

October 15, 2020

The Honorable Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

**Re: California Independent System Operator Corporation
Docket No. ER 21-____-000
2020 Grid Management Charge – Cost of Service Study Update**

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) submits this tariff amendment to implement modest adjustments to the allocation of its Grid Management Charge (GMC) revenue requirement to its market services, system operations, and congestion revenue rights (CRR) services cost categories. In accordance with the CAISO's tariff (Appendix F, Schedule 1, Part A), the CAISO conducted its latest cost of service study in 2020 based on 2019 data. The study results indicate the need to adjust the GMC percentage allocation.¹ The CAISO requests the Commission approve the proposed tariff modifications effective on January 1, 2021. The CAISO further requests the Commission issue an order by December 15, 2020, to allow the CAISO time to implement the revised percentages on the proposed effective date.

The CAISO's GMC consists of three separate service charges: (1) the market services charge, (2) the system operations charge, and (3) the CRR services charge. The CAISO allocates its GMC revenue requirement to these service charges based on the results of the CAISO's triennial cost of service study. The 2019 cost of service study indicated a need to amend the CAISO tariff to adjust the percentage of its total revenue requirement allocated to the market services and system operations cost categories, shown in Table 1 below. Specifically, the cost of service study supports changing the market services allocation from 32% to 49% and the system operations allocation from 66% to 49%. The CAISO proposes to maintain the current 2% allocation to the CRR services cost category based on the results of the cost of service study.

¹ The CAISO submits this filing pursuant to Section 205 of the Federal Power Act, 16 U.S.C. § 824d and 18 C.F.R. § 35.15.

Table 1: Summary of GMC Cost Category Percentage Changes

| Cost Category | 2016 Study Effective 2018 GMC | 2019 Study Effective 2021 GMC | Change from Prior |
|-------------------|-------------------------------|-------------------------------|-------------------|
| Market Services | 32% | 49% | 17% |
| System Operations | 66% | 49% | -17% |
| CRR Services | 2% | 2% | 0% |

The CAISO is also requesting the Commission approve modifications to its tariff regarding the reliability coordinator (RC) funding percentage, which is set based on the cost of service study. The CAISO uses the RC funding percentage to determine the RC funding requirement. The CAISO’s proposed tariff modifications remove language implementing the RC funding percentage for the start-up period for the CAISO’s RC function. The CAISO proposes to replace the start-up provisions with language that updates the RC funding requirement based on the cost of service study. Based on the 2019 cost of service study, the CAISO does not propose to change the RC funding requirement level, which will remain at 9%.

In addition, the 2019 cost of service study demonstrated the need to modify other tariff-defined fees. Through this filing, the CAISO requests approval to modify the fees shown in Table 2 below.

Table 2: Summary of Supplemental Fee Changes

| Fee | Billing Units | Current Fee Amount | Proposed Fee Amount |
|--------------------------------------|-------------------------------------|--------------------|---------------------|
| Schedule Coordinator Application Fee | per application | \$ 5,000 | \$ 7,500 |
| CRR Application Fee | per application | \$ 1,000 | \$ 5,000 |
| SCID Monthly Fee | per month | \$ 1,000 | \$ 1,500 |
| TOR Fee | minimum of supply or demand TOR MWh | \$ 0.2400 | \$ 0.1800 |

Lastly, the CAISO seeks tariff modifications to clarify the CAISO’s ability to maintain funding for its self-insured healthcare reserve.

As discussed below, the CAISO thoroughly vetted the 2019 cost of service study

and the proposed tariff modifications with stakeholders pursuant to a robust and transparent stakeholder process, and there was broad-based support for the proposal. The tariff amendments provide stability and rate certainty, while ensuring an open and transparent evaluation of the GMC fees and charges on a regular basis through a regular cost of service study. This process, in conjunction with the CAISO's annual budget development process, promotes transparency and gives stakeholders the opportunity to participate in every aspect of the CAISO's budget, revenue requirement development, and GMC rate design.

I. Background

A. GMC Overview

The GMC is the vehicle through which the CAISO recovers its annual revenue requirement from the entities that use CAISO services. Funding the annual revenue requirement ensures the CAISO recovers its administrative, operating, and capital costs. The CAISO developed the current GMC rate design based on a cost of service study that the CAISO conducted for the purposes of establishing the GMC for 2012 (2010 cost of service study).² The CAISO vetted the cost of service study and GMC rate design through a robust stakeholder process, and the Commission approved the existing GMC rate design, effective January 1, 2012.³ In 2014, the CAISO filed an updated cost of service study based on the methodology reflected in the 2010 cost of service study and minor modifications to the GMC process. The Commission approved the new cost of service study and the minor GMC modifications effective January 1, 2015.⁴ In 2017, the CAISO filed an updated cost of service study and associated tariff modifications. The Commission approved the new cost of service study effective January 1, 2018.⁵

The GMC comprises three cost categories, four administrative fees, and a fixed charge for transmission ownership rights holders. This rate design, which the CAISO first proposed in the 2011 GMC filing, substantially simplified the existing GMC structure and more closely aligned the cost allocation categories with the CAISO's nodal market.⁶ At the time of the 2011 GMC filing, the GMC had seven service categories with seventeen related charge codes. With the 2011 filing, the CAISO preserved the formula rate with a fixed revenue requirement cap but reduced the number of service categories

² That cost of service study was based on 2010 data.

³ *Cal. Indep. Sys. Operator Corp.*, 136 FERC ¶ 61,236 (2011).

⁴ *Cal. Indep. Sys. Operator Corp.*, 149 FERC ¶ 61,232 (2014).

⁵ *Cal. Indep. Sys. Operator Corp.*, Nov. 21, 2017 FERC Order, http://www.caiso.com/Documents/Nov21_2017_LetterOrderAcceptingTariffAmendment-2017GridManagementCharge-Cost_ServiceStudyUpdate_ER18-91.pdf.

⁶ The history of the CAISO's GMC was described in the testimony of Mr. Michael Epstein, which accompanied the 2011 GMC filing. The CAISO is attaching that testimony for reference as Attachment D.

from seven to three:

- (1) The market services category consists of costs related to implementing and operating the markets and is charged based on each scheduling coordinator's gross absolute value of awarded megawatt hours of energy and megawatts per hour of ancillary services in the day-ahead and real-time markets;
- (2) The system operations category consists of costs associated with reliably operating the grid by balancing supply and demand and is charged based on each scheduling coordinator's gross absolute value of real-time energy flows for generation, load, imports and exports; and
- (3) The congestion revenue rights category consists of costs related to the CRR function and is charged based on each scheduling coordinator's total megawatt CRR holdings applicable to each hour.

The CAISO currently allocates the overall revenue requirement to these categories based on percentages developed in the 2016 cost of service study: 32% to market services, 66% to system operations and 2% to CRR services. The CAISO tariff requires the CAISO to conduct an updated cost of service study every three years to "recalculate the three service charge percentages and the rates for the fees and charges that constitute the Grid Management Charge as set forth in Section 11.22."⁷

The 2011 revised GMC rate design also included two new transaction fees: the bid segment fee of \$0.005 per bid segment; and the CRR auction bid fee of \$1.00 per trade. In addition, the revised rate design retained the existing inter-scheduling coordinator fee of \$1.00 per trade and the scheduling coordinator ID fee of \$1,000 per month of market activity. These transaction and administrative fees are similar to fees assessed by other ISOs and RTOs. The CAISO also deducts the administrative fees from the respective service categories' revenue requirement allocations as described in the CAISO tariff.⁸

The 2011 revised rate design carried forward the transmission ownership rights (TOR) exemption from the monthly GMC calculation of the system operations charges. As explained in greater detail below, this exemption reflects TOR holders' more limited use of the CAISO grid, and is a fixed charge of \$0.24 per megawatt-hour of flow, assessed on the minimum of the customer's supply or demand megawatt-hours.

⁷ CAISO Tariff Appendix F, Schedule 1, Part A.

⁸ The CAISO credits the bid segment fee, inter-scheduling coordinator trade transaction fee and the scheduling coordinator ID charge against the market services category, the CRR auction bid fee against the CRR service category, and the transmission ownership rights fee against the system operation category.

In 2014, the CAISO implemented its Energy Imbalance Market (EIM) in which other balancing authority areas can participate in the CAISO’s real-time energy market. As part of the stakeholder process for the EIM, the CAISO, in conjunction with its stakeholders, developed the EIM Administrative Charge, which is derived from the real-time portion of GMC cost categories. In 2015, the CAISO amended its EIM Administrative Charge to better align with the GMC. The 2015 amendment established the EIM Administrative Charge as it currently exists, which bases the EIM Administrative Charge on the real-time activities associated with market services and system operations categories of the GMC.⁹ The CAISO does not propose any changes to the structure of the EIM Administrative Charge in this filing, but the new market services and system operations percentage allocations will cause corresponding modifications to the EIM Administrative Charge rates as shown in Table 3 below.

Table 3: Summary of EIM Cost Category Percentage Changes

| Cost Category | Sub-Category | 2016 Study Effective 2018 GMC | 2019 Study Effective 2021 GMC | Change 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% |

Finally, the CAISO began offering RC services to balancing authority areas within the Western Interconnection in 2019. As part of the stakeholder process to implement RC services, the CAISO developed the RC services charge to recover the cost of providing RC services. The CAISO leveraged its existing rate design model and activity based costing system to determine the amount it would charge for RC service. Using this approach, the CAISO developed an annual RC funding requirement. The funding requirement is the product of the CAISO’s overall annual revenue requirement multiplied by the percentage of costs attributable to providing RC services (the “RC percentage”) as determined as part of the triennial cost of service study.

The CAISO developed two initial RC services percentages. The first initial percentage, which the CAISO calculated as two percent of its total revenue requirement, represented the costs the CAISO expected to incur in offering RC services to entities within its own balancing authority area, which it began serving on July 1, 2019, along with a few external entities. The initial percentage established the RC services rate until September 1, 2019, the date on which the CAISO began providing RC services to other entities outside its balancing authority area. The CAISO calculated that nine percent of its total revenue requirement reasonably represented of the costs the CAISO would incur in offering RC services to entities both inside and external to its balancing authority area. This filing removes language from the tariff regarding the initial RC services percentages. The CAISO reviewed the RC percentage in the 2019

⁹ *Cal. Indep. Sys. Operator Corp.*, 153 FERC ¶ 61,087 at P 60.

cost of service study and proposes to maintain the currently effective nine percent rate.

The CAISO does not propose to change the Commission-approved GMC structure. The CAISO only proposes to update the percentages associated with each of the service categories per the results of the recent cost of service study, and in accordance with tariff requirements, to recalculate the service charges as appropriate. This approach is consistent with the CAISO's prior cost of service study updates since 2011.

II. The 2019 Cost of Service Study and 2021 GMC Update Stakeholder Process

The tariff requires the CAISO to conduct an updated cost of service study every three years using cost and reported hours data from the previous fiscal year.¹⁰ The CAISO commenced the 2019 cost of service study process by presenting the 2019 cost of service study and 2021 GMC update at a stakeholder meeting on June 24, 2020. The 2019 cost of service study described (1) the overall 2019 cost of service study methodology and results; (2) the cost of service study impact on the EIM cost category percentages; (3) the cost of service study impact on the RC percentage; and (4) the cost of service analysis used to review and update other supplemental fees.¹¹

The CAISO received two comments from stakeholders in response to the June 24, 2020 meeting. The CAISO posted responses to the comments on July 9, 2020, and offered to meet with the commenting parties to discuss individual concerns. The CAISO held a second stakeholder meeting on July 29, 2020. The CAISO received only one set of written comments in response to the July 29, 2020 and fully addressed the factual questions received. No party submitted written comments opposing the 2019 cost of service study results or the CAISO's proposed updates to the tariff. CAISO management presented the cost of service study and the proposed changes to rates and fees to the CAISO Board of Governors at the October 2020 board meeting. The CAISO Board of Governors approved the changes to the rates and fees as presented by management and also approved clarifying tariff language regarding the self-insured healthcare reserve.

III. The 2019 Cost of Service Study

The 2019 cost of service study uses the same Commission-approved activity based costing (ABC) modeling and cost allocation methodology the CAISO used in the

¹⁰ CAISO Tariff Appendix F, Schedule 1, Part A.

¹¹ See Attachment C, 2019 Cost of Service Study and 2021 GMC Update, also available on the CAISO website: <http://www.aiso.com/Documents/DraftFinal2019CostofServiceStudyand2021GridManagementChargeUpdate.pdf>. See also, Attachment F, the CAISO's presentation materials from the June 24, 2020 stakeholder meeting.

2010, 2013, and 2016 cost of service studies. In the June 24, 2020, cost of service overview, the CAISO described the cost of service study methodology, including an explanation of ABC and the levels of employee activities used in the study.¹² Activity based costing is a time tracking methodology by which CAISO employees keep track of the time they spend on various activities.

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.

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 CAISO derives the RC funding percentage similarly to the GMC cost category percentages in that it multiplies the RC funding percentage 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

Currently, the ABC analysis disaggregates CAISO functions into nine core processes (level 1 activities). Each of the core activities are further broken down into major processes (level 2 activities) which are then mapped back to the level one activity. There are 107 level 2 activities included in the 2019 cost of service study, as shown in Table 4 below.¹³ CAISO continually reviews and develops its processes to reflect its current state of operations and process flows.

¹² Attachment C at 6-13.

¹³ *Id.* at Pg. 8.

Table 4: 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 |

A. Allocating Activity Costs and Indirect Costs to Cost Categories

The CAISO conducted the 2019 cost of service study similar to how it conducted the 2010, 2013, and 2016 studies. As explained in the 2019 cost of service study and 2021 GMC update document, CAISO level 1 and 2 activities fall generally into two overall categories: direct employee activities, which can be mapped to the four service categories, and indirect or support activities, which support CAISO business services but are not attributable to any specific cost category (e.g., managing human resources).

First, the CAISO divided the nine level 1 processes into either direct employee activities or indirect/support activities. The cost of service study assigns all support activities to a category of indirect costs. Second, using information provided by the business process owners, the CAISO mapped the level 2 functions associated with the direct level 1 activities to one of the four service categories (i.e., market services, system operations, CRR services and reliability coordinator services) based on the extent to which the activity supported the function the category represented. Because it is infeasible to perform such mapping with a high degree of precision, the CAISO mapped the direct activities using the 12 standard percentage allocations presented in Table 5 below.

Table 5: 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% | |

For example, the CAISO mapped the Manage Transmission and Resource Implementation function (identified as task 205) 100% under the system operations cost category because it pertains to managing the building and maintaining of the grid. Thus, related costs are entirely to support system operations. If the activity was not attributable to any specific cost category, e.g., stakeholder training or dispute resolution, the CAISO identified it as 100% indirect cost (the same category the cost of service study assigns to support activities). The CAISO used this same mapping approach in prior cost of service studies.¹⁴ The CAISO then used the same approach to allocate three additional items to the three direct cost categories and the indirect cost category: (1) debt service¹⁵ and cash-funded capital; (2) non-payroll support items; and (3) other income¹⁶ and operating reserve credit.¹⁷ After calculating the percentage allocations to the three direct cost categories, the CAISO aggregated the indirect cost category and allocated those costs proportionally to the direct cost categories.

