

**Comments of Powerex Corp. on
Resource Adequacy Enhancements Stakeholder Working Group**

Submitted by	Company	Date Submitted
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Powerex appreciates the opportunity to submit comments on CAISO’s Resource Adequacy Enhancements Stakeholder Workshop held on April 8-9, 2019. Powerex commends CAISO’s continued efforts to improve California’s Resource Adequacy program to ensure that CAISO is provided with the resources necessary to meet CAISO’s long-term reliability needs.

As described further below, Powerex believes that CAISO’s proposals in this proceeding represent a substantial step forward towards addressing gaps in the existing Resource Adequacy framework that have:

- significantly understated resource adequacy needs by setting System Resource Adequacy procurement requirements in a manner that does not accurately reflect system needs; and
- substantially overstated the extent to which capacity committed to meet Resource Adequacy requirements actually contributes to meeting reliability needs by (i) failing to take into account expected resource unavailability in determining the amount of capacity that a resource can provide and (ii) allowing entities to provide Resource Adequacy when they have little ability to actually supply capacity to California.

The result of these gaps has been a Resource Adequacy program that has been systematically incapable of ensuring that the resources committed through the program are sufficient to meet system needs. As shown in Table 1 below, the System Resource Adequacy requirement for the CAISO grid has regularly fallen below actual peak system needs. Once actual unit outages are considered, the quantity of System Resource Adequacy capacity that has been available is substantially less than the quantity required to cover CAISO actual peak hourly demand plus required contingency reserves.

Table 1

	CEC 1-in-2 Forecast Peak ¹ (MW)	plus 15% PRM (MW)	RA Target ² (MW)	Actual Peak Hourly Load ³ (MW)	Required Contingency Reserve ⁴ (MW)	Total Capacity Required (MW)	RA Surplus (Deficiency) (MW)	Unit Outages ⁵ (MW)	Resource Adequate?
2016									
June	39,625	5,944	45,568	44,454	2,590	47,044	(1,476)	(7,152)	No
July	44,364	6,655	51,018	45,981	2,716	48,697	2,322	(6,222)	No
August	46,848	7,027	53,875	43,812	2,548	46,360	7,515	(5,944)	Yes
September	42,388	6,358	48,747	42,810	2,460	45,270	3,477	(7,309)	No
2017									
June	41,834	6,275	48,109	44,184	2,659	46,843	1,266	(9,454)	No
July	45,259	6,789	52,048	45,374	2,627	48,001	4,047	(7,088)	No
August	45,967	6,895	52,862	47,297	2,778	50,075	2,787	(6,151)	No
September	45,489	6,823	52,312	49,909	2,871	52,780	(468)	(5,885)	No
2018									
June	37,596	5,639	43,235	37,803	2,594	40,397	2,838	(7,228)	No
July	43,080	6,462	49,542	46,487	3,026	49,513	29	(4,780)	No
August	44,923	6,738	51,661	45,021	2,734	47,755	3,907	(6,181)	No
September	42,579	6,387	48,966	38,536	2,374	40,910	8,056	(5,275)	Yes

¹ 2016 monthly values are from CPUC 2016 RA Report, Tbl. 3 (for CPUC-jurisdictional LSEs only) scaled to "Total CAISO Coincident Peak" for 2016 from final CEC Mid-Baseline Mid A&E Savings forecast in 14-IEP-1

2017 values from https://www.aiso.com/Documents/AgendaandPresentation_2018AnnualReviewofAvailabilityAssessmentHoursJun6-2017.pdf (at 32);

2018 values from <http://www.aiso.com/Documents/Presentation-CapacityProcurementMechanismSignificantEvent.pdf> (at 4, "CAISO-RA")

² Equal to CEC 1-in-2 peak forecast plus PRM; does not reflect reductions due to demand response or other factors, and hence may exceed the System RA that LSEs are required to show.

³ From CAISO OASIS, "CAISO Demand Forecast" for "Actual" process and "CAISO-Total" region.

⁴ From CAISO OASIS, "AS Requirements" of Spin and Non-Spin for "AS_CAISO_EXP" region during hour of peak load for respective month. Does not include Reg-Up, which is approximately 350 MW during peak hours.

⁵ From CAISO report "Curtailed and Non-Operational Generators in California" on day of peak load in respective month. <http://www.aiso.com/market/Pages/OutageManagement/UnitStatus.aspx>.

Unless these gaps are addressed immediately, it is increasingly likely that CAISO will experience periods when it does not have the resources necessary to maintain reliability in the face of a rapidly evolving grid. CAISO traditionally has been able to compensate for the shortcomings of the System Resource Adequacy framework through dispatch of in-state resources that were not committed to provide Resource Adequacy, as well as through short-term imports of energy from neighboring regions. But the viability of both of these options is rapidly declining as a result of several factors. For instance, the total Net Qualifying Capacity of all in-state resources is now less than the System Resource Adequacy requirement.

In addition, at the same time that the CAISO is experiencing an increase in the need for capacity and flexibility due to the growth of renewable resources as well as the retirement of once-through cooling resources and other thermal resources, other states and provinces throughout the west are increasingly facing similar capacity and flexibility challenges due to the changing resource mix. For example, several utilities in the west are seeking to retire coal generation resources in the coming years at the same time that they will be continuing to grow their renewable generation fleet. The Oregon Public Utilities Commission, for instance, has directed PacifiCorp to evaluate the potential retirement of a portion of its coal fleet as part of its integrated resource planning process—changes that PacifiCorp has acknowledged have the potential to stress system reliability and create new challenges.¹ In Alberta, approximately 1,300 MW of coal generation was retired and/or mothballed in 2018, an additional estimated 300 MW of coal generation is expected to be retired in 2019. Looking forward, it is expected that all of Alberta's 18 coal-fired generating facilities will be retired by 2030.² With these and similar changes throughout the west, it is becoming increasingly risky to assume that external regions will necessarily have sufficient

¹ See PacifiCorp, 2019 Integrated Resource Plan Public Input Meeting at 4 (Dec. 3-4, 2018), available at: http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2019_IRP/PacifiCorp_2019_IRP_December_3-4_2018_PIM.pdf.

