



Texas Nodal Program Update

Jerry Sullivan

Executive Director, ERCOT

Program Director, Texas Nodal Program

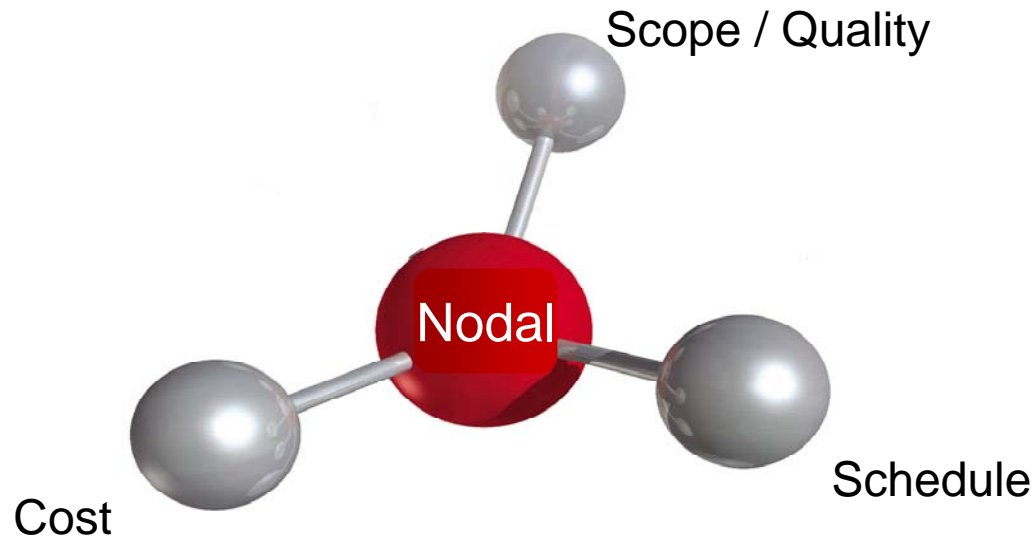
TAC Meeting

March 30, 2007

Agenda

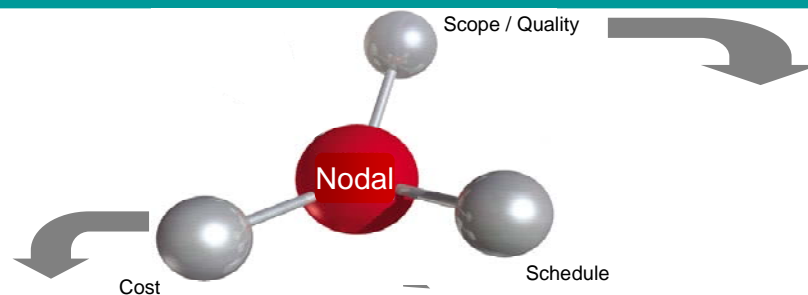
Item	Who	Purpose
Overall Program Status	Jerry Sullivan	For Information
New Nodal Dashboard	“ “	For Information
Nodal Progress Highlights and Details	“ “	For Information
Nodal Schedule	“ “	For Information
Nodal Budget update	“ “	For Information
Staffing update	“ “	For Information
Nodal Program Risks	“ “	For Information
Server Migration (and discussion of impacts)	David Forfia	For Information

Nodal Delivery Success depends on 3 key dimensions...



These three dimensions “drive” the daily routine of the entire program

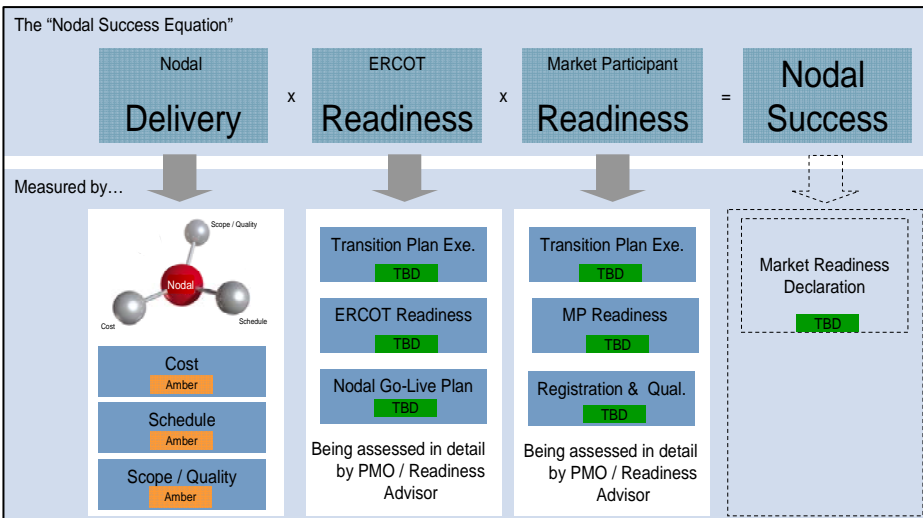
As reported on March 8, program is Amber and it is being assessed continually



