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Division	Dept No.	Title	Grade	Description of Duties	Impact on Budget if Request Not Filled
Information Technology	310	UNIX Administrator (TRU64)	11	Redundancy of skill sets and reduction of workload for single point of failure.	Without the requested position, ERCOT would continue to be exposed to this is a single point of failure for the administrator position. With added applications and projects, the workload for this position increases with only one person to properly maintain the servers.
Information Technology	310	Solaris Administrator	11	Additional resources are needed to administer existing Solaris applications in production and ERCOT's expanded hardware footprint. Responsibilities are currently met with contract labor. Transferring responsibility to an ERCOT employee should save approximately $136,000 per year.	Without the requested position, ERCOT would continue to provide the functions with more costly contractor services.
Information Technology	310	Test Environment Support	10	Requested position help ERCOT develop a more robust test environment.	Lack of an adequate test environment results in slower time to market, more production outages, greater protocol violations, and less efficient use of hardware
Information Technology	330	Network Management Administrator II	11	Position requested to support existing HP Openview operations for production efficiency.	Without the requested position, ERCOT would need to reduce staff workload by outsourcing more of the production responsibilities at greater costs.
Information Technology	330	HP Openview Operations	11	Skill set redundancy for a vital application. Currently we have a single point of failure with one person operating and developing with HP Openview. Openview is the monitoring tool we use to monitor applications and systems in a real-time basis and is vital to responding quickly to production exceptions. Having a second developer will eliminate our risk exposure to keep our systems continually monitored.	Without the requested position, ERCOT's HP Openview applications and hardware will continue to be supported by a single ERCOT staff member. As a result, ERCOT's ability to keep systems continually monitored and timely respond to production exceptions is compromised.
Information Technology	345	Applications Engineer III	11	Participate in ERCOT committee meetings for analyzing emerging requirements. Develop IT solutions for market development and system operations in association with the ERCOT IT development team. Assist IT development team with project management. Develop reports on ERCOT internal business processes for strategic planning and management reporting. This position is geared to manage the increasing demands existing staff and eliminate a potential single point of failure in analyzing emerging system requirements.	Without the requested position, ERCOT would continue to be exposed to a single point of failure in terms of skills required to develop and architect solutions to wholesale market and power system security issues.
Information Technology	350	Senior Project Manager	13	Support project managers with project trending, reporting and contract administration. Project management administrative and infrastructure projects, training, and reporting.	Without the requested position, ERCOT may not be able to adequately support additional projects for ERCOT and market initiatives. Alternatively, ERCOT would have to use contractors at much higher cost to support projects.
Information Technology	354	Data warehouse Professional	11	Complete staffing of development team for new development and SIR. New enterprise data warehouse	Without the requested position, ERCOT will need to add consultants at higher cost to support efforts and as a result key skill, knowledge, and customer interface will not be retained by ERCOT.
Information Technology	354	Data warehouse Professional	10	Complete staffing of development team for new development and SIR. New enterprise data warehouse	Without the requested position, ERCOT will need to add consultants at higher cost to support efforts and as a result key skill, knowledge, and customer interface will not be retained by ERCOT.
Information Technology	355	Senior Application Architect	13	Create efficiencies with existing and new platforms . Current application architecture is not ideal in accordance with generally accepted best practices.	Lack of planned architecture will result in inefficient operations with future solutions costing more due to continually adding more hardware. A planned architecture will create an environment for better application integration, more efficient production and long term cost savings.

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Division	Dept #	Job Title	Grade	Justification	Impact if Not Approved
Information Technology	357	Senior Corporate Application System Analyst	12	New Team to support development and integration of corporate applications, which currently includes Lawson financials, human resources applications, document imaging and management, and project management tools.	Without the requested position, ERCOT would not be able to adequately support corporate applications.
Information Technology	357	Corporate Application Systems Analyst	11	New Team to support development and integration of corporate applications, which currently includes Lawson financials, human resources applications, document imaging and management, and project management tools.	Without the requested position, ERCOT would not be able to adequately support corporate applications.
Information Technology	370	Security Analyst	12	Additional security is required.	ERCOT would not be able to provide the level of security that it believes is necessary to protect ERCOT assets and serve the Texas market.
Information Technology	370	Security Analyst	12	To coordinate with state and federal officials regarding security issues. To investigate and secure federal funding specifically to increase awareness and facilitate actions, assisting all Texas market participants in security related matters.	The Texas electric market will continue to operate in security silos with no coordinated effort to secure federal funding and therefore making the marketplace more secure. This position will pay for itself with appropriate funding.
Information Technology	370	Security Analyst	12	Additional security is required.	ERCOT would not be able to provide the level of security that it believes is necessary to protect ERCOT assets and serve the Texas market.
Information Technology	385	Testing and Support Coordinator	12	New application and systems must be adequately tested before being released to production environment. The market has requested a large number of projects requiring system changes, and as a result, necessitates increased testing staff.	Without the requested position, there will be continued issues in production with deployment of code not adequately tested with program bugs introduced into the production environment. Bottleneck for project completions will be with adequate testing.
Information Technology	385	Testing and Support Coordinator	13	New application and systems must be adequately tested before being released to production environment. The market has requested a large number of projects requiring system changes, and as a result, necessitates increased testing staff.	Without the requested position, there will be continued issues in production with deployment of code not adequately tested with program bugs introduced into the production environment. Bottleneck for project completions will be with adequate testing.
Information Technology	390	Production Support	10	Production environment growth from 2003 projects.	Production protocols, uptime and efficiency will suffer due to increased deployment of new applications and updates to existing applications if the requested position is not allowed.
Information Technology	390	Senior Help Desk Analyst	11	Respond to requests from market and ERCOT staff. Need a strong leader to manage outsourced personnel.	Without the requested position, ERCOT responsiveness to help desk requests from the market and ERCOT staff may not meet expectations.
Information Technology	390	Data Archive / Data Warehouse Production Support	11	Production environment growth from 2003 projects.	Without the requested position, ERCOT may not be able to effectively support the new data warehouse. This may have negative impact on market monitoring and other important efforts.
Information Technology	390	GISB and FTP Production Support	10	Effectively monitor and support market participant data transmissions and transfers	Without the requested position, ERCOT will continue to use development resources in production support therefore reducing development time, increasing project delivery times, and slowing responses to issues.
Information Technology	395	ICCP and RTU Engineer	12	ICCP/RTU Communications	Without this position, ERCOT will remain exposed to a single point of failure in supporting ICCP/RTU communications.

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Division	Dept. No.	Requested Position	Grade	Justification	Impact if Not Approved
System Operations	410	Lead, Congestion Management Review and Analysis	12	Daily Operations Review and Analysis. ERCOT operators perform manual intervention and use extensive judgment when managing system congestion—including such activities as manually setting OC1 limits, OC2 limits, and OC2 shift factors, etc. To review daily operations and conduct insightful analysis The analysis that will be conducted by this group will help improve the quality of manual interventions and potentially reduce cost impacts to the market while maintaining system reliability. (Manual intervention has a large market impact. In some special conditions, increasing just 5 MW OC1 limit could potentially save the market a million dollars in one interval.) Other responsibilities of this group would include reviewing offset calculations and OOMC/OOME deployment, and analyzing all manual processes from the market's viewpoint. This group would analyze any instance of redispatch that cost the market money and perform a post-op of the decisions that were made for internal review. The feedback will be used to increase operator's efficiency, awareness and promote consistency between shifts. This group will also help ensure that if audited, we would have the necessary procedures in place to pass muster. An expanded role for this group would be to conduct outage cost analyses. Every day outages are decided based on the economics of the outage cost itself, without consideration of the economic cost to the market. A basic example would be: A transmission owner needs to take out a 138Kv line for 6 hours to replace a broken insulator. ERCOT will determine if it is physically possible to let them have the outage, and the TDSP will schedule this outage during normal working hours to keep labor costs low. If the group could highlight that this outage had a projected cost to the market of two million dollars, but would cost nothing if scheduled off peak, there might be a better way to manage this outage. ERCOT would provide the information to the stakeholders, they would decide what the next steps would be, if any.	If the requested position is not filled, ERCOT will not be able to do regular internal review and critique of operator actions and procedures from a non-operator perspective, particularly in regard to congestion management, to develop evaluation and improvements to reduce costs. Total congestion costs are over $200,000,000 per year. Only a 1% improvement would mean $2 M+ savings to market.
System Operations	410	Senior Market Analyst	12	Market Analyst - A: Currently we have one resource for market analysis. We have been generating Operations Monthly Report starting from April 2003. Operations Monthly Reports have received great compliments from market participants. The market analyst provides data analysis whenever participants or PUCT has questions about any abnormal market issues in time, and to generate more and better external and internal reports.Other responsibilities include: market power mitigation to conduct newly proposed CSM, interval auditing to ensure consistency between the current system and the Protocols, and watching other ISO's and learn from their failures and successes. Commission order 22 in docket 24770 will be in effect, we require a minimum of .3 FTEs for this alone. B. Market Operations PRR Coordinator: This FTE would also coordinate PRR activities within Market Operations to ensure that all PRRs are tracked from receipt through final approval or tabling. This position would be responsible for evaluating the business impact of proposed changes, coordinating the ERCOT response, and developing the impact analysis from Market Operations. This position would also update Market Operations on the target implementation dates, alert Market Operations when the implementation takes place, and would support Client Services in developing Market Notifications. We need to better represent ourselves at the PRS an ensure our comments and questions are addressed and manpower impacts are resolved before a PRR gets approved.	Without this position ERCOT will not be able to do regular reports on characteristics and causes of market anomalies (i.e. price spikes) and enhance and expand current market reporting.

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Division	Dept No	Title	Grade	Description of Duties	Impact if Denied the Requested New Hire
System Operations	410	Demand-Side Resource Coordinator	11	Registration, qualification, and performance monitoring of BULs and LaaRs - Currently all work with the market participants associated with the LaaR registration and qualification process has been performed by the demand side resource coordinator. This process is entirely manual and takes from four to eight hours per LaaR depending on the knowledge level of the Resource and the QSE. ERCOT continues to qualify on an average of two new LaaRs per week and this trend should continue for some time. In addition to the initial qualification, the Protocols require seasonal testing of LaaRs. These requirements were not clearly defined in the Protocols but a draft OGRR has been proposed which will make this testing very similar to the general capacity testing requirements presently in place for generation resources. These tests have not yet been conducted but ERCOT should initiate the requirement as soon as the OGRR is approved and probably no later than the fall season (starting in September). Presently ERCOT has 32 qualified LaaRs participating in the responsive reserve capacity market which will need to perform this seasonal testing. This person will also be responsible for the performance monitoring of LaaRs providing RRS during an under frequency event. Any performance abnormalities are to be investigated through the QSE representing those loads. With the implementation of the BUL program the responsibilities will be expanded. Initially this person will assist in the education and registration process. BUL performance monitoring is expected to be a daily activity during the summer months with somewhat lesser activity outside of that period. This daily process is expected to initially take one to two hours a day to perform and document.	Without this position ERCOT will not be able to fully support demand-side market programs, particularly the new BUL program, that can not currently be supported by the single person dedicated to these programs.
System Operations	410	Administrative Assistant/Analyst	4	Last year our current administrative assistant was promoted to Market Analyst, instead of filling that vacancy, we had a more pressing need for a Market Support Specialist to handle the immediate need of the Data Archive re-write project and monthly market reports so we up-graded the open administrative assistant to a Market Support Specialist.	Without this position ERCOT will not be able to replace administrative assistant position that was upgraded in 2003 to address data archive rewrite and monthly operations report requirements.
System Operations	420	Operations Engineer	11	To support protocol required tasks listed below, including Performance Disturbance reports, Client support, Contingency analysis, Transient studies, Outage Coordination support, Ancillary service requirement calculation, Training	Without this position we will continue to be unable to produce routine operating reports and conduct analysis and improvement of operating procedures and practices in a timely and proactive manner. Existing personnel are required full time to support real time operations.
System Operations	420	Operations Specialist	11	To support protocol required tasks listed below, including Protocol Change review and impact, Voltage Stability studies, Procedure maintenance, Transient Stability case maintenance, Black Start Studies and Annual seminar training.	Without this position we will continue to be unable to produce routine operating reports and conduct analysis and improvement of operating procedures and practices in a timely and proactive manner. Existing personnel are required full time to support real time operations.
System Operations	420	Database Engineer	11	The requested position will produce routine operating reports and conduct analysis and improvement of operating procedures and practices	Without this position we will continue to be unable to produce routine operating reports and conduct analysis and improvement of operating procedures and practices in a timely and proactive manner. Existing personnel are required full time to support real time operations.
System Operations	420	Operations Engineer	11	The requested position will produce routine operating reports and conduct analysis and improvement of operating procedures and practices	Without this position we will continue to be unable to produce routine operating reports and conduct analysis and improvement of operating procedures and practices in a timely and proactive manner. Existing personnel are required full time to support real time operations.

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Division	Dept	Job Title	Grade	Description of Duties and Responsibilities	Benefit to ERCOT and Consequences of Not Approving
System Operations	425	System Operations Training Specialist	10	The training staff was reorganized in 2003. We are left with two trainers trying to provide training on new applications, write procedures, prepare for the annual audit, and provide black start training (mandated by the protocols) to market participants. Audit training, procedure updates, and revisions takes up most of their time. New applications are going in service with little or no training. Testing is not getting done. Black start training for market participants is mandated by the protocols and takes one of our trainers away for several weeks per year. The PricewaterhouseCoopers audit dated November 19, 2002, stated: Additional training should be provided to system operators on their use of certain software applications. PricewaterhouseCoopers goes on to say: Additional training on the use of software applications should lead to increased efficiencies and the successful execution of software applications as required by the operating procedures.	There will be no training shift for operators resulting in an inability to carry out recommendations of the PricewtarehouseCoopers operational audit and NERC reliability authority audit. Training will continue to be spotty and part time with insufficient training of operators on Black Start, Operator Certification, system changes, new software and Texas Nodal market redesign. Performance on future operational audits will not be at a level expected by management and stakeholders. There will continue to be a higher level of liability exposure to ERCOT without a comprehensive training program for operators. Operators perform congestion management and other functions that cost ERCOT stakeholders hundreds of millions of dollars each year. A small increase in efficiency resulting from a comprehensive training program will more than pay the cost of requested staff.
System Operations	425	System Operations Training Specialist	10	The training staff was reorganized in 2003. We are left with two trainers trying to provide training on new applications, write procedures, prepare for the annual audit, and provide black start training (mandated by the protocols) to market participants. Audit training, procedure updates, and revisions takes up most of their time. New applications are going in service with little or no training. Testing is not getting done. Black start training for market participants is mandated by the protocols and takes one of our trainers away for several weeks per year. The PricewaterhouseCoopers audit dated November 19, 2002, stated: Additional training should be provided to system operators on their use of certain software applications. PricewaterhouseCoopers goes on to say: Additional training on the use of software applications should lead to increased efficiencies and the successful execution of software applications as required by the operating procedures.	There will be no training shift for operators resulting in an inability to carry out recommendations of the PricewtarehouseCoopers operational audit and NERC reliability authority audit. Training will continue to be spotty and part time with insufficient training of operators on Black Start, Operator Certification, system changes, new software and Texas Nodal market redesign. Performance on future operational audits will not be at a level expected by management and stakeholders. There will continue to be a higher level of liability exposure to ERCOT without a comprehensive training program for operators. Operators perform congestion management and other functions that cost ERCOT stakeholders hundreds of millions of dollars each year. A small increase in efficiency resulting from a comprehensive training program will more than pay the cost of requested staff.
System Operations	425	Administrative Assistant	4	The requested position will be responsible for formatting, typing, posting and otherwise maintaining the operations procedure manual. The staff member would also support the shift supervisors, training staff, and Chief System Operator.	Without this FTE we will continue to need to use a Temporary agency that charges ERCOT $22/hour and be subject to frequent changes in the person provided and lower efficiency. The FTE will provide a cost savings to ERCOT with more efficient job performance.

