



Texas Nodal Market Implementation

Program Update with emphasis on reporting
Quality and Schedule Metrics

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Monthly Board of Directors Meeting

March 18, 2008

- **Program Status** **Unchanged; Amber Status**
- **Quality** **Under control; metrics to be discussed**
- **Schedule** **Still Dec. 1; metrics to be discussed**
- **Cost**..... ***Under budget to date; EAC constant; \$2.2 M of Contingency earmarked***
- **Appendix**
 - Milestones
 - Successes
 - Risks
 - Readiness Scorecard



Nodal Delivery status remains *amber*; key checkpoints are approaching

Nodal Delivery

Scope / Quality

Green *

Amber

- Aligned with protocols
- Achieving quality standards to date

* TPTF is addressing issue where MPs not in complete agreement, e.g., self-committed resources in DAM.

- Applying increased efforts to identify and resolve defects in pre-FAT and FAT

Schedule

Amber

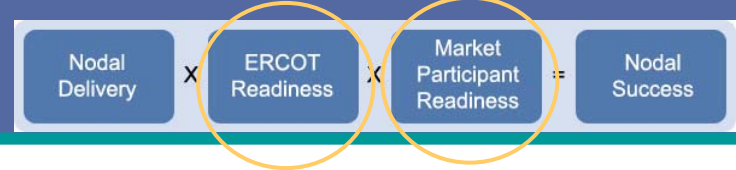
- Checkpoints in place to ensure ongoing viability of 12/1/2008.
- CIM for EDS behind schedule

Cost

Red

- Pending PUCT approval of Budget
- Fee request filed w/ PUC on 6 Mar 08

Legend				
Red	Program is not aligned to protocols	Current product quality is not sufficient for Nodal launch	Go-live = >30 days+	Estimate at Complete = >\$319.5m + 10%
Amber	Program is aligned to previous protocol version	Most Nodal products currently achieve quality standards	Go-live = <30 days+	Estimate at Complete = < \$319.5m + 10%
Green	Program is aligned with current protocols	All Nodal products currently achieve quality standards	Go-live = 12/1/08	Estimate at Complete = <\$319.5m



ERCOT Readiness status remains **amber**, increased efforts being applied towards transition planning and preparation

- Organization, Processes and Procedures, and Training show progress
- Concerns Remain:
 - Adequate availability of staff and resources for transition from project teams to employees within desired timeline
 - Procedures still draft until delivery of systems
 - Completion of training in time for EDS, 168 hour test

Market Readiness status improved to **amber**

- Connectivity, registration, and qualification improving
- Concerns Remain
 - Many metric milestones are upcoming in next two months
 - Hall of Fame Scorecard and Wall of Shame metrics will be prime motivators
 - See www.nodal.ercot.com

Nodal Quality effort experienced recent successes but concerns remain

- **Successes**

- NMMS has fixed a number of high severity defects (12 of 27)
- CRR has reduced the overall number of defects; currently only one severity 2 defect exist (No severity 1 defects)
- MMS is progressing well through FAT with a high test execution rate and no severity 1 or 2 defects

- **Areas of Concern**

- Vendor defect resolution time
- High percentage (72%) of EMS defects not detected until EDS

- **Mitigation Measures**

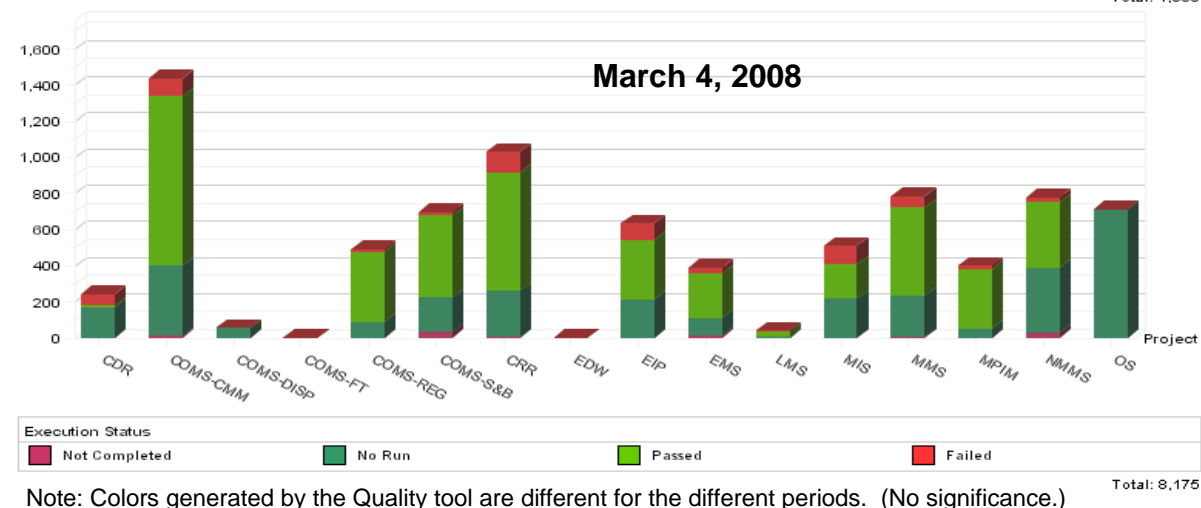
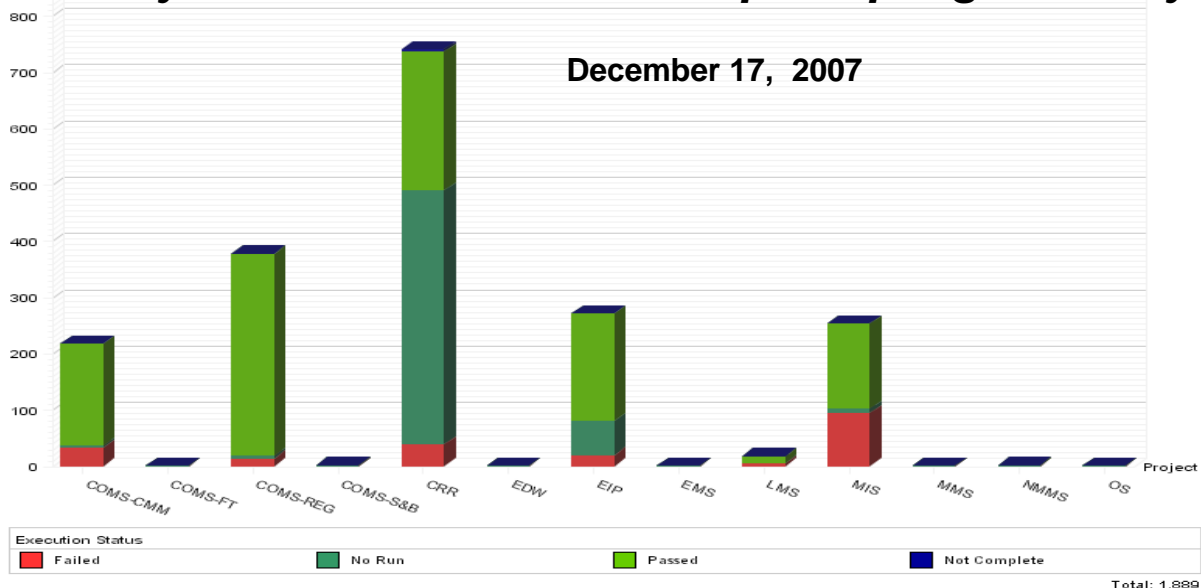
- Passive data center site with live data feed will allow for earlier defect detection

