California ISO

# Reliability Coordinator
# Rate Design, Terms and Conditions

## Draft Final Proposal

June 20, 2018

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California ISO

# 1. Introduction

The Reliability Coordinator Services Rate Design, Terms and Conditions stakeholder initiative will determine the necessary tariff changes to describe the rates, terms and conditions that support the California Independent System Operation's (CAISO) proposal to become a Reliability Coordinator (RC). The draft final proposal represents the next step in the CAISO stakeholder process, where we are committed to providing ample opportunity for stakeholder input into the design, implementation and planning activities. This process will lead to tariff changes that support the specific provisions which allow the CAISO to charge for just and reasonable rates for its RC services.

This draft final proposal modifies the straw proposal by incorporating changes that were requested by stakeholders where applicable. Following the April 5, 2018 posting of the straw proposal the CAISO received comments during an April 12th stakeholder meeting. In addition, written comments were received by stakeholders on May 7th. On May 31st[1], the CAISO posted comprehensive responses to stakeholders' comments; the responses provide valuable background behind the changes being proposed in this document. Finally, this updated proposal provides additional details on the RC services rate design, terms and conditions as well as the additional services the CAISO will provided, such as hosted advanced network applications (HANA).

After the stakeholder meeting scheduled for June 27th, the CAISO invites stakeholders to provide any supplemental comments by July 11th. The CAISO will then present the draft final proposal to the CAISO Board of Governors at its public meeting on July 25th for their review and approval. The CAISO will also post its initial draft of the tariff on July 18th. After approval by the Board, the CAISO will finalize the relevant tariff amendments to be filed with the Federal Energy Regulatory Commission (FERC). The CAISO will review the tariff language with stakeholders for comment after the Board meeting and prior to the FERC filing.

For background purposes, the CAISO currently receives reliability coordinator services from Peak Reliability (Peak). On January 2, 2018, the CAISO provided Peak with notice that it will no longer take service from, or fund, Peak after September 2, 2019. Prior to that termination date, the CAISO intends to be certified by the North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council (WECC) as a reliability coordinator within its balancing authority (BA) area. All transmission operators (TOPs) within the CAISO BA will become reliability coordinator (RC) service customers of the CAISO at that time. The CAISO RC services will also be offered to BAs outside of the CAISO BA area and to TOPs within those external BAs.

The CAISO is also working in parallel with the TOPs in the CAISO BAs, as well as with BAs and TOPs outside of the CAISO BA area that have provided a letter of intent and executed a non-disclosure agreement with the CAISO. This parallel effort allows for the development of the operating procedures, specific technical requirements, and other technical elements necessary to implement the reliability standards associated with CAISO RC services. This effort began with the formation of working groups comprised of subject matter experts from the BAs and TOPs interested in receiving CAISO RC services. The technical materials developed through this process will support the RC certification process and will eventually be incorporated into the CAISO business practices and operating procedures.

[1] The CAISO responses to comments can be found here, http://www.caiso.com/Documents/Comments-Responses-DraftAgreement-RCRateDesign-Terms-ConditionsStrawProposal.pdf.

The CAISO plans to be certified as an RC and be operational by July 1, 2019. At that time, the CAISO anticipates first providing RC services to all entities and TOPs within its BA area, followed by adding other interested BA areas or TOPs outside of the CAISO BA area in the fall of 2019. Throughout this time, the CAISO will stay closely coordinated with Peak and any other RC within the Western Interconnection. The ISO will also work with interested BAs, TOPs and other stakeholders on a thoughtful and rational schedule for the transition.

## 2. Reliability Coordinator Scope of Services

The CAISO has notified WECC that it will seek certification to perform the functions of an RC. In the NERC functional model, the RC is the entity that constitutes the highest level of authority responsible for the reliable operation of the bulk electric system (BES), has the wide area view of the BES, and has the operating tools, processes and procedures necessary to do so. The RC is vested with the authority to prevent or mitigate emergency operating situations in both next-day analysis and real-time operations through instructions issued to participating BAs and TOPs.

The CAISO will provide RC services to all entities and TOPs within its current BA area, BAs outside of its BA area that decide to take services from the CAISO and, through those BAs, the TOPs within those BA areas. These entities are collectively referred to as RC Customers. As discussed in more detail below, the CAISO will also separately offer services such as hosted advanced network applications and other reliability services to interested RC Customers.

The CAISO proposes to offer a full scope of reliability services. The core RC services are those required by the standards as explained below. These services will be offered at the RC services rate also explained in Section 6: Reliability Coordinator Funding Requirement and Rate Design. The RC services provided by the CAISO will consist of the tasks and functions required of reliability coordinators by the applicable reliability standards, including, but not limited to the items in the table below. These are services that are provided by Peak Reliability now, as well as any other RC certified by NERC.

| | Customer Type | | | |
|---|---|---|---|---|
| Core Services | BA | Generation Only BA | TOP | TOP with Assets but No Load |
| Outage Coordination | X | X | X | X |
| Next Day Operations Planning Analysis | X | X | X | X |
| Real Time Situational Awareness | X | X | X | X |
| Data Exchange to support Operations Planning Analysis and Real-Time Assessments | X | X | X | X |
| System Operating Limit (SOL) Methodology | X | | X | |
| System Restoration Coordination and Training (EOP-006) | X | | X | X |
| Centralized Messaging for RC Area | X | X | X | X |
| Stakeholder/ Working Group Processes | X | X | X | X |
| Secured Document Exchange (Plans, Procedures, Studies, Reports) | X | X | X | X |
| Data Exchange Services | X | X | X | X |
| Plan Reviews/ Approvals (EOP-005, 010 and 011) | X | EOP-011 | X | X |
| Power System Network Modeling | X | X | X | X |
| Unscheduled Flow Mitigation Process | X | X | X | X |

To elaborate, the CAISO RC will provide the following core RC services:

- Outage Coordination
  - Develop outage coordination processes for its RC area in accordance with the applicable reliability standards;
  - Review, assess, and provide approval or denial of outage requests in accordance with the outage coordination process; and
  - Provide access to an outage management system for its RC Customers as the means to exchange outage information.

- Next Day Operations Planning Analysis
  - Develop an operations planning analysis process for its RC area in accordance with the applicable reliability standards;
  - Perform operations planning analysis in accordance with the applicable reliability standards; and

  - Provide a secure platform for its RC Customers to utilize as a means to exchange operations planning analysis information.

- Real-Time Assessment, Monitoring, and Situational Awareness
  - Develop operations procedures and processes for its RC area in accordance with the applicable reliability standards;
  - Perform real-time assessment and monitoring in accordance with the applicable reliability standards; and
  - Provide a wide-area view for situational awareness in accordance with the applicable reliability standards.

- System Operating Limit (SOL) Methodology
  - Develop an SOL methodology for its RC area in accordance with the applicable reliability standards so that each TOP in its RC area will be able to establish its SOL that meets the applicable reliability standards.

- System Restoration Coordination and Training
  - Develop a system restoration plan for its RC area in accordance with the applicable reliability standards;
  - Provide system restoration drills for RC Customers in accordance with the applicable reliability standards;
  - Develop a review process for TOP's system restoration plans for its RC area in accordance with the applicable reliability standards; and
  - Review and approve each TOP's system restoration plan for its RC area in accordance with its approval process.

- Centralized Messaging for BAs and TOPs within CAISO's RC Area
  - Provide an application for the BAs and TOPs within the RC area to have the ability for exchanging system operations related messages in real-time.

- Stakeholder/ Working Group Processes
  - Support working group processes to implement operating procedures to support the NERC Reliability Standards required for RC operations.

- Secured Document Exchange (Plans, Procedures, Studies, Reports)
  - Provide a secured site for BA/TOPs within RC area to be able to exchange Operating Plan, Operating Procedure, studies, and reports in support for BA/TOPs operations coordination as needed to meet NERC Reliability Standards.

- Data Exchange Services
  - CAISO will provide platform and ability for BA/TOP to exchange data needed to monitor and assess the operation within the CAISO RC Area.

- Plan Reviews/ Approvals
  - CAISO will provide a secure site for the RC to facilitate BA and TOP plan reviews and approvals for EOP-005, EOP-010 and EOP-011.

- Unscheduled Flow Mitigation Process
    - CAISO will provide operations management of the unscheduled flow transmission relief process for the Qualified Transfer Path within the CAISO RC area as required by IRO-006-WECC reliability standard. This will be provided by utilization of Enhanced Curtailment Calculator

The RC services provided by the CAISO will conform to the requirements of the in-effect CAISO reliability plan that will be provided to NERC as part of its certification, as well as NERC's RC standards of conduct.

In addition to the responsibilities required by NERC standards, the CAISO will also facilitate the continuation of the Western Interconnection tools such as Western Interchange Tool (WIT). As a Balancing Authority, the CAISO understands the importance of the WIT in the Western Interconnection daily operations.

The CAISO also understands that historically this type of tool has been centrally managed by either WECC or the Reliability Coordinator. Although the Interchange Authority function has been removed from the NERC Functional Model, the CAISO agrees that this tool needs to continue to be used in the Western Interconnection, without any disruption to service. The CAISO is actively working with Peak, AESO, SPP, WECC and NERC to develop a transition plan to ensure that these tools continue to be centrally managed and available. Several options are being considered for the initial transition and the long term. The current and future management and development of the tools as well as the allocation of the associated costs will be documented in agreements with the other Reliability Coordinators. More information will be shared as it becomes available at future WECC meetings and in the CAISO RC project steering committee and working group meetings that are ongoing with interested balancing authorities and transmission operators that have signed a non-disclosure agreement with the CAISO.

The costs for WIT will be included in the core RC services rate based upon the scope of the CAISO RC service area.

