



# PowerOn™ Advantage

## Advanced Distribution Management System (ADMS)

Delivering increased reliability, productivity and efficiency through a single ADMS platform

PowerOn Advantage is a single, yet modular ADMS combining GE's best in class Distribution Management System (DMS) and Outage Management System (OMS) capabilities. GE's ADMS has been designed from the customer's perspective to bring stakeholders together on a single platform to interact with the network, perform work and share information in real-time. PowerOn Advantage enables utilities to keep the lights on, to respond to outages and to maximize return on network investment in the dynamic and ever changing distribution environment.

The growth of embedded generation such as solar and wind, the volume of electric vehicles and the management of an active distribution network all present fundamental challenges to existing utility control systems. At the same time, new measurement and control technologies are being introduced as more devices and sensors are deployed across the network, increasing the volume of data to be managed and visualized. All of this must be integrated with the utility's Information Technology (IT) department and systems while ensuring operational security. Utilities need the business processes demanded by higher performance targets as customers and regulators raise the bar of expectations.

Built on more than 30 years of industry experience and collaboration with our utility partners, PowerOn Advantage has been specifically designed to support utility professionals through a unique and easy-to-use user interface. GE's ADMS presents a paradigm shift in user-interaction, where data finds the user via a pre-defined dashboard with user-configurable widgets. Through guided work pages and streamlined and robust workflows, GE's intuitive ADMS provides the advanced situational awareness utilities require to face the challenges of a modern distribution grid.

### Key Benefits

UP TO  
33%

Reduction in SAIDI for increased reliability

UP TO  
30%

Reduction in crew/operator interaction for greater productivity

UP TO  
3%

Reduction in voltage for greater network efficiency

## Integrated and Streamlined Operations

- One network model providing a single view of all work across distribution network operations in real-time
- Integrated and optimized operational workflows, streamlined across GIS, ADMS, AMI and mobile
- End-to-end network model management processes and streamlined workflows

## Intuitive User Experience

- Pre-defined dashboard with user-configurable widgets providing greater situational awareness
- User experience focused around specific archetypes and key operational workflows
- Streamlined, intuitive and guided work pages optimized for operating during blue sky days or under extreme storm conditions

## Simplified System and Modular Design

- Quick-start packages offered to accelerate deployments which maximize improvements across reliability, productivity and efficiency KPIs
- Purpose-designed and built as an off-the-shelf ADMS product, deployable pre-configured on networks spanning from EHV to LV
- Modular software architecture on a core real-time platform for flexible implementations as either an OMS, a DMS or a fully functioning ADMS



