California ISO

Reliability Coordinator
Rate Design, Terms, and Conditions

Straw Proposal

April 5, 2018

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California ISO

Introduction

The California Independent System Operator Corporation (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 area. All transmission operators (TOPs) within the CAISO balancing authority (BA) area will become reliability coordinator (RC) service customers of the CAISO at that time.

The CAISO RC services will also be offered to balancing authorities (BAs) outside of the CAISO BA area and to transmission operators (TOPs) within those external BA areas. The purpose of this paper is to provide an overview of the CAISO proposed rate design, terms and conditions for its RC services.

This straw proposal represents the first step in the CAISO stakeholder process, which is an open and transparent effort with all interested stakeholders. This process will lead to tariff changes that support the specific provisions which allow the CAISO to bill for just and reasonable rates for RC services.

The stakeholder process is expected to go through a straw proposal and a draft final proposal. The draft final proposal will be presented to the CAISO Board of Governors for their review and approval following the stakeholder process. After approval by the Board, the CAISO will develop 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 prior to the FERC filing.

The CAISO will also be working in parallel with the TOPs in the CAISO BA area, 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 will allow 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. The effort has begun 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.

The CAISO plans to be certified as an RC and operational by the spring of 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. It will also work with interested BAs, TOPs and other stakeholders on a thoughtful and rational schedule for the transition.

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 applications and other reliability services to interested RC Customers.

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

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.

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.

The CAISO will also facilitate the continuation of the Western Interconnection tools such as Western Interchange Tool (WIT) and Enhanced Curtailment Calculator (ECC). The current OATI service is hosted by Peak. The CAISO is willing to jointly fund and/or host the ongoing service as well as other applications used as Western Interconnection wide tools. This topic will be addressed through discussions with other RCs in the Western Interconnection.

Reliability Coordinator Oversight

The CAISO will establish an interim senior management level Reliability Coordinator Project Steering Committee (RPSC). This committee will include a representative with responsibility for maintaining reliability 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. The committee, via working groups, will develop, review and comment on procedures and practices relating to the CAISO's implementation and certification of its RC function. Although the role of the RPSC is advisory in nature, the CAISO intends to follow the direction of the RPSC with respect to overarching RC policies and procedures unless the CAISO determines that doing so would (1) constitute an unacceptable risk to reliability, in its judgment as the reliability coordinator, or (2) be inconsistent with the reliability standards. The RPSC will also shape and provide guidance regarding a future oversight of the RC function.

Reliability Coordinator Service Agreements

Balancing Authorities will be required to enter into a Reliability Coordinator Service Agreement with the CAISO to receive RC services. The CAISO anticipates that TOPs within those BA areas could be directly invoiced for RC services provided that 1) the BA area in which they are located also receives RC services from the CAISO, and 2) they execute a Reliability Coordinator Service Agreement with the CAISO. The TOPs in the CAISO BA area must be represented by a scheduling coordinator and will be invoiced for RC services in accordance with the CAISO tariff.

The CAISO will develop a draft *pro forma* Reliability Coordinator Service Agreement and provide that draft for general stakeholder review as part of the associated RC services tariff development process.[1] This agreement would obligate 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. This *pro forma* agreement would be filed with FERC;

[1] The CAISO will publish a draft of the proposed Reliability Coordinator Service Agreement for comment no later than the publication of the draft final proposal.

individual service agreements would be executed and recorded in FERC's electronic quarterly reports.

Currently, the CAISO anticipates that the *pro forma* Reliability Coordinator Service Agreement 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.

Reliability Coordinator Onboarding, Initial Commitment, and Exiting Terms

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.

Onboarding

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. 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.

As part of the initial RC offering, the CAISO proposes a staggered onboarding integration for the set-up required for RC Customers with an official single start date in the fall of 2019. For future years, the CAISO proposes to onboard RC Customers at least once a year. There will be no implementation cost to obtain RC services from the CAISO. Monthly billings will begin once service is activated.

Implementation periods could run between 6 to 12 months depending upon the following: 1) whether the BA is already in the CAISO full network model (FNM); or 2) if not already in the CAISO's FNM, on the complexity of the RC Customer's resource configuration, system topology, the Common Informational Model (CIM) maturity of the RC Customer's model, and the RC Customer's staffing availability. The implementation period will be determined based on CAISO's assessment, in close coordination with the RC Customer, of the RC Customer's FNM and other data exchange capabilities.

RC Customers will need to execute the RC services *pro forma* agreement once the form of that agreement and the associated tariff provisions have been accepted by FERC. TOPs within the CAISO BA will become RC Customers upon FERC acceptance of the CAISO tariff provisions and will not need to enter into the *pro forma* RC Services Agreement.