² *Phasing Out Coal Pollution*, available at: <https://www.alberta.ca/climate-coal-electricity.aspx>.

excess capacity and flexibility on a short-term basis to allow CAISO to compensate for shortfalls resulting from the substantial gaps in the current Resource Adequacy program.

Powerex believes that these factors make the implementation of a robust Resource Adequacy program critical to the long-term reliability of the CAISO grid. Unless the gaps in the existing program are addressed, Powerex believes that it will become increasingly difficult for the CAISO to ensure it is able to obtain the capacity and flexibility that it needs to meet its long-term reliability needs in the face of the changing resource mix and increased competition from load-serving entities (“LSE”) outside of California.

Powerex believes that the enhancements that are being considered in this stakeholder process have the potential to significantly improve the ability of the System Resource Adequacy program to achieve its long-term objectives. In particular, Powerex supports CAISO’s proposals to take steps to:

- Tighten the requirements for external resources that commit to supply Resource Adequacy (“import RA”) to ensure that commitments are backed by the physical capacity and transmission necessary to support delivery to the CAISO and can be counted upon to perform when called upon to meet reliability needs; and
- Take into account expected resource unavailability in evaluating the quantity of resources committed to supply Resource Adequacy to California LSEs.

In Sections I and II below, Powerex provides suggestions regarding how these objectives can be achieved in a manner that continues to foster a competitive market for Resource Adequacy capacity. As described further below, Powerex believes that it is critical that any changes adopted through this proceeding achieve both of the following objectives:

- 1) Ensure that the resources committed to supply Resource Adequacy have the capabilities necessary to allow CAISO to reliably meet system needs; and
- 2) Avoid restrictions that unnecessarily discourage or exclude resources from providing Resource Adequacy that are capable of doing so.

In other words, any proposals that are adopted through this stakeholder process should be tailored in a way that avoids inadvertently creating new barriers to the competitive supply of Resource Adequacy by resources that have the physical capacity and transmission rights necessary to support their obligations. Otherwise, the restrictions adopted through this stakeholder process could have the unintended consequence of unnecessarily restricting the supply of resources eligible to meet reliability needs to the detriment of California ratepayers. Ultimately, the goal of any changes adopted through this stakeholder process should be to establish a Resource Adequacy framework that ensures that CAISO consistently has sufficient resources available to operate its system while allowing California’s reliability needs to be met using the most efficient and cost-effective resources available.

Section III of these comments outlines additional changes that CAISO should consider regarding the rules respecting System Resource Adequacy and Flexible Resource Adequacy that would further strengthen the ability of these programs to ensure the long-term reliability of the CAISO grid.

I. Import RA

Powerex strongly agrees with CAISO that the rules governing import RA must be modified to ensure that commitments with external suppliers can be counted upon to meet CAISO's reliability needs. As CAISO pointed out at the April 9th working group meeting, the existing requirements respecting import RA create opportunities for external suppliers to commit to supply System Resource Adequacy without possessing the physical resources (or system resources) and transmission necessary to meet their obligations. In effect, the existing framework allows marketers to speculate on their ability to obtain energy in the short-term markets to fulfill their commitments in the event that they are dispatched by the CAISO, and, if they are unable to do so, to simply decline their intertie award with little consequences. Even when a supplier that is providing import RA has a quantity of forward physical capacity equal to its Resource Adequacy commitments to the CAISO, there is currently no framework to ensure that those resources are not simultaneously being relied upon, on a forward basis, to meet other obligations in an external BAA (*i.e.*, double counted), creating significant risks that deliveries may be curtailed if and when such capacity is needed for another purpose. The result is that import RA resources may not be able to actually perform when called upon by the CAISO, leaving the CAISO to scramble to fill the resulting shortfall through short-term procurements of energy and out-of-market dispatch.

As discussed further below, Powerex believes that CAISO can significantly reduce the risks associated with speculative supply and double counting of resources, while also fostering a robust competitive market for Resource Adequacy capacity, by ensuring the following five measures are included in its final proposal:

- 1) At the time the respective Resource Adequacy annual and monthly supply plans are submitted, requiring entities supplying import RA to provide sufficient information to support that their import RA contracts are supported by specific physical generation resources (which may be system resources) that are reasonably expected to be surplus to other capacity commitments in external BAAs during the relevant commitment period;
- 2) Requiring that suppliers verify that they have the resources and transmission necessary to support their delivery obligations during the relevant commitment period through the submission of a day-ahead e-tag identifying the physical generation resources (which may be system resources) and firm transmission supporting the contract;
- 3) Tailoring the must-offer requirement imposed on System Resource Adequacy resources to ensure that resources are available when needed to meet reliability requirements;
- 4) Clarifying that import RA contracts represent a firm commitment to deliver energy when called upon by the CAISO; and
- 5) Creating incentives for import RA resources to deliver energy in accordance with their obligations by taking into account the historical non-performance and unavailability of a resource in determining the quantity of capacity that a supplier may provide in subsequent commitment periods.

Each of these five measures is reviewed in more detail below.

A. Supply Plan Requirements for Import RA

Powerex believes that the first step towards achieving the objective of minimizing opportunities for speculative supply and double counting is to require a demonstration that import RA is

supported by physical capacity at the time that suppliers submit their supply plans to demonstrate compliance with System Resource Adequacy requirements. Specifically, Powerex believes that CAISO should impose the following requirements:

- First, CAISO should require suppliers to identify the specific generation resource (which may be a system resource) supporting an import RA contract at the time of the submission of its supply plan. In particular, the supplier should be required to identify both the e-Tag Source BA and the e-Tag generation source from which the Resource Adequacy capacity will be provided.
- Second, CAISO should impose a tariff obligation that requires suppliers who provide import RA to have *a reasonable expectation at the time that the supplier enters the commitment that the capacity supporting the contract is reasonably expected not to be needed to meet any other capacity obligations in an external BAA*. CAISO also should consider whether it should further require that suppliers also submit an attestation with their supply plans affirming that the import RA contract is supported by physical generation capacity (or system resources) that is reasonably expected not to be needed to meet other capacity commitments in an external BAA.

