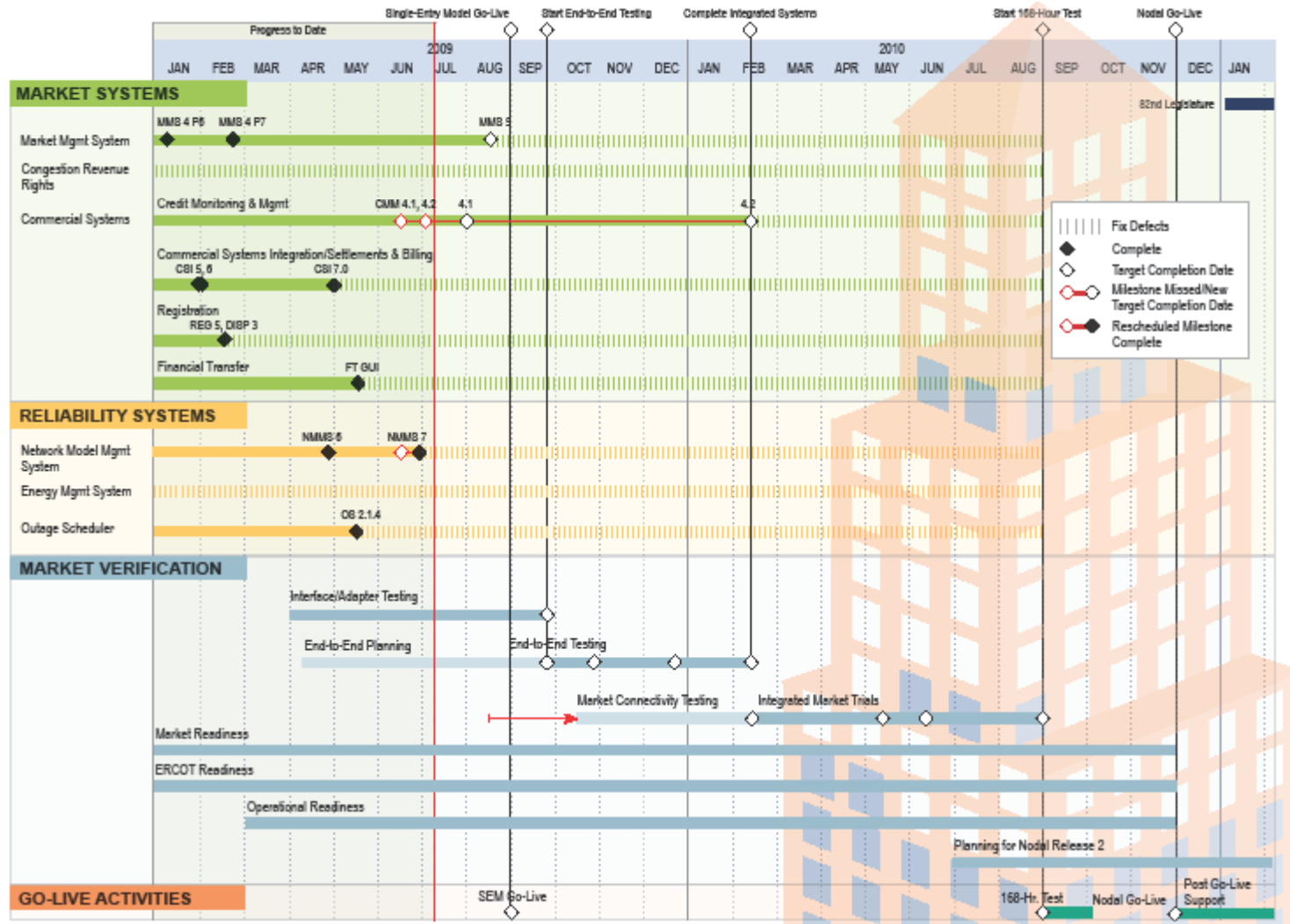# Nodal Program Update

Mike Cleary

Sr. VP and Chief Technology Officer

Agenda

- **Timeline**

- **Program Updates/Achievements**

- **Milestones**

- **Risks/Issues**

- **SEM Go-Live**

- **Financials**

Nodal Timeline

CMM/NMMS Milestone Slips

- ## CMM

  - Excessive defects found in custom components delivered in July

  - CMM 4.1 custom components required for end-to-end testing will be delivered on-time

    - Key functionality: Credit monitoring (8 custom components)

  - ERCOT will complete CMM 4.2 custom components in house and deliver by February 2010

    - Key functionality: Internal reports, report management

  - CMM 4.3's components rolled into 4.1 and 4.2

- ## NMMS 7

  - One week delay exiting FAT due to testing-resource constraints (due June 23, delivered June 30)

Significant Accomplishments

- **All Vendor Software Deliveries Complete**
  - MMS 5 delivered to iTest July 7 (3 days ahead of schedule)
  - EMS 6 delivered to iTest July 1
  - NMMS 7 exited FAT June 30

- **SEM Go-Live on Track for August 31**

- **Vendor Contract Re-Negotiations**
  - 5 targeted vendor contracts re-negotiated
  - Results:
    - Lower rates
    - More ERCOT control and oversight
    - Cleaned up unfavorable language in contractual documents

