Nodal Program
Revised Preliminary Budget

Nodal PMO

Special Board of Directors Meeting

January 21, 2009

Nodal Program Revised Preliminary Budget

Line	Expense Category	Approved Budget	Revised Preliminary Budget	Variance
1	Internal Labor Costs	$ 35,858,381	$ 86,140,621	$ 50,282,239
2	External Resource Costs	175,093,797	292,559,312	117,465,515
3	Administrative & Employee Expenses	7,614,628	3,078,690	(4,535,938)
4	Software & Software Maintenance	17,053,096	37,131,338	20,078,241
5	Hardware & Hardware Maintenance	42,103,029	54,417,538	12,314,509
6	Contingency	15,000,000	58,627,636	43,627,636
7	Subtotal - Direct Costs	292,722,931	531,955,134	239,232,203
8				
9	Backfill	1,422,626	8,479,263	7,056,638
10	Indirect Support Costs	10,589,195	17,803,472	7,214,277
11	Facilities Allocation	4,126,574	7,856,531	3,729,957
12	Subtotal - Overhead Costs	16,138,395	34,139,266	18,000,871
13				
14	Financing Costs	42,154,600	93,905,600	51,751,000
15				
16	**Total - Nodal Program Costs**	**$ 351,015,926**	**$ 660,000,000**	**$ 308,984,074**
17				
18	Less: Zonal/Nodal Interdependencies	(39,720,226)	(39,720,226)	-
19				
20	**Amount to be Recovered from Nodal Surcharge**	**$ 311,295,700**	**$ 620,279,774**	**$ 308,984,074**
21				
22	NOTE:			
23	Approved budget reflects authorization approved by the Public Utility Commission on May 13, 2008 per Docket 35428.			

Cost Elements

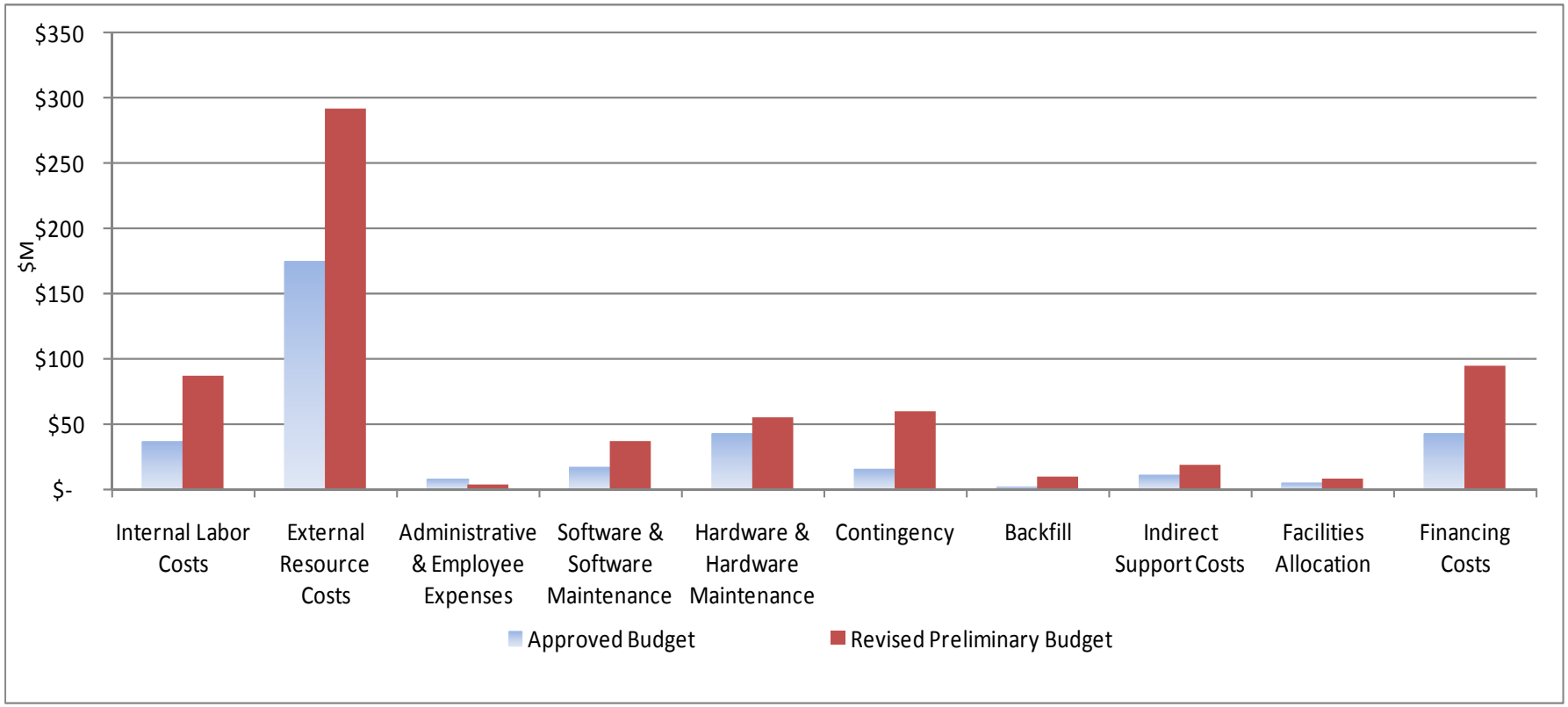
- **Internal Labor Costs**
  - Labor costs of ERCOT employees who are working on the Nodal program.
- **External Resource Costs**
  - Includes both contractor and vendor expenses. Examples of the two types of expenses would be contingent labor contracted to work on the Nodal program, and also software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

Cost Elements (continued)

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

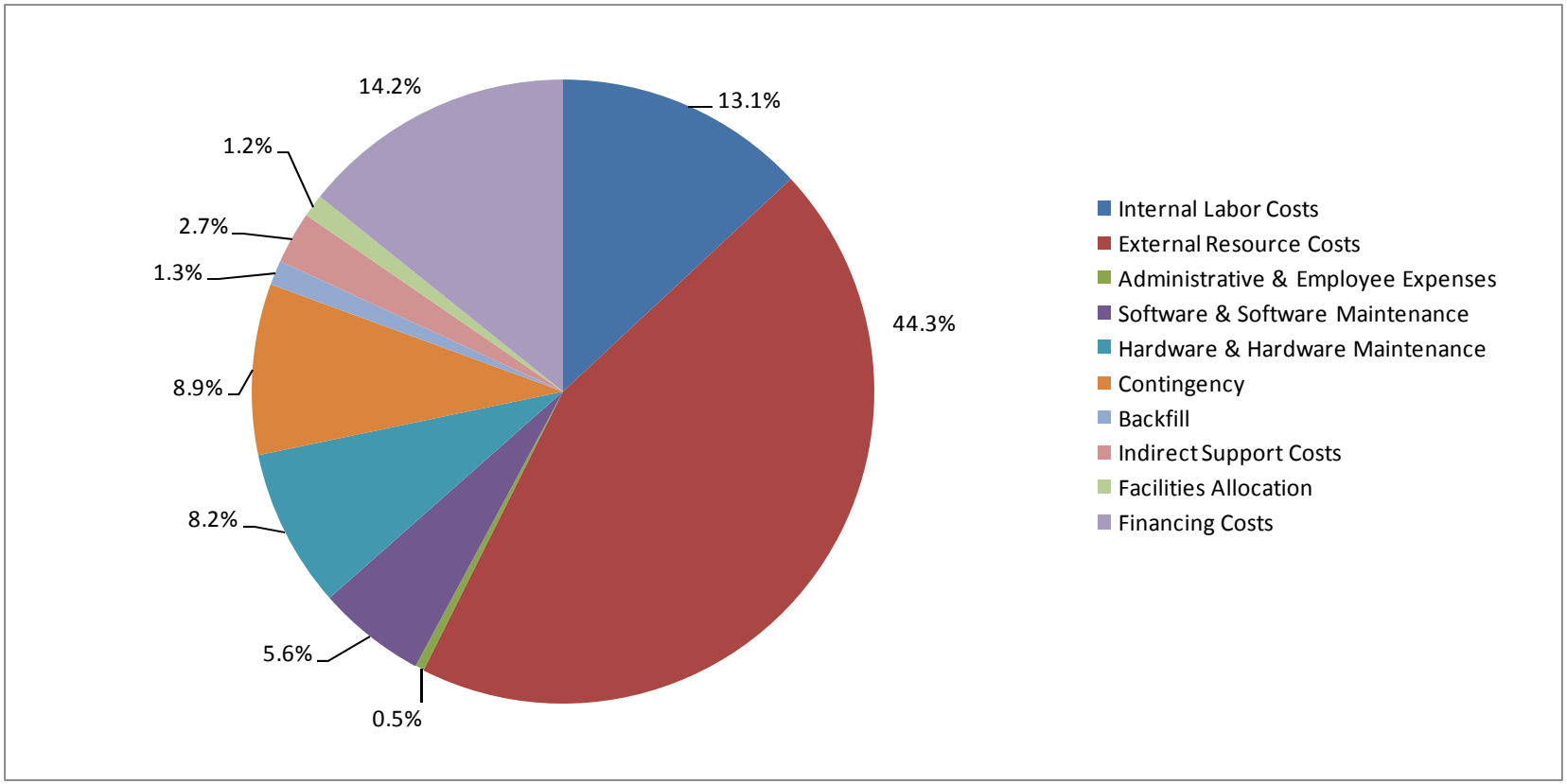
Program Level Approved vs. Revised Preliminary Budget Comparison

Nodal Program Budget Comparison by Cost Element



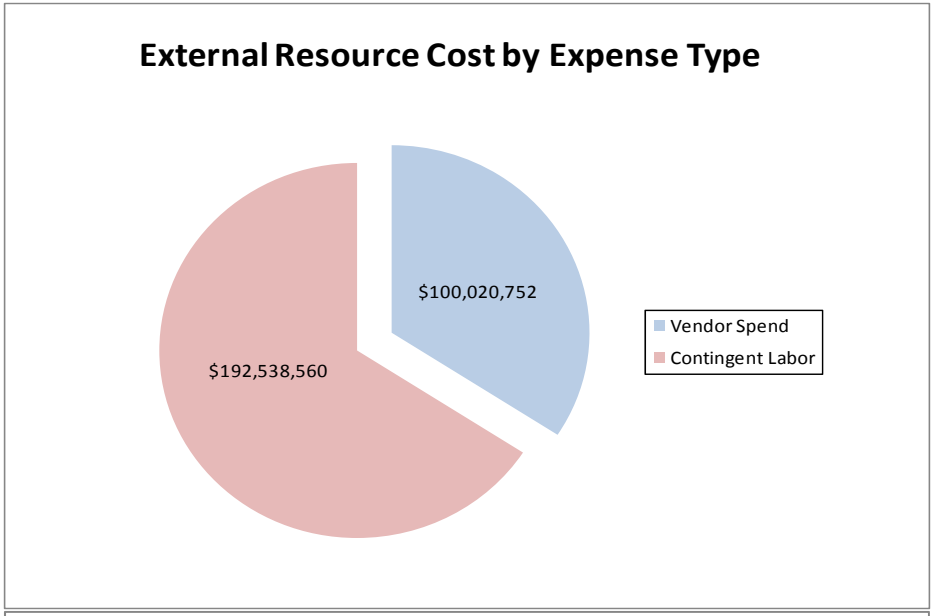
Revised Preliminary Budget Spend by Cost Element

