Nodal Program Update

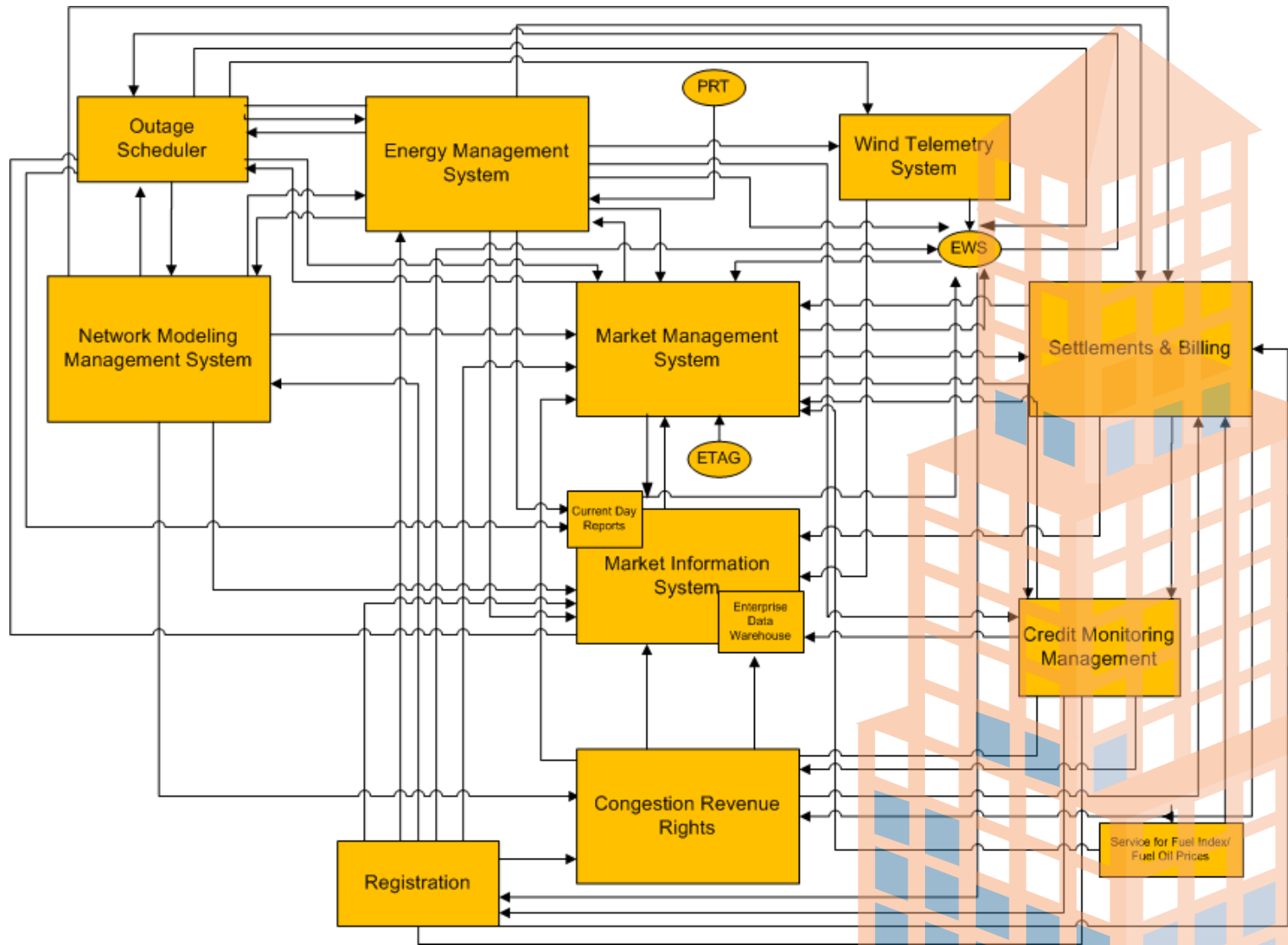**Mike Cleary**

Sr. VP and Chief Technology Officer

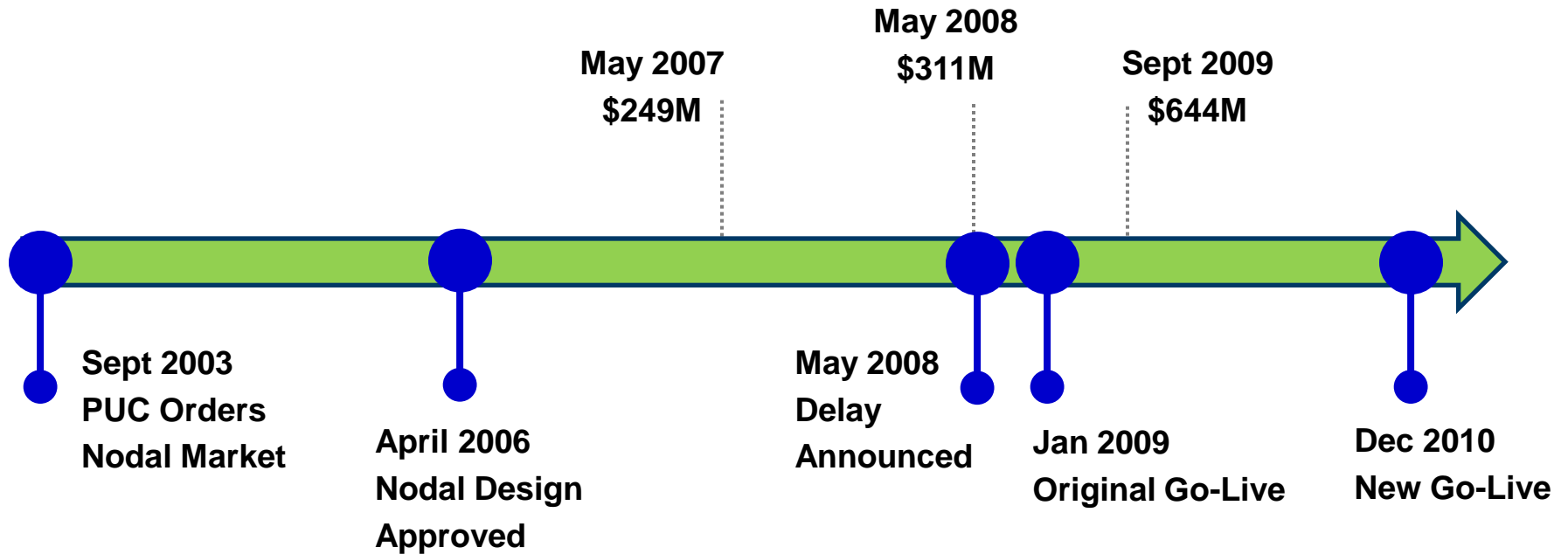**Sunset Review Commission**

27 October 2009

Nodal Program's Background

- **A complex engineering and business transformational program, involving hundreds of detailed workflows and processes**

- **April 5, 2006: PUCT signs order approving nodal stakeholder-developed protocols**

- **Program Scope**
  - Design and implement nodal market system, and transition from zonal market to nodal, as defined in PUCT-approved protocols

- **ERCOT's Objectives**
  - Directly assign congestion costs
  - Increase transparency of energy prices
  - Enhance reliability and increase market efficiency

