Advanced Distribution Management System (ADMS) Implementation Experience, Lessons Learned and Real Benefits

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Agenda

1. MGE Background
2. Distribution Operations Center (DOC) Overview
3. Advanced Distribution Management System (ADMS) Project Overview
4. Real Benefits
5. Lessons Learned
MGE Background

- Investor-Owned Utility
- Headquarters in Madison, WI
- 144,000 electric customers
- 147,000 natural gas customers
- 700 employees

- Electric Distribution and Generation
- 2,071 Primary Line Miles 13.8kV to 4.1kV
- 49 Substations
- Downtown low voltage network
- Extensive SCADA with numerous field devices
Distribution Operations Center (DOC)

- 24/7 nerve center of MGE’s field operations
- Primary users of ADMS
- 1 Lead Operator, 8 Operators, 5 Technicians, 1 Trainer
- Extensive SCADA / EMS Capability
ADMS Project Overview

• Received DOE SGIG to implement an ADMS
• Selected Alstom Grid’s Integrated Distribution Management System (IDMS)
• Replaced MGE’s in-house developed Outage Management System (OMS)
• Hired Quanta Technology to develop a plan and project manage the implementation
ADMS Project Requirements

- Provide real time system condition and performance information to operations personnel
  - Improved Safety and Reliability
  - Enhanced Operational Efficiency
  - Increased Customer Satisfaction
  - Augmented Situational Awareness and System Knowledge
- Improved operator training tools
- Provide real time operations information across the enterprise by integrating with existing Alstom EMS
- Create a platform for future Smart Grid evolution
**ADMS Timeline**

- **Phase 1** – DMS Network Model with Power Flow and interfaces Planning Engineering System model
- **Phase 2** – OMS with interfaces to AMI, IVR and Equipment Settings DB
- **Phase 3** – Advanced applications: Switch Orders, Fault Location, FISR, Training Simulator

- **DOE Submittal** - 9/22/10
- **Signed contract with Alstom** - 3/30/11
- **DMS Go Live** - 1/28/13
- **IVR Go Live** - 4/17/13
- **Equipment Settings DB Go Live** - 10/29/13
- **Parallel Operations** - 4/25/14
- **OMS/Adv. Apps Go Live Target** - 2/2015
ADMS Real Benefits
Better Visualization = Better Decisions

- Real time knowledge of system configuration – especially in construction areas, including tags and proposed facilities – NO PAPER MAPS

- Better Operator and Support Staff understanding of the distribution system
ADMS Real Benefits

Every day safety example:

Real-time circuit verification for hot-line work
ADMS Real Benefits
Less switching errors through improved visibility to circuit topology

MGE Average Annual Lost Load Switching Errors

Jan 2010 - Sept 2012 "Push Pins"
Jan 2010 - Sept 2012 "Push Pins"
Oct 2012 - Dec 2014 ADMS

MGE Average Annual Switching Error Contribution to SAIFI

Jan 2010 - Sept 2012 "Push Pins"
Oct 2012 - Dec 2014 ADMS

MGE averages ~400 switching procedures annually.
ADMS Real Benefits

Real Time and “Sand box” power flow benefits

- Summer 2014 N-2 Low Voltage Network Contingencies
- Unplanned Switching Analysis
ADMS Real Benefits
Also benefits users outside the Control Room

- Electronic Switch orders replaced paper process
- Read Only access available throughout the enterprise
- Improved business continuity (redundant servers vs. push pins dropped on the floor)
- Training Simulator for operators and other staff
ADMS Lessons Learned

• Project Management Governance
  – Select an Executive Sponsor and Steering Committee with representation from all business areas impacted.
  – Follow a structured PM methodology and plan to manage a project of this size.
  – Prioritize required functionality and development for the entire project. (i.e. AMI, IVR, Advanced Apps, Equipment Setting DBs)
ADMS Lessons Learned

• Cross-Functional Project Team
  – Multiple technical areas must work together closely including IT, Operations Technology and Operations Support.
  – Clearly define the roles and responsibility early in the project and identify areas of responsibility to maintain and support the system.
  – The network model is the core of the ADMS. Develop process to ensure model is clean and complete, and updated timely and ownership for updates.
ADMS Lessons Learned

• Business Needs Prioritization
  – Not all software fixes/enhancements may be achievable according to schedule. Developed a cause & effect scoring matrix based on what is most important to the company to assist in prioritization.
  – Develop a go live criteria at the commencement of the project. i.e. X% of the model must solve X% of the time

• System Functionality
  – ADMS is an emerging technology. It is important to thoroughly identify system requirements and allow sufficient time to develop and test new systems.
ADMS Lessons Learned

• Change Management
  – With a project of this size, implement in phases to avoid too much change at once.
  – Involve end users early and often to foster ownership.
  – Run current and new system in parallel to test the business process and systems prior to go live.
  – Spend time training end users on the new system and business processes.
ADMS Lessons Learned

• Vendor and Utility Collaboration
  – Vendor and Utility should continually collaborate throughout the entire project.
  – Become involved with vendor sponsored user groups to collaborate with other utilities, share best practices and provide feedback to vendors.
Thank you!

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