California Independent
System Operator Corporation

Attachment B

California ISO

Grid Management Charge: Revised 2007 Cost of Service Study

December 3, 2007

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Version: 3.0

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1.0 Introduction

This cost of service study allocates the CAISO's costs among the various services it provides in order to calculate the cost of each service provided, to determine how different customers cause costs to be incurred and to determine how to recover those costs from customers. The cost of service study will provide a template for how costs may be recovered through component charges of the Grid Management Charge. However, the charges resulting from application of this template may be adjusted to address issues of bill and rate impacts.

Since the last cost of service study was completed in 2003, the CAISO organization structure has undergone significant changes. In 2005 the company underwent a major realignment of the corporate structure. This realignment resulted in staff reassignments, and the formation of new cost centers and combination of responsibilities, as well as the elimination of many old cost centers[1]. Within the next year, the CAISO will also implement a major redesign of its market structure and upgrade of its technology infrastructure, known as Market Redesign and Technology Upgrade or MRTU. The CAISO has performed this update to the 2003 cost of service study to assess the impact of these changes.

The current cost of service study was performed in the early 2007 by CAISO staff, with revisions made to include the cost of service results for two new charges: Market Usage – Forward Energy and Core Reliability/Energy Transmission Services – Transmission Ownership Rights charges. The current cost of service study built on the experience gained through the previous study, refining the process as necessary.

The bulk of this report is taken up with a description of the approach and results of the 2007 cost of service study. This report also provides analysis regarding changes in the cost service allocations.

[1] A summary of the consultant's assessment of the corporate organization structure is located at: http://www.caiso.com/docs/2005/06/14/200506141636433058.pdf. A description of the budget impacts of this realignment can be found in the *Proposed FY 2006 Operating & Maintenance Budget*, located at: http://www.caiso.com/docs/2005/09/09/200509091443067156.pdf.

2.0 Introduction to Cost of Service Studies

This cost of service study has been conducted on the basis of the CAISO's embedded cost of service, alternatively known as the "fully allocated cost of service." The embedded cost method looks at the overall historical accounting costs of providing a given level of service in a given year. This study uses the embedded cost method to address the question of what costs should be recovered through the rates for each of the services the CAISO provides to its customers. The four basic steps in the cost of service study are (1) data gathering, (2) functionalization, (3) classification and (4) allocation.

Data Gathering. The types of data typically gathered are historical costs of capital and property assets, operating expenses, debt service, and historical bill determinants. These may be adjusted or forecast for the year in question. For the CAISO, the cost data gathered are budgeted on operations and maintenance expenditures, debt service, anticipated credits (offsets) to costs and the availability of excess funds from the Operating Reserve. In additional, historical bill determinants are compiled and used to forecast bill determinants for the test year, i.e., the year for which rates are being developed.

Functionalization. Functionalization is the determination of the services performed by the regulated entity and the costs of providing those services. In the case of traditional, vertically integrated utilities, the typical functions are production (generation), transmission, distribution and customer service. The CAISO recognized in a November 2002 discussion paper that both its cost structure and the types of services it performs are significantly different than those of a vertically integrated electric utility.[2] In light of those differences, the functions performed by the CAISO likewise differ. The CAISO has determined that its principal functions are Grid Reliability Services, Market Services and Settlements, Metering and Client Relations. Grid Reliability Services are sub-functionalized into Core Reliability Services and Energy Transmission Services. Market Services are sub-functionalized into Forward Scheduling, Congestion Management and Market Usage. These functions are described in the CAISO testimony in ER04-115-000, et. al.[3] and in various white papers on the CAISO website[4].

Classification. Classification is the determination of basis for recovery of the functionalized costs. The typical methods of recovery are demand, volumetric or customer charges. Demand charges are assessed on the basis of maximum instantaneous use of a service within a given time period, e.g., non-coincident peak demand in MWs. Volumetric charges are typically assessed on energy (kWh or MWh) usage or number of transactions. Customer charges are assessed on a per customer or incident bases. The CAISO has determined that Core Reliability Services were demand-related and should be recovered from non-coincident peak demand. Energy Transmission Services and Market Usage are related to energy flows on the grid. Forward Scheduling costs are transaction-related for the processing of schedules. Finally, Settlements, Metering and Client Relations costs are customer-related.

Allocation. The next step in the process is allocation of costs. Unlike a traditional, regulated utility that typically serves multiple customer classes, i.e., residential, commercial and industrial customers, the CAISO serves a single customer class: the Scheduling Coordinators who are its customers. Any of those Scheduling Coordinators could represent each or all of the traditional customer classes. For example, one of the large Scheduling Coordinators schedules load from residential, commercial, industrial and resale

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[2] See http://www.caiso.com/docs/2003/01/10/2003011017474215233.pdf.

[3] The CAISO testimony is located at: http://www.caiso.com/docs/2003/11/05/200311051652027140.html.

[4] See for example, Grid Management Charge Rate Under MRTU Project Summary, May 10, 2007, located at: http://www.caiso.com/1bda/1bdaeb2b61e10.pdf.

customers, along with providing scheduling services for other wholesale customers. The CAISO also has customers that have generation with no load.

After the cost of service study is completed, its results are used in the determination of rates. Bill determinants are applied to the allocated costs to determine rates for each level of service. For that purpose, bill determinants may be forecasted, based on projections of usage during the test year, or historic bill determinants may be used as a proxy for bill determinants during the test year. The CAISO compiled historical bill determinants for each of its functions in preparation for the cost of service study. The CAISO did not attempt to forecast any of the bill determinants for the 2007 test year. Rather, historic bill determinants during 2006 were used.

3.0 2003 Cost of Service Study

Under a FERC mandate to increase the transparency of its administrative charges[5], the CAISO performed a major redesign of its GMC rate structure in 2003. A consulting firm was tasked with the development of the cost of service study and rate structure. The cost of service study took place over several months and involved staff and management from every CAISO department. The study resulted in the enumeration of six functions of the ISO, associated activities, and detailed assignment of cost center budget, staff and systems[6].

Following a stakeholder process, the CAISO presented proposed GMC rates in an October 31, 2003 rate filing with the FERC. The rate filing was based on the set of CAISO functions produced by the 2003 cost of service study. These functions were:

- Core Reliability Services
- Energy Transmission Services
- Forward Scheduling
- Congestion Management
- Market Usage
- Settlements, Metering and Client Relations

With the consultant's assistance, the CAISO identified and functionalized each system application. Expenditures for capital item were functionalized and the source of funding identified. Using this information, the CAISO functionalized total debt service payments.

For operations and maintenance expenditures, the CAISO functionalized expenditures for each cost center existing in 2003. For cost centers that were directly assignable, managers and directors were interviewed and subsequently surveyed concerning the activities in their cost centers. Each of these managers and directors was asked to assign their staff and significant contract payments to each of the CAISO functions. For directly assignable Information Technology cost centers, staff was assigned on the basis of the systems supported by the cost center. The non-directly assignable cost centers were assigned on the basis of weighted averages of FTE (full time equivalent) staff across the ISO, overall direct expenditures, or supervised cost centers.

The resulting cost assignments were embedded in the ISO Tariff and filed with the FERC on October 31, 2003[7]. The proceeding established by FERC was resolved through settlement negotiations between the CAISO and stakeholders. The rate structure that resulted from those settlement negotiations modified the cost allocations and created new rates, which are currently in effect[8].

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[5] See documents in ER01-313-000, et. al.

[6] Documentation concerning the 2003 stakeholder process and ultimate Board decision on the GMC can be found on the CAISO website at: http://www.caiso.com/docs/2003/02/07/2003020716402314262.html.

[7] The filing is located on the CAISO website at: http://www.caiso.com/docs/2003/11/05/20031105165202714O.html.

[8] The settlement agreement is located on the CAISO website at: http://www.caiso.com/docs/2005/06/08/2005060814451035 64.pdf.

4.0 2007 Cost of Service Study

This cost of study was performed to take into account the changes in the CAISO's corporate organizational structure since 2003, as well as changes in the CAISO's operations anticipated with MRTU implementation, scheduled for 2008. The current cost of service study was performed in the late winter and spring of 2007 by CAISO staff. The current cost of service study built on the experience of the previous study, refining the process as necessary.

