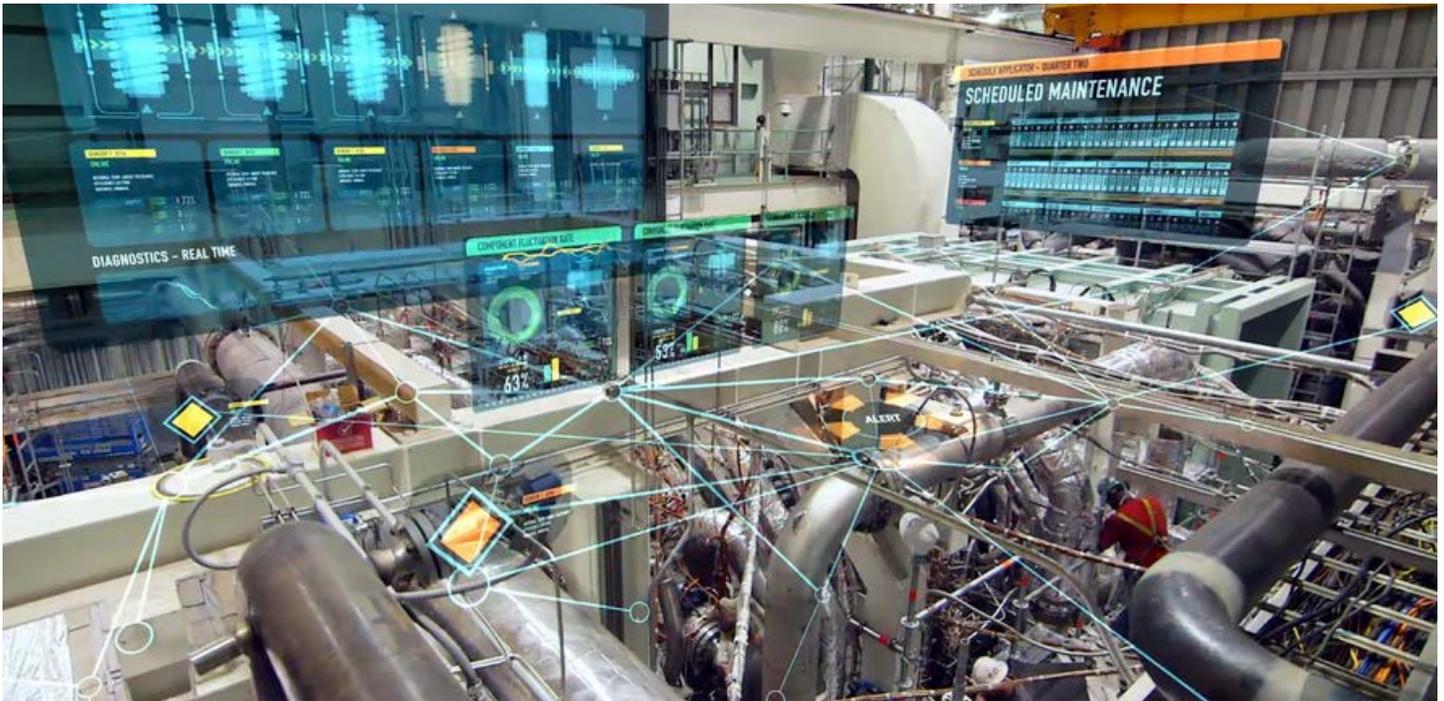




GE Power Digital

# Asset Performance Management

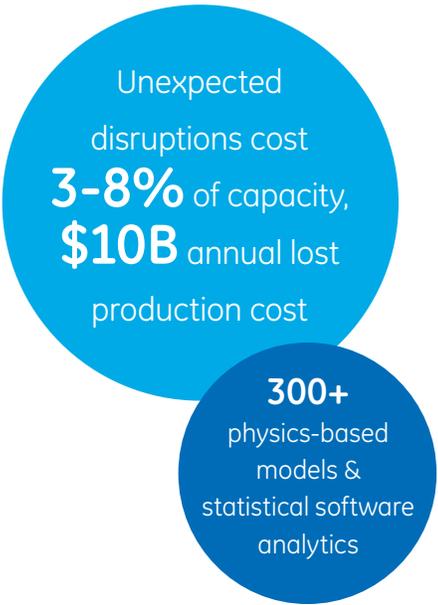


**“GE Asset Performance Solutions give us a heads up on potential problems coming down the pike. We use it to see anomalies before they become alarms; before they become critical issues.”**

— Mike Hartsig, Plant Manager,  
Griffith Energy

## Business Challenges

The power industry faces a complex set of market dynamics and emerging disruptive forces to the operating environment — volatile fuel prices, growing renewables, changing workforce, and shrinking budgets. There’s hope in data and analytics, but power operators still face significant barriers that make it difficult to use this data to business advantage. Information and people work in silos, and operator capacity is limited to analyze data that is collected. Moreover, traditional operations consist of multiple systems, each designed to measure and monitor singular machines or small groups of equipment. 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.



## Challenges Faced by Today's Operators

- Disconnected and conflicting data across assets, sites, regions
- A lack of asset level visibility — not knowing in advance when problems are about to occur
- Unplanned downtime with lost productivity and high cost of emergency repairs
- Costly and often unnecessary routine preventive maintenance that introduces risk and decreases availability
- High spare parts inventory levels for emergency repairs
- Loss of institutional knowledge as the existing workforce approaches retirement
- Delay in critical information reaching those that need to action — maintenance technicians, operators, etc.

