2020

BUDGET AND GRID MANAGEMENT CHARGE RATES

Prepared by the Financial Planning and Procurement Department
California Independent System Operator Corporation

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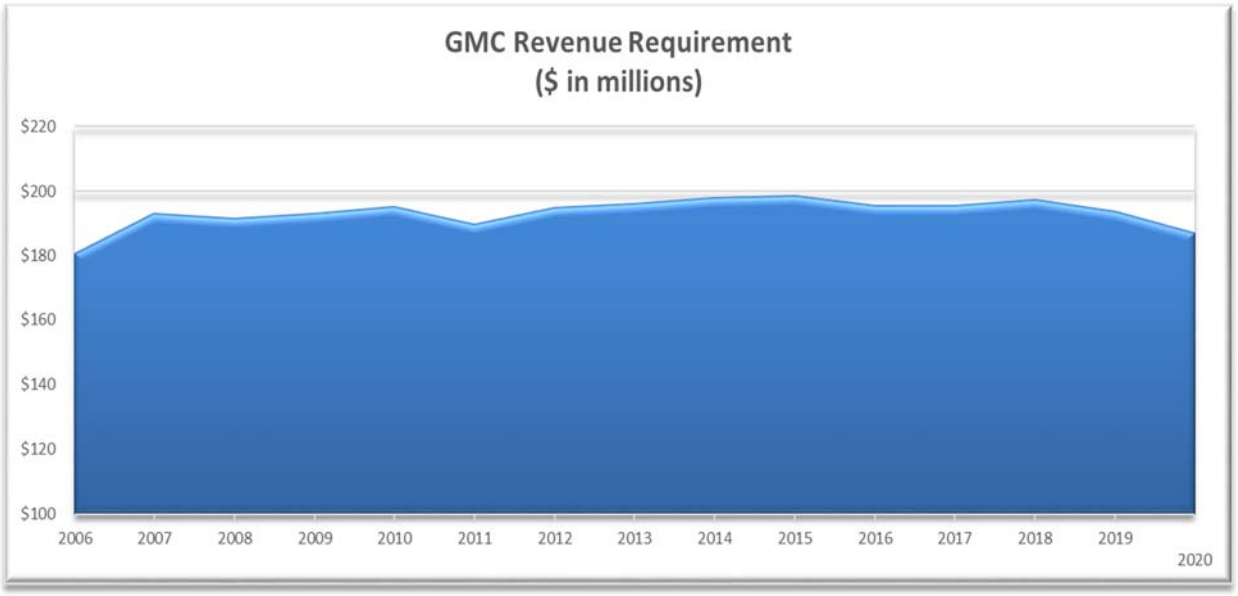
FINAL

California ISO

Table of Contents

I. 2020 GMC Revenue Requirement Summary

The 2020 Grid Management Charge (GMC) revenue requirement is $187 million, which represents a 3.4% decrease from 2019. Fiscal discipline remains a priority for the California Independent System Operator Corporation (ISO) as evidenced by the continued stability of the GMC revenue requirement. The 2020 GMC revenue requirement is the lowest revenue requirement since 2006. The ISO has absorbed several major initiatives during this time with no material impact to the GMC revenue requirement, which included launching the new market, constructing its secure primary and secondary locations, as well as implementing the Western Energy Imbalance Market (EIM) and Reliability Coordinator services (as known as RC West).



Components of 2020 GMC Revenue Requirement

A summary of the 2020 GMC revenue requirement compared to 2019 follows.

GMC Revenue Requirement ($ in millions)	2020 Budget	2019 Budget	Change $	Change %
Operations & Maintenance Budget	$195.0	$189.0	$6.0	3.2%
Debt Service (including 25% reserve)	16.9	16.9	0.0	0.0%
Cash Funded Capital	28.0	25.0	3.0	12.0%
Other Costs and Revenues	(41.3)	(23.9)	(17.4)	72.8%
Operating Costs Reserve Adjustment	(11.6)	(13.5)	1.9	-14.1%
Total GMC Revenue Requirement	**$187.0**	**$193.5**	**($6.5)**	**-3.4%**
Transmission Volume Estimate in TWh	238.4	239.7	(1.3)	-0.5%
Pro-forma bundled cost per MWh	**$0.7844**	**$0.8073**	**($0.0229)**	**-2.8%**

The operations and maintenance (O&M) budget is the major component of the GMC revenue requirement; therefore, managing it is critical to keeping a stable revenue requirement. The $6 million projected increase in the O&M budget is primarily due to budgeted merit and other compensation increases, additional contract staff, and reliability coordinator tools. The budgeted headcount will remain at 647.

Despite the increases in the O&M budget, the overall GMC revenue requirement will decline by $6.7 million from 2019 as other revenue is budgeted to increase by approximately $16.5 million combined in 2020.

The ISO projects that the 2020 transmission volumes will be 238.4 TWh, which is a decrease from projected 2019 volumes. The projected volumes are based on the three-year average of actual measured demand volumes as well as year-to-date 2019 volumes. Dividing the GMC revenue requirement by the projected volumes results in a pro-forma bundled cost per megawatt-hour (MWh) of $0.7844, or a decrease of $0.0229 per MWh from 2019.

The pro-forma bundled cost per MWh does not represent a single charge that the ISO uses, but is intended rather to represent a combination of charges a market participant could expect to pay if they utilized all of our grid management services, including: market services, system operations, and congestion revenue rights services. See Section X at the end of this document for the actual calculation of the rates.

II. Budget Overview

This budget package consists of the following items:

- O&M budget (Sections III thru V)
- Debt service costs (Section VI)
- Capital / project funding and cash-funded capital (Section VII)
- Other costs and revenues (Section VIII)
- Operating cost reserve adjustment (Section IX)
- Grid management charge components (Section X).

The O&M budget, the primary focus of this report, is the largest of these components and consists of the costs incurred for annual operations. The 2020 O&M budget of $195 million is $6 million greater than the 2019 O&M budget of $189 million. The O&M budget is presented in three separate views as noted below:

- By process — e.g., support customers and stakeholders (Section III)
- By resource — e.g., salaries and benefits (Section IV)
- By division — e.g., the Operations division (Section V).

Debt service costs are the principal and interest payments related to the 2013 bonds, and the collection of a 25% debt service reserve. The 2013 bonds refinanced the 2009 bonds which the ISO issued to build a new headquarters facility in Folsom, California and fund other capital expenditures. The total debt service to be collected in the 2020 GMC revenue requirement ($16.9 million) remains the same as 2019.

Cash-funded capital included in the GMC revenue requirement is $28 million with any unencumbered amounts carried over to fund future years' capital requirements. Collecting capital as a component of the GMC revenue requirement avoids the additional costs

associated with debt financing, including issuance costs, interest expense, and debt service reserves. The capital / project requirements for 2020 are projected to be $22 million and will be funded by the cash-funded capital amount described above.

Other costs and revenues are net revenues received from sources other than the GMC and reduce the overall GMC revenue requirement. They are budgeted to increase $17.4 million in 2020 to $41.3 million. These other revenues include items such as EIM administrative charges, reliability coordinator funding requirement, intermittent resource forecasting fees, interest earnings, California-Oregon intertie path operator fees, and generator interconnection fees.

The operating cost reserve adjustment is a credit of $11.6 million in 2020. In any year that the ISO operating reserve account exceeds 15% of the prospective year's O&M budget, the excess reduces the GMC revenue requirement for the following year. This adjustment also includes the 25% debt service reserve collected in 2019 and the difference between the budgeted and actual revenues and expenses from 2018.

Budget Guidance

The ISO's O&M budget is collaboratively developed using feedback from its stakeholders as well as from its Leadership team. The ISO held stakeholder meetings in July 2019 and November 2019 to allow for stakeholder input prior to building the 2020 budget. Notes from the discussions and subsequent stakeholder meetings are available on the ISO website[1].

Following its firm commitment to fiscal responsibility, the ISO utilizes the Zero-Based Budgeting (ZBB) method to develop its O&M budget. ZBB confronts conventional thinking and resource allocations by challenging every line item and assumption. Budget requests under the ZBB method require justification which helps us avoid over-budgeting, double counting, and automatic budget increases. The result is a well justified and balanced budget which is strategically aligned with the ISO's focus going into the year.

[1] The 2020 Budget and Grid Management Charge documentation and stakeholder feedback is available on the ISO website at http://www.caiso.com/informed/Pages/StakeholderProcesses/Budget-GridManagementCharge.aspx.

The combined efforts led the 2020 GMC revenue requirement to come in at $187 million, approximately $15 million less than the FERC approved $202 million cap. The budget funds operations and initiatives as set forth in the ISO vision as described below.

Strategic Outlook

The ISO tirelessly meets its responsibility to maintain the reliability of the high voltage grid that serves California and market participants throughout the West. Over the past several years, the ISO has created power markets and a grid infrastructure that efficiently uses renewable resources while strengthening system resiliency, all to the benefit of consumers.

At this time, the ISO grid has about 22,000 megawatts (MW) of renewable generation connected to the grid, including about 11,900 MW of solar and nearly 6,700 MW of wind-powered capacity.

In 2019, the ISO became its own reliability coordinator (RC) and is offering these services to other balancing authorities in the western United States. The ISO filed its proposed RC rate design, terms and conditions in August 2018 and FERC approved them in November. In February, the ISO announced the launch of the RC Oversight Committee and the service's new name, RC West. At the end of May, the ISO received certification from NERC to operate as the reliability coordinator for load serving entities in California and northern Mexico and began providing RC services to those entities in July 2019[2]. In October, the ISO received certification from NERC to operate as the reliability coordinator of record for the majority of the Western Interconnection. On November 1, 2019, the ISO launched its expanded RC services making it the RC of record for 41 entities across 14 western states and northern Mexico.

The ISO is also working to study and identify requirements needed to meet the goals of California's 100 percent clean energy goal, SB 100. To do so, the ISO continues to examine the risks of early economic retirement of the gas fleet, diminishing imports, and the retirement of once-through cooling generation.

In addition, the ISO is continuing a long-term program to identify and act on opportunities for renewables to provide essential grid services. In the past, the ISO has collaborated with

[2] The latest on the ISO Reliability Coordinator services initiative is available on the ISO website at http://www.caiso.com/informed/Pages/ReliabilityCoordinator/Default.aspx .

First Solar, the National Renewable Energy Laboratory, and Avangrid to demonstrate that solar and wind resources can provide essential reliability services.

Aligning with the ISO's Vision

The ISO remains committed to supporting growth and change while carefully managing its operating costs. Over the past several years, the ISO has enhanced the grid to become more flexible and adaptable, as very low and zero-carbon resources are added to the system to meet state clean air and water goals.

The budget aligns with the ISO's Strategic Vision, which is a guide to meet organizational and operational goals. The plan contains the following strategies:

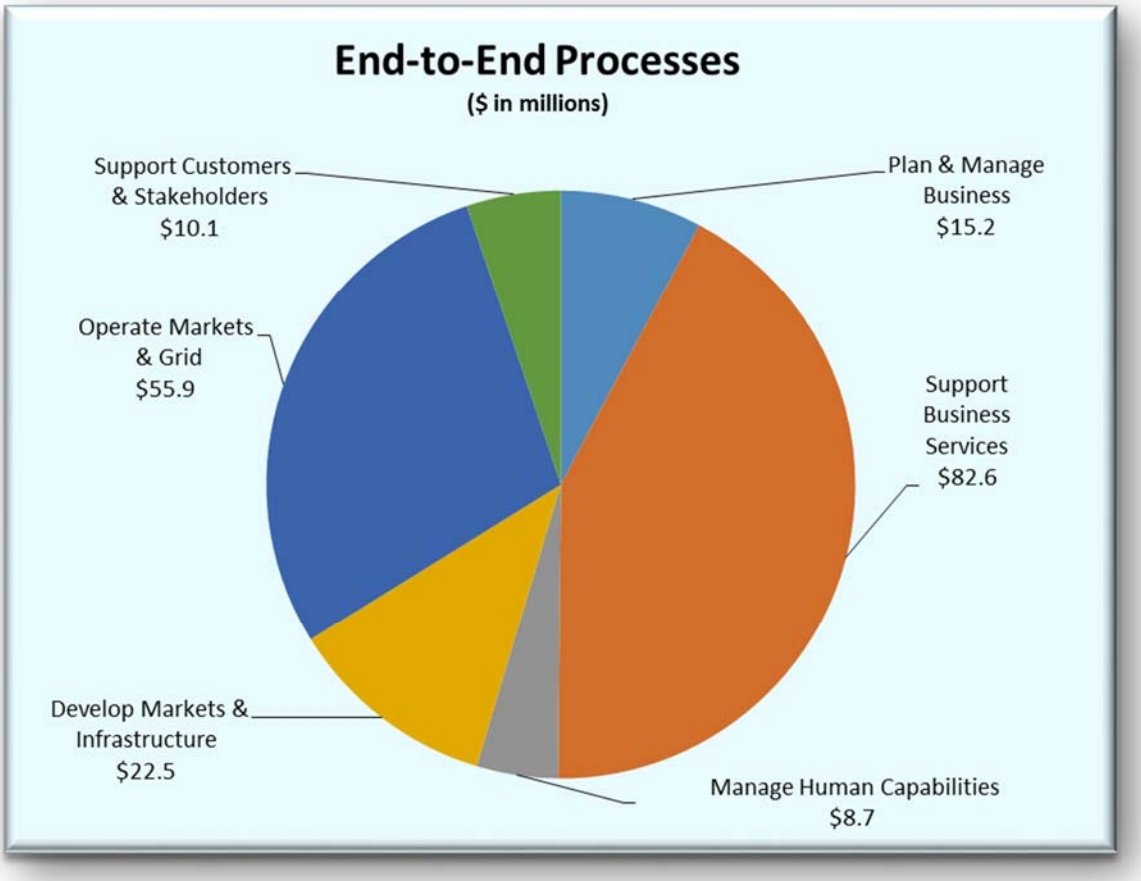
1. Reliable management of the grid,
2. Efficient operation of the ISO markets, and
3. Continued pursuit of operational excellence.

The Strategic Vision provides employees and managers our common goals while the budget explains how the corporation funds and allocates its resources to support its business plans. The budget is built upon a balanced mix of staffing, skills and financial resources.

Aligning the strategic planning process with budget planning provides greater transparency into the ISO's resources and business and operation costs. The ISO remains steadfast in its efforts to manage costs and utilize corporate resources in a smart and prudent manner.

III. O&M Budget - Process View

The ISO uses an activity-based costing system to provide greater transparency and granularity in how the budget supports corporate efforts. In support of this system, all employees record time worked each week to activities that roll-up to the six primary processes described below. Aggregating the time reported by employees results in percentages for each of the processes that represent the percentage of total resources spent on that process. Using the hours from the first nine months of 2019, the resulting percentages are then applied to the 2020 O&M budget. The results represent the costs for the six processes as shown below.



Plan and Manage Business

The **plan and manage business** process amounts to 7.8% of the O&M budget, and consists primarily of the activities related to strategic planning, governance, financial planning and project management.

Support Business Services

The **support business services** process amounts to 42.3% of the O&M budget, and is comprised primarily of the activities related to information technology, financial, legal and compliance support services.

Manage Human Capabilities

The **manage human capabilities** process amounts to 4.5% of the O&M budget, and consists of five primary end-to-end processes that combine to ensure the ISO attracts and retains the skills and talent necessary to achieve business objectives. The processes are compensation, benefits, recruitment, training and development, and employee relations.

Develop Markets and Infrastructure

The **develop markets and infrastructure** process group amounts to 11.5% of the O&M budget, and includes two separate processes that support the creation of value-added enhancements to the market design, as well as to proactively plan and facilitate grid upgrades. Activities in these processes include the review and analysis of the efficiency and quality of market results, identifying needed market design improvements, and transmission and generation interconnection planning.

