Guidehouse INSIGHTS

Research Report

Guidehouse Insights Leaderboard: Asset Performance Management

Assessment of Strategy and Execution for Nine Leading Vendors of APM Solutions for Utilities

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Section 1
Executive Summary

1.1 Market Introduction

The role of asset management in utility operations is becoming ever more critical. From the proliferation of digital sensors throughout transmission & distribution (T&D) networks to the ongoing regulatory challenges stemming from grid reliability, the value of asset management, and more specifically, asset performance management (APM), has never been higher. Historically, utilities have approached asset management from a simpler perspective, such as tracking asset maintenance schedules via spreadsheets, but APM lets them centralize asset information to enable useful analysis of asset health, maintenance schedules, and asset investment planning.

As these technologies have become more expansive and sophisticated, the number of modules captured under the APM umbrella has grown. At the same time, the pool of vendors has concentrated into traditional OEMs on the one hand (General Electric [GE Vernova], Schneider Electric, and Hitachi Energy), and specialized software providers on the other (IBM, mPrest, DNV, SAP, IPS Energy, and Bentley Systems).

These APM providers' offerings mix conventional innovations (e.g., modular, microservices-based design principles) with a wide mix of forward-looking business and technology reorientations. While product and strategy roadmaps naturally vary by vendor, common macrotrends include combining APM with asset analytics and enterprise asset management (EAM), integration of AI and machine learning to improve decision-making, revamped pricing and deployment models, mobile extensions, and cloud enablement, among many others. The criteria by which vendors are compared in this *Guidehouse Insights Leaderboard* are:

- Vision
- Go-to-Market Strategy
- Partners
- Technology
- Geographic Reach
- Sales, Marketing, and Distribution
- Product Performance
- Product Portfolio