Staff proceeded by first updating the definitions of the CAISO functions. Staff from each division was consulted in refining these definitions. Once definitions were updated, the CAISO proceeded to update functionalization of CAISO activities by cost center. In 2003, the CAISO developed a comprehensive list of CAISO activities with their functionalization and indicative cost centers. This list of activities was updated to reflect the new organizational structure, new cost center responsibilities and activities. The list was also updated to eliminate Congestion Management as a separate function with the implementation of MRTU. Activities related to Congestion Management have been attributed to other functions. The updated list is included as **Appendix A**. Section 5 contains a summary of the methodology used to develop the allocation to two new charges: Market Usage – Forward Energy and Core Reliability Services/Energy Transmission Services – Transmission Ownership Rights.

4.1 Functionalization of Operations and Maintenance Costs

The CAISO budgets its operations and maintenance (O&M) costs by departments known as cost centers. Almost all cost centers are led by a manager, director or officer[9]. A listing of current cost centers can be found in **Appendix B**. In performing the cost of service study on O&M, the first step is to review each cost center to determine the method of assignment. Non-Information Technology (IT) and IT cost centers were evaluated separately. Of the 64 cost centers, 52 were non-IT. Non-IT cost centers are further segregated depending on their activities. There are five methods of assignment for non-IT cost centers. These methods are shown in **Table 1**.

The assignment of O&M by cost center proceeds sequentially. Cost centers that directly provide services are considered directly assignable. Once these cost centers are identified, the cost assignment method (from Table 1) for each remaining cost center is determined.

[9] The exception is cost center 2412, Asset Management, which contains non-labor costs and no staff.

Table 1 Methods of Assignment Non-Information Technology Cost Centers	
Method	Description
Direct	Assignment is based on cost center activities. Cost center managers were consulted as to the cost centers activities and the functionalization of their activities. Examples: Real-Time Operations, Billing and Settlements, Tariff and Regulatory/Policy Development
FTE	Assignment is proportional to the staffing assignment of directly assigned cost centers. Examples: Human Resources, Facilities
Overhead	Assignment is based assignment of directly assigned cost centers. Examples: Accounting, Assistant Corporate Secretary, State/Federal Affairs
MRTU Capital	Assignment is based on the assignment of MRTU capital projects. Used for departments dedicated to MRTU development. Examples: MRTU Program
Supervised Cost Center	Assignment is based on the assignment of departments reporting to director or officer. Examples: Grid Operations, Market Services, Enterprise Risk Management

Each of the non-IT cost centers was reviewed to determine the method of assignment. Of the 52 non-IT cost centers, 29 directly provide services and are directly assigned, while 23 are assigned using one of the other methods. One department, Financial Planning and Treasury, had a portion of its costs related to credit management directly assigned and the remainder assigned as overhead. The method of functionalization used for each of these cost centers is also shown in **Appendix B**.

IT cost centers were directly assigned based on systems supported or on an expenditure on system basis. The systems supported by each IT cost center were identified. These IT cost centers and the systems they support are shown in **Appendix C**. Once this was determined, each IT cost center was reviewed to determine the method of assignment. The four methods and a brief definition of each are shown in **Table 2**.

Table 2 Methods of Assignment Information Technology Cost Centers	
Method	Description
Direct	Assignment is based on expenditures for specific systems. An itemized list of expenditures was reviewed, classified and functionalized by system. Examples: Asset Management
Direct System	Assignment is based on systems supported by the cost center Cost center managers were consulted as to systems supported and the level of activity by system. Examples: Data Center & Operations, EMS Information Technology
System Direct	Assignment is based overall assignment of corporate systems. Cost centers assigned with this method are responsible for support, project management or planning of systems enterprise-wide. Examples: IT Project Management, Software Quality Assurance, Information Security
Supervised Cost Center	Assignment is based on the assignment of departments reporting to director or officer Examples: IT Projects, Information Technology-General

The assignments of non-direct cost centers can be completed once the direct assignments are completed. Non-direct methods essentially use weighted-average assignments of the directly assignable cost centers to determine an "average" assignment to each function. The non-direct methods are FTE, overhead, and supervised cost center. FTE ratios are calculated using the staff assignments to function of the directly assignable cost centers. Overhead ratios are calculated using the cost assignments to each function of the directly assignable cost centers. The supervised cost center ratios by function are calculated using the cost assignments of cost centers reporting to it. Once complete, the resulting functionalization can be combined with budget information to develop the complete set of cost assignments by cost center and a roll-up of cost assignments for all of O&M[10]. A roll-up of cost assignments by corporate division using the 2008 budgeted amounts is shown in **Table 3**. A complete list of the cost assignments by cost center is shown in **Appendix D**.

[10] As the development of the allocations for CRS/ETS TOR and Market Usage-Forward Energy were developed after the initial release of the cost of service study, a fuller description of each can be found in Section 5.

Table 3 California Independent System Operator 2007 Cost of Service Subject to both review and approval (In millions)									
Functionalized Operations and Maintenance by Division for Proposed 2008 Budget									
Division		**CRS**	**ETS**	**CRS/ETS TOR**	**FS**	**MU**	**MU-FE**	**SMCR**	**Total**
2100	CEO	$3.69	$1.24	$0.04	$0.40	$2.22	$0.82	$1.96	$10.36
2200	Planning and Infrastructure Development	$5.23	$4.59	$-	$-	$-	$-	$-	$9.82
2300	Corporate Services	$7.71	$2.98	$0.09	$0.82	$2.21	$1.06	$5.80	$20.66
2400	Information Technology	$15.46	$3.54	$0.15	$3.56	$4.87	$2.05	$14.39	$44.01
2500	Operations	$19.65	$6.99	$0.32	$0.56	$6.42	$0.88	$7.43	$42.25
2600	Corporate Counsel	$4.13	$1.61	$0.05	$0.46	$1.42	$0.38	$2.60	$10.63
2700	Market Development and Program Management	$1.37	$1.55	$0.00	$0.64	$3.09	$0.03	$0.54	$7.23
2800	External Affairs	$0.99	$0.38	$0.01	$0.11	$0.34	$0.09	$5.76	$7.69
Total Operations and Maintenance		$58.24	$22.87	$0.66	$6.55	$20.57	$5.30	$38.47	$152.66
	Percent	38.2%	15.0%	0.4%	4.3%	13.5%	3.5%	25.2%	100.0%

4.2 Functionalization of Capital Projects

As assignment of O&M was being conducted, all significant computer systems and other capital projects procured for use by CAISO staff in their day-to-day activities[11] were identified. A comprehensive listing of systems developed in the previous cost of service study was updated and is attached as **Appendix E[12]**. The CAISO built on and refined this list for 2007. Each bond-funded capital project has been identified for each outstanding bond issue[13]. For bond funds that had not yet been expended at the time of the study, the project plan was used to forecast future expenditures.

Once capital projects were identified, each project was functionalized to the CAISO functions. For the majority of projects, the methodology developed in the 2003 cost of service study was used or refined. There are five methods of functionalizing capital projects. These methods are briefly described in the following table.

Table 4
Methods of Assignment
Capital Projects

Method	Description
Direct	Assignment is based on the activities supported by the system. Cost center managers were consulted as to the function of the system and its assignment. Example: Energy Management System, Network Applications, Settlements and Market Clearing
FTE	Assignment is proportional to assignment of directly assigned cost centers. Example: HR systems, Local Area Network, Office Equipment
Calculated direct	Assignment is based on the underlying data flows. Examples: Scheduling Infrastructure and Business Rules, Wide Area Network, Oracle Licenses
Department direct	Assignment is based on the assignments of the departments that use the system. Examples: Data Warehouse, Department of Market Monitoring Tools, Treasury Workstation
System Direct	Assignment is based on the overall assignment of corporate systems. Examples: Backup systems, Application Development Tools, Security ISS

Assignments for capital from the previous cost of service study were reviewed and updated as necessary. In particular, the assignments for all systems related to Congestion Management (CONG) were updated. As CONG no longer exists as a separate function under MRTU, costs for any system assigned to CONG were reassigned to other functions. In the previous cost of service study, congestion management capital expenditures were assigned to Energy Transmission Services, Congestion Management and Market Usage. In the current cost of service study, those capital expenditures were reassigned to Energy

[11] In reality, the steps in the cost study are not sequential, but are conducted concurrently.
[12] A listing including a description of each capital project is located on the California ISO website at: http://www.caiso.com/1c86/1c86b75b5950.pdf.
[13] The CAISO has three bond issues outstanding from the years 2000, 2004 and 2007, totaling $520 million.