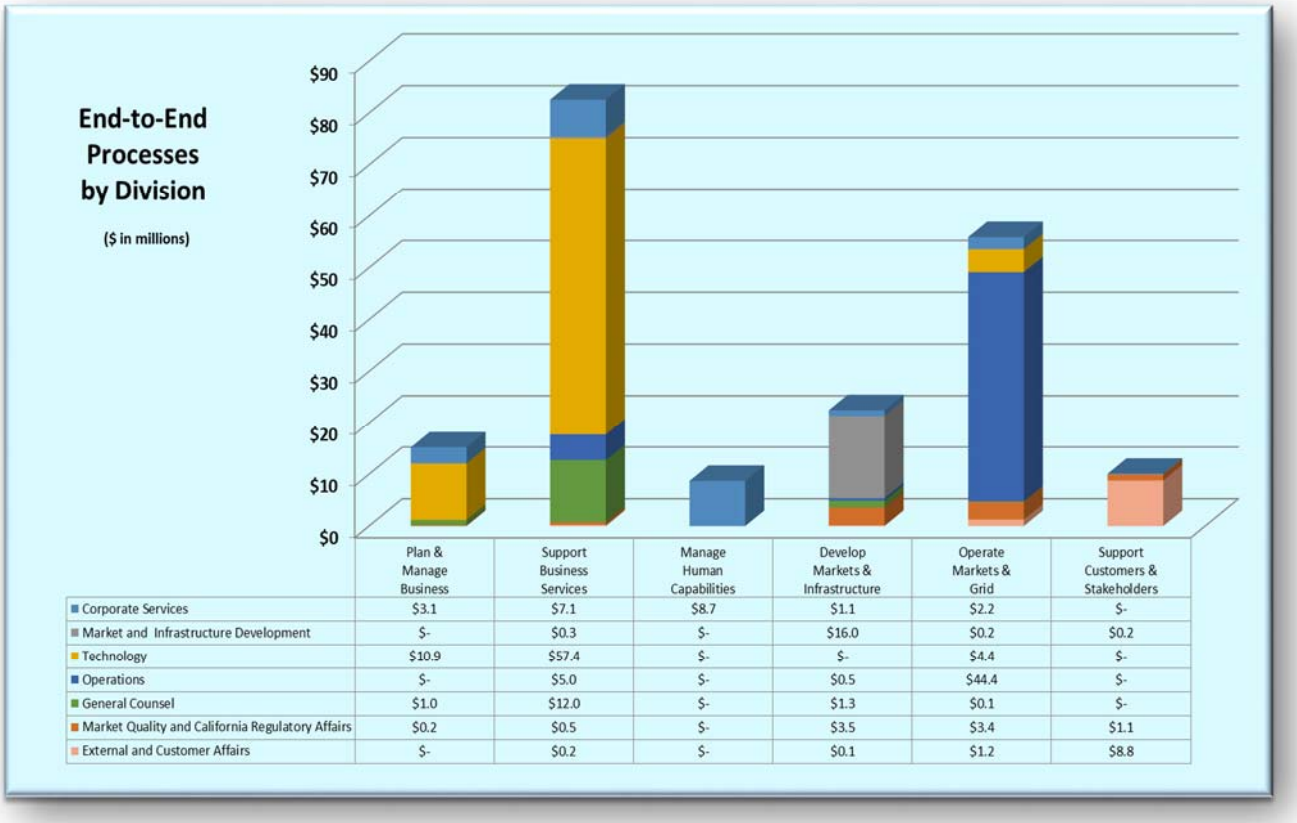
Operate Markets and Grid

The **operate markets and grid** process group amounts to 28.7% of the O&M budget, and includes three separate processes: 1) manage market and reliability data and modeling; 2) manage markets and grid; and 3) manage operations support and settlements.

Support Customers and Stakeholders

The **support customers and stakeholders** process amounts to 5.2% of the O&M budget, and consists primarily of the activities related to client and account management, stakeholder processes, government and regional affairs, and communications.

A look at how the process costs are allocated by division is as follows.

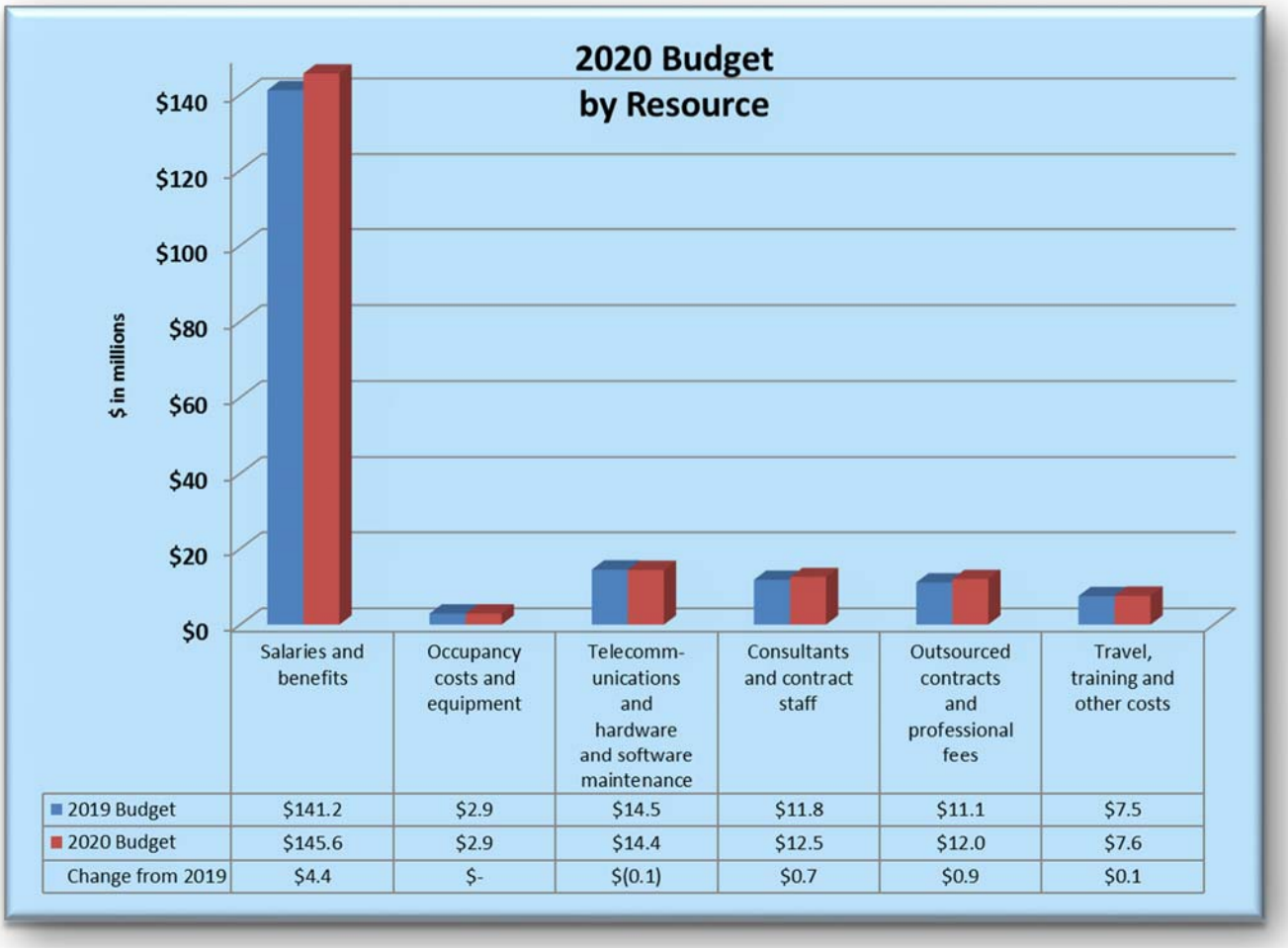


	Plan & Manage Business	Support Business Services	Manage Human Capabilities	Develop Markets & Infrastructure	Operate Markets & Grid	Support Customers & Stakeholders
Corporate Services	$3.1	$7.1	$8.7	$1.1	$2.2	$-
Market and Infrastructure Development	$-	$0.3	$-	$16.0	$0.2	$0.2
Technology	$10.9	$57.4	$-	$-	$4.4	$-
Operations	$-	$5.0	$-	$0.5	$44.4	$-
General Counsel	$1.0	$12.0	$-	$1.3	$0.1	$-
Market Quality and California Regulatory Affairs	$0.2	$0.5	$-	$3.5	$3.4	$1.1
External and Customer Affairs	$-	$0.2	$-	$0.1	$1.2	$8.8

IV. O&M Budget - Resource View

This section views the O&M budget in the traditional resource categories in which expenses are classified. The 2019 budget reflects reclassifications in order for it to be comparable to the 2020 budget presentation.

The chart below shows the major resource components.



	Salaries and benefits	Occupancy costs and equipment	Telecomm-unications and hardware and software maintenance	Consultants and contract staff	Outsourced contracts and professional fees	Travel, training and other costs
2019 Budget	$141.2	$2.9	$14.5	$11.8	$11.1	$7.5
2020 Budget	$145.6	$2.9	$14.4	$12.5	$12.0	$7.6
Change from 2019	$4.4	$-	$(0.1)	$0.7	$0.9	$0.1

Salaries and Benefits

The ISO depends on its highly educated and experienced employees to operate the grid and support market functions, which makes staff a critically important resource. Salaries and benefits comprise of 75% of the 2020 and 74% of the 2019 O&M budgets.

The staffing plan concentrates on attracting and retaining the best and brightest individuals in the industry. At times, the ISO revises the organizational structure to help keep pace with changing resource needs. The ISO also makes periodic organizational changes to align resources to focus on the important matters identified in the company's Strategic Vision, and better reflect end-to-end business processes.

The budgeted staffing level for 2020 is 647 employees, which is equivalent to the 2019-budgeted staffing level. As our active headcount is 634 as of the end of November 2019, there is no vacancy factor included in the 2020 budget.

A summary of the budgeted headcount for 2020 and 2019 is as follows.

Projected Staffing Levels	2020 Budget	2019 Budget	Change
Corporate Services Divisions	54	54	-
Market and Infrastructure Development	66	66	-
Technology	209	209	-
Operations	214	214	-
General Counsel	35	35	-
Market Quality and California Regulatory Affairs	30	30	-
External and Customer Affairs	39	39	-
Gross Headcount	**647**	**647**	-
Less Program Office Staff Included in Capital	(5)	(5)	-
Net Headcount	**642**	**642**	-

Staffing Related to Capital

As in past years, the O&M budget does not include the costs of staff dedicated full-time to capital projects, which are components of a separate capital budget. The capitalized staff amounted to five full-time staff in the Technology division's Program Management Office. The cost of other staff engaged in capital projects is budgeted in their respective cost centers; however, the financial statements that are prepared in accordance with generally accepted accounting principles include the capitalization of this labor.

Compensation Structure

The compensation budget includes funding for employee base salaries, benefits and payroll taxes, as well as other compensation elements, such as overtime, performance compensation, and related costs such as relocation and tuition reimbursement. The budget also includes funds for salary adjustments for merit, equity and market adjustments; as well as for increased healthcare costs. These costs have been budgeted for each position.

In setting the annual merit, equity and market adjustments budget, the Human Resources department participates in salary surveys administered by qualified third-party vendors. These vendors confidentially gather information related to competitive market pay rates.

The ISO's ability to attract and retain talent with the necessary skills and knowledge directly links to our ability to maintain competitive pay practices.

The total compensation packages provided to employees include performance compensation with payouts in the subsequent year based on individual and corporate performance.

A summary of the compensation components is as follows.

Compensation Components With Benefit Burden ($ in millions)	2020 Budget	2019 Budget	Change
Base Compensation	$119.4	$115.4	$4.0
Overtime (includes structured overtime for grid operators)	7.0	7.2	(0.2)
Performance Compensation	17.4	16.8	0.6
Other	1.8	1.8	0.0
Total Personnel Expense	**$145.6**	**$141.2**	**$4.4**

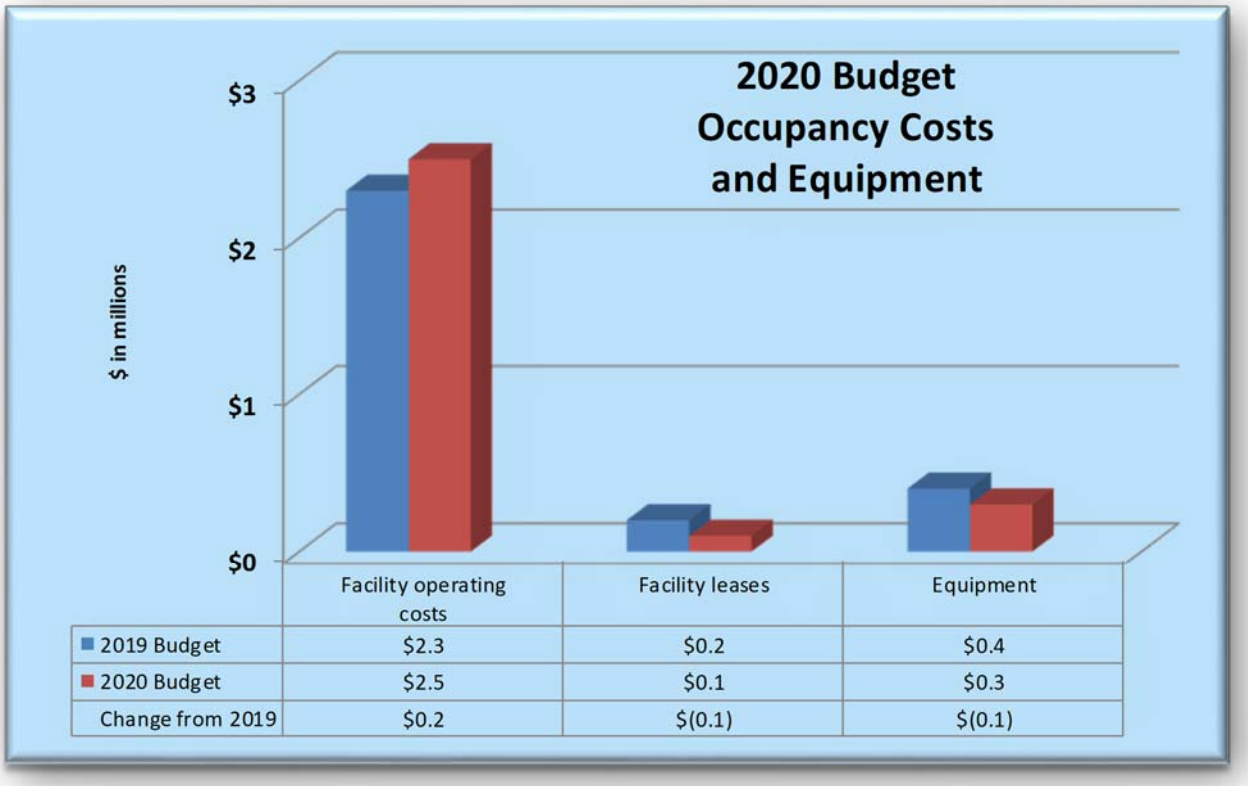
The employee benefits burden will remain at 38% of salary costs as summarized in the table below. The ISO will continue to manage contracts, prudently, to ensure these benefits are available to eligible employees with the costs primarily depending on employee population levels and participation.

The benefits burden is broken down as follows.

Benefit	Components	Rate
Health and Welfare Plans Medical, Dental and Vision	Medical, dental and vision; life, accidental death and long-term disability insurance; state unemployment insurance; and worker's compensation	16%
Retirement Benefit Plans	Retirement Savings Benefit Plan 401(k); Federal social security and Medicare; executive retirement plans; and retiree medical benefit plan	22%
Benefit Burden Rate		**38%**

Occupancy Costs and Equipment

Occupancy costs and equipment remains unchanged at $2.9 million for 2020. These costs represent 1% of the 2020 and 2% of the 2019 budget.

