Comments of Powerex Corp. on
Resource Adequacy Enhancements Issue Paper

Submitted by	Company	Date Submitted
Mike Benn 604.891.6074	Powerex Corp.	November 14, 2018

Powerex strongly supports CAISO's decision to commence a stakeholder process focused on strengthening critical aspects of the Resource Adequacy ("RA") program. Powerex agrees with the scope set out in CAISO's October 22, 2018 Issue Paper in this proceeding and agrees that the issues the CAISO has identified are ones that merit immediate attention. Powerex concurs that there is a growing urgency to make substantive changes to underlying RA program requirements in the near term.

Executive Summary

Resource Adequacy Program Enhancements Are Urgently Needed

The CAISO Issue Paper sets forth several key areas of the Resource Adequacy program that urgently require improvements. Powerex fully supports CAISO addressing each of these issues in this stakeholder process, as Powerex views enhancements in these areas as critical to:

1. Ensuring continued reliable operation of the CAISO grid in the face of a rapidly evolving resource mix in California and across the west; and
2. Enabling broader regional collaboration with the Pacific Northwest and Desert Southwest, including the potential development of a voluntary day-ahead organized market.

As the CAISO has recognized, there is clear evidence supporting the conclusion that the current Resource Adequacy program must be substantially strengthened in order to achieve its primary purpose of ensuring reliable service to CAISO load. On review of the relevant publicly-available data, several key observations can be made:

First, a review of historical public data for the summer months of 2016 through 2018, as compiled by Powerex[1] and presented below, demonstrates that the monthly Resource Adequacy system-wide requirement set by the California Public Utilities Commission ("CPUC") has been, at best, just enough to cover the CAISO actual peak hourly demand plus required contingency reserves; in certain months, it has been below actual system requirements (before accounting for any unit outages).

[1] Due to the multiple agencies involved in the Resource Adequacy program, Powerex has relied on various public sources for the data presented in the table, as identified in the notes to the table. Powerex welcomes any additional information or clarification regarding this data.

		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 AAEE Savings forecast in 14-IEP-1
2017 values from https://www.caiso.com/Documents/AgendaandPresentation_2018AnnualReviewofAvailabilityAssessmentHoursJun6-2017.pdf (at 32);
2018 values from http://www.caiso.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.caiso.com/market/Pages/OutageManagement/UnitStatus.aspx.

Second, a closer look at the public data demonstrates that even in those months where the system-wide Resource Adequacy (*i.e.,* System Resource Adequacy) requirement has been high enough to cover actual system needs, maintaining reliable operations would require virtually *every megawatt under contract to actually be available and to perform.* That is, the System Resource Adequacy target generally does not provide a "cushion" to account for the unavailability of resources at the time of peak system need.

Third, the public data further demonstrate that the level of actual System Resource Adequacy performance has repeatedly fallen well below levels needed to ensure reliability. In particular, CAISO data shows that a significant fraction of contracted Resource Adequacy capacity *has not* performed during this period. For instance, during peak load conditions in 2017, *approximately 6,000 MW* of resources under Resource Adequacy contracts failed to submit energy offers into the day-ahead market.[2]

In addition to these three data-driven observations, there is also ample evidence that indicates a significant portion of the Resource Adequacy capacity that is sold may not actually be supported by physical resources capable of performing if called upon by CAISO. For instance, the CAISO Department of Market Monitoring ("DMM") has expressed concern that the current rules governing the supply of Resource Adequacy from external resources "can allow a significant portion of resource adequacy requirements to be met by imports that may have limited availability and value

[2] CAISO Department of Market Monitoring, 2017 Report on Market Issues and Performance at Tbl. 10.1 (June 2018) ("2017 Annual Report").

during critical system and market conditions."[3] DMM also has expressed concerns regarding the performance of proxy demand resources, which can reduce the amount of Resource Adequacy capacity that load serving entities ("LSE") must procure.[4]

