# The Electric Reliability Council of Texas

## Utilicast Nodal Program Oversight Report No. 9

### System Integration Assessment

February 13, 2009

Public Document

Utilicast

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# 1. Executive Summary

## Scope and Approach

Nodal Oversight Report Number 8 highlighted system integration as one of the high risk areas for the ERCOT Nodal Implementation Program. The objective of Nodal Market Oversight Report Number 9 is to provide an independent assessment of integration initiative. Specifically, Utilicast assessed the following areas:

- Current state of integration on the Nodal Program
- Integration scope and approach
- Integration project organization structure and resource plan
- Integration technical solution

## Recommendations

Because of the urgency of the Nodal Program and to expedite the management response, the Utilicast team communicated findings and made recommendations as they arose during the course of this review. Based on our findings we made the following recommendations and include the management response to date:

| Recommendations | | Management Response |
|---|---|---|
| 1 | The application project teams should own and be accountable for developing and testing their application interfaces. | The Nodal PMO has reassigned the ownership for interface development and testing to the application project teams. |
| 2 | The scope of system integration testing (end-to-end testing) should be limited to confirming that the individual applications can operate as a single enterprise solution. | The Nodal PMO is in the process of interviewing qualified candidates to lead this effort and develop the necessary test scripts. |
| 3 | Clearly define and communicate the scope, objectives and expected deliverables of the core system integration components. | The Nodal PMO has revised its approach for application interface testing and integration testing (end-to-end business scenario testing). This revised integration approach has been reviewed with the Project Managers, including the scope definition, roles and responsibilities of the Project Teams, and process for aligning approach with project schedules and budgets. |
| 4 | Assign a qualified integration project lead. | The ERCOT executives and the Nodal PMO have assigned a qualified project manager to this role. |
| 5 | Appoint qualified leaders with clear ownership of clearly defined deliverables to the key system integration roles. | ERCOT has posted the leadership positions and has received a number of responses. To date three offers have been extended successful candidates.<br><br>The goal is to fill these positions with resources that have previous nodal market implementation or large-scale system integration experience. |

| Recommendations | | Management Response |
|---|---|---|
| 6 | Update project plans and budgets based on revised integration scope, objectives, roles and responsibilities. | ERCOT will be revising their project plan and schedule to align with the revised integration testing approach. |
| 7 | Define and implement (in conjunction with the market Participants) the specification for the volume and content of information transmitted over external web services. | |
| 8 | Build and configure a dedicated integration test environment. | Project Manager has been assigned to this initiative. Currently in the planning phase with an expected delivery date of March 2009. |
| 9 | Review access policies and IT controls for non-production environments. | Project Manager assigned to recommendation 8 will also be responsible for reviewing access and control policies. |

## Findings

The findings from this review are as follows:

| Review Area | Findings |
|---|---|
| Assess current state of integration on the Nodal Program | The Nodal Program has made notable progress in:<br>• Redefining the scope and objectives of the integration initiative consistent with requirements.<br>• Developing and communicating a coordinated integration approach.<br>• Assigning ownership and accountability for key integration deliverables.<br>• Hiring knowledgeable and experienced personnel in key leadership roles. |
| | Integration testing is estimated at 5% complete. The tests completed to date are basic application connectivity tests. The business process based end-to-end testing has yet to be completed. |
| | Development of the technical data transfer solution EIP (Enterprise Integration Project - TIBCO data transfer solution) is estimated at 85%-90% complete. |
| | Some of the project teams have made progress in developing and testing the required application interfaces (EMS-MMS and COMS) and are therefore further ahead in integration. |
| Review overall scope and approach of the Integration Project | There were unrealistic expectations of the role, responsibilities and deliverables of the integration initiative. |
| | The formal components one would expect to find in an integration approach were poorly defined. |
| | Lack of communication on system specification changes has resulted in a high rate of system fixes and rework on the Enterprise Integration Project. |
| Review Organization Structure and Resource Planning | Limited leadership available on the integration team with knowledge of integrating complex solutions and understanding of nodal markets and electricity reliability. |

| Review Area | Findings |
|---|---|
| | The integration resource plan was not well defined and seems excessive. |
| Technical data transfer solution review | The approach adopted for data transfer between applications has resulted in 3 separate technical solutions being developed.<br>• TIBCO service orientated solution<br>• Point-to-point data transfer<br>• CSI TIBCO orchestration solution<br><br>Based on our review, these solutions are consistent with program requirements. |
| | The specifications for volumes limits and package content managed by the external web services have not yet been fully defined. Consequently, there is a risk that transactions submitted by Market Participants may not be processed due to system constraints. |