	Cost	Schedule	Scope / Quality
	Amber	Amber	Amber
Summary of actions since March 8	<p>Completed a series of budget reviews to ensure program costs are under control.</p> <p>A significant proportion of contingency has been earmarked specifically for EMS, MMS, NMMS and COMS.</p>	<p>Program is expected to deliver successfully on 1 December 2008. Currently planning is to accelerate EDS 3 and 4 to ensure more confidence in the critical path and go-live date.</p>	<p>Still working through scope and cost impact reviews. Previously assessed NPRRs and white papers done at a project level are now being reviewed at a program level.</p>
Legend			
Red	Estimate at Complete = >\$263m	Go-live = >30 days+	Program is not wholly aligned to protocols
Amber	Estimate at Complete = \$248 - \$263m	Go-live = <30 days+	Program is aligned to previous version of protocols
Green	Estimate at Complete = <\$248m	Go-live = 12/1/08	Program is aligned with current protocols

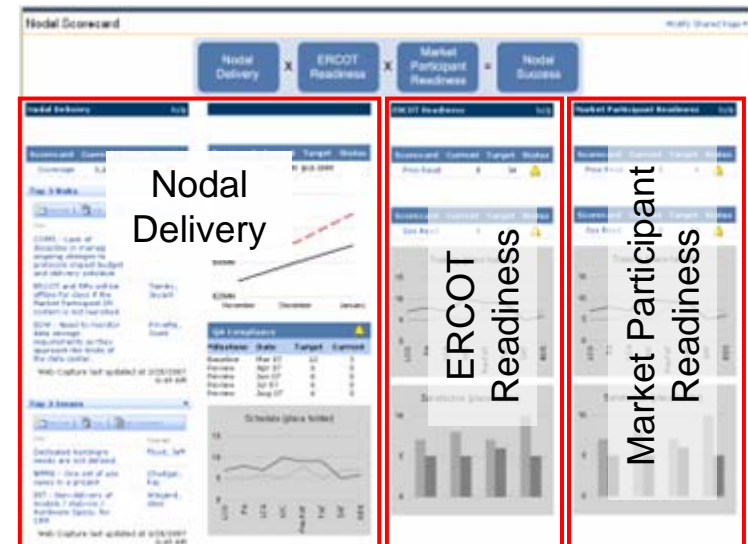
We have just launched the first version of Nodal Scorecard to track progress comprehensively...

Nodal Success is measured by the 3 components laid out below...

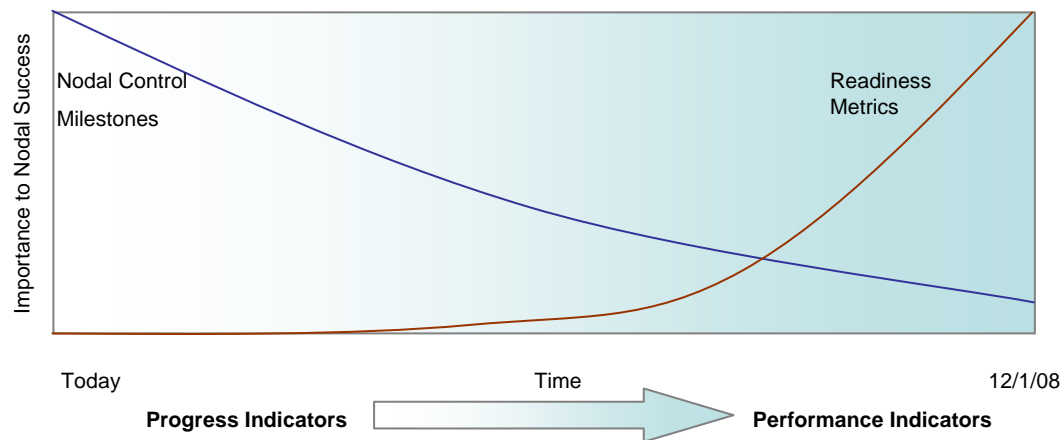


...which are represented on the Nodal Scorecard

Screenshot of 'live' web-based version



Readiness Metrics become important as we approach Go-Live



Readiness Metric Development Phase – Current

- Facilitate the development of metrics with the TPTF Metric Sub Group and ERCOT Business Managers (metric owners)
- Meet with the TPTF Metric Sub Group (MSG) as necessary to address metric issues
- Baseline readiness metrics with TPTF and TAC