B. Assigning Revenue Requirements Costs to Service Categories

Consistent with the process the CAISO followed in its three prior cost of service studies, after the CAISO completed this mapping, the CAISO then applied the resulting service category allocation matrix of level 2 activities and non-payroll costs to the 2019

¹⁴ The percentage allocations to the service categories were developed in the 2010 cost of service study and based on input from business units across the CAISO. The CAISO updated these percentage allocations in the 2019 cost of service study to incorporate the new reliability coordinator service category.

¹⁵ The CAISO tariff uses the term “financing costs.”

¹⁶ The cost of service study also refers to this as miscellaneous income. Under the CAISO tariff, it is “other costs and revenues.”

¹⁷ The CAISO tariff uses the term “operating cost reserve adjustment.”

revenue requirement budget to determine the costs associated with the four service categories. This process produced the proposed revised GMC cost allocation percentages.

The components of the 2019 revenue requirement are operations and maintenance (O&M) costs, debt service on the 2013 bonds, cash-funded capital, other costs and revenues, and operating cost reserve adjustment. To assign the revenue requirement to the service categories, the CAISO first split operations and maintenance costs—the largest budget item—into non-payroll support costs and activity-related costs (both direct and support). The CAISO mapped non-payroll support to the service categories and the indirect cost category based on the extent to which the activity supported the function that the category represented.

Assigning direct activity-related operating and maintenance costs to the service categories required the CAISO to collect 2019 employee time and the percentage breakdown of each CAISO cost center by level 1 and 2 direct operating activities. This was a multi-step process that began with the CAISO determining the percentage of the hours each cost center devoted to each level 2 activity, multiplying the percentage by the 2019 budgeted direct activity costs for that cost center, and then summing the costs for all cost centers for that level 2 activity. The CAISO then assigned those costs to cost categories based on the previously determined level 2 activity allocation.¹⁸ The CAISO similarly calculated the hours and costs for each cost center related to operating and maintenance support costs. Because these support activities were not related to any particular direct activities, the CAISO assigned all of them as indirect costs.¹⁹

The 2013 bonds refunded the 2009 bonds that had funded building the CAISO's corporate headquarters in Folsom. For debt service on the 2013 bonds, the CAISO allocated 100% of the costs to the indirect category.²⁰ The CAISO similarly assigned other revenues (from fees and interest) and operating reserve credit to a direct activity if applicable or to the indirect category.²¹

In the final step, the CAISO aggregated the amount in each of the three direct cost activities and then determined the ratio among the three. The CAISO allocated the indirect costs among the three according to this ratio to obtain the following overall updated percentages, shown in Table 6 below.²² The reliability coordinator costs, which represent 9% of revenue requirement prior to the RC funding requirement adjustment, were offset by the RC funding requirement. The remaining balance represents the GMC revenue requirement to be collected through the GMC rates and fees.

¹⁸ Attachment C at 19-33.

¹⁹ *Id.* at 13.

²⁰ *Id.* at 14.

²¹ *Id.* at 14-15.

²² *Id.* at 38.

Table 6: Allocation of Revenue Requirement to Cost Categories

| 2019 Modified Revenue Requirement | | | | | | |
|---|--------------------|-------------------|-------------------|-----------------|-------------------------|--------------------|
| Component | 2019 Budget | GMC | | | Reliability Coordinator | Indirect |
| | | Market Services | System Operations | CRR Services | | |
| <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% | | |

Although not necessary to determine the cost category percentages, the rates are needed to determine the EIM fee percentages. To achieve this, the CAISO calculated the projected revenues from the GMC fees, deducted them from the relevant service categories, and then divided the remaining amount by estimated volumes of billing determinants for each cost category to determine estimated GMC rates for stakeholder information purposes, as shown in Table 7 below.²³ These steps are consistent with the steps the CAISO undertook in its previous cost of service studies.

²³ *Id.* at 36-37.

Table 7: 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 |

The following table reflects the results of the cost of service study.

Table 8: 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 shift from the system operations cost category to the market services cost category is primarily driven by process efficiencies, system improvements, the introduction of the RC services cost category, and automation of services.

With a focus to keep its business processes current and to prepare for commencing its RC services, the CAISO underwent a corporate wide process and system improvement effort to update its process and project coding system, update its business processes, and re-educate its staff on the proper use of time reporting codes. This effort led to a number of improvements, such as improved time card data and project data. It also led to a clean-up of the CAISO business process and project coding system. Lastly, this effort reevaluated direct costs versus indirect costs and the weighting of the process tasks. CAISO's leadership team, as well as business process owners, participated in weighting the business process tasks, which led to a finer granularity of cost drivers.

The introduction of the RC services category also contributed to the shift. A

number of the RC functions previously existed in the system operations category as identified in the RC Rate Design proposal. With the introduction of the RC services category, the CAISO categorized a percentage of the costs associated with those functions under the RC services category, which decreased the costs associated with system operations. The shift contributed to the reduction of system operations category costs, which resulted in balanced costs between the system operations and market services cost categories and sub-categories.

Improved automation of services, such as the Existing Transmission Contract Calculator (ETCC), allowed for improved integration with other tools, which allowed CAISO staff to better utilize their time spent on system operations functions and devote more time spent on market services functions.

IV. Updated Rates and Charges

For the updated EIM Administrative Charge, the sections below describe the steps the CAISO took to derive the updated costs from the cost of service study and determine the appropriate level of each of these charges.

A. EIM Administrative Charge

All market participants, EIM or otherwise, pay the same rate for the real-time market and real-time dispatch activities. To update the EIM Administrative Charge, the CAISO used the 2019 cost of service study to identify and aggregate the real-time activity costs allocated to the market services and system operations categories. The CAISO then allocated indirect costs to the categories in proportion to the direct costs, in a process similar to that described above for allocating the overall cost of service study. Next, the CAISO applied the 2019 real-time revenue requirement cost proportions to the respective rates for market services and system operations, as shown in Tables 9 and 10 below.²⁴

²⁴ *Id.* at 57.

Table 9: Mapping Revenue Requirement to EIM Related 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% |

Table 10: Summary of EIM Percentages ²⁵

| 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 |
|-------------------|--------------------|----------------|------------------------|-------------------------|----------------------------------|--------------------|
| | (\$ in thousands) | (\$ / MWh) | | | (\$ in thousands) | (\$ / MWh) |
| 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 |

The Commission approved the process for developing the EIM Administrative Charge as part of the CAISO's EIM Year One Enhancements initiative.²⁶ The updates to the EIM Administrative Charge described above are consistent with the process developed in that proceeding, and the CAISO is not proposing any modifications to how it develops the EIM Administrative Charge.

B. RC Funding Percentage

In January 2018, the CAISO announced plans to become the RC for entities within its footprint and to offer RC 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, the Commission approved the rates, terms, and conditions for the RC services. In the first phase, the CAISO 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. The CAISO is now the RC for 42 entities in the Western Interconnection, responsible for 87 percent of the load in

²⁵ *Id.* at 5.

²⁶ *Cal. Indep. Sys. Operator Corp.*, 153 FERC ¶ 61,087 at P 60. ("We find that CAISO's proposed revisions to the calculation of the EIM administrative charge will ensure that CAISO market participants and EIM market participants are charged the same rate for similar real-time services.")

the western United States.

Most of the processes 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 RC services functions. To address this gap, beginning with the 2019 cost of service study, the 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 the 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 CAISO uses the RC funding percentage similarly to that of the GMC cost category percentages, namely, the RC funding percentage is multiplied against the revenue requirement to determine the RC funding requirement. The RC funding requirement is then divided by the reported MWh to determine the RC rate/MWh.

The 2019 cost of service study results indicate there is no change in the percentage of resources to support the RC function. Thus, there is no change in the RC funding percentage from the initial calculation reflected in CAISO's Reliability Coordinator Rate Design, Terms and Conditions proposal.²⁷

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.

C. Supplemental Fees

In the 2019 cost of service study, the CAISO analyzed the costs and fees for other supplemental services. The study results indicate that CAISO resources to process Scheduling Coordinator and CRR Applications have increased. The resources to process Scheduling Coordinator billing statements—which are partially recovered through the Scheduling Coordinator ID Fee—have also increased. These supplemental fees are designed to help recoup some of the costs that a new, or additional, Scheduling Coordinator or CRR customer has on systems and labor resources. Although some of the costs associated with these services are supported through the

²⁷ *Id.* at 60.

volumetric GMC charges, these supplemental fees represent a portion of the resource impact that any new entity, large or small, has on the CAISO.

Based on the results of the 2019 cost of service study, the CAISO proposes to increase the Scheduling Coordinator and CRR application fees from \$5,000 and \$1,000 to \$7,500 and \$5,000, respectively. The CAISO also proposes to increase the Scheduling Coordinator ID Fee from \$1,000 per month to \$1,500 per month. The CAISO provides the basis for each of these changes in the subsections below.

1. Scheduling Coordinator Application Fee

The SC application fee is one of the original fees the CAISO has assessed since its inception. The fee covers the processing and setup costs for an applicant to become a certified scheduling coordinator eligible to transact business directly with the CAISO. The CAISO last changed the Scheduling Coordinator Application Fee 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 Scheduling Coordinator application is \$7,500.²⁸

2. CRR Application Fee

The CAISO assesses the CRR application fee on any load serving entity that desires to become a candidate CRR Holder and participate in the CRR allocation process. CRRs are important to load serving entities 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 load serving entity (LSE). The CAISO introduced the CRR application fee in 2012, and the fee amount has not changed since its inception. As with the Scheduling Coordinator 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 \$5,000.²⁹ The CAISO Board of Governors sets the CRR application pursuant to tariff section 4.10.1.3. As a result, the CAISO does not propose any tariff changes for this fee increase with this filing.

3. Scheduling Coordinator ID Administrative Fee

The CAISO originally designed the Scheduling Coordinator ID administrative fee to limit the number of Scheduling Coordinator IDs to those needed for legitimate business purposes to reduce the additional burden on CAISO systems and resources

²⁸ *Id.* at 66-67.

²⁹ *Id.*

that an unlimited number of Scheduling Coordinator IDs 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 Scheduling Coordinator ID fee amount due to general inflation and system maintenance costs. In its evaluation as illustrated in Table 11, below, the CAISO concluded the Scheduling Coordinator ID fee should increase to \$1,500 per month to cover supporting system and labor costs from contributing groups such as Contracts, Credit, Resource Management, Scheduling Coordinator Management, Market Quality, Settlement, and Information Technology.³⁰

³⁰ *Id.* at 67-68.

Table 11: Calculation of SCID Fee

| Scheduling Coordinator ID Fee | | | 2019 COSS |
|--------------------------------------|------------------|---|-------------------------------------|
| SCID Related Costs | | | |
| ABC Code | Task Code | ABC Level 2 Activity | Amount (\$ in thousands) |
| 80001 | 201 | Develop and Monitor Regulatory Contract Procedures | \$ 612 |
| 80004 | 308 | Manage Credit & Collateral | \$ 313 |
| 80004 | 309 | Resource Management | \$ 669 |
| 80004 | 321 | Schedule Coordinator Management | \$ 87 |
| 80007 | 403 | Manage Market Quality System | \$ 287 |
| 80007 | 412 | Manage Market Billing & Settlements | \$ 600 |
| 80009 | 519 | Provision and Manage Access | \$ 561 |
| | | Applicable Direct Costs | \$ 3,129 |
| | | Total Market Services Direct Costs | \$ 43,641 |
| | | Percentage of SCIDs of Market Services Direct Costs | 7% |
| | | Total Market Services Indirect Costs | \$ 43,136 |
| | | Percentage Per Above | 7% |
| | | Applicable Indirect Costs | \$ 3,020 |
| | | Total SCID Related Costs | \$ 6,149 |
| SCID Fee Calculation | | | |
| | | | Amount |
| | | Total Applicable Direct and Indirect Costs | \$ 6,148,520 |
| | | Number of SCIDs (12/2019) | 341 |
| | | Annual Cost per ID | \$ 18,031 |
| | | Monthly Cost per ID | \$ 1,503 |
| | | Monthly Fee per ID (rounded) | \$ 1,500 |

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

D. TOR Fees

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.

In the 2019 cost of service study, the CAISO identified the specific level 2 activities utilized by TORs and determined that a total of \$38.9 million in direct and indirect costs should be allocated to TOR-related services. The costs were then multiplied by the TOR as a percentage of gross volume to determine the TOR costs to collect for service. The product was then divided by the applicable TOR MWh, resulting in a reduction of the TOR fee from \$0.2400 per MWh to \$0.1800 per MWh, as shown in Table 12 below.³¹

Table 12: 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) |

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.

E. Self-Insured Health Insurance Tariff Clarifications

As part of the 2019 cost of service study and 2021 GMC update, the CAISO also

³¹ *Id.* at 62-66.

introduced a tariff clarification to its existing operating cost reserve adjustment. Specifically, the proposed tariff clarification defines the accounting treatment for the CAISO's self-insured healthcare reserve. As background, CAISO converted a portion of its healthcare benefit program to a self-insured model in 2018. The intent of the program is 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. The 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 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.

The existing CAISO tariff provides that the CAISO perform an operating cost reserve adjustment as part of the annual GMC process. The operating cost reserve adjustment ensures any excess or shortfall in any category that makes up the revenue requirement is accounted for in the annual rate development. The CAISO believes the healthcare reserve is consistent with current budgeting processes, but seeks to clarify its interaction with the operating cost reserve adjustment process to remove any potential confusion. The proposed tariff clarification expressly exempts the healthcare reserve funds from the operating cost reserve adjustment.

V. Proposed Tariff Modifications

The proposed tariff revisions (1) incorporate the results of the 2019 cost of service study and 2018 GMC update; (2) update the supplemental fees; and (3) clarify the CAISO's ability to maintain funding for its self-insured healthcare reserve.³²

With respect to the results of the 2019 cost of service study, the CAISO proposes to update Appendix F, Schedule 1, Part A to reflect the allocation of the GMC to the service categories, as discussed above. Based on the results of the cost of service study, the allocation will be modified as follows:

- Market Services: change from 32% to 49%
- System Operations: change from 66% to 49%
- CRR Services: No change from 2%

³² The 2016 cost of service study did not indicate a need for a change in the cost allocations to any of the four administrative charges or the fixed charge for transmission ownership rights. The four administrative charges are the Bid Segment Fee, the CRR Transaction Fee, the Inter-Scheduling Coordinator Trade Transaction Fee and the Scheduling Coordinator ID Charge.

The CAISO also proposed to amend Schedule 1 of Appendix F to clarify how the CAISO uses the cost of service study to update the RC funding percentage and the EIM administrative charges. The CAISO similarly proposes modifications to Schedule 7 of Appendix F, regarding the RC service charge, to remove language applicable to remove language regarding the RC funding percentage for the initial RC period and to provide the updated percentage based on the cost of service study results.

Regarding the supplemental fees, the CAISO proposes to amend the tariff as follows:

- Sections 4.5.1.1.4 and 4.5.1.1.6.1 to change the scheduling coordinator application fee from \$5,000 to \$7,500;
- Section 11.22.4 to decrease TOR charges from \$0.24/MWh to \$0.18/MWh; and
- Section 11.22.8 to increase the scheduling coordinator ID fee charge from \$1,000 to \$1,500.