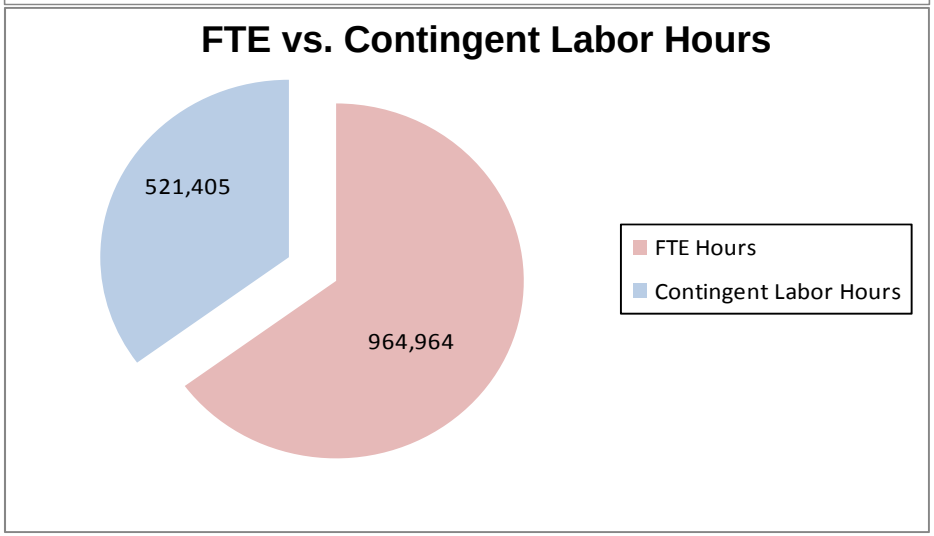
% Spend by Cost Element



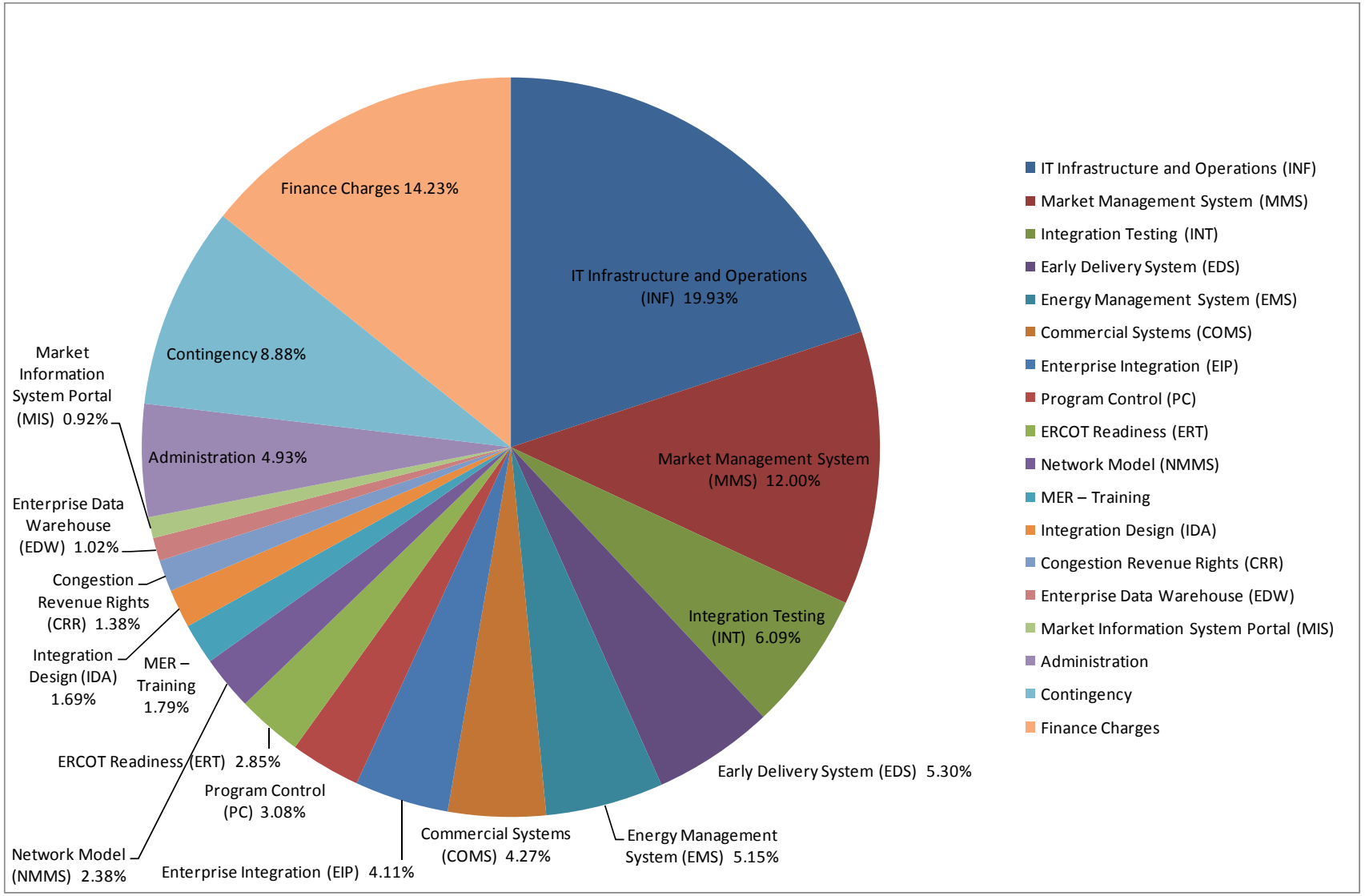
Nodal Program Revised Preliminary Budget - Labor Resources

- The External Resources cost category includes both contingent labor (contractor) and vendor costs associated with software development
- Of the $292,559,312 in external resource costs included in the revised preliminary budget:
  - 65.8% is budgeted for contingent labor
  - 34.2% is budgeted for vendor spend
- Of the 1,486,369 labor hours estimated to complete the program:
  - 35.1% is contingent labor
  - 69.9% is ERCOT FTE labor

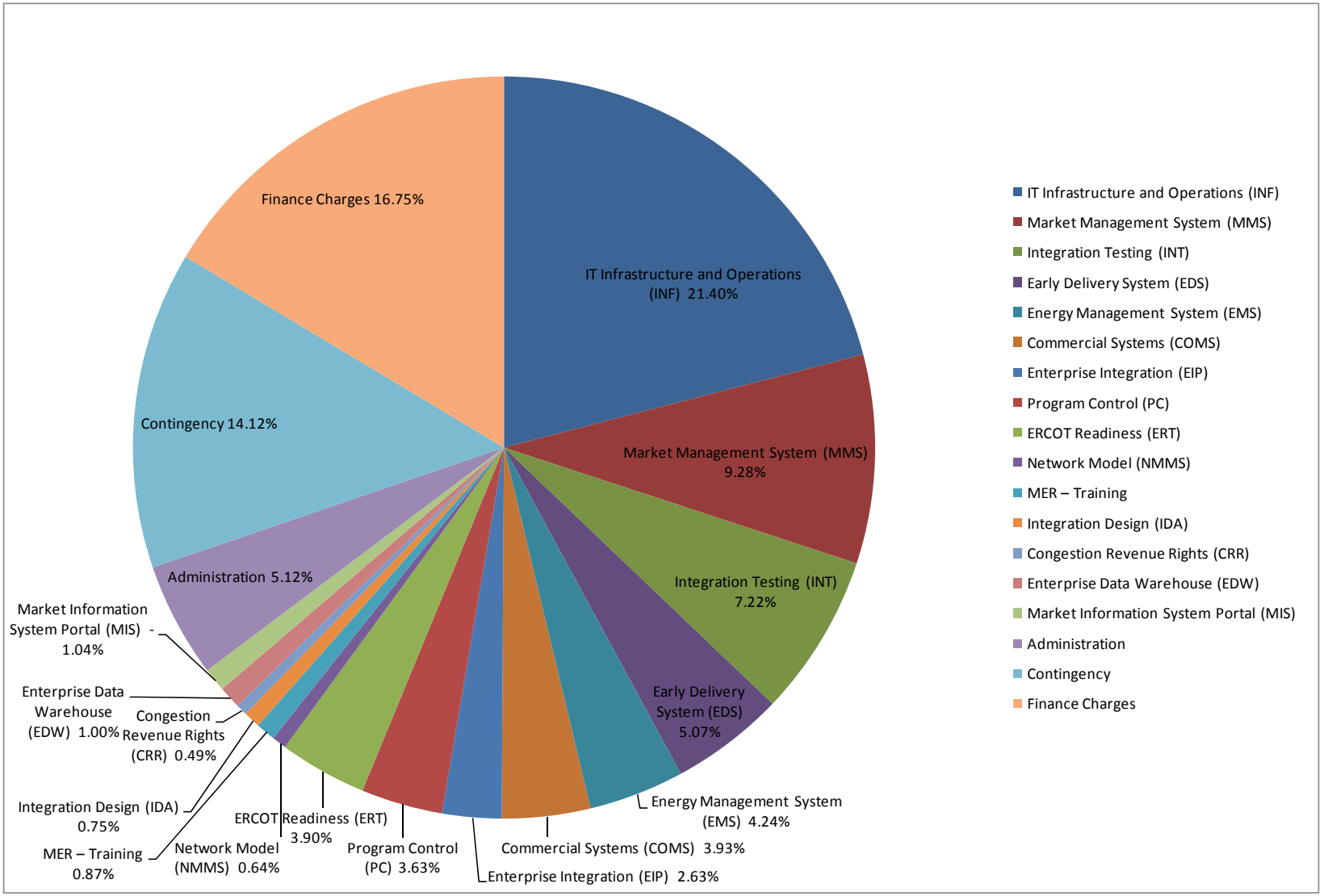




Nodal Program Preliminary Revised Budget - % of Total Program Spend by Project ($660M)



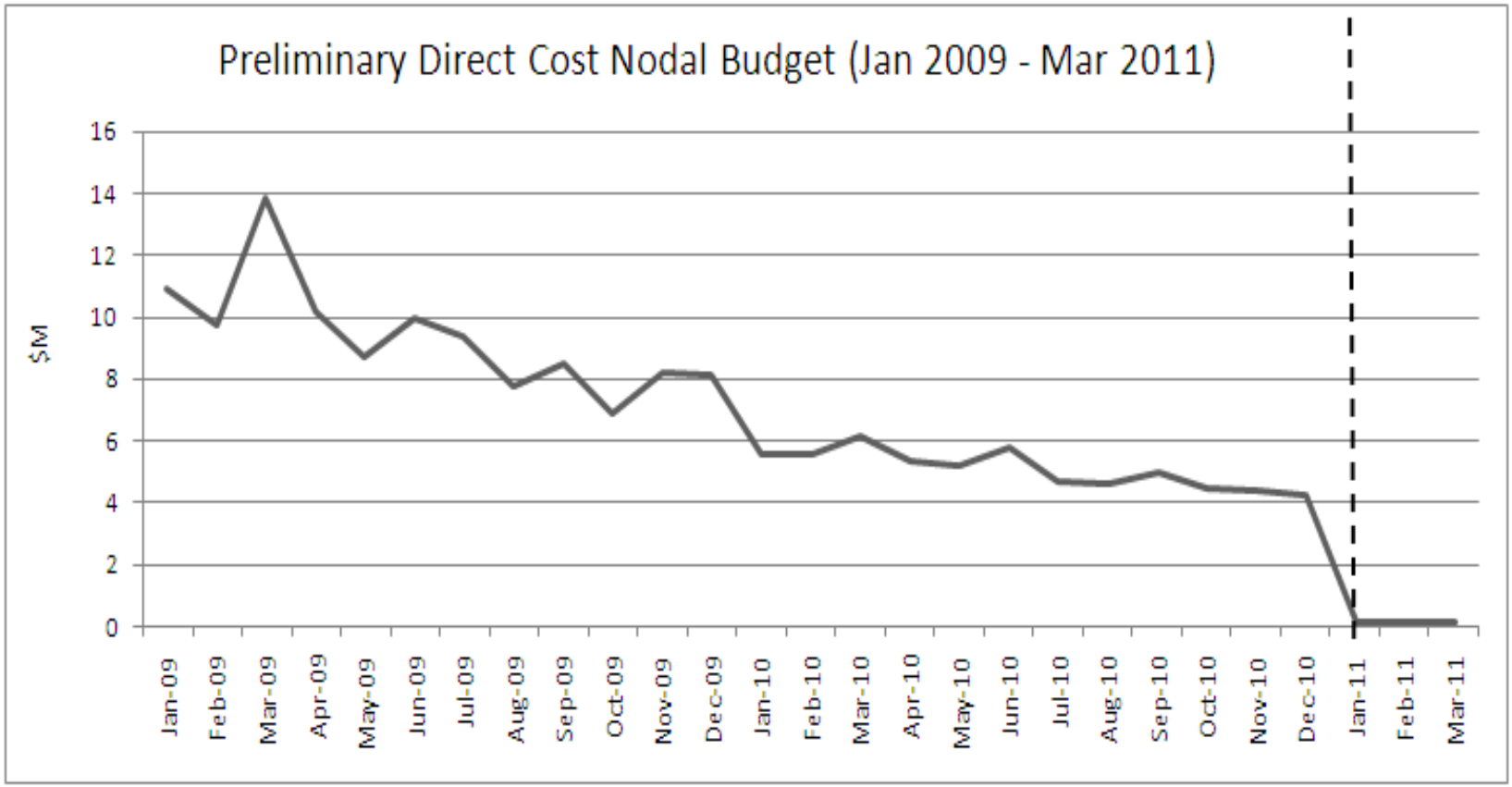
Nodal Program Preliminary Revised Budget - % of Spend by Project of new requested budget ($308M)



