



Nodal Program Update

Mike Cleary

Sr. VP and Chief Technology Officer

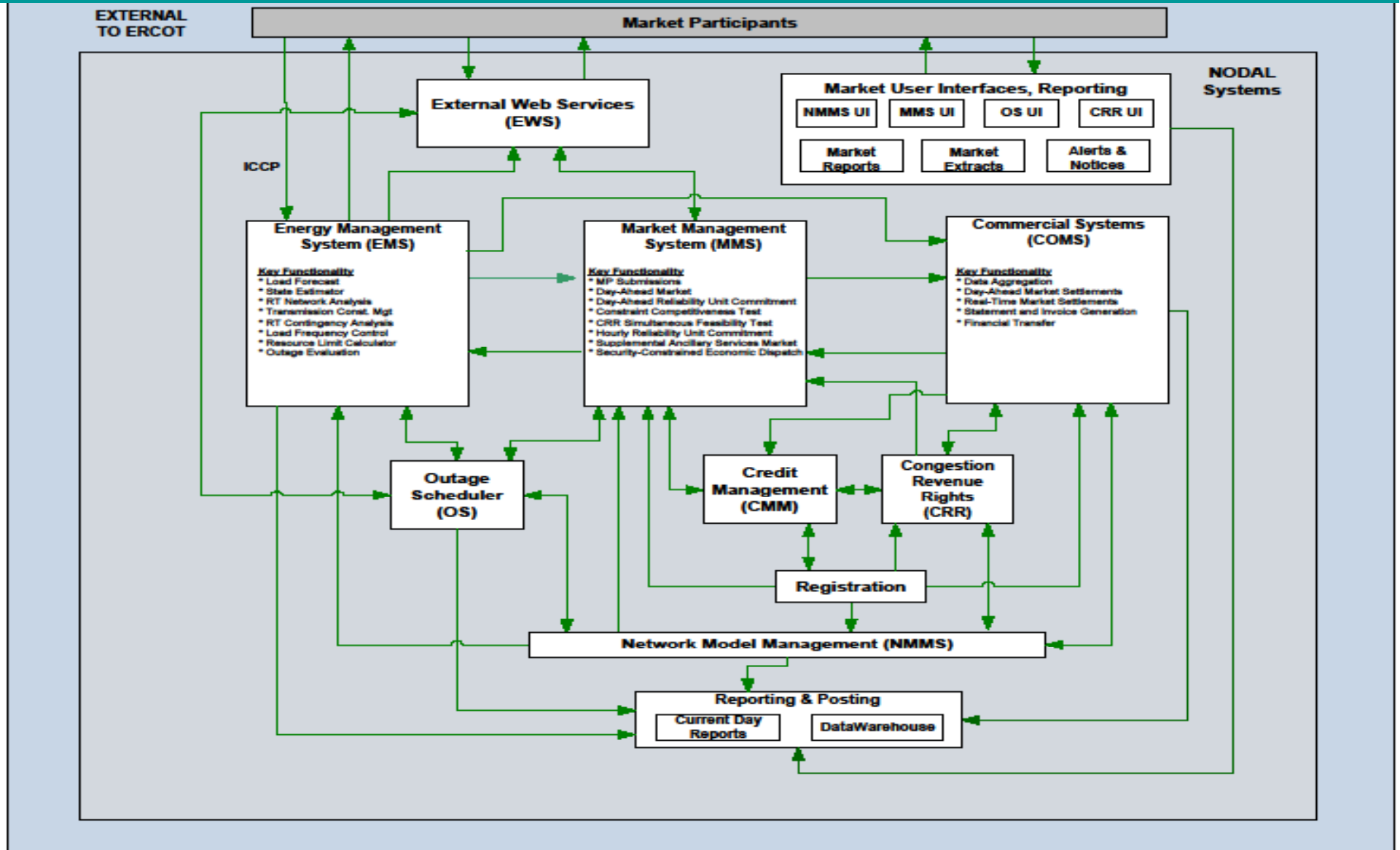
ERCOT Board of Directors

17 November 2009

Agenda

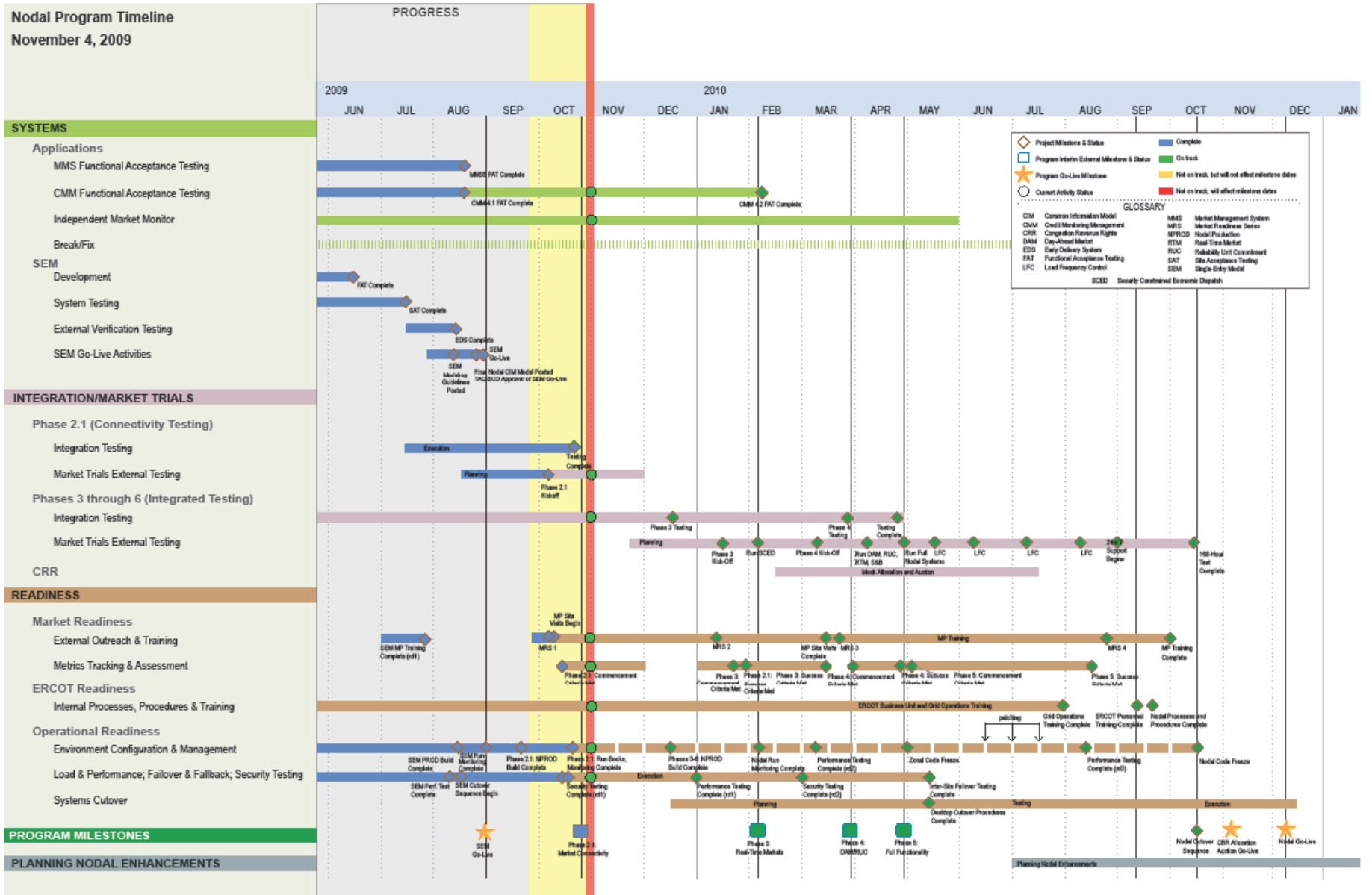
- **Program Status**
- **Market Readiness**
- **Financials**
- **Appendix**

Nodal Systems Blueprint



Nodal Timeline

Nodal Program Timeline
November 4, 2009



Completed Milestones

■ Program Milestone: Phase 2.1 Market Connectivity

◆ Included the following project milestones

- Market Trials
 - Phase 2.1 Connectivity Testing
 - » Technical Workshop Oct. 28
- Market Readiness
 - External Outreach & Training
 - » Completed first 7 of 33 MP site visits
 - Metrics Tracking & Assessment
 - » Phase 2.1 Commencement Criteria met: readiness review complete
- Operational Readiness
 - Environment Configuration & Management
 - » Phase 2.1 run books and monitoring: IT review complete
 - » Phase 2.1 NPROD build complete: final code installed and tested
 - Security Testing
 - » Security testing complete
 - » Performance testing: Web Services and UI benchmarks complete
- Integration Testing
 - Phase 2.1 testing complete: known issues list posted for Market Trials

