



California ISO

**2019 Cost of Service Study and
2021 GMC Update**

DRAFT

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Executive Summary

The CAISO completed its scheduled triennial cost of service study (2019 cost of service study) in accordance with its Tariff (Appendix F, Schedule 1). The study analyzes cost and time data to determine how much time and effort staff uses to support varying cost categories and supplemental services. CAISO uses study results to update the GMC revenue requirement percentage allocations to the market services, system operations, and congestion revenue rights services (CRR services) cost categories (outlined in Table 1). The study results are also used to update the energy imbalance market (EIM) cost category percentages (outlined in Table 2) and the recently developed, the reliability coordinator (RC) funding percentage (outlined in Table 3). In addition, as part of the 2019 cost of service study, the CAISO analyzed its cost to support supplemental services (outlined in Table 4). The resulting percentage allocation changes and fee changes will be effective for the 2021 through 2023 GMC revenue requirement and grid management charges (GMC).

Table 1 – Summary of GMC Cost Category Percentage Changes

Cost Category	2016 Study Effective 2018 GMC	2019 Study Effective 2021 GMC	Increase / (Decrease) from Prior
Market Services	32%	49%	17%
System Operations	66%	49%	-17%
CRR Services	2%	2%	0%

The 2019 cost of service study results indicate a 17% shift of resources (time and dollars) from the system operations cost category to the market services cost category; the CRR service cost category percentage remains the same. The shift from system operations to market services is primarily driven by the efficiencies accomplished in supporting system operations functions. Due to automation of services, system improvements, and process efficiencies, CAISO staff is focused on supporting market services and system operations functions equally.

Table 2 – Summary of EIM Cost Category Percentage Changes

Cost Category	Sub-Category	2016 Study Effective 2018 GMC	2019 Study Effective 2021 GMC	Increase / (Decrease) from Prior
Market Services	Real Time Market	79%	63%	-16%
	Day Ahead Market	21%	37%	16%
System Operations	Real Time Dispatch	39%	50%	11%
	Balancing Authority	61%	50%	-11%

The results also indicate a shift of EIM related resources as well, shown highlighted in Table 2. The study shows that 16% of market services' resources shifted from the real time market functions to day ahead market functions. In addition, 11% of system operations' resources shifted from balancing authority functions to real time dispatch functions. The driver of the shifts is a balancing of efforts between the market services and system operations functions and responsibilities.

Table 3 – Summary of RC Funding Percentage Changes

Cost Category	2016 Modified Study Effective 2019 GMC	2019 Study Effective 2021 GMC	Increase / (Decrease) from Prior
Reliability Coordinator Services	9%	9%	0%

New to the triennial cost of service study is the analysis of RC services efforts. CAISO implemented its RC services in 2019. The study results indicate there is no change in the RC funding percentage from that of the initial calculation as part of CAISO's Reliability Coordinator Rate Design, Terms and Conditions proposal¹; the funding percentage will remain at 9%.

¹ Visit the CAISO website for additional information regarding the [Reliability Coordinator Rate Design, Terms and Conditions proposal](#).

Table 4 – Summary of Supplemental Fee Changes

Fee	Billing Units	Current Fee	Updated Fee
Bid Segment Fee	per bid segment	\$ 0.0050	No Change
Inter SC Trade Fee	per Inter SC Trade	\$ 1.0000	No Change
Scheduling Coordinator ID Fee	per month	\$ 1,000	\$ 1,500
TOR Fees	minimum of supply or demand TOR MWh	\$ 0.2400	\$ 0.1800
CRR Bid Fee	number of nominations and bids	\$ 1.00	No Change
Intermittent Resource Forecasting Fee	per MWh	\$ 0.1000	No Change
Scheduling Coordinator Application Fee	per application	\$ 5,000	\$ 7,500
CRR Application Fee	per application	\$ 1,000	\$ 5,000
HANA Administrative Fee	annual fee	\$ 45,000	No Change
HANA Setup Fee	one time fee	\$ 35,000	No Change

CAISO also used the 2019 cost of service study to analyze efforts that support other supplemental services. The study results indicate resources to process applications and statements increased. Whereas, resources to support transmission ownership rights (TOR) efforts decreased. CAISO is proposing changes to the Scheduling Coordinator ID fee, TOR fee, Scheduling Coordinator Application fee, and CRR Application fee based on the study. The revenue collected from the fees offset the costs recovered through either the GMC revenue requirement or the GMC rates. The CAISO is not proposing any other change in supplemental fees.

Other Tariff Amendments

Additionally, CAISO seeks to clarify in the Tariff the administrative process around the self-insured healthcare reserve. In 2018, CAISO converted a portion of its healthcare benefit program to a self-insured model. The intent of the program was to help CAISO and its employees mitigate the effects of rising healthcare costs. A self-insured health insurance program shifts the financial risk of paying health insurance claims to the employer versus the health insurance company. The benefits to the employer include more control over the design of the health insurance plan and saving the profit margin that insurance companies add to their premiums.

CAISO works with a health benefit consultant annually to determine the appropriate amount of premiums to assess the users of the plan given expected claims data. The original intent of the self-insured program was to enable the CAISO to be able to build a reserve in years in which actual claims were less than expected and to

use those reserves in years in which claims exceeded expectations. This would smooth out the volatility associated with healthcare claims.

It is not clear in the existing tariff whether CAISO is able to hold back the reserve from the operating cost reserve adjustment that is performed each year to fund the self-insured healthcare reserve. The operating cost reserve adjustment ensures that any excess or shortfall in any category that makes up the revenue requirement is accounted for in the annual rate development. Although the CAISO originally believed that the healthcare reserve could be established using the existing budgeting processes, the effect on the Tariff operating cost reserve adjustment process is not clear and therefore, CAISO will add specific language describing the annual healthcare reserve process.

Application of ABC to GMC and RC Rate Structure

The CAISO used activity based costing (ABC) for the first cost of service study to restructure the GMC rate design in 2011. The GMC design was vetted through a comprehensive stakeholder process. The design was approved by the CAISO Board of Governors and the Federal Energy Regulatory Commission (FERC) in 2011 and became effective on January 1, 2012.

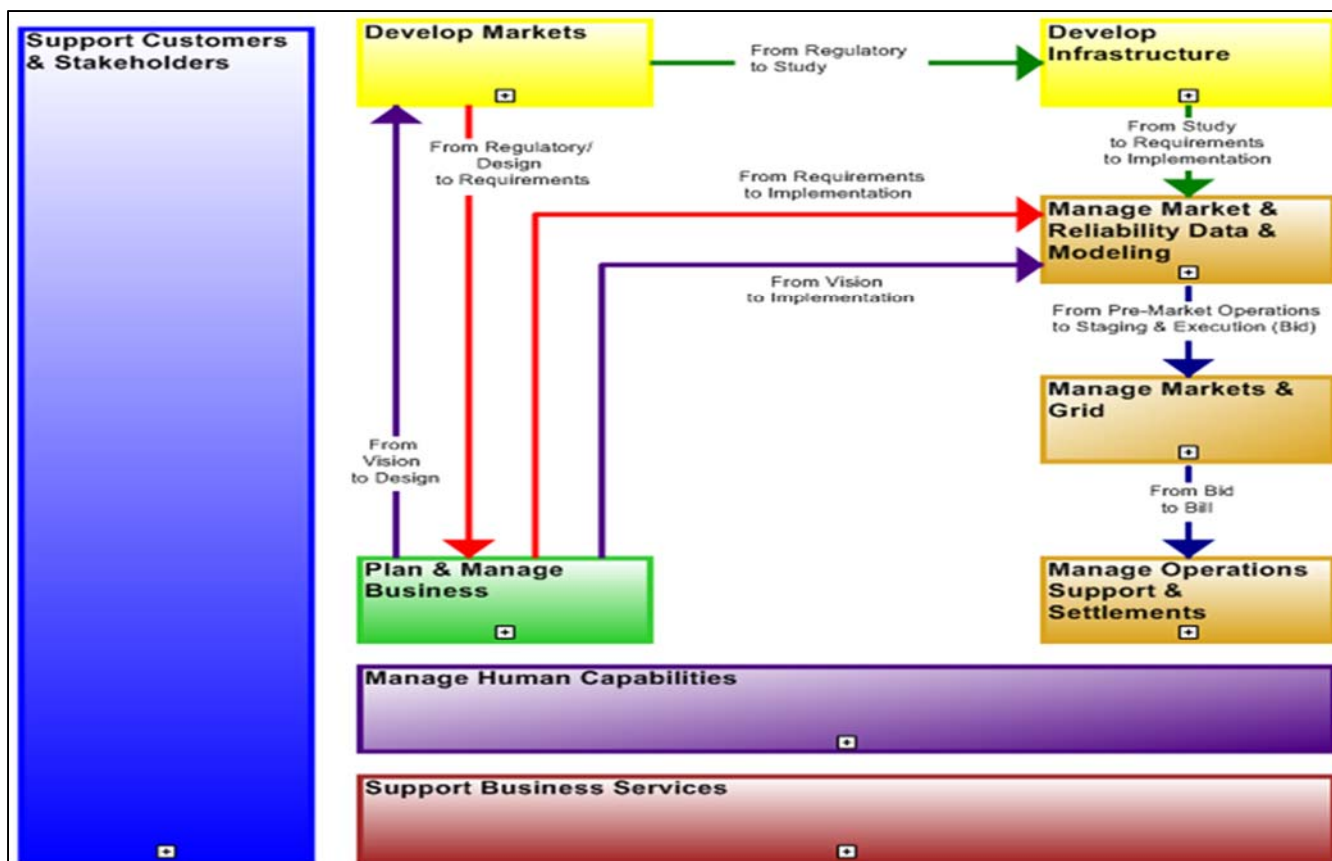
Activity based costing allows the CAISO to analyze the cost to provide services using budget, processes and time data. The analysis provides a comprehensive understanding of how much effort (time and resources) are contributing to each of the service cost categories. This method guides the CAISO to allocate the right portion of its annual revenue requirement to the GMC and other rates.

The GMC rate structure contains three cost categories: market services, system operations and CRR services. The market services category is designed to recover costs CAISO incurs for running the markets. The system operations category is designed to recover costs CAISO incurs for reliably operating the grid in real time. The CRR services category recovers costs CAISO incurs for running the CRR markets. The CAISO uses the cost of service study to determine the share of the CAISO's direct and indirect costs attributable to these three cost categories. The CAISO applies the percentages calculated as part of the cost of service study to the annual GMC revenue requirement to determine the amount in the cost categories upon which rates are set.

Within the market services and system operations cost categories, activity based costing also allows for the further delineation of resources to determine the appropriate percentage of GMC that EIM entities pay. Market services is bifurcated between real time market resources and day ahead market resources. While, system operations is split between real time dispatch resources and balancing area authority services. EIM entities pay the percentage of GMC associated with real time market and real time dispatch resources.

The 2019 cost of service study includes a new cost category, reliability coordinator, to calculate the RC funding percentage. The RC funding percentage represents the direct and indirect time and expense necessary for the CAISO to perform its RC services and functions. The RC funding percentage is used similarly to the GMC cost category percentages in that the RC funding percentage is multiplied against the revenue requirement to determine the RC funding requirement. This approach allows the RC funding requirement to leverage against the stability of CAISO's annual revenue requirement thus benefiting both the RC customers and the existing GMC customers.

Mapping of ISO Core Business Processes



Currently, the ABC analysis has disaggregated CAISO functions into nine core processes (level 1 activities). Each of the core activities were further broken down into major processes (level 2 activities) which were then mapped back to the level one activity. There are 107 level 2 activities included in the 2019 cost of service study.

CAISO continually reviews and develops its processes to reflect its current state of operations and process flows. The level 2 processes discussed in this study were mapped and defined as of March 2020. The level 1 activities were categorized into two types: (1) direct operating costs — those that can be directly mapped to a market, grid service, customer, or reliability service; and (2) support or indirect costs — those that support the direct activity.

Table 5 — Level 1 ABC Activities

ABC Process Code	Level 1 ABC Activity	Number of Level 2 Activity Tasks
Direct		
80001	Develop Infrastructure	10
80002	Develop Markets	9
80004	Manage Market & Reliability Data & Modeling	10
80005	Manage Market & Grid	6
80007	Manage Operations Support & Settlements	12
80008	Plan & Manage Business	12
80009	Support Business Services	34
80010	Support Customers & Stakeholders	6
	Total	99
Indirect		
80003	Manage Human Capabilities	8
9	Total	107

MAPPING OF ABC DIRECT OPERATING ACTIVITIES

Direct operating activities were defined, linked to specific processes, and measured using the 12 standard percentage allocations presented below.

Table 6 — Mapping of ABC Direct Operating Activities to Cost Categories

Standard Cost Category Percentage Allocations				
Option	1	2	3	4
1	100%			
2	95%	5%		
3	80%	20%		
4	80%	15%	5%	
5	80%	10%	5%	5%
6	60%	40%		
7	60%	35%	5%	
8	60%	30%	5%	5%
9	50%	50%		
10	50%	40%	10%	
11	45%	45%	5%	5%
12	40%	40%	20%	

2019 Modified Revenue Requirement: ABC Direct Operating Activities

GMC

Code	ABC Level 2 Activities	Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect	Comments
cost category % allocation							
80001 Develop Infrastructure (DI)							
201	Develop and Monitor Regulatory Contract Procedures	95%			5%		Efforts primarily support market services functions; as well as RC services functions on a smaller scale.
202	Manage Generator Interconnection Agreements		100%				Efforts related to managing the building and maintaining of the grid thus the costs are entirely to support system operations.
203	Manage Generator Interconnection Process		100%				Efforts related to managing the building and maintaining of the grid thus the costs are entirely to support system operations.
204	Manage Long Term Transmission Planning		100%				Efforts related to managing the building and maintaining of the grid thus the costs are entirely to support system operations.
205	Manage New Transmission Resources		95%		5%		Efforts primarily support system operations functions; as well as RC services functions on a smaller scale.
206	Manage Transmission Maintenance Standards		100%				Efforts related to managing the building and maintaining of the grid thus the costs are entirely to support system operations.
207	Manage Load Resource Data		100%				Efforts related to managing the building and maintaining of the grid thus the costs are entirely to support system operations.
208	Seasonal Assessment		100%				Efforts related to managing the building and maintaining of the grid thus the costs are entirely to support system operations.
209	Manage Queue Management		100%				Efforts related to managing the building and maintaining of the grid thus the costs are entirely to support system operations.
210	Manage Annual Delivery Assessment		100%				Efforts related to managing the building and maintaining of the grid thus the costs are entirely to support system operations.
80002 Develop Markets (DM)							
226	Manage Regulatory Filings					100%	Attributes are not distinguishable to any specific category.
227	Manage Tariff Amendments					100%	Attributes are not distinguishable to any specific category.
228	Manage Post Order, Rehearing, and Compliance					100%	Attributes are not distinguishable to any specific category.
229	Develop State / Federal Regulatory Policy	40%	60%				Efforts predominately support system operations functions; as well as those of market services on a smaller scale.
230	BPM Change Management	80%	10%	5%	5%		Efforts predominately support market services functions; as well as those of system operations, CRR services, and RC services on a smaller scale.
231	Develop Infrastructure Policy	40%	60%				Efforts predominately support system operations functions; as well as those of market services on a smaller scale.
232	Perform Market Analysis	80%	15%	5%			Efforts predominately support market services functions; as well as those of system operations and RC services on a smaller scale.
233	Develop Market Design	100%					Efforts are entirely to support the market results and function.
234	Manage Regulatory Contract Negotiations	95%			5%		Efforts primarily support system operations functions and RC service functions on a smaller scale.
80004 Manage Market & Reliability Data & Modeling (MMR)							
301	Manage Full Network Model Maintenance	45%	45%	5%	5%		Efforts primarily support market services and system operations functions equally, as well as those of RC services and CRR services on a smaller scale.
302	Plan & Develop Operations Simulator Training		95%		5%		Efforts primarily support system operations functions; as well as RC services functions on a smaller scale.
304	EMAA Telemetry	50%	50%				Efforts support market services and system operations functions equally.
307	Manage Congestion Revenue Rights			100%			Efforts support CRR services functions entirely.
308	Manage Credit & Collateral	40%	40%	20%			Efforts primarily support market services and system operations functions equally, as well as those of CRR services on a smaller scale.
309	Resource Management	50%	50%				Efforts support market services and system operations functions equally.
310	Manage Reliability Requirements		100%				Efforts relate to actual system operations functions thus the costs are entirely to support system operations.
311	Manage Operations Planning		95%		5%		Efforts primarily support system operations functions; as well as RC services functions on a smaller scale.
312	Manage WECC Studies		100%				Efforts relate to actual system operations functions thus the costs are entirely to support system operations.
314	Manage & Facilitate Procedure Maintenance		95%		5%		Efforts primarily support system operations functions; as well as RC services functions on a smaller scale.
316	Plan & Develop Operations Training		95%		5%		Efforts primarily support system operations functions; as well as RC services functions on a smaller scale.
317	Execute & Track Operations Training		95%		5%		Efforts primarily support system operations functions; as well as RC services functions on a smaller scale.
320	Provide Stakeholder Training	60%	30%	5%	5%		Efforts support all category functions; primarily those of market services and system operations.
321	Schedule Coordinator Management	45%	45%	5%	5%		Efforts primarily support market services and system operations functions equally; as well as those of RC services and CRR services on a smaller scale.
322	Register, Modify and Terminate PDR Resource	100%					Efforts are entirely to support the market results and function.
323	Calculate & Monitor Energy Costs & Indices	60%	35%		5%		Efforts primarily support market services and system operations functions; as well as RC services on a smaller scale.