3

May 2008
$311M

May 2007
$249M

Sept 2009
$644M

**Sept 2003
PUC Orders
Nodal Market**

**April 2006
Nodal Design
Approved**

**May 2008
Delay
Announced**

**Jan 2009
Original Go-Live**

**Dec 2010
New Go-Live**

Monthly Budget, Forecast and Actual Analysis
(Amounts in millions)
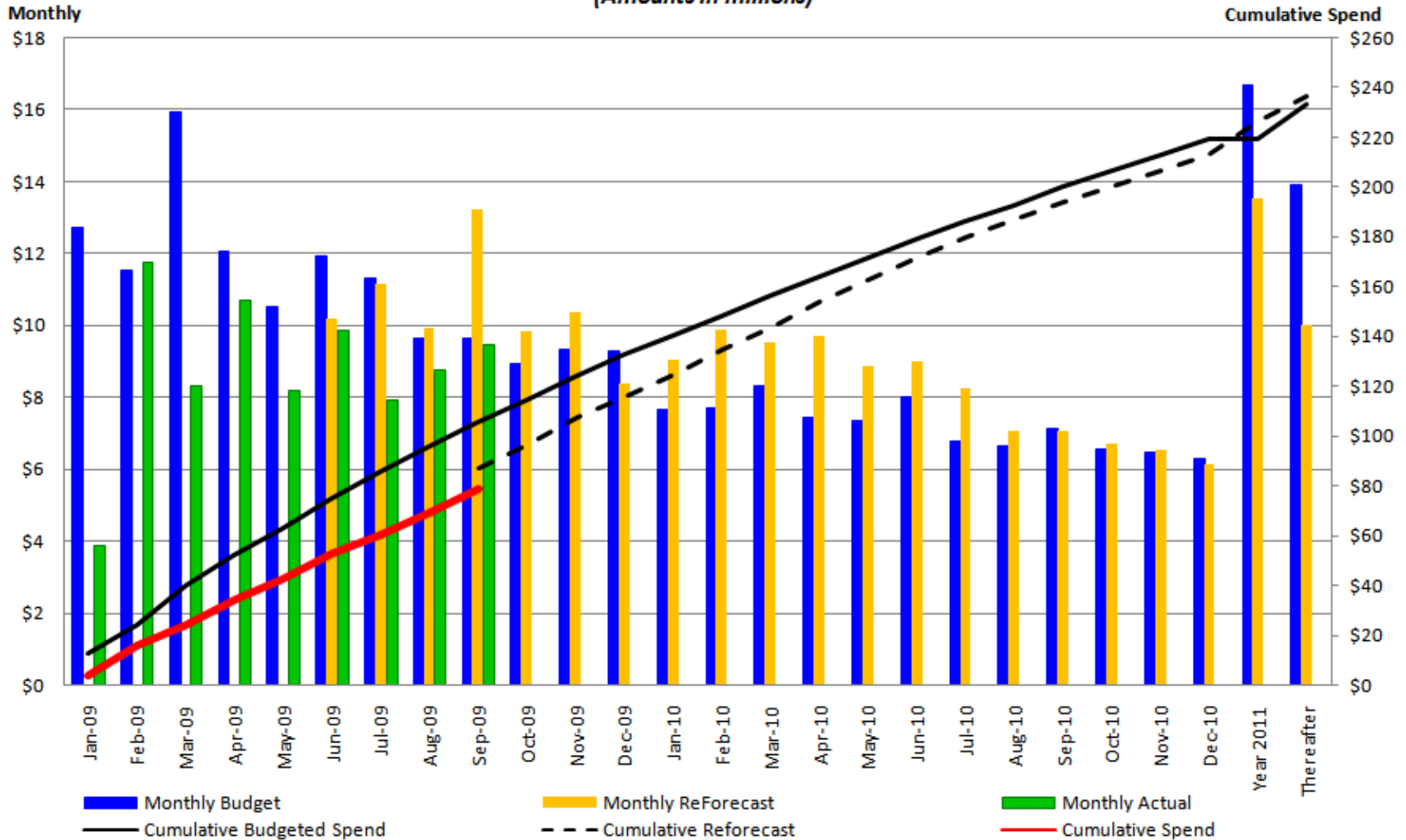
Nodal Program
Approved Forecast to Actual Comparison
Life-to-Date through September 2009

