



California ISO

**2016 Cost of Service Study and
2018 GMC Update**

May 2017

Table of Contents

GMC EXECUTIVE SUMMARY	3
Application of ABC to GMC Structure	5
Costing the 2016 Revenue Requirement	13
Step 1: Breaking Out Non-ABC Support Costs	14
Step 2: Allocation of O&M Costs	16
Step 3: Allocating Remaining Revenue Requirement Components to Cost Categories....	25
Step 4: Aggregating Revenue Requirement into Cost Categories.....	27
Step 5: Calculation of 2016 Rates Using New Cost Category Percentages.....	28
Summary of GMC Cost Category Percentages	30
ENERGY IMBALANCE MARKET	31
Application of ABC to EIM Rate Structure	31
Mapping of Cost Categories to EIM Activities	31
Costing the Cost Categories to EIM Activities	38
Step 1: Applying EIM Activity Percentages to Non-ABC O&M Support Costs	38
Step 2: Applying EIM Activity Percentages to ABC Direct O&M Costs	39
Step 3: Allocating the Remaining Revenue Requirement Components.....	42
Step 4: Aggregating Revenue Requirement into Cost Categories and Allocating Fees	43
Step 5: Calculation of the EIM Components of the 2016 Cost Category Rates	44
Summary of Change in EIM Percentages	44
TRANSMISSION OWNERSHIP RIGHTS	45
Application of ABC to TOR Rate Structure	45
Mapping and Costing of Cost Categories to TOR Activities	46
Summary of TOR Rate	48

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.

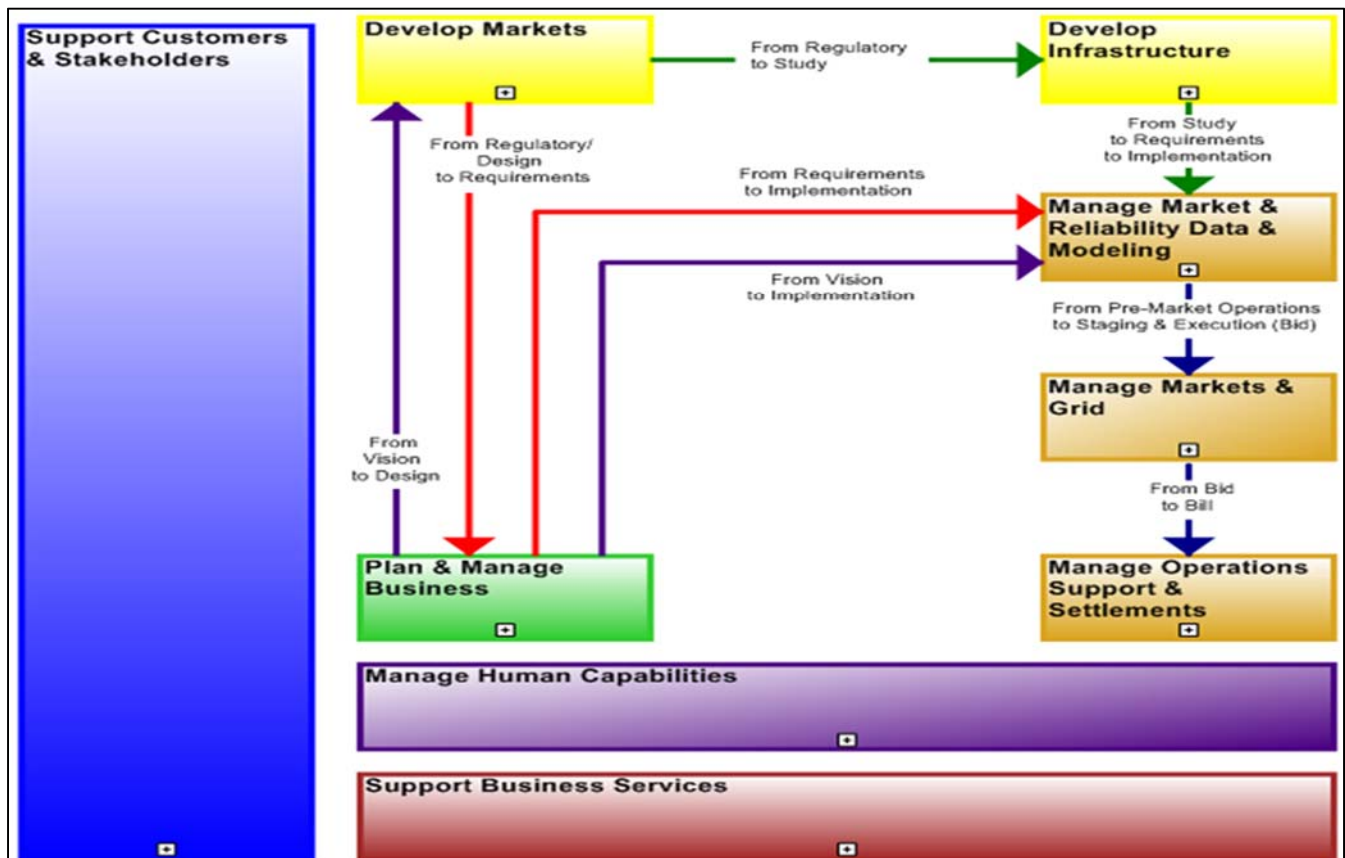
This is primarily driven by the market changes brought on by FERC Order 764 which positions the ISO real time market to better support the participation of intermittent resources and additional market intervals. Another driver behind the shift in cost categories is the reduction of direct costs (primarily 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%			Operational flow based but have some market relationship.
311	Manage Operations Planning		100%			
312	Manage WECC Seasonal Studies		100%			
314	Manage & Facilitate Procedure Maintenance	20%	80%			
315	Procedure Admin and Reporting	20%	80%			Operational flow based but have some market relationship.
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%			Based on support of day ahead and real time thus the costs are predominately operational flow based but have some market relationship.
362	Manage Operations Engineering Support	20%	80%			
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%			
409	Meter Data Acquisition and Processing		100%			Related to actual system operations thus the costs are entirely to support system operations.
411	Manage Market Clearing	45%	45%	10%		
412	Manage Market Billing & Settlements	45%	45%	10%		This is a 50/50 split after a minimum allocation to CRRs.
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%		Attributes are not distinguishable to any specific category.
25% debt service reserve 2013 bonds				100%		
Revenue changes				100%		
Expense changes				100%		

