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Power-Line Communications and IoT-Enabled Grid Monitoring Market Forecasts to 2034 – Global Analysis By Component (PLC Modems & Modules, IoT Sensors, Communication Gateways and Grid Monitoring Software Platforms), Technology, Application, End User and By Geography

https://marketpublishers.com/r/PFB8A569BFDBEN.html
Date: June 2026
Pages: 200
Price: US$ 4,150.00 (Single User License)
ID: PFB8A569BFDBEN

Abstracts

According to Stratistics MRC, the Global Power-Line Communications and IoT-Enabled Grid Monitoring Market is accounted for $10.3 billion in 2026 and is expected to reach $23.4 billion by 2034 growing at a CAGR of 10.8% during the forecast period. Integrating Power-Line Communication technology with IoT-based grid monitoring improves the performance and intelligence of electrical power networks. By using existing electrical wiring for data transfer, PLC eliminates the need for separate communication systems. IoT sensors enable real-time tracking of voltage, load, outages, and overall power quality across the grid. This combined approach allows utilities to detect faults quickly, perform predictive maintenance, and manage energy more efficiently. It also supports remote monitoring of grid infrastructure, reducing energy losses and improving operational control. This synergy leads to stronger, smarter, and more resilient global energy networks overall enhancing sustainability and reliability significantly worldwide.

According to IEEE (Institute of Electrical and Electronics Engineers), PLC systems can achieve data rates exceeding 500 kbps over medium-voltage lines, enabling utilities to transmit monitoring data without deploying new communication infrastructure.

Market Dynamics:

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Driver:

Smart grid modernization demand

The increasing shift toward smart grid development is a key factor driving adoption of PLC and IoT-based grid monitoring solutions. Energy utilities are modernizing outdated electrical systems by integrating digital communication and automation technologies to boost efficiency and reliability. PLC uses existing electrical lines for data exchange, while IoT devices deliver continuous visibility into grid conditions. This combination supports smart metering, remote diagnostics, and proactive maintenance strategies. Significant investments from governments and power companies are accelerating smart grid deployment. These advancements help create more adaptive, intelligent, and resilient electricity networks designed to efficiently support future energy requirements and growing demand.

Restraint:

Signal interference and noise issues in power lines

One significant limitation affecting PLC and IoT-based grid monitoring systems is interference and noise within electrical power lines. Because PLC relies on existing transmission lines for communication, it is exposed to disruptions from heavy electrical equipment, switching operations, and voltage variations. These disturbances can weaken signal strength, reduce transmission reliability, and affect data accuracy. Additionally, older infrastructure and environmental conditions further increase instability in communication performance. This makes it difficult for utilities to ensure consistent and high-quality data transfer. Consequently, extra signal conditioning and noise reduction mechanisms are required, increasing system complexity and limiting widespread implementation in smart grid networks.

Opportunity:

Growth in industrial automation and digitalization

The rapid growth of industrial automation and digital transformation offers substantial opportunities for PLC and IoT-based grid monitoring technologies. Modern industries depend on stable and efficient power systems to support automated manufacturing and smart factory operations. PLC technology enables communication across industrial electrical networks, while IoT devices provide continuous insights into energy

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consumption, equipment health, and system performance. This allows companies to reduce operational downtime, improve efficiency, and optimize energy usage. With the expansion of Industry 4.0 practices worldwide, demand for intelligent monitoring solutions is increasing, creating strong opportunities for advanced energy management systems in industrial applications.

Threat:

Rapid evolution of alternative communication technologies

A significant threat to PLC and IoT-enabled grid monitoring systems is the fast development of competing communication technologies like fiber optics, 5G networks, and satellite communication. These alternatives provide superior speed, lower latency, and higher reliability compared to power-line-based communication systems. Utilities often prefer these advanced technologies for mission-critical grid operations due to their enhanced performance. Moreover, continuous improvements in wireless and optical communication are making them more affordable and scalable. This increasing competition reduces the attractiveness of PLC solutions, potentially restricting their adoption in future smart grid deployments and limiting long-term growth prospects in the market.

Covid-19 Impact:

The COVID-19 outbreak influenced the PLC and IoT-based grid monitoring market in both positive and negative ways. With lockdowns in place, electricity usage shifted significantly toward residential areas, causing irregular load patterns that required enhanced real-time monitoring. Utilities increasingly adopted digital tools to maintain uninterrupted operations and manage grids remotely. PLC and IoT solutions helped reduce the need for on-site inspections and supported predictive maintenance strategies. However, disruptions in global supply chains and delays in infrastructure development temporarily hindered project execution. Overall, the pandemic emphasized the need for resilient, automated, and remotely controlled smart grid systems, strengthening future market growth.