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.

Initial Commitment

The CAISO proposes that a BA or TOP that receives RC services from the CAISO make an initial commitment of 18 months ("Initial Commitment").

An early termination fee will apply if an RC Customer terminates its agreement with the CAISO prior to the expiration of the Initial Commitment. The early termination fee will be equal to the estimated RC service fees that would otherwise be due for the balance of the remainder of the Initial Commitment. This fee reasonably ensures recovery of any costs incurred by the CAISO for the initial integration and subsequent termination of service to the RC Customer.

Exiting

An RC Customer may terminate its agreement with the CAISO, without penalty, by giving 6 months advance written notice to the CAISO after completion of the Initial Commitment. If the RC Customer gives less than 6 month notice, it will be charged an amount equal to the balance of estimated service fees remaining on the 6 month required notice period. The CAISO proposes to have two windows for exiting during the year, a spring window and a fall window. This is to ensure adequate preparation and resources, as well as to recognize seasonal challenges during the winter and summer months.

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 RC services. The model is based on seven guiding ratemaking principles[2] 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 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.[3]

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

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

[3] 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

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.

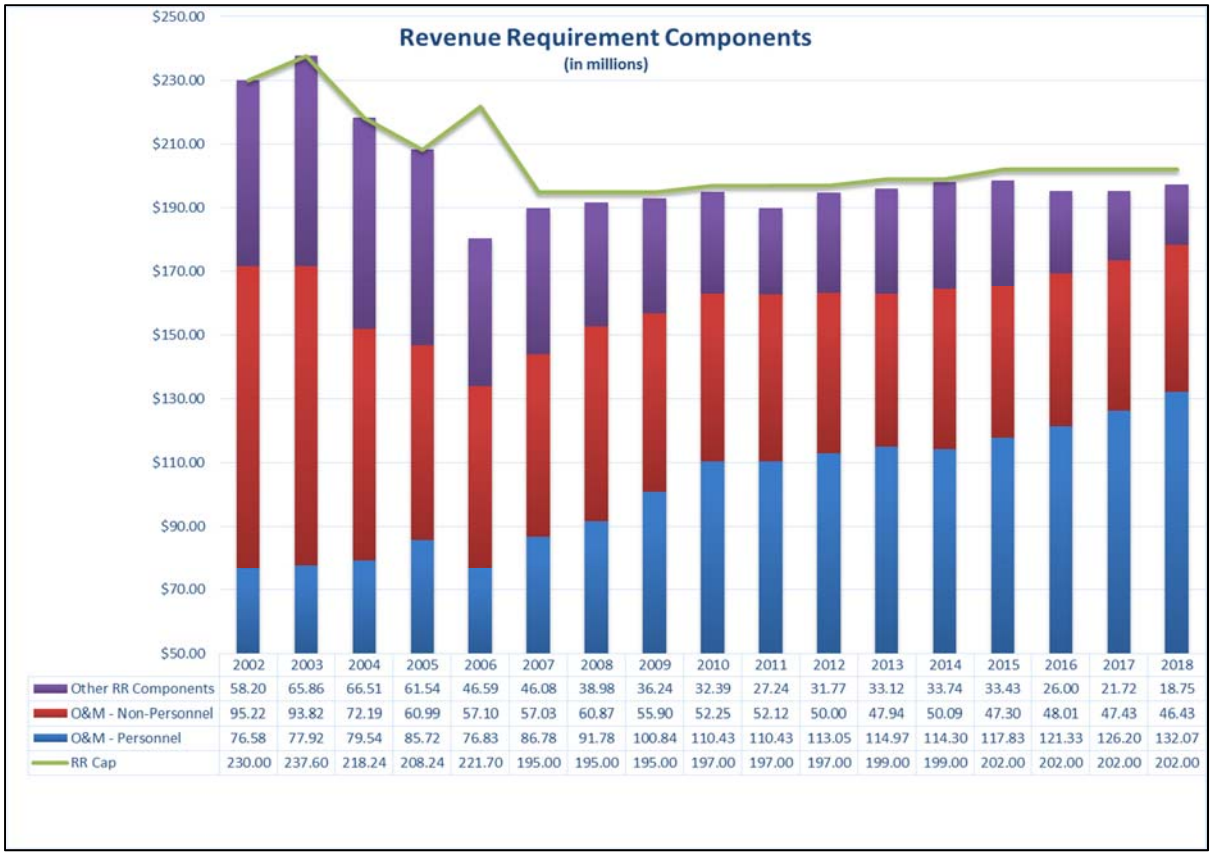
The process to develop the annual Revenue Requirement begins with a stakeholder meeting, generally scheduled during the second quarter of the year. At this time, the CAISO discusses with stakeholders budgeting assumptions for the upcoming year, including (1) controlling costs, (2) capital projects for 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"[4]. 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 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