Market Systems Update

Project	Sub-Project	Status	Open Critical Defects June 12/July 2		
MMS		• On schedule • MMS 5 final release; currently in FAT and scheduled to exit Aug. 21 • MMS 5 Patch 1 preliminary drop to iTest July 7 (scheduled July 10) • 14 interfaces to test by Sept. 1; test planning underway • Market Manager UI to exit FAT July 16	**MMS5**		
			Sev 1s 0 1 ▲ Sev 2s 3 3 Sev 3s 85 79 ▼		
CRR		• On schedule • CRR 1.9 final release; currently in FAT and scheduled to exit Aug. 31 • 3 of 9 interfaces in iTest, 2 in FAT, 4 in execution phase	**CRR 1.9**		
			Sev 1s 0 0 Sev 2s 1 0 ▼ Sev 3s 3 2 ▼		
COMS	**CMM**	• Behind schedule • CMM 4.1 in FAT at 52% completion; targeted to exit July 31 • Two CMM 4.2 components scheduled to exit FAT by July 31; remaining components combined with CMM 4.3 and to exit FAT February 2010 (internal functions only) • 4 of 5 interfaces currently in iTest • Outstanding release: CMM 4.2	**CMM 4.1**		
			Sev 1s 0 0 Sev 2s 151 84 ▼ Sev 3s 46 21 ▼		
	S&B	• FAT testing complete; 7 of 8 interfaces currently in iTest • Targeting refactoring completion by September 2009	Sev 1s 0 0 Sev 2s 3 0 ▼ Sev 3s 20 2 ▼		
	CSI	• FAT testing complete • Targeting refactoring completion by August 2009	Sev 1s 0 0 Sev 2s 0 0 Sev 3s 29 35 ▲		
	REG	• FAT testing complete • All 3 interfaces currently in iTest; 97% of testing complete	Sev 1s 0 0 Sev 2s 0 0 Sev 3s 1 0 ▼		

Reliability Systems Update

Project	Status	Open Critical Defects June 12/July 2		
NMMS	• On schedule • NMMS 7 final release; exited FAT June 30 • All 3 interfaces have exited FAT and are currently in iTest	**NMMS 7**		
		Sev 1s 0	0	
		Sev 2s 0	0	
		Sev 3s 83	48	▼
EMS	• On schedule • EMS 6 Patch 3 deployed to iTest July 1 • All 13 interfaces' test plans now complete • SPR Patch 3 completed FAT June 30	**SPR Patch 3**		
		Sev 1s 0	0	
		Sev 2s 1	0	▼
		Sev 3s 83	86	▲
OS	• On schedule • Common test plan for 12 of 13 interfaces complete • 2 defect patches planned for OS UI	**OS 2.1.4**		
		Sev 1s 0	0	
		Sev 2s 0	1	▲
		Sev 3s * 3	71	▲
		* excluding ROO defects		

Market Verification Update

Project	Status	Open Critical Defects June 12/July 2			
Interface/Adapter Testing	• Data management strategy undergoing review and approval • System-to-system testing of connectors in progress using Common Data Set • MMS 5 available for I/A testing • Level 1/Level 2 testing running behind, but working on efficiency gains in automation areas, early Level 3 testing and other adjustments	**FAT Defects**			
		Sev 1s	1	3	▲
		Sev 2s	26	129	▲
		Sev 3s	375	496	▲
		iTest Defects			
		Sev 1s	1	2	▲
		Sev 2s	84	87	▲
		Sev 3s	52	127	▲
End-to-End Testing	• Early E2E testing started with CRR auction settlement • Additional E2E testing planned in July (7 functional strings in total) • Full E2E to start in late September				
Market Trials	• Detailed plan to be rolled out at August TAC meeting • SEM Go-Live training for TSPs began June 23 • Market Trials submission testing begins in October 2009				
Market Readiness	• In detailed planning phase				
ERCOT Readiness	• In detailed planning phase				
Operational Readiness	• Schedule is being finalized • NMMS performance testing under way • System cutover validation and implementation under way				

Milestones Performance

Tracking Milestones Planned — June 2009

Proj	Name	%	Baseline	Forecast	Actual	Variance
Data	First Release of Common Data Set - DSV 1.0.0.0	100%	06/01/09	06/01/09	06/01/09	0 days
CRR	Final Updates to Transition Plan Complete	100%	06/01/09	06/16/09	06/16/09	11 days
EMS	EMS 6.3.1.x FAT Complete	100%	06/02/09	05/04/09	05/04/09	-20 days
NMMS	Modeling Guidelines Complete	100%	06/05/09	06/18/09	06/18/09	9 days
NMMS	Performance Testing of Training Environment Complete	100%	06/04/09	06/12/09	06/12/09	6 days
NMMS	Start Training for MP's	100%	06/23/09	06/23/09	06/23/09	0 days
OS	2.1.4.0 OS FAT Testing Complete	100%	06/15/09	05/14/09	05/14/09	-21 days
MIS	Dashboard Group 2 Portal Components Complete	0%	06/26/09	07/15/09	Delayed	12 days
COMS CMM	CMM 4.2 FAT Test Execution Complete	0%	06/24/09	07/31/09	Delayed	26 days
EIP	Integration Smoke Test of Adapters Complete	100%	06/19/09	06/19/09	06/19/09	0 days
E2E	Framework Established & Communicated to Team	100%	06/29/09	06/23/09	06/23/09	-4 days
EDS	Publish MMS Validation Rules Document	100%	06/01/09	06/01/09	06/01/09	0 days
EDS	Open Submission of Simple Cycle Greater Than 90MW	100%	06/30/09	06/30/09	06/30/09	0 days