Finally, the CAISO proposes to amend Appendix F, Schedule 1, Part C to clarify that any excess in the prior year budgeted amount for self-insured healthcare costs compared to actual self-insured healthcare costs are not included in the exists operating cost reserve adjustment.

VI. Effective Date and Request for Waivers

The CAISO requests that the Commission make the tariff revisions contained in the instant filing effective January 1, 2021. The CAISO further requests an order by December 15, 2020, to allow the CAISO to implement the revised charge on the effective date.

In addition, because the proposed GMC is a formula rate, the CAISO requests a waiver of section 35.13 of the Commission regulations,³³ including waivers of the requirements to submit full Period I and Period II data and work papers and cost-of-service statements in sections 35.13(c), 35.13(d)(1), (2), and (5), and 35.13(h).³⁴ These waivers are justified because the GMC is based on a revenue requirement vetted through the budget process with stakeholders and trued up to actual costs. The CAISO has also provided details about the cost of service analysis that is the basis for the revisions to the service category cost allocations and the supplemental fees that are the subject of this 2019 cost of service study and 2021 GMC update. The Commission has previously

³³ 18 C.F.R. § 35.13.

³⁴ 18 C.F.R. §§ 35.13(c), 35.13(d)(1), 35.13(d)(2), 35.13(d)(5), and 35.13(h).

granted waivers of the requirements to provide such data in a number of cases involving transmission formula rates.³⁵

Finally, the CAISO respectfully requests waiver of any other Commission regulations as may be necessary in order for these tariff revisions to become effective January 1, 2021.

VII. Communications

In accordance with Rule 203(b) of the Commission's Rules of Practice and Procedure,³⁶ communications regarding this filing should be addressed to the following individuals, whose names should be put on the official service list established by the Commission with respect to this submittal:

Anthony J. Ivancovich
Deputy General Counsel
Jordan Pinjuv
Senior Counsel
California Independent System Operator Corporation
250 Outcropping Way
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Tel: (916) 351-4400
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Email: aivancovich@caiso.com
jpinjuv@caiso.com

VIII. Service

The CAISO has served copies of this transmittal letter, and all attachments, on the California Public Utilities Commission, the California Energy Commission, and all parties with effective Scheduling Coordinator Service Agreements under the CAISO Tariff. In addition, the CAISO is posting this transmittal letter and all attachments on the CAISO website.

³⁵ See, e.g., *PPL Elec. Utils. Corp.*, 125 FERC ¶ 61,121, at PP 40-41 (2008); *Pub. Serv. Elec. & Gas Co.*, 124 FERC ¶ 61,303, at PP 23-24 (2008); *Okla. Gas & Elec. Co.*, 122 FERC ¶ 61,071 (2008) at PP 6, 41; *Commonwealth Edison Co.*, 119 FERC ¶ 61,238, at P 94 (2007).

³⁶ 18 C.F.R. § 385.203(b).

IX. Attachments

The following attachments, in addition to this transmittal letter, support the instant filing:

| | |
|--------------|---|
| Attachment A | Clean CAISO tariff incorporating the proposed tariff changes; and |
| Attachment B | Marked red-lined document showing the revisions containing the proposed tariff changes. |
| Attachment C | 2019 Cost of Service Study and 2021 GMC Update paper; |
| Attachment D | Testimony of Mr. Michael Epstein, filed with the 2012 GMC Update; |
| Attachment E | CAISO responses to stakeholder comments; |
| Attachment F | Presentation materials from the June 24, 2020 stakeholder meeting; |
| Attachment G | Memorandum to CAISO Board of Governors |

X. Conclusion

For the foregoing reasons, the Commission should accept the proposed tariff changes contained in the instant filing to become effective on January 1, 2021. Please contact the undersigned if you have any questions regarding this matter.

Respectfully submitted,

/s/ Anthony J. Ivancovich

Roger E. Collanton

General Counsel

Anthony J. Ivancovich

Deputy General Counsel

Jordan Pinjuv

Senior Counsel

Counsel for the California

Independent System Operator

Corporation

Attachment A – Clean Tariff

2020 Grid Management Charge – Cost of Service Study Update

California Independent System Operator Corporation

October 15, 2020

Section 4

4.5.1.1.4 Scheduling Coordinator Applicant Returns Application

At least 120 days before the proposed commencement of service, the Scheduling Coordinator Applicant must return a completed application form with the non-refundable application fee of \$7,500 to cover the application processing costs.

* * * * *

4.5.1.1.6.1 Information Requirements

The Scheduling Coordinator Applicant must submit with its application:

- (a) the proposed date for commencement of service, which may not be less than 120 days after the date the application was filed, unless waived by the CAISO;
- (b) financial and credit information as set forth in Section 12; and
- (c) the prescribed non-refundable application fee of \$7,500.

* * * * *

Section 11

* * * * *

11.22.4 TOR Charges

The ISO will exempt TORs from the Market Services Charge and the System Operations Charge that are calculated through the formula set forth in Appendix F, Schedule 1, Part A. The TOR Charge will be \$0.18/MWh, assessed on the minimum of a Scheduling Coordinator's TOR supply or TOR demand per Settlement Interval. The TOR Charge is subject to adjustment as described in Appendix F, Schedule 1, Part A. The CAISO will credit amounts recovered through the TOR Charges against the revenue

requirement for System Operations Charge as described in Appendix F, Schedule 1, Part A.

* * * * *

11.22.8 Scheduling Coordinator ID Charge

The Scheduling Coordinator ID Charge for each Scheduling Coordinator is \$1,500.00 per month, per Scheduling Coordinator ID Code for any Trading Month in which the Scheduling Coordinator has market activity. The Scheduling Coordinator ID Charge is subject to adjustment as described in Appendix F, Schedule 1, Part A. The CAISO will credit amounts recovered through the Scheduling Coordinator ID Charges against the revenue requirement for Market Services Charges as described in Appendix F, Schedule 1, Part A.

* * * * *

Appendix F

Rate Schedules

Schedule 1

Grid Management Charge

Part A – Monthly Calculation of Grid Management Charge (GMC)

The GMC consists of the following separate service charges: (1) the Market Services Charge; (2) the System Operations Charge; and (3) the CRR Services Charge. The GMC revenue requirement, determined in accordance with Part C of this Schedule 1, shall be allocated to the service charges specified in Part A of this Schedule 1 as follows: forty-nine (49) percent to Market Services; forty-nine (49) percent to System Operations; and two (2) percent to CRR Services. Starting in 2017 and every three (3) years thereafter, the CAISO will conduct an updated cost of service study, in consultation with stakeholders and using costs from the previous year. In conducting each cost of service study, the CAISO will recalculate the three service charge percentages and the rates for the fees and charges that constitute the Grid Management Charge as set forth in Section 11.22. In addition, the cost of service study results will be used to update the RC Funding Percentage used to calculate the annual RC Funding Requirement, as well as the real time percentages of the Market Services and System Operations service charges used to calculate the EIM Administrative Charges. If, based on the cost of service study results, the service category revenue requirement allocation percentages or the level of fees and charges have changed, the CAISO will submit tariff amendments to reflect such changes pursuant to Section 205 of the FPA.

* * * * *

Part C – Costs Recovered through the GMC

* * * * *

- (4) CAISO Operating Cost Reserve adjustment is the sum of:
 - (a) The excess or shortfall in collections of the prior year's rates compared to the budgeted amounts;
 - (b) The excess or shortfall in actual CAISO Operating Costs, CAISO Other Costs and Revenues and CAISO Financing Costs for the prior year compared to the budgeted amounts except any excess in the prior year budgeted amount for self-insured healthcare costs compared to actual self-insured healthcare costs;
 - (c) The estimate of current year collections and costs compared to budgeted amounts for the current year; and

* * * * *

Schedule 7

Reliability Coordinator Services Charge

The Reliability Coordinator Services Charge shall be based on the RC Funding Requirement. The RC Funding Requirement will consist of the annual costs associated with the CAISO's provision of Reliability Coordinator Services, including the annual costs associated with maintaining shared reliability coordinator tools such as the Western Interchange Tool and the Enhanced Curtailment Calculator. The CAISO will determine the RC Funding Requirement based on the percentage of its overall revenue requirement attributable to the cost of providing RC Services. This percentage, known as the RC Funding Percentage, will initially be determined by assessing the costs associated with providing RC Services, using data from the CAISO's 2016 cost of service study modified to reflect the assessed RC Services costs, and based on the expected number of customers that will have committed to take RC Services by the RC Services Dates provided in Section 19.2(b)(6). This percentage will be updated in conjunction with the triennial cost of service study conducted by the CAISO as described in Schedule 1, Part A of this Appendix F. The RC Funding Requirement will be calculated, on an annual basis, as the product of this percentage multiplied by the annual revenue requirement for the same year.

The RC Funding Requirement will be developed utilizing the procedures associated with the development of the GMC revenue requirement, as set forth in Schedule 1, Part D of this Appendix F. Entities taking RC Services from the CAISO will have the opportunity to participate in that annual budget process. The

RC Funding Percentage will be 9%, which will thereafter be used to calculate the annual RC Funding Requirement. The annual RC Funding Requirement will be assessed to applicable RC Customers, including Scheduling Coordinators that serve load in the CAISO Balancing Authority Area, in proportion to the Net Energy for Load or Net Generation for the period during which this rate is in effect.

The RC Funding Requirement will be treated as a component of the revenue in the CAISO Other Costs and Revenues category, for purposes of calculating the costs recovered through the GMC, as set forth in Schedule 1, Part C of this Appendix F.

* * * * *

Attachment B – Tariff Redlines

2020 Grid Management Charge – Cost of Service Study Update

California Independent System Operator Corporation

October 15, 2020

Section 4

4.5.1.1.4 Scheduling Coordinator Applicant Returns Application

At least 120 days before the proposed commencement of service, the Scheduling Coordinator Applicant must return a completed application form with the non-refundable application fee of ~~\$5,000~~7,500 to cover the application processing costs.

* * * * *

4.5.1.1.6.1 Information Requirements

The Scheduling Coordinator Applicant must submit with its application:

- (a) the proposed date for commencement of service, which may not be less than 120 days after the date the application was filed, unless waived by the CAISO;
- (b) financial and credit information as set forth in Section 12; and
- (c) the prescribed non-refundable application fee of ~~\$5,000~~7,500.

* * * * *

Section 11

* * * * *

11.22.4 TOR Charges

The ISO will exempt TORs from the Market Services Charge and the System Operations Charge that are calculated through the formula set forth in Appendix F, Schedule 1, Part A. The TOR Charge will be \$0.2418/MWh, assessed on the minimum of a Scheduling Coordinator's TOR supply or TOR demand per Settlement Interval. The TOR Charge is subject to adjustment as described in Appendix F, Schedule 1, Part A. The CAISO will credit amounts recovered through the TOR Charges against the revenue

requirement for System Operations Charge as described in Appendix F, Schedule 1, Part A.

* * * * *

11.22.8 Scheduling Coordinator ID Charge

The Scheduling Coordinator ID Charge for each Scheduling Coordinator is \$~~1,000~~1,500.00 per month, per Scheduling Coordinator ID Code for any Trading Month in which the Scheduling Coordinator has market activity. The Scheduling Coordinator ID Charge is subject to adjustment as described in Appendix F, Schedule 1, Part A. The CAISO will credit amounts recovered through the Scheduling Coordinator ID Charges against the revenue requirement for Market Services Charges as described in Appendix F, Schedule 1, Part A.

* * * * *

Appendix F

Rate Schedules

Schedule 1

Grid Management Charge

Part A – Monthly Calculation of Grid Management Charge (GMC)

The GMC consists of the following separate service charges: (1) the Market Services Charge; (2) the System Operations Charge; and (3) the CRR Services Charge. The GMC revenue requirement, determined in accordance with Part C of this Schedule 1, shall be allocated to the service charges specified in Part A of this Schedule 1 as follows: ~~thirty-two~~forty-nine (3249) percent to Market Services; ~~sixty-six~~forty-nine (6649) percent to System Operations; and two (2) percent to CRR Services. Starting in 2017 and every three (3) years thereafter, the CAISO will conduct an updated cost of service study, in consultation with stakeholders and using costs from the previous year. In conducting each cost of service study, the CAISO will recalculate the three service charge percentages and the rates for the fees and charges that constitute the Grid Management Charge as set forth in Section 11.22. In addition, the cost of service study results will be used to update the RC Funding Percentage used to calculate the annual RC Funding Requirement, as well as the real time percentages of the Market Services and System Operations service charges used to calculate the EIM Administrative Charges. If, based on the cost of service study results, the service category revenue requirement allocation percentages or the level of fees and charges have changed, the CAISO will submit tariff amendments to reflect such changes pursuant to Section 205 of the FPA.

* * * * *

Part C – Costs Recovered through the GMC

* * * * *

- (4) CAISO Operating Cost Reserve adjustment is the sum of:
- (a) The excess or shortfall in collections of the prior year's rates compared to the budgeted amounts;
 - (b) The excess or shortfall in actual CAISO Operating Costs, CAISO Other Costs and Revenues and CAISO Financing Costs for the prior year compared to the budgeted amounts except any excess in the prior year budgeted amount for self-insured healthcare costs compared to actual self-insured healthcare costs;
 - (c) The estimate of current year collections and costs compared to budgeted amounts for the current year; and
 - (d) The change in CAISO Operating Cost Reserve consistent with the level of the CAISO Operating Cost Reserve requirement.

* * * * *

Schedule 7

Reliability Coordinator Services Charge

The Reliability Coordinator Services Charge shall be based on the RC Funding Requirement. The RC Funding Requirement will consist of the annual costs associated with the CAISO's provision of Reliability Coordinator Services, including the annual costs associated with maintaining shared reliability coordinator tools such as the Western Interchange Tool and the Enhanced Curtailment Calculator. The CAISO will determine the RC Funding Requirement based on the percentage of its overall revenue requirement attributable to the cost of providing RC Services. This percentage, known as the RC Funding Percentage, will initially be determined by assessing the costs associated with providing RC Services, using data from the CAISO's 2016 cost of service study modified to reflect the assessed RC Services costs, and based on the expected number of customers that will have committed to take RC Services by the RC Services Dates provided in Section 19.2(b)(6). This percentage will be updated in conjunction with the triennial cost of service study conducted by the CAISO as described in Schedule 1, Part A of this Appendix F. The RC Funding Requirement will be calculated, on an annual basis, as the product of this percentage multiplied by the annual revenue requirement for the same year.

