



# Advanced Analytics: The Core of Asset Performance Management (APM)

## Why Analytics for APM?

**Operational and business conditions are continually evolving, particularly now as the power industry is undergoing a rapid transformation.** Distributed generation, renewables, smart grids, storage and prosumers are accelerating the rate of change. This means that operational conditions and demands are changing quickly, requiring power and utility companies to refine how they monitor and maintain operating assets. Those best managing shifts in market dynamics have embraced advanced analytics to grant them insights for equipment issues, improved outage planning and more continuous operation when the market demands.

*“As the Internet of Things (IoT) matures, more and better data becomes available about the operating status, condition and usage history of assets. This is enabling a new era of predictive analytics and APM.”*

Source: Gartner, “Optimizing Foundational Technology in Utilities Primer for 2017,” Chet Geschickter | Randy Rhodes, January 2017

Sophisticated analytics at the core of APM allow:

- The ability to predict asset issues well in advance of incidents impacting production
- Outage planning that maximizes profitability
- Insights to optimize asset life against driving asset output when required
- A comprehensive view of all plant assets, their health and future performance

## Types of Analytics Driving Asset Performance

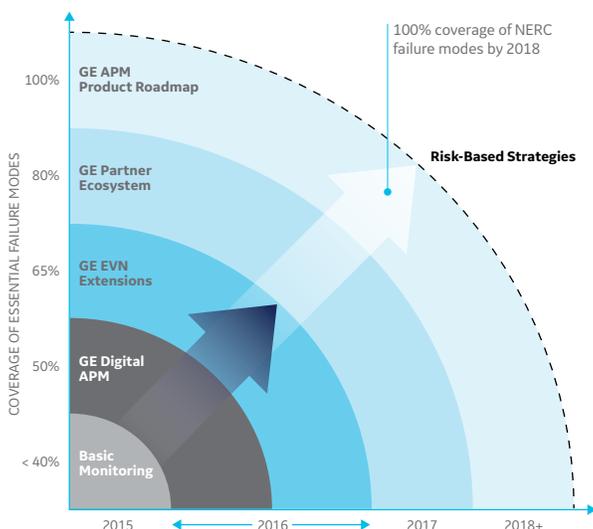
Understanding asset performance with data has been part of industrial operations for years, with basic information collection and condition-based monitoring. However, with advancements in machine sensors and the ability to collect and organize vast volumes of machine data, the role of analytics in power operations has taken on significant importance.

The types of analytics now deployed in many operating systems includes:

- **Descriptive Analytics:**  
What is happening now based on incoming data
- **Diagnostic Analytics:**  
A look at past performance to determine what happened and why
- **Predictive Analytics:**  
Based on patterns observed in the past, be able to predict future outcomes with accuracy
- **Prescriptive Analytics:**  
Recommended actions that should be taken based on descriptive, diagnostic and predictive analytics

## The Importance of Failure Mode Coverage

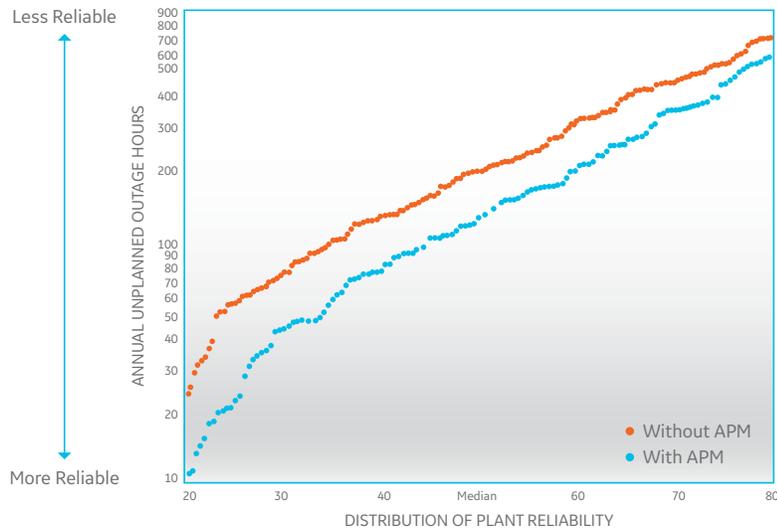
Every asset within an operating environment contributes risk to the overall functioning of the plant or grid. For an APM solution to be most effective, the analytics of that solution must monitor every asset with sensors and must cover the most critical failure modes of those assets. In this sense, not all APM solutions are created equal. The North American Reliability Corporation (NERC) has defined the failure modes for operating assets. To cover the majority of these critical failure modes requires deep machine experience, a catalog of analytic capabilities and a platform for analytic execution that can operate in real time.



## INDUSTRY-LEADING ANALYTIC COVERAGE

GE analytics are what powers APM. GE APM analytics provide 65% coverage of the most critical NERC failure modes with a goal of 100% coverage by 2018.

**REAL-WORLD RESULTS: GE APM IS PROVEN TO REDUCE UNPLANNED DOWNTIME**



**APM FOR GAS/STEAM**

- +10%** starting reliability
- +3%** total plant availability

**APM FOR RENEWABLES**

- +1.5%** site/farm availability
- 5%** maintenance cost

**APM FOR GRID**

- +15%** asset utilization

**APM FOR WORKFORCE**

- 5%–25%** increase in productivity

Plants utilizing APM are more reliable and have fewer annual unplanned outage hours than plants without APM. (Source: 2015 ORAP Data)

**CASE STUDY: SSE**

**Challenge:** Scottish and Southern Energy (SSE), the UK’s broadest-based energy company, needed to increase reliability of its thermal generation fleet after experiencing a number of technical failures over the previous several years.

**Solution:** With GE APM, SSE created an Equipment Performance Center (EPC) to continuously monitor asset health for over 11 different locations, tracking for factors such as combustion dynamics, turbine vibration analysis, boiler temperatures, creep analysis and safety case management.

**Results:** Using APM’s predictive analytics and monitoring to understanding pending issues before they became production issues, SSE has experienced a significant reduction in plant failures, resulting in increased plant availability and production. Early detection has resulted in:

- Savings of more than £3 million per year
- Savings of £100K in repair costs by not running the generator into a failed state
- Savings of £6 million per year in insurance cost
- 1,026 total monitored assets

**CASE STUDY: RASGAS**

**Challenge:** RasGas is one of the world’s premier integrated liquefied natural gas (LNG) enterprises. The Qatari-based company exports 77 MTA to the market, which represents roughly one-third of the global supply. RasGas is focused on cost and value optimization to reduce overall expenditures and enhance efficiency by improving plant reliability and availability without comprising safety, health and the environment.

**Solution:** RasGas began a pilot in 2014 using GE APM to cover both GE and non-GE equipment using machine data sensors, predictive analytics and process optimization to provide a unified user view to identify anomalies and increase visibility into asset performance and health.

**Results:** By 2015, the pilot project had demonstrated that APM analytics could detect equipment failures early and identify process optimization opportunities, resulting in:

- Move from reactive to predictive maintenance
- Reduction in unplanned downtime
- Improved productivity and reliability

GE APM solution is now expected to cover the entire plant by monitoring and connecting 2,300+ assets with over 65,000 GE and non-GE Devices.

**Start Reducing Your Unplanned Downtime Today**

Asset Performance Management from GE Digital, with the highest failure mode coverage in the industry, helps asset-centric organizations drive safer and more reliable operations while facilitating improved performance at a lower, more sustainable, cost.

Conduct an APM value assessment to identify reliability challenges and opportunities for improved asset performance. Contact your GE representative today to get started.



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