

California Independent System Operator  
2011 Cost of Service  
Functionalization of ISO System Applications

<b><u>Sheet Index:</u></b>	<b><u>Description</u></b>	<b><u>Updated for 2011?</u></b>
<u>System descriptions</u>	Listing of the ISO systems identified and a brief description of the system.	No
<u>Summary</u>	Listing of the ISO systems with their functionalization	No
<u>Assignment 2007 bonds</u>	Summary of the functionalization of capital expenditures funded by the 2007 bonds	No
<u>Assignment 2008 bonds</u>	Summary of the functionalization of capital expenditures funded by new money portion of 2008 bonds	Yes - revised allocation of funds to systems based on actual spending.
<u>Assignment 2009 bonds</u>	Summary of the functionalization of capital expenditures funded by new money portion of 2009 bonds	new
<u>Assignment 2011 cash</u>	Summary of the functionalization of revenue (cash) funded capital expenditures funded in 2011	Yes
<u>Summary Allocation</u>	Summary table showing the functionalization of each identified system	No
<b>Worksheets</b>		
<u>Oracle License Worksheet</u>	Worksheet showing functionalization of Oracle licensing costs	No
<u>EMC Worksheet</u>	Worksheet showing functionalization of EMC	Yes
<u>EMC Storage</u>	Worksheet showing EMC storage by system	Yes
<u>WAN Worksht 1</u>	Functionalization by system using the internal and external WAN costs	Yes
<u>WAN Worksht 2</u>	Assignment by system using EMC storage as allocator for internal WAN costs and number and type of Connected Entity for external WAN costs	Yes
<u>WAN Worksht 3</u>	Worksheet showing EMC storage allocaiton to assign WAN costs to functions	Yes
<u>WAN Worksht 4</u>	Worksheet showing number of Connected Entities	No

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Listing of Systems**

System	Description
ACC Upgrades (Communication between ISO & IOUs)	Original Cost of Startup and Trust to pay for the upgrade of the IOU's Communications systems between the ISO and the IOU. For EMS and Real time information
Ancillary Services Management (ASM) Component of SA	Ancillary Service Management is the method of procuring A/S through the market, which are scheduled and provided to the RT desks. There are regular discussions with MPs through CS as to the operation of ASM. Allocation based on system traffic information.
Application Development Tools	Various third party software applications used for internal application development and maintenance of ISO systems.
Automated Dispatch System (ADS)	System developed for clear indisputable dispatch instructions from the ISO to SC's and /or resources. Will send electronic notification, receive acknowledgement and log the transaction. Allocation determined that it provides Grid ops with advance information on incs and decs needed so can load follow and so 50%; relates to markets and scheduling at 25/20%; requires working with SCs and affects settlements so 5% CS; automatically logs accepted and rejected bids
Automated Load Forecast System (ALFS)	Automated Load Forecast System is used for DA load forecasting. It is used by Grid Ops for reserve procurement in the forward market and in getting ready for the needs during the next day. Thus 70% of its costs are assigned to CRS. Since it applies to the forward market it affects MU and, to a lesser degree, scheduling, at 20% and 10% respectively.
Automatic Mitigation Procedure (AMP)	A procedure for mitigating market power at both the system and local levels by mitigating the prices bid into the ISO's Energy and Ancillary Services Markets. The AMP limits bid prices to the extent that they (a) vary significantly (beyond specified thresholds) from historic bidding behavior; and (b) significantly increase (beyond specified thresholds) the Market Clearing Price. Part of the SA application.
Backup systems (Legato/Quantum)	Hardware and Software to provide ability to Back up ISO systems, providing the ability to recover data for all ISO system in case of a system failure. Backups are done everyday and retained forever, as well as being stored off site. Impacts on all operating systems, allocate based on total costs of operational systems
Balance of Business Systems (BBS)	Original name for the Settlements and interfaces to the Market Financial system. Application that generates the daily settlement statements and creates the information for the consolidated invoicing and calculates information for the GMC invoice. 100% SMCR
Balancing Energy Ex Post Price (BEEP) Component of SA	Balancing Energy Ex-Post Pricing ranks balancing energy bids and is run by generation dispatchers. It is a RT tool but it processes bids received by MU and affects scheduling and congestion. Allocation evaluation based on system traffic information
Bill's Interchange Schedule (BITS)	Bill's Interchange Schedule is a bridging produce that takes the final HA schedule and makes it available for the RT operators to view, helping with RT schedule management. This program allows Real-time Schedulers to track and calculate the dynamic Interchange values between the ISO control area and neighboring control areas. The net Interchange values represent the amount of energy that California may import or export across a specific Intertie for a given hour. It also provides the meter values for settlements. Thus 85% of its costs are assigned to CRS. 15% to MU (since it applies to the HA market)..
CAISO Outage Modeling Tool (COMT)	Automated processing of planned and unplanned outage information from SLIC into the Network Model providing the State Estimator and market simulation tools with accurate information. Assigned similarly to SLIC.
CaseWise (process modeling tool)	Third party software for Business Process Modeling and publishing, also allows for Fact Modeling to help define Business requirements of a business unit. Process modeling is being required for the full company. Considered an Enterprise application.
CHASE	C.H.A.S.E. - Change management, Help desk, Asset management, Service Level Agreements, Employee Life Cycle - This is a highly customized system using Remedy out of the box applications. Enterprise system to manage listed items. All employees have access.
Client Relations Tools	Applications used to improve communication with customers and issue tracking.
Common Information Model (CIM)	Developed for use with the current EMS system. Standard based on XML language. Defines electrical data , electrical network model. Used for communicating data between systems.
Compliance	Compliance applications produces automated programs to process Penalties and Ancillary Services adjustment to schedules based on a well defined set of rules. Compliance applications use a rule technology for the execution of business logic. Results are forwarded to settlement where prices are applied.
Congestion Management (CONG) Component of SA	Congestion Management is a forward market product but the RT desk uses its results. It is basically a congestion management tool, although it processes input from MU and requires explanations to CAISO customers on a regular basis. Its costs are assigned base on system traffic information.
DataWarehouse	The Data Warehouse uses a classic architecture composed of Operational Data Stores (ODSs), Data Marts (DMs), an On-Line Analytical Processing (OLAP) repository built on a Multidimensional Database Management System, batch load processes, a Metadata Repository (MDR) that manages the load process, and a set of best-of-breed reporting tools. The Data Warehouse provides the ability to analyze, report, query, and source non-real-time information to end users and second-tier applications with minimal impact to the critical operational systems. Used mainly by Compliance and Department of Market Analysis applications at this time.
Dept. of Market Analysis Tools (SAS/MARS)	Maintains key market data for ex post analysis. The data allows increased monitoring and analysis of transactions and scheduling, exports/import patterns by individual market participants, and regional energy markets. This data is critical to market analysis and is comprised of primary data from ISO departments as well as unique custom data that is designed, generated, and maintained by DMA staff. DMA uses several reporting tools to complete their work. They are Market Analysis Reporting System (MARS) and Statistical Analysis System (SAS). Essbase Data Mining Tool. and Plexos.
Dispute Tracking System (Remedy)	Online Settlement Dispute Program for SC to dispute Settlement statement, and for Client Relations to track, manage and record and communicate resolution of these items.
Documentum	Enterprise document management system (EDMS). Documentum was selected by the CAISO in 1999 to serve as the corporate EDMS. In addition to the base product, the CAISO uses AutoRender Pro to automate the generation of Adobe Acrobat renditions, DocInput for storing scanned hardcopies, and DocLoader for loading multiple files in a single transaction. These tools will continue to be used as the CAISO's information and record retention policies are implemented.
Electronic Tagging (Etag)	Electronic Tagging (E-tag) is the NERC Policy 3 mandated communication protocol for the creation, distribution and aproval of interchange transaction requests.
Energy Management System (EMS)	Energy Management System (EMS) is a collection of software and Hardware that monitor, evaluate and control the power systems lines, loads and generators within the ISO Control Area.
Engineering Analysis Tools	Custom developed tools for ISO Engineering group analysis as required to complete various function at the ISO.

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Listing of Systems**

System	Description
Evaluation of Market Separation	Report that quantifies the benefit of Market Separation rule the enforces allocation of transmission capacity. Must modify congestion code, and recalculate congestion changes for 1999. Market separation affects procurement of A/S and congestion split 50-50 Cong and MU
Existing Transmission Contracts Calculator (ETCC)	Existing Transmission Contracts (ETC's) are not subject to congestion management and can be scheduled later than other transmission. Therefore by use of the Existing Transmission Contracts Calculator program the ISO can forecast individual transmission line capacities based on the scheduling, outages and computations of existing transmission contracts (ETC). The ETCC results are utilized for the pre-scheduling of transmission, the determination of a total transmission capacity, the amount of FTR's for Day-Ahead/Hour-Ahead markets, and the establishment of scheduling rights for Real-Time Scheduling. This application has a major effect on the operations of the RT desk, on congestion management, and requires a lot of interaction with individual customers.
Global Resource Reliability Management Application (GRRMA)	Global Reliability Resource Management Application is the ISO's Reliability Must Run (RMR) scheduling tool. It allows the user to schedule Day Ahead, Hour Ahead, and Real Time local reliability energy instructions. Additionally, the dispatcher can call on a contracted RMR unit to provide Ancillary Services in the event that market has not provided the necessary percentage required. Application used to address RMR operations, which are control area operations. It does not do dispatch calculations or unit commitment but provides information on RMR. GO and MO have estimated that 75% of GRRMA's costs should be assigned to CRS, 15% to ETS (because of the scalability of the data file to the number of RMR units, 10% to MU because it affects the market, and 0% to SMCR there are regular interactions with SCs and generators on RMR activity but no direct interface to Settlements.
Grid Operations Training Simulator (GOTS)	Grid Operations Training Simulator is used for training RT operators. Its costs are assigned to CRS and E&TS on a 63/37 basis, the current allocation of the Operations Training group.
Hour-Ahead Data AnalysisTool, Day-Ahead Data AnalysisTool,	Developed Tool for Day/Hour-ahead desk to make informed decision on A/S purchases in a timely manner. To eliminate manual work around. Tool also aids in the data entry to SA, to help eliminate errors.
Human Resources	Human Resources Software applications the tracks employees and benefits and has a payroll module, for our in-house payroll system.
IBM Contract	Service Contract to supply people for desk side and set-up support for all ISO PC's, Help desk support, Operational system monitoring.Level one support for Connected Entities (CE) for AT&T connections, and LAN monitoring.
Integrated Forward Market (IFM)	The ISO's Day-Ahead and Hour-Ahead Market that simultaneously performs resource commitment, congestion management, energy market clearing and A/S procurement to minimize total bid cost. This system will provide RUC, Day Ahead Schedules & validation. RUC, CRS 10%, DA schedules & Validation 35%, Forward Market 55%
Internal Development	Cost for ISO employees that work on Capital Projects during the year. GAAP required reclassification.
Interzonal Congestion Management reform - Real Time	FERC request, report to quantify the Intra / Inter-Zonal cost across zones. Also RMR costs in real time and forward markets & how cost relates to zonal definition. Affects congestion and congestion management in RT by Grid Ops, so 50/50 split
Land and Building Costs	This is the cost of purchasing land and preliminary design cost for the property located on Iron Point Road.
Local Area Network (LAN)	Local Area Network is the physical communications cabling and network equipment that carry digital data communications between ISO user computers and Enterprise Servers and out to the Internet. Previously managed by MCI, now being done internally.
Locational Marginal Pricing (LMPM)	The market price for energy at a specific location on the transmission grid ("node") that represents the cost of serving one additional MWh of load at that node. The nodal LMP includes the cost of system energy, congestion and transmission losses. Same as "Nodal Price."
Market Quality System (MQS)	An application that performs post-market accounting, calculations and meter data corrections to reduce invoicing errors and disputes. Reduces manual validation, verification and correction of transactional data that could affect market settlements. Assigned 100% to SMCR.
Masterfile	An ISO data bank used to store information on each Scheduling Coordinator, Transmission Owner, Generation Owner and Control Area that does business with the ISO. Also, the specific file within that database associated with a particular entity.
Meter Data Acquisition System (MDAS)	MDAS is the collective name for all the Original metering systems MV-90 and MV-STAR. MV-90 is a licensed proprietary system from ITRON-UTS that allows for the collection, validation, editing, storage and transfer of meter data from a wide range of meters and recording devices that the ISO reads. This system gathers non-SC provided meter data, packages it into Settlement Quality Meter Data (SQMD) and sends the data to OMAR. MV-STAR functions have been replaced by the OMAR application.
Miscellaneous (2004 related capital)	Represents the amount determined to cover maintenance costs for software and hardware for items approved during 2004 Capital period.
Monitoring (Tivoli)	Monitoring software system, that is used to monitor and report the health of all applications at the ISO. Use system direct allocation.
MRTU Capital	Represents the rolled up allocations from the new applications that are being created for MRTU. Most applications are listed separately. The cost assignment from this application will be used on general MRTU costs, such as project management.
Network Applications	Network applications include the State Estimator, contingency analysis, Dispatcher Load Flow, Voltage Security Assessment and Dynamic Stability Analysis. These applications are used to model the transmission system in Real Time and for planning and training purposes. Typically considered as part of EMS.
New Resource Interconnection (NRI)	The NRI application was developed to allow for tracking of Generation, QF conversion, and Transmission interconnection projects from original initiation to completion or termination of ISO required activities. This application also enables the ISO to monitor and track Generator Interconnection application activities of the Developer and Participating Transmission Owners as required by FERC Order implementing Tariff Amendment No. 39.
New System Equipment (replacement of owned equipment)	Capital purchase to replace already owned equipment. This is for non desktop equipment, so allocated on system direct, costs.
NT/web servers	Servers the are running the applications that allow the ISO to communicate with the Internet.
NT-servers	Refers to Servers that are using the Network Technology (NT) platform and using Windows 2000 operating system. These servers run third party applications for Email, Microsoft Office, and other company wide applications, non operational applications.
Office Automation - desktop/laptop (OA)	Non operational applications, and equipment for all desktop systems. Includes Outlook, Microsoft Office, etc. Hardware and Software Maintenance for these systems.