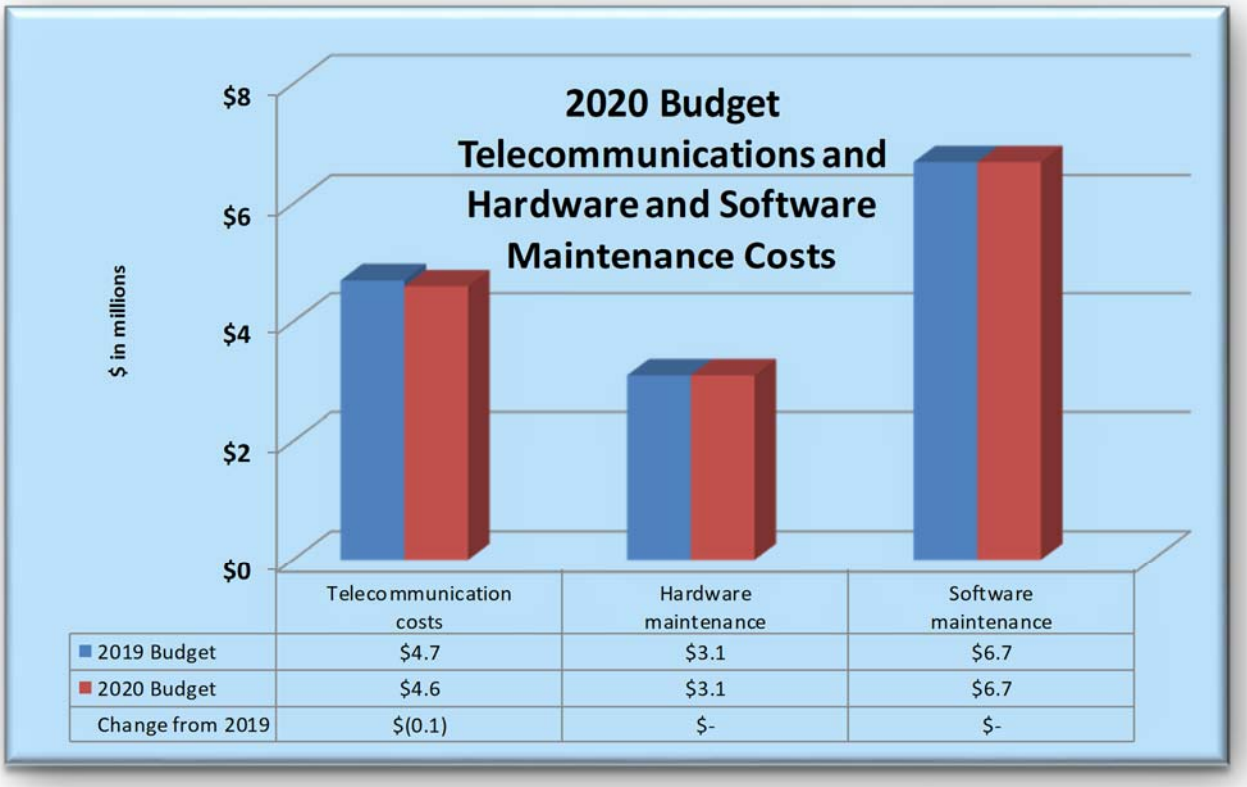


	Facility operating costs	Facility leases	Equipment
2019 Budget	$2.3	$0.2	$0.4
2020 Budget	$2.5	$0.1	$0.3
Change from 2019	$0.2	$(0.1)	$(0.1)

This resource category consists of the various ongoing costs to operate the facilities and related equipment. Whereas there is minimal shift between the expense drivers in this category for 2020, the expense category itself remains flat compared to 2019.

Telecommunications and Hardware and Software Maintenance Costs

Telecommunications and hardware and software maintenance costs will decrease nominally to $14.4 million for 2020. These costs represent 8% of the 2020 and 2019 budgets.



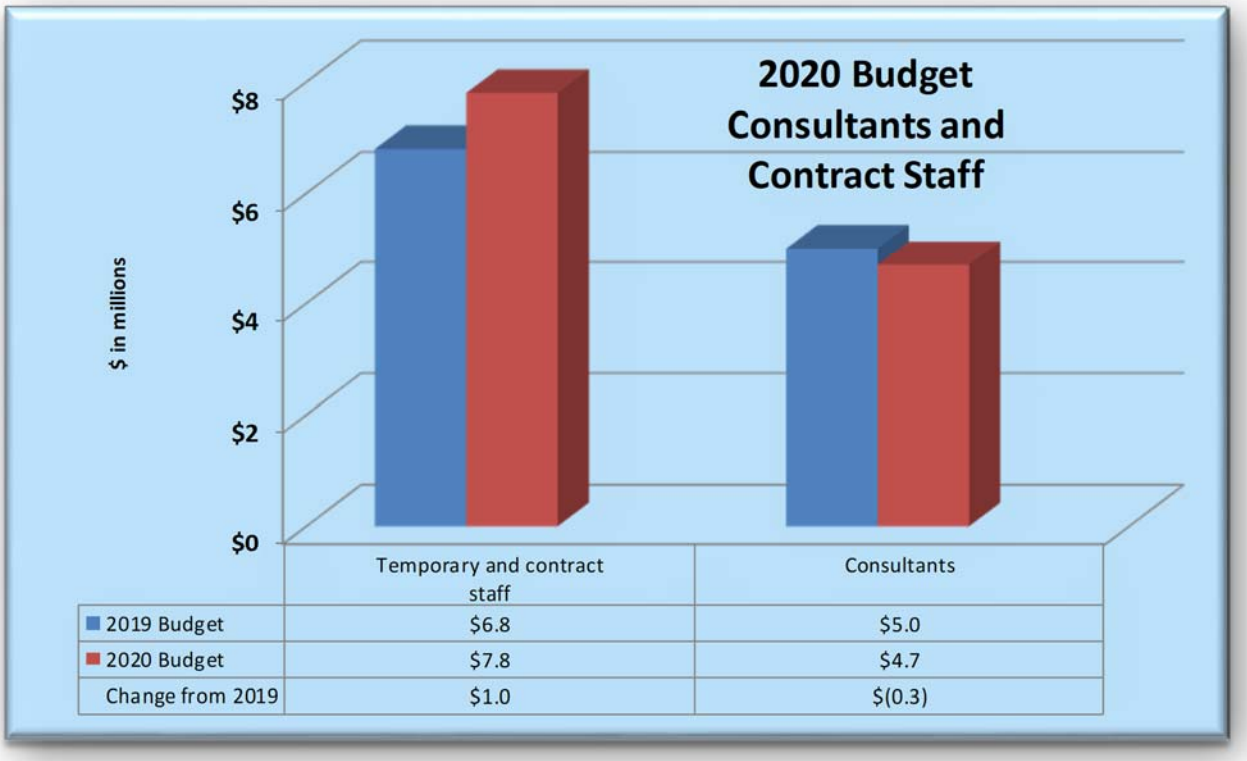
	Telecommunication costs	Hardware maintenance	Software maintenance
2019 Budget	$4.7	$3.1	$6.7
2020 Budget	$4.6	$3.1	$6.7
Change from 2019	$(0.1)	$-	$-

Telecommunication costs, which include wired and wireless services, will decrease nominally for 2020. The decrease is primarily due to reduced negotiated rates for telecommunication services.

Hardware and software maintenance costs, which are primarily licensing fees, remain unchanged for 2020.

Consultants and Contract Staff

Consulting and contract staff costs will increase by $0.7 million to $12.5 million for 2020. The consulting and contract staff budgets represent 6% of the 2020 and 2019 budget.

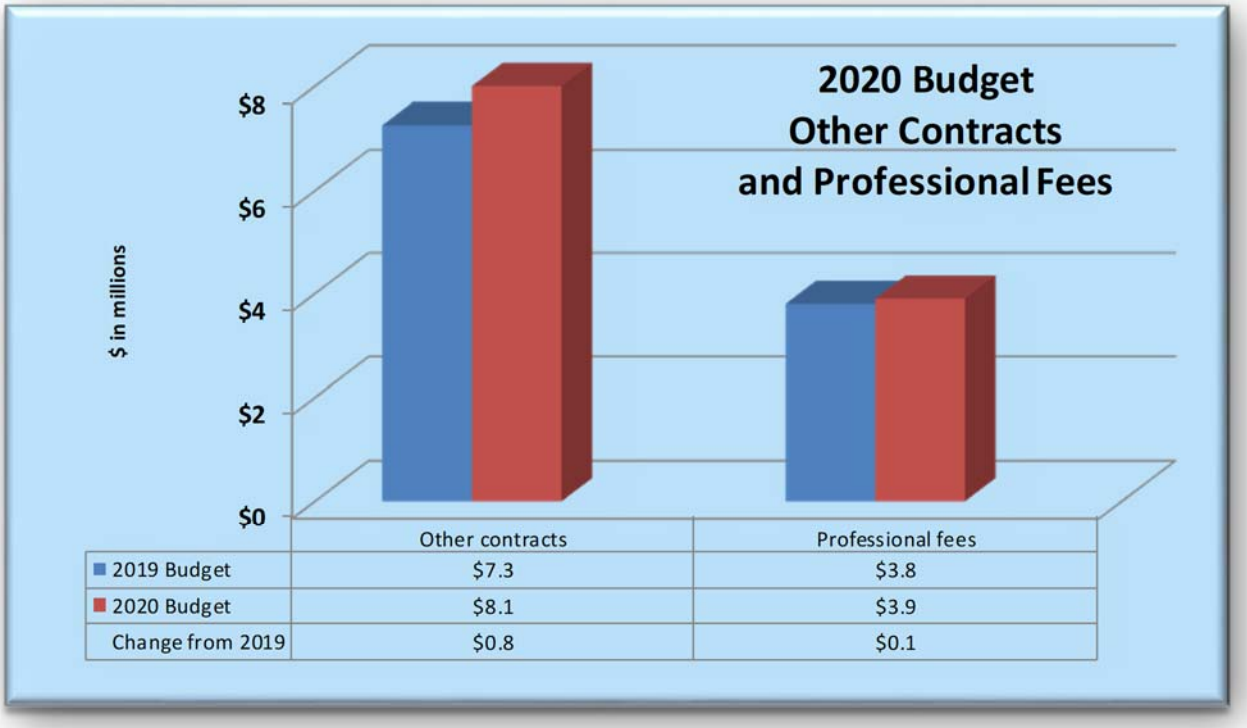


	Temporary and contract staff	Consultants
2019 Budget	$6.8	$5.0
2020 Budget	$7.8	$4.7
Change from 2019	$1.0	$(0.3)

The ISO regularly evaluates how to meet its responsibilities while remaining cost-effective and providing the highest service quality whether through hiring full-time employees or using outside resources (e.g., contractors, consultants or temporary staff). At times, the ISO may bring contractor work in-house when it is of an ongoing nature and lowers the overall cost with the same or better service quality. Examples of efforts requiring budget in 2020 include resource adequacy studies, process assessments, training, day-ahead-market studies, technology and operations system improvements, and the need for subject matter experts in various fields such as renewable integration.

Outsourced Contracts and Professional Fees

Outsourced contracts and professional fees will increase by $0.9 million to $12.0 million for 2020. The budget category represents 6% of the 2020 and 2019 budgets.



	Other contracts	Professional fees
2019 Budget	$7.3	$3.8
2020 Budget	$8.1	$3.9
Change from 2019	$0.8	$0.1

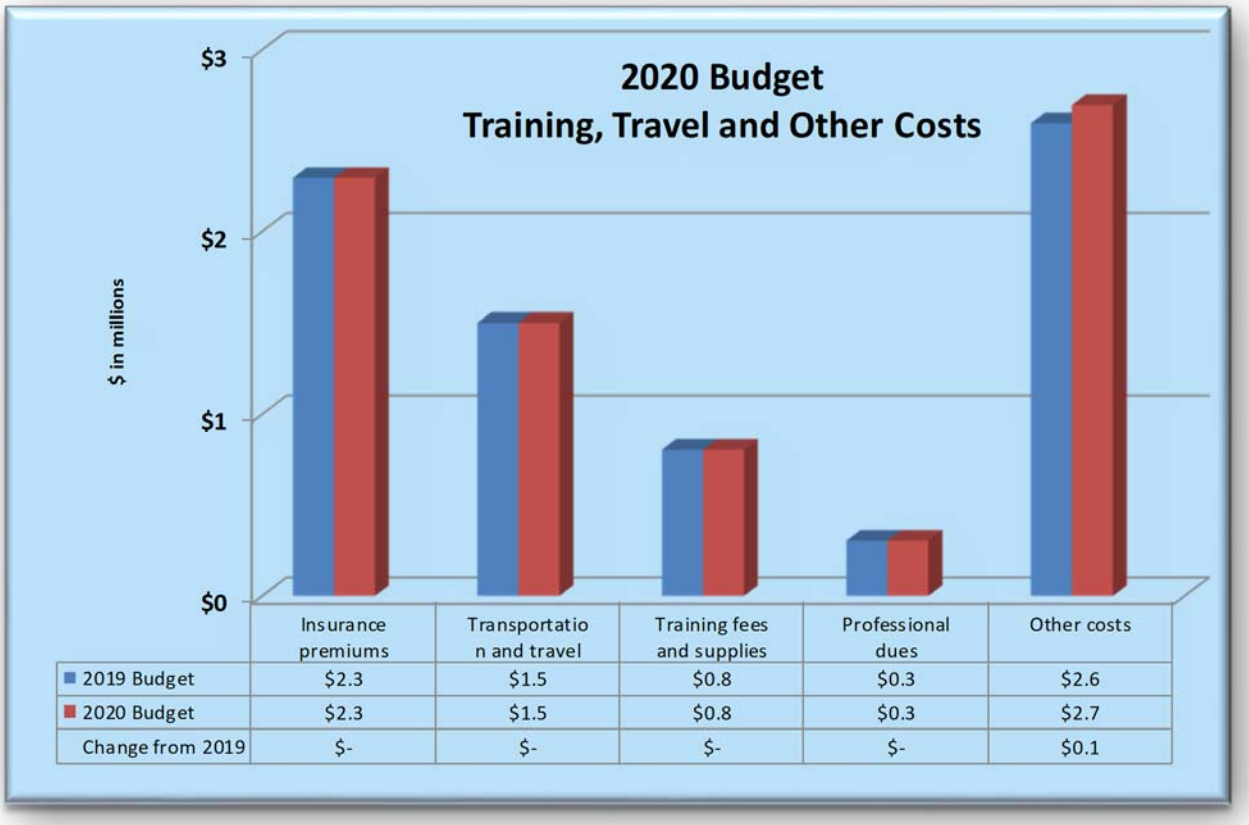
Other contracts, which represent contracts with third-party vendors for services, will increase by $0.8 million in 2020. The primary driver being the addition of tools needed to support RC functions.

A large component of the other contracts resource category is our forecasting costs. Intermittent resources pay a forecasting fee to the ISO of $0.10 per megawatt hour of generation. Such fees are budgeted for a total of $4.5 million in 2020. These fees received from the variable resources are included in the other costs and revenues component of the GMC revenue requirement to offset the related forecasting costs.

Professional fees, which are largely outside legal and audit costs, will increase by $0.9 million for 2020. This is due to an increase in costs for auditing services.

Training, Travel and Other Costs

Training, travel and other costs will increase nominally to $7.6 million for 2020. These budgets represent 4% of the 2020 and 2019 budget.



	Insurance premiums	Transportation and travel	Training fees and supplies	Professional dues	Other costs
2019 Budget	$2.3	$1.5	$0.8	$0.3	$2.6
2020 Budget	$2.3	$1.5	$0.8	$0.3	$2.7
Change from 2019	$-	$-	$-	$-	$0.1

Transportation and travel, training fees and supplies, professional dues, and insurance premiums, which include all of the corporate liability and property policies, remain unchanged for 2020.

Other costs (primarily bank fees, conference fees, office supplies and Board and stakeholder meeting costs) will have a nominal increase for 2020.

Reconciliation of 2020 O&M Budget

The O&M budget will increase by $6.0 million, or 3%, to $195.0 million in 2020 compared to $189.0 million in 2019.

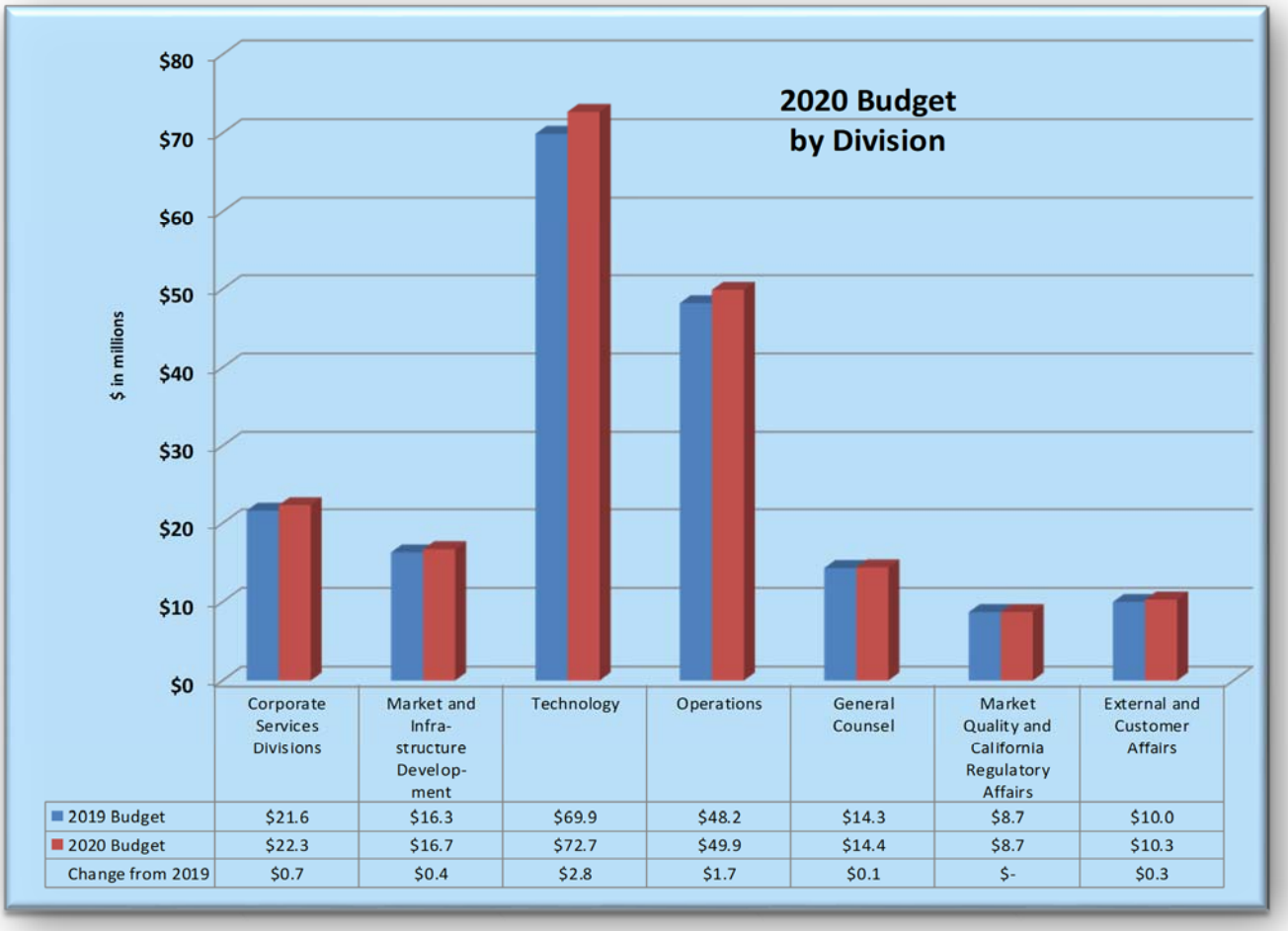
A reconciliation of the change follows ($ in millions).