# 3. Reliability Coordinator Oversight

The CAISO has established a senior management level interim committee, the Reliability Coordinator Project Steering Committee (RPSC). This committee includes a representative from each BA and TOP that has expressed interest in RC services and has executed a letter of intent and non-disclosure agreement, as well as a representative from the CAISO. Each representative is to have responsibility within their respective organization for maintaining reliability. The committee, via working groups, is developing, reviewing and commenting on procedures and practices relating to the CAISO's implementation and certification of its RC function. The RPSC is providing input and guidance regarding the establishment and role of a future RC oversight committee that will provide oversight of the RC function and is comprised of BAs and TOPs that elect to take RC service from the CAISO. The tariff will reference the oversight committee and provide that the committee's operation will be governed by a charter established by the CAISO and the BAs and TOPs that have elected to take RC service from the CAISO. This oversight committee will provide input and guidance to CAISO management on various issues relating to the RC function, including operational issues and overarching reliability coordinator policies and procedures.

The CAISO recognizes the importance of transparency. To that end, the oversight committee will hold at least one public meeting per year that will focus on any matters regarding the CAISO's performance of the RC function. This can help to serve the interests of stakeholders, including state and federal regulators and regional advisory bodies, such as the Western Interconnection Regional Advisory Board (WIRAB). CAISO staff will also maintain regular contact and interaction with such entities, including WIRAB, to ensure that state and federal regulators and regional advisory bodies are kept informed of matters relating to RC service and have a ready means to provide input and guidance on such matters.

# 4. Reliability Coordinator Service Agreements

All Balancing Authorities and Transmission Operators who wish to receive RC services from the CAISO must enter into a *pro forma* Reliability Coordinator Service Agreement (RCSA) with the CAISO. Adding Transmission Operators as specific signatories to the RCSA, including Transmission Operators in the CAISO balancing authority area, is necessary because Transmission Operators have specific obligations to provide data to the CAISO RC and will need to follow procedures that are not applicable to the Balancing Authorities. The *pro forma* RCSA will serve both Balancing Authorities and Transmission Operators and will be filed with FERC in August 2018; Once the *pro forma* agreement is accepted by FERC, individual service agreements with RC Customers will be executed and recorded in FERC's electronic quarterly reports.[2]

All Transmission Operators in the CAISO BA area will be required to execute the RCSA in November 2018 so that they are included within the CAISO RC when it begins operations on July 1, 2019. The RCSA will reflect that the RC of record effective July 1, 2019 is CAISO for the Transmission Operators in the CAISO BA area. Any RC Customers who wish to participate in the first onboarding on September 1, 2019 must initiate the RCSA process with the CAISO in November 2018 and execute the RCSA no later than December 2018. Execution of the RCSA facilitates the exchange of information and models that will be used in the set-up process and preparation for shadow operation. The RCSA will reflect that the RC of record effective September 1, 2019 is CAISO for the RC Customers in the first onboarding. After the first onboarding, future RC Customers will notify the CAISO of the date that they would like to begin receiving RC services; Schedule 1 of the RCSA will be amended to incorporate the date agreed upon by the CAISO. The CAISO will become the RC of record for a particular RC Customer on the date that the customer begins to actually receive RC services from the CAISO.

The Initial Term of the RCSA will be 18 months. Thereafter, the agreement will renew annually for consecutive one year terms until terminated by the RC Customer or the CAISO pursuant to the RCSA.

An RC Customer may terminate its agreement with the CAISO, without penalty, by giving not less than twelve (12) months' written notice to the CAISO after completion of the Initial Term; provided, such notice will be required to be aligned with the annual April exit window discussed below. An early termination fee will apply, equal to the balance of estimated service fees and HANA services, if applicable, remaining on the greater of the required notice period or payment period, if an RC Customer terminates its agreement before the expiration of said notice period. This fee reasonably ensures recovery of any costs incurred by the CAISO for the initial integration and subsequent

[2] A draft of the *pro forma* Reliability Coordinator Services Agreement was posted to the CAISO website on May 31, 2018 as part of the CAISO responses to comments.

termination of service to the RC Customer. If the RC Customer is receiving HANA services then the remaining initial set-up charge and the balance of the committed period for HANA services will need to be paid. The RC Customer's responsibility for any outstanding balances owed under the RCSA will survive the termination of the agreement.

After the initial start-up, based on comments received from stakeholders, the CAISO proposes to have one window each year, in April, for entering and exiting RC Services. This fixed window is to ensure adequate preparation and resources, appropriate WECC recertification processes, as well as to recognize seasonal challenges during the winter and summer months. As also discussed in the comments released May 31st, the CAISO will reasonably assist the RC Customer to transition to another Reliability Coordinator if requested by the RC Customer, provided the CAISO is reimbursed for reasonable costs incurred for the transition service. Be advised that in order to begin taking RC services within the annual April window, the RCSA must be executed well in advance to allow adequate time for the transfer of information and models along with a period for training and shadow operations in accordance with timelines laid out in the onboarding process.

The agreement obligates the CAISO to provide the RC services and the RC Customer to pay for the RC services it receives from the CAISO pursuant to the rate design, terms and conditions included in the CAISO tariff.

The RCSA will consist primarily of references to the applicable CAISO tariff provisions that will be developed for RC services and the applicable reliability standards relating to the RC function, and will also include common general contractual terms appropriate for the provision of RC services. Additional detail regarding the hosted services and physical security review is included in Appendix 3: Supplemental Services. The RCSA will also specifically establish the RC Customer responsibilities to follow the applicable provisions of the CAISO tariff,[3] and the type of RC Customer – Balancing Authority or Transmission Operator – will be identified in the agreement to ensure that the appropriate obligations are requested and performed. For sake of clarity, each RC Customer will be required to specifically list the Transmission Operators and Transmission Owners that they are representing. This clarification will allow the CAISO to ensure that all Transmission Owners are accounted for in each of the BA areas taking RC services.

Knowing that operational information is constantly changing, the proposed RCSA states that any information provided either by the CAISO or the RC Customer is accurate to the extent of the party's knowledge at the time of receipt. To ensure reliability of the grid, this measure of data exchange is critical for trust between the parties and good utility practice.

To accommodate the Federal Power Marketing Administrations, we have included the current federal government contracting provisions within the proposed RCSA. These provisions are only applicable to federal entities if and to the extent required by applicable law.

[3] The CAISO anticipates that its tariff will largely defer to the reliability standards in terms of the scope of core RC services to be provided, focusing instead on the rates, terms and conditions of providing those services. The functional responsibilities of an RC are defined by the applicable reliability standards, which are subject to enforcement under those rules and are likely to change over time, and repeating something addressed by a reliability standard in the tariff would create a potential for inconsistency. Accordingly, the tariff will include order of precedence language to ensure that the core RC services remain consistent with the reliability standards over time.

# 5. Reliability Coordinator Onboarding

The CAISO intends to make both the onboarding and future termination processes for CAISO RC services practical, efficient, and straight-forward for its RC Customers.

The CAISO will provide Reliability Coordinator services to TOPs in its BA area and will offer to provide the same services to BAs and TOPs outside of its BA area. The CAISO will develop and publish a detailed onboarding transition plan to ensure proper coordination among the RCs, BAs, and TOPs.

The goal of the CAISO's onboarding process is to ensure that each RC Customer is prepared, informed, and engaged in all aspects of receiving RC services. The RC Customers in the CAISO BA area will be required to execute the RCSA in November 2018 to start the CAISO RC on July 1, 2019. The remaining RC Customers will need to initiate the RCSA process in November 2018 and execute the RCSA no later than December 2018 to be eligible for the first onboarding on September 1, 2019. Execution of the agreement facilitates the exchange of information and models to begin the set-up process and preparation for shadow operation.

This preliminary onboarding process includes technology integration and customer service related tracks. This process will be initiated by the CAISO in parallel with this stakeholder initiative. The onboarding plan will provide information regarding processes and timing, as well as, a status of all entities and their participation plans. Each entity will be individually responsible to meet specific readiness criteria, as defined in the business practice manual, and to ensure that it completes the tasks to support its onboarding process and to certify its readiness.

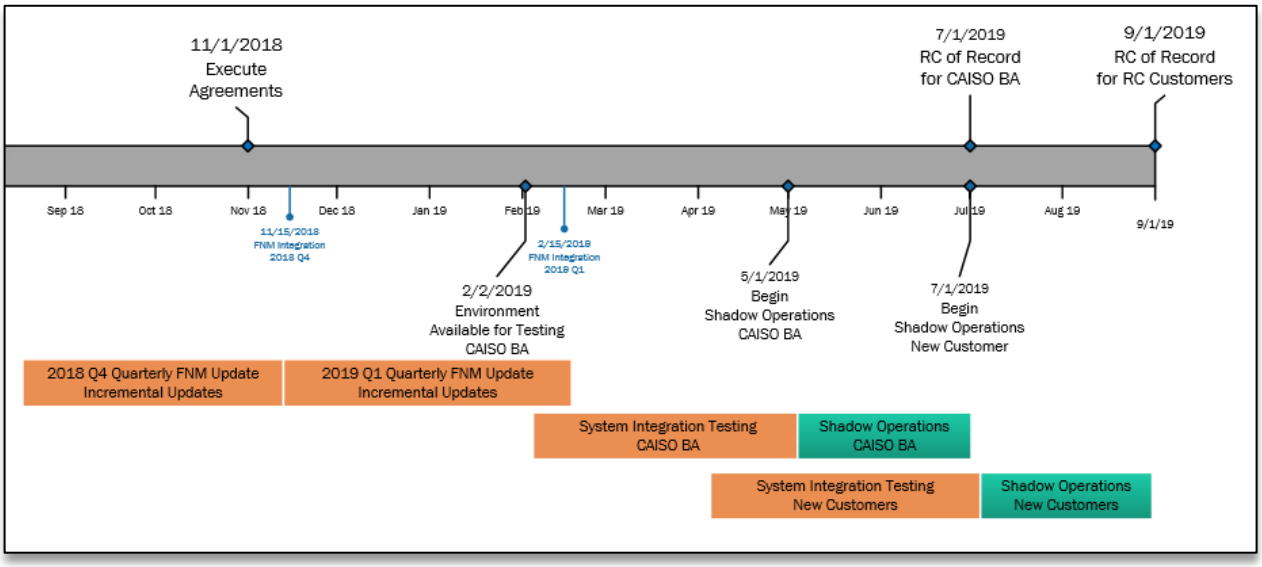



*Figure 1: Reliability Coordinator Customer Onboarding Timeline*

The CAISO will become the RC of record for transmission operators within its BA area in July 2019. The CAISO understands that interested BAs and TOPs outside of its BA area are considering a single date in the fall of 2019 for the CAISO to become the RC of record on their behalf. The CAISO supports this effort and will be ready to be the RC of record on their behalf on or after September 1, 2019. However, the CAISO will need to know the scope of RC Customers and the

date they wish to receive the services by the end of 2018. The CAISO *pro forma* Reliability Coordinator Service Agreement will be available in November 2018 which will document the RC services date. Additionally, an RC Business Practice Manual (BPM) will be published by the end of 2018.

