BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Continue Implementation and Administration, and Consider Further Development of, California Renewables Portfolio Standard Program.	Rulemaking 15-02-020 (Filed February 26, 2015)

COMMENTS OF THE CALIFORNIA BIOMASS ENERGY ALLIANCE, CALIFORNIA WIND ENERGY ASSOCIATION, CALPINE CORPORATION, GEOTHERMAL ENERGY ASSOCIATION AND ORMAT NEVADA, INC., ON THE RPS PROCUREMENT PLANS OF THE INVESTOR-OWNED UTILITIES

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I. INTRODUCTION AND SUMMARY

Pursuant to the California Public Utilities Commission ("Commission") Assigned Commissioner and Assigned Administrative Law Judge's Ruling Identifying Issues and Schedule of Review for 2016 Renewables Portfolio Standard ("RPS") Procurement Plans, dated May 17, 2016 ("ACR"), and the E-Mail Ruling Granting, in Part, the Investor Owned Utilities' ("IOU") [1] request for an extension of time to produce the 2016 RPS Procurement Plans, as communicated to the parties by SCE on June 13, 2016, the California Biomass Energy Alliance, California Wind Energy Association, Calpine Corporation, Geothermal Energy Association and Ormat Nevada, Inc. ("Joint Parties") respectfully submit these comments on the draft 2016 RPS Procurement Plans ("2016 Plans) filed by the IOUs on August 8, 2016.

On June 1, 2016, the Joint Parties filed a Motion in this proceeding ("Joint Parties' Motion") to amend the ACR to require the IOUs to include in their draft 2016 Plans a description of how they propose to address the projected direct and indirect costs of energy curtailments in their least-cost, best-fit ("LCBF") bid evaluation processes, and how they plan to make use of their contractual economic curtailment rights with respect to potential overgeneration conditions.[2] The goal of the Joint Parties' motion was to ensure that the IOUs' 2016 Plans contained sufficient information to inform parties' comments and Commission decisions on

[1] The Investor Owned Utilities include Pacific Gas and Electric Company ("PG&E"), Southern California Edison Company ("SCE"), and San Diego Gas & Electric Company ("SDG&E").

[2] The Joint Parties' Motion is appended to this filing as Attachment 1.

these issues. Based on a review of SCE's plan as well as SCE's response to a data request, the Joint Parties believe that SCE likely is considering curtailment appropriately in LCBF subject to the concerns and questions expressed below. The Joint Parties have remaining concerns about how all LSEs are managing contractual curtailment provisions and the potential for the costs of curtailment to be socialized and hence not appropriately accounted for in any individual LSE's procurement in the event that curtailment is reliability-related and not economic.

CPUC and CAISO planning models have demonstrated that the concentrated daytime output profile of solar photovoltaic projects will lead to very significant curtailment of all renewable and particularly solar energy over the next decade.[3] The cost impact of this curtailment will almost certainly dwarf the impact of the updated Renewables Integration Cost Adder and the Effective Load Carrying Capability ("ELCC") capacity valuation methodology. While all of these factors are important -- and the Commission should strive to ensure that all are updated and incorporated into the 2016 procurement cycle, the Commission should prioritize action on curtailment valuation due to its relative importance in minimizing the total costs of procurement outcomes.

The relative importance of curtailment costs in the LCBF process is readily apparent. The February 2015 Energy Division staff presentations on the RPS Calculator[4] showed that a marginal curtailment level of 20% raises the net cost of an illustrative resource by over 60%.[5] (The same Energy Division staff presentation shows marginal curtailments under a 50% RPS of about 20% for wind, biomass and geothermal resources and about 50% for solar resources.[6]) By comparison, the current RICA value of $3-$4/MWh would represent on the order of 7-10% of the net cost of the same illustrative resource. And, while the ELCC method is expected to substantially affect the share of capacity value that a variable resource receives credit for, capacity value is very low presently, and thus the ELCC methodology will have a relatively small impact on resource valuation.

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[3] See, e.g., Draft 2016 RPS Portfolios, RETI 2.0 Plenary Group Meeting, slide 12 (3/18/16) (CPUC presentation by Forest Kaser), and E3's Draft Renewable Portfolios for CAISO SB 350 Study presented at a February 8, 2016, CAISO Public Workshop.

[4] See February 2015 Workshop Slides on Resource Valuation, which can be found under "RPS Calculator 6.0 Documents" at http://www.cpuc.ca.gov/RPS_Calculator/.