The IoT sensors segment is expected to be the largest during the forecast period

The IoT sensors segment is expected to account for the largest market share during the forecast period because they are fundamental to capturing real-time information from electrical networks. These devices track important parameters including voltage levels,

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current flow, temperature changes, load variations, and potential fault signals across power infrastructure. Their capability to deliver precise and continuous monitoring data makes them highly important for efficient grid management. Energy providers depend on these sensors for early fault detection, predictive maintenance, and optimizing electricity distribution. With the expansion of smart grids and automated substations, the importance and adoption of IoT sensors continue to grow significantly worldwide.

The fault detection & predictive maintenance segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the fault detection & predictive maintenance segment is predicted to witness the highest growth rate, driven by the increasing demand for reliable and uninterrupted power supply. Utilities are integrating IoT devices, advanced data analytics, and PLC communication systems to detect abnormalities in advance and prevent system failures. This approach supports real-time alerts, automated diagnostics, and maintenance based on equipment condition rather than routine schedules. Aging power infrastructure, rising energy consumption, and smart grid expansion are further boosting adoption. The strong emphasis on reducing outages and operational costs is fueling rapid growth of this segment worldwide.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share because of its highly developed electricity infrastructure and early implementation of smart grid solutions. The region is supported by substantial investments in modernizing power networks and expanding the use of IoT-based monitoring systems. Government programs focused on enhancing energy efficiency and grid reliability also play a key role in driving adoption. Utilities across the United States and Canada are increasingly using PLC and IoT technologies for real-time monitoring, fault detection, and predictive maintenance. Strong presence of advanced technology companies further reinforces North America’s dominant position in the global market.

Region with highest CAGR:

Over the forecast period, the Asia-Pacific region is anticipated to exhibit the highest CAGR, driven by rapid urban expansion, increasing power consumption, and significant investments in smart grid projects. Major economies like China, India, Japan, and South Korea are upgrading their electrical infrastructure to enhance reliability, efficiency, and accessibility. Government support for digital transformation, renewable energy adoption,

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and smart city initiatives is further boosting market growth. The region’s strong industrial development and efforts to minimize transmission losses are also contributing to rising demand. These factors collectively position Asia-Pacific as the most rapidly expanding market globally.

Key players in the market

Some of the key players in Power-Line Communications and IoT-Enabled Grid Monitoring Market include Siemens AG, ABB Ltd., Schneider Electric SE, GE Vernova, Cisco Systems, Inc., STMicroelectronics N.V., Analog Devices, Inc., Broadcom Inc., devolo AG, Renesas Electronics Corporation, Hitachi, Ltd., Itron, Inc., Landis+Gyr AG, Hunt Energy IQ, Sensus, Elster Group, Silver Spring Networks and Toshiba Energy Systems & Solutions Corporation.

Key Developments:

In December 2025, ABB and HDF Energy have signed a joint development agreement (JDA) to co-develop a high-power, megawatt-class hydrogen fuel cell system designed for use in marine vessels. The project targets use of the system on various vessel types, including large seagoing ships such as container feeder vessels and liquefied hydrogen carriers.

In December 2025, GE Vernova has signed an agreement with Greenvolt Power to supply onshore wind turbines for the Gurbanesti wind farm in Calara?i county, Romania. The contractual scope covers the supply, installation, and commissioning of 42 units of 6.1MW, 158m rotor turbines. This marks the second major onshore wind agreement for GE Vernova Romania within two months, following an earlier announcement to deliver another 42 turbines for the Ialomi?a wind farm in the country.

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.

Components Covered:

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- PLC Modems & Modules
- IoT Sensors
- Communication Gateways
- Grid Monitoring Software Platforms

Technologies Covered:

- Narrowband PLC
- Broadband PLC
- Hybrid PLC
- Wireless IoT Integration

Applications Covered:

- Distribution Grid Monitoring
- Transmission Line Monitoring
- Substation Automation
- Smart Metering & Demand Response
- Fault Detection & Predictive Maintenance

End Users Covered:

- Utilities
- Industrial Facilities

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- Commercial Buildings
- Residential

Regions Covered:

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

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- Asia Pacific
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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)

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- Middle East
  - 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

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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
  - 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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