2019 Modified Revenue Requirement: ABC Direct Operating Activities

GMC

Code	ABC Level 2 Activities	Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect	Comments
<i>cost category % allocation</i>							
80005 Manage Market & Grid (MMG)							
352	Manage Day Ahead Market Support	95%			5%		Efforts primarily support market service functions; as well as RC services functions on a smaller scale.
353	Operations Real Time Support	80%	15%		5%		Efforts predominately support market service functions; as well as those of system operations and RC services functions on a smaller scale.
355	Outage Model & Management	5%	60%		35%		Efforts predominately support system operations functions; as well as those of RC services and market services on a smaller scale.
360	Real Time Operations	20%	80%				Efforts predominately support system operations functions; as well as market services functions on a smaller scale.
362	Manage Operations Engineering Support	15%	80%		5%		Efforts predominately support system operations functions; as well as those of market services and RC services functions on a smaller scale.
367	Manage Operations Compliance & Event Analysis		50%		50%		Efforts support system operations and RC services functions equally.
368	Manage Day Ahead and Market Operations	100%					Efforts support market services functions entirely.
370	Manage Real Time Reliability Coordination				100%		Efforts support RC services functions entirely.
80007 Manage Operations Support & Settlements (MOS)							
401	Perform Market Validation	80%	20%				Efforts predominately support market services functions; as well as those of system operations functions on a smaller scale.
402	Manage Dispute Analysis & Resolution	100%					Efforts are entirely to support the market services results and functions.
403	Manage Market Quality System	50%	40%	10%			Efforts predominately support market services functions; as well as those of system operations and CRR services on a smaller scale.
406	Manage Rules of Conduct					100%	Attributes are not distinguishable to any specific category.
409	Meter Data Acquisition and Processing	100%					Efforts support market services functions entirely.
411	Manage Market Clearing	45%	45%	5%	5%		Efforts primarily support market services and system operations functions equally, as well as those of RC services and CRR services on a smaller scale.
412	Manage Market Billing & Settlements	45%	45%	5%	5%		Efforts primarily support market services and system operations functions equally, as well as those of RC services and CRR services on a smaller scale.
413	Manage Reliability Must Run Settlements		100%				Efforts support reliability on the grid thus the costs are entirely to support system operations functions.
414	Manage Settlements Quarterly Release Cycle	45%	45%	5%	5%		Efforts primarily support market services and system operations functions equally, as well as those of RC services and CRR services on a smaller scale.
417	Perform Market Report	80%	20%				Efforts predominately support market services functions; as well as those of system operations functions on a smaller scale.
418	Manage Good Faith Negotiation Requests	100%					Efforts support market services functions entirely.
419	Manage Price Corrections	50%	40%	10%			Efforts predominately support market services functions; as well as those of system operations and CRR services on a smaller scale.
80008 Plan & Manage Business (PMB)							
451	Manage Financial Planning					100%	Attributes are not distinguishable to any specific category.
452	Manage Application, Environment & Infrastructure					100%	Attributes are not distinguishable to any specific category.
453	Manage Resource Allocation					100%	Attributes are not distinguishable to any specific category.
454	Project Portfolio Management					100%	Attributes are not distinguishable to any specific category.
455	Manage Technology Collaboration (Internal)	100%					Efforts support market services functions entirely.
457	Manage Annual Functional Release Lifecycle					100%	Attributes are not distinguishable to any specific category.
459	Enterprise Risk Management					100%	Attributes are not distinguishable to any specific category.
461	Perform Board Processes					100%	Attributes are not distinguishable to any specific category.
462	Manage Technology Collaboration (External)	100%					Efforts support market services functions entirely.
466	Manage Corporate Goal Alignment and Reporting					100%	Attributes are not distinguishable to any specific category.
467	Research & Proof of Concept					100%	Attributes are not distinguishable to any specific category.
469	Manage Project & Effort Lifecycles					100%	Attributes are not distinguishable to any specific category.

2019 Modified Revenue Requirement: ABC Direct Operating Activities

GMC

Code	ABC Level 2 Activities	Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect	Comments
<i>cost category % allocation</i>							
80009 Support Business Services (SBS)							
501	Manage Monthly Financial Cycle					100%	Attributes are not distinguishable to any specific category.
502	Invest Corporate Funds					100%	Attributes are not distinguishable to any specific category.
503	Manage Financial Reporting					100%	Attributes are not distinguishable to any specific category.
504	IT Application, System, & Non-Production Support	80%	15%		5%		Efforts predominately support market services functions; as well as those of system operations and RC services on a smaller scale.
505	IT Asset Management					100%	Attributes are not distinguishable to any specific category.
508	IT Configuration, Change & Release Management					100%	Attributes are not distinguishable to any specific category.
510	IT Event Management					100%	Attributes are not distinguishable to any specific category.
511	IT Incident Management	60%	30%	5%	5%		Efforts predominately support market services functions; as well as those of system operations, CRR services, and RC services on a smaller scale.
512	IT Information Security Management					100%	Attributes are not distinguishable to any specific category.
513	IT Problem & Risk Lifecycle Management	60%	30%	5%	5%		Efforts predominately support market services functions; as well as those of system operations, CRR services, and RC services on a smaller scale.
519	Provision and Manage Access					100%	Attributes are not distinguishable to any specific category.
520	Manage Facilities, Physical Security, & Safety					100%	Attributes are not distinguishable to any specific category.
521	Facilities Incident Management					100%	Attributes are not distinguishable to any specific category.
522	Corporate Incident Response & Disaster Recovery					100%	Attributes are not distinguishable to any specific category.
523	Manage Business Continuity Plan					100%	Attributes are not distinguishable to any specific category.
528	Procurement & Vendor Management					100%	Attributes are not distinguishable to any specific category.
529	Provide Legal Advice					100%	Attributes are not distinguishable to any specific category.
530	Manage Dispute Resolution					100%	Attributes are not distinguishable to any specific category.
533	Manage Evidence Review / Audit					100%	Attributes are not distinguishable to any specific category.
535	Tariff Controls Monitoring					100%	Attributes are not distinguishable to any specific category.
536	Manage Internal Audit					100%	Attributes are not distinguishable to any specific category.
537	Monitor Markets	80%		20%			Efforts predominately support market services functions and CRR services functions on a smaller scale.
538	Manage Tariff Rules Violations					100%	Attributes are not distinguishable to any specific category.
543	Market Design					100%	Attributes are not distinguishable to any specific category.
544	Maintain DMM Database					100%	Attributes are not distinguishable to any specific category.
545	Manage Business Process & Continuous Improvement					100%	Attributes are not distinguishable to any specific category.
546	Records Management					100%	Attributes are not distinguishable to any specific category.
548	Manage Compliance Standards Development and Implementation					100%	Attributes are not distinguishable to any specific category.
549	Manage Compliance Investigations					100%	Attributes are not distinguishable to any specific category.
550	Manage NERC Compliance					100%	Attributes are not distinguishable to any specific category.
552	IT Reports & Documentation					100%	Attributes are not distinguishable to any specific category.
553	Manage Vulnerability Remediation					100%	Attributes are not distinguishable to any specific category.
554	Monitor & Maintain Backups					100%	Attributes are not distinguishable to any specific category.
555	Manage Root Cause Analysis					100%	Attributes are not distinguishable to any specific category.
80010 Support Customers & Stakeholders (SCS)							
539	Representing the ISO					100%	Attributes are not distinguishable to any specific category.
601	Manage Client Inquiries	80%	10%	5%	5%		Efforts predominately support market services functions; as well as those of system operations, CRR services, and RC services on a smaller scale.
602	Account Management	80%	10%	5%	5%		Efforts predominately support market services functions; as well as those of system operations, CRR services, and RC services on a smaller scale.
603	Manage Stakeholder Processes	80%	10%	5%	5%		Efforts predominately support market services functions; as well as those of system operations, CRR services, and RC services on a smaller scale.
609	Manage External Affairs					100%	Attributes are not distinguishable to any specific category.
610	Manage Communications & Public Relations					100%	Attributes are not distinguishable to any specific category.

MAPPING OF NON-ABC SUPPORT COSTS

For the next step, the CAISO pulled significant non-payroll ABC costs out of the operations and maintenance budget and allocated to buckets based on specific charge codes or to indirect costs.

Table 7 — Mapping of Non-ABC Support Costs to Cost Categories

2019 Modified Revenue Requirement: Non-ABC Support Costs						
Component	GMC			Reliability Coordinator	Indirect	Comments
	Market Services	System Operations	CRR Services			
<i>cost category % allocation</i>						
Non-ABC Support Costs						
Corporate Services Divisions						
Bank Fees					100%	Attributes are not distinguishable to any specific category.
HR Support					100%	Attributes are not distinguishable to any specific category.
Insurance					100%	Attributes are not distinguishable to any specific category.
SSAE 16 Audit	45%	45%	5%	5%		Use Process 80007, Task 412 allocations.
Market and Infrastructure Development Division (MID)						
Market Surveillance Committee	80%	15%	5%			Use Process 80002, Task 232 allocations.
Technology Division (TECH)						
Hardware and Software Maintenance and Equipment					100%	Attributes are not distinguishable to any specific category.
Intermittent Resource Forecasting Costs	80%	15%		5%		Use Process 80005, Task 353 allocations.
Occupancy					100%	Attributes are not distinguishable to any specific category.
Reliability Coordinator Tools				100%		Use Process 80005, Task 370 allocations.
Telecommunications					100%	Attributes are not distinguishable to any specific category.
Market Quality and California Regulatory Affairs Division (MQCRA)						
Intermittent Resource Forecasting Costs	80%	15%		5%		Use Process 80005, Task 353 allocations.
General Counsel Division (GC)						
Operations Audit	24%	52%		24%		Use Process 80005 total allocations.
Outside Legal					100%	Attributes are not distinguishable to any specific category.

MAPPING OF ABC INDIRECT ACTIVITIES

ABC support activities were allocated to indirect costs.

Table 8 — Mapping of ABC Indirect Activities to Cost Categories

2019 Modified Revenue Requirement: ABC Indirect Costs						
Component	GMC			Reliability Coordinator	Indirect	Comments
	Market Services	System Operations	CRR Services			
<i>cost category % allocation</i>						
ABC Indirect Costs						
80003: Manage Human Capabilities (MHC)					100%	Attributes are not distinguishable to any specific category.

MAPPING OF DEBT SERVICE AND CASH FUNDED CAPITAL

Debt service is the aggregation of principle, interest, and a 25% debt service reserve on the 2013 bonds. The 2013 bonds refunded the 2009 bonds, which funded the building of CAISO’s corporate headquarters in Folsom. The debt service was allocated 100 percent to indirect costs.

The revenue requirement also includes cash funded capital. The funds raised through the GMC contribute to maintaining a long-term capital reserve fund, which varies from the capital project budget for that year. The number of, and cost for, capital projects varies significantly from year to year. The annual budget identifies the approved capital spending limits but not the projects themselves. A proposed listing is provided to an internal management committee; which meets throughout the year to review and approve funding for specific projects. Because of the uncertainty of the actual projects coming on line, 100% of the cash funded capital was allocated to indirect costs.

Table 9 — Mapping of Debt Service and Capital to Cost Categories

2019 Modified Revenue Requirement: Debt Service Bonds and Cash Funded Capital						
Component	GMC				Indirect	Comments
	Market Services	System Operations	CRR Services	Reliability Coordinator		
	<i>cost category % allocation</i>					
Debt Service Bonds					100%	Bonds used for Folsom location building and land. As well as for feasibility studies. Attributes are not distinguishable to any specific category.
Cash Funded Capital					100%	Amounts and projects vary yearly thus attributes are not distinguishable to any specific category.

MAPPING OF OTHER REVENUE AND OPERATING COST RESERVE ADJUSTMENT

The remaining revenue requirement components, other revenue and operating cost reserve adjustment, were then analyzed and allocated to buckets based on specific charge codes or to indirect costs.

Table 10 — Mapping of Other Revenue to Cost Categories

2019 Modified Revenue Requirement: Other Costs and Revenue						
Component	GMC				Indirect	Comments
	Market Services	System Operations	CRR Services	Reliability Coordinator		
cost category % allocation						
Other Costs and Revenue						
California-Oregon Intertie Path Operator Fees		100%				Fees offset system operations costs.
Energy Imbalance Market Administration Charges					100%	Attributes are not distinguishable to any specific category.
Interest Earnings					100%	Attributes are not distinguishable to any specific category.
Intermittent Resource Forecasting Fees	80%	15%		5%		Use Process 80005, Task 353 allocations.
Generator Interconnection Project Fees and Application Fees		100%				Use Process 80001, Task 203 allocations.
HANA Administrative Fees*				100%		Use Process 80005, Task 370 allocations.
Metered Sub-Station Penalties					100%	Attributes are not distinguishable to any specific category.
Planning Coordinator Fees		100%				Use Process 80001, Task 204 allocations.
SC Application Fees					100%	Attributes are not distinguishable to any specific category.
Reliability Coordinator Funding Requirement*				100%		Use Process 80005, Task 370 allocations.
* Modifications were made to the 2019 Revenue Requirement to include HANA Administrative Fees and a full year's worth of Reliability Coordinator Funding Requirement as these services were not or partially included in the original 2019 Revenue Requirement. As a reminder, the CAISO began offering Reliability Coordinator services July 1, 2019.						

Table 11 — Mapping of Operating Cost Reserve Adjustment to Cost Categories

2019 Modified Revenue Requirement: Operating Cost Reserve Adjustment						
Component	GMC				Indirect	Comments
	Market Services	System Operations	CRR Services	Reliability Coordinator		
cost category % allocation						
Operating Cost Reserve Adjustment						
Adjustment in 15% Reserve for O&M					100%	
25% Debt Service Reserve for 2013 Bonds					100%	
Revenue Changes					100%	
Expense Changes					100%	Attributes are not distinguishable to any specific category.

MAPPING OF INDIRECT COSTS

Indirect costs were aggregated and then allocated proportionally to direct costs. After this mapping is completed it can be applied to the CAISO revenue requirement to derive the related cost of service.

Costing the 2019 GMC Revenue Requirement

The CAISO applied the allocation matrix of level 2 activities to the 2019 revenue requirement to determine the costs associated with the cost categories. Modifications were made to the other costs and revenue category to include HANA administrative fees and a full year's worth of reliability coordinator (RC) funding requirement as these services were not included, in the case of HANA administrative fees, or partially included, in the case of the RC funding requirement, in the original 2019 revenue requirement. As a reminder, the CAISO began offering RC services July 1, 2019. The 2019 revenue requirement data and employee hours are the most recent information available to both determine the cost category percentage updates for the 2021 GMC tariff filing.

Table 12 — 2019 Modified GMC Revenue Requirement Components

2019 Modified GMC Revenue Requirement	
Components	Budget (\$ in thousands)
Operations and Maintenance	\$ 189,030
Debt Service	\$ 16,904
Cash Funded Capital	\$ 25,000
Other Costs and Revenues	\$ (38,662)
Operating Costs Reserve Adjustment	\$ (13,480)
Total	\$ 178,792

Completing the analysis required the following steps:

1. Breaking out non-ABC operations and maintenance (O&M) support costs and applying cost category percentages to these costs;
2. Allocating the ABC direct and indirect O&M costs into two components: level 2 activities and support costs. This process involved:
 - a. allocating cost centers to level 1 ABC activities
 - b. applying cost category percentages to level 1 support costs

- c. obtaining time estimates for level 2 activities for those level 1 activities that are direct operating costs
 - d. allocating costs to level 2 activities
 - e. applying cost category percentages;
3. Allocating remaining revenue requirement components to cost categories and applying cost category percentages to these costs;
 4. Aggregating costs and allocating indirect costs to cost categories based on percentage of direct costs, allocating fees to the cost category buckets and determining resulting cost category percentages; and
 5. Dividing resulting costs by estimated volumes to determine 2019 rates using revised cost category percentages.

Step 1: Breaking Out Non-ABC Support Costs

There are two types of O&M costs; those that are activity related such as costs attributed to personnel, and non-ABC costs such as facilities costs. The O&M budget was broken down into those two categories. The significant non-ABC support costs were removed from the divisions and allocated separately.

Table 13 — Allocation of Costs to ABC Activities and Non-ABC Activities

2019 Operations and Maintenance Budget (\$ in thousands)			
Division	ABC Activity Costs	Non-ABC Activity Costs	Total
Corporate Services	\$ 14,631	\$ 5,683	\$ 20,314
Market and Infrastructure Development	\$ 16,514	314	\$ 16,828
Technology	\$ 45,464	24,921	\$ 70,385
Operations	\$ 47,457	-	\$ 47,457
General Counsel	\$ 11,943	2,726	\$ 14,669
Market Quality and California Regulatory Affairs	\$ 8,609	355	\$ 8,964
External and Customer Affairs	\$ 10,413	-	\$ 10,413
Total	\$ 155,031	\$ 33,999	\$ 189,030

These budgeted costs were allocated using the percentages shown in *Table 7 — Mapping of Non-ABC Support Costs to Cost Categories*.

Table 14 — Allocation of Non-ABC Support Costs to Cost Categories

2019 Modified Revenue Requirement: Non-ABC Support Costs											
Component	GMC					2019 Budget	GMC				
	Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect		Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect
	cost category % allocation						budget allocations (amounts in thousands)				
Non-ABC Support Costs											
Corporate Services Divisions											
Bank Fees					100%	\$ 430	\$ -	\$ -	\$ -	\$ -	\$ 430
HR Support					100%	\$ 2,392	\$ -	\$ -	\$ -	\$ -	\$ 2,392
Insurance					100%	\$ 2,301	\$ -	\$ -	\$ -	\$ -	\$ 2,301
SSAE 16 Audit	45%	45%	5%	5%		\$ 560	\$ 252	\$ 252	\$ 28	\$ 28	\$ -
Corporate Services Division Total						\$ 5,683	\$ 252	\$ 252	\$ 28	\$ 28	\$ 5,123
Market and Infrastructure Development Division (MID)											
Market Surveillance Committee	80%	15%	5%			\$ 314	\$ 251	\$ 47	\$ 16	\$ -	\$ -
MID Total						\$ 314	\$ 251	\$ 47	\$ 16	\$ -	\$ -
Technology Division (TECH)											
Hardware and Software Maintenance and Equipment					100%	\$ 12,630	\$ -	\$ -	\$ -	\$ -	\$ 12,630
Intermittent Resource Forecasting Costs	80%	15%		5%	100%	\$ 986	\$ 789	\$ 148	\$ -	\$ 49	\$ -
Occupancy					100%	\$ 5,624	\$ -	\$ -	\$ -	\$ -	\$ 5,624
Reliability Coordinator Tools				100%		\$ 1,015	\$ -	\$ -	\$ -	\$ 1,015	\$ -
Telecommunications					100%	\$ 4,666	\$ -	\$ -	\$ -	\$ -	\$ 4,666
Technology Total						\$ 24,921	\$ 789	\$ 148	\$ -	\$ 1,064	\$ 22,920
Market Quality and California Regulatory Affairs Division (MQCRA)											
Intermittent Resource Forecasting Costs	80%	15%		5%		\$ 355	\$ 284	\$ 53	\$ -	\$ 18	\$ -
MQCRA Total						\$ 355	\$ 284	\$ 53	\$ -	\$ 18	\$ -
General Counsel Division (GC)											
Operations Audit	24%	52%		24%		\$ 126	\$ 30	\$ 66	\$ -	\$ 30	\$ -
Outside Legal					100%	\$ 2,600	\$ -	\$ -	\$ -	\$ -	\$ 2,600
General Counsel Total						\$ 2,726	\$ 30	\$ 66	\$ -	\$ 30	\$ 2,600
Total Non-ABC Support Costs						\$ 33,999	\$ 1,606	\$ 566	\$ 44	\$ 1,140	\$ 30,643

Step 2: Allocation of O&M Costs

For activity related O&M costs, the current ABC structure was utilized to allocate costs between the cost categories. CAISO activities were broken out into nine level 1 ABC activities as shown in *Table 5 — Level 1 ABC Activities*. For the direct operating level 1 activities, the associated level 2 activities were mapped to one of the three cost categories as shown in *Table 6 — Mapping of ABC Direct Operating Activities to Cost Categories*. The level 1 support activities were allocated to ABC support costs.

The O&M budget is comprised of approximately 111 cost centers. The reported 2019 time card data was collected and the percentage breakdown of each cost center by the level one and level 2 direct activities was determined. The percentage was applied to the activity budget for the cost center to allocate the cost center activity budget by dollars to the level one and level 2 direct operating activities.

ABC DIRECT OPERATING ACTIVITIES

Table 15 — Allocation of Division Hours to Direct Operating Activities

ABC Process Code	Level 1 ABC Activity	Allocation of Hours By Division							Total
		Corporate Services	Market and Infrastructure Development	Technology	Operations	General Counsel	Market Quality and California Regulatory Affairs	External and Customer Affairs	
Direct									
80001	Develop Infrastructure	4%	92%	0%	2%	0%	1%	1%	100%
80002	Develop Markets	0%	50%	0%	6%	9%	34%	0%	100%
80004	Manage Market & Reliability Data & Modeling	5%	1%	23%	62%	0%	3%	6%	100%
80005	Manage Market & Grid	0%	0%	4%	96%	0%	1%	0%	100%
80007	Manage Operations Support & Settlements	2%	0%	5%	77%	0%	15%	2%	100%
80008	Plan & Manage Business	7%	0%	87%	0%	6%	0%	0%	100%
80009	Support Business Services	13%	0%	71%	1%	15%	0%	0%	100%
80010	Support Customers & Stakeholders	0%	1%	0%	1%	0%	10%	88%	100%
	Total	6%	10%	33%	35%	5%	4%	6%	100%

The hours were then aggregated by level 2 activity.