[5] *Id.* at slide 35.

[6] *Id.* at slide 34.

The Commission should therefore take the following specific actions, which we discuss below, to ensure that curtailment costs are being fully accounted for in LCBF procurement:

- Ensure that curtailment costs are appropriately factored into LCBF energy valuations;
- Require the IOUs to use their economic curtailment rights to avoid negative pricing and to pay for CAISO-directed reliability-related generation reductions due to overgeneration conditions;
- In the event that curtailment is not managed economically by other Commission-jurisdictional LSEs such that the IOUs are instructed to undertake certain types of procurement to manage overgeneration-related reliability-related curtailments, allocate the costs of such procurement to all LSEs; and
- If necessary, delay the 2016 RFO until curtailment issues can be addressed in the LCBF Reform track.

Only SCE proposes to issue a 2016 solicitation; therefore, the other IOUs did not file Pro Forma contracts and LCBF procurement methodologies. While we focus primarily, therefore, on SCE's draft 2016 Plan, the Commission should apply the policies that we propose to all of the IOUs for their future procurements and should apply them indirectly, as explained, to all LSEs.

II. SEVERAL COMMISSION ACTIONS ARE NEEDED TO ENSURE THAT CURTAILMENT COSTS ARE PROPERLY ACCOUNTED FOR IN PROCUREMENT DECISIONS

A. The Commission Should Ensure that Curtailment Costs Are Appropriately Factored into LCBF Energy Valuations

Given the importance of potential curtailment costs, achieving least-cost, best-fit procurement results requires that the energy price assumptions used in LCBF reflect the potential for curtailment through low or negative prices in hours in which curtailment is expected to occur. Based on its draft 2016 Plan and response to a Joint Parties' data request, SCE appears to account appropriately for curtailment in its LCBF methodology although the Joint Parties have a few remaining questions and concerns about SCE's methodology.

SCE's draft 2016 Plan describes only very generally SCE's methodology for valuing "energy benefit" and "portfolio fit."[7] It is not possible to understand from the narrative in these (and surrounding) sections of the draft plan specifically how potential curtailment costs are being

[7] SCE (draft) 2016 RPS Procurement Plan, Volume 2, Public Version, at Appendix H.1, pp. 5 and 9.

valued. Moreover, SCE includes "[c]ongestion, negative price, and curtailment considerations not captured in the quantitative valuation" as factors under "[o]ther qualitative criteria / preferences." These factors are used "to determine advancement to the shortlist or tie-breakers, if any."[8] If SCE appropriately considers curtailment costs as part of energy benefit, portfolio fit or elsewhere, it is not clear why these costs would also need to be considered in this "other" category. Consideration in the "other" category alone would be a wholly insufficient means of addressing curtailment costs.

The Joint Parties therefore submitted a data request to SCE asking for further detail regarding how curtailment costs are valued. Specifically, with respect to the models that SCE uses to develop forward prices for energy, we asked, "When the production-cost simulations curtail renewable resources (or other resources) in order to balance load and generation, how are prices from the simulations determined?" More specific questions were included as well.[9]

The Joint Parties are encouraged by SCE's response, which states that SCE uses hourly, nodal production simulations to develop forward prices. These simulations reflect both congestion costs and the potential for overgeneration to lead to negative pricing. In addition, the simulations account for the foregone REC/RPS compliance value associated with curtailing renewable resources. The Joint Parties have the following remaining concerns and questions about the SCE methodology.

First, while it is the Joint Parties' understanding that the production cost simulations that SCE uses to develop forward prices account for curtailment, it is unclear in using those prices to value a specific resource whether SCE accounts for the option to curtail the specific resource or whether it simply treats the resource as must-take.

Second, while SCE's response to the Joint Parties' data request suggests that the production cost simulations that it uses to produce forward prices could yield prices as low as the CAISO bid floor, it is unclear how the simulations would result in prices that low, e.g., if the simulations assume that renewables can be curtailed at a foregone REC value that is presumably above the bid floor, do the simulations result in prices as low as the CAISO bid floor only when

[8] SCE (draft) 2016 RPS Procurement Plan, Volume 2, Public Version, at Appendix H.1, p. 10-11.

[9] SCE's complete response to the Joint Parties' data request (including the questions posed in the data request) is appended here as Attachment 2.

the potential for renewable curtailment has been exhausted? Do the simulations reflect penalty parameters associated with violating self-schedules in CAISO markets?

