SENATE COMMITTEE ON ENERGY, UTILITIES AND COMMUNICATIONS
Senator Ben Hueso, Chair
2019 - 2020 Regular

Bill No:	SB 772	**Hearing Date:**	4/24/2019
Author:	Bradford		
Version:	4/11/2019 As Amended		
Urgency:	No	**Fiscal:**	Yes
Consultant:	Nidia Bautista		

SUBJECT: Long duration bulk energy storage: procurement

DIGEST: This bill would require the California Independent System Operator (CAISO) to solicit for 2,000 to 4,000 megawatts (MWs) of long-duration bulk energy storage recovered by all ratepayers in the CAISO grid through a federally approved rate.

ANALYSIS:

Existing law:

1) Imposes, via The Public Utilities Act, various duties and responsibilities on the California Public Utilities Commission (CPUC) with respect to the purchase of electricity and requires the CPUC to review and adopt a renewable energy procurement plan for each investor-owned utility (IOU) and all retail sellers pursuant to the California Renewables Portfolio Standard Program (RPS). (Public Utilities Code §399.15)

2) Requires each publicly owned utility (POU) to adopt and implement a renewable energy resources procurement plan that requires the utility to procure a minimum quantity of eligible renewable energy resources each compliance period to achieve the RPS procurement goals. (Public Utilities Code §399.30)

3) Requires each load-serving entity (LSE) to prepare and file an integrated resource plan (IRP) that includes procurements enabling utilities to meet greenhouse gas (GHG) emissions reduction targets for the electricity sector. (Public Utilities Code §454.52)

4) Provides for the establishment of an Independent System Operator (ISO) as a nonprofit public benefit corporation and requires the ISO to make certain filings with the Federal Energy Regulatory Commission (FERC) and to seek authority from the FERC as needed to give the ISO the ability to secure generating and transmission resources necessary to guarantee achievement of planning and

operating reserve criteria no less stringent than those established by the Western Electricity Coordinating Council and the North American Electric Reliability Council. (Public Utilities Code §334 et seq.)

5) Establishes that FERC as exclusive jurisdiction over the transmission of electric energy in interstate commerce. Also establishes the process and procedures for establishing transmission of electric energy in interstate commerce by public utilities, i.e., the rates, terms & conditions of interstate electric transmission by public utilities. (Federal Power Act §§§201, 205, 206 (16 USC 824, 824d, 824e))

This bill:

1) Makes several findings and declarations concerning the changing electrical grid, the need to match generation to the demand for electricity, and the beneficial attributes of bulk energy storage.

2) Defines "long duration bulk storage project" to mean an energy storage resource interconnected to the electrical grid in California that has the capability to discharge at its capacity continuously for at least eight hours and cycle through its discharge and charge cycle on a daily basis, has at least 400 MWs in project capacity, and has been proven by way of deployment to have a minimum useful asset life of 40 years.

3) Requires the CAISO to complete, on or before June 30, 2022, a competitive solicitation process for one or more long duration bulk storage projects that have an aggregate capacity of at least 2,000 MWs, but not more than 4,000 MWs. Requires the CAISO to ensure the selected long duration bulk energy storage is feasible and can be constructed on a timeline consistent with the California RPS and the state's targets for reducing GHG emissions. Requires the CAISO to determine that procurement in excess of the 2,000-MWs limit maximizes the efficiency of sizing the long duration bulk energy storage projects procured.

4) Requires the CAISO to identify the targeted procurement capacity, commercial operation date, and technical criteria for the long duration bulk energy storage projects necessary to ensure support for renewable energy integration, to enhance grid reliability, and to achieve California's GHG emissions reduction goals by providing fast-ramping and flexible resources of the CAISO-controlled electrical grid.

5) Requires the procurement process to provide for cost recovery to all LSEs within the CAISO-controlled electrical grid for revenue requirements of any selected long duration bulk energy storage project at rates that the CAISO determines are just and reasonable and that take into account the distribution of benefits from the long duration bulk energy.