Table 16 — Allocation of Division Hours to Level 2 Activities

		Allocation of Hours By Division							
Code	ABC Level 2 Activities	Corporate Services	Market and Infrastructure Development	Technology	Operations	General Counsel	Market Quality and California Regulatory Affairs	External and Customer Affairs	Total
80001 Develop Infrastructure (DI)									
201	Develop and Monitor Regulatory Contract Procedures	0%	93%	0%	0%	0%	0%	7%	100%
202	Manage Generator Interconnection Agreements	0%	100%	0%	0%	0%	0%	0%	100%
203	Manage Generator Interconnection Process	16%	84%	0%	0%	0%	0%	0%	100%
204	Manage Long Term Transmission Planning	0%	100%	0%	0%	0%	0%	0%	100%
205	Manage New Transmission Resources	0%	30%	0%	50%	0%	19%	0%	100%
206	Manage Transmission Maintenance Standards	0%	100%	0%	0%	0%	0%	0%	100%
207	Manage Load Resource Data	0%	100%	0%	0%	0%	0%	0%	100%
208	Seasonal Assessment	0%	91%	0%	0%	0%	9%	0%	100%
209	Manage Queue Management	0%	100%	0%	0%	0%	0%	0%	100%
210	Manage Annual Delivery Assessment	0%	100%	0%	0%	0%	0%	0%	100%
10	Total DI	4%	92%	0%	2%	0%	1%	1%	100%
80002 Develop Markets (DM)									
226	Manage Regulatory Filings	0%	0%	0%	0%	100%	0%	0%	100%
227	Manage Tariff Amendments	0%	0%	0%	0%	100%	0%	0%	100%
228	Manage Post Order, Rehearing, and Compliance	0%	0%	0%	0%	100%	0%	0%	100%
229	Develop State / Federal Regulatory Policy	0%	15%	0%	85%	0%	0%	0%	100%
230	BPM Change Management	0%	29%	0%	71%	0%	0%	0%	100%
231	Develop Infrastructure Policy	0%	90%	0%	8%	0%	2%	0%	100%
232	Perform Market Analysis	0%	5%	0%	0%	0%	95%	0%	100%
233	Develop Market Design	0%	87%	0%	0%	0%	13%	0%	100%
234	Manage Regulatory Contract Negotiations	0%	100%	0%	0%	0%	0%	0%	100%
9	Total DM	0%	50%	0%	6%	9%	34%	0%	100%

		Allocation of Hours By Division								
Code	ABC Level 2 Activities	Corporate Services	Market and Infrastructure Development	Technology	Operations	General Counsel	Market Quality and California Regulatory Affairs	External and Customer Affairs	Total	
80004 Manage Market & Reliability Data & Modeling (MMR)										
301	Manage Full Network Model Maintenance	0%	0%	86%	14%	0%	0%	0%	100%	
302	Plan & Develop Operations Simulator Training	0%	0%	1%	99%	0%	0%	0%	100%	
304	EMAA Telemetry	0%	0%	0%	100%	0%	0%	0%	100%	
307	Manage Congestion Revenue Rights	0%	0%	0%	100%	0%	0%	0%	100%	
308	Manage Credit & Collateral	100%	0%	0%	0%	0%	0%	0%	100%	
309	Resource Management	0%	0%	0%	100%	0%	0%	0%	100%	
310	Manage Reliability Requirements	0%	18%	0%	65%	0%	17%	0%	100%	
311	Manage Operations Planning	0%	0%	0%	100%	0%	0%	0%	100%	
312	Manage WECC Studies	0%	0%	0%	100%	0%	0%	0%	100%	
314	Manage & Facilitate Procedure Maintenance	0%	0%	0%	100%	0%	0%	0%	100%	
316	Plan & Develop Operations Training	0%	0%	0%	98%	0%	2%	0%	100%	
317	Execute & Track Operations Training	0%	0%	0%	100%	0%	0%	0%	100%	
320	Provide Stakeholder Training	0%	0%	0%	2%	0%	0%	98%	100%	
321	Schedule Coordinator Management	0%	10%	0%	0%	0%	0%	90%	100%	
322	Register, Modify and Terminate PDR Resource	0%	0%	0%	100%	0%	0%	0%	100%	
323	Calculate & Monitor Energy Costs & Indices	31%	0%	0%	0%	0%	69%	0%	100%	
10	Total MMR	5%	1%	23%	62%	0%	3%	6%	100%	
80005 Manage Market & Grid (MMG)										
352	Manage Day Ahead Market Support	0%	0%	4%	36%	0%	60%	0%	100%	
353	Operations Real Time Support	0%	0%	78%	20%	0%	2%	0%	100%	
355	Outage Model & Management	0%	0%	0%	100%	0%	0%	0%	100%	
360	Real Time Operations	0%	0%	0%	100%	0%	0%	0%	100%	
362	Manage Operations Engineering Support	0%	0%	0%	100%	0%	0%	0%	100%	
367	Manage Operations Compliance & Event Analysis	0%	0%	0%	100%	0%	0%	0%	100%	
368	Manage Day Ahead and Market Operations	0%	0%	0%	100%	0%	0%	0%	100%	
370	Manage Real Time Reliability Coordination	0%	0%	0%	100%	0%	0%	0%	100%	
6	Total MMG	0%	0%	4%	96%	0%	1%	0%	100%	

		Allocation of Hours By Division							
Code	ABC Level 2 Activities	Corporate Services	Market and Infrastructure Development	Technology	Operations	General Counsel	Market Quality and California Regulatory Affairs	External and Customer Affairs	Total
80007 Manage Operations Support & Settlements (MOS)									
401	Perform Market Validation	0%	0%	0%	100%	0%	0%	0%	100%
402	Manage Dispute Analysis & Resolution	0%	0%	5%	95%	0%	0%	0%	100%
403	Manage Market Quality System	0%	0%	53%	47%	0%	0%	0%	100%
406	Manage Rules of Conduct	0%	0%	0%	100%	0%	0%	0%	100%
409	Meter Data Acquisition and Processing	0%	0%	0%	100%	0%	0%	0%	100%
411	Manage Market Clearing	100%	0%	0%	0%	0%	0%	0%	100%
412	Manage Market Billing & Settlements	0%	0%	0%	91%	0%	0%	9%	100%
413	Manage Reliability Must Run Settlements	0%	0%	0%	0%	0%	0%	100%	100%
414	Manage Settlements Quarterly Release Cycle	0%	0%	0%	100%	0%	0%	0%	100%
417	Perform Market Report	0%	0%	0%	47%	0%	53%	0%	100%
418	Manage Good Faith Negotiation Requests	0%	0%	0%	0%	54%	0%	46%	100%
419	Manage Price Corrections	0%	0%	0%	24%	0%	76%	0%	100%
12	Total MOS	2%	0%	5%	77%	0%	15%	2%	100%
80008 Plan & Manage Business (PMB)									
451	Manage Financial Planning	98%	0%	0%	0%	0%	2%	0%	100%
452	Manage Application, Environment & Infrastructure	0%	0%	100%	0%	0%	0%	0%	100%
453	Manage Resource Allocation	0%	0%	100%	0%	0%	0%	0%	100%
454	Project Portfolio Management	0%	0%	99%	1%	0%	0%	0%	100%
455	Manage Technology Collaboration (Internal)	0%	0%	100%	0%	0%	0%	0%	100%
457	Manage Annual Functional Release Lifecycle	0%	0%	100%	0%	0%	0%	0%	100%
459	Enterprise Risk Management	0%	0%	0%	0%	100%	0%	0%	100%
461	Perform Board Processes	3%	3%	0%	0%	91%	0%	3%	100%
462	Manage Technology Collaboration (External)	0%	0%	100%	0%	0%	0%	0%	100%
466	Manage Corporate Goal Alignment and Reporting	0%	0%	31%	0%	69%	0%	0%	100%
467	Research & Proof of Concept	0%	0%	100%	0%	0%	0%	0%	100%
469	Manage Project & Effort Lifecycles	0%	0%	100%	0%	0%	0%	0%	100%
12	Total PMB	7%	0%	87%	0%	6%	0%	0%	100%

		Allocation of Hours By Division							Total
Code	ABC Level 2 Activities	Corporate Services	Market and Infrastructure Development	Technology	Operations	General Counsel	Market Quality and California Regulatory Affairs	External and Customer Affairs	Total
80009 Support Business Services (SBS)									
501	Manage Monthly Financial Cycle	100%	0%	0%	0%	0%	0%	0%	100%
502	Invest Corporate Funds	100%	0%	0%	0%	0%	0%	0%	100%
503	Manage Financial Reporting	98%	0%	0%	0%	2%	0%	0%	100%
504	IT Application, System, & Non-Production Support	0%	0%	100%	0%	0%	0%	0%	100%
505	IT Asset Management	0%	0%	100%	0%	0%	0%	0%	100%
508	IT Configuration, Change & Release Management	0%	0%	99%	1%	0%	0%	0%	100%
510	IT Event Management	0%	0%	100%	0%	0%	0%	0%	100%
511	IT Incident Management	0%	0%	100%	0%	0%	0%	0%	100%
512	IT Information Security Management	0%	0%	100%	0%	0%	0%	0%	100%
513	IT Problem & Risk Lifecycle Management	0%	0%	100%	0%	0%	0%	0%	100%
519	Provision and Manage Access	0%	0%	100%	0%	0%	0%	0%	100%
520	Manage Facilities, Physical Security, & Safety	0%	0%	100%	0%	0%	0%	0%	100%
521	Facilities Incident Management	0%	0%	100%	0%	0%	0%	0%	100%
522	Corporate Incident Response & Disaster Recovery	13%	0%	1%	33%	45%	0%	7%	100%
523	Manage Business Continuity Plan	3%	1%	84%	9%	1%	0%	1%	100%
528	Procurement & Vendor Management	99%	0%	1%	0%	0%	0%	0%	100%
529	Provide Legal Advice	0%	0%	0%	0%	100%	0%	0%	100%
530	Manage Dispute Resolution	0%	0%	12%	0%	88%	0%	0%	100%
533	Manage Evidence Review / Audit	0%	0%	50%	50%	0%	0%	0%	100%
535	Tariff Controls Monitoring	0%	0%	6%	0%	94%	0%	0%	100%
536	Manage Internal Audit	0%	0%	1%	0%	99%	0%	0%	100%
537	Monitor Markets	98%	0%	0%	2%	0%	0%	0%	100%
538	Manage Tariff Rules Violations	80%	0%	0%	0%	20%	0%	0%	100%
543	Market Design	100%	0%	0%	0%	0%	0%	0%	100%
544	Maintain DMM Database	100%	0%	0%	0%	0%	0%	0%	100%
545	Manage Business Process & Continuous Improvement	0%	0%	81%	19%	0%	0%	0%	100%
546	Records Management	4%	4%	2%	7%	83%	0%	0%	100%
548	Manage Compliance Standards Development and Implementation	0%	17%	35%	31%	17%	0%	0%	100%
549	Manage Compliance Investigations	0%	0%	13%	0%	87%	0%	0%	100%
550	Manage NERC Compliance	0%	6%	8%	1%	85%	0%	0%	100%
552	IT Reports & Documentation	0%	0%	100%	0%	0%	0%	0%	100%
553	Manage Vulnerability Remediation	0%	0%	100%	0%	0%	0%	0%	100%
554	Monitor & Maintain Backups	0%	0%	100%	0%	0%	0%	0%	100%
555	Manage Root Cause Analysis	0%	0%	0%	92%	8%	0%	0%	100%
34	Total SBS	13%	0%	71%	1%	15%	0%	0%	100%
80010 Support Customers & Stakeholders (SCS)									
539	Representing the ISO	0%	20%	3%	2%	0%	62%	13%	100%
601	Manage Client Inquiries	0%	0%	0%	4%	0%	0%	96%	100%
602	Account Management	0%	0%	0%	0%	0%	0%	100%	100%
603	Manage Stakeholder Processes	0%	2%	0%	0%	0%	0%	98%	100%
609	Manage External Affairs	0%	0%	0%	0%	1%	21%	78%	100%
610	Manage Communications & Public Relations	0%	0%	0%	0%	0%	0%	100%	100%
6	Total SCS	0%	1%	0%	1%	0%	10%	88%	100%
Total Direct O&M		6%	10%	33%	35%	5%	4%	6%	100%

DIRECT OPERATING ACTIVITIES

The direct operating activities costs were factored into the allocation matrix shown in *Table 6 — Mapping of ABC Direct Operating Activities to Cost Categories* to get the costs to the cost categories.

Table 17 — Allocation of Division Costs to Direct Operating Activities

Allocation of Costs By Division (\$ in thousands)									
ABC Process Code	Level 1 ABC Activity	Corporate Services	Market and Infrastructure Development	Technology	Operations	General Counsel	Market Quality and California Regulatory Affairs	External and Customer Affairs	Total
Direct									
80001	Develop Infrastructure	\$ 629	\$ 11,623	\$ -	\$ 416	\$ 24	\$ 125	\$ 46	\$ 12,863
80002	Develop Markets	\$ 170	\$ 4,190	\$ -	\$ 599	\$ 1,302	\$ 3,442	\$ -	\$ 9,703
80004	Manage Market & Reliability Data & Modeling	\$ 1,303	\$ 227	\$ 3,247	\$ 9,678	\$ -	\$ 1,098	\$ 923	\$ 16,476
80005	Manage Market & Grid	\$ 610	\$ -	\$ 799	\$ 28,077	\$ -	\$ 206	\$ -	\$ 29,692
80007	Manage Operations Support & Settlements	\$ 359	\$ -	\$ 406	\$ 6,132	\$ 19	\$ 2,127	\$ 181	\$ 9,224
80008	Plan & Manage Business	\$ 1,282	\$ 51	\$ 14,432	\$ 13	\$ 2,039	\$ 19	\$ 90	\$ 17,926
80009	Support Business Services	\$ 6,814	\$ 251	\$ 26,511	\$ 2,457	\$ 8,473	\$ 4	\$ 18	\$ 44,528
80010	Support Customers & Stakeholders	\$ 178	\$ 163	\$ 24	\$ 64	\$ 41	\$ 1,575	\$ 9,154	\$ 11,199
	Total	\$ 11,345	\$ 16,505	\$ 45,419	\$ 47,436	\$ 11,898	\$ 8,596	\$ 10,412	\$ 151,611

The costs were then aggregated by level 2 activity.

Table 18 — Allocation of Division Costs to Level 2 Activity

2019 Modified Revenue Requirement: ABC Direct Operating Activities		Allocation of Costs By Division									
Code	ABC Level 2 Activities	Market and Corporate Services		Infrastructure Development		Technology Operations		Market Quality and California Regulatory Affairs		External and Customer Affairs	Total
		General Counsel	Regulatory Affairs	Customer Affairs							
<i>budget allocations (amounts in thousands)</i>											
80001 Develop Infrastructure (DI)											
201	Develop and Monitor Regulatory Contract Procedures	\$ 18	\$ 580	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 46	\$ 644	
202	Manage Generator Interconnection Agreements	\$ 9	\$ 310	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 319	
203	Manage Generator Interconnection Process	\$ 449	\$ 2,289	\$ -	\$ 3	\$ 24	\$ -	\$ -	\$ -	\$ 2,765	
204	Manage Long Term Transmission Planning	\$ 110	\$ 6,504	\$ -	\$ 4	\$ -	\$ -	\$ -	\$ -	\$ 6,618	
205	Manage New Transmission Resources	\$ 10	\$ 179	\$ -	\$ 409	\$ -	\$ 87	\$ -	\$ -	\$ 685	
206	Manage Transmission Maintenance Standards	\$ 10	\$ 504	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 514	
207	Manage Load Resource Data	\$ 6	\$ 241	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 247	
208	Seasonal Assessment	\$ 7	\$ 239	\$ -	\$ -	\$ -	\$ 38	\$ -	\$ -	\$ 284	
209	Manage Queue Management	\$ 10	\$ 776	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 786	
210	Manage Annual Delivery Assessment	\$ -	\$ 1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1	
	Total DI	\$ 629	\$ 11,623	\$ -	\$ 416	\$ 24	\$ 125	\$ 46	\$ 12,863		
80002 Develop Markets (DM)											
226	Manage Regulatory Filings	\$ 10	\$ -	\$ -	\$ -	\$ 833	\$ -	\$ -	\$ 843		
227	Manage Tariff Amendments	\$ 5	\$ 2	\$ -	\$ -	\$ 458	\$ -	\$ -	\$ 465		
228	Manage Post Order, Rehearing, and Compliance	\$ -	\$ -	\$ -	\$ -	\$ 11	\$ -	\$ -	\$ 11		
229	Develop State / Federal Regulatory Policy	\$ 5	\$ 30	\$ -	\$ 282	\$ -	\$ -	\$ -	\$ 317		
230	BPM Change Management	\$ 5	\$ 47	\$ -	\$ 138	\$ -	\$ -	\$ -	\$ 190		
231	Develop Infrastructure Policy	\$ 45	\$ 2,031	\$ -	\$ 177	\$ -	\$ 55	\$ -	\$ 2,308		
232	Perform Market Analysis	\$ 55	\$ 120	\$ -	\$ 2	\$ -	\$ 3,121	\$ -	\$ 3,298		
233	Develop Market Design	\$ 35	\$ 1,603	\$ -	\$ -	\$ -	\$ 266	\$ -	\$ 1,904		
234	Manage Regulatory Contract Negotiations	\$ 10	\$ 357	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 367		
	Total DM	\$ 170	\$ 4,190	\$ -	\$ 599	\$ 1,302	\$ 3,442	\$ -	\$ 9,703		