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

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

RC Funding Requirement

The CAISO proposes to develop an RC Funding Requirement. The Funding Requirement, as discussed further below, is the sum of the annual RC Operating Budget, RC Operating Budget Reserve, and the RC Revenue Adjustment. The CAISO proposes to treat the RC Funding Requirement as a revenue item in the CAISO Revenue Requirement's "Other Cost and Revenue" category. 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 is derived from the sum as follows:

RC Operating Budget + RC Operating Budget Reserve + RC Revenue Adjustment

RC Operating Budget

The CAISO proposes to develop an RC percentage to apply against its corporate Revenue Requirement in order to determine the RC Operating Budget. The RC percentage will represent the direct and indirect time and expense necessary for the CAISO to perform its RC services. 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 has 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 will be further subdivided to directly identify the roles and responsibilities of the Reliability Coordinator Services function. Labor will be the largest direct expense related to the CAISO's RC service. The CAISO projects that approximately 28 full time equivalent (FTE) positions will be needed to support the RC service. The CAISO proposes to allocate a proportionate amount of its indirect expenses to the RC budget as well. The indirect expenses include other components of the CAISO's Revenue Requirement such as support staff, 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 will first estimate the direct and indirect RC operating expenses. To project the direct RC expenses, the CAISO will determine the number of direct hours associated with each RC-related ABC task code performed by staff. The numbers of hours will then be converted into FTE positions. The estimated FTE count will be used to determine the indirect portion of the estimated RC expense.

The indirect portion of the estimated RC expense will be calculated by multiplying the FTE count by the indirect rate per FTE. The indirect rate per FTE will be determined by dividing the Revenue Requirement's Indirect Costs by the number of FTE included in the budget.

The Indirect Rate per FTE will be calculated as follows:

Revenue Requirement Indirect Expense / Budgeted FTE

The RC Indirect Expense will be calculated as follows:

*RC FTE * Indirect Rate*

The sum of the direct and indirect expenses will be the projected RC operating expense. The operating expense will then be backed into the Revenue Requirement to determine the RC percentage.

The RC percentage will be calculated as follows:

RC Operating Expenses / Revenue Requirement

The CAISO proposes to develop the RC Operating Budget as part of the 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 tracking the numbers of hours and resources tracked against the RC related process tasks.

See Appendix 1 for a list of RC related ABC Process Codes and Tasks.

RC Operating Budget Reserve

In addition, the CAISO proposes to include an RC Operating Budget Reserve component in its annual RC Funding Requirement. The reserve will be used to pay for regulatory and other fines or penalties assessed on the CAISO RC if the CAISO RC cannot determine the specific entity that incurred the penalty. Although the CAISO RC does not plan to be assessed any fines or penalties, a modest reserve will provide a buffer against significant cost adjustments should a fine or penalty be assessed. The RC Operating Budget Reserve will be 2% of the annual RC operating budget with a cumulative cap of no more than 10% of the current RC Operating Budget. Once the cap limit is achieved the CAISO will temporarily halt assessing an annual operating budget reserve. The CAISO will resume assessing the RC operating budget reserve when reserves dip below the cap limit as part of the following year's RC rate.

The RC Operating Budget Reserve will be calculated as follows:

*RC Operating Budget * 2%*

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.[5] 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. The clarification will state that entities outside of the CAISO's BA area that take RC services from the CAISO will be among the entities that can potentially be allocated costs associated with penalties related to the CAISO's performance of the RC function. In addition, penalties may be applied to specific RC Customers whose conduct was found to have contributed to such penalty and to recover costs associated with such penalties from that customer. As required by FERC in its Guidance Order, any such proposed allocation must be submitted to FERC for its review and approval.

[5] *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).

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RC Revenue Adjustment

The development of the RC rate will include an annual RC Revenue Adjustment. The adjustment will include the excess or shortfall in revenue collections from the prior year. The inclusion of the annual RC Revenue Adjustment will begin with the development of the 2022 RC rate using the full calendar activity from 2020 (the first full year of RC activity). Any excess or shortfall revenue adjustments will be recognized after the applicable calendar year is closed; therefore, any excess or shortfall adjustment will be captured in the following year's rate which is developed roughly 6 months prior to the effective date.

Given the CAISO RC services will begin during 2019, the CAISO proposes to use a fixed rate for 2019 that will not be eligible for any rate adjustments as described within the body of this proposal. The 2019 RC Funding Requirement and the projected RC rate will be calculated as part of the CAISO's general 2019 Revenue Requirement process.