Near-Term Milestones: Detailed Status (10-29-09)

■ Program Milestones

- Phase 3: Real-Time Markets

◆ Project Milestones Look-Ahead

Project Milestone	Status	Detail
Readiness/ Environment Configuration & Mgmt/ Phase 3-6 NPROD Build Complete	• Complete	• Infrastructure build complete.
Readiness/ Load & Performance/ Phase 3 Performance Testing	• On target	• Planning in progress
Integration/ Integrated Testing/ Phase 3 Testing	• On target	• Planning complete • Integrated testing under way (CRR, OS, SCED) • Running Real-Time operating scenarios twice weekly
Integration/ Integrated Testing/ Phase 3 Kickoff	• On target	• Meeting to be held in early January

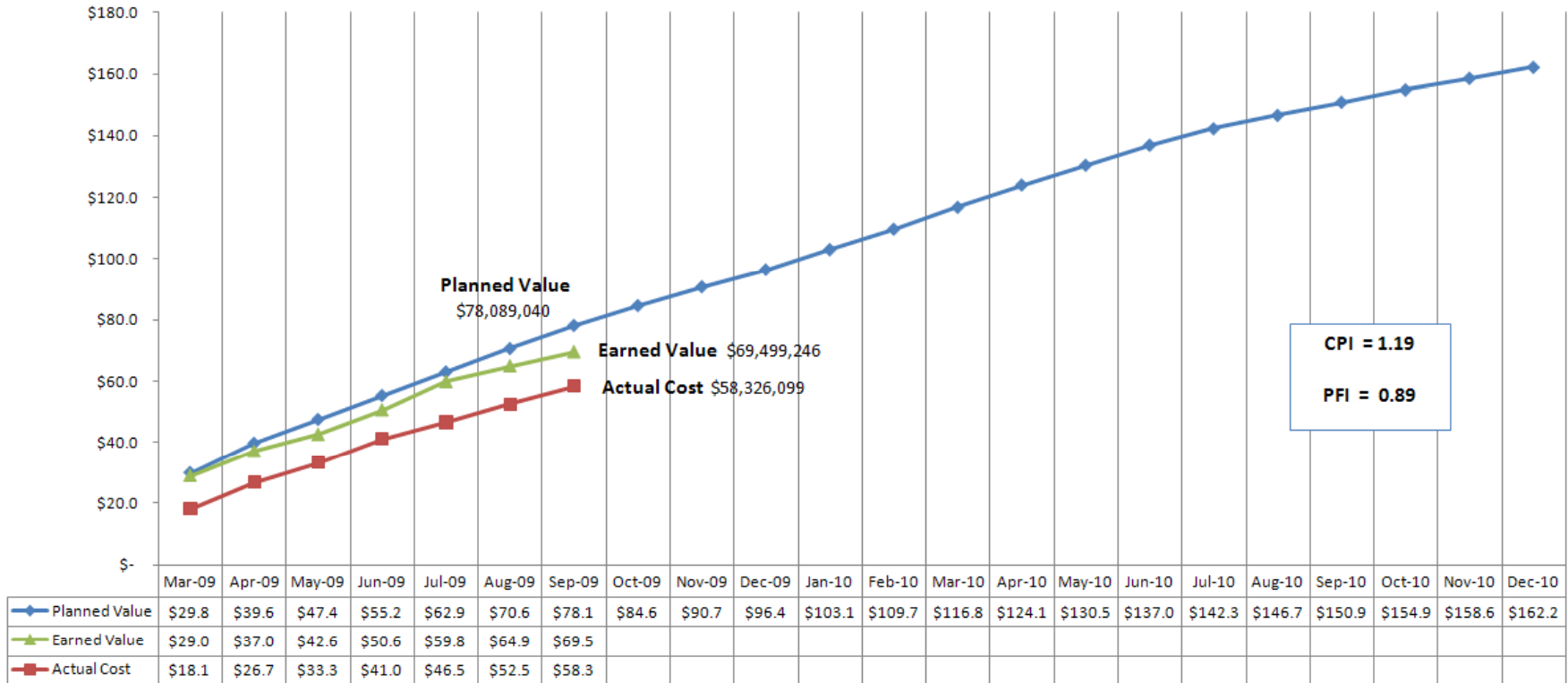
Future Program Milestones

Phase	When	Scope	Status
2.1: Market Connectivity <i>Milestone Complete</i>	Oct. 28	<ul style="list-style-type: none"> MP interface testing (API, Market Manager UI) Market System Rules Validation (Phase 1) 	<ul style="list-style-type: none"> Connectivity testing began as scheduled Up to 16 MPs testing market submissions daily Some technical issues on market side Few functional issues
3: Real-Time Markets	Mid January-Early February	<ul style="list-style-type: none"> MMS-SCED execution SCED results, report publishing CRR auction execution (CRR UI) OS submissions (API, OS UI) 	<ul style="list-style-type: none"> Planning complete Integrated testing under way (CRR, OS, SCED) Running Real-Time operating scenarios twice weekly
4: DAM/RUC	Late March-Early April	<ul style="list-style-type: none"> MMS-DAM, DRUC, HRUC, SCED execution Market results, report publishing Initial S&B execution Outage, CRR integration 	<ul style="list-style-type: none"> Planning in progress Integrated testing under way Executing DAM mechanics
5: Full Functionality	Late April-Early May	<ul style="list-style-type: none"> Run full nodal systems 	<ul style="list-style-type: none"> Planning in progress Internal DST test Nov. 1

Earned Value for the Nodal Program from March - September

Nodal Program

Chart only uses the values associated with the Internal Labor Costs, External Resource Costs, Administrative & Employee Expenses, Vendor and Backfill



NOTE: Amounts in Millions

Nodal Program Risks & Issues