Third, it is unclear whether the production cost simulations that SCE uses to develop forward prices for its upcoming solicitation will reflect a 40% RPS or a 50% RPS. As shown in Energy Division's RPS Calculator work, solar curtailment jumps from under 20% under a 40% RPS to over 50% under a 50% RPS.[10] Given SB 350's 50%-by-2030 RPS requirement, long-term resources procured under the 2016 RFO will be operating in a post-50% renewables portfolio and should be valued in that context.

Fourth, it is unclear whether SCE is using the CPUC's most current planning assumptions. For example, SCE's draft 2016 Plan states that it uses "the most recent Long-Term Procurement Plan ("LTPP")"[11] rather than the assumptions that the Commission adopted in May 2016 for use in the CAISO's 2016-17 Transmission Planning Process and Future Commission Proceedings.[12] These assumptions include important changes, such as modeling behind-the-meter generation as a supply resource. The assumptions also include 50% renewables portfolios for 2030.

The Joint Parties request clarification of the above. In addition, to ensure that SCE and other IOUs fully capture the potential for curtailment in the energy prices that they use in LCBF, the Commission should require that:

- the development of energy-price projections for LCBF reflect the most current IRP/LTPP assumptions, and follow the IRP/LTPP guidance on the appropriate representation of behind-the-meter solar in modeling;[13]
- the modeling reflect achievement of the 50% RPS target in 2030; and
- the price projections reflect all costs of curtailment, including the potential for prices to be impacted by penalty parameters associated with cutting self-schedules or violating power balance constraints in CAISO markets.

[10] *Supra* Note 4.

[11] SCE (draft) 2016 RPS Procurement Plan, Volume 2, Public Version, at Appendix H.1-5

[12] See R.13-12-010, Assigned Commissioner's Ruling Adopting Assumptions and Scenarios for Use in the California Independent System Operator's 2016-17 Transmission Planning Process and Future Commission Proceedings (May 17, 2016).

B. The Commission Should Require The IOUs To Use Their Economic Curtailment Rights To Avoid Negative Pricing And To Pay for CAISO-Directed Reliability-Related Generation Reductions Due to Overgeneration Conditions

In its draft 2016 Plan, SCE explained very clearly why it is in the interest of ratepayers for a utility to pay the full PPA price for curtailment in order to avoid negative pricing:

> In instances where SCE has either exceeded the curtailment cap [representing pre-paid economic curtailment] or only has "take-or-pay" economic curtailment rights to begin with, if SCE were not to curtail deliveries in excess of any schedules awarded at positive prices, customers would pay the contract price for that excess delivered energy *and* incur the costs associated with negative pricing in such intervals. SCE's economic bids will therefore serve to further limit customer exposure to negative prices both day-ahead and in real-time, even if SCE ultimately pays the contract price for curtailed energy.[14]

This logic should extend to the practices of the other IOUs (and, as discussed in section C, below, apply indirectly to all LSEs). Yet, SCE states only that it "will retain the right to curtail at its discretion" (paying for those curtailments).[15,16] SCE does not commit to using economic curtailment rights as a matter of practice. Further, SCE states that, "[a]s in prior years, SCE will not pay for curtailments in response to an emergency, or due to CAISO or transmission provider instructions."[17] This is generally consistent with the practices of the other IOUs.[18] For the following reasons, the Commission should require the IOUs to use their economic curtailment rights to avoid negative pricing and to pay all generators (those already contracted and those to be contracted) for CAISO-directed, reliability-related generation reductions due to overgeneration conditions.

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[14] SCE (draft) 2016 RPS Procurement Plan, Volume 1, Public Version, at p. 41.

[15] *Id*. at p. 42.

[16] As the IOUs pointed out in their June 16, 2016, Joint Response of the IOUs to the Joint Parties' Motion ("IOU Response"), the IOUs have strong incentives to curtail when it is economic to do so because their "least cost dispatch" is subject to CPUC review through the ERRA proceedings. IOU Response at p. 3-4.

[17] *Supra* note 15.

[18] See, e.g., definition of "Curtailment Order" in PG&E's pro forma RPS contract.