There are 2 main benefits of the RC Revenue Adjustment. First, the Revenue Adjustment supports the CAISO's goal of providing rate development transparency to customers receiving RC services. Second, it ensures that the CAISO collects the funds necessary to operate and manage its RC services, providing rate stability and supporting cash flow management for the RC Customers.

See Appendix 1 for RC Annual Funding Requirement and Rate Examples.

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, the CAISO proposes to use Net Generation MWh volumes. In cases where the submitted MWh volumes yield a charge less than the established monthly minimum charge, the RC Customer will be charged the monthly minimum charge.

Net Energy for Load (NEL), as defined by NERC[6], 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

[6] 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.

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Net Generation (NG), as defined by WECC[7], 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

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.

Monthly Minimum Charge calculation is:

Annual Minimum Charge / 12 months = Monthly Minimum Charge

The minimum charge amount will be updated as part of the triennial cost of service study by tracking the numbers of hours and resources tracked against the RC related process tasks.

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 monthly data and receive their monthly settlement statements.

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 prior year's volumes activity, 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 this date is consistent with the effective dates for the CAISO's other annually recalculated rates.

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

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RC Quarterly Rate Adjustments (if required)

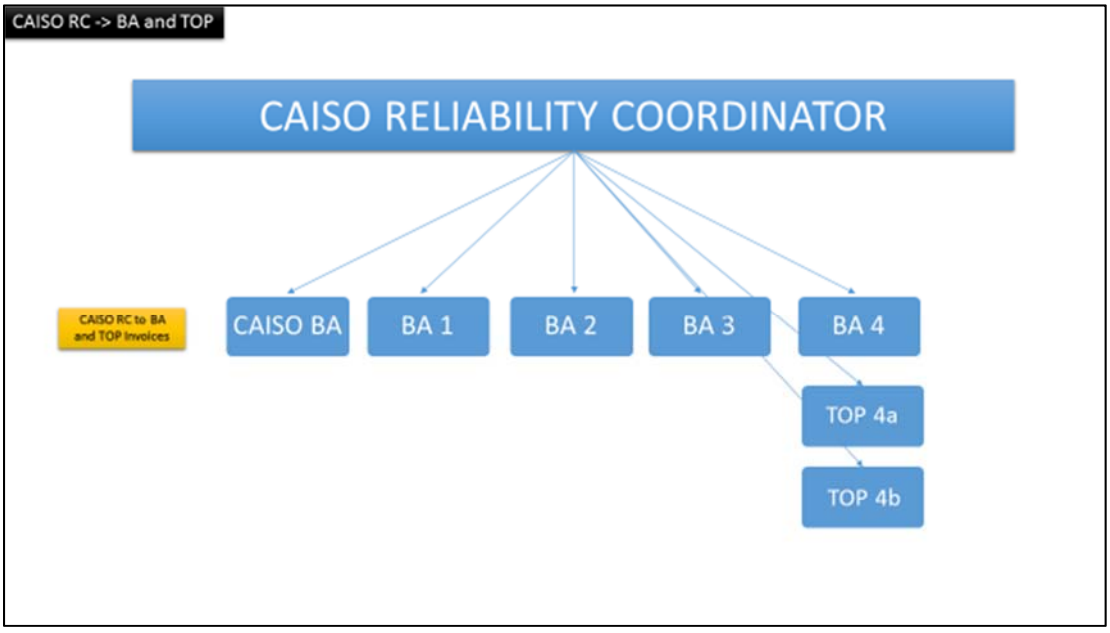
The CAISO proposes to have the ability to adjust its RC rates quarterly, up or down, so that rates yield the annual RC revenue as stated in the applicable year's RC Funding Requirement. The CAISO will adjust RC rates if the estimated annual RC revenue collections are projected to come in over or under the stated annual requirement by more than 5% or $500,000, whichever is greater, during the year. Such adjustment may be implemented not more than once per calendar quarter, and will be effective the first day of the next calendar month. The quarterly rate adjustment requirement excludes rate adjustments due to payment defaults as described below in the Proposed Settlements Process section.

The rates will be adjusted according to the formulae listed above using revised volume projections on a going-forward basis to reflect the change of more than 5% or $500,000, whichever is greater, from the estimated revenue collections provided in the annual Funding Requirement.

The benefit of a quarterly rate adjustment to the CAISO and its RC Customers is that it contains the impact of current year's activity (under collection and over collection) within the current year's RC membership pool. The following year's membership may differ.