As part of the initial RC offering, the CAISO proposes a staggered network model integration as part of the set-up required for multiple RC Customers. Even though the onboarding set-up process is staggered, there will be a mutually agreed upon single start date in the fall of 2019. For future years, the CAISO proposes to onboard RC Customers once a year in April. There will be no implementation cost to obtain RC services from the CAISO.

Readiness implementation periods could run between 6 to 12 months depending upon whether or not the BA is already in the CAISO full network model (FNM), the complexity of the RC Customer's resource configuration and system topology, and the maturity of the RC Customer's Common Informational Model (CIM). The CAISO, along with the RC customer, will determine the implementation based on these assessments.

RC Customers will execute the RCSA once the form of that agreement and the associated tariff provisions have been accepted by FERC. TOPs within the CAISO BA area will also enter into RCSA at that time.

The CAISO's Customer Service team will provide a coordinated readiness and training program for all RC Customers. In parallel with the onboarding process, RC Customers will also be integrated into the CAISO's RC Customer Service model for ongoing support services. The CAISO will track specific criteria that measure the readiness of the systems and processes of RC Customers, which will culminate in a certification of readiness.

# 6. Reliability Coordinator Funding Requirement and Rate Design

The CAISO will leverage its existing rate design model and activity based costing (ABC) system to determine the amount it will charge for its RC services. The model is based on seven guiding ratemaking principles[4] which are cost causation, focus on use of services, transparency, predictability, forecastability, flexibility and simplicity. This is the same model used by the CAISO to determine its other rates, including the Grid Management Charges (GMC) and Energy Imbalance Market (EIM) administrative fees.

The current GMC rate design was updated in 2014; the amendment was approved by FERC December 18, 2014 and became effective January 1, 2015. The rate design requires the CAISO to complete a cost of service study every three years to ensure it is properly allocating costs to its cost categories. The revenue requirement is allocated into three service categories: market services, system operations and congestion revenue rights (CRR) services based on

[4]Visit http://www.caiso.com/Documents/DraftFinalProposal-2012GridManagementChargeFeb15_2011.pdf for more information regarding the CAISO's GMC rate structure.

percentages developed in the latest cost of service study. The latest cost of service study was completed in 2017 using 2016 data. The CAISO uses ABC to track employee time and expenses by processes.[5]

The GMC and other administrative rates are the means through which the CAISO recovers its annual Revenue Requirement from the entities that use CAISO services. The Revenue Requirement represents the CAISO's operating, administrative, and capitals costs; it is developed in collaboration with the stakeholders in the preceding year.

The components of the Revenue Requirement include the following:

- Operations and Maintenance Budget (O&M),
- Debt Service,
- Cash Funded Capital,
- Other Costs and Revenues, and
- Operating Costs Reserve Adjustments.

The process to develop the annual Revenue Requirement begins with a stakeholder meeting, generally scheduled during the second quarter of the year. At this time, the CAISO discusses with stakeholders budgeting assumptions for the upcoming year, including (1) controlling costs, (2) capital projects for consideration, and (3) reordering CAISO expenditure priorities. The CAISO then spends the next few months to develop its budgetary needs for the upcoming year based on the CAISO's strategic plan and stakeholder feedback. During the early part of the fourth quarter, a draft of the Revenue Requirement is posted on the CAISO website; the document is titled, "Budget and Grid Management Charge Rates"[6]. The CAISO then conducts a follow up stakeholder meeting to discuss the highlights of the Revenue Requirement. Additionally, the draft is presented to the CAISO Board of Governors for their review and feedback. The CAISO provides stakeholders with at least one full governing board cycle to prepare comments on the proposed Revenue Requirement and present them at the next board meeting, which usually takes place in December. Before the CAISO presents the proposed Revenue Requirement to the Board for approval, it responds to all stakeholder comments and posts responses on the website. After Board approval, the CAISO posts the final version of the Revenue Requirement (posted as the "Budget and Grid Management Charge Rates Book") to be effective during the subsequent fiscal year. This documentation includes details such as the billing volumes used to develop the rate for each component of the GMC, together with work papers showing the rate calculations.

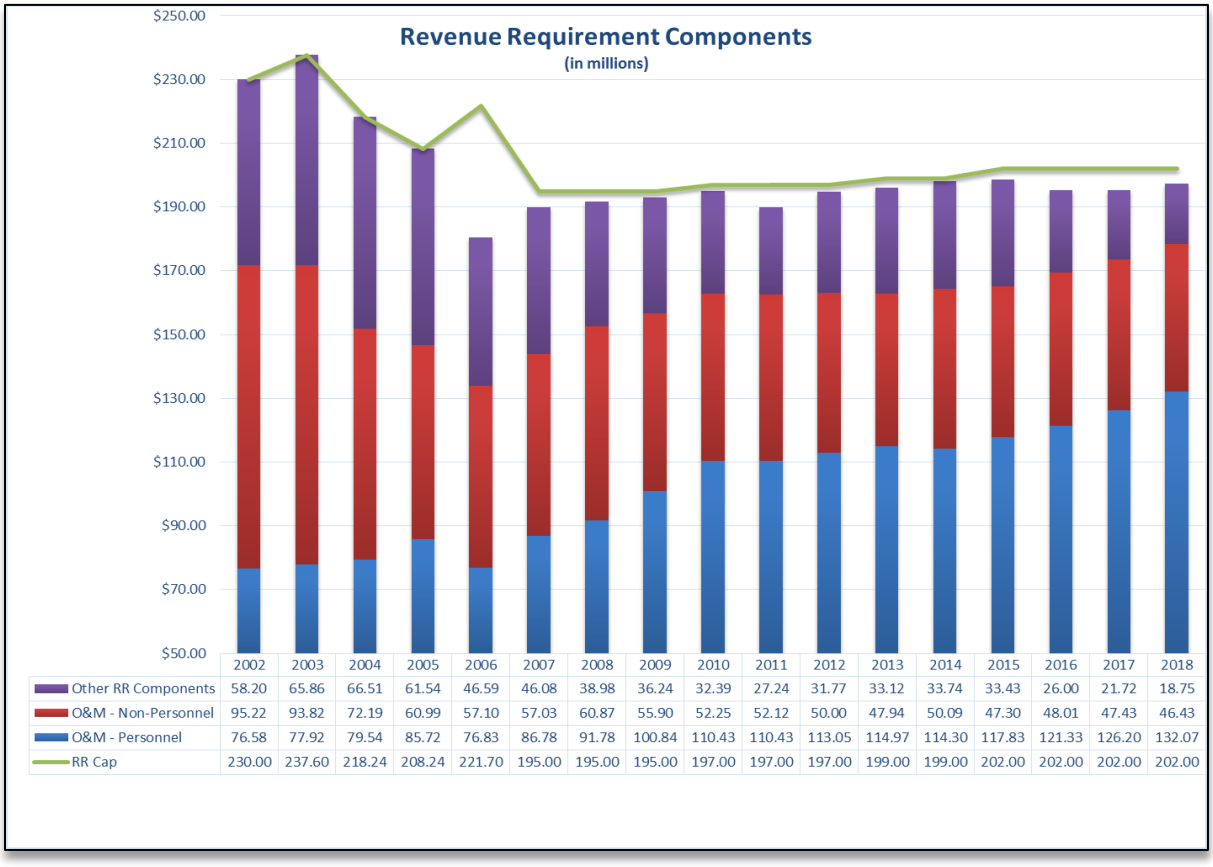
The Budget and Grid Management Charge Rates Book typically contains (1) a summary of the components of the revenue requirement compared to the prior year, (2) alignment with the

[5] Currently, the ABC analysis has disaggregated CAISO activity into nine core processes (level 1 activities). Each of the core activities are further broken down into major processes (level 2 activities) which are then mapped to the level one activity. There are 140 level 2 activities included in the 2016 cost of service study. More on the 2016 Cost of Service Study and 2018 GMC Update can be found here, http://www.caiso.com/Documents/2016Cost_ServicesStudy_2018GMCUpdate.pdf

[6] Visit http://www.caiso.com/informed/Pages/StakeholderProcesses/Budget-GridManagementCharge.aspx for more information regarding the annual Budget and Grid Management Charge Rates books.