As explained more fully in the Joint Parties' Motion, sellers are not in a position to factor curtailment costs into their bids.[19] First, bidders lack the ability to make even a reasonable estimate of overgeneration and have no control over overgeneration. For example, bidders will not be able to predict how much solar energy will be procured by all load-serving entities on the CAISO grid, the growth of rooftop solar installations,[20] load growth or future levels of demand-response (such as midday electric-vehicle charging), or energy exports that might reduce curtailment. Second, a conservative assumption will result in a losing bid, if other bidders do not project similarly high curtailment levels. Finally, to the extent that a resource contributes to overgeneration-related reliability curtailment, that curtailment will be spread over many resources. Therefore, if bidders are factoring any curtailment into their bids, it would likely be no more than the bidder's individual share of the average curtailment level expected under the CAISO's practice of uniformly curtailing generators during overgeneration conditions, not the total curtailment that all generators (both existing and planned) will suffer as a result of the bidder's marginal contribution to the need for curtailment.

Hence, bidders are unlikely to factor their marginal reliability-related curtailment costs into their offers. Requiring buyers to pay for overgeneration-related reliability curtailments will compensate sellers for curtailment that they are not in a position to accurately anticipate, and will encourage buyers to consider these reliability-related curtailment costs in their procurement decisions.

C. The Commission Should Provide That Other LSEs Properly Account for Curtailment Costs, or Ensure That The IOUs Receive Appropriate Cost Allocation

In the June 16, 2016, Joint Response of the IOUs to the Joint Parties' Motion ("IOU Response"), the IOUs stated that, if the Joint Parties' assumption that marginal solar PV bids could create the potential for curtailment of existing RPS resources is correct, and if addressing that curtailment would improve system reliability by avoiding future overgeneration and associated curtailment costs, then accounting for these costs in the LCBF process and paying higher costs for alternative renewable resources to improve system reliability should not be the

[19] Joint Parties' Motion at p.3.

[20] Though solar rooftops will cause curtailment, they will not suffer any curtailment because behind-the-meter resources are not subject to curtailment by the CAISO. Thus, the curtailment caused by rooftop solar will fall largely on wholesale solar projects.

sole responsibility of the IOUs' bundled customers.[21] This logic would extend to obtaining and using economic curtailment rights to avoid negative market pricing and overgeneration-related reliability curtailment. The IOUs' logic is not persuasive, however, for the reasons noted by SCE (see p. 6, above). Even if other LSEs do not buy resources with delivery profiles that lead to less curtailment, do not curtail those resources when prices are low or negative, and do not pay for overgeneration-related curtailment, it is still in the interest of the IOUs to do so themselves.

Nevertheless, in the event that curtailment is not managed economically by the non-IOU LSEs, and overgeneration-related reliability curtailments occur despite the IOUs' actions to avoid it, and the Commission instructs the IOUs to undertake certain types of procurement to manage reliability-related curtailment, such as greater investment in storage, the Joint Parties fully agree that the Commission should allocate the costs of such procurement to all LSEs on a cost-causation basis. As Public Utilities Code Section 454.51(c) states, the Commission should:

> Ensure that the net costs of any incremental renewable energy integration resources procured by an electrical corporation to satisfy the need identified in subdivision (a) are allocated on a fully nonbypassable basis consistent with the treatment of costs identified in paragraph (2) of subdivision (c) of Section 365.1.[22]

Public Utilities Code Section 365.1(c)(2) requires that if the Commission authorizes an IOU to enter into a contract needed to meet system or local reliability needs, the net capacity costs of that contract must be allocated on a fully nonbypassable basis to all benefitting customers in that IOUs service area. In particular, Section 365.1(c)(2) requires that the Commission must:

> (A) Ensure that, in the event that the commission authorizes, in the situation of a contract with a third party, or orders, in the situation of utility-owned generation, an electrical corporation to obtain generation resources that the commission determines are needed to meet system or local area reliability needs for the benefit of all customers in the electrical corporation's distribution service territory, the net capacity costs of those generation resources are allocated on a fully nonbypassable basis consistent with departing load provisions as determined by the commission, to all of the following:
>
> (i) Bundled service customers of the electrical corporation.

[21] IOU Response at p. 4.

[22] Subdivision(a) provides, in part, that the Commission "Identify a diverse and balanced portfolio of resources needed to ensure a reliable electricity supply that provides optimal integration of renewable energy in a cost-effective manner."

(ii) Customers that purchase electricity through a direct transaction with other providers.
(iii) Customers of community choice aggregators.