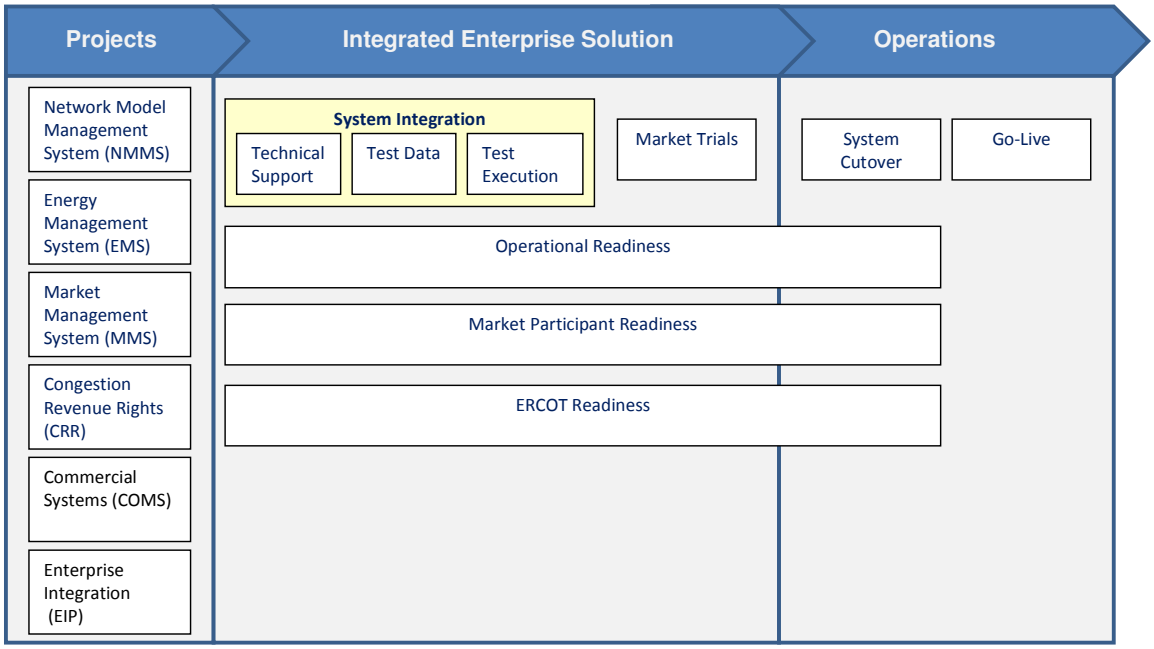
## 2. Scope and Objectives

ERCOT has engaged Utilicast to perform periodic, independent reviews of its Texas Nodal Market Redesign Program (Nodal Program) that covers the program's plans, project reporting, progress in achieving milestones, and other relevant areas. The purpose of the reviews is to provide the Nodal Oversight Committee and ERCOT's Board of Directors with independent assessments on the Nodal Program and to further enhance their confidence in the Nodal Program's progress. Utilicast will also assist ERCOT's management where possible by providing recommendations to improve the program. Utilicast is to provide periodic reports and in-person monthly presentations of findings and recommendations to the Nodal Program Oversight Committee, and will timely respond to special review requests made by the Committee.

Nodal Oversight Report Number 8 highlighted system integration as one of the high risk areas for the ERCOT Nodal Implementation Program. The objective of Nodal Market Oversight Report Number 9 is to provide an independent assessment of integration initiative. Specifically, Utilicast assessed the following areas:

- Current state of integration on the Nodal Program
- Integration scope and approach
- Integration project organization structure and resource plan
- Integration technical solution

The high level components of the Nodal Program are presented in the figure 1 below. The scope of this report is related to the system integration component (highlighted in yellow). The other program components are specifically excluded from the scope of this report.