CAISO's strategic plan, (3) a breakdown of the CAISO's O&M budget by process, (4) a breakdown of the O&M budget, broken down by resource compared to the prior year, (5) a breakdown of the O&M budget, broken down by division compared to the prior year, (6) details of debt service compared to the prior year, (7) description of capital and cash funded capital compared to the prior year, with a proposed listing of capital projects, (8) detail of other costs and revenues compared to the prior year, (9) detail of the operating cost reserve adjustment compared to the prior year, and (10) a rate calculation for the current year. Exhibits filed with the book include a forecast of billing volumes for the next year and a schedule of the calculation of the operating cost reserve adjustment.

Since 2007, the CAISO Revenue Requirement has averaged an annual increase of less than 1% and remains 17% lower than the highest Revenue Requirement in 2003. The CAISO has absorbed several major initiatives during this time with no material impact to the Revenue Requirement, which included the launching of its new market, construction of its now primary and secondary business locations, and the implementation of the Western Energy Imbalance Market.




| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Other RR Components | 58.20 | 65.86 | 66.51 | 61.54 | 46.59 | 46.08 | 38.98 | 36.24 | 32.39 | 27.24 | 31.77 | 33.12 | 33.74 | 33.43 | 26.00 | 21.72 | 18.75 |
| O&M - Non-Personnel | 95.22 | 93.82 | 72.19 | 60.99 | 57.10 | 57.03 | 60.87 | 55.90 | 52.25 | 52.12 | 50.00 | 47.94 | 50.09 | 47.30 | 48.01 | 47.43 | 46.43 |
| O&M - Personnel | 76.58 | 77.92 | 79.54 | 85.72 | 76.83 | 86.78 | 91.78 | 100.84 | 110.43 | 110.43 | 113.05 | 114.97 | 114.30 | 117.83 | 121.33 | 126.20 | 132.07 |
| RR Cap | 230.00 | 237.60 | 218.24 | 208.24 | 221.70 | 195.00 | 195.00 | 195.00 | 197.00 | 197.00 | 197.00 | 199.00 | 199.00 | 202.00 | 202.00 | 202.00 | 202.00 |

*Figure 2: CAISO 17-Year Revenue Requirement History*

## 6.1 RC Funding Requirement

The CAISO proposes to develop an annual RC Funding Requirement. The Funding Requirement, as discussed further below, will be the product of the CAISO's annual Revenue Requirement multiplied by the RC Percentage as determined as part of the triennial cost of service study. This approach allows the RC Funding Requirement to leverage against the stability of the CAISO's annual Revenue Requirement thus benefiting both the RC Customers and the existing GMC Customers. The RC Funding Requirement will be used as the numerator in order to calculate the RC Rate per MWh for BAs and TOPs.

The RC Funding Requirement will be calculated as follows:

*Annual Revenue Requirement * RC Percentage*

The RC percentage will represent the direct and indirect time and expense necessary for the CAISO to perform its RC services and functions. The percentage will be updated as part of the triennial cost of service study the CAISO completes as part of its tariff requirements.

As a starting point, the CAISO set a base line to determine the initial RC percentage. The base line was established by examining the roles and responsibilities associated with providing RC services and the necessary resources to support them. The existing CAISO ABC process codes and tasks codes were examined to identify the direct roles and responsibilities of the Reliability Coordinator Services function; in some cases this required new tasks to be developed.

Labor will be the largest expense related to the CAISO's RC service. In the scenario where the CAISO RC is providing service to most of the western interconnection, the CAISO projects that approximately 55 full time equivalent (FTE) positions will be needed to support the RC service. The 55 FTE represents the effort of FTEs considered in a direct supporting role and those considered in an indirect supporting role. The CAISO proposes to allocate a proportionate amount of its other indirect expenses to the RC budget as well. The indirect expenses include other components of the CAISO's Revenue Requirement such as administrative tools and capital. This indirect expense allocation allows RC services related projects to be considered during the annual capital budget planning process.

To calculate the RC percentage, the CAISO first estimated the direct RC operating expenses. As part of this effort the CAISO determined the number of direct hours associated with each RC-related ABC task code performed by staff. In addition, the CAISO paired these hours with the personnel expenses of each of the FTE included in the analysis. The second part of this effort was identifying the projected non-labor related costs and mapping these costs to the RC-related ABC task codes; these costs include RC specific tools and applications included in the core RC offering as well as in support of the supplemental RC services.

The indirect portion of the estimated RC expense was determined by allocating the indirect expenses identified in the Revenue Requirement proportionately based on the direct cost percentages.

The sum of the direct and indirect expenses less any RC-related supplemental revenue, such as for HANA, is the projected RC operating budget. The operating budget was then be backed into the Revenue Requirement to determine the RC percentage.

The RC percentage will be calculated as follows:

*RC Operating Budget / Revenue Requirement (sub-total before RC Income Allocation)*

The CAISO proposes to develop the RC operating budget as part of the annual O&M budget, annually, in connection with the general CAISO annual Revenue Requirement process, following the requirements and schedule set forth in the CAISO tariff (Appendix F, Schedule 1, and Part D – Budget Schedule).

The RC percentage will be updated as part of the triennial cost of service study by analyzing the hours and resources tracked against the RC-related ABC process and task codes.

See Appendix 1 for a list of RC related ABC Process Codes and Tasks as well as for RC Annual Funding Requirement and Rate Examples.

**FERC, NERC, and WECC Penalties**

Section 14.7 of the CAISO tariff sets forth a process by which the CAISO may seek, with FERC approval, to allocate reliability-related penalty costs assessed by FERC, NERC and/or WECC to specific entities whose conduct was found to have contributed to such penalty and to recover costs associated with such penalties from CAISO RC Customers. This provision was established pursuant to an order issued by FERC that sets forth the requirements and process that ISOs/RTOs must follow for allocation of such penalties.[7] Because this provision refers broadly to penalties levied against the CAISO "as the Registered Entity for the violation of one or more NERC Reliability Standards," it would apply to any penalties that the CAISO might receive in connection with performing the RC function. However, the CAISO plans to clarify in the tariff and/or Reliability Coordinator Services Agreement the application of this language to the RC function. As required by FERC in its Guidance Order, any such proposed allocation must be submitted to FERC for its review and approval.

The CAISO will not have an RC services specific operating reserve account and will instead rely upon the general CAISO operating reserves funded by RC Customers through their share of indirect cost allocations (see the Revenue Requirement section above for more details). The CAISO would therefore be able to pay fines received from FERC/NERC/WECC for failure to comply with a reliability standard from a single operating reserve, regardless of which function may have been penalized. This would avoid the complication of allocating reliability standard compliance penalties based on function, which would likely be difficult if not impossible and highly contentious in any event. The general CAISO operating reserve account is funded at 15% of the CAISO's Operating and Maintenance Budget and should be adequate to cover virtually any potential penalty levied upon the CAISO for any reliability standard compliance violation. In such a circumstance, the CAISO would apply an increase in the overall Revenue Requirement for the following year to cover the shortfall in operating reserves, which would then be recovered from all CAISO participants according to their share of the Revenue Requirement.

[7] *See* Order Providing Guidance on Recovery of Reliability Penalty Costs by Regional Transmission Organizations and Independent System Operators, 122 FERC ¶61,247 (2008)(Guidance Order).

This approach will reduce or more likely eliminate the need to ever invoke the tariff provisions associated with reliability standard compliance penalty allocation, which the CAISO has in fact never used. Nonetheless, the CAISO is not in a position to exempt RC Customers from this requirement because it is necessary to comply with FERC's guidance order on penalty allocations by Independent System Operators (ISO) and Regional Transmission Owners (RTO), which established a set of prescriptive requirements for penalty allocation that all ISOs and RTOs must follow. In reality, the penalty allocation provision would be invoked only if there were an extremely substantial penalty that could not be covered by reserves or, if in the CAISO's discretion, there were a need to pursue a direct allocation or indirect allocation as permitted under the provisions currently included in the CAISO tariff. All parties, including specifically federal entities, would have an opportunity to intervene and comment on the CAISO filing seeking FERC authorization to recover penalties incurred by the CAISO directly or indirectly from RC Customers.

## 6.2 RC Billing Data

The CAISO proposes to use Net Energy for Load MWh volumes as its RC billing data. As an alternative for generation only BAs and TOPs as defined by WECC, the CAISO proposes to use Net Generation MWh volumes. In cases where the submitted MWh volumes yield a charge less than the established minimum charge, the RC Customer will be charged the minimum charge.

***Net Energy for Load (NEL)***, as defined by NERC[8], is net balancing authority area generation, plus energy received from other balancing authority areas, less energy delivered to BA areas through interchange. It includes BA area losses but excludes energy required for storage at energy storage facilities.

Net Energy for Load calculation is:

*Net BA Generation + Imports into BA – Exports from BA – Energy for Storage*

***Net Generation (NG)***, as defined by WECC[9], is net power available from a generator to be fed to the power system. Net generation is equal to gross generation minus the generator's internal power usage (station service).

Net Generation calculation is:

*Net Generation at high side of transformer*

[8] Visit http://www.nerc.com/pa/Stand/Version%200%20Relaibility%20StandardsRD/Glossary_Clean_11-3-04.pdf for NERC's glossary of terms used in reliability standards.

[9] Visit https://www.wecc.biz/_layouts/15/WopiFrame.aspx?sourcedoc=/Administrative/Glossary.pdf&action=default&DefaultItemOpen=1 for WECC's glossary of terms.

***Minimum Charge***

The CAISO recognizes there will be funding entities that do not have any reported NEL or NG but still require RC services. The CAISO believes a basic funding principle should note that regardless of whether an entity has load tracked through its RC footprint or not it will still require a constant, although minimal, amount of administrative attention from its RC service provider. For this reason, the CAISO proposes to charge a minimum annual charge of $5,000 to entities that fall into this category, such as a BA that has low MWh volumes of generation only or a TOP with transmission assets but no load. The amount represents the effort (in time and dollars) the CAISO projects it will spend towards providing outage coordination, dispatch, and other services to such entities with zero or a very low level of NEL or NG.