Powerex believes that adopting these requirements would ensure that import RA contracts are backed by physical capacity that is reasonably expected to be available to meet the CAISO's needs, including in hours of peak demand, while avoiding imposing unduly burdensome requirements that have the ability to raise barriers to the participation of external resources in the Resource Adequacy program. Additionally, in order to provide further protections against the risks of speculative supply and double counting, CAISO should consider retaining the discretion to require suppliers to provide additional information about the resources supporting their commitments in the event that the supplier repeatedly failed to meet applicable obligations. For resources located in a BAA that has data sharing arrangements in place with the CAISO as part of the Energy Imbalance Market ("EIM"), it may be the case that the information that CAISO already receives is sufficient to provide CAISO with the necessary visibility into whether an applicable resource (which may be a system resource) has unloaded upward capacity.

B. Performance Requirements

Powerex also supports CAISO tightening the performance requirements imposed on suppliers committing to provide import RA to ensure that they can be counted upon to perform when called upon by the CAISO to maintain reliability. Importantly, *tightening the performance requirements imposed on suppliers providing import RA is not a substitute for requiring an up-front demonstration at the time that a supplier submits its supply plan*. The primary purpose of the System Resource Adequacy program is to ensure that sufficient resources are committed on a *forward basis* to meet expected load plus a conservative planning reserve margin. As a result, it is critical that suppliers have an obligation that their import RA commitments be backed by physical generation resources (which may be system resources) at the time Resource Adequacy supply plans are submitted, and that such supply is reasonably expected not to be needed to meet other capacity commitments; otherwise, speculative suppliers will continue to have the opportunity to commit to supply System Resource Adequacy without procuring the necessary physical capacity necessary to support their commitments. Nevertheless, Powerex believes that tightening the performance requirements imposed on import RA as described below can serve to complement the resource showing requirements set out above and act as a further deterrent to speculative supply and double counting.

1. Day-Ahead E-Tagging Requirement

As an initial matter, Powerex encourages CAISO to impose a requirement that suppliers providing import RA submit a day-ahead e-Tag for each hour of the delivery term that is consistent with the information provided at the time of the submission of the supply plan. In particular, during the performance term of the Resource Adequacy contract, suppliers providing import RA should be required to submit a day-ahead e-Tag for each hour identifying the same source BA and generation resource (or system resource) identified in the supplier's supply plan. These e-Tags should be submitted prior to the CAISO's integrated forward market, with a transmission profile equal to the Resource Adequacy obligation and an energy profile of zero. During hours that a day-ahead energy schedule is awarded, the energy profile could then be adjusted to match the award.

This day-ahead e-Tag requirement would further ensure that a supplier that has committed to support its import RA contract with physical generation resources (which may be system resources) actually makes those resources available to CAISO during the relevant commitment period. Such a requirement would further reduce the likelihood that a supplier would commit to provide import RA without first securing the physical generation resources (or system resources) necessary to support delivery.

2. Real-Time Must-Offer Obligation

Powerex also supports imposing a real-time must-offer obligation on suppliers that commit to provide import RA. In designing a real-time must-offer requirement, however, Powerex believes that the goal should be to ensure that Resource Adequacy resources make themselves available to the CAISO when they are expected to be necessary to meet CAISO reliability needs and avoiding unnecessary requirements for resources to be available in the real-time market during hours when such supply is clearly not needed. Powerex believes that imposing a requirement that suppliers providing import RA commit to submitting an offer in the real-time market during each and every hour of a commitment period may unnecessarily increase costs without providing offsetting reliability benefits.

Powerex believes that the appropriate balance can be struck by imposing a real-time must-offer obligation that is tailored to reflect system needs. More specifically, Powerex believes that CAISO should require that internal and external resources that commit to provide System Resource Adequacy submit an offer in the real-time market during the six highest peak net load hours during each day. Under this proposal, System Resource Adequacy resources that did not receive energy awards in the day-ahead market in any of the other eighteen hours of the day, would be able to avoid commitment costs and/or could redirect their supply during those hours for other purposes outside the CAISO BAA.

Powerex also believes that CAISO should maintain the flexibility to modify the real-time must-offer obligation in response to system conditions. In particular, Powerex believes that it would be appropriate to allow CAISO to:

- Waive the real-time must-offer requirement during any of the six highest peak net load hours when capacity is clearly not required in order to maintain reliability; or
- Extend the real-time must-offer obligation to encompass additional hours on a given day when warranted by system conditions.

Under this framework, CAISO would be permitted to make modifications to the real-time must-offer obligation on a day-ahead basis. As a practical matter, CAISO could determine the precise

hours in which the real-time must-offer obligation would apply during the existing Residual Unit Commitment process or, more efficiently, through a modernized day-ahead market design that is able to co-optimize the commitment of energy and capacity, developed as part of either the Day-Ahead Enhancements or Extended Day-ahead Market stakeholder initiatives.

Powerex believes that adopting a real-time must-offer obligation consistent with the framework set out above would ensure that CAISO has access to the System Resource Adequacy capacity that it needs in the hours in which it needs it. At the same time, it would avoid an unduly stringent must-offer requirement that has the potential to create new inefficiencies and unnecessarily increase the costs of providing reliable service to meet the reliability needs of the California grid.

3. 15-Minute Bidding Requirement

While Powerex supports tightening the performance requirements imposed on import RA, Powerex does not support imposing a 15-minute bidding requirement on such resources. Because System Resource Adequacy is about ensuring that there is sufficient capacity – rather than flexibility – there is nothing about the provision of System Resource Adequacy that would require that resources be dispatchable on a 15-minute basis. To the contrary, external suppliers that agree to provide import RA should be permitted to make their resources available to CAISO through the submission of hourly bids or self-schedules. While a 15-minute bidding requirement may be appropriate in the case of resources that agree to provide certain classes of Flexible RA, Powerex believes that imposing a 15-minute bidding requirement on external resources supplying System Resource Adequacy has the potential to unnecessarily reduce the availability of supply on the interties and, ultimately, increase the costs associated with meeting System Resource Adequacy requirements.

