Nodal Program Update

Mike Cleary

Sr. VP and Chief Technology Officer
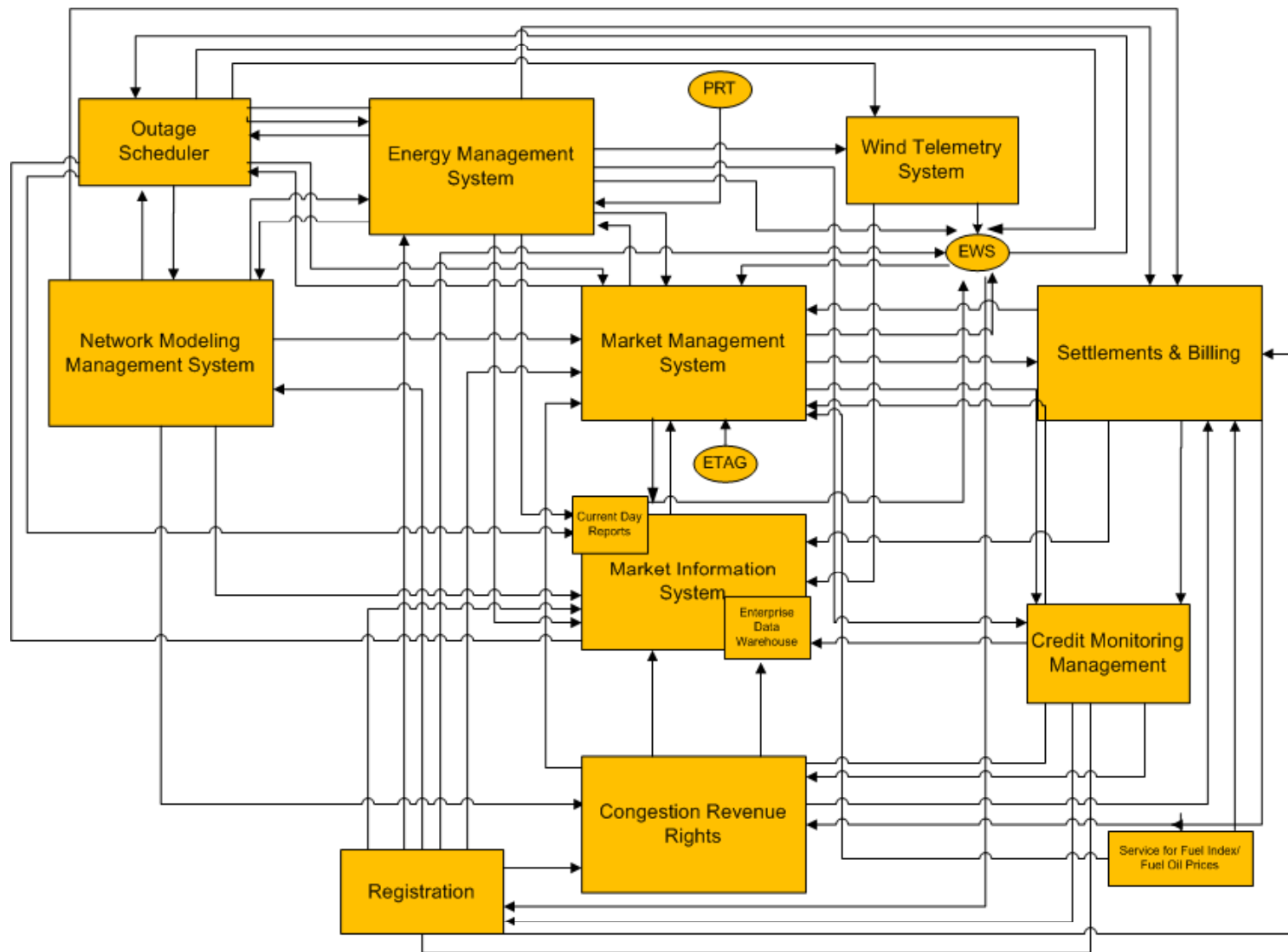
ERCOT Board of Directors