- **Defect Classification**

- Severity 1 – Data Loss/Critical Error
- Severity 2 – Loss of Functionality w/o workaround
- Severity 3 – Loss of functionality with workaround
- Severity 4 – Partial Loss of a feature set
- Severity 5 – Cosmetic/Documentation Error
- Severity 6 - Enhancement

Quality details: Nodal Test Results per Project

Quality related efforts have ramped up significantly in recent months

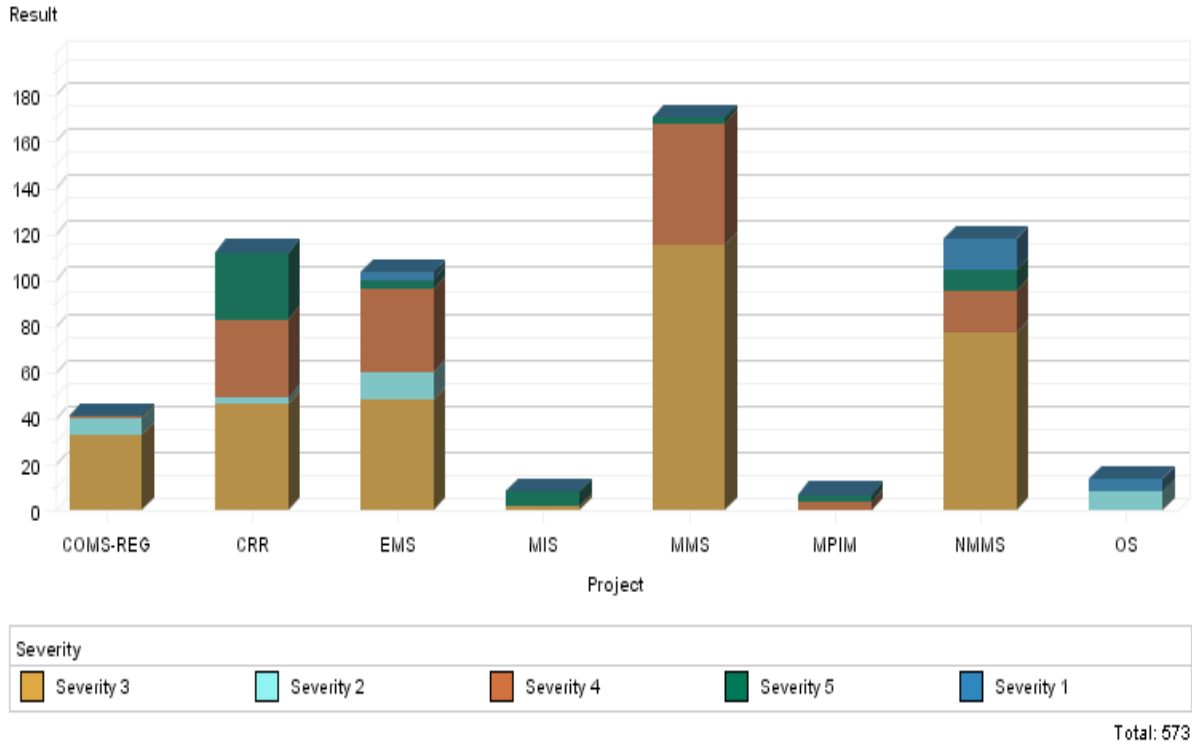


Note: Colors generated by the Quality tool are different for the different periods. (No significance.)