The minimum charge amount will be updated as part of the triennial cost of service study by analyzing the hours and resources tracked against the RC-related ABC process and task codes.

***Billing Data Submission***

The CAISO Market Results Interface - Settlements (MRI-S) system will be enhanced to provide RC Customers with the ability to electronically submit their data and receive their settlement statements.

## 6.3 RC Annual Rate

RC rates will be determined by dividing the RC Funding Requirement (adjusted for any known minimum charge billings) by the annual RC projected volumes. The projected volumes will be determined using the RC membership's submitted volumes for the applicable year (as discussed in the next section), as well as taking into consideration the planned RC Customer entries and exits over the course of the applicable year.

The RC annual rate will go into effect January 1. This date is consistent with the effective dates for the CAISO's other annually recalculated rates.

# 7. Reliability Coordinator Settlements Process

The RCSA will require the RC Customer to submit RC billing data in accordance with the CAISO tariff (i.e. NEL, NG, or minimum charge). In addition, the agreement will require the RC Customer to state for billing purposes what category they represent:

- Balancing Authority
- Transmission Operator (direct billing elected)
- Transmission Operator (billed to Balancing Authority); or
- Transmission Operator within the CAISO BA area

The CAISO proposes to invoice RC Customers annually on January 1st for RC services provided that calendar year. Payment will be due by January 31st of that same year. Federal entities will have an option to make monthly payments of 1/12 of the annual invoiced amount; in which case, the monthly payments will be due by the last business day of the month. In addition, the CAISO will

have the ability to directly invoice TOPs located within a BA area that are RC Customers. There will be a modified invoice process during the transition year of 2019.

In accordance with the RC meter submittal timeline as defined by the CAISO tariff, the RC billing data will be due prior to the RC service year. RC Customers will be required to submit their RC billing data volumes for the following year into MRI-S by September 30th; the RC billing data volumes will be for the preceding July 1st thru June 30th period. If the RC Customer does not submit any data, the CAISO will estimate the data and apply a default charge as discussed below.

An informational statement containing RC billing data volumes submitted by the RC Customers will be published by October 30th. RC Customers should use this statement to verify the submitted values for accuracy. The RC invoice will be calculated using the latest RC billing data volumes present in MRI-S as of December 31st.

The RC invoice charges will be based on the CAISO's current RC rate per MWh multiplied by the RC billing data in MRI-S (annual NEL or annual NG or annual minimum charge) or the default RC charge if data is not provided. If the BA or TOP does not provide any NEL volumes or NG volumes data through the MRI-S, the CAISO will estimate the default NEL volumes or default NG volumes based on the following:

- Default NEL MWh volumes will be based on the previous year's data provided by the NERC/WECC report on NEL for LSEs (Load Serving Entity).

- Default NG MWh volumes will be based on the sum of the RC Customer's generator(s) install capacity times 90% capacity factor times 8,760 hours per year.

Depending on the default NEL or default NG volumes, the RC Customer will be charged the greater of the default RC services charge or the RC minimum charge. The default RC services charge is a product of the RC rate and 125% of the default NEL or default NG volumes estimated by the CAISO above. The value of 125% was chosen as an incentive for RC Customers to provide their NEL or NG volumes but not significant enough to skew the overall allocation to the other RC Customers and impact their budgeting process.

The CAISO will also have a right to audit the NEL or NG data provided by the RC Customer.

RC Customers that are not in the first onboarding in 2019 will be required to make payments similar to the RC Customers in the first onboarding. As an example, an entity that wants to be an RC Customer on April 1, 2021 will need to execute the RCSA by July 1, 2020, to allow for system integration and at least two months of shadow operations. The RC Customer will be charged in January 2021 ¾ of the annual RC services charge for the first year (April 1, 2021 – December 31, 2021). If the RC Customers wants HANA services they must make their election similar to other RC Customers 90 calendar days in advance of starting shadow operation and will be charged similar to the other RC Customers as discussed in Appendix 3: Supplemental Services.

The diagram below reflects the proposed billing process from the CAISO to BA and TOPs.

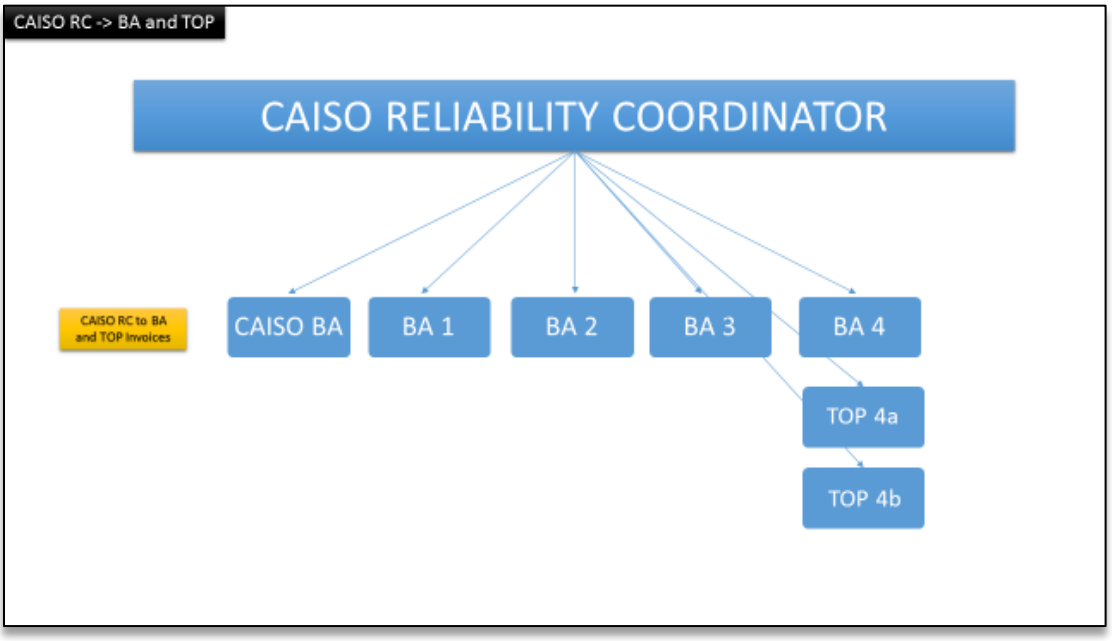



*Figure 3: CAISO RC to BA and TOP Billing Model*

See Appendix 2 for information regarding the Reliability Coordinator Services Billing to CAISO Scheduling Coordinators.

## 7.1 Invoice Validation Process

An RC settlements schedule will be published on the CAISO website containing the dates of RC settlement statements, invoices, and payment due dates. RC Customers will be invoiced in accordance with this schedule.

RC Customers have the ability to correct their RC billing data after receiving the informational statement and provide updated NEL and NG volumes as deemed necessary. Valid corrections will be reflected in the RC invoice.

## 7.2 Payment Default

RC Customers, with the exception of the Federal entities that choose to pay their annual charges over the course of the year, will be required to pay their invoice by January 31st following invoice issuance. If payment is not received by January 31st, the RC Customer will be charged a $1,000 late payment fee. In addition, the RC Customer will be in default and the CAISO will notify all RC Customers of a potential supplemental invoice due to a pending default. The CAISO reserves the right to suspend its role as the RC of record for the defaulting customer until such time payment is received; however, the CAISO will continue to perform all RC services to ensure reliability of CAISO

RC area including the area in default. In addition, the CAISO will send out a supplemental invoice to all active RC Customers for their proportionate amount of the invoice in default. Finally, the CAISO will also notify NERC and WECC of the default.

# 8. Business Practice Manuals

The table below lists the Business Practice Manuals[10] (BPM) that will be impacted by the addition of RC services.

| BPM | Description of Impact(s) |
|---|---|
| Managing Full Network Model | Updates and modeling of RC Customers |
| Outage Management | New RC Customers entering own outages |
| NEW: Reliability Coordination | Describes the roles and responsibilities of the CAISO RC and its customers |
| Settlements and Billing | RC services settlement updates |

Changes made to existing BPMs will go thru a BPM change management stakeholder review process. The RC services BPM will not establish the operating procedures and practices that apply to the CAISO's RC function. The RC operating procedures and practices will be developed and adopted through the RC services oversight process described in the body of this proposal. Operating procedures and practices described or referenced in the BPM will be for reference purposes only.

[10] CAISO Business practice manuals are available at: http://www.caiso.com/rules/Pages/BusinessPracticeManuals/Default.aspx

# 9. Next Steps

The RC Rate Design, Terms and Conditions initiative has two proposals, a straw proposal and a draft final proposal. The ISO stakeholder process provides for both proposals to be presented and discussed with stakeholders, followed by an opportunity to provide written comments. Afterwards, ISO management will present the draft final proposal and summarized stakeholder comments to the CAISO Board of Governors for their review and approval. Upon approval by the Board, the CAISO will develop the relevant tariff amendments to be filed with FERC. The CAISO will review these amendments with stakeholders for comment prior to the FERC filing.