Risk/Issue	Priority	Target	Status
Integration Testing <i>Continued risk around technology delivery of business systems integration due to complexity and continuing maturing of application and data dependencies.</i>	Medium	May 2010	<ul style="list-style-type: none"> On track; test phase planning, work plan complete. Execution of work plan, with specific focus on January Market Trials functionality, under way. Daily meetings being held.
Reconciling Protocols, Systems and Market Expectations <i>Experience by other ISOs in deploying nodal markets has shown that expectations of the market participants are often missed, despite best efforts at defining tariffs or protocol requirements. ERCOT needs to assume such a risk exists for this nodal implementation as well.</i>	High	12/15/09	<ul style="list-style-type: none"> On track; work underway to trace protocols, requirements and business processes alignment analyses are in progress. SMEs added to the team in May.
Internet Explorer Upgrade <i>Nodal Integration testing for the Market Participant (MP) User Interfaces and MIS reporting is using Internet Explorer (IE) version 6. MPs have requested ERCOT support a newer version: IE7 (IE8 is also available). If the nodal market-facing application requires certification against other IE versions, there will be internal and external costs associated with re-testing and updating the UIs.</i>	High	12/31/09	<ul style="list-style-type: none"> On track. ERCOT Enterprise Architecture team completed initial Zonal analysis and developed options. Nodal Impact assessment to be completed in parallel with Integration Testing over the next several weeks.
Market Interaction Operating Level Agreements (OLAs) <i>Need to determine operating level agreements associated with market interactions to assist ERCOT in establishing operational thresholds. ERCOT is responsible for ensuring any market thresholds required before Go-Live are defined, managed through the appropriate stakeholder processes and communicated in a timely fashion.</i>	High	April/May 2010	<ul style="list-style-type: none"> On track. Phase 2.1 OLAs established and communicated to the market during Oct. 8 Market Readiness Seminar. Phase 3 and 4 OLA definitions in process

