Horizon (Short-Term (Hours to Days), Medium-Term (Weeks to Months) and Long-Term (Years, Strategic Planning)), Deployment, Technology, Application and By Geography

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Abstracts

According to Stratistics MRC, the Global AI-Based Energy Demand Forecasting Market is accounted for $2.40 billion in 2026 and is expected to reach $28.14 billion by 2034 growing at a CAGR of 36.0% during the forecast period. Energy demand forecasting powered by AI uses sophisticated machine learning models and data analysis to estimate future energy requirements with high precision. It considers past consumption patterns, climatic data, economic trends, and user behavior to produce accurate short##- ##and long-term predictions. Utilities and grid managers can utilize these insights to optimize power production, cut costs, maintain grid reliability, and seamlessly incorporate renewable energy. Moreover, AI-enabled forecasts support energy efficiency, demand-response initiatives, and sustainable management practices. As smart grids expand, AI-based forecasting becomes essential for reliable and eco-friendly energy planning.

According to IEEE and utility case studies, data from smart meters and IoT sensors integrated with AI models allows interpretation of granular, real-time consumption patterns across residential, commercial, and industrial sectors. This integration improves short-term demand forecasts by up to 30% in accuracy, supporting dynamic pricing and demand response programs.

Market Dynamics:

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Driver:

Increasing adoption of smart grids

Rising smart grid deployment is boosting the AI-driven energy demand forecasting market. Smart grids, equipped with sensors, automation, and digital communication, rely on AI to anticipate electricity needs accurately. This ensures efficient load management, prevents energy loss, and maintains system stability. By forecasting demand in real time, utilities can optimize energy distribution, reduce blackouts, and align supply with consumption patterns. The synergy of smart grids and AI analytics supports operational improvements, informed decisions, and sustainable energy usage, positioning the market for substantial growth worldwide.

Restraint:

High initial investment costs

Implementing AI-powered energy demand forecasting solutions requires considerable initial expenditure on hardware, software, and expert personnel. Utilities must invest in sensors, computing systems, and AI tools, making adoption expensive for smaller organizations. Maintenance, upgrades, and data management further increase costs. While these systems offer long-term efficiency and operational savings, the high upfront financial requirement hinders market expansion. Developing countries are particularly affected, as limited budgets restrict the deployment of AI-driven forecasting solutions.

Opportunity:

Integration with renewable energy expansion

The transition to renewable energy creates significant opportunities for AI-based energy demand forecasting. Intermittent sources like solar and wind require accurate predictions to maintain grid stability and ensure efficient energy utilization. AI solutions analyze weather, historical consumption, and trends to optimize supply-demand balance, reducing dependency on traditional power plants. With governments worldwide investing in renewable energy infrastructure to achieve sustainability targets, the demand for AI-driven forecasting solutions is expected to rise. This integration of AI with renewable energy expansion offers substantial growth potential for solution providers, supporting efficient, reliable, and environmentally friendly power management globally.

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Threat:

Competition from traditional forecasting methods

Traditional forecasting techniques, including statistical models and manual methods, remain prevalent, especially in developing nations, posing a threat to AI-based energy demand forecasting. These conventional methods are considered familiar, dependable, and cost-effective, discouraging utilities from adopting AI solutions. Limited awareness of AI advantages and resistance to technological change reinforce the reliance on existing systems. As a result, AI-based forecasting may face slow adoption in markets where traditional methods dominate. Competition from conventional approaches continues to challenge market growth and limits the global penetration of AI-powered energy demand forecasting solutions, slowing the transition to advanced energy management technologies.

Covid-19 Impact:

The Covid-19 pandemic impacted the AI-driven energy demand forecasting market by altering energy consumption and delaying project implementations. Industrial slowdowns, lockdowns, and shifts in residential usage caused erratic demand, complicating forecasting. Disruptions in supply chains and workforce shortages hindered AI system deployment. Conversely, the crisis emphasized the value of digital tools and predictive analytics for effective energy management, boosting interest in AI technologies. As utilities adjust to post-pandemic energy patterns, market recovery is anticipated, with greater adoption of AI-based forecasting solutions to ensure grid resilience, operational efficiency, and optimized energy planning across residential, commercial, and industrial sectors.

The short-term (hours to days) segment is expected to be the largest during the forecast period

The short-term (hours to days) segment is expected to account for the largest market share during the forecast period. Grid operators and utilities rely on these predictions to manage daily energy load variations, optimize generation, and avoid service interruptions. Real-time insights from short-term forecasts enhance operational efficiency, support demand-response mechanisms, and enable rapid adjustments to consumption fluctuations. They are particularly important for integrating renewable energy and maintaining grid stability. With the increasing adoption of smart grids, real-

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time monitoring, and efficient energy management practices, short-term AI-based forecasting solutions continue to lead the market, reflecting their critical role in daily energy operations.

