Texas Nodal Market Implementation

ERCOT Board of Directors Meeting

Nodal Status and Budget Review

November 14, 2006

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- **Program Status and Spending to Date**
- **Procurement Practices**
- **Proposed Budget Baseline**

Progress this Month

- **Program Management**
  - Working through recruitment of Executive Director for Nodal
- **IDA Package**
  - Database Hosting and Oracle baseline Standards in final review
  - System of Systems Architecture (SoSA) Domain Model initial draft produced
  - ERCOT RUP website first draft produced, 20 of 27 document templates drafted for internal review
- **Commercial Systems Package**
  - Received TPTF approval of 18 of 27 Commercial Operations Business Requirement Documents (initial TPTF presentations complete for all requirements)
  - Lodestar Prototype underway. Initial 2 of 3 sets of recommendations complete. Remainder is on schedule to complete initial assessment by end of November
- **NMMS/Network Model Package**
  - Conceptual System Design scheduled for TPTF submission in December
  - Network Modeling forum (involving TSPs) scheduled for mid-November
  - Initiated discussions with AREVA regarding NMMS-EMS interface
- **EMS Package**
  - Project team restructured under MMS Project Manager, recovery in process
  - AREVA has fully endorsed recovery and replaced their Project Manager
  - KEMA SME staffing now responding well under ERCOT direction
- **MMS/SCED Package**
  - All five (5) MMS requirements documents scheduled for TPTF 11/7
  - ABB began Phase 2 implementation of SCED in October
- **CRR Package**
  - CRR Business Requirement document approved by TPTF
  - Conceptual System Design draft to be presented to TPTF week of 11/6
- **EDW Package**
  - IMM requirements, Protocol 17, were presented to TPTF for review for approval. Contact has been established with Potomac Economics for WEMM input
  - Compliance requirements, Protocol 8, is underway
  - Charter revised and reviewed with EDW Executive Sponsor for review with EDW Steering Committee
- **Integration Package**
  - First design iteration for MMS to Settlement proof of concept on schedule
  - Phase 2 plan to address other high-risk interfaces drafted

- **Market Participant Engagement & Readiness Package**
  - TPTF – First Conceptual System Design Document review scheduled for November 6. Status of TPTF Review of Business Requirement Documents:

COMS	18 approved	7 pending (2 referred to COPS)
CRR	1 approved	0 pending
MIS	1 conditionally approved	0 pending
EMS	0 approved	12 pending
MMS	0 approved	5 pending
EDW	0 approved	2 pending

  - Customer Care / Market Participant Readiness – Status of MP Executive identification: Approx. 1/3 of QSEs identified, 2/3 of TSPs identified.
  - MIS - Requirements approved conditionally, design papers under review, Vendor Document and Project Plan delivered, Integration team engaged
  - Training – Nodal 101 offsite training big success!, Economics of LMP class standing room only and booked full through the end of the year, “Day in the Life of an Operator” planned and in design
  - Communications – Over 5000 visits to the Nodal site in October. Top content is 1)NPRRs, 2)Working Docs, and 3)Training Materials. FAQ section of Nodal site in planning.
- **ERCOT Readiness & Transition Package**
  - 7 of 8 revised Operating Guides sent to Market Rules
  - Approximately ½ of the identified ~600 process/procedure documents assessed for Nodal impact; analysis to follow
  - Defining / Refining Vendor (COTS) Training Curriculums
  - EDS 3 Configuration overview under internal review prior to TPTF submission
  - Qualification Approach under internal review prior to TPTF submission
- **Infrastructure Package**
  - Installation of the storage array and IBM equipment for the Taylor data center approved at the September board meeting has begun
  - MMS development environment at ABB, setup started 10/30
  - NMMS development environment for Siemens purchasing started
  - Integration Proof of concept environment deployed
  - MIS Proof of concept environment deployed
- **Integrated Testing Package**
  - Staffing for Q4 completed
  - Multiple testing proofs of concept under way: test status dashboard, Greenhat (TIBCO testing tool), integration with RequisitePro (for traceability)
  - Preparations for ITest of first application (Learning Management System) under way

- **IBM conducted an initial assessment of the existing Nodal Program Controls**

- **<u>Overall results:</u> *"IBM observed key strengths in the Nodal Program Controls that will provide a good foundation for overall program controls."***

<u>Key Strengths</u>	<u>Key Gaps</u>
•Program Definition Structure	•Standard Estimating Model
•Status Reporting	•Configuration Management
•Key Performance Indicators	
•Risk Management	
•Program and Project Contingencies	
•Work Plan Management	

- **Nodal Program has reviewed both weakness points and have initiated corrective measures or explanations for gaps**

Overall program status is red, based on delays to Requirements

Key Requirements will not be approved by 10/30:

Outstanding Requirements	Projected TPTF approval date
EMS – 12 (of 12)	**12/'06**
MMS – 5 (of 5)	**11/'06**
Commercial Systems – 7 (of 27)	**11/'06**
EDW – IMM (1 of 1) and Compliance (1 of 1)	**12/'06**

The Chairman is preparing a letter for Market Participant executives to encourage active participation in TPTF review and approval of Nodal documents

Replacement Program Director:

- Interviews are underway for the permanent Executive Director position to lead Nodal
- Ron Hinsley has assumed this position in the interim, supported by PA Consulting

The program team is stable, momentum is maintained on current plans

EXPENDITURE CATEGORY	OCT	YTD
❑ O&M Expenses (,000):		
▪ Internal Labor	71	2,138
▪ Equipment, Tools, Materials & Supplies	3	39
▪ Outside Services/Consulting	251	2,782
▪ Facilities & Utilities	40	307
▪ Employee Expenses	3	32
▪ Interest & Fees	20	124
▪ Other	5	13
▪ Sub-Total	393	5,435
❑ Capital Expenditures (,000):		
▪ Sub-Total	5,197	14,375
❑ Total Expenditures (,000)	5,590	19,810[1]
❑ Commitments		47,541[2]

Notes:

[1]Total spending through September $14,220K, as noted in project summaries

[2]Reflects total value of Nodal Purchase Orders for goods and services, less payments, at 10/31

- **Program Status and Spending to Date**
- **Procurement Practices**
- **Proposed Budget Baseline**

- **All purchases that exceed a minimum $ threshold are competitively bid**
  - Additionally, price and/or cost analysis is completed on every procurement to establish that pricing is “fair and reasonable”
  - Negotiate as applicable, to achieve ERCOT objectives
- **Sourcing**
  - Single source - justification required including specific rationale, and requires both business and procurement management approval
  - Source selections based on obtaining the best “overall value” considering cost, quality, technical capability, service, delivery, and/or other criteria
- **Vendors**
  - ERCOT verifies legal status, financial viability, and that no conflicts of interest exist
- **All contracts are drafted / reviewed by Legal or Contract Administration to assure compliance with ERCOT T&C standards**
- **All procurements are approved by appropriate levels of management prior to award**

- **Initial review / approval by Procurement / Contracts / Legal personnel**
- **Approval for all PO's / contracts based on corporate policy (employees only)**

  A) Manager <= $50k
  B) Director <= $100k
  C) Vice President <= $350k
  D) CEO <= $1M
  E) BOD > $1m

- **Single source justifications – based on $ level above + 1 level higher**
- **Management exceptions for deviation from standard procedures, use of certain types of contracts, or use of T&C's outside of normal acceptance parameters require VP approval and approval by both the CFO and CEO**

A) Internal Audit

2006 Audit Plan

1. **Audit of procurement and contract administration (in progress)**
2. **Fraud prevention program administration (continuous testing)**
3. **On boarding and exiting of employees and contractors (issued 9-14-2006)**
4. **Limited-scope audit of Nodal contractor and employee expenses (issued 11-2-2006) - *"Internal audit found no reportable issues with regard to the Nodal contractor or employee expenses"***