2019 Modified Revenue Requirement: ABC Direct Operating Activities		Allocation of Costs By Division							
Code	ABC Level 2 Activities	Corporate Services	Market and Infrastructure Development	Technology	Operations	General Counsel	Market Quality and California Regulatory Affairs	External and Customer Affairs	Total
<i>budget allocations (amounts in thousands)</i>									
80004	Manage Market & Reliability Data & Modeling (MMR)								
301	Manage Full Network Model Maintenance	\$ 109	\$ -	\$ 3,245	\$ 501	\$ -	\$ -	\$ -	\$ 3,855
302	Plan & Develop Operations Simulator Training	\$ 9	\$ -	\$ 2	\$ 401	\$ -	\$ -	\$ -	\$ 412
304	EMAA Telemetry	\$ 17	\$ -	\$ -	\$ 520	\$ -	\$ -	\$ -	\$ 537
307	Manage Congestion Revenue Rights	\$ 19	\$ -	\$ -	\$ 108	\$ -	\$ -	\$ -	\$ 127
308	Manage Credit & Collateral	\$ 782	\$ -	\$ -	\$ -	\$ -	\$ 1	\$ -	\$ 783
309	Resource Management	\$ 28	\$ -	\$ -	\$ 1,309	\$ -	\$ -	\$ -	\$ 1,337
310	Manage Reliability Requirements	\$ 24	\$ 208	\$ -	\$ 1,095	\$ -	\$ 174	\$ 2	\$ 1,503
311	Manage Operations Planning	\$ 54	\$ -	\$ -	\$ 1,829	\$ -	\$ -	\$ -	\$ 1,883
312	Manage WECC Studies	\$ 2	\$ -	\$ -	\$ 78	\$ -	\$ -	\$ -	\$ 80
314	Manage & Facilitate Procedure Maintenance	\$ 13	\$ -	\$ -	\$ 290	\$ -	\$ -	\$ -	\$ 303
316	Plan & Develop Operations Training	\$ 48	\$ -	\$ -	\$ 2,050	\$ -	\$ 61	\$ -	\$ 2,159
317	Execute & Track Operations Training	\$ 29	\$ -	\$ -	\$ 1,327	\$ -	\$ -	\$ -	\$ 1,356
320	Provide Stakeholder Training	\$ 21	\$ -	\$ -	\$ 1	\$ -	\$ -	\$ 751	\$ 773
321	Schedule Coordinator Management	\$ 6	\$ 19	\$ -	\$ -	\$ -	\$ -	\$ 170	\$ 195
322	Register, Modify and Terminate PDR Resource	\$ 5	\$ -	\$ -	\$ 169	\$ -	\$ -	\$ -	\$ 174
323	Calculate & Monitor Energy Costs & Indices	\$ 137	\$ -	\$ -	\$ -	\$ -	\$ 862	\$ -	\$ 999
	Total MMR	\$ 1,303	\$ 227	\$ 3,247	\$ 9,678	\$ -	\$ 1,098	\$ 923	\$ 16,476
80005	Manage Market & Grid (MMG)								
352	Manage Day Ahead Market Support	\$ 7	\$ -	\$ 10	\$ 177	\$ -	\$ 186	\$ -	\$ 380
353	Operations Real Time Support	\$ 28	\$ -	\$ 785	\$ 248	\$ -	\$ 20	\$ -	\$ 1,081
355	Outage Model & Management	\$ 62	\$ -	\$ -	\$ 2,496	\$ -	\$ -	\$ -	\$ 2,558
360	Real Time Operations	\$ 258	\$ -	\$ -	\$ 12,797	\$ -	\$ -	\$ -	\$ 13,055
362	Manage Operations Engineering Support	\$ 101	\$ -	\$ -	\$ 3,915	\$ -	\$ -	\$ -	\$ 4,016
367	Manage Operations Compliance & Event Analysis	\$ 18	\$ -	\$ -	\$ 75	\$ -	\$ -	\$ -	\$ 93
368	Manage Day Ahead and Market Operations	\$ 51	\$ -	\$ 1	\$ 2,422	\$ -	\$ -	\$ -	\$ 2,474
370	Manage Real Time Reliability Coordination	\$ 85	\$ -	\$ 3	\$ 5,947	\$ -	\$ -	\$ -	\$ 6,035
	Total MMG	\$ 610	\$ -	\$ 799	\$ 28,077	\$ -	\$ 206	\$ -	\$ 29,692

2019 Modified Revenue Requirement: ABC Direct Operating Activities		Allocation of Costs By Division							
Code	ABC Level 2 Activities	Corporate Services	Market and Infrastructure Development	Technology	Operations	General Counsel	Market Quality and California Regulatory Affairs	External and Customer Affairs	Total
<i>budget allocations (amounts in thousands)</i>									
80007 Manage Operations Support & Settlements (MOS)									
401	Perform Market Validation	\$ 1	\$ -	\$ -	\$ 23	\$ -	\$ -	\$ -	\$ 24
402	Manage Dispute Analysis & Resolution	\$ 29	\$ -	\$ 60	\$ 1,386	\$ -	\$ -	\$ -	\$ 1,475
403	Manage Market Quality System	\$ 18	\$ -	\$ 346	\$ 209	\$ -	\$ -	\$ -	\$ 573
406	Manage Rules of Conduct	\$ 2	\$ -	\$ -	\$ 70	\$ -	\$ -	\$ -	\$ 72
409	Meter Data Acquisition and Processing	\$ 15	\$ -	\$ -	\$ 459	\$ -	\$ -	\$ -	\$ 474
411	Manage Market Clearing	\$ 118	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 118
412	Manage Market Billing & Settlements	\$ 55	\$ -	\$ -	\$ 1,124	\$ -	\$ -	\$ 154	\$ 1,333
413	Manage Reliability Must Run Settlements	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7	\$ 7
414	Manage Settlements Quarterly Release Cycle	\$ 71	\$ -	\$ -	\$ 2,253	\$ -	\$ -	\$ -	\$ 2,324
417	Perform Market Report	\$ 6	\$ -	\$ -	\$ 198	\$ -	\$ 745	\$ -	\$ 949
418	Manage Good Faith Negotiation Requests	\$ 1	\$ -	\$ -	\$ -	\$ 19	\$ -	\$ 20	\$ 40
419	Manage Price Corrections	\$ 43	\$ -	\$ -	\$ 410	\$ -	\$ 1,382	\$ -	\$ 1,835
	Total MOS	\$ 359	\$ -	\$ 406	\$ 6,132	\$ 19	\$ 2,127	\$ 181	\$ 9,224
80008 Plan & Manage Business (PMB)									
451	Manage Financial Planning	\$ 981	\$ -	\$ 3	\$ -	\$ -	\$ 19	\$ -	\$ 1,003
452	Manage Application, Environment & Infrastructure	\$ 48	\$ -	\$ 3,066	\$ -	\$ -	\$ -	\$ -	\$ 3,114
453	Manage Resource Allocation	\$ 3	\$ -	\$ 99	\$ -	\$ -	\$ -	\$ -	\$ 102
454	Project Portfolio Management	\$ 28	\$ -	\$ 1,832	\$ 13	\$ -	\$ -	\$ -	\$ 1,873
455	Manage Technology Collaboration (Internal)	\$ 60	\$ -	\$ 2,510	\$ -	\$ -	\$ -	\$ -	\$ 2,570
457	Manage Annual Functional Release Lifecycle	\$ 5	\$ -	\$ 184	\$ -	\$ -	\$ -	\$ -	\$ 189
459	Enterprise Risk Management	\$ 1	\$ -	\$ -	\$ -	\$ 60	\$ -	\$ -	\$ 61
461	Perform Board Processes	\$ 70	\$ 51	\$ -	\$ -	\$ 1,853	\$ -	\$ 90	\$ 2,064
462	Manage Technology Collaboration (External)	\$ 2	\$ -	\$ 145	\$ -	\$ -	\$ -	\$ -	\$ 147
466	Manage Corporate Goal Alignment and Reporting	\$ 3	\$ -	\$ 49	\$ -	\$ 126	\$ -	\$ -	\$ 178
467	Research & Proof of Concept	\$ 2	\$ -	\$ 205	\$ -	\$ -	\$ -	\$ -	\$ 207
469	Manage Project & Effort Lifecycles	\$ 79	\$ -	\$ 6,339	\$ -	\$ -	\$ -	\$ -	\$ 6,418
	Total PMB	\$ 1,282	\$ 51	\$ 14,432	\$ 13	\$ 2,039	\$ 19	\$ 90	\$ 17,926

2019 Modified Revenue Requirement: ABC Direct Operating Activities		Allocation of Costs By Division							
Code	ABC Level 2 Activities	Corporate Services	Market and Infrastructure Development	Technology	Operations	General Counsel	Market Quality and California Regulatory Affairs	External and Customer Affairs	Total
<i>budget allocations (amounts in thousands)</i>									
80009 Support Business Services (SBS)									
501	Manage Monthly Financial Cycle	\$ 778	\$ -	\$ 1	\$ -	\$ -	\$ -	\$ -	\$ 779
502	Invest Corporate Funds	\$ 500	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 500
503	Manage Financial Reporting	\$ 272	\$ -	\$ -	\$ -	\$ 5	\$ -	\$ -	\$ 277
504	IT Application, System, & Non-Production Support	\$ 343	\$ -	\$ 13,657	\$ -	\$ -	\$ -	\$ -	\$ 14,000
505	IT Asset Management	\$ 17	\$ -	\$ 650	\$ -	\$ -	\$ -	\$ -	\$ 667
508	IT Configuration, Change & Release Management	\$ 33	\$ -	\$ 1,441	\$ 13	\$ -	\$ -	\$ 4	\$ 1,491
510	IT Event Management	\$ 4	\$ -	\$ 174	\$ -	\$ -	\$ -	\$ -	\$ 178
511	IT Incident Management	\$ 96	\$ -	\$ 4,381	\$ -	\$ -	\$ 1	\$ -	\$ 4,478
512	IT Information Security Management	\$ 36	\$ -	\$ 1,545	\$ 266	\$ 18	\$ -	\$ 1	\$ 1,866
513	IT Problem & Risk Lifecycle Management	\$ 18	\$ 5	\$ 814	\$ -	\$ -	\$ -	\$ -	\$ 837
519	Provision and Manage Access	\$ 12	\$ -	\$ 549	\$ -	\$ -	\$ -	\$ -	\$ 561
520	Manage Facilities, Physical Security, & Safety	\$ 64	\$ 1	\$ 1,672	\$ 2	\$ -	\$ -	\$ -	\$ 1,739
521	Facilities Incident Management	\$ -	\$ -	\$ 4	\$ -	\$ -	\$ -	\$ -	\$ 4
522	Corporate Incident Response & Disaster Recovery	\$ 3	\$ -	\$ -	\$ 7	\$ 7	\$ -	\$ 2	\$ 19
523	Manage Business Continuity Plan	\$ 44	\$ 5	\$ 1,101	\$ 1,566	\$ 372	\$ 3	\$ 10	\$ 3,101
528	Procurement & Vendor Management	\$ 791	\$ -	\$ 13	\$ -	\$ -	\$ -	\$ -	\$ 804
529	Provide Legal Advice	\$ 57	\$ -	\$ -	\$ -	\$ 3,879	\$ -	\$ -	\$ 3,936
530	Manage Dispute Resolution	\$ 2	\$ -	\$ 8	\$ -	\$ 53	\$ -	\$ -	\$ 63
533	Manage Evidence Review / Audit	\$ 3	\$ -	\$ 75	\$ 52	\$ -	\$ -	\$ -	\$ 130
535	Tariff Controls Monitoring	\$ 7	\$ -	\$ 19	\$ -	\$ 395	\$ -	\$ -	\$ 421
536	Manage Internal Audit	\$ 37	\$ -	\$ 12	\$ -	\$ 1,849	\$ -	\$ -	\$ 1,898
537	Monitor Markets	\$ 1,914	\$ -	\$ 3	\$ 70	\$ -	\$ -	\$ -	\$ 1,987
538	Manage Tariff Rules Violations	\$ 34	\$ -	\$ -	\$ -	\$ 15	\$ -	\$ -	\$ 49
543	Market Design	\$ 358	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 358
544	Maintain DMM Database	\$ 1,329	\$ -	\$ 1	\$ -	\$ -	\$ -	\$ -	\$ 1,330
545	Manage Business Process & Continuous Improvement	\$ 5	\$ -	\$ 191	\$ 46	\$ -	\$ -	\$ -	\$ 242
546	Records Management	\$ 12	\$ 16	\$ 3	\$ 8	\$ 178	\$ -	\$ 1	\$ 218
548	Manage Compliance Standards Development and Implementation	\$ 2	\$ 17	\$ 25	\$ 37	\$ 15	\$ -	\$ -	\$ 96
549	Manage Compliance Investigations	\$ 3	\$ -	\$ 18	\$ -	\$ 155	\$ -	\$ -	\$ 176
550	Manage NERC Compliance	\$ 33	\$ 207	\$ 111	\$ -	\$ 1,500	\$ -	\$ -	\$ 1,851
552	IT Reports & Documentation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
553	Manage Vulnerability Remediation	\$ -	\$ -	\$ 2	\$ -	\$ -	\$ -	\$ -	\$ 2
554	Monitor & Maintain Backups	\$ 1	\$ -	\$ 41	\$ -	\$ -	\$ -	\$ -	\$ 42
555	Manage Root Cause Analysis	\$ 6	\$ -	\$ -	\$ 390	\$ 32	\$ -	\$ -	\$ 428
	Total SBS	\$ 6,814	\$ 251	\$ 26,511	\$ 2,457	\$ 8,473	\$ 4	\$ 18	\$ 44,528
80010 Support Customers & Stakeholders (SCS)									
539	Representing the ISO	\$ 8	\$ 145	\$ 17	\$ 7	\$ -	\$ 907	\$ 69	\$ 1,153
601	Manage Client Inquiries	\$ 38	\$ 4	\$ 7	\$ 57	\$ -	\$ 2	\$ 1,538	\$ 1,646
602	Account Management	\$ 19	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 699	\$ 718
603	Manage Stakeholder Processes	\$ 20	\$ 10	\$ -	\$ -	\$ -	\$ -	\$ 927	\$ 957
609	Manage External Affairs	\$ 57	\$ 4	\$ -	\$ -	\$ 41	\$ 666	\$ 4,161	\$ 4,929
610	Manage Communications & Public Relations	\$ 36	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,760	\$ 1,796
	Total SCS	\$ 178	\$ 163	\$ 24	\$ 64	\$ 41	\$ 1,575	\$ 9,154	\$ 11,199
	Total Direct O&M	\$ 11,345	\$ 16,505	\$ 45,419	\$ 47,436	\$ 11,898	\$ 8,596	\$ 10,412	\$ 151,611

For direct operating activities the costs were aggregated at level 2 and allocated to the cost category identified in *Table 6 — Mapping of ABC Direct Operating Activities to Cost Categories*.

Table 19 — Allocation of ABC Direct Operating Activity Costs to Cost Categories

2019 Modified Revenue Requirement: ABC Direct Operating Activities												
		GMC					GMC					
Code	ABC Level 2 Activities	Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect	2019 Budget	Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect
cost category % allocation						budget allocations (amounts in thousands)						
80001 Develop Infrastructure (DI)												
201	Develop and Monitor Regulatory Contract Procedures	95%			5%		\$ 644	\$ 612	\$ -	\$ -	\$ 32	\$ -
202	Manage Generator Interconnection Agreements		100%				\$ 319	\$ -	\$ 319	\$ -	\$ -	\$ -
203	Manage Generator Interconnection Process		100%				\$ 2,765	\$ -	\$ 2,765	\$ -	\$ -	\$ -
204	Manage Long Term Transmission Planning		100%				\$ 6,618	\$ -	\$ 6,618	\$ -	\$ -	\$ -
205	Manage New Transmission Resources		95%		5%		\$ 685	\$ -	\$ 651	\$ -	\$ 34	\$ -
206	Manage Transmission Maintenance Standards		100%				\$ 514	\$ -	\$ 514	\$ -	\$ -	\$ -
207	Manage Load Resource Data		100%				\$ 247	\$ -	\$ 247	\$ -	\$ -	\$ -
208	Seasonal Assessment		100%				\$ 284	\$ -	\$ 284	\$ -	\$ -	\$ -
209	Manage Queue Management		100%				\$ 786	\$ -	\$ 786	\$ -	\$ -	\$ -
210	Manage Annual Delivery Assessment		100%				\$ 1	\$ -	\$ 1	\$ -	\$ -	\$ -
	Total DI						\$ 12,863	\$ 612	\$ 12,185	\$ -	\$ 66	\$ -
80002 Develop Markets (DM)												
226	Manage Regulatory Filings				100%		\$ 843	\$ -	\$ -	\$ -	\$ -	\$ 843
227	Manage Tariff Amendments				100%		\$ 465	\$ -	\$ -	\$ -	\$ -	\$ 465
228	Manage Post Order, Rehearing, and Compliance				100%		\$ 11	\$ -	\$ -	\$ -	\$ -	\$ 11
229	Develop State / Federal Regulatory Policy	40%	60%				\$ 317	\$ 127	\$ 190	\$ -	\$ -	\$ -
230	BPM Change Management	80%	10%	5%	5%		\$ 190	\$ 151	\$ 19	\$ 10	\$ 10	\$ -
231	Develop Infrastructure Policy	40%	60%				\$ 2,308	\$ 923	\$ 1,385	\$ -	\$ -	\$ -
232	Perform Market Analysis	80%	15%	5%			\$ 3,298	\$ 2,638	\$ 495	\$ 165	\$ -	\$ -
233	Develop Market Design	100%					\$ 1,904	\$ 1,904	\$ -	\$ -	\$ -	\$ -
234	Manage Regulatory Contract Negotiations	95%			5%		\$ 367	\$ 349	\$ -	\$ -	\$ 18	\$ -
	Total DM						\$ 9,703	\$ 6,092	\$ 2,089	\$ 175	\$ 28	\$ 1,319

2019 Modified Revenue Requirement: ABC Direct Operating Activities

		GMC					GMC					
Code	ABC Level 2 Activities	Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect	2019 Budget	Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect
cost category % allocation						budget allocations (amounts in thousands)						
80004 Manage Market & Reliability Data & Modeling (MMR)												
301	Manage Full Network Model Maintenance	45%	45%	5%	5%		\$ 3,855	\$ 1,735	\$ 1,734	\$ 193	\$ 193	\$ -
302	Plan & Develop Operations Simulator Training		95%		5%		\$ 412	\$ -	\$ 391	\$ -	\$ 21	\$ -
304	EMAA Telemetry	50%	50%				\$ 537	\$ 268	\$ 269	\$ -	\$ -	\$ -
307	Manage Congestion Revenue Rights			100%			\$ 127	\$ -	\$ -	\$ 127	\$ -	\$ -
308	Manage Credit & Collateral	40%	40%	20%			\$ 783	\$ 313	\$ 313	\$ 157	\$ -	\$ -
309	Resource Management	50%	50%				\$ 1,337	\$ 669	\$ 668	\$ -	\$ -	\$ -
310	Manage Reliability Requirements		100%				\$ 1,503	\$ -	\$ 1,503	\$ -	\$ -	\$ -
311	Manage Operations Planning		95%		5%		\$ 1,883	\$ -	\$ 1,789	\$ -	\$ 94	\$ -
312	Manage WECC Studies		100%				\$ 80	\$ -	\$ 80	\$ -	\$ -	\$ -
314	Manage & Facilitate Procedure Maintenance		95%		5%		\$ 303	\$ -	\$ 288	\$ -	\$ 15	\$ -
316	Plan & Develop Operations Training		95%		5%		\$ 2,159	\$ -	\$ 2,051	\$ -	\$ 108	\$ -
317	Execute & Track Operations Training		95%		5%		\$ 1,356	\$ -	\$ 1,288	\$ -	\$ 68	\$ -
320	Provide Stakeholder Training	60%	30%	5%	5%		\$ 773	\$ 463	\$ 232	\$ 39	\$ 39	\$ -
321	Schedule Coordinator Management	45%	45%	5%	5%		\$ 195	\$ 87	\$ 88	\$ 10	\$ 10	\$ -
322	Register, Modify and Terminate PDR Resource	100%					\$ 174	\$ 174	\$ -	\$ -	\$ -	\$ -
323	Calculate & Monitor Energy Costs & Indices	60%	35%		5%		\$ 999	\$ 599	\$ 350	\$ -	\$ 50	\$ -
	Total MMR						\$ 16,476	\$ 4,308	\$ 11,044	\$ 526	\$ 598	\$ -
80005 Manage Market & Grid (MMG)												
352	Manage Day Ahead Market Support	95%			5%		\$ 380	\$ 361	\$ -	\$ -	\$ 19	\$ -
353	Operations Real Time Support	80%	15%		5%		\$ 1,081	\$ 865	\$ 162	\$ -	\$ 54	\$ -
355	Outage Model & Management	5%	60%		35%		\$ 2,558	\$ 128	\$ 1,535	\$ -	\$ 895	\$ -
360	Real Time Operations	20%	80%				\$ 13,055	\$ 2,611	\$ 10,444	\$ -	\$ -	\$ -
362	Manage Operations Engineering Support	15%	80%		5%		\$ 4,016	\$ 602	\$ 3,213	\$ -	\$ 201	\$ -
367	Manage Operations Compliance & Event Analysis		50%		50%		\$ 93	\$ -	\$ 46	\$ -	\$ 47	\$ -
368	Manage Day Ahead and Market Operations	100%					\$ 2,474	\$ 2,474	\$ -	\$ -	\$ -	\$ -
370	Manage Real Time Reliability Coordination				100%		\$ 6,035	\$ -	\$ -	\$ -	\$ 6,035	\$ -
	Total MMG						\$ 29,692	\$ 7,041	\$ 15,400	\$ -	\$ 7,251	\$ -
	MMG %s						100%	24%	52%	0%	24%	0%