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System Operations	425	System Operator - Day Ahead Desk (Primary Center)	11	System Operations now employs five shifts of eight people each to operate the ERCOT control area. We presently have no training shift. I am proposing that we add a training shift because of the following reasons: (1) The NERC audit report dated January 10, 2003 recommended that ERCOT "should include system restoration drills and periodic emergency procedure reviews into the training program". We had $150,000 budgeted for 2003 to train on system restoration but was unable to do so because we do not have a training shift; (2) NERC further stated that "if computer system upgrades do not reduce the number of workarounds required to operate the system" ERCOT should address the training issue. Computer system upgrades referred to here by NERC have not been completed and in fact are two years late; (3) When operating errors take place it is important that ERCOT can demonstrate prudent efforts to keep its operators trained and knowledgeable. Otherwise ERCOT is exposed to liability; (4) PJM ISO has 51 System Operators, rotate on six shifts, and have seven trainers. Their trainers train operators on their training week, do test activities, train operators on new applications, and train market participants. Their training obligations are very similar to ours; and (5) The PricewaterhouseCoopers' audit dated November 19, 2002, stated: We understand the resource constraints that currently hamper ERCOT's training efforts - most prominently the shortage of relief shift staff. However, as a maturing organization we strongly recommend that ERCOT make additional training a priority as market and operational changes will continue to drive this need.	There will be no training shift for operators resulting in an inability to carry out recommendations of the PricewaterhouseCoopers operational audit and NERC reliability authority audit. Training will continue to be spotty and part time with insufficient training of operators on Black Start, Operator Certification, system changes, new software and Texas Nodal market redesign. Performance on future operational audits will not be at a level expected by management and stakeholders. There will continue to be a higher level of liability exposure to ERCOT without a comprehensive training program for operators. Operators perform congestion management and other functions that cost ERCOT stakeholders hundreds of millions of dollars each year. A small increase in efficiency resulting from a comprehensive training program will more than pay the cost of requested staff.
System Operations	425	System Operator - Transmission and Security Desk	11	System Operations now employs five shifts of eight people each to operate the ERCOT control area. We presently have no training shift. I am proposing that we add a training shift because of the following reasons: (1) The NERC audit report dated January 10, 2003 recommended that ERCOT "should include system restoration drills and periodic emergency procedure reviews into the training program". We had $150,000 budgeted for 2003 to train on system restoration but was unable to do so because we do not have a training shift; (2) NERC further stated that "if computer system upgrades do not reduce the number of workarounds required to operate the system" ERCOT should address the training issue. Computer system upgrades referred to here by NERC have not been completed and in fact are two years late; (3) When operating errors take place it is important that ERCOT can demonstrate prudent efforts to keep its operators trained and knowledgeable. Otherwise ERCOT is exposed to liability; (4) PJM ISO has 51 System Operators, rotate on six shifts, and have seven trainers. Their trainers train operators on their training week, do test activities, train operators on new applications, and train market participants. Their training obligations are very similar to ours; and (5) The PricewaterhouseCoopers' audit dated November 19, 2002, stated: We understand the resource constraints that currently hamper ERCOT's training efforts - most prominently the shortage of relief shift staff. However, as a maturing organization we strongly recommend that ERCOT make additional training a priority as market and operational changes will continue to drive this need.	There will be no training shift for operators resulting in an inability to carry out recommendations of the PricewaterhouseCoopers operational audit and NERC reliability authority audit. Training will continue to be spotty and part time with insufficient training of operators on Black Start, Operator Certification, system changes, new software and Texas Nodal market redesign. Performance on future operational audits will not be at a level expected by management and stakeholders. There will continue to be a higher level of liability exposure to ERCOT without a comprehensive training program for operators. Operators perform congestion management and other functions that cost ERCOT stakeholders hundreds of millions of dollars each year. A small increase in efficiency resulting from a comprehensive training program will more than pay the cost of requested staff.

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System Operations	425	System Operator - Transmission and Security Desk (Back-up Center)	11	System Operations now employs five shifts of eight people each to operate the ERCOT control area. We presently have no training shift. I am proposing that we add a training shift because of the following reasons: (1) The NERC audit report dated January 10, 2003 recommended that ERCOT "should include system restoration drills and periodic emergency procedure reviews into the training program". We had $150,000 budgeted for 2003 to train on system restoration but was unable to do so because we do not have a training shift; (2) NERC further stated that "if computer system upgrades do not reduce the number of workarounds required to operate the system" ERCOT should address the training issue. Computer system upgrades referred to here by NERC have not been completed and in fact are two years late; (3) When operating errors take place it is important that ERCOT can demonstrate prudent efforts to keep its operators trained and knowledgeable. Otherwise ERCOT is exposed to liability; (4) PJM ISO has 51 System Operators, rotate on six shifts, and have seven trainers. Their trainers train operators on their training week, do test activities, train operators on new applications, and train market participants. Their training obligations are very similar to ours; and (5) The PricewaterhouseCoopers' audit dated November 19, 2002, stated: We understand the resource constraints that currently hamper ERCOT's training efforts - most prominently the shortage of relief shift staff. However, as a maturing organization we strongly recommend that ERCOT make additional training a priority as market and operational changes will continue to drive this need.	There will be no Training shift for Operators resulting in an inability to carry out recommendations of the PricewaterhouseCoopers Operational Audit and NERC Reliability Authority Audit. Training will continue to be spotty and part time with insufficient training of operators on Black Start, Operator Certification, system changes, new software and Texas Nodal market redesign. Performance on future operational audits will not be at a level expected by management and stakeholders. There will continue to be a higher level of liability exposure to ERCOT without a comprehensive training program for operators. Operators perform congestion management and other functions that cost ERCOT stakeholders hundreds of millions of dollars each year. A small increase in efficiency resulting from a comprehensive training program will more than pay the cost
System Operations	425	System Operator - Frequency Desk	11	System Operations now employs five shifts of eight people each to operate the ERCOT control area. We presently have no training shift. I am proposing that we add a training shift because of the following reasons: (1) The NERC audit report dated January 10, 2003 recommended that ERCOT "should include system restoration drills and periodic emergency procedure reviews into the training program". We had $150,000 budgeted for 2003 to train on system restoration but was unable to do so because we do not have a training shift; (2) NERC further stated that "if computer system upgrades do not reduce the number of workarounds required to operate the system" ERCOT should address the training issue. Computer system upgrades referred to here by NERC have not been completed and in fact are two years late; (3) When operating errors take place it is important that ERCOT can demonstrate prudent efforts to keep its operators trained and knowledgeable. Otherwise ERCOT is exposed to liability; (4) PJM ISO has 51 System Operators, rotate on six shifts, and have seven trainers. Their trainers train operators on their training week, do test activities, train operators on new applications, and train market participants. Their training obligations are very similar to ours; and (5) The PricewaterhouseCoopers' audit dated November 19, 2002, stated: We understand the resource constraints that currently hamper ERCOT's training efforts - most prominently the shortage of relief shift staff. However, as a maturing organization we strongly recommend that ERCOT make additional training a priority as market and operational changes will continue to drive this need.	There will be no training shift for operators resulting in an inability to carry out recommendations of the PricewaterhouseCoopers operational audit and NERC reliability authority audit. Training will continue to be spotty and part time with insufficient training of operators on Black Start, Operator Certification, system changes, new software and Texas Nodal market redesign. Performance on future operational audits will not be at a level expected by management and stakeholders. There will continue to be a higher level of liability exposure to ERCOT without a comprehensive training program for operators. Operators perform congestion management and other functions that cost ERCOT stakeholders hundreds of millions of dollars each year. A small increase in efficiency resulting from a comprehensive training program will more than pay the cost of requested staff.

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System Operations	425	System Operator - Frequency Desk (Back-up Center)	11	System Operations now employs five shifts of *eight people* each to operate the ERCOT control area. We presently have no training shift. I am proposing that we add a training shift because of the following reasons: (1) The NERC audit report dated *January 10, 2003* recommended that ERCOT "should include system restoration drills and periodic emergency procedure reviews into the training program". We had $150,000 budgeted for 2003 to train on system restoration but was unable to do so because we do not have a training shift; (2) NERC *further* stated that "if computer system upgrades do not reduce the number of workarounds required to operate the system" ERCOT should address the training issue. Computer system upgrades *referred to here by NERC* have not been completed and in fact are two years late; (3) When operating errors take place it is important that ERCOT *can demonstrate prudent efforts* to keep its operators trained and knowledgeable. Otherwise ERCOT is exposed to liability; (4) PJM ISO has 51 System Operators, rotate on six shifts, and have *seven trainers*. Their trainers train operators on their training week, do test activities, train operators on new applications, and train market participants. Their training *obligations* are very similar to ours; and (5) The PricewaterhouseCoopers' audit dated November 19, 2002, stated: We understand the resource constraints that currently hamper ERCOT's training efforts - most prominently the shortage of relief shift staff. However, as a maturing organization we strongly recommend that ERCOT *make additional training a priority as market and operational changes will continue to drive this need.*	There will be *no training shift* for operators resulting in an inability to carry out reliability authority audit. *Training will continue to be spotty and part time with insufficient training of operators on Black Start, Operator Certification, system changes, new software and Texas Nodal market redesign. Performance on future operational audits will not be at a level expected by management and stakeholders. There will continue to be a higher level of liability exposure to ERCOT without a comprehensive training program for operators. Operators perform congestion management and other functions that cost ERCOT stakeholders hundreds of millions of dollars each year. A small increase in efficiency resulting from a comprehensive training program will more than pay the cost of requested staff.*
System Operations	425	System Operator - Operating Hour Desk	11	*System Operations now employs five shifts of eight people each to operate the ERCOT control area. We presently have no training shift. I am proposing that we add a training shift because of the following reasons: (1) The NERC audit report dated January 10, 2003 recommended that ERCOT "should include system restoration drills and periodic emergency procedure reviews into the training program". We had $150,000 budgeted for 2003 to train on system restoration but was unable to do so because we do not have a training shift; (2) NERC further stated that "if computer system upgrades do not reduce the number of workarounds required to operate the system" ERCOT should address the training issue. Computer system upgrades referred to here by NERC have not been completed and in fact are two years late; (3) When operating errors take place it is important that ERCOT can demonstrate prudent efforts to keep its operators trained and knowledgeable. Otherwise ERCOT is exposed to liability; (4) PJM ISO has 51 System Operators, rotate on six shifts, and have seven trainers. Their trainers train operators on their training week, do test activities, train operators on new applications, and train market participants. Their training obligations are very similar to ours; and (5) The PricewaterhouseCoopers' audit dated November 19, 2002, stated: We understand the resource constraints that currently hamper ERCOT's training efforts - most prominently the shortage of relief shift staff. However, as a maturing organization we strongly recommend that ERCOT make additional training a priority as market and operational changes will continue to drive this need.*	There will be no training shift for operators resulting in an inability to carry out reconmendations of the PricewaterhouseCoopers operational audit and *NERC* insufficient training of operators on Black Start, Operator *Certification*, system changes, new software and Texas Nodal market redesign. Performance on future operational audits will not be at a level expected by management and stakeholders. There will continue to be a higher level of liability exposure to ERCOT without a comprehensive training program for operators. *Operators perform congestion* management and other functions that cost ERCOT stakeholders hundreds of millions of dollars each year. A small increase in efficiency resulting *from a* comprehensive training program will more than pay the cost of requested staff.

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System Operations	430	Senior Consultant (Engineer)	12	The requested position is needed to support continuing growth in planning, regulatory and stakeholder activities, support nodal market development including node/zone determination, constrained bidding for power market and TCR/FTE limits calculations. Support for security operations in stability and voltage analysis is continuing to grow.	Without this position we will be unable to develop timely RMR exit strategies, to support the open planning process, to perform independent review of all transmission projects, to provide testimony for transmission projects at public meetings and at the Public Utility Commission of Texas, or to determine the need for all projects. We will provide only limited identification of projects to reduce congestion costs (current is exceeding $300 million per year) and limited Transmission Project Information & Tracking (TPIT) support. The cost savings through transmission improvements can easily be many millions of dollars per project.
System Operations	430	Senior Consultant (Engineer)	12	The requested position is needed to support continuing growth in planning, regulatory and stakeholder activities. ERCOT system planning is steadily having to take on additional planning responsibilities previously done by the TSPs and/or ROS Task Forces (example stability model development). More studies as the independent organization are being called upon to maintain reliability and meet the Planning Criteria (example: RMR Protocol calls for exit strategy studies). PUCT also recently increased this responsibility to include determination of need for all transmission projects filed for certification. This will include testimony for these projects at the PUCT. TAC also recently directed us to perform generation adequacy studies every two years. Support for security operations in stability and voltage analysis is continuing to grow.	Without this position we will be unable to perform power system risk identification, to identify short-term/mid-term congestion (local and CSC), or to provide cost effective operations support and critical infrastructure analysis support. This position will help mitigate unexpected congestion scenarios such as the one costing $60 million in the month of June for Farmersville to Royse. Identification of North to Houston would have also represented significant financial savings to the market.
System Operations	430	Consultant (Engineer)	11	The requested position is needed to support continuing growth in planning, regulatory and stakeholder activities. Add depth to organization. ERCOT system planning is steadily having to take on additional planning responsibilities previously done by the TSPs and/or ROS task forces (example stability model development). More studies as the independent organization are being called upon to maintain reliability and meet the planning criteria (example: RMR Protocol calls for exit strategy studies).	Without this position we will be unable to develop timely RMR exit strategies, to support the open planning process, to perform independent review of all transmission projects, to provide testimony for transmission projects at public meetings and at the Public Utility Commission of Texas, or to determine the need for all projects. We will provide only limited identification of projects to reduce congestion costs (current is exceeding $300 million per year) and limited Transmission Project Information & Tracking (TPIT) support. The cost savings through transmission improvements can easily be many million of dollars per project.
System Operations	430	Consultant (Engineer)	11	The requested position is needed to support continuing growth in planning, regulatory and stakeholder activities. Add depth to organization. ERCOT system planning is steadily having to take on additional planning responsibilities previously done by the TSPs and/or ROS task forces (example stability model development). More studies as the independent organization are being called upon to maintain reliability and meet the planning criteria (example: RMR Protocol calls for exit strategy studies).	Without this position we will be unable to perform power system risk identification, to identify short-term/mid-term congestion (local and CSC), or to provide cost effective operations support and critical infrastructure analysis support. This position will help mitigate unexpected congestion scenarios such as the one costing $60 million in the month of June for Farmersville to Royse. Identification of North to Houston would have also represented significant financial savings to the market.
System Operations	440	Senior Consultant	12	This position will perform economic analyses related to developing an exit strategy for each RMR unit as required in Protocols as a result of PRR 396. In addition, it will: perform other congestion studies to evaluate transmission projects to reduce OOM costs; support regional planning groups with economic evaluations for transmission projects that have the potential to reduce local or interzonal congestion; provide regulatory support for CCN filings on transmission projects that are partially or wholly justified due to congestion analysis; and oversee fuel and economic forecast service and scenario development needed to provide robust forecasts of congestion costs.	Without the requested position ERCOT will not be able to perform other congestion studies to evaluate the economic impact of proposed transmission projects to reduce OOM costs or identify projects to reduce local congestion costs or perform other special studies and will provide only limited support for TPIT or Operations. Savings from cost-justified projects could easily exceed $100,000's per year per project that would not be approved without this analysis. Savings from operational support studies could save $millions if we anticipate one issue such as congestion north of Dallas.