2007 Audit Plan (as proposed)

1. **Fraud prevention program administration (continuous testing)**
2. **Audit of consultants/contractor compliance & purchases, procurement, and billing process**
3. **Audit of Nodal contractor/vendor billings**
4. **Audit of Nodal compliance with procurement guidelines**
5. **Audit of Nodal signing authority and delegation of authority**
6. **Audit of Nodal recruiting (decision process for selection of employees & consultants)**
7. **Audit of Nodal ethics compliance (contractors & employees)**
8. **Audit of accounts payable**

B) External Audit

1. **D&T – Audit of internal controls (complete 11/06)**

2. **PwC – Establish scope of annual financial audit considering size and complexity of Nodal**

3. **IBM – Key strengths provide good foundation for overall program control**
   - Gaps include lack of modeling approach to estimate overall effort and costs

C) Internal Control Management Program (ICMP)

1. **All internal control processes recently validated by D&T are in effect**

This document provides a high-level overview of the proposed Nodal budget

This material has been reviewed by TPTF and TAC

- Options for value engineering changes to the project scope were considered
- TPTF concurred that the materials presented meet the:
  - Scope of the requirements of the Nodal Protocols
  - Timeline for implementation approved by TPTF and TAC
  - Requirements of the TAC approved Nodal Transition Plan
- TPTF made no finding with regard to the total amount of the proposed budget

We seek concurrence with the proposed Nodal budget and TPTF's findings

Following such concurrence, ERCOT will baseline[1] the budget (to complement the scope and timeline) and prepare the updated Nodal market implementation cost filing for 1Q2007

[1] The baseline represents the accepted cost-schedule-scope equilibrium on the project, and forms the basis for comparing progress. Changing the baseline is a big deal as it represents a change in the equilibrium and requires explicit approval.

The program is driven by PUCT Order and requirements developed with Market Participants

The principal binding document (the Protocols signed into Order, Docket #31540) established the major requirements for the Nodal Program:

- The scope of Nodal
- The implementation date (1/1/09)

Market Participants established the ERCOT Nodal Transition Plan, which sets requirements for approach and implementation:

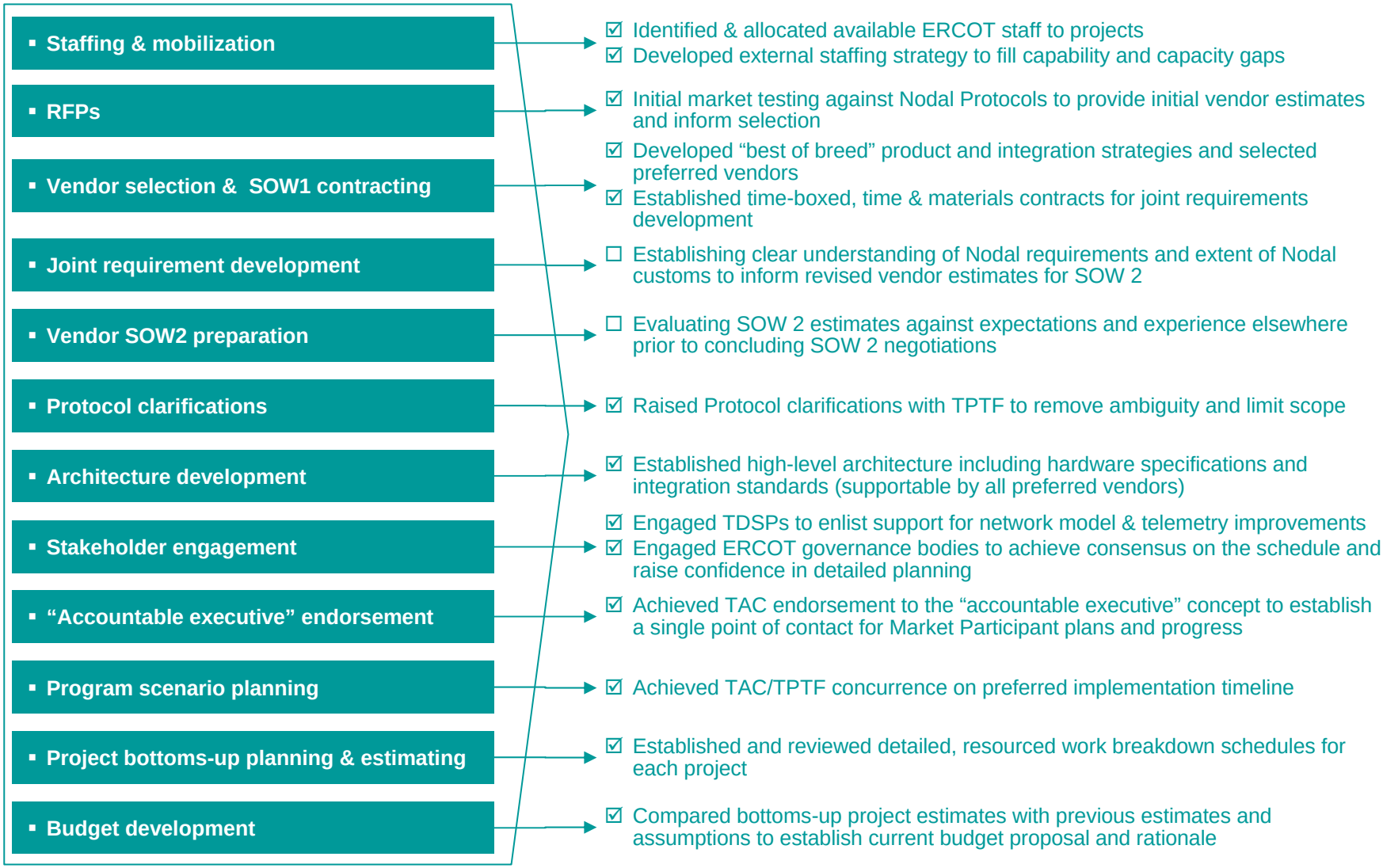
- The requirements for Market Participants review of all business requirements and design documents provides transparency in development
- The market trials sequence and requirements for Early Delivery Systems (EDS) to enable Market Participants to test and gain confidence in the new systems and processes
- The comprehensive training curriculum enables Market Participant and ERCOT staff readiness

The Nodal budget is driven by a number of factors

It is predicated on:

- The scale and complexity of the changes
- The vendor and integration approach
- The implementation sequence and timeline
- Zonal/Nodal interdependencies

The current budget has been through multiple cycles of elaboration and due diligence



The proposed baseline budget

9/06 Program Estimate

	Total
Internal Resource Costs	43,014,791
External Resource Costs	73,389,897
Vendor Labor	32,882,783
Hardware, Software, misc.	51,075,609
Finance Charges	10,600,000
Contingency	15,000,000
"Normalized" Total Budget[1]	**225,963,079**
Zonal/Nodal Dependencies	37,000,000
Grand Total	**262,963,079**

+80%

12/05 High-Level Estimate

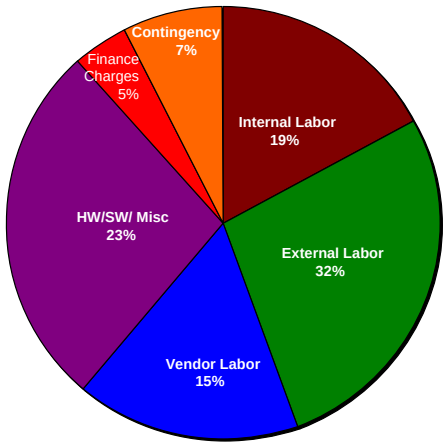
Total
15,752,316
36,755,404
6,482,000
37,281,455
5,313,468
24,067,794
125,652,437

+66%

11/04 CBA (KEMA)

Total
-
-
-
-
Not included
-
78,429,600

	Dimensions	Dimensions	Dimensions
Project duration	32 months	30 months	18 months
Composite labor rate	$100.5/hour	$100/hour	$137.5/hour
Contingency (vs base)	7%	25%	35%