Reliability Coordinator Settlements Process

The CAISO proposes to invoice BAs monthly for RC services. In addition, the CAISO will have the ability to directly invoice TOPs located within a BA area that are RC Customers. The invoiced charges will be based on the CAISO's current RC rate per MWh multiplied by the monthly NEL or NG per MRI-S. Depending on the NEL or NG volumes submitted, or lack thereof, it may be determined that the RC Customer be charged the minimum charge. In addition, a settlement statement will be provided to detail the charges on the invoices when applicable. An annual billing and payment schedule will be provided to the BAs and TOPs reflecting the dates of RC settlement statements, invoices, and payment due dates. The diagram below reflects the proposed billing process from the CAISO to BA and TOPs.



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

Invoice Dispute Process

RC Customers will be invoiced within the number of days specified in the billing and payment schedule. CAISO proposes to provide initial and final invoices and settlement statements. RC Customers will have the right to dispute the initial statement and invoiced amount, and any valid corrections will be reflected in the final settlement statement and invoice.

Payment Default

RC Customers will be required to pay their invoice by the 5th business day following invoice issuance. If payment is not received by the 10th business day, the RC Customer will be charged a $1,000 late payment fee on their next invoice. If payment is not made by the 15th business day, the RC Customer will be in default, and the CAISO will notify all RC Customers of a potential rate adjustment due to a pending default. Furthermore, if payment is not received by the 20th business day, the CAISO reserves the right to suspend that customer's RC services until such time payment is received and adjust the RC rate moving forward for all customers to absorb the payment default. The new rates will take effect the first day of the next calendar month.

Business Practice Manuals

The table below lists the Business Practice Manuals[8] (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.

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

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Next Steps

The stakeholder process for the RC Rate Design, Terms, and Conditions initiative is expected to go through a straw proposal and a draft final proposal. The draft final proposal will be presented to the CAISO Board of Governors for their review and approval following the stakeholder process. After 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 milestone schedule for the RC Rate Design, Terms, and Conditions initiative follows. The dates will be confirmed in future CAISO communications.

Date	Milestone
Thursday, April 12, 2018	Initial stakeholder meeting on RC Rate Design, Terms, and Conditions straw proposal
Thursday, April 26, 2018	Stakeholder written comments due on straw proposal
Thursday, May 24, 2018	CAISO will post draft final proposal
Thursday, May 31, 2018	2nd stakeholder meeting on RC Rate Design, Terms, and Conditions draft final proposal
Thursday, June 14, 2018	Stakeholder comments due on draft final proposal
June – July	Present draft final proposal to Board to Governors
June – July	CAISO will post draft tariff language
June – July	Stakeholder written comments due on draft tariff language
June – July	Conduct stakeholder call to discuss tariff language and comments
August	CAISO will file tariff language with FERC
October	FERC ruling on RC Rate Design

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Appendices

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

RC Business Process and Tasks

The CAISO proposes to utilize the following direct and indirect ABC process and task codes to identify RC services-related time and resources. Other ABC processes and task codes may be used, however, the codes identified below are anticipated to be the primary codes used to identify RC services-related time and resources. Employees will charge their time against these codes indicating how they spend their time. The time entry data is used to generate the triennial cost of service study which determines how the CAISO Revenue Requirement is allocated among its GMC cost categories.

Process Code	Process	Task Code	Task
80001	Develop Infrastructure	201	Develop & Monitor Regulatory Contract Procedures
80004	Manage Market & Reliability Data & Modeling (MMR)	301	Manage Full Network Model (FNM) Maintenance (MMR LII)
80004	Manage Market & Reliability Data & Modeling (MMR)	302	Plan & Develop Operations Simulator Training (MMR LII)
80004	Manage Market & Reliability Data & Modeling (MMR)	311	Manage Operations Planning (MMR LII)
80004	Manage Market & Reliability Data & Modeling (MMR)	312	Manage WECC Seasonal Studies (MMR LII)
80004	Manage Market & Reliability Data & Modeling (MMR)	314	Manage & Facilitate Procedure Maintenance (MMR LII)
80004	Manage Market & Reliability Data & Modeling (MMR)	316	Manage Systematic Approach to Operations Training (MMR LII)
80004	Manage Market & Reliability Data & Modeling (MMR)	317	Execute & Track Operations Training (MMR LII)
80005	Manage Markets & Grid (MMG)	355	Manage Outages (MMG LII)
80005	Manage Markets & Grid (MMG)	362	Manage Operations Engineering Support (MMG LII)
80005	Manage Markets & Grid (MMG)	365	Manage Real Time Operations - Transmission & Electric System (MMG LII)
80005	Manage Markets & Grid (MMG)	366	Manage Real Time Interchange Scheduling (MMG LII)
80005	Manage Markets & Grid (MMG)	369	Manage Real Time Operations Generation
80007	Manage Operations Support & Settlements (MOS)	412	Manage Market Billing & Settlements (MOS LII)
80010	Support Customers & Stakeholders (SCS)	601	Manage Client Inquiries (SCS LII)

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 earlier, 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 proposes to map the tasks identified as contributing to RC services to a new level 2 sub-category, Reliability Coordinator Services, by means of percentage allocation.