C. Import RA Product Characteristics

1. Firm Energy Requirement

Powerex has repeatedly raised concerns about the failure of the CAISO markets—both the short-term markets for energy and the Resource Adequacy framework—to differentiate between firm, non-firm, and speculative supply. As Powerex has explained, outside of the CAISO BAA, western forward and day-ahead bilateral transactions are most typically for WSPP Schedule C Firm Energy, which bundles hourly and multi-hour energy with sufficient capacity to ensure performance. While entities transacting outside of the CAISO BAA do sell non-firm, unit-contingent, and other lower quality products, they are required to do so explicitly and often do so at a significant discount from the prevailing price for firm energy. Within the CAISO, however, there currently is no mechanism for clearly distinguishing among firm, non-firm, and speculative supply in the forward markets for capacity or short-term markets for energy. Instead, suppliers are free to offer to sell energy or capacity in the CAISO markets without any express requirement that their transactions be backed by the physical capability to actually support their delivery obligations with a high degree of confidence.

Powerex believes that the current failure to differentiate among firm, non-firm, and speculative supply has a number of adverse consequences for the CAISO markets:

- It increases reliability risks by increasing the likelihood that resources that have been committed to supply energy or capacity to the CAISO markets will fail to deliver energy in accordance with their commitments, with the result that CAISO understandably will be

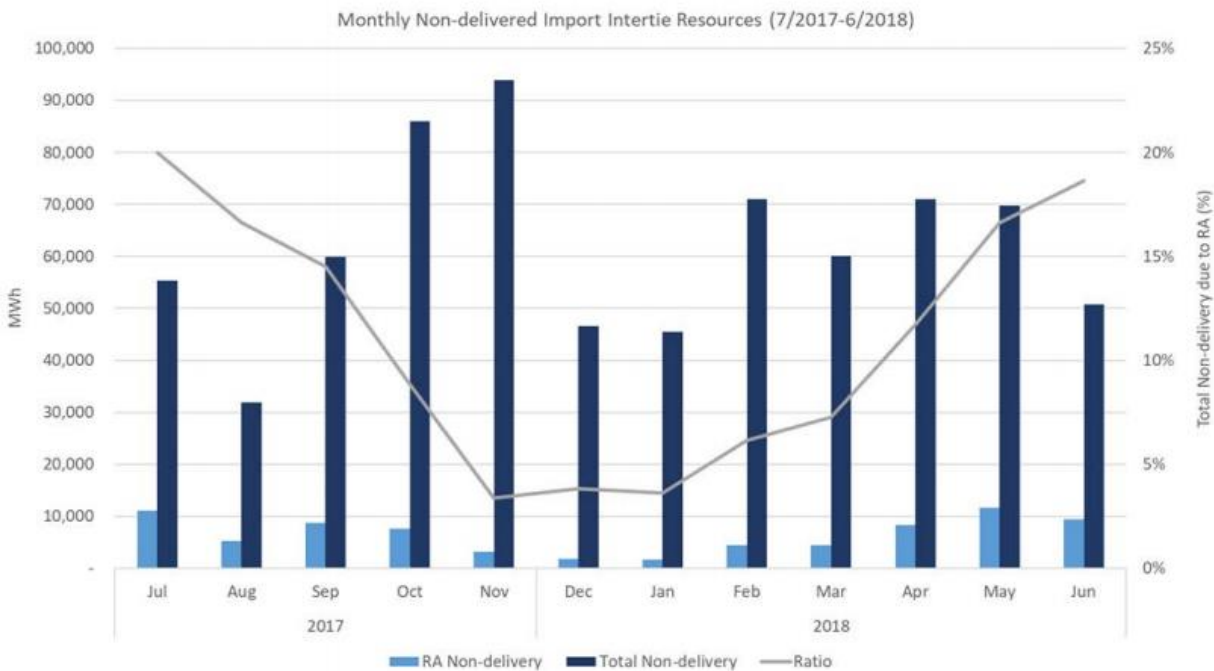
required to rely on out-of-market procurement and operator interventions to maintain reliability.

- It allows non-firm and speculative supply to displace offers to supply firm energy that are backed by the physical capacity necessary to support delivery, including sufficient balancing reserves in the source BAA, thereby inappropriately suppressing energy market prices; and
- By treating firm, non-firm, and speculative supply the same for purposes of pricing, settlement, and dispatch, it undercompensates firm supply for the greater contribution that it makes for maintaining reliability.

While the problems associated with the commingling of firm, non-firm, and speculative supply are not unique to the Resource Adequacy program, Powerex believes that ensuring that Resource Adequacy commitments represent obligations for firm supply backed by physical generation resources (or system resources), including sufficient balancing reserves in the source BAA, is critical to the ability of the Resource Adequacy program to achieve its objectives. Ultimately, the goal of the System Resource Adequacy program is to ensure that sufficient capacity is committed on a forward basis to allow CAISO to reliably serve demand and meet system needs. It is fundamentally inconsistent with this objective to allow non-firm and speculative supply – which cannot be relied upon to actually perform when needed by the CAISO – to count towards meeting System Resource Adequacy requirements.

The information provided by CAISO at the working group meeting confirms that the failure to differentiate among firm, non-firm, and speculative supply in the Resource Adequacy program is having a significant impact on the reliability of the CAISO markets. In particular, as reflected in the chart below, which has been excerpted from CAISO's presentation, it appears that a significant quantity of import RA contracts may be speculative and/or non-firm supply, with import RA accounting for approximately 20% of the intertie resources that fail to deliver on their awards.

Data shows undelivered import RA accounts for up to 20% of undelivered intertie resources (HASP)



Notably, other than the financial consequences associated with buying back their undelivered awards, import RA resources that fail to deliver energy when called upon by the CAISO face little consequences for failing to deliver. This stands in stark contrast to bilateral markets, where parties are unlikely to be willing to agree to continue to enter into transactions with a supplier that has been shown to have failed to commit the capacity and balancing reserves necessary to deliver energy in accordance with its firm commitments. This is the case regardless of whether the sale is sourced from baseload resources, dispatchable resources, or variable energy resources—all of which are expected to be bundled with sufficient balancing reserve capacity in the source BAA to ensure delivery for the period of the commitment.

