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Grid-Edge Intelligence and Edge Computing for Power Market Forecasts to 2034 – Global Analysis By Component (Hardware, Software and Services), Deployment Model, Application, End User and By Geography

https://marketpublishers.com/r/GD7EAA4402EAEN.html
Date: June 2026
Pages: 200
Price: US$ 4,150.00 (Single User License)
ID: GD7EAA4402EAEN

Abstracts

According to Stratistics MRC, the Global Grid-Edge Intelligence and Edge Computing for Power Market is accounted for $2.8 billion in 2026 and is expected to reach $12.8 billion by 2034 growing at a CAGR of 21.1% during the forecast period. Grid-edge intelligence and edge computing in power systems describe decentralized processing frameworks positioned near generation, transmission, and consumption assets to deliver rapid analytics and control. By shifting computation from centralized cloud platforms to local nodes, these systems improve speed, reliability, and operational efficiency. They enable advanced applications such as renewable integration, demand forecasting, predictive maintenance, and fault detection. Utilities deploy smart sensors, meters, and substation technologies to balance loads and minimize latency. This approach strengthens grid autonomy, enhances resilience, and supports cleaner energy transitions by allowing faster, data-driven decisions across modern electricity infrastructure and optimizing overall system performance efficiency gains.

According to the International Energy Agency (IEA), the number of smart power meters worldwide exceeded 1 billion in 2022, increasing from about 100 million in 2010.

Market Dynamics:

Driver:

Rising energy demand & EV adoption

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Growing electricity demand due to electrification trends and increasing electric vehicle adoption is a significant driver of grid-edge intelligence and edge computing in power systems. Higher energy consumption from residential, industrial, and transport sectors creates pressure on existing grid infrastructure. EV charging systems add new peak load complexities that require real-time tracking and balancing. Edge computing provides localized processing and faster response to changing demand conditions. Utilities can manage charging behavior, reduce overload risks, and maintain system stability. This driver is pushing investments in smart grid technologies to handle expanding and increasingly complex global energy requirements effectively and efficiently overall.

Restraint:

High initial investment and infrastructure complexity

Substantial upfront costs and complex infrastructure requirements significantly restrict the growth of grid-edge intelligence and edge computing in the power sector. Implementing edge devices, intelligent sensors, communication systems, and data platforms demands heavy financial investment. Many utilities, particularly in emerging economies, struggle to fund modernization of aging grid infrastructure. Technical difficulties arise when integrating advanced edge technologies with existing legacy systems, making deployment slow and complicated. These challenges collectively hinder widespread adoption and delay the transformation toward fully digital, intelligent, and decentralized grid-edge power management systems worldwide.

Opportunity:

Expansion of renewable energy and distributed energy resources (DERs)

The rapid growth of renewable energy and distributed energy resources creates a strong opportunity for grid-edge intelligence and edge computing in the power sector. The rising use of solar panels, wind farms, energy storage systems, and microgrids demands advanced decentralized monitoring and control capabilities. Edge computing supports this transition by enabling local data processing and efficient coordination of distributed energy assets. It helps utilities manage variable renewable output and maintain system stability. Driven by global sustainability goals and supportive policies, this opportunity continues to expand, positioning grid-edge technologies as essential tools for building flexible, reliable, and environmentally sustainable energy networks

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globally.

Threat:

Data privacy and regulatory compliance challenges

Issues related to data privacy and compliance with regulatory frameworks present a serious threat to grid-edge intelligence and edge computing adoption in the energy sector. Distributed systems gather and analyze large amounts of sensitive operational and consumer information, making secure handling essential. However, maintaining data protection across decentralized networks is complex and expensive. Varying regulatory standards across different regions further complicate compliance for global utilities. Non-compliance can lead to financial penalties, legal consequences, and reputational harm. Concerns over improper data usage also reduce user confidence. These factors collectively slow down adoption and limit scalability of edge-based power system technologies globally.

Covid-19 Impact:

The COVID-19 pandemic produced both negative and positive effects on the grid-edge intelligence and edge computing market in the power sector. At the beginning, supply chain disruptions, delayed projects, and limited workforce availability slowed implementation of edge-based technologies. Utilities also struggled with restricted field operations during lockdowns. However, the crisis accelerated digital adoption across the energy industry. The need for remote monitoring, increased household electricity usage, and demand for reliable power systems encouraged investment in edge computing solutions. Utilities strengthened focus on automation, real-time data processing, and decentralized control. Overall, the pandemic emphasized the need for resilient and digitally enabled power infrastructure systems globally.