Nodal Program Revised Preliminary Budget by Project

Project	Current Approved Budget	Preliminary Revised Budget	Variance
IT Infrastructure and Operations (INF)	65,400,015	131,510,128	101.1%
Market Management System (MMS) – includes IMM and Outage Scheduler	50,527,343	79,187,884	56.7%
Integration Testing (INT)	17,907,527	40,208,318	124.5%
Early Delivery System (EDS)	19,311,548	34,990,107	81.2%
Energy Management System (EMS)	20,913,735	34,003,122	62.6%
Commercial Systems (COMS) – includes Current Day Reports	16,022,542	28,173,603	75.8%
Enterprise Integration (EIP)	18,963,151	27,100,067	42.9%
Program Control (PC)	9,092,381	20,305,002	123.3%
ERCOT Readiness (ERT)	6,767,763	18,817,827	178.0%
Network Model (NMMS)	13,709,494	15,691,492	14.5%
MER – Training	9,137,503	11,834,859	29.5%
Integration Design (IDA)	8,876,607	11,183,882	26.0%
Congestion Revenue Rights (CRR)	7,605,047	9,112,429	15.4%
Enterprise Data Warehouse (EDW)	3,655,570	6,756,221	84.8%
Market Information System Portal (MIS)	9,255,331	6,040,725	-34.7%
Administration	16,715,769	32,551,098	94.7%
Contingency	15,000,000	58,627,636	290.8%
Finance Charges	42,154,600	93,905,600	122.8%
Total	**351,015,926**	**660,000,000**	**88.0%**

Nodal Program Revised Preliminary Budget – Direct Costs by Month



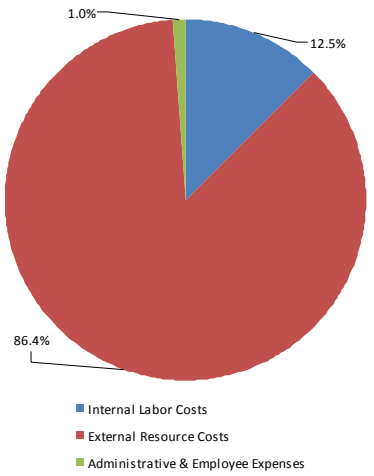
Project Detail

PROGRAM CONTROLS (PC)

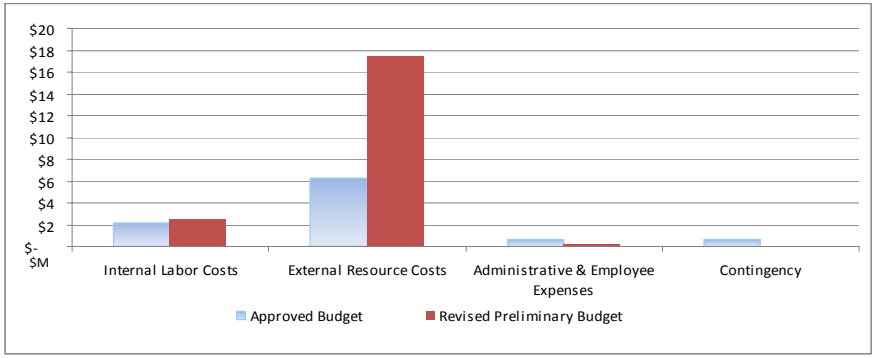
Approved vs. Revised Preliminary Budget

Line	Expense Category	Approved Budget	Revised Preliminary Budget	Variance
1	Internal Labor Costs	$ 2,194,392	$ 2,538,455	$ 344,063
2	External Resource Costs	6,219,037	17,548,886	11,329,849
3	Administrative & Employee Expenses	678,128	206,967	(471,161)
4	Software & Software Maintenance	-	-	-
5	Hardware & Hardware Maintenance	825	944	119
6	Contingency	595,403	-	(595,403)
7	Subtotal - Direct Costs	9,687,784	20,295,252	10,607,468
8				
9	Backfill	-	9,749	9,749
10				
11	**Total - Direct Costs & Backfill**	$ 9,687,784	$ 20,305,002	$ 10,617,217

Revised Preliminary Budget



Change by Cost Element



Commentary

- Includes funding for an external requirements management team
- Includes funding for new roles of:
  - QA manager
  - Nodal Resource Manager
  - Program Controls Manager
  - Master Scheduler
- Includes additional funds for 3rd party auditors (Utilicast)
- Primary driver for increased labor cost is extended project delivery timeline and the Program Controls scope lasts the duration of the program

Program Controls (PC)

Project Overview
The charter for Nodal Program Controls is to provide independent oversight of the Nodal project packages. Program Control will develop and maintain the standards, procedures, and supporting tools related to program management and project management; and provide training and support services to the Nodal program managers and project managers. This will be accomplished by defining project management processes and procedures; scope management; risk and issue management; meeting regularly with project managers and vendors; and program reporting.

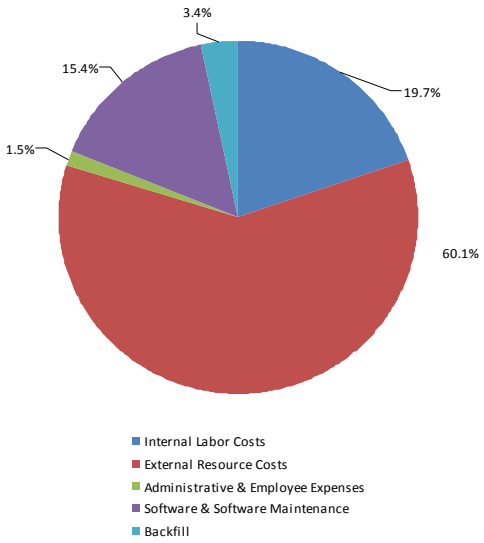
Cost Overview	
Internal Labor	ERCOT employees involved in Program Controls will be engaged at various levels: development and updates to project schedules, development of status reports, development and review of project management processes, quality assurance, managing risks and issues, internal and external communications, stakeholder presentations, data quality, and resource management.
External Labor	The contingent labor associated with Project Controls is mainly focused on PMO leadership, requirements management practice development, master project scheduling and reporting activities; and assistance with risk and issue management and communications . The contingent labor has expertise in these areas and provides a combined set of skills and experience that was not available in ERCOT. For example, no one at ERCOT has the expertise to develop a requirements management practice or to set up the project schedule controls for a program the size and complexity of the Nodal program.
Software and Software Maintenance	

NETWORK MODEL MANAGEMENT SYSTEM (NMMS)

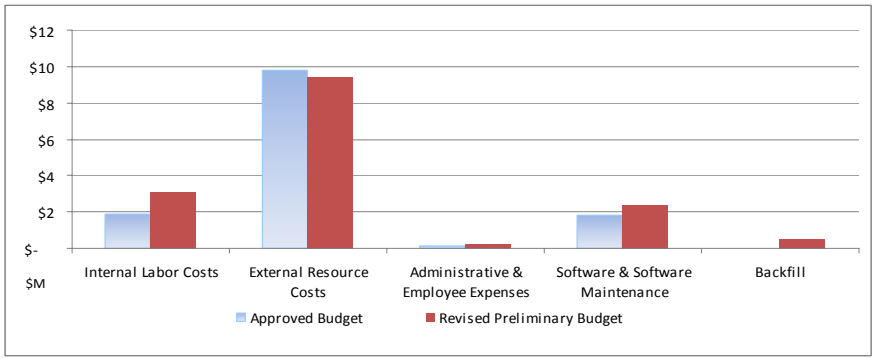
Approved vs. Revised Preliminary Budget

Line	Expense Category	Approved Budget	Revised Preliminary Budget	Variance
1	Internal Labor Costs	$ 1,909,356	$ 3,089,428	$ 1,180,071
2	External Resource Costs	9,807,586	9,426,224	(381,362)
3	Administrative & Employee Expenses	150,000	230,163	80,163
4	Software & Software Maintenance	1,828,661	2,416,095	587,434
5	Hardware & Hardware Maintenance	-	-	-
6	Contingency	101,200	-	(101,200)
7	Subtotal - Direct Costs	13,796,804	15,161,910	1,365,107
8				
9	Backfill	13,890	529,582	515,692
10				
11	**Total - Direct Costs & Backfill**	$ 13,810,694	$ 15,691,492	$ 1,880,799

Revised Preliminary Budget



Change by Cost Element



Commentary

- Added resources to support data validation and data quality activities
- Includes funding for backfill resources that are supporting Zonal work
- Travel increased due to travel to Siemens site in for activities in support of pre-FAT
- Majority of spend for NMMS ends after June 2009

Network Model Management System (NMMS)

Project Overview
The Network Model Management System (NMMS) includes the software needed to build a CIM-compliant database operations and planning model and provide interface tools for incremental and bulk updates to the Operations and Planning Network Models. The project includes the software tools that are needed to build and transfer the operations and planning model to EMS, MMS, OS, CRR, MIS, and Registration systems.