2019 O&M Budget	**$189.0**
Increases in the Budget	
Merit and other compensation increases	4.6
Increase in temporary staff	1.0
Increase in other contracts and services	0.8
Increase in travel, office and other costs	0.1
Total Increases	**6.5**
Decreases in the Budget	
Reduction in consultants	(0.3)
Reduction in overtime	(0.2)
Total Decreases	**(0.5)**
Net Change in Budget	**6.0**
2020 O&M Budget	**$195.0**

V. O&M Budget - Divisional View

This section views the O&M budget by division. The 2019 budget reflects reclassifications in order for it to be comparable to the 2020 budget presentation.

The O&M budget by division is as follows.



	Corporate Services Divisions	Market and Infra-structure Develop-ment	Technology	Operations	General Counsel	Market Quality and California Regulatory Affairs	External and Customer Affairs
2019 Budget	$21.6	$16.3	$69.9	$48.2	$14.3	$8.7	$10.0
2020 Budget	$22.3	$16.7	$72.7	$49.9	$14.4	$8.7	$10.3
Change from 2019	$0.7	$0.4	$2.8	$1.7	$0.1	$-	$0.3

The Technology and Operations divisions account for a combined 63% of the O&M budget. In all divisions, with the exception of Technology, the typical driver of year-over-year changes are labor related costs. While labor costs are also a main driver in the Technology division, many of the other resource categories can have an impact on the Technology budget as well (e.g., hardware and software maintenance costs).

A detailed description of each division follows including budgeted staffing levels and a description of any material changes.

Corporate Services Divisions

The Corporate Services Divisions are comprised of the office of the Chief Executive Officer (which includes the Department of Market Monitoring), Finance, and Human Resources divisions.

The **Department of Market Monitoring (DMM)** proactively undertakes sophisticated analysis to enhance market efficiencies and mitigate market power. This effort is especially important as the ISO implements new market features and services to support renewable resource development.

The department actively monitors the wholesale energy markets to prevent non-competitive behavior and ensure participants follow the rules. The DMM also reviews market results to confirm the activity produces effective and efficient outcomes.

The department continues to review and provide feedback on the effectiveness of the 15-minute/5-minute markets and the Western Energy Imbalance Market (EIM).

The DMM offers timely input on major market design initiatives, as well as products and requirements to ensure sufficient flexible capacity is available to integrate increasing amounts of variable renewable energy. In addition, the DMM works closely with the Market Quality and California Regulatory Affairs division to identify the challenges and opportunities of excess generation as more renewable resources, especially solar, are interconnected to the grid.

The DMM Oversight Committee and the Board of Governors separately review and approve the DMM budget. The budget is included in the Chief Executive Officer division.

The **Finance** division is comprised of various financial functions including treasury, credit, accounting, financial planning and procurement. Finance professionals manage cash and investments, insurance, credit and collateral management, clearing of the ISO market, general accounting, internal and external financial reporting, payables processing, financial planning and forecasting, budgeting, and administering the grid management charges (GMC). Through effective vendor selection and negotiation expertise, staff procures and manages goods and services for the corporation, as well as negotiates and manages commercial contracts.

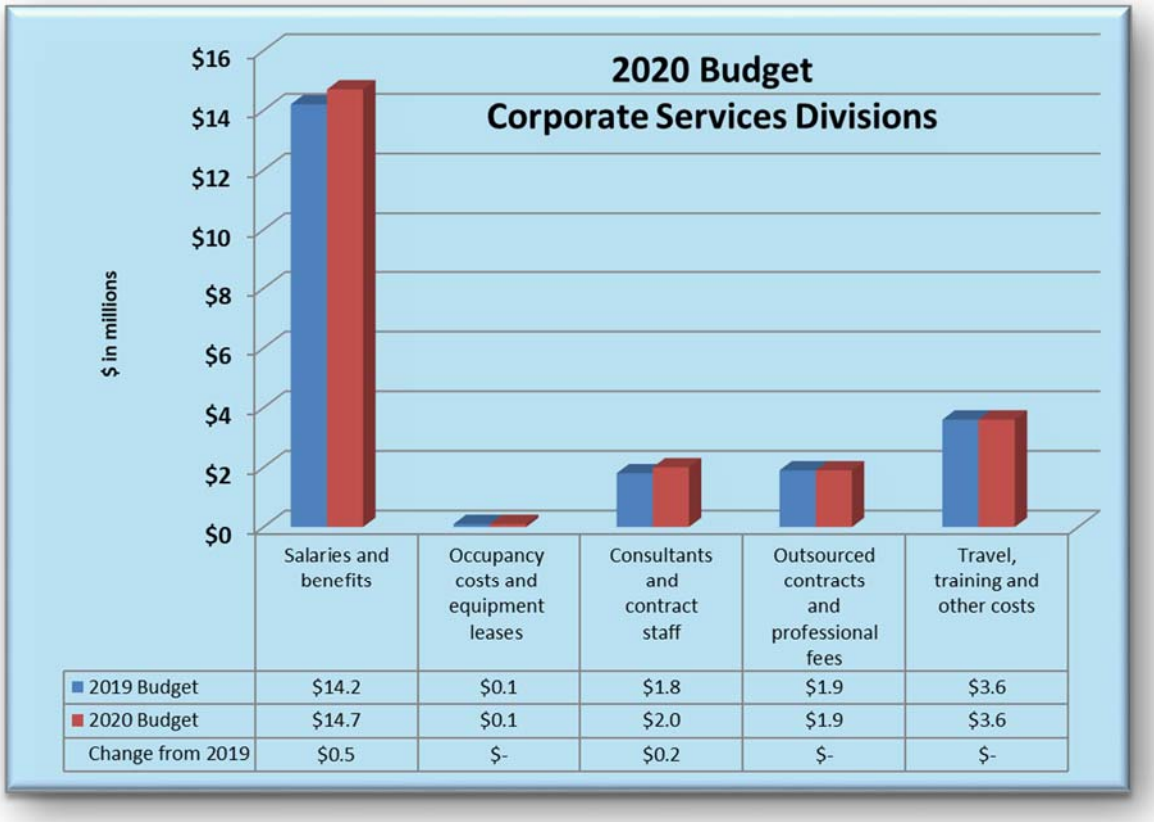
The **Human Resources** division uses established policies, programs and "people strategies" to attract and retain the uniquely talented professionals needed to reliably operate the electric grid and meet corporate strategic objectives and goals.

Essential people strategies include:

- Creating and reinforcing an intentional culture,
- Sustaining a highly engaged workforce,
- Enhancing knowledge and skills to ensure relevancy,
- Continuing to develop technical experts and strong leadership capabilities, and
- Recruiting and developing talent pipelines to retain targeted skills for critical areas.

Summary of Budget

The Corporate Services divisions' budgets will increase by $0.7 million to $22.3 million for 2020. Staffing remains unchanged at 54.



	Salaries and benefits	Occupancy costs and equipment leases	Consultants and contract staff	Outsourced contracts and professional fees	Travel, training and other costs
2019 Budget	$14.2	$0.1	$1.8	$1.9	$3.6
2020 Budget	$14.7	$0.1	$2.0	$1.9	$3.6
Change from 2019	$0.5	$-	$0.2	$-	$-

Salaries and benefits will increase by $0.5 million due to budgeted merit increases.

Consultants and contract staff will increase by $0.2 million primarily due to consultants for corporate training efforts.

Market and Infrastructure Development Division

The Market and Infrastructure Development division is a nationally as well as an internationally recognized leader in creating wholesale energy market designs that support a flexible grid powered with zero carbon resources. Grid planners use sophisticated modeling and analysis to create a holistic 10-year forward-looking transmission plan each year that supports the growth in renewable resources and maintains and strengthens grid reliability. Division staff also perform studies for resources seeking to interconnect to the grid. The division takes the lead in developing policies that support a robust market, and promote timely and efficient infrastructure development. It is responsible for complying with NERC standards and WECC regional criteria applicable to the Planning Coordinator functional entity. It is also responsible for negotiating, executing and tracking compliance using contractual agreements between the ISO and external entities, including power plant owners and operators.

The division regularly provides advice and in-depth analysis to state regulators on issues related to grid reliability and market efficiency.

A main priority for the division is developing the market mechanisms needed to expand elements of the ISO's day ahead market to balancing areas throughout the West. Such market enhancements play a critical role in managing and efficiently using renewable resources, and sharing low cost energy across a wide geographic area.

The division's experts spend substantial time and effort developing the rules and mechanisms to efficiently and reliably integrate renewable resources. This effort includes advancing distributed energy resources, including energy storage and electric vehicles, so participation in the wholesale energy market leverages their multi-faceted operational characteristics to the benefit of the grid and consumers. In addition, the grid planners continually look for ways to enhance transmission planning and generator interconnection processes to support state energy and environmental goals.

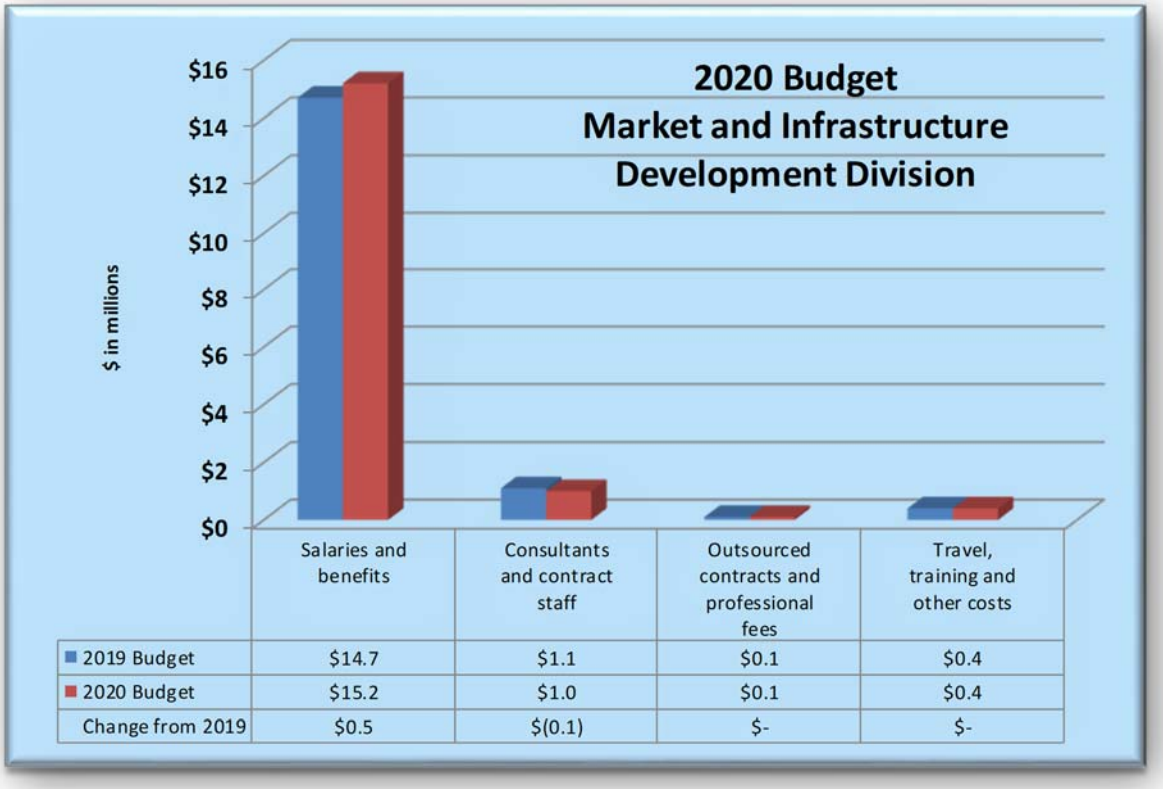
The **Market and Infrastructure Policy** group develops policies for new market products and enhancements to the existing market design to meet the changing needs of the grid. It also develops new policies for infrastructure development to better enable the rapid

transition to a low carbon and reliable grid. The division is also refining Western EIM processes and rules to promote an effective and transparent real-time market for EIM participants, which benefits the western U.S. interconnected grid.

The **Infrastructure Development** group conducts transmission planning and resource interconnection studies to ensure the ISO transmission system evolves to meet the changing needs of the grid. This group manages the resource interconnection study process - a competitive solicitation process for new transmission - and a committee for reviewing transmission maintenance practices among the ISO-participating transmission owners.

The **Infrastructure Contracts and Management** group develops and manages contracts to support the efficient function of the ISO markets. This includes generator interconnections and contracts related to reliable grid operations as determined by state and federal policies, and technological advances. Ongoing duties include developing policy positions on regulatory issues and responsibility for more than 2,700 ISO regulatory contracts, including their negotiation, drafting, and administration.

Summary of Budget[3]



The Market and Infrastructure Development Division budget will increase by $0.4 million to $16.7 million for 2020. Staffing remains unchanged at 66.

Salaries and benefits will increase by $0.5 million due to budgeted merit increases.

Consultants and contract staff will decrease nominally due to changes in administrative efforts.

[3] In November 2019, Dr. Keith Casey, Vice President, Market and Infrastructure Development, announced his retirement from the ISO effective in January 2020. The Market and Infrastructure Development division will undergo organizational changes in January 2020 related to Dr. Casey's retirement. The division's 2020 budget will be modified from what is presented in the budget book to reflect any organization changes. However, the overall 2020 corporate O&M budget amount will remain within the Board of Governor's approved amount.

Technology Division

The Technology division encompasses information technology (IT), power systems technology, campus operations, software quality, IT architecture, information security and program management functions. The division enhances ISO's intra-system performance and implements new functionalities to support goals and objectives by providing cost efficient and exceptional service.

The division's priorities are:

- Implementing strategic initiatives by making appropriate process, procedure and system changes,
- Making incremental technology improvements, especially for market and reliability operations,
- Proactively identifying and resolving system problems, and
- Predicting and proactively strengthen system vulnerabilities.

The Technology division maintains the foundation that the ISO's transparent and robust wholesale energy market and transmission system relies upon to integrate renewable resources. The division is also developing a scalable IT infrastructure to support an expanded day-ahead market and provide grid optimization to utilities throughout the West.

The division is well into its mid- and long-term plan to implement network architectural changes so ISO systems are easy to maintain as well as cost less to do so, while leveraging technologies to improve cost effectiveness.

The **Program Management Office** systematically serves the corporate strategy through project and process excellence. It leads, manages, and analyzes major initiatives and projects that enhance customer service and processes. The division's primary functions include release planning, program management, and business and system analysis for the Strategic Vision and the market initiatives roadmap. The Program Management Office follows proven, reliable processes to provide quality services, which are based upon Project Management Institute and Capability Maturity Model Integration standards.