- 11 of 13 tracking milestones for June completed

- Please see following slide for variance report

Tracking Milestones Planned — July 2009

Proj	Name	%	Baseline	Forecast	Actual	Variance
DSV	Release DSV 1.1.0.0	0%	07/03/09	07/14/09	NA	7 days
MMS	Deliver MMS5: Preliminary Release to iTest	100%	7/10/09	7/7/09	7/7/09	-3 days
MMS	MMS5 Patch 1 Released to FAT	100%	7/10/09	6/18/09	6/18/09	-16 days
MIS	MIS Build 13 Start	0%	7/20/09	7/20/09	NA	0 days
COMS CMM	CMM 4.3 FAT Execution Complete	0%	7/1/09	7/31/09	NA	21 days
EIP	EIP.WS1.1.19A Delivery Complete	0%	7/23/09	7/23/09	NA	0 days
E2E	Framework Established & Approved	0%	7/24/09	7/24/09	NA	0 days
E2E	String CRR Auction Pilot Run Complete	0%	7/30/09	7/30/09	NA	0 days
E2E	Outage Scheduler String: Test Cases Complete	0%	7/30/09	7/30/09	NA	0 days
EDS	Publish External Interface Specification V 1.19	0%	7/13/09	7/13/09	NA	0 days
EDS	Sandbox Release for External Interface Specification V 1.1	0%	7/13/09	7/13/09	NA	0 days
EDS	Complete Submission of Simple Cycle Less Than or Equal	0%	7/31/09	7/31/09	NA	0 days
ORT	Security Testing Scope of Work Completed	0%	7/15/09	7/7/09	NA	6 days
ORT	NMMS Final Run Book Completed	0%	7/30/09	7/30/09	NA	0 days

- 14 tracking milestones scheduled for July

Milestone Variance Analysis – June Tracking Milestones

Issue	Details	Schedule	Budget
MIS – Dashboard Group 2 Portal Components Complete	• Database access issues & some data not in the expected format	No impact to critical path	No impact to budget
COMS CMM – CMM 4.2 FAT Test Execution Completed	• High number of defects in software caused additional time and additional testing cycles	No impact to critical path	$254K impact to initial budget

Risks & Issues to Achieving Nodal's Major Milestones

◈ **Complete Integrated Systems (2-12-10)**

– Issue: Resource constraints for program
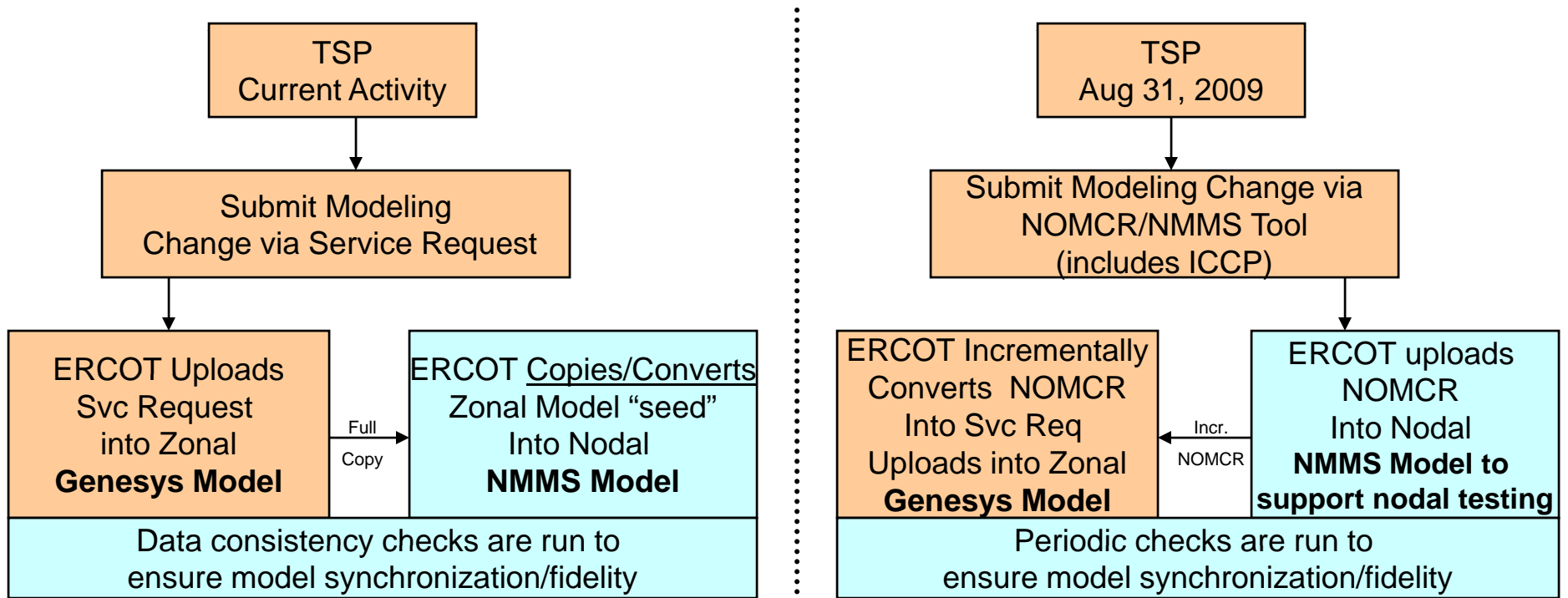
– Issue: Handling CMM delays for program