## Solution Description

APM is a software application designed to increase asset reliability and availability while reducing maintenance cost. APM connects disparate data sources and uses advanced analytics to turn that data into actionable insights while fostering collaboration and knowledge management across the organization. A commercial cloud solution, built on the Predix™ platform, APM also gives organizations the flexibility to develop new analytics and applications, making it adaptable to meet changing needs.

Asset Performance Management	Machine & Equipment Health	Reliability Management	Maintenance Optimization
<b>Legend</b> Existing Capabilities APM Mid-2016 Release AMP Late-2016 Release	Connectivity	Analytics Orchestration	Performance Benchmarking
	Condition Monitoring	Analytics Catalog	Asset Maintenance Strategy /Scenarios
	Data Management	Configurable Workflow	Financially Optimized Asset Strategy
	Data Analysis	Event Management	
	Configurable Dashboards	Case & Collaboration Management	
		Knowledge Management	

## Machine and Equipment Health

Providing a unified, complete and accurate view of the asset, it's state, status and health.

- **Connectivity:** Gives users immediate visual reference of the status of various plants across geographical locations
- **Condition monitoring:** Uses sensor analysis, anomaly detection & KPIs to present current operating state & health of assets
- **Data analysis:** Drills into underlying time series and other data to perform additional analyses in determining root cause
- **Data management:** Visualizes and enables manipulation of asset data to create a unified view of enterprise systems
- **Configurable dashboards:** Allows users to put together an aggregated view of asset data to create multiple dashboards for various personas and work processes

## Reliability Management

Predicting and accurately diagnosing issues and responding before they negatively impact assets.

- **Analytics orchestration:** Enables users to combine various analytic techniques for additional derived value (reduced false positives, automated root cause analysis, etc.)
- **Analytics catalog:** Provides analytics (detection, predictive, forensic, performance, etc.) in a SaaS/PaaS structure, enabling both use of and contribution to an analytics marketplace
- **Configurable workflow:** Links APM functionality to pre-configured and user-designed workflows, enabling and enhancing customers business process logic
- **Event management:** Manages alerts, alarms, advisors, and resource assignments to aid in impact assessments and investigations
- **Case & collaboration management:** Manages actions from assignment through resolution and supports collaboration between analysts, engineers, plant personnel
- **Knowledge management:** Leverages historical asset conditions and case data to enhance future analysis, while enabling machine and operator learning detection updates, logging and event management, whitelisting and automated backup.

## Maintenance Optimization\*

Balancing reliability, availability, performance and costs against risk to maximize the value of the asset.

- **Asset maintenance strategy:** Recommends modifications to preventative maintenance strategies for optimal utilization of assets based on budget and reliability risk constraints
- **Financially optimized strategy:** Provides recommendations on maintenance strategies based on operational priorities of cost, performance, and design basis requirements
- **Performance benchmarking:** Compares “like” assets and “digital twins” to identify opportunities for improved performance

\* For 2016 release

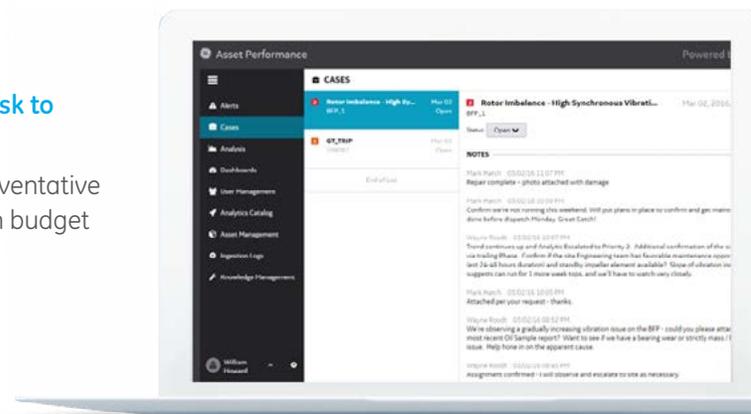
## REAL CUSTOMER RESULTS\*

**€2.28MM**  
cost reduction &  
avoidance over  
first year

**\$3M+**  
financial benefit  
in one year

**£6MM**  
per year  
insurance savings

\*Customer results are not indicative of guaranteed outcomes.



## Customer Benefits

### Overall APM Benefits

- **Improve reliability** — Advanced proprietary analytics that predict potential equipment failures with enough lead time to effectively plan maintenance
- **Improve availability** — Accurate diagnosis of equipment issues that enables faster repairs and shortens outage duration
- **Reduce maintenance costs** — Customized maintenance strategy that increases plant reliability while reducing the amount of maintenance activity performed overall
- **Maintain technical expertise** — A unified and accurate view of assets that provides clear guidance to next occurrence as well as asset history, accessible through an intuitive user interface
- **Deliver continuous improvement** — Build ecosystem that speeds the process by which new analytics are created, enabling operators to draw insights more quickly and drive action

### Machine and equipment health delivers:

- Visibility of machine status and issues anytime, anywhere
- Better decision-making through a single source of truth that crosses organizational silos
- Wing-to-wing story that brings together real-time data, alarms, events, and other operational data to get a clear picture of asset performance

### Reliability management helps customers:

- Reduce unplanned downtime by predicting equipment issues before they occur
- Collaborate efficiently on issues while automatically capturing best practices

### Maintenance Optimization will help customers:

- Develop better maintenance strategies that balance reliability, performance and costs
- Improve their ability to respond to market conditions as prices, demand and costs fluctuate (performance, etc.) in a SaaS/PaaS structure, enabling both use of and contribution to an analytics marketplace

## Asset Performance Management Applicability



LNG



Gas Fossil



Steam



Wind



Nuclear



Hydro



Solar



T&D



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