7 WAYS TO ACHIEVE OPERATIONS RELIABILITY WITH APM

ASSET PERFORMANCE MANAGEMENT (APM) FOR POWER GENERATION

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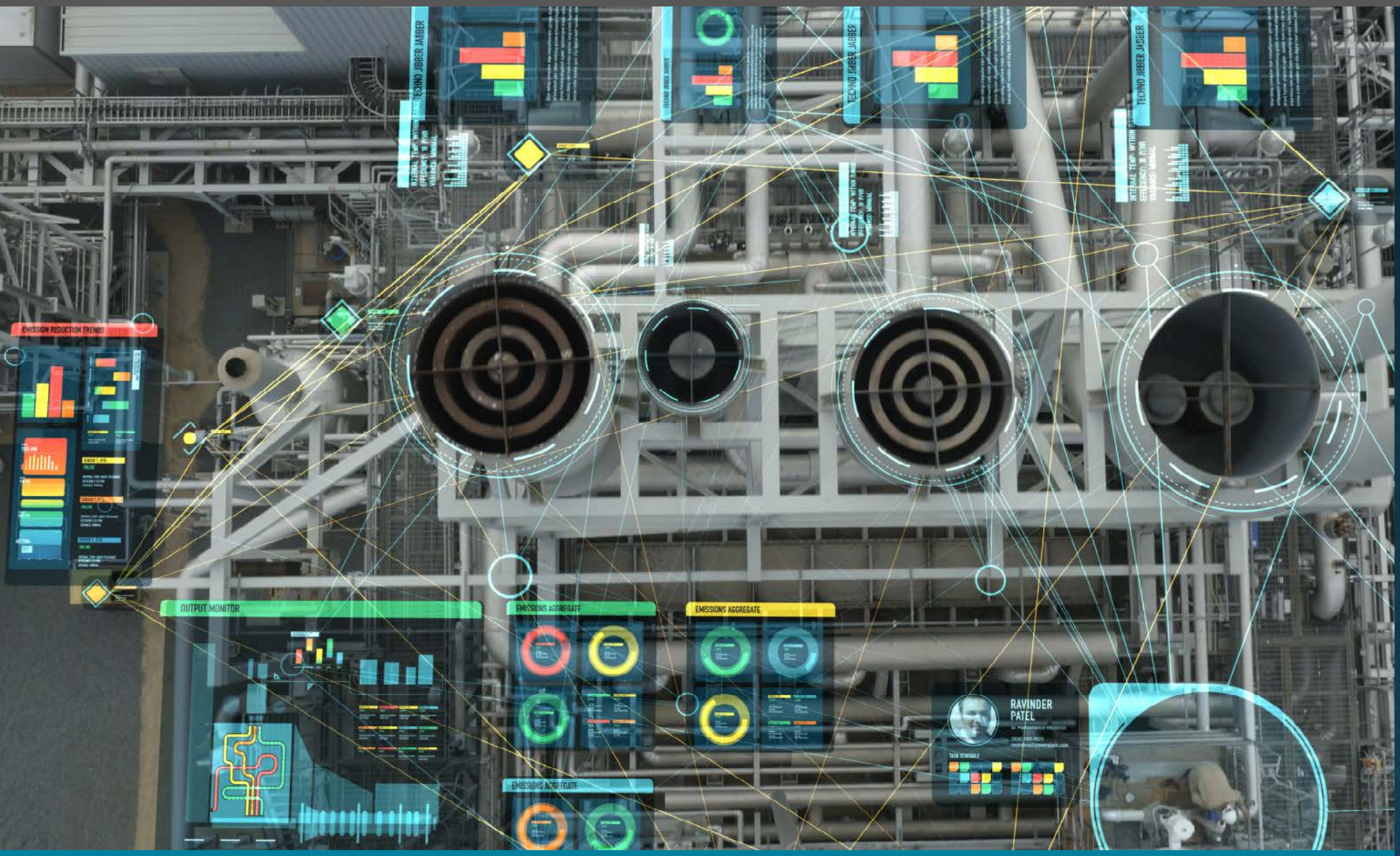

APM

WIKIPEDIA DEFINITION

ASSET PERFORMANCE MANAGEMENT

Encompasses the capabilities of data capture, integration, visualization and analytics tied together for the explicit purpose of improving the reliability and availability of physical assets.

BY 2018, 50% OF ASSET-INTENSIVE ORGANIZATIONS WILL RELY ON APM TO HELP THEM OPTIMIZE THE PERFORMANCE OF THEIR MISSION-CRITICAL ASSETS.

Source: Gartner, “Market Guide for Asset Performance Management”, Leif Eriksen, Kristian Steenstrup, Published: 23 July 2015

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1 Gather Data — and Lock it Down

Consolidate disparate data on a secured and standard platform.

