



Texas Nodal Market Implementation: Program Update

ERCOT Board of Directors
09 December 2008

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Vice President and Chief Information Officer

- **Health Indicators**
- **Steps to Finalize Schedule and Budget**
- **Preliminary Schedule**
- **Preliminary Budget**
- **Risks / Issues**

Health Indicators

Indicator	Status	Explanation
Overall	Red	<ul style="list-style-type: none">Overall status remains red, driven by schedule and budget indicators
Schedule	Red	<ul style="list-style-type: none">Schedule remains red until the integrated schedule is approved
Budget	Red	<ul style="list-style-type: none">Budget remains red until new budget is finalized and approved
Scope	Amber	<ul style="list-style-type: none">Requirements review still underway
Resources	Green	<ul style="list-style-type: none">Majority of projects reporting green status
Risks	Amber	<ul style="list-style-type: none">Program addressing risks/issues detailed on subsequent slide
Issues	Amber	<ul style="list-style-type: none">Program addressing issues/issues detailed on subsequent slide
Quality Control	Red	<ul style="list-style-type: none">Status driven by number of Sev 1 and 2 defects and lengthy defect turn-around time
ERCOT Readiness	Amber	<ul style="list-style-type: none">Status quo until the schedule is released
Market Participant Readiness	Amber	<ul style="list-style-type: none">Status quo until the schedule is released

Note: health indicator measures are located in the appendix

Steps to Finalize Schedule and Budget

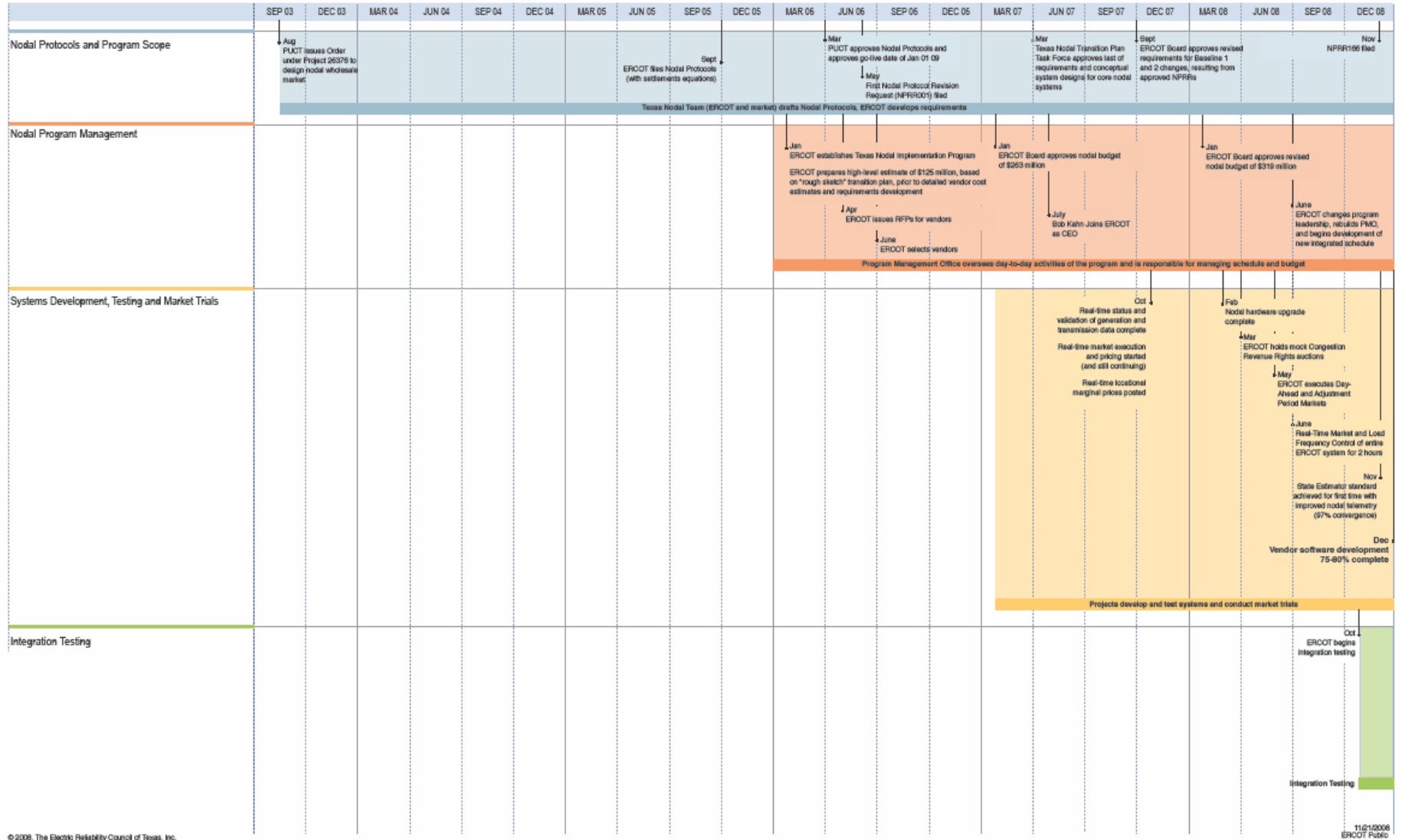
Step	Activity
1	Present schedule to TPTF for initial review
2	Incorporate TPTF feedback into schedule and identify budget impacts
3	Present revised schedule to TPTF for final review
4	Incorporate final TPTF feedback; finalize budget draft
5	Present to TAC and incorporate feedback
6	Present to Special Nodal Program Committee and incorporate feedback
7	Present to Board of Directors and incorporate feedback
8	Present to PUCT