For these reasons, Powerex believes CAISO must significantly enhance the requirements for providing Resource Adequacy capacity to ensure that a sufficient level of capacity and flexibility, supported by real physical resources, is committed on a forward basis to allow CAISO to reliably meet system needs under a full range of operational conditions. While Powerex recognizes that California's Resource Adequacy program is coordinated by CAISO, the CPUC, and the California Energy Commission, CAISO, as a Balancing Authority, has an independent obligation to take steps to remedy the gaps in the existing Resource Adequacy program and ensure that the program commits sufficient dependable capacity and flexibility on a forward basis to allow CAISO to reliably balance the grid under a full range of operating conditions.

Adequate forward procurement of capacity and flexible capacity is vital to avoiding CAISO's continued reliance on short-term market purchases to ensure resource adequacy. Eliminating reliance on short-term purchases can be expected to confer at least two key benefits to the CAISO and its customers:

- **It will reduce reliability risk**: Reliance on short-term purchases to serve peak load exposes CAISO customers to the risk that external entities and regions may not have excess supply that they are capable and willing to make available. Procurement of adequate resources on a forward basis eliminates this reliability risk to CAISO customers.
- **It is an important step toward workable regional arrangements for capacity**: To the extent CAISO needs can be most economically met through the commitment of capacity located outside of its balancing authority area ("BAA"), this is appropriately achieved through forward capacity arrangements that contribute to the annual fixed costs of external physical resources. Relying on these external resources through selective short-term energy purchases discourages such appropriate forward contracting activity.

While there may have been ample excess supply available in external regions to compensate for the gaps in the Resource Adequacy program in past years, changes in the resource mix throughout the western region are creating new and growing challenges, making it increasingly likely that short-term supply in any given hour may not be available in the future to assist the CAISO in maintaining reliability. In particular, while supply within California is becoming increasingly tight due to the retirement of once-through cooling resources and thermal resources more generally, states outside of California are increasingly facing their own capacity and flexibility challenges due to the retirement of coal generation resources and a transition towards greater reliance on renewable, intermittent resources.

In addition to supporting the ongoing reliable operation of the CAISO grid, strengthening the Resource Adequacy program is also likely to be an important step to facilitating the further

[3] CAISO Dept. of Market Monitoring, Q3 2018 Report on Market Issues and Performance at 87 (Nov. 1, 2018) ("Q3 2018 Report").

[4] 2017 Annual Report at 36, 41.

development of broader regional markets. In particular, enhancing the Resource Adequacy program will better position the CAISO BAA to pass resource sufficiency requirements for the Energy Imbalance Market and any expanded day-ahead market as the supply mix within California continues to evolve.

Powerex's Response to CAISO's Issue Paper

In the following sections, Powerex offers its initial thoughts and observations in a number of the areas identified in the CAISO's Issue Paper. As discussed more fully in the comments below:

- Powerex supports the CAISO developing a framework for reducing the Net Qualifying Capacity of both internal and external resources to incorporate estimates of resource unavailability. This would prevent the CAISO grid from becoming reliant on finding several thousand megawatts of last-minute supply in order to substitute for planned and forced unit outages, and reliably serve peak demand. As the generation fleet in the CAISO BAA and across the west continues to change, there can be no assurance that "substitute resources" will be available; *all* resources needed to reliably serve demand—including resources needed to make up for outages—must be procured in advance.

- Powerex supports taking steps to ensure that all import Resource Adequacy contracts are backed by real physical capabilities supporting delivery to the CAISO. Allowing suppliers to sell Resource Adequacy capacity without first securing the physical capability necessary to do so is inconsistent with the purpose of the Resource Adequacy program and increases reliability risks.

- Powerex supports modification of the Maximum Import Capability framework to prevent this framework from impairing the ability of external resources to supply Resource Adequacy while, at the same time, continuing to ensure the deliverability of import Resource Adequacy contracts.

In the final section, Powerex offers suggestions regarding how CAISO should prioritize and move forward with addressing the issues identified in the Issue Paper.