The tentative 2018 milestone schedule for the RC Rate Design, Terms and Conditions initiative follows.

| Date | Milestone |
|---|---|
| April 12, 2018 | Initial stakeholder meeting on RC Rate Design, Terms and Conditions straw proposal |
| May 4 | Stakeholder written comments due on straw proposal |
| June 20 | CAISO will post draft final proposal |
| June 27 | 2nd stakeholder meeting on RC Rate Design, Terms and Conditions draft final proposal |
| July 11 | Stakeholder comments due on draft final proposal |
| July 18 | CAISO will post draft tariff language |
| July 25 | Present draft final proposal to ISO Board of Governors |
| August 1 | Stakeholder written comments due on draft tariff language |
| August 8 | Conduct stakeholder call to discuss tariff language and comments |
| August 31 | CAISO will file tariff language with FERC |
| November | FERC ruling on RC Rate Design |
| November 2018 | CAISO will execute RC Service Agreements |

# Appendices

## Appendix 1: Reliability Coordinator Business Processes, Funding Requirement and Rate

**RC Business Processes and Tasks**

| Process Code | Process | Task Code | Task |
|---|---|---|---|
| 80004 | Manage Market & Reliability Data & Modeling (MMR) | 301 | Manage Full Network Model (FNM) Maintenance |
| 80004 | Manage Market & Reliability Data & Modeling (MMR) | 311 | Manage Operations Planning |
| 80004 | Manage Market & Reliability Data & Modeling (MMR) | 314 | Manage & Facilitate Procedure Maintenance |
| 80004 | Manage Market & Reliability Data & Modeling (MMR) | 316 | Operations Systematic Approach to Training |
| 80004 | Manage Market & Reliability Data & Modeling (MMR) | 317 | Execute & Track Operations Training |
| 80004 | Manage Market & Reliability Data & Modeling (MMR) | 320 | Provide Stakeholder Training |
| 80004 | Manage Market & Reliability Data & Modeling (MMR) | 321 | SC Management (Certification) |
| 80005 | Manage Markets & Grid (MMG) | 355 | Manage Outages |
| 80005 | Manage Markets & Grid (MMG) | 362 | Manage Operations Engineering Support |
| 80005 | Manage Markets & Grid (MMG) | 365 | Manage Real Time Operations - Transmission & Electric System |
| 80005 | Manage Markets & Grid (MMG) | 366 | Manage Real Time Interchange Scheduling |
| 80005 | Manage Markets & Grid (MMG) | 367 | Manage Annual Operational Assessment |
| 80005 | Manage Markets & Grid (MMG) | 369 | Manage Real Time Operations Generation |
| 80005 | Manage Markets & Grid (MMG) | 3xx | NEW TASK - Manage Real Time Reliability Coordination |
| 80007 | Manage Operations Support & Settlements (MOS) | 412 | Manage Market Billing & Settlements |
| 80009 | Support Business Services (SBS) | 511 | IT Incident Management - General |
| 80009 | Support Business Services (SBS) | 517 | IT Systems Maintenance Support |
| 80009 | Support Business Services (SBS) | 523 | Plan & Manage Business Continuity |
| 80009 | Support Business Services (SBS) | 545 | Manage Business Processes & Continuous Improvement |
| 80009 | Support Business Services (SBS) | 547 | Develop & Maintain Policies, Procedures & Standards |
| 80009 | Support Business Services (SBS) | 550 | NERC Compliance |
| 80009 | Support Business Services (SBS) | 51X | NEW TASK - IT Incident Management - Markets / Grid |
| 80010 | Support Customers & Stakeholders (SCS) | 601 | Client Inquiries |
| 80010 | Support Customers & Stakeholders (SCS) | 602 | Account Management |
| 80010 | Support Customers & Stakeholders (SCS) | 603 | Stakeholder Processes |

The processes and task identified above will contribute to the CAISO RC services. For example, the time and expense coded to Process Code 80004-Manage Market & Reliability & Modeling, Task 311-Manage Operations Planning directly contribute to the following RC services the CAISO will provide:

- Data Exchange to support Operations Planning Analysis and Real-Time Assessments
- Document Exchange (Plans, Procedures, Studies, Reports)
- IRO-010 Data Request
- Plan Reviews/ Approvals (EOP-005, 010 and 011)
- Seasonal Planning
- SOL Methodology

As mentioned, most of the codes are already included in the CAISO ABC process and task codes; however, they are not currently directly identified as a RC Services function. To address this, the CAISO will map the tasks identified as contributing to RC services to a new cost category, Reliability Coordinator Services, by means of percentage allocation.

**Cost Categories Used in Revenue Requirement**

| Cost Categories | Market Services | | System Operations | | CRR Services | NEW Reliability Coordinator Services |
|---|---|---|---|---|---|---|
| Sub-Category (level 1) | Real-Time Market | Day Ahead Market | Real-Time Dispatch | Balancing Authority Services | | |

For example, in the latest cost of service study, Process Code 80004-Manage Market & Reliability & Modeling, Task 311-Manage Operations Planning was allocated 100% to the System Operations cost category with an allocation of 20% to Real-Time Dispatch and 80% to Balancing Authority Services. Under the revised allocation, the task will be allocated 50% to the System Operations cost category and 50% to the NEW - Reliability Coordinator Services cost category; the level 1 allocation for System Operations will remain 20% to Real-Time Dispatch and 80% to Balancing Authority Services.

**Mapping of Process Code 80004-Manage Market & Reliability & Modeling, Task 311-Manage Operations Planning**

| Cost Category | System Operations | | Reliability Coordinator Services |
|---|---|---|---|
| | 50% | | 50% |
| Sub-Category (level 1) | Real-Time Dispatch | Balancing Authority Services | |
| | 20% | 80% | |

## RC Funding Requirement

*Assuming RC for a significant portion of the western interconnection.*

The following scenario is intended to illustrate how the CAISO proposes to calculate the annual RC Funding Requirement and rate/MWh if it were the RC for a significant portion of the western interconnection. The model presented assumes the CAISO RC services will support RC activity in its BA area and several of its EIM members' BA areas. If the actual CAISO RC footprint expands past these projected areas, the RC cost will not change. If the actual CAISO footprint is less than the projected areas, the RC cost will decrease. The actual RC rate will depend on committed RC Customers' MWh volumes.

| Modified Revenue Requirement | | | | | | |
|---|---|---|---|---|---|---|
| Component | Budget | Market Services | System Operations | CRRs | RC Services | Indirect |
| *($$ amounts in thousands)* | | | | | | |
| Direct Costs | $ 147,347 | $ 41,512 | $ 64,095 | $ 4,194 | $ 9,781 | $ 27,765 |
| Indirect Costs | $ 15,690 | $ - | $ - | $ - | $ - | $ 15,690 |
| Non-ABC Costs | $ 29,558 | $ 1,386 | $ 1,485 | $ 50 | $ 2,055 | $ 24,582 |
| **Total O&M** | **$ 192,595** | **$ 42,898** | **$ 65,580** | **$ 4,244** | **$ 11,836** | **$ 68,037** |
| | | | | | | |
| Debt Service 2013 Bonds | $ 16,900 | $ - | $ - | $ - | $ - | $ 16,900 |
| Cash Funded Capital | $ 22,000 | $ - | $ - | $ - | $ - | $ 22,000 |
| **Total Debt Service and Capital** | **$ 38,900** | **$ -** | **$ -** | **$ -** | **$ -** | **$ 38,900** |
| | | | | | | |
| Other Income (without RC Core Services Income) | $ (18,600) | $ (1,430) | $ (4,130) | $ - | $ (1,240) | $ (11,800) |
| Operating Cost Reserve Adj | $ (7,800) | $ - | $ - | $ - | $ - | $ (7,800) |
| **Total Other Revenue and Operating Costs Reserve Adj** | **$ (26,400)** | **$ (1,430)** | **$ (4,130)** | **$ -** | **$ (1,240)** | **$ (19,600)** |
| | | | | | | |
| **Revenue Requirement Sub-Total Before Indirect Allocations** | **$ 205,095** | **$ 41,468** | **$ 61,450** | **$ 4,244** | **$ 10,596** | **$ 87,337** |
| | | | | | | |
| Allocate Indirect Costs Based on Direct Cost % | $ - | $ 30,755 | $ 45,575 | $ 3,148 | $ 7,859 | $ (87,337) |
| | | | | | | |
| **Revenue Requirement Sub-Total Before RC Income Allocation** | **$ 205,095** | **$ 72,223** | **$ 107,025** | **$ 7,392** | **$ 18,455** | **$ -** |
| | | 35% | 52% | 4% | 9% | |
| Other Income: RC Core Services Income | $ (18,455) | | | | $ (18,455) | |
| | | | | | | |
| **Total Revenue Requirement** | **$ 186,641** | **$ 72,223** | **$ 107,025** | **$ 7,392** | **$ -** | **$ -** |

*Figure 4: Modified Revenue Requirement assuming a significant portion of the western interconnection footprint*

As mentioned earlier, the CAISO projects it will need approximately 55 FTEs to fulfill the roles and responsibilities of an RC provider for a significant portion of the western interconnection. The FTEs represent the aggregate number of employees (new and existing) that will contribute to directly supporting and indirectly supporting RC functions and responsibilities. The FTEs also represent multiple areas within the CAISO such as Operations, Technology, General Counsel, Customer and State Affairs, Human Resources, and Finance. The budget to support the new positions and other RC services-related expenses, such as WIT and ECC expenses, will be included in the O&M

budget beginning with the 2019 Revenue Requirement. The projected 55 FTEs were used as the basis to determine the initial RC percentage as illustrated in Figure 4.

The projection uses a forward looking Revenue Requirement that includes the cost projections for the FTEs along with non-labor cost projections. The 2016 Revenue Requirement was used as the basis because it is the Revenue Requirement used in the latest cost of service study however it was modified to include impacts expected with the new RC service offering and other non-RC planned projections. In this illustration, 9% of the Revenue Requirement represents the net costs necessary to support the RC services assuming the CAISO supports a significant portion of the western interconnection. The projection assumes the direct costs offset by direct revenue will be $10,596,000. The indirect costs of $7,859,000 are determined by multiplying the direct costs percentage against the Revenue Requirement (sub-total before RC Core Services Income). The direct and indirect costs combined total $18,455,000. This amount represents 9% of the annual Revenue Requirement. This percentage will be considered the RC Percentage used to determine the annual RC Funding Requirement. The RC Funding Requirement will be determined by multiplying the current year's Revenue Requirement (Sub-Total before RC Income) by the RC percentage. The RC Percentage will be reexamined and adjusted accordingly as part of the triennial cost of service study.