Preliminary Schedule – Key Points

- **Vendor product development is nearly complete (75-80%)**
- **Business processes and protocols traceability need to be completed**
- **System integration started in October 2008**
- **Testing and defect resolution is ongoing for all projects**
- **Market trials and production readiness, including go-live, will take 10.5 months and we should not shortcut this**
- **This schedule is preliminary pending TPTF review**

Timeline – Accomplishments to Date (visual)

Texas Nodal Market Implementation Timeline: Sept. 2003 - Dec. 2010

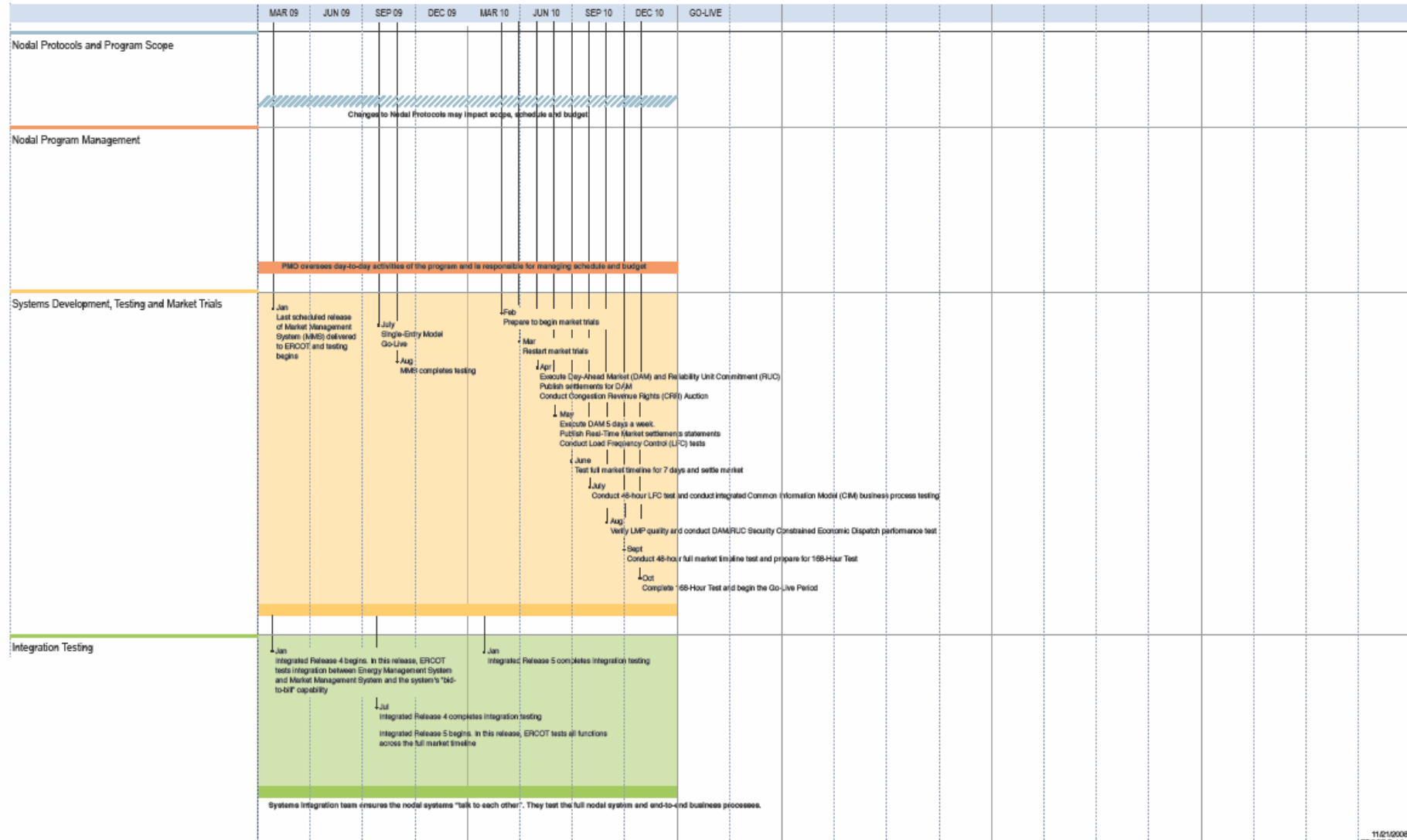


Timeline – Accomplishments to Date

Oct 2007	<ul style="list-style-type: none"> • Real-time status and validation of generation and transmission data complete (EDS 1) • Real-time market execution and pricing started (and continues) • Real-time locational market prices (LMPs) posted
Feb 2008	<ul style="list-style-type: none"> • Large hardware/software/data migration complete
Mar 2008	<ul style="list-style-type: none"> • ERCOT held mock Congestion Revenue Rights Auction
May 2008	<ul style="list-style-type: none"> • ERCOT executed Day Ahead and Adjustment Period Market
Jun 2008	<ul style="list-style-type: none"> • Real time market and Load Frequency Control of entire ERCOT system for 2 hours
Oct 2008	<ul style="list-style-type: none"> • Common Information Model (CIM) schema finalized • Integration Release 3 started
Nov 2008	<ul style="list-style-type: none"> • State Estimator standard achieved for first time with improved telemetry, reaching the quality measure of 97% convergence
Nov 2008	<ul style="list-style-type: none"> • System Operations Testing Environment (SOTE) available for TSP access
Nov 2008	<ul style="list-style-type: none"> • 75-80% of vendor software delivered to ERCOT
2008	<ul style="list-style-type: none"> • Numerous reports and extracts completed; electronic file formats provided to Market Participants