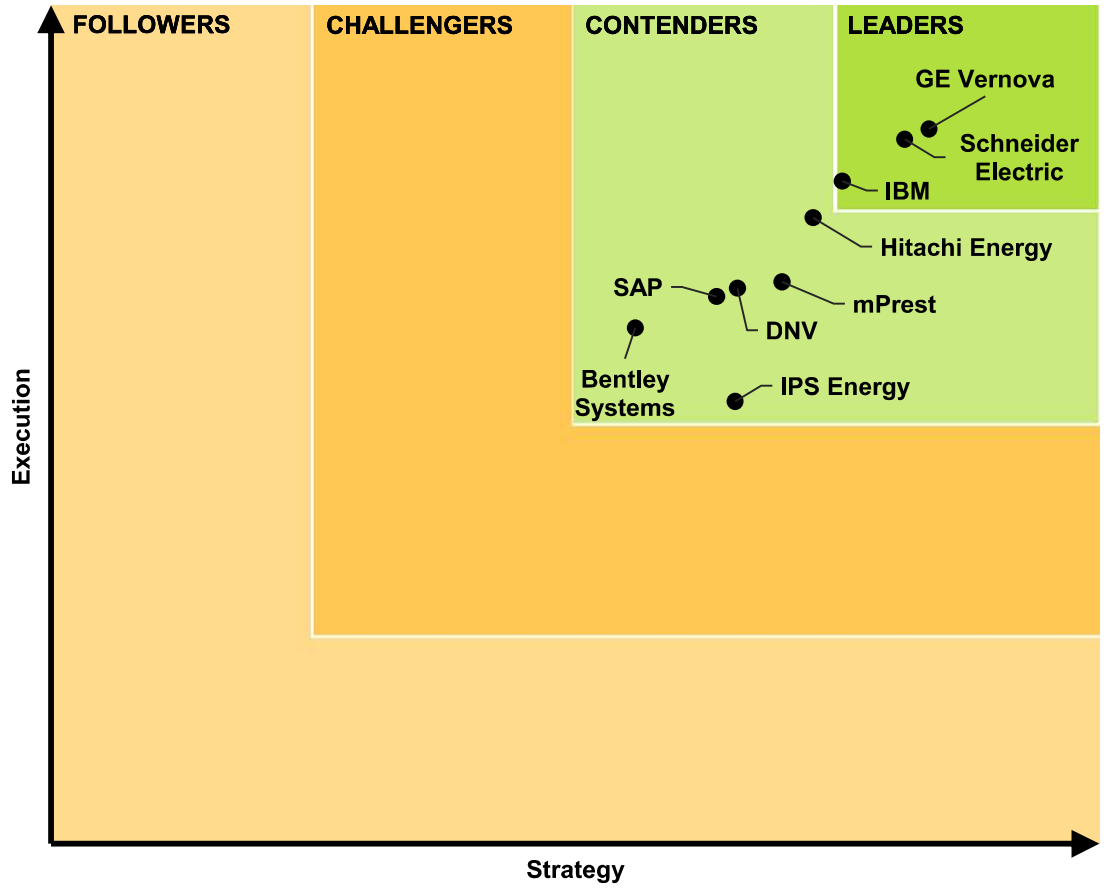
- Pricing
- Staying Power

A detailed description of each criterion is provided in the Criteria Definitions section of this report.

1.2 The Guidehouse Insights Leaderboard Grid

Three companies achieved Leader status in this analysis: GE Vernova, Schneider Electric, and IBM. These companies stand out from the competition because of their advanced technology and holistic portfolios, innovative business models, flexible system architectures, and significant installed base. Six companies ranked as Contenders: Hitachi Energy, mPrest, DNV, SAP, IPS Energy, and Bentley Systems. All of the vendors in the *Leaderboard* ranked as Leaders or Contenders, indicating a competitive landscape and a need for them to differentiate from one another.

Chart 1-1. The Guidehouse Insights Leaderboard Grid



(Source: Guidehouse Insights)

Section 2
Market Overview

2.1 Market Definition

Asset performance management (APM) is a submarket of utility IT and analytics that enhances the availability of information on assets and offers tools for optimized decision-making. APM tools consist of platforms that integrate multiple systems and sources of asset data, with dedicated asset analytics sitting on top. Applications include monitoring physical assets, optimized maintenance scheduling, field information tools, machine health and failure prediction, asset modeling, and asset tracking.

The two basic categories for energy applications are grid and power plant APM. This *Guidehouse Insights Leaderboard* looks at grid APM, which focuses on software representations of T&D assets and processes that allow for predicting and optimizing performance. Users can then assess the health of assets, design condition-based maintenance recommendations, and integrate those recommendations into maintenance plans. Asset owners can thereby reduce operations and management costs and manage all types of assets through common metrics.

2.2 Market Drivers

Several factors are driving the adoption of asset management solutions in the utility space. Primary drivers revolve around the need to improve communications across different departments to support enhanced collaboration, as well as cost considerations such as investment deferral and reducing maintenance downtime, and responding to climate change and the rise in inclement weather. Secondary yet emerging drivers include the need to integrate distributed energy resources (DER) and growth in managed service offerings.

- **Integrating enterprise asset management (EAM) processes.** Vendors have developed APM tools to help engineering, operations, and capital planning departments communicate better with each other. While each of these departments is heavily involved with assets, they have traditionally operated in their own silos, with little communication among them. APM can provide better information and analytical tools so they can improve their own specific jobs while supporting enhanced collaboration across departments.
- **Cost and efficiency.** On the one hand, APM can help reduce the cost of deploying a new infrastructure for making sense of data generated by connected devices in the grid, by replacing on-premises data storage and visualization technology with cloud-based solutions. At the same time, the data generated can give users a clearer picture of the health of assets, without

physically disconnecting assets to check. This means that maintenance work can focus on assets that are most likely to fail, reducing overall downtime and truck rolls.

- **Climate change and inclement weather.** Climate change is a significant driver for reliability/resiliency and asset management improvements. With a rise in inclement weather comes expanded vulnerability to critical and costly utility assets, such as substation equipment and transformers. Higher levels of situational awareness related to asset modeling/monitoring and granular weather forecasting will help mitigate these situations.

