SmartGridNews Webinar
Lessons from the Real World Webinar Series
Best Practices for IT/OT Convergence

August 21, 2013
Today’s Presenters

Jesse Berst
Host & Moderator
SmartGridNews.com

Jeff Meyers
Smart Grid Strategy & Development
Schneider Electric

John Dirkman
Sr. Product Manager
Smart Grid Global
Schneider Electric

Fred Fletcher
AGM Power Supply
Burbank Water and Power
1. Definitions and Drivers
2. Process for Convergence
3. Burbank Water and Power
4. Key Takeaways
<table>
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| Jeff Meyers | **Smart Grid Strategy & Development – Schneider Electric**  
|           | • **Works with the development teams and customers** helping them to understand the Smart Grid and how the use of integrated technology can bring energy efficiencies to the industry.  
|           | • Previously **President of Telvent Miner & Miner**  
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|           | • **Serves on** Microsoft Smart Energy Reference Architecture Advisory Council, SGIP (non-voting) and GWA Interop and Cybersec (now Technology) Committee.  
|           | • **Holds a BS** from So Dakota School of Mines; **MSEE** from University of Colorado. |
IT and OT Defined

- Operations Technology (OT)
  - a broad category of components - breakers, reclosers, sensors, controllers, inverters, load tap changers, relays, storage systems, etc.
  - the data and function interfaces between pieces of equipment
  - (often) the control room applications – e.g. SCADA
  - owned and supported by the business
  - mission critical – requires 24/7 availability
IT and OT Defined

- **Information Technology (IT)**
  - the systems that run the enterprise - CIS/Billing, AMI/MDM, GIS, Asset Management, Workflow Management, etc.
  - the data and function interfaces between equipment and humans in business processes
  - owned by the business but often supported by others
  - pervasive in utilities today, but may or may not be mission critical
The IT-OT Convergence Influencers

- Grid Modernization Spurs Growth in OT
  - new types of intelligent grid devices
  - increased smarts in traditional devices
  - more of everything

- Continuous Growth in IT
  - exponential increase in quantity and quality (and dependence)
  - pervasive IT in daily life

- A Smarter Grid Implies Integration on a Massive Scale
  - expanded functions and decision support
  - complexities of grid automation
  - cybersecurity
Implication No 1: Opportunity

Aligning Smart Grid Business Drivers …
Implication No 1: Opportunity

...with Key Applications
Implication No 1: Opportunity

Through IT-Enhanced OT
Implication No 2: Challenges

Grid Complexity Will Grow
• Better tools to model, monitor, and manage
• Advanced (closed-loop) automation to reduce human error

Architecture Will be Even More Critical
• Consider both Enterprise and Real-time requirements
• Logical architecture should be holistic
• Physical architecture will likely be incremental

Mindset for Human Resources Must Shift
• Organizational dynamic may have to change
• Skillsets will have to cross org boundaries

Increased Complexity in the IT-OT World
Questions?
### Name

**John Dirkman**

### Background

**Sr. Product Manager Smart Grid Global – Schneider Electric**

- **10+ years with Schneider Electric** as product and program manager for a wide variety of Smart Grid Implementations
- **Provides product and program management** for advanced integrated Smart Grid systems, driving the technical Smart Grid vision and strategy and ensuring product success in the marketplace.
- Holds a **BSEE from Tufts University**
- **Licensed Professional Engineer**
- **Active member of IEEE**
Process for IT-OT Convergence

1. Determine Smart Grid Business Drivers and Goals
   - Safety, Reliability, Efficiency, Customer Engagement, Equipment Usage History, Standardized Training, etc.

2. Develop a Smart Grid Roadmap
   - Determine which Smart Grid systems and devices will satisfy these Business Drivers
   - Determine specific functionality of these systems and devices

3. Develop a Smart Grid Business Case
   - Determine costs and benefits for your Smart Grid implementation

4. Develop detailed Business Process Workflows and Use Cases
5. Develop a system architecture and topology

- Uptime requirements
- Redundancy requirements
- Disaster recovery requirements
- Virtualization requirements
- Communications requirements
- Establish performance/latency, redundancy, bandwidth, communications protocol requirements
- Security requirements
- Determine appropriate level of security required
- Plan accordingly for system hardening
Process for IT-OT Convergence

6. Determine integration requirements and data flows
   - GIS, CIS, AMI/MDM, EMS, Weather Systems, Energy Trading, Workforce Management, etc.
   - often requires integration of data silos and groups that maintain this data

7. Conduct a thorough data analysis
   - data must be complete, current, and correct

8. Conduct a thorough device analysis
   - especially Distribution Automation
   - include communication systems

9. Establish solid Project Management capability

Collaboration between IT and OT/Business personnel is essential
Effective collaboration will lead to successful IT-OT convergence
Establish Project Teams

- Steering Committee/Executive Sponsors
- Project Management
- Integration Team
- Infrastructure/Telcom/Security Team
- Operations/Field/Real-time Team
- Advanced Power Applications Team
- Process Design Team
- Change Management/Training Team
- User Advocacy Team

