October 17, 2017

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

Re: California Independent System Operator Corporation
Docket No. ER18-____-000
2017 Grid Management Charge – Cost of Service Study Update

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) submits this tariff amendment to implement a modest adjustment to the allocation of its revenue requirement to the market services, system operations, and congestion revenue rights services (CRR services) cost categories of its Grid Management Charge (GMC). The CAISO's 2016 cost of service study completed in May 2017 indicated the need to adjust the GMC percentage allocation.[1] The CAISO requests that the Commission approve the proposed tariff modifications effective on January 1, 2018. The CAISO further requests that the Commission issue an order by December 15, 2017, to allow the CAISO to implement the revised percentages on the proposed effective date.

Specifically, the CAISO proposes amend its tariff to adjust the percentage of its total revenue requirement allocated to the GMC cost categories as follows:

- Market Services: change from 27% to 32%
- System Operations: change from 70% to 66%
- CRR Services: change from 3% to 2%

The CAISO also proposes minor clarifications to the description of the Energy Imbalance Market (EIM) Administrative Charge.

[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.

As discussed below, the CAISO thoroughly vetted the 2016 cost of service study 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 that 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 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]

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.[5] At the time of the 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 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-

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[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] 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 B.

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 2013 cost of service study: 27% to market services, 70% to system operations and 3% to CRR services. The CAISO tariff provides that the CAISO will conduct an updated cost of service study every three years, beginning in 2017, 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, as well as the EIM Administrative Charge."[6]

The 2011 revised GMC rate design also included two new transaction fees: the bid segment fee of $0.005 per bid segment; and the congestion revenue rights 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.[7]

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.

Finally, in 2014 the CAISO implemented its Energy Imbalance Market in which other balancing authority areas can participate in the CAISO's real-time energy market. As part of the stakeholder process for the Energy Imbalance Market, the CAISO, in conjunction with its stakeholders, developed the EIM Administrative Charge, which is

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[6] CAISO Tariff Appendix F, Schedule 1, Part A.

[7] 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 congestion revenue rights auction bid fee against the congestion revenue rights service category, and the transmission ownership rights fee against the system operation category.

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 establishes the EIM Administrative Charge based on the real-time activities associated with market services and system operations categories of the GMC.[8] 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.

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 three service charge percentages when conducting the triennial cost of service study. This approach is consistent with the CAISO's cost of service study updates since 2011.

II. The 2016 Cost of Service Study and 2018 GMC Update Stakeholder Process

The tariff requires the CAISO to conduct an updated cost of service study in 2017 (and every three years thereafter) using cost and reported hours data from the previous fiscal year.[9] The CAISO commenced the 2016 cost of service study update process by presenting the 2016 cost of service study and 2018 GMC update (2016 cost of service study) at a stakeholder meeting on May 24, 2017. The 2016 cost of service study described (1) the overall 2016 cost of service study methodology and results; (2) the cost of service analysis used to update the EIM Administrative Charge; and (3) the cost of service analysis used to update the TOR charge, as well a description of the overall 2018 GMC update proposal.[10]

Three stakeholders submitted comments on May 31, 2017. These were the only stakeholders to submit comments throughout the entire stakeholder process. The CAISO posted responses to the comments on June 7, 2017, and reached out to the commenting parties to discuss individual concerns. No parties raised objections or concerns regarding the results of the 2016 cost of service study and 2018 GMC update. CAISO management briefed the CAISO Board of Governors regarding the results of the cost of service study at the July 2017 board meeting.

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

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

10 *See* Attachment A, 2016 Cost of Service Study and 2018 GMC Update, also available on the CAISO website: http://www.caiso.com/informed/Pages/StakeholderProcesses/Budget-GridManagementCharge.aspx. *See also*, Attachment D, the CAISO's presentation materials from the May 24, 2017 stakeholder meeting.

III. The 2016 Cost of Service Study

The 2016 cost of service study uses the same Commission-approved activity based costing (ABC) modeling and cost allocation methodology that the CAISO used in the 2010 and 2013 cost of service studies. In the May 24, 2017, 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.[11] Activity based costing is a time tracking methodology by which CAISO employees keep track of the time they spend on various activities. Prior to implementing ABC, the CAISO had to undertake a series of interviews with department managers and directors to conduct a cost of service study. Using the ABC analysis, the CAISO was able to disaggregate its business functions into nine level 1 core processes. Each of the core processes was then broken down into level 2 activities. Level 2 activities provide a more granular view into the core processes. For example, Develop Infrastructure is a level 1 process (identified as process 80001) and Manage Transmission and Resource Implementation is a level 2 activity within the process (identified as task 205).

Although the CAISO had identified the level 2 activities at the time it conducted the 2010 study, it had implemented only level 1 of the ABC model in use for CAISO employee time and cost tracking. When the CAISO conducted the 2013 study, it had completed full level 2 ABC reporting, using activity codes and time sheet reporting. In addition, since conducting the 2010 cost of service study, the CAISO has changed the level 1 and level 2 processes and definitions to reflect better organizational changes and refinement of processes.

At the start of 2016, ABC encompassed nine level 1 processes aligning with the CAISO's core business functions. Level 2 reporting breaks these processes down into more granular activities that align with the level 1 business functions.[12] The level 2 activities allow the CAISO to track employee time more precisely, thus enabling a more precise allocation of the revenue requirement for cost recovery purposes.

A. Allocating Activity Costs and Indirect Costs to Cost Categories

The CAISO conducted the 2016 cost of service study similarly to how it conducted the 2010 and 2013 studies. As explained in the 2016 cost of service study and 2018 GMC update document, CAISO level 1 and 2 activities fall generally into two overall categories: direct employee activities, which can be mapped to the three 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

[11] Attachment A at 5-12.

[12] *Id.* at 5.

activities to a category of indirect costs. Second, the CAISO mapped the level 2 functions associated with the direct level 1 activities to one of the GMC service categories based on the extent to which the activity supported the function the category represented. Because it is not feasible to perform such mapping with a high degree of precision, the CAISO mapped the direct activities as one of the following: (1) all in one category or not in the category (100% or 0%); (2) a split between two categories (50% - 50%); or (3) partially in one category or another (80% or 20%) – or in the case of CRR services, a small portion of the activity (10%). For example, the Manage Transmission and Resource Implementation function (identified as task 205) was mapped 100% under the system operations cost category because it is an effort related to managing the building and maintaining of the grid thus the related costs are entirely to support system operations. If the activity was not attributable to any specific cost category, for example 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 the 2010 and 2013 cost of service studies.[13] 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 service[14] and cash-funded capital; (2) non-payroll support items; and (3) other income[15] and operating reserve credit.[16] 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 with the 2010 and 2013 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 2016 revenue requirement budget to determine the costs associated with the three categories. This process produced the proposed revised GMC cost allocation percentages.

The components of the 2016 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

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[13] 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.

[14] The CAISO tariff uses the term “financing costs.”

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

[16] The CAISO tariff uses the term “operating cost reserve adjustment.”

categories and the indirect cost category based on the extent to which the activity supported the function that the category represented (again using the 100%, 80%-20%, 50%-50%, or, for CRRs, 45%- 45%-10% breakdown).

Assigning direct activity-related operating and maintenance costs to the service categories required the CAISO to collect 2016 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 2016 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.[17] 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.[18]

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.[19] 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.[20]

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:[21]

Summary of Cost Category Percentages for 2018

Category	Percentage
Market Services	32%
System Operations	66%
CRR Services	2%

As a final step, 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

[17] Attachment A at 19-23.

[18] *Id.* at 23-24.

[19] *Id*. at 25.

[20] *Id.* at 25-26

[21] *Id*. at 27.

determine estimated GMC rates for stakeholder information purposes.[22] These steps are consistent with the steps the CAISO undertook in its previous cost of service studies.

IV. Updated Charges

For the updated EIM Administrative Charge and the TOR 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, Energy Imbalance Market or otherwise, pay the same rate with respect to the real-time market and real-time dispatch activities. To update the EIM Administrative Charge, the CAISO used the 2016 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 2016 real-time revenue requirement cost proportions to the respective rates for market services and system operations.[23]

Table 1 – Summary of EIM Rate[24]

($ in thousands)

Cost Category	Net Costs	GMC Pro Forma 2016 Rate	EIM Real Time Activity	EIM Percentage Share of Costs	EIM Cost of Real Time Activities	EIM Pro Forma 2016 Rate
Market Services	$ 57,388	$ 0.1038	Real Time Market	79%	$ 45,482	$ 0.0823
System Operations	$ 128,384	$ 0.2781	Real Time Dispatch	39%	$ 49,762	$ 0.1078
CRR Services	$ 2,841	$ 0.0034				$ -

The Commission approved the process for developing the EIM Administrative Charge as part of the CAISO's EIM Year One Enhancements initiative.[25] 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 the development of the EIM Administrative Charge. However, the CAISO is proposing some minor tariff modifications to clarify that the CAISO identifies the real-time

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22 *Id.* at 28-29.

23 *Id.* at 31-44.

24 *Id.* at 44.

25 *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.")

components of the market services and system operations categories in the triennial cost of service study conducted pursuant to Appendix F, Schedule 1, Part A. The proposed tariff language is consistent with past practice and has no effect on calculation of the EIM Administrative Charge.

B. TOR Charges

The 2016 cost of service study and 2018 GMC update document also describe the TOR charge update and the revenue requirement proposal. As the CAISO initially explained in the 2010 cost of service study, there were three service-related areas applicable to the TOR charges: (1) real-time operations, because the CAISO provides support on an emergency basis, similar to standby service; (2) scheduling, because the CAISO provides check-outs with neighboring balancing authorities in order to schedule flows across boundaries; and (3) outage management, because the CAISO provides for scheduling and coordination of outages across balancing authorities.

The CAISO identified the level 2 direct activities related to system operations applicable to TOR holders and then allocated indirect activities proportionately to the direct activities. It then identified the costs for the direct and indirect activities, based on the allocation percentages. After the CAISO derived the total direct and indirect costs, it calculated TOR costs as a percentage of system operations costs. The CAISO applied that percentage to system operations costs to determine the amount of costs to collect from TOR holders. Finally, the CAISO divided these costs by forecasted TOR volumes to determine the updated TOR charge of $0.24 MWH, which is unchanged from the current rate.[26]

Calculation of TOR Rate for 2018

Total applicable direct and indirect costs	$ 61,961,200
TOR percentage of total volumes	1.00%
TOR costs to collect	$ 619,612
TOR MWh for 2016	2,627,260
TOR updated rate per MWh	**$ 0.24**

C. Stakeholder Comments

Only three stakeholders submitted comments during the entire 2016 cost of service study and 2018 GMC update initiative.[27] The stakeholders sought additional background information regarding the changes in the allocation of the GMC to the three service categories.

[26] Attachment A at 45-48.

[27] Stakeholder comments and CAISO responses thereto are attached as Attachment C.

Two stakeholders had clarification questions regarding the 4% reduction in GMC cost allocation to the system operations category. The CAISO explained that this reduction was primarily driven by the decrease in costs and time recorded due to: (1) reallocating system operations' resources to create a new real time market desk; (2) improved overtime management; and (3) retirement of the 2008 bonds.

The CAISO also provided clarifications regarding calculation of the EIM Administrative Charge as a function of the real-time activities associated with the market services and system operations cost categories.

The CAISO presented the results of the 2016 cost of service study and 2018 GMC update at the July 2017 board meeting. No stakeholder expressed objections or disagreement with the 2016 cost of service study and 2018 GMC update.

V. Proposed Tariff Modifications

The proposed tariff revisions (1) incorporate the results of the 2016 cost of service study and 2018 GMC update; and (2) clarify that the EIM Administrative Charge is calculated based on the real-time components of the market services and system operations categories identified in the triennial cost of service study.[28]

With the respect the results of the 2016 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 27% to 32%
- System Operations: change from 70% to 66%
- CRR Services: change from 3% to 2%

With respect to the EIM Administrative Charge clarifications, the CAISO proposes the amend Section 29.11(i) to clarify that the real-time components of the market services and system operations categories are identified in the triennial cost of service study.

For the market services portion of the EIM Administrative Charge, the proposed clarifications specify that the real-time market percentage component of the market services charge is calculated in the triennial cost of service study. For the system

[28] 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.

operations portion of the EIM Administrative Charge, the proposed tariff clarifications specify that the real-time dispatch percentage component is calculated in the triennial cost of service study. The clarifications are consistent with Appendix F, Schedule 1, Part A, which notes that:

> 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 … as well as the EIM Administrative Charge.

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, 2018. The CAISO further requests an order by December 15, 2017, 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,[29] including waivers of the requirements to submit full Period I and Period II data and workpapers and cost-of-service statements in sections 35.13(c), 35.13(d)(1), (2), and (5), and 35.13(h).[30] 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 very minor revisions to the service category cost allocations and the transmission ownership rights charge that are the subject of this 2016 cost of service study and 2018 GMC update. The Commission has previously granted waivers of the requirements to provide such data in a number of cases involving transmission formula rates.[31]

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

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[29] 18 C.F.R. § 35.13.

[30] 18 C.F.R. §§ 35.13(c), 35.13(d)(1), 35.13(d)(2), 35.13(d)(5), and 35.13(h).

[31] *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).

VII. Communications

In accordance with Rule 203(b) of the Commission's Rules of Practice and Procedure,[32] 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:

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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.

IX. Attachments

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

Attachment A	2016 Cost of Service Study and 2018 GMC Update paper;
Attachment B	Testimony of Mr. Michael Epstein, filed with the 2012 GMC Update;
Attachment C	CAISO responses to stakeholder comments;
Attachment D	Presentation materials from the May 24, 2017 stakeholder meeting;

[32] 18 C.F.R. § 385.203(b).

Attachment E	Clean CAISO tariff incorporating the proposed tariff changes; and
Attachment F	Marked red-lined document showing the revisions containing the proposed tariff changes.

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, 2018. 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 – 2016 Cost of Service Study and 2018 GMC Update paper

2017 Grid Management Chart – Cost of Service Study Update

California Independent System Operator Corporation

California ISO

2016 Cost of Service Study and 2018 GMC Update

May 2017

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GMC EXECUTIVE SUMMARY

In accordance with the California ISO Tariff (Appendix F, Schedule 1) the ISO completed its scheduled tri-annual cost of service study. The study used 2016 data to determine the percentage allocations to the three cost categories – market services, system operations, and congestion revenue rights services (CRR services). The revised allocations will become effective with the 2018 grid management charge (GMC). The results of the study also update the 2018 the energy imbalance market (EIM) fee and 2018 transmission ownership rights (TOR) rate.

To set the stage for the recent study results, it is important to note that the ISO implemented activity based costing (ABC) in 2010. ABC was utilized for the first cost of service study to restructure the GMC rate design. The new GMC design was vetted through a comprehensive stakeholder process and approved by the ISO Board of Governors (ISO Board) and FERC in 2011 to be effective on January 1, 2012. The structure contains three cost categories: market services, system operations and congestion revenue rights services and percentages that are applied to the revenue requirement to determine the amount in the three cost categories upon which rates are set. The market services charge code is designed to recover costs the ISO incurs for running the markets. The system operations charge code is designed to recover costs the ISO incurs for reliably operating the grid in real time. The CRR services charge code recovers costs the ISO incurs for running the CRR markets.

Summary of Cost Category Percentages Changes

Cost Category	2013 Study Effective for 2015	2016 Study Effective for 2018	Change
Market Services	27%	32%	5%
System Operations	70%	66%	-4%
CRR Services	3%	2%	-1%

The 2016 cost of service study results indicate a shift of resources (time and dollars) from the system operations and congestion revenue rights services cost categories to the market services cost category. The market services percentage allocation will increase by 5% beginning with the 2018 GMC.