2.3 Market Barriers

Common high level barriers include system costs and integration complexities, while operational silos and poor data quality have also hindered increased adoption of APM solutions. Tertiary challenges include change management procedures, aging workforces, and the existing base of complex, homegrown solutions.

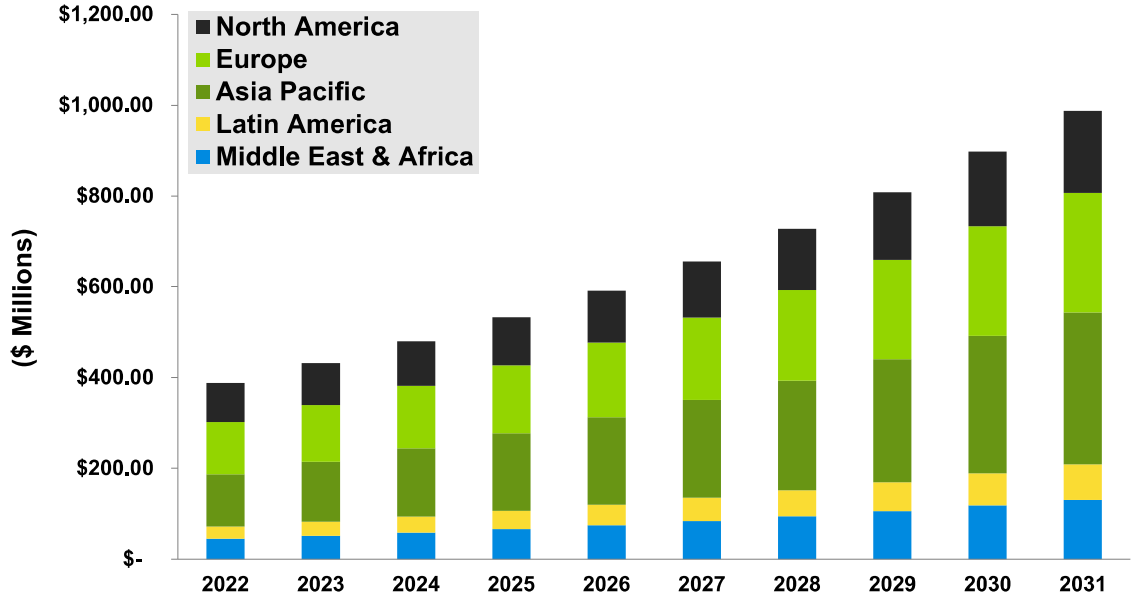
- **Cost and complexity.** Asset management software deployments require extensive product investments and integration efforts for software and telecommunications, as well as organizational restructuring and human capital investment. Many utilities remain unsure whether the potential benefits are worth the costs, particularly with the limited number of case studies involving advanced APM and analytics applications. Increasing operator awareness, microfinance funding, and other emerging operating models that require little or no upfront payment can help address this significant barrier.
- **Poor data quality.** Data quality has been a major struggle for utilities, whose approach to enterprise data storage can be haphazard. Few have employed data guardians to oversee how data is managed across the company. Instead, responsibility is passed to individual departments, which will typically store data according to their own needs and not with a view to sharing throughout the enterprise. If the question is whether utilities should wait for perfect (or even good) data to implement advanced asset management systems (AMS) or APM systems, vendors say no, but low levels of data fidelity have led many utilities to ignore the prospect of advanced asset management solutions.
- **Aging workforce and skills shortage.** With high upfront costs and the limited availability of skilled resources, the cost of sending both equipment and labor to off-grid generation sites is extremely high. These additional resource costs lower the value proposition for monitoring and control (M&C) to customers and create challenges for service providers to succeed in this market.
- **Utilities are still hesitant to implement cloud-based APM.** Cloud-based solutions were typically marketed to smaller and mid-market utilities to address internal skills shortages, but the cost and performance benefits are becoming

apparent to utilities of all sizes. Many larger utilities have also been reluctant to adopt cloud-based APM solutions due to concerns over cybersecurity, despite vendors' investments in securing cloud environments. A final factor is the differences in regulatory and accounting standards, specifically whether a company can capitalize relative expenses.