Transmission Services and Market Usage. Similarly, all other capital projects that contained an allocation to CONG were reassigned. The impact of this reassignment will be considered in Section 4 of this report.

Other significant changes include the refinements to data. The assignment of Scheduling Infrastructure is a function of number and type of schedules and bids processed. In this cost of service study, SI was assigned using numbers of schedules and Ancillary Services bids. The impact of this reassignment will be considered in Section 4 of this report.

Using the methods in Table 4, each capital project was functionalized. The result is a table showing each completed capital project and its functionalization. The cost and functionalization of each identified capital project is shown in **Appendix E**.

Capital expenditures are represented in the revenue requirement in two ways. To the extent that capital is bond-funded, the annual bond debt service reflects the cost of capital. The annual debt service should be functionalized using the underlying assignments of capital projects through cost-weighted average assignments. If the capital is financed from current revenue, then the each capital project can be separately assigned. Essentially, this is treating the expenditure as O&M for the purpose of assignment. The resulting cost-weighted allocations using 2008 Budgeted amounts are shown in **Table 5**.

Table 5
California Independent System Operator
2007 Cost of Service
Percentage Allocation by Bond Issue
Subject to both review and approval

	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
1998-2000 Bonds	29.96%	8.36%	0.31%	11.78%	16.47%	1.07%	32.05%	100.00%
2004 Bonds	16.20%	5.07%	0.17%	17.67%	10.90%	14.09%	35.90%	100.00%
2007 Bonds	13.44%	5.08%	0.15%	19.05%	10.48%	15.71%	36.09%	100.00%
2007 Cash Financed	77.04%	4.95%	0.66%	1.18%	7.33%	2.59%	6.27%	100.00%

The debt service costs (plus coverage) of each of the three bond issues and the 2007 cash-financed capital expenditures can be functionalized. The functionalization calculated from the factors in Table 5 for these four components of the revenue requirement are shown in **Table 6**.

Table 6
California Independent System Operator
2007 Cost of Service
Allocation by Bond Issue for Proposed 2008 Budget
Subject to both review and approval
(in millions)

	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
1998-2000 Bonds	$5.20	$1.45	$0.05	$2.05	$2.86	$0.19	$5.57	$17.37
2004 Bonds	$6.38	$1.99	$0.07	$6.95	$4.29	$5.55	$14.13	$39.35
2007 Bonds	$0.38	$0.14	$0.00	$0.53	$0.29	$0.44	$1.01	$2.80
2007 Cash Financed	$6.55	$0.42	$0.06	$0.10	$0.62	$0.22	$0.53	$8.50
Total Debt Service and Capital	$18.50	$4.01	$0.18	$9.63	$8.06	$6.39	$21.24	$68.02
Percent of Total	27.2%	5.9%	0.3%	14.2%	11.9%	9.4%	31.2%	100.0%

4.3 Functionalization of Expense Recovery Budget

The expense recovery budget consists of recurring revenues received by the CAISO other than GMC revenues, which are credited against the revenue requirement. Other revenues are defined in the Appendix F, Schedule 1, Part C as amounts that can "include but are not limited to application fees, WECC reliability coordinator reimbursements, Line Operator Charges, and fines assessed and collected by the ISO." Each revenue stream is reviewed to determine the assignment to CAISO function. Typical recurring revenues are SC application and training fees, WECC/NERC security coordinator reimbursement, COI Path Operator fee, the Large Generator Interconnection Project fees, and interest earnings.

SC application and training fees are assigned to the Settlements, Metering and Client Relations functions. The fees are partial cost recovery of the costs of company-client interactions, which are activities attributed to Settlements, Metering and Client Relations.

WECC/NERC security coordinator reimbursements are payments received to reimburse the CAISO for the cost of staffing security coordinators at the CAISO. The costs of these security coordinators are in cost center 2561, Reliability Coordination, which is assigned to Core Reliability Services.

The COI Path Operator fee is a reimbursement for the cost of operating the COI for the COI participants under the settlement agreement. The revenue is assigned to Core Reliability Services and Energy Transmission Services based on the overall proportion of Core Reliability Services and Energy Transmission Services in O&M.

Large Generator Interconnection Project fees are payments to recover the cost of providing planning and interconnection studies for new generator interconnections. The costs of these studies are paid directly by the project proponent. These revenues are assigned to Core Reliability Services to offset the budgeted costs in cost center 2241, Grid Assets.

Interest earnings are the earnings from corporate interest-bearing accounts. These revenues are an offset to general corporate expenses and are assigned based on the average assignment of O&M and capital projects before application of the expense recovery budget.

The functionalization of the expense recovery budget is shown in **Table 7**.

Table 7
California Independent System Operator
2007 GMC Cost Allocation Model
Subject to both review and approval
(in millions)

Functionalization of Expense Recovery Budget for Proposed 2008 Budget

	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
SC Application and Training Fees	$-	$-	$-	$-	$-	$-	$(0.35)	$(0.35)
WECC Reimbursement/NERC Reimbursement	$(2.30)	$-	$-	$-	$-	$-	$-	$(2.30)
COI Path Operator Fee	$(1.44)	$(0.56)	$-	$-	$-	$-	$-	$(2.00)
Large Generator Interconnection Project	$(0.97)	$-	$-	$-	$-	$-	$-	$(0.97)
Interest Earnings	$(0.77)	$(0.27)	$(0.01)	$(0.16)	$(0.29)	$(0.12)	$(0.60)	$(2.21)
Total Expense Recovery Budget	$(5.47)	$(0.83)	$(0.01)	$(0.16)	$(0.29)	$(0.12)	$(0.94)	$(7.81)
Percent of Total	70.0%	10.7%	0.1%	2.1%	3.7%	1.5%	12.0%	100.0%

4.4 Functionalization of Operating Reserve Credits

Per bond covenants, the CAISO must maintain a reserve account, Operating Reserve, equal to 15 percent of the next year's projected O&M expenses. The CAISO must also collect 125 percent of bond debt service (principal plus interest) annually. The additional 25 percent is used to fund the Operating Reserve. To the extent that the Operating Reserve is projected to exceed the required 15 percent of the projected O&M, the excess is applied to credit the next year's revenue requirement.

The CAISO tracks revenue by each Charge Type and aggregates these revenues by function. The Operating Reserve is calculated separately for each function and accumulates until the reserve becomes fully funded. For the year 2007, the expected Operating Reserve credit was $25.2 million. The functionalization of the Operating Reserve credit is shown in **Table 8**.

Table 8 California Independent System Operator 2007 GMC Cost Allocation Model Subject to both review and approval (in millions)								
Functionalization of Operating and Capital Reserves Credit for Proposed 2008 Budget								
	CRS	**ETS**	**CRS/ETS TOR**	**FS**	**MU**	**MU-FE**	**SMCR**	**Total**
	$(12.65)	$(1.86)	$(0.12)	$(2.82)	$0.40	$0.09	$(4.27)	$(21.23)
Percent of total	59.6%	8.7%	0.6%	13.3%	12.7%	4.3%	19.1%	100.0%

4.5 Cost of Service Results

Once each component of the revenue requirement is functionalized, the results are combined. The functionalization of each component and the total is shown in **Table 9**.

Table 9 California Independent System Operator 2007 GMC Cost Allocation Model Subject to both review and approval (in millions)								
Functionalization of 2008 Revenue Requirement								
	CRS	**ETS**	**CRS/ETS TOR**	**FS**	**MU**	**MU-FE**	**SMCR**	**Total**
Operations and Maintenance	$58.24	$22.87	$0.66	$6.55	$20.57	$5.30	$38.47	$152.66
Debt Service and Coverage	$18.50	$4.01	$0.18	$9.63	$8.06	$6.39	$21.24	$68.02
Expense Recovery Budget	$(5.47)	$(0.83)	$(0.01)	$(0.16)	$(0.29)	$(0.12)	$(0.94)	$(7.81)
Operating Reserve Credit	$(12.65)	$(1.86)	$(0.12)	$(2.82)	$0.39	$0.10	$(4.27)	$(21.23)
Total Revenue Requirement	$58.63	$24.19	$0.71	$13.20	$28.74	$11.68	$54.49	$191.64
Percent of Total	30.6%	12.6%	0.4%	6.9%	15.0%	6.1%	28.4%	100.0%

5.0 Development of CRS/ETS TOR and Market Usage – Forward Energy Allocations

The cost of service for both the CRS/ETS TOR and Market Usage – Forward Energy services was done after the initial release of cost of service results in June 2007. As the stakeholder process progressed, the cost of service for each was developed after consultation with stakeholders in order to avoid arbitrary allocation decisions. The analysis undertaken for each cost of service is similar to that described in Section 2.