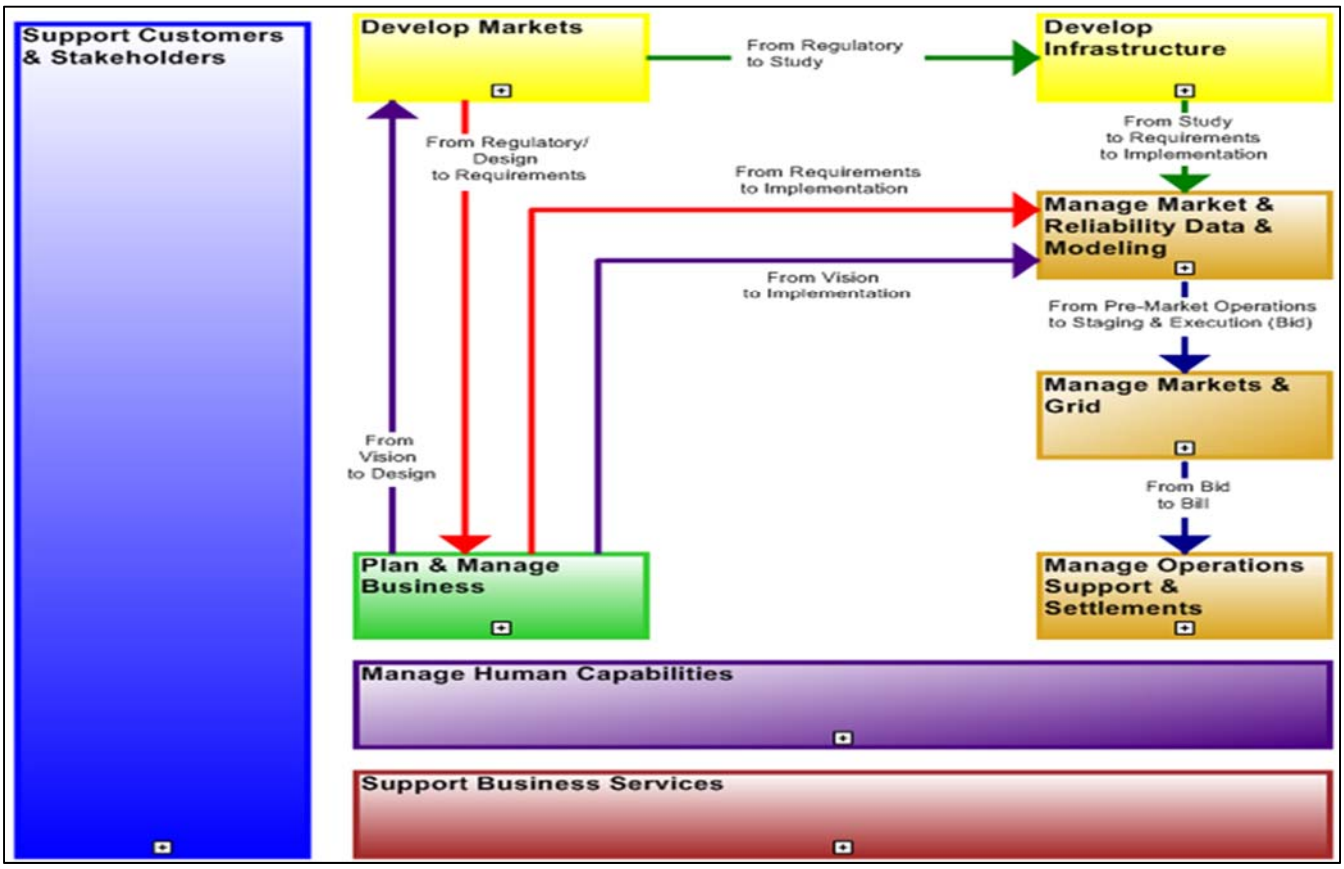
This is primarily driven by the market changes brought on by FERC Order 764 which positions the ISO real time market to better support the participation of intermittent resources and additional market intervals. Another driver behind the shift in cost categories is the reduction of direct costs (primarily in the system operations category) due to process efficiencies implemented since the last cost of service study.

Application of ABC to GMC Structure

When the ISO, conducted the first cost of service study in 2010, time reporting for ABC level 1 activities had just been implemented. Full level 2 reporting, using activity codes and time sheet reporting, commenced in 2011. This process is continually being reviewed and developed, and changes in definitions and levels have occurred since the last cost of service study.

The 2016 cost of service study used the same ABC modeling and cost allocation methodology used in the prior cost of service studies. Currently, the ABC analysis has disaggregated the ISO 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 to the level one activity. There are 140 level 2 activities included in the 2016 cost of service study.

Mapping of ISO Core Business Processes



The level 2 processes discussed in this study were mapped and defined as of March 2017. The level 1 activities were categorized into two types: (1) direct operating costs — those that can be directly mapped to a market, grid service or customer; and (2) support or indirect costs — those that support the direct activity.

Table 1 — Level 1 ABC Activities

ABC Code	Level 1 ABC Activity	Number of Level 2 Activity Tasks
	Direct Operating Costs	
80001	Develop Infrastructure	9
80002	Develop Markets	9
80004	Manage Market & Reliability Data & Modeling	17
80005	Manage Market & Grid	11
80007	Manage Operations Support & Settlements	16
80010	Support Customers & Stakeholders	8
	Indirect Operating Costs	
80003	Manage Human Capabilities	8
80008	Plan & Manage Business	16
80009	Support Business Services	46

Mapping of ABC Direct Operating Activities

Direct operating activities were defined, linked to specific processes, and measured. Using the three GMC categories, the level 2 activities were mapped as either (1) all in one category or not in the category (100% or 0%); (2) a 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%).

Table 2 — Mapping of ABC Direct Operating Activities to Cost Categories

Market Services	System Operations	CRR Services	Indirect	Comments
Percentage of cost(s) allocated to category.				
100%				The costs are entirely to support the market results and function resulting in a financially binding schedule or ancillary servicer award.
	100%			The costs are entirely to support system operations.
		100%		The costs are entirely to support the CRR process.
			100%	Attributes are not distinguishable to any specific category.
50%	50%			The costs support both market and system operations, equally.
45%	45%	10%		This is a 50/50 split after a minimum allocation to CRRs.
80%	20%			The costs are predominately market related but have some operational relationship.
20%	80%			The costs are predominately operational flow based but have some market relationship.

Task Code	Business Process Name	Market Services	System Operations	CRR Services	Indirect	Comments
	Develop Infrastructure (80001)					
201	Develop & Monitor Regulatory Contract Procedures				100%	Attributes are not distinguishable to any specific category.
202	Manage Generator Interconnection Agreements (GIA)		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 (GIP)		100%			
204	Manage Long Term Transmission Planning		100%			
205	Manage Transmission and Resource Implementation		100%			
206	Manage Transmission Maintenance Standards		100%			
207	NERC/ WECC Loads & Resources Data Requests		100%			
208	Seasonal Assessment (Under Development)		100%			
209	Manage Queue		100%			
	Develop Markets (80002)					
226	Manage Regulatory Filings				100%	Attributes are not distinguishable to any specific category.
227	Manage Tariff Amendments				100%	
228	Manage Post Order, Rehearing, and Compliance				100%	
229	Develop State/ Federal Regulatory Policy				100%	
230	BPM Change Management				100%	
231	Develop Infrastructure Policy		100%			Efforts related to managing the building and maintaining of the grid thus the costs are entirely to support system operations.
232	Perform Market Analysis	100%				The costs are entirely to support the market results and function.
233	Develop Market Design	100%				
234	Regulatory Contract Negotiations				100%	Attributes are not distinguishable to any specific category.
	Manage Market & Reliability Data & Modeling (80004)					
301	Manage Full Network Model (FNM) Maintenance	50%	50%			The costs support both market and system operations, equally.
302	Plan & Develop Operations Simulator Training	20%	80%			Significantly more operational procedures, thus the costs are predominantly operational flow based but have some market relationship.
304	EMAA Telemetry		100%			The costs are entirely to support system operations.
307	Manage Congestion Revenue Rights (CRR)			100%		The costs are entirely to support the CRR process.
308	Manage Credit & Collateral	45%	45%	10%		This is a 50/50 split after a minimum allocation to CRRs.
309	Resource Management	50%	50%			market and systems operations, equally.
310	Manage Reliability Requirements		100%			Relates to actual system operations thus the costs are entirely to support system operations.
311	Manage Operations Planning		100%			
312	Manage WECC Seasonal Studies		100%			
314	Manage & Facilitate Procedure Maintenance	20%	80%			Operational flow based but have some market relationship.
315	Procedure Admin and Reporting	20%	80%			
316	Operations Systematic Approach to Training	20%	80%			
317	Execute & Track Operations Training	20%	80%			
320	Provide Stakeholder Training				100%	Attributes are not distinguishable to any specific category.
321	SC Management				100%	
322	Register, Modify, and Terminate PDR/RDRR Resource	50%	50%			Resource attributes that support both, thus the costs support both market and systems operations, equally.
323	Calculate & Monitor Energy Costs & Indices	100%				Used for calc for defined energy bids.

Task Code	Business Process Name	Market Services	System Operations	CRR Services	Indirect	Comments
	Manage Markets & Grid (80005)					
352	Support Day Ahead Market	100%				The costs are entirely to support the market results and function.
353	Support Real Time Market	50%	50%			The costs support both market and system operations, equally.
355	Manage Outages		100%			Related to actual system operations thus the costs are entirely to support system operations.
360	Real Time Operations		100%			
362	Manage Operations Engineering Support	20%	80%			Based on support of day ahead and real time thus the costs are predominately operational flow based but have some market relationship.
363	RTO Shift Supervisor	20%	80%			The costs are predominately operational flow based but have some market relationship.
365	Manage Real Time Operations Transmission & Electric System		100%			Related to actual system operations thus the costs are entirely to support system operations.
366	Manage Real Time Interchange Scheduling		100%			
367	Manage Annual Operational Assessment				100%	Attributes are not distinguishable to any specific category.
368	Manage Day Ahead and Market Operations	80%	20%			The costs are predominately market related but have some operational relationship.
369	Manage Real Time Operations Generation	20%	80%			Based on support of day ahead and real time thus the costs are predominately operational flow based but have some market relationship.
	Manage Operations Support & Settlements (80007)					
401	Perform Price Validation	50%	50%			Related to proper outage allocation thus the costs support both market and system operations, equally.
402	Manage Dispute Analysis & Resolution				100%	Attributes are not distinguishable to any specific category.
403	Manage Market Quality System (MQS)	50%	50%			Portion of the MQS related to operational flows thus the costs support both the market and system operations, equally.
404	Manage Data Requests				100%	Attributes are not distinguishable to any specific category.
405	Manage Reg No Pay and Deviation Penalties Calculations		100%			Related to actual system operations thus the costs are entirely to support system operations.
406	Manage Rules of Conduct				100%	Attributes are not distinguishable to any specific category.
408	ISO RIG Engineering		100%			Related to actual system operations thus the costs are entirely to support system operations.
409	Meter Data Acquisition and Processing		100%			
411	Manage Market Clearing	45%	45%	10%		This is a 50/50 split after a minimum allocation to CRRs.
412	Manage Market Billing & Settlements	45%	45%	10%		
413	Manage Reliability Must Run (RMR) Settlements		100%			Supports reliability on the grid thus the costs are entirely to support system operations.
414	Manage Settlements Quarterly Release Cycle	45%	45%	10%		This is a 50/50 split after a minimum allocation to CRRs.
416	Market Issues Steering Committee	80%	20%			The costs are predominately market related but have some operational relationship.
417	Perform Market Reporting	50%	50%			The costs support both market and system operations, equally.
418	Manage Good Faith Negotiation (GFN) Requests				100%	Attributes are not distinguishable to any specific category.
419	Manage Price Corrections	80%	20%			The costs support both market and system operations, equally.
	Support Customers & Stakeholders (80010)					
539	Representing the ISO Externally				100%	Attributes are not distinguishable to any specific category.
601	Manage Client Inquiries	80%	20%			The costs are predominately market related but have some operational relationship.
602	Strategic Client Account Management	80%	20%			
603	Manage Stakeholder Process				100%	Attributes are not distinguishable to any specific category.
605	Develop PTOs				100%	Attributes are not distinguishable to any specific category.
606	Serve New Comers				100%	Attributes are not distinguishable to any specific category.
609	Government Affairs				100%	Attributes are not distinguishable to any specific category.
610	Communications & Public Relations				100%	Attributes are not distinguishable to any specific category.

Mapping of Non-ABC Support Costs

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

Table 3 — Mapping of Non-ABC Support Costs to GMC Cost Categories

2016 Revenue Requirement: Non-ABC Support Costs							
Component		Market Services	System Operations	CRR Services	Indirect		Comments
Chief Executive Officer Division							
Bank Fees					100%		Attributes are not distinguishable to any specific category.
SSAE 16 Audit		45%	45%	10%			Use 80007 Task 412
Operations Audit		21%	79%				Use 80005 total
Insurance					100%		Attributes are not distinguishable to any specific category.
HR Support					100%		Attributes are not distinguishable to any specific category.
Technology Division							
Hardware and Software Maintenance and Equipment					100%		Attributes are not distinguishable to any specific category.
Telecommunications					100%		Attributes are not distinguishable to any specific category.
Occupancy					100%		Attributes are not distinguishable to any specific category.
MQRI Division							
Intermittent Resource Forecasting Costs		50%	50%				Use 80005 Task 353
General Counsel Division							
Outside Legal					100%		Attributes are not distinguishable to any specific category.

Mapping of ABC Support Activities

ABC support activities were allocated to indirect costs.

Table 4 — Mapping of ABC Support Activities to GMC Cost Categories

2016 Revenue Requirement: ABC Support Costs							
Component		Market Services	System Operations	CRR Services	Indirect		Comments
Man Human Capabilities (MHC) (80003)					100%		Attributes are not distinguishable to any specific category.
Plan & Manage Business (PMB) (80008)					100%		Attributes are not distinguishable to any specific category.
Support Business Services (SBS) (80009)					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 the ISO'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 5 — Mapping of Debt Service and Capital to GMC Cost Categories

2016 Revenue Requirement: Debt Service Bonds and Cash Funded Capital							
Component		Market Services	System Operations	CRR Svcs	Indirect		Comments
Total Debt Service 2013 Bonds					100%		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 6 — Mapping of Other Revenue to GMC Cost Categories

2016 Revenue Requirement: Other Costs and Revenues							
Component		Market Services	System Operations	CRR Services	Indirect		Comments
Energy Imbalance Interconnection Fees					100%		
Intermittent Resource Forecasting Fees		50%	50%				Use 80005 Task 353
COI Path Operator Fees		21%	79%				Use 80005 total
Interest Earnings					100%		
Large Generation Interconnection Fees			100%				Use 80001 Task 203
SC Application Fees					100%		
MSS Penalties					100%		

Table 7 — Mapping of Operating Cost Reserve Adjustment to GMC Cost Categories

2016 Revenue Requirement: Operating Cost Reserve Adjustment							
Component		Market Services	System Operations	CRR Services	Indirect		Comments
Adjustment in 15% reserve for O&M					100%		
25% debt service reserve 2013 bonds					100%		
Revenue changes					100%		
Expense changes					100%		Attributes are not distinguishable to any specific category.

Indirect Costs

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

Costing the 2016 Revenue Requirement

The allocation matrix of level 2 activities was applied to the ISO's 2016 revenue requirement to determine the costs associated with the three categories: market services, system operations and CRR services. The 2016 revenue requirement data and employee hours are the most recent information available to both determine the GMC cost category percentage updates and the updated revenue requirement for the ISO's 2018 GMC tariff filing.

Table 8 —2016 Revenue Requirement Components

Revenue Requirement	2016 Budget (in thousands)
Operations and Maintenance	$ 169,340
Debt Service	$ 16,900
Cash Funded Capital	$ 24,000
Other Costs and Revenues	$ (10,800)
Operating Costs Reserve Adjustment	$ (4,100)
Total Revenue Requirement	**$ 195,340**

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 three buckets and determining resulting cost category percentages; and
5. Dividing resulting costs by estimated volumes to determine 2016 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 9 — Allocating Costs to ABC Activities and Non-ABC Support Costs

		2016 Operations and Maintenance Budget (amounts in thousands)		
Code	Division	ABC Activity Costs	Non-ABC Activity Costs	Total Budget
2100	Chief Executive Officer	$ 12,408	$ 5,355	$ 17,763
2200	Market and Infrastructure Development	$ 15,119	-	$ 15,119
2400	Technology	$ 40,198	21,951	$ 62,149
2500	Operations	$ 41,891	-	$ 41,891
2600	General Counsel and Chief Compliance Officer	$ 9,844	3,000	$ 12,844
2700	Market Quality and Renewable Integration	$ 6,233	2,235	$ 8,468
2800	Customer and State Affairs	$ 8,445	-	$ 8,445
2900	Regional and Federal Affairs	$ 2,661	-	$ 2,661
	Total	**$ 136,799**	**$ 32,541**	**$ 169,340**

These budgeted costs were allocated using the percentages shown in *Table 3 — Mapping of Non-ABC Support Costs to GMC Cost Categories.*

Table 10 — Allocation of Non-ABC Support Costs to Cost Categories

2016 Revenue Requirement: Non-ABC Support Costs										
Component		Market Services	System Operations	CRR Services	Indirect		2016 Budget	Market Services	System Operations	CRR Services	Indirect
							(amounts in thousands)				
Chief Executive Officer Division											
Bank Fees					100%		290	0	-	0	290
SSAE 16 Audit		45%	45%	10%			500	225	225	50	-
Operations Audit		21%	79%				$ 224	47	$ 177	0	$ -
Insurance					100%		2,231	0	-	0	2,231
HR Support					100%		2,110	0	-	0	2,110
Technology Division								0	-	0	-
Hardware and Software Maintenance and Equipment					100%		$11,838	0	$ -	0	$11,838
Telecommunications					100%		5,100	0	-	0	5,100
Occupancy					100%		5,013	0	-	0	5,013
MQRI Division								0	-	0	-
Intermittent Resource Forecasting Costs		50%	50%				$ 2,235	1118	$ 1,117	0	$ -
General Counsel Division								0	-	0	-
Outside Legal					100%		3,000	0	-	0	3,000
Total Non-ABC Support Costs							**$32,541**	**$1,390**	**$ 1,519**	**$ 50**	**$29,582**

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. ISO activities were broken out into nine level 1 ABC activities as shown in *Table 1 — 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 2 — Mapping of ABC Level 2 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 109 cost centers. The reported 2016 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 11 — Allocating Division Hours to Direct Operating Activities

		Allocation of Hours By Division								
ABC Code	Business Process Name	Chief Executive Officer	Market and Infrastructure Development	Technology	Operations	General Counsel and Chief Compliance Officer	Market Quality and Renewable Integration	Customer and State Affairs	Regional and Federal Affairs	Total
80001	Develop Infrastructure	2%	97%	0%	1%	0%	0%	0%	0%	100%
80002	Develop Markets	1%	49%	2%	3%	10%	35%	0%	0%	100%
80004	Manage Market & Reliability Data & Modeling	8%	1%	14%	72%	0%	0%	5%	0%	100%
80005	Manage Markets & Grid	0%	0%	4%	94%	0%	2%	0%	0%	100%
80007	Manage Operations Support & Settlements	2%	0%	3%	80%	0%	15%	0%	0%	100%
80010	Support Customers & Stakeholders	0%	0%	1%	0%	0%	0%	81%	18%	100%
	Total Direct ABC Level 2 Allocations	**2%**	**19%**	**4%**	**55%**	**1%**	**6%**	**10%**	**2%**	**100%**

The hours were then aggregated by level 2 activity.