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System	Description
Office equipment (scanner, printer, copier, fax, Communication Equip.)	Capital costs for the purchase of non computer hardware.
Open Access Same Time Information System (OASIS)	Open Access Same-Time Information System was created to ensure that any interested parties might have access to ISO market and transmission information through standardized electronic means on a non-discriminatory basis. The OASIS website, provides open access via a database which is automatically synchronized with the content of the online SI database. The user interface of OASIS conforms to the OASIS standard of query/response interaction and provides advance downloading functionality in CSV and XML formats. As such, it provides a customer service. However, pieces of it are used by Grid Ops, particularly outage information, load forecasting, and ATC. It reflects the results of the state of the market and is used to make decisions about scheduling. Thus the assignment is 10% CRS, 25% scheduling, 10% congestion, 35% MU, and 20% CS.
Operational Meter Analysis and Reporting (OMAR)	This Oracle-based database serves as the Settlement Quality Meter Data (SQMD) repository for the electrical usage data for the state of California. Data is accepted from the MV90 system and the SC's. Daily pushes and extracts of the SQMD are performed for Settlements, Compliance, Market Analysis, and the Data Warehouse. Master File and Schedule data are imported nightly. The system uses this data to flag data anomalies, identify occurrences of missing meter data, graph and view system data, and perform a preliminary calculation of potential UFE. OMAR-online is a web-based method of submitting and viewing SQMD also to check on the status of their meter data file submissions over the Internet that using software digital certificate security and encryption.
Oracle Corporate Financials	ISO Corporate Accounting System, includes the following modules for General Ledger, Account Payable, Account Receivable, Purchasing, Project Accounting, Fixed Assets, Budget, and Cash Management.
Oracle Enterprise Manager (OEM)	Utility used by our Data Base Administrator (DBA) to monitor and manage all the ISO Oracle Databases
Oracle Licenses	Oracle Licenses that are needed for most of our applications/ database infrastructure. Used by most of the Operational applications.
Oracle Market Financials BBS	Oracle Accounting applications, only using the General Ledger, Accounts Payable, Accounts Receivable modules for invoicing and payment processing for the Market Settlements process. Highly customized.
Out of Sequence Market Operation Settlements Information System (OOS)	Out of Sequence Market Operation Settlements Information System is the system for logging out-of-market (OOM) and out of sequence (OOS) for the BEEP dispatcher activity for settlement purposes, so 80% of its costs are attributable to CS. Its use is a function of the activities of RT operators, who are forced to go outside the market, so 5% of its costs are assigned to CRS and 5% to ETS, reflecting the variability of the use of OOM resources. It does affect scheduling, which is assigned 90% of its costs.
Outage Scheduler (OS)	Outage Scheduler. It records information on available generation so that when the market is run, available generation is known. It makes sure that energy is not dispatched that is not available and also provides input to assure appropriate congestion management. MU uses it to rejects bids for A/S and Energy that cannot be delivered. Its costs are assigned 50% to CRS, 10% to scheduling, and 20% each to congestion and MU.
Participating Intermittent Resource Project (PIRP)	This project created an application and modified existing applications to accommodate Scheduling Coordinator with wind base Intermittent Resources, to submit Energy Schedules contemporaneously with other types of resources. As a result of Amendment 42 of the ISO Tariff. SC will receive near real-time, state of the art wind generation forecasts, they will match their Hour-Ahead Energy Schedules to these forecasts in order to attain preferred schedules which are excluded from the assessment of hourly uninstructed deviations penalties on a daily basis. Instead the deviation penalty will be on a monthly basis.
Physical Facilities Software Application/Furniture/Leasehold Improvements	All locations, leasehold improvement, furniture and software to manage physical facilities.
Portal	The Portal allows access to Market Applications along with CAISO reports. Additionally, industry related news and links will be available through the Portal. The implementation of the Portal provides: • A single location to access ISO Market Applications • A common look and feel across the ISO Market Applications • A single digital certificate (per user) for all ISO Market Applications
Post Transaction Repository (PTR)	PTR is an application that manages all post-operational market data prior to being settled.
Process Information System (PI)	Process Information System is an historical part of EMS that records what generation units actually provide. Also maintains operation data, transmission, and AGC data from EMS system. Information is used by Compliance to determine penalties that information is passed to Settlements for billing. CRS 80%, 10% MU, 10% CS
Rational Buyer	Internally developed application that works with SA's ASM, to optimize the selection of A/S to procure the lowest price for services.
Real Time Energy Dispatch System (REDS)	Internally developed tool to handle manual dispatching information if system isn't functioning, to be able to create data after the fact for Expected Energy and Market Clearing price. Also allows the Market Quality good reports for reviewing information in case of disputes. Also allows us to audit and validate information generated from the BEEP part of SA.
Real Time Nodal Market	Real-time dispatching project that introduces the full network model and constraints into the real-time dispatching tools. This project will ensure that Locational Marginal Prices will be produced in real-time.
Reliability Management System (RMS)	Reliability Management System: WECC mandated performance criteria reporting system.
Remedy (related to Transmission Registry, New Resource Interconnection and Resource Registry)	Remedy Corporation application called Action Request system (ARS) is an application development environment. This has been used by the ISO to build customized application for various uses at the ISO. Allocation done based on Licenses and what systems they are being used in.
Remote Intelligent Gateway (RIG) & Data Processing Gateway (DPG)	Remote Intelligent Gateway (RIG), is equipment that is located at Generator sites that gather information about the generator and transmit to the ISO and to the generator from the ISO when we send a signals of MW set points for AGC control from the ISO EMS either direct or through the ISO Master RIG. The DPG is a device is a one way communication device for the ISO to receive informatin about generation. Originally RIG's where referred to as GCP's (Generator Communication Project) Costs related matters are assigned 100% to CRS because they involve interaction by RT personnel and AGC of generators.
Resource Adequacy	Tools to support and comply with the CPUC's Resource Adequacy program. Applications affected include SCUC (TCUC), interface tables for Settlements data, Settlements, and Compliance. The Resource Adequacy program provides that sufficient resources will be available to meet the expected peak demand, ensuring reliability in the Control Area.

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System	Description
Resource Register (RR)	The Resource Registry is a custom built Remedy application developed and maintained by the Enterprise Applications Group at the ISO. The purpose of the Resource Registry is to provide a data repository for the following information: Participating Generator Agreements/Participating Load Agreements; Reliability Must Run (RMR) Test Data; AGC Pre-Test Data; Ancillary Services (AS) Certification data; A View of Business Associate Master File (MF) data
RMR Application Validation Engine ( RAVE)	RMR Application Validation Tool customized third party tool, that allows the RMR analysts to eliminate manual work around, run validation in batch at night to save time and provide a database to store all RMR invoices. This tool also provides SC credit validation, which is the past-published values that were used to validate the owner supplied RMR invoice values of SC Credit.
Scheduling & Logging for ISO California (SLIC)	While SLIC (Scheduling & Logging for ISO California) was traditionally used for logging, it has been upgraded to allow generation SCs to enter outage information, including derates, which are used by the RT desk for operations. Outage information collected in SLIC is utilized by numerous ISO systems including SI, GRRMA, ETCC and EMS. All events that impact the electricity grid are logged into SLIC to provide full reporting and disclosure consistent with our tariff. Its information will affect scheduling and MU. Customers will use it as well. <b>Its costs are assigned 65% to CRS, 15% to scheduling, 5% to congestion, and 15% to MU.</b>
Scheduling & Tagging Next Generation (STiNG)	STiNG was the project to develop Control Area Scheduler (CAS), an interchange transaction scheduling system to replace BITS. CAS interfaces with E-tag software.
Scheduling Architecture (SA)	Scheduling Application is composed of BEEP, CONG, ASM, and miscellaneous small systems. Allocation is weighted average, based on traffic for the BEEP and ASM as CONG will not exist under MRTU.
Scheduling Infrastructure (SI)	Scheduling Infrastructure provides the means by which Market Participants submit & retrieve schedules & bid data. SI provides data interfaces with SC's EMS, SA and Settlements for daily statements. Base of allocation is on a system traffic analysis.
Scheduling Infrastructure Business Rules (SIBR)	The SIBR application will validate SC bids and offers as well as perform processing of bids and offers post validation. The SIBR application will publish validated bids and offers data for consumption by other CAISO applications within a stipulated time period after the market closes.
Security Constrained Economic Dispatch (SCED)	SCED will minimize the real-time cost of Imbalance Energy, determined from Energy bids submitted by participating resources, subject to transmission, nomogram and resource capability constraints, while accounting for transmission losses. The constraints will initially be enforced zonally.
Security- External/Physical	ISO Corporate security equipment, for all Folsom and Alhambra locations. Includes camera's card readers, hand readers, and monitoring equipment.
Security-ISS (CUDA)	Information/Cyber Security - Enterprise-wide information/cyber security program that provides the security infrastructure, procedures, and policies for the CAISO IT Infrastructure. This includes the Public Key Infrastructure (PKI); Enterprise Security Manager (ESM); and intrusion detection to ensure Confidentiality, Integrity, and Availability of CAISO systems.
Settlements and Market Clearing	The Settlements System and Market Clearing System (SaMC) provides an integrated automated solution to manage manages the CAISO settlement, billing, invoice, credit, and market clearing tasks. Replacement for current Settlement and Market Financial systems. Current system is unable to handle the new requirements.
Sign Board (Symon Board maint.)	Provides OASIS information and activity to ISO personnel, via a reader board displayed in various locations in ISO buildings
Startup Costs through 3/31/98, Working Capital-3 months	All costs for startup of the ISO, salaries and expense from June 1997 to July 1, 1998, when 1st payment for GMC received.
Storage (EMC symmetrix)	Dedicated Hardware that provides consolidated disk storage for multiple ISO database and applications. Three EMC products are currently used to provide storage, the Symmetrix, Clariion, Celerra. Allocation based on amount of storage currently being used by applications.
System Equipment Buyouts (lease buyouts)	Purchase of expiring equipment leases for hardware that still has several years of usage left. Allocated based on the system that it is supporting.
Tactical Emergency Management System (TEMS)	TEMS is a custom application developed specifically to manage emergency event information whether the Emergency Operations Center is activated or not. Use of this application is at the discretion of the Executive in Charge.
Telephone/PBX	Third party costs for regular telephone, cell phone, pager costs. Telecommunication system which allows internal and external voice communications.
Training Systems	Hardware and software for stand alone system to train ISO employees on new applications or changes to existing applications before deploying to production.
Transmission Constrained Unit Commitment (TCUC) Must Offer Obligation	TCUC is the application that is used to comply with the FERC June 19th & 25th Orders. This tool is used in the economic evaluation and decision-making process in which the ISO grants and denies Must Offer Waiver requests.
Transmission Map Plotting & Display	Transmission Map Plotting & Display - Our Transmission Map Plotting and Display system is used to create a set of detailed transmission maps for use by the Transmission Dispatchers, Operations Engineers and Transmission Planners. The primary use is in real-time operations to access the locations of reported fires and how close the fires are to the transmission lines. Obviously to do this function we need accurate geographic information about the transmission facilities and the location of the fires. The second use to mark damages to the lines caused by earthquakes, airplanes, storms, etc. The Operations Engineers and Planners also use the maps as a part of their grid planning and analysis work. They need to know where the lines are located and possible routes for new lines and for the location of new generating facilities that need to be hooked up to the grid. <b>CRS 50%, ETS 50%</b>
Treasury Workstation/Investment Program	Software or hardware that allows more efficient tracking and reporting of the CAISO investment portfolio.
Trustee Costs, Interest-Capitalized, User Groups	Start up costs for non-ISO employees from Dec. 1996 - July, 1998
Utilities - System i.e. Print drivers	Part of EMC storage usage for various system utilities.
Vitria (Middleware)	Third party software applications that allows different system to pass data between them without having to do application specific customizations. (also referred to as Enterprise Application Integration -EAI bus)
Wide Area Network (WAN)	The ISO Communication secure network. Previously supplied by MCI, being replaced by an AT&T network. This is the physical communication lines and equipment that carry digital data and voice communication between CAISO Data Centers and between the CAISO and Connected Entities (all Market participants that participate in the market through connections to the ISO such as Generators, Scheduling Coordinators, and Revenue Meters connects).