~~The percentage of the RC Funding Requirement for the initial RC Services Date provided in Section 19.2(b)(6) will be 2% for the July 1, 2019 targeted onboarding date, which will be assessed to applicable RC Customers, including Scheduling Coordinators that serve load in the CAISO Balancing Authority Area, in proportion to the Net Energy for Load or Net Generation for the period during which this rate is in effect. The percentage of the RC Funding Requirement for the initial RC Service Date provided in Section 19.2(b)(6) will be increased to 9% for the September 1, 2019 targeted onboarding date, which will thereafter be assessed to applicable RC Customers, including Scheduling Coordinators that serve load in the CAISO Balancing Authority Area, in proportion to the Net Energy for Load or Net Generation for the period during which this rate is in effect. The minimum annual RC Services Charge will also be prorated for applicable RC Customers during these periods.~~

The RC Funding Requirement will be developed utilizing the procedures associated with the development of the GMC revenue requirement, as set forth in Schedule 1, Part D of this Appendix F. Entities taking RC Services from the CAISO will have the opportunity to participate in that annual budget process. The RC Funding Percentage will be 9%, which will thereafter be used to calculate the annual RC Funding Requirement. The annual RC Funding Requirement will be assessed to applicable RC Customers, including Scheduling Coordinators that serve load in the CAISO Balancing Authority Area, in proportion to the Net Energy for Load or Net Generation for the period during which this rate is in effect.

The RC Funding Requirement will be treated as a component of the revenue in the CAISO Other Costs and Revenues category, for purposes of calculating the costs recovered through the GMC, as set forth in Schedule 1, Part C of this Appendix F.

* * * * *

Attachment C – 2019 Cost of Service Study & 2021 GMC Update Paper

2020 Grid Management Charge – Cost of Service Study Update

California Independent System Operator Corporation

October 15, 2020



California ISO

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

DRAFT FINAL

July 2020

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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).

The 2019 cost of service study results as shown in Table 1 below 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 the system operations cost category to the market services cost category is primarily driven by process efficiencies, system improvements, the introduction of the RC services cost category, and automation of services. The shift indicates CAISO staff is focused on supporting market services functions and system operations functions equally.

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 results also indicate a shift of EIM related resources as well, shown highlighted in Table 2 below. 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 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% |

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%.

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% |

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

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

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.

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 |

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.

Changes from the Straw Proposal

The content of this draft final is primarily the same as the straw proposal. All percentage allocations and fee changes that resulted from the updated cost of service study remain the same. This paper does provide additional explanations of the GMC cost category percentage shifts and the calculation of the Schedule Coordinator ID Fee as provided in response to stakeholder comments².

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.

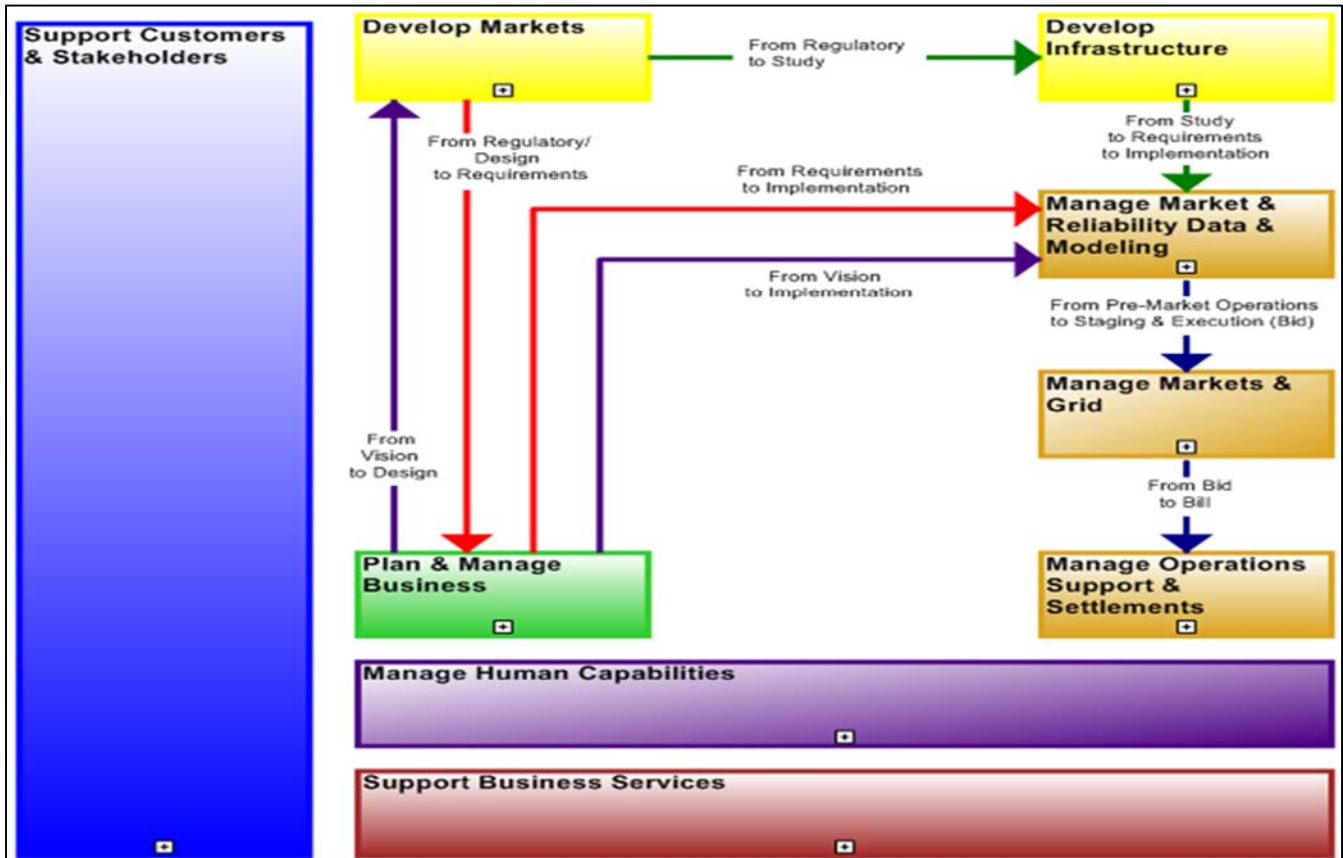
² Visit the CAISO website for additional information regarding the [2019 Cost of Service Study and 2021 GMC Update](#) stakeholder comments.

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

| Option | Standard Cost Category Percentage Allocations | | | |
|--------|---|-----|-----|----|
| | 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 | | | Reliability | | Comments |
| | Market Services | System Operations | CRR Services | Coordinator | Indirect | |
| 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 | | | Reliability | | Comments |
| | Market Services | System Operations | CRR Services | Coordinator | Indirect | |
| 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 | | General Counsel | | Market Quality and California Regulatory Affairs | External and Customer Affairs | Total |
| | | Services | Development | Technology | Operations | Counsel | Affairs | 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 | | | | | |
| | | | | | | <i>cost category % allocation</i> | | | | | | <i>budget allocations (amounts in thousands)</i> | | | | | |
| 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 | | | | | | | | | | | | |
|--|--|-----------------|-------------------|--------------|-------------------------|---|-------------------|------------------|-------------------|-----------------|-------------------------|------------------|
| | | 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) | | | | | | |
| 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 | \$ - | \$ 1,270 | \$ 12,155 |
| Reliability Coordinator Funding Requirement* | | | | | 100% | \$ 17,957 | \$ - | \$ - | \$ - | \$ 17,957 | \$ - |
| Total Other Costs and Revenue | | | | | | \$ 38,662 | \$ 3,040 | \$ 4,240 | \$ - | \$ 19,227 | \$ 12,155 |

* 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 RC 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 | | | | | | |
|---|--------------------|-------------------|-------------------|-----------------|-------------------------|--------------------|
| Component | GMC | | | | | |
| | 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 | | | | | | |
|-----------------------------------|----------------|----------|-----------------|-----------------|-------------------|---------------|
| Fee | Estimated 2019 | | 2019 Budget | Market Services | System Operations | CRRs |
| | Volumes | Rate | | | | |
| <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% |

The shift from the system operations cost category to the market services cost category is primarily driven by process efficiencies, system improvements, the introduction of the RC services cost category, and automation of services.

With a focus to keep its business processes current and in preparation of kicking off its RC services, the CAISO underwent a corporate wide process improvement and system improvement effort to update its process and project coding system, update its business processes, and re-educate its staff on the proper use of time reporting codes. This effort led to a number of improvements such as improved time card data collected and project data recorded. It also led to a clean-up of the CAISO business process and project coding system. Lastly, this effort reevaluated direct costs vs. indirect costs and the weighting of the process tasks. CAISO's leadership team, as well as business process owners, participated in weighting the business process tasks, which led to a finer granularity of cost drivers.

The introduction of the RC services category also contributed to the shift. A number of the RC functions previously existed in the system operations category as identified in the RC Rate Design proposal. With the introduction of the RC services category, a percentage of those functions were categorized under the RC services category, which caused a shift from the system operations category. The shift contributed to the reduction of the system operations category cost which effectively contributed to the balancing of the costs between the system operations and market services cost categories and their sub-categories.

Improved automation of services, like with Existing Transmission Contract Calculator (ETCC), allowed for improved integration with other tools which allowed CAISO staff to better utilize their time spent of system operations functions and devote more time spent on market services functions.

The combination of the aforementioned shift drivers led to a balancing of the costs as illustrated below; in other words, the costs were split 50/50 between direct and indirect categories. The balancing of direct costs and indirect costs in combination with the new weighting of the tasks resulted in a time and resource shift in the system operations cost category and market services cost category as well as a shift within their sub-categories.

| COSS: Direct Costs vs. Indirect Costs History <i>(\$\$ in thousands)</i> | | 2016 | | 2019 | |
|--|--|------------------|-------------|-------------------|-------------|
| | | \$\$ | % | \$\$ | % |
| Direct Costs | | \$ 57,780 | 30% | \$ 89,579 | 50% |
| Indirect Costs | | \$137,560 | 70% | \$ 89,213 | 50% |
| Total | | \$195,340 | 100% | \$ 178,792 | 100% |
| COSS: Cost Category History <i>(\$\$ in thousands)</i> | | | | | |
| | | 2016 | | 2019 | |
| | | \$\$ | % | \$\$ | % |
| Market Services | | \$ 62,591 | 32% | \$ 86,777 | 49% |
| System Operations | | \$129,059 | 66% | \$ 88,050 | 49% |
| CRR Services | | \$ 3,690 | 2% | \$ 3,965 | 2% |
| Total | | \$195,340 | 100% | \$ 178,792 | 100% |

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 | | |
|--|-------------------|-------------------------|----------|---|---------------|--------------|
| Component | System Operations | Real Time | BA | Category Budget | Real Time | BA |
| | | Dispatch | Services | | Dispatch | Services |
| | | % 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 |
| | | | <i>category % allocation</i> | | <i>budget allocations (amounts in thousands)</i> | | |
| 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 Dispatch | BA Services | Category Budget | Real Time Dispatch | BA 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 as illustrated in *Table 56 – Calculation of SCID Fee* below, 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.

Table 56 – Calculation of SCID Fee

| Scheduling Coordinator ID Fee | | | 2019 COSS |
|-------------------------------|-----------|---|-----------------------------|
| SCID Related Costs | | | |
| ABC Code | Task Code | ABC Level 2 Activity | Amount (\$ in thousands) |
| 80001 | 201 | Develop and Monitor Regulatory Contract Procedures | \$ 612 |
| 80004 | 308 | Manage Credit & Collateral | \$ 313 |
| 80004 | 309 | Resource Management | \$ 669 |
| 80004 | 321 | Schedule Coordinator Management | \$ 87 |
| 80007 | 403 | Manage Market Quality System | \$ 287 |
| 80007 | 412 | Manage Market Billing & Settlements | \$ 600 |
| 80009 | 519 | Provision and Manage Access | \$ 561 |
| | | Applicable Direct Costs | \$ 3,129 |
| | | Total Market Services Direct Costs | \$ 43,641 |
| | | Percentage of SCIDs of Market Services Direct Costs | 7% |
| | | Total Market Services Indirect Costs | \$ 43,136 |
| | | Percentage Per Above | 7% |
| | | Applicable Indirect Costs | \$ 3,020 |
| | | Total SCID Related Costs | \$ 6,149 |
| SCID Fee Calculation | | | |
| | | | Amount |
| | | Total Applicable Direct and Indirect Costs | \$ 6,148,520 |
| | | Number of SCIDs (12/2019) | 341 |
| | | Annual Cost per ID | \$ 18,031 |
| | | Monthly Cost per ID | \$ 1,503 |
| | | Monthly Fee per ID (rounded) | \$ 1,500 |

Attachment D – Testimony of Mr. Michael Epstein (2012)
2020 Grid Management Charge – Cost of Service Study Update
California Independent System Operator Corporation
October 15, 2020

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

California Independent System)
Operator Corporation)
)

ER11-____-000

DIRECT TESTIMONY OF
MICHAEL K. EPSTEIN
ON BEHALF OF THE
CALIFORNIA INDEPENDENT SYSTEM
OPERATOR CORPORATION

Q. PLEASE STATE YOUR NAME, TITLE AND BUSINESS ADDRESS.

A. My name is Michael K. Epstein. I am employed as Director of Financial Planning for the California Independent System Operator Corporation (the "ISO"). My business address is 250 Outcropping Way, Folsom, CA 95630.

Q. WHAT ARE YOUR DUTIES AND RESPONSIBILITIES?

A. I am responsible for the ISO's budget preparation and management; long term planning; accounting for the FERC refund case; market cash settlements; and audit coordination for all the ISO's settlement and operations activities. As part of my duties at the ISO, I oversee the development of the ISO's grid management charge, or "GMC." The GMC is the mechanism by which the ISO collects its administrative costs from participants in the markets conducted by the ISO and from others that benefit from the ISO's services.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.

A. I received both an MBA and a BA with a major in accounting from the University of Southern California in Los Angeles, California. Previously to my current position, I was the Controller of the ISO from 1997-2009. From 1994-1997, I was Vice President (Finance) of Siskon Gold Corporation, a publicly-traded mining company located in Grass Valley, California. From 1989-1994, I was Controller of the Grupe Company, a privately held diversified real estate company located in Stockton, California. From 1985-1989, I was Controller of Brush Creek Mining and Development Company located in Auburn, California. Prior to that, I was a

Certified Public Accountant in the practice of public accounting with both local and international accounting firms.

Q. HAVE YOU PROVIDED EXPERT TESTIMONY PREVIOUSLY?

A. Yes. I previously presented testimony in support of the ISO's GMC filing for 2001 in Docket No. ER01-313-000. I have also presented testimony as an expert witness in several real estate valuation cases, in insurance claim matters, and in a tax and securities investigation.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to explain the development of the ISO's 2012 GMC proposal. Specifically, I will discuss the background of the GMC, the cost-of-service study and stakeholder process through which the ISO developed the 2012 GMC proposal, including the ISO's use of Activity Based Costing, or "ABC," and the cost impact of the proposal on the different customer groups. I will also discuss the derivation of the rate for Transmission Owner Rights. Finally, I will explain the ISO's inclusion of a cap on the revenue requirement and a sunset date.

Ms. Deborah A. Le Vine is providing testimony that explains the process by which the GMC team associated the costs for specific ISO activities with the categories of services. She will also describe the analysis of services provided to the Transmission Ownership Rights holders that was used in determining the rate for Transmission Ownership Rights under the 2012 GMC proposal. Dr. Lorenzo Kristov's testimony will explain the rate design and the determination of

the billing determinants. Dr. Kristov will also explain the ISO's proposed grandfathering of certain power purchase agreements in order to mitigate extreme cost impacts.