The **Power Systems and Smart Grid Technology Development** department identifies emerging technologies that could benefit ISO operations, as it finds better ways to use mature technologies to enhance grid efficiencies and monitoring capabilities. Technology is

critical for efficiently interconnecting and managing renewable resources and identifying issues that could threaten grid reliability. The department reviews and approves technical requirements, software designs, and testing of the scheduling infrastructure business rules, integrated forward market, real-time markets, and market quality service applications.

The **Power System Technology Operations** department supports ISO operations by developing critical cyber assets and real-time systems. Key functions include product management, software design, and production support for real-time and operations applications. The department works side-by-side with the Operations division to ensure all network releases, patching, and upgrade enhancements transition to production without disrupting grid operations.

The **Infrastructure Engineering and Network Operations** department includes systems engineering and administration; network and data center operations - including 24/7 support of pre-market, market and post market applications; database engineering and storage administration; and change, problem and asset management. The team also manages redundant data, voice communications across multiple sites including associated hardware, and software capital budgets.

The **Security, Architecture and Model Management and Quality** department supports creation of the tools to maintain the enterprise network model. The team tracks and suggests controls to safeguard corporate information security. The department oversees Critical Infrastructure Protection compliance, executes security, performance and test automation, and ensures overall software quality. The department also defines information technology architecture guidelines.

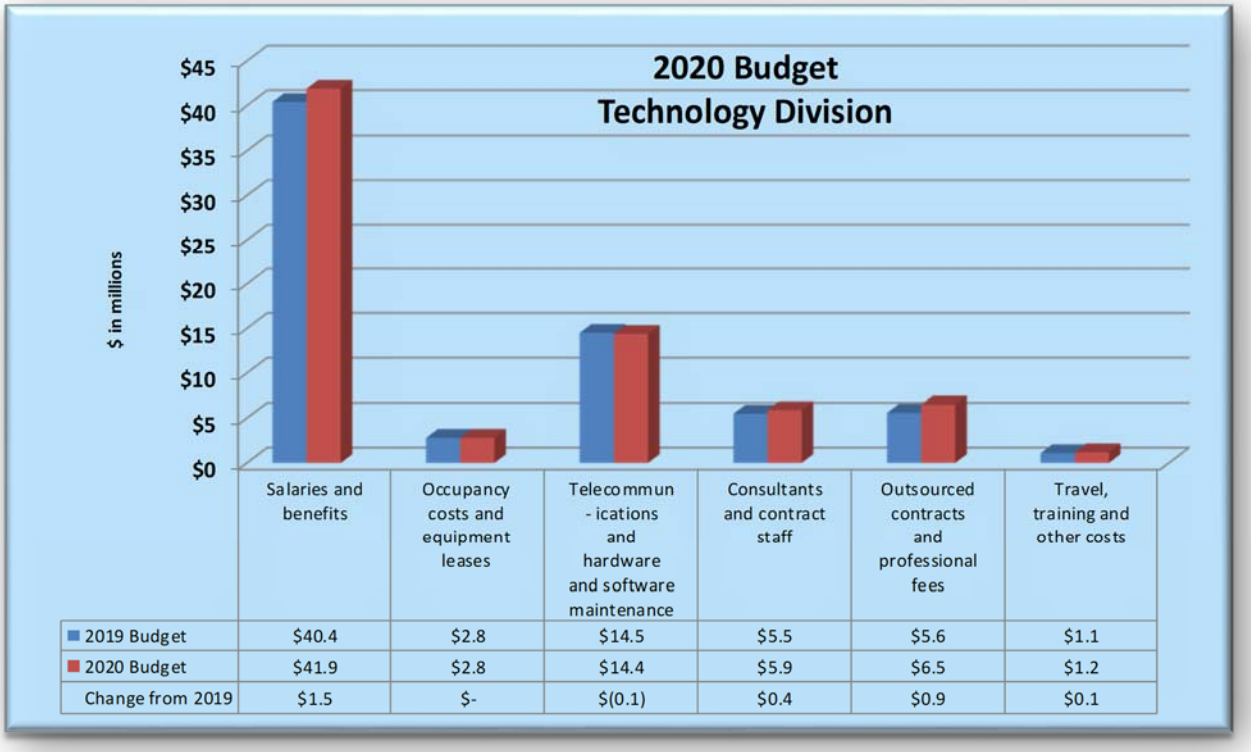
The **Business Solutions** department identifies software solutions and prepares them for deployment. Key functions include product management, systems analysis, software development, functional and regression testing, customer relationship management, vendor management, production support for ISO Operations and corporate and enterprise applications. The department's experts develop software applications that support every ISO division, all enterprise applications, and most applications that interact with external customers.

The **IT Enterprise Support and Campus Operations** department manages the service desk, desk side support of client systems, email, and supports all Windows servers. The Campus Operations team oversees the company buildings and infrastructure to provide a safe, efficient, and comfortable work environment. Expert building managers keep costs

down using industry best practices to maintain the ISO's 277,000 square foot LEED Platinum certified Folsom headquarters that sits on 27 acres, and the 35,833 sq. ft. backup facility in Lincoln. The team is also responsible for physical security at both ISO campuses. Additionally, the team includes Incident Command and Business Continuity to ensure the ISO is ready to respond to grid events and support normal business operations.

Summary of Budget

The Technology Division budget will increase by $2.8 million to $72.7 million for 2020. Staffing remains unchanged at 209.



	Salaries and benefits	Occupancy costs and equipment leases	Telecommun - ications and hardware and software maintenance	Consultants and contract staff	Outsourced contracts and professional fees	Travel, training and other costs
2019 Budget	$40.4	$2.8	$14.5	$5.5	$5.6	$1.1
2020 Budget	$41.9	$2.8	$14.4	$5.9	$6.5	$1.2
Change from 2019	$1.5	$-	$(0.1)	$0.4	$0.9	$0.1

Salaries and benefits will increase by $1.5 million due to budgeted merit increases.

The combined resources of telecommunication costs and hardware/software maintenance expenses will nominally decrease. This is primarily due to continued negotiations of reduced rates for telecommunication services.

Consultants and contract staff will increase by $0.4 million due to temporary contractors needed to complete efforts such as technology system improvements.

Outsourced contracts and professional fees will increase by $0.9 million primarily due to additional tools needed to support RC functions.

Travel, training, and other costs will increase nominally due to upward pressures on facility supplies costs.

Operations Division

The Operations division's mission is operating the bulk electric system and wholesale electricity markets with a high degree of reliability. It is comprised of System Operations, Operations Engineering Services, Regional Operations Policy and Analytics, Market Services Support, and Market Services Production departments.

Operating engineers use advanced technology tools to proactively manage the dynamic minute-by-minute changes experienced on the grid system. The ISO control center uses geospatial technology, and advanced visualization capabilities to provide system operators with a granular view of grid conditions. This means engineers can quickly identify potential grid and generation problems with a goal of solving them before they affect the real-time delivery of power. The Systems Operations department operates the Integrated Forward (wholesale) Market and the real-time market to deliver the most cost-effective electricity to consumers in California and seven other Western states while maintaining grid reliability.

The skilled professionals in the Systems Operations and Operations Engineering Services departments use advanced technologies and tools to reliably operate the grid, and support efficient markets that contribute to the evolution to a modern, flexible grid that reflects state policy goals.

The **System Operations** department is comprised of the Real-Time Operations and the Operational Readiness groups. The Real-Time Operations group includes interchange, transmission, generation, and market system operators who oversee electricity production schedules and power deliveries, and have the authority to manage generators and transmission lines to maintain reliability.

The **Operational Readiness** group implements the operational aspects of ISO policy and goals, and provides system operators with the tools and training needed to reliably manage the bulk electric system. The department functions include operating a training simulator program, implementing operations change initiatives, maintaining operating procedures, and developing and delivering training.

The **Operations Engineering Services** department directly supports System Operations with engineering and technical planning services. This includes performing annual and monthly resource adequacy validation and replacement requirement analysis; seasonal assessments, outage management and coordination analysis; and day-ahead and real-time engineering analysis. The department also assists in developing operating procedures and tools.

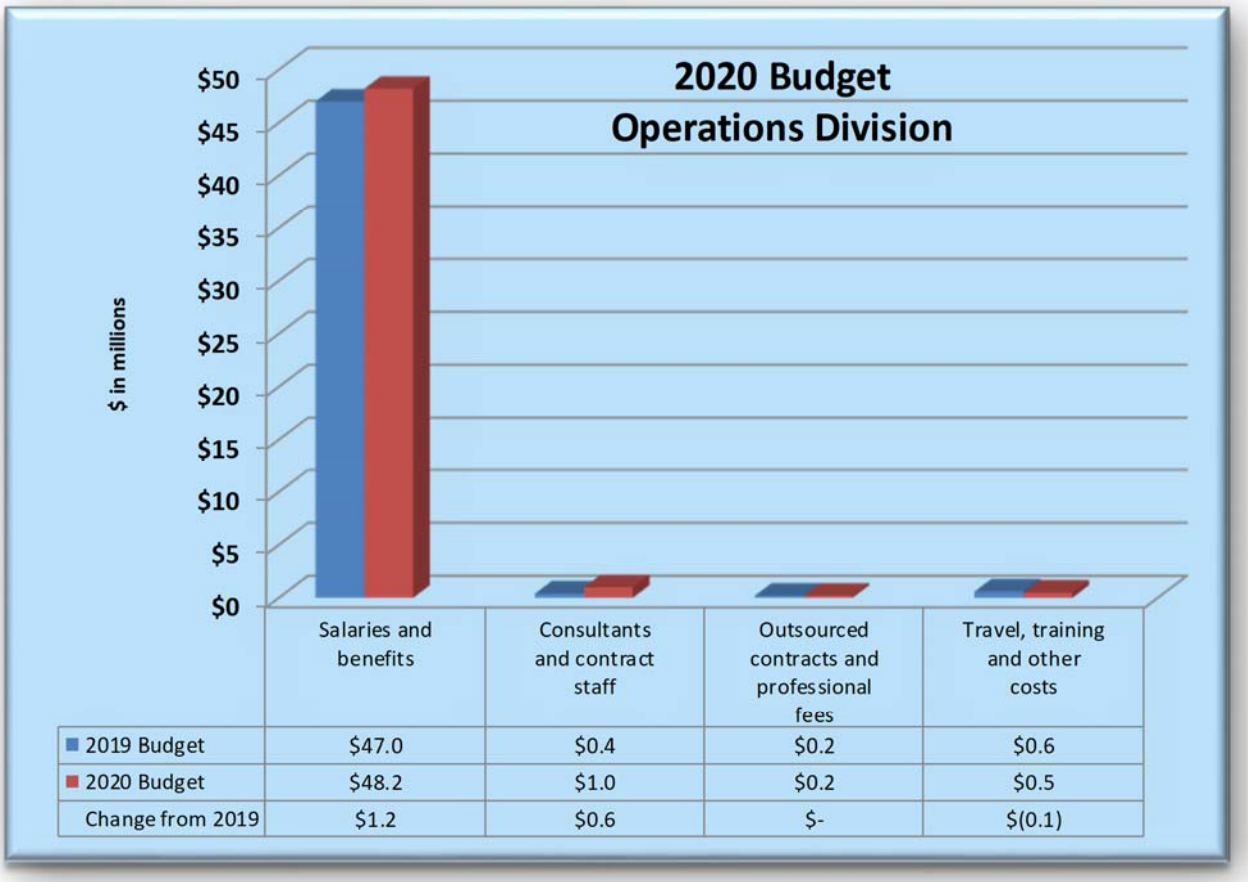
The **Regional Operations Policy and Analytics** department works with state, regional, and national entities to balance policy requirements with operational capabilities. This department is also the ISO liaison for coordinating gas and electric policies with state agencies and stakeholders, and represents the West in national forums on related gas and electric market issues. Additionally, this team provides comprehensive root-cause analysis services for both critical processes and operational events.

The **Market Services Support** department is responsible for implementing market software and technology enhancements to produce transparent, consistent, efficient operations and settlements. The team manages the Congestion Revenue Rights program, including model development, executing the monthly and annual auctions, and reporting on results. Other responsibilities include resolving settlement disputes, and processing and reporting of price corrections. Additionally, the team administers the Rules of Conduct program, which includes providing oversight of certain market participant behaviors.

The **Market Services Production** department works with new ISO participants to arrange for the exchange of data used in the ISO network and market models. The department supports existing participants in revising parameters for all related resources used in the markets. Department staff helps coordinate the required information exchange between ISO participants and internal supporting divisions, allowing defined weekly model scoping, verified accuracy of real-time telemetry and revenue metering, and coordinated resource interconnections. This department is also responsible for communicating with the ISO participants to produce daily settlement statements according to the tariff defined settlement timeline. This task is accomplished through daily system processing, data validations, corrections updating, and maintaining the weekly billing invoice publication cycle.

Summary of Budget

The Operations division budget will increase by $1.7 million to $49.9 million for 2020. Staffing remains unchanged at 214.



	Salaries and benefits	Consultants and contract staff	Outsourced contracts and professional fees	Travel, training and other costs
2019 Budget	$47.0	$0.4	$0.2	$0.6
2020 Budget	$48.2	$1.0	$0.2	$0.5
Change from 2019	$1.2	$0.6	$-	$(0.1)

Salaries and benefits will increase by $1.2 million due to budgeted merit increases.

Consultants and contract staff will increase by $0.6 million due to efforts such as operations system improvements.

Travel, training, and other costs will decrease nominally due to training program efficiencies.

General Counsel Division

The General Counsel division is led by the Vice President, General Counsel, Chief Compliance Officer and Corporate Secretary. The division is composed of the legal department, compliance and corporate affairs, internal audit, and the corporate secretary functions.

The **Legal** department provides legal counsel to the Board of Governors, the CEO, the executive team, and the ISO business units. The legal team provides advice and support on all legal matters that could affect the company. Legal advice is provided in all areas of the business, including regulatory proceedings before state and federal agencies, all tariff-related matters, generator interconnection issues, regulatory contracts, litigation, appeals and other adversary proceedings, compliance matters, vendor contracts, intellectual property, finance, tax, corporate governance, ethics and code of conduct matters, human resources, and immigration.

Compliance and Corporate Affairs promotes a corporate culture of compliance in support of all laws, regulations and corporate policies. The department assesses and ensures business units implement new and revised reliability standards and tariff requirements by documenting and monitoring processes, procedures and tools used to validate compliance. It collaborates with business units to test the effectiveness of internal controls to minimize the risk of non-compliance. It is also responsible for developing and implementing the corporate records management program in accordance with legal and regulatory recordkeeping requirements. In addition, Compliance and Corporate Affairs is responsible for a number of enterprise-wide responsibilities, including Strategic Vision development and formation of corporate annual and long-term goals and metrics.

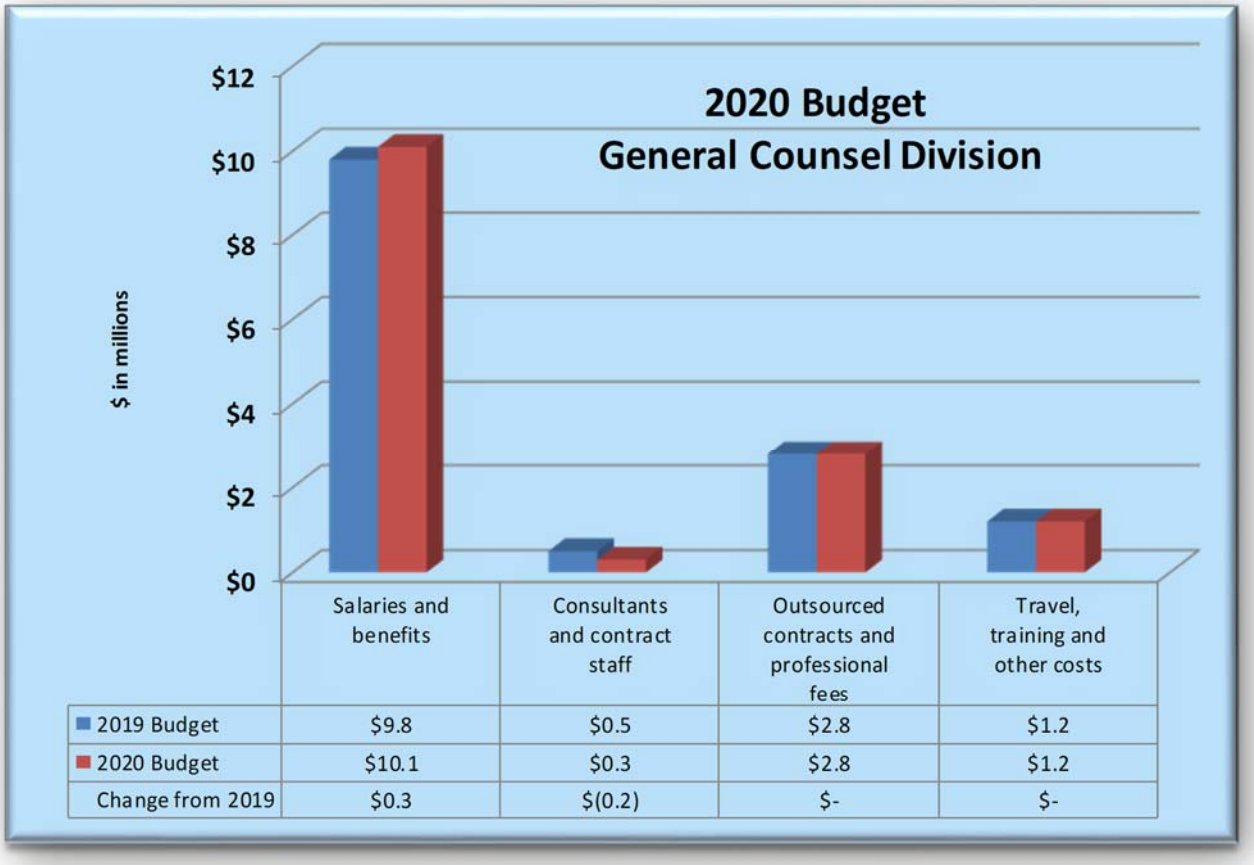
Internal Audit develops the annual internal audit plan and conducts audits to evaluate the effectiveness of management practices and controls. The team provides executive management and the Audit Committee with reasonable assurance regarding whether processes and controls are functioning as intended and risks are well managed. Internal Audit also facilitates the ISO enterprise risk activities, including briefing executive management and the Board on the top risks and status of the associated mitigation efforts. Internal Audit serves as an advisor to business units to add value and help promote a culture of compliance and ethics.