2 Filter Out the Noise

Prioritize operator actions — what to do now, what can be postponed.

3 Get a Bird's Eye View — with a Zoom Lens

Connect all assets, no matter the vendor, for a more complete view of operations. Understand individual asset health as well as asset relationships.

4 Enable Mobility for Collaboration

Create most efficient workflow using in-field and in-plant devices — leverage mobile to integrate overall workflows for maximum workforce efficiency.

5 Proactively Respond — Before Incidents Occur

Use advanced analytics to understand real-time equipment health and anticipate issues — ultimately minimizing forced outages and downtime.

6 Improve Safety Profile

Protect employee and public health with proactive asset management.

7 Reduce Dependence on "Tribal Knowledge"

Capture incident and response information to improve and automate future decision-making.

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1: GATHER YOUR DATA — AND LOCK IT DOWN

Multiple systems of machine data, alarms and alerts create a chaotic environment — and a lack of control.

The inability to create a single view through time-based data means that operations must manually attempt to understand dependencies and down-stream impacts.

The ability to gather all of the data into one secured environment for correlation and management, specifically designed for machine data analytics is the first step to wrestling back control of your operating environment.

GE Asset Performance Management Solutions provide data collection across operating assets and environments, with self-service dashboards that provide a view on key performance indicators, asset relationships and data analysis as well as other data sources, like work order history and weather.

These solutions are powered by Predix™, the premier Industrial Internet platform. Data security is built into the Predix environment — from the machine's edge all the way to the cloud through application development and execution.

POWER EXECUTIVES:
TOP BARRIERS FOR
BIG DATA
IMPLEMENTATIONS

- **31%** Consolidating disparate data
- **50%** Lack of talent to consolidate and interpret disparate data
- **31%** Data security

RasGas

RasGas Company Limited is one of the world's foremost integrated Liquefied Natural Gas (LNG) producers: The application of APM solutions is expected to meet a current gap in the LNG industry, whereby raw data is currently isolated and at different locations. The accumulated information from several years of operation in various locations can now be integrated to strengthen predictive and corrective capabilities. **READ MORE**

THE CLOUD ADVANTAGE
Six Reasons Power Leaders Are Moving to Cloud

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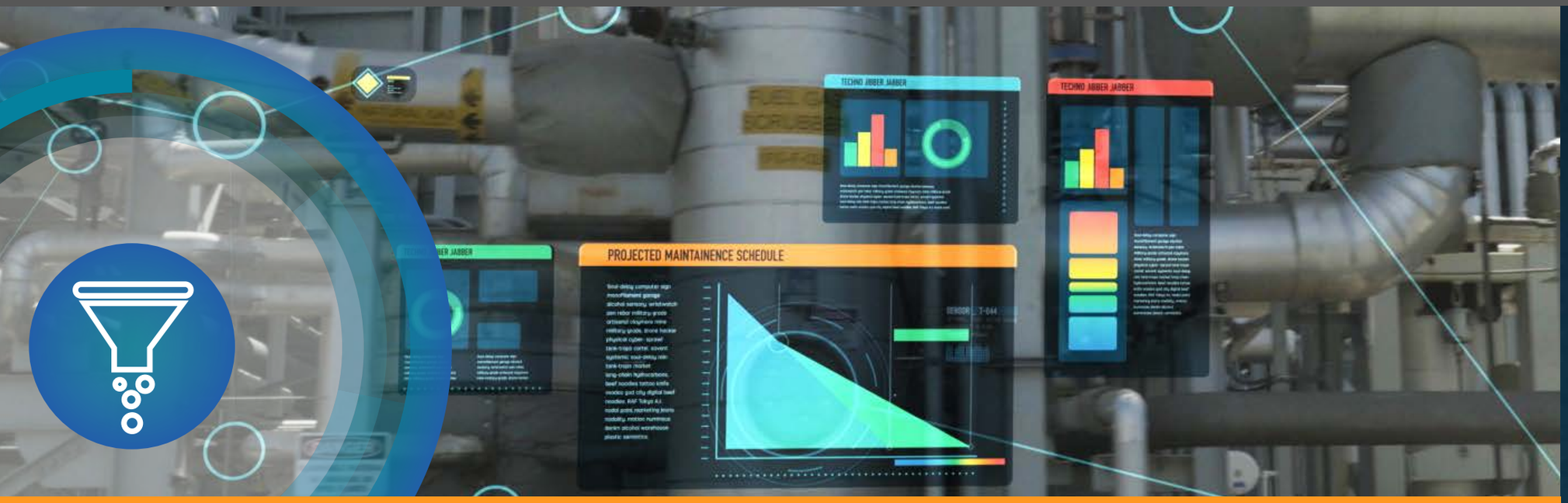

2: FILTER OUT THE NOISE

Projections for autonomously connected industrial endpoints are set to grow to 30 Billion by 2020.