5.1 Development of CRS/ETS TOR Allocation

This service for Transmission Ownership Rights is a combination of Core Reliability Services and Energy Transmission Services. This service includes both the nonscalable and scalable portions of Grid Reliability Services related to monitoring and supporting flows on TORs. TORs were considered as a group for purposes of performing this cost of service.

In determining the assignment of costs to this subfunction of Grid Reliability Services, Operations staff were consulted as to the services provided to TORs. As noted in companion document to this cost of service study, ***Revised MRTU Grid Management Charge Rate Proposal***, the CAISO provides three primary Grid Operations services to TORs. These are Real-Time Operations, Scheduling and Outage Coordination. Market Services also are provided, but in a manner consistent with those services provided to other market participants.

For Real-Time Operations, the CAISO provides support on an emergency basis for flows on TORs, in a manner similar to standby service. A common method to allocate costs for standby service is in proportion to the demands placed on the system. In this case, the non-coincident peak demand of TORs was measured relative to total system demand. The resulting fraction was used to assign a percentage of the costs of Real-Time Operations to this service.

For Scheduling, the CAISO provides check-outs with neighboring Balancing Authorities in order to track flows across boundaries. For this service, the assignment method was to use the ratio of the total number of schedules for TORs relative to the total number of schedules submitted to the CAISO.

For Outage Management, the CAISO provides for the scheduling and coordination of outages across the Balancing Authority. The assignment method was the number of TOR transmission outages relative to total CAISO transmission outages.

The resulting assignments were used to apportion the costs of these three services, which correspond to cost centers 2522, 2523 and 2524. In addition to these costs, a portion of the costs of the systems used by Grid Operations and the appropriate portion of non-direct costs were also allocated to the CRS/ETS TOR service.

The cost of this service could be recovered through an assessment on non-coincident peak demand or on a volumetric MWh basis. The volumetric bill determinant was chosen as TOR flows consist of exports, which are otherwise assessed CRS and ETS on a volumetric basis.

5.2 Development of Market Usage – Forward Energy Allocation

The development of the cost of service for the Market Usage – Forward Energy service proceeded in a manner similar to that of the CRS/ETS TOR service. The principal staff involved in the Day Ahead Market are under the Market Services department of the Operations division. The staff involved were directly assigned to this service. In addition to the direct assignments of staff, the costs of systems used to perform this service were allocated, along with the appropriate allocations of non-direct costs.

The cost of this service could be recovered from all bids into the Day Ahead Market or cleared bids on a per incident basis or a volumetric MWh basis. Consistent with the continuing practice of assessment only on cleared bids in Real Time, only cleared Day Ahead bids will be assessed this charge.

6.0 Conclusion

As noted throughout this report, the CAISO organizational structure has undergone significant changes since the last cost of service study was completed in 2003. The corporate realignment resulted in staff reassignments, and the formation of new cost centers and new responsibilities. Two new divisions were formed as a result of the realignment. Since 2003, the MRTU project has progressed significantly resulting in further reallocation of resources and capital expenditures on new systems. Two bonds issues to provide funding for MRTU and other capital expenditures have occurred over this period. The regulatory environment has also changed. State mandated resource adequacy programs have reduced the burden on CAISO Operations staff, while an emphasis on developing markets has increased those costs. The CAISO has assumed responsibility for generation planning in the Control Area. The CAISO has an increased focus on customer relations.

All these events have led to changes in cost assignments that are reflected in the cost of service study. As shown in this report, cost assignments for the Market Usage and Settlements, Metering and Client Relations function have increased due to the increased commitments in these areas.

APPENDIX A: Functionalization of Activity Groupings for ISO Rate Structure

Function	Sub-Function	Activities within proposed Grouping
Grid Reliability Services	Core Reliability Services (base level) Energy TransmissionServices (scalable portion)	Ancillary Services management: • Dispatch of energy associated with Ancillary Services or Resource Adequacy, including: o Regulation o Spin o Non-spin o Replacement reserve o Black start o Residual Unit Commitment Monitoring of system conditions and dispatching to maintain reliability: • Load and resource balancing • Transmission line/path congestion management • Voltage control • Frequency control • System emergency management • Power flow studies and security analyses Determination of resource adequacy in real time Coordinating Western Interconnection reliability with all WECC Reliability Coordinators Integration and communication with other Balancing Authorities: • Interconnected switching operations for planned and unplanned outages • Generation and transmission equipment outage coordination Interchange scheduling ETC scheduling and administration EMS and Telemetry management

APPENDIX A: Functionalization of Activity Groupings for ISO Rate Structure

Function	Sub-Function	Activities within proposed Grouping
Grid Reliability Services	Core Reliability Services (base level) Energy Transmission Services (scalable portion)	Day-ahead/HASP intertie scheduling • ETAG (NERC-required electronic schedule tagging) • Existing Transmission Contracts Calculator (ETCC) and scheduling • New Firm Uses (NFU) scheduling Reconciliation of schedules and interchange after-the-fact NERC/WECC/CAISO Tariff required reporting Weekly: • Inadvertent Interchange report • NERC reports (Inadvertent Interchange, ETAG) • WECC "donut" report Monthly: • WECC Unscheduled Flow curtailment report Quarterly: • Quarterly California Energy Commission 1305 report Annually: • SDG&E DOE report • FERC 714 report • Report of Economic Operation
Grid Reliability Services	Core Reliability Services (base level) Energy Transmission Services (scalable portion)	Pre-planning of and preparation for generation and transmission outages Generation and transmission equipment outage tracking and data/record keeping On-site generation outage monitoring (SB-39 compliance) Outage reporting (web site updates and regulatory agency reporting) Supply of Generation and Transmission data for OASIS postings

APPENDIX A: Functionalization of Activity Groupings for ISO Rate Structure

Function	Sub-Function	Activities within proposed Grouping
Grid Reliability Services	Core Reliability Services (base level) Energy Transmission Services (scalable portion)	Transmission Maintenance: • Develop, monitor and enforce of transmission maintenance standards • Manage and oversee new generation interconnections, major capacity additions or upgrades and supporting Transmission Planning in project tracking. • Manage, analyze, prepare reports on system availability, reliability, and outage records. • Manage, audit, investigate, approving Transmission Maintenance Practices. • Manage, oversee, and approve the equipment ratings. Operations Engineering: • Perform seasonal, annual, and, as necessary special analysis of transmission system performance and ratings. • Review, approve and provide specification on daily system configurations, emergency conditions, clearances and operational conditions. • Develop, prepare and update operating procedures. • Perform operational studies and system security analyses Operations Support: Manage the development, preparation and revision of all ISO Operating Procedures: • Transmission grid • Market Operations • Generation • Emergency • Perform generating unit ancillary service certification and P-MAX testing • Manage UDC and Inter-Balancing Area Operating agreements • Manage dynamic energy scheduling agreements and interfaces • Manage required WECC Reliability Management System (RMS) and NERC • Maintain Compliance Program data collection, tracking, storage and reporting processes

APPENDIX A: Functionalization of Activity Groupings for ISO Rate Structure

Function	Sub-Function	Activities within proposed Grouping
Grid Reliability Services	Core Reliability Services (base level) Energy Transmission Services (scalable portion)	Transmission Planning: • Perform system transmission planning to ensure overall reliability • Perform reserve requirement studies • Perform Long-term (monthly, annual and longer) load forecasting • Determine long term *transmission* resource adequacy Regional Coordination: • Coordinate participation in NERC, WECC, NAESB, ESC, and OSC • Monitor and participate in resolving seams issues in the Western Interconnection • Provide Balancing Area and interconnection mapping services to real time operations. Determine long-term *generation* resource adequacy: • Manage, develop, prepare, publish and participate in seasonal system load and generation assessments. • Participate, guide, influence, and maintain records on environmentally constrained generation units. • Determine dual fuel generator requirements Determine Reliability Must-Run ("RMR") contract requirements Review Participating Transmission Owners ("PTOs") Bulk Power Program and new generator or load interconnection studies
Grid Reliability Services	Core Reliability Services (base level)	Administration of RMR settlements Validation of Summer Reliability Generation invoices Development and implementation of Tariff modifications Maintenance of agreements with existing and new clients Meeting regulatory directives related to contract activities Non-vendor contract administration
Grid Reliability Services	Energy Transmission Services (scalable portion)	Evaluation of transmission capacity expansion Review and recommend changes to ISO rules and protocols Monitor and measure operational performance consistent with contractual commitments and Tariff requirements Ensure generator compliance with dispatch instructions and must offer requirements Administer ISO Oversight and Investigations Review