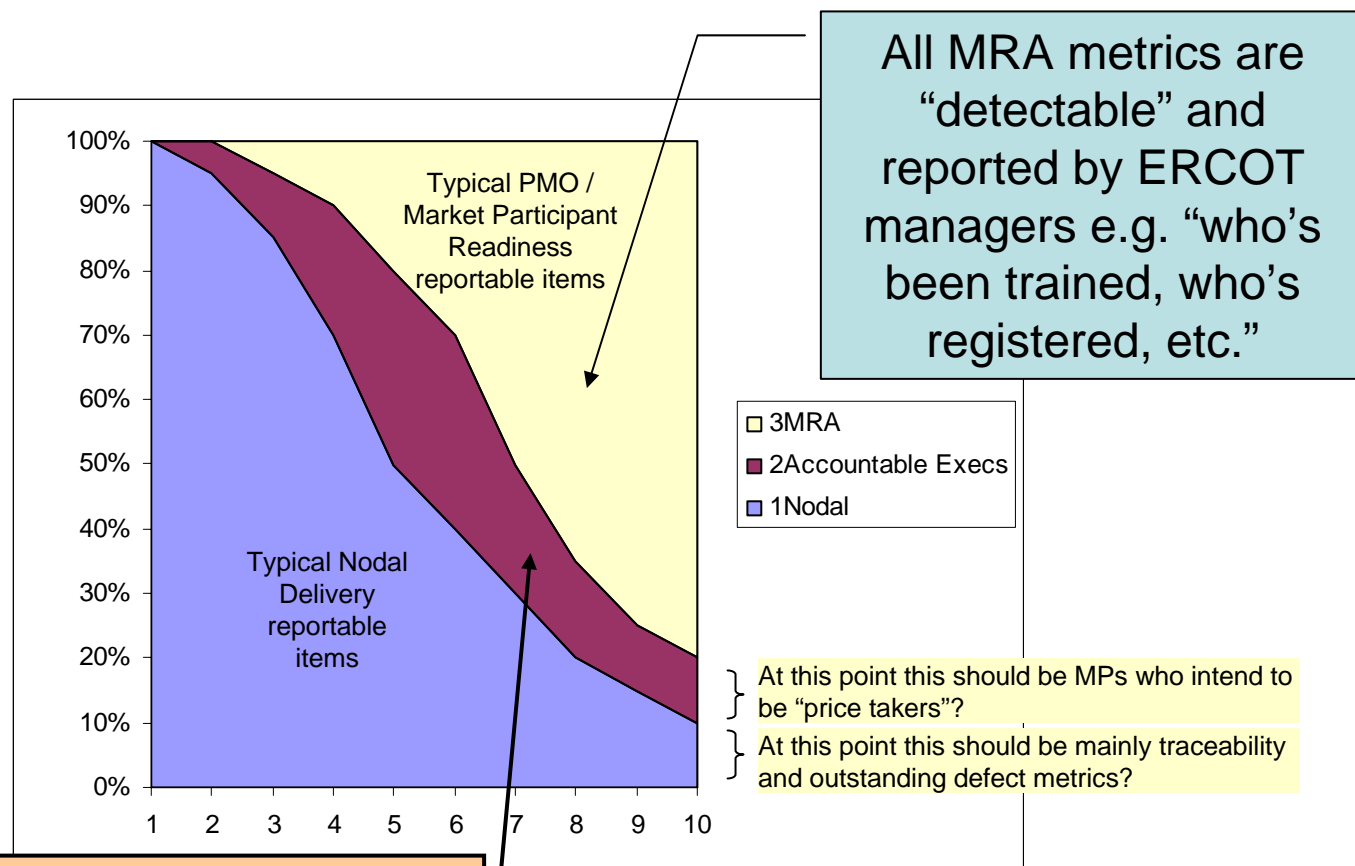
Metric Verification Phase – Begins in April 2007

- Begin collecting metric status
- Incorporate readiness status into program level reports
- Report readiness activities to the TPTF & TAC via nodal program updates
- Report to the main TPTF as necessary to obtain approval for new metrics and changes to existing metrics

Produce Market Readiness Declaration – November 2008

* New version of presentation

There is a gap between what Nodal can measure and what the Market Readiness Advisor's report...



This bit is not yet covered by the PMO / MRA – i.e. self reporting of progress (milestones) e.g. for MP software development

- **Market Operations Sandbox updated 3/22/2007**
 - Two way communications messaging and 3-part offer interface being exposed to Market Participants
- **Launch 1st web-based training module (ERCOT Nodal 101) 3/23**
- **Major vendor reviews held with Nexant (CRR), UISOL (EIP), and Areva (EMS) to resolve outstanding issues**
- **Requirements approved by TPTF**
 - EMS requirements approved 3/1
 - EDW requirements submitted 3/22
- **CSDs approved by TPTF**
 - Approvals for MMS, CRR, MIS and most COMS CSD's approved ahead of schedule
- **MIS Prototypes delivered ahead of schedule**

Progress this Month (March Detail)

■ Program Management Office (PMO)

- Launched 1st version of Nodal Balanced Scorecard
- Presented to PRS on Scope Change Control Process.
- Worked with Change Control to define Nodal scope baseline.

■ Integration Design Authority (IDA) Package

- SoSA CRR Integration
- MIS and COMS use cases being reviewed. Completed 111/177 COMS use cases. 55 have had an initial review.
- Initial review of MMS SCED use cases (15)

■ Commercial Systems Package (COMS)

- Completed functional decomposition reviews with developers.
- Completing Pseudo-code development for Settlements (iteration 1)
- Registration
 - Worked on integration artifacts.