66% of Nodal Program budget[1] is labor: $149MM

12/05Assumptions:

- Funding from Zonal includes: 50% Network Security Upgrade, EMS upgrade, 80-90% of NMMS
- OTS scope narrower (expanded as a result of ABB MMS selection)
- Model fidelity scope narrower (cf Nexant)
- Integration within projects, thus SOA would leverage Zonal resources and cost when needed
- MIS enhancement, not re-design
- Excluded SAS 70 and a greater proportion of ERCOT Readiness and Transition is O&M

11/04 CBA Assumptions:

- Use of automated Regression Testing tools limited to Commercial Systems
- Included facilities labor and activities (modifications to existing data centers and work area and incremental hardware)
- Minor incremental hardware
- Single vendor for EMMS (EMS, MMS and CRR); only modifications to Operator Actions, LFC/SCED, NSA, LMP calc and AS Monitoring. Excluded Load forecasting, Outage Scheduling and OTS.
- Few ERCOT.com and MIS changes, DAM and (Zonal) Portal Replacement Project will absorb some of these costs
- Training resource estimated at 6 FTE for 6 months (EMS, MMS and CS)
- Auction-based DAM will be implemented prior to Nodal; related ADAM costs considered sunk.

Major differences between the current estimate and the interim fee case (by Project)

Project	Current Estimate $M	Zonal/ Nodal Dependencies $M	"Normalized" estimate $M	Interim Fee Case $M	Under-estimate $M
Program Management (PMO)	7.1	-	7.1	2.0	5.1
Integration & Design Authority (IDA)	6.8	-	6.8	2.0	4.7
Network Model Management System (NMMS)	12.7	12	0.7	0.6	0.1
Energy Management System (EMS)	17.5	8	9.5	4.3	5.2
Market Management System (MMS)	26.3	-	26.3	10.9	15.4
Congestion Revenue Rights (CRR)	6.3	-	6.3	4.5	1.8
Commercial Systems (COMS)	14.8	-	14.8	9.1	5.7
Enterprise Integration (EIP)	12.3	-	12.3	0.5	11.9
Enterprise Data Warehouse (EDW)	4.0	-	4.0	2.5	1.5
Market Information System (MIS)	7.8	-	7.8	0.4	7.4
Infrastructure (INF)	61.8	17	44.8	32.9	11.9
Integration Testing (INT)	17.0	-	17.0	7.4	9.6
MP Engagement & Readiness (MER)	13.7	-	13.7	8.6	5.1
ERCOT Readiness & Transition (IRT)	29.3	-	29.3	10.7	18.6
Finance Charges	10.6	-	10.6	5.3	5.3
Contingency	15.0	-	15.0	24.1	(9.1)
TOTAL	**263**	**-** **37**	**=** **226**	**-** **125.7**	**=** **100.3**

Explanation of major differences

Item	Commentary	Zonal/Nodal dependencies $M	Under-estimate $M
ERCOT Readiness & Transition	▪ Greater effort and longer duration than previously estimated (includes training for 393 ERCOT staff – 67 hours average)	-	18.6
MMS	▪ Vendor cost previously under-estimated. Selected vendor (ABB) providing a modern product, consistent with ERCOT's architecture roadmap ▪ Development split to deliver SCED in advance of balance of MMS	-	15.4
Infrastructure	▪ Unix end-of-life previously assumed Zonal ▪ Data center virtualization previously assumed Zonal ▪ EDW storage, Oracle support and hardware previously assumed Zonal	17	11.9
Integration	▪ Much greater complexity of integration than previously assumed (much larger number of vendors resulting from best-of-breed product selection & greater complexity of ERCOT-specific data elements e.g. CIM extensions)	-	11.9
PMO & IDA and Audits	▪ PMO, architecture and RUP consulting support to enhance program & technical delivery capability previously under-estimated ▪ SAS 70 (part 1), Security & Program Control audits not included in previous estimate	-	9.8
Integration Testing	▪ Longer duration and more functional (end-to-end) testing than previously estimated	-	9.6
MIS	▪ Need to enhance usability and user experience requires portal replacement	-	7.4
Commercial Systems	▪ Greater effort and vendor costs than previously estimated	-	5.7
EMS	▪ EMS upgrade previously under-estimated and assumed Zonal ▪ Nodal customs previously under-estimated ▪ New outage scheduler previously under-estimated (vendor selection – ABB – governed by MMS selection)	8	5.2
MP Engagement & Readiness	▪ More training and customer care required by market participants than previously estimated	-	5.1
NMMS	▪ Majority of NMMS development and all SE/Network Model fidelity work previously assumed Zonal	12	0.1
Miscellaneous	▪ Miscellaneous increases against previous estimates in CRR, EDW	-	3.3
Finance charges	▪ Current estimate $10.6M (previous $5.3M)	-	5.3
Contingency	▪ Current contingency $15M (previous $24.1M)	-	(9.1)
		37	**100.3**

Nodal budget big picture

Budget	Description
$125.7M	Basis for Interim Nodal surcharge, budget created December 2005 ▪ Submitted to PUCT in April 2006
+	
$100.3M	Underestimated costs ▪ Market trials and training ▪ Architecture, RUP, PMO, and integration ▪ Product cost ▪ Miscellaneous (e.g. audits, testing)
=	
$226M	"Normalized" Nodal budget
+	
$37M	Zonal / Nodal project dependencies ▪ Infrastructure - $17M ▪ EMS - $8M ▪ NMMS, network model & telemetry - $12M
=	
$263M	**Total cost of Nodal**

Appendices – Project Summaries

Description: *Market Participant approval of Nodal designs, preparation for and participation in testing and trials, training and readiness live nodal operations.*		
Project Manager: Trip Doggett	***Vendor(s):*** *N/A*	
Budget: ***$21,543,878***	***Actuals YTD:*** ***$1,334,756***	***Actuals Total:*** ***$ 1,334,756***

Key deliverables/short term deliverables:

- *Training design (to accommodate several learning styles) development & delivery, and web-based training*
- *Communications*
- *TML replacement with new MIS web portal*
- *Market Participant Readiness Criteria, status reporting & Declarations*
- *Customer Care*

Key Assumptions:

- *TPTF is the primary Market Participant representative body for Nodal*
- *Engagement with Market Participants will comply with the requirements of the ERCOT Nodal Transition Plan*

Challenges/Risks:

- *Market Participant mobilization and active engagement in support of overall nodal project*
- *Number and heterogeneity of Market Participants*
- *Competing demands – including training development – for SME resource bottlenecks*

Comments:

- *Market Participant Accountable Executive concept being implemented*
- *TPTF workgroups being established (for MIS portal and Training consultation) where needed*

MER (excluding MIS): Cost Summary

	9/06 Program Estimate		12/05 High-Level Estimate		11/04 CBA (KEMA)
	Total		Total		Total
Internal Resource Costs	4,184,440		2,547,568		-
External Resource Costs	8,812,280		5,944,326		-
Vendor Labor	57,900		64,820		-
Hardware, Software, misc.	664,163		67,940		-
Total	13,718,783	+59%	8,624,654	+184%	3,036,000
	Dimensions		Dimensions		Dimensions
Project duration	30 months		30 months		10 months
Composite labor rate	$122/hour		$100/hour		$137.5/hour
Contingency (vs base)	(see summary)		25%		35%

Cost drivers for Training:
- PUCT concern that MPs have adequate opportunity to learn more about the Nodal model
- Training targeted for over 10,000 training attendees
- Multiple training delivery mechanisms: face-to-face, Web-Ex, Self-Paced web-enabled
- 7500 Hours of Face to Face course delivery prior to 12/1/08
- Very large curriculum of training supported – 38 courses hosted, 19 developed by project team
- TPTF Concern over training readiness requires extensive team support

Cost drivers for Customer Care:
- Ratio of 1 Account Manager per 10-14 QSEs.
- Includes an Online Help Center (web-based) and “extension 3900” support.
- Includes sending required market notices.