Table 12 — Allocating Division Hours to Level 2 Activities

Task Code	Business Process Name	Allocation of Hours By Division: Chief Executive Officer	Market and Infrastructure Development	Technology	Operations	General Counsel and Chief Compliance Officer	Market Quality and Renewable Integration	Customer and State Affairs	Regional and Federal Affairs	Total
	Develop Infrastructure (80001)									
201	Develop & Monitor Regulatory Contract Procedures	0%	100%	0%	0%	0%	0%	0%	0%	6%
202	Manage Generator Interconnection Agreements (GIA)	0%	100%	0%	0%	0%	0%	0%	0%	5%
203	Manage Generator Interconnection Process (GIP)	9%	91%	0%	0%	0%	0%	0%	0%	25%
204	Manage Long Term Transmission Planning	0%	100%	0%	0%	0%	0%	0%	0%	45%
205	Manage Transmission and Resource Implementation	0%	88%	0%	12%	0%	0%	0%	0%	2%
206	Manage Transmission Maintenance Standards	0%	100%	0%	0%	0%	0%	0%	0%	6%
207	NERC/ WECC Loads & Resources Data Requests	0%	100%	0%	0%	0%	0%	0%	0%	4%
208	Seasonal Assessment (Under Development)	0%	100%	0%	0%	0%	0%	0%	0%	3%
209	Manage Queue	0%	100%	0%	0%	0%	0%	0%	0%	4%
	Total	**2%**	**97%**	**0%**	**1%**	**0%**	**0%**	**0%**	**0%**	**100%**
	Develop Markets (80002)									
226	Manage Regulatory Filings	0%	0%	0%	0%	100%	0%	0%	0%	7%
227	Manage Tariff Amendments	0%	0%	0%	0%	100%	0%	0%	0%	2%
228	Manage Post Order, Rehearing, and Compliance	0%	0%	0%	0%	100%	0%	0%	0%	0%
229	Develop State/ Federal Regulatory Policy	0%	64%	0%	36%	0%	0%	0%	0%	7%
230	BPM Change Management	0%	0%	0%	96%	0%	0%	4%	0%	1%
231	Develop Infrastructure Policy	0%	97%	0%	3%	0%	0%	0%	0%	19%
232	Perform Market Analysis	2%	0%	8%	0%	0%	90%	0%	0%	31%
233	Develop Market Design	0%	77%	0%	0%	0%	23%	0%	0%	29%
234	Regulatory Contract Negotiations	0%	100%	0%	0%	0%	0%	0%	0%	5%
	Total	**1%**	**49%**	**2%**	**3%**	**10%**	**35%**	**0%**	**0%**	**100%**
	Manage Market & Reliability Data & Modeling (80004)									
301	Manage Full Network Model (FNM) Maintenance	0%	0%	75%	25%	0%	0%	0%	0%	18%
302	Plan & Develop Operations Simulator Training	0%	0%	7%	93%	0%	0%	0%	0%	6%
304	EMAA Telemetry	0%	0%	0%	100%	0%	0%	0%	0%	5%
307	Manage Congestion Revenue Rights (CRR)	0%	0%	0%	100%	0%	0%	0%	0%	6%
308	Manage Credit & Collateral	100%	0%	0%	0%	0%	0%	0%	0%	6%
309	Resource Management	0%	0%	0%	100%	0%	0%	0%	0%	12%
310	Manage Reliability Requirements	0%	34%	0%	66%	0%	0%	0%	0%	3%
311	Manage Operations Planning	0%	0%	0%	100%	0%	0%	0%	0%	13%
312	Manage WECC Seasonal Studies	0%	0%	0%	100%	0%	0%	0%	0%	1%
314	Manage & Facilitate Procedure Maintenance	9%	0%	0%	91%	0%	0%	0%	0%	6%
315	Procedure Admin and Reporting	0%	0%	0%	100%	0%	0%	0%	0%	0%
316	Operations Systematic Approach to Training	0%	0%	0%	100%	0%	0%	0%	0%	9%
317	Execute & Track Operations Training	0%	0%	0%	100%	0%	0%	0%	0%	10%
320	Provide Stakeholder Training	0%	0%	0%	0%	0%	0%	100%	0%	3%
321	SC Management	0%	0%	0%	0%	0%	0%	100%	0%	2%
322	Register, Modify, and Terminate PDR/RDRR Resource	0%	0%	13%	87%	0%	0%	0%	0%	0%
323	Calculate & Monitor Energy Costs & Indices	83%	0%	0%	0%	0%	17%	0%	0%	2%
	Total	**8%**	**1%**	**14%**	**72%**	**0%**	**0%**	**5%**	**0%**	**100%**

Task Code	Business Process Name	Allocation of Hours By Division								
		Chief Executive Officer	Market and Infrastructure Development	Technology	Operations	General Counsel and Chief Compliance Officer	Market Quality and Renewable Integration	Customer and State Affairs	Regional and Federal Affairs	Total
	Manage Markets & Grid (80005)									
352	Support Day Ahead Market	0%	0%	47%	10%	0%	42%	0%	0%	1%
353	Support Real Time Market	0%	0%	46%	36%	0%	18%	0%	0%	8%
355	Manage Outages	0%	0%	0%	100%	0%	0%	0%	0%	18%
360	Real Time Operations	0%	0%	0%	100%	0%	0%	0%	0%	1%
362	Manage Operations Engineering Support	0%	0%	0%	100%	0%	0%	0%	0%	9%
363	RTO Shift Supervisor	0%	0%	0%	100%	0%	0%	0%	0%	8%
365	Manage Real Time Operations Transmission & Electric System	0%	0%	0%	100%	0%	0%	0%	0%	18%
366	Manage Real Time Interchange Scheduling	0%	0%	0%	100%	0%	0%	0%	0%	13%
367	Manage Annual Operational Assessment	36%	0%	0%	64%	0%	0%	0%	0%	0%
368	Manage Day Ahead and Market Operations	0%	0%	0%	100%	0%	0%	0%	0%	10%
369	Manage Real Time Operations Generation	0%	0%	0%	100%	0%	0%	0%	0%	16%
	Total	**0%**	**0%**	**4%**	**94%**	**0%**	**2%**	**0%**	**0%**	**100%**
	Manage Operations Support & Settlements (80007)									
401	Perform Price Validation	0%	0%	19%	81%	0%	0%	0%	0%	0%
402	Manage Dispute Analysis & Resolution	0%	0%	8%	92%	0%	0%	0%	0%	6%
403	Manage Market Quality System (MQS)	0%	0%	15%	85%	0%	0%	0%	0%	14%
404	Manage Data Requests	0%	0%	0%	100%	0%	0%	0%	0%	2%
405	Manage Reg No Pay and Deviation Penalties Calculations	0%	0%	0%	100%	0%	0%	0%	0%	0%
406	Manage Rules of Conduct	0%	0%	0%	100%	0%	0%	0%	0%	2%
408	ISO RIG Engineering	0%	0%	0%	100%	0%	0%	0%	0%	1%
409	Meter Data Acquisition and Processing	0%	0%	0%	100%	0%	0%	0%	0%	12%
411	Manage Market Clearing	100%	0%	0%	0%	0%	0%	0%	0%	1%
412	Manage Market Billing & Settlements	0%	0%	0%	100%	0%	0%	0%	0%	23%
413	Manage Reliability Must Run (RMR) Settlements	0%	0%	0%	100%	0%	0%	0%	0%	0%
414	Manage Settlements Quarterly Release Cycle	0%	0%	0%	100%	0%	0%	0%	0%	18%
416	Market Issues Steering Committee	0%	0%	0%	100%	0%	0%	0%	0%	0%
417	Perform Market Reporting	0%	0%	0%	0%	0%	100%	0%	0%	1%
418	Manage Good Faith Negotiation (GFN) Requests	0%	0%	0%	0%	46%	0%	0%	54%	0%
419	Manage Price Corrections	2%	0%	0%	23%	0%	75%	0%	0%	19%
	Total	**2%**	**0%**	**3%**	**80%**	**0%**	**15%**	**0%**	**0%**	**100%**
	Support Customers & Stakeholders (80010)									
539	Representing the ISO Externally	0%	12%	27%	0%	0%	0%	20%	41%	2%
601	Manage Client Inquiries	0%	0%	0%	0%	0%	0%	100%	0%	20%
602	Strategic Client Account Management	0%	0%	0%	0%	0%	0%	100%	0%	10%
603	Manage Stakeholder Process	0%	0%	0%	0%	1%	0%	98%	0%	10%
605	Develop PTOs	0%	0%	0%	0%	0%	0%	67%	33%	0%
606	Serve New Comers	0%	0%	0%	0%	0%	0%	100%	0%	2%
609	Government Affairs	0%	0%	0%	0%	0%	0%	52%	48%	35%
610	Communications & Public Relations	0%	0%	0%	0%	0%	0%	100%	0%	21%
	Total	**0%**	**0%**	**1%**	**0%**	**0%**	**0%**	**81%**	**18%**	**100%**
	Total Direct ABC Level 2 Allocations	**2%**	**19%**	**4%**	**55%**	**1%**	**6%**	**10%**	**2%**	**100%**

Cost of Direct Operating Activities

The direct operating activities costs were factored into the allocation matrix shown in *Table 2 — Mapping of ABC Level 2 Direct Operating Activities to Cost Categories* to get the costs to the cost categories.

Table 13 — Allocation of Division Costs to Direct Operating Activities

		Allocation of Costs By Division (amounts in thousands)								
ABC Code	Business Process Name	Chief Executive Officer	Market and Infrastructure Development	Technology	Operations	General Counsel and Chief Compliance Officer	Market Quality and Renewable Integration	Customer and State Affairs	Regional and Federal Affairs	Total
80001	Develop Infrastructure	$ 162	$ 10,004	$ 6	$ 12	$ 4	$ -	$ -	$ -	$ 10,188
80002	Develop Markets	20	4,362	246	216	687	2,594	1	-	8,126
80004	Manage Market & Reliability Data & Modeling	992	86	1,261	7,500	-	34	483	-	10,356
80005	Manage Markets & Grid	4	-	714	23,688	-	587	-	-	24,993
80007	Manage Operations Support & Settlements	127	-	321	6,320	13	1,494	-	17	8,292
80010	Support Customers & Stakeholders	-	35	40	-	12	-	7,520	2,049	9,656
	Total Direct ABC Level 2 Allocations	**$ 1,305**	**$ 14,487**	**$ 2,588**	**$ 37,736**	**$ 716**	**$ 4,709**	**$ 8,004**	**$ 2,066**	**$ 71,611**

The costs were then aggregated by level 2 activity.

Table 14 — Allocation of Division Costs to Level 2 Activity

Task Code	Business Process Name	Allocation of Costs By Division (amounts in thousands)								
		Chief Executive Officer	Market and Infrastructure Development	Technology	Operations	General Counsel and Chief Compliance Officer	Market Quality and Renewable Integration	Customer and State Affairs	Regional and Federal Affairs	Total
	Develop Infrastructure (80001)									
201	Develop & Monitor Regulatory Contract Procedures	$ -	$ 441	$ -	$ -	$ -	$ -	$ -	$ -	$ 441
202	Manage Generator Interconnection Agreements (GIA)	-	358	-	-	-	-	-	-	358
203	Manage Generator Interconnection Process (GIP)	162	2,150	-	-	4	-	-	-	2,316
204	Manage Long Term Transmission Planning	-	4,767	6	2	-	-	-	-	4,775
205	Manage Transmission and Resource Implementation	-	242	-	10	-	-	-	-	252
206	Manage Transmission Maintenance Standards	-	635	-	-	-	-	-	-	635
207	NERC/ WECC Loads & Resources Data Requests	-	308	-	-	-	-	-	-	308
208	Seasonal Assessment (Under Development)	-	224	-	-	-	-	-	-	224
209	Manage Queue	-	879	-	-	-	-	-	-	879
	Total	**$ 162**	**$ 10,004**	**$ 6**	**$ 12**	**$ 4**	**$ -**	**$ -**	**$ -**	**$ 10,188**
	Develop Markets (80002)									
226	Manage Regulatory Filings	$ -	$ -	$ -	$ -	$ 499	$ -	$ -	$ -	$ 499
227	Manage Tariff Amendments	-	-	-	-	174	-	-	-	174
228	Manage Post Order, Rehearing, and Compliance	-	-	-	-	14	-	-	-	14
229	Develop State/ Federal Regulatory Policy	-	528	-	159	-	-	-	-	687
230	BPM Change Management	-	-	-	26	-	-	1	-	27
231	Develop Infrastructure Policy	-	1,517	-	31	-	-	-	-	1,548
232	Perform Market Analysis	20	-	246	-	-	2,098	-	-	2,364
233	Develop Market Design	-	2,064	-	-	-	496	-	-	2,560
234	Regulatory Contract Negotiations	-	253	-	-	-	-	-	-	253
	Total	**$ 20**	**$ 4,362**	**$ 246**	**$ 216**	**$ 687**	**$ 2,594**	**$ 1**	**$ -**	**$ 8,126**
	Manage Market & Reliability Data & Modeling (80004)									
301	Manage Full Network Model (FNM) Maintenance	$ -	$ -	$ 1,219	$ 375	$ -	$ -	$ -	$ -	$ 1,594
302	Plan & Develop Operations Simulator Training	-	-	39	613	-	-	-	-	652
304	EMAA Telemetry	-	-	-	381	-	-	-	-	381
307	Manage Congestion Revenue Rights (CRR)	-	-	-	495	-	-	-	-	495
308	Manage Credit & Collateral	760	-	-	-	-	-	-	-	760
309	Resource Management	-	-	-	1,071	-	-	-	-	1,071
310	Manage Reliability Requirements	-	84	-	208	-	-	-	-	292
311	Manage Operations Planning	-	2	-	1,259	-	-	-	-	1,261
312	Manage WECC Seasonal Studies	-	-	-	49	-	-	-	-	49
314	Manage & Facilitate Procedure Maintenance	106	-	-	652	-	-	-	-	758
315	Procedure Admin and Reporting	-	-	-	24	-	-	-	-	24
316	Operations Systematic Approach to Training	-	-	-	974	-	-	-	-	974
317	Execute & Track Operations Training	-	-	-	1,242	-	-	-	-	1,242
320	Provide Stakeholder Training	-	-	-	1	-	-	303	-	304
321	SC Management	-	-	-	-	-	-	180	-	180
322	Register, Modify, and Terminate PDR/RDRR Resource	-	-	3	156	-	-	-	-	159
323	Calculate & Monitor Energy Costs & Indices	126	-	-	-	-	34	-	-	160
	Total	**$ 992**	**$ 86**	**$ 1,261**	**$ 7,500**	**$ -**	**$ 34**	**$ 483**	**$ -**	**$ 10,356**