*Assuming RC for CAISO BA only.*

The following scenario is intended to illustrate how the CAISO proposes to calculate the annual RC Funding Requirement and rate/MWh for its BA footprint only. The RC percentage calculated under this scenario will be used in the 2019 Revenue Requirement and will remain in place until either the RC footprint expands beyond the CAISO BA or the RC percentage is updated as part of the next cost of service study.

Under this scenario, the CAISO projects it will need approximately 12 FTEs to fulfill the roles and responsibilities of an RC provider for its BA footprint. Again, the FTEs represent the aggregate number of employees (new and existing) that will contribute to directly supporting and indirectly supporting RC functions and responsibilities.

| Modified Revenue Requirement | | | | | | |
|---|---|---|---|---|---|---|
| Component | Budget | Market Services | System Operations | CRRs | RC Services | Indirect |
| *($$ amounts in thousands)* | | | | | | |
| Direct Costs | $ 141,847 | $ 41,541 | $ 66,263 | $ 3,686 | $ 2,599 | $ 27,758 |
| Indirect Costs | $ 17,058 | $ - | $ - | $ - | | $ 17,058 |
| Non-ABC Costs | $ 27,643 | $ 1,390 | $ 1,515 | $ 50 | $ 106 | $ 24,582 |
| **Total O&M** | **$ 186,548** | **$ 42,931** | **$ 67,778** | **$ 3,736** | **$ 2,705** | **$ 69,398** |
| | | | | | | |
| Debt Service 2013 Bonds | $ 16,900 | $ - | $ - | $ - | $ - | $ 16,900 |
| Cash Funded Capital | $ 22,000 | $ - | $ - | $ - | $ - | $ 22,000 |
| **Total Debt Service and Capital** | **$ 38,900** | **$ -** | **$ -** | **$ -** | **$ -** | **$ 38,900** |
| | | | | | | |
| Other Income (without RC Core Services Income) | $ (18,150) | $ (1,470) | $ (4,390) | $ - | $ (490) | $ (11,800) |
| Operating Cost Reserve Adj | $ (7,800) | $ - | $ - | $ - | $ - | $ (7,800) |
| **Total Other Revenue and Operating Costs Reserve Adj** | **$ (25,950)** | **$ (1,470)** | **$ (4,390)** | **$ -** | **$ (490)** | **$ (19,600)** |
| | | | | | | |
| **Revenue Requirement Sub-Total Before Indirect Allocations** | **$ 199,498** | **$ 41,461** | **$ 63,388** | **$ 3,736** | **$ 2,215** | **$ 88,698** |
| | | | | | | |
| Allocate Indirect Costs Based on Direct Cost % | $ - | $ 33,191 | $ 50,744 | $ 2,991 | $ 1,773 | $ (88,698) |
| | | | | | | |
| **Revenue Requirement Sub-Total Before RC Income Allocation** | **$ 199,498** | **$ 74,652** | **$ 114,132** | **$ 6,727** | **$ 3,988** | **$ -** |
| | | 37% | 57% | 3% | 2% | |
| Other Income: RC Core Services Income | $ (3,988) | | | | $ (3,988) | |
| | | | | | | |
| **Total Revenue Requirement** | **$ 195,510** | **$ 74,652** | **$ 114,132** | **$ 6,727** | **$ -** | **$ -** |

*Figure 5: Modified Revenue Requirement assuming a CAISO BA footprint only*

In this illustration, 2% of the Revenue Requirement represents the net costs necessary to support the RC services. The projection assumes the direct costs offset by direct revenue will be $2,215,000. The indirect costs of $1,773,000 are determined by multiplying the direct costs percentage against the Revenue Requirement (sub-total before RC Core Services Income). The direct and indirect costs combined total $3,988,000. This amount represents 2% of the annual Revenue Requirement. This percentage will be considered the RC Percentage used to determine the annual RC Funding Requirement. The RC Funding Requirement will be determined by multiplying the current year's Revenue Requirement (Sub-Total before RC Income) by the RC percentage. As mentioned earlier, the RC percentage calculated under this scenario will be used in the 2019 Revenue Requirement and will remain in place until either the RC footprint expands beyond the CAISO BA or the RC percentage is updated as part of the next cost of service study.

*For illustrative purposes we will use the forward looking Revenue Requirement assuming the CAISO is the RC for a significant portion of the western interconnection in our following examples.*

## Rate Calculation

The RC Funding Requirement is projected to be somewhere between $5 million and $19 million depending on the actual RC footprint. Dividing this amount by the projected volumes in the RC area yields an estimated rate somewhere near the $0.02/MWh to $0.06/MWh range.

| RC Funding Requirement | | |
|---|---|---|
| Revenue Requirement (Sub-Total Before RC Income) | $ | 205,095,000 |
| RC % | | 9% |
| RC Funding Requirement | $ | 18,458,550 |

## BA and TOP RC Charge

The annual RC service charge will be calculated by multiplying the RC rate/MWh by the MWh volumes submitted.

In this example, RC Customer A's annual MWh volumes are 24,559,000. The calculated annual charge is $944,424.

| | | Annual |
|---|---|---|
| Customer A's NEL or NG MWh Volumes | | 24,559,000 |
| RC Rate | $ | 0.0385 |
| Annual Charge | $ | 944,424 |

## Minimum Charge

If the MWh volumes submitted yield a charge that is less than the annual minimum charge, the customer will be charged the annual minimum charge amount.

In this example, RC Customer B's annual MWh volumes are 110,000. As the MWh volumes yield a calculated charge less than the minimum charge by $770, RC Customer B will be charged the annual minimum charge of $5,000.

| | | Annual |
|---|---|---|
| Minimum Charge | $ | 5,000 |
| | | |
| Customer B's NEL or NG MWh Volumes | | 110,000 |
| RC Rate | $ | 0.038 |
| RC Services Charge | $ | 4,230 |
| | | |
| Delta between Minimum Charge and Calculated Charge | $ | 770 |

## Default Charge

If the BA or TOP does not provide any NEL or NG MWh volumes through the MRI-S, the CAISO will estimate the default NEL volumes or default NG volumes based on the following:

- Default NEL MWh volumes will be based on the previous year's data provided by the NERC/WECC report on NEL for LSEs.

- Default NG MWh volumes will be based on the sum of the RC Customer's generator(s) install capacity times 90% capacity factor times 8,760 hours per year.

Depending on the default NEL or default NG MWh volumes the RC Customer will be charged the greater of the default RC services charge or the RC minimum annual charge. The default RC services charge is a product of the RC rate and 125% of the default NEL or default NG MWh volumes estimated by the CAISO above. The value of 125% was chosen as an incentive for RC Customers to provide their NEL or NG volumes but not significant enough to skew the overall allocation to the other RC Customers and impact their budgeting process.

In this example, RC Customer C does not provide their NEL MWh volume and CAISO uses the default volumes of 110,000 MWh. In this case the default charge is greater than the minimum charge and RC Customer C will be charged the default charge of $5,288.

| | | Annual |
|---|---|---|
| Minimum Charge | $ | 5,000 |
| | | |
| Customer C's Estimated NEL MWh Volumes | | 110,000 |
| plus 25% | | 27,500 |
| Customer C's Estimated Default MWh Volumes | $ | 137,500 |
| RC Rate | $ | 0.0385 |
| Default NEL Charge | $ | 5,288 |
| | | |
| | | |
| Delta between Minimum Charge and Default Charge | $ | 288 |

In this example, RC Customer D does not provide their NG MW volumes and CAISO estimates 1,000 MW. In this case the default charge is greater than the minimum charge and RC Customer D will be charged $378,977.

| | | Annual |
|---|---|---|
| Minimum Charge | $ | 5,000 |
| | | |
| Customer D's Estimated NG MW Volumes | | 1,000 |
| Multiplied by Default Capacity Factor | | 90% |
| Estimated NG MW | | 900 |
| Multiplied by Hours/Year | | 8,760 |
| Estimated NG MWh Volumes | | 7,884,000 |
| plus 25% | | 1,971,000 |
| Customer D's Estimated Default MWh Volumes | | 9,855,000 |
| RC Rate | $ | 0.0385 |
| Default NG Charge | $ | 378,977 |
| | | |
| | | |
| Delta between Minimum Charge and Default Charge | $ | 373,977 |

# Appendix 2: Reliability Coordinator Services Billing to CAISO Scheduling Coordinators

Existing CAISO Scheduling Coordinators will continue to be receive an annual RC services invoice under their existing Schedule Coordinator ID number. The CAISO tariff invoicing and settlement procedures will apply to all load and transmission operator Scheduling Coordinators within the CAISO BA area. The CAISO Settlement System will calculate an annual total CAISO BA NEL and each Scheduling Coordinator's pro-rata portion of that total. The CAISO RC will use each Scheduling Coordinator's pro-rata portion of CAISO NEL as its billing data to generate invoices.

In addition, the CAISO proposes to bill a minimum charge of $5,000 to TOPs with zero to very low NEL volumes. The minimum charges collected from these entities will be deducted from the amount allocated to the remaining CAISO Scheduling Coordinators with load or generation.

**Invoice Dispute Process**

Scheduling Coordinators shall be prohibited from disputing any RC charges, except on grounds that an error in the invoice is due to a typographical or other ministerial error by the CAISO. Any dispute of an invoice type specified above shall be submitted and processed in accordance with the dispute procedure for RC charges.