- Since December 2007, the Program has undertaken a significant quality documentation and tracking process.
 - ✓ December 2007: 5 projects tracked
 - ✓ March 2008: 14 projects tracked (others are not in the testing phase)
 - Failure rates within acceptable limits, in most cases < 20%
 - Significant visibility into quality status of each project
- Note: Charts contain test results from all testing phases



The relative low number of Severity 1 and 2 defects is encouraging given the relative immaturity of the software

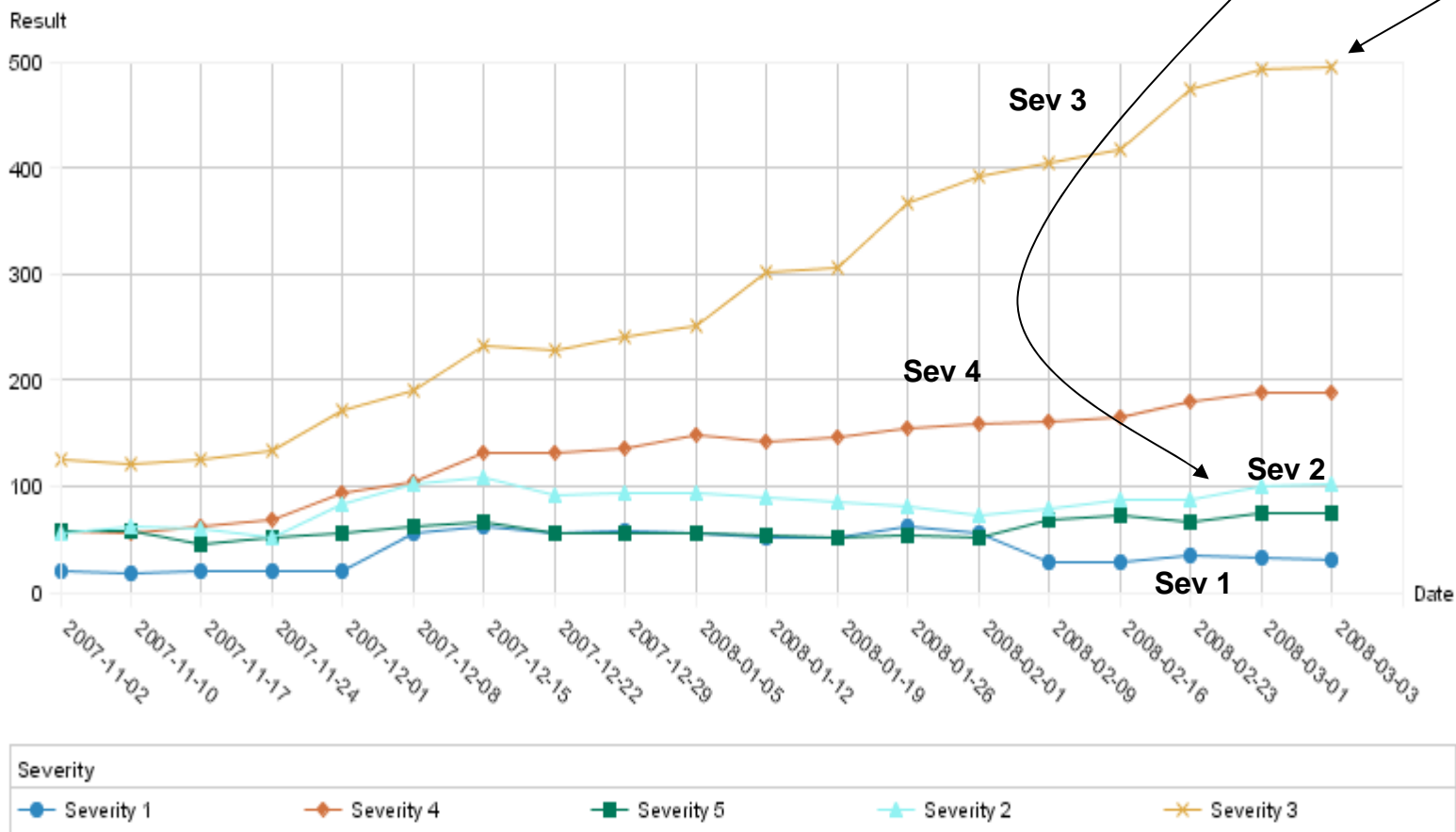


Note - Does not include Closed and Deferred; Data as of 3.3.08

- ❑ Active defects are being tracked by project, by vendor, and by classification.
- ❑ Severity 1 and 2 defects are the most critical:
 - ✓ No Severity 1 or 2 defects in the Market Management System (MMS)
 - ✓ 12 Severity 1 defects in the Network Model Management System (NMMS)
 - ✓ 8 Severity 1 defects in Energy Management System (EMS)
- ❑ There is a relatively high number of Severity 3 defects; not unexpected given the focus on fixing Severity 1s and 2s