Task Code	Business Process Name	Allocation of Costs By Division (amounts in thousands) Chief Executive Officer	Market and Infrastructure Development	Technology	Operations	General Counsel and Chief Compliance Officer	Market Quality and Renewable Integration	Customer and State Affairs	Regional and Federal Affairs	Total
	Manage Markets & Grid (80005)									
352	Support Day Ahead Market	$ -	$ -	$ 98	$ 31	$ -	$ 168	$ -	$ -	$ 297
353	Support Real Time Market	-	-	616	696	-	419	-	-	1,731
355	Manage Outages	-	-	-	2,775	-	-	-	-	2,775
360	Real Time Operations	-	-	-	140	-	-	-	-	140
362	Manage Operations Engineering Support	-	-	-	1,733	-	-	-	-	1,733
363	RTO Shift Supervisor	-	-	-	2,081	-	-	-	-	2,081
365	Manage Real Time Operations Transmission & Electric System	-	-	-	4,877	-	-	-	-	4,877
366	Manage Real Time Interchange Scheduling	-	-	-	3,451	-	-	-	-	3,451
367	Manage Annual Operational Assessment	4	-	-	520	-	-	-	-	524
368	Manage Day Ahead and Market Operations	-	-	-	3,090	-	-	-	-	3,090
369	Manage Real Time Operations Generation	-	-	-	4,294	-	-	-	-	4,294
	Manage Operations Support & Settlements (80007)									
401	Perform Price Validation	$ -	$ -	$ 5	$ 85	$ -	$ -	$ -	$ -	$ 90
402	Manage Dispute Analysis & Resolution	-	-	42	473	-	-	-	-	515
403	Manage Market Quality System (MQS)	-	-	270	1,101	-	-	-	-	1,371
404	Manage Data Requests	-	-	-	128	-	-	-	-	128
405	Manage Reg No Pay and Deviation Penalties Calculations	-	-	-	2	-	-	-	-	2
406	Manage Rules of Conduct	-	-	-	155	-	-	-	-	155
408	ISO RIG Engineering	-	-	-	87	-	-	-	-	87
409	Meter Data Acquisition and Processing	-	-	-	793	-	-	-	-	793
411	Manage Market Clearing	87	-	-	-	-	-	-	-	87
412	Manage Market Billing & Settlements	-	-	-	1,665	-	-	-	-	1,665
413	Manage Reliability Must Run (RMR) Settlements	-	-	-	39	-	-	-	-	39
414	Manage Settlements Quarterly Release Cycle	-	-	4	1,412	-	-	-	-	1,416
416	Market Issues Steering Committee	-	-	-	15	-	-	-	-	15
417	Perform Market Reporting	-	-	-	-	-	58	-	-	58
418	Manage Good Faith Negotiation (GFN) Requests	-	-	-	-	13	-	-	17	30
419	Manage Price Corrections	40	-	-	365	-	1,436	-	-	1,841
	Support Customers & Stakeholders (80010)									
539	Representing the ISO Externally	$ -	$ 35	$ 40	$ -	$ -	$ -	$ 52	$ 113	$ 240
601	Manage Client Inquiries	-	-	-	-	-	-	1,617	-	1,617
602	Strategic Client Account Management	-	-	-	-	-	-	1,077	3	1,080
603	Manage Stakeholder Process	-	-	-	-	12	-	529	2	543
605	Develop PTOs	-	-	-	-	-	-	-	-	-
606	Serve New Comers	-	-	-	-	-	-	118	1	119
609	Government Affairs	-	-	-	-	-	-	2,054	1,930	3,984
610	Communications & Public Relations	-	-	-	-	-	-	2,073	-	2,073
	Total Direct ABC Level 2 Allocations	**$ 1,305**	**$ 14,487**	**$ 2,588**	**$ 37,736**	**$ 716**	**$ 4,709**	**$ 8,004**	**$ 2,066**	**$ 71,611**

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

Table 15 — Allocating ABC Direct Operating Activities Costs to Cost Categories

2016 Revenue Requirement: ABC Direct Operating Activities											
Code	ABC Level 2 Activities	Market Services	System Operations	CRR Services	Indirect	2016 Budget	Market Services	System Operations	CRR Services	Indirect
						(amounts in thousands)				
80001	**Develop Infrastructure (DI)**									
201	Develop & Monitor Regulatory Contract Procedures				100%	$ 441	$ -	$ -	$ -	$ 441
202	Manage Generator Interconnection Agreements (GIA)		100%			$ 358	-	358	-	-
203	Manage Generator Interconnection Process (GIP)		100%			$ 2,316	-	2,316	-	-
204	Manage Long Term Transmission Planning		100%			$ 4,775	-	4,775	-	-
205	Manage Transmission and Resource Implementation		100%			$ 252	-	252	-	-
206	Manage Transmission Maintenance Standards		100%			$ 635	-	635	-	-
207	NERC/ WECC Loads & Resources Data Requests		100%			$ 308	-	308	-	-
208	Seasonal Assessment		100%			$ 224	-	224	-	-
209	Manage Queue		100%			$ 879	-	879	-	-
	Total DI					**10,188**	**-**	**9,747**	**-**	**441**
80002	**Develop Markets (DM)**									
226	Manage Regulatory Filings				100%	499	-	-	-	499
227	Manage Tariff Amendments				100%	174	-	-	-	174
228	Manage Post Order, Rehearing, and Compliance				100%	14	-	-	-	14
229	Develop State/ Federal Regulatory Policy				100%	687	-	-	-	687
230	BPM Change Management				100%	27	-	-	-	27
231	Develop Infrastructure Policy		100%			1,548	-	1,548	-	-
232	Perform Market Analysis	100%				2,364	2,364	-	-	-
233	Market Design & Infrastructure Policy	100%				2,560	2,560	-	-	-
234	Regulatory Contract Negotiations				100%	253	-	-	-	253
	Total DM					**8,126**	**4,924**	**1,548**	**-**	**1,654**
80004	**Manage Market & Reliability Data & Modeling (MMR))**									
301	Manage Full Network Model (FNM) Maintenance	50%	50%			1,594	797	797	-	-
302	Plan & Develop Operations Simulator Training	20%	80%			652	130	522	-	-
304	Energy Measure (EMAA) Telemetry		100%			381	-	381	-	-
307	Manage Congestion Revenue Rights (CRR)			100%		495	-	-	495	-
308	Manage Credit & Collateral	45%	45%	10%		760	342	342	76	-
309	Resource Management	50%	50%			1,071	536	535	-	-
310	Manage Reliability Requirements		100%			292	-	292	-	-
311	Manage Operations Planning		100%			1,261	-	1,261	-	-
312	Manage WECC Seasonal Studies		100%			49	-	49	-	-
314	Manage & Facilitate Procedure Maintenance	20%	80%			758	152	606	-	-
315	Procedure Admin and Reporting	20%	80%			24	5	19	-	-
316	Operations Systematic Approach to Training	20%	80%			974	195	779	-	-
317	Execute & Track Operations Training	20%	80%			1,242	248	994	-	-
320	Provide Stakeholder Training				100%	304	-	-	-	304
321	SC Management				100%	180	-	-	-	180
322	Register, Modify, and Terminate PDR/RDRR Resource	50%	50%			159	79	80	-	-
323	Calculate & Monitor Energy Costs & Indices	100%				160	160	-	-	-
	Total MMR					**10,356**	**2,644**	**6,657**	**571**	**484**

2016 Revenue Requirement: ABC Direct Operating Activities												
Code	ABC Level 2 Activities		Market Services	System Operations	CRR Services	Indirect		2016 Budget	Market Services	System Operations	CRR Services	Indirect
								(amounts in thousands)				
80005	**Manage Market & Grid (MMG)**											
352	Support Day Ahead Market		100%					297	297	-	-	-
353	Support Real Time Market		50%	50%				1,731	866	865	-	-
355	Manage Outages			100%				2,775	-	2,775	-	-
360	Real Time Operations			100%				140	-	140	-	-
362	Manage Operations Engineering Support		20%	80%				1,733	347	1,386	-	-
363	RTO Shift Supervisor		20%	80%				2,081	416	1,665	-	-
365	Manage Real Time Operations - Transmission & Electric System			100%				4,877	-	4,877	-	-
366	Manage Real Time Interchange Scheduling			100%				3,451	-	3,451	-	-
367	Manage Annual Operational Assessment					100%		524	-	-	-	524
358 + 368	Manage Day Ahead and Market Operations (Manage Market Operations)		80%	20%				3,090	2,472	618	-	-
364 +369	Manage Real Time Operations Generation		20%	80%				4,294	859	3,435	-	-
	Total MMG							**24,993**	**5,257**	**19,212**	**-**	**524**
	MMG %s							**100%**	**21%**	**79%**		
80007	**Manage Operations Support & Settlements (MOS)**											
401	Perform Price Validation		50%	50%				90	45	45	-	-
402	Manage Dispute Analysis & Resolution					100%		515	-	-	-	515
403	Manage Market Quality System (MQS)		50%	50%				1,371	685	686	-	-
404	Manage Data Requests					100%		128	-	-	-	128
405	Manage Reg No Pay and Deviation Penalties Calculations			100%				2	-	2	-	-
406	Manage Rules of Conduct					100%		155	-	-	-	155
408	ISO RIG Engineering			100%				87	-	87	-	-
409	Meter Data Acquisition and Processing			100%				793	-	793	-	-
411	Manage Market Clearing		45%	45%	10%			87	39	39	9	-
412	Manage Market Billing & Settlements		45%	45%	10%			1,665	749	749	167	-
413	Manage Reliability Must Run (RMR) Settlements			100%				39	-	39	-	-
414	Manage Settlements Quarterly Release Cycle		45%	45%	10%			1,416	637	637	142	-
416	Market Issues Steering Committee		80%	20%				15	12	3	-	-
417	Perform Market Reporting		50%	50%				58	29	29	-	-
418	Manage Good Faith Negotiation (GFN) Requests					100%		30	-	-	-	30
419	Manage Price Corrections		80%	20%				1,841	1,473	368	-	-
	Total MOS							**8,292**	**3,669**	**3,477**	**318**	**828**
80010	**Support Customers & Stakeholders (SCS)**											
539	Representing the ISO Externally					100%		240	-	-	-	240
601	Manage Client Inquiries		80%	20%				1,617	1,294	323	-	-
602	Strategic Client Account Management		80%	20%				1,080	864	216	-	-
603	Manage Stakeholder Process					100%		543	-	-	-	543
605	Develop PTOs					100%		-	-	-	-	-
606	Serve New Comers					100%		119	-	-	-	119
609	Government Affairs					100%		3,984	-	-	-	3,984
610	Communications & Public Relations					100%		2,073	-	-	-	2,073
	Total MOS							**9,656**	**2,158**	**539**	**-**	**6,959**
								-				
	Total Direct O&M							**$ 71,611**	**$18,652**	**$ 41,180**	**$ 889**	**$10,890**
	Direct O&M %							**100%**	**26%**	**58%**	**1%**	**15%**

ABC Support Activities

The same process yielded the following percentages for the three support activities.

Table 16 — Allocating Division Hours to Support Activities

ABC Code	Business Process Name	Allocation of Hours By Division: Chief Executive Officer	Market and Infrastructure Development	Technology	Operations	General Counsel and Chief Compliance Officer	Market Quality and Renewable Integration	Customer and State Affairs	Regional and Federal Affairs	Total
80003	Manage Human Capabilities	98%	0%	1%	0%	0%	0%	0%	0%	100%
80008	Plan & Manage Business	13%	0%	63%	12%	7%	5%	0%	0%	100%
80009	Support Business Services	12%	1%	67%	5%	13%	1%	1%	1%	100%
	Total Indirect ABC Level 2 Allocations	**16%**	**1%**	**63%**	**5%**	**11%**	**2%**	**1%**	**1%**	**100%**

These costs were inputs into the allocation matrix shown in *Table 4 — Mapping of ABC Support Activities to GMC Cost Categories* to get the costs to the cost categories.

Table 17 — Allocating Division Costs to Support Activities

ABC Code	Business Process Name	Allocation of Costs By Division (amounts in thousands): Chief Executive Officer	Market and Infrastructure Development	Technology	Operations	General Counsel and Chief Compliance Officer	Market Quality and Renewable Integration	Customer and State Affairs	Regional and Federal Affairs	Total
80003	Manage Human Capabilities	$ 3,123	$ 2	$ 29	$ 1	$ 9	$ 6	$ 4	$ -	$ 3,174
80008	Plan & Manage Business	2,165	-	6,390	1,918	1,311	513	2	27	12,326
80009	Support Business Services	5,815	630	31,191	2,236	7,808	1,005	435	568	49,688
	Total Indirect ABC Level 2 Allocations	**$ 11,103**	**$ 632**	**$ 37,610**	**$ 4,155**	**$ 9,128**	**$ 1,524**	**$ 441**	**$ 595**	**$ 65,188**

For support activities, the costs were aggregated and allocated as shown in *Table 4 — Mapping of ABC Support Activities to GMC Cost Categories.*

Table 18 — Allocating ABC Support Activities Costs to Cost Categories

2016 Revenue Requirement: ABC Support Costs										
Component	Market Services	System Operations	CRR Services	Indirect	2016 Budget	Market Services	System Operations	CRR Services	Indirect
					(amounts in thousands)				
Man Human Capabilities (MHC) (80003)				100%	3,173	0	-	0	3,173
Plan & Manage Business (PMB) (80008)				100%	12,327	0	-	0	12,327
Support Business Services (SBS) (80009)				100%	49,688	0	-	0	49,688
Total ABC Support Costs					**65,188**	**0**	**-**	**0**	**65,188**

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 5 — Mapping of Debt Service and Capital to GMC Cost Categories.*

Table 19 — Allocating Debt Service and Cash Funded Capital to Cost Categories

2016 Revenue Requirement: Debt Service Bonds and Cash Funded Capital										
Component	Market Services	System Operations	CRR Svcs	Indirect		2016 Budget	Market Services	System Operations	CRR Svcs	Indirect
						(amounts in thousands)				
Total Debt Service 2013 Bonds				100%		$ 16,900	$ -	$ -	$ -	$16,900
Cash Funded Capital				100%		$ 24,000	$ -	$ -	$ -	$24,000

Other Revenue

The components of other revenue were reviewed and all revenues allocated pursuant to *Table 6 — Mapping of Other Revenue to GMC Cost Categories.*

Table 20 — Allocating Other Revenue to Cost Categories

2016 Revenue Requirement: Other Revenue										
Component	Market Services	System Operations	CRR Services	Indirect		2016 Budget	Market Services	System Operations	CRR Services	Indirect
						(amounts in thousands)				
Energy Imbalance Interconnection Fees				100%		$ 2,500	$ -	$ -	$ -	$ 2,500
Intermittent Resource Forecasting Fees	50%	50%				2,100	1,050	1,050	-	-
COI Path Operator Fees	21%	79%				2,000	420	1,580	-	-
Interest Earnings				100%		2,000	-	-	-	2,000
Large Generation Interconnection Fees		100%				1,800	-	1,800	-	-
SC Application Fees				100%		300	-	-	-	300
MSS Penalties				100%		100	-	-	-	100
Total Other Costs and Revenue						**$10,800**	**$1,470**	**$ 4,430**	**$ -**	**$ 4,900**

Operating Cost Reserve Adjustment

The components of the operating cost reserve adjustment were reviewed and allocated pursuant to *Table 7 — Mapping of Operating Cost Reserve Adjustment to GMC Cost Categories.*

Table 21 — Allocating Operating Cost Reserve Adjustment to Cost Categories

2016 Revenue Requirement: Operating Cost Reserve Adjustment											
Component		Market Services	System Operations	CRR Services	Indirect		2016 Budget	Market Services	System Operations	CRR Services	Indirect
							(amounts in thousands)				
Adjustment in 15% reserve for O&M					100%		$ (600)	$ -	$ -	$ -	$ (600)
25% debt service reserve 2013 bonds					100%		3,400	-	-	-	3,400
Revenue changes					100%		90	-	-	-	90
Expense changes					100%		1,210	-	-	-	1,210
Total Operating Costs Reserve Adjustment							**$ 4,100**	**$ -**	**$ -**	**$ -**	**$ 4,100**