## PowerOn Advantage ADMS Overview

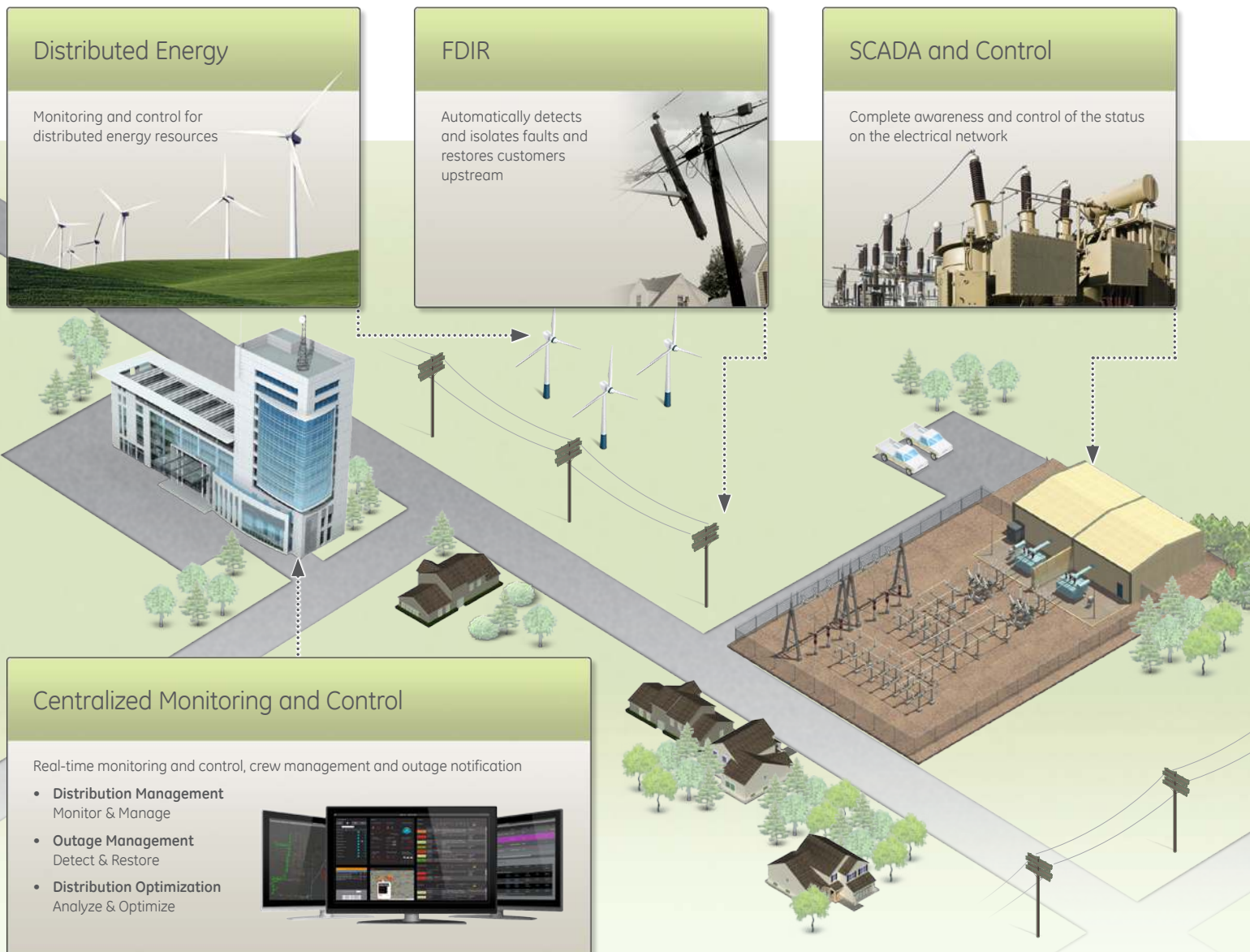
With a drive towards clean energy and addressing energy security concerns, the way we generate, distribute and consume energy is changing at an ever increasing rate. Add to this the need for enterprise system integration while enforcing cyber security policies, it is clear that a new approach to Operational Technology (OT) is required, supporting a closer collaboration and convergence with IT.

Existing standalone OMS and DMS systems are limited in their effectiveness. Data inaccuracies and divergence issues around multiple models reduce a utility's confidence to push network assets to higher utilization and creates delays in response times between systems, negatively impacting reliability and productivity KPIs. The on-going duplication of IT costs related to supporting, maintaining and upgrading two systems presents additional challenges.

GE's PowerOn Advantage is a single, modular ADMS that delivers reliability, productivity and efficiency all via one platform, one network model and a simplified operational workflow, using real-time network information that spans EHV to LV.

GE's ADMS encompasses advanced monitoring and control of the distribution network, fault and outage management and network performance optimization on a single system. PowerOn Advantage manages every step of the operation, from understanding the state of the network and planning work, to mobilizing resources, to optimally restoring parts of the network after an outage. Service bus integration, based on CIM standards, provides the flexible connection required to enable the OT/IT convergence desired globally by major utilities. GE delivers a cutting edge technology on a proven platform optimized for grid modernization.

## Optimized for Grid Modernization



# Integrated and Streamlined Operations

When an outage occurs, sensors on the grid communicate information from substations, circuits, meters or customer calls. This equates to a flood of data. Data that needs to be analyzed and acted upon.

With all of the information displayed in a single dashboard, the operator is able to clearly see the state of the network and all work being performed across the distribution grid. This enables safe practices and supports the operator's ability to make informed decisions at the appropriate time.