*There is no single solution to the team structure*
*Involves members from both IT and OT*
Establish a Project Charter

- Background
- Description
- Requirements
- Deliverables
- Phasing
- Schedule
- Benefits
- Sponsorship
- Responsibility Matrix
- Quality Assurance
- Risk Management
- Change Management
Business Process Mapping

1. Define Business Drivers
   - Map Business Drivers to Smart Grid functions/applications

2. Define Business Processes
   - Define as-is processes
   - Define to-be processes
   - Sometimes just defining or validating as-is processes leads to benefits

3. Develop Gap Assessment
   - Identify Impacted Roles
   - Establish and Prioritize Action Items
   - Develop Change Management Plan
   - Develop Training Plan
## As-Is Methodology Matrix - ADMS

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# Stakeholder Impact Assessment

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• Operates, plans, and develops power systems and supply for Burbank Water and Power while expanding the use of renewable energy to 33% of retail energy sales with rate increases less than the rate of inflation with outstanding reliability  
• Previously Smart Grid Chief Architect Open Access Technology International  
• 35+ year utility management career from system planning to operations to project development across multiple utilities  
• Has established and developed two award winning power plants, the UTC Smart Networks Council, Burbank ONE fiber services, electric and natural gas trading, and operates two power plants for other municipal utilities  
• Holds a BS from South Dakota School of Mines and Technology; MBA from University of South Dakota |

Fred Fletcher
Burbank Water and Power

- Traditional vertically integrated utility
- Subject to regulatory challenges of California
- Operates independently from California ISO
- Balances loads and resources within LADWP BA
- Operates Magnolia power plant for 6 municipals utilities
- Operates Tieton hydro plant for 2 municipal utilities
- Traditional resources include coal, large hydro, nuclear, and gas
- New resources include wind, biogas, solar, geothermal, small hydro
- Trades power throughout WECC using an extensive transmission system
- Early innovator in generation to customer owned resource management and optimization
- Received $20M Smart Grid Grant in 2009
- Emphasis on Affordability-Reliability-Sustainability
Current Era Challenges

- Integration of variable generation resources
  - Wind resources in Wyoming, Washington, and Utah
  - Solar resources in Burbank and Boulder City, NV (2015/16)
- Reduce greenhouse gas emissions
  - Coal plant for 40% of energy portfolio
- Avoid dependency upon natural gas
  - Natural gas for 30% of energy portfolio
- Maximize use of existing transmission
  - Five state transmission grid is large enough
- Eliminate or significantly defer capital additions
  - Generation and distribution additions can be managed
- Power restoration-local and regional outages
  - Able to restore power following regional outage such as earthquake
Business Challenges

- Customer owned generation
  - Solar
  - Combined Heat and Power
- Demand response
  - New service
- Energy Imbalance/Transactive Energy Markets
- Inter-hour scheduling
- Settlement tools
- Power System Operator span of control
- Training and Change Management
- Higher operational role for SCADA related systems
BWP Smart Grid Program Overview

$60 million – 3 year Capital Program

BWP Smart Grid Core Systems:
- Cisco powered fiber optic network
- Tropos City-wide wireless mesh network
- Trilliant / GE AMI meter system
- eMeter Meter Data Management System (MDMS)

Command and Control
- Schneider Electric OASyS SCADA
- Integrated Automated Dispatch System (IADS)
- New Power Operations Center

Security Suite
- Physical security
- Cyber security
- Policy, procedures, standards

Distribution/Station Automation
- Station Automation projects
- Feeder Automation projects
- Digital Relays / Auto-Reclosers
- Static Power Flow Model

Improved Business Systems
- Geographical Information System (GIS)
- Outage Management System (OMS)
- Enterprise Service Bus
- Customer Information System (CIS)
- Virtualized Server Environment

Customer Smart Choice
- OPower Home Energy Reports
- Customer Web Portal
- Time of Use Rates
- Smart Appliance Demonstration
- Demand Response and Load Management Analysis

Demonstration Projects
- Electric Vehicle Chargers
- Black Start Project (Micro Grid)
- Energy Storage
Technological Strategies

- Open interoperable systems
- IT/OT and Business Unit management approach
- Strong project management
- Use case analysis used to meet Strategic Objectives
- Solution structured from end to end
  - Control Center to Control Center data flows
  - Tighter integration to power resources
- Affordability, Sustainability, and Reliability
- GIS, SCADA, OMS, Demand Response Integration
- Calculation of uncertainty statistics
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We Are Well On Our Way …

… To An IT/OT Converged World
The IT/OT World

Opportunities
- Align with Key Smart Grid Business Drivers

Challenges
- Complexity Brings
  - The need for better automation
  - The requirement for consistent architecture
- A (Slight) Shift in the Human Resource View
Thank You!

You will receive a link to download a copy of the slides to the email you used to register.

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