Q. AS YOU TESTIFY, WILL YOU BE USING ANY SPECIALIZED TERMS?

A. Yes. Unless otherwise indicated, capitalized terms have the meanings set forth in the Master Definitions, Appendix A of the ISO Tariff.

I. HISTORY OF THE GRID MANAGEMENT CHARGE

Q. HAS THE GMC ALWAYS EMPLOYED THE SAME RATE DESIGN?

A. No. There have been three iterations of the GMC rate design: the original GMC rate design, in effect 1998 through 2000; the 2001 GMC rate design, in effect with minor modifications through 2003; and the 2004 rate design, which is in effect with certain modifications at the current time.

Q. PLEASE DESCRIBE THE ORIGINAL GMC FILING.

A. The ISO filed its original GMC on October 17, 1997. The original GMC was a single bundled formula rate designed to collect the costs of operating the ISO, including the ISO's start-up and development costs as well as ongoing operation and maintenance costs. The GMC was designed to be a monthly charge assessed to all Scheduling Coordinators.

Q. HOW DID THE GMC CHANGE IN 2001?

A. The filing of the original GMC led to negotiations and a settlement in 1998. The settlement called for a stakeholder process designed to unbundle the GMC into "buckets" reflecting the services provided. As a result of the stakeholder

process, the ISO proposed in a filing in 2000 to unbundle the GMC into three buckets: the Market Operations Charge, the Control Area Services Charge, and the Inter-Zonal Scheduling Charge. The 2001 GMC rate design was the subject of prolonged litigation. While litigation was underway, the ISO proposed an extension of the 2001 GMC rate design, with minor revisions in the nomenclature of the buckets. Pursuant to a settlement, the 2001 GMC rates design was extended through 2003, with a rate cap, subject to the outcome of the litigation. In Opinion Nos. 463, 463-A, 463-B, and 463-C, the Commission approved the 2001 GMC, with certain modifications.

Q. HOW WAS THE GMC REVISED IN 2004?

A. During the stakeholder process and litigation regarding the 2001 GMC rate design, certain parties argued for further unbundling of the GMC in order to more closely track the services that the ISO provides. Following another stakeholder process, and while litigation continued regarding the 2001 GMC, the ISO filed in 2003 a new GMC rate design, which was a formula rate with seven buckets. Specifically, the ISO proposed to unbundle the Control Area Services charge into two sub-functions, Core Reliability Services and Energy Transmission Services; and to unbundle the Market Operations and Inter-Zonal Scheduling Charges into three service categories; Forward Scheduling, Market Usage, and Congestion Management. The ISO also proposed to establish a Settlements, Metering, and Client Relations Charge, and further proposed that Energy Transmission Services be divided into Energy Transmission Services-Net Energy and Energy

Transmission Services-Uninstructed Deviations. The proceeding concluded in a settlement adopting the new design with various modifications. The settlement reduced the 2004 revenue requirement and provided revenue requirement caps for 2005 and 2006 below which the ISO would not be required to seek approval of its GMC rates.

Q. HOW WAS THE REVENUE REQUIREMENT FOR THE FORMULA RATE TO BE DETERMINED FOR 2005 AND 2006?

A. The revenue requirement was to be based on the ISO budget, as determined through the ISO's annual budget process. The rate was to be trued up to actual costs on a quarterly basis.

Q. YOU STATED THAT THIS RATE DESIGN IS CURRENTLY IN EFFECT. HOW DID THAT OCCUR?

A. From 2002 through 2009, the ISO was working on a new market design. Because of delays in implementation of the new market design, the ISO and its stakeholders agreed to extend the GMC rate design, the formula rate structure, and revenue requirement cap for 2007, 2008 and into 2009 until the effective date of the new market.

Q. WHAT WERE THE MODIFICATIONS OF THE 2004 RATE DESIGN THAT YOU MENTIONED?

A. Concurrently with extending the GMC on these three occasions, the ISO worked with its stakeholders to develop rate design modifications that would be necessary to reflect service category changes brought about by the new market

structure. The ISO proposed to retain the basic rate structure and make only those changes to the design needed to implement the new market. The modification consisted of (1) the elimination of the Congestion Management Charge; (2) modifications to the Core Reliability Services and Energy Transmission Services Charges to reflect flows on Transmission Ownership Rights; 3) changes in the billing determinants for Forward Scheduling and Market Usage Charges; and 4) an increase in the Settlements, Metering, and Client Relations Charge from \$500 to \$1,000. The Commission approved the proposal in 2008 and it went into effect on April 1, 2009.

Q WERE THERE ANY OTHER MODIFICATIONS?

A. Yes. Following the implementation of the new GMC, the ISO conducted a stakeholder process to address stakeholder concerns about the application of the Market Usage-Forward Energy Charge to inter-scheduling coordinator energy trades in the day-ahead market. This process culminated with the filing of a proposal to modify the billing determinants for the Market Usage-Forward Energy Charge and to extend the rest of the GMC until December 31, 2010. The Commission approved the extension of the GMC but suspended the Market Energy-Forward Usage Charge revision and set the matter for hearing and settlement procedures. Pursuant to a settlement, the revisions to the Market Usage-Forward Energy Charge went into effect on June 1, 2010. The settlement also extended the GMC rate design until December 31, 2011. In addition, as part

of the settlement, the ISO agreed to conduct a new cost-of-service study for the 2012 GMC.

Q. WHAT IS A COST-OF-SERVICE STUDY?

A. A cost-of-service study determines how the activities of each cost center or business unit should be distributed to cost categories. The results are used to assign costs to customers in a manner that reflects cost-causation.

Q. HOW DID THE ISO COMPLY WITH ITS COMMITMENT TO CONDUCT A NEW COST-OF-SERVICE STUDY FOR THE 2012 GMC?

A. The ISO determined that sufficient staff resources were available to conduct the 2012 GMC cost of service internally, but that it would require a robust internal process, employing subject matter expertise across many ISO business units, including system operations, markets and policy development, settlements, finance and others. The ISO accordingly assembled a team of internal experts to work on the project -- the "GMC team". I served as the GMC team lead. The ISO conducted the cost-of-service study as part of the development of the proposed revised GMC design that is the subject of this proceeding. In contrast to the cost-of-service study conducted in 2007, by which we intended to update cost allocations and billing determinants without requiring substantial changes to the GMC rate design, the ISO started the cost-of-service study for the 2012 GMC at ground level and re-evaluated all aspects of the GMC structure.

II. ISO REVENUE REQUIREMENT

Q. YOU STATED THAT THE REVENUE REQUIREMENT FOR THE FORMULA RATE IS DETERMINED THROUGH THE ISO'S BUDGET PROCESS. PLEASE DESCRIBE THAT PROCESS.

A. The budget process is set forth in Appendix F, Schedule 1, Part D of the ISO Tariff. It begins with an initial meeting with stakeholders, generally in June of each calendar year, at which the ISO receives ideas to control ISO costs; ideas for projects to be considered in the capital budget development process; and, suggestions for reordering ISO priorities in the coming year. Within the following two weeks, those ideas are submitted to the ISO's officers, directors and managers as part of the budget development process.

The ISO then prepares and submits a draft budget to the ISO Governing Board on an informational basis, after which it provides stakeholders with (a) the proposed capital budget with indicative projects for the subsequent calendar year, a budget-to-actual review for capital expenditures for the previous calendar year, and a budget-to-actual review of current year capital costs; and, (b) expenditures and activities in detail for the subsequent calendar year (in the form of a draft of the budget book for the ISO Governing Board), budget-to-actual review of expenditures and activities for the previous calendar year, and a budget-to-actual review of expenditures for the current year. This presentation generally occurs at the September or early October Board meeting each calendar year.

With this schedule, stakeholders then have substantially more time than the tariff-required forty-five (45) days for review between initial budget posting and final approval of the budget by the ISO Governing Board in December. At least one month prior to the ISO Governing Board meeting on the proposed budget, generally in November, the ISO holds a stakeholder meeting or conference call to discuss the details of the ISO's budget and revenue requirement. If necessary, the ISO will host a workshop on the ISO's budget preparation process in advance of the meeting.

As described in the tariff, the ISO responds in writing to all written comments on the draft annual budget submitted by stakeholders or issues a revised draft budget indicating in detail the manner in which the stakeholders' comments have been taken into consideration.

Q. WHAT WAS THE 2011 BUDGET?

A. The 2011 budget provided for a revenue requirement of \$189.8 million, which was a \$5.2 million decrease from 2010. A complete copy of the 2011 budget report is included as Exhibit No. ISO-17.

Q. WHAT IS THE STATUS OF THE 2012 BUDGET?

A. The kick-off meeting for the 2012 budget was held on June 16, 2011.

II. GMC DESIGN REVISION

Q. WHY DID THE ISO DECIDE TO REVISE THE DESIGN OF THE GMC?

A. The ISO introduced a new market design with new rules on April 1, 2009.

Although the ISO revised the GMC to reflect the new market design, the structure

of the new market is significantly different from the prior structure and the current GMC design does not accommodate the new market structure well. The ISO currently has 7 GMC service categories, which contain 17 charge codes and do not align well with market activities. Moreover, market enhancements frequently require the addition of a new service category and recovery methodology. The ISO concluded that absent a fundamental GMC design change, the implementation of additional market enhancements will increase the number of GMC service categories and charge codes, further contributing to the complexity of the rate structure.

Q. COULD YOU PROVIDE SOME EXAMPLES OF ISSUES THAT HAVE ARISEN WITH THE CURRENT GMC DESIGN?

A. Among other issues, because the current GMC structure could not accommodate the recovery of the costs of implementing convergence bidding in a manner related to cost-causation, the ISO had to create a new service category containing two new charge codes. Fairly allocating the Market Usage-Forward Energy charge presented similar challenges; virtually all parties agreed that the settlement related to the Market Usage-Forward Energy charge, while just and reasonable, was not ideal and needed to be revisited. Although the new market already has uplift costs to deter deviations, the current GMC design additionally charges scheduling coordinators for imbalances, which are very difficult to forecast. Finally, the Settlements, Metering, and Client Relations Charge, as structured, only collects a small fraction of the indirect costs associated with

these functional areas; the remaining costs are allocated to the other service categories.

Q. ARE THERE OTHER REASONS THAT CONTRIBUTED TO THE DECISION TO REVISE THE GMC DESIGN?

A. Yes. Other circumstances had changed significantly from those that existed at the time of the 2004 GMC settlement and those changed circumstances weighed in favor of a re-examination of the GMC design. Specifically, (1) the ISO had undergone a major corporate reorganization; (2) the ISO's debt structure had changed due to the ISO's construction of a new office building; (3) repayment of the bonds issued to fund the ISO's new market was imminent; and (4) stakeholders, who had previously participated in the 2004 GMC settlement, were now requesting greater GMC clarity, predictability and simplicity.

Q. DOES THE ISO PROPOSE TO CHANGE THE UNDERLYING FUNDAMENTAL DESIGN OF THE GMC?

A. No. The current GMC is a formula rate, whereby the ISO's revenue requirement is allocated based on a matrix of percentages allocating the activities of all the ISO cost centers to a set of GMC components, and then ultimately to GMC charge codes. These GMC charge codes are then recovered from the users of ISO services in accordance with objective billing determinants, which are calculated for each user in each billing period and reflect each user's activities and use of ISO services. The ISO's revenue requirement is determined by the annual budget developed with stakeholder input according to a process set forth

in the tariff and approved by the ISO Board. The tariff contains a revenue requirement “cap” under which the ISO may continue to recover the GMC without seeking FERC approval for changes to particular charges due to the formula rate implementation. The ISO believes that these aspects of the GMC design work well, and stakeholders have not expressed an interest in changing these aspects.

Q. ON WHAT PRINCIPLES DID THE GMC TEAM RELY IN DEVELOPING THE 2012 GMC?

A. In consultation with stakeholders, the team relied upon seven rate design principles in developing the 2012 GMC proposal:

- Cost Causation – Costs will be properly allocated to the correct GMC buckets and charged to those who benefit from or utilize those services.
- Focus on use of ISO services, not market behavior – The new GMC design should reflect its primary purpose as a vehicle for recovering the ISO’s revenue requirements based on each user’s use of the ISO’s services, not as a tool for shaping incentives based on market or operating behavior. Incentives such as these are appropriately addressed through the design of the market structure and market rules.
- Transparency – Costs and billing determinants will be clear, visible, and understandable to all market participants.
- Predictability – Market participants will be able to determine in advance what their GMC costs will be depending on their activity.

- Forecastability – The rates should utilize billing determinants that can be easily forecasted by both the ISO and market participants. This should result in fewer rate adjustments during the year.
- Flexibility – The new GMC structure should easily accommodate future market enhancements without excessive complexity or disrupting the overall structure.
- Simplicity – Simplify the current GMC structure to reduce the amount of varying bill determinants and the number of charge codes.

Q. PLEASE DESCRIBE THE PROCESS FOR DEVELOPING THE 2012 GMC.

A. There were five activities that we performed, in consultation with stakeholders, in developing the 2012 GMC:

- Functionalization - The process by which various activities are defined and sorted into service categories (functions and sub-functions) to reflect the different services provided by the ISO.
- Cost Allocation - The process by which the costs of providing services are allocated to the service categories (functions and sub-functions).
- Classification - The determination of billing determinants based on the customer cost causation factors.
- Rate Design - The process for deriving rates that divides the revenue requirement for each service category by the billing determinants.
- Bill Impacts Analysis - An evaluation of the impacts that the rate design will have on individual customer bills.

The first two of these activities are achieved through the cost-of-service study.

As I previously stated, I will be describing those two activities and the bill impact analysis. Ms. Le Vine will discuss the development of the allocation matrix used in cost allocation, and Dr. Kristov will discuss classification and rate design.

III. STAKEHOLDER PROCESS

Q. PLEASE DESCRIBE STAKEHOLDER INVOLVEMENT IN THE DEVELOPMENT OF THE 2012 GMC PROPOSAL.

A. As I have noted, stakeholder interest in greater clarity, predictability and simplicity was one of the factors that prompted the ISO's decision to revise the GMC design for 2012. The formal stakeholder process began April 21, 2010, when the ISO first discussed the process and timeline with stakeholders. On October 8, 2010, the ISO posted a discussion paper presenting methodology and initial results of the cost of service study and allocation of costs, which is presented as Exhibit No. ISO-2. The discussion paper also described the ISO proposed principles, discussed above. The ISO discussed these matters with stakeholders at a meeting on October 14 and solicited comments on the discussion paper. The comments on the discussion paper and the ISO's responses are included as Exhibit No. ISO-11.

Q. WHAT WERE THE NEXT STEPS?

A. After considering comments, on November 11, 2010, the ISO issued a straw proposal, which appears here as Exhibit No. ISO-3. The straw proposal included three charges: Market Services, System Operations, and Congestion Revenue

Rights, or “CRR,” Services. The proposal also included certain set fees. The ISO discussed the straw proposal with stakeholders during a telephone and web conference on November 18 and again solicited comments. During the conference, stakeholders requested data on bill impacts, based on the proposed GMC rate design and historical data. The stakeholder comments on the straw proposal and the ISO’s responses are included as Exhibit No. ISO-12.

