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Advanced Grid Diagnostics Market Forecasts to 2032 – Global Analysis By Product Type (Grid Condition Monitoring Solutions, Fault Detection & Localization Solutions and Predictive Maintenance Platforms), Component, Technology, Application, End User and By Geography

https://marketpublishers.com/r/AD46FBA0AE85EN.html
Date: January 2026
Pages: 200
Price: US$ 4,150.00 (Single User License)
ID: AD46FBA0AE85EN

Abstracts

According to Stratistics MRC, the Global Advanced Grid Diagnostics Market is accounted for $8.8 billion in 2025 and is expected to reach $20.7 billion by 2032 growing at a CAGR of 13% during the forecast period. Advanced Grid Diagnostics refer to intelligent monitoring and analytics systems that assess the health, performance, and stability of electrical grids. They use real-time data from sensors, substations, and distributed energy resources to detect faults, predict failures, and optimize maintenance. These diagnostics enable utilities to transition from reactive to predictive operations, improving grid reliability, integrating renewables, and reducing downtime. Technologies include AI-based asset monitoring, condition-based maintenance, and digital twin modeling.

According to BloombergNEF, the decentralization of energy through solar and wind is boosting investment in real-time diagnostic sensors that monitor transformer health and prevent outages in aging infrastructure.

Market Dynamics:

Driver:

Aging transmission and distribution assets

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The advanced grid diagnostics market is driven by the rapid aging of transmission and distribution infrastructure across developed and emerging economies. Fueled by decades of deferred upgrades, utilities are increasingly experiencing asset degradation, higher fault rates, and reliability challenges. Grid operators are therefore investing in advanced diagnostic solutions to monitor asset health in real time and extend operational lifecycles. Rising electricity demand and renewable energy integration further amplify stress on aging networks, reinforcing the need for predictive diagnostics to avoid costly outages and unplanned maintenance events.

Restraint:

High sensor installation costs

High costs associated with installing advanced grid sensors and monitoring devices remain a key restraint. Deployment across expansive transmission and distribution networks requires significant capital expenditure, skilled labor, and downtime planning. Utilities operating under budget constraints often delay large-scale sensor rollouts, particularly in rural or low-density areas. Additionally, the need for specialized hardware and secure communication infrastructure increases total cost of ownership. These financial barriers slow adoption rates, especially among smaller utilities and developing regions with limited modernization budgets.

Opportunity:

Predictive maintenance analytics deployment

Predictive maintenance analytics present a strong growth opportunity within the advanced grid diagnostics market. By leveraging real-time data and advanced analytics, utilities can shift from reactive maintenance to condition-based strategies. This approach reduces unplanned outages, optimizes asset utilization, and lowers long-term operational costs. Increasing availability of AI-driven analytics platforms and cloud-based solutions is making predictive maintenance more accessible. As utilities prioritize reliability and efficiency, analytics-driven diagnostics are expected to witness accelerated adoption across grid modernization initiatives.

Threat:

Operational data integration challenges

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Operational data integration challenges pose a notable threat to market growth. Utilities often operate fragmented legacy systems that generate data in incompatible formats, complicating analytics and real-time diagnostics. Integrating grid diagnostics solutions with existing SCADA, asset management, and outage management systems requires significant customization and expertise. Data silos, cybersecurity concerns, and interoperability limitations can undermine system effectiveness. If integration complexities persist, they may delay deployment timelines and reduce the perceived return on investment for grid diagnostics solutions.

Covid-19 Impact:

The COVID-19 pandemic moderately impacted the advanced grid diagnostics market. Initial disruptions to supply chains and delayed infrastructure projects slowed new deployments. However, restrictions on field workforce availability accelerated demand for remote monitoring and automated diagnostics solutions. Utilities increasingly adopted digital tools to maintain grid reliability with limited onsite intervention. Post-pandemic recovery has reinforced investment in resilient and digitally enabled grid infrastructure, positioning advanced diagnostics as a critical component of long-term utility modernization strategies.