The **Corporate Secretary** oversees a team that coordinates Board and other governance-related matters that include Board of Governors and EIM Governing Body meetings and

materials, Board committee meetings and materials (including for the Market Surveillance Committee), and other Board and EIM Governing Body communications. This group also maintains the official corporate record with regard to Board and EIM Governing Body matters.

Summary of Budget

The General Counsel division budget will increase nominally to $14.4 million for 2020. Staffing remains at 35.



	Salaries and benefits	Consultants and contract staff	Outsourced contracts and professional fees	Travel, training and other costs
2019 Budget	$9.8	$0.5	$2.8	$1.2
2020 Budget	$10.1	$0.3	$2.8	$1.2
Change from 2019	$0.3	$(0.2)	$-	$-

Salaries and benefits will increase by $0.3 million *due to budgeted merit increases*.

Consultants and contract staff will decrease by $0.2 million primarily due to in-housing of various functions.

Market Quality and California Regulatory Affairs Division

The **Market Quality and California Regulatory Affairs** division tracks and reports market performance metrics, and performs price analysis and validation to augment transparency and confidence in market results. The division performs short-term load, wind, and solar forecasting, and assesses system flexibility to support integrating renewable resources. The division also performs assessments and quantifies benefits related to the Western EIM.

In addition to performing in-depth market analysis, the division uses advanced short-term demand and supply forecasting technologies to ensure grid needs are met through the competitive wholesale energy market. The division conducts generation fleet studies that test whether adequate "flexible capacity" is installed to meet future electricity growth.

The **Market Development and Analysis** department monitors the market, as well as identifies and resolves systemic issues. The department supports policy development and new market design implementation. Department experts co-host the Market Performance and Planning Forum web conference, which provides updates and observations on current market performance to stakeholders with an emphasis on coordinating plans with them to implement market enhancements, services and features.

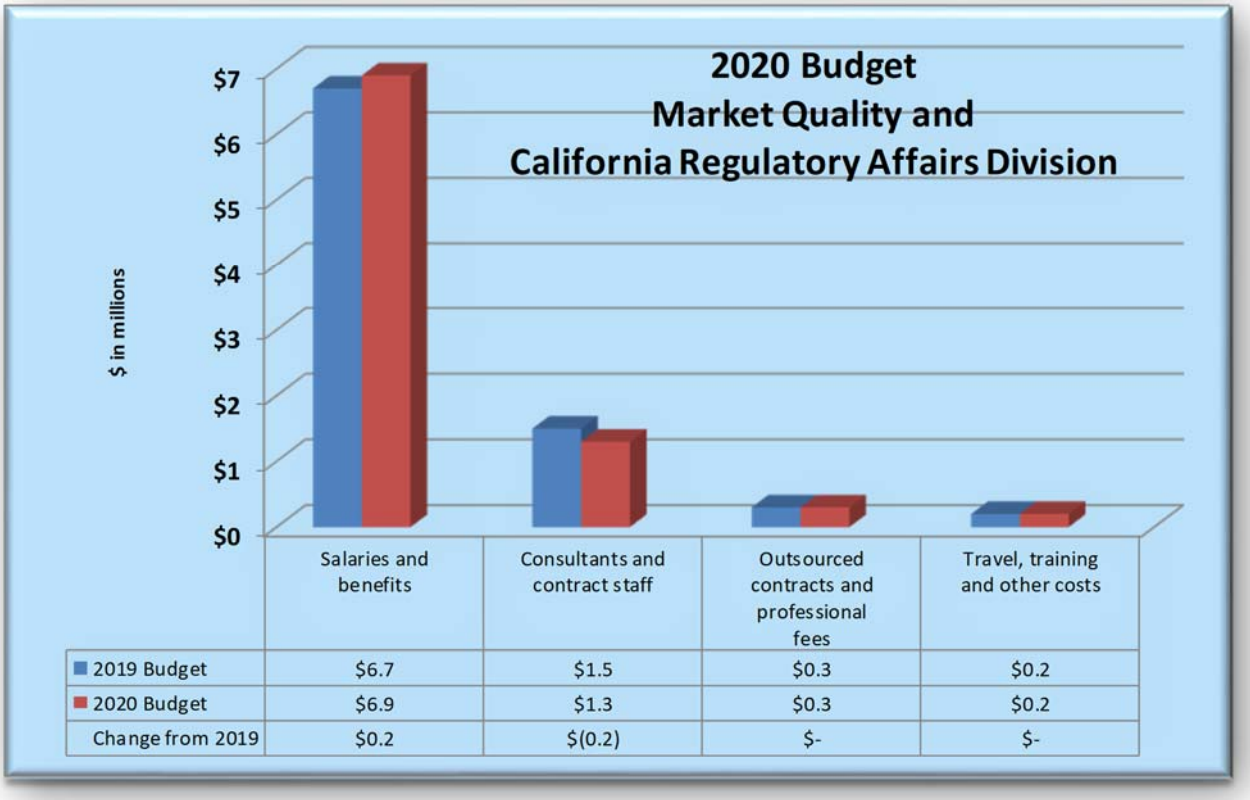
The **Market Validation and Quality Analysis** department monitors, analyzes, and validates the quality of daily market results. The department is responsible for price corrections, identifying, and addressing root causes of erroneous prices and other market quality issues.

The **Short Term Forecasting** department produces accurate short-term forecasts for load and variable energy resources including wind and solar generation.

The **California Regulatory Affairs** department builds and maintains relationships with regulatory agencies such as the California Public Utilities Commission, the California Energy Commission, and the California Air Resources Board, as well as monitors and manages regulatory matters that could influence ISO practices and policies.

Summary of Budget

The Market Quality and California Regulatory Affairs division budget will remain unchanged at $8.7 million for 2020. Staffing remains at 30.



	Salaries and benefits	Consultants and contract staff	Outsourced contracts and professional fees	Travel, training and other costs
2019 Budget	$6.7	$1.5	$0.3	$0.2
2020 Budget	$6.9	$1.3	$0.3	$0.2
Change from 2019	$0.2	$(0.2)	$-	$-

Salaries and benefits will increase by $0.2 million due to budgeted merit increases.

Consultants and contract staff will decrease by $0.2 million due to the completion of certain Enhanced Day Ahead Market (EDAM) studies in 2019.

External and Customer Affairs Division

The **External and Customer Affairs Division's** core mission is to provide professional and high quality service and support to the ISO's customers and stakeholders. The division engages with a broad group of stakeholders, customers, market participants, regulators, elected officials, and consumer and environmental groups to improve the ISO interactions and develop deeper collaboration with these entities.

Some of these activities include:

- Day-to-day response to issues and customer inquiries,
- Developing and providing general and client-specific training,
- Managing public stakeholder processes,
- Coordinating internal and external communications including the news media, social media and website management,
- Engaging state and federal legislators and their staff,
- Expanding participation in ISO market and reliability services, and
- Providing a broad assortment of external briefings and supporting materials.

There are two main functions within the division: **Customer Affairs** and **External Affairs**.

The **Customer Affairs** group includes Customer Service and Stakeholder Affairs and is the primary business contact between the ISO, its customers, and industry stakeholders. It offers bid-to-bill support services to all customers and provides technical support and training to new participants. The team relies on web-based resources, links to trade associations, and staff support to resolve customer issues and keep customers apprised of changes and policy initiatives, making it easier and seamless for entities to navigate and realize the full benefits of participating in the ISO markets. Responsibilities also include management of all public stakeholder initiatives.

The **External Affairs** group includes several business units including Communications and Public Relations, State Affairs, Regional and Federal Affairs, and Strategic Alliances and Regional Integration.

Communications and Public Relations manages internal and external communications, which includes producing printed, digital, social media, and video materials. The department is responsible for website management, employee communications, and media

relations. The department issues stakeholder communications, and develops new information, products, and services that add value to stakeholders, and others participating in the ISO grid and energy markets.

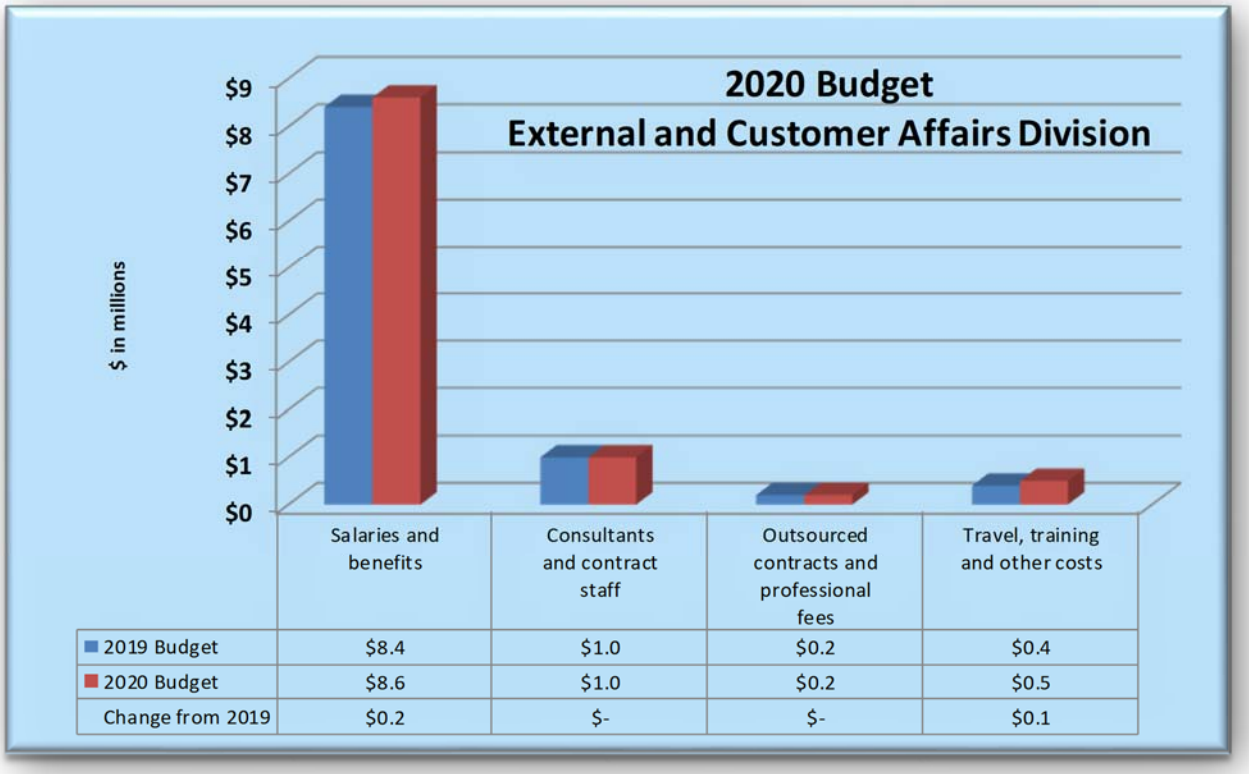
The **State Affairs** team develops relationships and maintains interactions with State of California lawmakers, the Administration, business associations, environmental organizations, and international delegations to enhance their understanding of grid operation and matters that could affect the reliability or economics of the ISO grid and energy markets. Additionally, the department tracks and comments on state legislation, and manages ISO Board of Governor's state Senate confirmations.

The **Regional and Federal Affairs** team monitors activities and manages relationships with state and federal governments, and regional and national industry stakeholders and associations. To ensure participants from across the West have a voice on regional related matters, such as the Western Energy Imbalance Market (EIM), this team supports the EIM governance structure and facilitates coordination between the EIM Governing Body, Regional Issues Forum, Body of State Regulators, and stakeholders.

The **Regional Integration** and **Strategic Alliances** teams promote regional coordination and cooperation across the West, which includes expanding the Western EIM and other market services, and facilitating the development of Reliability Coordination services for much of the West. These groups collaborate closely with other internal divisions and senior management to provide clear and professional coordination with regional utilities by supporting cost/benefits analysis, regulatory filings, and other activities necessary for participation in the ISO's markets. In addition, these groups provide expertise, education, and outreach to entities including neighboring balancing authorities, third party transmission customers, and a variety of other stakeholders on matters of importance to them.

Summary of Budget

The External and Customer Affairs division budget will increase by $0.3 million to $10.3 million for 2020. Staffing remains unchanged at 39.



	Salaries and benefits	Consultants and contract staff	Outsourced contracts and professional fees	Travel, training and other costs
2019 Budget	$8.4	$1.0	$0.2	$0.4
2020 Budget	$8.6	$1.0	$0.2	$0.5
Change from 2019	$0.2	$-	$-	$0.1

Salaries and benefits will increase by $0.2 million due to budgeted merit increases.

Travel, training, and other costs will increase nominally due to resumption of the Stakeholder Symposium in 2020.

VI. Debt Service

The debt service amount included in the GMC revenue requirement is $16.9 million, which remains the same as 2019. The amount includes the principal and interest payments due on the Series 2013 bonds and the 25% debt service reserve. The total equals the sum of the semi-annual interest payment due in August of the budget year, the principal and semi-annual interest payment due in February of the ensuing year, and the 25% debt service reserve amount required by the tariff and bond documents.

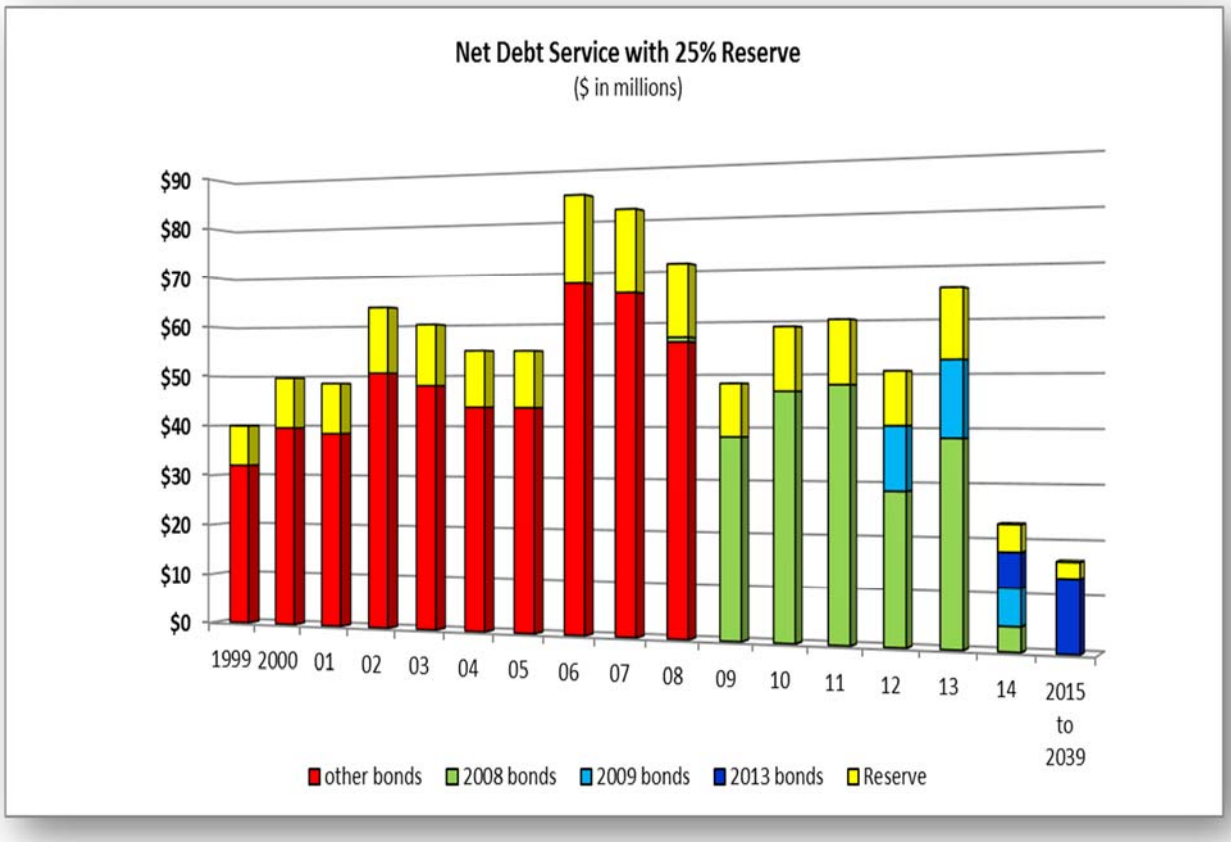
A summary of the debt service components is as follows.