With PowerOn Advantage, system restoration can be automated, via a Fault Detection, Isolation & Restoration (FDIR) engine. Using intelligent automation algorithms, FDIR can automatically execute switching to isolate the problem section of the circuit, restoring the maximum number of customers as quickly as possible.

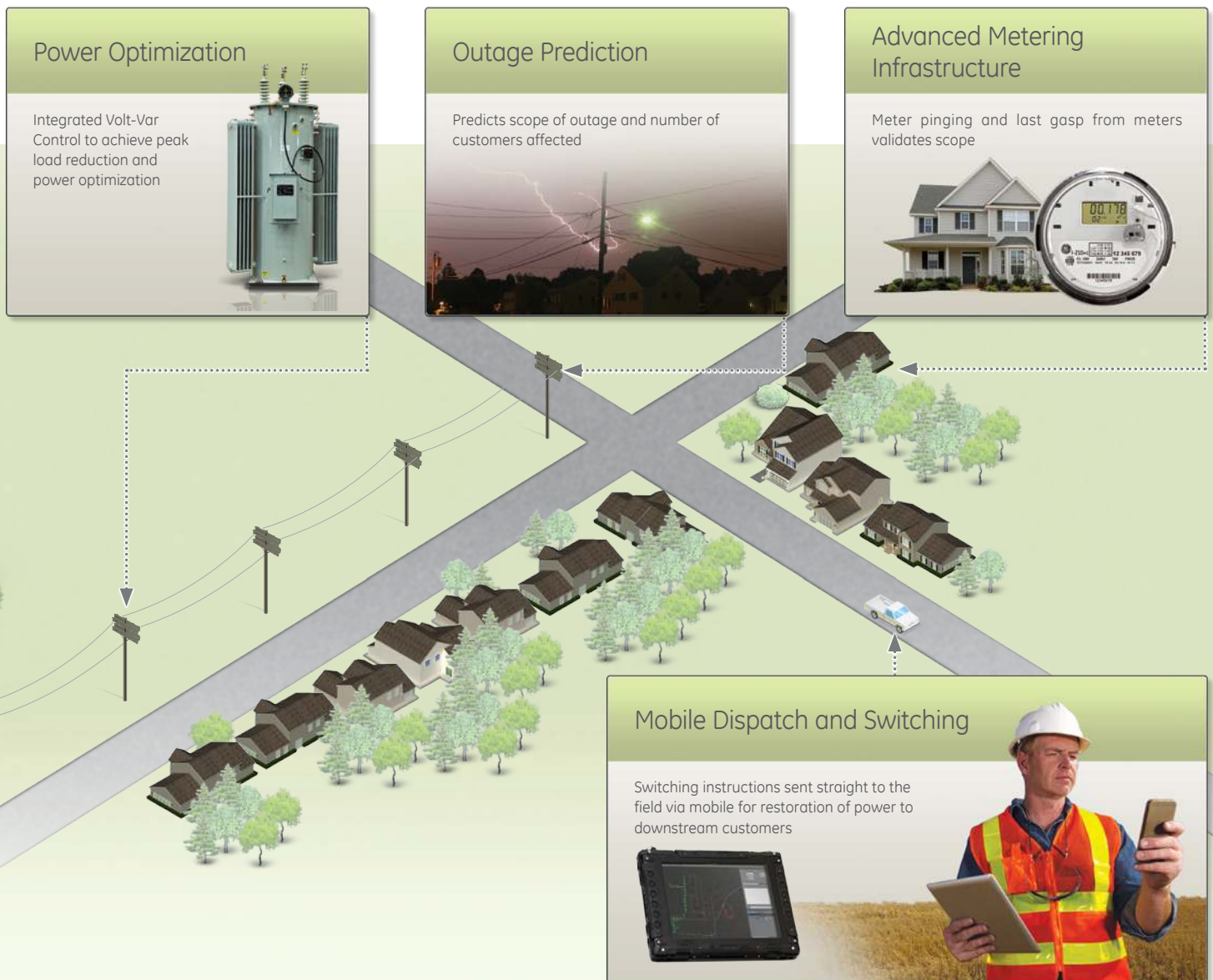
After the automated restoration, the intelligence of PowerOn Advantage assists the operator to find the available crews and sends them to the

identified section of line, while maintaining communication between the teams in the office and the field.