Timeline – Work Remaining (visual)

Texas Nodal Market Implementation Timeline: Sept. 2003 - Dec. 2010



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Timeline – Work Remaining

Expectations for Market Participants

Dec 2008	<ul style="list-style-type: none"> Integration Release 3 completes
Jan 2009	<ul style="list-style-type: none"> Synchronized version of CIM XML file for EMS, MMS, and CRR
Jan 2009 – Aug 2009	<ul style="list-style-type: none"> Final version MMS software delivered and regression tested
Jan 2009 – Jul 2009	<ul style="list-style-type: none"> Integration Release 4
Jul 2009 – Feb 2010	<ul style="list-style-type: none"> Integration Release 5
Jul/Aug 2009	<ul style="list-style-type: none"> NMMS Single Entry Model go-live
Feb 2010	<ul style="list-style-type: none"> Prepare for market trials
Mar 2010	<ul style="list-style-type: none"> Restart market trials
Apr 2010	<ul style="list-style-type: none"> Execute Day Ahead Market (DAM) and Reliability Unit Commitments (RUC) Publish settlements for DAM Conduct Congestion Revenue Rights (CRR) auction
May 2010	<ul style="list-style-type: none"> Execute DAM five days per week Publish real-time settlement statements Conduct 2-hour and 8-hour Load Frequency Control (LFC) tests
Jun 2010	<ul style="list-style-type: none"> Test full market timeline for 7 days and settle the market Conduct operational readiness testing (disaster recovery, failover testing)
Jul 2010	<ul style="list-style-type: none"> Conduct 48-hour LFC test Conduct integrated CIM business process testing
Aug 2010	<ul style="list-style-type: none"> Verify LMP quality Conduct DAM/RUC Security Constrained Economic Dispatch (SCED) performance test
Sep 2010	<ul style="list-style-type: none"> Conduct 48-hour full market timeline test and prepare for 168-hour test
Oct 2010	<ul style="list-style-type: none"> Complete the 168-hour test and begin the Go-Live Period
Dec 2010	<ul style="list-style-type: none"> Nodal Go-Live

