

Technology trends that will shape Digital transformation

Gas & Power Jaktarta 31st October 2019

Adopt digital solutions The data challenge



The Internet of Things 75 billion connected devices by 2025

Up to 20% lower capital expenditures through digitalization

New ways to keep up

Adopt digital solutions su What's needed: analytics, not analog



Optimize asset performance with digitalization

Improve supply chain with Additive Manufacturing

Protect assets with comprehensive cybersecurity

Improve decisions through increased collaboration

Power Diagnostics[®] - Global Fleet under Siemens Monitoring

SGT-8000H GTs
SGT-6000G GTs
SGT-5000F GTs
SGT-4000F GTs
SGT-3000E GTs
SGT-1000F, 2000E and V94.3 GTs

SST-3000, 4000, 5000 SSTs

Monitored Units:*

607

143

Gas turbines including generators

Steam turbines

Total site rated Power:* 163.6 GW

* Source: Fleet Data Management

Monitoring experience: More than 30 million operating hours and counting ...



Performance Monitoring

Monitoring of asset performance and operational KPIs

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- **Continuous insight** into • the production using **KPIs** to trace asset performance
- Simplifies management tasks through mgmt. and operational tools

Asset Diagnostics Centralized Asset

Diagnostic Services



- Condition monitoring
- Increases availability by enabling predictive maintenance
- Centralizes experience and know-how

Operation **Optimization** Automated operations and maintenance management

Digitalization of workflows

and maintenance processes

Transparency increase through

central plant data, spare part

and shift management



Generation Management Asset integration for optimal resource use and dispatch





- dispatch, generation scheduling and pooling
- Helps to fulfill commitments at min. resource consumption

Better decisions

Increase availability

Improve operations

Optimal dispatch

Digital focus – now on entire power plant!









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What is the **condition of ALL my assets** right now?

Am I doing **optimized maintenance** for the power plant or even my fleet?

How to extend the lifetime of my assets?

When should I replace my assets?

Am I making optimal use of available industry knowledge?

How will the condition of my assets develop in the future?

Which long term resources do I need to manage replacement waves?

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Customizable dashboards provide insights into KPIs, Health Index, States and Alarms





Customizable dashboards Health index based on Indicators

States and Alarms

Asset Performance Management for Power Plants

At a glance Asset Performance Management delivering significant cost savings and higher availability



Customer value across all assets of the entire power plant



Decreasing Investments in Maintenance and Service



Increasing Availability and Reliability



Extending Life Time of all components

San Gabriel Power Plant

First Gen 414MW Combined Cycle Plant

Asset Performance Management (APM4PP) Pilot Plant

> Introduction

First Gen

First Gen Corporation, through its subsidiaries, operates as an independent power producer in the Philippines. The company operates natural gas-fired power plant and hydroelectric power plant, as well as generates power through geothermal, wind, and solar power.

First Gen's wholly-owned First NatGas Power Corp. (FNPC) owns the 414-MW rated San Gabriel Power Plant. San Gabriel started commercial operations on November 7, 2016.

San Gabriel utilizes Siemens SCC6-8000H combinedcycle gas turbine, which is designed to have a combined-cycle efficiency rating greater than 60 percent and offers operational flexibility.

> Project

Siemens is the facility O&M provider. Siemens has provided operations from the start up of the facility through today.

APM was implemented as the first Siemens APM for Power Plants pilot for the complete implementation of the Siemens Bentley co-developed solution. The APM program is populated with Siemens proprietary models developed specifically for the San Gabriel Station. The experience and lessons learned from this installation will be incorporated in Siemens roll out of the world wide deployment of APM to both Siemens technology as well as any OEM based facility. We are utilizing our engineering and service experience for operating and maintaining entire facilities, as well as the millions of manhours of work done on plants worldwide.