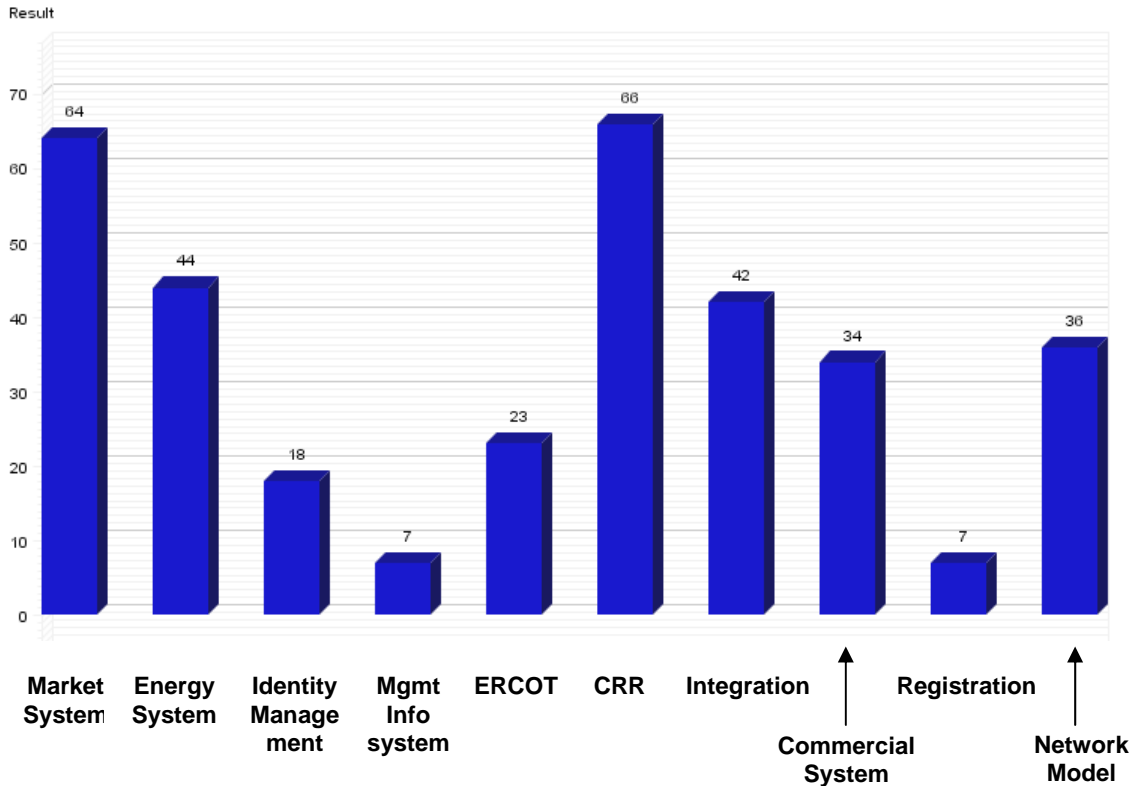
Quality Details: Nodal Active Defects by Severity Trend

- **Severity 3 defect trend is rising due to focus on fixing higher priority severity 1 and 2 defects**
- **Severity 2 trend indicates “defect open rate” is slightly higher than “defect closure rate”**



Quality Details: Average Days to Fix Defect by Vendor

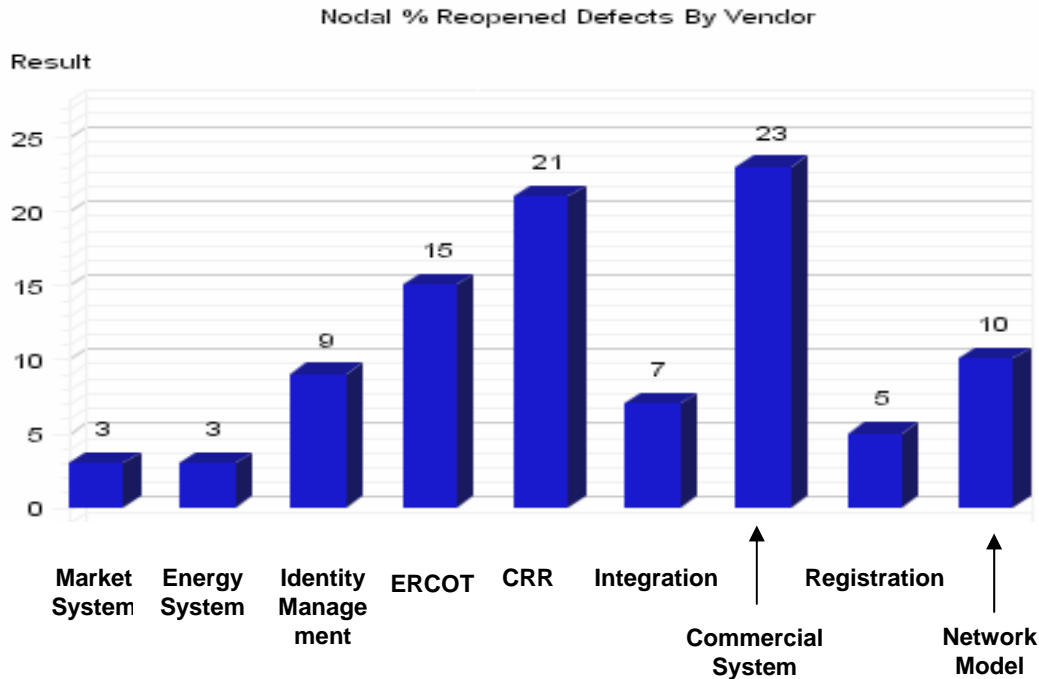
Defect turnaround time is a key indicator of vendor performance; increased emphasis being placed on vendor defect resolution, as needed



Note: Data as of 3.3.08

- ❑ Overall, the time to fix defects in various categories provides an indication of:
 - ✓ how long the product will be in testing
 - ✓ what the next release will look like
 - ✓ how long will it take to get to market trials.
 - ✓ ability to meet the 168 hour test.
- ❑ Not shown here is the turnaround by defect classification

Smaller vendors have experienced the most difficulties in terms of defect reopening