Preliminary Budget by Cost Element

Nodal Implementation Preliminary Budget				
Estimate at complete (EAC)	Budget	Actuals		Forecast
	Oct-08			
	Approved Budget	Life to Date	Subtotal Forecast	Total (Actuals + Forecast)
COST SUMMARY (\$)				
Internal Labor Costs	35,858,381	31,224,298	63,611,857	94,836,155
External Resource Costs	175,093,797	182,490,058	113,063,658	295,553,716
Administrative & Employee Expenses	7,614,628	1,624,547	1,524,663	3,149,210
Software & Software Maintenance	17,053,096	19,138,962	17,099,415	36,238,377
Hardware & Hardware Maintenance	42,103,029	44,722,227	11,694,438	56,416,665
Contingency	15,000,000	-	39,888,788	39,888,788
Total Direct Project Costs	290,722,931	279,200,092	246,882,819	526,082,911
Backfill	1,422,626	2,937,759	4,953,421	7,891,180
Indirect Support Costs	10,589,195	9,848,091	8,616,857	18,464,948
Facilities Support Allocation	4,126,574	5,511,383	2,494,185	8,005,567
Finance Charge**	10,600,000	11,286,700	88,268,693	99,555,393
Total Indirect Project Costs	28,738,395	29,583,933	104,333,156	133,917,089
Total Project Costs	319,461,326	308,784,025	351,215,975	660,000,000

**Finance Charge of \$88.2M is inclusive of new finance charges recovered during Nodal Surcharge Recovery Period

**Finance Charge of \$10.6M represents estimated finance costs through Dec 2008 only (development period), additional finance charges of \$31.6M were assumed during the debt repayment period for a total of \$42.2M for the entire Program

Cost Elements

- **Internal Labor Costs**
 - Labor costs of ERCOT employees who are working on the Nodal program.
- **External Resource Costs**
 - Includes both contractor and vendor expenses. Examples of the two types of expenses would be contingent labor contracted to work on the Nodal program, and also software development expenses from the software vendors (ABB, AREVA, etc...). Contractor labor is for staff augmentation where ERCOT does not have the number of employees required to perform the additional Nodal project work or where ERCOT does not have employees with the skills to perform the work.
- **Administrative & Employee Expenses**
 - Equipment, tools, office materials & supplies. Also includes ERCOT employee expenses. For example, the expenses for trips by ERCOT employees to vendor sites to supervise software development would fall into this category.
- **Software**
 - Expenses for purchased 3rd party software not being developed solely for the Nodal program. For example, this would include a wide variety of software ranging from Oracle database licenses to Microsoft Windows Server licenses. Also in this cost category are the maintenance expenses associated with the software licenses.
- **Hardware**
 - Includes all computer hardware purchased to enable the Nodal market and the future maintenance on this equipment. Examples would be servers, data storage hardware and networking equipment.

Cost Elements (continued)

- **Backfill**
 - This category represents the difference between ERCOT's labor expense for an internal employee and a contractor hired to perform that employee's duties while that employee is working on the Nodal program. For example, if the fully loaded cost to ERCOT for an employee was \$50/hr and that employee was reassigned from ERCOT base operations to the Nodal program and a contractor was hired at \$70/hr to perform the base operations duties while the employee is working on the Nodal program, the cost to the Nodal program is the difference between the two expenses, in this case \$20/hr.
- **Indirect Support Costs**
 - Several ERCOT administrative departments charge the Nodal program an allocation for services provided to Nodal. For example, ERCOT Procurement, Finance, Legal, and some others provide their services to the Nodal program. The amount charged to the Nodal program is based on an allocation that has been audited and approved.
- **Facilities Allocation**
 - Similar to the Indirect Support Costs category, the Facilities Allocation is a reimbursement to ERCOT base operations from the Nodal program for the facilities space and services provided by ERCOT to the Nodal program.
- **Finance Charge**
 - Interest expenses related to debt incurred to finance the Nodal program.