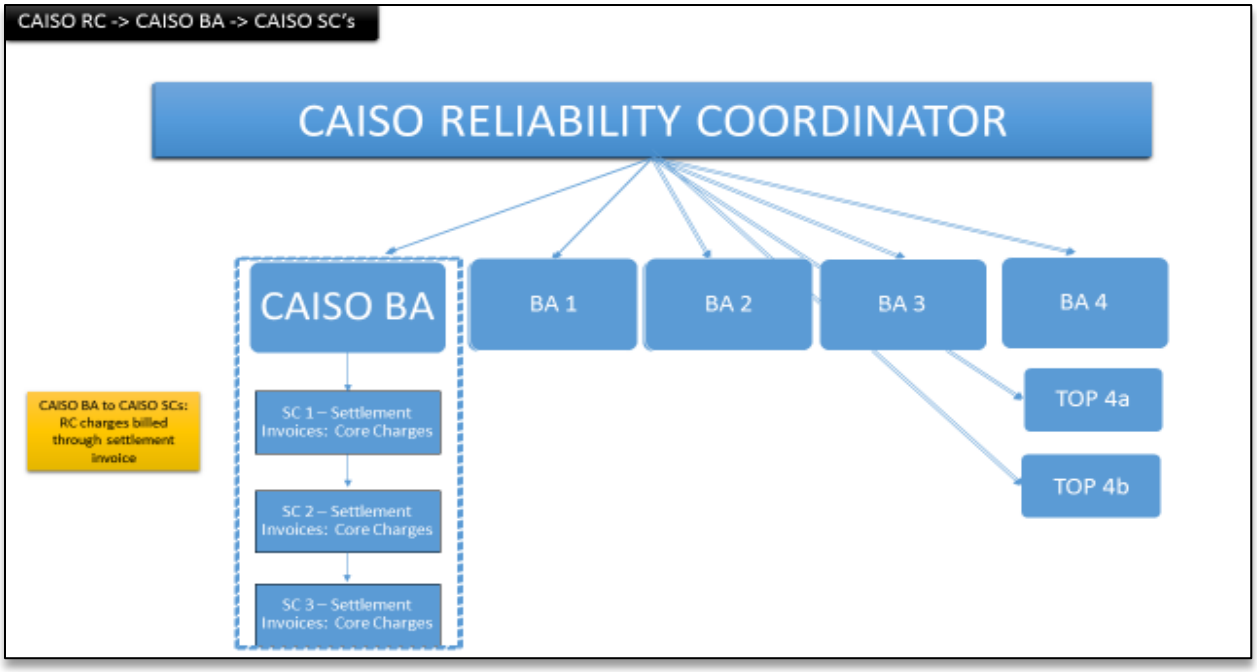



*Figure 6: CAISO RC to CAISO BA and SC Billing Model*

**Payment Default**

In the event a Scheduling Coordinator defaults on the payment of all or any portion of the RC charges invoiced, the CAISO will have the right to enforce the financial security provided by the defaulting Scheduling Coordinator, and to take any such other action as necessary to obtain

payment for the default amount. If a default invoice is issued, the CAISO Scheduling Coordinators must make timely payment to the CAISO within 5 business days of the default invoices' issuance.

# Appendix 3: Supplemental Services

The CAISO proposes to offer other services that will enhance its core RC services at an additional cost. These additional services include, but are not limited to, Hosted Advanced Network Applications (HANA) and Physical Security assessments (CIP-014). The CAISO will work with the RC Oversight Committee to identify supplemental services that will enhance the CAISO RC service offerings and to determine the best ways to fund them.

**Hosted Advanced Network Applications**

To help entities meet applicable standards requirements, the CAISO RC will also offer high-quality, low cost web-based HANA services to its RC Customers. Customers who select these HANA services will be able to view ratings, contingencies, remedial action schemes (RAS), one-line diagrams, along with real-time state estimation and real-time security assessments. HANA services will be further enhanced by the ability to filter contingency areas, define alarming options, and save study cases retained on-line for a period of 3 years. Accessing HANA services will be facilitated by the use of a CAISO RC-issued digital security certificate.

The CAISO RC will work with interested parties, in parallel to this stakeholder initiative, to ensure the scope of the HANA addresses the interested parties' needs. Responses to the CAISO questionnaire sent out an early April 2018 and other direct input collected will help the CAISO determine the scope of these services.

HANA will be available to TOPs and BAs that take RC services from CAISO. This service includes:

1. Read-only access and view to real-time State Estimator application.
2. Read-only access and view to Real Time Contingency Analysis (RTCA).
3. Access and ability to perform study powerflow utilizing CAISO's advanced network applications.
4. Access and ability to perform study Contingency Analysis utilizing CAISO's advanced network applications.

The CAISO requires a 3-year initial commitment for this service; the initial 3-year cost will include a one-time start-up fee and an annual ongoing fee for the software license and CAISO support. Annual enrollment in HANA services will continue unless the RC Customer submits a 12-month exit notification in writing; the exit notification must align with the RC Customers' anniversary period. After the initial 3-years of HANA service the annual cost to the RC Customer will be the annual ongoing fee.

The RC Customer must notify the CAISO in writing 90 calendar days prior to the start of their RC shadow operation period as to which HANA services it is electing to take.

The CAISO will invoice the RC Customer for their HANA services at the start of their shadow operation period then every year thereafter on their anniversary date. Payment will be due within twenty-one (21) business days from the date of the invoice.

The estimated cost for HANA services is as follows:

- One-Time Start-up Fee
  - A one-time charge of $35,000 - $70,000, depending upon the number of RC Customers taking the services
    - Note: This amount will be charged over the initial 3-year term in equal installments. For example, if the charge is $70,000 then the amount included in the initial 3-year invoices will be $23,333.

- Annual Ongoing Fee
  - Software License(s): CAISO will collect an amount equal to the vendor license costs which will vary per RC Customer depending upon the number of users.

  - CAISO support: $45,000 per RC Customer. CAISO support includes hardware for hosting the service, operation and maintenance, technical support, security and administrative costs.

**CIP-014 Physical Security**

The purpose of Critical Infrastructure Protection Standard 014 (CIP-014) is to identify and protect transmission stations and substations, and their associated primary control centers that if rendered inoperable or damaged as a result of a physical attack could result in instability, uncontrolled separation, or cascading within an Interconnection. Requirement R1 of the standard requires each TOP to perform periodic risk assessments of its transmission stations and substations that meet the criteria specified in the applicability section of the standard. The risk assessments consist of transmission analyses designed to identify the critical transmission stations and substations. Requirement R2 of the standard further requires each TOP to have an unaffiliated third party, such as a registered PC or RC, verify the risk assessment it performed under Requirement R1.

The CAISO currently provides this risk assessment verification service to its Participating Transmission Owners (PTOs). The CAISO will extend this service to TOPs who are RC Customers, if requested.

This service will be offered at cost of service and billed separate from the RC function. If the RC Customer desires this service, it will need to provide a $50,000 deposit and a written request to review a risk assessment to the CAISO. The CAISO will use the same process and criteria to review the risk assessment(s). In response to the request, the CAISO will evaluate the risk assessment which may include recommendations for the addition or deletion of a transmission station(s) or transmission substation(s). Once the evaluation of the risk assessment is completed, the CAISO will provide a report of its recommendations and meet with the RC Customer, if requested. The CAISO shall issue to the RC Customer one or more invoices for the assessment that include a detailed and itemized accounting of each assessment expense incurred (including those incurred by the CAISO and/or third parties) and corresponding amounts due. The CAISO shall draw from the risk assessment deposit any undisputed costs by the RC Customer within thirty (30) calendar days of issuance of an invoice.

Whenever the actual cost of performing the risk assessment exceeds the risk assessment deposit, the invoice will direct the RC Customer to pay the excess amount, and the RC Customer shall pay the undisputed amount in accordance with the invoice within thirty (30) calendar days. If the RC Customer fails to timely pay the actual costs exceeding the deposit and such costs have not been disputed, the default provisions, Section 5.3 of the Reliability Coordinator Services Agreement will invoke the CAISO tariff default provisions. The CAISO is not obligated to continue to conduct the risk assessment unless and until the RC Customer has paid all undisputed amounts.

California ISO

# Appendix 4: Acronyms

Below is a list of acronyms that appear in this document. Definitions are provided when they are helpful in setting the context of this document[11].

| Acronym | Term |
|---|---|
| ABC | Activity Based Costing |
| BA | Balancing Authority |
| BPM | Business Practice Manual |
| BES | Bulk Electric System |
| CAISO | California Independent System Operator Corporation |
| CIM | Common Informational Model |
| CIP | Critical Infrastructure Protection |
| CRR | Congestion Revenue Rights |
| ECC | Enhanced Curtailment Calculator |
| EIM | Energy Imbalance Market |
| FERC | Federal Energy Regulatory Commission |
| FNM | Full Network Model |
| FTE | Full Time Equivalent |
| GMC | Grid Management Charge |
| HAA | Hosted Advanced Application |
| HANA | Hosted Advanced Network Applications |
| ISO | Independent System Operator |
| LSE | Load Serving Entity |
| MRI-S | Market Results Interface - Settlements |
| MW | Mega Watt |
| MWh | Mega Watt Hours |
| NEL | Net Energy for Load |
| NG | Net Generation |
| NERC | North American Electric Reliability Corporation |
| PC | Planning Coordinator |
| Peak | Peak Reliability, Inc. |
| PTO | Participating Transmission Owner |
| RAS | Remedial Action Scheme |
| RC | Reliability Coordinator |
| RCSA | Reliability Coordinator Service Agreement |
| RPSC | Reliability Coordinator Project Steering Committee |
| RTO | Regional Transmission Owner |
| SC | Scheduling Coordinator |
| SOL | System Operating Limits |
| TO | Transmission Owner |
| TOP | Transmission Operator |
| WECC | Western Electricity Coordinating Council |
| WIT | Western Interchange Tool |

[11] A complete listing of the CAISO's definition and acronyms are available at: https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Definitions and Acronyms