Line	Cost Summary	Forecast	Actual	June-September 2009 Forecast Variance	January-May 2009 Budget Variance	Forecast Cumulative Variance
				Favorable / (Unfavorable)		
1	Internal Labor Costs	$49.9	$49.6	$0.3	$3.4	$3.7
2	Backfill Labor Costs	5.0	4.9	0.1	(0.2)	(0.1)
3	External Resource Costs	250.2	245.3	4.9	8.6	13.5
4	Software & Software Maintenance	24.1	22.9	1.2	(0.6)	0.6
5	Hardware & Hardware Maintenance	51.7	49.7	2.0	1.6	3.6
6	Other	2.0	1.9	0.1	0.2	0.3
7	**Sub-total Direct Project Costs**	**$382.9**	**$374.3**	**$8.6**	**$13.0**	**$21.6**
8	**Board Discretionary Fund**	**$0.0**	**$0.0**	**$0.0**	**$0.0**	**$0.0**
9	Allocations	$19.1	$18.9	$0.2	$1.6	$1.8
10	Finance Charges	21.5	21.7	(0.2)	1.3	1.1
11	**Sub-total Indirect Project Costs**	**$40.6**	**$40.6**	**$0.0**	**$2.9**	**$2.9**
12						
13	**Total**	**$423.5**	**$414.9**	**$8.6**	**$15.9**	**$24.5**

