

**BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking to Develop an  
Electricity Integrated Resource Planning  
Framework and to Coordinate and Refine  
Long-Term Procurement Planning  
Requirements.

Rulemaking 16-02-007  
(Filed February 11, 2016)

**REPLY COMMENTS OF THE CALIFORNIA ENERGY STORAGE ALLIANCE ON  
ADMINISTRATIVE LAW JUDGE'S RULING SEEKING COMMENT ON STAFF  
PROPOSAL ON THE PROCESS FOR INTEGRATED RESOURCE PLANNING**

Donald C. Liddell  
DOUGLASS & LIDDELL  
2928 2nd Avenue  
San Diego, California 92103  
Telephone: (619) 993-9096  
Facsimile: (619) 296-4662  
Email: [liddell@energyattorney.com](mailto:liddell@energyattorney.com)

Counsel for the  
**CALIFORNIA ENERGY STORAGE ALLIANCE**

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In accordance with the Rules and Procedure of the California Public Utilities Commission (“Commission”), the California Energy Storage Alliance (“CESA”)<sup>1</sup> hereby submits these reply comments on the *Administrative Law Judge’s Ruling Seeking Comment on Staff Proposal on Process for the Integrated Resource Planning*, issued by Administrative Law Judge Julie A. Fitch on May 16, 2017 (“Ruling”).

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<sup>1</sup> 8minutenergy Renewables, Adara Power, Advanced Microgrid Solutions, AES Energy Storage, AltaGas Services, Amber Kinetics, American Honda Motor Company, Inc., Bright Energy Storage Technologies, BrightSource Energy, Brookfield, Consolidated Edison Development, Inc., Customized Energy Solutions, Demand Energy, Doosan GridTech, Eagle Crest Energy Company, East Penn Manufacturing Company, Ecoult, EDF Renewable Energy, ElectriQ Power, eMotorWerks, Inc., Energport, Energy Storage Systems Inc., GAF, Geli, Green Charge Networks, Greensmith Energy, Gridscape Solutions, Gridtential Energy, Inc., Hitachi Chemical Co., IE Softworks, Innovation Core SEI, Inc. (A Sumitomo Electric Company), Johnson Controls, LG Chem Power, Inc., Lockheed Martin Advanced Energy Storage LLC, LS Power Development, LLC, Magnum CAES, Mercedes-Benz Energy, National Grid, NEC Energy Solutions, Inc., NextEra Energy Resources, NEXTracker, NGK Insulators, Ltd., NICE America Research, NRG Energy, Inc., Ormat Technologies, OutBack Power Technologies, Parker Hannifin Corporation, Qnovo, Recurrent Energy, RES Americas Inc., Sharp Electronics Corporation, SolarCity, Southwest Generation, Sovereign Energy, Stem, STOREME, Inc., Sunrun, Swell Energy, UniEnergy Technologies, Viridity Energy, Wellhead Electric, and Younicos. The views expressed in these Reply Comments are those of CESA, and do not necessarily reflect the views of all of the individual CESA member companies. (<http://storagealliance.org>).

## **I. INTRODUCTION.**

CESA understands the importance and complexity of the Integrated Resource Planning (“IRP”) process, which according to the “Staff Proposal on the Process for Integrated Resource Planning” (“Staff Proposal”), seeks to optimize resource planning around greenhouse gas (“GHG”) emissions reduction and other state policy goals such as the 50% Renewable Portfolio Standard (“RPS”) by 2030 while minimizing costs. Naturally, tradeoffs will need to be considered in the portfolio of generation resources California may use. In opening comments, most parties expressed support for the IRP process and the Staff Proposal but also expressed concerns about certain aspects of the RESOLVE model. CESA shares these concerns and, in these reply comments, recommends that production cost modeling of the Reference System Plan and Preferred System Plan be conducted by the Commission or some other contracted third party. The Commission may ensure the model results are reasonable by also conducting a few modeling runs using product cost simulation models such as PLEXOS. This will be important to validating the RESOLVE model results and perhaps in selecting truly viable Reference System Plans and Preferred System Plans.