2.4 Market Trends

The overall market for grid APM spending is expected to grow from $388.0 million in 2022 to $987.6 million in 2031, at a compound annual growth rate (CAGR) of 10.9%. Asia Pacific will be the main driver of growth, overtaking Europe as the largest region in 2023 to reach $334.7 million in investments by the end of the forecast period. North America will remain the smallest and slowest growing of the developed regions.

Chart 2-1. Grid APM Spending by Region, World Markets: 2022-2031



(Source: Guidehouse Insights)

Section 3
The Guidehouse Insights Leaderboard

3.1 The Guidehouse Insights Leaderboard Categories

Guidehouse Insights scored the vendors in this *Guidehouse Insights Leaderboard* according to four categories: Leaders, Contenders, Challengers, and Followers. These categories are defined here.

3.1.1 Leaders

Leaders are vendors that scored 75 or above in both Strategy and Execution. These companies have clearly differentiated themselves from the competition through exceptional development, strong supplier relationships, and a sustainable business model. Leaders are currently in the strongest position for long-term success in the grid APM market.

3.1.2 Contenders

Contenders are vendors that scored between 50 and 75 in both Strategy and Execution. While these companies have a solid foundation for growth and long-term success, they have not attained a superior position in the market. They are well-positioned to become Leaders, but have not yet fully executed their product launches, need to differentiate themselves via unique APM technology or cost breakthroughs, are seeing weaker than expected demand, or have limited market penetration.

3.1.3 Challengers

Challengers are vendors that scored higher than 25 in Strategy and Execution but are not yet contenders for market leadership. While the vendors are fundamentally sound, they face significant challenges stemming from a lack of strategic vision or investments, or risks to successful potential execution. Challengers may also be early in their arc of launch, therefore resulting in Execution scores that are based on small numbers of clients or deployments. No vendors have scored as Challengers in this analysis.