I. Powerex Supports Calculating NQC To Reflect The Expected Unavailability Of All Types Of Resources

Powerex agrees with the CAISO's assessment that current RA counting rules do not result in forward commitments that ensure resource adequacy. As discussed above, historical data shows that the existing RA procurement requirements appear generally consistent with the peak capacity needs of the CAISO grid—*i.e.*, peak hourly demand plus required contingency reserves—but do not provide any material margin to protect against the expected level of outages of resources committed under forward RA contracts. DMM recently reported that on average approximately 6,500 MW of resources internal to the CAISO BAA were unavailable due to outages each hour

during summer 2018.[5] This is consistent with reported resource outage levels during peak load hours during summer months in 2016 and 2017, as well, as shown in the prior table.

Currently, a resource that has sold RA is subject to complex substitution requirements during outages, driven by the RA availability incentive mechanism. This provides a seller of RA capacity a financial incentive to *attempt to secure* alternative supply to substitute for a resource that is unavailable due to an outage. While Powerex believes that financial incentives are appropriate to encourage certain behavior—such as offering available resources into the CAISO day-ahead and real-time markets—they are not sufficient to protect the reliable operation of the grid. Even a severe financial penalty will not result in a seller of RA *being able* to obtain substitute supply if there is no supply available in the short-term markets in the first place. The fundamental purpose of any RA program is to *prospectively ensure* that sufficient capacity will be available to reliably serve load under stressed system conditions. This means the advance procurement of resources must explicitly recognize that some portion of the capacity that is procured will not actually be available in the hours of greatest system need. Stated differently, a failure to expressly anticipate the unavailability of resources effectively makes the grid dependent on short-term market purchases in order to substitute for inevitable resource outages to maintain reliability. This is contrary to the very purpose of a RA program.

The anticipated unavailability of a resource to meet system needs is already incorporated in the Net Qualifying Capacity ("NQC") process for certain types of resources. The NQC of wind and solar resources, for instance, is calculated, in part, on the expected ability of those resources to produce energy during peak load conditions. It seems entirely appropriate to extend the application of this type of concept to all resources, in a technology-agnostic manner.

At the October 30, 2018 stakeholder meeting, some participants expressed the view that the risk of resource outages is, or should be, factored into the planning reserve margin ("PRM") that is applied to the peak demand forecasts. Powerex disagrees. As an initial matter, a PRM for the CAISO BAA would need to be considerably greater than 15% in order to protect against (1) forecast error, to a 1-in-10 year standard; (2) required contingency reserve; and (3) resource outages. Furthermore, adjusting the PRM would be a highly inefficient way to reflect the anticipated unavailability of resources providing RA capacity. This is because, at best, the PRM could only reflect the anticipated unavailability of the entire RA fleet, and hence there would be no incentive for individual resources to improve their availability during peak hours. In contrast, incorporating unavailability information in the calculation of each resource's NQC provides strong incentives for a resource to take steps to increase its availability, since this enables the resource to sell more RA capacity.

Powerex believes it will also be informative for the stakeholder process to explore how resource unavailability is incorporated into the RA frameworks of other organized markets. It is Powerex's understanding that the forward capacity markets operated by ISO New England, the New York Independent System Operator, and PJM Interconnection all include provisions to reduce the

[5] Q3 2018 Report at 11-12.

eligible forward capacity that can be supported by a resource based on that resource's historical availability and performance.

Powerex believes that the CAISO's consideration of "availability" in the NQC calculation should not be confined to the risk of a unit experiencing a planned or forced outage. As highlighted in recent reports by DMM, an important portion of resources committed for RA that *are* available nevertheless fail to submit an offer into the CAISO's markets as required by their contracts and applicable market rules.[6] This should be a clear indication that, at least for some resources, the current rules and incentives are ineffective at ensuring performance in accordance with RA obligations. By incorporating historical performance—whether due to planned or forced outages or any other reason—into the determination of the RA capacity that a resource is certified to sell, the CAISO will strengthen the incentives for committed resources to perform, and also ensure that only resources that are expected to be able to perform are certified to sell RA.

