Comprehensive Asset Performance Management
Siemens’ Asset Performance Management System (APMS) enables utilities to get the most out of their existing assets while providing options to improve power delivery reliability. It supports more informed decision making for replace, repair, and upgrade activities that significantly affect the bottom line and rate case justification. The APMS integrated product suite not only monitors and analyzes the asset and related environmental information, it helps protect assets from theft and damage.

The APMS system consists of:
- Siemens SmartSubstation and
- Spectrum PowerTM CC Asset Monitoring System (AMS).

Siemens SmartSubstation has both hardware and software products that are installed in substations as an integrated package to collect, automate and communicate asset information for analysis. The Spectrum PowerCC AMS is a software suite that stores, analyzes, filters, trends and communicates asset and system health to the Asset Manager in an interactive user environment. The Spectrum PowerCC AMS correlates many sources of Transmission, Distribution and Substation information in the utility enterprise.

Siemens SmartSubstation equips a substation with automation/monitoring devices and software to provide a complete set of substation information to the Spectrum PowerCC AMS. It establishes a substation IT infrastructure to simplify installation and modification of equipment, and reduce time to analyze and identify problems. The main components of Siemens SmartSubstation are:
- Secure Communications Gateway
  Provides secure access to the substation interfaces to legacy RTUs and Intelligent Electronic Devices (IED)s, and permits remote access and viewing of substation equipment.
- IEC 61850 Framework
  Establishes the basis for cost-effective installation and maintenance of automation and information equipment.
- Circuit Breaker Monitoring
  Collects information to assess contact wear, fuse failure, bearing temperature, and fault indication.
- Transformer Monitoring
  Provides protection for transformers, with continuous monitoring and evaluation of important electrical and thermal measured values.
- Dissolved Gas Analysis
  A fully automated closed loop gas chromatograph that identifies the most critical transformer fault types.
- Power Quality and Voltage Sags/Swells
  Provides power-swing detection/tripping and oscillographic fault recording.
- Local Monitoring and Control
  Provides a distributed substation control system supporting many standards, including IEC 61850, and a flexible local user interface.
- Substation Human Machine Interface (HMI)
  Specifically designed for energy automation process visualization, it provides a web-enabled, clearly arranged display of the system’s operating states.
- Analysis of Archived Data
  Processing, reporting, representation, alarming, and printing of archived measured and metered values.
- Fault Retrieval and Analysis
  Provides managing, archiving, analysis, and display of fault records.
Spectrum PowerCC Asset Monitoring System

The Spectrum PowerCC AMS is comprised of an integrated set of off-the-shelf products that are configured to meet specific customer needs. It continuously monitors, assesses, and manages the vital signs of the overall T&D infrastructure and the health of its individual assets. The Spectrum PowerCC AMS can be implemented at the customer site or provided as a hosted information service.

It includes the following components:

- **Information Model Manager (IMM)**
  Provides the capability to organize the asset information model and facilitate integration. Used to define the generalized structure of the Asset Model, based on the Common Information Model (CIM).

- **Historical Information System (HIS)**
  Used to store large volumes of information gathered on individual assets and the related environment at configurable time increments.

- **Standard Set of Data Acquisition (DAQ) Interface Mechanisms**
  Used to integrate common existing systems and provide standardized information exchange capabilities.

- **Integrated Set of Asset Analysis Applications**
  Process real-time events, assess trends, predict assets reaching “out-of-tolerance” maintenance or operations limits, and rank assets according to their “health index”.

- **Integrated Set of Dashboards**
  Supports visualization of data and reporting tools that simplify the Asset Manager’s tasks. It provides rapid navigation, information filtering, and prioritization of events and related work recommendations.

- **Adapters**
  Defined with the customer to address integration with the utility’s enterprise or specialized applications.
**Substation Cost Efficiencies**

Siemens SmartSubstation is based on the IEC 61850 Standard Architecture for substations. The integrated Siemens products establish a standard interface, transport mechanisms, and component-based solution, vastly reducing effort to install protection, automation and monitoring devices. It transforms the substation into an intelligent node on the utility information network. Combined with Siemens SmartSubstation application software and automation devices, remote access, Voice Over IP, substation automated decisions and other advanced features can be cost effectively supported.

**Condition Based Maintenance**

Siemens SmartSubstation Sensor/Monitor packages for transformers, breakers, substation environment and other types of equipment enable historical, statistical, and engineering analysis to determine overall asset health, as well as current and projected operational capacity and risk. Local substation applications combined with Spectrum PowerCC AMS analysis provide options for more cost effective management field work and maintenance.

Integrate Utility Operations and Maintenance through Asset Performance Management
Faster Restoration and Avoidance of Outages
Siemens SmartSubstation automation and analysis products provide the substation infrastructure to enable intelligent local automated decisions to improve restoration, avoid outages and increase operating options. It provides the ability to capture operational fault information, perform local analysis, and rapidly determine location and cause. The Spectrum PowerCC AMS correlates all available information from the distribution and transmission system with the substation to better coordinate and optimize response to operations events. For example, the transformer monitoring analysis application enables the user to operate a transformer closer to its thermal limits, keeping track of thermal aging, avoiding critical hot spot temperatures and avoiding hazardous conditions.

Visual Monitoring and Security
APMS includes the capability to visually monitor substation work activities, verify effects of problems, and generate alarms to detect intrusion. It informs the appropriate staff in operations, maintenance, and work and trouble management to streamline response.

Standard Model and Adaptable Architecture
The Spectrum PowerCC AMS information modeling approach and platform architecture proposed by Siemens provides a state-of-the-art, field-proven platform that has been implemented under a variety of solution scenarios. It is specifically designed to provide options for managed evolution from existing products/systems and grow with the utility's changing needs. The underlying model is based on utility Common Information Model standards, which helps guide vendor product component requirements, simplify integration, and minimize implementation risk. The application platform is founded upon standard interfaces, enabling you to efficiently integrate asset analysis applications as they become available, either from Siemens or from third party vendors.

Siemens as a Solution Provider
Siemens offers the depth of knowledge and experience that spans operations, maintenance, engineering, equipment manufacturing, solution architecture, information management, integration and program management that is essential to a successful APMS implementation. Siemens’ extensive resources in these areas, combined with its substation and information products and services ensure that you achieve the most from your implementation.
The information in this document contains general descriptions of the technical options available, which do not always have to be present in individual cases. The required features should therefore be specified in each individual case at the time of closing the contract.