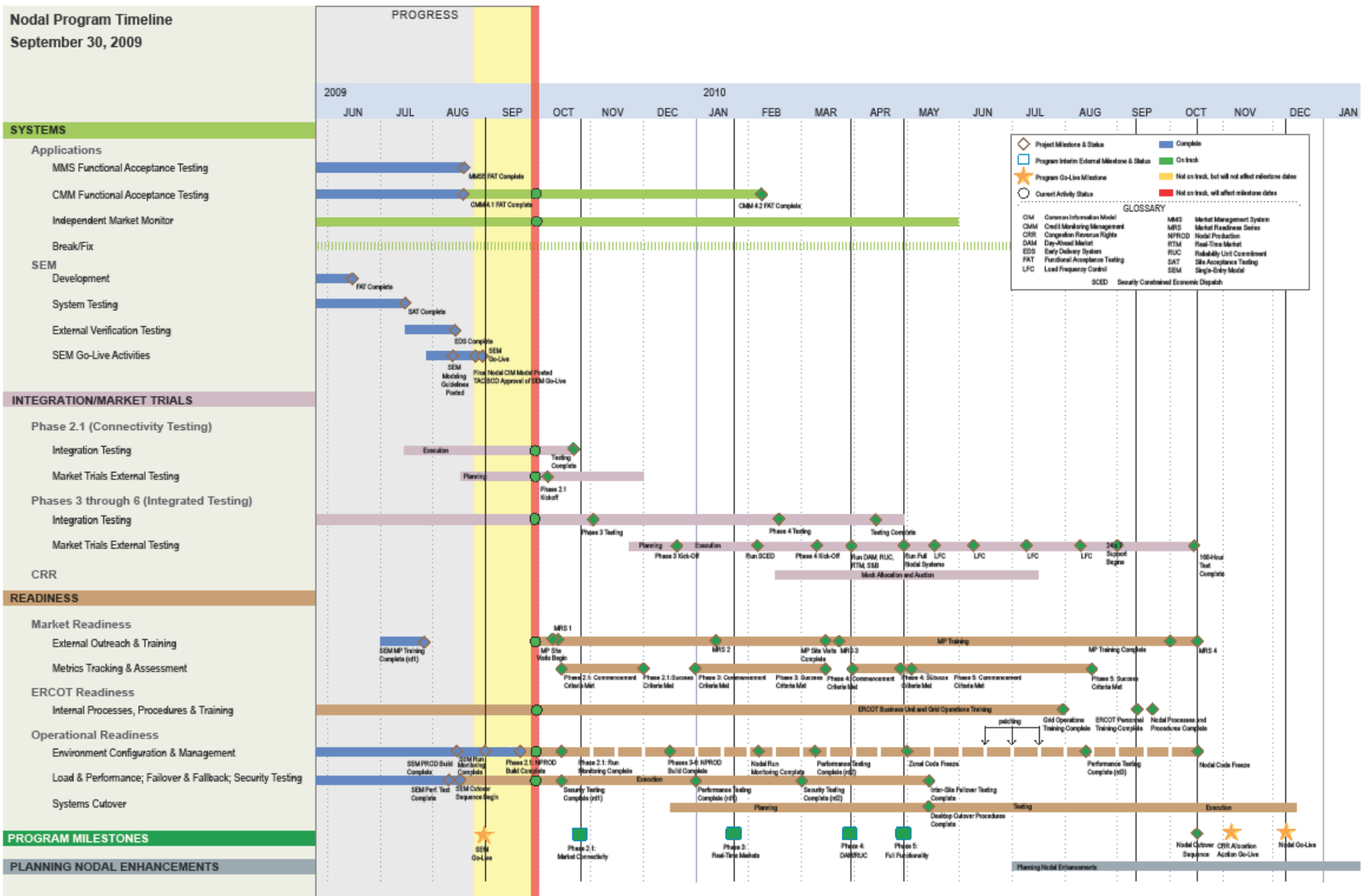**20 October 2009**

Agenda

- **Program Status**

- **Market Readiness**

- **Financials**

- **Appendix**

Nodal Systems Blueprint

Nodal Timeline

Completed Milestones

Program Milestone: Phase 2.1 Market Connectivity

- Included the following project milestones
  - Readiness/Market Readiness/External Outreach & Training
    - Market Readiness Seminar Oct. 8 (approx. 150 MPs)
    - MP site visits began Oct. 9 with LCRA; first of 35 visits
    - Phase 2.1 Market Connectivity Handbook posted Oct. 2
  - Market Trials/Phase 2.1 Connectivity Testing/MT External Testing
    - Phase 2.1 kickoff Oct. 8