6) Requires the CAISO cost recovery mechanism to collect the revenue requirement of any selected long duration bulk energy storage project through a cost-of-service, or similar, rate, net of revenues the project receives from participation in the CAISO-supervised markets.

Background

Bulk energy storage. Bulk energy storage, also known as grid-scale energy storage, can include any technology used to store energy on a large scale within the power grid. Pumped hydroelectric energy systems are the primary bulk energy technology deployed in California. However, there are other technologies, including compressed air energy systems and advanced rail energy systems. Additionally, with developments and advancements in technology, its possible battery storage may one day become more commonly used as a grid-scale energy storage. In the case of pumped hydroelectric energy storage, also known as pumped storage or pumped hydro, it is one of the oldest energy resources.

Renewable Portfolio Standard (RPS). California's ambitious RPS program is jointly implemented and administered by the CPUC and the California Energy Commission (CEC). The RPS program requires the state's energy LSEs, including IOUs, Community Choice Aggregators (CCAs), Electric Service Providers (ESPs) and POUs to procure 60 percent of their total electricity retail sales from eligible renewable energy resources by 2030, and a mix of RPS-eligible and zero-carbon resources by December 31, 2045, for a total of 100 percent clean energy. The RPS requires milestones on the path to 2030, including interim goals of 25 percent by 2016, 33 percent by 2020, 44 percent by 2024, and 52 percent by 2027. The CPUC reviews and approves RPS Procurement Plans and Compliance Reports for the IOUs, CCAs, and ESPs. The CEC oversees RPS compliance for the POUs. The large IOUs served approximately 75 percent of the state's retail electricity load in 2016, while the smaller IOUs, CCAs, and ESPs collectively served the remaining 25 percent. The POUs serve approximately 20-25 percent of California's electric load. The state is well on its way to achieving its existing RPS targets. Most POUs are on track to meet their 2020 goals and working towards their 2030 goals. The state's three largest electric utilities generally have met

current procurement goals and anticipate exceeding future procurement goals, with each having procured over 40 percent eligible renewable energy resources.

"Duck Curve" integration of renewables is a challenge for the electric grid. A typical pumped storage facility uses pumps and generators to move water between an upper and lower reservoir. When electricity is cheap during times of low demand, water is pumped from the lower reservoir to the upper reservoir. During periods of high demand, water is released from the upper reservoir through a generator to produce electricity that can be sold at higher prices. This fluctuation and responsiveness to the changing electricity landscape during the day, can help with renewables integration and replace the reliance on natural gas power plants. However, pumped storage requires a significant amount of up front capital, long construction phase, and, like other resources, connection to transmission lines to connect to the power grids.

Integrated Resources Plan (IRP) Reference System Plan. As required in SB 350 (De León, Chapter 547, Statutes of 2015), the IRP process requires the CPUC to identify a portfolio of resources for electricity procurement that provides optimal integration of renewable energy in a cost-effective manner, and minimize impacts on ratepayer's bills. The identification of this portfolio is intended to guide LSEs' IRPs, which help ensure that utilities meet GHG reduction targets for the electricity sector. The reference system plan is a guide – not a mandate. As part of the first two-year IRP planning cycle, last year, the CPUC adopted a reference system plan, which identifies the energy procurements needed to help the LSEs meet specific GHG reduction goals. The CPUC adopted a GHG reduction goal of 42 million metric tons (MMT) by 2030. To meet this target, the CPUC identified specific procurements for LSEs, noted in the IRP reference system plan.

IRP RESOLVE model. In its efforts to develop the IRP system reference plan, the CPUC utilized RESOLVE which is a model that can solve for the optimal investments in renewable resources, energy storage technologies, new gas plants, and gas plant retrofits subject to an annual constraint on delivered renewable energy that reflects the constraints of the RPS policy, GHG emissions and maintaining resource adequacy and reliability. The RESOLVE is a modeling tool, not a forecast, but it can help serve as a guide based on the assumptions included in the model.

