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## Asset Performance Management for Power Grids

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### Abstract

This paper explores the business drivers, challenges and innovations in the industry to maximize reliability in the power grid through Asset Performance Management.

It highlights the role of digitization in delivering reliable and data-driven decisions through bringing together information from different organization silos and performing analysis in a methodical, consistent manner. Digital technologies such as mobile tools, industrial internet, big data and predictive analysis are some of the technologies that can be leveraged.

An actual cases study is used to illustrate how an asset performance management project is implemented and how customer achieved extremely positive return on investment in a short time with practical technologies.

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### 1. Introduction

Asset Performance Management (APM) in the electricity generation, transmission and distribution context refers to the decisions that the asset owner has to make to increase asset availability, optimize overall cost of asset maintenance and reduce risks associated with asset operation. Consistent data management, risk management tools and advanced analytics through smart use of technology is required to make this a reality. Some of these technologies are discussed, such as digital and cloud services. A successful reference project is also discussed.

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## 2. Business Drivers for Asset Performance Management

Motivation to improve asset performance is usually a result of changing corporate strategy or operating environment (Hadjsaid and Sabonnadiere, 2012). Below is a list of some of these drivers.

### 2.1. Pressure to increase profit in flat and volatile economy

The global GDP growth worldwide is 2.5% in 2016. Most organizations including power grid business owners target their growth at a much higher rate. New and innovative solutions are required to achieve this above-average growth while mitigate the operational risks.

### 2.2. Demand for agility in asset operations

Industrial developments such as renewable integration and demand response systems requires the role of grid asset owners to be more and more agile. Additionally, power systems and the supporting human processes are becoming more complex. A well-managed APM system will place useful asset data closer to the day to day consumers of such data – operators and engineers.

### 2.3. Tighter regulation and increased compliance risk

Increasing maturity of regulators and awareness of environmental, economic impact of electricity generation and transmission/distribution contribute to tighter rules and regulations. Asset owners are required to understand and mitigate the risks throughout the lifecycle of their equipment. Future spending on capital and operational expenditure (CAPEX and OPEX) also needs to be justified with increasing vigor.

### 2.4. Aging assets and increased operation risks

With nearly 20% of assets over the world near the end of life, careful decisions must be made regarding the operation, maintenance and replacement decisions of these assets.

## 3. The Industrial Internet and Asset Performance Management

Many industrial plays including General Electric (GE) has invested ambitiously in digital technologies. The future of energy industry is seen as a new value chain augmented and interconnected by digital technology, where both power and information flow in multiple directions, all actors adding value.

Maximization of reliability and asset value, as key parts of the holistic view of the electricity supply chain, are the strategic objectives of Asset Performance Management. A key part of this objective is the optimization of maintenance and asset replacement decisions, supported via the following processes:

- Collect asset data through sensors, data collection tools or from external databases
- Apply data through predictive and interventions models
- Apply a methodology for decision making covering both engineering and financial aspects.
- Make decisions that most benefit the organization as a whole

This paper now explores the various technologies and digitalization techniques available today and how it relates to asset performance management:

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