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Allocation by Bond Issue

	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
2007 Bonds	13.3%	3.9%	0.1%	20.0%	8.9%	19.7%	34.1%	100.0%
2008 Bonds	22.7%	9.3%	0.3%	13.0%	11.9%	12.1%	30.7%	100.0%
2009 Bonds	40.9%	16.7%	0.5%	3.0%	10.1%	6.0%	22.9%	100.0%
2011 Cash Financed	26.7%	10.7%	0.3%	17.6%	18.2%	7.1%	19.5%	100.0%



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System	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
ACC Upgrades (Communication between ISO & IOUs)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Ancillary Services Management (ASM) Component of SA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Application Development Tools	\$ 144,609	\$ 54,949	\$ 1,640	\$ 112,817	\$ 74,894	\$ 118,215	\$ 242,875	\$ 750,000
Automated Dispatch System (ADS)	\$ 453,854	\$ -	\$ 3,763	\$ 228,808	\$ 183,047	\$ -	\$ 45,762	\$ 915,234
Automated Load Forecast System (ALFS)	\$ 653,075	\$ -	\$ 5,415	\$ 94,070	\$ 188,140	\$ -	\$ -	\$ 940,700
Automatic Mitigation Procedure (AMP)	\$ -	\$ 141,344	\$ 1,172	\$ -	\$ 25,150	\$ -	\$ -	\$ 167,666
Backup systems (Legato/Quantum)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Balance of Business Systems (BBS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Balancing Energy Ex Post Price (BEEP) Component of SA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Bill's Interchange Schedule (BITS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
CAISO Outage Modeling Tool (COMT)	\$ 231	\$ 5	\$ 2	\$ 54	\$ 67	\$ -	\$ -	\$ 359
CaseWise (process modeling tool)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
CHASE	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Client Relations Tools	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 794,736	\$ 794,736
Common Information Model (CIM)	\$ 495,889	\$ -	\$ 4,111	\$ -	\$ -	\$ -	\$ -	\$ 500,000
Compliance	\$ 146,437	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 204,321	\$ 350,759
Congestion Management (CONG) Component of SA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Congestion Reform-DSOW	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Congestion Revenue Rights (CRR)	\$ -	\$ 1,064,869	\$ 8,829	\$ -	\$ 3,623,731	\$ -	\$ -	\$ 4,697,429
DataWarehouse	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Dept. of Market Analysis Tools (SAS/MARS)	\$ 369,524	\$ -	\$ -	\$ 102,262	\$ 770,417	\$ 282,321	\$ 125,476	\$ 1,650,000
Dispute Tracking System (Remedy)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Documentum	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Electronic Tagging (Etag)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Energy Management System (EMS)	\$ 7,377,249	\$ -	\$ 61,166	\$ -	\$ -	\$ -	\$ -	\$ 7,438,415
Engineering Analysis Tools	\$ 625,843	\$ 417,229	\$ 8,648	\$ -	\$ -	\$ -	\$ -	\$ 1,051,720
Evaluation of Market Separation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Existing Transmission Contracts Calculator (ETCC)	\$ 7,414	\$ 1,271	\$ 72	\$ 5,980	\$ 9,184	\$ -	\$ 5,980	\$ 29,900
FERC Study Software	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Firm Transmission Right (FTR) and Secondary Registration System (SRS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Global Resource Reliability Management Application (GRRMA)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Grid Operations Training Simulator (GOTS)	\$ 468,615	\$ 275,218	\$ 6,167	\$ -	\$ -	\$ -	\$ -	\$ 750,000
Hour-Ahead Data AnalysisTool, Day-Ahead Data AnalysisTool,	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Human Resources	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
IBM Contract	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Integrated Forward Market (IFM)	\$ 2,079,923	\$ -	\$ 17,245	\$ 7,340,089	\$ -	\$ 11,534,426	\$ -	\$ 20,971,683
Internal Development	\$ 289,219	\$ 109,898	\$ 3,281	\$ 225,633	\$ 149,788	\$ 236,431	\$ 485,750	\$ 1,500,000
Interzonal Congestion Management reform - Real Time	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Land and Building Costs	\$ 532,315	\$ 254,167	\$ 6,521	\$ 20,095	\$ 187,844	\$ 22,411	\$ 296,209	\$ 1,319,562
Local Area Network (LAN)	\$ 834,451	\$ 398,430	\$ 10,222	\$ 31,501	\$ 294,462	\$ 35,130	\$ 464,334	\$ 2,068,530
Locational Marginal Pricing (LMPM)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Market Quality System (MQS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 6,461,030	\$ 6,461,030
Masterfile	\$ 323,023	\$ -	\$ 2,678	\$ 325,701	\$ 895,678	\$ -	\$ 81,425	\$ 1,628,506
Meter Data Acquisition System (MDAS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 85,656	\$ 85,656

**California Independent System Operator  
2011 Cost of Service  
Listing of Systems**

System	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
Miscellaneous (2004 related capital)	\$ 968,521	\$ 368,021	\$ 10,987	\$ 755,589	\$ 501,603	\$ 791,746	\$ 1,626,653	\$ 5,023,121
Monitoring (Tivoli)	\$ 64,960	\$ 24,684	\$ 737	\$ 50,678	\$ 33,643	\$ 53,104	\$ 109,102	\$ 336,908
MRTU Capital	\$ 6,647,245	\$ 2,451,802	\$ 73,091	\$ 9,960,691	\$ 5,635,479	\$ 8,073,723	\$ 19,561,294	\$ 52,403,326
Network Applications	\$ -	\$ 4,704,888	\$ 39,009	\$ -	\$ -	\$ -	\$ -	\$ 4,743,898
New Resource Interconnection (NRI)	\$ 1,207,740	\$ -	\$ 10,014	\$ -	\$ -	\$ -	\$ -	\$ 1,217,753
New System Equipment (replacement of owned equipment)	\$ 793,231	\$ 301,414	\$ 8,998	\$ 618,837	\$ 410,820	\$ 648,450	\$ 1,332,250	\$ 4,114,000
NT/web servers	\$ 95,327	\$ 45,516	\$ 1,168	\$ 3,599	\$ 33,639	\$ 4,013	\$ 53,045	\$ 236,307
NT-servers	\$ 423,794	\$ 202,351	\$ 5,191	\$ 15,999	\$ 149,549	\$ 17,842	\$ 235,822	\$ 1,050,548
Office Automation - desktop/laptop (OA)	\$ 344,938	\$ 164,699	\$ 4,225	\$ 13,022	\$ 121,722	\$ 14,522	\$ 191,942	\$ 855,070
Office equipment (scanner, printer, copier, fax, Communication Equip.)	\$ 148,175	\$ 70,750	\$ 1,815	\$ 5,594	\$ 52,288	\$ 6,238	\$ 82,453	\$ 367,313
Open Access Same Time Information System (OASIS)	\$ 56,199	\$ 16,057	\$ 599	\$ 141,663	\$ 238,803	\$ -	\$ 113,330	\$ 566,651
Operational Meter Analysis and Reporting (OMAR)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,035,803	\$ 1,035,803
Oracle Corporate Financials	\$ 1,399,802	\$ 668,372	\$ 17,148	\$ 52,844	\$ 493,964	\$ 58,932	\$ 778,927	\$ 3,469,987
Oracle Enterprise Manager (OEM)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Oracle Licenses	\$ 33,289	\$ 606	\$ 281	\$ 9,547	\$ 10,429	\$ -	\$ 16,584	\$ 70,736
Oracle Market Financials BBS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Out of Sequence Market Operation Settlements Information System (OOS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Outage Scheduler (OS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Participating Intermittent Resource Project (PIRP)	\$ -	\$ -	\$ -	\$ 1,132,382	\$ 616,375	\$ -	\$ -	\$ 1,748,757
Physical Facilities Software Application/Furniture/Leasehold Improvements	\$ 783,234	\$ 373,975	\$ 9,595	\$ 29,568	\$ 276,388	\$ 32,974	\$ 435,835	\$ 1,941,569
Portal	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 587,859	\$ 587,859
Post Transaction Repository (PTR)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 473,304	\$ 473,304
Process Information System (PI)	\$ 603,027	\$ -	\$ 5,000	\$ -	\$ 76,003	\$ -	\$ 76,003	\$ 760,034
Rational Buyer	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Real Time Energy Dispatch System (REDS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Real Time Nodal Market	\$ 607,463	\$ -	\$ 5,037	\$ 175,000	\$ 962,500	\$ -	\$ -	\$ 1,750,000
Reliability Management System (RMS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Remedy (related to Transmission Registry, New Resource Interconnection and Resource Registry)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Remote Intelligent Gateway (RIG) & Data Processing Gateway (DPG)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Resource Adequacy	\$ 238,992	\$ -	\$ 1,982	\$ -	\$ -	\$ -	\$ -	\$ 240,973
Resource Register (RR)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
RMR Application Validation Engine ( RAVE)	\$ 26,140	\$ -	\$ 217	\$ -	\$ -	\$ -	\$ -	\$ 26,357
Scheduling & Logging for ISO California (SLIC)	\$ 1,893,723	\$ 41,620	\$ 16,046	\$ 440,636	\$ 545,550	\$ -	\$ -	\$ 2,937,576
Scheduling & Tagging Next Generation (STING)	\$ 220,444	\$ -	\$ 1,828	\$ -	\$ 39,225	\$ -	\$ -	\$ 261,497
Scheduling Architecture (SA)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Scheduling Infrastructure (SI)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Scheduling Infrastructure Business Rules (SIBR)	\$ -	\$ -	\$ -	\$ 3,102,899	\$ 1,688,962	\$ -	\$ -	\$ 4,791,862
Security Constrained Economic Dispatch (SCED)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Security- External/Physical	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Security-ISS (CUDA)	\$ 79,713	\$ 30,289	\$ 904	\$ 62,188	\$ 41,284	\$ 65,163	\$ 133,879	\$ 413,420
Settlements and Market Clearing	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 10,963,014	\$ 10,963,014
Sign Board (Symon Board maint.)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Startup Costs through 3/31/98, Working Capital-3 months	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Storage (EMC symmetrix)	\$ 867,159	\$ 229,367	\$ 8,214	\$ 444,593	\$ 597,669	\$ 315,686	\$ 1,267,190	\$ 3,729,877



**California Independent System Operator  
2011 Cost of Service  
Listing of Systems**

System	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
System Equipment Buyouts (lease buyouts)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Tactical Emergency Management System (TEMS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Telephone/PBX	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Training Systems	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Transmission Constrained Unit Commitment (TCUC) Must Offer Obligation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Transmission Map Plotting & Display	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Treasury Workstation/Investment Program	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Trustee Costs, Interest-Capitalized, User Groups	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Utilities - System i.e. Print drivers	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Vitria (Middleware)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Wide Area Network (WAN)	\$ 121,110	\$ 2,653	\$ 1,022	\$ 58,805	\$ 35,638	\$ 851	\$ 83,863	\$ 303,942
<b>Total</b>	\$ 32,425,896	\$ 12,414,448	\$ 364,039	\$ 25,561,144	\$ 18,963,934	\$ 22,312,179	\$ 48,451,706	\$ 160,493,346
<b>Percent of Total</b>	20.20%	7.74%	0.23%	15.93%	11.82%	13.90%	30.19%	100.00%

**California Independent System Operator  
2011 Cost of Service  
Listing of Systems**

System	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
ACC Upgrades (Communication between ISO & IOUs)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Ancillary Services Management (ASM) Component of SA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Application Development Tools	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Automated Dispatch System (ADS)	\$ 81,938	\$ -	\$ 679	\$ 41,308	\$ 33,047	\$ -	\$ 8,262	\$ 165,234
Backup systems (Legato/Quantum)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Balance of Business Systems (BBS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Balancing Energy Ex Post Price (BEEP) Component of SA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Bill's Interchange Schedule (BITS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
CAISO Outage Modeling Tool (COMT)	\$ 231	\$ 5	\$ 2	\$ 54	\$ 67	\$ -	\$ -	\$ 359
CaseWise (process modeling tool)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
CHASE	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Client Relations Tools	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Common Information Model (CIM)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Compliance	\$ 62,940	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 87,819	\$ 150,759
Congestion Management (CONG) Component of SA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Congestion Reform-DSOW	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Dept. of Market Analysis Tools (SAS/MARS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Dispute Tracking System (Remedy)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Documentum	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Electronic Tagging (Etag)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Energy Management System (EMS)	\$ 402,745	\$ -	\$ 3,339	\$ -	\$ -	\$ -	\$ -	\$ 406,084
Engineering Analysis Tools	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Evaluation of Market Separation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Existing Transmission Contracts Calculator (ETCC)	\$ 7,414	\$ 1,271	\$ 72	\$ 5,980	\$ 9,184	\$ -	\$ 5,980	\$ 29,900
FERC Study Software	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Grid Operations Training Simulator (GOTS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Hour-Ahead Data AnalysisTool, Day-Ahead Data AnalysisTool,	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Human Resources	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
IBM Contract	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Integrated Forward Market (IFM)	\$ 1,180,856	\$ -	\$ 9,791	\$ 4,167,263	\$ -	\$ 6,548,556	\$ -	\$ 11,906,465
Internal Development	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Interzonal Congestion Management reform - Real Time	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Land and Building Costs	\$ 532,315	\$ 254,167	\$ 6,521	\$ 20,095	\$ 187,844	\$ 22,411	\$ 296,209	\$ 1,319,562
Local Area Network (LAN)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Locational Marginal Pricing (LMPM)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Market Quality System (MQS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,121,381	\$ 3,121,381
Masterfile	\$ 13,380	\$ -	\$ 111	\$ 13,491	\$ 37,099	\$ -	\$ 3,373	\$ 67,454
Meter Data Acquisition System (MDAS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Miscellaneous (2004 related capital)	\$ 20,175	\$ 7,666	\$ 229	\$ 15,739	\$ 10,449	\$ 16,493	\$ 33,884	\$ 104,635
Monitoring (Tivoli)	\$ 63,586	\$ 24,162	\$ 721	\$ 49,607	\$ 32,932	\$ 51,981	\$ 106,795	\$ 329,783
MRTU Capital	\$ 3,069,714	\$ 1,132,248	\$ 33,754	\$ 4,599,871	\$ 2,602,478	\$ 3,728,465	\$ 9,033,452	\$ 24,199,981
Network Applications	\$ -	\$ 47,209	\$ 391	\$ -	\$ -	\$ -	\$ -	\$ 47,600
New Resource Interconnection (NRI)	\$ 487,780	\$ -	\$ 4,044	\$ -	\$ -	\$ -	\$ -	\$ 491,825