2019 Modified Revenue Requirement: ABC Direct Operating Activities

		GMC					GMC										
Code	ABC Level 2 Activities	Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect	2019 Budget	Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect					
						<i>cost category % allocation</i>						<i>budget allocations (amounts in thousands)</i>					
80007 Manage Operations Support & Settlements (MOS)																	
401	Perform Market Validation	80%	20%				\$ 24	\$ 19	\$ 5	\$ -	\$ -	\$ -					
402	Manage Dispute Analysis & Resolution	100%					\$ 1,475	\$ 1,475	\$ -	\$ -	\$ -	\$ -					
403	Manage Market Quality System	50%	40%	10%			\$ 573	\$ 287	\$ 229	\$ 57	\$ -	\$ -					
406	Manage Rules of Conduct					100%	\$ 72	\$ -	\$ -	\$ -	\$ -	\$ 72					
409	Meter Data Acquisition and Processing	100%					\$ 474	\$ 474	\$ -	\$ -	\$ -	\$ -					
411	Manage Market Clearing	45%	45%	5%	5%		\$ 118	\$ 53	\$ 53	\$ 6	\$ 6	\$ -					
412	Manage Market Billing & Settlements	45%	45%	5%	5%		\$ 1,333	\$ 600	\$ 599	\$ 67	\$ 67	\$ -					
413	Manage Reliability Must Run Settlements		100%				\$ 7	\$ -	\$ 7	\$ -	\$ -	\$ -					
414	Manage Settlements Quarterly Release Cycle	45%	45%	5%	5%		\$ 2,324	\$ 1,046	\$ 1,046	\$ 116	\$ 116	\$ -					
417	Perform Market Report	80%	20%				\$ 949	\$ 759	\$ 190	\$ -	\$ -	\$ -					
418	Manage Good Faith Negotiation Requests	100%					\$ 40	\$ 40	\$ -	\$ -	\$ -	\$ -					
419	Manage Price Corrections	50%	40%	10%			\$ 1,835	\$ 917	\$ 734	\$ 184	\$ -	\$ -					
	Total MOS						\$ 9,224	\$ 5,670	\$ 2,863	\$ 430	\$ 189	\$ 72					
80008 Plan & Manage Business (PMB)																	
451	Manage Financial Planning					100%	\$ 1,003	\$ -	\$ -	\$ -	\$ -	\$ 1,003					
452	Manage Application, Environment & Infrastructure					100%	\$ 3,114	\$ -	\$ -	\$ -	\$ -	\$ 3,114					
453	Manage Resource Allocation					100%	\$ 102	\$ -	\$ -	\$ -	\$ -	\$ 102					
454	Project Portfolio Management					100%	\$ 1,873	\$ -	\$ -	\$ -	\$ -	\$ 1,873					
455	Manage Technology Collaboration (Internal)	100%					\$ 2,570	\$ 2,570	\$ -	\$ -	\$ -	\$ -					
457	Manage Annual Functional Release Lifecycle					100%	\$ 189	\$ -	\$ -	\$ -	\$ -	\$ 189					
459	Enterprise Risk Management					100%	\$ 61	\$ -	\$ -	\$ -	\$ -	\$ 61					
461	Perform Board Processes					100%	\$ 2,064	\$ -	\$ -	\$ -	\$ -	\$ 2,064					
462	Manage Technology Collaboration (External)	100%					\$ 147	\$ 147	\$ -	\$ -	\$ -	\$ -					
466	Manage Corporate Goal Alignment and Reporting					100%	\$ 178	\$ -	\$ -	\$ -	\$ -	\$ 178					
467	Research & Proof of Concept					100%	\$ 207	\$ -	\$ -	\$ -	\$ -	\$ 207					
469	Manage Project & Effort Lifecycles					100%	\$ 6,418	\$ -	\$ -	\$ -	\$ -	\$ 6,418					
	Total PMB						\$ 17,926	\$ 2,717	\$ -	\$ -	\$ -	\$ 15,209					

2019 Modified Revenue Requirement: ABC Direct Operating Activities

Code	ABC Level 2 Activities	GMC					2019 Budget	GMC				
		Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect		Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect
		cost category % allocation						budget allocations (amounts in thousands)				
80009 Support Business Services (SBS)												
501	Manage Monthly Financial Cycle					100%	\$ 779	\$ -	\$ -	\$ -	\$ -	\$ 779
502	Invest Corporate Funds					100%	\$ 500	\$ -	\$ -	\$ -	\$ -	\$ 500
503	Manage Financial Reporting					100%	\$ 277	\$ -	\$ -	\$ -	\$ -	\$ 277
504	IT Application, System, & Non-Production Support	80%	15%			5%	\$ 14,000	\$ 11,200	\$ 2,100	\$ -	\$ 700	\$ -
505	IT Asset Management					100%	\$ 667	\$ -	\$ -	\$ -	\$ -	\$ 667
508	IT Configuration, Change & Release Management					100%	\$ 1,491	\$ -	\$ -	\$ -	\$ -	\$ 1,491
510	IT Event Management					100%	\$ 178	\$ -	\$ -	\$ -	\$ -	\$ 178
511	IT Incident Management	60%	30%	5%		5%	\$ 4,478	\$ 2,687	\$ 1,343	\$ 224	\$ 224	\$ -
512	IT Information Security Management					100%	\$ 1,866	\$ -	\$ -	\$ -	\$ -	\$ 1,866
513	IT Problem & Risk Lifecycle Management	60%	30%	5%		5%	\$ 837	\$ 502	\$ 251	\$ 42	\$ 42	\$ -
519	Provision and Manage Access					100%	\$ 561	\$ -	\$ -	\$ -	\$ -	\$ 561
520	Manage Facilities, Physical Security, & Safety					100%	\$ 1,739	\$ -	\$ -	\$ -	\$ -	\$ 1,739
521	Facilities Incident Management					100%	\$ 4	\$ -	\$ -	\$ -	\$ -	\$ 4
522	Corporate Incident Response & Disaster Recovery					100%	\$ 19	\$ -	\$ -	\$ -	\$ -	\$ 19
523	Manage Business Continuity Plan					100%	\$ 3,101	\$ -	\$ -	\$ -	\$ -	\$ 3,101
528	Procurement & Vendor Management					100%	\$ 804	\$ -	\$ -	\$ -	\$ -	\$ 804
529	Provide Legal Advice					100%	\$ 3,936	\$ -	\$ -	\$ -	\$ -	\$ 3,936
530	Manage Dispute Resolution					100%	\$ 63	\$ -	\$ -	\$ -	\$ -	\$ 63
533	Manage Evidence Review / Audit					100%	\$ 130	\$ -	\$ -	\$ -	\$ -	\$ 130
535	Tariff Controls Monitoring					100%	\$ 421	\$ -	\$ -	\$ -	\$ -	\$ 421
536	Manage Internal Audit					100%	\$ 1,898	\$ -	\$ -	\$ -	\$ -	\$ 1,898
537	Monitor Markets	80%				20%	\$ 1,987	\$ 1,590	\$ -	\$ 397	\$ -	\$ -
538	Manage Tariff Rules Violations					100%	\$ 49	\$ -	\$ -	\$ -	\$ -	\$ 49
543	Market Design					100%	\$ 358	\$ -	\$ -	\$ -	\$ -	\$ 358
544	Maintain DMM Database					100%	\$ 1,330	\$ -	\$ -	\$ -	\$ -	\$ 1,330
545	Manage Business Process & Continuous Improvement					100%	\$ 242	\$ -	\$ -	\$ -	\$ -	\$ 242
546	Records Management					100%	\$ 218	\$ -	\$ -	\$ -	\$ -	\$ 218
548	Manage Compliance Standards Development and Implementation					100%	\$ 96	\$ -	\$ -	\$ -	\$ -	\$ 96
549	Manage Compliance Investigations					100%	\$ 176	\$ -	\$ -	\$ -	\$ -	\$ 176
550	Manage NERC Compliance					100%	\$ 1,851	\$ -	\$ -	\$ -	\$ -	\$ 1,851
552	IT Reports & Documentation					100%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
553	Manage Vulnerability Remediation					100%	\$ 2	\$ -	\$ -	\$ -	\$ -	\$ 2
554	Monitor & Maintain Backups					100%	\$ 42	\$ -	\$ -	\$ -	\$ -	\$ 42
555	Manage Root Cause Analysis					100%	\$ 428	\$ -	\$ -	\$ -	\$ -	\$ 428
Total SBS							\$ 44,528	\$ 15,979	\$ 3,694	\$ 663	\$ 966	\$ 23,226
80010 Support Customers & Stakeholders (SCS)												
539	Representing the ISO					100%	\$ 1,153	\$ -	\$ -	\$ -	\$ -	\$ 1,153
601	Manage Client Inquiries	80%	10%	5%		5%	\$ 1,646	\$ 1,317	\$ 165	\$ 82	\$ 82	\$ -
602	Account Management	80%	10%	5%		5%	\$ 718	\$ 574	\$ 72	\$ 36	\$ 36	\$ -
603	Manage Stakeholder Processes	80%	10%	5%		5%	\$ 957	\$ 765	\$ 96	\$ 48	\$ 48	\$ -
609	Manage External Affairs					100%	\$ 4,929	\$ -	\$ -	\$ -	\$ -	\$ 4,929
610	Manage Communications & Public Relations					100%	\$ 1,796	\$ -	\$ -	\$ -	\$ -	\$ 1,796
Total SCS							\$ 11,199	\$ 2,656	\$ 333	\$ 166	\$ 166	\$ 7,878
Total Direct O&M							\$ 151,611	\$ 45,075	\$ 47,608	\$ 1,960	\$ 9,264	\$ 47,704
Direct O&M %							100%	30%	31%	1%	6%	32%

ABC INDIRECT ACTIVITIES

The same process yielded the following percentages for the indirect activities.

Table 20 — Allocation of Division Hours to Indirect Operating Activities

		Allocation of Hours By Division							
ABC Process Code	Level 1 ABC Activity	Corporate Services	Market and Infrastructure Development	Technology	Operations	General Counsel	Market Quality and California Regulatory Affairs	External and Customer Affairs	Total
Indirect									
80003	Manage Human Capabilities	97%	0%	1%	1%	0%	0%	0%	100%

These costs were inputs into the allocation matrix shown in *Table 8 — Mapping of ABC Indirect Activities to Cost Categories* to get the costs to the cost categories.

Table 21 — Allocation of Division Costs to Indirect Operating Activities

		Allocation of Costs By Division (\$ in thousands)							
ABC Process Code	Level 1 ABC Activity	Corporate Services	Market and Infrastructure Development	Technology	Operations	General Counsel	Market Quality and California Regulatory Affairs	External and Customer Affairs	Total
Indirect									
80003	Manage Human Capabilities	\$ 3,286	\$ 9	\$ 45	\$ 21	\$ 45	\$ 13	\$ 1	\$ 3,420

For indirect activities, the costs were aggregated and allocated as shown in *Table 8 — Mapping of ABC Indirect Activities to Cost Categories*.

Table 22 — Allocation of ABC Indirect Activity Costs to Cost Categories

2019 Modified Revenue Requirement: ABC Indirect Costs											
Component	GMC					2019 Budget	GMC				
	Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect		Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect
	<i>cost category % allocation</i>						<i>budget allocations (amounts in thousands)</i>				
ABC Indirect Costs											
80003: Manage Human Capabilities (MHC)					100%	\$ 3,420	\$ -	\$ -	\$ -	\$ -	\$ 3,420
Total ABC Indirect Costs						\$ 3,420	\$ -	\$ -	\$ -	\$ -	\$ 3,420

Step 3: Allocating Remaining Revenue Requirement Components to Cost Categories

DEBT SERVICE AND CASH FUNDED CAPITAL

The allocation of costs is based on the percentage allocation in *Table 9 — Mapping of Debt Service and Capital to Cost Categories*.

Table 23 — Allocation of Debt Service and Cash Funded Capital to Cost Categories

2019 Modified Revenue Requirement: Debt Service Bonds and Cash Funded Capital											
Component	GMC					2019 Budget	GMC				
	Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect		Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect
cost category % allocation					budget allocations (amounts in thousands)						
Debt Service Bonds					100%	\$ 16,904	\$ -	\$ -	\$ -	\$ -	\$ 16,904
Cash Funded Capital					100%	\$ 25,000	\$ -	\$ -	\$ -	\$ -	\$ 25,000

OTHER REVENUE

The components of other revenue were reviewed and all revenues allocated pursuant to *Table 10 — Mapping of Other Revenue to Cost Categories*.

Table 24 — Allocation of Other Revenue to Cost Categories

2019 Modified Revenue Requirement: Other Costs and Revenues											
Component	GMC					2019 Budget	GMC				
	Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect		Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect
cost category % allocation					budget allocations (amounts in thousands)						
Other Costs and Revenue											
California-Oregon Intertie Path Operator Fees				100%		\$ 2,000	\$ -	\$ 2,000	\$ -	\$ -	
Energy Imbalance Market Administration Charges					100%	\$ 8,600	\$ -	\$ -	\$ -	\$ 8,600	
Interest Earnings					100%	\$ 3,300	\$ -	\$ -	\$ -	\$ 3,300	
Intermittent Resource Forecasting Fees		80%	15%	5%		\$ 3,800	\$ 3,040	\$ 570	\$ -	\$ 190	
Generator Interconnection Project Fees and Application Fees				100%		\$ 1,600	\$ -	\$ 1,600	\$ -	\$ -	
HANA Administrative Fees*					100%	\$ 1,080	\$ -	\$ -	\$ -	\$ 1,080	
Metered Sub-Station Penalties					100%	\$ 175	\$ -	\$ -	\$ -	\$ 175	
Planning Coordinator Fees				100%		\$ 70	\$ -	\$ 70	\$ -	\$ -	
SC Application Fees					100%	\$ 80	\$ -	\$ -	\$ -	\$ 80	
Sub-Total (without RC Funding Requirement)						\$ 20,705	\$ 3,040	\$ 4,240	\$ -	\$ 12,155	
Reliability Coordinator Funding Requirement*				100%		\$ 17,957	\$ -	\$ -	\$ -	\$ 17,957	
Total Other Costs and Revenue						\$ 38,662	\$ 3,040	\$ 4,240	\$ -	\$ 19,227	

* Modifications were made to the 2019 Revenue Requirement to include HANA Administrative Fees and a full year's worth of Reliability Coordinator Funding Requirement as these services were not or partially included in the original 2019 Revenue Requirement. As a reminder, the CAISO began offering Reliability Coordinator services July 1, 2019.

OPERATING COST RESERVE ADJUSTMENT

The components of the operating cost reserve adjustment were reviewed and allocated pursuant to *Table 11 — Mapping of Operating Cost Reserve Adjustment to Cost Categories*.

Table 25 — Allocation of Operating Cost Reserve Adjustment to Cost Categories

2019 Modified Revenue Requirement: Operating Cost Reserve Adjustment											
Component	GMC					2019 Budget	GMC				
	Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect		Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect
	<i>cost category % allocation</i>						<i>budget allocations (amounts in thousands)</i>				
Operating Cost Reserve Adjustment											
Adjustment in 15% Reserve for O&M					100%	\$ (1,580)	\$ -	\$ -	\$ -	\$ -	\$ (1,580)
25% Debt Service Reserve for 2013 Bonds					100%	\$ 3,400	\$ -	\$ -	\$ -	\$ -	\$ 3,400
Revenue Changes					100%	\$ 7,122	\$ -	\$ -	\$ -	\$ -	\$ 7,122
Expense Changes					100%	\$ 4,538	\$ -	\$ -	\$ -	\$ -	\$ 4,538
Total Operating Cost Reserve Adjustment						\$ 13,480	\$ -	\$ -	\$ -	\$ -	\$ 13,480

Step 4: Aggregating Revenue Requirement into Cost Categories

The individual revenue requirements were aggregated and indirect costs allocated based on total direct costs.

The reliability coordinator costs, which represent 9% of revenue requirement prior to the RC funding requirement adjustment, were offset by the reliability coordinator funding requirement. The remaining balance represents the GMC revenue requirement to be collected through the GMC rates and fees.

Table 26 — Allocation of Revenue Requirement to Cost Categories

2019 Modified Revenue Requirement		GMC					
Component	2019 Budget	Market Services	System Operations	CRR Services	Reliability Coordinator	Indirect	
<i>budget allocations (amounts in thousands)</i>							
Direct Costs	\$ 151,611	\$ 45,075	\$ 47,608	\$ 1,960	\$ 9,264	\$ 47,704	
Indirect Costs	\$ 3,420	\$ -	\$ -	\$ -	\$ -	\$ 3,420	
Non-ABC Costs	\$ 33,999	\$ 1,606	\$ 566	\$ 44	\$ 1,140	\$ 30,643	
Total O&M	\$ 189,030	\$ 46,681	\$ 48,174	\$ 2,004	\$ 10,404	\$ 81,767	
Debt Service	\$ 16,904	\$ -	\$ -	\$ -	\$ -	\$ 16,904	
Cash Funded Capital	\$ 25,000	\$ -	\$ -	\$ -	\$ -	\$ 25,000	
Total Debt Service and Capital	\$ 41,904	\$ -	\$ -	\$ -	\$ -	\$ 41,904	
Other Costs and Revenues (without RC Funding Requirement)	\$ (20,705)	\$ (3,040)	\$ (4,240)	\$ -	\$ (1,270)	\$ (12,155)	
Operating Cost Reserve Adjustment	\$ (13,480)	\$ -	\$ -	\$ -	\$ -	\$ (13,480)	
Total Other Revenue and Operating Costs Reserve Adj	\$ (34,185)	\$ (3,040)	\$ (4,240)	\$ -	\$ (1,270)	\$ (25,635)	
Revenue Requirement Sub-Total Before Indirect Allocations	\$ 196,749	\$ 43,641	\$ 43,934	\$ 2,004	\$ 9,134	\$ 98,036	
Direct Costs %		44%	45%	2%	9%		
Indirect Costs Allocated Based on Direct Cost %		43,136	44,116	1,961	8,823	(98,036)	
Revenue Requirement Sub-Total Before RC Funding Requirement Adjustment	\$ 196,749	\$ 86,777	\$ 88,050	\$ 3,965	\$ 17,957	\$ -	
RC Funding Percentage		44%	45%	2%	9%		
Reliability Coordinator Funding Requirement	\$ (17,957)	\$ -	\$ -	\$ -	\$ (17,957)	\$ -	
GMC Revenue Requirement	\$ 178,792	\$ 86,777	\$ 88,050	\$ 3,965	\$ -	\$ -	
Cost Category Percentages for GMC Rates		49%	49%	2%			

Step 5: Calculation of 2019 Rates Using New Cost Category Percentages

Although not necessary to determine the cost category percentages, the rates are needed to determine the EIM fee. The GMC rates were determined by first estimating fees as shown in the following table

Table 27 — Estimation of Fee Revenue and Mapping of Fees to Cost Categories

2019 Modified Revenue Requirement		Estimated 2019		2019			
Fee	Volumes	Rate	Budget	Market Services	System Operations	CRRs	
<i>(amounts in thousands)</i>							
Bid Segment Fees	69,972,240	\$ 0.005	\$ 350	\$ 350			
Inter-SC Trade Fees	2,367,091	\$ 1.00	\$ 2,367	\$ 2,367			
SCID Fees	334	\$ 1,000	\$ 4,008	\$ 4,008			
TOR Fees	4,604,305	\$ 0.24	\$ 1,105		\$ 1,105		
CRR Auction Bid Fees	730,456	\$ 1.00	\$ 730			\$ 730	
Total			\$ 8,560	\$ 6,725	\$ 1,105	\$ 730	

The estimated fees were then deducted from the revenue requirement resulting in the remaining revenue requirement to be collected. The remaining amount to be collected is divided by the estimated volumes of billing determinants for each cost category in order to determine the respective rates.