Participant Readiness Touch Points

2009/2010

	November	December	January	February
Meetings		<ul style="list-style-type: none"> • NATF 12/8 	<ul style="list-style-type: none"> • NATF 1/5 	<ul style="list-style-type: none"> • NATF 2/2
Training	<ul style="list-style-type: none"> • Nodal 101 • LSE 201 • Generation 101, 201 • Economics of LMP • Transmission 101 ◆ Settlement Workshop 	<ul style="list-style-type: none"> • Nodal 101 • LSE 201 • Generation 101, 201 • Basic Training • Economics of LMP • Transmission 101 ◆ Settlement Workshop 	<ul style="list-style-type: none"> • Nodal 101 • LSE 201 • Generation 101, 201 • CRR – online ◆ Settlement Workshop 	<ul style="list-style-type: none"> • Nodal 101 • LSE 201 • Basic Training • Generation 101, 201 • CRR – instructor-led • Settlement Workshop • Operations Seminar • Economics of LMP
Outreach	<ul style="list-style-type: none"> • ERCOT & MP metrics • 8 site visits 	<ul style="list-style-type: none"> • 2 site visits • Metrics mapped to future phases 	<ul style="list-style-type: none"> • 9 site visits • Initiate Phase 3 metrics ◆ MRS #2 	<ul style="list-style-type: none"> • 7 site visits
Market trials	<ul style="list-style-type: none"> • Bi-weekly calls • Voluntary MP connectivity testing • Voluntary market web services/UI re-qualification 	<ul style="list-style-type: none"> • Bi-weekly calls • 2.1 environment closed • Sandbox decommissioned • MP Handbooks <ul style="list-style-type: none"> • SCED/LFC • CRR 	<ul style="list-style-type: none"> • Start weekly calls • Mandatory QSE/CRRAH re-qualification begins 	<ul style="list-style-type: none"> • Weekly calls ■ Phase 3 Market Trials initiates • QSE OS qualification
			<ul style="list-style-type: none"> • MP Handbooks <ul style="list-style-type: none"> • DAM/RUC • Outage Scheduler • COMS 	

Market Participant Site Visits

7 Outreach Site Visits have been completed

Entity	Date	Entity	Date
<input checked="" type="checkbox"/> LOWER COLORADO RIVER AUTHORITY	9-Oct	NRG TEXAS POWER	TBD
<input checked="" type="checkbox"/> CALPINE CORP	14-Oct	DIRECT ENERGY LP	5-Jan
<input checked="" type="checkbox"/> AUSTIN ENERGY	20-Oct	CPS ENERGY	6-Jan
<input checked="" type="checkbox"/> CITY OF GARLAND	21-Oct	BRAZOS ELECTRIC	TBD
<input checked="" type="checkbox"/> GDF SUEZ ENERGY MARKETING	29-Oct	BTU (Bryan Texas Utilities) SERVICES	13-Jan
<input checked="" type="checkbox"/> ANP FUNDING	3-Nov	TOPAZ POWER MANAGEMENT	19-Jan
<input checked="" type="checkbox"/> LUMINANT ENERGY	5-Nov	OCCIDENTAL	20-Jan
<input type="checkbox"/> INVENERGY WIND DEVELOPMENT	10-Nov	SHELL ENERGY	21-Jan
<input type="checkbox"/> EXELON	11-Nov	TENASKA POWER SERVICES	26-Jan
<input type="checkbox"/> AMERICAN ELECTRIC POWER SERVICE	12-Nov	OPTIM ENERGY	27-Jan
<input type="checkbox"/> CONSTELLATION ENERGY	17-Nov	APX	3-Feb
<input type="checkbox"/> PSEG ENERGY RESOURCES	18-Nov	NEXTERA ENERGY	11-Feb
<input type="checkbox"/> FULCRUM POWER	2-Dec	WIND PANEL (Houston)	16-Feb
<input type="checkbox"/> EAGLE ENERGY PARTNERS I LP	3-Dec	RETAIL PANEL (Houston)	17-Feb
<input type="checkbox"/> STEC	9-Dec	TRI-EAGLE ENERGY	18-Feb
<input type="checkbox"/> BP ENERGY COMPANY	10-Dec	XTEND ENERGY LP	2-Mar
		EC AND R QSE	9-Mar

Confirmed Completed

- **Site Visit Team Goals**
 - Understand other ISOs' business processes/procedures
 - Understand how markets handle reliability and markets
 - Understand how specific systems/displays support market and reliability operations
 - Learn problems encountered in implementing new bulk power markets and corrective actions
- **Lessons Learned**
 - Teams will prepare briefing presentations/training on how the visited market performs operations tasks and how they compare with ERCOT's processes
- **Schedule**
 - Nov. 11-12: Midwest ISO
 - Nov. 17-18: CAISO
 - Dec. 9-10: NYISO