**California Independent System Operator  
2011 Cost of Service  
Listing of Systems**

System	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
New System Equipment (replacement of owned equipment)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
NT/web servers	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
NT-servers	\$ 196,867	\$ 93,999	\$ 2,412	\$ 7,432	\$ 69,471	\$ 8,288	\$ 109,548	\$ 488,016
Office Automation - desktop/laptop (OA)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Office equipment (scanner, printer, copier, fax, Communication Equip.)	\$ 61,562	\$ 29,394	\$ 754	\$ 2,324	\$ 21,724	\$ 2,592	\$ 34,256	\$ 152,607
Open Access Same Time Information System (OASIS)	\$ 36,364	\$ 10,390	\$ 388	\$ 91,663	\$ 154,517	\$ -	\$ 73,330	\$ 366,651
Operational Meter Analysis and Reporting (OMAR)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 35,803	\$ 35,803
Oracle Corporate Financials	\$ 248,835	\$ 118,813	\$ 3,048	\$ 9,394	\$ 87,809	\$ 10,476	\$ 138,466	\$ 616,841
Oracle Enterprise Manager (OEM)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Oracle Licenses	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Oracle Market Financials BBS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Out of Sequence Market Operation Settlements Information System (OOS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Outage Scheduler (OS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Participating Intermittent Resource Project (PIRP)	\$ -	\$ -	\$ -	\$ 10,203	\$ 5,554	\$ -	\$ -	\$ 15,757
Physical Facilities Software Application/Furniture/Leasehold Improvements	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Portal	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Post Transaction Repository (PTR)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 226,019	\$ 226,019
Process Information System (PI)	\$ 3,994	\$ -	\$ 33	\$ -	\$ 503	\$ -	\$ 503	\$ 5,034
Rational Buyer	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Real Time Energy Dispatch System (REDS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Real Time Nodal Market	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Reliability Management System (RMS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Remedy (related to Transmission Registry, New Resource Interconnection and Resource Registry)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Remote Intelligent Gateway (RIG) & Data Processing Gateway (DPG)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Resource Adequacy	\$ 238,992	\$ -	\$ 1,982	\$ -	\$ -	\$ -	\$ -	\$ 240,973
Resource Register (RR)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
RMR Application Validation Engine ( RAVE)	\$ 26,140	\$ -	\$ 217	\$ -	\$ -	\$ -	\$ -	\$ 26,357
Scheduling & Logging for ISO California (SLIC)	\$ 4,884	\$ 107	\$ 41	\$ 1,136	\$ 1,407	\$ -	\$ -	\$ 7,576
Scheduling & Tagging Next Generation (STING)	\$ 220,444	\$ -	\$ 1,828	\$ -	\$ 39,225	\$ -	\$ -	\$ 261,497
Scheduling Architecture (SA)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Scheduling Infrastructure (SI)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Scheduling Infrastructure Business Rules (SIBR)	\$ -	\$ -	\$ -	\$ 1,456,309	\$ 792,695	\$ -	\$ -	\$ 2,249,004
Security Constrained Economic Dispatch (SCED)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Security- External/Physical	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Security-ISS (CUDA)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Settlements and Market Clearing	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,586,112	\$ 4,586,112
Sign Board (Symon Board maint.)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Startup Costs through 3/31/98, Working Capital-3 months	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Storage (EMC symmetrix)	\$ 48,932	\$ 12,943	\$ 463	\$ 25,088	\$ 33,725	\$ 17,814	\$ 71,505	\$ 210,471
System Equipment Buyouts (lease buyouts)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Tactical Emergency Management System (TEMS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Telephone/PBX	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Training Systems	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -



**California Independent System Operator  
2011 Cost of Service  
Listing of Systems**

System	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
Transmission Constrained Unit Commitment (TCUC) Must Offer Obligation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Transmission Map Plotting & Display	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Treasury Workstation/Investment Program	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Trustee Costs, Interest-Capitalized, User Groups	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Utilities - System i.e. Print drivers	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Vitria (Middleware)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Wide Area Network (WAN)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total</b>	\$ 7,016,821	\$ 2,030,628	\$ 73,349	\$ 10,517,926	\$ 4,680,780	\$ 10,407,074	\$ 17,972,698	\$ 52,699,276
<b>Percent of Total</b>	13.31%	3.85%	0.14%	19.96%	8.88%	19.75%	34.10%	100.00%

**California Independent System Operator  
2011 Cost of Service  
Listing of Systems**

System	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
ACC Upgrades (Communication between ISO & IOUs)								
Ancillary Services Management (ASM) Component of SA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Application Development Tools								
Automated Dispatch System (ADS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Backup systems (Legato/Quantum)								
Balance of Business Systems (BBS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Balancing Energy Ex Post Price (BEEP) Component of SA								
Bill's Interchange Schedule (BITS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
CAISO Outage Modeling Tool (COMT)								
CaseWise (process modeling tool)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
CHASE								
Client Relations Tools	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 594,736	
Common Information Model (CIM)								
Compliance	\$ 83,498	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 116,502	
Congestion Management (CONG) Component of SA								
Congestion Reform-DSOW	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Congestion Revenue Rights (CRR)								
DataWarehouse	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Dept. of Market Analysis Tools (SAS/MARS)								
Dispute Tracking System (Remedy)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Documentum								
Electronic Tagging (Etag)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Energy Management System (EMS)								
Engineering Analysis Tools	\$ 30,777	\$ 20,518	\$ 425	\$ -	\$ -	\$ -	\$ -	
Evaluation of Market Separation								
Existing Transmission Contracts Calculator (ETCC)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
FERC Study Software								
Grid Operations Training Simulator (GOTS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Hour-Ahead Data AnalysisTool, Day-Ahead Data AnalysisTool,								
Human Resources	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
IBM Contract								
Integrated Forward Market (IFM)	\$ 750,301	\$ -	\$ 6,221	\$ 2,647,826	\$ -	\$ 4,160,870	\$ -	
Internal Development								
Interzonal Congestion Management reform - Real Time	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Land and Building Costs								
Local Area Network (LAN)	\$ 834,451	\$ 398,430	\$ 10,222	\$ 31,501	\$ 294,462	\$ 35,130	\$ 464,334	
Locational Marginal Pricing (LMPM)								
Market Quality System (MQS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,139,649	
Masterfile								
Meter Data Acquisition System (MDAS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 85,656	
Miscellaneous (2004 related capital)								
Monitoring (Tivoli)	\$ 1,374	\$ 522	\$ 16	\$ 1,072	\$ 711	\$ 1,123	\$ 2,307	
MRTU Capital								

**California Independent System Operator  
2011 Cost of Service  
Listing of Systems**

System	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
Network Applications	\$ -	\$ 3,665,903	\$ 30,395	\$ -	\$ -	\$ -	\$ -	
New Resource Interconnection (NRI)								
New System Equipment (replacement of owned equipment)	\$ 426,887	\$ 162,210	\$ 4,842	\$ 333,035	\$ 221,088	\$ 348,972	\$ 716,967	
NT/web servers								
NT-servers	\$ 226,927	\$ 108,352	\$ 2,780	\$ 8,567	\$ 80,078	\$ 9,554	\$ 126,275	
Office Automation - desktop/laptop (OA)								
Office equipment (scanner, printer, copier, fax, Communication Equip.)	\$ 46,273	\$ 22,094	\$ 567	\$ 1,747	\$ 16,329	\$ 1,948	\$ 25,749	
Open Access Same Time Information System (OASIS)								
Operational Meter Analysis and Reporting (OMAR)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 500,000	
Oracle Corporate Financials								
Oracle Enterprise Manager (OEM)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Oracle Licenses								
Oracle Market Financials BBS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Out of Sequence Market Operation Settlements Information System (OOS)								
Outage Scheduler (OS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Participating Intermittent Resource Project (PIRP)								
Physical Facilities Software Application/Furniture/Leasehold Improvements	\$ 742,894	\$ 354,714	\$ 9,100	\$ 28,045	\$ 262,153	\$ 31,276	\$ 413,387	
Portal								
Post Transaction Repository (PTR)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 247,284	
Process Information System (PI)								
Rational Buyer	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Real Time Energy Dispatch System (REDS)								
Real Time Nodal Market	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Reliability Management System (RMS)								
Remedy (related to Transmission Registry, New Resource Interconnection and Resource Registry)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Remote Intelligent Gateway (RIG) & Data Processing Gateway (DPG)								
Resource Adequacy	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Resource Register (RR)								
RMR Application Validation Engine ( RAVE)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Scheduling & Logging for ISO California (SLIC)								
Scheduling & Tagging Next Generation (STING)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Scheduling Architecture (SA)								
Scheduling Infrastructure (SI)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Scheduling Infrastructure Business Rules (SIBR)								
Security Constrained Economic Dispatch (SCED)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Security- External/Physical								
Security-ISS (CUDA)	\$ 79,713	\$ 30,289	\$ 904	\$ 62,188	\$ 41,284	\$ 65,163	\$ 133,879	
Settlements and Market Clearing								
Sign Board (Symon Board maint.)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Startup Costs through 3/31/98, Working Capital-3 months								
Storage (EMC symmetrix)	\$ 818,227	\$ 216,424	\$ 7,750	\$ 419,505	\$ 563,943	\$ 297,873	\$ 1,195,684	
System Equipment Buyouts (lease buyouts)								
Tactical Emergency Management System (TEMS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	



California Independent System Operator  
2011 Cost of Service  
Listing of Systems

System	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
Telephone/PBX								
Training Systems	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Transmission Constrained Unit Commitment (TCUC) Must Offer Obligation								
Transmission Map Plotting & Display	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Treasury Workstation/Investment Program								
Trustee Costs, Interest-Capitalized, User Groups	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Utilities - System i.e. Print drivers								
Vitria (Middleware)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Wide Area Network (WAN)								
Total	\$ 19,143,337	\$ 7,877,919	\$ 218,060	\$ 10,917,548	\$ 9,995,558	\$ 10,239,489	\$ 25,902,159	\$ 84,294,070
Percent of Total	22.71%	9.35%	0.26%	12.95%	11.86%	12.15%	30.73%	100.00%

**Note:**  
Data is masked as not all projects have been contracted for.

California Independent System Operator  
2011 Cost of Service  
Listing of Systems

	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
Allocation from 2011 Facilities Cost Center	40.9%	16.7%	0.5%	3.0%	10.1%	6.0%	22.9%	100.0%
Total 2009 Bond Dollars	\$ 81,706,000	\$ 33,330,000	\$ 946,000	\$ 6,026,000	\$ 20,116,000	\$ 12,002,000	\$ 45,874,000	\$ 200,000,000
Total	\$ 81,706,000	\$ 33,330,000	\$ 946,000	\$ 6,026,000	\$ 20,116,000	\$ 12,002,000	\$ 45,874,000	\$ 200,000,000
Percent of Total	40.85%	16.67%	0.47%	3.01%	10.06%	6.00%	22.94%	100.00%

**California Independent System Operator  
2011 Cost of Service  
Listing of Systems**

System	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
ACC Upgrades (Communication between ISO & IOUs)								
Ancillary Services Management (ASM) Component of SA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Application Development Tools								
Automated Dispatch System (ADS)	\$ 371,916	\$ -	\$ 3,084	\$ 187,500	\$ 150,000	\$ -	\$ 37,500	\$ 750,000
Backup systems (Legato/Quantum)								
Balance of Business Systems (BBS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Balancing Energy Ex Post Price (BEEP) Component of SA								
Bill's Interchange Schedule (BITS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
CAISO Outage Modeling Tool (COMT)								
CaseWise (process modeling tool)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
CHASE								
Client Relations Tools	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 200,000	\$ 200,000
Common Information Model (CIM)								
Compliance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Congestion Management (CONG) Component of SA								
Congestion Reform-DSOW	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Congestion Revenue Rights (CRR)								
DataWarehouse	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Dept. of Market Analysis Tools (SAS/MARS)								
Dispute Tracking System (Remedy)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Documentum								
Electronic Tagging (Etag)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Energy Management System (EMS)								
Engineering Analysis Tools	\$ 595,066	\$ 396,711	\$ 8,223	\$ -	\$ -	\$ -	\$ -	\$ 1,000,000
Evaluation of Market Separation								
Existing Transmission Contracts Calculator (ETCC)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
FERC Study Software								
Grid Operations Training Simulator (GOTS)	\$ 468,615	\$ 275,218	\$ 6,167	\$ -	\$ -	\$ -	\$ -	\$ 750,000
Hour-Ahead Data AnalysisTool, Day-Ahead Data AnalysisTool,								
Human Resources	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
IBM Contract								
Integrated Forward Market (IFM)	\$ 148,767	\$ -	\$ 1,233	\$ 525,000	\$ -	\$ 825,000	\$ -	\$ 1,500,000
Internal Development								
Interzonal Congestion Management reform - Real Time	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Land and Building Costs								
Local Area Network (LAN)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Locational Marginal Pricing (LMPM)								
Market Quality System (MQS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,200,000	\$ 1,200,000
Masterfile								
Meter Data Acquisition System (MDAS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Miscellaneous (2004 related capital)								
Monitoring (Tivoli)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
MRTU Capital								



