SmartGrid Interoperability Challenges at TXU Electric Delivery

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Prior to Deregulation in ERCOT: Integrated Electric Utility
Post ERCOT Deregulation: Restructured Electric Industry

Competitive Generation

Transmission & Distribution

Competitive Retail Electric Providers (REPs)

Prohibited from selling electricity or other competitively available energy services

Regulated

Customer
TXU Electric Delivery: Who We Are

- "Wires" company in Texas electric market
- 3 million electric meters
- ~115k miles of T&D lines
- 6th largest T&D company in US
- Serve ~65 Competitive Retailers
- Regulated by Texas PUC
Today

- Consumption data provided by TDU, via ERCOT, to REP
- REP utilizes data for billing

**Meter readings provided to retail electric providers (REPs) for billing**
Being Enabled at TXU ED Today

- Consumption data provided to customer and REP via web **Meter Data Portal**
- REP program parameters communicated to home through internet or other means
- In-home device control by REP or by in-home monitor

**Meter and network are being installed by TXUED. Portal in development to provide readings the next day via internet. Retailers may implement pricing, load control, other automation services. Consumer may implement their own choices.**
All Customer Communications via TDU’s Communications Infrastructure

- Consumption data provided by TDU to customer in home and to REP
- REP program parameters communicated to home through TDU network and meter
- In-home device control provided by TDU at request of REP

Vision: Unitary utility network for meter and in-home communication
Retail providers ride on top of that communications network
Broadband over Power Line (BPL) Network Architecture

- **Utility Partner**
- **Broadband Partner**
- **Internet POP**
- **Metro Area Fiber Network**
- **CT Coupler & CT Backhaul Point®**
- **Fiber Backhaul**
- **Low voltage lines**
- **Medium voltage lines**
- **CT Coupler & CT Bridge**
- **Modems at Premises**

- **Utility Substation**
Power Line Carrier (PLC)
Network Architecture

Backhaul Communications

- Distribution Substation
- Substation Control Equipment
- Power Lines
- Load Control Transponder
- Electric Meter, (Hard Disconnect)
- Service To Home
- Commercial Meter Transponder

Meter Management System
Present IT Systems

Meter Data Management System

- AMR System 1
- AMR System 2
- Power Information Platform by eMeter (PIPe)

Existing Legacy Systems

- Billing, Meter Asset, Outage Management, Work Management

Existing AMR and Other Systems

- Cellular IDR, POTS IDR, Hunt, MV90, Manually Read Meters

ERCOT Market
Future IT Systems

Meter Data Management System

- Data
- eMeter
- Data
- Power Information Platform by eMeter (Pipe)

Future Systems

- Enterprise Service Bus
- Billing
- Outage
- Work Mgmt
- GIS
- Web

AMR System 1
- TWACS

AMR System 2
- Current

Existing AMR System
- Cellular IDR, POTS IDR, MV90

Meter Data Portal

ERCOT Market
SmartGrid Vision

Applications
- OMS/DMS/SCADA/MWM
- BPL Smart Grid
- EMS/SCADA

Control & Telemetry
- AMi (PLC and BPL)
- Substation Monitoring
- Distribution Automation

Communications Infrastructure
- BPL – Fiber Network
- PLC, Cellular, Paging and Satellite
1. Replace aging mobile workforce management (MWM) system that is no longer supported by vendors

2. Implement a fully integrated OMS/DMS/MWM system suite replacing a “legacy” home-grown Outage Management System (OMS) and several unrelated distribution control systems

3. Leverage the “new” data available through AMIS into system operations activities

4. Utilize “intelligent” field mounted equipment in true “smart grid” activities

5. Provide near real-time data and control to distribution operations control centers

6. Improve reliability to customers while controlling costs
1. Utilize “completely off the shelf” (COTS) applications wherever possible and work with vendors to update/improve applications

2. Implement utility standards for common information models (CIM) to allow improved interoperability between various applications

3. Leverage the “new” technologies available for enterprise application integration (EAI) by using a state-of-the-art middleware suite for new application implementations

4. Utilize service oriented architecture (SOA) concepts to keep access to vital information open and easily accessed by any application

5. Provide near real-time data and value-added information to all market participants (customers, retail electric providers, ERCOT, and other participants) via Web Portals and specialized information transfers
Outage Management System Landscape

MAXIMO

Trouble Density

CIS+

TXU rep C&I customers

CATS

Work Order Tracking

trouble ticket

Work order

electrical connectivity, work orders, GLN info

customer info create trouble ticket

CNO

residential customers

Electric CIS

Service order, trouble ticket, connectivity, customer info

customer info, premise info, street light data

HOT CATS (system "H")

Today

outage report
SmartGrid Interoperability Challenges

Future State