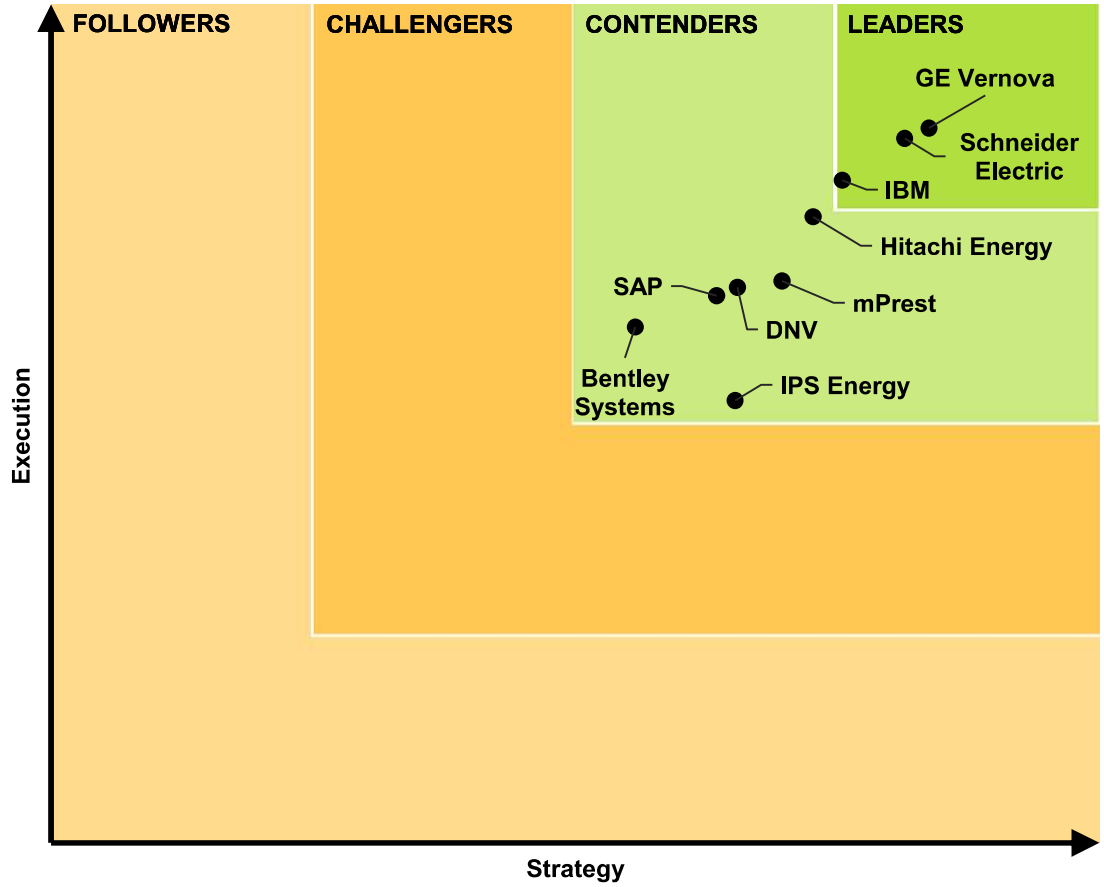
3.1.4 Followers

Followers are vendors that have failed to distinguish themselves and scored below 25 in Strategy and Execution. These companies are not currently expected to challenge the Leaders unless they can substantially alter their strategic vision and expand their resources. Their long-term viability is in doubt unless systemic changes are made within the organization. No vendors have scored as Followers in this analysis.

3.2 The Guidehouse Insights Leaderboard Grid

Three companies achieved Leader status in this analysis: GE Vernova, Schneider Electric, and IBM. These companies stand out from the competition because of their advanced technology and holistic portfolios, innovative business models, flexible system architectures, and significant installed base. Six companies ranked as Contenders: Hitachi Energy, mPrest, DNV, SAP, IPS Energy, and Bentley Systems.

Chart 3-1. The Guidehouse Insights Leaderboard Grid



(Source: Guidehouse Insights)

These vendors have predominantly standardized around common product offerings and are investing in similar technology and business enhancements. This contributes to a relatively narrow variance in overall scores. However, leading APM providers continue to differentiate themselves adequately via highly sophisticated and reliable solutions, holistic product portfolios, favorable ROI, and more flexible architectures, pricing options, and deployment models.

Table 3-1. The Guidehouse Insights Leaderboard Overall Scores

Rank	Company	Score
1	GE Vernova	84.5
2	Schneider Electric	82.7
3	IBM	77.3
4	Hitachi Energy	73.7
5	mPrest	68.4
6	DNV	65.9
7	SAP	64.4
8	IPS Energy	59.3
9	Bentley Systems	58.7

(Source: Guidehouse Insights)

Section 4
Company Rankings

4.1 Leaders

With scores above 75 in both Strategy and Execution, companies ranked as Leaders are considered advanced in developing grid APM offerings.

4.1.1 GE Vernova

Overall Score: 84.5

Strategy: 83.8

Execution: 85.3

GE Vernova is a division of General Electric (GE), a global engineering and technology provider founded in 1892 and based in Boston, Massachusetts. In November 2021, GE announced that it planned to split into three separate, publicly traded companies focused on renewable energy, healthcare, and aviation. GE Vernova, the company's portfolio of energy businesses, is expected to be spun off in early 2024 through the combination of the existing GE Renewable Energy, GE Power, and GE Digital business groups.

Bringing together innovation and technology along with power grid expertise from GE Vernova's Digital, Renewables, and Gird Solutions businesses, GE's APM strategy is based on a three-tiered approach: asset health, asset reliability, and maintenance optimization. Its APM product suite includes advanced diagnostics for asset health, risk-based and predictive analysis, and financial planning. Underlying these technologies is GE's GridOS software portfolio for grid orchestration throughout T&D networks.