**California Independent System Operator  
2011 Cost of Service  
Listing of Systems**

System	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
Network Applications	\$ -	\$ 991,777	\$ 8,223	\$ -	\$ -	\$ -	\$ -	\$ 1,000,000
New Resource Interconnection (NRI)								
New System Equipment (replacement of owned equipment)	\$ 366,344	\$ 139,204	\$ 4,156	\$ 285,802	\$ 189,732	\$ 299,479	\$ 615,283	\$ 1,900,000
NT/web servers								
NT-servers	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Office Automation - desktop/laptop (OA)								
Office equipment (scanner, printer, copier, fax, Communication Equip.)	\$ 40,340	\$ 19,262	\$ 494	\$ 1,523	\$ 14,235	\$ 1,698	\$ 22,448	\$ 100,000
Open Access Same Time Information System (OASIS)								
Operational Meter Analysis and Reporting (OMAR)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 500,000	\$ 500,000
Oracle Corporate Financials								
Oracle Enterprise Manager (OEM)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Oracle Licenses								
Oracle Market Financials BBS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Out of Sequence Market Operation Settlements Information System (OOS)								
Outage Scheduler (OS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Participating Intermittent Resource Project (PIRP)								
Physical Facilities Software Application/Furniture/Leasehold Improvements	\$ 40,340	\$ 19,262	\$ 494	\$ 1,523	\$ 14,235	\$ 1,698	\$ 22,448	\$ 100,000
Portal								
Post Transaction Repository (PTR)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Process Information System (PI)								
Rational Buyer	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Real Time Energy Dispatch System (REDS)								
Real Time Nodal Market	\$ 607,463	\$ -	\$ 5,037	\$ 175,000	\$ 962,500	\$ -	\$ -	\$ 1,750,000
Reliability Management System (RMS)								
Remedy (related to Transmission Registry, New Resource Interconnection and Resource Registry)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Remote Intelligent Gateway (RIG) & Data Processing Gateway (DPG)								
Resource Adequacy	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Resource Register (RR)								
RMR Application Validation Engine ( RAVE)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Scheduling & Logging for ISO California (SLIC)								
Scheduling & Tagging Next Generation (STING)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Scheduling Architecture (SA)								
Scheduling Infrastructure (SI)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Scheduling Infrastructure Business Rules (SIBR)								
Security Constrained Economic Dispatch (SCED)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Security- External/Physical								
Security-ISS (CUDA)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Settlements and Market Clearing								
Sign Board (Symon Board maint.)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Startup Costs through 3/31/98, Working Capital-3 months								
Storage (EMC symmetrix)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
System Equipment Buyouts (lease buyouts)								
Tactical Emergency Management System (TEMS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

California Independent System Operator  
2011 Cost of Service  
Listing of Systems

System	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
Telephone/PBX								
Training Systems	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Transmission Constrained Unit Commitment (TCUC) Must Offer Obligation								
Transmission Map Plotting & Display	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Treasury Workstation/Investment Program								
Trustee Costs, Interest-Capitalized, User Groups	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Utilities - System i.e. Print drivers								
Vitria (Middleware)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Wide Area Network (WAN)								
Total	\$ 6,265,738	\$ 2,505,901	\$ 72,630	\$ 4,125,669	\$ 4,287,597	\$ 1,665,617	\$ 4,576,849	\$ 23,500,000
Percent of Total	26.66%	10.66%	0.31%	17.56%	18.25%	7.09%	19.48%	100.00%

Note:

**California Independent System Operator  
2011 Cost of Service  
Listing of Systems**

System	Method	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
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	19.28%	7.33%	0.22%	15.04%	9.99%	15.76%	32.38%	100.00%
Automated Dispatch System (ADS)	Direct	49.59%	0.00%	0.41%	25.00%	20.00%	0.00%	5.00%	100.00%
Backup systems (Legato/Quantum)	System directs	19.28%	7.33%	0.22%	15.04%	9.99%	15.76%	32.38%	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%
Congestion Reform-DSOW	Direct	0.00%	63.76%	0.53%	0.00%	35.71%	0.00%	0.00%	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%
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%
IBM Contract	Dept direct	33.39%	15.32%	0.40%	5.98%	12.83%	6.34%	25.73%	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	19.28%	7.33%	0.22%	15.04%	9.99%	15.76%	32.38%	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%



**California Independent System Operator  
2011 Cost of Service  
Listing of Systems**

System	Method	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
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	19.28%	7.33%	0.22%	15.04%	9.99%	15.76%	32.38%	100.00%
Monitoring (Tivoli)	System directs	19.28%	7.33%	0.22%	15.04%	9.99%	15.76%	32.38%	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	19.28%	7.33%	0.22%	15.04%	9.99%	15.76%	32.38%	100.00%
NT/web servers	FTE	40.34%	19.26%	0.49%	1.52%	14.24%	1.70%	22.45%	100.00%
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	47.06%	0.86%	0.40%	13.50%	14.74%	0.00%	23.44%	100.00%
Oracle Licenses	Calculated Direct	47.06%	0.86%	0.40%	13.50%	14.74%	0.00%	23.44%	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%
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%

**California Independent System Operator  
2011 Cost of Service  
Listing of Systems**

System	Method	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
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	19.28%	7.33%	0.22%	15.04%	9.99%	15.76%	32.38%	100.00%
Settlements and Market Clearing	Direct	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
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	23.25%	6.15%	0.22%	11.92%	16.02%	8.46%	33.97%	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	19.28%	7.33%	0.22%	15.04%	9.99%	15.76%	32.38%	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	19.28%	7.33%	0.22%	15.04%	9.99%	15.76%	32.38%	100.00%
Vitria (Middleware)	System directs	19.28%	7.33%	0.22%	15.04%	9.99%	15.76%	32.38%	100.00%
Wide Area Network (WAN)	Calculated Direct	39.85%	0.87%	0.34%	19.35%	11.73%	0.28%	27.59%	100.00%

**Note:**

These allocation factors remain unchanged from those developed in 2007 and included in Appendix F, Part E of the MRTU Tariff

**California Independent System Operator  
2011 Cost of Service  
Bond Financed Capital Expenditures**

System	1998-2000 Bonds	2004 Bond expenditures		2007 Bond expenditures		2011 Cash Financed	2008 Bond expenditures	Total by System
		New Market	Other Capital	New Market	Other Capital			
ACC Upgrades (Communication between ISO & IOUs)	\$ -	\$ -	\$ -	\$ -	\$ -			
Ancillary Services Management (ASM) Component of SA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Application Development Tools	\$ -	\$ -	\$ -	\$ -	\$ -			
Automated Dispatch System (ADS)	\$ -	\$ -	\$ -	\$ 165,234	\$ -	\$ 750,000		
Automated Load Forecast System (ALFS)	\$ -	\$ -	\$ -	\$ 9,700	\$ -			
Automatic Mitigation Procedure (AMP)	\$ -	\$ -	\$ -	\$ 167,666	\$ -	\$ -		
Backup systems (Legato/Quantum)	\$ -	\$ -	\$ -	\$ -	\$ -			
Balance of Business Systems (BBS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Balancing Energy Ex Post Price (BEEP) Component of SA	\$ -	\$ -	\$ -	\$ -	\$ -			
Bill's Interchange Schedule (BITS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
CAISO Outage Modeling Tool (COMT)	\$ -	\$ -	\$ -	\$ -	\$ 359			
CaseWise (process modeling tool)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
CHASE	\$ -	\$ -	\$ -	\$ -	\$ -			
Client Relations Tools	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 200,000		
Common Information Model (CIM)	\$ -	\$ -	\$ -	\$ -	\$ -			
Compliance	\$ -	\$ -	\$ -	\$ 150,759	\$ -	\$ -		
Congestion Management (CONG) Component of SA	\$ -	\$ -	\$ -	\$ -	\$ -			
Congestion Reform-DSOW	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Congestion Revenue Rights (CRR)	\$ -	\$ -	\$ -	\$ 692,172	\$ -			
DataWarehouse	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Dept. of Market Analysis Tools (SAS/MARS)	\$ -	\$ -	\$ -	\$ -	\$ -			
Dispute Tracking System (Remedy)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Documentum	\$ -	\$ -	\$ -	\$ -	\$ -			
Electronic Tagging (Etag)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Energy Management System (EMS)	\$ -	\$ -	\$ -	\$ 406,084	\$ -			
Engineering Analysis Tools	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,000,000		
Evaluation of Market Separation	\$ -	\$ -	\$ -	\$ -	\$ -			
Existing Transmission Contracts Calculator (ETCC)	\$ -	\$ -	\$ -	\$ 29,900	\$ -	\$ -		
FERC Study Software	\$ -	\$ -	\$ -	\$ -	\$ -			
Grid Operations Training Simulator (GOTS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 750,000		
Hour-Ahead Data AnalysisTool, Day-Ahead Data AnalysisTool,	\$ -	\$ -	\$ -	\$ -	\$ -			
Human Resources	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
IBM Contract	\$ -	\$ -	\$ -	\$ -	\$ -			
Integrated Forward Market (IFM)	\$ -	\$ -	\$ -	\$ 11,906,465	\$ -	\$ 1,500,000		
Internal Development	\$ -	\$ -	\$ -	\$ -	\$ -			
Interzonal Congestion Management reform - Real Time	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Land and Building Costs	\$ -	\$ -	\$ -	\$ -	\$ 1,319,562			
Local Area Network (LAN)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Locational Marginal Pricing (LMPM)	\$ -	\$ -	\$ -	\$ -	\$ -			
Market Quality System (MQS)	\$ -	\$ -	\$ -	\$ 3,121,381	\$ -	\$ 1,200,000		
Masterfile	\$ -	\$ -	\$ -	\$ 67,454	\$ -			
Meter Data Acquisition System (MDAS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Miscellaneous (2004 related capital)	\$ -	\$ -	\$ -	\$ -	\$ 104,635			
Monitoring (Tivoli)	\$ -	\$ -	\$ -	\$ -	\$ 329,783	\$ -		
MRTU Capital	\$ -	\$ -	\$ -	\$ 24,199,981	\$ -			
Network Applications	\$ -	\$ -	\$ -	\$ 47,600	\$ -	\$ 1,000,000		
New Resource Interconnection (NRI)	\$ -	\$ -	\$ -	\$ -	\$ 491,825			
New System Equipment (replacement of owned equipment)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,900,000		
NT/web servers	\$ -	\$ -	\$ -	\$ -	\$ -			
NT-servers	\$ -	\$ -	\$ -	\$ -	\$ 488,016	\$ -		