Cost drivers for TPTF:
- 5 meeting days per month; at the MET center (no travel or outside facility costs)

Cost drivers for Communications:
- Current publications and web work, including postings

Cost Drivers for MP Readiness Criteria:
- Four auditors will make 45 site visits each, with a travel budget, to Market Participants to gather data from Market Participants on their progress toward meeting the criteria, and will report that progress to the MRA. MRA not in MER budget.

12/05 Assumptions:
- Includes training and LMS
- Excludes approval process

11/04 CBA assumptions:
- Training included planning, curriculum design & development.
- Training resource estimated at 6 FTE for 6 Months (split evenly between EMS, MMS and Commercial Operations topics. Excluded basic ERCOT training as ERCOT already performs these
- Change Management includes MP interactions requiring NPPR approval (TPTF activities)

Budget reduction options to be discussed with TPTF & TAC

Structural options:
- Consolidation of generation courses ($910,000 Reject by TPTF on 9/12/06)
- Reduce course duration ($200,000 Reject by TPTF on 9/12/06)
- Delay development of certain courses until after transition ($737,000 Reject by TPTF on 9/12/06)
- Reducing number of channels to be presented (78,000 Reject by TPTF on 9/12/06)
- Reducing number of internally-focused (ERCOT, Inc) courses

Cost reduction options:
- Replace readiness auditors with self-reporting my MP Accountable Executive ($1.3M approved by TPTF 9/28/06)
- Decrease ratio of Account Manager per QSEs
- Eliminate website / communication activities
- Find a more cost effective way to print ($100,000 Completed)
- Only deliver courses once a month ($400,00 Completed)
- Reduce the quality of the training deliverables. ($800,000 Reject by TPTF on 9/12/06)

MER (MIS): Cost Summary

	9/06 Program Estimate	12/05 High-Level Estimate	11/04 CBA (KEMA)
	Total	Total	Total
Internal Resource Costs	319,410	72,540	-
External Resource Costs	2,582,500	169,260	-
Vendor Labor	4,319,309	-	-
Hardware, Software, misc.	603,876	193,440	-
Total	7,825,095	435,240	660,000
		+1,698%	-34%
	Dimensions	Dimensions	Dimensions
Project duration	30 months	30 months	10 months
Composite labor rate	$96/hour	$100/hour	$137.5/hour
Contingency (vs base)	(see summary)	25%	35%

Cost drivers:
- Scope: over 300 Protocol Requirements
- Large number of integration points and dependencies from numerous sources
- Vendor selected to ensure required level of performance, functionality is delivered in the necessary timeframe
- Software licenses
- Length of project (dependent on drops from multiple product projects)
- Enhancements to user experience (improved navigation, based on end-user feedback; personalizable "My Page" that allows users to tailor their home page; dashboard that presents data graphically; consistent look and feel with other new ERCOT applications and ERCOT.com)

12/05 Assumptions:
- Assumed TML enhancement, not re-design
- Assumed using current ERCOT portal licenses and technology
- Assumed little re-write of existing Portal, only enhancements due to Nodal protocols

11/04 CBA assumptions:
- ERCOT.com and MIS changes low assuming DAM and (Zonal) Portal Replacement Project would absorb some of these costs

Budget reduction options to be discussed with TPTF & TAC

Structural options
- TML can be retained to reduce the overall cost of implementing a portal for Nodal, foregoing user experience/usability enhancements (essentially a “link farm”)
  Savings potential ~ $5M (Rejected by TPTF on 9/27-28/06)

Cost reduction options
- Reduce functionality to include only the minimum to meet the Protocols
  Savings potential ~ $0.5M (Rejected by TPTF on 9/27-28/06)

Project area: Integrated ERCOT Readiness and Transition Project		
Description: *Preparation of the ERCOT organization and final verification of all parties' readiness to operate under the Nodal Protocols in live operations.*		
Project Manager: Steve Grendel	***Vendor(s):*** *N/A*	
Budget: ***$29,279,839***	***Actuals YTD:*** ***$318,018***	***Actuals Total:*** ***$318,018***

Key deliverables/short term deliverables:

- *Early Delivery System (EDS) strategy and plans*
- *ERCOT Readiness Criteria*
- *ERCOT Readiness & Transition Plans (by function)*
- *ERCOT readiness preparations*
- *EDS Market Trials*
- *ERCOT Readiness Declarations*

Key Assumptions:

- *Management of the EDS trials will be the responsibility of the IRT Project Team*
- *Planning and preparations for each ERCOT function will be the responsibility of the respective ERCOT Director*

Challenges/Risks:

- *Balance of staffing (including contractors and employees) between Zonal, Nodal program and Nodal transition activities*

Comments:

- *RFP process in progress for 3rd Party readiness advisor*
- *RFP process in progress for Transition experts*

IRT: Cost Summary

	9/06 Program Estimate		*12/05 High-Level Estimate*		*11/04 CBA (KEMA)*
	Total		Total		Total
Internal Resource Costs	13,133,224		2,770,425		-
External Resource Costs	16,146,615		6,464,326		-
Vendor Labor	-		713,020		-
Hardware, Software, misc.	-		722,380		-
Total	**29,279,839**	**+174%**	10,670,151	**+47%**	7,260,000
	Dimensions		Dimensions		Dimensions
Project duration	34 months		26 months		6-10 months
Composite labor rate	$104.5 hour		$100/hour		$137.5/hour
Contingency (vs base)	(see summary)		25%		35%

Cost drivers:

- EDS Labor Effort

	EDS 3		EDS 4	
	Avg. FTE	% of Current Zonal FTEs	Avg. FTE	% of Current Zonal FTEs
Sys Ops	23	18%	27.5	22%
Com Ops	10.5	15%	22.5	33%
IT	21	13%	27	16%
Market Services	8	13%	9	14%

- Internal (43%) / External (57%) labour cost
  - Necessary for running two parallel environments (Zonal / Nodal) without adding significant FTEs
- Readiness Activities (393 significantly impacted FTEs)
  - Average of 67 class-room training hours (IRT paying for attendance only)
  - Average of 2 months of hands-on Nodal simulation (via EDSs)
- Multiple overlapping application environments to operate (Motes, EDS 3, EDS 4)
- Market Participant Registration, Financial & Operational Qualification
- 3rd Party Market Readiness Advisor (MRA)
- Operating Guides, and internal procedures documents to update / maintain, training staff on process changes

12/05 Assumptions:

- Assumed 6 months of market trials
- Assumed significant effort by internal FTEs
- Assumed 6 months of pilot

11/04 CBA assumptions:

- Includes documentation and 6 months of Trials
- Assumed 2 major trial activities (not the complexity envisaged in the EDS sequence)
- Excluded SAS70 audits

Budget reduction options to be discussed with TPTF & TAC

- Reduce EDS 3 by 3 months. Start EDS 3 on April 1, 2008 with completion on Sept 30, 2008
  Savings potential ~ $670k (Rejected by TPTF on 9/27-28/06)
- Internal/External Readiness Advisor Approach. Confirm readiness criteria by Feb 2007, track progress using internal resources for 7 month, starting 2008 use 3rd-party
  Savings potential ~ $1.1M

Description: *Business and technical architecture, design standards and design assurance for the Program*		
Project Manager: Jeyant Tamby	***Vendor(s):*** *IBM*	
Budget: ***$6,770,726***	***Actuals YTD:*** ***$1,139,109***	***Actuals Total:*** ***$1,139,109***

Key deliverables/short term deliverables:

- *Guidance on contracts and Vendor selection*
- *Overall business and technical architecture*
- *Strategies & Roadmaps – Integration, EDW, MIS, hardware, security, database hosting, UI design, XML standards*
- *RUP artifacts and training*
- *Technical architecture assistance*
- *Quality assurance*
- *Requirements traceability (e.g. RequisitePro)*
- *User interface standards*