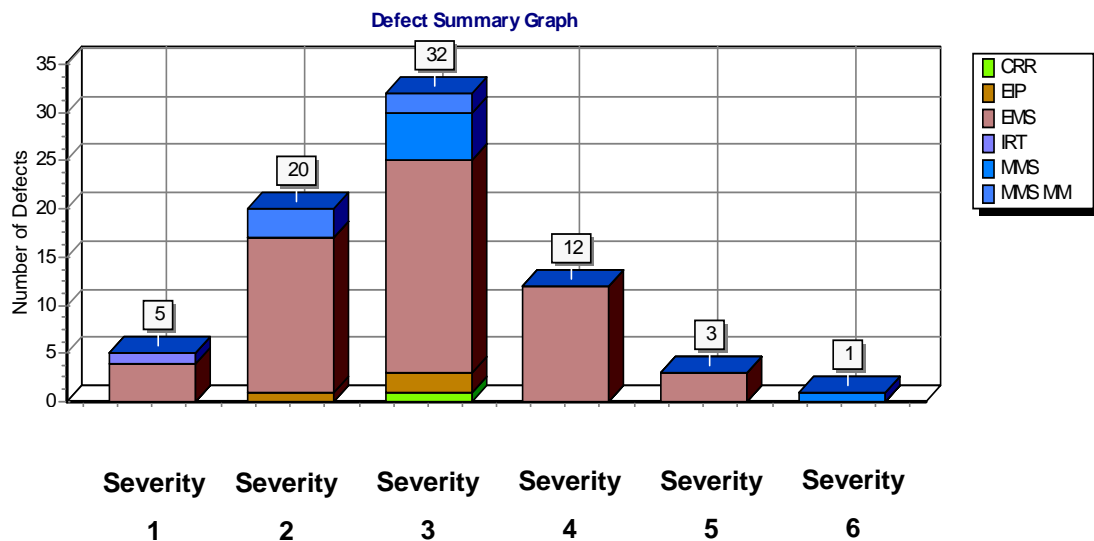


- ❑ Test Script first pass resolution covered in in slides 4 & 5
- ❑ ABB and AREVA are fixing their products with a low reopen rate, a good indication that the EMS and the MMS vendors are sufficiently testing their software defect bundles prior to releasing software to ERCOT.
- ❑ Implication of current and future vendor performance

Indicates what percentage of fixes delivered by a vendor retested unsuccessfully.

Note: Data as of 3.8.08

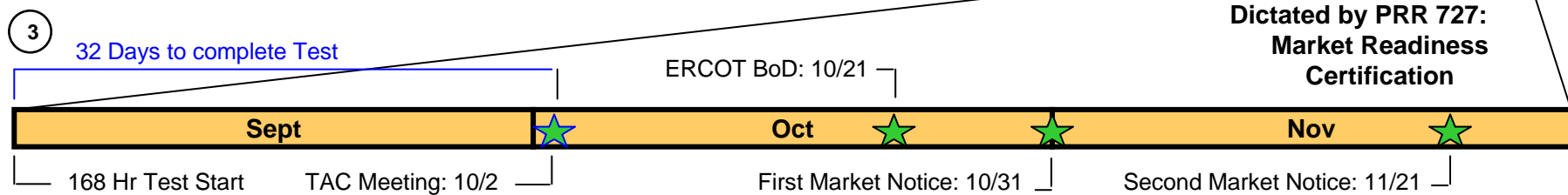
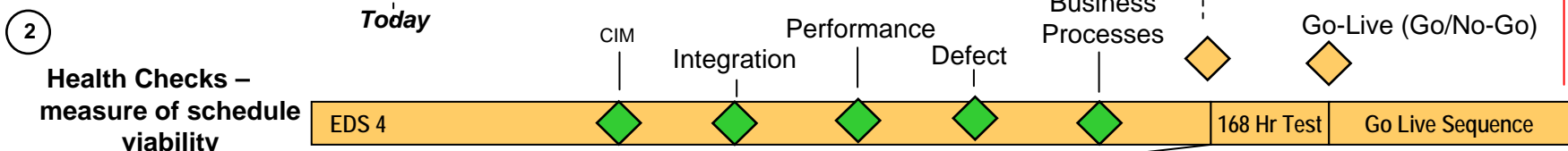
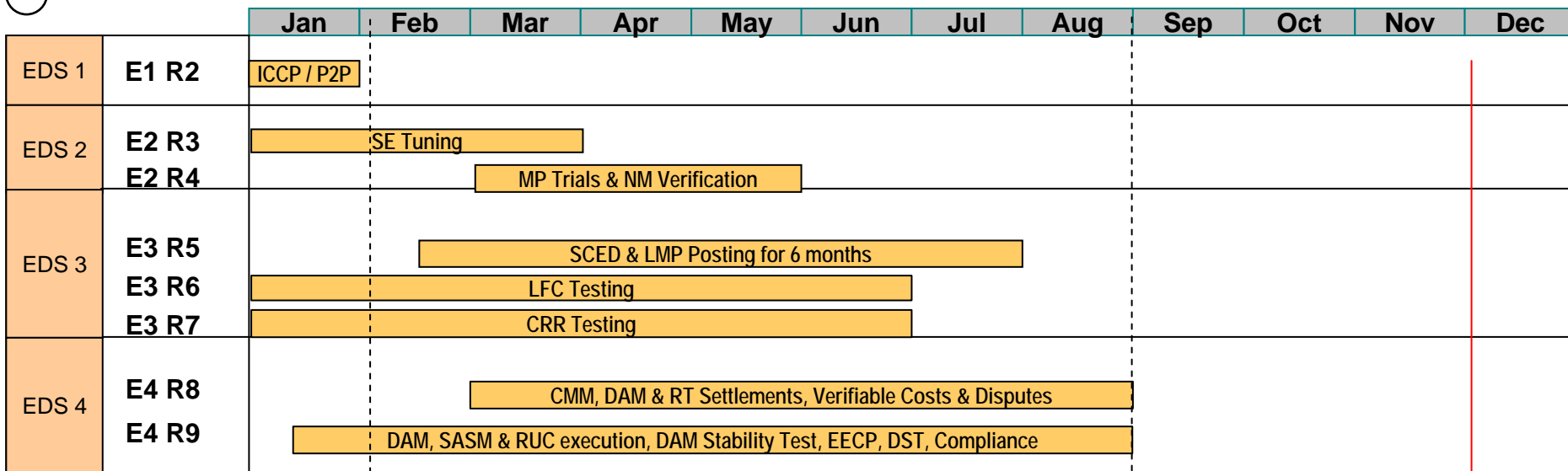
Enhanced FAT testing should result in increased defect detection prior to EDS