*(Figure 1 – High level components of the Nodal Program)*

Utilicast has been requested to provide the following deliverables as part of this engagement:

- Findings on the current state of the Nodal Program integration initiative including scope and objectives, planning, resources, level of completion to date and adequacy of the organizational and control structures in place to complete the initiative.
- Findings and recommendations on the integration initiative.
- Opportunities for improvement.

This document serves as the final deliverable of Market Oversight Report Number 9 and contains the final versions of each of the project deliverables as listed above.

# 3. Approach

The Utilicast project team, over a six week period, conducted a review of the Nodal Program system integration initiative to understand progress to date and related risks and issues. The purpose of the review is to determine if ERCOT is properly positioned and organized to successfully integrate the individual project deliverables in to a single integrated enterprise solution. To achieve this, the project team adopted the following approach:

| Tasks | Description |
|---|---|
| **Assess current state of the Nodal Program system integration initiative** | Through interviews and reviews of project documentation, assess the progress to date of the Nodal Program integration initiative including:<br>• Current status including planned and actual work completed to date.<br>• Budgeted and actual cost to date and value received.<br>• Expected cost to complete. |
| **Review overall integration scope and approach** | Working with the Program Management Office and the integration project management teams review the methodology, approach, plans and budget for system integration. Specific areas of interest included:<br>• What is the definition of integration(what does End-to-End Testing include, what does EDS testing include)?<br>• What approach is being used for integration testing?<br>• What is the plan and timeline for system integration?<br>• What are the costs incurred and value gained to date? |
| **Evaluate the project organization structure and resource plan** | Based on leading practice, assess the project team structure, recourse levels and skills sets assigned to system integration. Specific areas of interest include:<br>• Overall project leadership.<br>• Assignment of roles, responsibilities and ownership of key deliverables.<br>• Staffing levels and skill sets assigned versus those required to effectively complete system integration. |
| **Review of the technical data transfer solution** | Working with ERCOT and IT and the Enterprise Integration Project (EIP) assess the quality technical data transfer solution. Specific areas of concern include:<br>• Why are there many approaches to data transfer (TIBCO, CSI, MMS_EMS)? Should there be one standard approach?<br>• Are the reported concerns of many point of failure warranted?<br>• Is the technical data transfer solution viable/feasible for the long term?<br>• What has been completed to date?<br>• What are the costs incurred and value gained to date? |
| **Confirm findings and recommendations** | Utilicast summarized the findings from the high level and detailed assessments. The findings were then reviewed with the program sponsors and PMO leadership to gain additional insight and input. Utilicast noted any objections and/or exceptions to the findings and recommendations and included them in the final presentation. |
| **Present findings and recommendations** | Utilicast prepared and presented to the Nodal Program Oversight Committee of the Board a written report with the findings and recommendations from this review. Utilicast will also prepare a PowerPoint presentation summarizing the findings and recommendations for discussion with the Nodal Program Oversight Committee, the ERCOT Board, ERCOT Management, the Executive Steering Committee and other stakeholders. |

# 4. Findings

The findings have been organized by the areas assessed for the integration review:

1. Assess the current state of integration on the Nodal Program.
2. Review overall scope and approach of the Integration Project.
3. Assess the organization structure and resource plan for integration.
4. Evaluate the technical implementation of the integration project.