Key Assumptions:

- *Current top-level business architecture is solid*
- *All systems will conform to the integrated Data Dictionary based on CIM standards*
- *Program will follow concepts of Rational Unified Process Methodology of iterative development*
- *All critical documentation will go through QA process*

Challenges/Risks:

- *Integration – across multiple projects, vendors and applications*
- *Quality and rework due to complexity and changes*
- *Testing Strategy for complex overall Nodal "system"*

Comments:

IDA: Cost Summary

	9/06 Program Estimate Total	*12/05 High-Level Estimate* Total	*11/04 CBA (KEMA)* Total
Internal Resource Costs	1,020,825	476,049	-
External Resource Costs	3,855,940	1,110,781	-
Vendor Labor	-	194,460	-
Hardware, Software, misc.	1,893,961	241,260	-
Total	**6,770,726**	**2,022,550**	**1,056,000**
	+235%	+92%	
	Dimensions	**Dimensions**	**Dimensions**
Project duration	20 months	30 months	3 months
Composite labor rate	$121/hour	$100/hour	$137.5/hour
Contingency (vs base)	(see summary)	25%	35%

Cost drivers:

- Consultants for additional capability in Business Architecture, Enterprise Architecture and Project Management
- IBM RUP training & adoption
- KEMA Study
- Software licenses (ReqPro, Business Process Modeler)

Budget reduction options to be discussed with TPTF & TAC

- None proposed

12/05 Assumptions:

- Includes enhancement of technical delivery capability: RUP artifacts and training, solution architects, and delivery environment and tools (e.g. ReqPro)
- Excluded RUP/SDLC development
- Excluded RUP training
- Excluded Rational Tool suite
- Excluded external solution Architects
- Excluded Rational Support

11/04 CBA Assumptions:

- The numbers above only include Requirements Definition activities.
- It assumed that independent quality assurance will be provided by development groups and production support groups under different managers and teams (2004 ERCOT organization).
- These development groups work with vendors up till FAT; ITEST, UAT and Regression stages are performed by Production Support and Business Teams.
- Design fidelity and assurance was the responsibility of Release Management, Production Support and Business Owners.
- This organizational structure was abandoned in 2005.

Description: *Capability to generate Planning and Network Models for Real-Time, Day-Ahead and Future applications and studies*		
Project Manager: Raj Chudgar	***Vendor(s):*** *Siemens Power T&D, Inc. (NMMS); Nexant, Inc. (Network Modeling & Telemetry)*	
Budget: ***$12,689,421***	***Actuals YTD:*** ***$843,197***	***Actuals Total:*** ***$843,197***

Key deliverables/short term deliverables:

- *Naming Conventions*
- *State Estimator Criteria*
- *Network Modeling & Telemetry (proof of required fidelity)*
- *Requirements for TPTF approval*
- *Conceptual System Design for TPTF approval*
- *Time based Network Operations and Planning Model Management System*

Key Assumptions:

- *Factory Acceptance Testing – Pre-FAT on vendor premises; FAT on ERCOT premises*
- *Zero severity 1 or 2 bugs coming out of FAT or ITEST*

Challenges/Risks:

- *Integration - multiple interface, one-liner and data dependencies (MMS, EMS, CRR, outage scheduler, registration)*
- *There are no vendors with prior experience with development of time-based models*

Comments:

- *ERCOT will be the first ISO to utilize time-based model functionality for down-stream applications*

NMMS: Cost Summary

	9/06 Program Estimate		*12/05 High-Level Estimate*		*11/04 CBA (KEMA)*
	Total		Total		Total
Internal Resource Costs	1,045,200		174,438		-
External Resource Costs	1,372,600		407,022		-
Vendor Labor	10,121,621		-		-
Hardware, Software, misc.	150,000		-		-
Total	**12,689,421**	**+2,082%**	**581,460**	**-78%**	**2,640,000**
	Dimensions		Dimensions		Dimensions
Project duration	24 months		30 months		12 months
Composite labor rate	$110/hour		$100/hour		$137.5/hour
Contingency (vs base)	(see summary)		25%		35%

Cost drivers:

- Zonal $11.5MM cost assumed as part of budget
- Project Mgt, SME Consultants to supplement internal capability, support requirements & architecture are from many consulting firms
- Model Fidelity work as directed by TAC approved SE and Telemetry criteria
- TDSP coordination and assimilation into NMMS solution
- Siemens Licenses and Maintenance

Budget reduction options to be discussed with TPTF & TAC

Structural options:

- Ramp Nodal SE criteria to Zonal fidelity & eliminate EDS 1/2 with MPs
  Savings potential ~ $5M *(Rejected by TPTF on 9/27-28/06 – contrary to Protocols)*
- Elimination of time-based models/NMMS
  Savings potential ~ $7.5M *(Rejected by TPTF on 9/27-28/06 – contrary to Protocols)*

Cost reduction options:

- Elimination of planning time based models
  Savings potential ~ $1M *(Rejected by TPTF on 9/27-28/06 – contrary to Protocols)*

12/05 Assumptions:

- Excluded 80-90% of NMMS as funded by Zonal (~$7MM)
- Excluded majority of model fidelity cost, assumed as part of ERCOT O&M budget
- Excluded naming convention cost
- Narrower scope of model fidelity work (cf Nexant)

11/04 CBA Assumptions:

- Assumed 10 FTEs for 12 months
- Estimates included a new transaction software tool for model changes submittal and tracking with TDSPs
- Additional telemetry costs were not included
- Additional model testing and evaluation environments needed
- 7-8 modelers to handle a 6-8 months of project transition period was expected

EMS: Project Summary

Description: *Implement the necessary changes to ERCOT's current Energy Management System (EMS) and implement the new Renewal Production Potential (RPP) function to satisfy the requirements set forth in the Texas Nodal Protocols approved by Order signed by the PUCT on April 5th, 2006. At the same time, upgrade the ERCOT EMS*

Project Manager: Al Hirsch	*Vendor(s): Requirements KEMA, AREVA (EMS, LF), AWS True Wind (RPP)*

Budget: $17,490,950	***Actuals YTD: $985,745***	***Actuals Total: $985,745***

Key deliverables/short term deliverables:
- *Requirements for TPTF approval*
- *Conceptual System Design for TPTF review*
- *EMS platform upgrade & ERCOT customizations*
- *Full ICCP capability*
- *Network Security upgrade and Load Frequency Control*
- *Migration of enhanced Zonal Load Forecast to Nodal*
- *New RPP*

Key Assumptions:
- *Factory Acceptance Testing – Pre-FAT on vendor premises; FAT on ERCOT premises*
- *Zero severity 1 or 2 bugs coming out of FAT or ITEST*

Challenges/Risks:
- *Integration - multiple interfaces and data dependencies between the EMS and other systems (MMS, NMMS, Settlements, OS, etc.)*
- *Vendor Capability to deliver new software and application according to the Nodal Program timeline*

Comments:
- *Established mutually positive and collaborative relation with AREVA*
- *Reconstituting viable EMS team*

EMS: Cost Summary

	9/06 Program Estimate		*12/05 High-Level Estimate*		*11/04 CBA (KEMA)*
	Total		Total		Total
Internal Resource Costs	4,333,160		498,920		-
External Resource Costs	794,565		1,164,148		-
Vendor Labor	10,104,225		1,294,920		-
Hardware, Software, misc.	2,259,000		1,294,920		-
Total	**17,490,950**	**+311%**	**4,252,908**	**-26%**	**5,770,000**
	Dimensions		Dimensions		Dimensions
Project duration	32 months		18 months		9 months
Composite labor rate	$88/hour		$100/hour		$137.5/hour
Contingency (vs base)	(see summary)		25%		35%

Cost drivers:

- EMS upgrade, previously assumed to be part of Zonal, included in the Nodal implementation.
- New development in the EMS systems, specially LFC, to fulfill the Nodal requirements
- Renewable Production Potential system will be also part of the nodal implementation
- Major EMS/NMMS interface will be implemented along with the Texas Nodal Market
- Different vendor in the MMS system increased complexity of EMS/MMS interfaces
- New Outage Scheduler

Budget reduction options to be discussed with TPTF & TAC

- None proposed

12/05 Assumptions:

- Assumed 50% Network Security upgrade funded by Zonal
- Assumed EMS upgrade was Zonal (~$8MM)
- Assumed OTS scope narrower (expanded as a result of ABB MMS selection)

11/04 CBA assumptions:

- Assumed single vendor for EMMS (EMS, MMS & CRR)
- Included modifications to Operator Actions, Real Time Sequence and Dispatch (LFC and SCED), NSA Study Network Apps, procurement of LMP calculator and AS Monitoring
- Excluded Load Forecast, Outage Scheduling and Operator Training Simulator

Description: *Business processes and systems for the Nodal Real-Time and Day-Ahead Energy and AS Markets and Outage Scheduler*		
Project Manager: Al Hirsch	***Vendor(s):*** *ABB, Inc.*	
Budget: ***$26,271,320***	***Actuals YTD:*** ***$1,043,911***	***Actuals Total:*** ***$1,043,911***

Key deliverables/short term deliverables:

- *Requirements for TPTF approval*
- *Conceptual System Design for TPTF approval*
- *Day Ahead Market capability*
- *Supplemental AS Market capability*
- *Reliability Unit Commitment capability*
- *Security Constrained Economic Dispatch (Real Time Market) capability*
- *DC Tie*
- *Data for Wholesale Market Monitoring*

Key Assumptions:

- *Factory Acceptance Testing – Pre-FAT on vendor premises; FAT on ERCOT premises*
- *Zero severity 1 or 2 bugs coming out of FAT or ITEST*

Challenges/Risks:

- *Inadequate or Flawed Nodal System Design – Critical impact to performance, robustness, dependability, reliability*
- *Integration, Architecture & System Construction - multiple interface and data dependencies causing major impacts to schedule, cost, operation*
- *Substantial rework over the extended life of the project impacting schedule, cost & performance due to directed changes*

Comments:

- *ABB is fully committed and has stepped up as a member of the joint project team*

MMS: Cost Summary

	9/06 Program Estimate		*12/05 High-Level Estimate*		*11/04 CBA (KEMA)*
	Total		Total		Total
Internal Resource Costs	3,409,120		1,485,792		-
External Resource Costs	6,007,200		3,466,848		-
Vendor Labor	13,500,000		2,983,200		-
Hardware, Software, misc.	3,355,000		2,983,200		-
Total	**26,271,320**	**+141%**	**10,919,041**	**+190%**	**3,762,000**
	Dimensions		Dimensions		Dimensions
Project duration	20 months		30 months		15 months
Composite labor rate	$101/hour		$100/hour		$137.5/hour
Contingency (vs base)	(see summary)		25%		35%

Cost drivers:

- Significant cost driver is splitting early delivery of SCED from balance of MMS
- Significant cost driver is lack of system design/specification prior to start of MMS design
- Secondary cost driver is length of "market trials" following development
- Secondary cost driver is lack of SMEs from existing ERCOT staff

Budget reduction options to be discussed with TPTF & TAC

Structural options:

- Single release of MMS
  Savings potential ~ $1M *(Rejected by TPTF on 9/27-28/06 – contrary to ERCOT Transition Plan)*
- Divert ERCOT resources from Zonal projects
  Savings potential ~ $2.5M
- Eliminate vendor support through EDS
  Savings potential ~ $3.5M

12/05 Assumptions:

- One (1) build cycle
- Excluded multiple market trials
- Included significant ERCOT staff available for development

11/04 CBA Assumptions:

- Auction-based DAM will be implemented prior to Nodal; related ADAM costs considered sunk.

Project area: Congestion Revenue Rights		
Description: *Business processes and systems to allow the CRR Owner to be charged or receive compensation for congestion rents that arise when the ERCOT Transmission Grid is congested in the Day-Ahead Market (DAM) or in Real-Time*		
Project Manager: Shawna R. Jirasek	***Vendor(s):*** *Nexant, Inc.*	
Budget: ***$6,258,506***	***Actuals YTD:*** ***$301,866***	***Actuals Total:*** ***$301,866***

Short term deliverables:
- *Requirements for TPTF approval, Conceptual System Design for TPTF approval*

Key deliverables:
- *PCRR and MCFRI allocation capability*
- *CRR auction capability*
- *CRR ownership tracking capability and Bilateral trading capability*

Key Assumptions:
- *Factory Acceptance Testing – Pre-FAT on vendor premises; FAT on ERCOT premises*
- *Zero severity 1 or 2 bugs coming out of FAT or ITEST*

Challenges/Risks:
- *New CRR process to ERCOT, new technology to ERCOT, and implementation different than that in other ISOs*
- *Integration - multiple interface and data dependencies (NMMS, MMS, Registration, Settlement, Credit Monitoring)*
- *Early CRR delivery – may result in rework to fit into integrated Nodal program*

Comments:
- *Solution vendor accepting fast delivery timeline*
- *Market Participant specialist on board and integrated in the project team*

CRR: Cost Summary

	9/06 Program Estimate	*12/05 High-Level Estimate*	*11/04 CBA (KEMA)*
	Total	Total	Total
Internal Resource Costs	1,065,480	1,346,400	-
External Resource Costs	1,800,840	3,141,600	-
Vendor Labor	792,000	-	-
Hardware, Software, misc.	2,600,186	-	-
Total	**6,258,506**	4,488,000	5,580,000
		+39%	**-20%**
	Dimensions	Dimensions	Dimensions
Project duration	21 months	30 months	14 months
Composite labor rate	$128/hour	$100/hour	$137.5/hour
Contingency (vs base)	(see summary)	25%	35%

Cost drivers:

- Untested nodal protocols; protocol design decisions increase costs
- Complicated solution requiring highly specialized SME and vendor knowledge
- Fixed price software development contract with perpetual license
- Early delivery of completed CRR product
- Entirely new CRR business processes and ongoing business team
- No CRR 'Home-Team' in the ERCOT business until 2008

Budget reduction options to be discussed with TPTF & TAC

Structural options:

- Direct allocationto loads
  Savings potential ~ $5M *(Rejected by TPTF on 9/27-28/06 – contrary to Protocols)*

Cost reduction options:

- Reduce scope to exclude Multi-Period Auction Optimization
  Savings potential ~ $0.5M

12/05 Assumptions:

- Excluded CRR statements and bills (COMS)
- Excluded credit limit generation (COMS)
- Excluded Registration (COMS)
- Excluded CRR interface with MMS (MMS)

11/04 CBA Assumptions:

- Tighter and more complex interactions with Planning and Operations Engineering models and staff.
- Assumed new products, new 3rd party software; considered new SW license costs.