**California Independent System Operator  
2011 Cost of Service  
Bond Financed Capital Expenditures**

System	1998-2000 Bonds	2004 Bond expenditures		2007 Bond expenditures		2011 Cash Financed	2008 Bond expenditures	Total by System
		New Market	Other Capital	New Market	Other Capital			
Office Automation - desktop/laptop (OA)	\$ -	\$ -	\$ -	\$ -	\$ -			
Office equipment (scanner, printer, copier, fax, Communication Equip.)	\$ -	\$ -	\$ -	\$ -	\$ 152,607	\$ 100,000		
Open Access Same Time Information System (OASIS)	\$ -	\$ -	\$ -	\$ 366,651	\$ -			
Operational Meter Analysis and Reporting (OMAR)	\$ -	\$ -	\$ -	\$ 35,803	\$ -	\$ 500,000		
Oracle Corporate Financials	\$ -	\$ -	\$ -	\$ -	\$ 616,841			
Oracle Enterprise Manager (OEM)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Oracle Licenses	\$ -	\$ -	\$ -	\$ -	\$ -			
Oracle Market Financials BBS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Out of Sequence Market Operation Settlements Information System (OOS)	\$ -	\$ -	\$ -	\$ -	\$ -			
Outage Scheduler (OS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Participating Intermittent Resource Project (PIRP)	\$ -	\$ -	\$ -	\$ 15,757	\$ -			
Physical Facilities Software Application/Furniture/Leasehold Improvements	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 100,000		
Portal	\$ -	\$ -	\$ -	\$ -	\$ -			
Post Transaction Repository (PTR)	\$ -	\$ -	\$ -	\$ 226,019	\$ -	\$ -		
Process Information System (PI)	\$ -	\$ -	\$ -	\$ 5,034	\$ -			
Rational Buyer	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Real Time Energy Dispatch System (REDS)	\$ -	\$ -	\$ -	\$ -	\$ -			
Real Time Nodal Market	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,750,000		
Reliability Management System (RMS)	\$ -	\$ -	\$ -	\$ -	\$ -			
Remedy (related to Transmission Registry, New Resource Interconnection and Resource Registry)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Remote Intelligent Gateway (RIG) & Data Processing Gateway (DPG)	\$ -	\$ -	\$ -	\$ -	\$ -			
Resource Adequacy	\$ -	\$ -	\$ -	\$ -	\$ 240,973	\$ -		
Resource Register (RR)	\$ -	\$ -	\$ -	\$ -	\$ -			
RMR Application Validation Engine ( RAVE)	\$ -	\$ -	\$ -	\$ 26,357	\$ -	\$ -		
Scheduling & Logging for ISO California (SLIC)	\$ -	\$ -	\$ -	\$ 7,576	\$ -			
Scheduling & Tagging Next Generation (STiNG)	\$ -	\$ -	\$ -	\$ 251,097	\$ 10,400	\$ -		
Scheduling Architecture (SA)	\$ -	\$ -	\$ -	\$ -	\$ -			
Scheduling Infrastructure (SI)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Scheduling Infrastructure Business Rules (SIBR)	\$ -	\$ -	\$ -	\$ 2,249,004	\$ -			
Security Constrained Economic Dispatch (SCED)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Security- External/Physical	\$ -	\$ -	\$ -	\$ -	\$ -			
Security-ISS (CUDA)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Settlements and Market Clearing	\$ -	\$ -	\$ -	\$ 4,586,112	\$ -			
Sign Board (Symon Board maint.)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Startup Costs through 3/31/98, Working Capital-3 months	\$ -	\$ -	\$ -	\$ -	\$ -			
Storage (EMC symmetrix)	\$ -	\$ -	\$ -	\$ -	\$ 210,471	\$ -		
System Equipment Buyouts (lease buyouts)	\$ -	\$ -	\$ -	\$ -	\$ -			
Tactical Emergency Management System (TEMS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Telephone/PBX	\$ -	\$ -	\$ -	\$ -	\$ -			
Training Systems	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Transmission Constrained Unit Commitment (TCUC) Must Offer Obligation	\$ -	\$ -	\$ -	\$ -	\$ -			
Transmission Map Plotting & Display	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Treasury Workstation/Investment Program	\$ -	\$ -	\$ -	\$ -	\$ -			
Trustee Costs, Interest-Capitalized, User Groups	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Utilities - System i.e. Print drivers	\$ -	\$ -	\$ -	\$ -	\$ -			
Vitria (Middleware)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Wide Area Network (WAN)	\$ -	\$ -	\$ -	\$ -	\$ -			
<b>Total Assignable</b>	\$ -	\$ -	\$ -	\$ 48,733,804	\$ 3,965,472	\$ 23,500,000	\$ 84,294,070	\$ 160,493,346
<b>Note:</b>								

California Independent System Operator  
2011 Cost of Service  
Bond Financed Capital Expenditures

System	1998-2000 Bonds	2004 Bond expenditures		2007 Bond expenditures		2011 Cash Financed	2008 Bond expenditures	Total by System
		New Market	Other Capital	New Market	Other Capital			
2008 bond data and 2011 Cash Financed is masked as not all projects have been contracted for.								



## **Worksheets for Oracle Licenses, EMC, and WAN**

California Independent System Operator  
2011 Cost of Service  
Oracle License Worksheet

Expenditures on System	System	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
\$ 915,234	Automated Dispatch System (ADS)	\$ 453,854	\$ -	\$ 3,763	\$ 228,808	\$ 183,047	\$ -	\$ 45,762	\$ 915,234
\$ -	Bill's Interchange Schedule (BITS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 29,900	Existing Transmission Contracts Calculator (ETCC)	\$ 7,414	\$ 1,271	\$ 72	\$ 5,980	\$ 9,184	\$ -	\$ 5,980	\$ 29,900
\$ -	Firm Transmission Right (FTR) and Secondary Registration System (SRS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ -	Global Resource Reliability Management Application (GRRMA)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 85,656	Meter Data Acquisition System (MDAS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 85,656	\$ 85,656
\$ 1,035,803	Operational Meter Analysis and Reporting (OMAR)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,035,803	\$ 1,035,803
\$ -	Dispute Tracking System (Remedy)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 2,937,576	Scheduling & Logging for ISO California (SLIC)	\$ 1,893,723	\$ 41,620	\$ 16,046	\$ 440,636	\$ 545,550	\$ -	\$ -	\$ 2,937,576
\$ -	Scheduling Infrastructure (SI)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 5,004,170	Totals	\$ 2,354,991	\$ 42,891	\$ 19,881	\$ 675,425	\$ 737,780	\$ -	\$ 1,173,201	\$ 5,004,170
		47.1%	0.9%	0.4%	13.5%	14.7%	0.0%	23.4%	100.0%

**California Independent System Operator  
2011 Cost of Service  
EMC Storage Assignment by System**

System	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
ACC Upgrades (Communication between ISO & IOUs)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Ancillary Services Management (ASM) Component of SA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Application Development Tools	\$ 2,608	\$ 991	\$ 30	\$ 2,034	\$ 1,351	\$ 2,132	\$ 4,380	\$ 13,525
Automated Dispatch System (ADS)	\$ 922	\$ -	\$ 8	\$ 465	\$ 372	\$ -	\$ 93	\$ 1,860
Automated Load Forecast System (ALFS)	\$ 3,814	\$ -	\$ 32	\$ 549	\$ 1,099	\$ -	\$ -	\$ 5,494
Automatic Mitigation Procedure (AMP)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Backup systems (Legato/Quantum)	\$ 1,059	\$ 403	\$ 12	\$ 826	\$ 549	\$ 866	\$ 1,779	\$ 5,494
Balance of Business Systems (BBS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 91,715	\$ 91,715
Balancing Energy Ex Post Price (BEEP) Component of SA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Bill's Interchange Schedule (BITS)	\$ 1,781	\$ -	\$ 15	\$ -	\$ 317	\$ -	\$ -	\$ 2,113
CAISO Outage Modeling Tool (COMT)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
CaseWise (process modeling tool)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
CHASE	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Client Relations Tools	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Common Information Model (CIM)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Compliance	\$ 8,258	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 11,522	\$ 19,780
Congestion Management (CONG) Component of SA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Congestion Reform-DSOW	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Congestion Revenue Rights (CRR)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
DataWarehouse	\$ 33,643	\$ 3,048	\$ -	\$ 3,274	\$ 20,130	\$ 7,378	\$ 39,036	\$ 106,508
Dept. of Market Analysis Tools (SAS/MARS)	\$ 3,218	\$ -	\$ -	\$ 891	\$ 6,710	\$ 2,459	\$ 1,093	\$ 14,370
Dispute Tracking System (Remedy)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Documentum	\$ 5,115	\$ 2,442	\$ 63	\$ 193	\$ 1,805	\$ 215	\$ 2,846	\$ 12,680
Electronic Tagging (Etag)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Energy Management System (EMS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Engineering Analysis Tools	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Evaluation of Market Separation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Existing Transmission Contracts Calculator (ETCC)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
FERC Study Software	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Firm Transmission Right (FTR) and Secondary Registration System (SRS)	\$ -	\$ 230	\$ 2	\$ 203	\$ 783	\$ -	\$ 135	\$ 1,352
Global Resource Reliability Management Application (GRRMA)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Grid Operations Training Simulator (GOTS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Hour-Ahead Data AnalysisTool, Day-Ahead Data AnalysisTool,	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Human Resources	\$ 2,796	\$ 1,335	\$ 34	\$ 106	\$ 987	\$ 118	\$ 1,556	\$ 6,931
IBM Contract	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Integrated Forward Market (IFM)	\$ 16,646	\$ -	\$ 138	\$ 58,745	\$ -	\$ 92,314	\$ -	\$ 167,843
Internal Development	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Interzonal Congestion Management reform - Real Time	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Land and Building Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Local Area Network (LAN)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

**California Independent System Operator  
2011 Cost of Service  
EMC Storage Assignment by System**

System	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
Locational Marginal Pricing (LMPM)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Market Quality System (MQS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 40,321	\$ 40,321
Masterfile	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Meter Data Acquisition System (MDAS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Miscellaneous (2004 related capital)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Monitoring (Tivoli)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
MRTU Capital	\$ 27,661	\$ 10,203	\$ 304	\$ 41,449	\$ 23,451	\$ 33,597	\$ 81,399	\$ 218,062
Network Applications	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
New Resource Interconnection (NRI)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
New System Equipment (replacement of owned equipment)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
NT/web servers	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
NT-servers	\$ 174,406	\$ 83,275	\$ 2,136	\$ 6,584	\$ 61,545	\$ 7,343	\$ 97,049	\$ 432,337
Office Automation - desktop/laptop (OA)	\$ 7,502	\$ 3,582	\$ 92	\$ 283	\$ 2,647	\$ 316	\$ 4,174	\$ 18,597
Office equipment (scanner, printer, copier, fax, Communication Equip.)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Open Access Same Time Information System (OASIS)	\$ 3,437	\$ 982	\$ 37	\$ 8,664	\$ 14,606	\$ -	\$ 6,931	\$ 34,657
Operational Meter Analysis and Reporting (OMAR)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 10,989	\$ 10,989
Oracle Corporate Financials	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Oracle Enterprise Manager (OEM)	\$ 1,591	\$ 29	\$ 13	\$ 456	\$ 499	\$ -	\$ 793	\$ 3,381
Oracle Licenses	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Oracle Market Financials BBS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Out of Sequence Market Operation Settlements Information System (OOS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Outage Scheduler (OS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Participating Intermittent Resource Project (PIRP)	\$ -	\$ -	\$ -	\$ 1,971	\$ 1,073	\$ -	\$ -	\$ 3,043
Physical Facilities Software Application/Furniture/Leasehold Improvements	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Portal	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Post Transaction Repository (PTR)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 76,745	\$ 76,745
Process Information System (PI)	\$ 26,827	\$ -	\$ 222	\$ -	\$ 3,381	\$ -	\$ 3,381	\$ 33,812
Rational Buyer	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Real Time Energy Dispatch System (REDS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Real Time Nodal Market	\$ 64,717	\$ -	\$ 537	\$ 18,644	\$ 102,542	\$ -	\$ -	\$ 186,439
Reliability Management System (RMS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Remedy (related to Transmission Registry, New Resource Interconnection and Resource Registry)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Remote Intelligent Gateway (RIG) & Data Processing Gateway (DPG)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Resource Adequacy	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Resource Register (RR)	\$ 1,425	\$ -	\$ 12	\$ -	\$ -	\$ -	\$ -	\$ 1,437
RMR Application Validation Engine ( RAVE)	\$ 9,809	\$ -	\$ 81	\$ -	\$ -	\$ -	\$ -	\$ 9,890
Scheduling & Logging for ISO California (SLIC)	\$ 1,090	\$ 24	\$ 9	\$ 254	\$ 314	\$ -	\$ -	\$ 1,691
Scheduling & Tagging Next Generation (STING)	\$ 5,344	\$ -	\$ 44	\$ -	\$ 951	\$ -	\$ -	\$ 6,340
Scheduling Architecture (SA)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Scheduling Infrastructure (SI)	\$ -	\$ -	\$ -	\$ 56,926	\$ 30,986	\$ -	\$ -	\$ 87,911

**California Independent System Operator  
2011 Cost of Service  
EMC Storage Assignment by System**

System	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
Scheduling Infrastructure Business Rules (SIBR)	\$ -	\$ -	\$ -	\$ 4,379	\$ 2,384	\$ -	\$ -	\$ 6,762
Security Constrained Economic Dispatch (SCED)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Security- External/Physical	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Security-ISS (CUDA)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Settlements and Market Clearing	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 114,116	\$ 114,116
Sign Board (Symon Board maint.)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Startup Costs through 3/31/98, Working Capital-3 months	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Storage (EMC symmetrix)								\$ -
System Equipment Buyouts (lease buyouts)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Tactical Emergency Management System (TEMS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Telephone/PBX	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Training Systems	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Transmission Constrained Unit Commitment (TCUC) Must Offer Obligation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Transmission Map Plotting & Display	\$ 210	\$ 210	\$ 3	\$ -	\$ -	\$ -	\$ -	\$ 423
Treasury Workstation/Investment Program	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Trustee Costs, Interest-Capitalized, User Groups	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Utilities - System i.e. Print drivers	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Vitria (Middleware)	\$ 652	\$ 248	\$ 7	\$ 509	\$ 338	\$ 533	\$ 1,095	\$ 3,381
Wide Area Network (WAN)								
<b>Total</b>	\$ 404,533	\$ 107,000	\$ 3,832	\$ 207,404	\$ 278,814	\$ 147,269	\$ 591,148	\$ 1,740,000
<b>Percent of Total</b>	23.2%	6.1%	0.2%	11.9%	16.0%	8.5%	34.0%	100.0%

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California Independent System Operator  
2011 Cost of Service  
EMC Storage by Type of Application