Table 28 — 2019 GMC Rates Using Revised Cost Category Percentages

2019 Modified Revenue Requirement				
Component	2019 Budget	GMC		
		Market Services	System Operations	CRR Services
<i>budget allocations (amounts in thousands)</i>				
GMC Revenue Requirement	\$ 178,792	\$ 86,777	\$ 88,050	\$ 3,965
Less Fees				
Bid Segment Fees	\$ (350)	\$ (350)	\$ -	\$ -
Inter-SC Trade Fees	\$ (2,367)	\$ (2,367)	\$ -	\$ -
SCID Fees	\$ (4,008)	\$ (4,008)	\$ -	\$ -
TOR Fees	\$ (1,105)	\$ -	\$ (1,105)	\$ -
CRR Auction Bid Fees	\$ (730)	\$ -	\$ -	\$ (730)
Total Fees	\$ (8,560)	\$ (6,725)	\$ (1,105)	\$ (730)
Remaining Revenue Requirement to Collect	\$ 170,232	\$ 80,052	\$ 86,945	\$ 3,235
Estimated Volumes				
Estimated Volumes		534,286	450,807	609,490
Less Grandfathered Generation		-	(3,723)	-
Total Estimated Volumes (GWh)		534,286	447,084	609,490
2019 Rates Using Revised Percentages		\$ 0.1498	\$ 0.1945	\$ 0.0053

Summary of GMC Cost Category Percentage Changes

The following table reflects the results of the cost of service analysis. The new percentages specified below will go into effect in January 1, 2021.

Table 29 — Summary of GMC Cost Category Percentage Changes

Cost Category	2016 Study Effective 2018 GMC	2019 Study Effective 2021 GMC	Increase / (Decrease) from Prior
Market Services	32%	49%	17%
System Operations	66%	49%	-17%
CRR Services	2%	2%	0%

Energy Imbalance Market

The EIM provides entities with the opportunity to leverage CAISO's existing real time market platform to facilitate five-minute economic dispatch. The EIM provides reliability and economic benefits to both existing market participants and new EIM entities by utilizing CAISO's 15-minute market and real time dispatch. The EIM relies on CAISO's existing real time portion of the market services activities and system operations activities.

Conceptually, EIM participants will pay the same rate as existing customers but only for the real time market and real time dispatch activities specifically related to EIM. To determine the updated EIM fee, using the 2019 cost of service study, CAISO identified and aggregated the real time activity costs allocated to the two main cost categories – market services and system operations. The CAISO then allocated indirect costs to the categories based on the proportion to direct costs. The respective real time cost proportions were then applied to the respective rates for market services and system operations.

The costs include the EIM share of all components of the revenue requirement such that EIM participants will pay the same rate as existing customers for the real time activities they are using.

Application of ABC to EIM Rate Structure

As noted earlier, the ABC analysis disaggregated CAISO's primary business functions into nine core processes (level 1 activities). Each core activity was then divided into major processes (level 2 activities) which were mapped to the corresponding level 1 activity. The first step was to allocate the two cost category activities to the corresponding real time components. The market services component relates to either the real time market or the day ahead market. The system operations component relates to either real time dispatch or balancing authority services.

Mapping of Cost Categories to EIM Activities

Market services' real time market and system operations' real time dispatch activities are mapped to the EIM rate structure. These activities are defined, linked to specific processes, and measured using the 12 standard percentage allocations presented in *Table 6 – Mapping of ABC Direct Operating Activities to Cost*

Categories. If the activity was identified as indirect or the attribute was not distinguishable to any specific category, it was not included in the initial steps of the allocation process but rather allocated at the end of the process based on percentages of direct allocable costs.

MARKET SERVICES

The following mapping only addresses those level 2 activities that are mapped to market services, which then in turn were mapped to either the real time market or the day ahead market. The direct ABC level 2 activities mapped to market services is taken from *Table 6 – Mapping of ABC Direct Operating Activities to Cost Categories.*

Table 30 — Mapping of Market Services ABC Direct Operating Activities

Market Services Split		
Real Time Market	Day Ahead Market	Comments
<i>(% of cost to allocate to category)</i>		
100%		Efforts support real time market functions.
	100%	Efforts support day ahead market functions.
50%	50%	Efforts support real time market and day ahead market functions equally.
80%	20%	Efforts predominately support real time market functions.
20%	80%	Efforts predominately support day ahead market functions.

2019 Modified Revenue Requirement: ABC Direct Operating Activities			Market Services Split		
Code	ABC Level 2 Activities	Market Services	Real Time Market	Day Ahead Market	Comments
			category % allocation		
80001 Develop Infrastructure (DI)					
201	Develop and Monitor Regulatory Contract Procedures	95%	50%	50%	Efforts support real time market and day ahead market functions equally.
80002 Develop Markets (DM)					
229	Develop State / Federal Regulatory Policy	40%	50%	50%	Efforts support real time market and day ahead market functions equally.
230	BPM Change Management	80%	50%	50%	Efforts support real time market and day ahead market functions equally.
231	Develop Infrastructure Policy	40%	50%	50%	Efforts support real time market and day ahead market functions equally.
232	Perform Market Analysis	80%	80%	20%	Efforts predominately support real time market functions.
233	Develop Market Design	100%	50%	50%	Efforts support real time market and day ahead market functions equally.
234	Manage Regulatory Contract Negotiations	95%	50%	50%	Efforts support real time market and day ahead market functions equally.
80004 Manage Market & Reliability Data & Modeling (MMR)					
301	Manage Full Network Model Maintenance	45%	50%	50%	Efforts support real time market and day ahead market functions equally.
304	EMAA Telemetry	50%	100%		Efforts support real time market functions.
308	Manage Credit & Collateral	40%	50%	50%	Efforts support real time market and day ahead market functions equally.
309	Resource Management	50%	80%	20%	Efforts predominately support real time market functions.
320	Provide Stakeholder Training	60%	50%	50%	Efforts support real time market and day ahead market functions equally.
321	Schedule Coordinator Management	45%	80%	20%	Efforts predominately support real time market functions.
322	Register, Modify and Terminate PDR Resource	100%	50%	50%	Efforts support real time market and day ahead market functions equally.
323	Calculate & Monitor Energy Costs & Indices	60%	80%	20%	Efforts predominately support real time market functions.
80005 Manage Market & Grid (MMG)					
352	Manage Day Ahead Market Support	95%		100%	Efforts support day ahead market functions.
353	Operations Real Time Support	80%	100%		Efforts support real time market functions.
355	Outage Model & Management	5%	50%	50%	Efforts support real time market and day ahead market functions equally.
360	Real Time Operations	20%	100%		Efforts support real time market functions.
362	Manage Operations Engineering Support	15%	50%	50%	Efforts support real time market and day ahead market functions equally.
368	Manage Day Ahead and Market Operations	100%	50%	50%	Efforts support real time market and day ahead market functions equally.

2019 Modified Revenue Requirement: ABC Direct Operating Activities			Market Services Split		
Code	ABC Level 2 Activities	Market Services	Real Time Market	Day Ahead Market	Comments
80007 Manage Operations Support & Settlements (MOS)					
401	Perform Market Validation	80%	80%	20%	Efforts predominately support real time market functions.
402	Manage Dispute Analysis & Resolution	100%	80%	20%	Efforts predominately support real time market functions.
403	Manage Market Quality System	50%	80%	20%	Efforts predominately support real time market functions.
409	Meter Data Acquisition and Processing	100%	50%	50%	Efforts support real time market and day ahead market functions equally.
411	Manage Market Clearing	45%	50%	50%	Efforts support real time market and day ahead market functions equally.
412	Manage Market Billing & Settlements	45%	80%	20%	Efforts predominately support real time market functions.
414	Manage Settlements Quarterly Release Cycle	45%	80%	20%	Efforts predominately support real time market functions.
417	Perform Market Report	80%	80%	20%	Efforts predominately support real time market functions.
418	Manage Good Faith Negotiation Requests	100%	50%	50%	Efforts support real time market and day ahead market functions equally.
419	Manage Price Corrections	50%	80%	20%	Efforts predominately support real time market functions.
80008 Plan & Manage Business (PMB)					
455	Manage Technology Collaboration (Internal)	100%	80%	20%	Efforts predominately support real time market functions.
462	Manage Technology Collaboration (External)	100%	50%	50%	Efforts support real time market and day ahead market functions equally.
80009 Support Business Services (SBS)					
504	IT Application, System, & Non-Production Support	80%	50%	50%	Efforts support real time market and day ahead market functions equally.
511	IT Incident Management	60%	50%	50%	Efforts support real time market and day ahead market functions equally.
513	IT Problem & Risk Lifecycle Management	60%	50%	50%	Efforts support real time market and day ahead market functions equally.
537	Monitor Markets	80%	50%	50%	Efforts support real time market and day ahead market functions equally.
80010 Support Customers & Stakeholders (SCS)					
539	Representing the ISO				
601	Manage Client Inquiries	80%	80%	20%	Efforts predominately support real time market functions.
602	Account Management	80%	80%	20%	Efforts predominately support real time market functions.
603	Manage Stakeholder Processes	80%	20%	80%	Efforts predominately support day ahead market functions.

The market services related non-ABC support costs were mapped from *Table 7 – Mapping of Non-ABC Support Costs to Cost Categories*.

Table 31 — Mapping of Market Services Non-ABC Support Costs

2019 Modified Revenue Requirement: Non-ABC Support		Market Services Split		Comments
Component	Market Services	Real Time Market	Day Ahead Market	
Non-ABC Support Costs				
Corporate Services Divisions				
SSAE 16 Audit	45%	80%	20%	Use Process 80007, Task 412 allocations.
Market and Infrastructure Development Division (MID)				
Market Surveillance Committee	80%	80%	20%	Use Process 80002, Task 232 allocations.
Technology Division (TECH)				
Intermittent Resource Forecasting Costs	80%	100%		Use Process 80005, Task 353 allocations.
Market Quality and California Regulatory Affairs Division (MQCRA)				
Intermittent Resource Forecasting Costs	80%	100%		Use Process 80005, Task 353 allocations.
General Counsel Division (GC)				
Operations Audit	24%	72%	28%	Use Process 80005 total allocations.

Then other revenue mapped to market services from *Table 10 – Mapping of Other Revenue to Cost Categories* were mapped to real time market and / or day ahead market.

Table 32 — Mapping of Market Services Other Revenue

2019 Modified Revenue Requirement: Other Costs and Revenue		Market Services Split		Comments
Component	Market Services	Real Time Market	Day Ahead Market	
Other Costs and Revenue				
Intermittent Resource Forecasting Fees	80%	100%		Use Process 80005, Task 353 allocations.

Market services fees from *Table 27 – Estimation of Fee Revenue and Mapping of Fees to Cost Categories* are mapped as follows.

Table 33 — Mapping of Market Services Fees

2019 Modified Revenue Requirement		Market Services Split		Comments
Fee	Market Services	Real Time Market	Day Ahead Market	
		(% of cost to allocate to category)		
Bid Segment Fees	100%	50%	50%	Bidding in both markets.
Inter-SC Trade Fees	100%		100%	All in forward market.
SCID Fees	100%	50%	50%	Participate in both markets.

SYSTEM OPERATIONS

The following mapping only addresses those level 2 activities that are mapped to system operations, which then in turn were mapped to either the real time dispatch or balancing authority (BA) services. The direct ABC level 2 activities mapped to system operations is taken from *Table 6 – Mapping of ABC Direct Operating Activities to Cost Categories*.

Table 34 — Mapping of System Operations ABC Direct Operating Activities

System Operations Split		
Real Time Dispatch	Balancing Authority Services	Comments
<i>(% of cost to allocate to category)</i>		
100%		Efforts support real time dispatch functions.
	100%	Efforts support balancing authority services functions.
50%	50%	Efforts support real time dispatch and balancing authority services functions equally.
80%	20%	Efforts predominately support real time dispatch functions.
20%	80%	Efforts predominately support balancing authority services functions.

2019 Modified Revenue Requirement: ABC Direct Operating Activities			System Operations Split		
Code	ABC Level 2 Activities	System Operations	Real Time Dispatch	BA Services	Comments
			category % allocation		
80001 Develop Infrastructure (DI)					
202	Manage Generator Interconnection Agreements	100%		100%	Efforts support balancing authority functions.
203	Manage Generator Interconnection Process	100%		100%	Efforts support balancing authority functions.
204	Manage Long Term Transmission Planning	100%		100%	Efforts support balancing authority functions.
205	Manage New Transmission Resources	95%		100%	Efforts support balancing authority functions.
206	Manage Transmission Maintenance Standards	100%		100%	Efforts support balancing authority functions.
207	Manage Load Resource Data	100%		100%	Efforts support balancing authority functions.
208	Seasonal Assessment	100%		100%	Efforts support balancing authority functions.
209	Manage Queue Management	100%		100%	Efforts support balancing authority functions.
210	Manage Annual Delivery Assessment	100%		100%	Efforts support balancing authority functions.
80002 Develop Markets (DM)					
229	Develop State / Federal Regulatory Policy	60%		100%	Efforts support balancing authority functions.
230	BPM Change Management	10%	100%		Efforts support real time dispatch functions.
231	Develop Infrastructure Policy	60%		100%	Efforts support balancing authority functions.
232	Perform Market Analysis	15%	100%		Efforts support real time dispatch functions.
80004 Manage Market & Reliability Data & Modeling (MMR)					
301	Manage Full Network Model Maintenance	45%	100%		Efforts support real time dispatch functions as the grid operates in real time.
302	Plan & Develop Operations Simulator Training	95%	100%		Efforts support real time dispatch functions as the grid operates in real time.
304	EMAA Telemetry	50%	20%	80%	Efforts predominately support balancing authority functions.
308	Manage Credit & Collateral	40%	50%	50%	Efforts support real time dispatch and balancing authority functions equally.
309	Resource Management	50%	50%	50%	Efforts support real time dispatch and balancing authority functions equally.
310	Manage Reliability Requirements	100%		100%	Efforts support balancing authority functions.
311	Manage Operations Planning	95%	20%	80%	Efforts predominately support balancing authority functions.
312	Manage WECC Studies	100%	20%	80%	Efforts predominately support balancing authority functions.
314	Manage & Facilitate Procedure Maintenance	95%	20%	80%	Efforts predominately support balancing authority functions.
316	Plan & Develop Operations Training	95%	100%		Efforts support real time dispatch functions.
317	Execute & Track Operations Training	95%	100%		Efforts support real time dispatch functions.
320	Provide Stakeholder Training	30%	50%	50%	Efforts support real time dispatch and balancing authority functions equally.
321	Schedule Coordinator Management	45%	20%	80%	Efforts predominately support balancing authority functions.
323	Calculate & Monitor Energy Costs & Indices	35%	100%		Efforts support real time dispatch functions.

2019 Modified Revenue Requirement: ABC Direct Operating Activities			System Operations Split			
Code	ABC Level 2 Activities	System Operations	Real Time Dispatch	BA Services	Comments	
			category % allocation			
80005 Manage Market & Grid (MMG)						
353	Operations Real Time Support	15%	100%			Efforts support real time dispatch functions.
355	Outage Model & Management	60%	20%	80%		Efforts predominately support balancing authority functions. Efforts support real time dispatch and balancing authority functions equally.
360	Real Time Operations	80%	50%	50%		Efforts support real time dispatch and balancing authority functions equally.
362	Manage Operations Engineering Support	80%	100%			Efforts support real time dispatch functions.
367	Manage Operations Compliance & Event Analysis	50%		100%		Efforts support balancing authority functions.
80007 Manage Operations Support & Settlements (MOS)						
401	Perform Market Validation	20%	100%			Efforts support real time dispatch functions.
403	Manage Market Quality System	40%	100%			Efforts support real time dispatch functions.
411	Manage Market Clearing	45%	50%	50%		Efforts support real time dispatch and balancing authority functions equally.
412	Manage Market Billing & Settlements	45%	100%			Efforts support real time dispatch functions.
413	Manage Reliability Must Run Settlements	100%	100%			Efforts support real time dispatch functions.
414	Manage Settlements Quarterly Release Cycle	45%	100%			Efforts support real time dispatch functions.
417	Perform Market Report	20%	100%			Efforts support real time dispatch functions.
419	Manage Price Corrections	40%	100%			Efforts support real time dispatch functions.
80009 Support Business Services (SBS)						
504	IT Application, System, & Non-Production Support	15%	50%	50%		Efforts support real time dispatch and balancing authority functions equally.
511	IT Incident Management	30%	100%			Efforts support real time dispatch functions.
513	IT Problem & Risk Lifecycle Management	30%	100%			Efforts support real time dispatch functions.
80010 Support Customers & Stakeholders (SCS)						
601	Manage Client Inquiries	10%	100%			Efforts support real time dispatch functions.
602	Account Management	10%	100%			Efforts support real time dispatch functions.
603	Manage Stakeholder Processes	10%	100%			Efforts support real time dispatch functions.

The system operations related non-ABC support costs were mapped from *Table 7 – Mapping of Non-ABC Support Costs to Cost Categories*.

Table 35 — Mapping of System Operations Non-ABC Support Costs

2019 Modified Revenue Requirement: Non-ABC Support Costs		System Operations Split		Comments
Component	System Operations	Real Time Dispatch	BA Services	
		% of budget allocation		
Non-ABC Support Costs				
Corporate Services Divisions				
SSAE 16 Audit	45%	100%		Use Process 80007, Task 412 allocations.
Market and Infrastructure Development Division (MID)				
Market Surveillance Committee	15%	100%		Use Process 80002, Task 232 allocations.
Technology Division (TECH)				
Intermittent Resource Forecasting Costs	15%	100%		Use Process 80005, Task 353 allocations.
Market Quality and California Regulatory Affairs Division (MQCRA)				
Intermittent Resource Forecasting Costs	15%	100%		Use Process 80005, Task 353 allocations.
General Counsel Division (GC)				
Operations Audit	52%	58%	42%	Use Process 80005 total allocations.

Then other revenue mapped to system operations from *Table 10 – Mapping of Other Revenue to Cost Categories* were allocated to real time dispatch and / or balancing authority services.