◈ **Market Trials (2-12-10)**

– Risk: Reconciling protocols, systems and market expectations

◈ **Nodal Go-Live (12-1-10)**

– Risk: Data Center capacity concerns

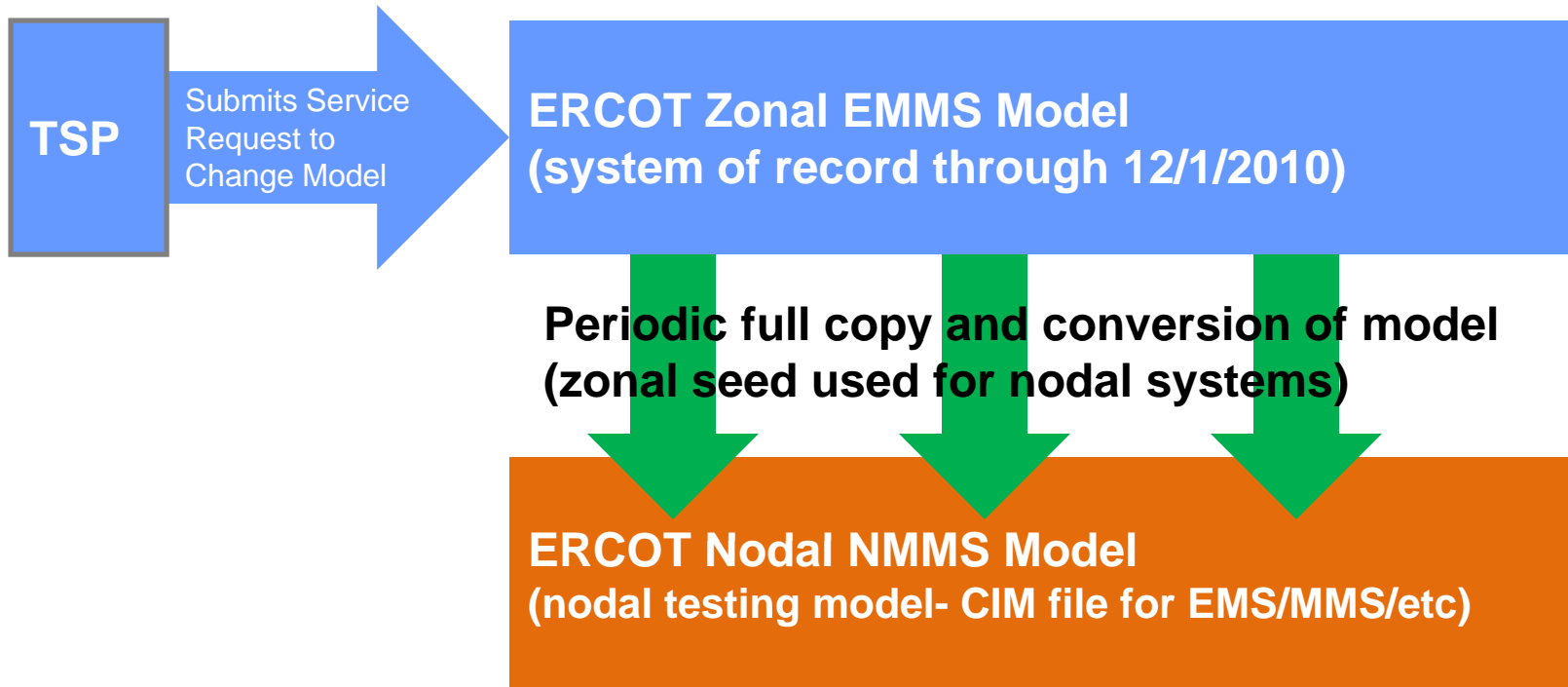– Risk: Integrity of network model data from market participants

See Appendix for details on Risk/Issues mitigation.
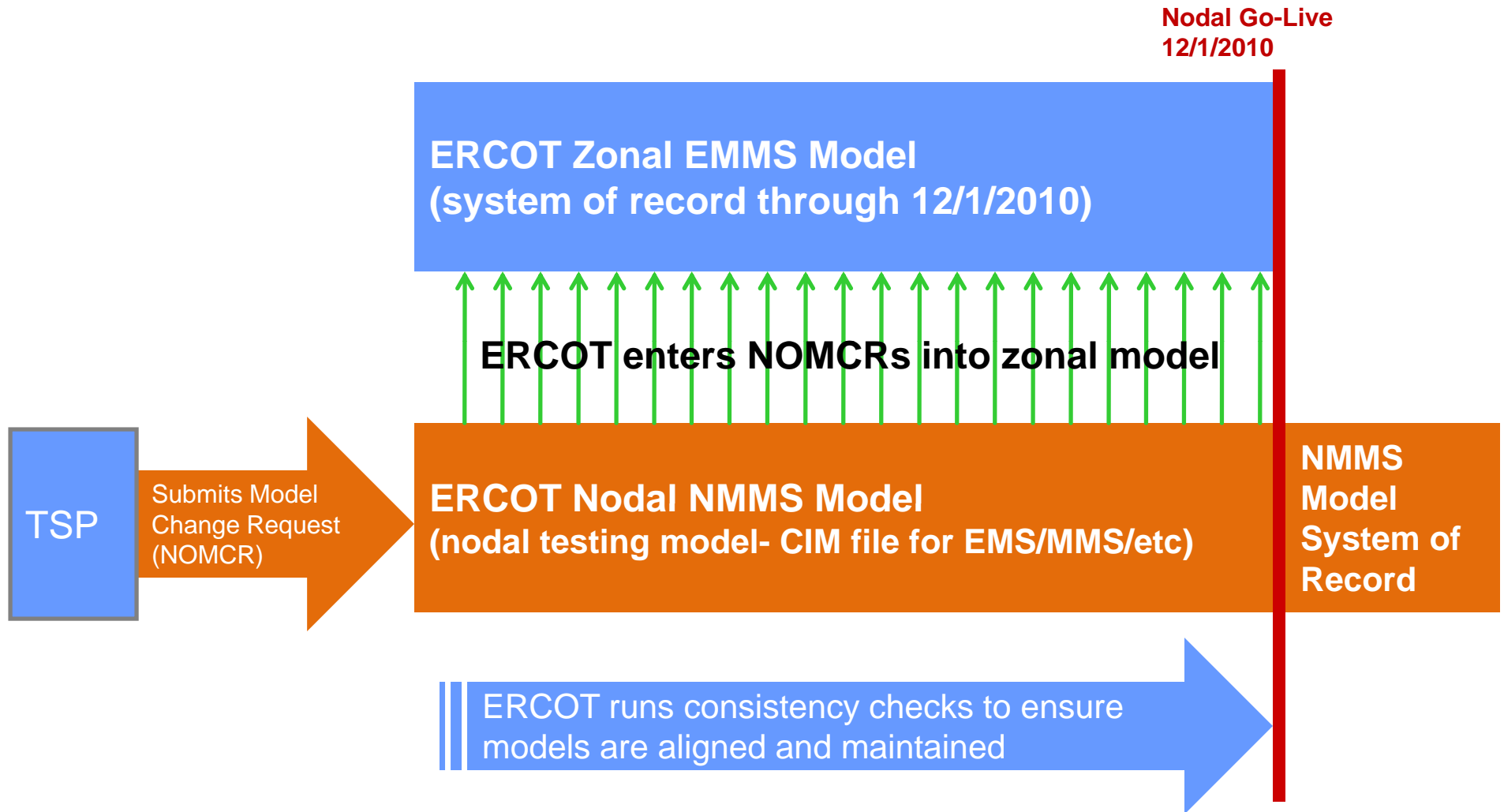
SEM Go-Live Overview