Project Milestones

- Readiness/Operational Readiness/Environment Configuration & Management
  - Phase 2.1 NPROD build complete
    - Hardware installed, baseline code set on schedule; final build scheduled Oct. 16

Current Milestones: Detailed Status (10-9-09)

Program Milestones
– Phase 2.1: Market Connectivity

Project Milestones (October look-ahead)

Project Milestone	Status	Detail
Integration/ Phase 2.1 Connectivity Testing/ Integration Testing	• On target	• MMS UI: initial test cycle 100% complete • MMS EWS: initial test cycle 100% complete • 33 open defects (no Sev 1s) in regression test: 92% complete
Readiness/ Market Readiness/ Metrics Tracking & Assessment	• On target.	• Phase 2.1 Commencement Criteria met (environment built and validated)
Readiness/ Operational Readiness/ Environment Configuration & Management	• On target.	• Phase 2.1 run monitoring
Readiness/ Operational Readiness/ Security Testing	• On target.	• Performance testing: 50% (web service stability and loading, UI stability and loading)

Phase 2.1 Market Connectivity Defect Update

Project	Sub-Project	Status	Open Critical Defects Sept. 30/Oct. 8		
MMS	Core Application	• MMS Release 5 with several patches currently being used for Market Connectivity testing. • A portion of the outstanding defects have been fixed in a patch that is currently in the MMS FAT environment, with testing underway. Once that testing is complete, the patch will be migrated to iTest; remaining defects have been logged with the vendor and are being worked into an upcoming patch.	**MMS5**		
			Sev 1s	0	0
			Sev 2s	2	3
			Sev 3s	17	17
			(P1/P2)		
MMS	Market Manager UI	• Market Manager UI release 1.16.1 with additional patches currently being used for Market Connectivity testing. • All outstanding defects have been logged with the in-house development team; development/testing/deployment cycles to address critical defects are in progress.	**MMS MM UI 1.16.1**		
			Sev 1s	0	0
			Sev 2s	3	4
			Sev 3s	5	6
			Sev 4s	3*	3*
			Sev 5s	2*	2*
			(P1/P2)		
EIP	EWS-MMS Interface	• EIP external Web Services spec release1.19 with several patches currently being used for Market Connectivity testing. • All outstanding defects have been logged with the in-house development team; development/testing/deployment cycles to address critical defects are in progress.	**EIP 1.19**		
			Sev 1s	0	0
			Sev 2s	2	2
			Sev 3s	0	0
			(P1/P2)		

* Sev 4s, 5s are priority 1 or 2 (must fixes); see slide 15 in appendix for further explanation.

Future Program Milestones

Phase	When	Scope	Status
2.1: Market Connectivity	Oct. 28	• MP interface testing (API, Market Manager UI) • Market System Rules Validation (Phase 1)	• On track
3: Real-Time Markets	Mid January-Early February	• MMS-SCED execution • SCED results, report publishing • CRR auction execution (CRR UI) • OS submissions (API, OS UI)	• Integrated testing under way
4: DAM/RUC	Late March-Early April	• MMS-DAM, DRUC, HRUC, SCED execution • Market results, report publishing • Initial S&B execution • Outage, CRR integration	• Integrated testing under way
5: Full Functionality	Late April-Early May	• Run full nodal systems	• Planning in progress

Nodal Program Risks & Issues

- **Immediate (Next Phase)**
    - Risk: Integration Testing
        - Schedule coordination
        - Exception testing

- **Long-Term**
    - Risk: Reconciling protocols, systems and market expectations
    - Risk: Data Center expansion capacity concerns
    - Risk: Internet Explorer upgrade
    - Risk: Market Interaction Operating Level Agreements (OLAs)