APPENDIX A: Functionalization of Activity Groupings for ISO Rate Structure

Function	Sub-Function	Activities within proposed Grouping
Market Services	Forward Scheduling	Manage transmission and generation schedules: • Day and HASP schedules (including Participating Intermittent Resources) • Determine schedule feasibility
Market Services	Market Usage	Manage congestion Day Ahead
Market Services	Market Usage	Monitoring and reporting on congestion management market performance Investigating and reporting on potential gaming and market power abuses (congestion)
Market Services	Market Usage	Perform weekly, daily and hourly load forecasting Operate A/S and Real-Time markets Determine market clearing prices (A/S and Energy) Mitigate bids (real time and forward) Maintenance of market information postings (transmission/market OASIS) Operate unit commitment service under SMD Mitigate market power in Day-Ahead Market, HASP and Real Time Market Develop and manage demand response participation Administer Congestion Revenue Rights: • Perform CRR allocation (Primary) • Coordinate CRR bilateral trading (Secondary) • Calculate and determine feasibility of CRR capacity
Market Services	Market Usage	Monitor and report on market performance Investigate and report on potential gaming and market abuses Perform special studies on market efficiency, bidding behavior Develop new market rules or changes to market rules in response to market behavior Prepare and provide reports to regulatory authorities Implement and calculate penalties and sanctions for noncompliance

APPENDIX A: Functionalization of Activity Groupings for ISO Rate Structure

Function	Sub-Function	Activities within proposed Grouping
Settlements, Metering and Client Relations		Determine charges associated with: • Transmission services • Day-Ahead schedules and markets (A/S and Energy) • HASP • Real time balancing energy market • Congestion management • Administrative charges, including the Grid Management Charge Manage settlement data Manage ETC manual settlements Prepare market and GMC invoices Prepare special invoices for FERC fees, interest, etc. Perform settlement statement reruns Market/settlements design and settlements training Dispute resolution, GFN, arbitration and monitoring Credit and collateral management • Manage collections and payments • SC financial security analysis Determination of losses and allocation Metering and data management • Collect and validate data from ISO polled meters • Repository of data polled from ISO polled meters and data submitted by SCs • Responsible for site inspection of metering sites • Responsible for setting up RIG data bases and submitting data into EMS • Push data to Settlement databases Manage Participating Intermittent Resources settlements

APPENDIX A: Functionalization of Activity Groupings for ISO Rate Structure

Function	Sub-Function	Activities within proposed Grouping
Settlements, Metering and Client Relations		Provide ISO Tariff, Systems, Market and Settlements guidance to market participants Communicate scheduled events to market participants Communicate Market information Develop training curriculum Provide training to Market Participants (Settlements, System Infrastructure, Market Design) Facilitate stakeholder process Facilitate resolution of Market Participant issues
Settlements, Metering and Client Relations		Administer ISO contracts (non-vendor, e.g., RMR, PTO, MSS) Negotiate, manage, litigate contracts
	Administrative and General (not directly assigned elsewhere	CEO Finance and Accounting (non-credit related portion) Legal HR Regulatory policy and affairs Information services Strategic development Communications

Appendix B
California Independent System Operator
Revised 2007 Cost of Service including CRS/ETS TOR and MU-Forward Energy
Subject to both review and approval

Assignment/Allocation Method for Non-IT Cost Centers

CC #	Cost Center	Description
2111	CEO-General	Allocated using overhead ratios
2121	Market Monitoring	Direct assignment
2122	Market Surveillance Committee (Non-labor costs only)	Direct assignment
2211	Planning and Infrastructure Development	Allocated using supervised cost centers in 2200
2221	Regional Transmission-North	Direct assignment
2231	Regional Transmission-South	Direct assignment
2241	Grid Assets	Direct assignment
2242	Generator Interconnections	Direct assignment
2251	Network Applications	Direct assignment
2311	CFO General	Allocated using supervised cost centers in 2300
2321	Accounting	Allocated using overhead ratios
2331	Financial Planning and Treasury	Allocated using overhead ratios; portion related to credit administration directly assigned
2341	Human Resources	Allocated proportional to FTE
2351	Facilities	Allocated proportional to FTE
2361	Procurement and Vendor Management	Allocated using overhead ratios
2371	Enterprise Risk Management	Allocated using overhead ratios
2372	Internal Audit	Allocated using overhead ratios
2373	Information Security	Proportional to directly allocated system applications
2374	Physical Security	Allocated proportional to FTE
2511	Operations-General	Allocated using supervised cost centers in 2500
2521	Grid Operations	Allocated using supervised cost centers in 2500
2522	Real-Time Operations	Direct assignment
2523	Scheduling	Direct assignment
2524	Outage Management	Direct assignment
2531	Alhambra Grid Operations	Direct assignment
2541	Market Services	Allocated using supervised cost centers in 2500
2542	Market Operations	Direct assignment
2543	Billing and Settlements	Direct assignment
2544	Settlement Projects	Direct assignment
2545	Market Information	Direct assignment
2551	Operations Support	Allocated using supervised cost centers in 2500
2552	Operations Data and Compliance	Direct assignment
2553	Operations Procedures and Training	Direct assignment
2554	Model & Contract Implementation	Direct assignment
2555	Information Engineering & Analysis	Direct assignment
2561	Reliability Coordination	Direct assignment
2611	General Counsel-General	Allocated using supervised cost centers in 2600
2621	Asst General Counsel-Corporate	Allocated using overhead ratios

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California Independent System Operator
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Assignment/Allocation Method for Non-IT Cost Centers

CC #	Cost Center	Description
2631	Asst General Counsel-Regulatory	Allocated using overhead ratios
2641	Asst General Counsel Tariff & Compliance	Allocated using overhead ratios
2651	Asst Corporate Secretary	Allocated using overhead ratios
2711	Market Development-Program Mgmt-General	Allocated using supervised cost centers in 2700
2721	Market and Product Development	Direct assignment
2722	Tariff and Regulatory/Policy Development	Direct assignment
2723	Infrastructure Policy & Contracts	Direct assignment
2731	Program Office	Allocated using overhead ratios
2741	MRTU Program	Allocated using MRTU assignment
2811	External Affairs-General	Allocated using supervised cost centers in 2800
2821	Communications & Public Relations	Allocated using overhead ratios
2822	Information Products & Services	Allocated using overhead ratios
2831	State/Federal Affairs	Allocated using overhead ratios
2841	Customer Services and Industry Affairs	Allocated using overhead ratios

Appendix C
California Independent System Operator
Revised 2007 Cost of Service including CRS/ETS TOR and MU-Forward Energy
Subject to both review and approval

Systems Supported by IT Cost Centers

	2412	2451	2453	2462	2463	2464
ACC Upgrades (Communication between ISO & IOUs)						
Ancillary Services Management (ASM) Component of SA						
Application Development Tools	X					
Automated Dispatch System (ADS)					X	
Automated Load Forecast System (ALFS)					X	
Automatic Mitigation Procedure (AMP)					X	
Backup systems (Legato/Quantum)	X					
Balance of Business Systems (BBS)					X	
Balancing Energy Ex Post Price (BEEP) Component of SA					X	
Bill's Interchange Schedule (BITS)					X	
CAISO Outage Modeling Tool (COMT)						
CaseWise (process modeling tool)						X
CHASE						X
Client Relations Tools						
Common Information Model (CIM)						
Compliance	X				X	
Congestion Management (CONG) Component of SA					X	
Congestion Reform-DSOW						
Congestion Revenue Rights (CRR)	X				X	
DataWarehouse						X
Dept. of Market Analysis Tools (SAS/MARS)	X					X