		Alhambra	Folsom	Total	% of storage	Share of EMC Lease Cost
Subsystem	Application	Allocated (GB)				
NAS	NT-servers	2,346	21,000	23,346	11.34%	\$ 197,344
IFM	Integrated Forward Market (IFM)	9,928	9,928	19,856	9.65%	\$ 167,843
RTN	Real Time Nodal Market	9,928	9,928	19,856	9.65%	\$ 167,843
MQS	Market Quality System (MQS)	2,385	2,385	4,770	2.32%	\$ 40,321
SIBR	Scheduling Infrastructure Business Rules (SIBR)	400	400	800	0.39%	\$ 6,762
CMRI	Post Transaction Repository (PTR)	1,754	1,754	3,508	1.70%	\$ 29,653
SAMC	Settlements and Market Clearing	3,150	3,150	6,300	3.06%	\$ 53,254
Dreams	Settlements and Market Clearing	3,600	3,600	7,200	3.50%	\$ 60,862
CAP	Compliance	1,170	1,170	2,340	1.14%	\$ 19,780
RAVE	RMR Application Validation Engine ( RAVE)	585	585	1,170	0.57%	\$ 9,890
EDR	Post Transaction Repository (PTR)	-	5,571	5,571	2.71%	\$ 47,092
INT	MRTU Capital	450	1,798	2,248	1.09%	\$ 19,002
OAP	Open Access Same Time Information System (OASIS)	450	450	900	0.44%	\$ 7,608
NAS	NT-servers	5,400	9,500	14,900	7.24%	\$ 125,950
Documentum	Documentum	750	750	1,500	0.73%	\$ 12,680
ALFS	Automated Load Forecast System (ALFS)	200	450	650	0.32%	\$ 5,494
Vitria	Vitria (Middleware)	200	200	400	0.19%	\$ 3,381
OASIS	Open Access Same Time Information System (OASIS)	1,600	1,600	3,200	1.55%	\$ 27,050
Settlements	Balance of Business Systems (BBS)	800	2,450	3,250	1.58%	\$ 27,472
OMAR	Operational Meter Analysis and Reporting (OMAR)	650	650	1,300	0.63%	\$ 10,989
ADS	Automated Dispatch System (ADS)	100	120	220	0.11%	\$ 1,860
SRS	Firm Transmission Right (FTR) and Secondary Registration System (SRS)	60	100	160	0.08%	\$ 1,352
SLIC	Scheduling & Logging for ISO California (SLIC)	80	120	200	0.10%	\$ 1,691
BITS	Bill's Interchange Schedule (BITS)	100	150	250	0.12%	\$ 2,113
DW	DataWarehouse	6,300	6,300	12,600	6.12%	\$ 106,508
MHAP	Balance of Business Systems (BBS)	3,800	3,800	7,600	3.69%	\$ 64,243
RTMA	Real Time Nodal Market	1,000	1,200	2,200	1.07%	\$ 18,597
GIS	Transmission Map Plotting & Display	25	25	50	0.02%	\$ 423
PIRP	Participating Intermittent Resource Project (PIRP)	110	250	360	0.17%	\$ 3,043
OEM	Oracle Enterprise Manager (OEM)	200	200	400	0.19%	\$ 3,381
TRR	Resource Register (RR)	50	120	170	0.08%	\$ 1,437
SI/SA	Scheduling Infrastructure (SI)	3,800	6,600	10,400	5.05%	\$ 87,911
PI	Process Information System (PI)	1,000	3,000	4,000	1.94%	\$ 33,812
ESS	Human Resources	230	590	820	0.40%	\$ 6,931
STING	Scheduling & Tagging Next Generation (STING)	250	500	750	0.36%	\$ 6,340
VMWARE	NT-servers	3,800	9,100	12,900	6.27%	\$ 109,044
Legato	Backup systems (Legato/Quantum)	200	450	650	0.32%	\$ 5,494
Exchange	Office Automation - desktop/laptop (OA)	500	1,700	2,200	1.07%	\$ 18,597
MA	Dept. of Market Analysis Tools (SAS/MARS)	-	1,700	1,700	0.83%	\$ 14,370
MRTU	MRTU Capital	4,000	7,000	11,000	5.34%	\$ 92,983
Non Production Environment	MRTU Capital	-	12,549	12,549	6.10%	\$ 106,077
Infrastructure Services	Application Development Tools	400	1,200	1,600	0.78%	\$ 13,525
<b>TOTAL USABLE Storage (GB)</b>		<b>35,605</b>	<b>98,488</b>	<b>205,844</b>	<b>100.00%</b>	<b>\$ 1,740,000</b>

**California Independent System Operator  
2011 Cost of Service  
Assignment of WAN Related Applications to Functions**

System	WAN Total	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
ACC Upgrades (Communication between ISO & IOUs)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Ancillary Services Management (ASM) Component of SA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Application Development Tools	\$ 23,648	\$ 4,560	\$ 1,733	\$ 52	\$ 3,557	\$ 2,361	\$ 3,727	\$ 7,658	\$ 23,648
Automated Dispatch System (ADS)	\$ 3,724	\$ 1,846	\$ -	\$ 15	\$ 931	\$ 745	\$ -	\$ 186	\$ 3,724
Backup systems (Legato/Quantum)	\$ 2,835	\$ 547	\$ 208	\$ 6	\$ 426	\$ 283	\$ 447	\$ 918	\$ 2,835
Balance of Business Systems (BBS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Balancing Energy Ex Post Price (BEEP) Component of SA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Bill's Interchange Schedule (BITS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
CAISO Outage Modeling Tool (COMT)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
CaseWise (process modeling tool)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
CHASE	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Client Relations Tools	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Common Information Model (CIM)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Compliance	\$ 8,996	\$ 3,756	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,240	\$ 8,996
Congestion Management (CONG) Component of SA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Congestion Reform-DSOW	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Dept. of Market Analysis Tools (SAS/MARS)	\$ 6,973	\$ 1,562	\$ -	\$ -	\$ 432	\$ 3,256	\$ 1,193	\$ 530	\$ 6,973
Dispute Tracking System (Remedy)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Documentum	\$ 3,457	\$ 1,395	\$ 666	\$ 17	\$ 53	\$ 492	\$ 59	\$ 776	\$ 3,457
Electronic Tagging (Etag)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Energy Management System (EMS)	\$ 2,101,437	\$ 2,084,156	\$ -	\$ 17,280	\$ -	\$ -	\$ -	\$ -	\$ 2,101,437
Engineering Analysis Tools	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Evaluation of Market Separation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Existing Transmission Contracts Calculator (ETCC)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
FERC Study Software	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Grid Operations Training Simulator (GOTS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Hour-Ahead Data AnalysisTool, Day-Ahead Data AnalysisTool.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Human Resources	\$ 3,482	\$ 1,404	\$ 671	\$ 17	\$ 53	\$ 496	\$ 59	\$ 782	\$ 3,482
IBM Contract	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Integrated Forward Market (IFM)	\$ 7,444	\$ 738	\$ -	\$ 6	\$ 2,605	\$ -	\$ 4,094	\$ -	\$ 7,444
Internal Development	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Interzonal Congestion Management reform - Real Time	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Land and Building Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Local Area Network (LAN)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Locational Marginal Pricing (LMPM)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Market Quality System (MQS)	\$ 42,255	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 42,255	\$ 42,255
Masterfile	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Meter Data Acquisition System (MDAS)	\$ 1,313,398	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,313,398	\$ 1,313,398

**California Independent System Operator  
2011 Cost of Service  
Assignment of WAN Related Applications to Functions**

System	WAN Total	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
Miscellaneous (2004 related capital)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Monitoring (Tivoli)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
MRTU Capital	\$ 10,386	\$ 1,317	\$ 486	\$ 14	\$ 1,974	\$ 1,117	\$ 1,600	\$ 3,877	\$ 10,386
Network Applications	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
New Resource Interconnection (NRI)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
New System Equipment (replacement of owned equipment)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
NT/web servers	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
NT-servers	\$ 205,243	\$ 82,795	\$ 39,533	\$ 1,014	\$ 3,126	\$ 29,217	\$ 3,486	\$ 46,072	\$ 205,243
Office Automation - desktop/laptop (OA)	\$ 26,061	\$ 10,513	\$ 5,020	\$ 129	\$ 397	\$ 3,710	\$ 443	\$ 5,850	\$ 26,061
Office equipment (scanner, printer, copier, fax, Communication Equip.)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Open Access Same Time Information System (OASIS)	\$ 7,440	\$ 738	\$ 211	\$ 8	\$ 1,860	\$ 3,135	\$ -	\$ 1,488	\$ 7,440
Operational Meter Analysis and Reporting (OMAR)	\$ 3,724	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,724	\$ 3,724
Oracle Corporate Financials	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Oracle Enterprise Manager (OEM)	\$ 1,708	\$ 804	\$ 15	\$ 7	\$ 231	\$ 252	\$ -	\$ 400	\$ 1,708
Oracle Licenses	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Oracle Market Financials BBS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Out of Sequence Market Operation Settlements Information System (OOS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Outage Scheduler (OS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Participating Intermittent Resource Project (PIRP)	\$ 3,105	\$ -	\$ -	\$ -	\$ 2,010	\$ 1,094	\$ -	\$ -	\$ 3,105
Physical Facilities Software Application/Furniture/Leasehold	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Portal	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Post Transaction Repository (PTR)	\$ 7,551	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7,551	\$ 7,551
Process Information System (PI)	\$ 35,264	\$ 27,980	\$ -	\$ 232	\$ -	\$ 3,526	\$ -	\$ 3,526	\$ 35,264
Rational Buyer	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Real Time Energy Dispatch System (REDS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Real Time Nodal Market	\$ 40,195	\$ 13,952	\$ -	\$ 116	\$ 4,019	\$ 22,107	\$ -	\$ -	\$ 40,195
Reliability Management System (RMS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Remedy (related to Transmission Registry, New Resource Interconnection and Remote Intelligent Gateway (RIG) & Data Processing Gateway (DPG))	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Resource Adequacy	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Resource Register (RR)	\$ 235	\$ 233	\$ -	\$ 2	\$ -	\$ -	\$ -	\$ -	\$ 235
RMR Application Validation Engine ( RAVE)	\$ 5,895	\$ 5,846	\$ -	\$ 48	\$ -	\$ -	\$ -	\$ -	\$ 5,895
Scheduling & Logging for ISO California (SLIC)	\$ 4,031	\$ 2,599	\$ 57	\$ 22	\$ 605	\$ 749	\$ -	\$ -	\$ 4,031
Scheduling & Tagging Next Generation (STiNG)	\$ 21,746	\$ 18,332	\$ -	\$ 152	\$ -	\$ 3,262	\$ -	\$ -	\$ 21,746
Scheduling Architecture (SA)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Scheduling Infrastructure (SI)	\$ 11,119	\$ -	\$ -	\$ -	\$ 7,200	\$ 3,919	\$ -	\$ -	\$ 11,119
Scheduling Infrastructure Business Rules (SIBR)	\$ 1,654,171	\$ -	\$ -	\$ -	\$ 1,071,134	\$ 583,037	\$ -	\$ -	\$ 1,654,171
Security Constrained Economic Dispatch (SCED)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

**California Independent System Operator  
2011 Cost of Service  
Assignment of WAN Related Applications to Functions**

System	WAN Total	CRS	ETS	CRS/ETS TOR	FS	MU	MU-FE	SMCR	Total
Security- External/Physical	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Security-ISS (CUDA)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Settlements and Market Clearing	\$ 122,005	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 122,005	\$ 122,005
Sign Board (Symon Board maint.)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Startup Costs through 3/31/98, Working Capital-3 months	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Storage (EMC symmetrix)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
System Equipment Buyouts (lease buyouts)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Tactical Emergency Management System (TEMS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Telephone/PBX	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Training Systems	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Transmission Constrained Unit Commitment (TCUC) Must Offer Obligation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Transmission Map Plotting & Display	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Treasury Workstation/Investment Program	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Trustee Costs, Interest-Capitalized, User Groups	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Utilities - System i.e. Print drivers	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Vitria (Middleware)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Wide Area Network (WAN)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total</b>	<b>\$ 5,694,048</b>	<b>\$ 2,268,872</b>	<b>\$ 49,707</b>	<b>\$ 19,144</b>	<b>\$ 1,101,657</b>	<b>\$ 667,633</b>	<b>\$ 15,941</b>	<b>\$ 1,571,093</b>	<b>\$ 5,694,048</b>
<b>Percent of Total</b>		<b>39.8%</b>	<b>0.9%</b>	<b>0.3%</b>	<b>19.3%</b>	<b>11.7%</b>	<b>0.3%</b>	<b>27.6%</b>	<b>100.0%</b>

Amounts may be redacted due to contractual nondisclosure provisions.