Large IOUs long on renewable procurement. As noted above, the large IOUs are currently long on procurement and are anticipated to meet their 2030 RPS requirements by 2020. Initially the IOUs procured more renewables than necessary in part to hedge against potential RPS shortfalls due to the initial higher project failure rates. However, changes in the electricity landscape, in particular

the load migration from IOUs to other load-serving entities – CCAs and ESPs – results in the IOUs having less of a need to procure additional resources, including renewable energy resources. Considering LSEs and the CPUC are in the midst of the first IRP cycle and the uncertainty in the electricity landscape due to load migration, an obvious question is whether any additional procurement is needed at this time.

SB 772. This bill mandates a procurement goal of 2,000 to 4,000 MWs of long duration bulk storage, largely meant to prefer pumped storage hydroelectric projects. The author notes the hurdles for pumped storage, in particular, long lead times, high up-front costs, and a challenge for any one LSE to procure the resource. Moreover, the author states that this particular resource will be needed in a 60 percent plus RPS world as adopted by SB 100.

Too much? Too soon? Too costly? As noted above, long duration bulk energy – including pumped storage – can provide some beneficial attributes that can complement the integration of renewables on the electric grid. However, the fundamental questions are: how much is needed, where is it needed, and when is it needed? Considering the costs to ratepayers is likely in the billions of dollars, for projects and corresponding transmission lines mandated by this bill, it would seem wise to proceed with caution. As noted above the CPUC and CEC are in the final stages of the first two-year cycle of the IRP, as required by SB 350. In adopting the IRP Reference System Plan, the CPUC noted that with respect to pumped storage, "staff concluded that there is enough lead time before 2030, under the 42 MMT Scenario, that procurement activities do not need to begin in this IRP cycle." The CPUC did note that they would examine pumped storage again with better information in the next IRP cycle. The proponents of this bill argue that the new SB 100 RPS and zero-carbon goals necessitate to a deeper GHG reduction goal than what was adopted in the first cycle of the IRP. They argue that a deeper GHG goal would warrant the procurement of long duration bulk storage proposed by this bill. It is accurate that the first IRP cycle did not incorporate the SB 100 goals, since this bill had not been adopted at that time. However, the CPUC has already stated that the SB 100 goals would be incorporated into subsequent IRPs which are already being initiated.

California ISO or Western States ISO? This bill would establish a new precedent and require the ISO to procure the mandated energy storage as transmission assets through a competitive solicitation process. There are many concerns with such an approach, not the least of which is that this Legislature in recent years has been repeatedly asked whether to expand the ISO from a largely California footprint to a broader, Western States ISO. Under either scenario, the prospect of ISO procurement is not very appealing, and perhaps, less so, under an expanded and

uncertain grid. One of the concerns with CAISO procurement, is that historically CAISO has limited procurement to only where there is a demonstrated need to address reliability, including as identified through the resources adequacy program. These procurements tend to be at much higher prices than what might otherwise be purchased through a CPUC review. However, the proponents are correct to note that the purchases required by this bill would not be part of the resource adequacy program, but handled as transmission assets, under a review by the FERC. However, the CAISO has noted its own concerns with this approach. Furthermore, the CAISO has stated they had studied the use of energy storage in 2016-17, but they found that the benefits did not outweigh the costs, generally. Additionally, as stakeholders have noted, the notion of the ISO procuring for resources as it oversees dispatch would provide an opportunity for the ISO to have bias in the market. If the ISO is an air traffic controller, were we to require it to contract for airplanes, would it take action to benefit the landing and take-offs of those planes above that of others.

ISO procurement invites FERC action. Transmission procurement is very clearly under federal jurisdiction by the FERC. To the extent one has concerns about the current FERC, this mandated procurement would likely be handled by the existing federal administration. The CAISO has stated that the approach proposed in this bill would "fundamentally alter California's direct authority over procurement and would inject federal oversight into the process." As the CAISO states, the preference for a specific resource type could be viewed as discriminatory under the Federal Power Act, and thereby challenged by other stakeholders under review by the FERC. Additionally, any tariff changes would need to be submitted to FERC for review and adoption. Important to note that transmission cases have generally resulted in increasing rates for ratepayers, in many cases outpacing the increases in distribution. While many stakeholders are active at the CPUC, there are fewer participants involved in transmission cases affecting Californians. In acknowledgement of this challenge, the Legislature last year approved budget requests to support increased participation by the CPUC to help better protect California ratepayers in FERC cases. Nonetheless, CPUC participation at the FERC will still be limited and is only a more recent development. Should the Legislature wish to mandate the procurement of bulk energy resource, the Legislature can accomplish this mandate without inviting FERC action by utilizing the state's existing procurement authority and directing the CPUC and POUs to procure the MWs.