Comparing ISO Terminology

ERCOT	CAISO	Midwest ISO	NYISO
ERCOT Nodal Market	Market Redesign Technology Update (MRTU)	Midwest ISO Energy and Operating Reserve Market	NYISO Energy Market
Nodal Protocols	CAISO Tariff and Business Practice Manuals (BPMs)	Midwest ISO Tariff and Business Practice Manuals (BPMs)	NYISO Tariff
Congestion Revenue Rights (CRRs)	Congestion Revenue Rights (CRRs)	Financial Transmission Rights (FTRs), Auction Revenue Rights (ARRs)	Transmission Congestion Contracts (TCCs)
Daily Reliability Unit Commitment (DRUC)	Residual Unit Commitment (part of overall Day-Ahead Market process)	Forward Reliability Assessment Commitment (FRAC)	Day-Ahead Security Constrained Unit Commitment (SCUC); part of Day-Ahead Market
Day-Ahead Market (DAM)	Integrated Forward Market (IFM); part of overall Day-Ahead Market process	Day-Ahead Market	Day-Ahead SCUC
Hourly Reliability Unit Commitment (HRUC)	Short-Term Unit Commitment (STUC) [5 hour look-ahead]; Real-Time Unit Commitment (RTUC) [1-2 hour look-ahead]	Intraday Reliability Assessment Commitment (IRAC)	Real-Time Commitment (RTC)
Locational Marginal Price (LMP); no loss component in LMP	Locational Marginal Price (LMP)	Locational Marginal Price (LMP)	Locational Based Marginal Price (LBMP)



Monthly Financial Review

Mike Cleary

Sr. Vice President & Chief Technology Officer

17 November 2009

Monthly Financial Review

Financials to be provided to the Board before Nov. 17.

Questions?

Appendix

Defect Definitions

Severity	Definition
Severity 1: Data loss/critical error	Defects that render unavailable the critical functions of the system under test. These include errors such as system errors, application failures, loss of data, incorrect calculations, inability to transfer data, failure to access database, and inability to display information to the user.
Severity 2: Loss of functionality w/o workaround	Defects that render unavailable partial functionality of the system under test with no workaround available. These include errors such as incorrect information displayed to the user, information not updating correctly, extracts failing, and missing export files.
Severity 3: Loss of functionality with workaround	Defects that render unavailable partial functionality of the system under test with a workaround available. These include errors such as incorrect message displayed, optional information missing or not displayed correctly, not receiving e-mail notifications, and incorrect defaults.
Severity 4: Partial loss of a feature set	Defects that affect a feature that is not executed on a frequent basis and there is not a significant impact on the system. These include errors such as help information, filtering, and consistent naming.
Severity 5: Cosmetic/documentation error	Defects that are cosmetic and need to be resolved, but are not a factor in the functionality or stability of the system. These include errors such as field alignment, report formatting, drop down list order, fonts, column order and documentation that is inconsistent with the system(s) as tested.

	Prescription in Quality Center
Priority 1	Must fix ASAP
Priority 2	Must fix prior to Go-Live
Priority 3	Not critical to fix before Go-Live
Priority 4	Minor system/user impact
Priority 5	No system/user impact

Protocol Traceability Effort Update

Tier 1 Sections					
	PTE Traced Items	Research Items	In Progress: Business Procedures	In Progress: Reports/ Extracts	PTE Alignment Items
Section 3 – Management Activities for the ERCOT system (Nov NATF)	904	271	449	116	TBD
Section 4 – Day Ahead Operations (Nov NATF)	640	124	61	65	TBD
Section 5 – Transmission Security Analysis and RUC (Nov NATF)	167	28	58	8	TBD
Section 6 – Adjustment Period and Real-Time Operations (Dec NATF)	921	168	434	52	TBD
Section 7 – Congestion Revenue Rights (Oct NATF)	481	68	85	29	1
Section 8 – Performance Monitoring (Dec NATF)	224	86	149	2	TBD
Section 9 – Settlement & Billing (Nov NATF)	410	0	0	0	TBD
Section 16.11 – Financial Security for Counter Parties (Dec NATF)	200	109	9	1	TBD
Section 17 – Market Monitoring & Data Collection (Dec NATF)	25	3	21	1	TBD
Total	3972	800	1266	274	TBD

