BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes

Rulemaking 20-05-003
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Long Duration Energy Storage Association of California
Opening Comments on Portfolios to be Used in the 2021-22 TPP

Julia Prochnik
Executive Director, LDESAC
1520 15th St., Suite #6
Sacramento, CA 95814
916.573.0403
julia@storeenergyca.org

John Nimmons, J.D.
John Nimmons & Associates, Inc.
175 Elinor Ave., Suite G
Mill Valley, CA 94941
415.381.7310
jna@sustnrg.com

Regulatory Counsel for LDESAC

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In accordance with the October 20, 2020 Administrative Law Judge's Ruling Seeking Comments On Portfolios To Be Used In The 2021-22 Transmission Planning Process (Ruling), the Long Duration Energy Storage Association of California (LDESAC) offers these comments on the specific Questions for Parties posed in Section 2.1 of the Ruling.

In particular LDESAC focuses our opening comments on answering questions 2 and 3.

2. Do you recommend any changes to the proposed Base Case portfolio in Attachment B? If so, provide justification for your recommended changes.

3. Do you recommend any changes to the proposed Policy-Driven Sensitivity portfolios in Attachment B? If so, provide justification for your recommended changes.

I. INTRODUCTION

In adopting the Proposed Portfolios described in Attachment B to the Ruling, Decision (D.) 20-03-028 identified a 2026 need for 973 MW (in the RSP) or 1,605 MW (in the 38MMT portfolio) of "pumped (long-duration) storage." In that decision the Commission explained that "pumped-storage hydro resources are a proxy in general for long-duration storage resources." It went on to state that it expected LSEs to procure resources in broad categories defined by their attributes, which for long-duration energy storage (LDES) meant "able to provide 8-12 hours of storage" – and presumably longer where they can contribute to system reliability and GHG emissions reductions.

1 Ruling, page 3.
2 D.20-03-028, issued April 6, 2020 in R.16-02-007, at pp. 41, 46.
3 Id., p. 63.
In other words, the LDES that the Commission required LSEs to address in their IRPs – and which some but not all LSEs have now done – certainly includes pumped hydro, but also other forms of LDES with similar attributes that serve differing applications, satisfy varying site needs, represent different size projects, and offer a range of cost and value propositions tailored to LSEs’ local and system-wide needs.

As we observed in our October 23 IRP Comments,
"[These] technologies currently include pumped hydro, compressed air, liquid air, zinc-air batteries, flow batteries, flywheels, molten salt, electrolytic hydrogen, and repurposed gravity wells. These technologies can be deployed in projects ranging from a few hundred kilowatts to several gigawatts. Some involve site-specific applications, while others can be deployed almost anywhere."4

Most importantly, these and other LDES technologies play a critical role in supporting the delivery of renewable energy over the course of all hours of the year by enabling the most flexible and efficient use of least-cost energy resources. This includes balancing generation with demand; improving transmission efficiency; providing grid stability; allowing carbon-free generation of electricity through the night; and shifting power supply over much longer periods. LDES can reduce costs, increase grid security, and provide reliable backup power during outages.

Unfortunately, current modeling largely neglects many of these values associated directly with storage duration in batteries and other technologies. As explained below, LDESAC believes that the models can be made more comprehensive, accurate and predictive. To make progress in this direction, LDESAC recommends that the Commission authorize staff to transmit to the California Independent System Operator (CAISO) for use in the 2021-22 Transmission Planning Process (TPP):

• The “2019-2020 38 MMT with 2019 IERP” portfolio (38 MMT Portfolio) as the base case for reliability and policy-driven analyses; and
• A sensitivity case that builds from the CAISO’s October 23, 2020 Assessment of CPUC-Selected 38 MMT Integrated Resource Plan Portfolio (CAISO 38 MMT Modeling).

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II. THE ENERGY DIVISION SHOULD UPDATE ITS MODELING INPUTS TO INCLUDE DEMONSTRATABLE LDES BENEFITS

LDESAC recommends the changes described below to Attachment B's proposed "46 MMT with 2019 IEPR" Base Case and its “2019-2020 38 MMT, with 2019 IEPR” Policy-Driven portfolio to ensure that transmission planning and development aligns with resource planning and development. Without substantially more LDES, these portfolios will not bring forth the resources needed to meet California's reliability or climate goals.