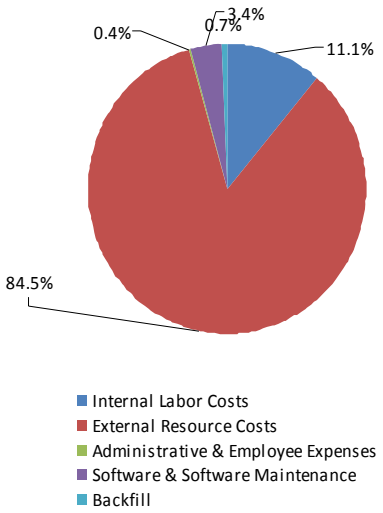
Cost Overview	
Internal Labor	ERCOT employees involved in the NNMS project will be engaged at various levels: development of Network Modeling and Planning Model business processes; building the operations and planning models; documenting and reviewing vendor requirements, design, and test books; participating in pre-FAT and FAT of vendor software releases; coding validation rules; developing; developing NMMS interfaces; and developing market participant training materials.
External Labor	The contingent labor associated with the project is mainly focused on project management and facilitation of the activities required to complete the deliverables. Most of the contingent labor has CIM and energy expertise in these areas and provides a combined set of skills and experience that was not available in ERCOT
Software and Software Maintenance	

ENERGY MANAGEMENT SYSTEM (EMS)

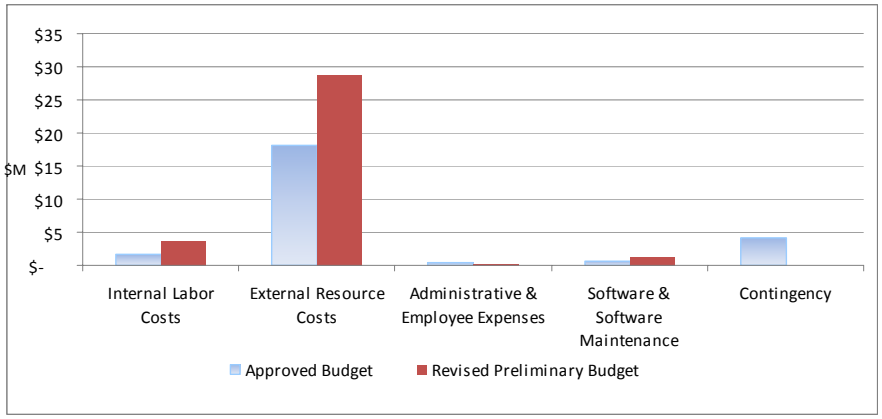
Approved vs. Revised Preliminary Budget

Line	Expense Category	Approved Budget	Revised Preliminary Budget	Variance
1	Internal Labor Costs	$ 1,643,630	$ 3,763,267	$ 2,119,637
2	External Resource Costs	18,067,656	28,741,770	10,674,113
3	Administrative & Employee Expenses	413,684	124,361	(289,324)
4	Software & Software Maintenance	637,673	1,148,061	510,388
5	Hardware & Hardware Maintenance	-	3,000	3,000
6	Contingency	4,115,800	-	(4,115,800)
7	Subtotal - Direct Costs	24,878,444	33,780,458	8,902,014
8				
9	Backfill	151,091	222,664	71,573
10				
11	**Total - Direct Costs & Backfill**	$ 25,029,535	$ 34,003,122	$ 8,973,587

Revised Preliminary Budget



Change by Cost Element



Commentary

- New funding request includes funds to implement OTS (Operator Training Simulator)
- Includes funding for AREVA support & limited maintenance agreement
- New funding request includes the extension of key external contractors supporting CIM importer software and project management
- Majority of spend for EMS ends after August 2009

Energy Management System (EMS)

Project Overview
The charter for Energy Management System (EMS) project states their scope to be “Implement the Nodal Energy Management System (EMS) and Renewal Production Potential (RPP) compliant and in accordance with the requirements as set forth in the Texas Nodal Protocols approved by Order signed by the PUCT on April 5, 2006.” This will be accomplished through the upgrade of the existing EMS platform and implementation of the required custom features for meeting the specific new Market Redesign protocols and requirements, including, new State Estimator function that meet State Estimation Standards and monitoring requirements, a Topology Consistency Analyzer, Forced Outage Detection, Contingency Analysis, Outage Evaluation, Voltage VAR Support Tools, Transmission Constraint Manager, Dynamic Ratings Enhancements, Network Analysis Support Tools, TSAT/VSAT enhancements and SCADA enhancements.

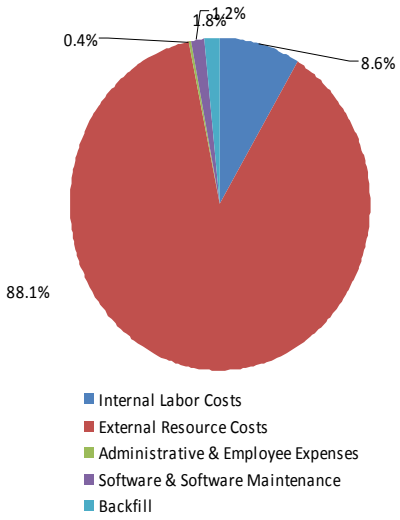
Cost Overview	
Internal Labor	ERCOT employees involved in the EMS project are engaged at various levels: leading project engineering, leading application services, managing the Operator Training Simulator and System Operations Test Environments implementation, application/software developers, systems administration services, power applications subject matter experts, testers, and integration support.
External Labor	The contingent labor associated with the EMS project is mainly focused on project management and facilitation of the activities required to complete the EMS deliverables. Most of the contingent labor has power systems analysis and operations expertise in these areas and provides a combined set of skills and experience that was not available in ERCOT. For example, ERCOT has no prior experience with AREVA CIM Exporters and Importers and key external resources with that experience are part of the project. AREVA T&D is the supplier of the EMS base systems. AREVA is engaged as a complementary developer of several custom EMS enhancements required to meet Nodal Protocol requirements including the CIM Importer software for the EMS project.
Software and Software Maintenance	ERCOT will need to enter into a maintenance agreement that provides the necessary support from AREVA for activities such as additions to the software, troubleshooting, defect resolution, and creation, testing and delivery of new release and patches post go-live.

MARKET MANAGEMENT SYSTEM (MMS)

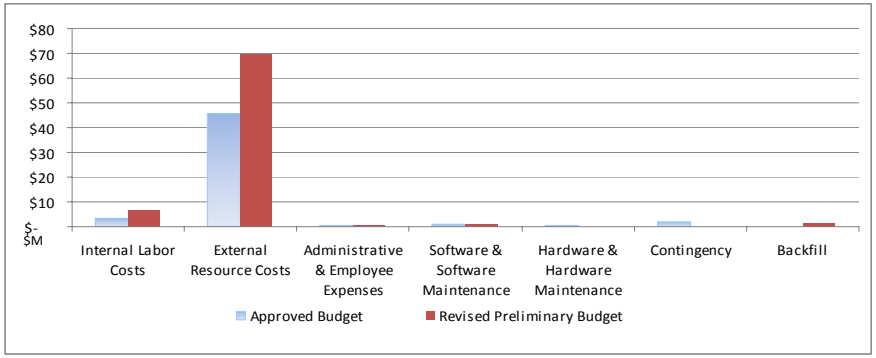
Approved vs. Revised Preliminary Budget

Line	Expense Category	Approved Budget	Revised Preliminary Budget	Variance
1	Internal Labor Costs	$ 3,228,338	$ 6,805,199	$ 3,576,861
2	External Resource Costs	45,483,528	69,743,519	24,259,991
3	Administrative & Employee Expenses	274,424	281,119	6,695
4	Software & Software Maintenance	1,000,000	960,445	(39,555)
5	Hardware & Hardware Maintenance	500,000	-	(500,000)
6	Contingency	2,000,000	-	(2,000,000)
7	Subtotal - Direct Costs	52,486,290	77,790,282	25,303,992
8				
9	Backfill	41,053	1,397,602	1,356,549
10				
11	**Total - Direct Costs & Backfill**	$ 52,527,343	$ 79,187,884	$ 26,660,541

Revised Preliminary Budget



Change by Cost Element



Commentary

- A large portion of the new funding request is to fund software product development
- Key external resources are performing project management, business analysis, and subject matter expert roles in support of MMS
- This funding request also includes new funds to complete Outage Scheduler and IMM needs
- Majority of spend for MMS ends after August 2009

Market Management System (MMS)

Project Overview
The charter for the Market Management System (MMS) project defines the project scope as “100% replacement of existing zonal Market Management System (MMS) with new Market Management System (MMS) compliant with the nodal market requirements and as defined by the Protocols approved by the PUCT. Market Management System (MMS) is the Nodal system used to run the Day-Ahead and Real-Time Markets, Reliability Unit Commitment (RUC) and Supplemental Ancillary Services Market (SASM).

Cost Overview	
Internal Labor	ERCOT employees involved in the MMS project are engaged at various levels: • Subject matter experts own overall system architecture and requirements documents, engage with ABB as leads for design, development, testing, and implementation activities across the major components of the system (e.g., DAM, RUC); subject matter experts are also the leads for process and procedure development, and interface with the key stakeholders (e.g., TPTF, trainers) on their areas of expertise; • Analysts support the subject matter experts in areas such as testing, troubleshooting, data analysis, artifacts review; • Market operations support (MOS) management owns the MMS application and acts as the business sponsor for the MMS project.
External Labor	ERCOT lacks enough resources with specific domain experience necessary to effectively meet all the scheduled activities. Contingent labor resources will also be used to ‘backfill’ for ERCOT resources not assigned to the nodal project to allow those ERCOT employees to participate in the program in preparation for their role after nodal go-live. The contingent labor resources associated with the MMS project are focused in the following areas: • Project management and project controls: Contingent labor project management resources are needed to effectively manage the MMS project and vendor, since ERCOT resources have not implemented a standalone MMS in the past. The opportunity to have gained that experience internally did not exist at ERCOT prior to the nodal program. • Subject matter experts: Contingent labor subject matters have many years of broad and deep market-specific experience and are being leveraged to support the ERCOT subject matters experts activities described above. • Business analysts: Contingent labor business analysts have experience or education necessary to complete tasks requiring analysts skills and are being leveraged to support the ERCOT business analyst activities described above (e.g., testing) • ABB is the vendor for the MMS project. They are responsible for delivering a high quality MMS that meets all the requirements as defined in the five MMS requirements documents. In addition to delivery of the actual software, their costs include all the additional activities required to support delivery and testing of a major software application (e.g., project management, internal QA, third party software, licenses fees).
Software and Software Maintenance	ABB maintains ownership of the code, therefore ERCOT will need to enter into a maintenance agreement that provides ERCOT with the necessary support from ABB for activities such as additions to the software, troubleshooting, defect resolution, and creation, testing and delivery of new release and patches post go-live

Outage Scheduler (OS) (A subproject of MMS)

Project Overview
The ERCOT Outage Scheduler (OS) supports the ability to submit transmission equipment and generation resource outage requests and to manage those requests throughout their life cycles. The Outage Scheduler makes outage data available to other ERCOT systems. Outage requests for transmission equipment and generation resources are submitted by their respective transmission service providers and qualified scheduling entities or, where and when authorized, on their behalf by ERCOT outage coordinators or ERCOT system operators. Outage Scheduler supports all outage types required by the Texas Nodal Protocols. It provides the capability for managing outage life cycles including enforcing outage scheduling rules. NOTE: There was not a separate charter for the OS project. It is included in the MMS project charter as a deliverable.

Cost Overview	
Internal Labor	ERCOT's internal resources are responsible for OS requirement definitions and the testing of the ABB developed product through the Nodal program life cycle (e.g., project development and testing, integration development and testing, market facing testing).
External Labor	The OS application is developed by ABB, an external vendor. They are responsible for artifact development (e.g., requirements, functional design, conceptual design, detail design, use cases, test plans, test cases and test scripts), and application design, development, testing, maintenance and support of the OS application. Some of the critical skill sets that were not available internally at ERCOT will be filled in by contract resources. ERCOT has utilized contractors for the project management, testing and coordination of the testing and market trial activities for designing, developing and testing the replacement of the market-facing user interface delivered by ABB. The ongoing maintenance and support activities of the OS application and user interface will be transitioned to the ERCOT home team upon completion of the integration test.
Software and Software Maintenance	ABB maintains ownership of the OS code, therefore ERCOT will need to enter into a maintenance agreement that provides ERCOT the funding necessary to obtain support from ABB for activities such as additions to the software, troubleshooting, defect resolution, and creation, testing and delivery of new release and patches post go-live.

Independent Market Monitor (IMM) (A subproject of MMS)

Project Overview
The Independent Market Monitor (IMM) project is in the process of defining the requirements necessary to meet the Independent Market Monitor's (IMM) need for additional study tool capabilities that will enable them to effectively and accurately monitor and analyze the ERCOT nodal market. These requirements are in addition to those that will be met via the market management system (MMS) currently being delivered by ABB. The next phase of the project will include development of a complete project schedule and will cover all project requirements through deployment and testing (e.g., infrastructure, software (MMS, MMS third party requirements) and integration into the nodal environments).