| Findings | Descriptions |
|---|---|
| **Assess current state of integration on the Nodal Program** | |
| **The Nodal Program has made notable progress.** | The overall finding of this review is that the integration initiative to date had unrealistic expectations for project deliverables, was not well planned, incorrectly staffed and not well managed. This has resulted in the inefficient use of resources and rework of solutions causing the costs incurred to date to be higher than expected for this type of initiative.<br><br>The Nodal Program recognizes the issues and risks related to the integration initiative and have made notable progress, in a relatively short period of time, in addressing concerns the following areas:<br>• Redefining the scope and objectives of the integration initiative consistent with requirements.<br>• Developing and communicating a coordinated integration approach.<br>• Assigning ownership and accountability for key integration deliverables.<br>• Hiring knowledgeable and experienced personnel in key leadership roles.<br><br>More details of the progress made to date by the Nodal Program are contained in the recommendations section of this report. |
| **Integration testing is estimated at 5% complete. The tests completed to date are basic application connectivity tests. The business process based end-to-end testing has yet to be completed.** | Based on the revised schedule, integration testing is estimated at 5% complete. As of December 2008, $21.2m of has been incurred on integration testing. The estimated cost to complete is $18.9m. Although integration resources were reassigned for application functional testing of the CRR, CMM and COMS projects, the cost are prohibitive. The timeline for integration testing was poorly planned. The integration project commenced to early in the program and individual project solutions were not at a stage of completion to allow effective integration testing. Consequently, the resources assigned to integration were not utilized efficiently.<br><br>There are limited metrics available to assess the integration testing completed to date. The testing has focused on the elementary connectivity between application (termed |

| Findings | Descriptions |
|---|---|
| | level 1 and level 2 tests). These tests confirm the connectivity and ability to transfer data between applications through the technical data transfer solution such as an enterprise data bus. No end-to-end business process based testing has been completed at this time. |
| **Development of the technical data transfer solution EIP (Enterprise Integration Project - TIBCO data transfer solution) is estimated at 85%-90% complete.** | As of December 2008, $21.4m has been spent on development of the Enterprise Integration Project (EIP). The estimated cost to complete is $5.6m. Development of the EIP solution is estimated at 85%-90% complete. The remaining work in this area relates to completing the development of the solution, supporting integration testing and bug fixes. |
| **Some of the project teams have made progress in developing and testing the required application interfaces (EMS-MMS and COMS) and are therefore further ahead in integration.** | The EMS, MMS and COMS project teams have realized the importance of system interfaces and have developed and tested the application interfaces as part of their overall application development approach. These project teams have made notable progress in identifying and coordinating the exchange of data between their application and upstream and downstream solutions and have correctly implemented and tested a significant portion of the functionality of these interfaces as part of their functional testing. This approach of taking ownership to define, coordinate, and test the development of interfaces should be applied in all application development projects. |
| **Review overall scope and approach of the Integration Project** | |
| **There were unrealistic expectations of the role, responsibilities and deliverables of the integration initiative.** | The roles and responsibilities of the integration initiative were poorly defined and in some cases the application development teams had unrealistic expectations that the integration team was responsible for the testing of the application interfaces. This resulted in some of the application project teams focusing on, and assigning highest priority to development of core system functionality while overlooking the critical data interfaces. Interfaces were being developed, but in many cases they were not considered critical and were poorly coordinated between applications as specifications evolved and changed from those used by the technical team to develop the adaptors.<br><br>There was limited testing of the application interfaces as part of application functional testing. The quality of the interface product delivered to integration test was low and there were many interface defects identified in integration testing and these defects were assigned a lower priority by the application development teams because of the emphasis on delivering core functionality. This cycle stunted the progress of the integration initiative that continued to incur resource costs. |

| Findings | Descriptions |
|---|---|
| **The formal components one would expect to find in an integration approach were poorly defined.** | Scope – the scope, objectives and success criteria for system integration are not well defined and overly complex. The view of the integration project team is that the test plan should include a large portion of application Functional Acceptance Testing together with the complexity of transactions and business scenarios expected in market trails. The objectives of integration testing are to confirm that the applications, infrastructure and technical data transfer solutions that have been developed as individual projects can operate as a single integrated enterprise solution. This is best achieved by confirming that a controlled set of business scenarios are producing an expected set of outputs in a production-like environment.<br><br>Test data – the integration test data sets, including elements such as static data, coordinated transactions and inputs and expected outputs have yet to be completed.<br><br>End-to-end Business Process Test Scenarios – the limited set of business process based tests required to confirm the successful integration of the enterprise solution (combining the individual project components) have not been fully developed. Some preliminary work was performed by the Early Delivery System team in this area and is available to the end-to-end business team to begin planning.<br><br>Operational Readiness – minimal work has been completed to assess system performance and to confirm compliance of the enterprise solution to ERCOT IT policy, service levels and controls. The areas that need to be addressed under operational readiness include:<br>• Performance test planning and execution for business and time critical systems<br>• Failover testing for high availability systems<br>• Business continuity and disaster recovery<br>• System security requirements<br>• System monitoring<br>• Capacity requirements |