Preliminary Budget by Project

Project	Current Approved Budget	Preliminary Revised Budget	Variance
IT Operations & Infrastructure (INF)	65,400,015	132,761,230	103.0%
Market Management System (MMS)	50,527,343	79,862,883	58.1%
Integration Testing (INT)	17,907,527	42,229,395	135.8%
Early Delivery System (EDS)	19,311,548	37,178,516	92.5%
Energy Management System (EMS)	20,913,735	36,440,056	74.2%
Commercial Systems (COMS)	16,022,542	29,717,150	85.5%
Enterprise Integration (EIP)	18,963,151	26,832,020	41.5%
Program Control (PC)	9,092,381	20,525,874	125.7%
ERCOT Readiness (ERT)	6,767,763	20,100,060	197.0%
Network Model (NMMS)	13,709,494	16,364,647	19.4%
MER – Training	9,137,503	12,020,952	31.6%
Integration Design (IDA)	8,876,607	10,995,342	23.9%
Congestion Revenue Rights (CRR)	7,605,047	8,980,757	18.1%
Enterprise Data Warehouse (EDW)	3,655,570	7,098,125	94.2%
Market Information System Portal (MIS)	9,255,331	6,096,552	-34.1%
Administration	16,715,769	33,352,259	99.5%
Contingency	15,000,000	39,888,788	165.9%
Finance Charges**	10,600,000	99,555,393	839.2%
Total	319,461,326	660,000,000	106.6%

**Finance Charge of \$99.5M is inclusive of the previous finance charges and new finance charges recovered during Nodal Surcharge Recovery Period

**Finance Charge of \$10.6M represents estimated finance costs through Dec 2008 only (development period), additional finance charges of \$31.6M were assumed during the debt repayment period for a total of \$42.2M for the entire Program

Preliminary Forecast Spend by Month

Preliminary Nodal Budget (Nov 2008 - Mar 2011)