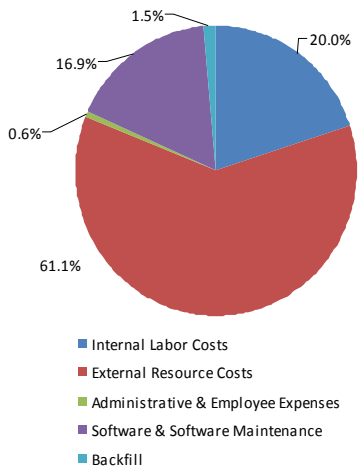
Cost Overview	
Internal Labor	IMM employees involved in the IMM project are fulfilling the following roles/responsibilities ▪ Subject matter expert responsibilities include schedule-related activities such as: project and business sponsorship; requirements definition, review and approval; engaging with MMS project and market operations support (MOS*) resources regarding design, development, testing, and implementation activities since IMM will leverage the MMS application; and interfacing with the key stakeholders for IMM-related activities (e.g., TPTF) ▪ ERCOT employees involved in the IMM project are fulfilling the following roles/responsibilities: analysts to support the IMM subject matter experts and perform schedule-related activities such as supporting the requirements definition and documentation; *market operations support (MOS) management owns the MMS application, acts as the business sponsor for the MMS project and is the ERCOT liaison to the IMM NOTE 1: An ERCOT project manager will be joining the IMM project at the beginning of the next phase (February 2009) to create the complete schedule and fulfill all project management activities NOTE 2: later in the project ERCOT business analyst and subject matter experts will be available to support the IMM in roles and responsibilities similar to those defined for these resources in the MMS project
External Labor	The only contingent labor resources associated with the IMM project at this point is an MMS subject matter expert with experience in defining requirements based on board and deep market knowledge; this role is being filled by a contractor since the ERCOT resource with this skill was fully allocated to the MMS project. ABB is the vendor for the IMM project since the MMS application will be the software modified to meet the IMM project requirements.
Software and Software Maintenance	ABB maintains ownership of the MMS code; therefore ERCOT will need to enter into a maintenance agreement that provides the IMM the funding necessary to obtain support from ABB for activities such as additions to the software, troubleshooting, defect resolution, and creation, testing and delivery of new release and patches post go-live.

CONGESTION REVENUE RIGHTS (CRR)

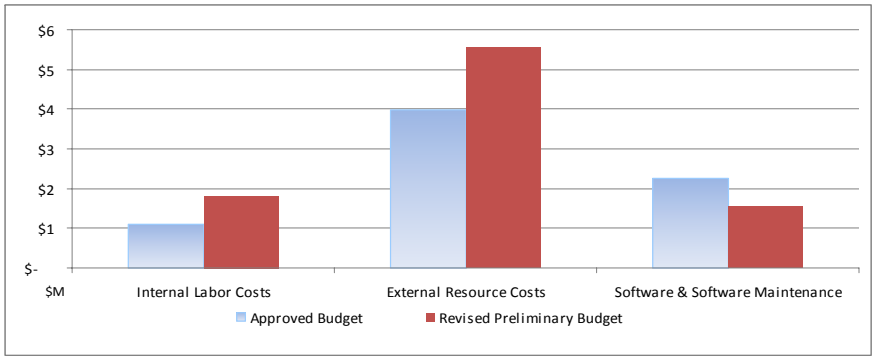
Approved vs. Revised Preliminary Budget

Line	Expense Category	Approved Budget	Revised Preliminary Budget	Variance
1	Internal Labor Costs	$ 1,110,376	$ 1,818,263	$ 707,887
2	External Resource Costs	3,967,830	5,565,252	1,597,422
3	Administrative & Employee Expenses	143,492	53,468	(90,023)
4	Software & Software Maintenance	2,265,075	1,538,350	(726,725)
5	Hardware & Hardware Maintenance	-	1,649	1,649
6	Contingency	290,000	-	(290,000)
7	Subtotal - Direct Costs	7,776,773	8,976,983	1,200,210
8				
9	Backfill	118,275	135,447	17,172
10				
11	**Total - Direct Costs & Backfill**	$ 7,895,047	$ 9,112,429	$ 1,217,382

Revised Preliminary Budget



Change by Cost Element



Commentary

- This funding request includes funding to run three auctions before market go-live

Congestion Revenue Rights (CRR)

Project Overview
The CRR project provides business processes and systems to allow the CRR account holders to purchase rights to be charged or receive compensation for locational marginal price differences that arise when the ERCOT transmission grid is congested in the day-ahead or real-time markets. The CRR system is an entirely new market system that will replace the application currently in place for the zonal transmission congestion rights (TCR) market. The CRR system will allow for up to approximately 120 million products to be sold in each auction, as opposed to the five directional products currently auctioned in the TCR market. The CRR system allows for product interactions not currently available in zonal, which in turn requires power flow integration. Finally electronic connectivity between the CRR system and other ERCOT systems/departments will be implemented.

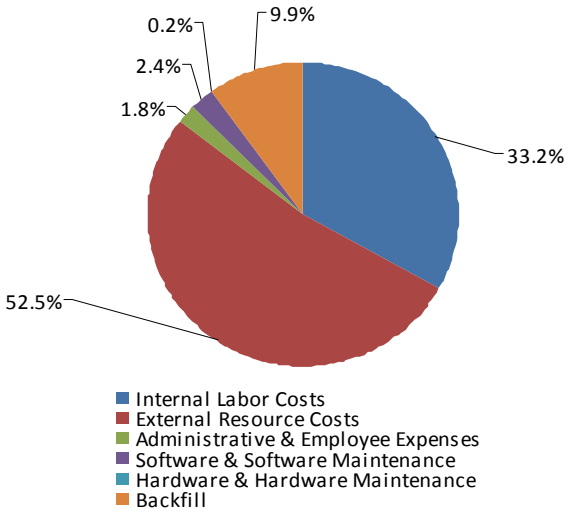
Cost Overview	
Internal Labor	Internal resource SMEs will be actively involved in integration and EDS testing efforts. As part of the 2010 EDS schedule, CRR SMEs will be on hand to run three separate annual auctions: a test auction for EDS3 Release 7, a mock auction for the 168-hour test, and the first monthly go-live CRR auction for the month of the Nodal Implementation. Tasks involved in running auctions include creating network models, creating source/sink lists, creating contingency lists, and creating flowgate lists and definitions. The CRR home team currently consists of three employees, two of whom are 50% committed to zonal.
External Labor	The CRR Team is using consultants for its needs in the areas of technical architecture, integration framework and project analysis, areas in which the current CRR team has neither the bandwidth nor the expertise to complete in-house.
Software and Software Maintenance	CRR currently has in place an interim maintenance agreement used to provide on-site vendor support during the period between the completion of the work required under the SOW and the commencement of the Annual maintenance Agreement. The current agreement will conclude in August 2009. The IMA will be extended on a quarterly basis until the Texas Nodal Market Implementation. Quarterly fees for the IMA will be $37,000. Once the CRR system is placed into production, The Annual Maintenance will be activated. The price of the Annual Maintenance Agreement will be negotiated at a later date.

COMMERCIAL SYSTEMS (COMS)

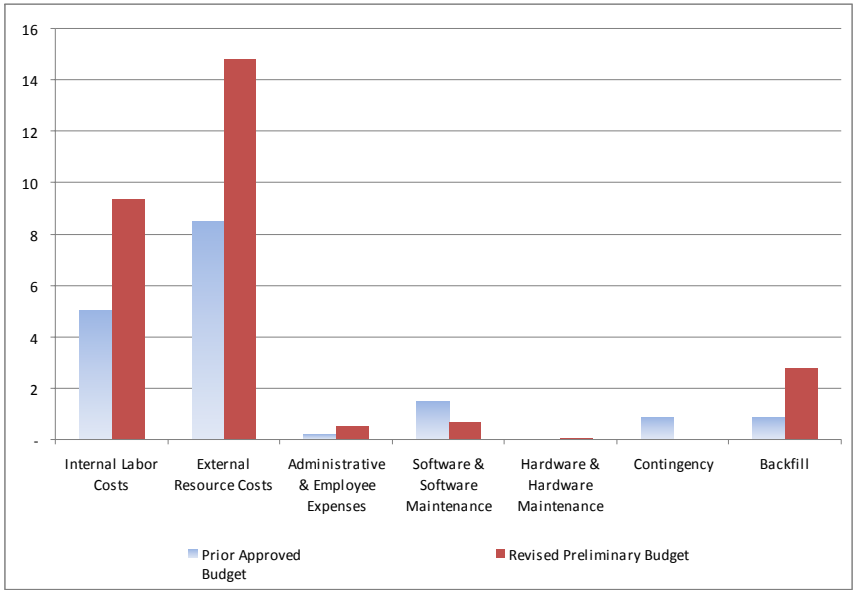
Approved vs. Revised Preliminary Budget

Line	Expense Category	Approved Budget	Revised Preliminary Budget	Variance
1	Internal Labor Costs	$ 5,035,030	$ 9,343,925	$ 4,308,895
2	External Resource Costs	8,476,570	14,790,414	6,313,844
3	Administrative & Employee Expenses	200,000	514,781	314,781
4	Software & Software Maintenance	1,458,469	670,847	(787,622)
5	Hardware & Hardware Maintenance	10,400	66,356	55,956
6	Contingency	865,000	-	(865,000)
7	Subtotal - Direct Costs	16,045,469	25,386,322	9,340,853
8				
9	Backfill	842,073	2,787,281	1,945,208
10				
11	**Total - Direct Costs & Backfill**	$ 16,887,542	$ 28,173,603	$ 11,286,061

Revised Preliminary Budget



Change by Cost Element



Commentary

- This funding request includes funds to support the development of CSI (Commercial Services Integration)
- This funding request includes substantial backfill funds for contractors to perform Zonal Settlement & Billing functions as nearly the entire ERCOT Settlements & Billing team is engaged in the Nodal development
- The COMS project is heavily staffed with ERCOT internal resources
- Credit Management Module (CMM) software development and support is included in the COMS budget
- The majority of COMS spend ends after April 2009

Commercial Systems (COMS)

Project Overview
The Commercial Systems scope covers delivery of all new and enhanced functionality to deliver the Nodal Protocols. Business functions included in the scope of Commercial Systems are: Settlements and Billing, Data Aggregation, Metering, Load Profiling, Credit Monitoring and Management, Registration, Disputes, Financial Transfer and commercial enterprise interfaces/integration. Functionality to be developed and delivered are: (majority is new development on enhanced legacy systems) ▪ Settlement of the Day Ahead and Real Time Energy ▪ Settlement of the RUC ▪ Settlement of Ancillary Services ▪ Settlement and Invoicing of CRR (including CRR Balancing Account and CRR Auction Revenue Disbursement) ▪ Settlement System Upgrade ▪ Statements/Invoices (including CRR Invoicing) ▪ Credit Monitoring (new infrastructure / Vendor software product) ▪ Data Aggregation ▪ Metering ▪ Load Profiling ▪ Commercial System and Cross Package Interfaces ▪ Financial Transfer (new infrastructure ▪ AS Obligations Calculations ▪ Validation and Delivery of Invoices and Statements ▪ Settlement Validation, Audit, and Reporting Tools ▪ Batch Scheduling ▪ Registration ▪ Dispute Tools ▪ Extracts for Commercial Systems (new infrastructure)

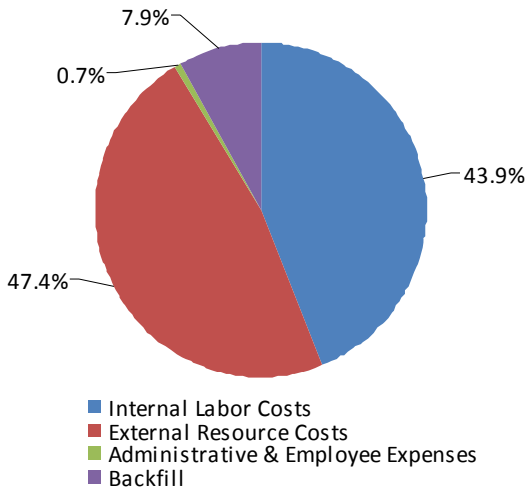
Cost Overview	
Internal Labor	ERCOT employees are providing project management, requirements development, design, test plans, code development, executing test and supporting market trials, and providing advocate support to market participant subcommittees, working groups and task forces. 72 of the 93 COMS resources are ERCOT FTEs.
External Labor	The contingent labor consist of additional staff needed for the development of Commercial Services Integration, Lodestar data aggregation, external facing dispute tool development, project management for Settlements, and 12 Zonal backfill resources for the ERCOT FTEs working on the COMS project.
Software and Software Maintenance	Software vendor labor consists of metadata development from Oracle (Lodestar) for Settlements and software development, patching and project management services from Triplepoint for the Credit Management System. Software licensing agreements with Triplepoint are in place and currently budgeted by COMS for the Credit Management System