D. If Necessary, the Commission Should Delay the 2016 RFO Until Curtailment Issues Can Be Addressed in the LCBF Reform Track

If -- despite the importance of addressing curtailment in minimizing total RPS procurement costs and avoiding emergency overgeneration situations, as demonstrated by Energy Division's work products -- the Commission is hesitant to take the steps outlined above in the context of approving the IOUs' procurement plans, the Commission should prioritize discussion of these issues in the first LCBF Reform workshop, schedule that workshop as soon as possible, and rule on the issues expeditiously such that they can be incorporated into the Commission's decision on the 2016 Plans. If that requires a delay in the 2016 RFO, the delay will be warranted by the importance of the matter and, in any case, should not require more than a few months' delay.

III. CONCLUSION

For the foregoing reasons, the Commission should take the above-specified actions to ensure that LSEs fully account for curtailment costs in LCBF procurement in order to minimize total RPS compliance costs.

Respectfully submitted,

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September 1, 2016

VERIFICATION

I, Nancy Rader, am the Executive Director of the California Wind Energy Association. I am authorized to make this Verification on its behalf. I declare under penalty of perjury that the statements in the foregoing copy of "Comments of the California Biomass Energy Alliance, California Wind Energy Association, Calpine Corporation, Geothermal Energy Association and Ormat Nevada, Inc., on the RPS Procurement Plans of the Investor-Owned Utilities" are true of my own knowledge, except as to the matters which are therein stated on information and belief, and as to those matters I believe them to be true.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on September 1, 2016, at Berkeley, California.

/s/ *Nancy Rader*

Nancy Rader
Executive Director
California Wind Energy Association

Attachment 1

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I. INTRODUCTION

The Assigned Commissioner and Administrative Law Judge Mason's May 17, 2016, Ruling Identifying Issues and Schedule of Review for 2016 Renewables Portfolio Standard Procurement Plans ("Ruling"), among other things, instructed the three investor-owned utilities ("IOUs") to "continue to report on observations and issues related to economic curtailment as well as any actions and analysis." (Ruling at p. 16.) Pursuant to the Commission's Rule of Practices and Procedure 11.1, the California Biomass Energy Alliance, California Wind Energy Association, Calpine Corporation, Geothermal Energy Association and Ormat Nevada, Inc. ("Joint Parties") respectfully submit this motion to modify the Ruling to direct the utilities to specifically address: (1) how they propose to address the projected direct and indirect costs of energy curtailments in the least-cost, best-fit bid evaluation process, and (2) how they plan to make use of their contractual economic curtailment rights with respect to potential overgeneration conditions. Full consideration of these issues is necessary in the 2016 procurement cycle to ensure that the utilities acquire a least-total-cost portfolio, avoid shifting substantial costs onto other market participants, and foster timely compliance with the

Renewables Portfolio Standard ("RPS") policy.[1] Properly addressing what is a common-pool problem may require the Commission and the IOUs to rethink how the utilities handle economic and overgeneration-related curtailments.

II. ARGUMENT

A. Achieving a Least-Total-Cost Portfolio Requires Accounting for All Curtailment Costs in Procurement Decisions

CPUC and CAISO planning models show that the concentrated daytime output profile of solar photovoltaic projects is expected to lead to very significant curtailment of solar energy over the next decade, a timeframe obviously encompassed in LCBF bid analysis.[2] Curtailment is an explicit cost component of the CPUC's RPS Calculator, which is used to project cost-effective 50% RPS resource portfolios for meeting California's 2030 Renewables Portfolio Standard ("RPS") goals. This model make a critical assumption that may not track current utility practice: that generators are paid for their curtailed energy at the full contract price.[3] That is, the model assumes that the cost to curtail excess renewable generation will be included in the least-cost, best-fit (LCBF) analyses leading to utility procurement decisions, with the result that solar energy becomes less cost-effective and resources with output profiles that are complementary to solar become more competitive as solar penetration increases. However, it is not at all clear that curtailment costs are, in fact, being fully included – if included at all – in utilities' analyses of proposed bids. As a result, utility procurements may not be leading to a least-cost RPS portfolio.

Curtailment costs may be overlooked or under-estimated for two primary reasons. First, overgeneration-related curtailments are not necessarily of concern to the purchasing utility. This is because if normal operating practices, including the dispatch of economic curtailment bids from renewable resources, fail to maintain system reliability when supply is expected to exceed

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[1] In the event that curtailment is included as one of many issues to be addressed in an anticipated ruling addressing least-cost, best-fit reform in this proceeding, the Joint Parties stress that curtailment requires more immediate attention.