Energy storage resources are and will be an important tool for the Commission and Load-Serving Entities (“LSEs”) in helping to integrate renewables, providing ramping and peaking capabilities, adding resiliency to the grid, and delivering high-performing ancillary services. To ensure energy storage resources are appropriately modeled in RESOLVE, it will be important to account for the operational characteristics of energy storage resources today and in the future, and to adhere to existing legislative mandates and programs in estimating the current and future market deployments for energy storage. The costs for energy storage should also reflect the latest industry reports. In these reply comments, CESA responds to other parties on these points.

Finally, the Staff Proposal appropriately proposes to run specific cases for large-scale, long-duration energy storage (*i.e.*, ‘bulk energy storage’) due to the unique procurement challenges of these long-lead-time resources that require contracting with multiple LSE off-takers. While certain parties would rather not ‘force in’ these resources, CESA believes it is critically important to understand the value of these resources to potentially discuss procurement opportunities and pathways – a discussion that must begin immediately to be able to bring these resources online in time, if these resources are determined to be valuable in the modeling results.

## **II. PRODUCTION COST SIMULATION MODELING IS AN IMPORTANT VALIDATION STEP TO ENSURE VIABILITY AND REASONABLENESS OF SELECTED PORTFOLIOS FROM RESOLVE.**

CESA noted concerns from several parties with the use of the RESOLVE model in the 2017-2018 IRP, much of which stemmed from the lack of access to the RESOLVE model until very late in the IRP process (*i.e.*, after the preliminary modeling results are released in late July 2017) and a lack of benchmarking with other grid planning models. In particular, multiple parties echoed CESA’s opening comments on the limitations of RESOLVE in modeling production costs and operating constraints on an 8,760-hour and sub-hourly basis.<sup>2</sup> In addition to looking at least-cost of resources in a set of circumstances, as done by RESOLVE, it is important for grid planning models to identify operational feasibility of a fleet across time, which increasingly involves the ability of a set of resources to operate the grid, provide flexible

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<sup>2</sup> Large-Scale Solar Association (“LSA”) Comments, p. 3; CAISO Comments, p. 7; and Office of Ratepayer Advocates (“ORA”) Comments, p. 12.

capacity and ramping capabilities from one-hour to the next, *and* to meet the Planning Reserve Margin and other requirements.<sup>3</sup> As the CAISO summarizes well in its comments:<sup>4</sup>

“RESOLVE is an effective screening tool to develop a short-list of scenarios for further analysis. The RESOLVE model was used in CAISO’s Senate Bill 350 analysis on the impact of a regional independent system operator power market to develop plausible renewable energy portfolios. However, to better understand the reliability impacts of the RESOLVE portfolios, the CAISO relied on a separate model to conduct detailed reliability analysis over all 8,760 hours in a year using production cost simulations of the entire western power grid.”

It is vitally important and reasonable to validate the RESOLVE model results with established production cost modeling. Ideally, the Commission would coordinate with the CAISO to conduct any such modeling given their experience with unit commitment dispatch models and their understanding of important real-time operating constraints. CESA in particular supports the CAISO’s recommended approach to have RESOLVE generate a short-list of portfolios that meet all the state’s policy goals as inputs for production cost simulation modeling, through which the Reference System Plan would be selected.<sup>5</sup> CESA finds this appropriate because the Reference System Plan is intended to serve as an ‘anchor’ in evaluating the aggregate of the LSE Plans to ultimately determine a Preferred System Plan. If the anchor is not viable on a real-world operational basis, CESA finds limited value in developing a Reference System Plan. Furthermore, it would be reasonable to test a range of RESOLVE-generated Reference System Plan portfolios through production cost simulation modeling since it is unclear from the outset which portfolio would pass these operational reliability tests. While the

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<sup>3</sup> California Independent System Operator (“CAISO”) Comments, pp. 7, 9; LSA Comments, pp. 7-8; California Large Energy Consumers Association (“CLECA”) Comments, p. 16; ORA Comments, pp. 33-34; TransWest Express LLC Comments, p. 4; and Vote Solar Comments, p. 4.

<sup>4</sup> CAISO comments, p. 6.

<sup>5</sup> *Idem*, p. 8.

Commission proposes to conduct such production cost simulation modeling using Strategic Energy Risk Valuation Model (“SERVM”) to evaluate the LSE Plans,<sup>6</sup> CESA recommends that the range of potential Reference System Plans also be validated for the reasons stated above. Finally, in line with the Staff Proposal, CESA recommends that the aggregate of the LSE Plans be tested under production cost simulation modeling to support the selection of the Preferred System Plan and that opportunities be provided for models other than SERVM be used at this stage of the modeling process.