Amounts in millions

ERCOT

Nodal Internal/External and Vendor Headcount
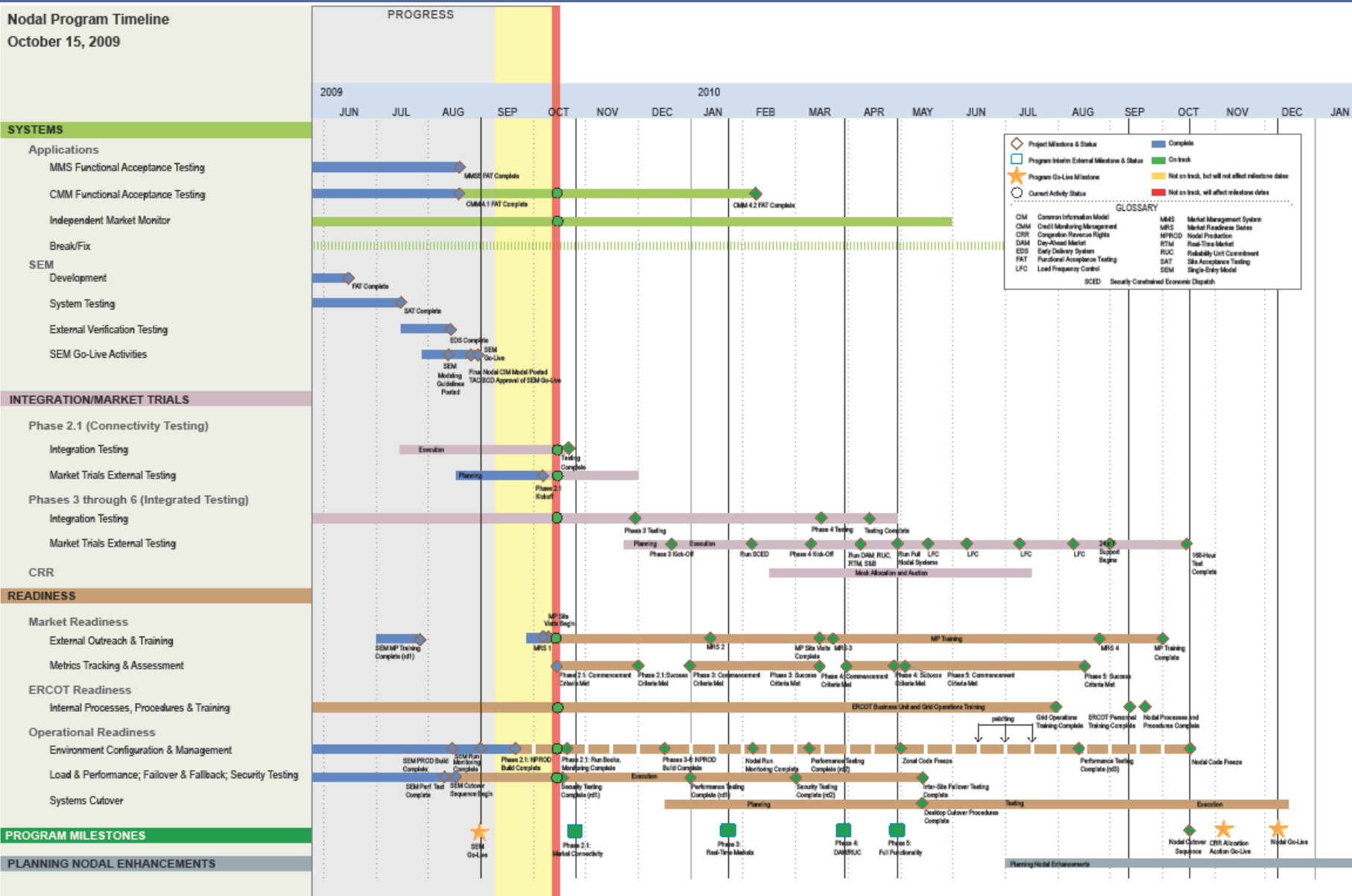### *for 2009*