- **Single Entry Model (SEM) Go-Live is the switchover on Aug 31, 2009 for TSP submissions of network operations model change requests**
  - from "Service Request" submissions via TML
  - to "NOMCR" submissions via the NMMS
    - System of record for model changes becomes NOMCRs on 8/31/09
    - System of record for network operations model for reliability and dispatch remains Zonal/Genesys system until Dec 2010

TSP Current Activity			TSP Aug 31, 2009	
Submit Modeling Change via Service Request			Submit Modeling Change via NOMCR/NMMS Tool (includes ICCP)	
ERCOT Uploads Svc Request into Zonal **Genesys Model**	Full Copy	ERCOT Copies/Converts Zonal Model "seed" Into Nodal **NMMS Model**	ERCOT Incrementally Converts NOMCR Into Svc Req Uploads into Zonal **Genesys Model**	Incr. NOMCR	ERCOT uploads NOMCR Into Nodal **NMMS Model to support nodal testing**
Data consistency checks are run to ensure model synchronization/fidelity			Periodic checks are run to ensure model synchronization/fidelity	

Current Network Operations Model Maintenance for TSPs

TSP

Submits Service Request to Change Model

ERCOT Zonal EMMS Model (system of record through 12/1/2010)

Periodic full copy and conversion of model (zonal seed used for nodal systems)

ERCOT Nodal NMMS Model (nodal testing model- CIM file for EMS/MMS/etc)

Network Operations Model Maintenance for Resource & QSE (today and post 8/31/09)

Nodal Go-Live 12/1/2010

ERCOT Zonal EMMS Model (system of record through 12/1/2010)

ERCOT enters into zonal model

ERCOT Nodal NMMS Model (nodal testing model- CIM file for EMS/MMS/etc)