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Division	Dept No	Job Title	Grade	Description of Duties	Impact on Budget if Request Not Filled
System Operations	440	Associate Consultant	11	Work has already been done to develop a Transmission Project Information and Tracking system (TPIT) through which market participants would be able to obtain information about the dates and expected costs of planned transmission upgrades. Accurate information of this type is required by market participants to appropriately value TCRs, and to project prices and congestion costs. This position would maintain the TPIT database and provide support to TSPs that are maintaining the information in that system and to market participants that use the database. In addition, the position would maintain correct transmission data from TPIT in UPlan databases and make improvements to the database system. This will be mid to lower-level position with some transmission experience to perform labor intensive work yet be able to understand concepts.	Without the requested position ERCOT will not be able to independently develop production and generation cost studies for all RMR units (RMR costs are currently at $300,000 - $400,000 per day), perform other congestion studies to evaluate the economic impact of proposed transmission projects to reduce OOM costs, provide operations support, identify projects to reduce local congestion costs, perform special studies or provide support for TPIT.
System Operations	440	Associate Consultant	10	The market forecasting and congestion analysis work uses the UPLAN model and requires an enormous amount of data from a variety of sources. This position would maintain correct data in UPlan databases. In addition, it would: convert transmission cases containing different proposed projects into UPLAN format and set up zone definitions, generator-bus mapping, etc.; maintain current base cases, forecasts of load, fuel and economic assumptions in UPlan databases; and, develop a management system for UPLAN inputs and outputs. This will be entry-level position to perform labor intensive work.	Current senior-level positions spend much of their time maintaining the databases that are necessary to run the models for congestion forecasting and analysis. As a result, very few studies other than first priority RMR exit strategy will be performed. If this position is not created, the function does not have adequate support from junior staff.
System Operations	440	Consultant	11	This position will primarily perform "shorter-term" congestion analyses, such as: providing routine short-term congestion forecasts, projecting likely future commercially significant constraints and congestion due to extended outages. It will also perform special studies such as: to determine which lines should be focused on for dynamic ratings and potential cost savings; provide generation dispatch for use in studies to evaluate long-term outage scheduling. It will also provide generation dispatches for planning power flow cases and support TDSP needs for different dispatches for power flow cases and will provide support for other congestion studies as available.	Without the requested position ERCOT will not be able to perform special studies such as market redesign, CSC determination, economic generation adequacy studies, dynamic ratings candidate identifications. We will perform only a limited number of congestion studies to evaluate the economic impact of proposed transmission projects to reduce OOM costs or to identify projects to reduce local congestion costs; and will provide only limited support for TPIT or Operations. Savings from cost-justified projects could easily exceed $100,000's per year per project that would not be identified without this analysis. Adequate TPIT support ensures that market participants can appropriately value TCRs.
System Operations	440	Senior Consultant	12	DSM RFP - PRR 396 requires that an exit strategy be developed for each RMR unit that includes the consideration of potential DSM options. The only mechanism that would allow ERCOT to evaluate and implement DSM alternatives to RMR is an RFP process. Although this position is not necessarily contingent on its approval, a PRR has been proposed but not yet submitted that would more precisely define that consideration of DSM options would include the issuance and evaluation of proposals resulting from an RFP for DSM resources appropriate to eliminate the need for the RMR unit. This position would oversee these DSM RFPs including administration and evaluation of proposals and provide regulatory support for RFPs. Support on-going management of contract performance for contracts resulting from these RFPs. Support load modeling in UPlan. Provide project financial evaluation.	Without the requested position ERCOT will not be able to timely respond to new protocols revision requests. For instance, ERCOT would not be able to issue or analyze requests for proposals for demand-side management to be used in lieu reliability-must-run units for lower cost demand-side management.
System Operations	440	Administrative Assistant	4	Tp provide additional administrative support for expanded transmission services group. The requested position would result in two administrative assistants supporting a staff of 38 professionals.	Administrative support will be provided by contract labor or ERCOT staff at higher cost and/or lower efficiency.

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Division	Position	Title	Grade	Description of Duties	Justification for Position
Market Operations	505	Market Project Analyst	11	Coordinate requirements with market operations staff with regard to cross impacts of projects between market operations and commercial operations. Projects include PR-30160 Market Redesign, PR-30032 Voltage Support Compensation, PR-20123 Direct Load Control, PR-30067 BES Deployment Dependency on Resource Plan, PR-30072 Balance Schedule Dependency on Resource Plan and PR-30034 Synchronous Condenser Compensation.	Listed projects are slated for 2004. There are not sufficient resources in business areas to design, test and implement from a business perspective for these projects. Major risk is delays in implementation and lack of resources for Market Redesign.
Market Operations	530	Meter Engineer I	11	Perform site audits and follow up with documentation for ERCOT polled settlement metering facilities.	Site audits for EPS metered facilities are a Protocol requirement. First half of the year, program needs to be drafted. FTE requirement begins June 2004 for full time auditing responsibilities for ERCOT
Market Operations	530	Senior Meter Engineer	12	This job classification is needed to support the work responsibilities associated with the introduction of competitive metering, a legislative requirement and PUCT order. Depending on tasks required of ERCOT by competitive metering, implementation could necessitate addition of four or more employees to ERCOT staff. In the first year of implementation, certification and testing are not required.	The risks of not hiring the requested employee are delays in project implementation and limited ERCOT leadership and involvement in the process.
Market Operations	540	Load Profiling Analyst II	11	The requested position will be responsible for load research relating to direct load control projects and other new load research work. The responsibilities of the position will also include unaccounted for energy analysis, including monthly reports on unaccounted for energy to the TAC.	Load Research and DLC are Protocol requirements for next year as well as items regarded as critical by the PUCT. Risk for this FTE could mean inadequate ERCOT participation in these efforts and delay in implementation.
Market Operations	570	Senior Data Analyst	12	Replace contractor who is performing daily activities for system operations with FTE. Support of data extract variance process, move-in / move-out project and associated increased workload. Additionally, to support the Siebel replacement project.	Workload that is being supported by contractors will not go away with the 727 variance process. Market Ops shifted resources into this group to support the work to-date. Risk is that the 727 variance process will not be timely from ERCOT perspective. If FTE's are not approved, then we need to consider Contractor positions for this workload.
Market Operations	570	Data Analyst II	11	Replace contractor who is performing daily activities for system operations with FTE. Support of data extract variance process, move-in / move-out project and associated increased workload. Additionally, to support the Siebel replacement project.	Workload that is being supported by contractors will not go away with the 727 variance process. Market Ops shifted resources into this group to support the work to-date. Risk is that the 727 variance process will not be timely from ERCOT perspective. If FTE's are not approved, then we need to consider Contractor positions for this workload.
Market Operations	570	Data Analyst II	11	Replace contractor who is performing daily activities for system operations with FTE. Support of data extract variance process, move-in / move-out project and associated increased workload. Additionally, to support the Siebel replacement project.	Workload that is being supported by contractors will not go away with the 727 variance process. Market Ops shifted resources into this group to support the work to-date. Risk is that the 727 variance process will not be timely from ERCOT perspective. If FTE's are not approved, then we need to consider Contractor positions for this workload.
Market Operations	570	Data Analyst I	10	Replace contractor who is performing daily activities for system operations with FTE. Support of data extract variance process, move-in / move-out project and associated increased workload. Additionally, to support the Siebel replacement project.	Workload that is being supported by contractors will not go away with the 727 variance process. Market Ops shifted resources into this group to support the work to-date. Risk is that the 727 variance process will not be timely from ERCOT perspective. If FTE's are not approved, then we need to consider Contractor positions for this workload.

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Division	Dept	Job Title	Grade	Description of [illegible]	[illegible]
Market Operations	570	Data Analyst I	10	Replace contractor who is performing daily activities for system operations with FTE. Support of data extract variance process, move-in / move-out project and associated increased workload. Additionally, to support the Siebel replacement project.	Workload that is being supported by contractors will not go away with the 727 variance process. Market Ops shifted resources into this group to support the work to-date. Risk is that the 727 variance process will not be timely from ERCOT perspective. If FTE's are not approved, then we need to consider Contractor positions for this workload.
Market Operations	570	Registration Analyst I	9	Hire of temp worker who is performing daily activities as Registration Analyst. Increased workload due to opt-in entities, new retailers and additional activities mandated by Retail Market Subcommittee.	Workload that is being supported by contractors will not go away with the 727 variance process. Market Ops shifted resources into this group to support the work to-date. Risk is that the 727 variance process will not be timely from ERCOT perspective. If FTE's are not approved, then we need to consider Contractor positions for this workload.
Market Operations	570	Registration Analyst I	9	Hire of temp worker who is performing daily activities as Registration Analyst. Increased workload due to opt-in entities, new retailers and additional activities mandated by Retail Market Subcommittee.	Workload that is being supported by contractors will not go away with the 727 variance process. Market Ops shifted resources into this group to support the work to-date. Risk is that the 727 variance process will not be timely from ERCOT perspective. If FTE's are not approved, then we need to consider Contractor positions for this workload.
Market Operations	580	Senior Analyst	11	Additional responsibilities in OOME down for wind units (new protocol requirement begun in 2003) and anticipated DC-tie support for PRR 408. Backup assistance with transmission congestion rights and renewable energy credits program. PRR 408 requires hourly data transmission to the TDSPs. The market decided to employ a manual process rather than invest $500,000 in a systematic change.	DC Tie reporting (PRR 408) cannot be supported by system changes and requires someone to daily organize data from Ops, Lodestar and from NERC Tag software to provide determinants to TDSP's. Risk is that we would not be able to support that with current workload.
Market Operations	605	Senior Administrative Assistant	9	Administrative support for retail market operations division.	Administrative support will be provided by contract labor or ERCOT staff at higher cost and/or lower efficiency.
Market Operations	640	Retail Market Test Coordinator	12	Per PUCT, market goal is at least four flights per year, this means we will be testing year round. A full time position for Market Flight Coordinator would allow ERCOT to respond to ERCOT's testing needs as well as the market needs. The 2004 flight to support move-in / move-out will be the largest the market will undertake. As additional municipal utilities and cooperative's opt-in, larger flight tests will occur with more market participants. ERCOT's aim is to have one analyst per five market participants testing. This ratio was effectively used during 2003.	Without the requested staff for testing personnel, ERCOT will not be able to meet the market goal of four test flights per year or ERCOT will have to fill more testing positions with higher-priced contractor services.
Market Operations	640	Internal Testing Coordinator	12	With internal ERCOT projects and regular maintenance the internal testing for the related SIRS and project changes will be extensive. An Internal Testing Coordinator would work closely with the project teams and with the business teams to identify what is required for user acceptance testing. In addition, work closely with release management staff to ensure testing meets the schedules outlined. ERCOT's aim is to have one analyst per five market participants testing. This ratio was effectively used during 2003.	Without the requested staff for testing personnel, ERCOT will not be able to meet the market goal of four test flights per year or ERCOT will have to fill more testing positions with higher-priced contractor services.
Market Operations	640	Testing Analyst	9	With additional market tests and internal testing efforts, additional staff for executing the tests will be needed. ERCOT's aim is to have one analyst per five market participants testing. This ratio was effectively used during 2003.	Without the requested staff for testing personnel, ERCOT will not be able to meet the market goal of four test flights per year or ERCOT will have to fill more testing positions with higher-priced contractor services.

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Division	Dept	Job Title	Grade	Description of Duties of New	Impact of Foregoing the Proposed New Hire
Market Operations	640	Testing Analyst	9	With additional market tests and internal testing efforts, additional staff for executing the tests will be needed. ERCOT's aim is to have one analyst per five market participants testing. This ratio was effectively used during 2003.	Without the requested staff for testing personnel, ERCOT will not be able to meet the market goal of four test flights per year or ERCOT will have to fill more testing positions with higher-priced contractor services.
Market Operations	640	Testing Analyst	9	With additional market tests and internal testing efforts, additional staff for executing the tests will be needed. ERCOT's aim is to have one analyst per five market participants testing. This ratio was effectively used during 2003.	Without the requested staff for testing personnel, ERCOT will not be able to meet the market goal of four test flights per year or ERCOT will have to fill more testing positions with higher-priced contractor services.
Market Operations	640	Testing Analyst	9	With additional market tests and internal testing efforts, additional staff for executing the tests will be needed. ERCOT's aim is to have one analyst per five market participants testing. This ratio was effectively used during 2003.	Without the requested staff for testing personnel, ERCOT will not be able to meet the market goal of four test flights per year or ERCOT will have to fill more testing positions with higher-priced contractor services.
Market Operations	640	Testing Analyst	9	With additional market tests and internal testing efforts, additional staff for executing the tests will be needed. ERCOT's aim is to have one analyst per five market participants testing. This ratio was effectively used during 2003.	Without the requested staff for testing personnel, ERCOT will not be able to meet the market goal of four test flights per year or ERCOT will have to fill more testing positions with higher-priced contractor services.
Market Operations	650	Retail Account Analyst	9	This position will search for patterns, gaps in education, actionable items that affect all market participants (as opposed to impacting individual market participants). Will work closely with ESI ID data integrity management team and account managers.	Communication, understanding , and coordination of effort between market participants and ERCOT staff will not be enhanced to the extent ERCOT management believes that it should be.
Market Operations	650	Senior Retail Account Manager	12	With average of five new market participants each flight test, need to staff to handle additional market education and handling of market participant requests. The position will be responsible for site visits and educational opportunities for the market participants.	Communication, understanding , and coordination of effort between market participants and ERCOT staff will not be enhanced to the extent ERCOT management believes that it should be.
Market Operations	660	Senior Client Relations Analyst	10	A senior analyst is needed to for the following reasons: (1) coordinate the work of the other two analysts in support of the account managers; (2) coordinate the posting of and maintenance of market information on the ERCOT website; (3) coordinate the development of training materials for internal client relations staff; (4) work with client relations managers in delivery of market bulletins and market notices as well as training related to these items; (5) coordinate market conference calls and web seminars; (6) coordinate site visits and other customer relationship management issues; and (7) produce reports on disputes to facilitate timely resolution and protocols compliance	Communication, understanding , and coordination of effort between market participants and ERCOT staff will not be enhanced to the extent ERCOT management believes that it should be.

