

## BIOGRAPHICAL INFORMATION

Randy Cough  
Director Electric T&D Solutions  
GE Energy

### Specific Responsibilities

Mr. Cough is responsible to provide strategic direction and vision for the Electric Utility software segment for GE Energy's Network Reliability and Services group. Understanding customer needs matched with Advanced Distribution and Outage Management Systems along with technology solutions is the key element in GE Energy's vision of network management. Our customers are continually managing their capital expenditures and operations costs in relation to their network capacity and reliability. GE Energy's vision is to be the company that customers turn to in solving their capacity, reliability and cost equation issues. In addition, Mr. Cough provides executive leadership and consulting based on industry knowledge for the procurement and implementation of GE Energy's Electric Utility Software solutions to ensure customer satisfaction.

### Past Experience

Mr. Cough has more than 30 years of utility, consulting, and project management experience with the last 15 years specializing on Electric Transmission & Distribution system solutions relating to outage management systems, distribution management systems, engineering management and design, geographic information systems, network asset management, mobile workforce management systems integrated with other Utility applications.

### Educational Information

B.S. – Engineering Clarkson University

### Professional Memberships

GITA  
Institute of Electrical and Electronics Engineers (IEEE)  
Project Management Institute (PMI)

## **Utility of the Future – Enhanced benefits by integrating OMS and AMI Technology**

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### **ABSTRACT**

Advanced Metering Infrastructure (AMI) technology has offered a tremendous savings to electric utility companies in the collection of meter information. However, AMI also has the ability to detect customer outages and provide other advantages to the process. Many Electric Utilities have integrated AMI technology into the distribution and outage management process to verify customer calls, enhance outage prediction, identify nested outages and verify restoration. This presentation will outline how the AMI system integrated with a Distribution and Outage Management System can provide additional benefits to Electric Utilities.

### **Overview**

#### Utility Business Drivers and Challenges today

As Electric Utilities look to the future with the intense pressure to improve reliability, operational efficiencies, and customer satisfaction, Utilities will require advancements in Distribution Management and Operational Management Systems along with integration with other utility enterprise systems to meet the growing demand for operational improvement. Evolving business and regulatory challenges have resulted in utility demands to use DMS and OMS tools seamlessly integrated with other technologies such as AMI to manage Outage Management processes with regards to unplanned outages, while also managing complex and heavily loaded distribution networks with advanced distribution applications.

Utilities are seeing the increasing requirement for the amount of automation and data collection points being applied to customer premises and utility networks. Regulatory decisions may and will directly drive deployment of advanced metering independent of economic calculations. Regulators have very good reasons for directing utility actions, including fairness, value to the society as a whole, and quality of service. For example, regulated utilities in California and Ohio are now responding to regulatory direction to submit plans large-scale AMI deployments with costs and overall benefits the customers and utilities.

As Utilities reconcile the strategic AMI business case and the find ways to recoup the investment for AMI deployments, utilities are also able to see line of sight to many other benefits associated with AMI specifically around operational efficiencies.

To enable immediate benefits of Automated Meter Reading (AMR) the Automated Metering Infrastructure (AMI) will need to be architected and has now transformed into what most utilities are coining the “Intelligent Grid”. When considering an intelligent grid, the investment can be

significant, however by considering a phased investment approach several “non-metering” benefits can be achieved over time.

Many utilities may be still deliberating on the fundamental question “What is the Intelligent Grid”? The following key functional capabilities should be considered for the enablement of an Intelligent Grid:

- An open and standard based architecture that will carve out the path for future technologies beyond the meter
- 2-way communications with smart devices distributed across the power systems with associated software applications analytics/decision support tools which enable the following:
  - Remote reading, connect/disconnect, TOU & real-time pricing, Load profiles/forecasting, Demand Side Management (DSM)
  - Detection & verification of outages
  - Volt/VAR Management
  - Transformer Asset Management
  - Improve circuit utilization
  - More efficient deployment of field personnel
  - Replacing static wallboards with a real-time digital network

#### AMI Integration with Utility Distribution Operations

As many Utilities have replaced legacy outage management systems with advanced geographic based systems, the utility can enable new business processes which will provide for a complete set of network management functions supporting not just outage management functions, but also enterprise outage management solution. This will allow utilities to achieve another level of operational benefits and capabilities across entire organization.