Participant Readiness Touch Points

	October	November	December	January
2009/2010				
	October	November	December	January
Meetings	• NATF 10/27		• NATF 12/8	• NATF tbd
Training	• Nodal 101 • LSE 201 • Generation 101 • Basic Training: http://nodal.ercot.com/training/index.html	• Nodal 101 • LSE 201 • Generation 101, 201 • Economics of LMP • Transmission 101 ◆ Settlement Workshop	• Nodal 101 • LSE 201 • Generation 101, 201 • Basic Training • Economics of LMP • Transmission 101 ◆ Settlement Workshop	• Nodal 101 • LSE 201 • Generation 101, 201 • CRR – online ◆ Settlement Workshop
Outreach	◆ Readiness Center • Limited ERCOT metrics • 6 site visits	• Additional ERCOT & MP metrics • 6 site visits	• 3 site visits	• 8 site visits • Initiate Phase 3 metrics
Market trials	• Bi-weekly calls ◆ 2010 Market Trials Roadmap: Oct. 8 ◆ Technical Workshop: Oct. 28 ■ Market Connectivity open to MPs Oct. 28	• Bi-weekly calls • Voluntary MP connectivity testing	• Bi-weekly calls • Voluntary MP connectivity testing	• Start weekly calls • MP re-qualification begins

◆ MP Handbooks
- *SCED/LFC*
- *CRR*
- *DAM/RUC*
- *Outage Scheduler*
- *COMS*

Monthly Financial Review

Financials to be emailed separately before Board meeting.

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

Tentative Outreach Scheduled Site Visits

Entity	Date
☑ LOWER COLORADO RIVER AUTHORITY	9-Oct
☑ CALPINE CORP	14-Oct
☑ AUSTIN ENERGY	20-Oct
☑ CITY OF GARLAND	21-Oct
TOPAZ POWER MANAGEMENT	29-Oct
ANP FUNDING	3-Nov
☑ LUMINANT ENERGY	5-Nov
INVENERGY WIND DEVELOPMENT	10-Nov
☑ AMERICAN ELECTRIC POWER SERVICE	12-Nov
CONSTELLATION ENERGY	17-Nov
EXELON	18-Nov
PSEG ENERGY RESOURCES	19-Nov
NRG TEXAS POWER	1-Dec
FULCRUM POWER	2-Dec
EAGLE ENERGY PARTNERS I LP (QSE, RE, SQ1)	3-Dec
STEC	9-Dec

Entity	Date
BP ENERGY COMPANY	10-Dec
DIRECT ENERGY LP	5-Jan
CPS ENERGY	6-Jan
BRAZOS ELECTRIC	12-Jan
BTU (Bryan Texas Utilities) SERVICES	13-Jan
GDF SUEZ ENERGY MARKETING	19-Jan
OCCIDENTAL	20-Jan
SHELL ENERGY	21-Jan
TENASKA POWER SERVICES	26-Jan
OPTIM ENERGY	27-Jan
APX	3-Feb
NEXTERA ENERGY	11-Feb
WIND PANEL (Houston)	16-Feb
RETAIL PANEL (Houston)	17-Feb
TRI-EAGLE ENERGY	18-Feb
XTEND ENERGY LP	2-Mar
EC AND R QSE	9-Mar

☑ *Confirmed or completed*

Protocol Traceability Effort Update

	Definition	SME Analysis/Validation	Begin Reviews w/Business	Target for NATF reports
Tier 1 Sections				
Section 7	Congestion Revenue Rights	**90%**	**In progress**	**Sept**
Section 8	Performance Monitoring	**75%**	**In progress**	**Dec (revised)**
Section 3	Management Activities for the ERCOT system	**70%**	**In progress**	**Nov**
Section 4	Day Ahead Operations	**75%**	**In Progress**	**Nov**
Section 5	Transmission Security Analysis and RUC	**10%**	**In Progress**	**Nov**
Section 9	Settlement & Billing	**50%**	**10/01**	**Nov**
Section 6	Adjustment Period and Real-Time Operations	**25%**	**10/20**	**Dec**
Section 17	Market Monitoring & Data Collection	**0%**	**10/22**	**Dec**
Section 16.11	Financial Security for Counter-Parties	**0%**	**10/27**	**Dec**

Tier 2 (Moderate Impact): 10, 11, 12, 13, 20, 22 (Dec. '09 completion target)
Tier 3 (Low Impact): 1, 2, 14, 15, 18, 19, 21, 23, 24 (Dec. '09 completion target)