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PUCT Docket No.
Workpaper 24(b) : Detail Regarding Request for New Employees for the Texas Nodal Project

Division	Dept. Job Title	Grade	Description of Duties & Need	Impact if Position is Not Filled
Corporate Administration	110 Financial Analyst	10	Requested position will ssist in cost-benefit analysis of Texas Nodal Project	Without this position ERCOT would have to use higher priced contractor, and lose the knowledge and experience gained during this effort, that is critical for ongoing successful operation of the market changes.
Corporate Administration	120 Regulatory Attorney	11	Requested position will assist senior corporate counsel in monitoring the new market design for legal and regulatory issues; informing regulatory and legislative staff of ERCOT issues; preparing for 2005 legislative session.	Without this position ERCOT would have to use higher priced contractor, and lose the knowledge and experience gained during this effort, that is critical for ongoing successful operation of the market changes.
Corporate Administration	120 Administrative Assistant	5	To assist lawyers with paper workload	Without this position ERCOT would have to use higher priced contractor, and lose the knowledge and experience gained during this effort, that is critical for ongoing successful operation of the market changes.
Corporate Administration	170 Senior Market Rules Analyst	12	To Support backlog of 2003 Protocol Change Efforts and Groups and 2004 Changes	Without this position ERCOT would have to use higher priced contractor, and lose the knowledge and experience gained during this effort, that is critical for ongoing successful operation of the market changes.
Corporate Administration	170 Staff Market Analyst	11	To Support Senior Market Rules Analysts	Without this position ERCOT would have to use higher priced contractor, and lose the knowledge and experience gained during this effort, that is critical for ongoing successful operation of the market changes.
Corporate Administration	170 Senior Contracts and Group Administrator	9	To Support Market Rules Group (Current Market and Texas Nodal)	Without this position ERCOT would have to use higher priced contractor, and lose the knowledge and experience gained during this effort, that is critical for ongoing successful operation of the market changes.
Corporate Administration	170 WebMaster/Developer	12	PRR's, Project Lists, etc., Project Server Admin/Web Development	Without this position ERCOT would have to use higher priced contractor, and lose the knowledge and experience gained during this effort, that is critical for ongoing successful operation of the market changes.
Information Technology	310 Windows Administration	10	Installation, maintanence and problem resolution of hardware and operating system.	Without this position ERCOT would have to use higher priced contractor, and lose the knowledge and experience gained during this effort, that is critical for ongoing successful operation of the market changes.
Information Technology	310 Desk Side Support	8	Installation, maintanence and problem resolution of hardware and operating system on workstations.	Without this position ERCOT would have to use higher priced contractor, and lose the knowledge and experience gained during this effort, that is critical for ongoing successful operation of the market changes.
Information Technology	330 Network Management Administrator III	11	Design, Installation, maintanence and problem resolution of network hardware. Works with System Administration and end users for problem resolution.	Without this position ERCOT would have to use higher priced contractor, and lose the knowledge and experience gained during this effort, that is critical for ongoing successful operation of the market changes.
Information Technology	350 Sr. Project Manager	13	Senior project manager to manage and control the analysis and design, and create the project plans for the new market design efforts.	Without this position ERCOT would have to use higher priced contractor, and lose the knowledge and experience gained during this effort, that is critical for ongoing successful operation of the market changes.
Information Technology	353 Market Tech Servcies Liaison	13	Require additional liaison to represent ERCOT IT in the working groups and subcommittees related to the market design initiative. This allows us to be ahead of the curve on requirements resulting from protocol revisions, market requests, etc. Involvement from the Market Technical Services was also requested by Ray Guiliani at Executive Committee meeting. Currently, the group has on two FTEs plus manager to cover all existing requirements and was intended to grow to allow better coverage after assessment period post formation.	Without this position ERCOT would run the risk of unanticipated requirements that impact ERCOT systems late in the process of the market design initiative. It is shown that ERCOT benefits from early participation in the process to prepare and react to market decisions.

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Workpaper 24(b) : Detail Regarding Request for New Employees for the Texas Nodal Project

Division	Dept	Job Title	Grade	Description of Duties of New	Impact of Foregoing the Proposed New Hire
Information Technology	355	Senior Analyst	13	Facilitate market design impacts to IT Applications. It is expected for the market design initiative to have major impqact to key systems such as Settlement and Billing. This individual will serve in a cross-functional capacity across all applications areas within the Package 2 applications as well as Package One.	Without this position information technology staff would be vulnerable to invlaid design of applications supporting the market design deployment. This effort requires the focus and dedication of a senior individual to account for these system changes.
System Operations	430	Senior Consultant (Engineer)	12	Needed to Support Continuing Growth in Planning, Regulatory & Stakeholder Activities, Support nodal market development including node/zone determination, constrainted bidding for power market and TCR/FTE limits calcualtions. Support for security operations in stability and voltage analysis is continuing to grow.	Without this position ERCOT will be unable to support market redesign modeling effort, to perform cost-benefit analyses, or to integrate nodal analysis into planning activities, generation interconnection requests, and other studies.
System Operations	440	Senior Consultant	12	Market Redesign and Special Studies - In the near term, this position will model different congestion management schemes proposed as part of Texas Nodal market redesign efforts to determine impacts and differential impacts and oversee Uplan model modification efforts to model Texas Nodal market redesign. Its ongoing work will be to perform market-based generation reserve margin / adequacy studies as supported by Generation Adequacy Task Force in February 2003 and to support and perform on-going ERCOT requirements resulting from ICAP-type protocols resulting from Texas Nodal efforts. As time permits, this position will also perform other special studies as they develop.	Without this position ERCOT will not be able to perform special studies such as market redesign, CSC determination, economic generation adequacy studies. dynamic ratings candidate identifications.
Market Operations	505	Market Project Technical Analyst	12	This position will assist project analysts with technical requirements documentation for submittal to ERCOT information technology staff for all SIRs, SCRs and projects. This position will be invaluable during the requirements definition of PR-30160 Market Redesign and provide input on PR-30032 Voltage Support Compensation, PR-30083 Lodestar Upgrade would affect Production Business units, PR-30103 TCR Settlement Synchronization and PR-30034 Synchronous Condenser Compensation	Without this position ERCOT would have to use higher priced contractor, and lose the knowledge and experience gained during this effort, that is critical for ongoing successful operation of the market changes.
Market Operations	505	Market Project Analyst	11	This position will become the Data Aggregation Subject Matter Expert and responsible for all Data Aggregation SIRs, SCRs and related Market Projects such as PR-30160 Market Redesign, PR-20123 Direct Load Control, PR-30022 UFE Analysis, PR-30040 Direct Load Control for BULs	Without this position ERCOT would have to use higher priced contractor, and lose the knowledge and experience gained during this effort, that is critical for ongoing successful operation of the market changes.
Market Operations	505	Market Project Analyst	10	This requsted position willcoordinate requirements with market operations (Package 1) with regard to cross impacts of projects between market operations and commercial operations. Projects include PR-30160 Market Redesign, PR-30032 Voltage Support Compensation, PR-20123 Direct Load Control, PR-30067 BES Deployment Dependency on Resource Plan, PR-30072 Balance Schedule Dependency on Resource Plan and PR-30034 Synchronous Condenser Compensation	Without this position ERCOT would have to use higher priced contractor, and lose the knowledge and experience gained during this effort, that is critical for ongoing successful operation of the market changes.
Market Operations	605	Senior Business Project Manager - Day Ahead Market and Forward Market	12	This position will be responsible for project management, market participant facilitation, business analysis for the day ahead and forward market business processes, and systems and client support related to the Texas Nodal rulemaking.	Without this position ERCOT would have to use higher priced contractor, and lose the knowledge and experience gained during this effort, that is critical for ongoing successful operation of the market changes.
Market Operations	605	Senior Business Project Manager - Day Ahead Market and Forward Market	12	This position will be responsible for project management, market participant facilitation, business analysis for the day ahead and forward market business processes, and systems and client support related to the Texas Nodal rulemaking.	Without this position ERCOT would have to use higher priced contractor, and lose the knowledge and experience gained during this effort, that is critical for ongoing successful operation of the market changes.

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PUCT Docket No.
Workpaper 24(c) : Detail Regarding Request for New Employees for the Commercial Applications Enhancement Project

Division	Dept	Position Title	Grade	Description of Duties of New Employee	Consequences of Not Approving New Employee
Market Operations	505	Senior Business Project Analyst	12	A single business project manager is needed to dedicate time to the new commercial systems pilot program and change out of the existing commercial systems to a new commercial systems product. A proof of concept and eventual implementation of a new system will require business to support existing system and develop and support the new system concurrently.	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.
Market Operations	550	Settlement Analyst	11	Settlement analyst required to replace senior settlement analyst to support day-to-day processes and manual workarounds. The senior settlement analyst will lead the team of business analysts on the new commercial systems pilot and implementation team to supervise vendor, participate in design, development, and running settlements simultaneously to production. Proposed new position will also be charged with training existing settlement staff on the new commercial systems product and will oversee cutover from the existing commercial system to the new system.	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.
Market Operations	550	Settlement Analyst	10	Settlement analyst will replace a Grade 11 analyst to support day-to-day processes and manual workarounds. The senior settlement analyst will lead the team of business analysts on the new commercial systems pilot and implementation team to supervise vendor, participate in design, development, and running settlements simultaneously to production. Proposed new position will also be charged with training existing settlement staff on the new commercial systems product and will oversee cutover from the existing commercial system to the new system.	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.
Market Operations	550	Settlement Analyst	10	Settlement analyst will replace Grade 10 analyst to support day-to-day processes and manual workarounds. The senior settlement analyst will lead the team of business analysts on the new commercial systems pilot and implementation team to supervise vendor, participate in design, development, and running settlements simultaneously to production. Proposed new position will also be charged with training existing settlement staff on the new commercial systems product and will oversee cutover from the existing commercial system to the new system.	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.
Market Operations	550	Settlement Specialist	9	Settlement Analyst will replace Grade 10 analyst to support day-to-day processes and manual workarounds. The senior settlement analyst will lead the team of business analysts on the new commercial systems pilot and implementation team to supervise vendor, participate in design, development, and running settlements simultaneously to production. Proposed new position will also be charged with training existing settlement staff on the new commercial systems product and will oversee cutover from the existing commercial system to the new system.	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.

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Division	Grade	Title	Description of Position	Impact if Position is Not Approved
Market Operations	540	Load Profiling Analyst II	11	Load Profiling Analyst assigned to new commercial systems pilot and implementation project responsible for providing direction to vendor regarding load profiling methodologies and rules, support design effort, test effort and validation of data results as product mirrors production	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.
Market Operations	540	Data Aggregation Analyst II	11	Data aggregation analyst assigned to new commercial systems pilot and implementation project responsible for providing direction to vendor regarding data aggregation and acquisition methodologies and rules, support design effort, test effort and validation of data results as product mirrors production	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.
Market Operations	540	Data Aggregation Analyst I	10	Data aggregation analyst assigned to new commercial systems pilot and implementation project responsible for providing direction to vendor regarding data aggregation and acquisition methodologies and rules, support design effort, test effort and validation of data results as product mirrors production	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.
Market Operations	540	Data Aggregation Analyst I	10	Data aggregation analyst assigned to new commercial systems pilot and implementation project responsible for providing direction to vendor regarding data aggregation and acquisition methodologies and rules, support design effort, test effort and validation of data results as product mirrors production	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.
Market Operations	570	Data Analyst II	11	EDIM team will require analysts to evaluate, design, test and implement retail transaction issues and rules with the new commercial systems pilot and implementation project. The team of analysts will be required to maintain synchronization of retail transactions and wholesale calculations, registration information, data variance compliance, and FasTrak compliance to ensure the development of a new commercial system will maintain retail and wholesale synchronization.	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.

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Market Operations	570	Data Analyst II	11	EDIM team will require analysts to evaluate, design, test and implement retail transaction issues and rules with the new commercial systems Pilot and implementation project. Team will be required to maintain synchronization of retail transactions and wholesale calculations, registration information, Data Variance compliance, and FasTrak compliance to ensure the development of a new commercial system will maintain retail and wholesale Synchronization	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.
Market Operations	570	Data Analyst I	10	EDIM team will require analysts to evaluate, design, test and implement retail transaction issues and rules with the new commercial systems Pilot and implementation project. Team will be required to maintain synchronization of retail transactions and wholesale calculations, registration information, Data Variance compliance, and FasTrak compliance to ensure the development of a new commercial system will maintain retail and wholesale Synchronization	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.
Market Operations	570	Data Analyst I	10	EDIM team will require analysts to evaluate, design, test and implement retail transaction issues and rules with the new commercial systems Pilot and implementation project. Team will be required to maintain synchronization of retail transactions and wholesale calculations, registration information, Data Variance compliance, and FasTrak compliance to ensure the development of a new commercial system will maintain retail and wholesale Synchronization	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.
Market Operations	660	Sr. Wholesale Account Manager	12	Wholesale client services will require one wholesale account manager to facilitate communication, education, testing and training of wholsesale market participants regarding new commercial applications.	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.
Market Operations	650	Sr. Retail Account Manager	12	Retail client services will require one retail account manager to facilitate communication, education, testing and training of retail market participants regarding new commercial applications.	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.

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Division	Dept	Job Title	Grade	Description of Duties of New Hire	Impact of Not Filling the Proposed New Hire
Market Operations	640	Testing Coordinator	12	Retail testing will require one testing coordinator to manage and support the day-to-day processes of the ERCOT and market participant testing efforts. The testing coordinator will lead the team of testing specialists on the new commercial systems pilot and implementation team as they create and execute testing methods to support current day-to-day process in the new system. The testing coordinator will create and execute a market flight test to demonstrate to market participants the new commercial systems product. The testing coordinator will also be in charge of training existing testing staff on the new commercial systems product for future testing.	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.
Market Operations	640	Testing Specialist	10	Retail testing will require testing specialists to create and execute user acceptance testing scripts to ensure the development of a new commercial system will maintain retail and wholesale functionality. Testing specialists will conduct both ERCOT and amrket participant user acceptance testing.	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.
Market Operations	640	Testing Specialist	10	Retail testing will require testing specialists to create and execute user acceptance testing scripts to ensure the development of a new commercial system will maintain retail and wholesale functionality. Testing specialists will conduct both ERCOT and amrket participant user acceptance testing.	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.
Market Operations	640	Testing Specialist	10	Retail testing will require testing specialists to create and execute user acceptance testing scripts to ensure the development of a new commercial system will maintain retail and wholesale functionality. Testing specialists will conduct both ERCOT and amrket participant user acceptance testing.	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.
Market Operations	640	Testing Specialist	10	Retail testing will require testing specialists to create and execute user acceptance testing scripts to ensure the development of a new commercial system will maintain retail and wholesale functionality. Testing specialists will conduct both ERCOT and amrket participant user acceptance testing.	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.