| Findings | Descriptions |
|---|---|
| **Lack of communication on system specification changes has resulted in a high rate of system defects and rework on the EIP project.** | The initial EIP solution was developed in isolation (independent and ahead of the core business applications) using outdated application specifications. It is estimated that between 30%-50% of $21.4m in costs incurred to date, is attributable to rework resulting from specification changes. There was limited communication between the application project teams and the EIP team the application specifications changed and evolved over time. Consequently, when application versions were delivered for testing with the EIP solution there were high failure rates in the EIP adapters that resulted in a large rework effort. While there has been a notable improvement in coordination between the EIP development team and application development teams when new versions of the applications are delivered from the vendors there still is not an agreed set of interface specifications. |
| **Review Organization Structure and Resource Planning** | |
| **Limited leadership available on the integration team with knowledge of integrating complex solutions and understanding of nodal markets and electricity reliability.** | There are more than sufficient resources available within the Nodal Program with the necessary skill sets to physically execute the tasks needed to:<br>• Integrate the individual applications and technical data transfer solutions.<br>• Bring the system live.<br><br>A review of the integration organization structure identified a lack of coordination and leadership, nodal market knowledge and integration experience to effectively manage these resources through the system integration initiative and go-live. The integration project leadership struggled to clearly define, coordinate, communicate implement and manage the key components of an approach to effectively transitioning from an 'individual solution development view' to an 'enterprise solution view'. This lack of leadership and direction has resulted in the inefficient use of resources, higher than expected costs and is a risk to the success of system integration and therefore a risk to the current schedule and budget. |
| **The integration resource plan was not well defined and seems excessive.** | A definitive plan has not been developed to determine what resources and skill sets are actually needed for successful system integration.<br><br>As the original scope of the integration effort was not well defined and overly complex, there is a risk that the resources estimated are excessive. The integration team currently estimates close to 150 Full Time Equivalents (FTEs) in September '09 assigned to integration testing. This staffing level is excessive when compared to other similar projects in industry. |

| Findings | Descriptions |
|---|---|
| **Technical data transfer solution review** | |
| **The approach adopted for data transfer between applications has resulted in 3 separate technical solutions being developed.**<br>• **TIBCO service orientated solution**<br>• **Point-to-point data transfer**<br>• **CSI TIBCO orchestration solution**<br><br>**Based on our review, these solutions are consistent with program requirements.** | The data transfer technical approaches developed by the Nodal Program, while diverse, are needed to serve the unique mix of business information and process integration requirements of the program and on review were found to be typical of leading practice solutions applied in other RTOs.<br><br>The development of what seemed to be three separate integration approaches raised concerns that the Nodal Program did not have a standardized technical data transfer solution and that each project developing a solution based on their needs. This introduced the following potential risks:<br>• Duplication of effort resulting in increased cost to the program.<br>• Difficulty coordinating the data transfer solutions in end-to-end testing.<br>• Increase cost of maintenance of non-standard solutions.<br><br>A review of the technical data transfer solutions found that the Nodal Project has put in place appropriate integration patterns to handle the varying requirements for ERCOT Nodal Market systems. The architecture is based on industry recognized Service Orientated Architecture standards and practices and establishes a platform for the long-term goal of IT to de-couple applications, processes, and information. |
| **The specifications for volumes limits and package content managed by the external web services have not yet been fully defined. Consequently, there is a risk that transactions submitted by Market Participants may not be processed due to system constraints.** | The Nodal Program has not yet developed a well-defined specification for the volume limits and content of Market Participant transactions delivered through External Web Services solution. In addition, the MMS, as designed and built, has technical constraints on the maximum file size (3MB file size limit) and combination of transactions (homogeneity of bid/offer compositions) that it can accept and process. As a result:<br>• There are no clear guidelines to assist the Market Participants in designing their solutions that interface with ERCOT which effectively presumes a free-form submission of transactions. ERCOT is unable to predict or control the receipt of transactions from the market.<br>• This approach assumes that ERCOT will accept and process all transaction files from the market irrespective of content and volume.<br>• The Nodal Team is attempting to develop high risk complex solutions (such as chunking - breaking down files received into manageable units) to manage every possible data combination and configuration that might be received from the market. |