Many utilities are still faced with challenges from the deployment of OMS solutions based on the limited capabilities of today:

- Utilities and OMS solutions are still dependent on customers to report outages
- Device prediction accuracy – Utility data show that up to 30% of the single customer calls are not classified as outages
- Detection and verification of nested outages – nested outages can go un-noticed for several hours during Severe Storms
- Crews management & utilization – Crews dispatched to the in-correct location or return trips for Nested Outages are costly to the utility
- Ability for dispatchers to have greater visibility of system conditions

With the deployment of Intelligent Grid and AMI the utility has the ability for network operators to proactively manage large and complex networks in a more advance way. Today’s AMI technology capabilities allow the network operators to:

- Ability to Ping any Device or Meter at any time
- Ability to Ping a meter & verify a no-light call
- Ability to evaluate the entire circuit or feeder
- Provide the network operator with prediction validation

- Provide additional information for locating the faulted device
- Outage restoration verification
- Identification of potential nested outages
- Improved Network Operator System Visualization

Once the Operations Management System (OMS) software is integrated with the AMI system the network operations personnel can automatically ping the customer and verify the status of the meter. If the customer's meter pings in-service the call & order can be cancelled which avoids a crew being dispatched to the site. This may be the simplest use of AMI but has the biggest overall impact and can eliminate approximately 30% of calls from being dispatched.

Another very important OMS business process improvement is with predicted outage validation and periodic outage assessment. With a 2-way integration of OMS and AMI system, customers under the predicted outage can be "pinged" a positive response from AMI for no-service verification. Outage orders or customers can be flagged for a follow-up action and if any customers ping in-service, the network operator can evaluate the entire circuit for nested outages to determine the correct interrupted device.

After restoration or partial restoration activities are completed, the network operators can verify restoration accuracy at the customer level. The crew will verify the interrupted device was repaired and returned to normal for the OMS system along with AMI to automatically ping the meters involved in the outage. This action will verify a restoration result regarding "no-power" on an individual customer basis. If for instance, the customer ping as still being out of service, the OMS prediction process will start over and a nested outage will be created for additional follow-up action while the crew is still in the area. This is a significant improvement to the overall restoration efforts and customer satisfaction.

Finally looking forward, the AMI infrastructure will allow for many other future Distribution Operation Management capabilities and improvements.

The enablement of AMI and additional data elements allows the utility to deploy additional real-time monitoring, control and management solutions.

Distribution Management applications such as:

- Distribution – Automated Feeder Restoration
- Distribution Power Analysis - Real time unbalanced load flow
- Volt/Var Optimization - Multi-objective optimization system

### Challenges and Issues to keep in Mind

Although there are many benefits that can be realized with an integrated Distribution Management and AMI system, utilities will still have challenges to overcome. Some of which are:

- Communication Network – performance, scalability, redundancy
- Maintaining the Operated Network Model - As Switched Model
- Reliability of information - AMI notification / Ping notification
- OMS integration with AMI – Ability to "turn-off" AMI specifically during Storm

## Summary

The integration of AMI and OMS can offer several benefits to the utility.

- Outage notifications are immediate – AMI can provide initial outage reporting & more accurate information
- Customer Call Volume can be significantly reduced
- Advanced outage prediction – Enables dispatchers the ability perform additional device analysis and improve accuracy of outage predictions.
- Dramatic reductions in field trips to single customer outages – meter status can be validated for non-utility problems
- Restoration processes are enhanced – ability to validate all or selected meters avoids nested outages
- Improved crew utilization
- Customer Satisfaction with proactive communication and status
- Improvements on identification of outages and momentary data