Project area: Commercial Systems		
Description: *Business processes and systems for Settlements and Billing, Data Aggregation, Metering, Load Profiling, Credit Monitoring, Registration, Disputes, Financial Transfer*		
Project Manager: Raj Chudgar	***Vendor(s):*** *LODESTAR®, Siebel®, ROME®*	
Budget: ***$14,778,835***	***Actuals YTD:*** ***$1,276,123***	***Actuals Total:*** ***$1,276,123***

Key deliverables/short term deliverables:

- *Requirements for TPTF approval*
- *Settlement payments and charges for Day Ahead, RUC, Real Time, Ancillary Services, and CRRs*
- *Credit monitoring and management capabilities*
- *Invoicing capabilities*
- *Registration capabilities*
- *Disputes capabilities*
- *Financial Transfer capabilities*

Key Assumptions:

- *Zero severity 1 or 2 bugs coming out of FAT or ITEST*

Challenges/Risks:

- *Integration - multiple interface and data dependencies*
- *Probability of substantial re-work due to scope changes/clarifications introduced in Real-Time and Day-Ahead requirements*

Comments:

- *Nodal necessitates a complete re-write of Settlement due to volume of data and new methods of calculation*
- *ERCOT is leading the Settlement development internally*

COMS: Cost Summary

	9/06 Program Estimate Total		*12/05 High-Level Estimate* Total		*11/04 CBA (KEMA)* Total
Internal Resource Costs	5,561,400		2,724,492		-
External Resource Costs	5,112,200		6,357,147		-
Vendor Labor	3,905,235		-		-
Hardware, Software, misc.	200,000		-		-
Total	**14,778,835**	**+63%**	**9,081,638**	**+3%**	**8,844,000**
	Dimensions		**Dimensions**		**Dimensions**
Project duration	27 months		30 months		18 months
Composite labor rate	$95/hour		$100/hour		$137.5/hour
Contingency (vs base)	(see summary)		25%		35%

Cost drivers:
- Sheer effort to re-write settlements (150,000 effort hours)
- Project Management, SME Consultants to supplement internal capability, support requirements & architecture are from many consulting firms
- ROME Licenses and Maintenance
- Additional Lodestar/Siebel Licenses
- Scope dictated by upstream systems
- High susceptibility to change requests

Budget reduction options to be discussed with TPTF & TAC

Structural options:
- None proposed

Cost reduction options:
- None proposed

12/05 Assumptions:
- Excluded training for settlements (MER)
- Excluded any changes to zonal settlements
- Excluded extracts (EDW)
- Excluded CRR settlements (CRR)

11/04 CBA assumptions:
- Included Registration, MMS to COS interface, Data Aggregation, Credit and Risk Management, Settlements, Post LMP Mitigation and Dispute Resolution

Description: *Capability to collect historic data and provide information services to MPs, PUCT, WEMM and FERC, perform data analysis.*		
Project Manager: Sylvia Shiroyama	***Vendor(s):*** *N/A*	
Budget: ***$4,036,800***	***Actuals YTD:*** ***$125,849***	***Actuals Total:*** ***$125,849***

Key deliverables/short term deliverables:

- *EDW strategy and roadmap*
- *EDW Governance structure*
- *Requirements for TPTF approval*
- *Business Intelligence – dynamic reporting (CDW framework)*
- *Business Intelligence – standard reporting (including internal, MOMS, Market, Compliance, Credit reporting)*
- *Operational Data Stores (including Lodestar, EMMS ODS)*
- *Market data extracts*
- *Information replication (ODS, RSS replication)*

Key Assumptions:

- *EDW is a shared asset across ERCOT*
- *Zero severity 1 or 2 bugs coming out of FAT or ITEST*

Challenges/Risks:

- *Impact of extensive schema changes will require all output types to change*
- *EDW governance*
- *Requirements for extract capability rather than extracts will cause the subjects and volumes of data to grow significantly along with the implications of supporting and managing that data from an operational perspective*

Comments:

- *EDW Project Manager started 9/5/06*
- *ERCOT is leading the EDW development internally*

EDW: Cost Summary

	9/06 Program Estimate		*12/05 High-Level Estimate*		*11/04 CBA (KEMA)*
	Total		Total		Total
Internal Resource Costs	2,492,800		749,820		-
External Resource Costs	1,544,000		1,749,579		-
Vendor Labor	-		-		-
Hardware, Software, misc.	-		-		-
Total	**4,036,800**	**+62%**	**2,499,399**	**+72%**	**1,452,000**
	Dimensions		Dimensions		Dimensions
Project duration	32 months		23 months		12 months
Composite labor rate	$82/hour		$100/hour		$137.5/hour
Contingency (vs base)	(see summary)		25%		35%

Cost drivers:
- Number of new databases / systems
- Schema changes to existing systems
- External resource needs
- Data volumes
- Data latency to EDW
- Data retention
- Capture frequency
- Increased information services for ERCOT, PUCT, IMM, ERO, and Market
- IMM, ERO requirements least known

Budget reduction options to be discussed with TPTF & TAC

Structural options:
- EDW latency, retention, access (Program team to put forward options)

Cost reduction options (savings potential 5%-10%):
- Reduced extract flexibility - a reduced number of views and subject tables would reduce cost. It would result in less ability to integrate data sources
  Savings potential ~ $0.5M

12/05 Assumptions:
- Assumed substantial leveraging of Zonal
- Assumed leveraged zonal technology
- Excluded Compliance (ERO) reports
- Excluded rebuilding zonal extracts/reports

11/04 CBA assumptions:
- Included Performance Monitoring changes and Nodal driven enhancements to general data extracts and reporting capabilities. A substantial EDW replacement project was under way at the time of the study therefore major EDW system changes were not included

Project area: Infrastructure		
Description: *Provision of development, testing, EDS and production environments across the Program*		
Project Manager: David Forfia	***Vendor(s):*** *IBM, EMC, Oracle*	
Budget: ***$61,840,407***	***Actuals YTD:*** ***$1,642,332***	***Actuals Total:*** ***$1,642,332***

Key deliverables/short term deliverables:
- *Hardware specifications*
- *Hardware procurement*
- *Data center capacity resolution*
- *IT Services Catalogue*
- *Service Level Agreements for all Nodal projects*
- *Project development & test (FAT) environments*
- *Integration testing (ITEST) environments*
- *EDS environments*
- *Production environments*

Key Assumptions:
- *Infrastructure capacity can be incrementally added using IBM's capacity upgrade on-demand model*
- *ICCP communications infrastructure included in EMS project*

Challenges/Risks:
- *Existing Data Center capacity (power)*

Comments:
- *IT Operations will be one of the first ERCOT function to transition to Nodal operations, starting with setting up development environments*

INF: Cost Summary

	9/06 Program Estimate		*12/05 High-Level Estimate*		*11/04 CBA (KEMA)*
	Total		Total		Total
Internal Resource Costs	2,191,800		724,800		-
External Resource Costs	5,547,520		1,691,200		-
Vendor Labor	1,759,300		-		-
Hardware, Software, misc.	52,341,787		30,487,455		-
Total	**61,840,407**	**+88%**	**32,903,455**	**+210%**	**10,600,000**
	Dimensions		Dimensions		Dimensions
Project duration	30 months		27 months		10 months
Composite labor rate	$108/hour		$100/hour		$137.5/hour
Contingency (vs base)	(see summary)		25%		35%

Cost drivers:

- Number of distinct environments operating concurrently
- New enterprise class server platform adopted 7/2006
- Data center power and space recovery
- Accelerated deployment schedule of 1Q2007

Budget reduction options to be discussed with TPTF & TAC

Structural options:

- Reduce the number of concurrent deployed environments. Savings potential ~ $8M
- Fund Zonal Unix end of life and storage projects. Savings potential ~ $17M

Cost reduction options:

- Reduce database and integration software license costs. Savings potential ~ $2M
- Reduce data retention period. Savings potential ~ $2-3M
- Allow cost recovery of ongoing maintenance, database license fees and hardware residual value to fund Nodal. Savings potential ~ $5M

12/05 Assumptions:

- Included all standard OS costs
- Included all Oracle licenses
- Included all hardware licensing and maintenance costs
- Included internal labor to build hardware
- Assumed adequate Data Center capacity

11/04 CBA assumptions:

- Included facilities labor and activities (modifications to existing datacenters and work area and incremental hardware
- At the time ERCOT had just renovated their EMMS hardware and TCC 2 was under construction

Description: *Messaging capability to loosely couple ERCOT applications through web services, transforming interfaces into messages*		
Project Manager: TBD	***Vendor(s): UISOL***	
Budget: ***$12,323,860***	***Actuals YTD:*** ***$0***	***Actuals Total:*** ***$0***