Allocating costs to all CAISO LSEs. As proposed by this bill, the costs of the projects procured by the proposed mandated procurement would be shouldered by all LSEs participating in the CAISO-controlled electric grid. Such an approach may be beneficial to financing large, expensive capital projects that might be too

large and expensive for any one LSE to procure. However, the approach fails to acknowledge the efforts of each LSE to procure a cost optimized diverse portfolio. Again, the Legislature may wish to consider proceeding with caution before diving in to such an approach. The proponents of this bill may have some merit about the ability of any one LSE to procure one very large contract for bulk energy storage. However, the state is in the midst of debating proposals to establish a central procurement entity or approach to procurement. It is possible that a new entity or approach would be adopted in time to procure for the a large mandated resource.

Timing. The question for the Legislature is whether a determination that it is exactly this resource on the specific timeline is needed. The proponents note that bulk energy storage facilities require long lead times, potentially 10 years. They state that such a long lead time merits immediate action by the state. One challenge of the proposed effort through legislation may have the unintended effect of increasing costs to all ratepayers, where a more cost-effective approach may be optimized through the IRP process. It may be that some patience is warranted. As the CPUC notes, any additional statutory clean energy procurement mandates will limit the ability of the CPUC, stakeholders, and sister agency partners to look at a full range of energy resource alternatives to find the optimal mix of clean energy resources needed to achieve California's pioneering GHG remission reduction plan."

Proposed Amendments. Should the members of the committee wish to move this bill forward, the author and committee may wish to amend this bill to mandate a lower overall MW procurement at no more than 1,500 MWs, with authority to increase to up to no more than 2,000 MWs if the Reference System Plan of the second cycle of the IRP identifies the need up to that amount. Additionally, the author and committee may wish to amend this bill to preserve the state's procurement authority and have the procurement mandated through the CPUC, and CEC for POU entities, as such avoiding any federal jurisdictional issues.

Prior/Related Legislation

AB 2787 (Quirk, 2018) would have required the CAISO to procure 1,000 to 2,000 MWs of capacity from long duration energy storage projects by December 31, 2019 and allocate the costs to all LSEs within the ISO-controlled electrical grid. The bill died in the Senate.

SB 100 (De León, Chapter 312, Statutes of 2018) established the 100 Percent Clean Energy Act of 2017 which increases the RPS requirement from 50 percent by 2030 to 60 percent, and creates the policy of planning to meet all of the state's

retail electricity supply with a mix of RPS-eligible and zero-carbon resources by December 31, 2045, for a total of 100 percent clean energy.

AB 893 (E. Garcia, 2018) would have required, by December 31, 2021, each retail seller of electricity and each local POU to procure a proportionate share of electricity products from a statewide total of 3,000 MWs of geothermal generation capacity, as specified. The bill died in the Senate.

SB 350 (De León, Chapter 547, Statutes of 2015) established, among other items, a 50 percent RPS and a requirement to establish and IRP process, in order to optimize the portfolio of resources to meet the state's GHG goals at lowest possible cost.

AB 2514 (Skinner, Chapter 469, Statutes of 2010) required the CPUC to determine appropriate targets, if any, for LSEs to procure energy storage systems. The bill required LSEs to meet any targets adopted by the CPUC by 2015 and 2020. The bill required POUs to set their own targets for the procurement of energy storage and then meet those targets by 2016 and 2021.

AB 33 (Quirk, Chapter 680, Statutes of 2016) obligated the CPUC, in consultation with the CEC, to evaluate and analyze the potential for all types of long-duration bulk energy storage resources to help integrate renewables into the electric grid.