NMMS Model System of Record

QSE — Submits ICCP Change via Service Request

RE — Submits RARF (Resource Asset Reg Form) via Service Request

ERCOT process
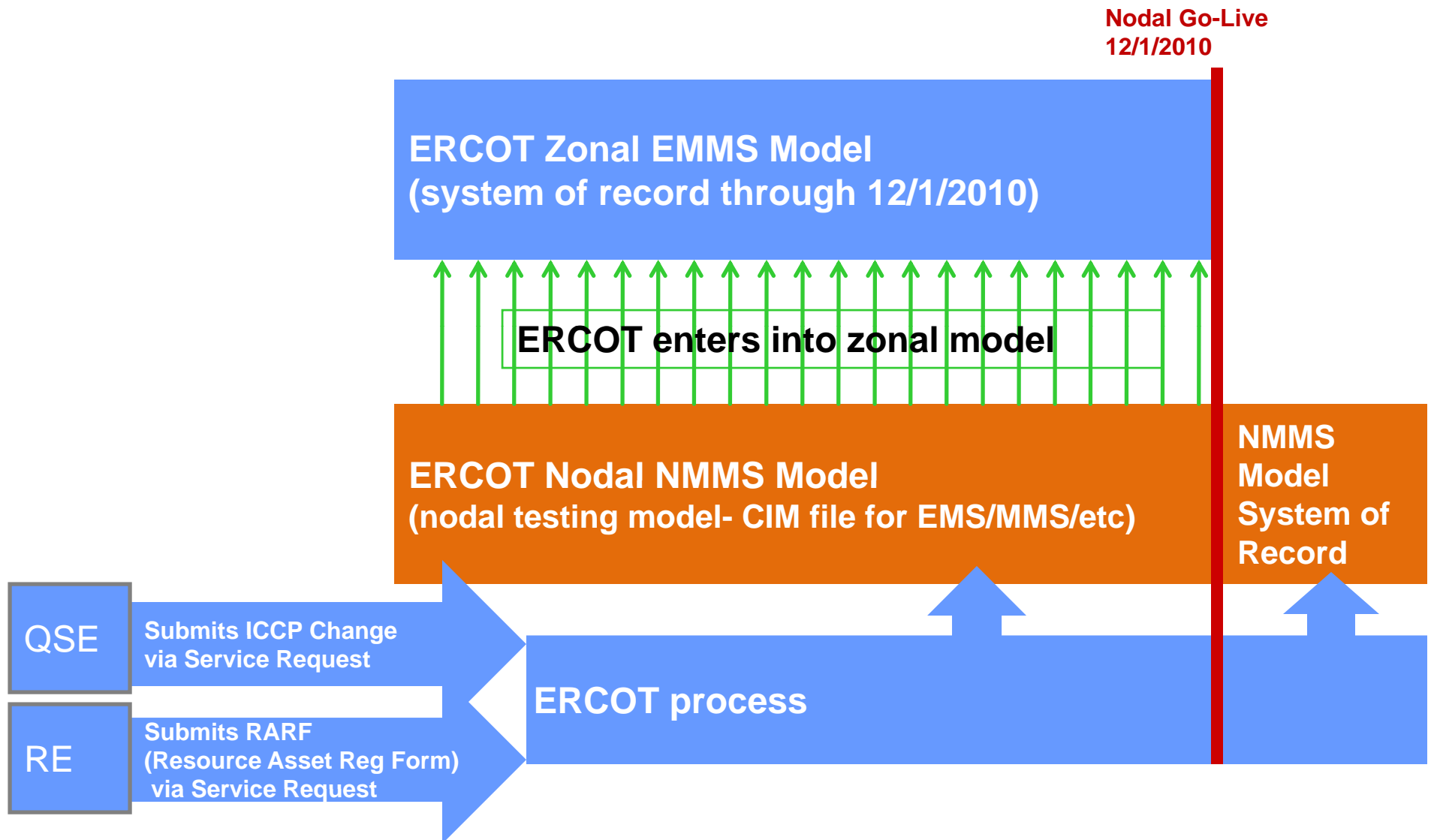
SEM Go-Live: Market Engagement Dashboard

TO/TDSP	Attendance at any of the SEM Market Calls	# of Representatives scheduled to take SEM Training	# of TDSP users with access to the test SEM environment	# test NOMCRs Submitted by TDSPs to the test SEM environment
AEP TEXAS CENTRAL COMPANY	X	X	X	X
BRAZOS ELECTRIC POWER CO OP INC (TDSP)	X	X	X	X
BROWNSVILLE PUBLIC UTILITIES BOARD (TDSP)	X	X	X	
BRYAN TEXAS UTILITIES (TDSP)		X	X	X
CENTERPOINT ENERGY HOUSTON ELECTRIC LLC (TDSP)	X	X	X	X
CITY OF AUSTIN DBA AUSTIN ENERGY (TDSP)	X	X	X	X
CITY OF COLLEGE STATION (TDSP)	X	X	X	
CITY OF GARLAND (TDSP)	X	X	X	
CPS ENERGY (TDSP)	X	X	X	
DENTON MUNICIPAL ELECTRIC (TDSP)		X	X	X
GEUS (TDSP)	X		X	
GOLDEN SPREAD ELECTRIC COOPERATIVE INC (TSP)	X	X		
LCRA TRANSMISSION SERVICES CORPORATION	X	X	X	X
ONCOR ELECTRIC DELIVERY COMPANY	X	X	X	
RAYBURN COUNTRY CO OP DBA RAYBURN ELECTRIC	X	X		
RIO GRANDE ELECTRIC CO OP (TDSP)	X			
SOUTH TEXAS ELECTRIC CO OP INC	X	X	X	
TEXAS MUNICIPAL POWER AGENCY	X	X	X	
TEXAS-NEW MEXICO POWER CO (TDSP)	X	X	X	
WEATHERFORD MUNICIPAL UTILITY SYSTEM				
TEX-LA ELECTRIC CO OP OF TEXAS				
TOTAL:	**17**	**63**	**81**	**22**

SEM Go-Live Criteria Dashboard

JULY | AUGUST

14 | 28 1 | 7 10 | 20/21 | 30 | TBD

ERCOT sufficiently staffed for maintenance of nodal and zonal systems

ERCOT publishes NMMS Modeling Guidelines/ Validation Rules document

ERCOT publishes Network Operations Model Validation white paper

◇ Key date

Nodal EMS is capable of consuming NMMS CIM files through the EMS CIM importer for use in the Nodal EMS applications

ERCOT sends 30-day market notice

ERCOT publishes latest data dictionary and schema

TSPs and ERCOT complete EDS/trials activities called out in SEM Go-Live Procedure

ERCOT publishes Network Operations Model validation results

Nodal network model validated and approved as baseline for SEM Go-Live by ERCOT SysOps and MktOps directors

ERCOT sends 10-day market notice

ERCOT publishes populated CIM model to be used for SEM Go-Live

SEM Go-Live readiness approved by TAC and ERCOT Board

- **Market engagement**
  - June 4: Began weekly ERCOT/TSP market calls
  - June 8:Test system for TSP testing deployed
  - June 23: 6-week training schedule begins

- **Stakeholder communications**
  - ERCOT has reported detailed testing/training progress to market on weekly SEM calls, NDSWG/ROS and TAC

SEM Go-Live Approval of Readiness

21.12.2 Notice to Market Participants of Activities Essential for Nodal Market Open

ERCOT shall issue Notices informing Market Participants of the confirmation of, or any changes to, the implementation schedules for each of the following nodal market design activities. The Notice will include an update of the implementation schedules for the remaining nodal market design activities:

(1) Single entry model;
(2) Initiation of the 168-hour testing;
(3) Completion of 168-hour test;
(4) First congestion revenue rights monthly auction;
(5) Real-time market implementation; and
(6) Day-ahead market implementation.