Key deliverables/short term deliverables:

- *Integration strategy and roadmap*
- *Integration Vendor procurement*
- *Project mobilization*
- *ERCOT extended CIM (ECIM)*
- *Implemented ECIM on database and XSD*
- *Tested and operating interfaces*
- *Tested and operating Common services (Audit, Monitoring, Exception Handling, Authentication, Data Transfer)*

Key Assumptions:

- *Vendor will deliver interfaces compliant with ERCOT integration standards*
- *Scope of integration would not include over 100 interfaces*

Challenges/Risks:

- *Transformation layer requires ERCOT extended CIM (ECIM)*
- *Balance of point-to-point solutions (for bulk data) with web services (messaging)*
- *Integration design work is starting late*

Comments:

- *UISOL will be performing integration design and quality assurance. A separate vendor may be chosen for implementation.*

EIP: Cost Summary

	9/06 Program Estimate Total	*12/05 High-Level Estimate* Total	*11/04 CBA (KEMA)* Total
Internal Resource Costs	2,917,200	135,988	-
External Resource Costs	7,799,200	317,306	-
Vendor Labor	-	-	-
Hardware, Software, misc.	1,607,460	-	-
Total	**12,323,860**	**453,294**	**2,244,000**
		+2,619%	**-80%**

	Dimensions	Dimensions	Dimensions
Project duration	25 months	15 months	6 months
Composite labor rate	$152/hour	$100/hour	$137.5/hour
Contingency (vs base)	(see summary)	25%	35%

Cost drivers:
- Number of interfaces (200)
- Number of critical applications where backup solution (P2P) is needed
- ECIM definitions (400-600)
- Common integration infrastructure that can be leveraged
- Large number of external staff required

Budget reduction options to be discussed with TPTF & TAC
- None proposed

12/05 Assumptions:
- Integration assumed to be within projects thus SOA would leverage Zonal resources and cost when needed
- Included integration effort within base projects

11/04 CBA assumptions:
- Assumed 6 months & 17FTE
- Assumed single vendor for EMMS (EMS, MMS & CRR) – hence majority of effort was needed on MMS to Lodestar, EMMS to EDW, EMMS to MP User Interface.
- All interfaces point to point using Oracle gateways

Project area: Integration Testing		
Description: *Site Acceptance Testing (SAT) of integrated applications from multiple projects and vendors*		
Project Manager: Glen Wingerd	***Vendor(s):*** *N/A*	
Budget: ***$16,977,383***	***Actuals YTD:*** ***$129,892***	***Actuals Total:*** ***$129,892***

Key deliverables/short term deliverables:
- *Sustainable testing tools, procedures and methodologies*
- *Smoke, Performance, Integration, and Regression Test scripts*
- *SAT entrance criteria*
- *SAT exit criteria*
- *Test Results and sign-off*

Key Assumptions:
- *Zero severity 1 or 2 errors are accepted into Integration Testing*

Challenges/Risks:
- *Multiple dependencies on upstream projects and applications*
- *Demonstration of Nodal TXMACS overall system performance*

Comments:
- *ERCOT is leading the integration Testing internally*
- *This project will establish an ongoing testing capability for Nodal*

INT: Cost Summary

	9/06 Program Estimate	12/05 High-Level Estimate	11/04 CBA (KEMA)
	Total	Total	Total
Internal Resource Costs	4,691,272	1,608,737	-
External Resource Costs	11,349,461	3,753,721	-
Vendor Labor	-	972,300	-
Hardware, Software, misc.	936,650	1,019,100	-
Total	16,977,383	7,353,858	2,640,000
		+131%	+179%
	Dimensions	Dimensions	Dimensions
Project duration	32 months	30 months	6 months
Composite labor rate	$88/hour	$100/hour	$137.5/hour
Contingency (vs base)	(see summary)	25%	35%

Cost drivers:

- Testing scope:
  1. Smoke (1% of functional testing)
  2. Functional (for CRR, MIS, EDW)
  2. Integration (all)
  3. Security (all)
  3. Regression (5% of functional testing)
  4. Performance (all)
- 50/50 internal/external staffing

Project Scope Drivers

CRR Requirements	90
MMS Requirements	400
EMS Requirements	200
COMS Requirements	2000
Integration Requirements	250
MIS major use cases	2
MIS Reports Test Scripts	9000
MIS UI Validations Requirements	200
Learning Management System Requirements	15
Outage Scheduler Requirements	50
EDW Full Time Testers	4
FT/CM/Registration Requirements	225
NMMS Use cases	200

Permutation Drivers

Use Cases per Requirement	1-4
Test Cases per Use Case	6
Test Scripts per Test Case	2-8
Time required to build each Test Script (including automation)	30 min
Time required to build the test data for each Test Script	12 min
Time required to execute each Test Script	6 min
Iterations of execution per Test Script	3
Defects per Test Script	0.5-0.2
Time required to manage each defect	2 hrs
# External data points (Entire project)	15
# External GUIs (Entire project)	26
# Internal Data Integration Points (Entire project)	250

12/05 Assumptions:

- Assumed 1 ITEST phase
- Assumed composition included significant ERCOT FTE staff

11/04 CBA assumptions:

- ERCOT integration Testing and User Acceptance Testing
- 6 months and 17 FTEs
- Use of automated Regression Testing tools limited to Commercial Systems
- Release Management Department already owned those tools
- EMMS regression testing limited to the utilization of project developed Test Scripts

Budget reduction options to be discussed with TPTF & TAC

- None proposed

Description: *Program leadership, organization, mobilization, strategic planning and delivery assurance.*		
Project Manager: Tim Pare	***Vendor(s):*** *N/A*	
Budget: ***$7,101,155***	***Actuals YTD:*** ***$5,078,520***	***Actuals Total:*** ***$5,078,520***

Key deliverables/short term deliverables:

- *Program organization & governance*
- *Program Charter*
- *Program Management Corporate Standard & Operating Procedures*
- *Integrated plans, controls and reporting*
- *Program risk management*
- *Executive stakeholder management*

Key Assumptions:

- *The resource model envisages a lean core team (including "super" Project Managers and assurance functions) – 'contracting' with internal and external providers for deliverables (rather than resources)*
- *The Program Charter establishes the Program scope, schedule and budget baseline – any changes will be subject to formal change control*

Challenges/Risks:

- *Balance of staffing (including contractors and employees) between Zonal, Nodal program and Nodal transition activities*

Comments:

- *External consultants (PA) have been retained to provide PMO/Program Management support*
- *External consultants (IBM) have been retained to provide independent review of Program Controls*

PMO/PC: Cost Summary

9/06 Program Estimate

	Total
Internal Resource Costs	222,300
External Resource Costs	3,851,440
Vendor Labor	3,000,000
Hardware, Software, misc.	27,415
Total	**7,101,155**

	Dimensions
Project duration	32 months
Composite labor rate	$118.5/hour
Contingency (vs base)	(see summary)

+258%

12/05 High-Level Estimate

Total
436,346
1,018,142
259,280
271,760
$1,985,528

Dimensions
30 months
$100/hour
25%

-22%

11/04 CBA (KEMA)

Total
-
-
-
-
2,552,000

Dimensions
21 months
$137.5/hour
35%

Cost drivers:
- Duration
- Consultants to supplement Program Management capability
- Program Control independent audit (IBM), SAS70, Security Audit
- 9 PMO staff excluded package PMs, schedulers, controllers, etc

Budget reduction options to be discussed with TPTF & TAC
- Divert ERCOT PMO resources from Zonal projects
  Savings potential ~ $0.5M

12/05 Assumptions:
- Significantly lower estimate of program management consulting support for PMO
- 10 PMO 50% FTE, 50% contractors
- Excluded Program Control Independent Audits

11/04 CBA Assumptions:
- PMO of 10 FTEs spread over two phases