| Findings | Descriptions |
|---|---|
| | This is considered to be a high risk approach that could be resolved easily by defining and agreeing the specification and rules for transaction submission. The potential risk is that transactions submitted by market participants fail to be processed by ERCOT resulting in loss to the participants and grounds for legal action. Specific concerns are:<br>• The solutions developed by ERCOT to resolve this issue may not work for all solutions developed by the Market Participants.<br>• The complex solutions required to accommodate free-form transaction submission introduce higher risk of system failure and possible loss or corruption of transactions. |
| **The test environment for end-to-end testing (iTest) is not complete.** | A dedicated integrated test environment is urgently needed for end-to-end testing. This testing is currently conducted in one of the environments allocated to Early Delivery System (EDS). The purpose of the EDS environment is to house the systems required for market trails, Market Participant integration and operations readiness testing such as system failover. Since this environment is viewed, and therefore controlled, as a 'production-like' environment (subject to production change control requirements including black outs, etc) it has resulted in unnecessary delays in releasing solutions into the integration test environment.<br><br>There are plans to build a dedicated integration test environment that would be used to test the full ERCOT enterprise solution. That environment in currently under construction and expected to be completed in March 2009. |

# 5. Recommendations

Based on our findings we make the following recommendations:

| Recommendations | Descriptions | Management Response |
|---|---|---|
| **Scope and Objectives of the Integration Project need to be revised and streamlined** | | |
| **1. The application project teams should own and be accountable for developing and testing their application interfaces.** | The scope and objectives of the application project teams should be the development of their individual business solutions including core functionality and application interfaces. It is recommended that the application receiving data (the sink application) should be assigned responsibility and ownership for coordinating the development and testing of a given interface. It is expected that applications should have core functionality and interfaces fully tested in FAT prior to release to integration. The application project teams should be assigned ownership for resolving and testing interface defects identified during end-to-end testing. | The Nodal PMO has reassigned the ownership for interface development and testing to the application project teams. |
| **2. The scope of system integration testing (end-to-end testing) should be limited to confirming that the individual applications can operate as a single enterprise solution.** | The scope of end-to-end testing should be revised to exclude tasks such as additional functional testing and attempts to replicate the complex business scenarios expected in market trials. The scope of the end-to-end testing should confined to confirming that the applications that have been developed and tested in separated projects can be assembled into a single integrated enterprise solution. This should be achieved by executing a controlled number of process based test scenarios (represent a simple 'day in the life' of ERCOT operations) that confirms application connectivity and generates expected outputs from a predetermined set of inputs. | The Nodal PMO is in the process of interviewing qualified candidates to lead this effort and develop the necessary test scripts. End-to-end testing approach has been discussed with core PMs. Extended communications to team members will occur week of Feb 16th. |
| **3. Clearly define and communicate the scope, objectives and expected deliverables of the core system integration components** | Develop a clear definition of scope, objectives and deliverables for the key component of the system integration initiative. These should be clearly communicated to all project teams to set and align expectations. The key components include end-to-end testing as outlined in recommendation 2 above and other examples include:<br><br>Technical Support– The scope and objectives of the integration technical support initiative is management of the integration test environment. Liaising with the Information Systems Department, this initiative should own and be accountable for the build, configuration, maintenance, release management and version control for the integration test environment. | The Nodal PMO has revised its approach for application interface testing and integration testing (end-to-end business scenario testing). This revised integration approach has been reviewed with the Project Managers, including the scope definition, roles and responsibilities of the Project Teams, and process for aligning approach with project |