**California Independent System Operator  
2011 Cost of Service  
Assignment of WAN Costs by Application**

	Internal WAN	External WAN	Total WAN	Percent of Total
ACC Upgrades (Communication between ISO & IOUs)	\$0	\$0	\$0	0.0%
Ancillary Services Management (ASM) Component of SA	\$0	\$0	\$0	0.0%
Application Development Tools	\$23,648	\$0	\$23,648	0.4%
Automated Dispatch System (ADS)	\$3,724	\$0	\$3,724	0.1%
Backup systems (Legato/Quantum)	\$2,835	\$0	\$2,835	0.0%
Balance of Business Systems (BBS)	\$0	\$0	\$0	0.0%
Balancing Energy Ex Post Price (BEEP) Component of SA	\$0	\$0	\$0	0.0%
Bill's Interchange Schedule (BITS)	\$0	\$0	\$0	0.0%
CAISO Outage Modeling Tool (COMT)	\$0	\$0	\$0	0.0%
CaseWise (process modeling tool)	\$0	\$0	\$0	0.0%
CHASE	\$0	\$0	\$0	0.0%
Client Relations Tools	\$0	\$0	\$0	0.0%
Common Information Model (CIM)	\$0	\$0	\$0	0.0%
Compliance	\$8,996	\$0	\$8,996	0.2%
Congestion Management (CONG) Component of SA	\$0	\$0	\$0	0.0%
Congestion Reform-DSOW	\$0	\$0	\$0	0.0%
Dept. of Market Analysis Tools (SAS/MARS)	\$6,973	\$0	\$6,973	0.1%
Dispute Tracking System (Remedy)	\$0	\$0	\$0	0.0%
Documentum	\$3,457	\$0	\$3,457	0.1%
Electronic Tagging (Etag)	\$0	\$0	\$0	0.0%
Energy Management System (EMS)	\$0	\$2,101,437	\$2,101,437	36.9%
Engineering Analysis Tools	\$0	\$0	\$0	0.0%
Evaluation of Market Separation	\$0	\$0	\$0	0.0%
Existing Transmission Contracts Calculator (ETCC)	\$0	\$0	\$0	0.0%
FERC Study Software	\$0	\$0	\$0	0.0%
Grid Operations Training Simulator (GOTS)	\$0	\$0	\$0	0.0%
Hour-Ahead Data AnalysisTool, Day-Ahead Data AnalysisTool,	\$0	\$0	\$0	0.0%
Human Resources	\$3,482	\$0	\$3,482	0.1%
IBM Contract	\$0	\$0	\$0	0.0%
Integrated Forward Market (IFM)	\$7,444	\$0	\$7,444	0.1%
Internal Development	\$0	\$0	\$0	0.0%
Interzonal Congestion Management reform - Real Time	\$0	\$0	\$0	0.0%
Land and Building Costs	\$0	\$0	\$0	0.0%



**California Independent System Operator  
2011 Cost of Service  
Assignment of WAN Costs by Application**

	Internal WAN	External WAN	Total WAN	Percent of Total
Local Area Network (LAN)	\$0	\$0	\$0	0.0%
Locational Marginal Pricing (LMPM)	\$0	\$0	\$0	0.0%
Market Quality System (MQS)	\$42,255	\$0	\$42,255	0.7%
Masterfile	\$0	\$0	\$0	0.0%
Meter Data Acquisition System (MDAS)	\$0	\$1,313,398	\$1,313,398	23.1%
Miscellaneous (2004 related capital)	\$0	\$0	\$0	0.0%
Monitoring (Tivoli)	\$0	\$0	\$0	0.0%
MRTU Capital	\$10,386	\$0	\$10,386	0.2%
Network Applications	\$0	\$0	\$0	0.0%
New Resource Interconnection (NRI)	\$0	\$0	\$0	0.0%
New System Equipment (replacement of owned equipment)	\$0	\$0	\$0	0.0%
NT/web servers	\$0	\$0	\$0	0.0%
NT-servers	\$205,243	\$0	\$205,243	3.6%
Office Automation - desktop/laptop (OA)	\$26,061	\$0	\$26,061	0.5%
Office equipment (scanner, printer, copier, fax, Communication Equip.)	\$0	\$0	\$0	0.0%
Open Access Same Time Information System (OASIS)	\$7,440	\$0	\$7,440	0.1%
Operational Meter Analysis and Reporting (OMAR)	\$3,724	\$0	\$3,724	0.1%
Oracle Corporate Financials	\$0	\$0	\$0	0.0%
Oracle Enterprise Manager (OEM)	\$1,708	\$0	\$1,708	0.0%
Oracle Licenses	\$0	\$0	\$0	0.0%
Oracle Market Financials BBS	\$0	\$0	\$0	0.0%
Out of Sequence Market Operation Settlements Information System (OOS)	\$0	\$0	\$0	0.0%
Outage Scheduler (OS)	\$0	\$0	\$0	0.0%
Participating Intermittent Resource Project (PIRP)	\$3,105	\$0	\$3,105	0.1%
Physical Facilities Software Application/Furniture/Leasehold Improvements	\$0	\$0	\$0	0.0%
Portal	\$0	\$0	\$0	0.0%
Post Transaction Repository (PTR)	\$7,551	\$0	\$7,551	0.1%
Process Information System (PI)	\$35,264	\$0	\$35,264	0.6%
Rational Buyer	\$0	\$0	\$0	0.0%
Real Time Energy Dispatch System (REDS)	\$0	\$0	\$0	0.0%
Real Time Nodal Market	\$40,195	\$0	\$40,195	0.7%
Reliability Management System (RMS)	\$0	\$0	\$0	0.0%
Remedy (related to Transmission Registry, New Resource Interconnection and Resource Registry)	\$0	\$0	\$0	0.0%
Remote Intelligent Gateway (RIG) & Data Processing Gateway (DPG)	\$0	\$0	\$0	0.0%

**California Independent System Operator  
2011 Cost of Service  
Assignment of WAN Costs by Application**

	Internal WAN	External WAN	Total WAN	Percent of Total
Resource Adequacy	\$0	\$0	\$0	0.0%
Resource Register (RR)	\$235	\$0	\$235	0.0%
RMR Application Validation Engine ( RAVE)	\$5,895	\$0	\$5,895	0.1%
Scheduling & Logging for ISO California (SLIC)	\$4,031	\$0	\$4,031	0.1%
Scheduling & Tagging Next Generation (STiNG)	\$21,746	\$0	\$21,746	0.4%
Scheduling Architecture (SA)	\$0	\$0	\$0	0.0%
Scheduling Infrastructure (SI)	\$11,119	\$0	\$11,119	0.2%
Scheduling Infrastructure Business Rules (SIBR)	\$0	\$1,654,171	\$1,654,171	29.1%
Security Constrained Economic Dispatch (SCED)	\$0	\$0	\$0	0.0%
Security- External/Physical	\$0	\$0	\$0	0.0%
Security-ISS (CUDA)	\$0	\$0	\$0	0.0%
Settlements and Market Clearing	\$122,005	\$0	\$122,005	2.1%
Sign Board (Symon Board maint.)	\$0	\$0	\$0	0.0%
Startup Costs through 3/31/98, Working Capital-3 months	\$0	\$0	\$0	0.0%
Storage (EMC symmetrix)	\$0	\$0	\$0	0.0%
System Equipment Buyouts (lease buyouts)	\$0	\$0	\$0	0.0%
Tactical Emergency Management System (TEMS)	\$0	\$0	\$0	0.0%
Telephone/PBX	\$0	\$0	\$0	0.0%
Training Systems	\$0	\$0	\$0	0.0%
Transmission Constrained Unit Commitment (TCUC) Must Offer Obligation	\$0	\$0	\$0	0.0%
Transmission Map Plotting & Display	\$0	\$0	\$0	0.0%
Treasury Workstation/Investment Program	\$0	\$0	\$0	0.0%
Trustee Costs, Interest-Capitalized, User Groups	\$0	\$0	\$0	0.0%
Utilities - System i.e. Print drivers	\$0	\$0	\$0	0.0%
Vitria (Middleware)	\$0	\$0	\$0	0.0%
Wide Area Network (WAN)	\$0	\$0	\$0	0.0%
	\$625,042	\$5,069,006	\$5,694,048	100.0%

Amounts may be redacted due to contractual nondisclosure provisions.

California Independent System Operator  
2011 Cost of Service  
EMC Storage by Type of Application  
Internal WAN

		Alhambra	Folsom		% of storage	Budgeted amount	Budgeted by System
Subsystem	Application	Allocated (Gb)				\$730,994	
NAS	NT-servers	13,260	24,480	37,740	17.85%	\$ 130,479	\$ 130,479
IFM	Integrated Forward Market (IFM)	538	1,615	2,153	1.02%	\$ 7,444	\$ 7,444
Documentum	Documentum	500	500	1,000	0.47%	\$ 3,457	\$ 3,457
ALFS	Automated Load Forecast System (ALFS)		-	-	0.00%	\$ -	\$ -
MQS	Market Quality System (MQS)	2,376	9,846	12,222	5.78%	\$ 42,255	\$ 42,255
SIBR	Post Transaction Repository (PTR)	493	1,691	2,184	1.03%	\$ 7,551	\$ 7,551
CMRI	Settlements and Market Clearing	2,825	3,707	6,532	3.09%	\$ 22,583	\$ 22,583
CAP	Compliance	1,166	1,436	2,602	1.23%	\$ 8,996	\$ 8,996
RAVE	RMR Application Validation Engine ( RAVE)	762	943	1,705	0.81%	\$ 5,895	\$ 5,895
EDR	Post Transaction Repository	-	22,723	22,723	10.75%	\$ 78,560	\$ 78,560
INT	MRTU Capital	448	2,556	3,004	1.42%	\$ 10,386	\$ 10,386
M RTP5	DRS	90	135	225	0.11%	\$ 778	\$ 778
OASIS	Open Access Same Time Information System (OASIS)	717	1,435	2,152	1.02%	\$ 7,440	\$ 7,440
SaMC	Settlements and Market Clearing	6,782	7,639	14,421	6.82%	\$ 49,858	\$ 49,858
OMAR	Operational Meter Analysis and Reporting (OMAR)	359	718	1,077	0.51%	\$ 3,724	\$ 3,724
ADS	Automated Dispatch System (ADS)	404	673	1,077	0.51%	\$ 3,724	\$ 3,724
SRS	Firm Transmission Right (FTR) and Secondary Registration System (SRS)	582	719	1,301	0.62%	\$ 4,498	\$ 4,498
SLIC	Scheduling & Logging for ISO California (SLIC)	404	762	1,166	0.55%	\$ 4,031	\$ 4,031
DW	DataWarehouse	3,478	-	3,478	1.64%	\$ 12,024	\$ 12,024
Dreams	Settlements and Market Clearing	6,470	7,866	14,336	6.78%	\$ 49,564	\$ 49,564
RTMA	Real Time Nodal Market	3,861	7,765	11,626	5.50%	\$ 40,195	\$ 40,195
Legacy (On Anote1 )	ALFS / PIRP / OASIS	683	-	683	0.32%	\$ 2,361	\$ 2,361
Legacy (On Apdb7 )	OMAR	1,117	-	1,117	0.53%	\$ 3,862	\$ 3,862
Legacy (On Apdb19 )	MOH/MPPP	2,009	-	2,009	0.95%	\$ 6,946	\$ 6,946
Legacy (On Aride1)	RTMA - Real Time Nodal Market	574	-	574	0.27%	\$ 1,984	\$ 1,984
Legacy (On Alhiapp189a)	STLMTP / RRUNP / MFP / RMRP / BCFP	1,742	-	1,742	0.82%	\$ 6,023	\$ 6,023
Legacy (On Fpdb20/Apdb19)	GEMP / ITSMP / MPPP / RIMSP / TRRP	33	400	433	0.20%	\$ 1,497	\$ 1,497
Legacy (On Fpdb29/Apdb30)	CMFP / BLP	471	471	942	0.45%	\$ 3,257	\$ 3,257
Legacy (On Fpdb31/Apdb32)	CMRP / TRRP	99	99	198	0.09%	\$ 685	\$ 685
PIRP	Participating Intermittent Resource Project (PIRP)	314	584	898	0.42%	\$ 3,105	\$ 3,105
OEM	Oracle Enterprise Manager (OEM)	157	337	494	0.23%	\$ 1,708	\$ 1,708
TRR	Resource Register (RR)	34	34	68	0.03%	\$ 235	\$ 235
SI/SA	Scheduling Infrastructure (SI)	3,216	-	3,216	1.52%	\$ 11,119	\$ 11,119
PI	Process Information System (PI)	4,300	5,900	10,200	4.82%	\$ 35,264	\$ 35,264
ESS	Human Resources	270	737	1,007	0.48%	\$ 3,482	\$ 3,482
STING	Scheduling & Tagging Next Generation (STiNG)	1,540	4,750	6,290	2.97%	\$ 21,746	\$ 21,746
VMWARE	NT-servers	4,950	16,675	21,625	10.23%	\$ 74,764	\$ 74,764
Legato	Backup systems (Legato/Quantum)	340	480	820	0.39%	\$ 2,835	\$ 2,835
Exchange	Office Automation - desktop/laptop (OA)	4,275	3,263	7,538	3.57%	\$ 26,061	\$ 26,061
MA	Dept. of Market Analysis Tools (SAS/MARS)	1,017	1,000	2,017	0.95%	\$ 6,973	\$ 6,973
MRTU	MRTU Capital	-	-	-	0.00%	\$ -	\$ -
Infrastructure Services	Application Development Tools	3,420	3,420	6,840	3.24%	\$ 23,648	\$ 23,648
TOTAL USABLE Storage (GB)		76,076	135,359	211,435	100.00%	\$ 730,994	\$ 730,994

**California Independent System Operator  
2011 Cost of Service  
Connected Entities by Type of WAN Connection**

Type of Connection	System Assignment Type	Number of Connections	Percent of Total
Scheduling Coordinator Circuits - (Market Operations)	Scheduling Infrastructure Business Rules (SIBR)	117	32.6%
Meter Circuits ( Settlements, Metering, Client Relations)	Meter Data Acquisition System (MDAS)	93	25.9%
ICCP, RIG, DPG Circuits to EMS (Grid Operations)	Energy Management System (EMS)	148	41.5%