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										
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										
Intermittent Resource Forecasting Costs	50%	50%			\$ 2,235	1118	\$ 1,117	0	\$ -	
General Counsel Division										
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

ABC Code	Business Process Name	Allocation of Hours By Division								Total
		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	
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									Total
		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		
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

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
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
<i>(amounts in thousands)</i>										
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	
<i>(amounts in thousands)</i>										
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	
<i>(amounts in thousands)</i>										
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		
	<i>(amounts in thousands)</i>						
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
			<i>(amounts in thousands)</i>			
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
	<i>(amounts in thousands)</i>			
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 Requirement 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 analysis 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%		The grid is operated in real time.
315	Procedure Admin and Reporting	20%	100%		
316	Operations Systematic Approach to Training	20%	100%		
317	Execute & Track Operations Training	20%	100%		
322	Register, Modify, and Terminate PDR/RDRR Resource	50%	50%	50%	
323	Calculate & Monitor Energy Costs & Indices	100%	50%	50%	The costs support both the real time market and day ahead market, equally.
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 analysis 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 analysis 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
<i>(amounts in thousands)</i>						
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
<i>(amounts in thousands)</i>						
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
<i>(amounts in thousands)</i>							
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
<i>(amounts in thousands)</i>							
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	
<i>(amounts in thousands)</i>								
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	
<i>(amounts in thousands)</i>							
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
<i>(amounts in thousands)</i>						
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

Revenue Requirement (amounts in thousands)	2016 Budget	Market Services Split			System Operations Split		
		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	2016 Study	Amount	2013 Study	2016 Study	Amount
		Effective for 2015	Effective for 2018	Over / (Under) Since Last COSS	Effective for 2015	Effective for 2018	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	\$ -