[2] See, e.g., Draft 2016 RPS Portfolios, RETI 2.0 Plenary Group Meeting, slide 12 (3/18/16) (CPUC presentation by Forest Kaser); and E3's Draft Renewable Portfolios for CAISO SB 350 Study presented at a February 8, 2016, CAISO Public Workshop.

[3] *Id.* (E3 study at slide 10).

demand, CAISO will implement reliability-related curtailment of renewable resources. The investor-owned utilities' pro forma power purchase agreements (PPAs) – and therefore presumably most, if not all, of their signed contracts – generally provide that the utilities will not pay for any reliability-related curtailments ordered by the CAISO, including curtailments resulting from overgeneration.[4] In this way, the utilities would shift curtailment costs to the seller.

Second, it is unlikely that bidders are fully factoring reliability-related curtailment into their pricing. While nobody may be able to accurately predict curtailment due to overgeneration over the long term, bidders lack access to much of the data needed to make even a reasonable estimate. For example, bidders will not be able to predict how much solar energy will be procured by California's utilities as well as all other load-serving entities on the CAISO grid, the growth of rooftop solar installations, [5] load growth or future levels of demand-response (such as midday electric-vehicle charging) or energy exports that might reduce curtailment. Furthermore, a conservative assumption will result in a losing bid, if other bidders do not project similarly high curtailment levels. Finally, as discussed below, most of the curtailment caused by the bidder will affect other operating generators.

B. The LCBF Process Should Consider Costs Imposed on Other Market Participants

Reliability-related curtailments affect not only the marginal renewable supplier but other suppliers as well because reliability-related curtailments are indiscriminate, e.g., they do not differentiate between generation from new solar generators who may have tipped the market into overgeneration conditions and existing solar generators who may be curtailed only as the result of new solar resources entering the market. In fact, studies show that, while the marginal

[4] See definition of "Curtailment Order" in PG&E's pro forma RPS contract and the definition of "Curtailed Product" in SCE's pro forma RPS contract.

[5] Though solar rooftops will cause curtailment, they will not suffer any curtailment because behind-the-meter resources are not subject to curtailment by the CAISO. Thus, the curtailment caused by rooftop solar will fall largely on wholesale solar projects.

curtailment caused by a bidder might be equivalent to 65% of its generation, overall average curtailment at that point would be 9% of overall renewable energy production.[6]

Thus, even if a bidder were to factor in some estimated amount of curtailment that it might suffer over its lifetime, it would not factor in the total curtailment that all generators (both online and contracted) would suffer because of the bidder's marginal contribution to the need for curtailment. Thus, the bidder effectively shifts costs to other market participants, largely other solar generators that would otherwise produce power during times of curtailment. These costs, as far as the Joint Parties can tell, are not being considered in the LCBF bid evaluation process. Moreover, it is not clear whether the utilities are factoring in reduced production from generators (primarily, but not exclusively, solar generators) in their own portfolios resulting from their additional solar procurements and resulting curtailments, let alone reduced production in the portfolios of the other utilities.

C. Fully Accounting for Curtailment Costs Will Foster Timely RPS Compliance

As discussed above, renewable energy curtailments are expected to be very significant if solar procurements dominate the 50% RPS portfolio. These curtailments (on the order of 9% of all renewables) could affect the ability of the IOUs to comply with the RPS policy. By the same token, fully anticipating and accounting for curtailments (and avoiding them when it is cost-effective to do so) will foster timely RPS compliance.

D. Rethinking How The Utilities Handle Overgeneration-Related Curtailments May Be Necessary

The situation described above represents a common-pool resource problem[7] in which everyone has access to a resource and, by using it, additional costs are imposed on other users of the resource. In this case, the grid's limited ability to absorb generation becomes exhausted at certain times due to a combination of limited demand and high solar generation, resulting in a

[6] Marginal curtailment for solar PV was found to be 65% in a solar-heavy 50% RPS scenario in E3's Investigating a Higher Renewables Portfolio Standard in California (January 2014), at p. 15; similar results were found in E3's more recent Western Interconnection Flexibility Assessment, where almost 9% of all renewables are shown to be curtailed on average in a high-solar case (slide 30). Also see note 2, *supra,* CPUC presentation slide 9.

[7] More specifically, the grid can be thought of as an open-access resource.

curtailment order to all generators. In their procurement plan filings, the IOUs should address this common-pool problem.

