



Data-Driven Grid Reliability:

IoT Sensing and Analytics to Enable Predictive Maintenance and Improve Resiliency

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Executive Summary

Managing utility distribution networks can be a significant undertaking with many challenges. The distribution network is a critical part of a power system, allowing utilities to provide safe, reliable, and affordable energy to their customers.

Major issues facing many distribution utilities today include but are not limited to aging infrastructure, managing increases in maintenance and labor costs, preventing unplanned outages, and minimizing restoration times.

Digital transformation within utility distribution systems is maturing with the emergence of artificial intelligence, IoT sensors, advanced analytics, and predictive maintenance, all of which can significantly improve reliability and build resiliency in the power grid.



Reliability Is Still a Top Priority for Utilities

32 percent of utilities describe improved operational performance and improved service reliability as their motivations to invest in information technology and operational technology (IT/OT) integration.

Implementing continuous condition-based monitoring and fault-detection applications is a proactive approach to grid management and provides greater grid reliability, as opposed to the endless and inefficient reactive break/fix approach to asset maintenance.

Source: IDC's Future of Operations Survey 2021

Only a Third of Utilities Report Major Reliability Improvements

Operational improvements are a high priority for utilities. However, **only 1/3 of them** report major improvements in reliability.

In order to improve grid reliability, utilities must move from schedule-based maintenance to condition-based maintenance.



Source: IDC's Future of Operations Survey 2021

Aging and Retiring Workforce Puts Pressure on Field Services

Approximately **50 percent of utility workers** will reach retirement age in the next five to seven years.

An aging and retiring workforce will lead to a loss of institutional knowledge that will impact field service capabilities. Workers will need to acquire new skill sets, technologies, and processes to improve grid reliability.

Sources: 1. U.S. Department of Energy, 2. IDC's *Connected Field Service in Utilities Moves Beyond Reactive Maintenance*

The Value of Becoming Data Driven in Utility Operations

Data and analytics are emerging as valuable commodities, which can enable quicker and improved operational decision making for utilities.

Over 30 percent of North American utilities prioritize the investment of cloud-based operational data and analytics within their IT/OT related initiatives.

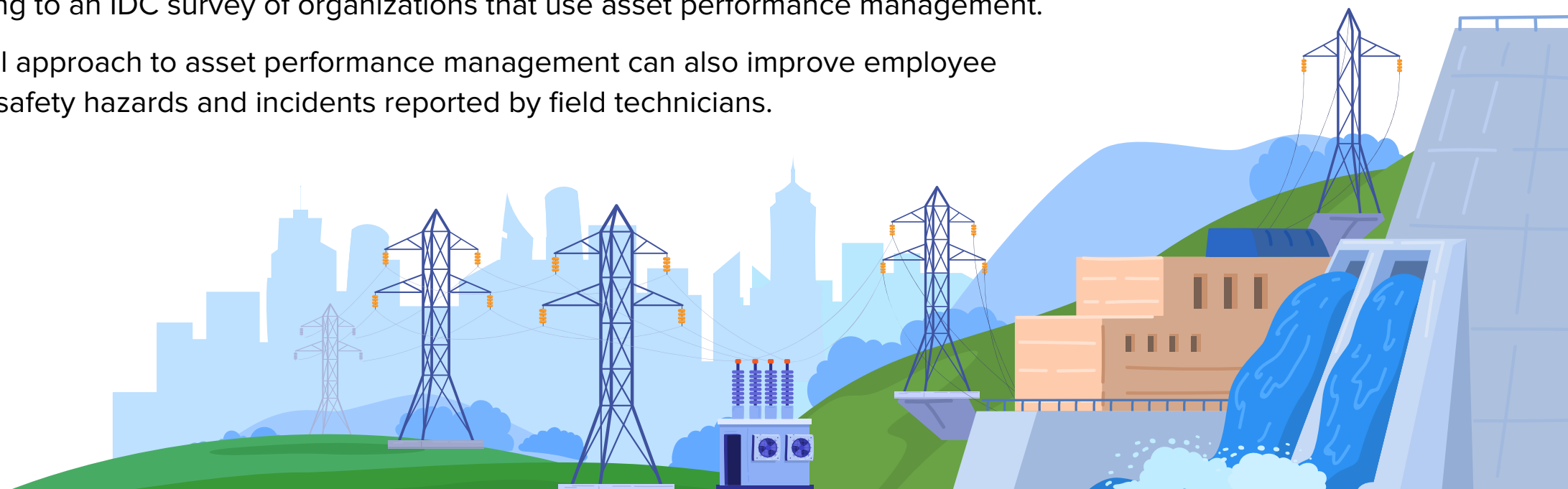
Source: IDC's IT/OT Convergence Survey 2020