Attachment B reports that

"Although a loss of load expectation (LOLE) study has not yet been performed on this portfolio, the portfolio is a comprehensive reflection of the resources being planned for . . ." 5

However, neither the proposed Base Case or 38MMT portfolio include the latest baseline or newly contracted resources included in the LSEs' September 1 IRP filings.6 And we now understand that meeting California's system needs requires more flexibility and current planning is no longer adequate to meet the net demand peak, which occurs later in the day.7

Existing models do not include sufficient data and evidence for them to flexibly respond to the variability of climate change effects and unplanned outages. Since the LSEs' contracted resources were not included in the baseline resource assumptions, staff can take this opportunity to update the methodology and resources with sufficient granularity to include diverse LDES technologies in the base case as well as the sensitivity portfolio analysis. This will help move toward a reliable grid infrastructure with flexibility to handle changing weather, supply and load patterns.

Models must allow for flexibility and tools such as LDES to provide the duration and endurance needed to meet changing climate scenarios. Storage provides many benefits at longer

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5 Attachment B, at p. B-5.
6 Attachment B, at pp. B-4 and B-5.
7 See CAISO/CPUC/CEC Preliminary Root Cause Analysis, Mid-August 2020 Heat Storm, October 6, 2020, which reports (e.g., at p. 6) that increased solar penetration means that the single peak demand period on which the RA construct is based is yielding to multiple critical periods, of which the most challenging one now is the net demand peak (i.e., the peak of load net of solar and wind) which occurs later in the day. The analysis concludes that critical grid needs may manifest in other hours, seasons or conditions as the resource portfolio evolves, and that expedited planning and procurement processes must focus on flexibility.
than 4-hour duration, but Table 3 of the staff’s 2020-2021 *Modeling Assumptions* report\(^8\) limits battery duration to only four hours. We urge the Commission to expand the modeling and update the table, as well as the Base Case and Policy-Driven sensitivities, to include 8-hour and longer storage durations. This should include multiday scenarios where LDES can be discharged continuously, without compromising reliability by recharging during peak demand periods.

Staff also mention that they seek further coordination with CAISO, and in their discussions propose LDES as a suitable mitigation strategy that, hand in hand with the transmission planning process, is critical for grid dependability and resiliency.

LDESAC concurs fully with the CAISO’s October 23 IRP Comments and its attached 38MMT *Assessment* that modeling improvements must be made to validate the proposed portfolios, and that the CPUC’s modeling must be coordinated and reconciled with CAISO’s.\(^9\) The Commission should use the recent CAISO study results\(^10\) and include the updated numbers as well as long duration energy storage technologies in the Base Case portfolio in Attachment B. In D.20-03-028, the Commission recognized a need for at least 1,605 MW of long-duration energy storage by 2026 under the 38 MMT target.\(^11\)

As noted in the CAISO’s October 23 Comments, the Commission must ensure that LSEs procure resources to meet 2026 system needs and to fill the resource deficiency of 3,493 MW.\(^12\) This underscores the need to increase the capacity of storage resources in the current base case and sensitivity portfolios. Energy Division has an opportunity now to update plans and ensure the needed diversity of resources to address the Diablo Canyon retirement. The state cannot afford to extend retiring gas plants again at the expense of local frontline communities, customers and the environment. The Commission has the opportunity to correct this costly assumption with changes to planning models, and the procurement process must be “best fit” to secure the needed performance capabilities based on evolving grid needs. Both the CAISO and SCE highlight the critical need to procure capacity now, and LDES is essential to any solution

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\(^10\) Id, *Assessment*, p.6.

\(^11\) D.20-03-028, pp. 46-47.

\(^12\) *Supra* note 10, *Comments*, pp. 1 and 3.
that meets statewide climate targets as we replace the 4,000 MW to be lost with Diablo Canyon retirement.