In the view of the Joint Parties, addressing the problem will require that procurement decisions take into account the potential "overuse" of the grid, such that procurement that exacerbates overgeneration will occur only when it is cost-effective in a global sense, including its impact on the curtailment of other resources.[8] This will require the utilities to account and pay for all curtailed power associated with congestion and overgeneration.[9] Three specific fixes are needed:

(1) generators should be paid for reliability-related curtailment;

(2) impacts of additional procurement on the curtailment of existing and planned generation must be accounted for in the analyses leading to procurement decisions; and

(3) the utilities should utilize their economic curtailment rights under their existing contracts (under which generators are paid for economic curtailments) to avoid reliability-related curtailment.

Many versions of past utility pro forma PPAs allowed for a limited number of unpaid hours of economic curtailment in order to respond to very low or negative market prices, since utilities would rather not pay the PPA price when they get little or nothing – or even have to pay – to offload the energy onto the grid in return. These contract provisions also enable the use of economic curtailment to back generators down to avoid an overgeneration situation. Moreover, utility contracts also generally allow for unlimited curtailment if the seller is paid at the PPA price. In the normal course, one would expect the market price of energy to fall as supply began to exceed demand, which would introduce an incentive for a utility to utilize its economic curtailment rights to reduce supply before the supply-demand imbalance resulted in negative prices being applied to the utility's entire portfolio. Nevertheless, it's quite possible that utilities

[8] Alternatively, the utilities could assign increasing, but reasonable levels of unpaid overgeneration-related reliability curtailments to each group of annual procurements (with the balance of curtailments paid). This would require selective curtailments, however, which would require the CAISO to give curtailment instructions to specific Scheduling Coordinators or generators, rather than the current practice of curtailing all generators uniformly.

[9] E3 similarly concludes, in its Western Interconnection Flexibility Assessment (see note 6, *supra*, at slide 46), that "creating an environment in which renewables can be curtailed routinely on an economic basis is necessary to avoid emergency conditions & reliability events."

would not avail themselves of the opportunity to avoid negative pricing by paying for economic curtailment. This might occur if engaging in a strategy of foregoing the utilities' economic curtailment rights would push the supply-demand imbalance past the "tipping point," forcing the CAISO to implement reliability-related curtailment.

If, instead, utilities were required to utilize their economic curtailment rights under their existing contracts to avoid overgeneration events, it would (in addition to solving the overgeneration problem) remove the economic incentive to engage in the strategy noted above. Namely, it would convert the overgeneration cost to a utility/ratepayer cost, rather than shifting it onto existing generators who could not reasonably have factored expected levels of reliability-related curtailment into their original PPA pricing. Moreover, an existing generator does not control the decision to engage in additional procurement of resources that cause increasing levels of reliability-related curtailment (their buyer does, along with other buyers).

Even if utilities don't pay existing generators for economic curtailment to avoid overgeneration, they should still factor the overall curtailment that is expected to result from their incremental procurements into their LCBF processes to achieve results going forward that are economically rational overall. The common-pool problem requires the problem to be resolved by looking at the big picture.[10] The CPUC should require greater transparency and an explanation of how the utilities are factoring in the impact of potential additional procurement on overall curtailment across all existing resources into the bid-evaluation process.

Since the utilities likewise cannot perfectly forecast anticipated levels of curtailment, they could use a low- and high-range of curtailments to inform their decision-making. This range could be based on reasonably possible levels of CAISO exports to neighboring BAs, rooftop-solar penetration, demand-response programs, and time-of-use pricing incentives, etc. This analysis should also factor in the low or negative energy values that would be involved in CAISO exports (or sales within an expanded CAISO) of generation that would otherwise be

[10] To the extent that Electric Service Providers (ESPs) and Community Choice Aggregators (CCAs) do not employ this type of LCBF process and continue to purchase solar without paying to avoid curtailments, the investor-owned utilities (IOUs) should be able to charge them for the higher direct costs that they incur to avoid overgeneration curtailments pursuant to PU Code Sec. 454.51.

curtailed. Procurement decisions could be based on a mid-range assumption, or could involve hedging any bets that curtailment levels will be on the low-end of the spectrum by procuring some renewable resources that would most cost-effectively reduce potential curtailments through resource diversity.

