**BEFORE THE PUBLIC UTILITIES COMMISSION**

**OF THE STATE OF CALIFORNIA**

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| Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes. | R.20-05-003 |

# R.20-05-003 (IRP) REPLY COMMENTS OF THE NATIONAL HYDROPOWER ASSOCATION, INC. ON PROPOSED DECISION ADOPTING 2023 PREFERRED SYSTEM PLANNING AND RELATED MATTERS, AND ADDRESSING TWO PETITIONS FOR MODIFICATION.


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## I. INTRODUCTION

Pursuant to Rule 14.3 of the California Public Utilities Commission's (CPUC or Commission) Rules of Practice and Procedure, NHA submits these reply comments in response to the Proposed Decision Adopting 2023 Preferred System Plan and Related Matters, and Addressing Two Petitions for Modification (PD). In these reply comments, NHA:

- Supports GreenGenStorage, LLC's ("GreenGen") request to broaden long duration storage technology to be technology agnostic.[1]
- Supports GreenGen's request to model pumped storage at 8, 10, and 12-hour durations.[2]
- NHA agrees with GreenGen and Mussy Grade Road Alliance's ("MGRA") that the costs of pumped storage are incomplete.

[1] *See* GreenGen's opening comments dated January 29, 2024.
[2] *Id.*

## II. DISCUSSION

### A. Long Duration Energy Storage Should be Technology Agnostic

The current RESOLVE criteria only models 8-hour storage duration for lithium-ion batteries and limits other storage technologies, like pumped storage, to a 12-hour duration. This dichotomy does not accurately reflect the capabilities of pumped storage, nor is it consistent with CPUC's 2021 PSP plan that defines long duration storage as a resource that "must be able to discharge at maximum capacity over an *eight-hour period* from a single resource…"[3] There are several examples of cost-effective 8-hour pumped storage projects that meet this definition and should be eligible for modeling. Consequentially, the RESOLVE criteria should be revised to be technology agnostic, allowing for pumped storage and other technologies that meet the 8-hour duration threshold to be included in modeling. With the largest existing fleet by capacity in the U.S., and more fully licensed projects like Swan Lake set to be online in 2028,[4] California has a unique opportunity to maximize pumped storage for its 8+ hour storage needs.

### B. Pumped Storage Should be Modeled at 8, 10, and 12-Hour Durations to Facilitate Resource Diversity

Categorically limiting pumped storage to a 12-hour duration for RESOLVE modeling also contributes to an overreliance on lithium-ion batteries and, as GreenGen commented, "…undercuts the Commission's goal of obtaining a diverse range of clean energy resources." The proposed 2024-2025 TPP base case portfolio of RESOLVE selected storage in 2039 shows 21,363.5 MW of Li-Ion Batteries and 935 MW of other long duration storage such as pumped

[3] Decision 22-02-004 Adopting 2021 Preferred System Plan at pp. 35-36 (Issued February 15, 2022) (emphasis added); See also Ordering Paragraph 2(a) "Long lead-time resources required by this order by June 1, 2026 shall be defined as: at least 1,000 megawatts (MW) of long-duration storage (able to deliver at maximum capacity for at least eight hours from a single resource." (OP 2(a) at pp. 94-95)

[4] See Swan Lake North Hydro, LLC comments dated December 1, 2023.

storage, flow batteries, and compressed air storage[5] (or just 0.042% of the MWs selected in 2039). This projected lack of resource diversity unnecessarily constrains available options to fulfill long duration storage requirements and closes the door on the significant economic benefits offered by pumped storage projects, like thousands of jobs during construction and a reliance on domestic supply chains that are not dependent on sourcing critical minerals such as lithium, cobalt, and nickel.[6] This value is not properly captured in the current RESOLVE model, nor are the reliability benefits of pumped storage like frequency response, flexible ramping, blackstart, and other ancillary services.

Pumped storage is a long lead time resource. Limiting pumped storage to a 12-hour duration in the RESOLVE modeling narrows project pathways for consideration in the resource and transmission planning process. This, in turn, can delay the project's online date and jeopardize its ability to access Inflation Reduction tax credits and pursue commercialization. Meanwhile, years will pass and the opportunity for California to procure reliable, cost-effective, and environmentally-sound pumped storage to meet California's climate goals and ensure grid reliability will be lost. Given the already costly and slow process associated with pumped storage licensing, any additional delays in portfolio inclusion and transmission interconnection will further dampen investor appetite to fund these projects and worsen resource diversity. RESOLVE assumptions must be revised to model pumped storage at different durations.

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[5] "Summary of Resolve selected storage resources for 2034 and 2039 by resource type and RESOLVE modeling location" (October 20, 2023). Slide 12 at https://www.cpuc.ca.gov/-/media/cpucwebsite/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irpltpp/2023-irp-cycle-events-and-materials/tpp-psp_10-20-23_workshop_tppbusbarslides.pdf.

[6] Energy Monitor. The top ten critical minerals powerhouses of the energy transition. By Oliver Gordon, dated August 30, 2023. At https://www.energymonitor.ai/sectors/extractive-industries/the-top-ten-critical-minerals-powerhouses-of-the-energy-transition/

### C. Pumped Storage Projects are Unique and Warrant Individual Assessment for the Full Life of the Asset when Comparing Costs to Other Resources like Lithium-Ion Batteries

As GreenGen noted in their reply comments, when comparing cost and performance of storage technologies, there must be a fair account of the nuances of each resource. Confusion regarding comparing the costs pumped storage with the cost of other storage technologies such as Tesla Megapacks to a proposed pumped storage project in San Diego illustrate the need for a better understanding of specific pumped storage projects attributes and costs.[7] NHA joins GreenGen in commenting that modeling should account for full asset life when comparing costs between long-duration storage technologies and should assess pumped storage projects on a case-by-case basis.

Pumped storage projects are licensed for up to 50 years, with a potential relicense term of 30-50 years thereafter. NHA emphasizes that, when considering the levelized cost of energy, pumped storage hydropower can be similar in cost to short-duration batteries over the 80-plus year life cycle of a pumped storage asset.[8] In contrast, lithium-ion battery packs tend to last just 10-15 years, and much is still unknown about degradation, decommissioning, and replacement costs. Pricing forecasts for lithium-ion batteries are also highly dependent upon uncertain critical mineral supply chains. Pumped storage, on the other hand, is a mature, proven technology with a history of providing long lasting value to the grid.

Furthermore, because every pumped storage facility is different, cost cannot be accurately captured using simple medians or averages. To better inform these resource comparisons, the Commission should assess each pumped storage project individually. Tax credits and other

[7] See Mussey Grade Road Alliance comments dated January 30, 2024.
[8] *See* GreenGen's comments dated December 1, 2023.

government incentives like those from the Inflation Reduction Act and Bipartisan Infrastructure Law can also have a large influence on overall project costs overtime, especially for long lead time resources like pumped storage. Taking advantage of these credits can completely change the economics of a project and its affordability relative to other storage technologies. NHA joins GreenGen in noting that, while RESOLVE has attempted to capture federal funding benefits, "it does not do so in a way that considers the timeline to take advantage of this funding."[9] The Commission should consider these nuances when assessing RESOLVE assumptions and criteria.

## III. CONCLUSION

The National Hydropower Association appreciates the opportunity to provide reply comments in this important matter. We look forward to continuing efforts to ensure that pumped storage is properly analyzed in the context of California's clean energy future.

Sincerely,

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[9] *Id.*