Severity 1 – Data Loss/Critical Error
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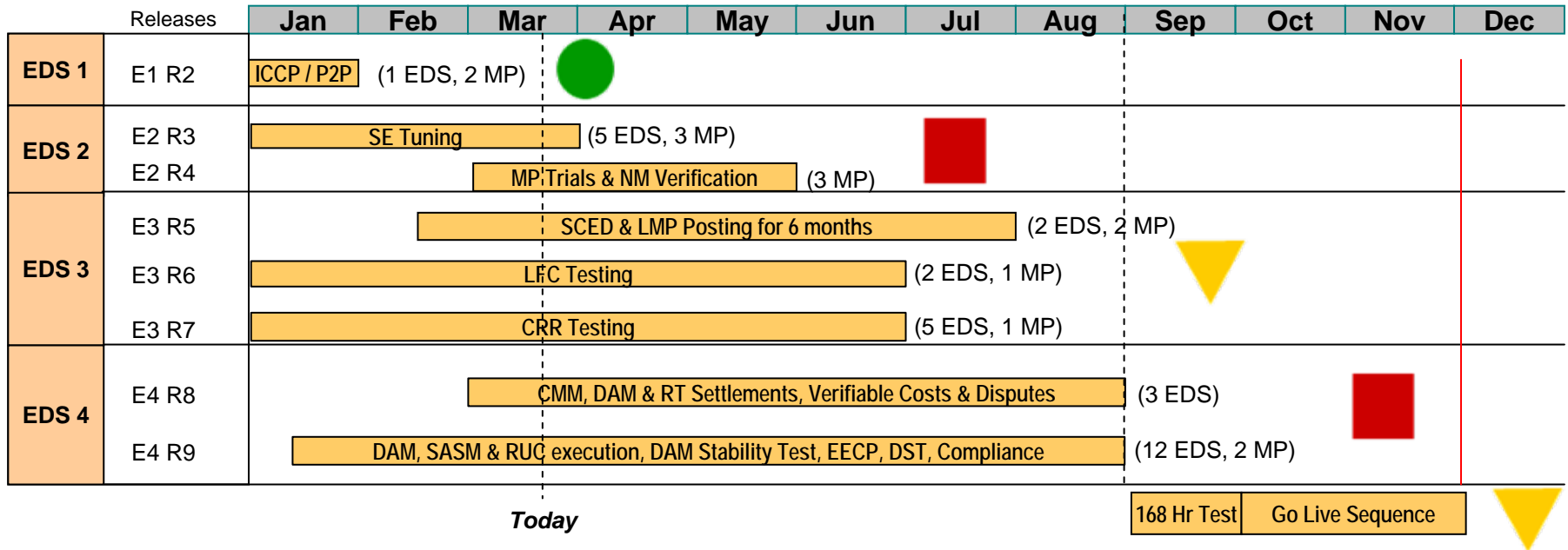
- ❑ Focus of EDS testing effort on core functionality, therefore majority of defects detected are severity 1 - 3.
- ❑ Lesson learned: EMS 2 and EMS 3 were released with insufficient FAT testing, resulting in substantial number of defects showing up in the Early Delivery Systems
- ❑ Mitigation measures are being put in place for earlier defect detection, e.g., live data feed in test environment

December 1, 2008 is our "Go Live date" and the major emphasis is on our critical path involving the Early Delivery System exposures to the MPs



Schedule: This is the metric status for each of the Early Delivery Systems

EDS activities and schedule are monitored and measured by 59 metrics. These metrics will become very important and evidence of our progress.



(xx) – Number of metrics associated with a particular Release

Overall Readiness (not listed above): 15 metrics

EDS1 – Complete

EDS2 – Overall Red resulting from ongoing issues with State Estimator

EDS3 – Yellow resulting from LMP performance and delays in LFC/ACE testing

<http://scorecard.ercot.com>

EDS4 – Mostly unmeasured at this point, but inheriting Red status from recently moved Alarms Processing metric. Commercial Ops metrics being measured are Green