The grid condition monitoring solutions segment is expected to be the largest during the forecast period

The grid condition monitoring solutions segment is expected to account for the largest market share during the forecast period, due to their essential role in real-time asset visibility and fault prevention. These solutions enable continuous monitoring of critical components such as transmission lines, transformers, and substations. Utilities prioritize condition monitoring to detect anomalies early, reduce outage risks, and improve network reliability. The ability to support predictive maintenance and regulatory compliance further strengthens adoption, making this segment the largest contributor to overall market revenue.

The software platforms segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the software platforms segment is predicted to witness the highest growth rate, results from widespread deployment across transmission and distribution networks. Their scalability, proven reliability benefits, and direct impact on

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reducing operational risks drive strong demand. Integration with advanced analytics platforms enhances decision-making and asset performance optimization. Additionally, increasing investments in smart grids and renewable energy integration require continuous condition assessment, reinforcing the dominance of this segment in the advanced grid diagnostics market.

Region with largest share:

During the forecast period, the Asia Pacific region is expected to hold the largest market share, driven by extensive grid expansion and modernization initiatives across major economies. Rapid urbanization, rising electricity consumption, and large-scale renewable energy integration in countries such as China and India are accelerating investments in grid diagnostics technologies. Government-backed smart grid programs and heightened focus on reducing transmission losses further support adoption. The region's scale of infrastructure development makes it the leading contributor to overall market revenue.

Region with highest CAGR:

Over the forecast period, the North America region is anticipated to exhibit the highest CAGR due to aggressive grid modernization efforts and stringent reliability requirements. Aging infrastructure, increasing climate-related disruptions, and heightened cybersecurity concerns are prompting utilities to adopt advanced diagnostics solutions. Strong investment capacity, favorable regulatory frameworks, and early adoption of AI-based grid management technologies further accelerate market growth. These factors collectively position North America as the fastest-growing regional market during the forecast period.

Key players in the market

Some of the key players in Advanced Grid Diagnostics Market include Siemens Energy, Schneider Electric, ABB Ltd, General Electric, Hitachi Energy, Eaton Corporation, Cisco Systems, Itron Inc., Landis+Gyr, Oracle Utilities, Hexagon AB, S&C Electric Company, SEL (Schweitzer Engineering Labs), Autogrid Systems, OSISoft (AVEVA PI), and Trimble Inc.

Key Developments:

In November 2025, ABB Ltd partnered with VoltaGrid to deliver grid stabilization

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technologies for U.S. data centers. ABB supplied 27 synchronous condensers and prefabricated eHouse units to support stable electricity for AI-driven workloads. ABB also renewed its framework agreement with Enedis to advance smart grid technologies.

In October 2025, Siemens Energy published its Infrastructure Transition Monitor 2025, surveying 1,400 executives across 19 countries. The study highlighted that AI and digital grid technologies are now seen as essential for resilience, with energy security overtaking climate cooperation as the top policy priority.

In September 2025, Cisco Systems was highlighted in a Grid Cybersecurity Research Report (2025–2034) as a key player alongside IBM and Siemens. Cisco is investing in AI-driven threat intelligence and blockchain-enhanced security solutions to protect smart grids from expanding cyberattack surfaces.

Product Types Covered:

- Grid Condition Monitoring Solutions
- Fault Detection & Localization Solutions
- Predictive Maintenance Platforms

Components Covered:

- Hardware Devices
- Software Platforms
- Sensors & Measurement Units
- Communication Modules

Technologies Covered:

- AI-Based Diagnostics
- IoT-Enabled Monitoring

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- Digital Substation Technologies
- Advanced Data Analytics

Applications Covered:

- Transmission Networks
- Distribution Networks
- Substations
- Renewable Energy Integration
- Grid Modernization Projects

End Users Covered:

- Power Utilities
- Grid Operators
- Energy Service Providers
- Industrial Power Consumers

Regions Covered:

- North America
  - US
  - Canada
  - Mexico

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- Europe
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  - UK
  - Italy
  - France
  - Spain
  - Rest of Europe
- Asia Pacific
  - Japan
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  - New Zealand
  - South Korea
  - Rest of Asia Pacific
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  - Argentina
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Rest of South America

Middle East & Africa

Saudi Arabia

UAE

Qatar

South Africa

Rest of Middle East & 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 2024, 2025, 2026, 2028, and 2032
- 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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Note: Tables for North America, Europe, APAC, South America, and Middle East & Africa Regions are also represented in the same manner as above.

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