| Recommendations | Descriptions | Management Response |
|---|---|---|
| | Test Data – The scope and objective of the test data initiative is to develop a set of coordinated test data to support the process based business scenarios. This initiative is responsible for defining the static and transaction data that supports the controlled set of tests representing 'a day in the life' of ERCOT. This initiative is also accountable for initializing and maintaining the data sets in the integration test environment during testing.<br><br>Operational Readiness – Planning and execution of items such as performance test, failover testing, security reviews are essential to insure the nodal systems are consistent with IT policy and expected service levels. These activities will be occurring in the EDS environment and should be closely coordinated with Market Trial activities.<br><br>In addition to the components detailed in this recommendation, the scope of Market Trials, ERCOT Readiness and Market Participant Readiness and System Cutover should also be clearly defined and closely coordinated with Integration. | schedules and budgets. |
| **Assign knowledgeable, qualified resources to lead the system integration implementation** | | |
| **4. Assign a qualified integration project lead.** | Appoint a qualified experienced system integration lead with overall ownership and responsibility for successfully integrating the project in to an enterprise solution and to assist with bringing that solution live. The qualifications and characteristics of this individual should include:<br>• Understanding of ERCOT business model including nodal markets and electricity reliability.<br>• Experience in successfully integrating complex enterprise solutions. | The ERCOT executives and the Nodal PMO have assigned a qualified project manager to this role. |

<table>
<tr><th>Recommendations</th><th>Descriptions</th><th>Management Response</th></tr>
<tr>
<td>5. Appoint qualified leaders with clear ownership of clearly defined deliverables to the key system integration roles.</td>
<td>Assign people with an understanding of ERCOT business model and experience with managing nodal market integration in to the following key roles:
<table>
<tr><th>Integration Role</th><th>Responsibilities Include:</th></tr>
<tr><td>Technical Support Lead</td><td>• Effective operation of non-production environments.<br>• Infrastructure configuration of non-production environments.<br>• Release management to non-production environments.<br>• Liaising with IT technical team.<br>• Technical defect, risk and issue management.</td></tr>
<tr><td>Test Execution Lead</td><td>• Develop business process based end-to-end test scripts.<br>• Execute end-to-end tests.<br>• Testing defect, risk, and issue management.</td></tr>
<tr><td>Test Data Lead</td><td>• Compile synchronized transaction and static data to support the end-to-end tests.<br>• Develop inputs and expected outputs of each core business systems.<br>• Manage, coordinate, and monitor test data sets in iTest and EDS environments.<br>• Data defect and issue management.</td></tr>
<tr><td>Operational Readiness Lead</td><td>• Performance testing.<br>• Security compliance.<br>• System access management.<br>• System failover testing.</td></tr>
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</td>
<td>ERCOT has posted, and has received a number of responses from qualified candidates (both internal and contract resources) who are for a number of these roles. The goal is to fill these positions with resources that have previous nodal market implementation or large-scale system integration experience.<br><br>ERCOT has extended offers for the Technical Support Lead, and End-to-End Test Lead. Expected start date will be early March.<br><br>Nodal PMO is interviewing with an internal candidate for Data Lead.<br><br>Interviews are in progress for Operational Readiness Lead.</td>
</tr>
<tr>
<td>6. Update project plans and budgets based on revised integration scope, objectives, roles and responsibilities.</td>
<td>Realign the project plans, integrated schedule and budgets to reflect scope changes. It is recommended that this be completed as part of the ongoing review and assessment budget to actual estimated cost to complete.</td>
<td>ERCOT will be revising their project plan and schedule to align with the revised integration testing approach.</td>
</tr>
</table>