II. Powerex Supports Modifying The Requirements Respecting Import RA To Prohibit The Participation Of Speculative Supply

Powerex supports CAISO's decision to include a review of RA import rules and provisions in the scope of this initiative. As CAISO recognizes in the Issue Paper, the existing RA framework does not include any requirements that ensure that import RA contracts are supported by physical capabilities necessary to effectuate delivery. In practice, it is not until the deadline for the submission of an e-Tag at 20 minutes prior to the relevant operating hour that CAISO is informed of the physical resource(s) and transmission delivery arrangements that will be available to meet CAISO load. The result is that external suppliers can sell RA capacity on an entirely speculative basis, without having secured any physical resources or necessary transmission service to support this commitment. In addition, the CAISO DMM has expressed concern that "resource adequacy imports could be routinely bid significantly above projected prices in the day-ahead market to ensure that they do not clear" while complying with their must-offer obligation.[7] In the unlikely event that their day-ahead offers are accepted, then these suppliers can attempt to procure energy on a short-term basis in external markets.

Powerex believes that allowing import RA contracts that are not backed by real physical capabilities to count towards meeting RA requirements increases reliability risks and is fundamentally inconsistent with the primary purpose of the RA program. In effect, external suppliers that agree to supply RA without securing the necessary physical capabilities in advance are speculating on their ability to purchase energy in the spot market to the extent that their day-ahead offers are accepted. This means that these suppliers are most likely to be unable to meet their delivery obligations during peak periods when supply is tight in the west—the very conditions in which the RA program is intended to secure reliability. Indeed, recent information from the CAISO confirms that the frequency of intertie delivery failures increases dramatically during those periods in which the CAISO market and the external regional markets are most stressed.[8]

[6] 2017 Annual Report at at Tbl. 10.1.

[7] *Id.* at 27-28.

[8] Intertie Deviation Settlement: Straw Proposal Presentation at 27.

Moreover, allowing speculative supply to count towards meeting RA requirements crowds out the external suppliers that actually have real physical capabilities that can support RA commitments. As a practical matter, an external supplier that enters into a contract to supply RA that is supported by physical capability and transmission investments will incur numerous costs that a speculative supplier is able to avoid. This includes the costs associated with setting aside generation capacity and reserving necessary transmission rights for the term of the RA commitment. The result is that import RA backed by real physical resources and transmission investments will face a significant cost disadvantage relative to import RA contracts offered by speculative supply.

It is important to recognize that physical suppliers that are displaced from supplying RA as a result of speculative suppliers cannot be counted on to simply make their capacity available to the CAISO on a short-term basis through participation in the CAISO day-ahead and real-time markets. In reality, external suppliers that are unable to secure an RA commitment due to the participation of speculative supply will have an incentive to sell their capacity on a long-term basis outside of the CAISO, particularly as changing grid conditions increase demand for capacity in external regions. The result will be that CAISO will have fewer supply options available to compensate for intertie delivery failures associated with the participation of speculative supply, further exacerbating the reliability risks associated with allowing speculative suppliers to supply RA.

For the foregoing reasons, Powerex encourages CAISO to move forward with a review of RA import rules, with a focus on ensuring that all import RA contracts are backed by real physical capabilities necessary to support future energy delivery. More specifically, Powerex suggests that CAISO consider requiring that:

- Import RA suppliers identify, at the time that the RA contract is executed, the source BA and the e-Tag generation source from which the RA capacity will be provided; and
- Import RA suppliers submit e-Tags for every hour of the contract term identifying the same source BA and generation source that was designated in the RA contract.