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Workpaper 24(c) : Detail Regarding Request for New Employees for the Commercial Applications Enhancement Project

Division	Dept No	Title	Grade	Description of Duties	Justification for Position
Market Operations	640	Testing Specialist	10	Retail testing will require testing specialists to create and execute user acceptance testing scripts to ensure the development of a new commercial system will maintain retail and wholesale functionality. Testing specialists will conduct both ERCOT and market participant user acceptance testing.	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.
Market Operations	600	Retail Business Project Manager	12	Project manager will be responsible for coordination between various business stakeholders and ERCOT during implementation of the commercial applications enhancement project. The responsibilities of the project manager will include issues relating to retail business processes, ETS and Portal, market migration to new systems, and post launch issue resolution.	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.
Market Operations	600	Training Specialist	10	Position will be repsopnsible for delivery of training on new commercial applications to ERCOT and and market participant staff.	It is essential ERCOT's commercial applications are operating on current, supported hardware and software versions. The upgrade and possible migration of commercial systems, will necessitate parallel operation of existing and new systems for a period of time. ERCOT must be staffed to operate the systems concurrently. If the requested position is not filled, ERCOT's ability to successfully complete the commercial systems enhancement project will be compromised or the function will be performed by consultants and contractors at higher cost to ERCOT and the market.

ERCOT Fiscal Year 2004 Budget
PUCT Docket No.
Workpaper 24(d): Detail Regarding Request for New Employees for the SAS70 Type 2 Audit

Information Technology	330	System Administrator	12	The successful SAS 70 Type 2 audit requires extensive, sustained effort from information technology staff and business personnel. This position will provide needed assistance regarding HP Openview systems such as alerting, writing custom scripts for performance metrics, and service level agreement reporting.	ERCOT will not be adequately prepared for the annual rigors of a SAS 70 type 2 audit year-after-year. As a result, ERCOT may not be in a position to satisfy market participant's requirements regarding internal control over ERCOT processes and practices. All audit efforts will require time from staff working on current projects. Existing production work will potentially be delayed to focus on audit requirements.
Information Technology	330	Network Administrator	11	The successful SAS 70 Type 2 audit requires extensive, sustained effort from information technology staff and business personnel. This position will assist system administration and end-users on design, installation, maintenance, and problem resolution of network hardware.	ERCOT will not be adequately prepared for the annual rigors of a SAS 70 type 2 audit year-after-year. As a result, ERCOT may not be in a position to satisfy market participant's requirements regarding internal control over ERCOT processes and practices. All audit efforts will require time from staff working on current projects. Existing production work will potentially be delayed to focus on audit requirements.
Information Technology	390	System Analyst	12	The successful SAS 70 Type 2 audit requires extensive, sustained effort from information technology staff and business personnel. This position will assist all information technology staff in the mitigation of the SAS 70 audit.	ERCOT will not be adequately prepared for the annual rigors of a SAS 70 type 2 audit year-after-year. As a result, ERCOT may not be in a position to satisfy market participant's requirements regarding internal control over ERCOT processes and practices. All audit efforts will require time from staff working on current projects. Existing production work will potentially be delayed to focus on audit requirements.
Information Technology	390	Documentation Specialist	12	The successful SAS 70 Type 2 audit requires extensive, sustained effort from information technology staff and business personnel. This position will be responsible for documenting all current procedures and ensuring the documentation, procedures and processes satisfy SAS 70 requirements throughout the year. Currently, ERCOT has no position assigned such documentation tasks.	ERCOT will not be adequately prepared for the annual rigors of a SAS 70 type 2 audit year-after-year. As a result, ERCOT may not be in a position to satisfy market participant's requirements regarding internal control over ERCOT processes and practices. All audit efforts will require time from staff working on current projects. Existing production work will potentially be delayed to focus on audit requirements.
Information Technology	390	Document and Process Developer	12	The successful SAS 70 Type 2 audit requires extensive, sustained effort from information technology staff and business personnel. This position will be responsible for documenting all current procedures and ensuring the documentation, procedures and processes satisfy SAS 70 requirements throughout the year. Currently, ERCOT has no position assigned such documentation tasks.	ERCOT will not be adequately prepared for the annual rigors of a SAS 70 type 2 audit year-after-year. As a result, ERCOT may not be in a position to satisfy market participant's requirements regarding internal control over ERCOT processes and practices. All audit efforts will require time from staff working on current projects. Existing production work will potentially be delayed to focus on audit requirements.

Staff Report on
Cost Ranges for the Development and Operation of a Day One Regional Transmission Organization

Docket No. PL04-16-000

Prepared by the Staff of the
Federal Energy Regulatory Commission

October 2004

Executive Summary

This Study is intended to inform the Commission and facilitate discussions with the industry and the states regarding Regional Transmission Organization (RTO) formation. Specifically, the purpose of this Study is to estimate the cost of developing a Day One RTO that provides independent and non-discriminatory transmission service and satisfies the minimum requirements of Order No. 2000 to operate as an RTO. Further, the Study estimates the annual operating expenses necessary to run such an organization. Estimates of the costs of RTO formation vary widely and market participants cite the cost of RTO development as a significant barrier to RTO formation.

The Study did not undertake an analysis of the benefits of RTOs. The benefits of RTOs, such as more efficient dispatch and elimination of redundant functions, have been evaluated in numerous reports. For example, the Department of Energy (DOE) study, completed in April 2003 and summarized in Exhibit 1, found that implementation of the Commission's Standard Market Design through RTOs can provide benefits to the ratepayers of the country.

The analytical base for this Study rests largely on information gleaned from audit staff, FERC Form No. 1 data and interviews with and data responses from existing RTOs and Independent System Operators (ISOs). This approach of examining actual experiences provides valuable insight into the potential cost for an RTO to start-up and provide Day One functions. These functions include open access transmission service, scheduling authority and available transmission capacity (ATC) determination, redispatch for congestion management, ancillary services, planning, parallel path flow mitigation, interregional coordination and market monitoring. The Study assumes that a Day One RTO does not have bid-based, security-constrained economic dispatch, unit commitment, locational prices, financial transmission rights or capacity markets as the Northeast and California ISOs have. Such Day Two functions involve further costs which are beyond the scope of this study.

Each organization's unique circumstances, such as geographic location, market type, roll-out expectations, and software development, created comparability problems. While the development paths and experiences of existing RTOs and ISOs varied significantly and did not provide a basis upon which to make direct comparisons, Staff was able to draw upon these experiences. The Study found some patterns that provide an indication of expected investment costs and annual operating expenses. The Study concludes with an estimated range of expected investment costs and related annual expenses. These estimates can help focus future discussions regarding the cost of developing an RTO. Unlike other studies that combine investment costs and annual operating expenses, this Study separates these two elements so market participants, customers and regulators can more readily focus on the potential rate impact.

Staff made the following key findings from this Study:

➢ **The direct impact of a new Day One RTO should be less than one-half of one percent of a retail customer's bill.** Staff calculations show that the average annual operating expense of a new Day One RTO would impact the average retail customer by approximately 0.02¢/KWh, or less than 0.3% of the customer's total bill. This represents a charge of $2.31 per year for a typical residential consumer, or $0.19 per month. Staff expects these direct costs would be offset by a reduction in costs by transmission owners in the region over time. In addition, these costs would also likely be offset by efficiencies in grid and market operations; however, this study did not evaluate those benefits. Staff anticipates that by employing a lessons learned approach, a new organization should be at the lower end of the cost range, producing a relatively small impact on customers, which should not be an impediment to RTO formation.

➢ **To date, Day One RTOs have required an investment outlay of between $38 million and $117 million and an annual revenue requirement of between $35 million and $78 million.** Staff believes an organization beginning today and taking a lessons learned approach from previously formed organizations will experience costs at the lower end of the investment cost range, and likely incur costs in the range of approximately $50 to $70 million in investment and operating costs of $50 to $70 million. This amount of investment should provide the independent organization with hardware and fully operational software to calculate ATC and schedule transmission through a centralized control center. The annual expense would provide for staffing and operations and maintenance costs sufficient to run and manage the organization. Further, these expense estimates would provide sufficient income to allow the RTO to cover its debt service, through depreciation and interest expenses. The organization would participate with the local transmission owners in regional planning and would maintain NERC reliability requirements.

➢ **Many of the costs are for reliability-related functions.** The Day One functions listed above—transmission service, scheduling authority and available transmission capacity (ATC) determination, redispatch for congestion management, ancillary services, planning, parallel path flow mitigation, interregional coordination and market monitoring—are, with the exception of market monitoring, related to reliability as much as they are to markets. We note that performing such functions on a regional basis is likely to bring reliability benefits; however, measuring such benefits is beyond the scope of this study.

➢ **Cost overruns can result from changing plans mid-course, poor project management and extensive delays.** In interviews with RTO managers, several expressed that they experienced cost overruns due to incomplete planning of their

ultimate software goals, which resulted in continued—and costly—changes to the software design. A consultant noted that in today's market one should be able to use off-the-shelf products (with some modification) and the experience of other RTOs to reduce the probability and extent of cost overruns.

➢ **Cost data are not accounted for in a standardized way.** Each organization used Generally Accepted Accounting Principles, but reported investment costs and annual expenses differently. That is, while one organization directly assigned costs to a particular cost element or operational function, another respondent showed no such cost element or operational function. The Uniform System of Accounts, designed for the traditional vertically-integrated utility, is not always aligned with the functions of an ISO or RTO. Staff recommends review of the reporting requirements and possible standardization to facilitate cost oversight by the public and the Commission.

Comments concerning this report may be filed in Docket No. PL04-16-000.

For information about this report please contact:

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Exhibits

I. Purpose

This Study is intended to inform the Commission and facilitate discussions with the industry and the states regarding Regional Transmission Organization (RTO) formation. Specifically, the purpose of this Study was to estimate the cost of developing a Day One RTO that provides independent and non-discriminatory transmission service in accordance with Order No. 2000. The purpose was not to detail the particular costs of any RTO, nor is this Study a tool for auditing existing RTOs and Independent System Operators (ISOs) (collectively, regional transmission providers) from which data were collected. Rather, this analysis is a review of the start-up experiences and costs of currently operating regional transmission providers, which may be used as a starting point for discussions regarding the initial cost of creating an RTO. This Study focuses on asset investment costs and annual operating expenses; unless otherwise noted, it does not consider expenses borne by utilities to form the RTO (sunk costs). This Study also does not consider the benefits of RTO formation; such analysis has been presented in numerous reports.[1]

II. Introduction and Background

In 1996, the Commission issued Order No. 888, which required, as a remedy for undue discrimination, that all public utilities provide open access transmission.[2] In 1999, the Commission issued Order No. 2000.[3] The Commission's objective was "for all transmission owning entities in the Nation, including non-public utility entities, to place their transmission facilities under the control of appropriate regional transmission institutions [RTOs] in a timely manner." Order No. 888 and Order No. 2000 set the foundation upon which to build regional transmission institutions and competitive

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[1] See Exhibit 1 for a summary of the benefits claimed in various RTO studies.

[2] Promoting Wholesale Competition Through Open Access Non-discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, Order No. 888, 61 Fed. Reg. 21,540 (May 10, 1996), FERC Stats. & Regs. P 31,036 (1996), *order on reh'g*, Order No. 888-A, 62 Fed. Reg. 12,274 (March 14, 1977), FERC Stats. & Regs. P 31,048 (1997), *order on reh'g*, Order No. 888-B, 81 FERC ¶ 61,248 (1997), *order on reh'g*, Order No. 888-C, 82 FERC ¶ 61,046 (1998), *aff'd in relevant part sub nom.* Transmission Access Policy Study Group, *et al.* v. FERC, 225 F.3d 667 (D.C. Cir. 2000), *aff'd sub nom.* New York v. FERC, 535 U.S. 1 (2002).

[3] Regional Transmission Organizations, Order No. 2000, 65 Fed. Reg. 809 (January 6, 2000), FERC Stats. & Regs., ¶ 31,089 (1999), *order on reh'g*, Order No. 2000-A, 65 Fed. Reg. 12,088 (March 8, 2000), FERC Stats. & Regs. ¶ 31,092 (2000), *affirmed sub nom.* Public Utility District No. 1 of Snohomish County, Washington, *et al.* v. FERC, 272 F.3d 607 (D.C. Cir. 2001).

electricity markets. To date, there are several operational RTOs, with additional regions expecting RTO operations in the near future.

While significant progress has been made in developing ISOs and RTOs, certain regions of the country remain concerned that the Commission's RTO policies are too prescriptive in substance and in implementation timetable, and do not sufficiently accommodate regional differences. In response, the Commission has stated that it would consider phased-in implementation and sequencing tailored to each region that allows modifications to benefit customers in each region. As a result, several sponsors of regional organizations in the formative stage have now adopted strategies to develop RTOs with only those characteristics and functions that provide a benefit to their respective regions. For example, during a September 24, 2003 Commission-sponsored meeting in Phoenix, Arizona, the sponsors of the WestConnect RTO, LLC proposal informed the attendees that they intend to institute a phased approach to development of WestConnect. The sponsors claimed the cost of starting a fully functional RTO was not comparable to the benefits that such an organization would bring to the Southwest.

Based on the Phoenix meeting, Commission Staff undertook an effort to better understand the cost elements associated with independent control of the regional transmission grid for the non-discriminatory and transparent provision of transmission service, *i.e.*, a Day One Regional Transmission Organization. This report seeks to identify the cost of establishing and operating a Day One RTO.

III. Creating the Day One Regional Transmission Organization

To establish cost estimates for the development of a Day One RTO, Staff undertook the following process:

(A) Identification of the minimum functions necessary to provide independent, non-discriminatory transmission service;
(B) Identification of a representative group of existing and emerging ISOs and RTOs for study to inform the cost estimates for each function;
(C) Development of the representative investment and annual operating expense estimates; and
(D) Comparisons to the Day One RTO of the costs associated with similar functions of existing ISOs and RTOs.

During this process, Staff collected data through informal discussions with representatives from the industry, annual reports, FERC Form No. 1, and the Commission's audit staff.

(A) Identification of the Minimum Functions Required for a Day One Regional Transmission Organization

Through several orders, the Commission has concluded that certain limited functions provide a suitable beginning that allows a proposed RTO to have a sufficient level of market independence and operational authority to qualify for RTO status.[4] The Commission's findings in these orders repeatedly focused on the notion of functional authority over the operations of the transmission grid, independent from market participants, with oversight responsibilities that are intended to remove any barriers to non-discriminatory practices and create robust competition.