FISCAL EFFECT: Appropriation: No Fiscal Com.: Yes Local: Yes

SUPPORT:

California Partnership
California State Association of Electrical Workers
California State Pipe Trades Council
California Wind Energy Association, if amended
City of Coachella
Coachella Valley Economic Partnership
Coachella Valley Water District
Coalition of California Utility Employees
Congress of California Seniors
County of Riverside 4th District Supervisor, V. Manuel Perez
Culturas Music & Arts
Eagle Crest Energy
East Valley Coalition
Gridflex Energy, LLC
International Brotherhood of Electrical Workers, Local 440

JinkoSolar (U.S.) Inc.
Los Angeles/Orange Counties Building & Construction Trades Council
Magnum CAES, LLC
Mission Springs Water District
NextEra Energy Resources
NEXTracker
Pueblo Unido Community Development Corporation
San Bernardino/Riverside Counties Building & Construction Trades Council, AFL-CIO
San Diego County Building & Construction Trades Council
San Diego County Water Authority
San Francisco Building & Construction Trades Council
State Building & Construction Trades Council, AFL-CIO

OPPOSITION:

Agricultural Energy Consumers Association
Audubon California
California Large Energy Consumers Association
California League of Food Producers
California Municipal Utilities Association
California Native Plant Society
California Wilderness Coalition
Center for Biological Diversity
Defenders of Wildlife
Hydrostor
Independent Energy Producers Association
Large-scale Solar Association
National Parks Conservation Association
Northern California Power Agency
Sierra Club California
Solar Energy Industries Association
Southern California Public Power Authority
The Nature Conservancy

ARGUMENTS IN SUPPORT: According to the author:

> "California has set ambitious goals for our energy sector, but there are holes in the road to 100% zero-carbon power by 2045. One of these is long-duration energy storage. The State already acted in 2010 to spur the growth of short-duration storage with AB 2514. But as we increase our reliance on renewable energy, which is intermittent by nature, we will need more storage of all kinds on the electric grid. This includes long-duration storage,

which can store vast amounts of energy and discharge over much longer periods of time.

But the State has not yet acted to spur the growth of this necessary resource, which we will need to meet our energy goals. Because long-duration storage projects take up to 10 years to bring online, the time to act is now. It will be more expensive to ratepayers if we must rush to fill this void in subsequent years rather than acting proactively to ensure California has the necessary resources to meet the energy goals already enacted into law."

ARGUMENTS IN OPPOSITION: The arguments in opposition to this bill generally fall into the following categories of concerns: (1) concern about the costs of the projects and the impact to ratepayers, (2) concerns about the designations of the CAISO as the procurement entity and related federal/state jurisdictional concerns, (3) the lack of need for this procurement requirement, (5) the undermining of the existing procurement process through the IRP, and (6) concern about the effects of Eagle Mountain project on the water, habitat, and environment of sensitive lands in the surrounding site area. Specifically, the California Large Energy Consumers Association and The Utility Reform Network express concerns about the effect on ratepayers from the procurement mandate in this bill. The POUs also take issue with the indiscriminate allocation of costs for a costly resource that is not needed and may not be directly benefiting a utility's customers. The Independent Energy Producers (IEP) raise concerns with the costs, the lack of need for this bill, as well as, the undermining of the IRP process. The IEP also raises significant concern with the designation of the CAISO as the procurement entity and the involvement of FERC. Several conservation and environmental organizations are concerned that this bill would support a controversial project, Eagle's Crest/Eagle Mountain, which would threaten the environment in and around Joshua Tree National Park. These organizations are particularly concerned with the groundwater mining by the project and the effect of the loss of the water. They also raise concerns that this project could use fossil fuel to run the facility, thereby potentially negating the "clean energy" the project would create.

CAISO CONCERNS: Although not taking a position, the CAISO has raised concerns about the designation of the CAISO as the procurement entity for this resource and the potential to raise federal/state jurisdictional concerns. On these matters, the CAISO specifically notes the need to undergo FERC approval to include cost-allocation mechanism in their tariff.

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