Appendix C
California Independent System Operator
Revised 2007 Cost of Service including CRS/ETS TOR and MU-Forward Energy
Subject to both review and approval

Systems Supported by IT Cost Centers

	2412	2451	2453	2462	2463	2464
Dispute Tracking System (Remedy)						X
Documentum	X					X
Electronic Tagging (Etag)					X	
Energy Management System (EMS)	X			X		
Engineering Analysis Tools	X					
Evaluation of Market Separation						
Existing Transmission Contracts Calculator (ETCC)					X	
FERC Study Software						
Firm Transmission Right (FTR) and Secondary Registration System (SRS)	X				X	
Global Resource Reliability Management Application (GRRMA)					X	
Grid Operations Training Simulator (GOTS)				X		
Hour-Ahead Data AnalysisTool, Day-Ahead Data AnalysisTool,						
Human Resources	X					
Outsourced Contracts	X	X				
Integrated Forward Market (IFM)	X					
Internal Development						
Interzonal Congestion Management reform - Real Time					X	
Land and Building Costs						
Local Area Network (LAN)	X		X			
Locational Marginal Pricing (LMPM)						
Market Quality System (MQS)						
Masterfile					X	

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Systems Supported by IT Cost Centers

	2412	2451	2453	2462	2463	2464
Meter Data Acquisition System (MDAS)	X				X	
Miscellaneous (2004 related capital)						
Monitoring (Tivoli)	X					
MRTU Capital	X					
Network Applications	X					
New Resource Interconnection (NRI)						
New System Equipment (replacement of owned equipment)	X					
NT/web servers	X	X				
NT-servers	X					
Office Automation - desktop/laptop (OA)	X					
Office equipment (scanner, printer, copier, fax, Communication Equip.)	X					
Open Access Same Time Information System (OASIS)					X	
Operational Meter Analysis and Reporting (OMAR)						
Oracle Corporate Financials	X					X
Oracle Enterprise Manager (OEM)						
Oracle Licenses	X					
Oracle Market Financials BBS						X
Out of Sequence Market Operation Settlements Information System (OOS)					X	
Outage Scheduler (OS)					X	
Participating Intermittent Resource Project (PIRP)	X				X	
Physical Facilities Software Application/Furniture/Leasehold Improvements	X					X
Portal						

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Systems Supported by IT Cost Centers

	2412	2451	2453	2462	2463	2464
Post Transaction Repository (PTR)						X
Process Information System (PI)	X			X		
Rational Buyer					X	
Real Time Energy Dispatch System (REDS)					X	
Real Time Nodal Market						
Reliability Management System (RMS)						
Remedy (related to Transmission Registry, New Resource Interconnection and Resource Registry)	X					X
Remote Intelligent Gateway (RIG) & Data Processing Gateway (DPG)						
Resource Adequacy						
Resource Register (RR)					X	
RMR Application Validation Engine (RAVE)	X				X	X
Scheduling & Logging for ISO California (SLIC)					X	
Scheduling & Tagging Next Generation (STiNG)	X					
Scheduling Architecture (SA)					X	
Scheduling Infrastructure (SI)					X	
Scheduling Infrastructure Business Rules (SIBR)						
Security Constrained Economic Dispatch (SCED)						
Security- External/Physical	X					X
Security-ISS (CUDA)	X					
Settlements and Market Clearing					X	X
Sign Board (Symon Board maint.)						
Startup Costs through 3/31/98, Working Capital-3 months						

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Systems Supported by IT Cost Centers

	2412	2451	2453	2462	2463	2464
Storage (EMC symmetrix)	X					
System Equipment Buyouts (lease buyouts)						
Tactical Emergency Management System (TEMS)						
Telephone/PBX	X	X	X			
Training Systems						
Transmission Constrained Unit Commitment (TCUC) Must Offer Obligation						
Transmission Map Plotting & Display	X					
Treasury Workstation/Investment Program						
Trustee Costs, Interest-Capitalized, User Groups						
Utilities - System i.e. Print drivers						
Vitria (Middleware)	X					
Wide Area Network (WAN)		X	X			

Appendix D
California Independent System Operator
Revised 2007 Cost of Service including CRS/ETS TOR and MU-Forward Energy
Subject to both review and approval

Operations and Maintenance Allocations

CC#	Cost Center	Method	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
2111	CEO-General	OH	38.89%	15.11%	0.44%	4.29%	13.32%	3.54%	24.42%	100.00%
2121	Market Monitoring	DA	22.40%	0.00%	0.00%	6.20%	46.69%	17.11%	7.61%	100.00%
2122	Market Surveillance Committee (Non-labor costs only)	DA	25.00%	0.00%	0.00%	0.00%	75.00%	0.00%	0.00%	100.00%
2211	Planning and Infrastructure Development	SCC	53.25%	46.76%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
2221	Regional Transmission-North	DA	57.67%	42.33%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
2231	Regional Transmission-South	DA	54.60%	45.40%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
2241	Grid Assets	DA	68.34%	31.66%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
2242	Generator Interconnections	DA	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
2251	Network Applications	DA	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
2311	CFO General	SCC	37.33%	14.40%	0.42%	3.97%	10.70%	5.12%	28.05%	100.00%
2321	Accounting	OH	38.89%	15.11%	0.44%	4.29%	13.32%	3.54%	24.42%	100.00%
2331	Financial Planning and Treasury	DA/OH	31.42%	12.20%	0.36%	3.46%	10.76%	2.86%	38.95%	100.00%
2341	Human Resources	FTE	40.85%	16.67%	0.47%	3.01%	10.06%	6.00%	22.94%	100.00%
2351	Facilities	FTE	40.85%	16.67%	0.47%	3.01%	10.06%	6.00%	22.94%	100.00%
2361	Procurement and Vendor Management	OH	38.89%	15.11%	0.44%	4.29%	13.32%	3.54%	24.42%	100.00%
2371	Enterprise Risk Management	SCC	34.73%	11.83%	0.38%	5.53%	9.35%	6.78%	31.40%	100.00%
2372	Internal Audit	OH	38.89%	15.11%	0.44%	4.29%	13.32%	3.54%	24.42%	100.00%
2373	Information Security	SD	23.53%	3.01%	0.22%	9.91%	6.42%	9.47%	47.44%	100.00%
2374	Physical Security	FTE	40.85%	16.67%	0.47%	3.01%	10.06%	6.00%	22.94%	100.00%
2411	Information Technology-General	SCC	35.13%	8.03%	0.35%	8.08%	11.07%	4.65%	32.69%	100.00%
2412	Asset Management (Non-Labor costs only)	DA	32.40%	9.79%	0.34%	7.51%	12.78%	5.37%	31.83%	100.00%
2421	IT Projects	SD	23.53%	3.01%	0.22%	9.91%	6.42%	9.47%	47.44%	100.00%
2431	IT Project Management	SD	23.53%	3.01%	0.22%	9.91%	6.42%	9.47%	47.44%	100.00%
2441	Software Quality Assurance	SD	23.53%	3.01%	0.22%	9.91%	6.42%	9.47%	47.44%	100.00%
2451	IT Support & Operations	DS	37.26%	10.02%	0.39%	9.71%	12.49%	2.34%	27.78%	100.00%

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Operations and Maintenance Allocations