Order No. 2000 specified eight functions for RTOs: tariff administration and design, congestion management, parallel path flow, ancillary services, OASIS, market monitoring, planning and expansion, and interregional coordination. The difference between the minimal requirements to operate an RTO and the more complex functions currently performed by, for example, Northeastern ISOs and RTOs is referred to as "Day One" versus "Day Two" RTO functionality.

Figure 1

	Pre-Day One	Day One	Day Two
Tariff Administration & Design		X	X
Congestion Management			
Redispatch		X	
Market-Based			X
Parallel Path Flow		X	X
Ancillary Services		X	X
OASIS	X	X	X
Market Monitoring		X	X
Transmission Planning		X	X
Interregional Coordination		X	X
Day-Ahead Energy Market			X
Same-Day Energy Market			X
Ancillary Services Market			X
Capacity Market			X

Figure 1 shows the minimum functions of a Day One RTO, as spelled out in Order No. 2000. To operate as an RTO, the Day One entity must meet the minimum requirements of Order No. 2000, but such operation may not include market-based mechanisms for congestion management or the operation of energy markets. A fully functional RTO (or Day Two RTO) will carry out all of the functions to a greater extent, employing market-based mechanisms, and include additional functions.[5] Staff notes that "Pre-Day One" organizations perform only regional OASIS functions, without actually controlling the transmission facilities. ERCOT, for example, initially operated in this manner.

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[4] *See, e.g.*, Arizona Public Service Company, *et al.*, 101 FERC ¶ 61,033 (2002); Avista Corp., *et al.*, 100 FERC ¶ 61,274 (2002); and Southwest Power Pool, Inc., 106 FERC ¶ 61,110 (February 10, 2004).

[5] It should be noted that functions such as operating ancillary services and capacity markets are optional programs that some existing RTOs, such ISO-NE, have chosen to perform.

While Order No. 2000 put forth eight minimum functions that an RTO must perform, some of these functions are unlikely to be fully performed by a Day One RTO. For example, market monitoring takes place on a smaller scale for Day One operations than under the Day Two scheme. Similarly, the Day One RTO will initially have a role in transmission planning, but only at the Day Two point will the RTO become fully responsible for planning. Finally, the extent of congestion management differs between Day One and Day Two entities. The Commission has ruled that full market-based congestion management does not have to be performed when RTO operations commence.[6] The variation in performing these functions has a direct effect on the resources devoted to them. This Study attempts to capture only those resources that have been classified as Day One functions. This Study does not consider the resources associated with retail access programs. State legislated retail access or retail choice programs are not a requirement of Order No. 2000. While these programs are created by the states, and implemented by the RTO, such programs are considered voluntary, under a Day One or a Day Two RTO.

In order to use information as provided by RTOs and ISOs, Staff organized the cost data into consistent functions. For this, Staff found it useful to rely on the North American Electric Reliability Council (NERC) functional model.[7] The advent of open-access transmission service and the evolution of competitive markets and new entrants prompted NERC to re-evaluate the functions performed by the traditional control area operator. NERC issued a schematic of functions that can be applied across regions and across different regulatory and institutional structures. This model defines the core functions of control area operators and assigns responsibility for maintaining reliability. It also explains the relationship between and among the entities responsible for performing the tasks within each function. FERC has encouraged the use of the NERC functional model in its RTO policy in order to clarify responsibilities between transmission owners and RTOs/ISOs.[8]

Staff determined the following NERC functions necessary to satisfy the Commission's requirements for becoming an operational RTO: Transmission Service Provider and Reliability Authority. In addition, a transmission support function and organizational management are necessary to develop an adequate framework for the Day One RTO. Finally, the Day One RTO should be responsible for the regional oversight of transmission planning. While not necessarily performing the planning function, oversight

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[6] *See* Arizona Public Service Company, *supra* note 5; Midwest Independent Transmission System Operator, Inc., 97 FERC ¶ 61,326 (December 20, 2001).

[7] See Exhibit 2 for a graphic representation.

[8] *See* Midwest Independent Transmission System Operator, Inc., 105 FERC ¶ 61,145 (October 29, 2003) and Southwest Power Pool, Inc., 106 FERC ¶ 61,110 (February 10, 2004).

authority and the ability to review expansion is critical for regional reliability.

Transmission Service Provider

The Transmission Service Provider administers the transmission tariff and provides transmission services to qualified market participants. The tasks involved include receiving and processing transmission service requests; maintaining a commercial interface for receiving and confirming such requests (*i.e.,* an open access same-time information system or OASIS); approving or denying transmission service requests; approving interchange transactions; determining and posting available transmission capacity (ATC) values; and allocating transmission losses among the users. The analysis assumes that the RTO will facilitate provision of ancillary services so transmission customers will have a one-stop shop from which to obtain the necessary ancillary services from the underlying transmission and generation owners.[9]

The Transmission Service Provider will perform OASIS and tariff administration and design functions in accordance with Order No. 2000. Market monitoring also falls under the purview of the Transmission Service Provider.

Reliability Authority

The Reliability Authority, as defined in the NERC model, ensures the real-time operating reliability of the interconnected bulk electric transmission systems within a Reliability Authority Area.[10] Activities include, but are not limited to: (1) enforcement of operational reliability requirements; (2) monitoring of all reliability-related parameters within the Reliability Authority Area, including generation dispatch and transmission maintenance; (3) revision authority for transmission and generation maintenance plans; (4) development and enforcement of interconnection reliability operating limits to protect against instability and cascading outages; (5) approval/denial authority over bilateral schedules from a reliability perspective; and (6) direction of emergency procedures and system restoration.

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[9] The NERC Reliability Function Model includes other responsibilities, including a Balancing Authority, which has the responsibility to maintain load-interchange-generation balance within its area of responsibility. Many of the authorities for this function are served through the provision of ancillary services under an Open Access Transmission Tariff (OATT).

[10] A Reliability Authority Area is the collection of generation, transmission and loads within the boundaries of the Reliability Authority. This boundary coincides with one or more Balancing Authority Areas, which are the areas in which a controlling Organization maintains a load-resource balance.

To perform these duties, the Transmission Service Provider needs to communicate with market participants, generators, transmission owners and operators and distribution owners. This communication often requires hardware and software interconnectivity to achieve the real-time monitoring and actions necessary to maintain the reliable operation of the grid. These systems are often embodied in energy management (EMS) and Supervisory Control and Data Acquisition (SCADA) systems.[11]

The RTO will perform other reliability-related Day One functions as described in Order No. 2000. These functions include congestion management, parallel path flow, ancillary services, transmission planning and interregional coordination.

Support Functions

While the NERC Model was used to determine the necessary operational functions of an RTO, Staff determined that additional cost centers were needed to capture the required administrative functions of a Day One RTO. Accordingly, two additional cost categories were included in the analysis—Transmission Support and Management.

Transmission Support

Transmission Support function, as Staff has defined it, includes the systems (hardware and software) and other necessary capital assets for the settlements and billing, and customer service operations. This list, while not exhaustive, best reflects the support services necessary in the provision of transmission service.

Management

The second support function is the day-to-day management of the transmission organization. The services included in this function include human resources, finance, administrative support, and building operations. Accordingly, the systems (*e.g.,* executive and decision support systems and general web service), furniture, and related assets were included in the Day One operations.

(B) Representative Study Group

After Staff determined the functions necessary for a Day One RTO, investment

[11] EMS systems, often characterized as the communication system with the generators and their operation, are typically embodied in a SCADA system, which, while collecting generator and transmission flow data, also can monitor and collect data on discrete facilities (breakers, lines, generator nodes, etc.) for purposes of monitoring the grid.

and expense profiles were developed. Staff reviewed the operations of existing ISOs and RTOs to determine a representative group for a Day One RTO. With the exception of the PJM Interconnection, LLC (PJM), Staff excluded ISOs and RTOs that developed from a tight power pool. As a result, the Midwest Independent Transmission System Operator (Midwest ISO), the Electric Reliability Council of Texas (ERCOT), the Southwest Power Pool (SPP), and PJM were selected for study.[12] This review did not select the Northeast entities (ISO-New England and New York ISO) or the California Independent System Operator, Inc. (CAISO) as representative examples.[13] These entities, among other things, began operations with full Day Two market functions. As such, their costs were not representative of Day One RTO costs.

SPP is unique in this analysis, and the results for it should be interpreted accordingly. At the time of this Study, SPP had only been granted conditional RTO status.[14] The costs and expenses reflected in this Study are accurate for the services SPP currently provides, but are not necessarily reflective of a fully operational Day One RTO. For example, one of the functions of a Day One RTO is market monitoring, but funds for an independent market monitor are not included in SPP's budget. In contrast, SPP has been able to draw on the formation and operating experience of other RTOs, reducing the outlay required for start-up.

Information sources utilized in the Study include industry interviews, industry submissions, FERC Form No. 1 documents, and data from Commission audit staff. The ISO and RTO cost submissions were derived from actual and budgeted costs, and were developed in summary format in an effort to respond to the scope of this Study; they do not represent actual current revenue requirements. The information, in some instances, was purported to be illustrative of what each entity believed it would cost to replicate and administer its organization. Some actual data from a specific reporting period, indicated as representative of the Day One operations defined in this Study, was also submitted. Each entity denoted the specific time frame in its development that is representative of Day One RTO functions. For example, the Midwest ISO and ERCOT identified end-of-year 2002 numbers as the best representation of their Day One costs and expenses.

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[12] While it is recognized that the PJM area operated as an experienced power pool, the detailed data provided by PJM staff allowed for analysis, assignment and inclusion of PJM costs in the development of a Day One RTO.

[13] A cursory review of the data from the NYISO and ISO-NE indicated that, because they evolved out of tight power pools, were not representative of the Day One RTO development this Study attempts to capture. Review of the CAISO financial data indicated that it would not lend itself to identification of the Day One functionality with reasonable results.

[14] Southwest Power Pool, Inc., *supra,* note 8. *See also* Southwest Power Pool, Inc., 108 FERC ¶ 61,003 (July 2, 2004).

Staff organized the supplied cost data and information into the NERC functions based upon (1) the entities' own description of costs, (2) cost element descriptions, (3) RTO/ISO allocations to cost categories, and (4) Staff's analysis and allocation of supplied costs.[15] This last step was necessary because the existing RTOs and ISOs do not maintain standard accounting practices similar to each other and do not have a Uniform System of Accounts tailored to their accounting needs and business structure.[16]

(C) Development of Investment Costs

The following describes the methodology employed by Staff to develop investment cost figures. The essence of the analysis was to take the facilities provided within the company's definitions of accounts and to, where possible, directly align these costs with Day One functions and otherwise allocate the facilities using a direct labor ratio.

Staff's Study does not include previously-incurred sunk costs as a part of the RTO's cost. Those costs are being recovered, at least partially, by the current transmission companies. Staff considered only the actual assets to be purchased by the RTO, such as hardware, building, etc. These assets of the new organization would likely require capital investment by the founding group and such costs would be recovered through rates established by the RTO. Other industry studies have used different assumptions. For example, in its initial overview of start-up costs, WestConnect's first study combined these investment costs and expenses, and then added substantial cash reserve allowances, sunk costs and past consultant fees.

PJM Interconnection

The data from PJM was the most comprehensive data received and represents the accumulation of facilities placed in service through the year 2000. While PJM represents a Day Two RTO, the data utilized in this analysis allowed Staff to closely represent the same functionality as a Day One RTO.

PJM provided summary data itemizing its investment costs, organized by service schedules under its tariff.[17] PJM allocated the costs of its facilities to the functions embodied by the report to its Administrative Cost Recovery service schedule (Schedule 9 to the PJM Tariff). The PJM Administrative Cost Recovery service schedule is separated

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[15] Staff performed some allocations based upon general ratemaking principles, *e.g.*, direct labor ratios.

[16] Currently the Uniform System of Accounts is designed for vertically-integrated utilities.

[17] The PJM summary data is included as Exhibit 3 at page 2.

into six separate schedules: (1) Control Area Services Administration; (2) Fixed Transmission Rights Services; (3) Market Support Services; (4) Regulation and Frequency Response; (5) Capacity Resource and Obligation Management; and (6) Management Services. Staff used PJM's definitions of cost categories as a basis for determining which costs would be necessary for minimum functionality.

Using these six schedules and PJM's description for the types of activities (and hence costs) included in each schedule, Staff aligned, to the extent possible, these service schedules and costs with the relevant Day One categories, *i.e.,* Control Area Administration, Market Support Service, and Management Services. For example, PJM defines the Control Area Services as comprising all activities associated with preserving the reliability of the PJM bulk power system and providing point-to-point and network transmission service. Cost items in this service category include OASIS, calculation of ATC, real-time transmission monitoring, transmission service requests, EMS and reliability reporting. Most of these costs have been allocated to the Transmission Service Provider function, but such cost items do have relation to the Reliability Authority function. The costs that are clearly identifiable as pertaining to enhancing reliability are accounted for entirely in the Reliability Authority function.

PJM's Market Support Service encompasses activities which support PJM market operations, including scheduling functions, market settlements and billing, and market monitoring functions. Many of the functions included in this cost category do not pertain to a Day One, minimum functionality approach. However, costs related to EMS, OASIS, and generator communications do support minimum functionality. Thus, the costs for these discrete facilities are included as the Transmission Support function.

PJM's Management Services cost function comprises all administrative and management cost elements that support all the services PJM provides. Cost items such as the PJM information warehouse, internet network architecture, and enterprise security are attributable to this function, and were included as costs of Management of the RTO.

Finally, in order to present a figure that reflects the cost of PJM's building to house the facilities, Staff used the value, as provided for in the 2002 PJM Annual Report, for the cost of the buildings owned by PJM participants and turned over to the PJM for use. The 2002 annual report notes that two buildings had an original cost of $2.9 million and $4.8 million, respectively. Further, one of the buildings underwent $2.9 million in renovations before PJM took residence.[18] PJM also identified control center infrastructure costs as building upgrades. Therefore, the analysis has estimated the total value of these buildings at $11 million.[19]

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[18] PJM 2002 Annual Report, Notes to Consolidated Financial Statements, Note 10.

[19] While the simple purchase cost by PJM participants was used, the present value

In conclusion, the analysis of PJM facilities resulted in the following estimated investment cost for minimum Day One operations: Transmission Service Provider - $35 million; Transmission Support - $15.5 million; Reliability Authority - $1.3 million; and Management - $6.7 million. Combined with the building cost estimate of $11 million, total Day One costs estimated from PJM approximate $69.6 million.

Midwest Independent Transmission System Operator

The Midwest ISO maintains its accounts in the form prescribed by the Commission's Uniform System of Accounts. Accordingly, the Midwest ISO records its physical plant assets by FERC account number. Since the Midwest ISO does not own production or distribution facilities, all of its facilities costs are reflected in Transmission Plant Accounts as structures and station equipment (Account Nos. 352 and 353) and in General Plant (Account Nos. 389, 390, 391, 397 and 398).

