Austin Energy’s New GMS and Integration with Market Systems

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Topics

• Austin Energy Overview
• ERCOT Nodal Market Preparations
• Austin Energy GMS Procurement
• Austin Energy Market Systems
• GMS and Market Systems Seamless Integration
• Listens Learned
Austin Energy Overview

- 9th largest public power utility
- 407,000 customers
- 437 square miles service area
- $1.3 billion in annual revenues
- 1,700 employees
- City Council Board of Directors
- Fully integrated utility
- Diverse generation mix
- Generation 2,926 MW
- Peak Load 2,585 MW
- ERCOT Member
Austin Energy Overview

Service Territory

- Travis County
- AE Service
- Area Shared With TXU
- Austin City Limits
ERCOT Market

- Non-Opt-In Entity (NOIE) – NO part in retail Market
- Qualified Scheduling Entity (QSE) – Submit bids, dynamic/static gen schedules, settle retail/wholesale gen resources with ERCOT according to EPS meters at tielines and gen. terminals
- Power Generation Entity (PGE)
- Transmission and Distribution Service Provider (TDSP)
ERCOT Nodal Market Preparations

- Nodal Market is mandate by State of Texas
- Initial On-line Nodal Date – Jan 2009
- ERCOT market is settled zonal now.
- AE’s Energy Market Operations (EMO) Division is impacted the most by the ERCOT market transition.
- EMO hired a consulting company to address all aspects of market transition – 9/06
ERCOT Nodal Market Prep-Cont’d

Consulting service was divided to 3 phases

Phase 1:

1. Capability assessment

   - RFI: Market System Evaluation and Transition to ERCOT Nodal Market
ERCOT Nodal Market Prep-Cont’d

Evaluated Systems from RFI:
A. Energy Market Analysis
   LT Resource Planning, LF, Market Analysis, QSE specific activities (STLF, Bidding Wind, PF, OPF, etc)
B. Energy Supply and Risk Management
C. Electric Operations
D. Settlement & Risk Control
E. Market Systems – EMS/GMS, MOS, Disaster recovery
F. QSE Sales & Services
ERCOT Nodal Market Prep-Cont’d

Consulting service was divided to 3 phases
Phase 1 (Con’t)
2. Needs assessment
3. Gap analysis
4. Recommendation and readiness schedule
   (with Executive briefing)
Consulting service was divided to 3 phases
Phase 2: Procurement
- GMS
- LT Resource planning and ERCOT TCR Auction analysis
Phase 3: testing, implementation, and acceptance
- Done internal
Austin Energy GMS Procurement

• Specifications prepared by a consultant but was revised internally to meet ERCOT Nodal Market Requirements and other internal IT standards.

Evaluation Criteria's:
1. Open
2. Windows Platform
3. Comply with latest communication standards
4. Short learning curve
5. Proven customer service
6. Ease to add new generation/tie equip to system w/o system operation interruptions
7. cost
Austin Energy GMS (or POS)

- The GMS was designed for Nodal Market.
- Signed a Contract on 9/2007
- Received the PDS a month later
- Systems delivered 1/2008
- Implemented RTU/ICCP connection for the next 6 months
- Performed ERCOT Nodal LFC Tests 3 times
- ERCOT Postponed the Nodal live to Dec. 1, 2010
Austin Energy GMS (or POS)

- Went back to the vendor to have the system both Zonal/Nodal Capable 3/2009
- Vendor with our support implemented the Zonal market interface on the system and performed FAT.
- GMS zonal in production 10/2009
- Have done LFC tests with ERCOT 6 times from 2 hr test to 48 hour test.
- POS has seamless integration with MOS
Conceptual Layout of an unbundled GMS

QSE Acronyms:

AGC: Automatic Generation Control
COP: Current Operating Plan
CRR: Congestion Revenue Rights
ED: Economic Dispatch
GMS: Generation Management System
ICCP: Inter Control Center Protocol
MOS: Market Operating System
MSI: Market System Interface
POS: Power Operating System
RCM: Reserve Constraint Monitor
RTU: Remote Terminal Unit
SCED: Security Constrained Economic Dispatch
SCUC: Security Constrained Unit Commitment
UC: Unit Commitment
UCE: Unit Control Error

QSE: Quick System Engineering
TDSP: Transmission and Distribution System Planning
TDMS: Transmission and Distribution Management System
SE: System Engineer
LF/CA: Load Forecasting/CURRENT ALTERNATE LOAD FORECASTING
SCADA: Supervisory Control and Data Acquisition
# Austin Energy Market Systems

Market systems design, manage, integrate, operate and support the following production environments to enable Austin Energy to participate in ERCOT’s deregulated wholesale electricity market.

## Market Operating System (MOS)
- Listeners
- BASS (Clients & API)
- Real Time Web Portal
- Real Time XML Queries

## Power Operating System (POS)
- GMS Interface
- GMS Historian

## QSE Data Archive
- Operations
- Settlement

## Settlement Systems
- Web Summaries
- BASS Client
Market Systems

MOS & POS Information Flow
(Control to what AE will be settled against)
QSE Historian Data Acquisition Subsystem

SYSTEM LAMBDA HOURLY DATA
INTERVAL DATA
AE SCHEDULES
ERCOT NOTIFICATIONS
ERCOT QUERIES
SYSTEM HOURLY LOAD
GMS and Market Systems Seamless Integration

Energy Supply & Risk Management

Forecasting
Market Analysis

Unit Commitment

Electric Operations

Market Operating System

Power Operating System (GMS)

ERCOT

Settlement
Market Systems

Deployments
Balancing Energy
Unit Specific
AS Obligations
Markets
Bid Awards
Prices
Emergency notifications
Balanced Schedules
Balancing Bids
AS Bids
Replacement Bids
Queries – Market Data

xml

xml statements
invoices

disputes

AUSTIN ENERGY®
AE QSE Nodal Operation Monitoring Systems

Energy & Market Operations

This site is designed to provide Austin Energy QSE nodal market information for day-ahead and real-time operations. The web pages are classified into the following four categories:

<table>
<thead>
<tr>
<th>GMS Realtime</th>
<th>GMS real time displays provide brief summary on the GMS system status, generation unit MW and reserves, and real time load conditions.</th>
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<tbody>
<tr>
<td>Bids and Offers</td>
<td>Bids and Offers pages provide daily bids and offers Austin Energy send to ERCOT for DAM and RTM market.</td>
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<tr>
<td>QSE Operation</td>
<td>QSE operation displays provide information assisting both DAM and RTM market operations.</td>
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<td>QSE Data</td>
<td>QSE data displays have all historical data for QSE market operations.</td>
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The following are some related web sites for QSE Operations:

1. AE ERCOT Nodal: https://www.ae.com/ercot
OSI Data Selection: Step 1 of 2

YEAR: 2010
MONTH: September
DATA RESOLUTION: 1 Hour
DATABASE: OSI Hist 1

Continue...
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AE-SUBQSE Unit Status on 9/19/2010
Listens Learned

- Open platform systems with standard communication interface gives us the capability to have an edge on market competition under evolving market rules.
- Effectively leveraging internal resources creativity and inside knowledge and knowhow beats the competition