In addition to addressing the effective capacity needed to replace Diablo Canyon, we agree with the CAISO that "The 'least-cost' portfolio, which is based on the input cost parameters in the capacity expansion model, is not necessarily the optimal portfolio from a reliability or resource planning perspective."13 We also agree on the need for diverse resources to ensure protection when system conditions become unreliable. LDES can meet planned and unexpected ramping needs, save customers money and provide service during multi-day events when called upon, and it has to be on the system to help meet our climate goals. Again, we agree with other parties and with the multi-agency Preliminary Root Cause report that a net load duration curve methodology is needed now to account for capacity and energy duration, and should be adopted for the Base Case portfolio and the Policy-Driven Sensitivity portfolios in Attachment B.

Specifically regarding Question 3, in the sensitivity runs, Energy Division should run sub-hourly production simulation models to understand wind and solar and correctly include the current and projected cost and performance capabilities of LDES to ensure renewables are online for longer durations. It is important to look at the storage forecast when wind and solar forecast errors occur and examine the synergies of renewables and storage. One solution is to look at saturation effects and consider modeling multiple days in a row (NREL can help with this). LDES enhances grid stability during times of fluctuation and needs to be correctly modeled in the Policy-Driven Sensitivity portfolios. The Commission should also be analyzing multiple weather years to accurately assess the significant contribution from wind, solar and storage in both the Base Case portfolio and the Policy-Driven Sensitivity portfolios in Attachment B. And LDESAC agrees with CESA that the Commission should evaluate ways to properly represent and evaluate hybrid resources in all their configurations.

LDESAC also recommends that Commission staff run an additional Policy-Driven Sensitivity using LDES as a transmission asset. Some portion of opportunity costs from building LDES can be offset by the value of avoiding some transmission projects. For example, different types of energy storage can be located in or next to a transmission line and right of way to supply or use power. Energy storage provides additional capacity akin to transmission line flows. LDES also provides reactive power, frequency and voltage control, congestion relief, synchronous inertia,

13 Supra note 10, Comments, p. 6.
and special protection schemes. Modeling LDES with the base case and sensitivity runs is thus essential for LSE planners to achieve lower costs and greater customer benefits by minimizing the risk of stranded generation assets that become undeliverable for lack of transmission capacity.

Finally, LDESAC agrees with Staff that 'battery energy storage' mapping methodology must be updated to incorporate policy considerations such as ratepayer cost and air quality and disadvantaged community impacts. We also urge that mapping go beyond batteries and include all forms of storage – whether small or large, site-specific or available anywhere, short- or long-duration – and that it include LDES that is ready for procurement today, as well as emerging storage technologies poised to enter commercial markets within the next few years.

III. THE COMMISSION SHOULD ADOPT 38 MMT AS THE BASE CASE

Many LSEs¹⁴ advocated for 38 MMT or below, urging that customers will benefit from a 38 MMT target which allows the state to meet SB 100's emissions goals with clean energy, while providing reliable services and cost savings. The Commission should make the GHG modeling targets 38 MMT or below in the Base Case portfolio and the Policy-Driven Sensitivity portfolios in Attachment B.

The CAISO recently amplified the threat posed by simply continuing to plan in accordance with the status quo and existing tools. In its October 23, 2020, production cost analysis of the 38 MMT Portfolio, the CAISO concluded not only did the 38 MMT Portfolio materially fail to meet the standard 0.1 day per year loss of load expectation reliability criterion in 2026 and 2030, but it also significantly exceeded the CO2 emissions target. Indeed, the CAISO found that the 38 MMT Portfolio, even after accounting for over 19 GW of new resources, fell short of “effective capacity” to meet the reliability target by 3,493 MW in 2026 and 1,383 MW in 2030, and resulted in 41.2 MMT of CO2 emissions.

The timing and size of the resource deficiencies identified by the CAISO for 2026 are no coincidence. The retirement of Diablo Canyon in 2024-2025 poses a serious challenge to achieving California’s environmental goals while also maintaining reliability. The Commission has properly recognized that the time for action to replace Diablo Canyon’s lost capacity is

urgent. The Commission has signaled that procurement for Diablo Canyon replacement capacity will be directed through an order in April 2021. But just replacing Diablo Canyon capacity without incorporating the outcome of the CAISO’s analysis will again leave California in jeopardy of rolling blackouts.