Q. HOW DID THE ISO RESPOND TO THE REQUEST FOR BILL IMPACT DATA?

A. The GMC team used historical data to develop estimated bill impacts for the individual scheduling coordinators and for the major classes of customers. Under section 20 of the ISO Tariff, however, there are limits on the ISO’s release of individual scheduling coordinator data. To ensure compliance with section 20, the ISO used only individual data that were six months old and did not identify, or permit identification of, the applicable scheduling coordinator. The ISO allowed scheduling coordinators to view their own bill impacts on a confidential basis. The ISO issued a market notice to this effect and released the data on December 2, 2010, which is included as Exhibit No. ISO-4. The ISO conducted a stakeholder meeting to discuss the data on December 13. The stakeholder comments on the bill impacts and the ISO’s responses are included as Exhibit No. ISO-13. The ISO also posted additional information about the proposed billing determinants addressed in the straw proposal on December 16, 2010, which appears as Exhibit No. ISO-5.

Q. HOW DID THE ISO PROCEED AFTER THE DECEMBER 13 MEETING?

A. After considering comments on the straw proposal and on the bill impacts, the ISO posted a modified straw proposal and revised bill impact information. The modified straw proposal is Exhibit No. ISO-6. The ISO proposed the modification to ameliorate certain bill impacts. Specifically, the ISO proposed to phase in the applicability of the System Operations Charge to suppliers; to exclude Transmission Ownership Rights from the Market Services Charge and to limit the exposure of Transmission Ownership Rights to the System Operations charge, and to modify some of the fees. The ISO also proposed modification of its revenue cap proposal – from a five-year stepped cap to a three year uniform cap. The ISO held another stakeholder telephone and web conference to discuss the modification of the GMC proposal on January 20, 2011. Stakeholder comments and the ISO's responses are included as Exhibit No. ISO-14. On February 8, 2011, the ISO again conducted a stakeholder telephone and web conference, this time to discuss further modification of the straw proposal; instead of phasing in the applicability of the Systems Operation Charge to suppliers, the ISO proposed to grandfather, *i.e.*, to exempt, suppliers that had entered long term contracts in reliance on the existing GMC provisions until the first opportunity to revise the contracts. Stakeholder comments on that proposal and the ISO's responses are included as Exhibit No. ISO-15.

Q. HOW DID THE ISO PROCEED FROM THIS POINT?

A. After considering the comments on the most recent proposal, the ISO posted a draft final proposal on February 15, 2011, presented as Exhibit No. ISO-7, and hosted a stakeholder telephone and web conference regarding the proposal on February 22, 2011. Stakeholder comments on that proposal and the ISO's responses are included as Exhibit No. ISO-16. Following consideration of these comment, the ISO management finalized the 2012 GMC proposal for presentation to the ISO Board of Governors.

IV. COST-OF-SERVICE STUDY: FUNCTIONALIZATION

Q. YOU STATED EARLIER THAT THE ISO USED ACTIVITY-BASED COSTING, OR "ABC," IN THE COST-OF-SERVICE STUDY. WHAT IS ACTIVITY-BASED COSTING?

A. ABC is a costing model that identifies activities in an organization and assigns the cost of each activity to products and services produced by the organization according to the actual consumption by each. While the ISO did not begin using ABC until 2008, the identification of the information needed to make the costing model successful began in 2006 with a company-wide process mapping effort, which developed into a hierarchy of business processes. The ISO's ABC analysis disaggregated the ISO operations into ten core functions (level 1 activities). Each of the core activities were broken down into major processes (level 2 activities). Unlike earlier descriptions of ISO activities for developing cost categories, the ABC activities are linked to specific processes and are

measurable. Time reporting on level 1 activities commenced October 2009 with pilot programs on level 2 activities. The ISO intends to move to full level 2 time-reporting by the end of 2011.

Q. WHAT ACTIVITIES WERE IDENTIFIED FOR THE COST-OF-SERVICE STUDY?

A. The level 1 activities can be categorized into two types: (1) direct operating costs, *i.e.*, those that can be directly mapped to a market, grid service or customer and (2) indirect costs, *i.e.*, those that support the direct activity. Of ten level 1 activities, the GMC team categorized six as direct operating costs and four as indirect or support costs. They are described in Table 1 of Exhibit No. ISO-2. Each of the level 1 activities comprised multiple level 2 activities. The level 2 activities analyzed in the cost-of-service study were the processes that had been mapped as of May, 2010. A complete list of level 2 activities is included as Exhibit 1 to the October 8, 2010 Discussion Paper (Exhibit No. ISO-2).

Q. HOW DID THE ISO USE THE ABC ANALYSIS IN DEVELOPING THE 2012 GMC?

A. The ISO considered a number of options for aggregating activities. The first option was to map activities to the existing GMC service categories. However, the existing structure was too complex to achieve the goals of greater transparency, predictability and simplicity. Level 2 activities would need to be further broken down in order to make mapping possible. For example the ISO

does not have any activity related specifically to deviations, although there is a GMC charge related to deviations.

We then examined a second option: to map activities to customer categories. The ISO prepared a list of 31 customer categories, including utility distribution companies, merchant generation, proxy demand response, self-scheduled exports, and many more. When we mapped these categories to the level 2 activities, it soon became apparent that in a majority of cases the level 2 activity applied to all categories. This observation prompted a third option, identifying common activities across all customers.

Q. WHAT COMMON ACTIVITIES DID THE ISO IDENTIFY?

A. An examination of the ISO's map of customer activity for the new nodal market systems revealed a common sequence of activities. Energy flowed on the ISO grid based on (1) bids that customers submitted and (2) schedules that the ISO's market systems subsequently awarded. In addition, there were activities related to Congestion Revenue Rights, or "CRRs." Based on this sequence, the ISO established three categories of activities: Market Services, System Operations, and CRR Services. This structure, incidentally, is very similar to what other ISOs and RTOs with nodal markets have implemented to recover their administrative charges.

Q. WHAT WAS THE NEXT STEP IN FUNCTIONALIZATION?

A. The next, and final, step in functionalization was to produce an allocation matrix that mapped the level 2 activities to the three cost categories. The ISO mapped

direct costs as (1) all in one category or not in the category (100% or 0%), (2) split between two categories (50% / 50%), or (3) partially in one category or another (80% or 20%), or in the case of CRRs, a small portion of the activity (10%). The ISO mapped support costs as “indirect,” for later allocation to the cost categories. The ISO also applied the mapping to the software underlying the debt service portion of the revenue requirement. Ms. Le Vine will testify regarding this mapping process. The allocation matrix is included as Tables 2 and 3 in Exhibit No. ISO-2.

V. COST-OF-SERVICE STUDY - COST ALLOCATION.

Q. PLEASE DESCRIBE THE COST ALLOCATION PROCESS.

A. As I noted earlier, cost allocation is the process by which the costs of providing services are allocated to the service categories (functions and sub-functions). In this case, we applied the level 2 allocation matrix to the ISO’s 2010 revenue requirement to determine the costs associated with each of the three categories of activities: Market Services, System Operations, and CRR Services. We applied this process separately to operations and maintenance, or “O&M” costs, to debt service and out of pocket capital expenses, and to the operating reserve credit and miscellaneous revenue. We then aggregated the direct costs in each cost category and determined the percentage attributable to each. We used those direct cost percentages to allocate indirect costs and added the results to the totals for each cost category.

Q. HOW DID THE ISO MAP THE O&M COSTS?

A. We first reviewed the 2010 O&M budget to segregate non-ABC costs, that is, those costs that could not be associated with level 2 activities, such as facilities costs. The next step was to associate activity-related costs with specific level 2 activities. Because each of the ISO's 80 cost centers had been coding their time to level 1 activities during 2010, the ISO was able to identify each cost center that had recorded time to direct level 1 activities. We recorded all of the activity costs for cost centers with no direct activities as indirect (support) costs. We sent a questionnaire to the managers of each such cost center that had direct costs asking them to identify the percentage of time devoted to each of the level 2 activities and met with each of them to review their responses for reasonableness. We then applied the reported percentages to the cost center's 2010 budget to determine that cost center's costs associated with each level 2 activity. By aggregating the costs reported by the cost centers for each level 2 activity, we were able to calculate an ISO-wide cost for that activity.

We next used the level two allocation matrix to allocate the costs of the level 2 activity to the Market Services, System Operations, CRR Services, or Indirect (support) cost categories. Finally, by aggregating the amounts allocated to each cost category, the ISO determined the total O&M to be included in each of those categories.

We then turned to the non-ABC costs. With one exception, we allocated those costs to the indirect (support) category. We allocated professional fees for

the audit of controls around the settlement of the market (the SAS 70 audit) 45% to Market Services, 45% to Systems Operations, and 10% to CRRs. These were the same percentages used for the allocation of the level 2 activities for market settlements.

Finally, we summed the O&M cost for each category. Market Services represented \$11.924 million, System Operations \$46.373 million, CRRs \$1.6 million, and Indirect \$102.798 million. These calculations appear in Table 12 of Exhibit No. ISO-2.

Q. HOW DID THE ISO ALLOCATE DEBT SERVICE AND OUT-OF-POCKET EXPENSES TO COST CATEGORIES?

A. As I mentioned above, we had prepared a cost allocation matrix for each of the debt service and out-of-pocket capital items in the budget. We applied that matrix to the budgeted amounts and summed the results for each cost category. Market Services represented \$21.3 million or 27%, System Operations \$46.373 million or 48%, CRRs \$1.6 million or 4%, and Indirect \$102.798 million or 21%. These calculations appear in Table 9 of Exhibit No. ISO-2.

Q. HOW DID THE ISO ALLOCATE MISCELLANEOUS REVENUE AND OPERATING RESERVE CREDIT TO COSTS CATEGORIES?

A. We review the components of miscellaneous revenue and determined that the entire \$8.1 million should be classified as indirect. We also reviewed the components of the operating reserve credit. With one exception, we allocated them to the indirect category. We allocated the change in debt service reserve

based on the percentages we had calculated for debt service. As a result, we allocated the operating reserve credit \$3.295 million to Market Services, \$5.856 million to System Operations, \$0.488 million to CRRs and \$25.861 million to indirect costs. This information is in Table 11 of Exhibit No. ISO-2.

Q. WHAT WAS THE TOTAL ALLOCATION TO COST CATEGORIES?

A. The percentages of direct costs were 27% Market Services, 69% System Operations, and 4% CRRs. After we allocated a total of \$84.544 million of indirect costs according to these percentages, the total revenue requirement for Market Services was \$52.756 million; the total revenue requirement for System Operations was \$134.883 million; and the total revenue requirement for CRRs was \$7.456 million. The breakdown of these amounts appears in Table 12 of Exhibit No. ISO-2.

Q. HAVE YOU CALCULATED ESTIMATED RATES BASED ON THESE DATA?

A. Yes. During the development of the GMC, we used volume data from June 1, 2009, to May 31, 2010, and equalized the 2010 revenue requirement to the actuals expenditures for that period. With that data, the rate for Market Services would have been \$0.0914/MWh (energy) or MW (award); the System Operations rate would have been \$0.2700/MWh; and the CRR Services rate would have been \$0.0113/MWh.

VI. TRANSMISSION OWNERSHIP RIGHTS

Q. YOU MENTIONED SPECIAL RATE TREATMENT FOR TRANSMISSION OWNERSHIP RIGHTS. PLEASE EXPLAIN THAT.

A. Transmission Ownership Rights refers to the ownership rights to facilities within the ISO Balancing Area of entities that have not executed the Transmission Control Agreement, such that their facilities are not a part of the ISO Controlled Grid. The ISO has in the past recognized that it provides only limited services to the possessors of Transmission Ownership Rights, and thus has historically not charged such entities the full GMC.

Q. HOW DID THE ISO DETERMINE THE RATE FOR TRANSMISSION OWNERSHIP RIGHTS?

A. As Ms. Le Vine discusses in her testimony, as part of the cost-of-service study, the ISO determined that the only services provided to Transmission Ownership Rights are a limited number of ABC level 2 activities. These activities are all related to System Operations because there is no Transmission Ownership Rights participation in the Market Services category. The ISO calculated the direct costs of those activities and the percentage of System Operations direct costs that those activities represent. The ISO then allocated indirect costs to those activities based on the percentage of direct costs. The total direct and indirect costs for activities that served Transmission Ownership Rights was \$45.197 million. Next, the ISO determined the ratio of Transmission Ownership Rights MWh to total MWh, which was 2%. Applying the 2% to the total direct and

indirect costs, the ISO determined that \$0.9 million in costs were attributable to Transmission Ownership Rights. The ISO evaluated different methodologies to adjust the Transmission Ownership Rights rate in order to recover this amount. We determined that using the minimum of supply or demand would reduce the number of billable Transmission Ownership Rights MWh to 3.3 million MWh and that then using a rate of \$0.27/MWh would collect revenue of \$0.9 million.

VII. BILL IMPACT ANALYSIS

Q. YOU STATED THAT BILL IMPACT ANALYSIS WAS THE LAST PHASE OF DEVELOPING A REVISED GMC RATE DESIGN. WHAT BILL IMPACT ANALYSIS DID THE ISO PERFORM?

A. As I discussed in connection with the stakeholder process, the ISO performed a bill impact analysis on its initial straw proposal, both for individual scheduling coordinators and on an aggregate basis by customer type, which led to proposed modifications, for which the ISO also performed bill impact analyses. Subsequently, the ISO abandoned one of the proposed modifications – phasing in of System Operations charges to suppliers – in favor of grandfathering of certain suppliers, which is included in the final proposal and discussed in Dr. Kristov’s testimony.

Q. WHAT IS THE AGGREGATED BILL IMPACT OF THE FINAL PROPOSAL?

A. The 2012 GMC rate design would have the biggest impact on holders of CRRs. Their share of the overall GMC would be \$4.43 million, up from \$0.33 million. The share paid by Investor-Owned Utilities would increase from \$121.55 million

to \$128.39 million and that paid by suppliers would increase from \$17.20 million to \$19.44 million. The share paid by municipal utilities would decrease to \$17.59 million from \$19.93 million and that paid by importers and marketers would decrease from \$30.98 million to \$20.93 million. Other market participants, a catch-all category, would pay \$4.33 million, versus \$5.11 million under the current rate design. The ISO believes these results are the result of more closely aligning the GMC rate with cost causation.

IX. REVENUE CAP AND SUNSET

Q. WHY DID THE ISO INCLUDE A RATE CAP AND SUNSET DATE?

A. Because the GMC is a formula rate, the ISO does not believe that a revenue requirement cap or sunset date is a necessary element of the rate. Nonetheless, as part of the settlement of the 2004 GMC, the ISO agreed to a revenue requirement cap. Under that settlement, the parties agreed that, until 2007, the ISO could avoid a filing under section 205 if the revenue requirement did not exceed \$195 million in 2004 and 2005 and \$197 million in 2006. As I discussed above, this aspect of the agreement was extended on an annual basis and is in place today. Because the rate cap remains important to a number of stakeholders, the ISO decided to include a rate cap in its current proposal.