EARLY DELIVERY SYSTEMS (EDS)

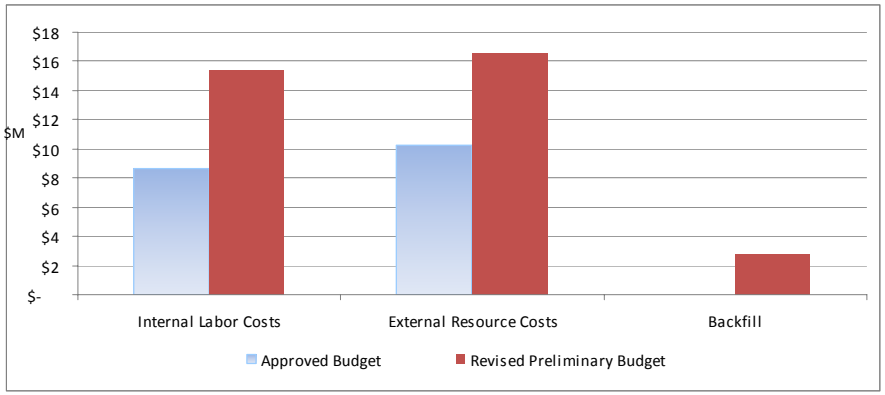
Approved vs. Revised Preliminary Budget

Line	Expense Category	Approved Budget	Revised Preliminary Budget	Variance
1	Internal Labor Costs	$ 8,676,012	$ 15,374,424	$ 6,698,411
2	External Resource Costs	10,237,995	16,580,041	6,342,046
3	Administrative & Employee Expenses	360,514	252,336	(108,178)
4	Software & Software Maintenance	937	1,064	127
5	Hardware & Hardware Maintenance	-	12,092	12,092
6	Contingency		-	-
7	Subtotal - Direct Costs	19,275,458	32,219,956	12,944,498
8				
9	Backfill	36,090	2,770,152	2,734,062
10				
11	**Total - Direct Costs & Backfill**	$ 19,311,548	$ 34,990,107	$ 15,678,559

Revised Preliminary Budget



Change by Cost Element



Commentary

- The EDS project timeline extends through market go-live in December 2010, but spending does not increase until January 2010
- The EDS project includes substantial backfill funding to fulfill Zonal responsibilities while ERCOT FTEs are contributing to EDS efforts
- EDS deliverables include executing all market trials and executing all Nodal go live activities

Early Delivery Systems (EDS)

Project Overview
The charter for ERCOT early delivery systems (EDS), states their scope to be the “Definition and Execution of Early Delivery Systems (EDS) and Zonal to Nodal transition.” The EDS activities are more commonly referred to as market trials in other ISOs. The defining objective of this work is to sufficiently exercise the people, processes, and technology of the ERCOT market, for both ERCOT and market participant organizations, under Nodal protocols to ensure continuity of the electric grid and energy market during the transition to Nodal. This will be accomplished by working with the Nodal program and market participants to: ▪ Define and execute all Nodal market trial activities from system planning and operations, to market execution, to financial settlement. ▪ Define and measure all market metrics for reporting to TAC. ▪ Define and execute Nodal Go-Live activities

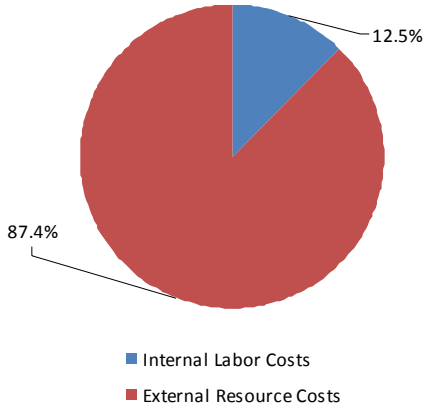
Cost Overview	
Internal Labor	ERCOT internal labor for the EDS project fits into two engagement categories: ▪ ERCOT supervisors and managers engaged in developing the approach and execution plans for market trial activities. These activities include extensive planning meetings, engagement with market to refine test plans, and provide support during trial execution. ▪ ERCOT business and IT staff execute and support the activity for the test duration and reporting of the results. This is the staff which will ultimately own the nodal systems and processes.
External Labor	The external labor associated with the EDS project fits into three categories ▪ Contract staff for project management, facilitation, and documentation support in order to effectively plan, document, and execute the EDS activities. The ERCOT staff that executes the trial does not have the expertise or the bandwidth to focus on these detailed planning and documentation activities leading into the tests. ▪ Contract staff for market support to address questions and communicate with more than 150 market participant organizations. This temporary staff addresses the details of market trials. ▪ Contract staff to backfill for ERCOT zonal employees who are needed for market trial execution and support.
Software and Software Maintenance	There is no application software associated with the EDS project

SYSTEMS INTEGRATION (Formerly EIP)

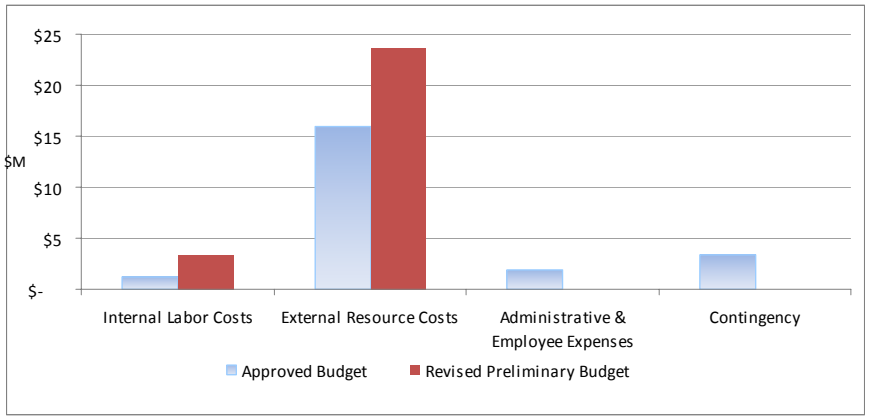
Approved vs. Revised Preliminary Budget

Line	Expense Category	Approved Budget	Revised Preliminary Budget	Variance
1	Internal Labor Costs	$ 1,183,959	$ 3,394,106	$ 2,210,146
2	External Resource Costs	15,933,586	23,697,382	7,763,796
3	Administrative & Employee Expenses	1,845,606	3	(1,845,603)
4	Software & Software Maintenance	-	6,338	6,338
5	Hardware & Hardware Maintenance	-	-	-
6	Contingency	3,377,794	-	(3,377,794)
7	Subtotal - Direct Costs	22,340,945	27,097,828	4,756,883
8				
9	Backfill	-	2,239	2,239
10				
11	**Total - Direct Costs & Backfill**	$ 22,340,945	$ 27,100,067	$ 4,759,122

Revised Preliminary Budget



Change by Cost Element



Commentary

- The EIP project is dependent on external contractors for the design and development of software interfaces and integration points
- Retaining these external resources on the extended project timeline is the main driver for the increased funding request

Systems Integration (formerly Enterprise Integration Project (EIP))

Project Overview
The Systems Integration project is tasked with developing software to enable systems to share data to enable end-to-end business processes required by the Nodal program. Included in this effort is the external web services interface, which will be the market participant's primary interface into the market systems. Additional software components within scope include a common services infrastructure for logging, exception management, and auditing as well as monitoring and other operational support components. The software is developed using TIBCO, an integration toolset which is currently in use at ERCOT in other systems.

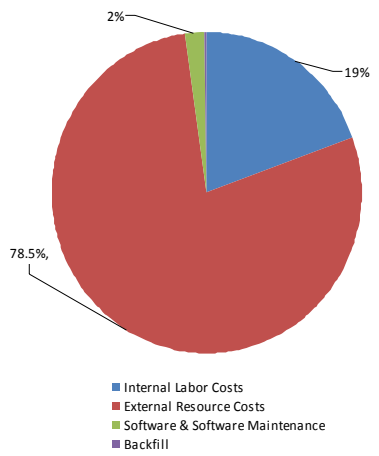
Cost Overview	
Internal Labor	Five internal development resources are fully allocated to the Nodal program. These resources have been assigned deliverables and are in the process of transitioning knowledge and responsibility for those deliverables from external resources. The overall objective is to be fully internally supported by the start of market trials. Responsibilities include: Creation and revision of Analysis and Design documents, development and unit test of software, resolution of software defects.
External Labor	External resources have been utilized for a majority of the effort in Systems Integration. ERCOT did not have sufficient internal resources to complete this project. Additionally, given the size of the effort, the available internal resources did not have sufficient experience to complete the task. These external resources are sourced from two different vendors—UISOL to support design and initial quality assurance capabilities, and Perficient to support the software development effort. Two individuals are currently sourced as contingent labor—one provides quality assurance testing and the other supports the team's software build and deployment process.
Software and Software Maintenance	The TIBCO toolset is covered by an enterprise support contract, which covers all TIBCO products utilized by ERCOT. The contract provides on-call support five days per week during business hours, support via e-mail, and distribution of product patches.

INTEGRATION TESTING (INT)

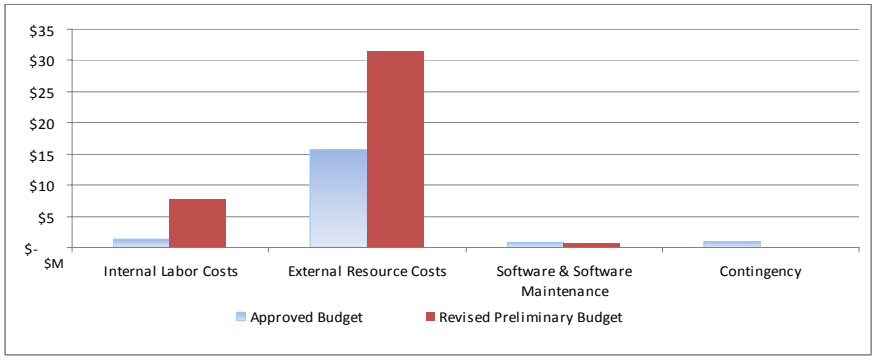
Approved vs. Revised Preliminary Budget

Line	Expense Category	Approved Budget	Revised Preliminary Budget	Variance
1	Internal Labor Costs	$ 1,313,632	$ 7,806,625	$ 6,492,993
2	External Resource Costs	15,790,697	31,549,120	15,758,423
3	Administrative & Employee Expenses	48,999	1,271	(47,728)
4	Software & Software Maintenance	685,608	816,891	131,283
5	Hardware & Hardware Maintenance	-	(34,180)	(34,180)
6	Contingency	935,000	-	(935,000)
7	Subtotal - Direct Costs	18,773,936	40,139,728	21,365,791
8				
9	Backfill	68,590	68,590	-
10				
11	**Total - Direct Costs & Backfill**	$ 18,842,527	$ 40,208,318	$ 21,365,791

Revised Preliminary Budget



Change by Cost Element



Commentary

- The Integration testing budget includes funds for external and internal resources to test integration functionality of the core software systems – this work includes:
  - Design of test cases
  - Design of test scripts
  - Execution of all integration testing

Integration Testing (INT)

Project Overview
The charter for the Integration Testing (INT) Project is to test and validate data integration (bid to bill data flow) and IT operational readiness of the Nodal systems in preparation for market participant testing. This will be accomplished through the: ▪ Definition and build out of the Nodal integration test environment ▪ Development of the Nodal integration test strategy and integrated release test plans ▪ Development of the integrated release schedule ▪ Management, coordination and tracking of the Nodal release pipeline ▪ Definition and execution of integration and operational readiness test cases and scripts that are traceable to integration specifications, Nodal supplemental requirements, and end-to-end market and operations use cases ▪ Definition of the integration defect management process, and the definition, deployment, and management of testing tools, processes, and staff.