Cost Categories	Market Services		System Operations			CRR Services
Sub-Category (level 1)	Real-Time Market	Day Ahead Market	Real-Time Dispatch	Balancing Authority Services		
NEW: Sub-Category (level 2)				Balancing Authority Services	Reliability Coordinator 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 remain 100% to System Operations with 20% to Real-Time Dispatch and 80% to Balancing Authority Services. However, the time and resources will be broken down further to 50% Balancing Authority Services and 50% to Reliability Coordinator Services.

Mapping of Process Code 80004-Manage Market & Reliability & Modeling, Task 311-Manage Operations Planning			
Category	**System Operations**		
Sub-Category (level 1)	Real-Time Dispatch	Balancing Authority Services	
	20%	80%	
NEW: Sub-Category (level 2)		Balancing Authority Services	Reliability Coordinator Services
		50%	50%

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RC Funding Requirement and Rate Examples

The following scenarios are intended to illustrate how the CAISO proposes to calculate the annual RC Funding Requirement, rate/MWh, and rate adjustments (as necessary). In addition, some examples are provided to illustrate how monthly invoices will be calculated. 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.

As mentioned earlier, the CAISO projects it will need approximately 28 FTEs to fulfill the roles and responsibilities of an RC provider. The 28 FTEs represent the aggregated number of employees that will work completely on RC roles and responsibilities. The actual number of positions needed is 32 (existing and new). However, some of the positions will support non-RC functions as well as RC functions. Thus, the 28 FTEs represent new and existing FTEs that will directly support the RC function. The FTEs also represent multiple areas within the CAISO such as Operations, Technology, General Council, and Customer and State Affairs. The budget to support the new positions and other RC services-related expenses will begin to be included in the O&M budget beginning with the 2019 Revenue Requirement. The projected 28 FTEs were used as the basis to determine the initial RC percentage as illustrated below.

2016 Revenue Requirement with RC Projections

$$ in thousands

Component	2016 RR	Market Services	System Operations	CRRs	RC	Indirect
Direct Costs	$ 76,084	$ 18,652	$ 40,619	$ 889	$ 5,035	$ 10,890
Indirect Costs	65,188					65,188
Non-ABC Costs	32,541	1,390	1,519	50		29,582
Total O&M	**173,813**	**20,042**	**42,138**	**939**	**5,035**	**105,660**
Debt Service	16,900					16,900
Capital	24,000					24,000
Other Income	(10,800)	(1,470)	(4,430)			(4,900)
Oper Cost Reserve Adj	(4,100)					(4,100)
Total Other Components	**26,000**	**(1,470)**	**(4,430)**	-	-	**31,900**
Total Before Allocation of Indirect and RC Income Offset	**199,813**	**18,572**	**37,708**	**939**	**5,035**	**137,560**
Direct Cost %						
Allocate Indirect		42,025	86,676	2,627	6,232	(137,560)
Total Before RC Income Offset	**199,813**	**60,597**	**124,384**	**3,566**	**11,267**	-
					6%	
Other Income: RC	(11,267)				(11,267)	
Total Revenue Requirement	**$ 188,546**	**$ 60,597**	**$ 124,384**	**$ 3,566**	**$ -**	**$ -**
Cost Category Percentages	**100%**	**32%**	**66%**	**2%**	-	

The projection uses the 2016 Revenue Requirement along with cost projections for the 28 FTEs. The 2016 Revenue Requirement was used because it is the Revenue Requirement used in the latest cost of service study. In this illustration, 6% of the Revenue Requirement represents the costs necessary to support the RC services. (Please note that the RC services will be treated as a sub-category of the System Operations cost category in the Revenue Requirement. It is only broken out as a cost category in the illustration above for simplicity purposes.) The projection assumes the direct costs for the 28 FTEs will be $5,035,000. The indirect costs of $6,232,000 are calculated by taking the indirect costs/per FTE times the number of FTEs associated with the RC function ($223,000 * 28 = $6,232,000). The direct and indirect costs combined total $11,267,000. The RC percentage will be used to determine the RC Operating Budget by multiplying the current year's Revenue Requirement by the RC percentage. The percentage will be adjusted as part of the triennial cost of service study. For illustrative purposes we will use the 2018 Revenue Requirement in our following examples.

If the CAISO RC footprint were to only include its existing BA area, it would only require 12 FTEs, yielding an RC percentage of 2% of the Revenue Requirement.