Step 4: Aggregating Revenue Requirement into Cost Categories

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

Table 22 — Allocating Revenue Requirement to Cost Categories

2016 Revenue Requirement					
Component	**2016 Budget**	**Market Services**	**System Operations**	**CRRs**	**Indirect**
	(amounts in thousands)				
Direct Costs	$ 71,611	$ 18,652	$ 41,180	$ 889	$ 10,890
Indirect Costs	65,188	-	-	-	65,188
Non-ABC Costs	32,541	1,390	1,519	50	29,582
Total O&M	**169,340**	**20,042**	**42,699**	**939**	**105,660**
O&M Direct %		31%	67%	2%	
Debt Service 2013 bonds	16,900	-	-	-	16,900
Cash Funded Capital	24,000	-	-	-	24,000
Total Debt Service and Capital	**40,900**	**-**	**-**	**-**	**40,900**
Other Income	(10,800)	(1,470)	(4,430)	-	(4,900)
Operating Cost Reserve Adj	(4,100)	-	-	-	(4,100)
Total Before Allocation of Indirect	**195,340**	**18,572**	**38,269**	**939**	**137,560**
Direct Costs %		32%	66%	2%	
Allocate Indirect		44,019	90,790	2,751	(137,560)
Total Revenue Requirement	**$ 195,340**	**$ 62,591**	**$ 129,059**	**$ 3,690**	
Cost Category Percentages	**100%**	**32%**	**66%**	**2%**	

Step 5: Calculation of 2016 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 23 — Estimation of Fee Revenue and Mapping of Fees to Cost Categories

2016 Revenue Requirement						
Fee	**Estimated 2016 Volumes**	**Rate**	**2016 Budget**	**Market Services**	**System Operations**	**CRRs**
			(amounts in thousands)			
Bid Segment Fees	58,074,478	$ 0.005	$ 290	$ 290		
Inter-SC Trade Fees	2,320,578	$ 1.00	$2,321	$2,321		
SCID Fees	261	$ 1,000	$2,592	$2,592		
TOR Fees	2,812,708	$ 0.24	$ 675		$ 675	
CRR Auction Bid Fees	849,313	$ 1.00	$ 849			$ 849
Total Fees			**$6,727**	**$5,203**	**$ 675**	**$849**

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 24 — 2016 GMC Rates Using Revised Cost Category Percentages

2016 Revenue Requirement				
Component	**2016 Budget**	**Market Services**	**System Operations**	**CRRs**
	(amounts in thousands)			
Revenue Requirement	**$ 195,340**	**$ 62,591**	**$ 129,059**	**$ 3,690**
Less Fees				
Bid Segment Fees	(290)	(290)	-	-
Inter-SC Trade Fees	(2,321)	(2,321)	-	-
SCID Fees	(2,592)	(2,592)	-	-
TOR Fees	(675)	-	(675)	-
CRR Auction Bid Fees	(849)	-	-	(849)
Total Fees	(6,727)	(5,203)	(675)	(849)
Remaining Revenue Requirment to Collect	**$ 188,613**	**$ 57,388**	**$ 128,384**	**$ 2,841**
Estimated Volumes		552,607	467,311	838,191
Less Grandfathered Generation		-	(5,694)	-
Estimated Volumes		**552,607**	**461,617**	**838,191**
2016 Rates Using Revised Percentages		**$ 0.1038**	**$ 0.2781**	**$ 0.0034**

Summary of GMC Cost Category Percentages

The following table reflects the results of the cost of service analysis. The percentages specified below will go into effect in 2018.

Table 25 — Cost Category Percentages Effective 2018

Cost Category	Percentages Effective 01/01/2018
Market Services	32%
System Operations	66%
CRR Services	2%

ENERGY IMBALANCE MARKET

The EIM provides entities with the opportunity to leverage the ISO'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 the ISO's 15-minute market and real-time dispatch. The EIM relies on the ISO'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 2016 cost of service study, the ISO identified and aggregated the real time activity costs allocated to the two main cost categories – market services and system operations. Indirect costs were then allocated 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 ISO's 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 the ISO'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

three GMC categories, the level 2 activities were mapped as either (1) all in one category or not in the category (100% or 0%); (2) a 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%). 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 2 – Mapping of ABC Direct Operating Activities to Cost Categories*.

Table 26 — Mapping of Market Services ABC Direct Operating Activities

Real Time Market	Day Ahead Market	Comments
Percentage of cost(s) allocated to category.		
100%		The costs are entirely to support the real time market.
	100%	The costs are entirely to support the day ahead market.
50%	50%	The costs support both the real time market and day ahead market, equally.
80%	20%	The costs are predominately real time market related but have some day ahead market relationship.
20%	80%	The costs are predominately day ahead market based but have some real time market relationship.

Task Code	Business Process Name	Market Services	Real Time Market	Day Ahead Market	Comments
	Develop Markets (80002)				
232	Perform Market Analysis	100%	80%	20%	Considerably more market run intervals and reporting anaylsis in real time market.
233	Develop Market Design	100%	50%	50%	Market analysis and design encompasses both markets.
	Manage Market & Reliability Data & Modeling (80004)				
301	Manage Full Network Model (FNM) Maintenance	50%	50%	50%	The full network model encompasses both markets.
302	Plan & Develop Operations Simulator Training	20%	100%		The grid is operated in real time.
308	Manage Credit & Collateral	45%	50%	50%	Credit and collateral required for all markets.
309	Resource Management	50%	80%	20%	reflected in real time market.
314	Manage & Facilitate Procedure Maintenance	20%	100%		
315	Procedure Admin and Reporting	20%	100%		
316	Operations Systematic Approach to Training	20%	100%		
317	Execute & Track Operations Training	20%	100%		The grid is operated in real time.
322	Register, Modify, and Terminate PDR/RDRR Resource	50%	50%	50%	The costs support both the real time market and day ahead market, equally.
323	Calculate & Monitor Energy Costs & Indices	100%	50%	50%	
	Manage Markets & Grid (80005)				
352	Support Day Ahead Market	100%		100%	Applies to day ahead market.
353	Support Real Time Market	50%	100%		Applies to real time market.
362	Manage Operations Engineering Support	20%	50%	50%	Ensures system conditions accurately reflected in markets.
363	RTO Shift Supervisor	20%	100%		Applies to real time market.
368	Manage Day Ahead and Market Operations	80%	80%	20%	Considerably more market run intervals and reporting anaylsis in real time market. 24X7 staffing to support rt activities.
369	Manage Real Time Operations Generation	20%	100%		Applies to real time market.
	Manage Operations Support & Settlements (80007)				
401	Perform Price Validation	50%	80%	20%	The costs are predominately real time market related but have some day ahead market relationship.
403	Manage Market Quality System (MQS)	50%	80%	20%	Process to feed correct data into settlements (base EIM schedules are equivalent to day ahead schedules).
411	Manage Market Clearing	45%	80%	20%	
412	Manage Market Billing & Settlements	45%	80%	20%	Predominately real time market activity.
414	Manage Settlements Quarterly Release Cycle	45%	80%	20%	Predominately real time market activity.
416	Market Issues Steering Committee	80%	80%	20%	Considerably more market run intervals and reporting anaylsis in real time market.
417	Perform Market Reporting	50%	50%	50%	Market performance and validation encompasses both markets.
419	Manage Price Corrections	80%	80%	20%	Market performance and validation encompasses both markets.
	Support Customers & Stakeholders (80010)				
601	Manage Client Inquiries	80%	80%	20%	The costs are predominately real time market related but have some day ahead market relationship.
602	Strategic Client Account Management	80%	80%	20%	

The market services related non-ABC support costs were mapped from *Table 3 – Mapping of Non-ABC Support Costs to GMC Cost Categories.*

Table 27 — Mapping of Market Services Non-ABC Support Costs

2016 Revenue Requirement: Non-ABC Support Costs		Market Services Split		
Component	Market Services	Real Time Market	Day Ahead Market	Comments
Chief Executive Officer Division				
SSAE 16 Audit	45%	80%	20%	Use 80007 Task 412
Operations Audit	21%	82%	18%	Use 80005 total
MQRI Division				
Intermittent Resource Forecasting Costs	50%	100%		Use 80005 Task 353

Then other revenue mapped to market services from *Table 6 – Mapping of Other Revenue to GMC Cost Categories* were then mapped to real time market and / or day ahead market.

Table 28 — Mapping of Market Services Other Revenue

2016 Revenue Requirement: Other Costs and Revenue		Market Services Split		
Component	Market Services	Real Time Market	Day Ahead Market	Comments
Intermittent Resource Forecasting Fees	50%	100%		Use 80005 Task 353
COI Path Operator Fees	21%	82%	18%	Use 80005 total

Market services fees from *Table 23 – Estimation of Fee Revenue and Mapping of Fees to Cost Categories* are mapped as follows.

Table 29 — Mapping of Market Services Fees

2016 Revenue Requirement		Market Services Split		
Fee	Market Services	Real Time Market	Day Ahead Market	Comments
		(% 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 services. The direct ABC level 2 activities mapped to system operations is taken from *Table 2 – Mapping of ABC Direct Operating Activities to Cost Categories*.

Table 30 — Mapping of System Operations ABC Direct Operating Activities

Real Time Dispatch	Balancing Authority Services	Comments
Percentage of cost(s) allocated to category.		
100%		The costs are entirely to support the real time dispatch.
	100%	The costs are entirely to support the balancing authority services.
50%	50%	The costs support both the real time dispatch and balancing authority services, equally.
80%	20%	The costs are predominately real time dispatch related but have some balancing authority services relationship.
20%	80%	The costs are predominately balancing authority services based but have some real time dispatch relationship.

Task Code	Business Process Name	System Operations	Real Time Dispatch	Balancing Authority Services	Comments
	Develop Infrastructure (80001)				
202	Manage Generator Interconnection Agreements (GIA)	100%		100%	
203	Manage Generator Interconnection Process (GIP)	100%		100%	
204	Manage Long Term Transmission Planning	100%		100%	
205	Manage Transmission and Resource Implementation	100%		100%	
206	Manage Transmission Maintenance Standards	100%		100%	
207	NERC/ WECC Loads & Resources Data Requests	100%		100%	
208	Seasonal Assessment (Under Development)	100%		100%	
209	Manage Queue	100%		100%	This is a balancing authority responsibility.
	Develop Markets (80002)				
231	Develop Infrastructure Policy	100%		100%	This is a balancing authority responsibility.
	Manage Market & Reliability Data & Modeling (80004)				
301	Manage Full Network Model (FNM) Maintenance	50%	100%		The grid operates in real time.
302	Plan & Develop Operations Simulator Training	80%	100%		The grid operates in real time.
304	EMAA Telemetry	100%	20%	80%	
308	Manage Credit & Collateral	45%	100%		Relates to the billing for market transactions.
309	Resource Management	50%	50%	50%	The costs support both the real time dispatch and balancing authority services, equally.
310	Manage Reliability Requirements	100%		100%	This is an ISO process to implement resource adequacy.
311	Manage Operations Planning	100%	20%	80%	
312	Manage WECC Seasonal Studies	100%	20%	80%	
314	Manage & Facilitate Procedure Maintenance	80%	20%	80%	This is primarily a balance authority responsibility.
315	Procedure Admin and Reporting	80%	100%		
316	Operations Systematic Approach to Training	80%	100%		
317	Execute & Track Operations Training	80%	100%		The grid operates in real time.
322	Register, Modify, and Terminate PDR/RDRR Resource	50%	50%	50%	The costs support both the real time dispatch and balancing authority services, equally.
	Manage Markets & Grid (80005)				
353	Support Real Time Market	50%	100%		Applies to real time market.
355	Manage Outages	100%	20%	80%	The costs are predominately balancing authority services based but have some real time dispatch relationship.
360	Real Time Operations	100%	50%	50%	The costs support both the real time dispatch and balancing authority services, equally.
362	Manage Operations Engineering Support	80%	100%		Ensures system conditions accurately reflect real time market.
363	RTO Shift Supervisor	80%	80%	20%	Manages ISO grid reliability and ensures real time market dispatch after reflecting system conditions.
365	Transmission & Electric System	100%		100%	The costs are entirely to support the balancing authority services.
366	Manage Real Time Interchange Scheduling	100%	20%	80%	The costs are predominately balancing authority services based but have some real time dispatch relationship.
368	Manage Day Ahead and Market Operations	20%	80%	20%	The costs are predominately real time dispatch related but have some balancing authority services relationship.
369	Manage Real Time Operations Generation	80%	50%	50%	The costs support both the real time dispatch and balancing authority services, equally.
	Manage Operations Support & Settlements (80007)				
401	Perform Price Validation	50%	100%		Price corrections are in real time.
403	Manage Market Quality System (MQS)	50%	100%		Process to feed correct data into settlements (base EIM schedules are equivalent to day ahead schedules).
405	Manage Reg No Pay and Deviation Penalties Calculations	100%		100%	
408	ISO RIG Engineering	100%		100%	This is a balancing authority responsibility.
409	Meter Data Acquisition and Processing	100%	100%		Validate meter data for settlement purposes.
411	Manage Market Clearing	45%	100%		
412	Manage Market Billing & Settlements	45%	100%		
413	Manage Reliability Must Run (RMR) Settlements	100%	100%		
414	Manage Settlements Quarterly Release Cycle	45%	100%		Predominately real time or market activity.
416	Market Issues Steering Committee	20%	100%		Addressing RT market issues that effect rt dispatch.
417	Perform Market Reporting	50%	100%		Market analysis and validation encompass both markets.
419	Manage Price Corrections	20%	100%		Market analysis and validation encompass both markets.
	Support Customers & Stakeholders (80010)				
601	Manage Client Inquiries	20%	100%		
602	Strategic Client Account Management	20%	100%		The costs are entirely to support the real time dispatch.

The system operations related non-ABC support costs were mapped from *Table 3 – Mapping of Non-ABC Support Costs to GMC Cost Categories.*

Table 31 — Mapping of System Operations Non-ABC Support Costs

2016 Revenue Requirement: Non-ABC Support Costs		System Operations Split		
Component	System Operations	Real Time Dispatch	BA Services	Comments
Chief Executive Officer Division				
SSAE 16 Audit	45%	100%		Use 80007 Task 412
Operations Audit	79%	37%	63%	Use 80005 total
MQRI Division				
Intermittent Resource Forecasting Costs	50%	100%		Use 80005 Task 353

Then other revenue mapped to system operations from *Table 6 – Mapping of Other Revenue to GMC Cost Categories* were then allocated to real time dispatch and / or balancing authority services.

Table 32 — Mapping of System Operations Other Revenue

2016 Revenue Requirement: Other Costs and Revenue		System Operations Split		
Component	System Operations	Real Time Dispatch	BA Services	Comments
Intermittent Resource Forecasting Fees	50%	100%		Use 80005 Task 353
COI Path Operator Fees	79%	37%	63%	Use 80005 total
Large Generation Interconnection Fees	100%		100%	Use 80001 Task 203

System operations fees from *Table 23 – Estimation of Fee Revenue and Mapping of Fees to Cost Categories* were mapped as follows.

Table 33 — Mapping of System Operations Fees

2016 Revenue Requirement		System Operations Split	
Fee	System Operations	Real Time Dispatch	Balancing Authority Services	Comments
TOR Fees	100%	100%		Real time function.

Costing the Cost Categories to EIM Activities

The amounts from the 2016 cost of service study were applied to the market services and system operations categories to derive the direct real time activity costs.

Table 34 – Components of the 2016 Revenue Requirement

Revenue Requirement (amounts in thousands)	2016 Budget	Market Services	System Operations	CRR Services
Non-ABC O&M Support Costs	$ 32,541	$ 1,390	$ 1,519	$ 50
Direct ABC O&M Costs	$ 71,611	$ 18,652	$ 41,180	$ 889
Debt Service	$ 16,900	$ -	$ -	$ -
Cash Funded Capital	$ 24,000	$ -	$ -	$ -
Other Costs and Revenues	$ (10,800)	$ (1,470)	$ (4,430)	$ -
Operating Costs Reserve Adjustment	$ (4,100)	$ -	$ -	$ -
Subtotal	**$ 130,152**	**$ 18,572**	**$ 38,269**	**$ 939**
Indirect Costs	$ 65,188	$ 44,019	$ 90,790	$ 2,751
Revenue Requirement Before Fees	**$ 195,340**	**$ 62,591**	**$ 129,059**	**$ 3,690**
Less Fees	$ (6,727)	$ (5,203)	$ (675)	$ (849)
Revenue Requirement	**$ 188,613**	**$ 57,388**	**$ 128,384**	**$ 2,841**

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 10 – 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 27 and Table 31).

Table 35 – Allocation of Market Services Non-ABC Support Costs

2016 Revenue Requirement: Non-ABC Support Costs		Market Services Split		Market Services Split		
Component	Market Services	Real Time Market	Day Ahead Market	Total	Real Time Market	Day Ahead Market
				(amounts in thousands)		
Chief Executive Officer Division						
SSAE 16 Audit	45%	80%	20%	225	180	45
Operations Audit	21%	82%	18%	47	39	8
MQRI Division						
Intermittent Resource Forecasting Costs	50%	100%		1,118	1,118	-

Table 36 – Allocation of System Operations Non-ABC Support Costs

2016 Revenue Requirement: Non-ABC Support Costs		System Operations Split		System Operations Split		
Component	System Operations	Real Time Dispatch	BA Services	Total	Real Time Dispatch	BA Services
				(amounts in thousands)		
Chief Executive Officer Division						
SSAE 16 Audit	45%	100%		225	225	-
Operations Audit	79%	37%	63%	177	65	112
MQRI Division						
Intermittent Resource Forecasting Costs	50%	100%		1,117	1,117	-

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

The ABC direct O&M costs from *Table 15 – Allocating ABC Direct Operating Activities to Cost Categories* were allocated using the percentages shown in the *Mapping of ABC Direct Operating Activities* tables above (Table 26 and Table 30).