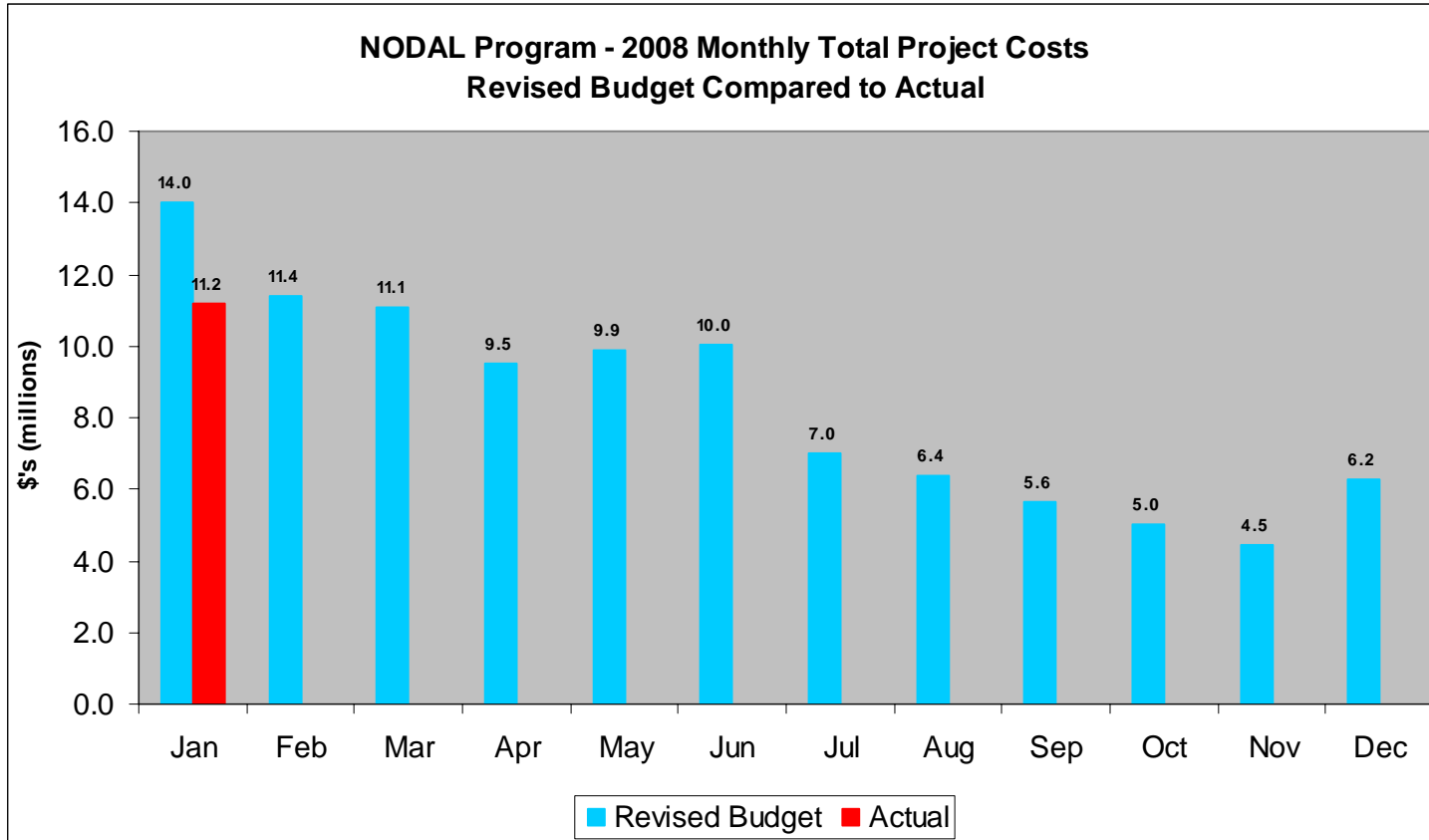
Overall Readiness – Yellow due to open issues on telemetry, modeling, and CIM

- ***EAC Revised Budget and Forecast remain constant***
- ***Spending in January was lower and reversed all of the overrun through December.***

**Nodal Program
Cost Element Summary**
(\$ Millions)

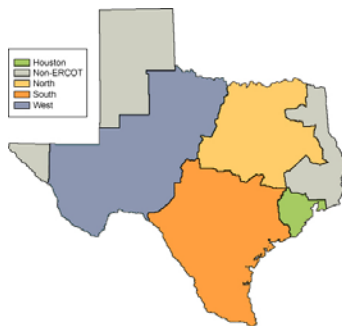
Cost Element	Through January 2008			Estimate at Complete (EAC)		
	Revised Budget	Actual	Var. (o)/u Budget	Revised Budget	Forecast	Var. (o)/u Budget
Internal Labor	\$ 27.1	\$ 27.5	\$ (0.4)	\$ 47.9	\$ 47.9	\$ -
External Labor	61.8	57.9	3.9	94.9	94.9	-
Vendor	47.2	47.2	-	76.8	78.8	(2.0)
Hardware / Software	56.6	57.5	(0.9)	59.2	59.4	(0.2)
Taxes and Other	10.1	9.6	0.5	15.1	15.1	-
Subtotal	\$ 202.8	\$ 199.7	\$ 3.1	\$ 293.9	\$ 296.1	\$ (2.2)
Contingency	-	-	-	15.0	12.8	2.2
Total Nodal Program	\$ 202.8	\$ 199.7	\$ 3.1	\$ 308.9	\$ 308.9	\$ -
Finance Charge	6.9	6.8	0.1	10.6	10.6	-
Total	\$ 209.7	\$ 206.5	\$ 3.2	\$ 319.5	\$ 319.5	\$ -

Nodal program costs reflect concentrated activity through mid-year, then trending downward toward transition

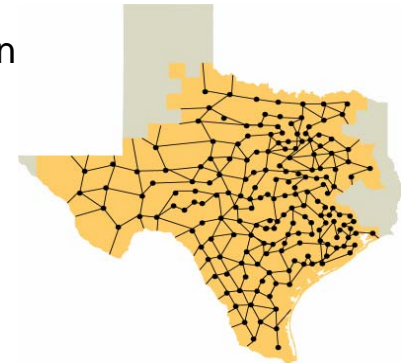


Note: Costs exclude contingency and financing charges; spike in December expenditures reflects vendor payments (~\$4 million); January is understated slightly due to a lack of accruals

Questions ??



ERCOT Nodal Market Transition



Nodal Update Appendix

(Not covered in 3.18.08 presentation)

Key milestones coming up in the next month...