Using a robust set of workflows, the control center keeps data and decisions moving to avoid delays, and directs the task to the right person.

The restoration to the remaining customers must be done with precise coordination to ensure the safety of crews and the public. With PowerOn Advantage, operators clearly see the tasks required and the system status. They are then able to communicate with field crews efficiently, allowing them to confidently and quickly proceed with the restoration.

PowerOn Advantage has the flexibility to play many roles in a restoration. System restoration can be automated, restoration steps can be recommended or PowerOn Advantage can simply manage the workflow and let the operator make the decisions.



# Intuitive User Experience

## Data Finds the User

### Previous Industry Approach

Historically, utilities have struggled to gather network information from multiple, separate applications. These applications use multiple filters and table configurations to access relevant information, resulting in inefficient work flows across multiple screens. Operators need extensive knowledge, experience and training to navigate the system, and the system itself has limited effectiveness in maintaining situational awareness, especially under stress conditions such as large storms.



Multiple, Separate Applications and Workflows

### Historical User Interface

System operators have traditionally needed to access multiple applications to obtain network information. This is an inefficient process and requires extensive knowledge of the system and applications.

### New Paradigm

PowerOn Advantage is changing the industry's approach to data access. PowerOn Advantage offers an integrated dashboard with pre-defined work pages, creating a seamless next generation user experience. Through guided, streamlined and robust work flows, the intuitive PowerOn Advantage delivers advanced situational awareness in an environment with ever increasing volumes of data to be managed, controlled and visualized to meet grid modernization objectives.



Single Integrated Dashboard

### PowerOn Advantage User Interface

With PowerOn Advantage, operators can now access network information via a single, integrated dashboard. Streamlined work flows enable efficient network management.

## Key Dashboard Components

The pre-defined and integrated dashboard within PowerOn Advantage presents relevant and necessary network information to system operators in one easy to use interface where data finds the user. The dashboard provides an optimal view of all critical information requiring the attention of the operator, robust for both blue sky days as well as extreme storm conditions.

**Communication Module**  
The Communication Module provides a seamless way to contact various people inside and outside the control room. Includes one-click call, email, chat and SMS.

**Dashboard Widgets**  
These user-configurable, animated widgets provide high-level status summaries of items related to the user's role. When an item requires immediate attention, the widget distinguishes itself with a visual cue.

**Map Overlay Module**  
The Map Overlay Module provides an overview of the region or operator's area of responsibility with pre-defined and configurable layers of information that can be overlaid.

# Simplified System and Modular Design

## Modular Design and Functional Components

PowerOn Advantage has been designed with modularity in mind. This design gives customers the flexibility to choose to deploy as a single DMS, a single OMS or as a fully functioning ADMS. GE understands how customers work and can deliver a proven software solution to meet utilities' needs in distribution operations with a platform that is ready to grow and expand with our customers, today, tomorrow and into the future.

## Modular System Offerings

GE offers PowerOn Advantage in a variety of tailored and modular based packages designed to accelerate delivery. Our pre-configured solution and services meet the utility's key business objectives quickly. Whether it's increasing reliability, improving productivity or delivering greater network efficiency, GE can provide the right package to optimize your utility's grid modernization efforts, while increasing overall customer satisfaction.

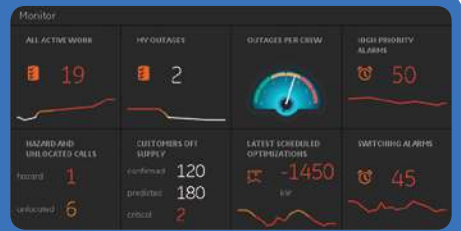
### Functional Components of PowerOn Advantage



**Distribution Management**  
Monitor & Manage



**Outage Management**  
Detect & Restore



**Distribution Optimization**  
Analyze & Optimize

### Base Components

- Automation
- Calculation Engine
- Event Management
- Group Telecontrol
- Master Log
- Network Display
- Temporary Devices
- Time Series Data Store
- TLQ Management
- Topology Processing
- Training Simulation
- Trending