Table 36 — Mapping of System Operations Other Revenue

2019 Modified Revenue Requirement: Other Costs and Revenue		System Operations Split		Comments
Component	System Operations	Real Time Dispatch	BA Services	
		% of budget allocation		
Other Costs and Revenue				
California-Oregon Intertie Path Operator Fees	100%		100%	Fees offset system operations costs.
Intermittent Resource Forecasting Fees	15%	100%		Use Process 80005, Task 353 allocations.
Generator Interconnection Project Fees and Application Fees	100%		100%	Use Process 80001, Task 203 allocations.
Planning Coordinator Fees	100%		100%	Use Process 80001, Task 204 allocations.

System operations fees from *Table 27 – Estimation of Fee Revenue and Mapping of Fees to Cost Categories* were mapped as follows.

Table 37 — Mapping of System Operations Fees

2019 Modified Revenue Requirement		System Operations Split		Comments
Fee	System Operations	Real Time Dispatch	Balancing Authority Services	
		(% of cost to allocate to category)		
TOR Fees	100%	100%		Real time function.

Costing the Cost Categories to EIM Activities

The amounts from the 2019 cost of service study were applied to the market services and system operations categories to derive the direct real time activity costs.

Table 38 – Components of the 2019 Modified GMC Revenue Requirement

2019 Modified GMC Revenue Requirement		Market Services	System Operations	CRR Services
Component	Budget			
Non-ABC O&M Support Costs	\$ 33,999	\$ 1,606	\$ 566	\$ 44
Direct ABC O&M Costs	\$ 151,611	\$ 45,075	\$ 47,608	\$ 1,960
Debt Service	\$ 16,904	\$ -	\$ -	\$ -
Cash Funded Capital	\$ 25,000	\$ -	\$ -	\$ -
Other Costs and Revenues	\$ (38,662)	\$ (3,040)	\$ (4,240)	\$ -
Operating Costs Reserve Adjustment	\$ (13,480)	\$ -	\$ -	\$ -
Subtotal	\$ 175,372	\$ 43,641	\$ 43,934	\$ 2,004
Indirect Costs	\$ 3,420	\$ 43,136	\$ 44,116	\$ 1,961
GMC Revenue Requirement Before Fees	\$ 178,792	\$ 86,777	\$ 88,050	\$ 3,965
Less Fees	\$ (8,560)	\$ (6,725)	\$ (1,105)	\$ (730)
Remaining Revenue Requirement to Collect	\$ 170,232	\$ 80,052	\$ 86,945	\$ 3,235

Completing the analysis required the following steps:

1. applying EIM activity percentages to non-ABC O&M support costs;
2. applying EIM activity percentages to ABC direct O&M costs;
3. applying EIM activity percentages to other revenue;
4. aggregating costs and allocate indirect costs to EIM activities based on percentage of direct costs and allocation of fees to EIM activities to determine the resulting EIM activity amounts and percentages; and
5. applying the EIM activity percentage to the applicable cost category (market services and / or system operations) to determine the EIM component.

Step 1: Applying EIM Activity Percentages to Non-ABC O&M Support Costs

The non-ABC support costs from *Table 14 – Allocation of Non-ABC Support to Cost Categories* were allocated using the percentages shown in the *Mapping of Non-ABC Support Costs* tables above (Table 31 and Table 35).

Table 39 – Allocation of Market Services Non-ABC Support Costs

2019 Modified Revenue Requirement: Non-ABC Support Costs		Market Services Split		Market Services Split		
Component	Market Services	Real Time Market	Day Ahead Market	Category Budget	Real Time Market	Day Ahead Market
		% of budget allocation		budget allocations (amounts in thousands)		
Non-ABC Support Costs						
Corporate Services Divisions						
SSAE 16 Audit	45%	80%	20%	\$ 252	\$ 202	\$ 50
Corporate Services Division Total				\$ 252	\$ 202	\$ 50
Market and Infrastructure Development Division (MID)						
Market Surveillance Committee	80%	80%	20%	\$ 251	\$ 201	\$ 50
MID Total				\$ 251	\$ 201	\$ 50
Technology Division (TECH)						
Intermittent Resource Forecasting Costs	80%	100%		\$ 789	\$ 789	\$ -
Technology Total				\$ 789	\$ 789	\$ -
Market Quality and California Regulatory Affairs Division (MQCRA)						
Intermittent Resource Forecasting Costs	80%	100%		\$ 284	\$ 284	\$ -
MQCRA Total				\$ 284	\$ 284	\$ -
General Counsel Division (GC)						
Operations Audit	24%	72%	28%	\$ 30	\$ 22	\$ 8
General Counsel Total				\$ 30	\$ 22	\$ 8
Total Non-ABC Support Costs				\$ 1,606	\$ 1,498	\$ 108

Table 40 – Allocation of System Operations Non-ABC Support Costs

2019 Modified Revenue Requirement: Non-ABC Support Costs	System Operations Split			System Operations Split		
	System Operations	Real Time	BA	Category Budget	Real Time	BA
		Dispatch	Services		Dispatch	Services
Component	% of budget allocation			budget allocations (amounts in thousands)		
Non-ABC Support Costs						
Corporate Services Divisions						
SSAE 16 Audit	45%	100%		\$ 252	\$ 252	\$ -
Corporate Services Division Total				\$ 252	\$ 252	\$ -
Market and Infrastructure Development Division (MID)						
Market Surveillance Committee	15%	100%		\$ 47	\$ 47	\$ -
MID Total				\$ 47	\$ 47	\$ -
Technology Division (TECH)						
Intermittent Resource Forecasting Costs	15%	100%		\$ 148	\$ 148	\$ -
Technology Total				\$ 148	\$ 148	\$ -
Market Quality and California Regulatory Affairs Division (MQCRA)						
Intermittent Resource Forecasting Costs	15%	100%		\$ 53	\$ 53	\$ -
MQCRA Total				\$ 53	\$ 53	\$ -
General Counsel Division (GC)						
Operations Audit	52%	58%	42%	\$ 66	\$ 38	\$ 28
General Counsel Total				\$ 66	\$ 38	\$ 28
Total Non-ABC Support Costs				\$ 566	\$ 538	\$ 28

Step 2: Applying EIM Activity Percentages to ABC Direct O&M Costs

The ABC direct O&M costs from *Table 19 – Allocation of ABC Direct Operating Activities to Cost Categories* were allocated using the percentages shown in the *Mapping of ABC Direct Operating Activities* tables above (Table 30 and Table 34).

Table 41 – Allocation of Market Services ABC Direct Operating Costs

2019 Modified Revenue Requirement: ABC Direct Operating Activities		Market Services Split			Market Services Split		
Code	ABC Level 2 Activities	Market Services	Real Time Market	Day Ahead Market	Category Budget	Real Time Market	Day Ahead Market
			category % allocation		budget allocations (amounts in thousands)		
80001 Develop Infrastructure (DI)							
201	Develop and Monitor Regulatory Contract Procedures	95%	50%	50%	\$ 612	\$ 306	\$ 306
	Total DI				\$ 612	\$ 306	\$ 306
80002 Develop Markets (DM)							
229	Develop State / Federal Regulatory Policy	40%	50%	50%	\$ 127	\$ 64	\$ 63
230	BPM Change Management	80%	50%	50%	\$ 151	\$ 76	\$ 75
231	Develop Infrastructure Policy	40%	50%	50%	\$ 923	\$ 462	\$ 461
232	Perform Market Analysis	80%	80%	20%	\$ 2,638	\$ 2,110	\$ 528
233	Develop Market Design	100%	50%	50%	\$ 1,904	\$ 952	\$ 952
234	Manage Regulatory Contract Negotiations	95%	50%	50%	\$ 349	\$ 175	\$ 174
	Total DM				\$ 6,092	\$ 3,839	\$ 2,253
80004 Manage Market & Reliability Data & Modeling (MMR)							
301	Manage Full Network Model Maintenance	45%	50%	50%	\$ 1,735	\$ 868	\$ 867
304	EMAA Telemetry	50%	100%		\$ 268	\$ 268	\$ -
308	Manage Credit & Collateral	40%	50%	50%	\$ 313	\$ 157	\$ 156
309	Resource Management	50%	80%	20%	\$ 669	\$ 535	\$ 134
320	Provide Stakeholder Training	60%	50%	50%	\$ 463	\$ 232	\$ 231
321	Schedule Coordinator Management	45%	80%	20%	\$ 87	\$ 70	\$ 17
322	Register, Modify and Terminate PDR Resource	100%	50%	50%	\$ 174	\$ 87	\$ 87
323	Calculate & Monitor Energy Costs & Indices	60%	80%	20%	\$ 599	\$ 479	\$ 120
	Total MMR				\$ 4,308	\$ 2,696	\$ 1,612
80005 Manage Market & Grid (MMG)							
352	Manage Day Ahead Market Support	95%		100%	\$ 361	\$ -	\$ 361
353	Operations Real Time Support	80%	100%		\$ 865	\$ 865	\$ -
355	Outage Model & Management	5%	50%	50%	\$ 128	\$ 64	\$ 64
360	Real Time Operations	20%	100%		\$ 2,611	\$ 2,611	\$ -
362	Manage Operations Engineering Support	15%	50%	50%	\$ 602	\$ 301	\$ 301
368	Manage Day Ahead and Market Operations	100%	50%	50%	\$ 2,474	\$ 1,237	\$ 1,237
	Total MMG				\$ 7,041	\$ 5,078	\$ 1,963
	MMG %s				100%	72%	28%

2019 Modified Revenue Requirement: ABC Direct Operating Activities			Market Services Split		Market Services Split			System Operations Split		
Code	ABC Level 2 Activities	Market Services	Real Time Market	Day Ahead Market	Category Budget	Real Time Market	Day Ahead Market	Category Budget	Real Time Dispatch	BA Services
			<i>category % allocation</i>		<i>budget allocations (amounts in thousands)</i>			<i>budget allocations (amounts in thousands)</i>		
80007 Manage Operations Support & Settlements (MOS)										
401	Perform Market Validation	80%	80%	20%	\$ 19	\$ 15	\$ 4	\$ 5	\$ 5	\$ -
402	Manage Dispute Analysis & Resolution	100%	80%	20%	\$ 1,475	\$ 1,180	\$ 295	\$ -	\$ -	\$ -
403	Manage Market Quality System	50%	80%	20%	\$ 287	\$ 230	\$ 57	\$ 229	\$ 229	\$ -
409	Meter Data Acquisition and Processing	100%	50%	50%	\$ 474	\$ 237	\$ 237	\$ -	\$ -	\$ -
411	Manage Market Clearing	45%	50%	50%	\$ 53	\$ 27	\$ 26	\$ 53	\$ 27	\$ 26
412	Manage Market Billing & Settlements	45%	80%	20%	\$ 600	\$ 480	\$ 120	\$ 599	\$ 599	\$ -
414	Manage Settlements Quarterly Release Cycle	45%	80%	20%	\$ 1,046	\$ 837	\$ 209	\$ 1,046	\$ 1,046	\$ -
417	Perform Market Report	80%	80%	20%	\$ 759	\$ 607	\$ 152	\$ 190	\$ 190	\$ -
418	Manage Good Faith Negotiation Requests	100%	50%	50%	\$ 40	\$ 20	\$ 20	\$ -	\$ -	\$ -
419	Manage Price Corrections	50%	80%	20%	\$ 917	\$ 734	\$ 183	\$ 734	\$ 734	\$ -
	Total MOS				\$ 5,670	\$ 4,367	\$ 1,303	\$ 2,863	\$ 2,837	\$ 26
80008 Plan & Manage Business (PMB)										
455	Manage Technology Collaboration (Internal)	100%	80%	20%	\$ 2,570	\$ 2,056	\$ 514	\$ -	\$ -	\$ -
462	Manage Technology Collaboration (External)	100%	50%	50%	\$ 147	\$ 74	\$ 73	\$ -	\$ -	\$ -
	Total PMB				\$ 2,717	\$ 2,130	\$ 587	\$ -	\$ -	\$ -
80009 Support Business Services (SBS)										
504	IT Application, System, & Non-Production Support	80%	50%	50%	\$ 11,200	\$ 5,600	\$ 5,600	\$ 2,100	\$ 1,050	\$ 1,050
511	IT Incident Management	60%	50%	50%	\$ 2,687	\$ 1,344	\$ 1,343	\$ 1,343	\$ 1,343	\$ -
513	IT Problem & Risk Lifecycle Management	60%	50%	50%	\$ 502	\$ 251	\$ 251	\$ 251	\$ 251	\$ -
537	Monitor Markets	80%	50%	50%	\$ 1,590	\$ 795	\$ 795	\$ -	\$ -	\$ -
	Total SBS				\$ 15,979	\$ 7,990	\$ 7,989	\$ 3,694	\$ 2,644	\$ 1,050
80010 Support Customers & Stakeholders (SCS)										
601	Manage Client Inquiries	80%	80%	20%	\$ 1,317	\$ 1,054	\$ 263	\$ 165	\$ 165	\$ -
602	Account Management	80%	80%	20%	\$ 574	\$ 459	\$ 115	\$ 72	\$ 72	\$ -
603	Manage Stakeholder Processes	80%	20%	80%	\$ 765	\$ 153	\$ 612	\$ 96	\$ 96	\$ -
	Total SCS				\$ 2,656	\$ 1,666	\$ 990	\$ 333	\$ 333	\$ -
	Total Direct O&M				\$ 45,075	\$ 28,072	\$ 17,003	\$ 47,608	\$ 22,157	\$ 25,451
	Direct O&M %				100%	62%	38%	100%	47%	53%

Table 42 – Allocation of System Operations ABC Direct Operating Costs

2019 Modified Revenue Requirement: ABC Direct Operating Activities			System Operations Split		System Operations Split		
Code	ABC Level 2 Activities	System Operations	Real Time	BA	Category Budget	Real Time	BA
			Dispatch	Services		Dispatch	Services
			category % allocation		budget allocations (amounts in thousands)		
80001 Develop Infrastructure (DI)							
202	Manage Generator Interconnection Agreements	100%		100%	\$ 319	\$ -	\$ 319
203	Manage Generator Interconnection Process	100%		100%	\$ 2,765	\$ -	\$ 2,765
204	Manage Long Term Transmission Planning	100%		100%	\$ 6,618	\$ -	\$ 6,618
205	Manage New Transmission Resources	95%		100%	\$ 651	\$ -	\$ 651
206	Manage Transmission Maintenance Standards	100%		100%	\$ 514	\$ -	\$ 514
207	Manage Load Resource Data	100%		100%	\$ 247	\$ -	\$ 247
208	Seasonal Assessment	100%		100%	\$ 284	\$ -	\$ 284
209	Manage Queue Management	100%		100%	\$ 786	\$ -	\$ 786
210	Manage Annual Delivery Assessment	100%		100%	\$ 1	\$ -	\$ 1
	Total DI				\$ 12,185	\$ -	\$ 12,185
80002 Develop Markets (DM)							
229	Develop State / Federal Regulatory Policy	60%		100%	\$ 190	\$ -	\$ 190
230	BPM Change Management	10%	100%		\$ 19	\$ 19	\$ -
231	Develop Infrastructure Policy	60%		100%	\$ 1,385	\$ -	\$ 1,385
232	Perform Market Analysis	15%	100%		\$ 495	\$ 495	\$ -
	Total DM				\$ 2,089	\$ 514	\$ 1,575
80004 Manage Market & Reliability Data & Modeling (MMR)							
301	Manage Full Network Model Maintenance	45%	100%		\$ 1,734	\$ 1,734	\$ -
302	Plan & Develop Operations Simulator Training	95%	100%		\$ 391	\$ 391	\$ -
304	EMAA Telemetry	50%	20%	80%	\$ 269	\$ 54	\$ 215
308	Manage Credit & Collateral	40%	50%	50%	\$ 313	\$ 157	\$ 156
309	Resource Management	50%	50%	50%	\$ 668	\$ 334	\$ 334
310	Manage Reliability Requirements	100%		100%	\$ 1,503	\$ -	\$ 1,503
311	Manage Operations Planning	95%	20%	80%	\$ 1,789	\$ 358	\$ 1,431
312	Manage WECC Studies	100%	20%	80%	\$ 80	\$ 16	\$ 64
314	Manage & Facilitate Procedure Maintenance	95%	20%	80%	\$ 288	\$ 58	\$ 230
316	Plan & Develop Operations Training	95%	100%		\$ 2,051	\$ 2,051	\$ -
317	Execute & Track Operations Training	95%	100%		\$ 1,288	\$ 1,288	\$ -
320	Provide Stakeholder Training	30%	50%	50%	\$ 232	\$ 116	\$ 116
321	Schedule Coordinator Management	45%	20%	80%	\$ 88	\$ 18	\$ 70
323	Calculate & Monitor Energy Costs & Indices	35%	100%		\$ 350	\$ 350	\$ -
	Total MMR				\$ 11,044	\$ 6,925	\$ 4,119

2019 Modified Revenue Requirement: ABC Direct Operating Activities			System Operations Split		System Operations Split		
Code	ABC Level 2 Activities	System Operations	Real Time Dispatch	BA Services	Category Budget	Real Time Dispatch	BA Services
			category % allocation		budget allocations (amounts in thousands)		
80005 Manage Market & Grid (MMG)							
353	Operations Real Time Support	15%	100%		\$ 162	\$ 162	\$ -
355	Outage Model & Management	60%	20%	80%	\$ 1,535	\$ 307	\$ 1,228
360	Real Time Operations	80%	50%	50%	\$ 10,444	\$ 5,222	\$ 5,222
362	Manage Operations Engineering Support	80%	100%		\$ 3,213	\$ 3,213	\$ -
367	Manage Operations Compliance & Event Analysis	50%		100%	\$ 46	\$ -	\$ 46
	Total MMG				\$ 15,400	\$ 8,904	\$ 6,496
	MMG %s				100%	58%	42%
80007 Manage Operations Support & Settlements (MOS)							
401	Perform Market Validation	20%	100%		\$ 5	\$ 5	\$ -
403	Manage Market Quality System	40%	100%		\$ 229	\$ 229	\$ -
411	Manage Market Clearing	45%	50%	50%	\$ 53	\$ 27	\$ 26
412	Manage Market Billing & Settlements	45%	100%		\$ 599	\$ 599	\$ -
413	Manage Reliability Must Run Settlements	100%	100%		\$ 7	\$ 7	\$ -
414	Manage Settlements Quarterly Release Cycle	45%	100%		\$ 1,046	\$ 1,046	\$ -
417	Perform Market Report	20%	100%		\$ 190	\$ 190	\$ -
419	Manage Price Corrections	40%	100%		\$ 734	\$ 734	\$ -
	Total MOS				\$ 2,863	\$ 2,837	\$ 26
80009 Support Business Services (SBS)							
504	IT Application, System, & Non-Production Support	15%	50%	50%	\$ 2,100	\$ 1,050	\$ 1,050
511	IT Incident Management	30%	100%		\$ 1,343	\$ 1,343	\$ -
513	IT Problem & Risk Lifecycle Management	30%	100%		\$ 251	\$ 251	\$ -
	Total SBS				\$ 3,694	\$ 2,644	\$ 1,050
80010 Support Customers & Stakeholders (SCS)							
601	Manage Client Inquiries	10%	100%		\$ 165	\$ 165	\$ -
602	Account Management	10%	100%		\$ 72	\$ 72	\$ -
603	Manage Stakeholder Processes	10%	100%		\$ 96	\$ 96	\$ -
	Total SCS				\$ 333	\$ 333	\$ -
	Total Direct O&M				\$ 47,608	\$ 22,157	\$ 25,451
	Direct O&M %				100%	47%	53%

Step 3: Allocating the Remaining Revenue Requirement Components

The other revenue from *Table 24 – Allocation of Other Revenue to Cost Categories* were allocated using the percentages shown in the *Mapping of Other Revenue* tables above (Table 32 and Table 36).