Table 37 – Allocation of Market Services ABC Direct Operating Costs

2016 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	Total	Real Time Market	Day Ahead Market
					(amounts in thousands)		
80002	**Develop Markets (DM)**						
232	Perform Market Analysis	100%	80%	20%	2,364	1,891	473
233	Market Design & Infrastructure Policy	100%	50%	50%	2,560	1,280	1,280
	Total DM				**4,924**	**3,171**	**1,753**
80004	**Manage Market & Reliability Data & Modeling (MMR))**						
301	Manage Full Network Model (FNM) Maintenance	50%	50%	50%	797	399	398
302	Plan & Develop Operations Simulator Training	20%	100%		130	130	-
308	Manage Credit & Collateral	45%	50%	50%	342	171	171
309	Resource Management	50%	80%	20%	536	429	107
314	Manage & Facilitate Procedure Maintenance	20%	100%		152	152	-
315	Procedure Admin and Reporting	20%	100%		5	5	-
316	Operations Systematic Approach to Training	20%	100%		195	195	-
317	Execute & Track Operations Training	20%	100%		248	248	-
322	Register, Modify, and Terminate PDR/RDRR Resource	50%	50%	50%	79	40	39
323	Calculate & Monitor Energy Costs & Indices	100%	50%	50%	160	80	80
	Total MMR				**2,644**	**1,849**	**795**
80005	**Manage Market & Grid (MMG)**						
352	Support Day Ahead Market	100%		100%	297	-	297
353	Support Real Time Market	50%	100%		866	866	-
362	Manage Operations Engineering Support	20%	50%	50%	347	174	173
363	RTO Shift Supervisor	20%	100%		416	416	-
358 + 368	Manage Day Ahead and Market Operations (Manage Market Operations)	80%	80%	20%	2,472	1,978	494
364 +369	Manage Real Time Operations Generation	20%	100%		859	859	-
	Total MMG				**5,257**	**4,293**	**964**
	MMG %s				**100%**	**82%**	**18%**
80007	**Manage Operations Support & Settlements (MOS)**						
401	Perform Price Validation	50%	80%	20%	45	36	9
403	Manage Market Quality System (MQS)	50%	80%	20%	685	548	137
411	Manage Market Clearing	45%	80%	20%	39	31	8
412	Manage Market Billing & Settlements	45%	80%	20%	749	599	150
414	Manage Settlements Quarterly Release Cycle	45%	80%	20%	637	510	127
416	Market Issues Steering Committee	80%	80%	20%	12	10	2
417	Perform Market Reporting	50%	50%	50%	29	15	14
419	Manage Price Corrections	80%	80%	20%	1,473	1,178	295
	Total MOS				**3,669**	**2,927**	**742**
80010	**Support Customers & Stakeholders (SCS)**						
601	Manage Client Inquiries	80%	80%	20%	1,294	1,035	259
602	Strategic Client Account Management	80%	80%	20%	864	691	173
	Total MOS				**2,158**	**1,726**	**432**
	Total Direct O&M				**$ 18,652**	**$ 13,966**	**$ 4,686**
	Direct O&M %				**100%**	**75%**	**25%**

Table 38 – Allocation of System Operations ABC Direct Operating Costs

2016 Revenue Requirement: ABC Direct Operating Activities			System Operations Split		System Operations Split		
Code	ABC Level 2 Activities	System Operations	Real Time Dispatch	BA Services	Total	Real Time Dispatch	BA Services
					(amounts in thousands)		
80001	**Develop Infrastructure (DI)**						
202	Manage Generator Interconnection Agreements (GIA)	100%		100%	358	-	358
203	Manage Generator Interconnection Process (GIP)	100%		100%	2,316	-	2,316
204	Manage Long Term Transmission Planning	100%		100%	4,775	-	4,775
205	Manage Transmission and Resource Implementation	100%		100%	252	-	252
206	Manage Transmission Maintenance Standards	100%		100%	635	-	635
207	NERC/ WECC Loads & Resources Data Requests	100%		100%	308	-	308
208	Seasonal Assessment	100%		100%	224	-	224
209	Manage Queue	100%		100%	879	-	879
	Total DI				**9,747**	**-**	**9,747**
80002	**Develop Markets (DM)**						
231	Develop Infrastructure Policy	100%		100%	1,548	-	1,548
	Total DM				**1,548**	**-**	**1,548**
80004	**Manage Market & Reliability Data & Modeling (MMR))**						
301	Manage Full Network Model (FNM) Maintenance	50%	100%		797	797	-
302	Plan & Develop Operations Simulator Training	80%	100%		522	522	-
304	Energy Measure (EMAA) Telemetry	100%	20%	80%	381	76	305
308	Manage Credit & Collateral	45%	100%		342	342	-
309	Resource Management	50%	50%	50%	535	268	267
310	Manage Reliability Requirements	100%		100%	292	-	292
311	Manage Operations Planning	100%	20%	80%	1,261	252	1,009
312	Manage WECC Seasonal Studies	100%	20%	80%	49	10	39
314	Manage & Facilitate Procedure Maintenance	80%	20%	80%	606	121	485
315	Procedure Admin and Reporting	80%	100%		19	19	-
316	Operations Systematic Approach to Training	80%	100%		779	779	-
317	Execute & Track Operations Training	80%	100%		994	994	-
322	Register, Modify, and Terminate PDR/RDRR Resource	50%	50%	50%	80	40	40
	Total MMR				**6,657**	**4,220**	**2,437**
80005	**Manage Market & Grid (MMG)**						
353	Support Real Time Market	50%	100%		865	865	-
355	Manage Outages	100%	20%	80%	2,775	555	2,220
360	Real Time Operations	100%	50%	50%	140	70	70
362	Manage Operations Engineering Support	80%	100%		1,386	1,386	-
363	RTO Shift Supervisor	80%	80%	20%	1,665	1,332	333
365	Manage Real Time Operations - Transmission & Electric System	100%		100%	4,877	-	4,877
366	Manage Real Time Interchange Scheduling	100%	20%	80%	3,451	690	2,761
358 + 368	Manage Day Ahead and Market Operations (Manage Market Operations)	20%	80%	20%	618	494	124
364 +369	Manage Real Time Operations Generation	80%	50%	50%	3,435	1,718	1,717
	Total MMG				**19,212**	**7,110**	**12,102**
	MMG %s				**100%**	**37%**	**63%**

2016 Revenue Requirement: ABC Direct Operating Activities			System Operations Split		System Operations Split		
Code	ABC Level 2 Activities	System Operations	Real Time Dispatch	BA Services	Total	Real Time Dispatch	BA Services
					(amounts in thousands)		
80007	**Manage Operations Support & Settlements (MOS)**						
401	Perform Price Validation	50%	100%		45	45	-
403	Manage Market Quality System (MQS)	50%	100%		686	686	-
405	Manage Reg No Pay and Deviation Penalties Calculations	100%		100%	2	-	2
408	ISO RIG Engineering	100%		100%	87	-	87
409	Meter Data Acquisition and Processing	100%	100%		793	793	-
411	Manage Market Clearing	45%	100%		39	39	-
412	Manage Market Billing & Settlements	45%	100%		749	749	-
413	Manage Reliability Must Run (RMR) Settlements	100%	100%		39	39	-
414	Manage Settlements Quarterly Release Cycle	45%	100%		637	637	-
416	Market Issues Steering Committee	20%	100%		3	3	-
417	Perform Market Reporting	50%	100%		29	29	-
419	Manage Price Corrections	20%	100%		368	368	-
	Total MOS				**3,477**	**3,388**	**89**
80010	**Support Customers & Stakeholders (SCS)**						
601	Manage Client Inquiries	20%	100%		323	323	-
602	Strategic Client Account Management	20%	100%		216	216	-
	Total MOS				**539**	**539**	**-**
	Total Direct O&M				**$ 41,180**	**$ 15,257**	**$ 25,923**

Step 3: Allocating the Remaining Revenue Requirement Components

The other revenue from *Table 20 – Allocating Other Revenue to Cost Categories* were allocated using the percentages shown in the *Mapping of Other Revenue* tables above (Table 28 and Table 32).

Table 39 — Allocation of Market Services Other Revenue

2016 Revenue Requirement: Other Costs and Revenues		Market Services Split		Market Services Split		
Component	Market Services	Real Time Market	Day Ahead Market	Total	Real Time Market	Day Ahead Market
				(amounts in thousands)		
Intermittent Resource Forecasting Fees	50%	100%		1,050	1,050	-
COI Path Operator Fees	21%	82%	18%	420	344	76

Table 40 — Allocation of System Operations Other Revenue

2016 Revenue Requirement: Other Costs and Revenues		System Operations Split		System Operations Split		
Component	System Operations	Real Time Dispatch	BA Services	Total	Real Time Dispatch	BA Services
				(amounts in thousands)		
Intermittent Resource Forecasting Fees	50%	100%		1,050	1,050	-
COI Path Operator Fees	79%	37%	63%	1,580	585	995
Large Generation Interconnection Fees	100%		100%	1,800	-	1,800

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

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

Table 41 – Mapping Revenue Requirement to Cost Categories

		Market Services Split			System Operations Split		
Revenue Requirement (amounts in thousands)	2016 Budget	Market Services	Real Time Market	Day Ahead Market	System Operations	Real Time Dispatch	BA Services
Non-ABC O&M Support Costs	$ 32,541	$ 1,390	$ 1,337	$ 53	$ 1,519	$ 1,407	$ 112
Direct ABC O&M Costs	$ 71,611	$ 18,652	$ 13,966	$ 4,686	$ 41,180	$ 15,257	$ 25,923
Debt Service	$ 16,900	$ -	$ -	$ -	$ -	$ -	$ -
Cash Funded Capital	$ 24,000	$ -	$ -	$ -	$ -	$ -	$ -
Other Costs and Revenues	$ (10,800)	$ (1,470)	$ (1,394)	$ (76)	$ (4,430)	$ (1,635)	$ (2,795)
Operating Costs Reserve Adjustment	$ (4,100)	$ -	$ -	$ -	$ -	$ -	$ -
Subtotal	**$ 130,152**	**$ 18,572**	**$ 13,909**	**$ 4,663**	**$ 38,269**	**$ 15,029**	**$ 23,240**
Indirect Costs	$ 65,188	$ 44,019	$ 33,014	$ 11,005	$ 90,790	$ 35,408	$ 55,382
Revenue Requirement Before Fees	**$ 195,340**	**$ 62,591**	**$ 46,923**	**$ 15,668**	**$ 129,059**	**$ 50,437**	**$ 78,622**
Less Fees	$ (6,727)	$ (5,203)	$ (1,441)	$ (3,762)	$ (675)	$ (675)	$ -
Revenue Requirement	**$ 188,613**	**$ 57,388**	**$ 45,482**	**$ 11,906**	**$ 128,384**	**$ 49,762**	**$ 78,622**
Percentage applicable to EIM Activities			**79%**	**21%**		**39%**	**61%**

Step 5: Calculation of the EIM Components of the 2016 Cost Category Rates

The percentages from Table 41 were applied to the cost categories' real time component's rate from *Table 24 – 2016 GMC Rates Using Revised Cost Category Percentages.*

Table 42 – Calculation of the EIM Components

Cost Category	Net Costs ($ in thousands)	Pro Forma 2016 Rate	EIM Real Time Activity	EIM Percentage Share of Costs	EIM Cost of Real Time Activities	EIM Pro Forma 2016 Rate
Market Services	$ 57,388	$ 0.1038	Real Time Market	79%	$ 45,482	$ 0.0823
System Operations	$ 128,384	$ 0.2781	Real Time Dispatch	39%	$ 49,762	$ 0.1078

Summary of Change in EIM Percentages

A comparison of the EIM cost category percentages and costs from the 2013 and 2016 cost of service studies is shown below. As noted earlier, the increase in the market services real time market percentage is primarily driven by the market changes brought on by FERC Order 764 which positions the ISO real time market to better support the participation of intermittent resources and additional market intervals. Whereas the decrease in the system operations real time dispatch percentage is primarily due to process efficiencies implemented since the last cost of service study.

Table 43 – Comparison of EIM Percentages and Costs

Cost Category	Real Time Activity	2013 Study Effective for 2015	2016 Study Effective for 2018	Amount Over / (Under) Since Last COSS	2013 Study Effective for 2015	2016 Study Effective for 2018	Amount Over / (Under) Since Last COSS
					(amount in thousands)		
Market Services	Real Time Market	61%	79%	19%	$ 28,911	$ 45,482	$ 16,571
System Operations	Real Time Dispatch	45%	39%	-6%	$ 60,932	$ 49,762	$ (11,170)

TRANSMISSION OWNERSHIP RIGHTS

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

The following three ISO services are required for TORs"

1. **Real-Time Operations** – The ISO provides support on an emergency basis for flows on TORs, in a manner similar to standby service.
2. **Scheduling** – The ISO provides check-outs with neighboring balancing authorities (BA) in order to schedule flows across boundaries. .
3. **Outage Management** – The ISO provides for the scheduling and coordination of outages across the BA.

Application of ABC to TOR Rate 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 44 –ABC Direct Operating Activities for TORs

Transmission Owner Rights (TOR) Fee Using 2016 Cost of Service Study		
ABC Code	**Task Code**	**ABC Level 2 Activity**
80004	301	Manage Full Network Model (FNM) Maintenance
80005	355	Manage Outages
80005	362	Manage Operations Engineering Support
80005	363	RTO Shift Supervisor
80005	365	Manage Real Time Operations Transmission & Electric System
80005	366	Manage Real Time Interchange Scheduling
80005	368	Manage Day Ahead and Market Operations

Mapping and Costing of Cost Categories to TOR Activities

Using the process described below, a total of $62 million in direct and indirect costs were allocated to TORs. The ISO reached this conclusion by identifying the costs for the specific level 2 activities from the 2016 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 45 – Calculation of TOR Related Costs

Transmission Owner Rights (TOR) Fee Using 2016 Cost of Service Study				
ABC Code	**Task Code**	**ABC Level 2 Activity**		**Amount (in thousands)**
80004	301	Manage Full Network Model (FNM) Maintenance		$ 375
80005	355	Manage Outages		$ 2,775
80005	362	Manage Operations Engineering Support		$ 1,733
80005	363	RTO Shift Supervisor		$ 2,081
80005	365	Manage Real Time Operations Transmission & Electric System		$ 4,877
80005	366	Manage Real Time Interchange Scheduling		$ 3,451
80005	368	Manage Day Ahead and Market Operations		$ 3,090
		TOR Related Direct Costs		$ 18,382
		Total System Operations Direct Costs		$ 38,269
		Percentage of TORs to System Operations Direct Costs		48%
		Total System Operations Indirect Costs		$ 90,790
		Percentage Per Above		48%
		TOR Related Indirect Costs		$ 43,579
		Total TOR Related Costs		**$ 61,961**

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 46 - TORs as a Percentage of Total Volumes

Transmission Owner Rights (TOR) Fee Using 2016 Cost of Service Study				
TOR Flow				
				Volumes (in MWh)
		2016 System Operations Volume		456,812,233
		Add Back Grandfathered Contracts		5,694,000
		TOR Supply		3,495,980
		TOR Demand		2,627,260
		Total Adjusted System Operations Volume		468,629,472
		Total Gross TOR Volume (Supply and Demand)		6,123,239
		TOR as a Percentage of Gross Volume		1.00%

The amount to collect is then derived by multiplying the TOR related costs by the TOR percentage results. The TOR rate is then determined by dividing the amount to collect by the 2016 forecasted TOR volume. The revised TOR rate is as follows

Table 47 – Calculation of TOR Rate

Transmission Owner Rights (TOR) Fee Using 2016 Cost of Service Study				
TOR Fee Calculation				
				Amount
		Total TOR Related Costs		$ 61,961,200
		TOR as a Percentage of Gross Volume		1.00%
		TOR Costs to Collect		$ 619,612
		TOR MWh for 2016 (min. of supply and demand)		2,627,260
		TOR Updated Rate per MWh		$ 0.24

Summary of TOR Rate

Whereas the 2016 TOR related costs increased $17.8 million from the last cost of service study the TOR percentage of gross MWh volume decreased which resulted in the TOR rate remaining at $0.24 cents per MWh.