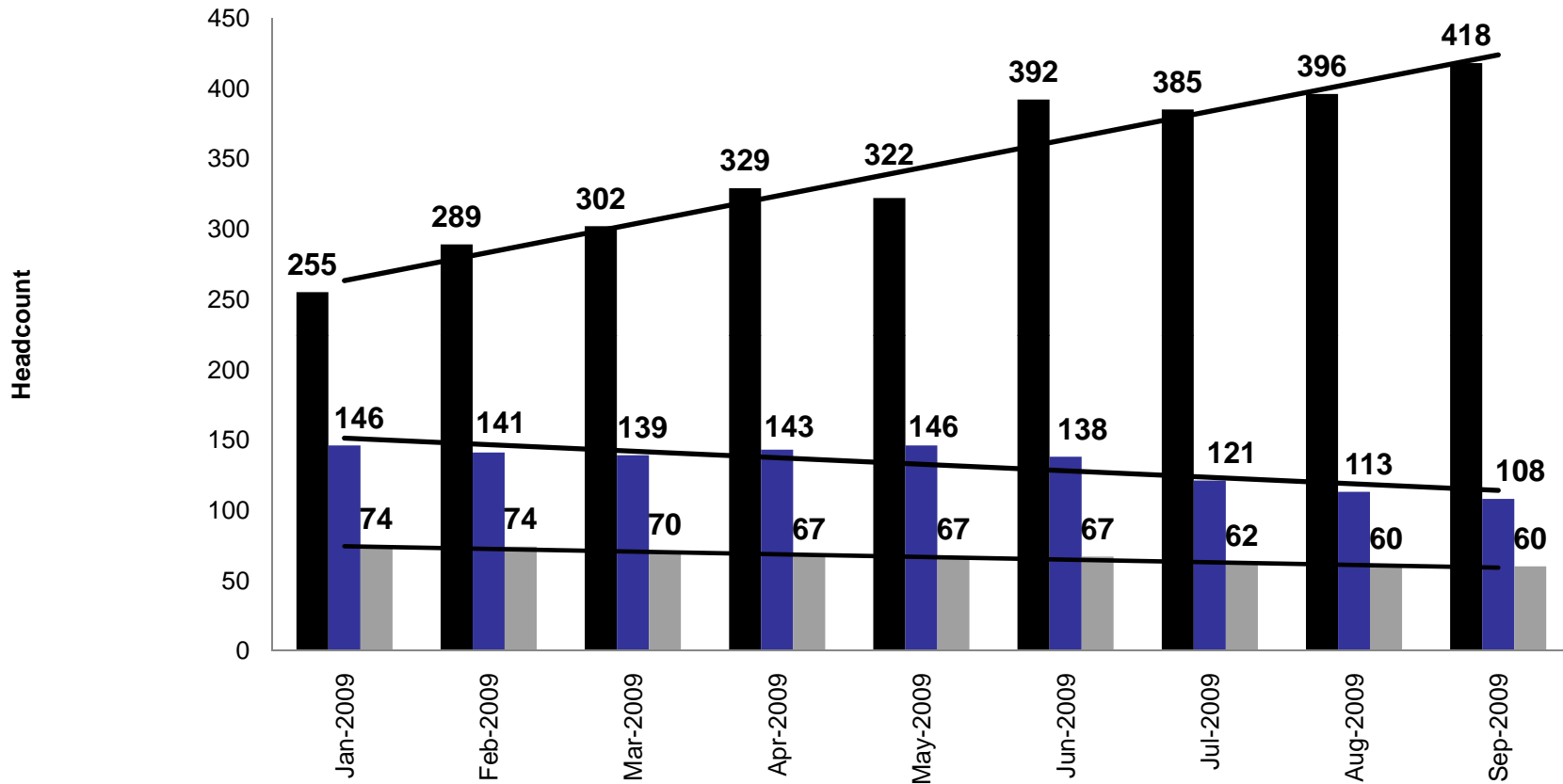
Protocol Traceability Effort Update

Tier 1 Sections				
	PTE Traced Items	Full Trace Report	Research Items	PTE Alignment Items
Section 7 – Congestion Revenue Rights	481	Posted 10/27	68	1

Alignment Item Review			
#	Category (Procedure, Protocol, Requirement)	Explanation	Change Control # / details
1	Procedure	CRR Handbook – assigned, due 12/31/09	n/a

Research Item Review	
#	Category / details
15	Research needed with business owner. Includes identification of business procedure or report/extract and updates to CRR Business Requirements.
7	Pending action by PTE team – review of answers provided by business owners
46	Removing as result of NPRR195 being passed at BOD on 10/20
68	Total above

Nodal Internal/External and Vendor Headcount (2009)



	Jan-2009	Feb-2009	Mar-2009	Apr-2009	May-2009	Jun-2009	Jul-2009	Aug-2009	Sep-2009
■ ERCOT Employees	255	289	302	329	322	392	385	396	418
■ Contingent Labor	146	141	139	143	146	138	121	113	108
■ Vendor Labor	74	74	70	67	67	67	62	60	60

Program Risk: Market Interaction Operating Level Agreements (OLAs)