The software segment is expected to be the largest during the forecast period

The software segment is expected to account for the largest market share during the forecast period because it plays a central role in processing data, performing analytics, and supporting real-time operational decisions. Software systems are essential for functions such as grid monitoring, energy optimization, predictive maintenance, and managing distributed energy resources. Utilities depend on these platforms to analyze large volumes of information generated by edge devices like sensors and smart meters. These solutions improve efficiency, enhance grid stability, and enable greater

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automation. Increasing adoption of AI-based tools, integrated cloud-edge architectures, and cybersecurity-focused applications further reinforces the strong position of the software segment worldwide.

The cybersecurity & grid resilience segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the cybersecurity & grid resilience segment is predicted to witness the highest growth rate. This expansion is fuelled by the rising number of cyber attacks targeting essential power infrastructure and the growing demand for secure and uninterrupted electricity delivery. With increasing digitalization and connectivity of power grids, risks across distributed edge devices and communication systems are also rising. Utilities are focusing on advanced security mechanisms, real-time intrusion detection, and stronger resilient architectures. Edge computing supports this need by enabling local monitoring and rapid response, thereby improving protection and ensuring continuous grid operations globally.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share, driven by its highly developed electricity infrastructure and early adoption of smart grid technologies. The region has strong participation from major technology companies and utilities investing heavily in digital energy transformation. Widespread use of IoT-enabled devices and growing integration of renewable energy further support market expansion. Utilities across the United States and Canada are increasingly deploying edge computing systems to improve grid performance, reliability, and security. Government support and a strong focus on innovation continue to strengthen North America’s leading position in this global market.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR, supported by rapid urban expansion, increasing power consumption, and large-scale smart grid development. Key economies including China, India, Japan, and South Korea are investing significantly in upgrading power infrastructure and integrating renewable energy sources. Government initiatives focused on modernizing aging grids and promoting digital technologies are also driving adoption. In addition, rising industrial activity and broader use of IoT-enabled energy systems contribute to market acceleration. These combined factors make Asia Pacific the fastest-expanding regional

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market globally.

Key players in the market

Some of the key players in Grid-Edge Intelligence and Edge Computing for Power Market include Siemens AG, Schneider Electric, ABB Ltd., General Electric, IBM Corporation, Oracle Corporation, Cisco Systems, Hitachi Energy, NVIDIA Corporation, Intel Corporation, Amazon Web Services, Microsoft Corporation, Google LLC, Hewlett Packard Enterprise, Dell Technologies, Huawei Technologies, Rockwell Automation and Emerson Electric.

Key Developments:

In November 2025, Siemens Energy has signed a contract to design and deliver the power conversion system for Oklo's Aurora powerhouse reactors. The contract will see Siemens Energy conduct detailed engineering and layout activities for a condensing SST-600 steam turbine, an SGen-100A industrial generator, and associated auxiliaries to support Oklo’s first advanced reactor, the Aurora powerhouse at Idaho National Laboratory.

In November 2025, Schneider Electric announced a two-phase supply capacity agreement (SCA) totaling $1.9 billion in sales. The milestone deal includes prefabricated power modules and the first North American deployment of chillers. The announcement was unveiled at Schneider Electric'sInnovation Summit North America in Las Vegas, convening more than 2,500 business leaders and market innovators to accelerate practical solutions for a more resilient, affordable and intelligent energy future.

In November 2025, Hitachi Energy India and Bharat Heavy Electricals Ltd (BHEL) have executed a novation agreement that transfers contractual rights and obligations for the Rajasthan HVDC project from Rajasthan Part I Power Transmission Ltd (RPPTL) to an Adani Group entity. The agreement, completed, formalises the replacement of RPPTL with AESL Projects Ltd (APL) as the contracting party.

Components Covered:

- Hardware
- Software

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Services

Deployment Models Covered:

On-Premises Edge Systems

Cloud-Integrated Edge Systems

Hybrid Architectures

Applications Covered:

Grid Monitoring & Control

Distributed Energy Resource (DER) Management

Demand Response & Load Management

Predictive Maintenance & Asset Optimization

Energy Trading & Market Participation

Cybersecurity & Grid Resilience

End Users Covered:

Utilities

Independent Power Producers (IPPs)

Industrial & Commercial Facilities

Smart Cities & Municipal Infrastructure

Residential & Community Energy Systems

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Regions Covered:

- North America
  - United States
  - Canada
  - Mexico
- Europe
  - United Kingdom
  - Germany
  - France
  - Italy
  - Spain
  - Netherlands
  - Belgium
  - Sweden
  - Switzerland
  - Poland
  - Rest of Europe
- Asia Pacific
  - China

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- Japan
- India
- South Korea
- 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

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Saudi Arabia

United Arab Emirates

Qatar

Israel

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, 2032 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:

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Company Profiling

Comprehensive profiling of additional market players (up to 3)

SWOT Analysis of key players (up to 3)

Regional Segmentation

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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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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