In this example, we calculate the 2018 RC Operating Budget and the Operating Reserve. This example assumes the first full year of service. If year one had any over or under revenue collection, it would be added to the third year's RC Funding Requirement. It takes a full two requirement cycles to determine what the revenue excess or shortfall would be and include it into the Funding Requirement.

Initial Rate Calculation

The RC Funding Requirement is projected to be somewhere between $5 million and $12 million depending on the actual RC footprint. Dividing this amount by the projected volume in the RC area yields a rate somewhere between $0.02/MWh and $0.03/MWh.

RC Funding Requirement		
Revenue Requirement (prior to RC Funding Requirement)	$	197,252,000
RC %		6%
RC Operating Budget	$	11,787,545
Plus RC Operating Budget Reserve %		2%
Reserve Amount	$	235,751
Plus RC Revenue Adjustment	$	-
RC Funding Requirement	$	12,023,295

BA and TOP Monthly Charge

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

In this example, RC Customer A's monthly MWh volumes are 2,046,583. The calculated monthly charge is $51,165.

	Annual	Monthly
Customer A's NEL or NG MWh Volumes	24,559,000	2,046,583
RC Rate	$ 0.0250	$ 0.0250
Monthly Charge	$ 613,975	$ 51,165

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Minimum Charge

If the volumes submitted yield a charge that is less than the monthly minimum charge, the customer will be charged the monthly minimum charge amount. RC Customers that do not submit any volumes will be charged the minimum monthly charge amount.

The annual minimum charge is $5,000; the monthly minimum charge is 1/12 of the annual amount (or $417).

In this example, RC Customer B's monthly MWh volumes are 12,500. As the MWh volumes yield a calculated charge less than the minimum charge by $104, thus RC Customer B will be charged the minimum monthly charge of $417.

	Annual	Monthly
Minimum Charge	$ 5,000	$ 417
Customer B's NEL or NG MWh Volumes	150,000	12,500
RC Rate	$ 0.025	$ 0.025
RC Services Charge	$ 3,757	$ 313
Delta between Minimum Charge and Calculated Charge	$ 1,243	$ 104

Rate Adjustment

The CAISO proposes to have the ability to adjust its RC rates quarterly, up or down, so that the product of the rate multiplied by MWh volumes yield the annual RC revenue as stated in the applicable year's Funding Requirement. The rates will be adjusted according to the formulae listed above using revised volume projections on a going-forward basis to reflect the change of more than 5% or $500,000, whichever is greater, from the estimated revenue collections provided in the annual Funding Requirement.

In this example, the revenue collected in the 1st quarter ("Q1") is 33% (or $994,176) higher than the budgeted revenue, which indicates a rate adjustment is necessary.

RC Funding Requirement	Annual Budget	Quarterly Budget
Dollars	$ 12,023,295	$ 3,005,823.75
Projected MWh Volumes	480,000,000	120,000,000
1st Quarter	Budget	Actuals
Dollars	$ 3,005,824	$ 4,000,000
MWh Volumes	120,000,000	159,690,002

The revenue surplus will be applied against the budgeted RC Funding Requirement for the remainder of the year in order to determine the adjusted amount of RC Funding Requirement. Then, the projected MWh volumes are divided into the adjusted RC Funding Requirement to determine the RC rate/MWh going

RC Funding Requirement	$ 12,023,295
Less Q1 RC Funding Requirement Budget	$ (3,005,824)
RC Funding Requirement for Remainder of Year	$ 9,017,471
plus Q1 Under or (Overage)	$ (994,176)
Adjusted RC Funding Requirement for Remainder of Year	$ 8,023,295
Revised Projected MWh Volumes	479,070,005
Adjusted RC Rate/MWh	$ 0.0167