In this learning phase of the IRP process, it will be important to incorporate this validation step. The Commission should discuss with stakeholders to perhaps reduce sensitivity cases, contract with third parties to work in parallel, focus on just one of either the Reference System Plan or Preferred System Plan for this validation, or some other solution to free up some time and resources, if needed, to include production cost simulation modeling in the IRP process.

**III. ENERGY STORAGE ASSUMPTIONS AND INPUTS SHOULD INCORPORATE STATUTORY MANDATES AND REFLECT CURRENT INDUSTRY PRACTICES AND MARKET REPORTS.**

As noted in our opening comments, the RESOLVE model should include D.13-10-040 requirements, potential deployments based on available Self-Generation Incentive Program (“SGIP”) funds, and Assembly Bill (“AB”) 2868 requirements as the default baseline assumption for energy storage in RESOLVE and optimize for least-cost additions of incremental energy storage needs beyond that. Natural Resources Defense Council (“NRDC”) agrees with the notion that legislative mandates for RPS and energy storage procurement must be fulfilled before solving for a least-cost GHG reductions path.<sup>7</sup> These mandates must be met and should therefore

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<sup>6</sup> Staff Proposal, p. 62.

<sup>7</sup> NRDC Comments, p. 2.

be reflected as the default baseline assumption for energy storage in RESOLVE. However, this view is not shared by Pacific Gas and Electric Company (“PG&E”), which recommended that the Commission model mandated energy storage resources related to AB 2514 and AB 2868 as candidate resources instead of baseline resources. PG&E adds that, “doing so will allow the cost-effectiveness of the mandates to be assessed and provide a valuable insight to the planning process.”<sup>8</sup>

CESA finds PG&E’s recommendation to gauge the cost-effectiveness of the mandate to not be the purpose of the IRP – *i.e.*, to cost-effectively identify resources that meet its GHG reductions, renewables, reliability, and disadvantaged community objectives, among others. Meanwhile, the energy storage procurement framework adopted in R.15-03-011 in response to AB 2514 and D.13-10-040 is intended to transform the market for energy storage technologies, so long as the procured resources are determined to be ‘cost effective’. Additionally, a separate evaluation of the energy storage procurement framework will occur in R.15-03-011. The IRP process is not the appropriate venue and time to conduct a cost-effectiveness analysis of the mandate. CESA also finds inconsistency in PG&E’s view that the statutory and compliance requirements for the RPS program must be met, but the same perspective is not shared for the energy storage procurement mandate. CESA finds no basis for PG&E recommending that mandated energy storage resources be treated as candidate resources but at the same time objecting to the Staff Proposal’s approach to remove the RPS target and rely on a GHG constraint to meet the RPS requirement.<sup>9</sup> These two mandates are both required to be met.

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<sup>8</sup> PG&E Comments, p. 31.

<sup>9</sup> *Ibid*, p. 30.



The other key area of CESA's opening comments were on the assumed energy storage capital costs in the Staff Proposal. CESA recommended that the low-end of the range included in the 2016 Lazard study be used, which reflects more up-to-date costs for energy storage technology costs. CESA's views are reflected in PG&E's comments, which similarly express concern that energy storage capital costs are high compared to industry reports.<sup>10</sup> The Commission should thus use the low-end of the Lazard study for energy storage capital costs. If behind-the-meter ("BTM") energy storage resources are explicitly modeled separately as candidate resources, then again, the low-end range of the Lazard study for the "Commercial & Industrial" use case should be used,<sup>11</sup> given that the residential energy storage market is still nascent and the predominant application of BTM energy storage is for the commercial and industrial customer segments.<sup>12</sup>

On the other hand, CESA disagrees with PG&E's suggested assumption that battery cell lifetimes be modeled for greater than 10 years for durations greater than four hours, and less than 10 years for durations less than four hours, based on the assumed cycling of energy storage of different durations. CESA disagrees and believes that it is more appropriate to look to manufacturer's warranties as a reference point. CESA observes that most manufacturers' warranties are for energy storage systems with 10 to 15 year warranties, which are incorporated as eligibility requirements for SGIP funds and are increasingly reflected in commitment cost and use-limitation designs in CAISO markets. With smart battery management systems and algorithms, many energy storage systems are able to manage the operational profile to ensure

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<sup>10</sup> *Ibid*, pp. 27-28.