### Enterprise Interoperability

- Customer Manager
- DRMS
- EMS
- Enterprise Historian
- ICCP
- Outage Reporting
- Planning Analysis
- Smallworld Electric Office
- Smart Meter
- Reporting

### Modular Offerings

#### Productivity

- Auto Gen Schematics
- Commissioning Manager
- Crew Management
- Mobile Dispatch & Switching
- Switching Advisor & Management

#### Reliability

- Call Taker
- Fault Level Studies
- Fault Location
- FDIR
- Load Shed and Restoration
- Outage Analysis & Prediction
- Protection Verification
- Restoration Management
- Storm Manager

#### Efficiency

- DER Management
- Distribution Power Analysis
- Distribution State Estimation
- Dynamic Thermal Limits
- Feeder Reconfiguration
- Integrated Volt-Var Control
- Load Forecasting
- Load Transfer Capacity
- Low Voltage Management

### Enterprise Interfaces

- Asset Management
- Building Management
- CIS
- ERP
- GIS
- Call Center
- OMS Systems
- Mobile Systems
- SCADA
- Workforce Management

## Fewer Interactions – Productivity

### Challenge

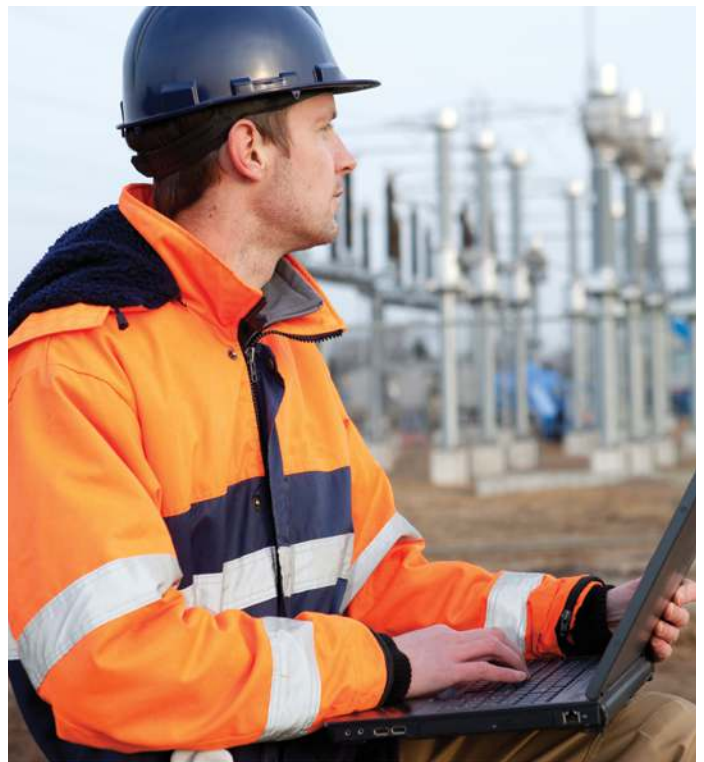
Doing more with less is a common challenge utilities face on a daily basis. The need to reduce costs across distribution operations while ensuring operational safety and managing the increasing number of recently added devices across multiple systems requires a new approach to interactions between man and machine.

### Solution

PowerOn Advantage has been designed with simplification in mind. The market leading approach to user experience focuses on reducing the number of clicks to mobilizing data out to the field. GE understands the needs of utilities and how to improve productivity of the workforce.

Under storm conditions an operator can complete orders directly from a list with single mouse-click progressions, allowing scaling up of crews per operator. With mobile switching, field crews can be sent switching work electronically, allowing them to instantly confirm authorized switching by secure communication without the need to talk to the operator. The rich mobile client provides a direct linkage to schematics, maps and GPS navigation. Mobile switching shortens outage durations and reduces crew to control room interaction times, again enabling more crews to be coordinated per operator.

GE understands how you work.



## Improved Performance – Reliability

### Challenge

How a utility's current reliability metrics perform compared to regulatory targets is an extremely important measure for all utilities around the world. Reducing the impact and duration of both planned switching and unplanned fault restoration is critical to achieving reliability improvement goals.