Debt Service ($ in millions)	2020 Budget	2019 Budget	Change
Principal payments	$5.4	$5.2	$0.2
Interest payments	8.1	8.3	(0.2)
Subtotal	**13.5**	**13.5**	**-**
25% debt service reserve	3.4	3.4	-
Total Debt Service	**$16.9**	**$16.9**	**$-**

The Series 2013 bonds were issued in November 2013 to refinance the 2009 bonds. The 2009 bonds had been issued to finance the ISO's headquarters facility in Folsom, California and to fund other capital expenditures. Below is the future amortization schedule for the 2013 bonds. Note: The bonds are callable on February 1, 2023.

Amortization Schedule for 2013 Bonds ($ in millions)	Principal	Interest	Total
2020	$5.4	$8.1	$13.5
2021	5.6	7.9	13.5
2022	5.9	7.6	13.5
2023	6.2	7.3	13.5
2024-2039	140.3	62.5	202.8
Total	**$163.4**	**$93.4**	**$256.8**

See a summary of the historical debt service below.



VII. Capital / Project Budget and Cash-Funded Capital

The cash-funded capital component of the 2020 GMC revenue requirement will be $28 million. This component has been critical to the ISO's goal of maintaining a stable GMC revenue requirement. Historically, capital projects had largely been funded by debt financing. Beginning in 2010, the ISO converted debt service savings in the GMC revenue requirement to the cash-funded capital component. Using these collections as a way to finance capital projects removed the inefficiencies and costs associated with debt financing.

From the 2020 cash-funded capital component, the ISO is proposing a capital / project budget of $22 million to fund projects such as those detailed on the following pages. The Board of Governors approval of the 2020 Budget will include this capital/project budget and it is treated separately from the GMC revenue requirement. The Corporate Management

Committee (CMC) authorizes individual projects within the approved budget throughout the year. The CMC includes the Chief Executive Officer, VP - Chief Financial Officer and Treasurer, and VP - General Counsel and Chief Compliance Officer. The Board must approve any increases above the current year approved budget.

Future annual capital / project budgets are estimated to be in the range of $18 million - $22 million per year and are funded through the cash-funded capital component of the GMC revenue requirement and its related reserves. Excess amounts in any given year are set aside for future projects and help enable the ISO to maintain a stable revenue requirement for an extended period.

Supplemental Projects

During 2019, several entities signed EIM implementation agreements with the ISO. These include Public Service Company of New Mexico, NorthWestern Energy, Turlock Irrigation District, and Balancing Authority of Northern California (phase 2) for implementation in 2021. As outlined in the agreements, the prospective EIM entities reimburse the ISO for costs incurred around the implementation. Since funding comes from the entity, these projects budgets are outside of the annual capital / project budget.

Capital / Project Budget Development Process

The 2020 project prioritization process runs from July 2019 through November 2019. The Program Management Office collaborates with the internal business units and maintains a list of projects throughout the year. The list aligns with the corporate vision, the information technology roadmap, and the market initiatives roadmap. On a periodic basis, strategic initiative owners and managers review the progress of active projects, identify issues and risks, and propose changes to the master project list.

The project list is updated as part of the annual budgeting process to align the strategic projects scheduled for the following year. The projects are ranked to help determine the most important items, which results in an initial master list. The rating of each project is based on the criteria listed below. The ISO website contains additional project and release information[4].

[4] The latest ISO release planning and project information is available on the ISO website at http://www.caiso.com/informed/Pages/ReleasePlanning/Default.aspx

Ranking Criteria		
Strategy	**Strategic Initiative**	**Weight**
Compliance	Establish a culture of compliance	15%
Grid reliability	Enhances reliability of the grid by addressing and existing or potential operational issue	15%
Contributes to increased customer service		10%
Ensure continued reliability during grid transformation (capacity on the system)	Evolve the market Markets and performance (MAP) Develop infrastructure and tools	10%
Explore opportunities for regional collaboration and technological innovation	Incorporate renewable resources Improve forecasting capabilities MAP	10%
ISO process improvement	Process and quality	10%
Market efficiency	Addresses a current or potential market inefficiency	10%
Strengthen California's global leadership commitment to renewable, responsible and reliable energy (regulatory coordination)	Advance state energy and environmental initiatives	10%
Development of staff / talent pipeline	People strategies	5%
Information Technology system qualities	System and tools	5%

The business and financial case criteria follows:

- Does the project require development by market participants?
- Does the project deliver cost savings?
- How much are the project implementation costs?
- Does the project reduce operations and maintenance costs?
- Does the project mitigate any corporate risk?
- A factor for executive discretion is included.

Proposed Project List

The following list provides an indication of the projects proposed for initiation during 2020. The listing represents all projects in the process of being ranked to determine final list within current year budget. This year's list includes the following four areas and initiatives:

- Market and operational excellence,
- Enhancement of the technology foundation,
- Focus on customer service and other costs, and
- Grid evolution readiness and regional innovation opportunities.

All projects that are ready for funding are presented to the CMC for consideration and approval. Items that the CMC consider include business case and cost-benefit to the company and market participants. The CMC approves and monitors projects on a monthly basis.

The 2020 priorities may change depending on developments during the remainder of 2019 and into 2020. The actual projects completed during 2020 will vary, including the potential addition of projects currently not on the following list, the deferral of projects on this list to future years, or the elimin7ation of projects deemed to be unnecessary.

Proposed Projects for 2020	**Amount**
Market and Operational Excellence	
Operations & market services system improvements 2020	Large
Post market consolidation/settlements replacement	Large
Contingency modeling enhancements - transmissions	Medium
Day ahead market (DAM) enhancements	Medium
Energy management system (EMS) enhancements 2020	Medium
Flexible ramping product deliverability in real time market (RTM)	Medium
Operations training environment improvements	Medium
Outage optimization Phase 2	Medium
Program office internal labor	Medium
Resource adequacy enhancements	Medium
Upgrade congestion revenue rights (CRR) system by 2020	Medium
Energy imbalance market (EIM) enhancements 2020	Small
Enhance behind the meter forecast	Small
Enhanced curtailment tool	Small
Incorporation of operations non-core tools into final destination	Small
Initialization funding for capital projects	Small
Intertie deviation settlement	Small
Market timeline settlement transformation	Small

Proposed Projects for 2020	Amount
Reducing time gap between real time pre dispatch (RTPD) running time and binding interval	Small
Use market operator in e-tag	Small
Total	**$12,000,000**
Enhance the Technology Foundation	
Enterprise model management system (EMMS) phase 4	Large
Miscellaneous hardware & software purchases	Large
Masterfile service oriented architecture (SOA) phase 2	Medium
Model synchronization and activation (MSAA) Phase 2	Medium
Reliability Coordinator (RC) enhancements 2020	Medium
Technology systems improvements for production 2020	Medium
Critical data business continuity improvements	Small
Excess behind the meter production	Small
Flexible ramping product enhancements	Small
Information technology robustness 2020	Small
Mixed integer processor (MIP) performance improvements 2020	Small
SAS implemented price corrections	Small
Total	**$8,475,000**
Focus on Customer Service and Other Costs	
Facilities replacement reserve	Medium
Campus operations annual funding	Small
Total	**$900,000**
Grid Evolution Readiness and Regional Innovation Opportunities	
Interconnection process enhancement 2020	Small
Resource interconnection management system (RIMS) enhancements	Small
Total	**$625,000**
Total Proposed Projects for 2020	**$22,000,000**

Note: The costs of individual projects are not identified; they are categorized by size as follows: small projects under $500,000, medium project from $500,000 up to $1 million, and large projects over $1 million

VIII. Other Costs and Revenue

Other costs and revenue will increase by $17.4 million to $41.3 million, primarily due to increased revenues from the reliability coordinator services and the EIM administrative charges. This component, representing net revenues received outside of the GMC, lowers the overall GMC revenue requirement. By diversifying its revenue streams, the ISO is able to maintain a favorable revenue requirement (and ultimately favorable rates) while still developing well-rounded O&M and capital budgets that serves its needs.

The details of this category are as follows.

Other Costs and Revenue ($ in millions)	**2020 Budget**	**2019 Budget**	**Change**
Reliability Coordinator Funding Requirement	$18.5	$4.3	$14.2
Energy Imbalance Market Administrative Charges	9.5	8.6	0.9
Intermittent Resource Forecasting Fees	4.5	3.8	0.7
Interest Earnings	3.9	3.3	0.6
California-Oregon Intertie Path Operator Fees	2.0	2.0	-
Generation Interconnection Project Fees	1.4	1.5	(0.1)
HANA Administrative Fees	0.9	-	0.9
Scheduling Coordinator Application and Other Fees	0.6	0.4	0.2
Total Other Costs and Revenue	**$41.3**	**$23.9**	**$17.4**

As RC services officially launched in July 2019, the reliability coordinator (RC) funding requirement will have its first full year of revenues in 2020. The 2020 RC funding requirement, projected at $18.5 million, represents the amount of revenue the ISO requires to offset the costs the ISO will incur to provide RC services.

The 2020 RC funding requirement is calculated as follows.

Revenue Requirement ($ in millions)	RC %	2020 Budget
Operations and Maintenance Budget		$ 195.0
Debt Service (including 25% reserve)		16.9
Cash Funded Capital		28.0
Other Costs and Revenues		(22.8)
Operating Costs Reserve Adjustment		(11.6)
Revenue Requirement (prior to RC Funding Requirement)		**205.5**
RC Funding Requirement for January - December 2020	9%	(18.5)
Total Revenue Requirement		**$ 187.0**

EIM administrative charges are projected to increase to $9.5 million due to increased participation in the market. The Western EIM currently has nine participating members in eight western states and has produced over $801.1 million dollars in gross benefits (as of the third quarter of 2019) since its launch in 2014. New participants scheduled for 2020 include Seattle City Light and Salt River Project.

Intermittent resource forecasting fees are projected to increase to $4.5 million due to additional eligible intermittent resources coming on-line.

Interest earnings are projected to increase to $3.9 million due to more favorable short-term interest rates.

Fees for conducting generator interconnection project studies are expected to decrease slightly to $1.4 million to reflect projected requests.

New to 2020 is Hosted Advance Network Applications (HANA) revenue. The HANA service is a supplemental reliability coordinator service. HANA revenue is projected to be $0.9 million.

All other components of this category are projected to remain unchanged.

IX. Operating Cost Reserve Adjustment

The operating cost reserve adjustment for 2020 will be an $11.6 million credit. This amount will reduce the GMC revenue requirement. This component typically includes the following adjustments:

- An adjustment related to an increasing or decreasing O&M budget to ensure that the 15% reserve margin is maintained per the tariff,
- The return of the 25% debt service reserve collection from the prior year,
- and, the true-up of budget-to-actual revenues and expenses from the preceding audited year.[5]

A summary of the adjustment is below.

Operating Cost Reserve Adjustment ($ in millions)	**2020 Budget**	**2019 Budget**	**Change**
Change in the 15% reserve for O&M budget	($0.9)	($1.6)	$0.7
25% debt service collection from prior year	3.4	3.4	(0.0)
True-up of budget to actual revenues and other	9.1	11.7	(2.6)
Total Operating Cost Reserve Credit / (Debit)	**$11.6**	**$13.5**	**($1.9)**

The calculation of the 15% reserve adjustment is as follows.

Change in 15% Operating Reserve ($ in millions)	**2020 Budget**	**2019 Budget**	**Change**
O&M budget	$195.0	$189.0	$6.0
Operating Reserve percentage	15%		
Total Operating Reserve	**$29.2**	**$28.3**	**$0.9**

[5] See Attachment C, Calculation of Operating Cost Reserve Adjustment, for detailed calculation information.

X. Grid Management Charge Calculations

The ISO recovers its GMC revenue requirement through unbundled grid management charges (GMC). Each unbundled service has a corresponding rate, which is paid by service users. Rates are calculated by dividing each service cost by its forecasted billing determinant volume. The result is a rate per unit of use. The current design, implemented in 2012, provides for three volumetric charges and five associated fees and charges. The design was updated in 2015 and 2018 as a result of the cost of service study that is completed every three years to ensure the ISO is properly charging costs to its cost categories. The cost categories consist of market services, system operations, and congestion revenue rights (CRR). The next cost of service study will be completed in 2020 and any changes will be implemented January 1, 2021.

Components of GMC and Billing Determinants

The three service categories, five associated fees and charges, and their billing determinants are as follows:

Type	Bill Determinant	Charge Code
Grid Management Charges		
Market Service Charge	Awards in MWh or MW of supply and demand excluding Transmission Ownership Rights (TORs)	4560
Systems Operations Charge	Metered flows in MWh of supply and demand in the ISO balancing authority with the following two exceptions, TORs and qualifying grandfathered supply contracts	4561
CRR Service Charge	MWh of congestion	4562
Miscellaneous Fixed Fees		
Bid Segment Fee	Number of bid segments in the ISO market for supply or demand	4515
Inter-SC Trades Fee	Number of trades by scheduling coordinator (SC)	4512
SCID Fee	Monthly charge if statement produced for an SC	4575
TOR Charge	Minimum of metered supply or demand in MWh on TORs	4563
CRR Auction Bid Fee	Number of accepted bids in CRR auctions	4516

Rate Calculation

There are eight steps to calculate rates, as noted below:

1. Estimate billing determinant volumes for fees and charges;
2. Multiply volumes by rates to derive revenues for individual fees and charges;
3. Allocate over or under collection of GMC revenue to the three service categories;
4. Allocate remaining GMC revenue requirement into three service categories;
5. Deduct fee and charge revenue from associated service category costs;
6. Estimate billing determinant volumes for three service categories;
7. Deduct grandfathered supply volumes from system operations charge; and
8. Divide residual GMC revenue requirement from step 4 by adjusted billing determinant volumes from steps 6 and 7 to derive individual service category rates[6].

[6] See Attachment B, Actual and Estimated Volumes, for detailed information.