The cloud-based segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the cloud-based segment is predicted to witness the highest growth rate. They provide scalable data storage, real-time processing, and remote access, allowing utilities and energy providers to deploy AI forecasting efficiently. Cloud platforms lower upfront infrastructure costs, simplify maintenance, and facilitate integration with smart grids and IoT devices. Their flexibility, affordability, and easy deployment encourage rapid adoption. As digital transformation in energy management accelerates, cloud-based AI forecasting tools are becoming increasingly popular, driving market growth and enabling more efficient, connected, and scalable energy prediction solutions worldwide.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share, driven by advanced energy infrastructure, widespread smart grid deployment, and substantial investment in AI technologies. Utilities in the region emphasize efficient energy production, reliable grid management, and renewable integration, increasing the need for AI forecasting solutions. Government policies supporting energy efficiency, coupled with robust R&D initiatives, reinforce market growth. The presence of major technology players and early adoption of innovative solutions further solidify North America’s position. Collectively, these factors make the region the largest contributor to the global AI-based energy demand forecasting market, highlighting its technological leadership and market dominance.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR, driven by rapid industrial growth, urbanization, and surging electricity consumption. Governments in the region are investing in smart grids, renewable energy, and digital energy management, supporting AI adoption. Utilities and energy providers increasingly rely on AI-driven forecasting to improve efficiency and reliability. Emerging economies are modernizing energy infrastructure, creating ample opportunities for advanced AI solutions. The convergence of rising electricity demand,

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favorable policies, and growing technological adoption is fueling strong market growth in Asia-Pacific, making it the fastest-growing region for AI-based energy demand forecasting globally.

Key players in the market

Some of the key players in AI-Based Energy Demand Forecasting Market include Siemens AG, General Electric Company, Schneider Electric SE, IBM Corporation, ABB Ltd, Honeywell International Inc., Hitachi Energy, Microsoft Corporation, Amazon Web Services (AWS), C3.ai, Engie, Envision Energy, Xcel Energy, Eletrobas, ?rsted, RWE, Auto Grid Systems Inc. and Oracle Corp.

Key Developments:

In November 2025, Siemens AG and Shanghai Electric signed a framework agreement for the “Intelligent Grid – Medium-Low Voltage New-Type Power System Equipment Procurement Project,” during the 8th China International Import Expo (CIIE). The collaboration aims to deepen innovation in medium##- ##and low-voltage power system equipment, driving progress in digitalization and decarbonization to support China’s dual-carbon targets.

In October 2025, ABB has signed a term sheet agreement with Dutch renewable energy company SwitcH2 to engineer and supply automation and electrification solutions for SwitcH2’s floating production, storage and offloading (FPSO) unit dedicated to producing green ammonia from green hydrogen.

In April 2025, Hitachi Energy India Ltd declared over a major contract won by a joint venture of Hitachi Energy and Bharat Heavy Electricals Limited (BHEL). Rajasthan Part I Power Transmission Limited, a wholly-owned subsidiary of Adani Energy Solutions Ltd (AESL), awarded the contract, for a high-voltage direct current?(HVDC) transmission endeavor. The project involves the development of a 6,000 MW, ±800 kilovolt (kV) bi-pole and bi-directional HVDC transmission system.

Forecasting Horizons Covered:

Short-Term (Hours to Days)

Medium-Term (Weeks to Months)

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Long-Term (Years, Strategic Planning)

Deployments Covered:

Cloud-Based

On-Premises

Technologies Covered:

Traditional Machine Learning

Deep Learning

Reinforcement Learning

Hybrid/Ensemble Models

Applications Covered:

Utilities

Industrial

Commercial

Residential

Microgrids

Regions Covered:

North America

United States

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- Canada
- Mexico

Europe

- United Kingdom
- Germany
- France
- Italy
- Spain
- Netherlands
- Belgium
- Sweden
- Switzerland
- Poland
- Rest of Europe

Asia Pacific

- China
- Japan
- India
- South Korea

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- Australia
- Indonesia
- Thailand
- Malaysia
- Singapore
- Vietnam
- Rest of Asia Pacific

South America

- Brazil
- Argentina
- Colombia
- Chile
- Peru
- Rest of South America

Rest of the World (RoW)

- Middle East
- Saudi Arabia
- United Arab Emirates
- Qatar
- Israel

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Rest of Middle East

Africa

South Africa

Egypt

Morocco

Rest of Africa

What our report offers:
- Market share assessments for the regional and country-level segments
- Strategic recommendations for the new entrants
- Covers Market data for the years 2023, 2024, 2025, 2026, 2027, 2028, 2030, 3032 and 2034
- Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)
- Strategic recommendations in key business segments based on the market estimations
- Competitive landscaping mapping the key common trends
- Company profiling with detailed strategies, financials, and recent developments
- Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

All the customers of this report will be entitled to receive one of the following free customization options:

Company Profiling

Comprehensive profiling of additional market players (up to 3)

SWOT Analysis of key players (up to 3)

Regional Segmentation

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Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)

Competitive Benchmarking

Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

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(2023-2034) ($MN)
Table 19 Global AI-Based Energy Demand Forecasting Market Outlook, By Microgrids (2023-2034) ($MN)
Note: Tables for North America, Europe, APAC, South America, and Rest of the World (RoW) Regions are also represented in the same manner as above.

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