It is, of course, difficult to forecast the ISO's revenue requirements more than three years out and to persuade stakeholders to accept such forecasts. Rather than attempt to specify future revenue requirements, the ISO decided to limit the current GMC to three years, after which the ISO can revisit the revenue

requirement and rate structure if it desires. The ISO recognizes that a sunset date is not necessary to achieve this end and that stakeholders that believe that the formula is no longer reasonable can always file a complaint. Nonetheless, the ISO believes that a sunset date provides greater comfort to those stakeholders that have concerns about potential ISO spending.

Q. WHAT REVENUE CAP DOES THE ISO PROPOSE?

A. The ISO is proposing to maintain the current revenue cap of \$197 million for 2012. For 2013 and 2014, the ISO is proposing a cap of \$199 million.

Q WHAT IS THE BASIS FOR THIS PROPOSED CAP?

A. The cap was determined through the stakeholder process. There was general support and no opposition to the proposal. The ISO's revenue requirement was approximately \$190 million for 2010. Future revenue requirements will be affected by load growth and inflation. If one assumes a volume growth of 1% and an operations and maintenance cost increase of 1.6%, the out-of-pocket capital of \$19.5 million, the ISO's revenue requirement will be \$193 million in 2012, \$194 million in 2013, and \$196 million in 2015. If operations and maintenance costs instead increase by a still modest 3.1%, the revenue requirement for those years would be \$193 million, \$195 million, and \$197 million, respectively. A revenue cap, to serve its purpose, should be sufficiently above those amounts to allow for contingencies, but not by so much to encourage profligate spending. The caps exceed the projected revenue

requirement by between 1% and 2%, which the ISO believes is consistent with these purposes.

Q. THANK YOU, MR. EPSTEIN. I HAVE NOTHING FURTHER.

DECLARATION OF WITNESS

I, Michael E. Epstein, declare under penalty of perjury that the statements contained in the Direct Testimony of Michael K. Epstein on behalf of the California Independent System Operator Corporation in this proceeding are true and correct to the best of my knowledge, information, and belief.

Executed on this 5th day of July, 2011.

/s/ Michael K. Epstein
Michael K. Epstein

Attachment E – CAISO Response to Stakeholder Comments
2020 Grid Management Charge – Cost of Service Study Update
California Independent System Operator Corporation
October 15, 2020

**Stakeholder comments and questions from the
2021 Budget and GMC Process and 2019 Cost of Service Study Draft
Tariff Language stakeholder conference call meeting held on July 29,
2020.**

Supporting meeting documents are available here,
<http://www.caiso.com/informed/Pages/StakeholderProcesses/Budget-GridManagementCharge.aspx>.

Stakeholder Comments and Questions

| Submitted by | Company or Entity | Date Submitted |
|---|--|----------------|
| Sean Neal, DWG&P (916) 498-0121 smn@dwgp.com | City of Santa Clara, California dba Silicon Valley Power and Modesto Irrigation District | August 5, 2020 |

The City of Santa Clara, California, dba Silicon Valley Power (“SVP”) and the Modesto Irrigation District (“MID”) thank the California Independent System Operator Corporation (“CAISO”) for the opportunity to submit comments and questions in connection with the CAISO’s 2021 Budget and Grid Management Charge (“GMC”) Process, and July 29, 2020 web conference. SVP and MID raise below questions which they request that the CAISO answer, as well as a comment concerning the SCID fee at the end of this document:

Regarding CAISO’s 2020-2021 Preliminary Project Listing:

Does the “Day-ahead reliability tool phase 2” relate to Day-Ahead Market Enhancements (“DAME”) implementation and, if so, what does the project entail?

ISO Response

No, these two projects are not related.

Does “Resource adequacy enhancements” include upgrade of CAISO’s Outage Management System (“OMS”), or will such expenditures be deferred until the

unforced capacity (“UCAP”) policy is approved at FERC as suggested during a recent RA Enhancements meeting?

ISO Response

The Resource adequacy enhancements initiative is still in progress and the Draft Final Proposal (DFP) has not been released, however, there is an intent to improve the OMS as part of Track 1 in preparation for the UCAP policy. After the DFP is completed, the ISO teams will perform an impact assessment, which will help provide direction on the changes that will be communicated through the External BRS and Release Users Group (RUG).

Regarding the “Transmission access charge (TAC) billing” project, last year CAISO provided during the stakeholder budget process that this project was the same as the “TAC Structure Enhancements” project, and that CAISO would rename the initiative to the latter. Seeing as CAISO has not done so, we seek confirmation that these two project names continue to be used interchangeably into the 2021-2020 project listing.

ISO Response

The “Transmission access charge billing determinant” Policy Initiative was closed in September 2016 and a new Policy initiative “Review Transmission Access Charge Structure” was introduced in 2017 to consider the TAC structure in a more comprehensive manner. The initiative was renamed to “Transmission Access Charge Structure Enhancements” in 2019. The original budget name remained as the TAC Structure Enhancements initiative has been delayed.

What projects is EDAM associated with, if any, in the Preliminary Project listing for 2021-2022 or Active Project Listing as of June 30, 2020?

ISO Response

The Extend Day-Ahead Market (EDAM) Policy Initiative will extend participation in the day-ahead market to EIM Entities. There are not any projects in the Preliminary Project Listing associated with this initiative.

Why does “ESDER Phase 4” appear on the list as that initiative draws to a close?

ISO Response

The Draft Final Proposal (DFP) for ESDER Phase 4 was posted on 5/20/2020 and the stakeholder process continues. The budget item will cover the implementation cost of this initiative in 2021.

Last summer during the budget process, CAISO explained the “Focus on Customer Service and Other Costs” project classification in its 2019 quarterly financials included an “external training program” slated for end of 2019, though that project did not appear in the Final 2020 Budget book issued in December 2019. Does the external training program that was presumably deferred appear on the Preliminary Project Listing for 2021-2022 as “expand external capability for hands-on training”, or elsewhere in the Preliminary Project listing?

ISO Response

CAISO for 2020 has an external training program underway that will provide Computer Based Training (CBT) modules that expands its external training program focused on Scheduling Coordinator Certification. The specific line item 2021-2022 project list for this effort is the “Customer computer based training (CBT) program” item. There is another effort “Expand external training capability for hand on training” that is currently on hold due to the focus on CBT development.

What is “Incorporation of operations non-core tools into final destination?”

ISO Response

This budget item is part of a longer-term strategy to incorporate functionality currently in stand-alone operations tools and manual work-arounds into larger systems for improved efficiency and supportability.

Regarding CAISO’s active capital projects listing:

What does the “2020 Hardware & Software Purchases” project approved at \$3 million but 0% completed cover?

ISO Response

This is annual budget used to cover purchases such as hardware replacement for aging and inadequate equipment as well as additional servers to support applications and environments that the CAISO relies on to manage its operations. This budget also covers purchases such as new licenses or new subscriptions for software that are required for compliance purposes. Funding for any other IT equipment, such as storage or communication equipment, would also be funded from this project budget.

As of June 30th, purchase orders have been issued against this budget, but invoices had not been received, approved and processed; thus, the encumbered expense shows as 0% complete on the report.

As this is an annual project budget, the prior year's remaining funding will be used to cover eligible purchases before any current year funding is used; which was the case this year and explains why the 2019 Hardware and Software project is included on the completed project listing.

What does "OSI 2020 Non Capital" approved at \$1.15 million and 25% complete cover?

ISO Response

The full name of this project is Operation System Improvements (OSI) 2020. This project is an annual request to cover cost of small changes that are identified by the Operations' team. The changes are for modifying existing functionality in various applications. This project also covers cost for changes to software as a service tools, such as with the OMS and ITS systems. Following accounting guidelines, these improvements are not adding new functionality and, in some cases, we do not own the system; as such, we do not capitalize the project costs and treat the projects as "Non-Capital" projects. The percentage complete is based on invoices received and approved, which until changes are made and tested, vendors should not be billing us.

Regarding CAISO's financial summaries:

Referring to the quarterly financial reports posted for 2020 (PDF 4), why does the YTD Budget for full-time employees change from Q1 to Q2? CAISO hired 8 new employees in Q2—in what department, and does CAISO anticipate future hiring to fill the YTD budget of 657 personnel, which is shown at 633 currently? If so, in what department?

ISO Response

The CAISO increased its budgeted positions to address pressing needs in its Technology, Market Policy & Performance, and External & Customers Affairs divisions. The CAISO intends to actively pursue filling all of the budgeted positions.

Referring to the quarterly financial reports posted for 2020, what were the most significant (cost-wise) capital projects the Corporate Management Committee approved in Q1 2020 (\$9M) and in Q2 2020 (\$13.8M)?

ISO Response

The capital project report is a cumulative report and reflects that the total approved projects as of June 30, 2020 is \$13.8M.

The Q1 2020 report included 4 approved projects that were above \$500K each and at a total of \$6M. The approved projects included the following:

1. Miscellaneous Hardware and Software = \$3M
2. Operation and market services system improvement 2020 = \$1.2M
3. Annual Capital Reserve Funding = \$1.2M
4. Technology system improvements for production = \$600K

The Q2 2020 report included 3 approved projects that were above \$500K each and at a total of \$2.5M. The approved projects included the following:

1. Settlements replacement project = \$1M
2. RC Enhancements 2020 = \$969K
3. Masterfile service oriented architecture phase 2 = \$582K

The remaining amount of \$5.3M was allocated between the other 35 projects that were presented to the CMC under \$500K each.

In addition, regarding the proposed 2021 monthly SCID fee increase to \$1,500 per month from \$1,000 per month:

MID/SVP support the request of Amber Power and ETRACOM that the CAISO provide the calculations behind the incremental costs. MID/SVP share concerns that the resulting new fee amount would have a greater impact on smaller entities, and may be prohibitive towards creating an SC representing a small generating facility (such as some small renewable facilities). Further, MID/SVP submit that some consideration be given to exploring an alternative monthly SCID fee methodology or application, where higher SCID fees initially exist over the first year of SC existence, but where monthly SCID fees would taper off in future years consistent with a reduction in costs to the CAISO of maintaining the SCIDs once established.

ISO Response

The increase in the SCID fee is to cover the additional cost required to support the SCID accounts since the last fee analysis was completed in 2012. Some of the responsibilities associated with the maintenance of the accounts includes, but is not limited to, the following:

- Contract modifications,
- Credit checks,
- Master file maintenance,
- Customer readiness, training, and change requests,
- Data storage,
- Settlements production,
- Certificate and account maintenance, and

- Hardware and software costs

A calculation of the proposed fee is provided in the Cost of Service Study. The calculation of the fee follows the same methodology used to calculate the CAISO's other fees and cost allocations, such as for the TOR fee and the GMC cost categories' percentage of the revenue requirement allocation. The revenue collected from the SCID fee will offset costs recovered through the Market Services charge rate.

Attachment F – Presentation materials from June 24, 2020 stakeholder meeting

2020 Grid Management Charge – Cost of Service Study Update

California Independent System Operator Corporation

October 15, 2020



Briefing on 2019 Cost of Service Study and 2021 GMC Update

April Gordon

Director, Financial Planning and Procurement

Stakeholder Call

June 24, 2020

Agenda

TOPIC

2019 Cost of Service Study Overview

2021 Update and Impact to GMC Percentages

Impact to EIM Percentages

Impact to RC Funding Percentage

Impact to Supplemental Fees

Tariff Amendments

Key Calendar Dates and Next Steps

Stakeholder Feedback and Discussion



California ISO

2019 Cost of Service Study Overview

What is the cost of service study?

A triennial study in which activity based costing (ABC) and the revenue requirement components are used to set forth the *cost category percentages* used to calculate the annual grid management charges (GMC) as well as other rates and fees.

| GMC Rate Calculation | | | | | | | | |
|----------------------------------|---|---|---|--|---|-----------------------------|---|--------------|
| Annual Revenue Requirement | X | Cost of Service Study's GMC Percentages | = | Amount to Collect per GMC Cost Category | / | Estimated GMC Volumes | = | GMC Rates |

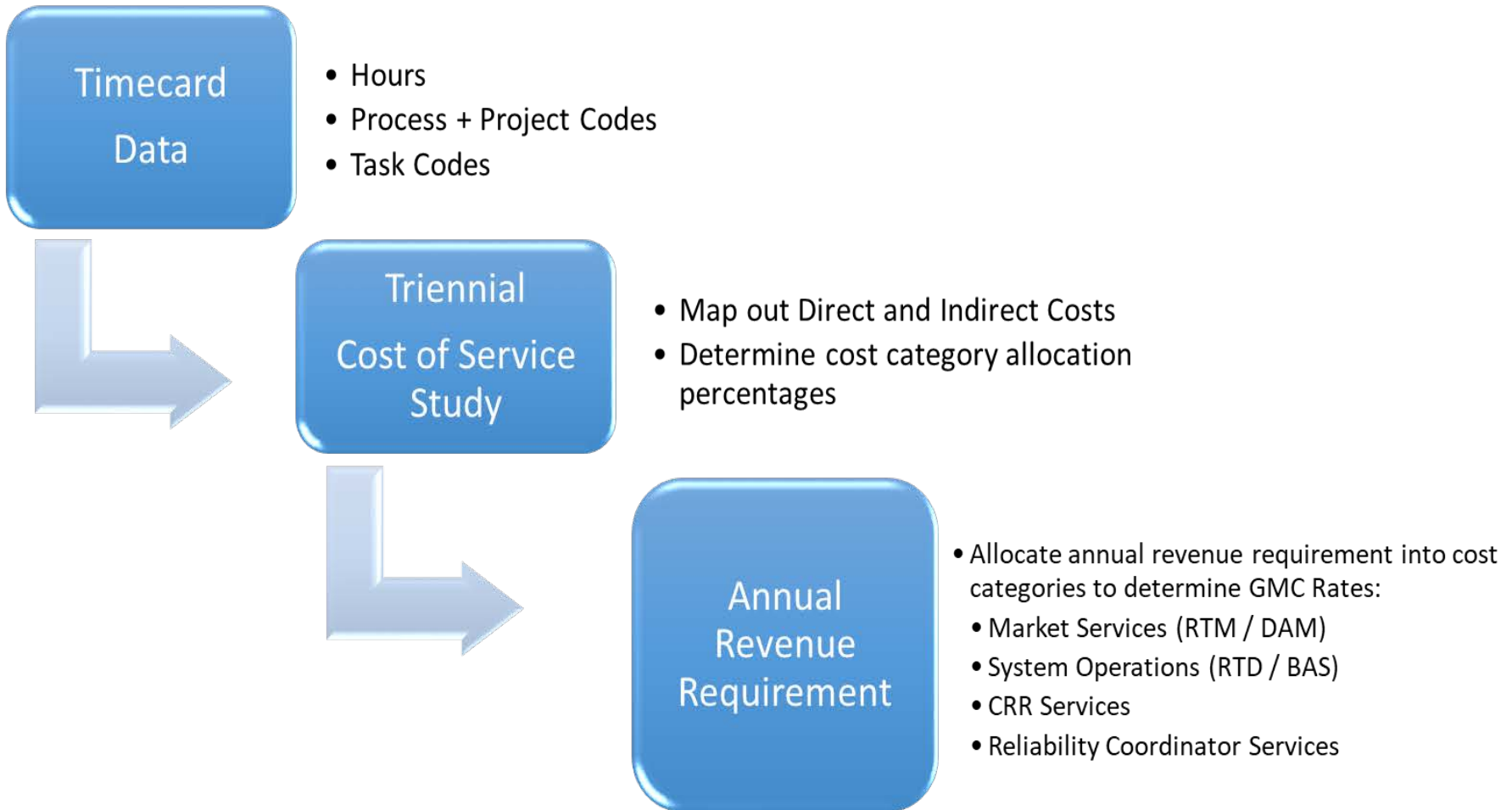
Impacted Charges, Rates and Fees

Updated percentages are applied to:

- Market Services Charge
- System Operations Charge
- Congestion Revenue Rights Services (CRR Services) Charge
- Fees and Rates
 - EIM Fees
 - RC Rate
 - Supplemental Fees

Percentages set forth in the study are used for a period of 3 years until the next cost of service study is conducted.