Protocol Traceability Effort Update

Tier 1 Sections				
	PTE Traced Items	**PTE Research Items (All)**	**Business Research Items**	**PTE Alignment Items**
Section 7 – Congestion Revenue Rights	486	11	11	1
Section 8 – Performance Monitoring	204	91	85	TBD
Section 3 – Management Activities for the ERCOT system	905	327	243	TBD
Section 4 – Day Ahead Operations	640	129	117	TBD
Section 5 – Transmission Security Analysis and RUC	162	22	5	TBD
Section 9 – Settlement & Billing	487	87	0	TBD
Section 6 – Adjustment Period and Real-Time Operations	898	229	34	TBD
Section 17 – Market Monitoring & Data Collection	39	0	0	TBD
Section 16.11 – Financial Security for Counter Parties	213	0	0	TBD
Total	**4,034**	**896**	**495**	**TBD**

Protocol Traceability Effort Update

Tier 1 Sections				
	PTE Traced Items	**PTE Full Trace Report**	**PTE Research Items**	**PTE Alignment Items**
Section 7 – Congestion Revenue Rights	**486**	**Will post for Oct NATF**	**14**	**1**
Section 8 – Performance Monitoring	**204**	**Will post for Dec NATF**	**85**	**TBD**
Section 3 – Management Activities for the ERCOT system	**905**	**Will post for Nov NATF**	**327**	**TBD**

Details	
	Overview of PTE Alignment Items
Section 7 – Congestion Revenue Rights	**Alignment – 1. CRR Handbook – assigned, due 12/31/09**
Section 8 – Performance Monitoring	**Research items in progress**
Section 3 – Management Activities for the ERCOT system	**Research items in progress**

Nodal Internal/External and Vendor Headcount
for 2009
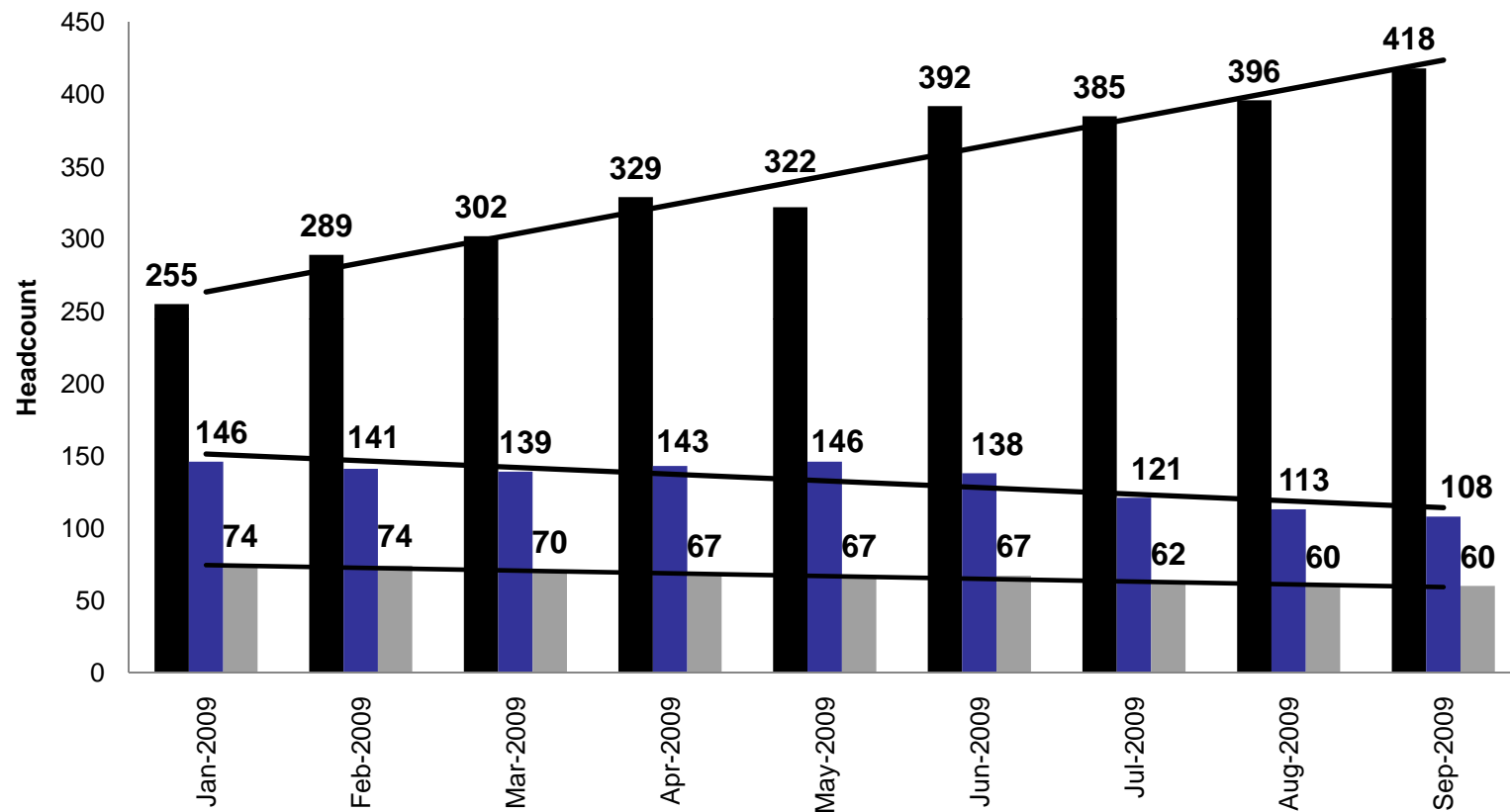
	Jan-2009	Feb-2009	Mar-2009	Apr-2009	May-2009	Jun-2009	Jul-2009	Aug-2009	Sep-2009
■ ERCOT Employees	255	289	302	329	322	392	385	396	418