Instead, the Commission should direct the CAISO to map the additional necessary capacity needed to achieve the reliability metric. Without doing so, the Commission will again be “inherently separating the transmission investment decisions from the procurement direction given to the LSEs.” (D.20-03-028 at p. 70.) Simply put, transmission must be aligned with resource development.

This is especially true if preferred resources, including renewables and storage, will be used to fulfill the needed effective capacity. The magnitude of the deficiency identified by the CAISO will undoubtedly influence power flows and must be analyzed. If not, the Commission will likely leave the State no alternative other than to extend OTC units, given the existing infrastructure, to meet the capacity shortfall. This outcome contravenes state policy, but without planning for an alternate future, including information on the cost and feasibility of the alternatives, the possibility of successful execution is diminished. Thus, LDESAC recommends that the in addition to the 38 MMT case as the Base Case, that the Commission authorize the CAISO to perform a sensitivity that meets the reliability metric and the 38 MMT carbon target.

The CAISO examined the 38 MMT portfolio and concluded that it would not provide enough effective capacity.15 LDES procurement will help meet this need. If the models and portfolios don't account for wildfire, heat storms, transmission line failures, and other threats that are certain to occur, then planning will not result in a resilient or reliable grid. LDES technologies mitigate and protect the grid and provide least-cost options with lower emissions, cost savings, and ancillary services. The models, base cases and sensitivities in Attachment B should account for these diverse and demonstrable benefits.

One of the desired outcomes of SB 100 and the joint agencies is to reduce criteria pollutants and lower costs in disadvantaged communities. LDESAC also agrees with the CAISO that the Commission urgently needs to expedite procurement and focus on Diablo’s capacity replacement, and that there is simply not enough time “to wait for the results of . . . LSE resource

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15 “Effective capacity is the energy-backed capacity that is available when it is needed to avoid loss of load events.” (Assessment, p.1, note 2)
planning exercises and simultaneously ensure LSEs secure sufficient new resources to meet the 2026 needs. The Commission should use its procurement authority to ensure 2026 resource needs are met.” 16

III. CONCLUSION

LDESAC appreciates the opportunity to respond to the questions posed by ALJ Fitch. We believe that the Commission's models must be coordinated with the CAISO's, and that both must reflect the realities of a changing grid and increasing amounts of variable clean energy. The Base Case and Policy-Driven Sensitivity portfolios in Attachment B should be updated and reflect these realities. LDESAC urges the Commission to acknowledge the essential contributions of LDES, and coordinate quickly with LSEs to ensure enough capacity and resources to meet 2026 and 2030 needs.

LDESAC agrees with other parties17 that modeling approaches and strategies to meet California's energy challenge need to be robust, and include different types of analyses using different techniques that ensure resource diversity, prominently including LDES in updated models and portfolios. Transparency and model coordination is critical in this effort.

At a minimum, the Commission should adopt the 38 MMT as the Base Case and Policy-Driven Sensitivity portfolios in Attachment B, and ensure that disadvantaged communities receive priority as we pursue California's climate goals.

With these changes, we urge the Commission to expedite procurement of both short- and long-term energy storage.

Respectfully submitted,
LONG DURATION ENERGY STORAGE ASSOCIATION

/s/ Julia Prochnik                /s/ John Nimmons, J.D.
Executive Director              John Nimmons & Associates, Inc.
LDESAC                            175 Elinor Ave., Suite G
1520 15th St., Suite #6           Mill Valley, CA 94941
Sacramento, CA 95814              415.381.7310
916.573.0403                      jna@sustnrg.com
julia@storeenergyca.org           Regulatory Counsel for LDESAC

16 Supra note 10, Comments, p. 7.
17 E.g., Comments of Peninsula Clean Energy Authority on Submitted Integrated Resources Plans, filed in this proceeding on October 23, 2020, at p. 11.