The value of data collected from these connections depends on systems that identify key events, correlate alerts and alarms, and grant operators a view into actions that are of primary importance.

Alarm management has been part of plant operations for years. However, filtering out false positives and understanding priorities in an automated way has been a challenge.

Enter advanced analytics, where individual asset sensor data can be examined as well as relationships between multiple asset information. Using this data, sophisticated algorithms can filter out random variation and key-in on critical issues.

GE Asset Performance Management Solutions are unique in that each asset is treated as an individual with its own stored digital model based on historical performance. The system then accounts for variations in ambient conditions like humidity, salinity, usage and other factors and can eliminate false positive readings.

Analytics are employed to identify which alerts are likely to be critical, guiding operations staff with action prioritization.

95%

of Alarms Don't Matter

Advanced Analytics allow operators to look at alarms as a system, rather than individual measurements — to understand relationships between alarms, and ultimately focus on ones that really matter.

BORD GÁIS ENERGY

"The software that GE's developing is not just about collecting Big Data. It's about turning that data into useful information, into intelligence, and it can help us make better decisions."

— Whitegate Project Engineer Chris Barry

It's this intelligent mix of data that allowed Whitegate to make almost immediate changes, such as identifying an incorrectly installed component that, when corrected, provided a 25% savings on gas usage.

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3: GET A BIRD'S EYE VIEW — WITH A ZOOM LENS

Traditional operations consist of multiple systems, each designed to measure and monitor singular machines or small groups of equipment.

Until now, there has not been the ability to consolidate and provide that "single pane of glass" that operations management and staff need to see how operations are performing — holistically — across the plant and across multiple plants.

The truth is that both are required: the ability to drill down to each piece of equipment, but to also understand how an issue will influence the overall health and production output of the environment.

GE Asset Performance Management Solutions are designed to provide a new level of visibility, with understanding of individual assets as well as interdependencies between assets and workflows. With case management combined with decision analytics, operators can assess their environments at the portfolio, plant, asset class and equipment layers, drilling down to meet their immediate needs.

BORD GÁIS ENERGY

- All the plant's assets are fully connected, and because they no longer operate in isolation, Bord Gáis Energy gets all the data it needs to understand how efficiently its power station is running.
- READ MORE

GRIFFITH ENERGY

"In a word, we need to know the big picture . . . GE gives us a heads up on potential problems coming down the pike. We use it to see anomalies before they become alarms; before they become critical issues."

— Mike Hartzig, Plant Manager, Griffith Energy

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4: ENABLE MOBILITY FOR COLLABORATION

Modern industrial companies must optimize for mobile form factors (smartphone, tablet, etc.) and not for desktops to provide most effective workflow in an operating environment.

Mobile workers need to be able to measure performance and input data directly into their systems. Applications must allow a mobile worker to do rounds around all equipment, across the plant.

The benefit of this configuration is that equipment that is experiencing issues can be addressed quickly, with maintenance data captured into the system in real time, reducing incidents of lost data and errors when manual paper processes are used.

GE Asset Performance Management Solutions were built with mobile in mind, integrating operator workflows to perform in a collaborative operating environment. Diagnostic and role-based configurable workflows with mobile "built in" contribute to overall operating efficiency by enabling operators to provide support from any place at any time, minimizing potential downtime.

34% **of power companies** will be implementing mobile over the next 3 years.
Source: GE and Accenture, Industrial Internet Report for 2015

"Mobility extends asset management business processes to the point of action, creating opportunities to optimize business processes."

— Ralph Rio, Vice President of Enterprise Software, ARC Advisory Group

Cornell University

40% faster off-hours troubleshooting with mobile Industrial Internet technology

With thousands of equipment assets running 24/7, Cornell University's onsite power facility has information at its fingertips through the use of GE's Mobile capabilities.

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"GE allows us to monitor and control our systems in a manner which maximizes reliability and efficiency."

— Tim Peer PE, Energy Plant Manager, Cornell University

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5: PROACTIVELY RESPOND — BEFORE INCIDENTS OCCUR

The results of unplanned downtime can be severe for every industrial company, with real bottom line impacts.

Predictive maintenance uses machine data and analytics to understand when components are likely to fail. Proactive action can then be taken to order new parts and schedule maintenance during off-production peak times, providing longer windows of continuous operation.

This also has positive impacts on workforce efficiencies, emissions controls (fewer start-up emissions) and asset life extension for improved capital management.