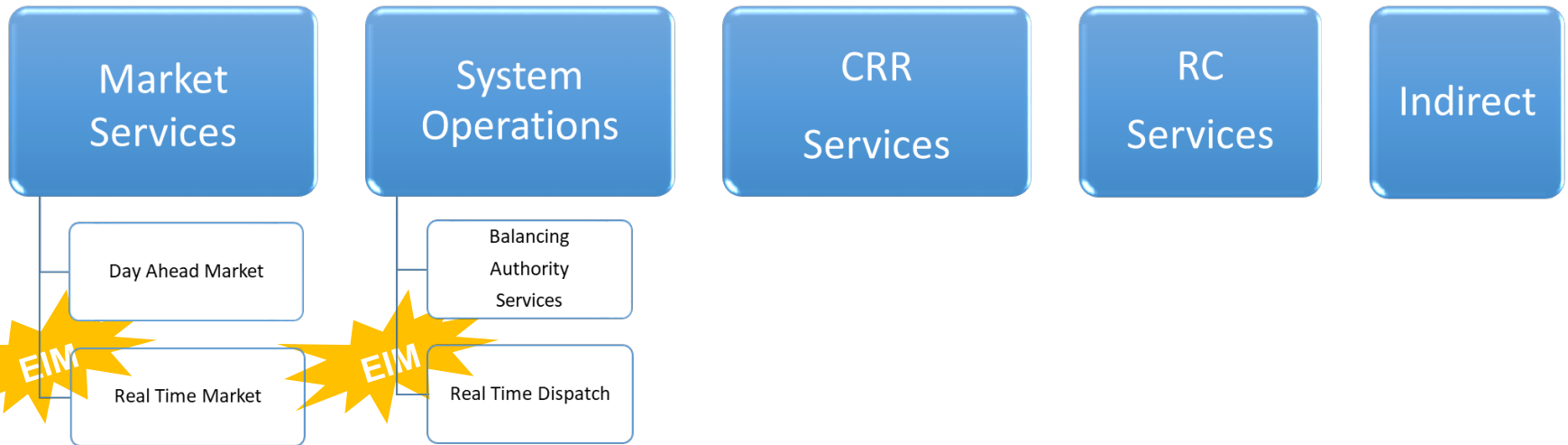
What steps are involved?



Mapping of Core Business Processes

| ABC Process Code | Level 1 ABC Activity | Number of Level 2 Activity Tasks | Number of Non-Administrative 2019 Hours Reported |
|------------------|---|----------------------------------|--|
| Direct | | | |
| 80001 | Develop Infrastructure | 10 | 78,397 |
| 80002 | Develop Markets | 9 | 55,434 |
| 80004 | Manage Market & Reliability Data & Modeling | 10 | 134,537 |
| 80005 | Manage Market & Grid | 6 | 198,864 |
| 80007 | Manage Operations Support & Settlements | 12 | 80,178 |
| 80008 | Plan & Manage Business | 12 | 85,738 |
| 80009 | Support Business Services | 34 | 297,001 |
| 80010 | Support Customers & Stakeholders | 6 | 58,025 |
| | Total | 99 | 988,173 |
| Indirect | | | |
| 80003 | Manage Human Capabilities | 8 | 23,978 |
| | | | |
| 9 | Total | 107 | 1,012,151 |

Cost Categories





California ISO

2021 Update and Impact to GMC Percentages

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% |

System Operations to Market Services Shift

Primarily driven by efficiencies accomplished in supporting system operations.

- Automation of services,
- System improvements,
- and process efficiencies.

GMC Rates Comparison

| Rates Comparison | | | | |
|--|--|---------------------|-------------------|-----------|
| <i>\$ Rates per MWh</i> | | | | |
| | | GMC Cost Categories | | |
| Year | | Market Services | System Operations | CRRs |
| 2020 (eff 1/1/20) | | \$ 0.0994 | \$ 0.2788 | \$ 0.0078 |
| 2020 (Using 2019 COSS results) | | \$ 0.1601 | \$ 0.2059 | \$ 0.0078 |
| Increase / (Decrease) From Prior | | \$ 0.0607 | \$ (0.0729) | \$ - |
| Projected 2021 (using 2019 COSS results) | | \$ 0.1533 | \$ 0.1977 | \$ 0.0074 |



California ISO

Impact to EIM Percentages

Summary of EIM 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 primary driver of the shifts is a balancing of efforts between the market services and system operations functions and responsibilities.

EIM Rates Comparison

| Rates Comparison | | | | |
|--|-----------------|------------------|--------------------|--|
| <i>\$ Rates per MWh</i> | | | | |
| | | | | |
| Year | EIM Rate | RT Market | RT Dispatch | |
| 2020 (eff 1/1/20) | \$ 0.1872 | \$ 0.0785 | \$ 0.1087 | |
| 2020 (Using 2019 COSS results) | \$ 0.2039 | \$ 0.1009 | \$ 0.1030 | |
| Increase / (Decrease) From Prior | \$ 0.0167 | \$ 0.0224 | \$ (0.0057) | |
| Projected 2021 (using 2019 COSS results) | \$ 0.1955 | \$ 0.0966 | \$ 0.0989 | |



California ISO

Impact to RC Funding Percentage

RC Rate Structure

| RC Rate Calculation | | | | | | | | |
|----------------------------|---|---|---|------------------------|---|--------------|---|---------|
| Annual Revenue Requirement | X | Cost of Service Study's RC Funding Percentage | = | RC Funding Requirement | / | Reported Mwh | = | RC Rate |

- **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.
- **RC Funding Requirement**
 - 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.
- **RC Rate**
 - The RC funding requirement is then divided by the reported MWh to determine the RC rate/MWh.

Summary of RC Funding Percentage Change

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

- No change in the RC funding percentage from that of the initial calculation.
- No change in rate design.
 - 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.

RC Rates Comparison

| Rates Comparison | | |
|--|----|---------|
| <i>\$ Rates per MWh</i> | | |
| Year | | RC Rate |
| 2020 (eff 1/1/20) | \$ | 0.0278 |
| 2020 (Using 2019 COSS results) | \$ | 0.0278 |
| Increase / (Decrease) From Prior | \$ | 0.0000 |
| Projected 2021 (using 2019 COSS results) | \$ | 0.0267 |



California ISO

Impacts to the Supplemental Fees

Supplemental Fees Impacted

The study was also used to analyze efforts that support other supplemental services. The results indicate resources to process applications and statements increased. Whereas, resources to support TOR efforts decreased.

Impacted Fees:

- Scheduling Coordinator ID (SCID) Fee
- Transmission Ownership Rights (TOR) Fee
- Scheduling Coordinator Application Fee
- Congestion Revenue Rights Application Fee

Summary of 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 |



California ISO

Tariff Amendments

Tariff Amendments

- Tariff Amendments to include:
 - Cost of service study percentage and fee updates
 - Clarifying healthcare reserve language



California ISO

Key Calendar Dates and Next Steps

Key Calendar Dates* and Next Steps

| Key Date | Event |
|--------------------------|---|
| July 1, 2020 | Stakeholder comments due |
| July 9 | Post Stakeholder meeting minutes and Stakeholder comments (with replies) to website. |
| July 29 | Conduct 2 nd Stakeholder meeting (call) to review final draft proposal and tariff amendments |
| September 16 | Present 2021 GMC update to EIM Governing Body |
| September 30 – October 1 | Present 2021 GMC update to Board of Governors |
| October | File amended Tariff with FERC |
| Jan 1, 2021 | New GMC Percentages and Fees go into effect |

**Dates are subject to change*

Stakeholder Feedback and Discussion

- Comments? Questions?
- Please submit follow up comments and / or questions to initiativecomments@caiso.com by close of business July 1.
- The discussion paper is available on the ISO website at <http://www.caiso.com/informed/Pages/StakeholderProcesses/Budget-GridManagementCharge.aspx>.

Attachment G – Memorandum to CAISO Board of Governors
2020 Grid Management Charge – Cost of Service Study Update
California Independent System Operator Corporation
October 15, 2020



Memorandum

To: ISO Board of Governors

From: Ryan Seghesio, Chief Financial Officer

Date: September 23, 2020

Re: **Decision on 2021 ISO Rates and Fees Changes**

This memorandum requires Board action.

EXECUTIVE SUMMARY

The ISO completed its scheduled triennial cost of service study in accordance with its tariff. The study used activity based costing to analyze cost and time data from 2019 to determine how much time and effort staff uses to support varying cost categories and supplemental services. The ISO uses the study results to update the grid management charges revenue requirement percentage allocations to the market services, system operations, and congestion revenue rights (CRR) services cost categories (outlined in Table 1). The study results are also used to update the energy imbalance market cost category percentages (outlined in Table 2), and the recently developed reliability coordinator (RC) funding percentage (outlined in Table 3). In addition, as part of the cost of service study, the ISO analyzed its cost to support supplemental services (outlined in Table 4). The analysis of the supplemental services and its fees supports changes to some of the fees. Finally, as part of this effort, Management clarified tariff language regarding the treatment of the recently created self-insured healthcare reserve.

The cost category percentage changes and some of the fee changes are requirements of the cost of service study under the tariff and the current rate structure; as such, they do not require additional approval. However, the scheduling coordinator application fee and the congestion revenue rights application fee changes as well as the clarifying self-insured healthcare reserve tariff language do require Board approval.

Management recommends the following motion:

Moved, that the ISO Board of Governors approves the scheduling coordinator application fee and the congestion revenue rights application fee increases, as outlined in the memorandum dated September 23, 2020; and

Moved, that the ISO Board of Governors approves the clarifying tariff language related to the self-insured healthcare reserve, as outlined in the memorandum dated September 23, 2020; and

Moved, that the ISO Board of Governors authorizes Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the proposal described in the memorandum, including any filings that implement the overarching initiative policy but contain discrete revisions to incorporate Commission guidance in any initial ruling on the proposed tariff amendment.

DISCUSSION AND ANALYSIS

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

The ISO continues to use activity based costing 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 ISO 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 the ISO incurs for running the markets. The system operations category is designed to recover costs the ISO incurs for reliably operating the grid in real time. The CRR services category recovers costs the ISO incurs for running the CRR markets. The ISO uses the cost of service study to determine the share of the ISO's direct and indirect costs attributable to these three cost categories. The ISO 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 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 ISO 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 the ISO’s annual revenue requirement, thus benefiting both the RC customers and the existing GMC customers.

Currently, the ABC analysis has disaggregated ISO 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 cost of service study.

The ISO 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.

The latest cost of service study results as shown in Table 1 below indicate a 17% shift of resources (time and dollars) from the system operations cost category to the market services cost category; the CRR services cost category percentage remains the same. The shift from the system operations cost category to the market services cost category is primarily driven by process efficiencies, system improvements, the introduction of the RC services cost category, and automation of services. The shift indicates ISO staff is focused on supporting market services functions and system operations functions equally.

Table 1 – Summary of GMC Cost Category Percentage Changes

| Cost Category | 2016 Study Effective 2018 GMC | 2019 Study Effective 2021 GMC | Change from Prior |
|----------------------|--|--|------------------------------|
| Market Services | 32% | 49% | 17% |
| System Operations | 66% | 49% | -17% |
| CRR Services | 2% | 2% | 0% |

The results 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 2 – Summary of EIM Cost Category Percentage Changes

| Cost Category | Sub-Category | 2016 Study Effective 2018 GMC | 2019 Study Effective 2021 GMC | Change 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% |

New to the triennial cost of service study is the analysis of RC services efforts. The ISO 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 the ISO’s Reliability Coordinator Rate Design, Terms and Conditions proposal; the funding percentage will remain at 9%.

Table 3 – Summary of RC Funding Percentage Changes

| Cost Category | 2016 Modified Study Effective 2019 GMC | 2019 Study Effective 2021 GMC | Change from Prior |
|----------------------------------|--|-------------------------------|-------------------|
| Reliability Coordinator Services | 9% | 9% | 0% |

The ISO also used the 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 efforts decreased. The ISO proposes changes to the scheduling coordinator ID fee, transmission ownership rights 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 ISO does not propose any other change in supplemental fees.

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 |

Additionally, the ISO seeks to clarify in the tariff the administrative process around the self-insured healthcare reserve. In 2018, the ISO converted a portion of its healthcare benefit program to a self-insured model. The intent of the program was to help the ISO 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.

The ISO 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 ISO to be able to build a reserve in years in which actual claims were less than estimated and to use those reserves in years in which claims exceeded estimates. This would smooth out the volatility associated with healthcare claims.

Although the ISO 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, the ISO will add specific language describing the annual healthcare reserve process.

POSITIONS OF THE PARTIES

Numerous stakeholders participated in the June and July stakeholder calls¹ to discuss the cost of service study results and impacts to the 2021 GMC and EIM rates. The

¹ The stakeholder comments can be found at <http://www.caiso.com/informed/Pages/StakeholderProcesses/Budget-GridManagementCharge.aspx>.

participants included (but were not limited to) Arizona Public Service, Pacific Gas & Electric, PacifiCorp, Puget Sound Energy, and San Diego Gas & Electric. There were no objections or concerns raised regarding the results, with the exception of the proposed monthly scheduling coordinator ID fee increase. Two market participants requested the calculation support behind the proposed fee increase and requested the ISO explore other monthly scheduling coordinator ID fee costing methodologies. The ISO considered their requests and provided the calculation, as well as other support behind the proposed fee increase. The EIM Governing Body was briefed on the proposed adjustment during the September 16, 2020 EIM Governing Body general session meeting.

MANAGEMENT RECOMMENDATION

Management seeks Board approval to increase the scheduling coordinator application fee and the CRR application fee, and to clarify the language related to the self-insured healthcare reserve in the tariff. All other percentage and fee adjustments as part of the cost of service study are requirements under the tariff and current rate structure. With approval, Management will file the necessary tariff amendments with FERC adjusting the relative percentage allocations and fee amounts, as well as clarifying language related to the self-insured healthcare reserve. The revised allocations will become effective with the 2021 GMC, EIM, and other rates and fees. The 2021 changes will remain in place until the next GMC update (planned for 2024).