Powerex believes that the failure to differentiate firm supply from speculative and non-firm supply in the Resource Adequacy framework unfairly disadvantages resources located within the CAISO. More specifically, the existing framework allows speculative and non-firm supply, such as external variable energy resources without sufficient balancing reserves, to be treated as if they represent firm commitments to supply capacity. The qualifying capacity of internal wind and solar resources, in contrast, are adjusted downwards through use of the Effective Load Carrying Capability (“ELCC”) methodology to reflect their anticipated availability.

For the foregoing reason, Powerex believes that CAISO should clarify that all import RA (unless otherwise identified as a variable energy resource as further described below) must represent firm commitments and must be supported by the physical capacity and balancing reserves necessary to ensure that the resource can deliver energy in accordance with its commitments with a high degree of confidence. Imposing an express requirement that all import RA represent *firm commitments with sufficient balancing reserves to ensure delivery with a high degree of confidence* will help ensure that CAISO can count on import RA contracts to maintain reliability

and reduce the frequency of intertie delivery failures. By reducing the potential that System Resource Adequacy procurement requirements will be met by resources that have little ability to actually meet reliability needs, imposing such a requirement will help ensure that the Resource Adequacy program commits sufficient resources on a forward basis to allow CAISO to operate its system during stressed system conditions.

In order to avoid unnecessarily excluding external variable energy resources that are unable to procure the balancing reserves necessary to firm up their deliveries from competing to provide Resource Adequacy, Powerex believes that it would be appropriate to also give external variable energy resources the option to have their qualifying capacity calculated using the same ELCC methodology that is applied to internal variable energy resources. Powerex believes that extending the ELCC methodology to external variable energy resources would promote the transparent and competitive supply of Resource Adequacy capacity by ensuring that the likely availability of such resources was taken into account in determining their qualifying capacity.

2. Firm Transmission

Consistent with the requirement that import RA represent a firm commitment, Powerex supports requiring that each import RA contract be backed by firm transmission during the relevant delivery term. More specifically, Powerex believes that CAISO should require suppliers providing import RA to submit a day-ahead e-Tag for each hour of the delivery term of an import RA contract that identifies firm transmission service from the generation source to the CAISO intertie scheduling point designated in the RA contract.

In considering the need for such a requirement, it is important to consider the different priorities of transmission service that are available under the Open Access Transmission Tariff (“OATT”) framework that characterizes the west outside of the CAISO. In particular, it is important to recognize that, under the OATT framework, the transmission capacity of a line will be sold multiple times to various rights holders, each of which have different priority of use and access to the line. In the first instance, the capacity of a transmission line typically will be sold as firm transmission or, in some cases, conditional firm service. As a general matter, firm rights holders are entitled to priority access to the transmission capacity and are subject to curtailment only in certain limited circumstances (e.g., due to a transmission de-rate). Transmission capacity that is sold to firm rights holders is then resold on a non-firm basis for periods ranging from one hour to one year. The ability to flow on non-firm transmission depends on the decision of firm rights holders to fully utilize their rights during a particular period. To the extent that the available capacity of the line is not sufficient to accommodate schedules submitted by both firm and non-firm rights holders, then the schedules of non-firm rights holders will be curtailed to preserve firm rights holders’ ability to use the capacity of the line.

The manner in which transmission is sold under the OATT has significant implications for the reliability of import RA commitments. Notably, the lack of a requirement to support an import RA contract with firm transmission creates a risk of “double counting” of external transmission for purposes of the Resource Adequacy program. More specifically, it is very possible that multiple suppliers will be relying on the very same transmission capacity to allow them to schedule energy to multiple BAAs—with the potential that those holding non-firm rights will have their schedules “bumped” to accommodate the schedules of firm rights holders. By creating the potential for this type of double counting of transmission, Powerex believes that the lack of a requirement to

support import RA contracts with firm transmission increases the risk that a supplier that has committed to provide import RA will not be able to deliver energy when called upon by the CAISO.

Powerex believes that changes to the manner in which transmission is scheduled in recent years have served to increase the reliability risks associated with the lack of an express firm transmission requirement. Importantly, when the existing System Resource Adequacy framework was established, non-firm rights holders were generally only subject to curtailment prior to each hour. With the implementation of intra-hourly scheduling in recent years, however, firm rights holders can now submit intra-hour schedules. The result is that non-firm transmission is more frequently subject to curtailment within a given hour, increasing the uncertainty faced by non-firm rights holders and reducing the likelihood that they will be able to flow energy uninterrupted throughout a given operating hour.

Powerex believes that allowing import RA contracts to be supported by non-firm transmission is inconsistent with the purpose of the Resource Adequacy program and significantly increases reliability risk. The purpose of the Resource Adequacy program is to ensure that sufficient resources are committed on a forward basis to allow CAISO to reliably operate its system under a full range of operational conditions. Achieving this objective requires that the resources that have been committed to supply Resource Adequacy in a given period offer their capacity to the CAISO and deliver energy when called upon by the CAISO. In practice, however, an import RA contract supported by non-firm transmission cannot be counted on to be available when called upon by the CAISO. To the contrary, to the extent that firm rights holders on the relevant transmission paths schedule over their reservations, then it is likely that deliveries associated with an import RA contract supported by non-firm transmission will be curtailed in whole or in part. Even if an import RA resource that is supported by non-firm transmission is available at the beginning of a given hour, the potential of intra-hour scheduling creates a risk that deliveries from an import RA resource supported by non-firm rights will be curtailed on an intra-hour basis. In either case, the result is the same: CAISO will be left to procure short-term supply to backstop the delivery failure of the import RA resource and maintain reliability.