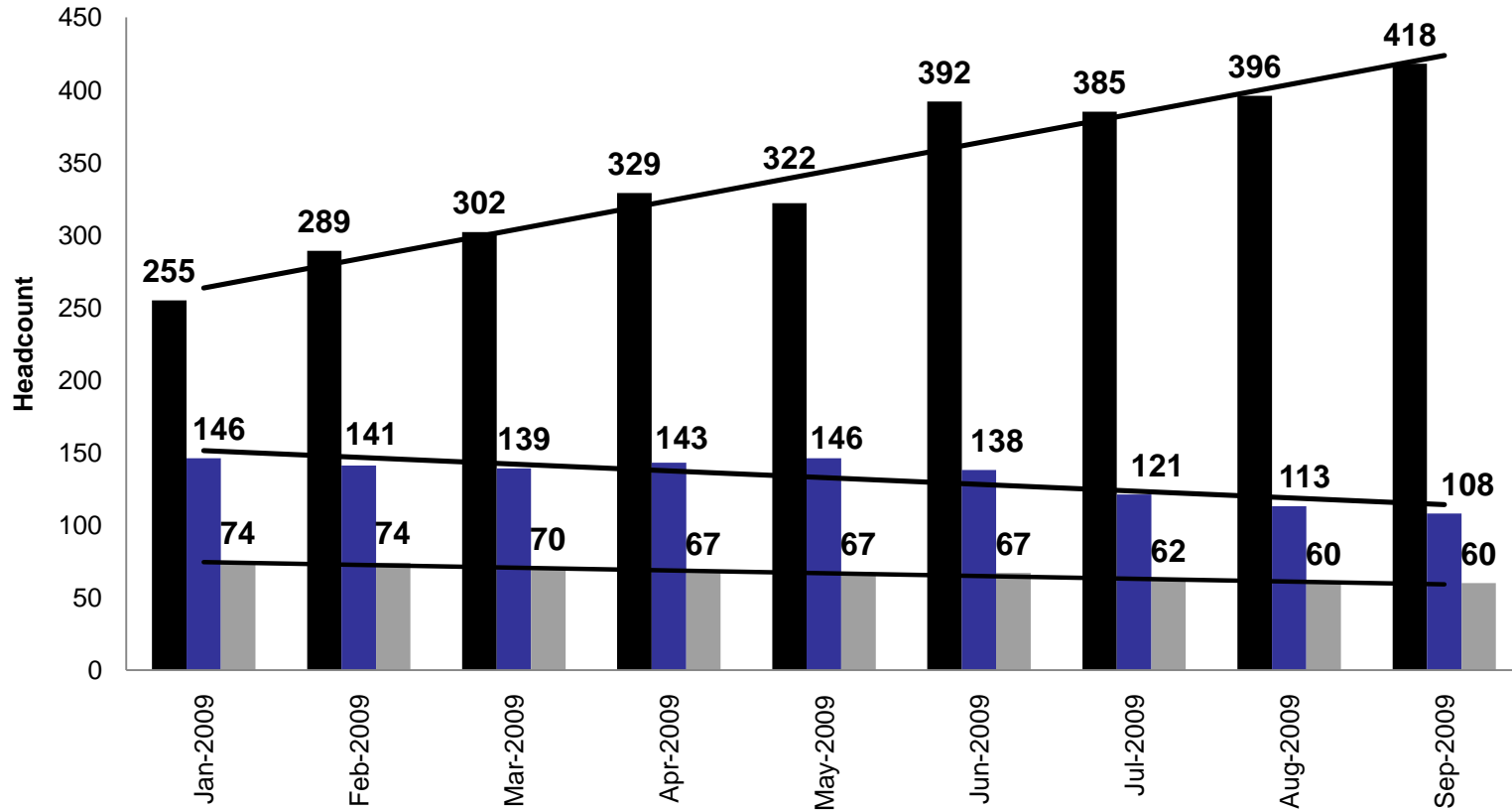
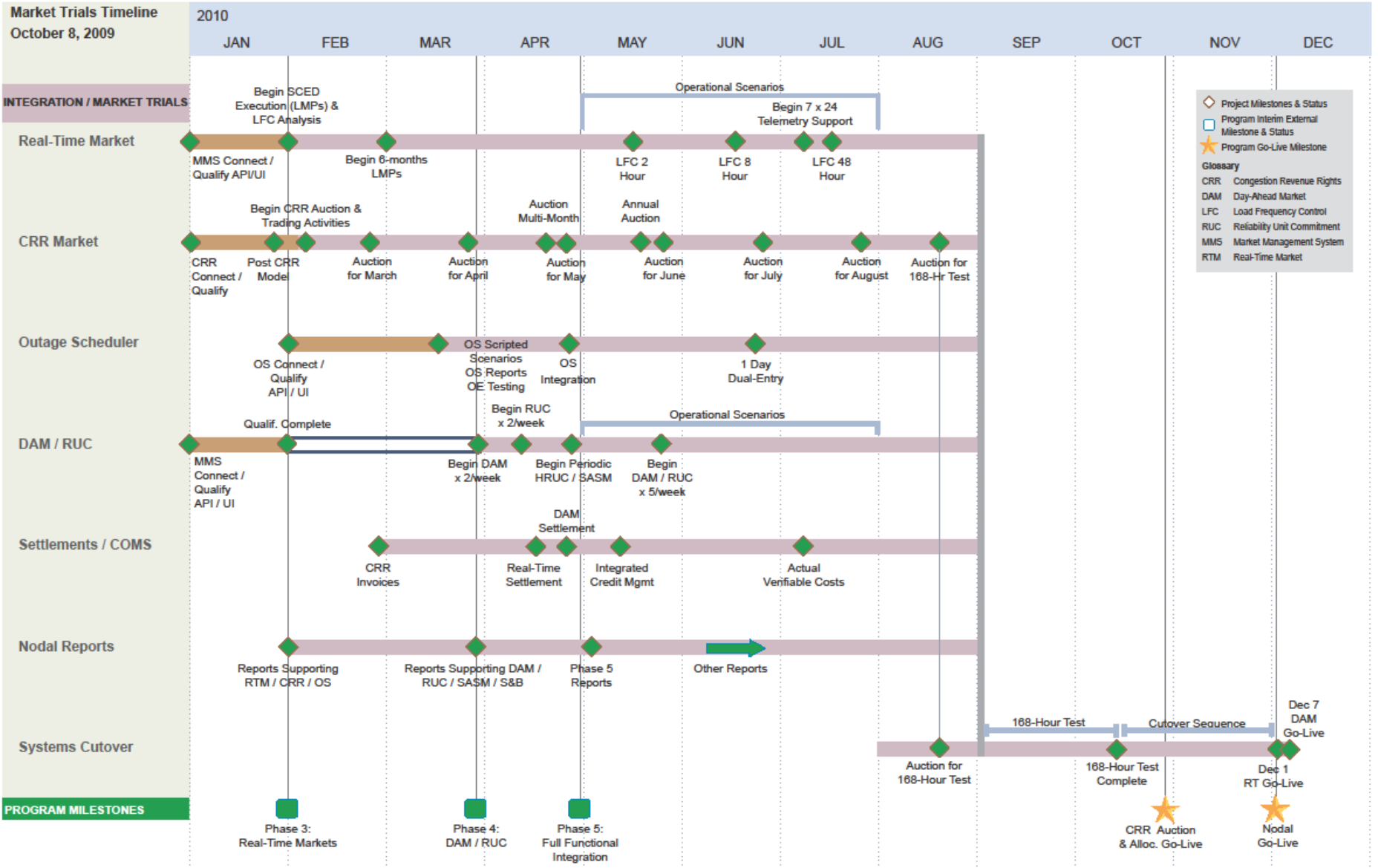|	Jan-2009	Feb-2009	Mar-2009	Apr-2009	May-2009	Jun-2009	Jul-2009	Aug-2009	Sep-2009
■ ERCOT Employees	255	289	302	329	322	392	385	396	418
■ Contingent Labor	146	141	139	143	146	138	121	113	108