■ Network Model Management System/Network Model Package (NMMS)

- NMMS
 - Updated CIM data dictionary and DB schema (continuous)
 - Finalized IDA punch list
- NMT
 - Working with TDSPs weekly on Network Operations modeling: Now 78% complete with 6,444 identified data issues. The new query (based on the 1/1/07 to 3/1/07 period) results brought in 1,054 additional new pending data issues. Closed 376 issues this week.
 - Critical Measurement/New Telemetry analysis: Now 71% complete with 689 completed out of the 973 identified critical measurements. Worked with AEP this week.
 - Measurement weights: Finalizing review of data changes in the NMT study environment.
 - Transition plan to operations on schedule to complete by 3/31/2007.

■ Energy Management System Package (EMS)

- Presented Proposed EMS-MMS-OTS Nodal Baseline 001 (Change from May, 2006)
- Launched Internal Development & Conducted Meetings to Elaborate Design Details
- Finalized NMMS-EMS (Exporter/Importer) Interface SOW's for AREVA.

■ Market Management System/SCED Package (MMS)

- Successful MMS Design Review for Accelerated SCED Delivery Completed
- Summary: MMS Project On Track for On-Schedule Start Of SCED Pre-FAT

■ Enterprise Data Warehouse Package (EDW)

- EDW Project CSD initial draft completed.
- Protocol 17 requirements doc to TPTF on 3/23/2007.
- EDW Project CSD doc to TPTF on 3/23/2007.

■ Enterprise Integration Package (EIP)

- The External Interfaces Specification draft has been submitted for review. Drafts are in place for 95 defined interfaces, there are no known outstanding interfaces.
- Web Services for 3PO and Boomerang were completed within the defined timeframe.
- Completed code review for common service auditing, external interface template and MMS simulator.

■ Market Participant Engagement & Readiness Package (MER)

- Use Cases approved.
- Prototype 2 reviewed with TPTF on schedule.
- Google appliance installed, tested, evaluation results being documented.
- Dashboard Portlet End to End POC using a mocked up web service.

■ Integrated Readiness & Transition Package (IRT)

- Presented Organization Sizing approach to Nodal Steering Group. Approval received.

EDS 1 & 2

- Received approval from TPTF on EDS 1 plan
- Provided outline of EDS 2 to TPTF on 3/22
- Supported ICCP WebEx with QSE Manager committee
- Continued beta P2P checkout. 9 TSPs tested. 4 QSEs tested

Readiness Advisor.

- 114 Metrics
- TPTF Approved: 10 (last week:10)

■ Infrastructure Package (INF)

- MP Identity Management: Third Pass of vendor proposal received.

■ Integrated Testing Package (INT)

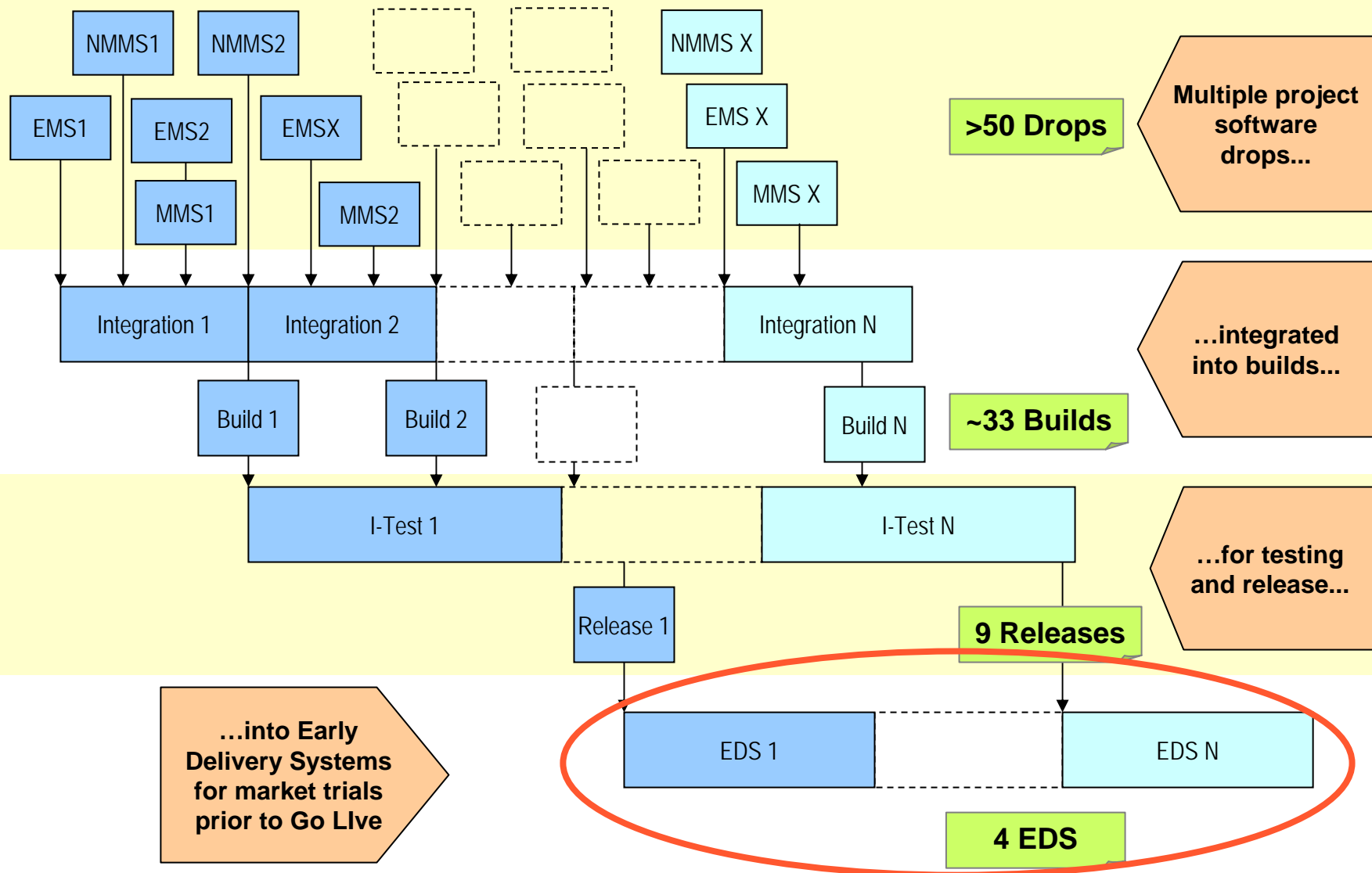
- Created draft Registration test plan.
- Verified VPN Access has Passed the Security Signoff
- Received final approval for external testing configuration via guest network
- Draft of Test Data GUI interface
- Produced Utility to create test scripts from QC and Test Data