Table 48 - Comparison of TOR Rates

Transmission Owner Rights (TOR) Fee				Per 2016 COSS	Per 2013 COSS	Amount Over / (Under) Since Last COSS
TOR Fee Calculation						
				Amount	Amount	Amount
		Total TOR Related Costs		$ 61,961,200	$ 44,121,880	$ 17,839,320
		TOR as a Percentage of Gross Volume		1.00%	1.69%	
		TOR Costs to Collect		$ 619,612	$ 745,660	$ (126,048)
		TOR MWh for 2016 (min. of supply and demand)		2,627,260	3,162,319	(535,059)
		TOR Updated Rate per MWh		$ 0.24	$ 0.24	$ -

Attachment B – Testimony of Mr. Michael Epstein, filed with the 2012 GMC Update

2017 Grid Management Chart – Cost of Service Study Update

California Independent System Operator Corporation

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 C – CAISO Response to Stakeholder Comments

2017 Grid Management Chart – Cost of Service Study Update

California Independent System Operator Corporation

Stakeholder comments and questions on 2016 Cost of Service Study and 2018 GMC Update meeting held on May 24, 2017.

COST OF SERVICE STUDY SUMMARY

The triannual cost of service study (COSS) uses activity based costing (ABC) to determine the percentages used to allocate the annual revenue requirement into the grid management charges (market services, system operations, and CRR services). The COSS also tracks the shift in time and resources associated with the cost categories (also referred to as grid management charges) between studies.

GMC Percentages			
Cost Category	2013 Study Effective for 2015	2016 Study Effective for 2018	Amount Over / (Under) Since Last COSS
Market Services	27%	32%	5%
System Operations	70%	66%	-4%
CRR Services	3%	2%	-1%

The 2016 COSS results indicated a shift in time and expense from system operations and congestion revenue rights (CRR) services to market services.

The new percentages will be used to determine the 2018 grid management charges (GMC) rates, which will become effective January 1, 2018. In addition to impacting the GMC rates, the new percentages will impact the EIM fee and TOR fee.

Evolution of the GMC Rates						
Triannual Cost of Service Study's New GMC Percentages	X	Annual Revenue Requirement	/	Estimated GMC Volumes	=	GMC Rates

The development of the 2018 revenue requirement (RR) kicks off in July and concludes when the Board approves the RR in December. The 2018 RR Stakeholder kickoff meeting (on-site) is scheduled for July 25th.

STAKEHOLDER: Meg McNaul with Thompson Coburn LLP on behalf of the Cities of Anaheim, Azusa, Banning, Colton, Pasadena, and Riverside California

1: On slide 11 of the May 24, 2017 briefing on the Cost of Service Study and at page 3 of the CAISO's report, the percentage for CRR Services is shown as reduced to 2% from 3%. What is the reason for the change?

RESPONSE: The decrease is related, in part, to the shift in time and expense to market services.

Another reason for the decrease is the absence of the 2008 bonds (and the related allocation to the operating reserve adjustment[1]). The 2008 bonds included in the 2013 COSS[2] were classified directly to the cost categories. The net amount of the 2008 bonds and operating cost reserve adjustment allocated to CRRs in the 2013 COSS was $912 thousand. The 2008 bonds have since been retired. The 2013 bonds included in the 2016 COSS were categorized as indirect as they were used to fund the Folsom headquarters. Indirect costs are allocating based on percentages of direct costs.

2: Also on slide 11 of the May 24, 2017 briefing and at pages 3-4 of the CAISO's report, the CAISO explains that the percentage change for the CAISO System Operations category is reduced by 4%, from 70% to 66%, due to "process efficiencies." Please specify and explain the "process efficiencies" that result in the revised percentage for CAISO System Operations.

RESPONSE: The most impactful process efficiency was the improved overtime management, which resulted in a substantial reduction in hours and dollars associated with system operations.

The absence of the 2008 bonds (and the related allocation to the operating reserve adjustment) is another reason for the percentage change. The net amount of the 2008 bonds and operating cost reserve adjustment allocated to system operations in the 2013 COSS was $9.6 million. As previously mentioned, the 2013 bonds included in the 2016 COSS were categorized as indirect as they were used to fund the Folsom headquarters. Indirect costs are allocating based on percentages of direct costs.

3: On slide 15 of the May 24, 2017 briefing, the CAISO explains that the change in the cost allocation for the EIM System Operations charge is also due to "process efficiencies." Are these the same process efficiencies that produce the revised percentages for the CAISO System Operations charge? If they are different, please specify and explain the process efficiencies that result in the revised amount for the EIM System Operations charge?

RESPONSE: The system operations (real time dispatch) percentage decrease is primarily driven by the decrease in costs and time recorded due to the reallocation of system operations' resources to create a new real time market desk as well as improved overtime

[1] The operating cost reserve adjustment takes into consideration 25% debt service collected in the previous year.

[2] The 2013 cost of service study can be found here, http://www.caiso.com/Documents/DiscussionPaper2-Cost-ServiceStudy-2015GMC_Update.pdf.

management. The absence of the 2008 bonds, as previously mentioned, is another reason for the percentage change.

4: For the System Operations cost category, the percentage resulting from the 2016 Cost of Service Study is decreased relative to the prior cost of service study by 4% (see slide 11), but the decrease is shown as 6% for EIM System Operations (see slide 15). Why are the percentages different for CAISO System Operations versus EIM System Operations?

5: Similarly, the percentage for the CAISO Market Services charge is shown as increasing by 5% (see slide 11), while the percentage for the EIM Market Services charge is increasing by 19%. Why are the percentages different?

RESPONSE: This response applies to both question 4 and question 5.

The EIM fee is calculated using the real time activities of the market services and system operations cost categories (also referred to as GMC). As previously noted, the 2016 COSS results indicated a shift in time and resources from system operations and congestion revenue right (CRR) services to market services. In addition, there was a shift within the market services' activities and system operations' activities as noted below.

GMC Percentages			
Cost Category	2013 Study Effective for 2015	2016 Study Effective for 2018	Amount Over / (Under) Since Last COSS
Market Services	27%	32%	5%
System Operations	70%	66%	-4%
CRR Services	3%	2%	-1%

Cost Category	Activity	2013 Study Effective for 2015	2016 Study Effective for 2018	Amount Over / (Under) Since Last COSS
Market Services	Real Time Market	61%	79%	19%
Market Services	Day Ahead Markets	39%	21%	-19%
System Operations	Real Time Dispatch	45%	39%	-6%
System Operations	Balancing Authority Services	55%	61%	6%

6: With respect to page 29 of the CAISO's report, please provide a breakdown of the Estimated Volumes that are used as the billing determinants to derive each GMC rate. Will the Estimated Volumes be revised at some point prior to the 2018 rates taking effect, or will these be the volumes that are used for purposes of setting the GMC rates during 2018? Are any EIM transactions included in the volumes that are used to establish the CAISO Market Services or CAISO System Operations charges?

RESPONSE: The volume break down used to calculate the 2016 GMC rates is as follows: market services 552,607,979 MWh; system operations 461,616,533 MWh; and CRR services

838,190,699 MWh. The volumes used as part of the annual GMC rate calculations are revised annually and published in the Budget and GMC Rates Book which is posted on the CAISO website. The volumes indicated above are volumes through those specific charge codes and therefore, do not include any EIM transactions, which have their own charge code.

7: Please explain how the revenues from the EIM Market Services charge and the EIM System Operations charge offset the CAISO Market Services and System Operations charges. Does the CAISO reflect the revenues resulting from these charges as offsets to the respective revenue requirements in each of these categories as part of its annual budgeting process? Are actual revenues received during the prior budget year used for this purpose?

RESPONSE: EIM fees are recorded as an "other revenue", which serves as an offset to total revenue requirement amount. There are five main components of the CAISO's annual revenue requirement: 1) operations & maintenance budget, 2) debt service, 3) cash funded capital, 4) other costs and revenues, and 5) operating cost reserve adjustment. The last two are typically offsets to the first three uses. Assuming no change in the other components, as other revenues increase due to more participants in the energy imbalance market, the net revenue requirement decreases, which in turn reduces the amount used to calculate the grid management charges. Any actual amounts over collected or under collected in any given year are included in the following 2nd year's operating cost reserve adjustment. There is a two year lag between finalizing a year's activity and creating the following year's revenue requirement. For example, the true-up of revenues and expenses for 2016 will be used in the calculation of the 2018 revenue requirement.

8: The CAISO's workpapers accompanying its report show a composite "EIM Rate" of $0.1901. Similarly, slide 16 from the CAISO's briefing shows a composite EIM rate for 2017 of $0.1882, versus the EIM pro forma 2016 rate (which we understand to represent the rate that will be effective in 2018), of $0.1901. Is it correct that the results of the CAISO's 2016 Cost of Service Study and 2018 GMC Update provide for an increase in the composite EIM rate of $0.0019?

RESPONSE: The pro-forma rates referenced in the COSS and related documentation are intended to show what the 2016 rates would have been using the new percentage allocations. Assuming the 2018 revenue requirement is similar to the 2016 amount, than the pro forma 2016 rate is an approximation of what the 2018 rates will be. And, yes, if the components are added together, the composite rate shows a $0.0019 increase. The new percentages will be used to determine 2018 rates, which will be developed as part of the annual budget process later this year.

STAKEHOLDER: Suzy Niederkorn with NV Energy

1: I agree with the current 2017 rates below but I could not find the 2018 updated rates.

RESPONSE: The 2018 rates are not yet determined. The process to develop those rates begins in July and concludes when the Board approves the rates in December. The 2018 Revenue Requirement (RR) Stakeholder kickoff meeting (on-site) is scheduled for July 25th. As stated earlier, the pro forma 2016 rates shown in the paper and presentation were intended to approximate the 2018 rates assuming stable revenue requirements.

2: Does Congestion Revenue Rights Services apply to EIM Entity? I understand our EIM Entity receives Market Services and System Operations charges in GMC. What is the 2016 and 2017 rates on CRR?

RESPONSE: The CRR services' GMC does not impact the EIM rate nor is it included in the development of the EIM rate. The EIM fee is derived from the real time activities of the market services and system operations GMC.

The 2017 CRR services rate is $.0059/MWh.

STAKEHOLDER: David Cohen with Navigant Consulting

1: In 2016 how many total FTE positions were in CAISO? What was the Direct Salary & Benefit dollars associated with those FTE?

RESPONSE: The 2016 operations and maintenance budget included budget for 593 FTE with a salaries and benefits budget of $121.6 million.

2: In 2016 how many dollars of Total Revenue Requirement were associated with "Contractors" or non -CAISO FTEs?

RESPONSE: The 2016 operations and maintenance budget for consultants and contract staff was $11.9 million.

3: In all the Tables presented in the Report [cost of service study] please insert a Column identifying where the Dollars came from earlier Tables. It would help the understanding of the process of computations.

RESPONSE: The source of the data used in the tables is often referenced in the relevant section's write up. In addition, the cost of service study work papers were posted to the ISO website to allow for a broader view of the flow data.

4: Table 8 Please add two column2 to the table and summarize Labor & Non-labor dollars for each line item.

RESPONSE: The O&M budget is the only component of the RR in which this request is applicable. Only the O&M contains labor expense (driven in part by FTE hours) and non-labor expense. However, the COSS does not require labor and non-labor expense broken out in order to reach its results. Rather the expense categories used in the study include direct and indirect activity based costing (ABC) costs and non-ABC costs. The FTE reported hours are used to determine the ABC costs.

Table 8: 2016 Revenue Requirement Components

Revenue Requirement	2016 Budget (in thousands)
Operations and Maintenance	$ 169,340
Debt Service	$ 16,900
Cash Funded Capital	$ 24,000
Other Costs and Revenues	$ (10,800)
Operating Costs Reserve Adjustment	$ (4,100)
Total Revenue Requirement	**$ 195,340**

A breakdown of the O&M budget broken out by those categories as well as the hours reported by division is as follows:

Code	Division	Number of Non-Administrative 2016 Hours Reported	2016 Operations and Maintenance Budget (amounts in thousands) DIRECT ABC Activity Costs	INDIRECT ABC Activity Costs	ABC Activity Costs	Non-ABC Activity Costs	Total Budget
2100	Chief Executive Officer	99,533	$ 1,305	$ 11,103	$ 12,408	$ 5,355	$ 17,763
2200	Market and Infrastructure Development	119,735	$ 14,487	$ 632	$ 15,119	-	$ 15,119
2400	Technology	370,582	$ 2,588	$ 37,610	$ 40,198	21,951	$ 62,149
2500	Operations	368,852	$ 37,736	$ 4,155	$ 41,891	-	$ 41,891
2600	General Counsel and Chief Compliance Officer	66,649	$ 716	$ 9,128	$ 9,844	3,000	$ 12,844
2700	Market Quality and Renewable Integration	48,026	$ 4,709	$ 1,524	$ 6,233	2,235	$ 8,468
2800	Customer and State Affairs	66,155	$ 8,004	$ 441	$ 8,445	-	$ 8,445
2900	Regional and Federal Affairs	16,212	$ 2,066	$ 595	$ 2,661	-	$ 2,661
	Total	**1,155,742**	**$ 71,611**	**$ 65,188**	**$ 136,799**	**$ 32,541**	**$ 169,340**

5: Using Time Cards how do employees know how and when to split their time between Direct ABC codes and Task Codes and what could be support or indirect codes?

RESPONSE: Employees are instructed by their managers as to which ABC codes and tasks to use according to the work completed.

6: What are the internal processes to verify Time Cards are reported correctly? Do Supervisors check the subordinate employee's time entry?

RESPONSE: Managers are responsible for reviewing and approving time cards weekly.

7: What type of monthly reports are generated to compare budgeted FTE Staff time versus what is reported?

RESPONSE: Manager time and labor reports as well as ABC reports are available to managers to review time reported and codes used.

8: Table 9 insert a column identifying the CAISO FTE associated with the column Total Budget by Code number.

RESPONSE: The data used in the COSS does not take into consideration the number of FTEs but the hours reported by the FTEs. A breakdown of the hours reported by division is referenced in the response to number 4.

9: Table 11 insert a row above ABC Code and identify the CAISO FTE numbers for each of the columns.

RESPONSE: The data used in the COSS does not take into consideration the number of FTEs but the hours reported by the FTEs. A breakdown of the hours reported by division is referenced in the response to number 4.

10: Table 13 insert a row above ABC Code and identify the CAISO FTE numbers for each of the columns.

RESPONSE: The data used in the COSS does not take into consideration the number of FTEs but the hours reported by the FTEs. A breakdown of the hours reported by division is referenced in the response to number 4.

11: Table 22 – The row Non-ABC Costs =$29.582 million come from?

RESPONSE: See table 10 – Allocation of Non-ABC Support Costs to Cost Categories.

12: Refer to Table 43 [Comparison of EIM Percentages and Costs],

a) Explain why Market Service 2013 Study Effective for 2015 rose by $16.571 million in the 2016 Study? Provide the 2013 and 2016 Market Service "real time" billing units that support the increase.

RESPONSE: The market services (real time market) percentage increase is primarily driven by the additional costs and time recorded in order to implement and manage additional 15-minute market as well as the additional a real time market desk (24x7) since the last COSS.

b) Explain why System Operations 2013 Study Effective for 2015 declined by ($11.170 million) in the 2016 Study? Provide the 2013 and 2016 System Operations "real time" billing units that support the reduction.

RESPONSE: The system operations (real time dispatch) percentage decrease is primarily driven by the decrease in costs and time recorded due to the reallocation of system operations' resources to create a new real time market desk as well as improved overtime management. The absence of the 2008 bonds, as previously mentioned, is another reason for the percentage change.

	Market Services Real Time Market			System Operations Real Time Dispatch		
Revenue Requirement (amounts in thousands)	2013 Cost of Service Study	2016 Cost of Service Study	Change	2013 Cost of Service Study	2016 Cost of Service Study	Change
Non-ABC O&M Support Costs	$ 553	$ 1,337	$ 784	$ 1,653	$ 1,407	$ (246)
Direct ABC O&M Costs	$ 8,075	$ 13,966	$ 5,891	$ 14,093	$ 15,257	$ 1,164
Debt Service	$ 3,152	$ -	$ (3,152)	$ 10,555	$ -	$ (10,555)
Other Costs and Revenues	$ (544)	$ (1,394)	$ (850)	$ (1,878)	$ (1,635)	$ 243
Operating Costs Reserve Adjustment	$ (708)	$ -	$ 708	$ (2,462)	$ -	$ 2,462
Subtotal	**$ 10,528**	**$ 13,909**	**$ 3,381**	**$ 21,961**	**$ 15,029**	**$ (6,932)**
Indirect Costs	$ 19,525	$ 33,014	$ 13,489	$ 39,964	$ 35,408	$ (4,556)
Revenue Requirement Before Fees	**$ 30,053**	**$ 46,923**	**$ 16,870**	**$ 61,925**	**$ 50,437**	**$ (11,488)**
Less Fees	$ (1,142)	$ (1,441)	$ (299)	$ (993)	$ (675)	$ 318
Revenue Requirement	**$ 28,911**	**$ 45,482**	**$ 16,571**	**$ 60,932**	**$ 49,762**	**$ (11,170)**
Percentage applicable to EIM Activities	**61%**	**79%**	**18%**	**45%**	**39%**	**-6%**

Note: For both the 2013 and 2016 cost of service studies cash funded capital is categorized as indirect and is included in the Indirect Costs. For the 2016 cost of service study debt service is categorized as indirect and is included in the Indirect Costs.