CC#	Cost Center	Method	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
2452	System & Database Administration	SD	23.53%	3.01%	0.22%	9.91%	6.42%	9.47%	47.44%	100.00%
2453	Data Center & Operations	DS	40.24%	18.35%	0.49%	2.44%	14.15%	1.65%	22.70%	100.00%
2454	Architecture & Systems Engineering	SD	23.53%	3.01%	0.22%	9.91%	6.42%	9.47%	47.44%	100.00%
2462	EMS Information Technology	DS	94.09%	2.45%	0.80%	0.00%	1.33%	0.00%	1.33%	100.00%
2463	Operations Information Technology	DS	31.43%	9.40%	0.33%	13.67%	26.52%	0.00%	18.65%	100.00%
2464	Corporate Systems	DS	32.52%	10.30%	0.32%	1.22%	10.23%	1.92%	43.49%	100.00%
2511	Operations-General	SCC	46.52%	16.54%	0.75%	1.33%	15.19%	2.09%	17.58%	100.00%
2521	Grid Operations	SCC	68.53%	24.09%	1.42%	0.00%	5.96%	0.00%	0.00%	100.00%
2522	Real-Time Operations	DA	60.99%	29.70%	1.20%	0.00%	8.11%	0.00%	0.00%	100.00%
2523	Scheduling	DA	65.75%	32.87%	1.38%	0.00%	0.00%	0.00%	0.00%	100.00%
2524	Outage Management	DA	94.00%	0.37%	4.17%	0.00%	1.47%	0.00%	0.00%	100.00%
2531	Alhambra Grid Operations	DA	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
2541	Market Services	SCC	5.38%	0.00%	0.00%	5.03%	44.24%	7.90%	37.46%	100.00%
2542	Market Operations	DA	5.14%	0.00%	0.00%	13.08%	56.08%	20.56%	5.14%	100.00%
2543	Billing and Settlements	DA	12.57%	0.00%	0.00%	0.00%	0.00%	0.00%	87.44%	100.00%
2544	Settlement Projects	DA	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
2545	Market Information	DA	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
2551	Operations Support	SCC	38.68%	19.64%	0.00%	0.00%	1.76%	0.00%	39.92%	100.00%
2552	Operations Data and Compliance	DA	41.75%	0.00%	0.00%	0.00%	0.00%	0.00%	58.25%	100.00%
2553	Operations Procedures and Training	DA	63.23%	36.77%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
2554	Model & Contract Implementation	DA	35.54%	0.00%	0.00%	0.00%	8.77%	0.00%	55.69%	100.00%
2555	Information Engineering & Analysis	DA	8.80%	46.39%	0.00%	0.00%	0.00%	0.00%	44.82%	100.00%
2561	Reliability Coordination	DA	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
2611	General Counsel-General	SCC	38.89%	15.11%	0.44%	4.29%	13.32%	3.54%	24.42%	100.00%
2621	Asst General Counsel-Corporate	OH	38.89%	15.11%	0.44%	4.29%	13.32%	3.54%	24.42%	100.00%

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Operations and Maintenance Allocations

CC#	Cost Center	Method	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
2631	Asst General Counsel-Regulatory	OH	38.89%	15.11%	0.44%	4.29%	13.32%	3.54%	24.42%	100.00%
2641	Asst General Counsel Tariff & Compliance	OH	38.89%	15.11%	0.44%	4.29%	13.32%	3.54%	24.42%	100.00%
2651	Asst Corporate Secretary	OH	38.89%	15.11%	0.44%	4.29%	13.32%	3.54%	24.42%	100.00%
2711	Market Development-Program Mgmt-General	SCC	18.92%	21.45%	0.04%	8.86%	42.78%	0.43%	7.51%	100.00%
2721	Market and Product Development	DA	7.43%	14.86%	0.00%	7.43%	62.86%	0.00%	7.43%	100.00%
2722	Tariff and Regulatory/Policy Development	DA	0.00%	9.34%	0.00%	18.69%	71.97%	0.00%	0.00%	100.00%
2723	Infrastructure Policy & Contracts	DA	45.42%	44.49%	0.00%	0.00%	0.00%	0.00%	10.09%	100.00%
2731	Program Office	OH	38.89%	15.11%	0.44%	4.29%	13.32%	3.54%	24.42%	100.00%
2741	MRTU Program	DS	10.30%	4.25%	0.12%	19.93%	10.75%	16.19%	38.46%	100.00%
2811	External Affairs-General	SCC	12.89%	5.01%	0.15%	1.42%	4.41%	1.17%	74.96%	100.00%
2821	Communications & Public Relations	OH	38.89%	15.11%	0.44%	4.29%	13.32%	3.54%	24.42%	100.00%
2822	Information Products & Services	DA	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
2831	State/Federal Affairs	OH	38.89%	15.11%	0.44%	4.29%	13.32%	3.54%	24.42%	100.00%
2841	Customer Services and Industry Affairs	DA	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
2011	Other									

	Key to Method Acronyms
Direct Assignment	DA
Direct System	DS
Supervised cost center (directors/officers)	SCC
Allocated by personnel headcount	FTE
Overhead	OH
System Direct - Proportional to allocation of directly functionalized systems	SD

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ACC Upgrades (Communication between ISO & IOUs)	Direct	99.18%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	100.00%
Ancillary Services Management (ASM) Component of SA	Direct	14.88%	0.00%	0.12%	40.00%	45.00%	0.00%	0.00%	100.00%
Application Development Tools	System directs	23.53%	3.01%	0.22%	9.91%	6.42%	9.47%	47.44%	100.00%
Automated Dispatch System (ADS)	Direct	49.59%	0.00%	0.41%	25.00%	20.00%	0.00%	5.00%	100.00%
Automated Load Forecast System (ALFS)	Direct	69.42%	0.00%	0.58%	10.00%	20.00%	0.00%	0.00%	100.00%
Automatic Mitigation Procedure (AMP)	Direct	0.00%	84.30%	0.70%	0.00%	15.00%	0.00%	0.00%	100.00%
Backup systems (Legato/Quantum)	System directs	23.53%	3.01%	0.22%	9.91%	6.42%	9.47%	47.44%	100.00%
Balance of Business Systems (BBS)	Direct	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Balancing Energy Ex Post Price (BEEP) Component of SA	Direct	49.59%	2.83%	0.43%	20.00%	27.14%	0.00%	0.00%	100.00%
Bill's Interchange Schedule (BITS)	Direct	84.30%	0.00%	0.70%	0.00%	15.00%	0.00%	0.00%	100.00%
CAISO Outage Modeling Tool (COMT)	Direct	64.47%	1.42%	0.55%	15.00%	18.57%	0.00%	0.00%	100.00%
CaseWise (process modeling tool)	FTE	40.34%	19.26%	0.49%	1.52%	14.24%	1.70%	22.45%	100.00%
CHASE	FTE	40.34%	19.26%	0.49%	1.52%	14.24%	1.70%	22.45%	100.00%
Client Relations Tools	Direct	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Common Information Model (CIM)	Direct	99.18%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	100.00%
Compliance	Dept direct	41.75%	0.00%	0.00%	0.00%	0.00%	0.00%	58.25%	100.00%
Congestion Management (CONG) Component of SA	Direct	0.00%	28.34%	0.23%	0.00%	71.43%	0.00%	0.00%	100.00%

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Congestion Reform-DSOW	Direct	0.00%	63.76%	0.53%	0.00%	35.71%	0.00%	0.00%	100.00%
Congestion Revenue Rights (CRR)	Direct	0.00%	22.67%	0.19%	0.00%	77.14%	0.00%	0.00%	100.00%
DataWarehouse	Dept direct	31.59%	2.86%	0.00%	3.07%	18.90%	6.93%	36.65%	100.00%
Dept. of Market Analysis Tools (SAS/MARS)	Dept direct	22.40%	0.00%	0.00%	6.20%	46.69%	17.11%	7.60%	100.00%
Dispute Tracking System (Remedy)	Direct	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Documentum	FTE	40.34%	19.26%	0.49%	1.52%	14.24%	1.70%	22.45%	100.00%
Electronic Tagging (Etag)	Direct	99.18%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	100.00%
Energy Management System (EMS)	Direct	99.18%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	100.00%
Engineering Analysis Tools	Direct	59.51%	39.67%	0.82%	0.00%	0.00%	0.00%	0.00%	100.00%
Evaluation of Market Separation	Direct	0.00%	14.17%	0.12%	0.00%	85.71%	0.00%	0.00%	100.00%
Existing Transmission Contracts Calculator (ETCC)	Direct	24.79%	4.25%	0.24%	20.00%	30.71%	0.00%	20.00%	100.00%
FERC Study Software	Direct	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
Firm Transmission Right (FTR) and Secondary Registration System (SRS)	Direct	0.00%	17.00%	0.14%	15.00%	57.86%	0.00%	10.00%	100.00%
Global Resource Reliability Management Application (GRRMA)	Direct	74.38%	14.88%	0.74%	0.00%	10.00%	0.00%	0.00%	100.00%
Grid Operations Training Simulator (GOTS)	Direct	62.48%	36.70%	0.82%	0.00%	0.00%	0.00%	0.00%	100.00%
Hour-Ahead Data AnalysisTool, Day-Ahead Data AnalysisTool,	Direct	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%
Human Resources	FTE	40.34%	19.26%	0.49%	1.52%	14.24%	1.70%	22.45%	100.00%