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Nodal Timeline

Nodal Program Timeline
October 15, 2009

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 • Migrated 2.1 software into Nodal Production environment • Functional regression and final performance testing under way
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)	• Planning complete • Integrated testing under way (CRR, OS, SCED) • Running Real-Time operating scenarios twice weekly
4: DAM/RUC	Late March-Early April	• MMS-DAM, DRUC, HRUC, SCED execution • Market results, report publishing • Initial S&B execution • Outage, CRR integration	• Planning in progress • Integrated testing under way • Executing DAM mechanics
5: Full Functionality	Late April-Early May	• Run full nodal systems	• Planning in progress • Internal DST test scheduled Nov. 1

Market Trials Roadmap

Market Trials Timeline
October 8, 2009

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |

INTEGRATION / MARKET TRIALS

Real-Time Market
- Begin SCED Execution (LMPs) & LFC Analysis
- MMS Connect / Qualify API/UI
- Begin 6-months LMPs
- Operational Scenarios
- Begin 7 x 24 Telemetry Support
- LFC 2 Hour
- LFC 8 Hour
- LFC 48 Hour

CRR Market
- CRR Connect / Qualify
- Post CRR Model
- Begin CRR Auction & Trading Activities
- Auction for March
- Auction for April
- Auction Multi-Month
- Auction for May
- Annual Auction
- Auction for June
- Auction for July
- Auction for August
- Auction for 168-Hr Test

Outage Scheduler
- OS Connect / Qualify API / UI
- OS Scripted Scenarios OS Reports OE Testing
- OS Integration
- 1 Day Dual-Entry

DAM / RUC
- MMS Connect / Qualify API / UI
- Qualif. Complete
- Begin DAM x 2/week
- Begin RUC x 2/week
- Begin Periodic HRUC / SASM
- Begin DAM / RUC x 5/week
- Operational Scenarios

Settlements / COMS
- CRR Invoices
- DAM Settlement
- Real-Time Settlement
- Integrated Credit Mgmt
- Actual Verifiable Costs

Nodal Reports
- Reports Supporting RTM / CRR / OS
- Reports Supporting DAM / RUC / SASM / S&B
- Phase 5 Reports
- Other Reports

Systems Cutover
- Auction for 168-Hour Test
- 168-Hour Test
- 168-Hour Test Complete
- Cutover Sequence
- Dec 1 RT Go-Live
- Dec 7 DAM Go-Live

PROGRAM MILESTONES
- Phase 3: Real-Time Markets
- Phase 4: DAM / RUC
- Phase 5: Full Functional Integration
- CRR Auction & Alloc. Go-Live
- Nodal Go-Live

Legend:
- ◇ Project Milestones & Status
- ☐ Program Interim External Milestone & Status
- ★ Program Go-Live Milestone

Glossary
- CRR Congestion Revenue Rights
- DAM Day-Ahead Market
- LFC Load Frequency Control
- RUC Reliability Unit Commitment
- MMS Market Management System
- RTM Real-Time Market

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Participant Readiness Touch Points

	2009/2010			
	October	**November**	**December**	**January**
Meetings	• NATF 10/13 • 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 • 5 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*	

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Questions ?