<sup>11</sup> Lazard. *Levelized Cost of Storage Analysis v2.0*, p. 18.

<sup>12</sup> GTM Research. *U.S. Energy Storage Monitor: Q1 2017*, p. 10.

lifetimes that align with their warranties. PG&E’s recommendation appears to be arbitrary and not in line with industry practices.

Finally, CESA notes that BTM energy storage systems can function as both load-modifying and supply-side resources and can provide multiple services from the same resource or fleet of resources, which are not reflected in RESOLVE and was noted by several parties in their opening comments.<sup>13</sup> CESA agrees that RESOLVE is limited in these regards and is eager to work with the Commission and E3 in thinking of ways to address these limitations.

Accounting for the statutory mandates, latest industry cost reports, and current industry practices related to manufacturer’s warranties will better ensure that energy storage resources are accurately reflected in the RESOLVE model.

**IV. LONG-LEAD-TIME RESOURCES SHOULD APPROPRIATELY BE STUDIED AS A SPECIAL CASE IN RESOLVE, GIVEN THE NEED TO MEASURE ITS BENEFITS AND COSTS AND DETERMINE WHETHER NEAR-TERM ACTION IS NEEDED.**

Each of the investor-owned utilities (“IOUs”) opposed the ‘special study’ for long-lead-time resources, preferring to allow RESOLVE to select these resources as candidate resources to determine cost effectiveness and avoid resource-specific procurement.<sup>14</sup> However, the IOUs may overlook the point about the Staff Proposal’s purpose for modeling these long-lead-time resources – *i.e.*, to see if there are resources that increase costs but decrease financial risk overall and whether short-term action can be made to move these long-lead-time resources to procurement pathways if benefits are found in RESOLVE. The RESOLVE model is a capacity expansion model that co-optimizes investment with various constraints to build resources over

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<sup>13</sup> Environmental Defense Fund (“EDF”) Comments, p. 6; PG&E Comments, p. 22; San Diego Gas and Electric Company (“SDG&E”) Comments at p. 26; and Vote Solar Comments at pp. 4, and 10.

<sup>14</sup> PG&E comments, pp. 7, 16, 42-43; SCE comments, pp. 18, 25-26; and San Diego Gas and Electric Company (“SDG&E”) Comments, p. 28.

time. Without ‘forcing in’ these long-lead-time resources such as bulk energy storage, the investment decisions will be made in pre-defined investment time frames that meet any identified needs with the minimum incremental resources needed. Without a special case study for long-lead-time resources, there may not be a way to evaluate the benefits and costs of these resources which as part of the end-portfolio, could provide a more efficient solution than through incremental minimalist procurements. Further, scenarios where the long-lead-time resources are not forced in will also be modeled, providing a comparative analysis of these resources.

The IOUs may also under-appreciate how long-lead-time resources face unique procurement challenges due to the potential need to contract with and allocate costs across multiple LSEs. By forcing in these resources in RESOLVE, the 2017 IRP run will provide informational insights into whether a new proceeding or track is needed to begin discussions of procurement pathways and other related policy issues.<sup>15</sup> Importantly, this information does not commit the Commission or LSEs to actually procuring these resources, but to simply discuss potential pathways and further discuss whether these resources are warranted based on further special studies of making this long-term investment. Pathfinder CAES provides some suggested procurement models,<sup>16</sup> which would be appropriately discussed in this new proceeding or track if benefits are found.

CESA therefore supports the Staff Proposal’s inclusion of long-lead-time resources as a special case in the RESOLVE modeling runs.

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<sup>15</sup> Eagle Crest Energy Comments, p. 8; Pathfinder CAES Comments, pp. 17-18; and The Utility Reform Network (“TURN”) Comments, p. 18.

<sup>16</sup> Pathfinder CAES Comments, p. 16.

V. **CONCLUSION.**

CESA appreciates the opportunity to submit these reply comments on the Staff Proposal and looks forward to working with the Commission and stakeholders to establish an effective IRP process and ensure informative and actionable modeling results from the Reference System Plan and Preferred System Plan.

Respectfully submitted,



Donald C. Liddell  
DOUGLASS & LIDDELL

Counsel for the  
**CALIFORNIA ENERGY STORAGE ALLIANCE**

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