The short-term milestones are mostly on track

<i>Control Milestone</i>	<i>Baseline</i>	<i>Actual/F'cast</i>	<i>Comment</i>
Requirements approval	10/31/2006	3/31/2007	EMS requirements have been approved by the TPTF. EDW requirements submitted to TPTF on 3/22/2007
Interface specs – final	3/31/2007	3/30/2007	On schedule, working with MP subgroup
3 part offer & Boomerang Sandbox	3/23/2007	3/23/2007	Two way communications messaging service and 3 part offer interface being exposed to MPs
EDS 1 Start	5/15/2007	4/01/2007	Phased approach to achieving EDS 1 objectives
Enterprise Integration Build Vendor Selected	3/31/2007	4/09/2007	On schedule
Sandbox Release Plan	4/30/2007	4/30/2007	IRT and EIP teams working to identify key features to be exposed to MPs
EMS CSD Submitted to TPTF	4/30/2007	4/30/2007	On schedule

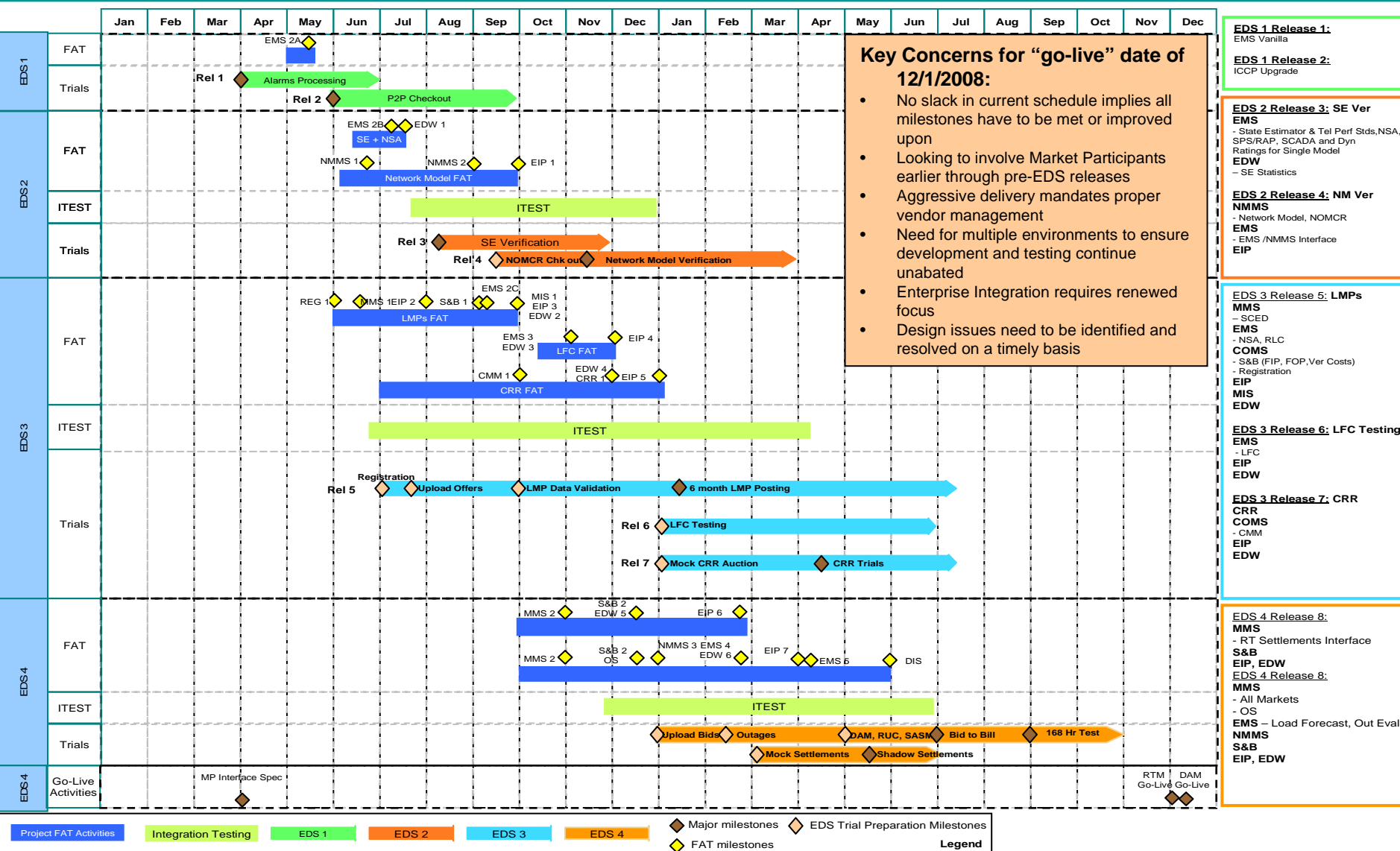
Critical path – overview of complexity

New effort is to improve EDS dates (see red oval below)



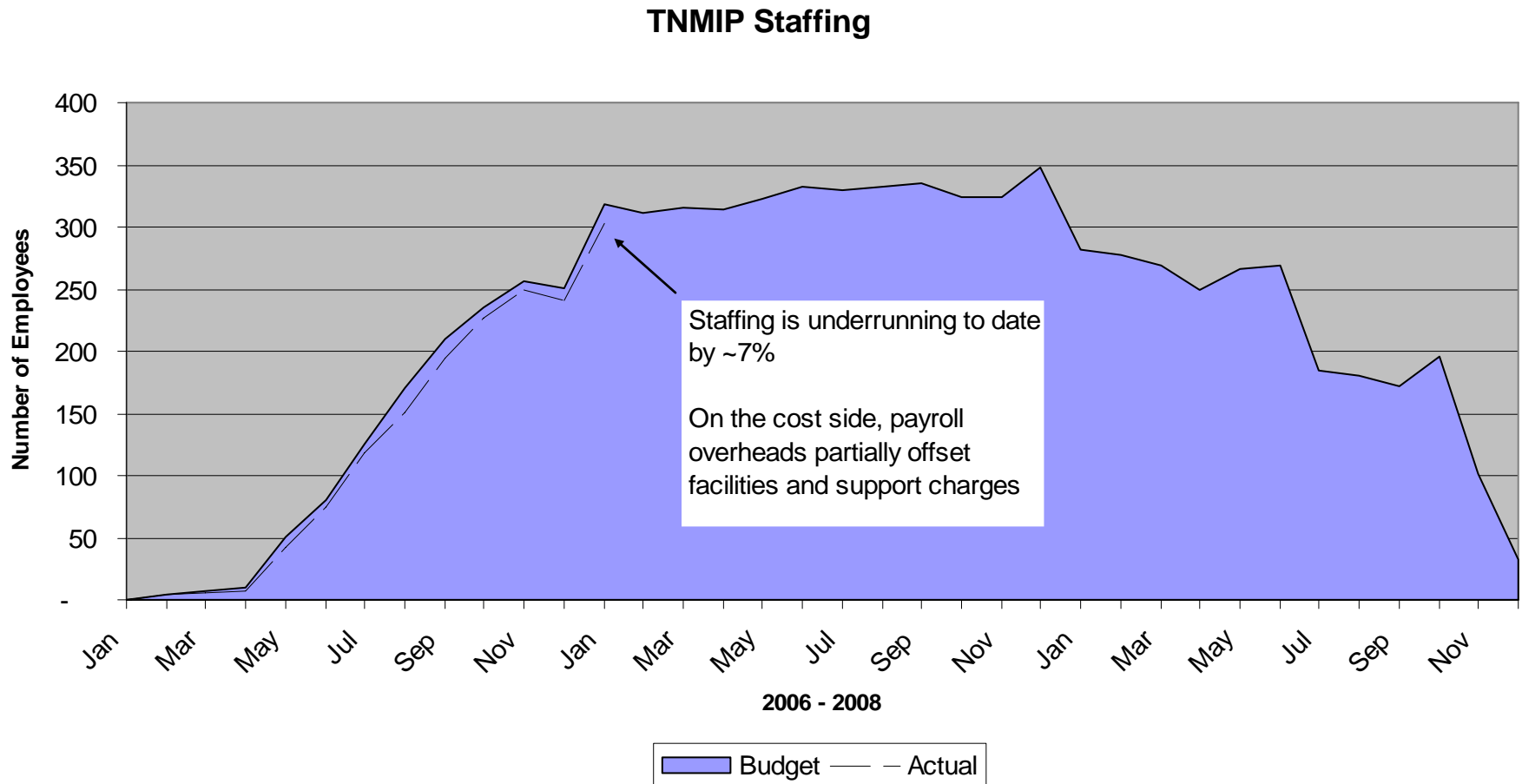
Time Line Update by Early Delivery System (EDS)