21.12.3 Notice to Market Participants of Effective Date for Nodal Protocol Provisions and Retirement of Zonal Protocol Provision

No part of the nodal market design may start operation until all the Market Readiness Criteria for that part of the nodal market design have been met. Certification that all Market Readiness Criteria have been met must be made at least by each of the following: the Transition Plan Task Force (TPTF), TAC, ERCOT Staff and the ERCOT Board. Upon such certification, ERCOT shall issue two Notices alerting Market Participants to the effective date of Nodal Protocol sections and the retirement of Zonal Protocol sections, as applicable. ERCOT shall issue the first Notice no less than thirty (30) days prior to the effective date or retirement date, as applicable, and the second Notice no less than ten (10) days prior to the effective date or retirement date, as applicable. The Notice shall include:

(1) The Nodal Protocol Sections to become effective and
(2) The Zonal Protocol Sections to be retired, if any.

- **Go-Live Approval per Zonal Protocols sequence (discussion, if needed)**
  - Previous slide reflected Zonal Protocol Section 21 description of the nodal sequence of proof-of-readiness, approval, market notice
  - Recognition of issue that most "readiness" artifacts come in mid-August
  - Note that no nodal protocol language goes into effect with SEM Go-Live

  - Propose that ERCOT release a conditional 30-day market notice Aug 1
    - Conditional upon TAC/Board approval later in month
    - Aug 16- ERCOT is accelerating sign-off and posting of model verification results
    - Aug 17- special TAC and/or Special Nodal Program Committee
    - Aug 18- Board meeting vote for go-live

  - With Board approval, ERCOT would issue a revised 30-day notice to reflect approval condition met on Aug 18
  - ERCOT would release 10-day market notice on Aug 21
  - SEM Go-Live Aug 31, 2009

Monthly Financial Review

Steve Byone

June Actuals to be Presented

At Board Meeting

Questions ?

Appendix

Program Issue:
Handling CMM Delays for Nodal Program

◇ **Potential Milestone Impact: Complete Integrated Systems**

Issue: Handling CMM Delays			Delays in completing the detailed requirements and designs for CMM have occurred because of turnover in both ERCOT and vendor staff. There are limited business resources allocated to complete creation of requirements and to perform reviews.
Issue Life Cycle State			
Plan	**Manage**		
Mitigation Plans	Who	Target Date	Current Status
1. Break the definition and development of remaining CMM capability into incremental releases. Modify contract with vendor to fit the approach.	H. Parrish	Contract revisions in process	6/19/09 SOW was executed this week 6/12/09 Have agreement on an amendment to the SOW with Triple Point, expect signature next week
2. Identify ERCOT business resources to ensure the plan can be executed.	H. Parrish		6/5/09 2 backfill positions filled 4/17/09 2 additional Credit FTE resources are participating in testing. Business to have at least 2 backfill.
3. Identify vendor resources to ensure the plan can be executed.	H. Parrish	As needed	6/29/09 Triple Point staff coming to ERCOT site, to fix defects found during testing 5/7/09 ERCOT on site at Triple Point, providing PM oversight and 2 testers for pre-FAT
4. Receive software and perform FAT in increments, to keep overall program on schedule.	H. Parrish	7/08/09	6/29/09 Increments needed for end-to-end testing will be complete by end of July, with other changes delivered by Feb. 2010. 5/15/09 Deliveries of software scheduled from through 5/26/09, with testing incrementally to 7/17/09

ERCOT-Wide Issue:
Zonal Resource Constraints for Nodal Program

◇ **Potential Milestone Impact: Complete Integrated Systems**

Issue: Zonal Resource Constraints for Nodal Program			Because the Nodal go-live date has been delayed, there are a number of Zonal projects, PRRs, and IMM suggestions for Zonal improvements that result in resource constraints for the Program.
Issue Life Cycle State			
Plan	**Manage**		
Mitigation Plans	Who	Target Date	Current Status
1. Manage list of PRRs and SCRs to a resource plan that uses a strategy to avoid impacting program personnel resources when delivering additional Zonal enhancements.	D. Forfia D. Troxtell	Ongoing	6/19/09 – Comprehensive round of EAC reviews have been conducted with all Nodal projects 5/15/09 – Meetings were held, to review EACs with Mike Cleary and Janet Ply, with updates made
2. Manage Project Priority List (PPL) with clear view of resources needed for any projects in flight or about to be launched, with a strategy to avoid impact on Nodal personnel resources.	D. Forfia D. Troxtell	Ongoing	6/17/09 – Solution has been established to be used for monthly data analysis and resolution of resource constraints. In the process, effort hours are gathered for Zonal projects, Nodal work, and Base work. Over-allocations are determined, and meetings are held to resolve.

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.	Nodal Project Managers	7/1/09	4/13/09 Program is planning the assessment activities.
2. Add team members to the nodal program with Texas market experience to ensure readiness for Market Trials. Have them assess completeness of requirements addressed by the software new/tailored for the Texas nodal market and participate in end-to-end testing.	J. Ply	8/1/09	6/5/09 – Two team members are on board who have Texas market expertise. Both are working in Betty Day's team on tracing completeness of the program implementation and identifying gaps
3. Keep the oversight groups apprised of progress.	M. Cleary	Ongoing	4/13/09 Risk incorporated into the set being reported externally; will be maintained actively.