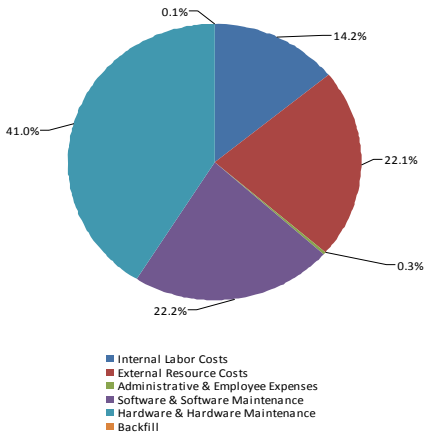
Cost Overview	
Internal Labor	ERCOT employees are involved in the INT project at all levels of the integration test planning and execution activities. Specifically, ERCOT employees are supporting the design and build out of the integration test environment, participating in the development, review and approval process for the integration test strategy, test plans, and test cases, supporting the definition and implementation of testing tools and automation framework, managing the integration defect management process, and supporting the day-to-day integration test execution, results validation, coordination, tracking, control and status reporting to the program.
External Labor	The contingent labor associated with the INT Project is supporting the following roles: project manager (PM), technical and functional subject matter expert (SME), and integration tester. The PM and SME roles have been filled with contingent labor, where necessary, because the required skills and domain experience were not available within ERCOT. ERCOT internal resources (business owners) will take on more responsibility for integration test execution as the INT schedule progresses. Additionally, contingent resources are being used to augment the ERCOT enterprise test team driven by the need for an increase integration test resources to meet schedule. There are no software vendors associated with the INT project.
Software and Software Maintenance	The INT project paid for one year of software maintenance and support on the following test tools: Mercury Quality Center, LISA and Quick Test Pro.

IT OPERATIONS AND INFRASTRUCTURE (INF)

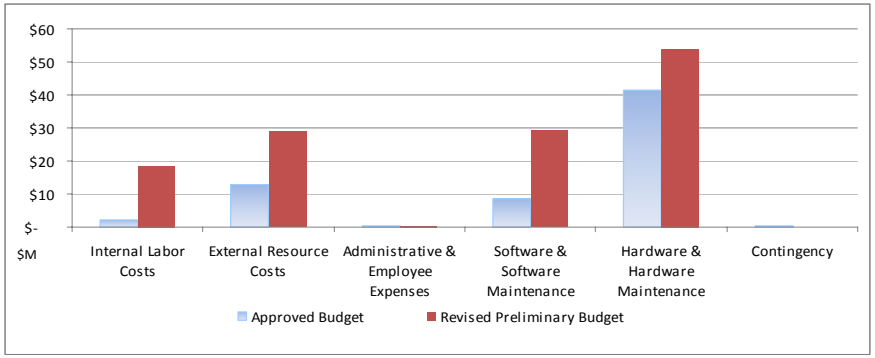
Approved vs. Revised Preliminary Budget

Line	Expense Category	Approved Budget	Revised Preliminary Budget	Variance
1	Internal Labor Costs	$ 2,182,376	$ 18,708,251	$ 16,525,875
2	External Resource Costs	12,838,766	29,083,524	16,244,758
3	Administrative & Employee Expenses	346,727	434,416	87,689
4	Software & Software Maintenance	8,404,523	29,221,135	20,816,612
5	Hardware & Hardware Maintenance	41,583,904	53,982,947	12,399,044
6	Contingency	500,000	-	(500,000)
7	Subtotal - Direct Costs	65,856,296	131,430,273	65,573,978
8				
9	Backfill	43,719	79,855	36,136
10				
11	**Total - Direct Costs & Backfill**	$ 65,900,015	$ 131,510,128	$ 65,610,113

Revised Preliminary Budget



Change by Cost Element



Commentary

- The IT Operations and Infrastructure budget's substantial increase is due to the extended timeline for internal and external labor costs needed to support the following new environments:
  - Development, FAT, iTest, Sandbox, iFAT, and two EDS environment
- The breakdown of total project expenses in the IT Operations & Infrastructure expenses are:
  - 52% Hardware & Software Purchases
  - 14% ERCOT FTE labor
  - 22% External labor & vendor spend
  - 12% Hardware & Software Maintenance

IT Operations and Infrastructure (INF)

Project Overview
The Nodal IT Operations & Infrastructure project team shall ensure mission critical infrastructure is delivered and supported as specified for the ERCOT enterprise architecture. ▪ Deliver specified hardware, database software and the integration platform software as defined by the functional requirements for each Nodal project. ▪ Meet the SLA for delivery that is consistent with the ERCOT enterprise architecture. ▪ Provide responsive service to support the successful delivery and maintenance of infrastructure systems at ERCOT ▪ Develop an IT Services catalogue for the services provided to the Nodal program. ▪ Establish and operate to the service level agreements for respective systems. ▪ Provide monitoring and reporting as specified in the support agreements for hardware systems. ▪ Provide data center resource capacity (power, space and cooling) to satisfy approved, forecasted infrastructure demands. ▪ Provide transition plans to ensure delivery of Nodal infrastructure to ERCOT staff as early as possible to ensure readiness for market go-live. ▪ Provide release management services to control the deployment of software and systems to controlled environments (Added after Nov 2006 charter) ▪ Provide Market Participant Identity Management System to enable the management and provisioning of user accounts in the market facing system

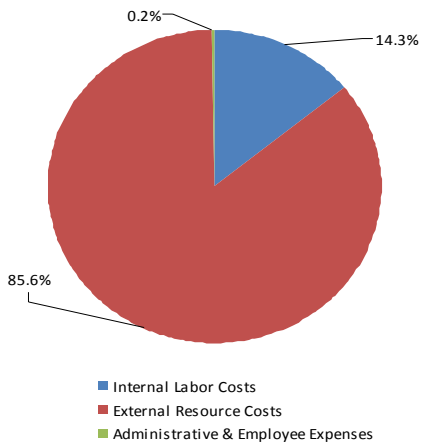
Cost Overview	
Internal Labor	Nodal IT Operations & Infrastructure project uses primarily ERCOT staff for the build out and delivery of infrastructure services. Starting in October 2008, Nodal IT Operations & Infrastructure budget incorporated the labor to support all database, storage, operating system, network, desk side, and application operation administration services delivered by the IT department in order to reduce administrative overhead in tracking the operation of each project's environment. INF budget also contains the release management team supporting and operating the tools necessary to deploy code to the appropriate environments for the Nodal program.
External Labor	Nodal IT Operations & Infrastructure uses some contract labor to provide services described above in internal labor. The current budget draft for Infrastructure uses 73% internal labor and 27% external labor based on the effort planned from Nov 2008 through Dec 2010.
Software and Software Maintenance	Nodal IT Operations & Infrastructure project includes the cost for the purchase and maintenance of all nodal program purchased hardware including IBM P and X series hardware, network equipment, and storage systems. Infrastructure also pays for the purchase and maintenance of enterprise software used across multiple nodal projects including, AIX, Linux, Windows, VMware, Oracle, TIBCO, OpenView, all desktop software (Office, Visio, Project, etc.), GPFS, Net IQ, Confluence, Jreports, Compilers, Time Machine, Policy Server, Citrix, Storage Foundation, NetBackup, Veritas, ITKO, Tripwire, and management software for firewalls and SAN equipment.

MARKET INFORMATION SYSTEMS (MIS)

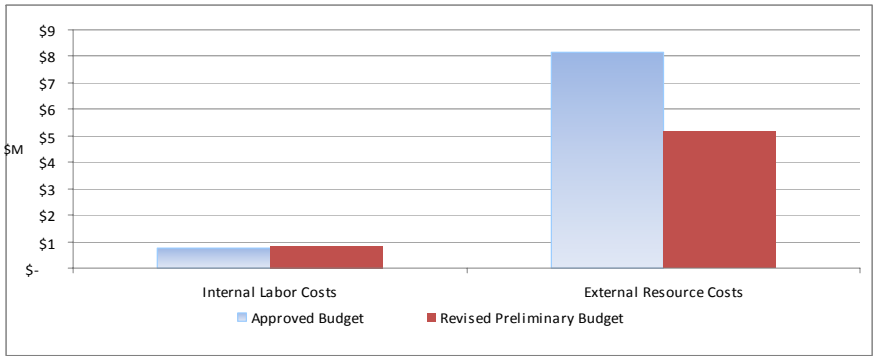
Approved vs. Revised Preliminary Budget

Line	Expense Category	Approved Budget	Revised Preliminary Budget	Variance
1	Internal Labor Costs	$ 779,151	$ 863,109	$ 83,957
2	External Resource Costs	8,159,180	5,167,864	(2,991,316)
3	Administrative & Employee Expenses	12,000	9,752	(2,248)
4	Software & Software Maintenance	305,000	-	(305,000)
5	Hardware & Hardware Maintenance	-	-	-
6	Contingency	-	-	-
7	Subtotal - Direct Costs	9,255,331	6,040,725	(3,214,607)
8				
9	Backfill	-	-	-
10				
11	**Total - Direct Costs & Backfill**	$ 9,255,331	$ 6,040,725	$ (3,214,607)

Revised Preliminary Budget



Change by Cost Element



Commentary

- The MIS project shows a budget decrease due to a change in the organization of some Nodal projects and deliverables. Some deliverables previously included in the MIS budget have been transitioned to other projects
- The remaining scope of the MIS project includes not only development of the MIS web portal, but also completion of the Current Day Reports (CDR)
- Current Day Reports are defined as reports or extracts with a latency, frequency, and/or performance requirement that cannot be met by the EDW environment (< 8 hrs.)

Market Information System (MIS)

Project Overview
The project charter states that the purpose of the MIS (Market Information System) web portal is to provide a single point of access for market participants, PUC, and ERCOT staff to Nodal market information, and to ERCOT market-facing applications. The MIS will provide access to reports, extracts, applications, and any other content required by protocols in a central location.

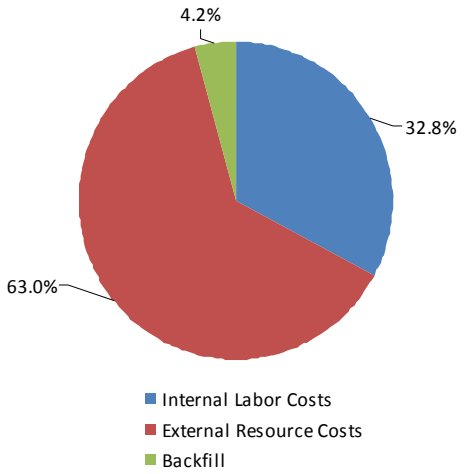
Cost Overview	
Internal Labor	The internal labor on the MIS team consists of developers from the Web and Data Services team as well as a business analyst on loan from the Zonal Program Office. The developers are working on sub-application components of the portal such as Search, Notice Builder, and View By Protocol. The business analyst is continuing to work on requirement updates and build-specific documents.
External Labor	The external resources on the MIS project are in charge of setting up the environments for the MIS portal and doing the core portal design and development. Development includes the configuring the software to create the landing pages, portlets, and individual links as well setting up the supporting components such as JBOSS, LDAP, proxies, etc. This work was staffed with vendors due to the home team being saturated with zonal development and support.
Software and Software Maintenance	The MIS project had two major software expenditures. Due to the nature of the TIBCO licensing at ERCOT, the project's entire software budget was transferred to the Infrastructure project. In return, the MIS received all necessary components of TIBCO as well as the Jinfonet JReports software used on the portal.