The Optimized Program Schedule shows a Go-Live of 12/1/2008



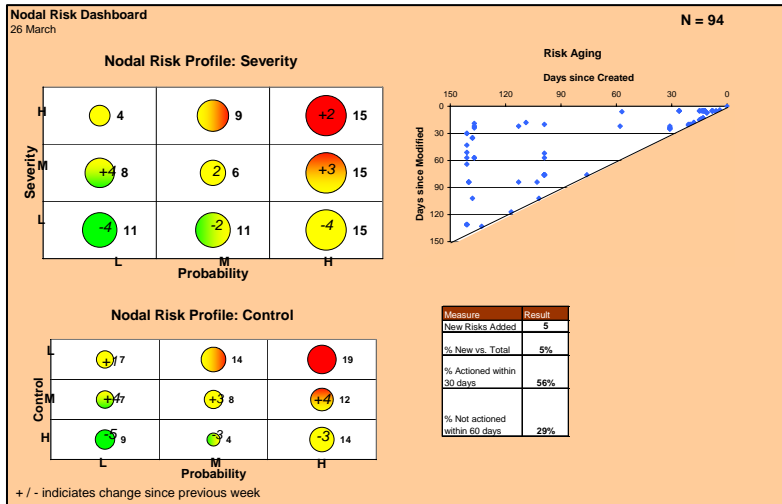
EXPENDITURE CATEGORY	FEB	Program Total
❑ O&M Expenses (\$000's):		
▪ Internal Labor	5	1,716
▪ Equipment, Tools, Materials & Supplies	4	55
▪ Outside Services/Consulting	3	4,924
▪ Software license	53	177
▪ Hardware	49	199
▪ Facilities & Utilities	0	1
▪ Employee Expenses	0	34
▪ Interest and Fees	62	492
▪ Depreciation and Amortization	477	3,821
▪ Other	643	2,717
▪ Sub-Total	1,300	14,137
❑ Capital Expenditures (\$000's):		
▪ Sub-Total	8,076	55,878
❑ Total Expenditures (\$000's)	9,376	<u>70,016</u>
❑ Commitments		\$49,114

The staffing trend to date shows that Nodal is currently 7% under projected staffing levels...



The program is currently managing ~100 risks...

Nodal Risk is captured on a risk dashboard which shows profiling and aging information...



...which is aggregated from detailed risk entries from the Nodal projects

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
1	Issue #	Assigned To	Status	Type	Owner	Title	Priority	Sev	Contn	Prds	Preld	Cost Impact	Schedule impact (Weeks)	Probability											
40	98	Steve - Shiloh	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
41	99	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
42	100	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
43	101	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
44	102	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
45	103	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
46	104	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
47	105	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
48	106	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
49	107	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
50	108	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
51	109	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
52	110	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
53	111	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
54	112	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
55	113	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
56	114	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
57	115	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
58	116	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
59	117	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
60	118	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
61	119	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
62	120	Andrew Grier	Identified	Program Risk	Chudgar, Jerry	ERCOT and MPs will be offline for days if the Market Part						\$ 6,000,000		7.00%											
63	121	Andrew Grier	Identified	Program Risk	Chud																				

Risk	Owner	Description
ERCOT and MPs will be offline for days if the Market Participant IM system is not launched	Sullivan, Jerry	The MP Identity Management System is a key element of the Nodal system that currently cannot be implemented due to lack of funding.
INT - Window for Integration testing gets compressed to unacceptable/in-feasible level	Wingerd, Glen	No accurate detailed plan of code/module/function delivery from project teams resulting in the inability to accurately plan for test cycles
INT - Late Delivery of code/modules/functions	Wingerd, Glen	Late Delivery of code/modules/functions causing delays of delivery to EDS
INT - Poor documentation (requirements, Use Cases, Test Cases)	Wingerd, Glen	Poor documentation (requirements, Use Cases, Test Cases, Design Documents, CSD) resulting in inadequate testing and risk to production systems.
NMMS - One set of use cases in a project	Chudgar, Raj	This was discussed at the technical risk forum. Background: Multiple sets of use cases are observed in the project.
Dedicated hardware needs are not defined.	Floyd, Jeff	The quantity and specification for dedicated servers are not know at this time.
CMM - Credit Monitoring Integration	Chudgar, Raj	Integration of the information is critical, but also critical is the timing of the credit exposure business process and application built in capabilities to limit bids"
NMMS - On-time Deployment	Chudgar, Raj	"NMMS must be deployed in time to load the static data so that ERCOT can provide the model for SE and SCEED testing in 2007.
COMS - Lack of discipline in managing ongoing changes to protocols impact budget and delivery schedule	Chudgar, Raj	Currently the MPs are making significant changes to Sections 4, 6, and 7. These changes HIGHLY impact Comm. Systems. Some of the impacts have meant clarifications to our assumptions and others have forced rework.
Vendor deliveries may not be aligned with market trials timelines and scope	Grendel, Steven	This risk will become an issue if development, FAT, or SAT testing exceed time allotted in the critical path. This will impact IRT's timeline for training users (on the systems), validate functionality in the Sandbox and/or EDS environment, late start of interaction with MPs