For the foregoing reasons, Powerex believes that CAISO should make clear that the use of non-firm rights to support import RA commitments is not acceptable. Instead, CAISO should clarify that all import RA contracts must be supported by firm transmission to ensure that import RA resources can be counted upon to deliver when called upon by the CAISO and maintain reliability. Adopting such measures will not only promote reliability, but they will help ensure comparability between external and internal resources as well. In reality, any resource may be rendered unavailable due to a transmission de-rate. This is the case, regardless of whether the resource is located within the CAISO BAA or in an external BAA. However, import RA contracts are unique in that the current framework allows sellers of import RA to rely on non-firm transmission reservations to support deliveries to the CAISO and to simply fail to deliver in the event that such transmission capacity is displaced by the firm rights holder.

In taking steps to ensure that import RA contracts are supported by firm transmission, Powerex emphasizes that CAISO should strive to strike a balance between ensuring that import RA resources are not relying on transmission that is subject to being “bumped” by higher priority rights holders and ensuring that requirements are not so stringent that they prevent resources that can reliably deliver energy to the grid from qualifying to supply Resource Adequacy. For that reason, Powerex believes that suppliers committed to provide import RA should be permitted to demonstrate that they have firm transmission by submitting a day-ahead e-Tag identifying firm

transmission service for each day of the delivery term rather than showing that they have firm transmission at the time of the submission of their supply plan. Powerex believes that requiring a demonstration that a supplier providing import RA has firm transmission on a day-ahead basis will give suppliers the flexibility necessary to optimize their transmission portfolio while ensuring that import RA resources can be counted upon to deliver energy when called upon by the CAISO.

Powerex also believes that it would be appropriate for CAISO to consider allowing import RA contracts to be supported by either a firm transmission reservation or conditional firm service. As a general matter, conditional firm transmission service refers to long-term firm service for which there is a number of hours per year or specified system conditions in which the reservation can be curtailed prior to other long-term firm transmission service. Because such service is only subject to curtailment in certain limited conditions and generally maintains a firm transmission priority, Powerex believes that it would be appropriate to give sellers the option to support their import RA contracts with conditional firm service as well.

3. Substitution

Powerex supports CAISO's efforts to simplify the rules governing substitution. Powerex emphasizes, however, that any use of substitution for import RA contracts must be carefully considered to avoid re-opening the door to allowing external suppliers to commit to provide import RA when they do not have the physical capacity or transmission necessary to support their commitment. Nevertheless, Powerex recognizes that there may be the potential for efficiency gains associated with allowing a supplier with an import RA commitment to use more cost effective resources to support its delivery obligation in real-time.

Specifically, Powerex believes that substitution rules for import RA should be designed in a manner that continues to ensure that import RA contracts are backed by physical capacity (or system resources) while also allowing cost-effective substitution. In order to accomplish this objective, Powerex believes that any substitution rules should not excuse a supplier from submitting a day-ahead e-Tag during each hour that identifies the same physical generation resources (or system resources) that were identified at the time its submitted its supply plan. However, to the extent that a resource is required to submit an offer in real-time, Powerex believes that it would be appropriate to allow the supplier to use a substitute resource to fulfill its obligation as long as the product quality is the same (e.g., can meet applicable performance obligations and represents a firm commitment).

4. Performance Assessments

Powerex supports CAISO's efforts to reduce reliance on, or eliminate, the Resource Adequacy Availability Incentive Mechanism ("RAAIM"). Powerex recognizes that the RAAIM is intended to provide a financial incentive for resources to comply with their delivery obligations and to obtain substitute capacity in the event of an outage. Powerex believes that financial penalties are fundamentally insufficient to protect the reliable operation of the grid. Even a significant financial penalty will not allow a supplier that has sold Resource Adequacy on a speculative basis to obtain substitute supply if there is no supply available in the short-term markets in the first place. Rather than relying on financial penalties to encourage suppliers to deliver energy in accordance with their Resource Adequacy obligations, the goal should be to ensure that the Resource Adequacy program consistently commits sufficient firm resources on a forward basis to meet reliability

requirements taking into account the potential for outages and other factors that have the potential to render a resource unavailable.

Rather than focusing on financial penalties, Powerex believes that CAISO should use resource performance to monitor compliance with Resource Adequacy program requirements, including the requirements to back import RA contracts with physical generation resources (or system resources) and firm transmission. In other words, the repeated failure of a supplier that is providing import RA to meet its delivery obligations may be evidence that the supplier does not actually have the physical capacity or firm transmission necessary to support its obligations. In that situation, it would be appropriate for CAISO to require the supplier to provide additional information about the resources and transmission supporting the supplier's obligations.

Powerex also believes that it would be appropriate to take resource performance into account when evaluating the quantity of Resource Adequacy that an external supplier can provide. In particular, Powerex believes that it would be appropriate for CAISO to "de-rate" the ability of a Scheduling Coordinator to provide Resource Adequacy based on historical performance. If a Scheduling Coordinator that has committed to provide import RA fails to meet the performance requirements associated with its commitment, then this should be reflected in the calculation of capacity that the Scheduling Coordinator will be eligible to supply going forward. This would ensure that the historical availability of Scheduling Coordinators supplying import RA is taken into account in determining the quantity of Resource Adequacy that they can provide similar to the unforced capacity ("UCAP") framework that CAISO currently is considering for internal resources (discussed further below). Powerex believes that taking into account the historical performance of Scheduling Coordinators supplying Import RA would create a powerful incentive for Scheduling Coordinators to ensure that they have the physical capacity and transmission necessary to support their delivery obligations.

II. RA Counting Methodology

A. Unforced Capacity

Powerex strongly supports CAISO's proposals to ensure that resource availability is taken into account by incorporating the use of UCAP into the Resource Adequacy framework. As noted above, the fundamental purpose of the Resource Adequacy program is to proactively ensure that sufficient capacity is committed on a forward basis to allow CAISO to reliably serve load under stressed system conditions. In practice, the quantity of capacity that is available in a given period always will be less than the net qualifying capacity/installed capacity value of resources committed to supply Resource Adequacy due to outages and other factors that have the potential to render a generation unit unavailable. Taking into account the potential for resource unavailability through the use of UCAP will help ensure that the quantity of resources that are actually available in any given period is sufficient to allow CAISO to reliably operate its system even when resource outages are taken into account. In that regard, Powerex believes that the proposal to incorporate the use of a UCAP measure represents an important step forward towards addressing one of the critical gaps in the existing Resource Adequacy framework.