The Midwest ISO asserted that all costs from calendar year 2002 represent an accurate description of its Day One functionality; as those costs were incurred from the form under which the Midwest ISO commenced operations on February 1, 2002. Each of the separate physical asset accounts was reviewed in order to determine the most suitable NERC Functional Category to be assigned. For example, Midwest ISO Account No. 35303 – Computer Software-Transmission, is booked as transmission station equipment. Thus, there is no need to allocate any of this software to the management function.[20]

While certain assets were directly assigned to functions, others were not.[21] Staff developed an allocator to assign costs across all functions based on selection and assignment of 187 of the 227 FTEs for Day One operations. Of the 187, 55% were allocated to the Transmission Service Provider, 28% to Transmission Support, 10% to the Reliability Authority, and 7% to Management. This allocation allows the accounts that contain the general facilities for the use of all employees, including those identified as serving the Transmission Service Provider function to be spread over all the functions. Conversely, similar to the direct transmission assets, the computer hardware and software and communication equipment booked to the General Plant accounts were exclusively allocated to the Management function. This was done because the Transmission Plant accounts already included specific telecommunication equipment and computer systems. These General Plant systems are assumed to incorporate such systems as the finance, human resource, and corporate inter- and intranet systems.

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of the effective rent to PJM of $1.6 million per year over twenty years, discounted at a rate of 10% results in a present value of approximately $13.6 million.

[20] See Exhibit 3, p. 7, Midwest ISO Assets.

[21] For example, Account No. 39100 – Office Furniture and Fixtures-General was booked as general plant.

Finally, the Midwest ISO buildings are booked separately to General Plant Account No. 39011 – Buildings-General Leased. The building costs are reflected separately from all other allocated costs in this analysis. The building cost to house the allocated facilities is $15.8 million.[22]

The analysis of the Midwest ISO facilities results in the following estimated cost for Day One operations: Transmission Service Provider - $55.4 million; Transmission Support - $29 million; Reliability Authority - $10 million; and, Management - $7 million. Combined with the estimate of the building required to house the necessary facilities of $15.8 million, total investment costs from analyzing the Midwest ISO are approximately $117 million.

Electric Reliability Council of Texas

Unlike the accounting by PJM and the Midwest ISO, ERCOT data did not provide a high level of detail in the description of capital assets. As with the Midwest ISO, the most reasonable allocation methodology employed for this analysis was a direct labor allocation.[23]

Using data from 2002 as the most representative of Day One operations, Staff reviewed, selected and assigned a portion of ERCOT's full-time employees to the Transmission Service Provider, Transmission Support, Reliability Authority, and Management functions. Through this review, 188 of ERCOT's 296 full-time employees (or 64%), based upon end-of-year 2002, were selected as necessary for minimum functionality. Of the 188, 60% were assigned to the Transmission Service Provider function, 18% to the Transmission Support function, 5% to the Reliability Authority function, and 17% to the Management function.

These same labor ratios were used to apportion investment costs for Day One functions. Unlike the Midwest ISO, the ERCOT data did not allow for allocation of certain identified costs by discrete labor ratios. Rather, because ERCOT only provided the overall assets in five general categories,[24] the costs in each category were allocated across all functions, with the exception of IT equipment and software. Supplementary information provided by ERCOT noted $410,000 in computer hardware and software related to the management of the RTO.[25] Thus, Staff allocated the major IT systems

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[22] The $15.8 million is the present value of the lease.

[23] See Exhibit 3, p. 12, ERCOT 2002 FTEs.

[24] The categories are Computer Equipment and Software, Buildings and Leasehold, Furniture and Fixtures, Land and Improvements, and Vehicles.

[25] Staff did not include IT systems that were in development.

across Transmission Service Provider, Transmission Support and Reliability Authority, and directly assigned the $410,000 to the Management function. As a result, the analysis of the ERCOT facilities results in the following estimated cost for Day One operations: Transmission Service Provider - $59.7 million; Transmission Support - $18 million; Reliability Authority - $4.5 million; and Management - $1 million.

Finally, ERCOT data reflects total Buildings and Leasehold assets of $48.9 million for the year ending 2002. Through application of the fully allocated labor ratio, approximately $31 million of the cost of the buildings is representative to house the minimum functionality.[26] Combined with the estimates of the four functions, total investment costs from analyzing ERCOT is estimated at $114 million.

Southwest Power Pool

SPP provided an assignment of costs and expenses to the defined functions, which allowed Staff to reflect the data in two ways: SPP fully allocated and SPP without an imbalance market.

In 2000, SPP started developing a system for commercial and market operations. The market project was put on hold while SPP pursued its merger with the Midwest ISO. In March 2003, the merger plans were terminated and SPP resumed plans to implement market operations. The 2003 cost data that was used for SPP includes the first phase of its market operations implementation: real-time balancing market with market power mitigation and market monitoring. Because this project seeks to define the cost of minimum Day One functions, Staff included SPP's costs both with and without the new market operations (market operations as defined by SPP include a real time imbalance markets).

SPP data indicates the following necessary costs for minimum functionality: $22.3 million for Transmission Service Provider; $3 million for Transmission Support; $5.6 million for Reliability Authority; and, $2.3 million for Management. In order to account for facilities to house the minimum operations, Staff approximated the lease costs for SPP out ten years by increasing its 2003 lease amount by 3% per year; a figure to account for inflation. Staff then discounted the lease payments on a net present value basis in order to approximate the cost of the SPP building. In doing so, Staff arrived at an estimated building cost of $5.1 million.

Staff developed two estimates of SPP's costs—one that is near Day One functionality and one that is a pre-Day One entity. The Day One version includes SPP's

[26] In contrast to the other RTOs, ERCOT's building was constructed predicated on the functions it was required to provide by legislation.

new market operations systems costs, resulting in a total estimate of $38.3 million. By removing SPP's market operations systems costs of $20.8 million, Staff is better able to create a cost estimate of minimum functionality. Excluding the market system costs estimates a start-up cost of $17.5 million. However, it was decided that this functionality would not be sufficient to represent the needs of a Day One RTO. SPP's market implementation is assumed to include the necessary hardware and software for sufficient grid monitoring and generator communication needed to fulfill the Reliability Authority function. Thus, it was determined that $17.5 million (which excludes SPP's market system) is more representative of a pre-Day One organization.

(D) Development of Annual Operating Expenses

The annual expense for a Day One RTO depicted by this Study is formulated much like a cost of service. Included in the annual expenses are debt service, operations and maintenance (O&M) and labor costs, taxes other than income taxes, and depreciation expense. The following assumptions were made:

1. Debt-only financing; thus no equity return is included.
2. Consistent with accounting practice, straight line depreciation rates of three years for non-EMS software, five years for non-EMS hardware, seven years for EMS systems, and fifteen years for buildings, related chattels and office equipment. Lease options were not evaluated.
3. Income taxes were assumed to be zero because the RTO would likely be a non-profit entity. Taxes other than income (property and local) were included where identified.
4. Fully loaded labor costs (including pension and benefits, Federal Insurance Contributions Act (FICA) taxes and unemployment taxes) were used based upon the assumed amount of labor required to staff the organization.
5. Operation and maintenance expenses were included for the assets selected.
6. Interest expense was imputed to recover the interest portion of the debt services, while the depreciation covered the principal.[27]

The Study did not include expenses incurred by utilities or the RTO during pre-operating stages. While some RTOs financed start-up activities and currently amortize such costs, they usually are recovered over a finite period. For example, the Midwest ISO secured a debt issuance to fund development activities, including labor and consulting expenses, rather than have the participating transmission owners fund those activities directly. As a result, Midwest ISO accounts for those expenditures on its

[27] Staff analyzed the debt costs of the representative group and the utility industry and concluded that a range of debt costs from 6.5% to 7.5% was reasonable. (See Exhibit 5.)

balance sheet and amortizes the amount over seven years. Since this Study is intended to focus on the actual investment necessary for Day One operations, pre-operation start-up activities are excluded.

Using the representative group of ISOs and RTOs in this project to develop an estimate of Day One operating expenses required making certain assumptions and allocations based upon the quality of the data gathered. The following describes the operating expenses utilized to develop a snapshot of operating a Day One RTO.

PJM Interconnection

Labor Costs

The fully loaded labor costs (compensation and pension benefits) were provided by PJM in its 2004 budget estimates. The same cost center categories were utilized for the related expenses as were assigned for investment. Only the FTEs assigned to the cost centers selected to the asset assignment are defined to contribute to the total labor force of the Day One RTO. Thus, of the 493 budgeted employees for 2004, only 263 FTEs are assumed to be required to staff the minimum functionality. In order to determine the annual labor expense, Staff divided the total compensation and benefits expense in PJM's 2004 budget, by the budgeted FTEs (493) to develop a labor expense per FTE. Staff then multiplied the labor expense per FTE by the allocated number of FTEs for minimum functionality (263) in order to obtain a total annual fully loaded labor cost of $34.9 million.

Depreciation

Using generally accepted straight-line depreciation, as described above, non-building assets (computers, software, furniture, etc.), were depreciated over their respective useful lives (three or five years). EMS assets were depreciated over seven years and a fifteen-year useful life was used for the building.[28] As a result, non-building and building assets from PJM data reflect annual depreciation expenses of $12.7 million.

Operations & Maintenance

Since the greatest annual expense for the Day One RTO is labor, O&M was estimated based on operating expenses per FTE. Staff divided PJM's materials and

[28] It is important to note that these depreciation lives are targeted for purposes of cost recovery through rates rather than application of the Internal Revenue Service's Modified Accelerated Cost Recovery System (MACRS). Under MACRS, buildings are depreciated over a 39 year period.

supplies and other expenses, from the selected cost centers, by 2004 budgeted FTEs of 493. The O&M cost per FTE was then multiplied by the assumed level of staffing (263), resulting in an O&M expense estimate of $9.8 million per year.

Other Expenses

In order to account for some taxation, Staff included property taxes and other employee related expenses in this expense development. Employee related expenses, calculated as prorated portion of annual budgeted expenses, include lodging, travel, meetings, meals, training, telecommunications, buildings maintenance and utilities associated with staff allocated to Day One operations. Non-employee expenses include annual budget for insurance, board expenses, annual member meeting, audit fees, property and school taxes, and bank fees. Non-employee expenses do not vary by staff number or customer transaction volumes. As a result, the total other expenses equal $16 million.[29]

Debt Service

Finally, to account for the debt service of the RTO, Staff attempted to accurately depict the annual cost of funds from each organization in the study group. For most RTOs and ISOs, the depreciation expense recovers the principal payback for debt issuance. However, a recovery for interest expense is also required. From PJM, Staff developed an interest expense by taking an average of unpaid Day One capital investment (less depreciation expense), multiplied by an estimated 7.00% interest rate. In doing so, Staff calculated the interest expense of debt service for Day One functionality from PJM data at $4.4 million.

Staff's calculation of expenses necessary for Day One operations approximate $78 million per year, or $0.22/MWh.[30]

Midwest Independent Transmission System Operator

Labor Costs

The Midwest ISO provided staff with the number of employees by department by activity. Based on end-of-year 2002 data, the Midwest ISO had total full-time staffing of 227 employees. Reviewing the data submitted, staff aligned the Midwest ISO activities

[29] See Exhibit 3, p. 5, Column (B), Lines (6) and (7).

[30] See Exhibit No. 3, page 20 for the calculation of $/MWh. The calculations reflect the annual expense divided by net energy on the RTO or ISO system. However, certain RTOs, *e.g.* the Midwest ISO, use peak energy data for rate development.

to a corresponding Day One function. Staff then selected only the employee head count that was necessary to serve each of the transmission, reliability, support, and management roles. Of the total 227 full-time employees, 187 were determined to be necessary for Day One, independent operations.[31] Of the 187, through Staff's judgment, 55% were allocated to the Transmission Service Provider, 28% to Transmission Support, 10% to the Reliability Authority, and 7% to Management. To develop the fully loaded labor costs, Staff devised an average cost of labor based upon the level of compensation reported for 2002, including benefits and taxes, related to the amount of staff selected. By developing the average annual labor cost, Staff determined a per FTE annual cost of $117,167. The annual average compensation was then applied to the allocated FTEs (187) in order to determine annual labor expense of $22 million.

Depreciation

Identical to the process in the PJM analysis, Staff utilized generally accepted depreciation rates for non-building assets and a 15-year depreciation rate for building. As a result, from the Midwest ISO data, Staff developed an annual depreciation expense of $15.4 million.

Operations & Maintenance

Using the Midwest ISO's representation of 2002 annual numbers to reflect Day One functionality, Staff selected the Midwest ISO's annualized occupancy expenses and actual supplies and other expenses for O&M. In doing so, Staff developed an annual O&M expense from the Midwest ISO of $13 million.

Other Expenses

As with the PJM analysis, to obtain an estimate of the Midwest ISO's other expenses, Staff selected labor related and non-labor related expenses that represent the non-direct expenses of operating the RTO, including insurance and property taxes. As a result, Staff developed a total other expense of $13 million.

Debt Service

For the 2002 calendar year, Midwest ISO provided total debt interest expense of just under $10 million. In review of Midwest ISO's 2002 annual report, Staff noted that Midwest ISO's debt carries an interest rate of 8.75%. In order to develop an interest expense on the Midwest ISO assets, staff used the average of the unpaid first year Day One capital, multiplied by 8.5% to develop a level of interest expense to develop a level

[31] See Exhibit 3, p. 8, Midwest ISO Headcount.

of debt service of $9.3 million.

Staff's calculation of expenses necessary for Day One operations approximate $73 million per year or $0.21/MWh.

Electric Reliability Council of Texas

Labor Costs

ERCOT provided actual data for its fiscal year 2002 that depicts staffing levels by cost center division. In order to delineate the level of staffing to support minimum functionality, Staff performed two levels of allocation. First, labor was directly assigned to the four functions where applicable. Many departments, however, served multiple functions. Those that were determined to perform across all functions were allocated to the functions by the ratio of the direct labor assigned to each of the four minimum functions. Staff allocated 188 of ERCOT's 296 FTEs to support the minimum functionality. As with the Midwest ISO data, Staff developed an average annual cost of compensation and benefits per FTE. The average annual cost was then multiplied by the allocated labor of 188 FTEs to obtain an estimated annual labor cost of $17.8 million.

Depreciation

Again, as in the analyses of the other data providers, Staff utilized generally accepted depreciation rates for the non-building assets on a straight-line method and depreciated the building over fifteen years. However since Staff was unable to segregate EMS systems from the total systems, the depreciation rate for equipment and software was set at 5 years. Accordingly, the ERCOT example resulted in a depreciation expense of $18.6 million.

Operations & Maintenance

To develop the O&M expense from the ERCOT data, Staff used only ERCOT's administrative and other expenses and hardware and software maintenance and licensing expenses. The administrative and other expenses were divided by ERCOT's full FTE staff of 296 employees for 2002. With that O&M expense per FTE, Staff multiplied the expense per FTE by the 188 allocated employees to reflect an estimated O&M expense of $3 million. To that Staff added ERCOT's full hardware and software licensing and maintenance expenses of $4.3 million for a total example O&M expense of $7.3 million.