13: In 2016 how many dollars of EIM fees and TOR fees are credited against the CAISO Revenue Requirement? In what table, can we trace the amounts?

RESPONSE: The 2016 RR included $2.5 million in EIM fees and $675 thousand in TOR fees.

For EIM fees, see table 20 – Allocating Other Revenue to Cost Categories for more information.

For TOR fees, see table 23 – Estimation of Fee Revenue and Mapping of Fees to Cost Categories for more information.

14: Table 45, please identify from which Table the Total System Operations Indirect Cost of $90.790 million are shown?

RESPONSE: See table 22 – Allocating Revenue Requirement to Cost Categories.

Attachment D – Presentation Materials from the May 24, 2017 Stakeholder Meeting

2017 Grid Management Chart – Cost of Service Study Update

California Independent System Operator Corporation

California ISO

Briefing on 2016 Cost of Service Study and 2018 GMC Update

Ryan Seghesio
CFO

Stakeholder Meeting
May 24, 2017

Agenda

TOPIC
2016 Cost of Service Study Overview
2018 GMC Update
Impacts to the EIM Fee
Impacts to the TOR Fee
Key Calendar Dates and Next Steps
Stakeholder Feedback and Discussion

California ISO

2016 Cost of Service Study Overview

What is the cost of service study?

- A tri-annual 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 charge (GMC).
    - Updated percentages are applied to:
        - Market services
        - System operations
        - Congestion revenue rights services (CRR services)
        - Fees
            - » EIM Fee
            - » TOR Fee
    - 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?

- Update business process framework
- Map hours and costs to GMC cost categories
- Allocate revenue requirement components to GMC cost categories
- Aggregate revenue requirement into GMC cost categories and new GMC cost category percentages
- Calculate rates using new GMC cost category percentages
- Apply similar methodology to EIM to determine new real time activity percentages used to calculate annual fee
- Apply similar methodology to TOR to determine new TOR Fee

What is the business process framework?

- High level view of ISO activities
  - Groups tactical core processes into strategic groupings
  - Illustrates high-level information streams
- Diagrams provide a visual representation of the work
- Demonstrates flow of ‘work’ through different business processes and business units

ISO Mapping of Core Business Processes

ABC Code	Level 1 ABC Activity	Number of Level 2 Activity Tasks	Number of Non-Administrative 2016 Hours Reported
Direct			
80001	Develop Infrastructure	9	85,174
80002	Develop Markets	9	61,237
80004	Manage Market & Reliability Data & Modeling	17	103,931
80005	Manage Market & Grid	11	203,020
80007	Manage Operations Support & Settlements	16	91,830
80010	Support Customers & Stakeholders	8	70,178
Indirect			
80003	Manage Human Capabilities	8	28,137
80008	Plan & Manage Business	16	63,648
80009	Support Business Services	46	448,587
Totals			
9		140	1,155,742

Activity based costing overview

- Same process as previous cost of service studies
- Segregated 2016 O&M into payroll and non-payroll costs
- Used 2016 hours to allocate cost center costs to activities
- Resulting activity costs then mapped to 3 GMC cost categories or indirect
- Mapped non-payroll costs to 3 service categories or indirect

Activity based costing overview continued

- Mapped activities using the following rules:
  - 100% or 0% if entirely in one category or not
  - 50% / 50% if supports both market services and system operations
    - or its split after 10% went to CRRs thus 45% / 45%
  - 80% / 20% if partially in one activity or the other

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2018 GMC Update

Cost Category Percentages Changes

Cost Category	2013 Study Effective for 2015	2016 Study Effective for 2018	Change
Market Services	27%	32%	5%
System Operations	70%	66%	-4%
CRR Services	3%	2%	-1%

Market Services Shift

– Primarily driven by the addition of 15-minute market and reallocation of resources to create real time market desk (24x7)

System Operations Shift

– Primarily due to process efficiencies implemented since the last cost of service study

Pro Forma 2016 GMC Rates Compared to Current Rates

Cost Category	Percentage Share of Costs	Pro Forma 2016 Rate	2017 Rate	Increase / (Decrease) in Rates
Market Services	32%	$ 0.1038	$ 0.0854	$ 0.0184
System Operations	66%	$ 0.2781	$ 0.3025	$ (0.0244)
CRR Services	2%	$ 0.0034	$ 0.0059	$ (0.0025)

Impacts to the EIM Fee

What is EIM and which services contribute to it?

- Energy imbalance market (EIM) provides entities with the opportunity to leverage the ISO's existing real-time market platform to facilitate 15-minute and 5-minute economic dispatch.
  - Provides reliability and economic benefits to both existing market participants and new EIM entities
  - 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
- The following ISO services are required for EIM:
  - Market services real time market
  - System operations real time dispatch

Comparison of EIM Percentages and Costs

Cost Category	Real Time Activity	2013 Study Effective for 2015	2016 Study Effective for 2018	Amount Over / (Under) Since Last COSS	2013 Study Effective for 2015	2016 Study Effective for 2018	Amount Over / (Under) Since Last COSS
					(amount in thousands)		
Market Services	Real Time Market	61%	79%	19%	$ 28,911	$ 45,482	$ 16,571
System Operations	Real Time Dispatch	45%	39%	-6%	$ 60,932	$ 49,762	$ (11,170)

Market Services Shift

– Primarily driven by the addition of 15-minute market and reallocation of resources to create real time market desk (24x7)

System Operations Shift

– Primarily due to process efficiencies implemented since the last cost of service study

Calculation of the EIM Components

Cost Category	Pro Forma 2016 Rate	EIM Real Time Activity	EIM Percentage Share of Costs	EIM Pro Forma 2016 Rate	EIM 2017 Rate	Increase / (Decrease) in Rates
Market Services	$ 0.1038	Real Time Market	79%	$ 0.0823	$ 0.0521	$ 0.0302
System Operations	$ 0.2781	Real Time Dispatch	39%	$ 0.1078	$ 0.1361	$ (0.0283)

Impacts to the TOR Fee

What is TORS and which services contribute to it?

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

- The following ISO services are required for TORs:
  - **Real-Time Operations** – The ISO provides support on an emergency basis for flows on TORs, in a manner similar to standby service
  - **Scheduling** – The ISO provides check-outs with neighboring balancing authorities (BA) in order to schedule flows across boundaries
  - **Outage Management** – The ISO provides for the scheduling and coordination of outages across the BA

Calculation and comparison of TOR Rates

Transmission Owner Rights (TOR) Fee				Per 2016 COSS	Per 2013 COSS	Amount Over / (Under) Since Last COSS
TOR Fee Calculation						
				Amount	Amount	Amount
		Total TOR Related Costs		$ 61,961,200	$ 44,121,880	$ 17,839,320
		TOR as a Percentage of Gross Volume		1.00%	1.69%	
		TOR Costs to Collect		$ 619,612	$ 745,660	$ (126,048)
		TOR MWh for 2016 (min. of supply and demand)		2,627,260	3,162,319	(535,059)
		TOR Updated Rate per MWh		$ 0.24	$ 0.24	$ -

- The 2016 TOR related costs increased $17.8 million
- The TOR percentage of gross MWh volume decreased
- The TOR rate remaining at $0.24 cents per MWh

California ISO

Key Calendar Dates and Next Steps

Key Calendar Dates* and Next Steps

Key Date	Effort	Event
May 31, 2017	2018 GMC Update	Stakeholder comments due
June 7	2018 GMC Update	Post Stakeholder meeting minutes and Stakeholder comments (with replies) to website.
July 13	2018 GMC Update	Present 2018 GMC update to EIM Governing Body
July 25	2018 RR	Conduct 2018 Revenue Requirement (RR) Stakeholder kickoff meeting (on-site)
July 26 - 27	2018 GMC Update	Present 2018 GMC update to Board of Governors for approval
August	2018 GMC Update	Amend Tariff
September	2018 GMC Update	File amended Tariff with FERC
October 12	2018 RR	Present Preliminary 2018 Revenue Requirement to the Board of Governors for review and consideration
November 13	2018 RR	Conduct 2nd 2018 Revenue Requirement Stakeholder meeting (call)
Early December	2018 GMC Update	Target date in which Tariff changes will be approved
December 13 -14	2018 RR	Present 2018 Revenue Requirement to Board of Governors for approval
Jan 1, 2018	2018 RR	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 May 31.

- The discussion paper is available on the ISO website at http://www.caiso.com/informed/Pages/StakeholderProcesses/Budget-GridManagementCharge.aspx.

Attachment E – Clean Tariff Records Incorporating Proposed Changes

2017 Grid Management Chart – Cost of Service Study Update

California Independent System Operator Corporation

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 (32) percent to Market Services; sixty-six (66) 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, as well as the EIM Administrative Charge. 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.

1. The rate for the Market Services Charge will be calculated by dividing the annual GMC revenue requirement allocated to this service category by the forecast annual gross absolute value of MW per hour of Ancillary Services capacity awarded in the Day-Ahead and Real-Time Markets, MWh of Energy cleared in the Day-Ahead market, Virtual Demand Award, Virtual Supply Award, and Instructed Imbalance Energy, less the forecast annual gross absolute value of such Energy as may be excluded for a load following MSS pursuant to an MSS agreement, Standard Ramping Energy, Regulation Energy, Ramping Energy Deviation, Residual Imbalance Energy, Exceptional Dispatch Energy and Operational Adjustments for the Day-Ahead and Real-Time.

2. The rate for the System Operations Charge will be calculated by dividing the annual GMC revenue requirement allocated to this service category by forecast annual gross absolute

value of MWh of real-time energy flows on the ISO Controlled Grid, net of amounts excluded pursuant to Part E of this Schedule.

3. The rate for the CRR Services Charge will be calculated by dividing the annual GMC revenue requirement allocated to this service category by the forecast annual sum of awarded MW of CRRs per hour.

The rates for the foregoing charges shall be adjusted automatically each year, effective January 1 for the following twelve (12) months, in the manner set forth in Part D of this Schedule.

* * * *

29.11. Settlements And Billing For EIM Market Participants.

* * * *

(i) **EIM Administrative Charge.**

(1) **In General.** The CAISO will charge EIM Market Participants an EIM Administrative Charge consisting of the real-time portions of the Market Services Charge and the System Operations Charge.

(2) **Market Services Charge.** The Market Services Charge shall be the product of the Market Services Charge for each Scheduling Coordinator as calculated according to the formula in Appendix F, Schedule 1, Part A, the real-time market percentage as calculated in the cost of service study according to Appendix F, Schedule 1, Part A, and the sum of Gross FMM Instructed Imbalance Energy (excluding FMM Manual Dispatch Energy) and Gross RTD Instructed Imbalance Energy (excluding RTD Manual Dispatch Energy Standard Ramping Deviation, Ramping Energy Deviation, Residual Imbalance Energy, and Operational Adjustments).

(3) **System Operations Charge.** The System Operations Charge shall be the product of the System Operations Charge for each Scheduling Coordinator, as

calculated according to the formula in Appendix F, Schedule 1, Part A, the real-time market percentage as calculated in the cost of service study conducted according to Appendix F, Schedule 1, Part A, and the absolute difference between metered energy and the EIM Base Schedules.

(4) **Minimum EIM Administrative Charge.** The CAISO will calculate the minimum EIM Administrative Charge as the product of the sum of the real-time activities associated with market services charge and the real-time activities chart associated with system operations, as well as -

(A) five percent of the total gross absolute value of Supply of all EIM Market Participants; plus

(B) five percent of the total gross absolute value of Demand of all EIM Market Participants.

(5) **Withdrawing EIM Entity.** If the EIM Entity notifies the CAISO of its intent to terminate participation in the Energy Imbalance Market and requests suspension of the Energy Imbalance Market in its Balancing Authority Area under Section 29.4(b)(4), the CAISO will charge the EIM Entity the minimum EIM Administrative Charge calculated under Section 29.11(i)(4) during the notice period.

(6) **Application of Revenues.** The CAISO will apply revenues received from the EIM Administrative Charge against the costs to be recovered through the Grid Management Charge as described in Appendix F, Schedule 1, Part A.

Attachment F – Marked Tariff Records Showing Red-lined Proposed Changes

2017 Grid Management Chart – Cost of Service Study Update

California Independent System Operator Corporation

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 ~~twenty seven~~ (32~~27~~) percent to Market Services; sixty-six~~seventy~~ (66~~70~~) percent to System Operations; and two~~three~~ (2~~3~~) 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, as well as the EIM Administrative Charge. 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.

1. The rate for the Market Services Charge will be calculated by dividing the annual GMC revenue requirement allocated to this service category by the forecast annual gross absolute value of MW per hour of Ancillary Services capacity awarded in the Day-Ahead and Real-Time Markets, MWh of Energy cleared in the Day-Ahead market, Virtual Demand Award, Virtual Supply Award, and Instructed Imbalance Energy, less the forecast annual gross absolute value of such Energy as may be excluded for a load following MSS pursuant to an MSS agreement, Standard Ramping Energy, Regulation Energy, Ramping Energy Deviation, Residual Imbalance Energy, Exceptional Dispatch Energy and Operational Adjustments for the Day-Ahead and Real-Time.

2. The rate for the System Operations Charge will be calculated by dividing the annual GMC revenue requirement allocated to this service category by forecast annual gross absolute

value of MWh of real-time energy flows on the ISO Controlled Grid, net of amounts excluded pursuant to Part E of this Schedule.

3. The rate for the CRR Services Charge will be calculated by dividing the annual GMC revenue requirement allocated to this service category by the forecast annual sum of awarded MW of CRRs per hour.

The rates for the foregoing charges shall be adjusted automatically each year, effective January 1 for the following twelve (12) months, in the manner set forth in Part D of this Schedule.

* * * *

29.11. Settlements And Billing For EIM Market Participants.

* * * *

(i) **EIM Administrative Charge.**

(1) **In General.** The CAISO will charge EIM Market Participants an EIM Administrative Charge consisting of the real-time portions of the ~~an EIM~~ Market Services Charge and the ~~an EIM~~ System Operations Charge.

(2) ~~EIM~~ **Market Services Charge.** The ~~EIM~~ Market Services Charge shall be the product of the Market Services Charge for each Scheduling Coordinator as calculated according to the formula in Appendix F, Schedule 1, Part A, the ~~R~~real-~~T~~time ~~M~~market ~~P~~percentage as calculated in the cost of service study according to ~~the formula in~~ Appendix F, Schedule 1, Part A, and the sum of Gross FMM Instructed Imbalance Energy (excluding FMM Manual Dispatch Energy) and Gross RTD Instructed Imbalance Energy (excluding RTD Manual Dispatch Energy Standard Ramping Deviation, Ramping Energy Deviation, Residual Imbalance Energy, and Operational Adjustments).

(3) ~~EIM~~ **System Operations Charge.** The ~~EIM~~ System Operations Charge shall be the product of the System Operations Charge for each Scheduling Coordinator,

as calculated according to the formula in Appendix F, Schedule 1, Part A, the ~~R~~real-~~T~~time ~~M~~market ~~P~~percentage as calculated in the cost of service study conducted according to ~~the formula in~~ Appendix F, Schedule 1, Part A, and the absolute difference between metered energy and the EIM Base Schedules.

(4) **Minimum EIM Administrative Charge.** The CAISO will calculate the minimum EIM Administrative Charge as the product of the sum of the real-time activities associated with market services charge and the real-time activities chart associated with system operations, as well as ~~EIM Market Service Charge and the EIM System Operations Charge and~~-

(A) five percent of the total gross absolute value of Supply of all EIM Market Participants; plus

(B) five percent of the total gross absolute value of Demand of all EIM Market Participants.

(5) **Withdrawing EIM Entity.** If the EIM Entity notifies the CAISO of its intent to terminate participation in the Energy Imbalance Market and requests suspension of the Energy Imbalance Market in its Balancing Authority Area under Section 29.4(b)(4), the CAISO will charge the EIM Entity the minimum EIM Administrative Charge calculated under Section 29.11(i)(4) during the notice period.

(6) **Application of Revenues.** The CAISO will apply revenues received from the EIM Administrative Charge against the costs to be recovered through the Grid Management Charge as described in Appendix F, Schedule 1, Part A.