Powerex believes, however, that calculating the UCAP of a resource based solely on its forced outage rate is not sufficient to ensure that there are consistently sufficient resources available to the CAISO to allow it to reliably operate its system under a full range of operating conditions. More specifically, Powerex believes that it would be appropriate to base the calculation of UCAP

on the availability of a resource more generally, regardless of whether a resource is unavailable due to an outage or some other factor that prevents it from meeting its obligations.

Whether a Resource Adequacy resource is unavailable due to a forced outage, a planned outage, a failure to comply with its must-offer obligation, or a failure to respond when dispatched for energy is immaterial from a reliability perspective. Regardless of the cause, the result is the same: CAISO cannot rely on the Resource Adequacy resource to maintain reliability and may be forced to rely on short-term procurement to compensate for the resulting shortfall. Such a result is fundamentally inconsistent with the purpose of the Resource Adequacy program.

For that reason, Powerex believes that the UCAP of a resource should reflect the actual historical performance of the resource. Powerex believes that this could be achieved by basing the calculation of the UCAP rating of a resource based on its unavailability/non-performance in the highest 1-2% of net load hours of each year over a defined historical period (e.g., five years). Such an approach would provide a robust measure of resource availability and would take into account outages, compliance with must-offer requirements, compliance with dispatch instructions and schedules,³ and resource seasonality. In the case of a new resource, CAISO could calculate the UCAP rating based on the average availability/performance of other resources employing similar technology until CAISO obtained sufficient unit-specific availability/performance information to calculate the UCAP of the individual unit. Powerex believes that such an approach could be applied broadly to internal and external thermal, hydroelectric, and demand response resources while maintaining the use of the ELCC methodology for wind and solar resources.

While certain parties have expressed concern about the relationship between the transition to the use of a UCAP measure and the existing planning reserve margin (“PRM”) requirement, Powerex believes that implementation of a framework to take into account resource unavailability is critical to ensuring that the Resource Adequacy framework results in the forward procurement of the quantity of resources necessary to maintain reliability. Nevertheless, Powerex recognizes that the nature and needs of the grid have changed dramatically since the existing PRM requirements were set in the wake of the California Energy Crisis. For that reason, Powerex agrees that it may be appropriate to engage in a holistic review of the PRM. In considering changes to PRM requirements, however, it will be critical to avoid changes that simply serve to offset the improvements associated with implementation of a UCAP measure.

B. Accounting for Outages

At the working group meeting, CAISO explained that it was considering two potential data sources for calculating forced outage rates: the NERC Generation Availability Data System (“GADS”); and CAISO’s Outage Management System (“OMS”).

Powerex supports the use of NERC GADS information to calculate the forced outage rates of generation resources. Powerex agrees that OMS information may not adequately the forced outages relevant to the calculation of the forced outage rate of generation resources. While GADS reporting is only mandatory for resources of 20 MW or more, Powerex believes that CAISO should consider modifying the existing Resource Adequacy framework to require smaller resources that

³ For the purpose of taking into account compliance with dispatch instructions and schedules, Powerex believes that it would be appropriate for CAISO to take into account the net uninstructed deviations of a resource exceeding an appropriate threshold to exclude *de minimis* variations (e.g., 1%).

wish to participate in the provision of Resource Adequacy to begin reporting information in accordance with the NERC GADS.

III. Other Issues

A. Calculation of System Resource Adequacy Requirements

As noted above, Powerex believes that the proposals that CAISO is considering in this proceeding have the potential to significantly improve the ability of the Resource Adequacy program to maintain reliability. It is important to recognize, however, that these efforts may still not be sufficient to ensure that the Resource Adequacy program commits sufficient resources on a forward basis to maintain reliability if the System Resource Adequacy procurement requirement does not accurately reflect system needs.

Unfortunately, recent experience demonstrates that the current approach of basing the System Resource Adequacy requirement on a 1-in-2 forecast of peak load in each month plus a planning reserve margin of approximately 15% does not accurately capture actual system needs. In particular, it is well documented that actual peak system load exceeded System Resource Adequacy requirements by thousands of MW on numerous days in September 2017 when a heat wave caused load to peak in the early weeks of September rather than in August.

Powerex believes that the shortcomings of the existing methodology could be mitigated by moving towards a framework that sets System Resource Adequacy requirements based on the forecast peak hourly load for the entire season (e.g., summer or winter). Such an approach would better take into account the potential for significant year-to-year variations in the timing of peak load by eliminating the artificial break between calendar months and taking a more holistic look at reliability needs in a given season.

Powerex is concerned that CAISO will continue to experience significant periods when the quantity of resources committed to provide Resource Adequacy capacity is insufficient to maintain reliability absent efforts to ensure that procurement requirements accurately reflect system needs. Powerex recognizes that CAISO cannot unilaterally modify the calculation of the System Resource Adequacy requirement through this proceeding. Nevertheless, Powerex encourages CAISO to continue to coordinate with the California Public Utilities Commission (“CPUC”) and California Energy Commission to improve the calculation of System Resource Adequacy requirements to ensure that they accurately reflect system needs.

B. Elimination of the Monthly Showing

Powerex also encourages CAISO to work with the CPUC to eliminate the existing month-ahead showing requirement in favor of a season-ahead showing process. As LSEs outside of the CAISO increasingly face capacity challenges due to the increasing penetration of renewable resources and retirement of conventional thermal resources, it is likely that there will be increasing competition for capacity and flexibility throughout the Western Interconnection. Powerex believes that the continued reliance of California on month-ahead procurements will put California LSEs at a disadvantage when competing to procure capacity with external LSEs offering yearly or multi-year capacity commitments. To the extent that there is not sufficient capacity available on a month-ahead basis, then the quantity of capacity procured through the Resource Adequacy Program may not be sufficient to meet system requirements. Even if capacity is available in the

month ahead time frame, it may not represent the most efficient and cost effective capacity available, thereby increasing the overall costs of meeting Resource Adequacy requirements.