Table 43 — Allocation of Market Services Other Revenue

2019 Modified Revenue Requirement: Other Costs and Revenue		Market Services Split		Market Services Split		
Component	Market Services	Real Time Market	Day Ahead Market	Category Budget	Real Time Market	Day Ahead Market
				<i>budget allocations (amounts in thousands)</i>		
Other Costs and Revenue						
Intermittent Resource Forecasting Fees	80%	100%		\$ 3,040	\$ 3,040	\$ -

Table 44 — Allocation of System Operations Other Revenue

2019 Modified Revenue Requirement: Other Costs and Revenue		System Operations Split		System Operations Split		
Component	System Operations	Real Time Dispatch	BA Services	Category Budget	Real Time Dispatch	BA Services
		<i>% of budget allocation</i>		<i>budget allocations (amounts in thousands)</i>		
Other Costs and Revenue						
California-Oregon Intertie Path Operator Fees	100%		100%	\$ 2,000	\$ -	\$ 2,000
Intermittent Resource Forecasting Fees	15%	100%		\$ 570	\$ 570	\$ -
Generator Interconnection Project Fees and Application Fees	100%		100%	\$ 1,600	\$ -	\$ 1,600
Planning Coordinator Fees	100%		100%	\$ 70	\$ -	\$ 70
Total Other Costs and Revenue				\$ 4,240	\$ 570	\$ 3,670

Step 4: Aggregating Revenue Requirement into Cost Categories and Allocating Fees

The CAISO aggregated individual revenue requirements for each category, indirect costs were allocated based on the total of direct costs and fees were allocated as described above.

Table 45 – Mapping Revenue Requirement to Cost Categories

2019 Modified GMC Revenue Requirement		Market Services Split			System Operations Split		
Component	Budget	Market Services	Real Time Market	Day Ahead Market	System Operations	Real Time Dispatch	BA Services
Non-ABC O&M Support Costs	\$ 33,999	\$ 1,606	\$ 1,498	\$ 108	\$ 566	\$ 538	\$ 28
Direct ABC O&M Costs	\$ 151,611	\$ 45,075	\$ 28,072	\$ 17,003	\$ 47,608	\$ 22,157	\$ 25,451
Debt Service	\$ 16,904	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Cash Funded Capital	\$ 25,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Other Costs and Revenues	\$ (38,662)	\$ (3,040)	\$ (3,040)	\$ -	\$ (4,240)	\$ (570)	\$ (3,670)
Operating Costs Reserve Adjustment	\$ (13,480)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Subtotal	\$ 175,372	\$ 43,641	\$ 26,530	\$ 17,111	\$ 43,934	\$ 22,125	\$ 21,809
Indirect Costs	\$ 3,420	\$ 43,136	\$ 26,223	\$ 16,913	\$ 44,116	\$ 22,217	\$ 21,899
GMC Revenue Requirement Before Fees	\$ 178,792	\$ 86,777	\$ 52,753	\$ 34,024	\$ 88,050	\$ 44,342	\$ 43,708
Less Fees	\$ (8,560)	\$ (6,725)	\$ (2,179)	\$ (4,546)	\$ (1,105)	\$ (1,105)	\$ -
Remaining Revenue Requirement to Collect	\$ 170,232	\$ 80,052	\$ 50,574	\$ 29,478	\$ 86,945	\$ 43,237	\$ 43,708
			63%	37%		50%	50%

Step 5: Calculation of the EIM Components of the 2019 Cost Category Rates

The percentages from Table 45 were applied to the cost categories' real time component's rate from

Table 28 – 2019 GMC Rates Using Revised Cost Category Percentages.

Table 46 – Calculation of the EIM Components

Cost Category	Category Net Costs	Pro Forma Rate	EIM Real Time Activity	EIM Percentage of Costs	EIM Cost of Real Time Activities	EIM Pro Forma Rate
	<i>(\$ in thousands)</i>	<i>(\$ / MWh)</i>			<i>(\$ in thousands)</i>	<i>(\$ / MWh)</i>
Market Services	\$ 80,052	\$ 0.1498	Real Time Market	63%	\$ 50,574	\$ 0.0947
System Operations	\$ 86,945	\$ 0.1945	Real Time Dispatch	50%	\$ 43,237	\$ 0.0967

Summary of EIM Cost Category Percentage Changes

A comparison of the EIM cost category percentages from the 2016 and 2019 cost of service studies is shown highlighted below. As noted earlier, the study shows that 16% of market services' resources shifted from the real time market functions to day ahead market functions. In addition, 11% of system operations' resources shifted from balancing authority functions to real time dispatch functions. The driver of the shifts is a balancing of efforts between the market services and system operations functions and responsibilities.

Table 47 – Summary of EIM Cost Category Percentage Changes

Cost Category	Sub-Category	2016 Study Effective 2018 GMC	2019 Study Effective 2021 GMC	Increase / (Decrease) from Prior
Market Services	Real Time Market	79%	63%	-16%
	Day Ahead Market	21%	37%	16%
System Operations	Real Time Dispatch	39%	50%	11%
	Balancing Authority	61%	50%	-11%

Reliability Coordinator Services

In January 2018, CAISO announced plans to become the RC for entities within its footprint and to offer the service to all balancing authorities and transmission operators in the West. Shortly after, CAISO began a public process to develop its RC services. In November 2018, FERC approved the rates, terms, and conditions for the RC services. CAISO collaborated with entities, regulators, and other RC service providers to work toward its certification, and to create procedures for logistics and operations. CAISO completed the NERC certification process led by the Western Electricity Coordinating Council (WECC), allowing it to provide RC services. In the first phase, RC West became the RC of record for 16 entities as of July 1, 2019. The November 1, 2019 cutover marked the second phase of a transition of power grid oversight responsibility. RC West is now the RC for 42 entities in the Western Interconnection, overseeing 87 percent of the load in the western United States.

Most of the process and tasks necessary to support the RC services were already identified in CAISO's ABC process and task codes; however, they were not directly identified as a RC Services function. To address this gap, beginning with the 2019 cost of service study, CAISO mapped the tasks identified as contributing to RC services to a new cost category, Reliability Coordinator, by means of percentage allocation. This approach allows CAISO to leverage against the stability of its annual revenue requirement to develop an annual RC funding requirement thus benefiting both the RC customers and the existing GMC customers.

By mapping the tasks to the RC cost category, the CAISO is able to calculate the RC funding percentage. The RC funding percentage represents the direct and indirect time and expense necessary for the CAISO to perform its RC services and functions. The RC funding percentage is used similarly to that of the GMC cost category percentages in that the RC funding percentage is multiplied against the revenue requirement in order to determine the RC funding requirement. The RC funding requirement is then divided by the reported MWh to determine the RC rate/MWh.

Table 48: Allocation of Revenue Requirement to RC Cost Category

2019 Modified Revenue Requirement						
Component	2019 Budget	GMC				Indirect
		Market Services	System Operations	CRR Services	Reliability Coordinator	
<i>budget allocations (amounts in thousands)</i>						
Direct Costs	\$ 151,611	\$ 45,075	\$ 47,608	\$ 1,960	\$ 9,264	\$ 47,704
Indirect Costs	\$ 3,420	\$ -	\$ -	\$ -	\$ -	\$ 3,420
Non-ABC Costs	\$ 33,999	\$ 1,606	\$ 566	\$ 44	\$ 1,140	\$ 30,643
Total O&M	\$ 189,030	\$ 46,681	\$ 48,174	\$ 2,004	\$ 10,404	\$ 81,767
Debt Service	\$ 16,904	\$ -	\$ -	\$ -	\$ -	\$ 16,904
Cash Funded Capital	\$ 25,000	\$ -	\$ -	\$ -	\$ -	\$ 25,000
Total Debt Service and Capital	\$ 41,904	\$ -	\$ -	\$ -	\$ -	\$ 41,904
Other Costs and Revenues (without RC Funding Requirement)	\$ (20,705)	\$ (3,040)	\$ (4,240)	\$ -	\$ (1,270)	\$ (12,155)
Operating Cost Reserve Adjustment	\$ (13,480)	\$ -	\$ -	\$ -	\$ -	\$ (13,480)
Total Other Revenue and Operating Costs Reserve Adj	\$ (34,185)	\$ (3,040)	\$ (4,240)	\$ -	\$ (1,270)	\$ (25,635)
Revenue Requirement Sub-Total Before Indirect Allocations	\$ 196,749	\$ 43,641	\$ 43,934	\$ 2,004	\$ 9,134	\$ 98,036
Direct Costs %		44%	45%	2%	9%	
Indirect Costs Allocated Based on Direct Cost %		43,136	44,116	1,961	8,823	(98,036)
Revenue Requirement Sub-Total Before RC Funding Requirement Adjustment	\$ 196,749	\$ 86,777	\$ 88,050	\$ 3,965	\$ 17,957	\$ -
RC Funding Percentage		44%	45%	2%	9%	
Reliability Coordinator Funding Requirement	\$ (17,957)	\$ -	\$ -	\$ -	\$ (17,957)	\$ -
GMC Revenue Requirement	\$ 178,792	\$ 86,777	\$ 88,050	\$ 3,965	\$ -	\$ -
Cost Category Percentages for GMC Rates		49%	49%	2%		

The mapping of RC services is included in the aforementioned sections' tables. The culmination of the mapping resulted in a 9% RC funding percentage. There is no change in the RC funding percentage from that of the initial calculation as part of CAISO's Reliability Coordinator Rate Design, Terms and Conditions proposal.

Table 49– Summary of RC Funding Percentage Changes

Cost Category	2016 Modified Study Effective 2019 GMC	2019 Study Effective 2021 GMC	Increase / (Decrease) from Prior
Reliability Coordinator Services	9%	9%	0%

In addition to mapping the RC related efforts, CAISO revisited the tasks necessary to support load serving and generator only entities. This effort required outreach to the various subject matter experts that support RC services such as from the RC, Operations Planning and Operations Compliance groups. The general feedback was, whereas the number of

requirements to support generator only facilities is lower, it was determined the same operations and planning tasks are required to ensure reliability throughout the interconnection footprint. In conclusion, CAISO determined that there is no separation of duties between supporting a load serving entity and generator only entity that supports a change in the RC rate design.

Supplemental Fees

As a final focus of the 2019 cost of service study, CAISO analyzed the efforts that support other supplemental services. The effort required input from the various groups that support the services such as from the Contracts, Contract and Model Implementation, Market Services, Operations Planning, Credit, and Customer Service groups.

The study results indicate resources to process applications and statements has increased. These supplemental fees are designed to help recoup some of the costs that a new, or additional, Scheduling Coordinator (SC) or CRR customer has on systems and labor resources. While some of the costs are supported through the volumetric charges of the GMC, these supplemental fees represent a portion of the resource impact that any new entity, large or small, has. The CAISO is proposing to increase fees that have remained unchanged for more than 10 years.

Conversely, the study has shown that resources to support TOR efforts have decreased due to streamlined processes and automation. The decrease in costs and higher volumes support a decrease in the TOR fee from \$0.24 per MWh to \$0.18 per MWh. CAISO does not propose any changes to other supplemental fee amounts.

The revenue collected from the fees offset the costs recovered through either the GMC revenue requirement or the GMC rates. The CAISO is not proposing any other change in supplemental fees.

Table 50– Summary of Supplemental Fee Changes

Fee	Billing Units	Current Fee	Updated Fee
Bid Segment Fee	per bid segment	\$ 0.0050	No Change
Inter SC Trade Fee	per Inter SC Trade	\$ 1.0000	No Change
Scheduling Coordinator ID Fee	per month	\$ 1,000	\$ 1,500
TOR Fees	minimum of supply or demand TOR MWh	\$ 0.2400	\$ 0.1800
CRR Bid Fee	number of nominations and bids	\$ 1.00	No Change
Intermittent Resource Forecasting Fee	per MWh	\$ 0.1000	No Change
Scheduling Coordinator Application Fee	per application	\$ 5,000	\$ 7,500
CRR Application Fee	per application	\$ 1,000	\$ 5,000
HANA Administrative Fee	annual fee	\$ 45,000	No Change
HANA Setup Fee	one time fee	\$ 35,000	No Change

Transmission Ownership Rights

Transmission ownership rights (TOR) represent transmission capacity on facilities that are located within the CAISO balancing authority area that are either wholly or partially owned by an entity that is not a participating transmission owner.

The following four services are required for TOR:

1. Real Time Operations

CAISO provides support on an emergency basis for flows on TOR, in a manner similar to standby service.

2. Scheduling

CAISO provides check-outs with neighboring balancing authorities (BA) in order to schedule flows across boundaries.

3. Outage Management

CAISO provides for the scheduling and coordination of outages across the BA.

4. Settlements

CAISO utilizes its settlements system and processes to charge TOR fees.

Application of ABC to TOR Fee Structure

TORs utilize the ABC level 2 activities identified in the table below. These activities are all related to system operations as there is no TOR participation in the market and thus market services costs are not applicable.

Table 51 –ABC Direct Operating Activities for TORs

Transmission Ownership Rights (TOR) Fee		
ABC Code	Task Code	ABC Level 2 Activity
80004	301	Manage Full Network Model (FNM) Maintenance
80004	311	Manage Operations Planning
80004	312	Manage WECC Studies
80005	355	Manage Outages
80005	360	Real Time Operations
80005	362	Manage Operations Engineering Support
80007	411	Manage Market Clearing
80007	412	Manage Market Billing & Settlements

Mapping and Costing of Cost Categories to TOR Activities

Using the process described below, a total of \$38.9 million in direct and indirect costs were allocated to TORs. CAISO reached this conclusion by identifying the costs for the specific level 2 activities from the 2019 cost of service update. The indirect dollars were then allocated based on the direct percentage. A table summarizing the cost of TORs is as follows

Table 52 – Calculation of TOR Related Costs

Transmission Ownership Rights (TOR) Fee			
Calculation of TOR Costs			
ABC Code	Task Code	ABC Level 2 Activity	Amount (\$ in thousands)
80004	301	Manage Full Network Model (FNM) Maintenance	\$ 1,734
80004	311	Manage Operations Planning	\$ 1,789
80004	312	Manage WECC Studies	\$ 80
80005	355	Manage Outages	\$ 1,535
80005	360	Real Time Operations	\$ 10,444
80005	362	Manage Operations Engineering Support	\$ 3,213
80007	411	Manage Market Clearing	\$ 53
80007	412	Manage Market Billing & Settlements	\$ 599
		Applicable Direct Costs	\$ 19,447
		Total System Operations Direct Costs	\$ 43,934
		Percentage of TORs to System Operations Direct Costs	44%
		Total System Operations Indirect Costs	\$ 44,116
		Percentage Per Above	44%
		Applicable Indirect Costs	\$ 19,411
		Total TOR Related Costs	\$ 38,858

System operation's indirect costs were allocated based on the percentage of direct cost as shown above. Then the ratio of TOR MWh to the total system operations (flow) MWh was calculated to determine the usage percentage.

Table 53 - TORs as a Percentage of Gross Volumes

Transmission Ownership Rights (TOR) Fee		
TOR Flow		
		Volumes (in MWh)
	System Operations Volume	442,538,230
	Add Back Grandfathered Contracts	3,723,000
	TOR Supply	4,339,223
	TOR Demand	4,313,917
	Total Adjusted System Operations Volume	454,914,369
	Total Gross TOR Volume (Supply and Demand)	8,653,140
	TOR as a Percentage of Gross Volume	2.00%

The amount to collect is then derived by multiplying the TOR related costs by the TOR percentage results. The TOR fee is then determined by dividing the TOR costs to collect by the minimum of actual TOR supply or actual TOR demand for 2019. The revised TOR fee is as follows

Table 54 – Calculation of TOR Fee

Transmission Ownership Rights (TOR) Fee		
TOR Fee Calculation		
		Amount
	Total Applicable Direct and Indirect Costs	\$ 38,858,040
	TOR as a Percentage of Gross Volume	2.00%
	TOR Costs to Collect	\$ 777,161
	TOR MWh for 2019 (min. of supply and demand)	4,313,917
	TOR Fee per MWh	\$ 0.1800

Summary of TOR Fee Changes

Despite a decrease in the applicable TOR costs, the TOR related costs to collect increased by \$157,549 from the last cost of service study due to TOR having a higher percentage of gross volume. However, the cost to collect divided by the increased MWh resulted in a reduction of the TOR fee from \$0.2400 per MWh to \$0.1800 per MWh. CAISO proposes to decrease the TOR fee to \$0.1800 per MWh effective January 1, 2021. The revenue collected from the TOR fee will offset costs recovered through the System Operations charge rate.

Table 55 – Summary of TOR Fee Changes

Transmission Ownership Rights (TOR) Fee		2016 COSS	2019 COSS	Increase / (Decrease) From Prior
TOR Fee Calculation				
		Amount	Amount	Amount
	Total Applicable Direct and Indirect Costs	\$ 61,961,200	\$ 38,858,040	\$ (23,103,160)
	TOR as a Percentage of Gross Volume	1.00%	2.00%	1.00%
	TOR Costs to Collect	\$ 619,612	\$ 777,161	\$ 157,549
	TOR MWh for 2019 (min. of supply and demand)	2,627,260	4,313,917	1,686,657
	TOR Fee per MWh	\$ 0.2400	\$ 0.1800	\$ (0.0600)

Application Fees

The SC application fee is one of the original fees the CAISO has assessed since inception. The fee is intended to cover the processing and setup costs for an applicant to become a certified scheduling coordinator eligible to transact business directly with the CAISO. The fee amount was last changed in 2007. As part of the 2019 cost of service study, CAISO evaluated the actual cost of processing applications, establishing connectivity, evaluating financial security, and providing training. When the hours to perform these functions per application are applied against a general burden rate per hour the cost to process a SC application is \$7,500.

The CRR application fee is assessed on any load serving entity (LSE) that desires to become a candidate CRR Holder so that they can participate in the CRR allocation process to request CRRs. CRRs are important to LSEs since they are a financial instrument used to offset congestion charges for the scheduled load in the day

ahead market. These entities are allocated CRRs based on the load serving obligation of the LSE. The CRR application fee was introduced in 2012; the fee amount has not changed since. As with the SC application fee, CAISO evaluated the actual cost of processing applications, establishing connectivity, evaluating financial security, and providing training. When the hours to perform these functions per application are applied against a general burden rate per hour the cost to process a CRR application is \$5,000.

CAISO proposes to increase the SC application fee to \$7,500 and the CRR application fee to \$5,000 effective January 1, 2021. The revenue collected from these fees will offset the annual GMC revenue requirement.

Scheduling Coordinator ID Administrative Fee

The SCID administrative fee was originally designed to limit the number of SCIDs to those needed for legitimate business purposes in order to reduce the additional burden on CAISO systems and resources that an unlimited number of SCIDs could create. However, since the fee was last assessed in 2012, the cost to support the settlements system and provide monthly statements and invoices has increased beyond the \$1,000 per month per SCID fee amount due to general inflation and system maintenance costs. In its evaluation, CAISO concluded the SCID fee should increase to \$1,500 per month to cover supporting system and labor costs from contributing groups such as Contracts, Credit, Resource Management, SC Management, Market Quality, Settlement, and IT.

CAISO proposes to increase the SCID administrative fee to \$1,500 effective January 1, 2021. The revenue collected from the SCID fee will offset costs recovered through the Market Services charge rate.