The Value of Asset Performance Management, Predictive Maintenance, and Remote Monitoring and Diagnostics

Data-driven predictive and prescriptive maintenance can vastly improve utility operational KPIs.

An advanced approach to asset management that includes remote monitoring and diagnostics can boost asset availability by 20 percent and lower maintenance and labor costs by 15 to 20 percent, according to an IDC survey of organizations that use asset performance management.

A strategic digital approach to asset performance management can also improve employee safety, reducing safety hazards and incidents reported by field technicians.



Electrification of Everything Will Continue to Tax the Grid

The increase in distributed energy resources such as solar, battery storage, and electric vehicles is creating more disruption and complexity for utilities, interfering with their ability to manage the grid effectively.

As the distribution grid continues to become more complex, leveraging digital operational and maintenance applications and tools will become essential for effective management. Over 45 percent of utilities are doing a pilot or proof of concept in intelligent grid management utilizing sensors, data, and analytics to better handle the grid, according to IDC's *U.S. IoT Decision Maker Survey 2021*.

Key Takeaways: Build Grid Resiliency and Enhance Asset Management Strategies with IoT Sensing and Advanced Analytics

Adopt new inspection technology for condition-based monitoring:

Advanced inspection technologies enabling condition-based monitoring can heighten asset health awareness of overhead equipment, improve grid reliability and resiliency, and extend asset life cycles.

Digitally connect critical assets: Within the next three years, utilities will have digitally connected 75 percent of their critical assets to predict and prevent equipment failure and to prescribe best maintenance options for optimizing and extending asset life cycles, according to IDC's *Worldwide Utilities FutureScape*.

Consider leveraging grid analytics from edge to cloud: Over 60 percent of utilities that have deployed grid analytics in the cloud consider these applications to be business critical, according to IDC's *Industry Survey 2021*.

Invest in artificial intelligence (AI) and machine learning (ML): Over 50 percent of utilities will increase technology spend to optimize operations with an emphasis on AI and ML technologies, thus doubling the penetration of predictive and prescriptive maintenance.



About the Analyst



John Villali

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John Villali is a Research Director for IDC Energy Insights, primarily responsible for thought leadership in the areas of digital transformation and smart operations in the power sector. Mr. Villali's extensive experience in the energy industry and his firsthand experience with the needs and desires of participants in the industry allow him to provide superior market insight. Mr. Villali's core research coverage includes but is not limited to distributed energy management, asset management, energy policy, demand response, mobile workforce management, and energy trading.

[More about John Villali](#)

Message from the Sponsor

SAS Grid Guardian AI, a first-of-its-kind solution, helps utilities achieve the next level of T&D system reliability. By deploying edge-computing sensing technology and advanced analytics focused on radiofrequency (RF) emissions from failing overhead equipment, utilities can significantly reduce equipment failures and prioritize maintenance plans for safety, reliability, and uptime. With SAS Grid Guardian AI you can:

- Create safer work environments for your repair crews and reduce their exposure to safety hazards
- Reduce O&M costs by decreasing the amount of overtime paid for outage restoration work
- Significantly decrease the duration and frequency of customer interruptions caused by equipment failures, which translates to happier and more satisfied customers

All without the installation of additional costly monitoring devices. You just need to provide SAS with basic information about the areas you are interested in improving, and SAS Grid Guardian AI does the rest!

Realize ROI within 1 year. No changes required to the grid or equipment.

Learn more at www.sas.com/grid-guardian-ai

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