◇ Potential Milestone Impact: Phase 2.1 Market Connectivity

Risk: Market interaction OLAs				Need to determine operating level agreements associated with market interactions to assist ERCOT in establishing operational thresholds. ERCOT is responsible for ensuring any market thresholds required before Go-Live are defined, managed through the appropriate stakeholder processes and communicated in a timely fashion.		
Risk Life Cycle State						
Define	Plan	Manage	Watch			
Mitigation Plans				Who	Target Date	Current Status
Operational Readiness Team to define OLAs for the nodal services defined in the ERCOT IT Services Catalog: <ul style="list-style-type: none"> • RT Generation Control • RT Sequence and SCED • RT Reporting and Notifications • Market Transactions and Clearing • Outage Schedules Management • Network Model Management • Enterprise Information Services • Congestion Revenue Management • MP Relationship Management • Financial Clearinghouse 				J. McCall	April/May 2010	10/12/2009: Phase 2.1 OLAs established and communicated to the market during the Oct. 8 Market Readiness Seminar. ERCOT will continue to define OLAs for each subsequent Market Trial Release via the ORT project.

Program Risk: Integration Testing

◇ Potential Milestone Impact: Market Trials

Risk: Integration Testing				Continued risk around technology delivery of business systems integration due to complexity and continuing maturing of application and data dependencies.		
Risk Life Cycle State						
Define	Plan	Manage	Watch			
Mitigation Plans				Who	Target Date	Current Status
<ul style="list-style-type: none"> Planned Integration Test phases and associated functional and technology components. Created effort-based testing delivery work plan to prioritize and align deliverables to key external milestones. Instituted daily PMO meetings to manage and mitigate day-to-day risks to scope and schedule deliverables. 				PMO	Ongoing	<p>9/2/09 – Planning of Test phases and associated work plan has been completed</p> <p>Execution of work plan, with specific focus on January Market Trials functionality, has begun</p>

Program Risk: Internet Explorer 6 Upgrade

◇ Potential Milestone Impact: Phase 2 Market Connectivity

Risk: Internet Explorer 6 Upgrade				Nodal Integration testing for the Market Participant (MP) User Interfaces and MIS reporting is using Internet Explorer (IE) version 6. MPs have requested ERCOT support a newer version, IE7. In addition, IE8 is also available. If the Nodal Market-Facing application requires certification against other IE versions, there will be internal and external costs associated with re-testing and updating the web-user interfaces.		
Risk Life Cycle State						
Define	Plan	Manage	Watch			
Mitigation Plans				Who	Target Date	Current Status
Currently the ERCOT Enterprise Architecture team is researching to assess impact.				S. Catoe	Complete	9/30/09 – Zonal analysis is complete and Corporate analysis is at 50 percent. Currently working on estimates to conduct impact analysis.
Nodal Impact assessment to be completed in parallel with Integration Testing over the next several weeks.				T. Baum	12/31/09	Resource assignments will be assigned and load balanced within current Phase 3 Integration Testing activities.
Determine implementation timelines based on current resource plan. Complete Nodal Change Request.				TBD	12/31/09	

Program Risk: Reconciling Protocols, Systems and Market Expectations

◇ Potential Milestone Impact: Market Trials

Risk: Reconciling Protocols, Systems and Market Expectations				Experience with deploying nodal markets by other ISOs has shown that expectations of the market participants are often missed, despite best efforts at defining tariffs or protocol requirements. ERCOT needs to assume such a risk exists for this nodal implementation as well.		
Risk Life Cycle State						
Define	Plan	Manage	Watch			
Mitigation Plans				Who	Target Date	Current Status
1. Assess maturity and readiness of software in the initial nodal release, focusing on new/tailored capability for Texas Nodal.				B. Day K. Farley	12/22/09 (revised)	11/02/09 – SMEs are working with business owners on research and alignment items. NATF web ex for 11/30/09 and 12/18/09 to review full trace reports with Market Participants.
2. Add team members to the nodal program with Texas market experience to ensure readiness for Market Trials. SMEs to discussion alignment issues with ERCOT business owners. SMEs to report the results of the assessment to the ERCOT business owners for resolution.				B. Day K. Farley	Ongoing	11/02/09 – Work is underway to trace protocols, requirements and business processes alignment analyses are in progress.
3. Keep the oversight groups apprised of progress.				M. Cleary	Ongoing	11/02/09 – status reports provided to program, NATF, TAC, Special Nodal Committee monthly.