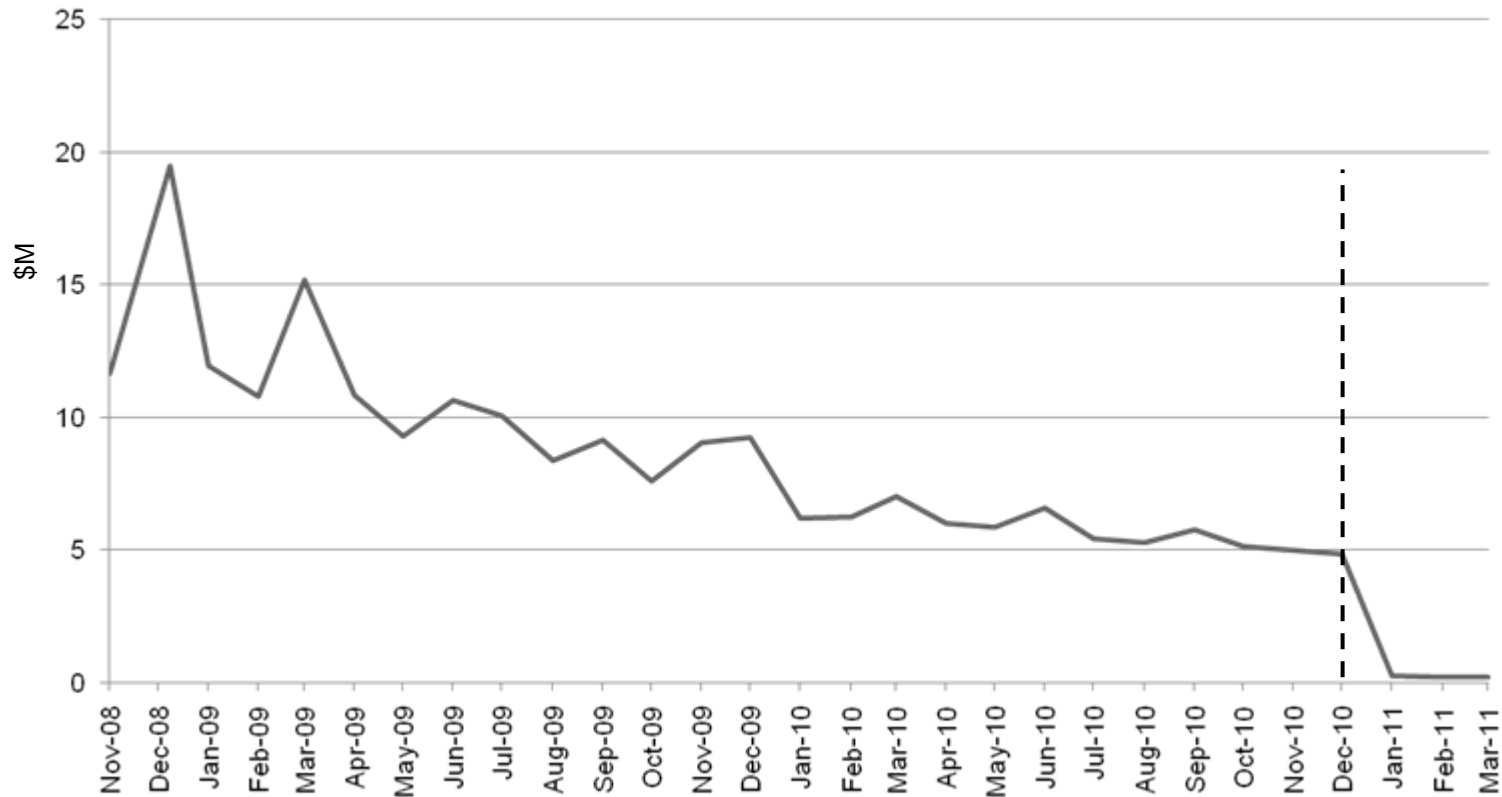


Chart does not include finance charges or contingency

Top Risks / Issues

Description	Status
NEW RISK: With the delayed go-live for Nodal, there are a number of Zonal projects, PRRs, and IMM suggestions for Zonal improvements that may result in resource constraints for Nodal.	<ul style="list-style-type: none">Currently in process of identifying potential resource conflicts so that ERCOT can reprioritize scheduled Nodal activities and/or identify new resources to perform the additional work.
NEW RISK: In order to keep the multiple database environments in synch (Dev, iTest, Prod), a refresh of the associated databases must be completed. This activity is estimated to take approximately one month based on prior refreshes. Actual downtime is estimated at one to two weeks and has not been incorporated into the schedule.	<ul style="list-style-type: none">Tentatively scheduled for March 2009; working closely with Nodal project teams to minimize downtime impacts.
Information Lifecycle Management (ILM) strategy for ERCOT is behind schedule. <ul style="list-style-type: none">Problem: Current processes do not adequately address archival and storage requirements for Nodal; Existing Data Center constraints limit new storage growthWithout ILM in place and executed, the nodal program go-live date could be delayed because of insufficient storage	<ul style="list-style-type: none">Assigning a PM to manage a project to develop an ILM strategy and implement the strategy<ul style="list-style-type: none">Project funds have been identifiedProject to be managed by Business, IT and Nodal

Appendix

Health Indicator Measures

Metric	Green	Amber	Red
Overall	Both core indicators are green	At least one core indicator is amber, but none are red	At least one core indicator is red
Schedule	All activities on the critical path are complete, or are expected to be complete, on or ahead of the planned dates	No dates have been missed, but one or more critical path activities is forecasted to complete late	At least one critical path deliverable has missed its due date. Project implementation date is in jeopardy
Budget (hrs)	Project forecasted to complete within the baselined hours	Project forecasted to complete up to 5% over the baselined hours	Project forecasted to complete more than 5% over the baselined hours
Scope	All Requirements approved; no unplanned scope changes	Pending approvals for Requirements; no unplanned scope changes	Unapproved Requirements and/or unplanned scope changes
Resources	All key resource positions are filled and no schedule delays are expected.	One or two key positions are not staffed and the schedule may be adversely impacted.	More than two key positions are not staffed and the schedule will be impacted.
Risk	All project risks have a Risk Score ≤ 4	At least one project risk has a Risk Score ≥ 5 and ≤ 8	At least one project risk has an Risk Score ≥ 9
Issues	All issues are being resolved by the required due dates	Some issues are remaining open past the required due dates but none are of "critical" priority (Impact = 3 or 4)	At least one "critical" priority issue (Impact = 3 or 4) is open past the due date
Quality Control	Defect metrics meet all of the following: <ul style="list-style-type: none"> • # of Severity 1 = 0 • # of Severity 2 = 0 • Avg. #. Days to Close Sev 1 and Sev 2 Defects < 45 • % Reopen Defects < 15 	Defect metrics meet at least one of the following: <ul style="list-style-type: none"> • #. Severity 1 = 1 to 5 • #. Severity 2 = 1 to 5 • Avg. # Days to Close Sev 1 and Sev 2 Defects ≥ 45 and ≤ 90 • % Reopen ≥ 15 and ≤ 24 	Defect metrics meet at least one of the following: <ul style="list-style-type: none"> • #. Severity 1 > 5 • #. Severity 2 > 5 • Avg. # Days to Close Sev 1 and Sev 2 Defects > 90 • % Reopen > 24

Questions ?