Other Expenses

The other expense calculation, like O&M, is calculated by taking ERCOT's facility and equipment costs, and consulting and legal services for 2002, in proportion to

the amount of labor selected for Day One operations. This results in other expenses of $13 million.

Debt Service

As with PJM and Midwest ISO, in order to develop a representation of interest expense, Staff multiplied the average of the Day One first year ERCOT assets by seven percent. As a result, the data reflects a debt expense of $7.3 million.[32]

Staff's calculation of expenses necessary for Day One operations approximate $64 million per year or $0.22/MWh.

Southwest Power Pool

Labor Costs

SPP provided data for the 2003 calendar year. As a result of extensive discussion with SPP staff, SPP provided its own allocation, confirmed by Staff review, of labor required for minimum functionality.[33] However, because of the new market implementation that SPP resurrected in 2003, Staff analyzed SPP from two perspectives: with the market costs and without the market costs.[34] For the analysis with the market costs, all 140 SPP FTEs are included in the calculation for a weighted average annual cost of labor per FTE of $137,797. Thus with all FTEs counted, annual labor expense is $19.3 million. By excluding the imbalance market staffing levels, the total FTE allocation is reduced to 109 FTEs. Based upon the average annual labor cost, total annual labor cost is approximated at $15.1 million.

Depreciation

When developing the depreciation expense, the key difference between SPP with the market systems and without is the difference in computer hardware and software

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[32] ERCOT carries debt where the principal repayment has been deferred for a certain period. Beginning in 2005, recovery of the principal amounts, separate from depreciation recovery and interest expense, will be included in ERCOT's cost recovery mechanism. However, for consistency purposes in the illustrative cost examples, ERCOT's principal recovery is not included.

[33] Given its historic operating structure and control and now preliminary guidance on performing as an RTO, SPP is much like a minimally functional Organization.

[34] Cost data from SPP includes the first phase of its market operations implementation, *i.e.,* real-time balancing market with market power mitigation and market monitoring.

assets. While the asset levels for all other assets would be identical, the "fully loaded SPP" has $20.8 million in additional systems to account for. As a result, on a straight-line basis, SPP with market systems incurs an annual depreciation expense of $6.99 million, whereas SPP without the new market systems exhibits a depreciation expense of $2.8 million.[35]

Operations & Maintenance

Staff utilized all of the SPP reported expenses from its administrative and maintenance expense accounts. This resulted in a total annual O&M expense of just over $5 million. By removing the administrative and maintenance expense accounts related to the new market activities, the SPP data approximates an O&M expense of $2.9 million.

Other Expenses

To ascertain a level of other expense for SPP, Staff used an estimate of labor-related taxes by applying the statutory IRS rates to the estimates of labor costs. For SPP with market systems, labor related taxes are approximately $1.5 million per year. SPP data excluding the market systems labor cost reflects labor related tax expense of $1.2 million.

Debt Service

Staff applied a 7% interest rate to average SPP assets to develop a representative interest expense of $2.4 million. Excluding the market operations assets, Staff developed an interest expense of $1.1 million.

Total approximate expenses, with market operations: $35.3 million per year, or $0.16/MWh. Total approximate expenses, less market operations: $23.2 million per year, or $0.11/MWh.

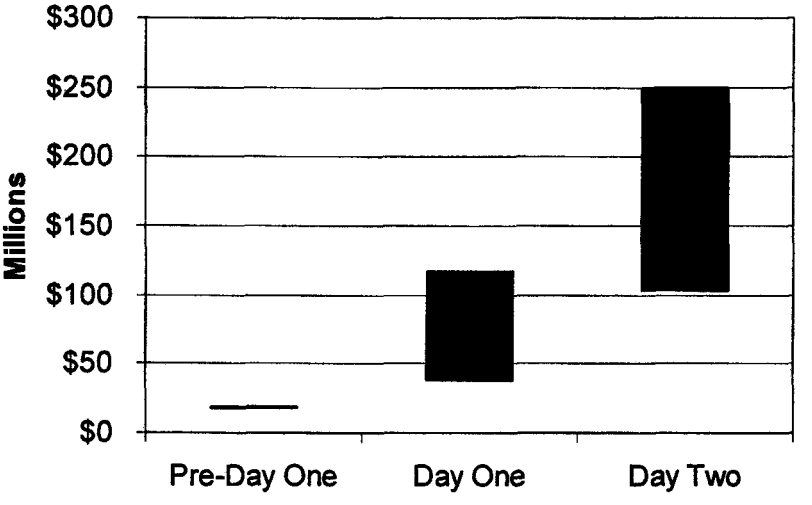
IV. Results

The experiences reviewed in this Study indicate that, to date, Day One RTOs require an investment outlay of between $38 million and $117 million (Figure 2), with annual operating expenses between $35 million and $78 million (Figure 3). The investment range should provide the Day One RTO with the infrastructure, including hardware and fully operating software and other capital assets, necessary to operate the

[35] There was not a clear separation of general furniture/equipment, non-EMS systems and EMS systems to assign depreciation rates. Thus all non-building assets were depreciated over 5 years.

regional transmission system, determine ATC and schedule transmission service through centralized control.[36]

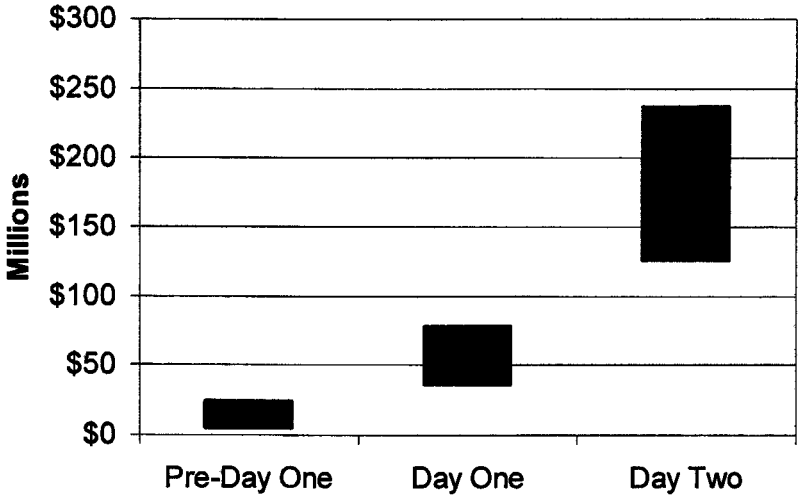
Figure 2
Investment Cost Ranges



The investment range is also sufficient to assure the necessary completion of the communication systems that allow the centralized Day One RTO to monitor the regional grid and take any necessary action to maintain or enhance reliability. Further, the annual expense would provide for staffing, operating expense, debt service, depreciation and taxes sufficient to efficiently manage the organization.

[36] Day Two data reflects the investment costs and annual revenue requirements of existing RTOs and ISOs, including those that were not selected for Day One study.

Figure 3
Annual Operating Expense Ranges



Presentation in terms of ranges is useful because the organizations in the sample group vary by location, services, and participation. Similarly, the costs were incurred in different years, and Staff did not make an adjustment for inflation. Staff found that no particular entity, without some level of system enhancement and operational experience, serves as an exact example of a Day One RTO. While the use of existing ISOs and RTOs assisted Staff in the identification of the costs necessary to develop a Day One RTO, the cost data was not consistently developed or provided to Staff, so that only in a grouping was the information relevant for the Study. Accordingly, the results of the analysis portray an expected range of investment and expense amounts. The development of an RTO from an area in which a tight power pool exists can benefit, in terms of potential lower investment costs, from the already developed centralized communication systems. Also, entities located in lower cost areas, in terms of labor and real estate costs, would likely have lower operating expenditures. Conversely, new development in high cost areas can increase building acquisition costs.

Another reason for the development of the cost ranges is due to the quality of the data used in this Study. While some of the respondents to this Study provided detailed investment and operating data by cost element, others provided summary data with less definition. Also, as described above, much of the data analysis required the use of allocation factors. While Staff used allocation factors that are consistent with Commission precedent for ratemaking methodologies, the allocation factors are meant to create a cost model not a definitive cost amount. It is not the conclusion of either the participating organizations or Staff that the cost estimates associated with each organization reflect what its actual cost of operating under a Day One scheme would have been.

Notwithstanding, Staff believes that the Study is an accurate reflection of what a new Day One RTO could expect for required investment and opening day expense. Further, Staff believes the Study's intrinsic value is that it is based on other RTOs' actual experience. The added value of the range approach is that it allows for a sliding scale of costs over time. For example, an entity formed today would face different and likely lower hardware and software expenditures, while facing potential increases in building costs due to inflation. Further, regional differences play a role in determining how much must be spent for both investment and operating expenses.

In conclusion, Staff believes that ranges displayed in this Study reflect costs likely to be incurred by an RTO attempting to perform the Day One functions discussed above.

V. Start-up Cost Conclusions

While this Study seeks to identify the costs of starting a Day One RTO, Staff sought to:

A) Compare the results here with (1) the cost-benefit analyses completed for various regions which have also been attempting to quantify the costs and benefits of RTO formation and (2) what existing large operating companies are currently charging for similar services; and
B) Assess the impact of the added annual charges on customers so market participants and regulators can review and discuss their significance.

Comparisons

At least six cost-benefit studies have been completed since the issuance of Order No. 2000.[37] Among the studies that attempted to estimate the cost of developing an RTO, only the RTO-West Cost Benefit study, completed in March 2002, contained an assessment of RTO start-up costs and operating costs.[38]

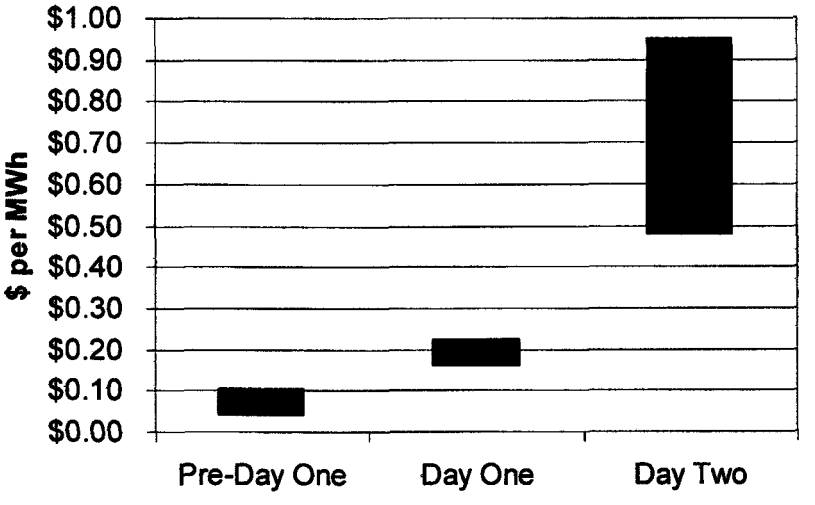
According to the RTO-West study, the estimated cost to develop an RTO is $82 million. This translates to an annual operating expense or revenue requirement of $50 million—amounts similar to Staff's expense and investment estimates. The RTO-West

[37] These include studies for the Southeastern Association of Regulatory Utility Commissioners (SEARUC), RTO-West filing utilities, NY-ISO and NERTO formation of a single RTO, and Northeast RTO consisting of PJM, NY-ISO and NERTO. Studies were also completed separately by the Commission and the Department of Energy. The GridFlorida study is underway.

[38] A current study being completed for the GridFlorida RTO proposes to include an assessment of the start-up costs under a day-one and day-two approach.

study used existing data from operating entities much in the same fashion as Staff's Study did. In doing so, however, there was no dissection of the estimated development costs by RTO function or through staged implementation. The RTO-West study concluded that, on a per unit basis, it would cost between $0.40/MWh and $0.58/MWh.[39] In comparison to the RTO-West study, Staff used its calculated Day One expenses and load data from each of the representative group members to project that a new Day One RTO (in those regions) would result in an added charge to customers in the range of $0.16/MWh to $0.22/MWh (Figure 4).[40] It is important to note that some of the functions of a Day One RTO are currently being provided and charged for by transmission owners. For example, utilities, including large multi-state holding companies, have explicit charges in their tariffs for Scheduling, System Control and Load Dispatch service.[41] This function is only one of the many functions that an RTO performs and will no longer be performed or charged for by the current utilities.

Figure 4
Annual Operating Expense Ranges per MWh



[39] See Exhibit No. 6 for the relevant portions of the RTO-West Study.

[40] In the cases where the rate development is based on peak energy on the grid (*e.g.*, the Midwest ISO), the per unit impact would be lower because of this larger load in the denominator. For example, the derived Day One rate for the Midwest ISO, using peak energy, would be $0.13/MWh, rather than $0.21/MWh.

[41] This sample includes Arizona Public Service Company ($0.06/MWh), Entergy Corporation ($0.10/MWh), Florida Power & Light Company ($0.03/MWh), Florida Power Corporation ($0.11/MWh), Public Service Company of Colorado ($0.13/MWh), Public Service Company of New Mexico ($0.05/MWh), Southern Electric Generating Company ($0.11/MWh), and Tampa Electric Company ($0.05/MWh).

Staff's projection demonstrates that the ultimate charge to customers will largely depend on the geographic size and electrical load of the new organization, as well as the costs. For example, using the PJM Day One illustration, the impact of increasing the PJM footprint to expected 2005 levels would result in an approximate rate of $0.15/MWh.[42] By increasing its geographic footprint, through incremental increases in investment, PJM was able to offset the costs by increasing its electrical load. PJM indicated that, had its footprint been smaller, investment costs would likely have been lower. Thus, size has implication in two contexts: costs differ as a result of both load density and geographic footprint. As a result, it is important to recognize that while some RTO costs are increasing, the increases are a function of geographic expansion and addition of functions, at the request of RTO customers. For example, PJM's 2005 operating budget is expected to increase by 46% to accommodate its larger footprint and service needs, but the additional scope will actually reduce the per unit charge by 27%.

Another aspect of this study was to work with the sponsors of WestConnect RTO. As a result of Staff's discussion with WestConnect, an understanding was developed that recognizes separate reporting of investment and start-up costs. In addition, Staff's and WestConnect's estimates of the costs of a Day One RTO are reasonably close.[43]

Impact

Finally, in order to provide perspective on the financial impact of a new RTO to end-use customers, Staff calculated the percentage of a retail customer's bill that would be associated with the additional expense. Staff used its average annual revenue requirement of $62.5 million and Energy Information Agency data on the overall national average cost of production, transmission and distribution service to produce this estimate. The median expense of developing and operating a Day One RTO would impact retail rates by less than 0.3 percent (or two one-hundredths of one cent, $0.0002, per kWh) (see Figure 5).[44] This represents a charge of $2.31 per year for a typical residential consumer, or $0.19 per month.

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[42] See Exhibit 3, p. 5, Column (C), for detailed information. The forecast costs reflect the incremental additions necessary to serve the expanded footprint.

[43] WestConnect developed a study that reflects year one annual revenue requirement of about $50 million and necessary investment (as defined above) of approximately $65 million.

[44] The average $62.5 million operating cost was divided by the regional average load of the United States (Exhibit 3, pages 21 and 22).