ENTERPRISE DATA WAREHOUSE (EDW)

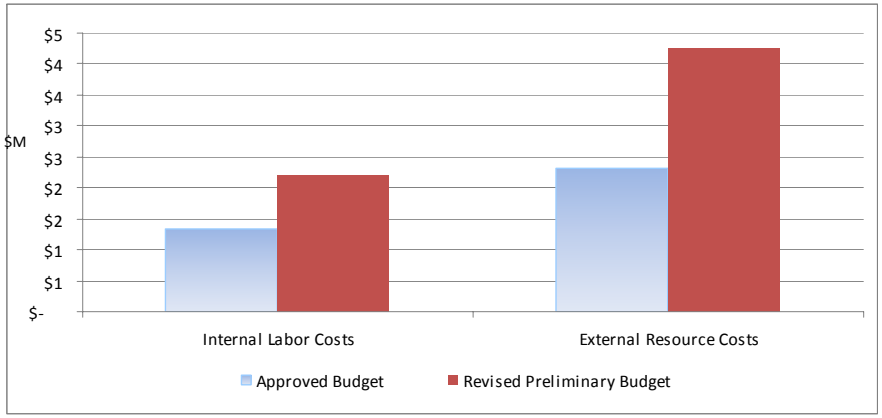
Approved vs. Revised Preliminary Budget

Line	Expense Category	Approved Budget	Revised Preliminary Budget	Variance
1	Internal Labor Costs	$ 1,340,578	$ 2,214,886	$ 874,308
2	External Resource Costs	2,313,243	4,255,342	1,942,098
3	Administrative & Employee Expenses	-	18	18
4	Software & Software Maintenance	-	-	-
5	Hardware & Hardware Maintenance	-	-	-
6	Contingency		-	-
7	Subtotal - Direct Costs	3,653,822	6,470,246	2,816,424
8				
9	Backfill	1,748	285,975	284,227
10				
11	**Total - Direct Costs & Backfill**	$ 3,655,570	$ 6,756,221	$ 3,100,652

Revised Preliminary Budget



Change by Cost Element



Commentary

- The EDW project utilizes primarily contingent labor to develop, text, and document reports and extracts of market data

Enterprise Data Warehouse (EDW)

Project Overview
The charter for ERCOT Enterprise Data Warehouse team (EDW) states their scope to "Ensure Enterprise Information Services (EIS) provides an integrated system that meets Nodal Protocol requirements." This will be accomplished by helping MPs, PUCT, IMM, FERC, ERCOT, and the public by: ▪ Providing capability to collect and access historic data; Providing a platform for performing data analysis; ▪ Providing the capability to collect data from operational systems for retention, reporting and analysis; ▪ Providing predefined data extracts; and ▪ Providing the data library for all EIS data products

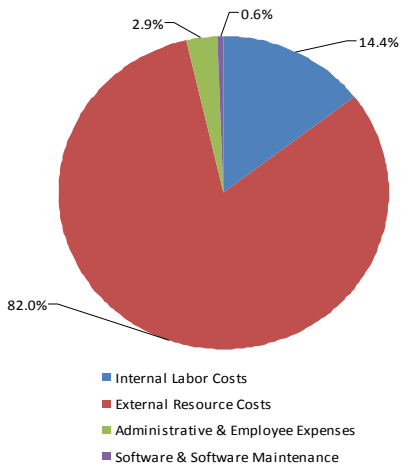
Cost Overview	
Internal Labor	ERCOT employees involved in the EDW project will be engaged at various levels: Development associated with data replication for specified core project systems; development of reports and extracts as identified by protocol requirements; testing and support of replication, reports, and extracts; documentation of all development, processes, procedures, end-to-end service level agreements (SLAs), systems controls showing compliance with ERCOT internal control standards, recommended staffing plans to accomplish on-going EIS activities at ERCOT post-go-live; software documentation that includes installation and maintenance guides; standards to control access to EIS systems; standards and SLAs for posting to EIS systems; standards for retention of data in EIS systems and disaster recovery of EIS systems.
External Labor	The contingent labor associated with the EDW project is mainly focused on development, test, and documentation activities required to complete the EDW deliverables. Most of the contingent labor has expertise in these areas and provides a combined set of skills and experience to augment current EIS staff assigned to the EDW project. There are three roles on the EDW team filled by contingent labor: Database Administrator, Database Developer, and Database Analyst. While these roles exist on the EIS staff, additional resources are necessary to provide deliverables for EDW in the timeframe required. There are no software vendors associated with the EDW project.
Software and Software Maintenance	There is no application software associated with the EDW project.

MARKET ENGAGEMENT AND READINESS (MER) - TRAINING

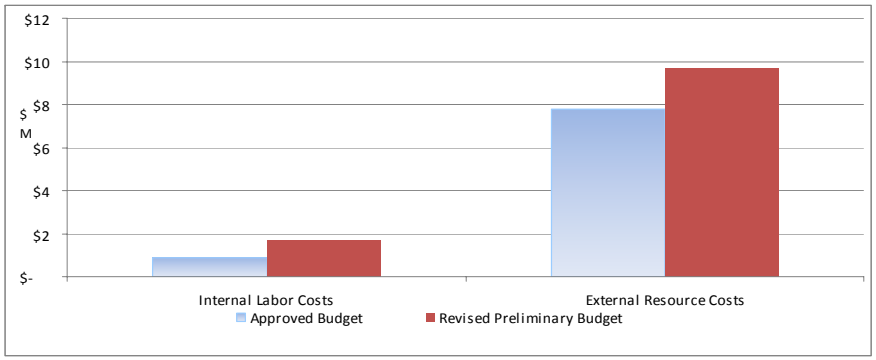
Approved vs. Revised Preliminary Budget

Line	Expense Category	Approved Budget	Revised Preliminary Budget	Variance
1	Internal Labor Costs	$ 887,279	$ 1,705,278	$ 817,999
2	External Resource Costs	7,789,147	9,706,149	1,917,002
3	Administrative & Employee Expenses	254,056	347,280	93,223
4	Software & Software Maintenance	199,120	76,152	(122,968)
5	Hardware & Hardware Maintenance	7,900	-	(7,900)
6	Contingency	-	-	-
7	Subtotal - Direct Costs	9,137,503	11,834,859	2,697,356
8				
9	Backfill	-	-	-
10				
11	**Total - Direct Costs & Backfill**	$ 9,137,503	$ 11,834,859	$ 2,697,356

Revised Preliminary Budget



Change by Cost Element



Commentary

- This project includes funding to develop and deliver market training to ERCOT market participants
- The MER-Training funding increase results primarily from extended program timeline.

Market Engagement and Readiness (MER) Training

Project Overview
Market Engagement and Readiness – Training: Preparing market participants for the nodal market through training is an integral part of the transition to the nodal market. This project is charged with development and delivery of nodal market training to market participants and ERCOT staff to parallel the development of the market rules and the systems to be used for system operations and market operations. The training is primarily based on the ERCOT nodal market rules or protocols but also includes training on market participant user interfaces. ERCOT does not currently have a formal market participant training group and the training delivered as part of this project is expected to continue after the completion of the transition to the nodal market.

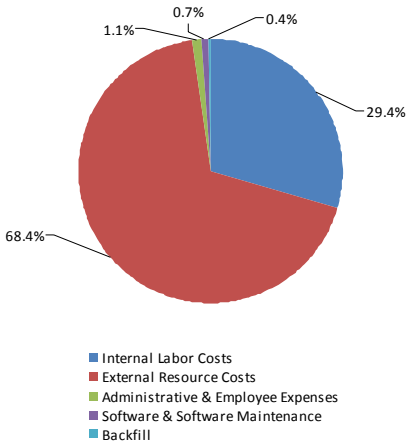
Cost Overview	
Internal Labor	Internal ERCOT resources have been used in all aspects of this project. The project is managed by an internal ERCOT resource. Subject matter experts from various ERCOT business areas are consulted in the development of training material. They also provide critical reviews of training materials prior to approval for training delivery. ERCOT personnel are also engaged in the delivery of the training to market participants as available.
External Labor	External resources were engaged to develop and deliver market participant training as ERCOT did not have a formal department charged with this task prior to the nodal market transition. The project has engaged external subject matter experts in the development and delivery of training. The project has also engaged learning specialists, instructional designers and graphics artists from companies with experience in the development and delivery of training using proved adult education principles.
Software and Software Maintenance	WBT Manager: This is a Learning Management System (LMS) used to register students as well as to deliver web-based training. The application is hosted at an off-site vendor (On-Line Training Corporation)

ERCOT READINESS AND TRANSITION (ERT)

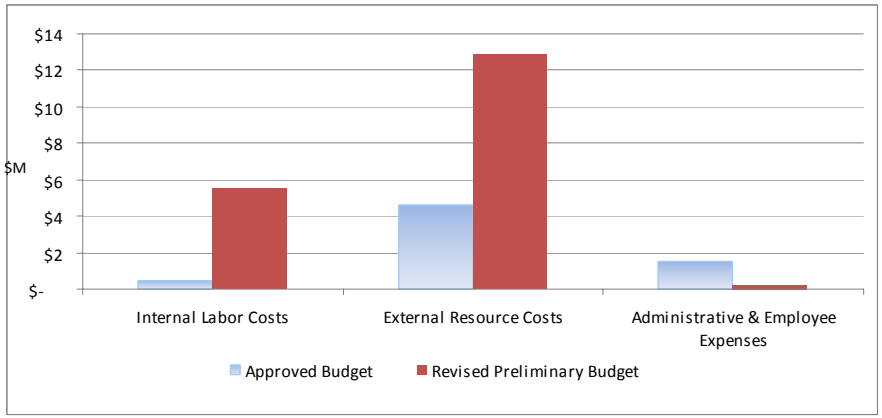
Approved vs. Revised Preliminary Budget

Line	Expense Category	Approved Budget	Revised Preliminary Budget	Variance
1	Internal Labor Costs	$ 441,360	$ 5,540,171	$ 5,098,811
2	External Resource Costs	4,586,232	12,865,252	8,279,019
3	Administrative & Employee Expenses	1,535,775	198,604	(1,337,171)
4	Software & Software Maintenance	195,000	135,813	(59,187)
5	Hardware & Hardware Maintenance	-	-	-
6	Contingency	-	-	-
7	Subtotal - Direct Costs	6,758,367	18,739,840	11,981,473
8				
9	Backfill	9,396	77,987	68,591
10				
11	**Total - Direct Costs & Backfill**	$ 6,767,763	$ 18,817,827	$ 12,050,064

Revised Preliminary Budget



Change by Cost Element



Commentary

- The prior approved budget did not include funding for ERCOT internal training on impacted business processes and skills required for execution of nodal market after implementation
- External resources will perform:
  - Business process definition and redesign
  - NERC compliance alignment and support
  - Independent Metrics Readiness Advisor
  - Staff augmentation for ERCOT Client Relations
  - Skills based training assessment and design

ERCOT Readiness and Transition (ERT)

Project Overview
The charter for ERCOT Readiness and Transition (ERT) states their scope to be “Preparation of the ERCOT organization and final verification of all parties’ readiness to operate under the Nodal Protocols in live operations.” This will be accomplished through definition of nodal processes and procedures; training of employees in nodal processes, procedures and enabling systems as appropriate for their roles and responsibilities in the new organization; and tracking of metrics as approved by TAC that were intended to ensure ERCOT’s readiness to operate the nodal market.

Cost Overview	
Internal Labor	ERCOT employees involved in the ERT project will be engaged at various levels: review of high level processes, assignment of resources within their group to document new or update existing lower level processes; write new or update existing procedures; support mapping of procedures to process, requirements and protocols to ensure coverage; identify training requirements based on roles and responsibilities required to operate the nodal market; attend training to meet training requirements; and provide data for metrics tracking.
External Labor	The contingent labor associated with the ERT project is mainly focused on project management and facilitation of the activities required to complete the ERT deliverables. Most of the contingent labor has energy expertise in these areas and provides a combined set of skills and experience that was not available in ERCOT. For example, the business process lead has led efforts to define and document processes for another ISO and has also worked in the energy industry as an operator and is NERC certified. Where energy expertise is not required is when activities require experience in a support discipline (e.g., requirements definitions and traceability to ensure integration of the protocols, processes and requirements). This expertise was not available in ERCOT.
Software and Software Maintenance	There is no application software associated with the ERT project