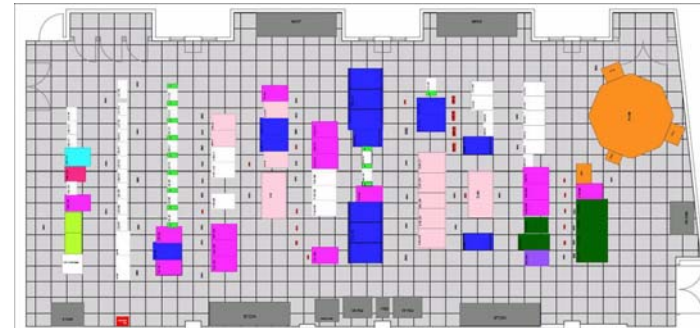
Texas Nodal Market Implementation Data Center Data Migration

ERCOT IT
Data Center Infrastructure

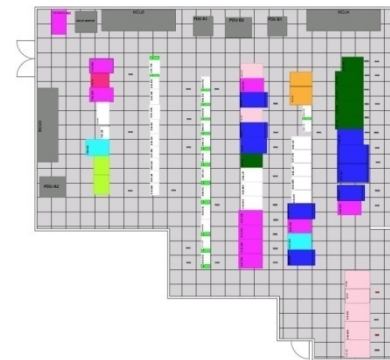
Current Situation

- **ERCOT Data Centers**

- There is a need to increase storage and test environments due to Nodal demands along with Zonal projects
- We have a proven technology solution in the Nodal budget
- Nodal already paid for the new technologies
- The new solution has lower operating costs, higher reliability, and reduces the space and electric requirements



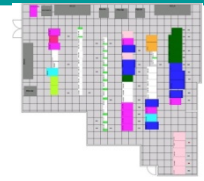
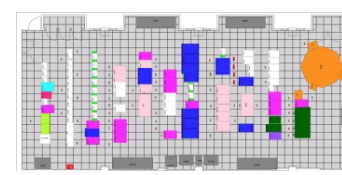
TCC-1 Data Center (floor schematic)



Austin Data Center (floor schematic)

- **We will do this with the minimum disruption**
- **We have a plan to:**
 - Minimize the risk
 - Maximize the benefit
 - Lower overall costs
 - Safeguard Market Operations
 - Improve service levels
 - Not affect Texas Set 3.0
- **However, there are always risks to be aware of in server migration**
- **We are working with all the project managers and ERCOT committees to reduce risk and to optimize the timing.**
- **We'd like to discuss why and when we are doing this migration.....**

Nodal data reqm'ts are immense but being covered



		TCC-1	Austin
Currently operating all data centers at or near maximum power capacity <ul style="list-style-type: none"> Computing capacity needs have grown over the past 4 years with each subsequent project implemented 	Max Storage Capacity	~600 TB	~600 TB
	Current Level	234 TB	226 TB
	Max Usable Power	202 KVA	180 KVA
	Current Level	185 KVA	183 KVA
	Annual Costs	\$2.4 M	\$1.3 M

Recovered enough data center capacity for the Texas Nodal Market Implementation to date			
<ul style="list-style-type: none"> Replacing older equipment with more efficient newer equipment 	Replaced	<ul style="list-style-type: none"> Storage Arrays Dell Servers Sun Servers 	<ul style="list-style-type: none"> Storage Arrays Dell Servers
<ul style="list-style-type: none"> Currently at power threshold in Austin Data Center until EMMS production migration complete 	Criticality is:		Austin
<ul style="list-style-type: none"> New equipment is installed along with old equipment and more equipment coming 	New vs. Old	<ul style="list-style-type: none"> Production EMMS Citrix IBM Unix Servers 	<ul style="list-style-type: none"> Production EMMS Citrix IBM Unix Servers

Why it is complicated

- **Standard refresh of Unix Servers not included on release schedules**
 - Project is on IO CART's PPL list for 2007
 - More complicated because of technology change
- **Nodal EDS 3 release for January 2008 requires equipment installations in September 2007**
 - “Production ready” for market trials
 - Becomes the disaster recovery area for Nodal after go live
- **We are determining the migration plan now**
 - Will be timed during normal releases
 - We have built in contingencies
 - IBM is assisting us with the migration

Only 73 Servers of 1,000 Servers need migration, this will provide 2-3 years of time, until more power is brought in

Timing of migration is important since equipment and storage is needed by September 2007

We are carefully planning this effort to minimize any impact to market operations

Questions