Project	Upcoming Highlights
EDW	<ul style="list-style-type: none"> • Complete FAT for initial build of EDW reports for State Estimator and MMS • <i>Implication:</i> Reports on Nodal EMS performance
CDR	<ul style="list-style-type: none"> • Complete and deploy Current Day reports (CDR) initial build. Included are reports for real time analysis, forecast information, system adequacy, and Day Ahead reports • <i>Implication:</i> Market Participant will be able to access reports about Nodal real time and day ahead system performance.
OS	<ul style="list-style-type: none"> • Complete full functionality for Outage Scheduler, including API, and start market trials (EDS 4 R9.2) • <i>Implication:</i> Market Participants will start testing the Outage Scheduler tool through either the UI or API
CMM	<ul style="list-style-type: none"> • Capability to generate Available Credit Limit (ACL) calculation for Market Participants in .PDF format • <i>Implication:</i> Market Participants can start viewing how their ACL will be provided on a business day basis
MIS	<ul style="list-style-type: none"> • Deployment of MIS Confidential capabilities as well as additional project landing pages • <i>Implication:</i> Market participants will be able to start obtaining information in their private areas on the Portal

Significant progress being made on many projects...

Project	Key achievements
CRR	<ul style="list-style-type: none"> Completed registration, allocation and training for CRR to MPs that are planning to participate in CRR Market Trials. Completed UI and file transfer connectivity testing with MPs in CRR Market Trials <i>Implication:</i> Ready to start CRR Mock Auction (monthly and annual) testing.
EMS	<ul style="list-style-type: none"> Completed testing of major upgrade for Load Frequency Control Market trials. Additional functionality or corrections for VSAT/TSAT, TCM, and RLC have also been delivered <i>Implication:</i> Market Participant testing for Load Frequency Control (EDS 3 R6.2) can start.
NMMS	<ul style="list-style-type: none"> NMMS Patch release for corrections needed for Market trials completed FAT testing and is moving to EDS <i>Implication:</i> Market Participants (TSPs) testing of the NMMS system is planning to start on 3/17 and will continue to May 2008.
COMS	<ul style="list-style-type: none"> The COMS team posted Day-Ahead Market (DAM) settlements statements and invoices using mocked up LCRA data on the nodal website. Market participants can view statements on the Readiness Center. <i>Implication:</i> MPs can start designing and testing their systems to consume the financial information.
MIS	<ul style="list-style-type: none"> MIS deployed landing pages for multiple projects, wind generation portlets, and the LMP contour map <i>Implication:</i> Market participants can now view LMP prices on a map and also obtain test wind generation information

Key risks remain and include the following:

Risk	Description	Likelihood	Impact on Go Live	Mitigation
EIP (Enterprise Integration Project)	<ul style="list-style-type: none"> Lack of source systems ability to validate integration points, impacts re-factoring cycle times and costs 	H	M	<ul style="list-style-type: none"> Building interfaces in advance of applications delivery based on available information expecting re-factoring Testing application and integration in available, sub-optimal hardware / software environments Integration team staffed for re-factoring of interfaces as needed
CIM (Common Information Model)	<ul style="list-style-type: none"> Uncertainty over ability to integrate CIM models may impact data and system quality and testing 	H	M	<ul style="list-style-type: none"> Working with 3 main vendors on multiple iterations of development and validation of CIM import/export Building work-around solution to preserve April 1st start of DAM / RUC EDS trials until importers are successfully tested
Infrastructure constraints (power, space, cooling)	<ul style="list-style-type: none"> Limits speed and scale of environment build outs, impacts development projects, integration, testing, and EDS trials 	L	M	<ul style="list-style-type: none"> Prioritizing build out of environments and applications based on EDS schedule Planning active / standby EDS environment (Austin / Taylor) to eliminate short-term iTest need Building test environment in Blue Building server room Removing <u>all</u> non-essential equipment from Austin data center Compressing Nodal deployment footprint as much as possible
NMMS	<ul style="list-style-type: none"> Single entry model 	L	H	<ul style="list-style-type: none"> ERCOT working with vendor to rectify defects/outstanding issues Single entry model must be in place by July to verify go-live model for CRR auction

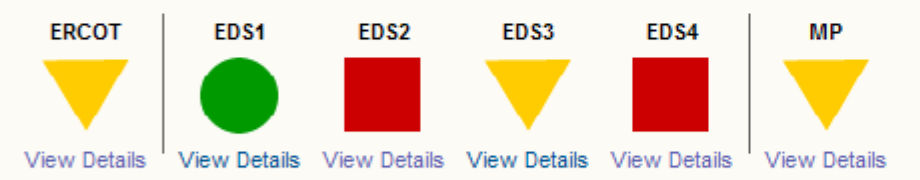


OVERALL READINESS

A successful transition to the nodal market is expressed by a simple equation:

$$\text{ERCOT Readiness} \times \text{Nodal Program Readiness} \times \text{MP Readiness} = \text{Success}$$

The following scorecard illustrates readiness in these three key areas. You may view details for each area or log in to view your organization's individual scorecard.



Legend

- Metric met. No action required.
- Metric missed - first instance. Action required within first reporting period.
- Metric missed - subsequent instance. Action required immediately.
- Future action. No metrics.
- Highlighted icons are clickable to reveal more detail.



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- ❑ The Readiness Scorecard provides significant, easily accessible and transparent visibility about Program status
- ❑ Allows for high level “at a glance” status, as well as “drill down” capability across each area and in each metric
- ❑ Regularly updated and monitored
- ❑ Status is available to anyone through <http://scorecard.ercot.com>
- ❑ Confidential MP status only obtained through user name and password