### Solution

GE's FDIR solution can improve SAIDI and SAIFI metrics for customers. PowerOn Advantage builds on that experience to provide a highly sophisticated FDIR solution, with proven restoration capability and a clear focus on safety through a fail-safe methodology.

Utilizing the power flow engine for optimized restoration, FDIR intelligence isolates faults to the smallest possible section using fault location, then restores upstream power and looks for the best load transfer options for restoring downstream customers. PowerOn Advantage can split the downstream section and seek multiple transfers to restore customers as well as reach into adjacent circuits and use feeder reconfiguration to create additional capacity for the transfers. The result is the maximum number of customers restored in the shortest possible time.

GE understands how you improve.



## Maximizing ROI – Network Efficiency

### Challenge

Finding ways to maximize Return on Investment (ROI) is a critical element of any utility's plan for grid modernization. Specifically, any actions taken which can defer or even avoid physical network reinforcement can deliver significant cost savings. Solutions focused on reducing system losses, increasing utilization and optimizing power delivery are key to success in delivering network efficiencies.

### Solution

The Integrated Volt-Var Control (IVVC) module in PowerOn Advantage offers a flexible optimization based approach to Volt-Var management. User-definable objective functions and constraints are designed to operate in advisory or automated modes:

- Conservation Voltage Reduction: Voltage reduction to minimize total energy consumption or to shave off the load peaks during periods of high demand.
- Loss Minimization: Minimizes technical losses by switching capacitors to minimize Var flows on feeders while respecting power factor limits set by transmission operations.

GE understands how you conserve.



## Making Connections – Interoperability

### Challenge

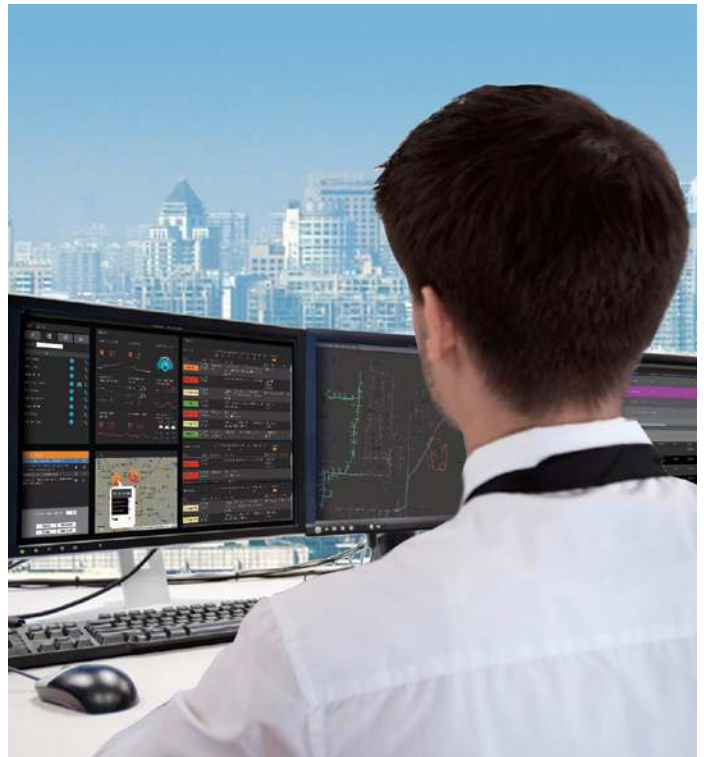
For a utility to realize the full potential of ADMS benefits across productivity, reliability and efficiency, an accurate network data model is essential. This operational model must not only show the current state of the network, but also the normal state and proposed designs. In addition, as the amount of embedded generation and active networks increase down to low voltages, the need to model low voltage networks becomes a pre-requisite.

### Solution

With one of the market's leading breadth of applications, GE offers customers an end-to-end network management solution that spans the entire power system, from high- to low-voltage networks. PowerOn Advantage is pre-configured and optimized to connect with GE's Smallworld™ Electric Office geospatial information system (GIS) via a CIM-based adaptor to provide simplified workflows, data management and synchronized network models across operations and planning, all with a single point of data maintenance at a reduced cost.