Program Risk:
Market Interaction Operating Level Agreements (OLAs)

◇ **Potential Milestone Impact: Phase 2.1 Market Connectivity**

Risk: Market interaction SLAs				Need to determine service 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
Currently identifying market interactions requiring OLAs as part of the operational readiness project.			J. McCall	10/7/09	Closed

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	
• 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	9/2/09 – Planning of Test phases and associated work plan has been completed Execution of work plan, with specific focus on October Market Trials functionality has begun	

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

Mitigation Plans	Who	Target Date	Current Status
Currently the ERCOT Enterprise Architecture team is researching to assess impact.	S. Catoe	10/30/09	9/30/09 – Zonal analysis is complete and Corporate analysis is at 50 percent. Currently working on estimates to conduct impact analysis.

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	12/15/09	10/9/09 – SMEs are working with business owners on research and alignment items. Full trace reports will be provided to NATF starting late October.
2. Add team members to the nodal program with Texas market experience to ensure readiness for Market Trials. SMEs will report requirements to testing traceability gaps to ERCOT business owners for resolution.	B. Day K. Farley	Ongoing	10/9/09 – 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	10/9/09 – Status reports provided to the program, NATF, TAC, and Special Nodal Committee monthly.

ERCOT-Wide Risk:
Data Center Capacity Concerns

◇ **Potential Milestone Impact: Nodal Go-Live**

Risk: Data Center Capacity Space Concerns	Data center capacity, space, and power may be inadequate for Nodal go-live, unless plans for expansion are adequate.		
Risk Life Cycle State			
Define / Plan / **Manage** / Watch			

Mitigation Plans	Who	Target Date	Current Status
1. Establish an Information Lifecycle Management approach to manage the life cycle of data being managed.	D. Forfia	Implementation expected Q1 2010 for Retail Applications	ERCOT project PR 90006_01 Commercial Systems Information Lifecycle Management Project will be presenting as an update during the October Board of Directors Meeting, and will request Execution and Funding approval at the November Board of Directors Meeting.
2. Expand current data center space, and build out new data center, to increase ERCOT data center capacity.	D. Forfia	Bastrop DC in production mid - 2011 TCC3 in production mid-2011	TCC1 expansion and risk-mitigation steps for Met Data Center provide sufficient space for Nodal Go-Live in December 2010. Relocation to the new data centers occurs in mid-2011 after Nodal Go-Live.
3. Validate and monitor Nodal data capacity assumptions for Go Live	D. Forfia	Ongoing	Status reports are provided to the Board of Directors in executive sessions.