Powerex also supports further dialogue around measures to prevent potential "double-counting" of resources (*i.e.*, where the same resource capability has been committed to meet capacity or flexibility requirements in two or more BAAs). Among other things, Powerex believes that CAISO should consider whether measures are necessary to prevent entities from agreeing to sell RA from resources that are expected to be necessary to serve their own load and, as a result, are at high risk of curtailment.

III. Powerex Supports Reevaluation of the MIC Framework

Powerex strongly supports CAISO's proposal to conduct a comprehensive review of the CAISO's Maximum Import Capability ("MIC") allocation framework as part of this initiative. Powerex believes that the MIC allocation framework has had the effect of significantly limiting the ability of

external resources to compete to supply RA capacity.[9] In particular, the existing MIC allocation framework allocates the vast majority of intertie capability to the largest California LSEs, who historically have not utilized their full allocation to support import RA contracts. With no mechanism to ensure that unused intertie capability is made available to other LSEs to support RA contracts, this intertie capability is effectively "stranded" to the detriment of both smaller LSEs and external suppliers who are unable to obtain the intertie capability necessary to support an import RA contract.

Powerex encourages CAISO to engage in further dialogue with stakeholders regarding how the MIC framework can be modified to prevent the stranding of capacity and remove artificial barriers to the participation of external resources in the RA program. In considering potential alternatives to the existing framework, Powerex believes that CAISO should be guided by the following principles.

- First, any framework that is implemented must ensure that the import RA contracts at a given intertie do not exceed the quantity of energy that can be delivered given the physical constraints of the transmission grid. Powerex agrees that it would be inappropriate and inconsistent with the objectives of the RA program to allow contracts with external resources to count towards meeting RA requirements without ensuring that the supplier actually has the ability to deliver energy during the relevant commitment period.

- Second, the framework must ensure that import capability is available to support RA contracts with external resources to the maximum extent possible consistent with the physical capabilities of the CAISO interties. In other words, entities should not be precluded from obtaining the intertie capacity needed to support RA contracts or be required to pay to obtain for intertie capacity when there is unused intertie capacity remaining.

- Third, the entities that fund the costs associated with intertie facilities should have priority access to the use of that capacity to support their own RA contracts, subject to an appropriate release mechanism for any unused capacity. In particular, the entities funding the embedded cost of the CAISO interties should be given the first opportunity to use that intertie capacity to support an RA contract in each RA procurement timeframe. However, to the extent that intertie capacity is not used to support an RA contract in a respective RA procurement timeframe, then that intertie capability should be made available to other LSEs and market participants to support RA contracts.

Powerex believes that there are a number of potential approaches that could be implemented that are consistent with these principles and that would eliminate the shortcomings of the existing MIC framework.

[9] Comments of Powerex Corp. on Flexible Resource Adequacy Criteria and Must Offer Obligations Phase 2 Second Revised Flexible Capacity Framework (May 17, 2018), *available at* http://www.caiso.com/Documents/PowerexComments-SecondRevisedDraftFlexibleCapacityFramework.pdf.

IV. Powerex Supports Addressing The RA Enhancements Through Multiple Phases

Powerex agrees with CAISO's proposal to address the issues set out in the Issue Paper in distinct phases. In Powerex's view, there are a number of gaps in the RA program that represent immediate threats to system reliability and should be prioritized in the first phase of this initiative. Specifically, Powerex recommends that CAISO prioritize:

1. Ensuring that resource availability, including outages, are properly reflected in the NQC for all resources; and
2. Developing requirements for import RA contracts to ensure that all contracts are backed by physical capacity and transmission.

Powerex believes that these steps would expedite addressing clear flaws with significant implications for reliability, and hence should be prioritized for resolution in advance of the 2020 RA year.

The second phase of the RA enhancements would address remaining issues, including enhancements to the MIC, the Capacity Procurement Mechanism and Reliability Must Run contracts, and Flexible RA. Powerex believes that these latter issues are generally more complex, and while critical, should perhaps best be addressed after the items set forth above. Moreover, the resolution of certain of these topics will be informed by, and dependent on, the enhancements developed under the first phase.