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IBM Contract	Dept direct	34.79%	13.90%	0.40%	4.29%	11.66%	4.26%	30.69%	100.00%
Integrated Forward Market (IFM)	Direct	9.92%	0.00%	0.08%	35.00%	0.00%	55.00%	0.00%	100.00%
Internal Development	System directs	23.53%	3.01%	0.22%	9.91%	6.42%	9.47%	47.44%	100.00%
Interzonal Congestion Management reform - Real Time	Direct	0.00%	63.76%	0.53%	0.00%	35.71%	0.00%	0.00%	100.00%
Land and Building Costs	FTE	40.34%	19.26%	0.49%	1.52%	14.24%	1.70%	22.45%	100.00%
Local Area Network (LAN)	FTE	40.34%	19.26%	0.49%	1.52%	14.24%	1.70%	22.45%	100.00%
Locational Marginal Pricing (LMPM)	Direct	9.92%	0.00%	0.08%	35.00%	55.00%	0.00%	0.00%	100.00%
Market Quality System (MQS)	Direct	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Masterfile	Direct	19.84%	0.00%	0.16%	20.00%	55.00%	0.00%	5.00%	100.00%
Meter Data Acquisition System (MDAS)	Direct	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Miscellaneous (2004 related capital)	System directs	23.53%	3.01%	0.22%	9.91%	6.42%	9.47%	47.44%	100.00%
Monitoring (Tivoli)	System directs	23.53%	3.01%	0.22%	9.91%	6.42%	9.47%	47.44%	100.00%
MRTU Capital	Direct	12.68%	4.68%	0.14%	19.01%	10.75%	15.41%	37.33%	100.00%
Network Applications	Direct	0.00%	99.18%	0.82%	0.00%	0.00%	0.00%	0.00%	100.00%
New Resource Interconnection (NRI)	Direct	99.18%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	100.00%
New System Equipment (replacement of owned equipment)	System directs	23.53%	3.01%	0.22%	9.91%	6.42%	9.47%	47.44%	100.00%
NT/web servers	FTE	40.34%	19.26%	0.49%	1.52%	14.24%	1.70%	22.45%	100.00%

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NT-servers	FTE	40.34%	19.26%	0.49%	1.52%	14.24%	1.70%	22.45%	100.00%
Office Automation - desktop/laptop (OA)	FTE	40.34%	19.26%	0.49%	1.52%	14.24%	1.70%	22.45%	100.00%
Office equipment (scanner, printer, copier, fax, Communication Equip.)	FTE	40.34%	19.26%	0.49%	1.52%	14.24%	1.70%	22.45%	100.00%
Open Access Same Time Information System (OASIS)	Direct	9.92%	2.83%	0.11%	25.00%	42.14%	0.00%	20.00%	100.00%
Operational Meter Analysis and Reporting (OMAR)	Direct	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Oracle Corporate Financials	FTE	40.34%	19.26%	0.49%	1.52%	14.24%	1.70%	22.45%	100.00%
Oracle Enterprise Manager (OEM)	Calculated Direct	6.46%	0.68%	0.06%	43.90%	26.52%	0.00%	22.38%	100.00%
Oracle Licenses	Calculated Direct	6.46%	0.68%	0.06%	43.90%	26.52%	0.00%	22.38%	100.00%
Oracle Market Financials BBS	Direct	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Out of Sequence Market Operation Settlements Information System (OOS)	Direct	4.96%	4.96%	0.08%	0.00%	90.00%	0.00%	0.00%	100.00%
Outage Scheduler (OS)	Direct	49.59%	5.67%	0.46%	10.00%	34.29%	0.00%	0.00%	100.00%
Participating Intermittent Resource Project (PIRP)	Calculated Direct	0.00%	0.00%	0.00%	64.75%	35.25%	0.00%	0.00%	100.00%
Physical Facilities Software Application/Furniture/Leasehold Improvements	FTE	40.34%	19.26%	0.49%	1.52%	14.24%	1.70%	22.45%	100.00%
Portal	Direct	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Post Transaction Repository (PTR)	Direct	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Process Information System (PI)	Direct	79.34%	0.00%	0.66%	0.00%	10.00%	0.00%	10.00%	100.00%
Rational Buyer	Direct	99.18%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	100.00%

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Real Time Energy Dispatch System (REDS)	Direct	99.18%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	100.00%
Real Time Nodal Market	Direct	34.71%	0.00%	0.29%	10.00%	55.00%	0.00%	0.00%	100.00%
Reliability Management System (RMS)	Direct	99.18%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	100.00%
Remedy (related to Transmission Registry, New Resource Interconnection and Resource Registry)	Direct	99.18%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	100.00%
Remote Intelligent Gateway (RIG) & Data Processing Gateway (DPG)	Direct	99.18%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	100.00%
Resource Adequacy	Direct	99.18%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	100.00%
Resource Register (RR)	Direct	99.18%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	100.00%
RMR Application Validation Engine (RAVE)	Direct	99.18%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	100.00%
Scheduling & Logging for ISO California (SLIC)	Direct	64.47%	1.42%	0.55%	15.00%	18.57%	0.00%	0.00%	100.00%
Scheduling & Tagging Next Generation (STiNG)	Direct	84.30%	0.00%	0.70%	0.00%	15.00%	0.00%	0.00%	100.00%
Scheduling Architecture (SA)	Calculated Direct	15.51%	12.00%	0.23%	19.99%	52.27%	0.00%	0.00%	100.00%
Scheduling Infrastructure (SI)	Calculated Direct	0.00%	0.00%	0.00%	64.75%	35.25%	0.00%	0.00%	100.00%
Scheduling Infrastructure Business Rules (SIBR)	Calculated Direct	0.00%	0.00%	0.00%	64.75%	35.25%	0.00%	0.00%	100.00%
Security Constrained Economic Dispatch (SCED)	Direct	0.00%	39.67%	0.33%	0.00%	60.00%	0.00%	0.00%	100.00%
Security- External/Physical	FTE	40.34%	19.26%	0.49%	1.52%	14.24%	1.70%	22.45%	100.00%
Security-ISS (CUDA)	System directs	23.53%	3.01%	0.22%	9.91%	6.42%	9.47%	47.44%	100.00%
Settlements and Market Clearing	Direct	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%

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Sign Board (Symon Board maint.)	FTE	40.34%	19.26%	0.49%	1.52%	14.24%	1.70%	22.45%	100.00%
Startup Costs through 3/31/98, Working Capital-3 months	FTE	40.34%	19.26%	0.49%	1.52%	14.24%	1.70%	22.45%	100.00%
Storage (EMC symmetrix)	Calculated Direct	24.87%	6.18%	0.21%	13.62%	17.62%	4.11%	33.40%	100.00%
System Equipment Buyouts (lease buyouts)	Calculated Direct	44.00%	1.00%	0.00%	7.00%	11.00%	0.00%	37.00%	100.00%
Tactical Emergency Management System (TEMS)	Direct	99.18%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	100.00%
Telephone/PBX	FTE	40.34%	19.26%	0.49%	1.52%	14.24%	1.70%	22.45%	100.00%
Training Systems	System directs	23.53%	3.01%	0.22%	9.91%	6.42%	9.47%	47.44%	100.00%
Transmission Constrained Unit Commitment (TCUC) Must Offer Obligation	Direct	0.00%	99.18%	0.82%	0.00%	0.00%	0.00%	0.00%	100.00%
Transmission Map Plotting & Display	Direct	49.59%	49.59%	0.82%	0.00%	0.00%	0.00%	0.00%	100.00%
Treasury Workstation/Investment Program	Dept direct	40.21%	19.26%	0.49%	1.81%	15.60%	2.00%	20.62%	100.00%
Trustee Costs, Interest-Capitalized, User Groups	Calculated Direct	17.40%	2.96%	0.17%	17.81%	19.94%	0.03%	41.69%	100.00%
Utilities - System i.e. Print drivers	System directs	23.53%	3.01%	0.22%	9.91%	6.42%	9.47%	47.44%	100.00%
Vitria (Middleware)	System directs	23.53%	3.01%	0.22%	9.91%	6.42%	9.47%	47.44%	100.00%
Wide Area Network (WAN)	Calculated Direct	38.26%	0.93%	0.32%	19.89%	12.46%	0.63%	27.51%	100.00%