GE Asset Performance Management Solutions can identify which assets are likely to fail, the root cause of the failure, and what is the priority of the impending events using physics-based analytics. The solution performs automatically, continuously and relentlessly — 24 hours/day — for optimized or most reliable asset operation under the current conditions.

Unexpected disruptions cost **3–8%** of capacity, **$10 billion annual lost production cost.**

Source: ASM Consortium

SALT RIVER PROJECT

"We use GE Solutions to help us get to 'No Unplanned Downtime' by moving us to more planned outages instead of reactionary or emergency outages. . . . and to show us when things are going to happen instead of waiting until they occur."

— May Milles, Manager, Power Generation Services, Salt River Project

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6: IMPROVE SAFETY PROFILE

Any time an unexpected failure occurs in an operating environment, there is a level of uncertainty and risk.

Risk can come in the form of worker exposure to toxic materials, electrical components and combustible elements. It also comes in the form of vehicle accidents or environmental hazards that put workers and the public in danger.

Other safety risks involve environmental site emissions and spills. Plant managers monitor these using leading indicators such as Near Misses Reported, EHS Concerns Reported, Audit Closure Rates and Training Completion Rates and lagging indicators such as I&I Rates, DAFW (days away from work) and Exceedances/NOVs/Spills/Fines.

GE Asset Performance Management Solutions create safer work environments by reducing the number of emergency incidents and creating more organized and scheduled maintenance that drive improved safety KPIs.

Following predetermined procedures proven to reduce safety and environmental hazards results in fewer incidents overall. Capturing responses and actions in a knowledge database can inform future actions toward safer responses.

81%

Improved safety cited as primary benefit of planned maintenance.

Plant Engineering 2015 Maintenance Study

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GE KNOWS SAFETY

GE — among the **first recipients of EHS's "America's Safest Companies"**

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Kraton Performance Polmers

GE honored with a **Platinum Contractor Safety Award** from Kraton Performance Polymers Inc. for the company's dedication to safety during the last 17 years.

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7: REDUCE DEPENDENCE ON "TRIBAL KNOWLEDGE"

Operator response is often based on an individual's historic knowledge of an asset's idiosyncrasies rather than a systematic approach.

This situation is acceptable only as long as that operator remains working in the same capacity. What happens as employees retire and "tribal knowledge" is lost?

Leveraging machine data collected and correlated using analytics in a common repository provides the basis for tracking operator response in an automated way.

Over time, common patterns emerge and best practices are identified that become part of recommended operator response. The result is greater consistency and automation for incident management and response.

GE Asset Performance Management Solutions provide the platform for capturing operator issue response in a case management system. This data store is the basis of a knowledge center that serves as a recommendation engine, finely tuned to provide the best response results.

30% **electric utility workforce** projected to retire within the next five years.

Power and utilities changing workforce, PwC, Dec 2013

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82% of basic operations practice failures were human performance-related

Source: ASM Consortium: Managing Human Reliability: An Abnormal Situation Management Historical Perspective, Oct. 2015

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Bureau of Labor Statistics

Employment of power plant operators in nonnuclear power plants is projected to decline 11 percent from 2012 to 2022. . . As older power plants close, they will be replaced with new plants that produce electricity more efficiently and, in many cases, have higher capacities.

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THE TIME TO ACT IS NOW

Big Data is shifting the competitive landscape

91%

of executives expect it to shift within the next year

Top 3 company fears if unable to implement their Big Data strategy in the next 1 to 3 years

72% Losing market share

69% Waning investor confidence

63% Less competitiveness

GE and Accenture: Industrial Internet Insights Report for 2015

WHY GE?

- Over 50 GE M&D Centers Worldwide for Oil & Gas, Power, Aviation and Industrial customers
- As one of the world's largest manufacturers, GE alone has 400 factories around the world and currently monitors and analyzes 50 million data elements from 10 million sensors on $1 trillion worth of managed assets daily

TO LEARN MORE

Conduct an APM value assessment to identify reliability challenges and opportunities for improved asset performance.

Ask your GE sales rep for more information.

For more information on GE APM Solutions, go to: ge.com/digital/powerapm

GE APM Solutions

Machine and Asset Health: Providing a unified view of the asset, anytime, anywhere, to understand performance at many levels and initiate immediate action.

Reliability Management: Predicting and accurately diagnosing issues — and responding before they negatively impact assets.

Maintenance Optimization: Balancing reliability, availability, performance and costs against risk to maximize asset value.

Built on Predix

The platform for the Industrial Internet

A global Industrial platform able to consume and analyze massive volumes and varieties of data by connecting to a multitude of machines (GE and Non-GE), sensors, control systems, data sources, and devices.

LEARN MORE

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