Powerex believes that moving towards a framework that required year-ahead and season-ahead procurement would position California to more effectively compete for capacity in the face of evolving grid conditions, ultimately helping to ensure that California's reliability needs are met using the most efficient and cost-effective set of resources available. At the same time, by establishing Resource Adequacy requirements on a seasonal peak demand basis rather than on a yearly peak demand basis, such a requirement would continue to allow California LSEs and other western LSEs to benefit from regional diversity. For instance, systems in the Pacific Northwest tend to be winter peaking and, as a result, suppliers in the Pacific Northwest are likely to have more excess capacity available in the summer than in the winter. Allowing California LSEs to meet a portion of the higher summer seasons Resource Adequacy requirement would allow California LSEs to take advantage of this regional diversity and reduce the costs of meeting System Resource Adequacy requirements.

C. Flexible Resource Adequacy

Although the foregoing comments have focused on the requirements respecting System Resource Adequacy, Powerex encourages CAISO to continue to evaluate potential enhancements to its existing Flexible Resource Adequacy program. As Powerex has described in detail in its comments in other proceedings,⁴ Powerex believes that the existing requirements respecting Flexible Resource Adequacy do not fully align with the nature of CAISO's flexibility needs or operational timelines. In addition, the existing Flexible Resource Adequacy framework suffers from gaps that are similar to the gaps that characterize the existing System Resource Adequacy framework:

- The existing framework does not differentiate among resources based on their relative ability to provide ramping capability (e.g., between those resources with significant ramp rates and slow ramp rates), and overstates the ability of internal resources to actually providing ramping capability; and
- The resource qualification requirements applicable to Flexible Resource Adequacy largely exclude external resources with significant real-time flexibility from meeting CAISO's flexibility needs.

Powerex encourages CAISO to continue to move forward with efforts to ensure that Flexible Resource Adequacy requirements accurately reflect system needs and that commitments to provide Flexible Resource Adequacy are backed by physical capacity capable of providing flexibility when required by the CAISO. At the same time, Powerex emphasizes that CAISO should be careful to ensure that program requirements do not inadvertently create opportunities for the speculative supply of Flexible Resource Adequacy and, instead, ensure that resources that contribute to meeting system flexibility requirements are compensated in a manner that reflects the services that they provide.

D. MIC Allocation Framework

⁴ Comments of Powerex Corp. on FRAC MOO – Phase 2 Supplemental Issue Paper, available at: <http://www.aiso.com/Documents/PowerexComments-FlexibleResourceAdequacyCriteriaMustOfferObligationPhase2-SupplementalIssuePaper.pdf>

Powerex continues to support CAISO's efforts to address the shortcomings of the Maximum Import Capability ("MIC") framework. As Powerex has explained in detail in its earlier comments, Powerex believes that the existing MIC allocation framework acts as a barrier to the competitive supply of Resource Adequacy by allocating the majority of intertie capability to the largest California LSEs, who have no obligation to use this capacity or release it to other parties. The result is that unused capacity is effectively "stranded" and unavailable to support Resource Adequacy commitments with other smaller LSEs and external suppliers, unless the LSE holding the intertie capability voluntarily elects to sell this capacity to another market participant.

Powerex encourages CAISO to move forward with implementation of a framework that avoids the inefficient stranding of intertie capability while ensuring that the entities that fund the embedded cost of the CAISO interties are given the first opportunity to support a Resource Adequacy contract in each procurement timeline.

Powerex believes that one approach that is consistent with these principles is to allocate import capability based on the Resource Adequacy contracts that are actually executed at a given intertie. Specifically:

- In October each year, LSEs would be required to inform CAISO of the Resource Adequacy contracts that they had executed with external resources for the upcoming capacity commitment period.
- CAISO would then evaluate the total quantity of yearly import Resource Adequacy contracts executed at a given intertie:
 - If the total quantity of executed yearly import RA contracts on an intertie does not exceed the intertie's transmission capacity, each LSE would be granted the MIC associated with its submitted year Resource Adequacy contracts.
 - If the total quantity of executed yearly Resource Adequacy contracts on an intertie exceeded the intertie transmission capability, then the capability at the relevant intertie would be allocated among the LSEs based on an appropriate allocation factor (e.g., load ratio share basis).

Powerex notes that, under this framework, any intertie capability allocated in the year-ahead process would not be reduced in the month-ahead (or season-ahead) process. In other words, a preference would be given to using intertie capability to support year-ahead Resource Adequacy contracts, with intertie capability only made available to support monthly (or seasonal) contracts to the extent that intertie capability remains after the year-ahead allocation process is complete. Powerex believes that providing a preference for year-ahead procurement is consistent with the objective of ensuring that the Resource Adequacy framework results in the forward commitment of capacity on an annual basis.

E. EIM Resource Participation

Powerex also encourages CAISO to consider taking steps to harmonize Resource Adequacy requirements with CAISO's EIM. Under the existing Resource Adequacy framework, external suppliers providing import RA are required to submit an offer to deliver energy at a CAISO intertie each day during the relevant delivery period. Notably, there currently is no framework for an external supplier that commits to provide Resource Adequacy and that participates in the CAISO EIM to comply with its obligation through delivery in the EIM. This is the case even where the supplier has sufficient physical capacity to commit on a forward basis, and firm transmission rights

that it is willing to use to support its Resource Adequacy commitment with energy deliveries occurring through its participation in the EIM.

Powerex believes that the lack of such a framework has the potential to discourage participation in the EIM and that the CAISO should consider developing a model that permits EIM resources to meet their Resource Adequacy commitments through participation in the EIM, using firm EIM transmission. Unless such a framework is developed, an increase in the quantity of Resource Adequacy met through import RA contracts in the coming years will have the potential to significantly reduce the quantity of firm transmission rights that are made available to the EIM, including on key paths connecting the Northwest to California (e.g., the Pacific AC Intertie). In order to mitigate the potential for such unintended consequences, Powerex believes that CAISO should convene a stakeholder process focused on facilitating the ability of EIM resources to participate in the Resource Adequacy program.