| Recommendations | Descriptions | Management Response |
|---|---|---|
| **Technical Recommendations** | | |
| **7. Define and implement (in conjunction with the market Participants) the specification for the volume and content of information transmitted over external web services.** | Document and communicate the acceptable parameters for information volumes and content transmitted by the Market Participants to ERCOT. This specification should account for any system constraints in the core nodal market applications for accepting and processing transactions within the defined market timeframes. | |
| **8. Build and configure a dedicated integration test environment.** | Consistent with leading IT practice, build and maintain a dedicated integration test environment to facilitate the end-to-end testing of full nodal enterprise solution. | Project Manager has been assigned to this initiative. Currently in the planning phase with an expected delivery date of March 2009. |
| **9. Review access policies and IT controls for non-production environments.** | Controls and access rights to non-production environments should be consistent with the potential business impact of corruption or loss in that environment. The policies and controls over development, test and integration test environments should be assessed and reconfigured to ensure that level of controls in place are reasonable and add value and do not unnecessarily constrain the Nodal Program implementation.<br>. | The Project Manager responsible for recommendation #8 is also responsible for reviewing control and access policies. |

## 6. Progress against prior recommendations – Report 8

As part of the reviews Utilicast has been asked to verify the ERCOT Management has addressed recommendations made by Utilicast in previous reports. To that end, ERCOT has provided an update on progress to addressing report 8 recommendations. Utilicast acknowledges that progress is being made in these areas, but has not had the opportunity to verify extent of progress and plans that have been put in place. Utilicast will be providing full comments on ERCOT's Action Plans as part of the next report or in an interim report specifically focusing on the review of previous recommendations based on feedback from the Special Nodal Committee.

| ID | Utilicast Recommendation | ERCOT Action Plan | Target Date |
|---|---|---|---|
| UTI08-01 | The individual project budgets should be challenged in the following areas:<br>a. Vendor contracts<br>b. Contract staff<br>c. Internal staff | a. Long –term vendor contracts will be negotiated with the assistance of a 3rd party negotiator, to address budget matters as well as others. 3rd parties are being interviewed at this time<br>b, c. Plans for use of contract staff, as well as the orderly transition to ERCOT teams are being examined, as we refine the schedule and plan for the remainder of the schedule | a) 2/17/09 for 3rd party negotiator decision; 6/30/09 for contracts to be renegotiated for top 5 vendors<br>b) Integrated schedule is being re-planned incrementally, with full re-plan to be complete in March, 2009 |
| UTI08-02 | Given the high risks of the integration phase of the Nodal Program, this area should be reviewed in detail and be the subject of Nodal Oversight Report 9. | This item is closed. The integration phase of the Nodal Program was made the subject of Nodal Oversight Report Number 9. | Closed, 2/2/09 |
| UTI08-03 | Scope for the December 2010 release of the Nodal Program should be locked down with any proposed changes subject to a strict change control process. | This item is closed. There is now a clear policy supported by the Board of Directors that any change that affects Nodal schedule and budget must by approved by the ERCOT CEO and Board of Directors. | Expect board approval of PRR799 on 2/17/09 |

| ID | Utilicast Recommendation | ERCOT Action Plan | Target Date |
|---|---|---|---|
| UTI08-04 | No enhancements should be considered for zonal market applications or processes unless assessed as business critical. | This item is closed. The ERCOT PMO is carefully monitoring Zonal project work, with guidelines in place to avoid use of Nodal resources. As of 1/30/09, there are no known requirements for use of Nodal resources in the work for 2009. | Closed; 1/30/09 |
| UTI08-05 | There should be immediate investment in new data center capacity to allow for expansion of IT infrastructure to support the Nodal Program. | A project has been initiated to expand the data center in Taylor (PR-80047). The planned occupancy date is September 2009. The plan to add or move hardware is under development. Additional data center space is planned as part of the Met Center disposition project (PR-80001). Those data centers should be online in early 2011. Plans are under development to provide capacity prior to those new data centers becoming available. | Early 2011 |
| UTI08-06 | Given the risks of market readiness and Market Participants potentially delaying "Go-live" due to ambiguous EDS exit criteria, this area should be subject to a detail review. | as of 2/4, this recommendation on hold at the request of Utilicast. They want to discuss the subject of Report #10 with the Special Nodal Committee. | 2/10/09 – next meeting of the Committee |