Calculation of Service Category Rates

Component	Market Services	System Operations	CRR Services	Total
Allocation of Revenue Requirement ($ in thousands)				
Total Revenue Requirement				$186,957
Adjust for (over) /under collection of 2018 rates	($673)	($859)	$187	(1,345)
Remaining to allocate				188,302
Percentages	32%	66%	2%	100%
% allocation of costs	60,257	124,279	3,766	188,302
Combined costs	**59,584**	**123,420**	**3,953**	**186,957**
Deduct Fee Revenue				
Bid Segment Fees	439	-	-	439
Inter-SC Trade Fees	2,572	-	-	2,572
SCID Fees	4,182	-	-	4,182
TOR Fees	-	1,043	-	1,043
CRR Auction Bid Fees	-	-	862	862
Total Fees	**7,193**	**1,043**	**862**	**9,098**
Calculation of Recoverable Costs				
Costs Less Fees	**$52,391**	**$122,377**	**$3,091**	**$177,859**
Projected MWh Volumes				
MWh Volumes	527,096,799	442,590,500	396,808,746	
Less grandfathered supply	-	-3,723,000	-	
Adjusted MWh Volumes	**527,096,799**	**438,867,500**	**396,808,746**	
Resulting Rates / MWh	**$0.0994**	**$0.2788**	**$0.0078**	

Calculation of Fee Revenue

Fee	Rate	Estimated Volumes	Estimated Revenue ($ in thousands)
Bid Segment Fees	$0.0050	87,775,873	$439
Inter-SC Trade	1.00	2,571,580	2,572
SCID Fees	1,000	349	4,182
TOR Fees	0.2400	4,345,065	1,043
CRR Auction Bid	1.00	862,044	862
Total			**$9,098**

Summary of Rates

Comparison of GMC Revenue Requirements by Service Category

($ in millions)

Charge Code	Service Category or Fee	2020 Budget	2019 Budget	$ Variance	% change
4560	Market Service Charge	$52.4	$56.9	($4.5)	-7.9%
4561	Systems Operations	122.4	125.1	(2.7)	-2.2%
4562	CRR Services Charge	3.1	3.0	0.1	3.3%
4515	Bid Segment Fees	0.4	0.4	-	0.0%
4512	Inter-SC Trades Fees	2.6	2.4	0.2	8.3%
4575	SCID Fees	4.2	4.0	0.2	5.0%
4563	TOR Charges	1.0	1.0	-	0.0%
4516	CRR Auction Bid Fees	0.9	0.7	0.2	28.6%
Total		**$187.0**	**$193.5**	**($6.5)**	**-3.4%**

Comparison of Grid Management Charge Rates

($ per unit)

Charge Code	Service Category	2020 Rate	2019 Rate	$ Variance	Comments
4560	Market Service Charge	$0.0994	$0.1065	($0.0071)	Rate decreased compared to the 2019 rate due to lower amount of Revenue Requirement to collect offset by lower projected volumes.
4561	Systems Operations Charge	$0.2788	$0.2797	($0.0009)	Rate decreased slightly compared to the 2019 rate due to lower amount of Revenue Requirement to collect offset by lower projected volumes.
4562	CRR Services Charge	$0.0078	$0.0100	($0.0022)	Rate decreased compared to the adjusted 2019 rate due to higher projected volumes offset by higher amount of Revenue Requirement to collect.

EIM Administrative Rates

($ per unit)

Grid Management Charge	EIM Portion	2020		2019		$ Variance
		% of GMC Service Charge	EIM Administrative Rates	% of GMC Service Charge	EIM Administrative Rates	
Market Services	Real Time Market	79%	$ 0.0785	79%	$ 0.0841	$ (0.0056)
System Operations	Real Time Dispatch	39%	$ 0.1087	39%	$ 0.1091	$ (0.0004)

Reliability Coordinator Service Rates

($ per unit)

Reliability Coordinator Service Rate	
RC Funding Requirement ($ in millions)	$ 18.5
Projected Volumes in TWh	664.1
Projected RC Service Rate per MWh	$ 0.0278

**Rate adjusted for minimum charges*

Summary of Charges, Fees, and Supplemental Rates

($ per unit)

Charge Code	Summary of Charges, Fees, and Rates	2020 Rate	2019 Rate	Change $	Billing Unit
Grid Management Charges					
4560	Market Service Charge	$0.0994	$0.1065	($0.0071)	per MWh
4561	Systems Operations Charge	$0.2788	$0.2797	($0.0009)	per MWh
4562	CRR Services Charge	$0.0078	$0.0100	($0.0022)	per MWh
Miscellaneous Fixed Fees					
701	EIR Forecast Fee	$0.1000	$0.1000	$0.0000	per MWh
4512	Inter-SC Trade Fees	$1.00	$1.00	$0.0000	per # of trades
4515	Bid Segment Fees	$0.0050	$0.0050	$0.0000	per # of bid segments
4516	CRR Auction Bid Fees	$1.00	$1.00	$0.0000	per # of nominations and bids
4563	TOR Fees	$0.2400	$0.2400	$0.0000	per MWh
4575	SCID Fees (monthly)	$1,000	$1,000	$0.0000	per # of SCID
Supplemental Services Rates					
4564	EIM Market Service	$0.0785	$0.0841	($0.0056)	per MWh
4564	EIM System Operations	$0.1087	$0.1091	($0.0004)	per MWh
5701	RC Service Rate	$0.0278			per MWh

California ISO

Actual and Estimated Volumes

Attachment A

Note: Actual data may vary between reporting cycles due to recalculation of settlement statements.

Charge Type:	Market Services	System Operations	CRR Services	Inter-SC Trades	Bid Segment Fees	CRR Auction Bid Fees	TOR Fees	SCID Fees
Charge Code:	**4560**	**4561**	**4562**	**4512**	**4515**	**4516**	**4563**	**4575**
Unit:	**MWh & MW**	**MWh**	**MWh**	**# of trades**	**# of bid segments**	**# of nominations & bids**	**Minimum of TOR supply & demand**	**# of SCID's**
2016 Actual Units								
Jan-16	42,266,502	35,205,345	58,723,112	181,760	4,636,070	56,441	136,501	226
Feb-16	38,242,052	32,063,733	59,160,131	177,090	4,360,806	68,337	158,847	228
Mar-16	42,465,768	35,037,653	66,064,698	193,114	4,712,180	66,507	199,365	232
Apr-16	41,612,181	34,447,057	61,191,096	199,228	4,765,154	67,127	269,498	239
May-16	43,979,064	36,992,445	63,114,378	214,838	5,139,592	70,386	306,438	242
Jun-16	50,195,316	42,588,143	62,299,386	225,426	5,127,418	66,337	263,748	247
Jul-16	53,784,564	46,583,921	66,843,208	230,808	5,305,540	60,504	264,674	252
Aug-16	53,369,579	45,855,510	70,130,476	236,742	5,284,354	58,347	266,431	254
Sep-16	47,197,653	40,219,578	68,008,824	222,096	5,171,054	54,574	242,689	257
Oct-16	44,512,132	36,778,826	66,025,122	206,998	5,573,306	72,242	221,933	266
Nov-16	40,722,032	34,679,607	60,056,145	186,910	5,328,268	59,765	139,575	275
Dec-16	42,134,758	36,397,069	62,670,453	200,006	5,420,618	253,428	157,543	276
Total 2016	**540,481,600**	**456,848,887**	**764,287,029**	**2,475,016**	**60,824,360**	**953,995**	**2,627,243**	**2,994**
2017 Actual Units								
Jan-17	43,034,411	36,862,670	66,225,336	174,622	5,205,586	58,821	172,149	274
Feb-17	38,226,744	32,199,995	60,748,988	158,500	4,765,778	61,788	135,505	276
Mar-17	40,618,235	34,483,825	66,443,290	174,018	5,267,614	66,952	200,827	275
Apr-17	40,428,234	33,616,712	64,998,622	199,744	5,220,122	67,423	252,706	278
May-17	44,541,613	37,507,361	65,920,690	201,118	5,496,430	73,357	350,337	278
Jun-17	48,535,231	41,888,513	64,707,064	205,082	5,494,366	63,564	332,165	284
Jul-17	54,641,006	47,435,784	72,507,166	215,110	5,690,786	58,608	327,077	286
Aug-17	54,824,270	47,017,751	74,393,081	203,910	5,725,446	66,164	299,640	291
Sep-17	48,323,113	41,658,279	73,908,881	195,770	5,426,082	69,381	262,398	298
Oct-17	44,292,291	37,816,174	69,560,658	181,236	5,584,084	81,819	312,762	301
Nov-17	40,055,798	34,393,898	65,527,692	183,722	5,060,398	81,045	341,547	299
Dec-17	41,279,527	36,257,662	67,518,951	184,562	5,272,128	313,883	420,106	299
Total 2017	**538,800,472**	**461,138,623**	**812,460,419**	**2,277,394**	**64,208,820**	**1,062,805**	**3,407,219**	**3,439**

California ISO

Actual and Estimated Volumes

Attachment A

Note: Actual data may vary between reporting cycles due to recalculation of settlement statements.

Charge Type:	Market Services	System Operations	CRR Services	Inter-SC Trades	Bid Segment Fees	CRR Auction Bid Fees	TOR Fees	SCID Fees
Charge Code:	4560	4561	4562	4512	4515	4516	4563	4575
Unit:	MWh & MW	MWh	MWh	# of trades	# of bid segments	# of nominations & bids	Minimum of TOR supply & demand	# of SCID's
2018 Actual Units								
Jan-18	40,581,592	35,192,541	72,836,487	167,642	5,198,750	62,160	297,144	305
Feb-18	37,830,207	31,764,777	65,488,442	160,956	4,732,582	60,184	242,274	305
Mar-18	41,075,082	34,080,015	66,888,589	174,284	5,325,110	60,474	346,503	306
Apr-18	39,788,145	32,922,961	62,889,737	180,400	5,380,146	51,408	373,257	319
May-18	43,252,949	35,815,280	65,177,511	183,256	5,829,922	54,667	476,907	324
Jun-18	46,113,588	38,474,119	63,726,392	197,328	6,018,982	64,826	479,127	328
Jul-18	58,034,280	48,359,743	70,844,513	224,344	6,601,730	70,021	485,323	334
Aug-18	55,626,269	47,216,689	71,015,782	239,172	7,025,780	70,173	470,235	334
Sep-18	46,514,469	39,259,848	67,344,750	231,184	6,618,150	70,794	477,184	335
Oct-18	44,179,362	36,183,359	69,093,395	206,436	6,468,862	82,796	386,458	335
Nov-18	42,433,045	35,406,654	68,835,029	192,364	6,198,378	83,752	369,025	338
Dec-18	44,263,397	37,001,774	71,712,289	199,664	6,525,552	242,686	353,231	337
Total 2018	**539,692,384**	**451,677,759**	**815,852,916**	**2,357,030**	**71,923,944**	**973,941**	**4,756,665**	**3,900**
2019 Actual Units from January to October & Estimate from November to December.								
Jan-19	41,815,480	34,655,055	30,711,450	199,888	6,631,928	48,219	392,081	333
Feb-19	39,654,176	32,824,277	28,479,230	182,352	5,904,408	45,923	280,273	340
Mar-19	41,464,950	34,235,959	32,135,302	215,758	6,364,278	48,944	319,007	336
Apr-19	41,038,151	33,696,474	30,801,634	218,624	6,336,702	49,792	391,675	341
May-19	42,655,919	34,939,289	32,270,261	238,124	6,739,848	49,674	375,021	341
Jun-19	44,829,614	38,241,825	34,142,961	247,422	6,823,450	61,827	425,206	347
Jul-19	51,704,413	43,894,478	34,755,542	266,350	7,264,290	65,050	449,136	347
Aug-19	52,124,564	45,015,884	35,838,863	266,286	7,301,898	64,480	442,601	346
Sep-19	48,697,129	40,967,987	35,267,279	245,008	7,449,976	63,156	404,936	349
Oct-19	43,276,276	35,376,817	35,282,066	231,452	7,538,132	76,363	315,124	347
Nov-19	40,514,504	33,332,138	33,673,144	232,464	5,599,144	74,048	265,871	347
Dec-19	42,890,555	35,567,853	33,451,014	242,402	6,109,732	214,568	284,134	347
Total 2019	**530,665,731**	**442,748,036**	**396,808,746**	**2,786,131**	**80,063,786**	**862,044**	**4,345,065**	**4,121**

California ISO

Actual and Estimated Volumes

Attachment A

Note: Actual data may vary between reporting cycles due to recalculation of settlement statements.

Charge Type:	Market Services	System Operations	CRR Services	Inter-SC Trades	Bid Segment Fees	CRR Auction Bid Fees	TOR Fees	SCID Fees
Charge Code:	4560	4561	4562	4512	4515	4516	4563	4575
Unit:	MWh & MW	MWh	MWh	# of trades	# of bid segments	# of nominations & bids	Minimum of TOR supply & demand	# of SCID's
2020 Estimated Units								
Jan-20	41,534,255	34,351,315	30,711,450	183,765	7,270,744	48,219	392,081	345
Feb-20	39,387,487	32,536,583	28,479,230	171,654	6,473,146	45,923	280,273	345
Mar-20	41,186,082	33,935,893	32,135,302	195,021	6,977,313	48,944	319,007	345
Apr-20	40,762,154	33,401,135	30,801,634	199,512	6,947,080	49,792	391,675	347
May-20	42,369,042	34,633,058	32,270,261	210,690	7,389,059	49,674	375,021	347
Jun-20	44,528,117	37,906,649	34,142,961	222,375	7,480,714	61,827	425,206	347
Jul-20	51,356,681	43,509,758	34,755,542	245,347	7,964,018	65,050	449,136	350
Aug-20	51,774,006	44,621,335	35,838,863	252,729	8,005,248	64,480	442,601	350
Sep-20	48,369,622	40,608,916	35,267,279	238,096	8,167,590	63,156	404,936	350
Oct-20	42,985,227	35,066,751	35,282,066	218,944	8,264,237	76,363	315,124	352
Nov-20	40,242,028	33,039,993	33,673,144	212,414	6,138,478	74,048	265,871	352
Dec-20	42,602,099	35,256,113	33,451,014	221,033	6,698,248	214,568	284,134	352
Total 2020	**527,096,799**	**438,867,500**	**396,808,746**	**2,571,580**	**87,775,873**	**862,044**	**4,345,065**	**4,182**
Change from 2016 Actual	-2.5%	-3.9%	-48.1%	3.9%	44.3%	-9.6%	65.4%	39.7%
Change from 2017 Actual	-2.2%	-4.8%	-51.2%	12.9%	36.7%	-18.9%	27.5%	21.6%
Change from 2018 Actual	-2.3%	-2.8%	-51.4%	9.1%	22.0%	-11.5%	-8.7%	7.2%
Change from 2019 Actual + Estimate	-0.7%	-0.9%	0.0%	-7.7%	9.6%	0.0%	0.0%	1.5%

The latest GMC rates as well as a history of the rates is available on the Grid Management Charge page on the CAISO public site.

California ISO

Attachment B

Calculation of Operating Cost Reserve Adjustment

($ in millions)

There are four factors that affect the calculation of the reserve adjustment:

- -Prior year's 25% debt service reserve
- -2018 true-up
- -2019 estimates
- -Change in the 15% operating cost reserve

Summary of Operating Cost Reserve Adjustment	If no changes to last years plan (a)	Budget to Actual (b)	Difference
Prior year's 25% debt service reserve collected	$ 3,381	$ 3,381	$ -
2018 true-up	-	9,148	9,148
2019 estimates	-	-	-
Change in the 15% operating cost reserve	(888)	(888)	-
2020 Reserve credit / (debit) from 2018 operations	**$ 2,493**	**$ 11,641**	**$ 9,148**

(a) Plan assumes prior year expenses and revenues were equal to budgeted amounts.
(b) Revised reflects the true -up of prior year activities.

California ISO

Attachment B

Calculation of Operating Cost Reserve Adjustment

($ in millions)

2018 True Up			
Description	**Budget**	**Actual**	**Difference**
Revenue			
GMC revenue	$ 197,256	$ 199,334	$ 2,078
Other income	16,700	20,450	3,750
Realized loss on investments	-	331	331
Total revenue	**213,956**	**220,115**	**6,160**
Expenses			
Expenses	(178,503)	(174,134)	4,370
Debt service: principal	(4,800)	(4,800)	-
Debt service: interest	(8,699)	(8,573)	126
Debt service reserve	(3,381)	(3,381)	-
Cash funded capital	(22,000)	(22,000)	-
Capital funded by EIM fees adjustment	-	(1,870)	(1,870)
Generator fines interest adjustment	-	362	362
Total expenses	**(217,384)**	**(214,395)**	**2,988**
Impact to Operating Reserve			
Net change in prior year true-up	**$ (3,428)**	**$ 5,720**	**$ 9,148**

California ISO

Attachment B

Calculation of Operating Cost Reserve Adjustment

($ in millions)

2019 Estimates			
Description	**Budget**	**Estimate**	**Difference**
Revenue			
GMC revenue	$ 193,500	$ 193,500	$ -
Other income	23,900	23,900	-
Total revenue	**217,400**	**217,400**	**-**
Expenses			
Operations and maintenance	(189,030)	(189,030)	-
Debt service: principal	(5,000)	(5,000)	-
Debt service: interest	(8,500)	(8,500)	-
Debt service reserve	(3,381)	(3,381)	-
Cash funded capital	(25,000)	(25,000)	-
Total expenses	**(230,911)**	**(230,911)**	**-**
Impact to Operating Reserve			
Net change current year estimates	**$ (13,511)**	**$ (13,511)**	**$ -**

Change in 15% Operating Cost Reserve			
Description	**2019 Budget**	**2020 Budget**	**Change**
Change in operations and maintenance budget from prior year	$ 189,030	$ 194,951	$ 5,921
Change in the 15% operating cost reserve	$ 28,355	$ 29,243	$ 888