◇ **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 ongoing	3/31/09 ILM Roadmap has been completed by SAIC, and next planning activities underway ERCOT project PR 90006_01 Commercial Systems Information Lifecycle Management: Project
2. Expand current data center space, and build out new data center, to increase ERCOT data center capacity.	D. Forfia	TCC1 build out complete 9/09 South DC in production Feb 2011 TCC3 in production May 2011	7/1/09 Preparations are underway to break ground for TCC3, with completion expected in September 2010. 6/12/09 Construction for TCC1 build out is underway and is ahead of schedule
3. Validate and monitor Nodal data capacity assumptions for Go Live	D. Forfia	Plan: May 2009 Analysis: to complete 7/15/09	6/12/09 Plan is in execution, with status report to Executive Team on 6/16/09

Program Risk
Integrity of Network Model Data from Market Participants

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

Risk: The model of the physical network inhibits healthy economic signals to the market	Some market participants may not populate the network model with all required transmission element data and attributes. This inaccurate model may not solve, or it may create erroneous solutions. This can make the nodal systems appear to be functioning improperly.			
Risk Life Cycle State				
Define — **Plan** — Manage — Watch				
Mitigation Plans	Who	Target Date	Current Status	
After Single Entry Model Go-Live, ERCOT will engage TSPs to validate the network model, in preparation for Market Trials	M. Mereness	September, 2009 through February, 2010	6/9/09 ROS and NDSWG are being engaged to determine the activities required during this validation period	
Each TSP will confirm that they have populated the model with data that is complete and accurate, and that they are prepared to transition to the Nodal Protocol timeline for updates.	V. Gates M. Mereness	February, 2010	Plans TBD	
ERCOT will work with market participants to review the quality of solutions with the model data and identify areas in which data accuracy needs to be improved.	V. Gates M. Mereness	February, 2010 through December, 2010	Plans TBD	

Nodal Internal/External and Vendor Headcount
for 2009
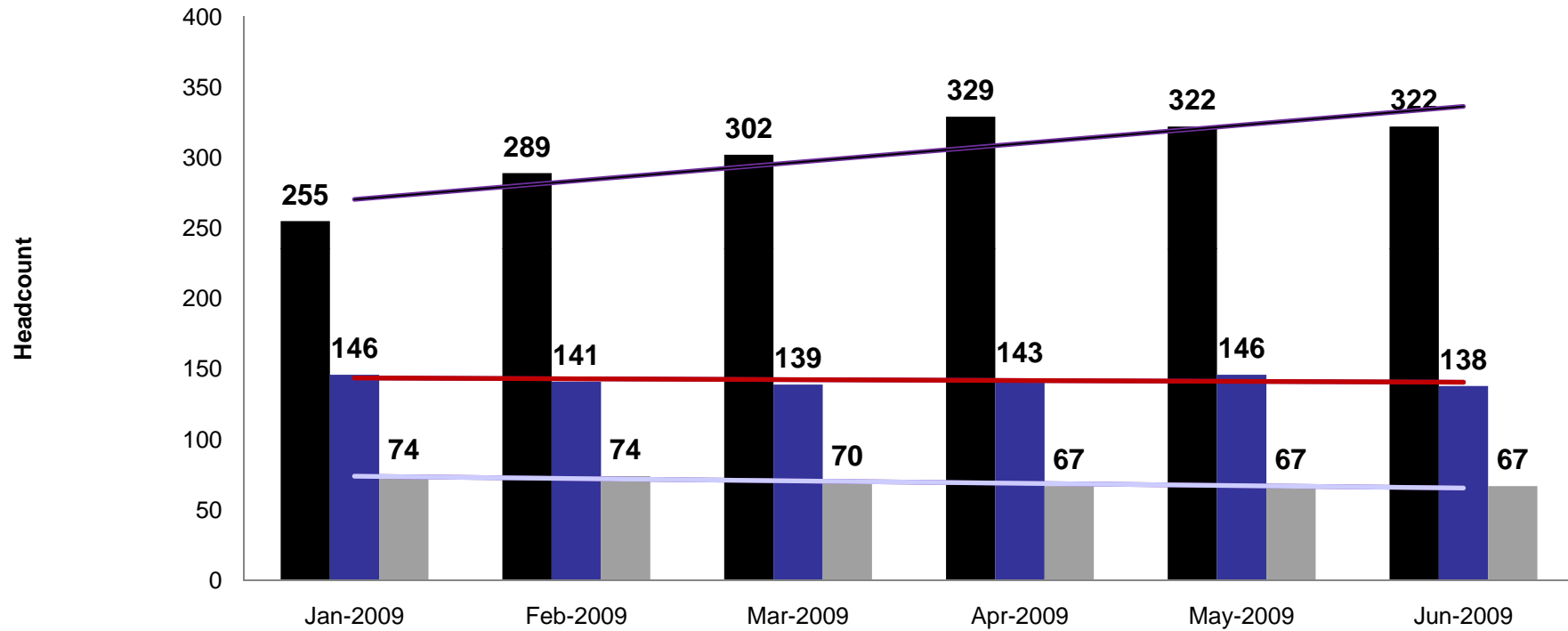
	Jan-2009	Feb-2009	Mar-2009	Apr-2009	May-2009	Jun-2009
ERCOT Employees	255	289	302	329	322	322
Contingent Labor	146	141	139	143	146	138
Vendor Labor	74	74	70	67	67	67