In this way, the various planning models, which demonstrate that more diverse 50% RPS resource mixes are more cost-effective, will come to fruition in actual utility procurements. Likewise, the state can avoid a common-pool problem that could lead to a dramatic loss of solar energy that would prevent the achievement of 50% goal and hurt all renewable energy generators, but ultimately hit solar projects the hardest.

E. CONCLUSION

For the foregoing reasons, the Joint Parties respectfully request that the Commission grant the Motion to direct the utilities to address specifically: (1) how they propose to address the projected direct and indirect costs of energy curtailments in the least-cost, best-fit bid evaluation process, and (2) how they plan to make use of their contractual economic curtailment rights with respect to potential overgeneration conditions. Including this information in the draft procurement plans will enable other parties to comment on the utilities' proposals in this regard, and enable the Commission to make any needed adjustments in the plans.

Respectfully submitted,

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June 1, 2016

VERIFICATION

I, Nancy Rader, am the Executive Director of the California Wind Energy Association. I am authorized to make this Verification on its behalf. I declare under penalty of perjury that the statements in the foregoing copy of "Motion of the California Biomass Energy Alliance, California Wind Energy Association, Calpine Corporation, Geothermal Energy Association and Ormat Nevada, Inc., to Amend Assigned Commissioner and Assigned Administrative Law Judge's Ruling Identifying Issues And Schedule of Review for 2016 Renewables Portfolio Standard Procurement Plans" are true of my own knowledge, except as to the matters which are therein stated on information and belief, and as to those matters I believe them to be true.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on June 1, 2016, at Berkeley, California.

/s/ *Nancy Rader*

Nancy Rader
Executive Director
California Wind Energy Association

Attachment 2

Southern California Edison
RPS OIR R.15-02-020

DATA REQUEST SET R.15-02-020-CALWEA-SCE-DR 001

To: CALWEA
Prepared by: Joseph Yan
Title: Manager
Dated: 08/23/2016

Question 01:

It is our understanding that SCE uses hourly production cost simulations to determine the hourly prices that are employed in its LCBF valuation methodology. When the production-cost simulations curtail renewable resources (or other resources) in order to balance load and generation, how are prices from the simulations determined? Are prices set to zero because resources with no fuel costs are deemed marginal? Do the simulations consider the fact that curtailing renewable resources entails a potential RPS compliance cost, i.e., that curtailing a resource on which an LSE was relying for RPS compliance may require the LSE to purchase renewable energy from another resource in order to meet RPS goals? Do the production cost simulations that SCE uses to calculate hourly prices for LCBF reflect CAISO offer floors, e.g., the current -$150/MWh offer floor?Under what circumstances would SCE's production□cost simulations yield prices as low as the CAISO offer floor?

Response to Question 01:

To the extent that your questions request market sensitive price information, SCE objects and has not provided the information.

SCE uses commercial software packages to conduct its fundamental market simulations (this can also be called a production-cost simulation) to mimic the CAISO day-ahead market auction that commits and dispatches available generation resources to meet demand and reserve requirements at minimum cost subject to transmission and individual generation resource constraints. This effort requires detailed generation, transmission, and demand information and produces hourly dispatches for generation resources; hourly locational marginal prices for energy with the three components: energy, congestion, and loss; and hourly transmission line flows and shadow prices for binding transmission constraints. Generally speaking, the hourly locational marginal price for energy at a location is determined by the cost of the marginal generation resource to meet demand plus the cost of congestion contributed by all binding transmission constraints and line losses. It is important to recognize that the cost representation of generation resources determine these three components. It is possible that the locational marginal prices for energy can be negative when system or local over-generation conditions occur. It is also possible that the locational marginal prices can be at the CAISO bid floor or even lower than the floor under system or local over-generation conditions.

SCE's fundamental market simulations support the stated RPS objectives and mandated

requirements, and all California generation resources are modeled; the renewable assumption is calculated based on the CPUC RPS calculator and is consistent with the goals of SB350; the CAISO Full Network Model is used to represent the transmission system, SCE's demand forecast and CEC forecast are used to represent the California demand, and other parameters such as the bid floor are consistent with the CAISO's day-ahead market. To be specific, the bidding cost of renewables in the simulation reflect SCE's market economic view of the value of renewables if one MW of renewable generation is curtailed including the replacement cost to meet the RPS requirement under system or local over-generation conditions. SCE's simulation results from 2016 - 2025, do result in over-generation conditions, and there are negative prices and renewable curtailments during some hours at some locations.