PowerOn Advantage builds on its service oriented architecture to deliver a vast array of connected business solutions that are interoperable with ERP, GIS, SCADA and customer information systems, as well as smart metering, mobile/field force automation and analytic platforms. PowerOn Advantage allows operators, planners, draftsmen and crews to leverage Smallworld Electric Office geospatial and asset management applications while planning, designing, analyzing, operating and maintaining their networks.

GE understands how you connect.



# Software Solutions Portfolio Overview

GE's portfolio of software operation systems designed for utilities around the globe provide a suite of software, ranging from asset management and control to advance analytics and hosted and consulting services, all to improve operator situational awareness, reduce operating costs and enhance electric reliability.




**Geospatial Systems**

Design and planning services, field automation and workforce management



**Utility Operation Systems**

Real-time control systems for the management of transmission and distribution networks



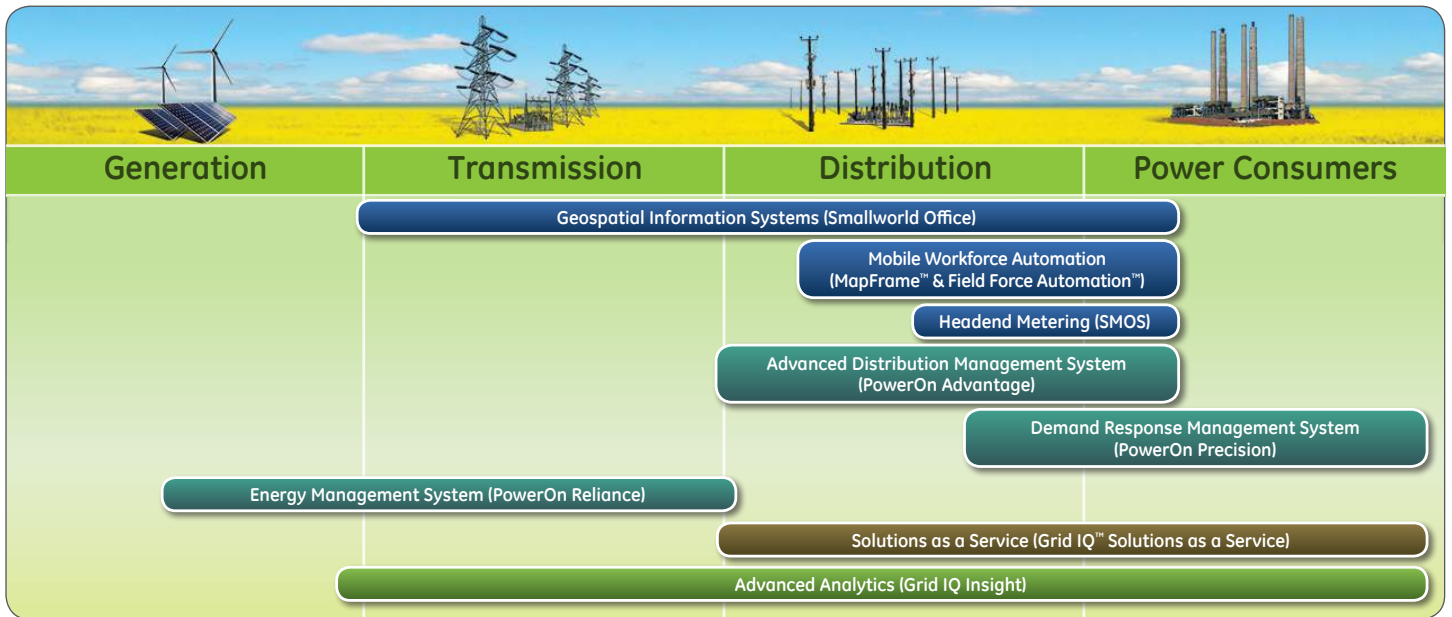
**Solutions as a Service**

Hosted services to shift integration, financial and deployment risks



**Advanced Analytics**

A flexible, real-time, scalable platform that enables utilities to put big data into action



For more information about PowerOn Advantage ADMS visit [GEDigitalEnergy.com/ADMS](http://GEDigitalEnergy.com/ADMS)



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