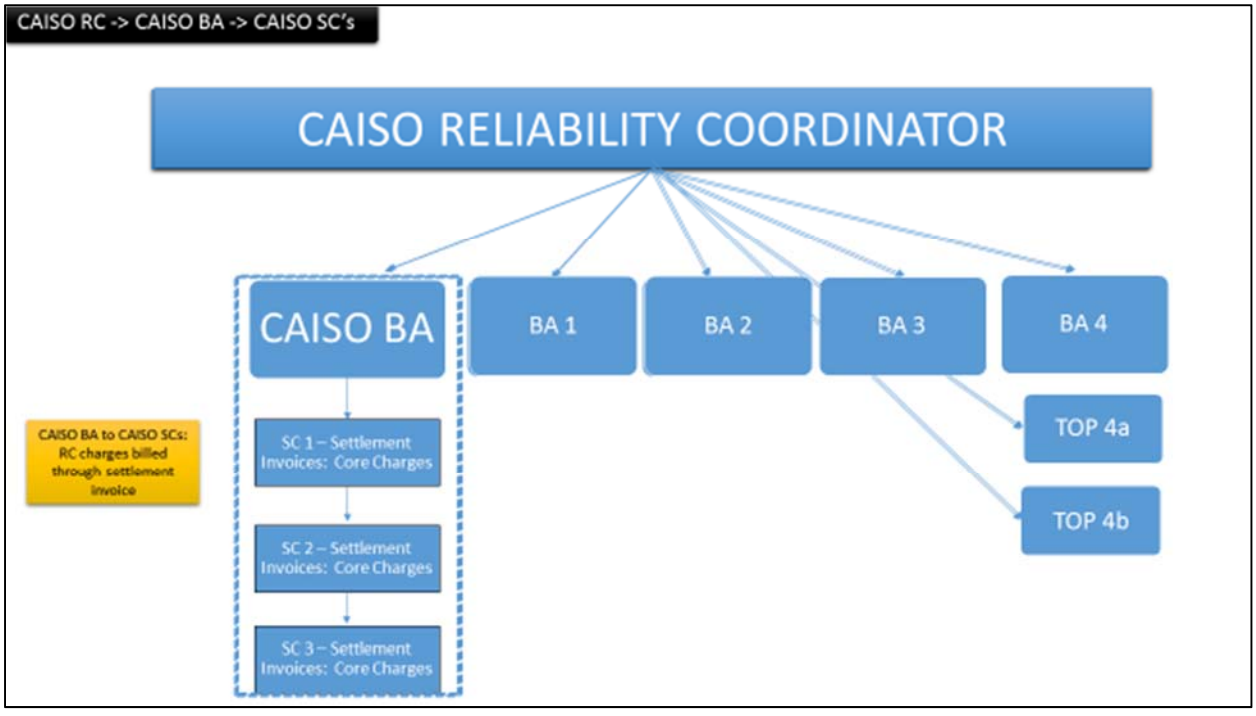
forward for the year (or until the next RC rate adjustment). In this example, the projected MWh volumes were determined using the volumes from Q1 as a run rate for the remainder of the year and assumes no change in the RC membership for the remainder of the year. The result is an adjusted RC rate of $0.0167/MWh. The new rate will become effective the first day of the following month, which in this case would be May 1.

The adjusted RC Funding Requirement for the remainder of the year plus the amount collected in Q1 still totals the original RC Funding Requirement set forth in the beginning of the year.

Q1 Actuals	$	4,000,000
plus Q2 - Q4 Budget	$	8,023,295
Total RC Funding Requirement	$	12,023,295
Initial RC Funding Requirement	$	12,023,295

Appendix 2: Reliability Coordinator Services Billings to CAISO Scheduling Coordinators

Existing CAISO Scheduling Coordinators will continue to be invoiced for RC services on a separate monthly invoice under their existing Schedule Coordinator ID number. The CAISO tariff invoicing and settlement procedures will apply to all load and transmission operators within the CAISO BA area. The CAISO RC will use the NEL and NG volumes submitted into MRI-S as its billing data to generate monthly invoices. In addition, the CAISO proposes to bill a minimum monthly charge of $417 to TOPs with zero to very low NEL or NG volumes. The revenue collected from these entities will be deducted from the amount allocated to the remaining CAISO's Scheduling Coordinators with load or generation.



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Invoice Dispute Process

Scheduling Coordinators shall make timely payment to the CAISO within 5 business days of invoice issuance. 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.

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 Applications (HAA) and Physical Security assessments. 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 Applications

To help entities meet applicable standards requirements, the CAISO RC will also offer high-quality, low cost web-based HAA services to its RC Customers. Customers who select these HAA 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. HAA 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 HAA 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 HAA addresses the interested parties' needs. The CAISO will be sending a questionnaire in early April 2018 to appropriate contact persons to solicit current usage and requirements of HAA services. Responses to the questionnaire and other direct input collected will help the CAISO determine the scope of these services. Once the scope is finalized, a pricing model will be offered. Pricing is expected to be no more than current costs charged by Peak and will be included in the draft final proposal to be published in May 2018.

The HAA services will be offered and billed separate from the RC function. A separate charge code will be developed for these services. The CAISO anticipates providing these services pursuant to a separate schedule of the RC Services Agreement. The services are expected to go live simultaneously with the RC services.

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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 and billed separate from the RC function. A separate charge code will be developed for this service. The CAISO anticipates providing these services pursuant to a separate schedule of the RC Services Agreement.

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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[9].

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
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
RPSC	Reliability Coordinator Project Steering Committee
SC	Scheduling Coordinator
SOL	System Operating Limits
TO	Transmission Owner
TOP	Transmission Operator
WECC	Western Electricity Coordinating Council
WIT	Western Interchange Tool

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