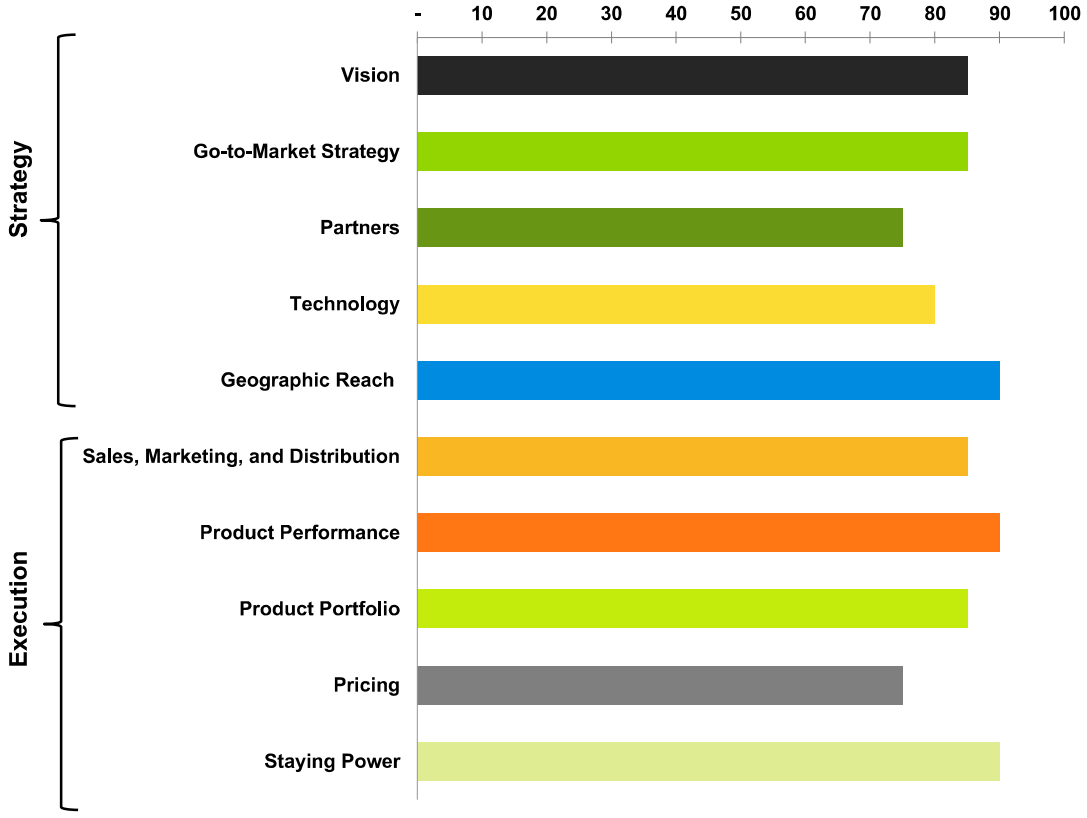
The company's APM offering is based on microservices-based architecture and includes the following modules: Industrial Data Diagnostics; EnergyAPM, APM Smart Signal; APM Health & Condition, APM Reliability, Performance & Risk; APM Strategy; APM Integrity; EnergyFIT (Field Inspection Tool); and APM Safety. These modules can be deployed separately or together as a holistic, interoperable solution.

GE offers both on-premises and cloud-based solutions for its APM software. For on-premises solutions, it works with clients to determine server needs and can provide requisite hardware (e.g., servers, gateways) to host the APM solution, while for cloud deployments, it can provide its own managed solution or support the customer's cloud environment. GE's cloud partners include Amazon Web Services (AWS) and Microsoft Azure.

GE Vernova's score places it as a Leader, thanks to its wide breadth of offerings and capabilities in the APM space, as well as its extensive customer base and global reach. The company cites 300 APM customers in the energy sector globally, across more than 4,000 sites, and in 2022, boasted a renewal rate of 96%. It also benefits from its established brand name and recognition, with a large equipment portfolio that contributes to its APM expertise.

www.gevernova.com

Chart 4-1. GE Vernova Strategy and Execution Scores



(Source: Guidehouse Insights)