

March 9, 2020

Email to: docket@energy.ca.gov

Docket Number: 19-SB-100

Subject: CESA's SB 100 Inputs and Assumptions Workshop Comments

Re: Comments of the California Energy Storage Alliance (CESA) following the February 24, 2020 Senate Bill 100 Inputs and Assumptions Workshop

The California Energy Storage Alliance (CESA) appreciates the opportunity to comment on the Inputs and Assumptions Workshop held in support of the Senate Bill (SB) 100 Joint Agency Report development. CESA acknowledges the leadership of the California Energy Commission (CEC), the California Public Utilities Commission (CPUC), and the California Air Resources Board (CARB) in assembling a vast group of stakeholders to share their concerns regarding the challenges the State will face in its transition to a zero-carbon electric grid by December 31, 2045.

CESA is a 501(c)(6) organization representing over 85 member companies across the energy storage industry and is involved in a number of proceedings and initiatives that energy storage is positioned to support a more reliable, cleaner, and more efficient electric grid. Our background and experience providing technical and policy insights in stakeholder processes across the CPUC, CEC, and the California Independent System Operator (CAISO) are of particular relevance to this subject. The challenges associated with the selection of an optimal path towards decarbonization are not unique to this initiative. CESA has actively participated in the Integrated Resource Planning (IRP) proceeding at the CPUC and the LA100 Initiative at the Los Angeles Department of Water and Power (LADWP), where both efforts have had to wrangle with similar complexities in planning for long-term decarbonization. Furthermore, CESA has engaged continuously with the CAISO regarding various operational and reliability challenges, offering technology-neutral recommendations that would enable operational certainty without sacrificing market flexibility and efficiency. Just as CESA and other stakeholders that have engaged in all these policy forums have leveraged their collective expertise, the Joint Agencies must do the same. Thus, CESA commends them for their collaboration and urges them to further integrate the efforts within the state to achieve the goals set forth by SB 100.

CESA is generally pleased with the clarifications and perspectives shared on the February 24th workshop. Our comments focus on the following areas:

- **The Joint Agencies should clarify and interpret SB 100's intent to phase out the use of fossil fuels:** While some may interpret the intent of SB 100 to be the complete phase out of fossil fuels in California's electric sector, there is an open question around whether gas can be retained for reliability only, not energy, such that the intent of SB 100 is adhered to. In this sense, the Joint Agencies should, among other key discussion items, clarify

whether line losses can be accounted for in achievement of the SB 100 goals and whether SB 100 excludes the potential for any fossil fuel use beyond 2045.

- **RESOLVE is not currently equipped to solve for long-duration storage needs:** As CESA has previously noted, RESOLVE’s optimization scheme may overlook the need for multi-day dispatch of storage assets, hindering its ability to robustly select an optimal portfolio for the purposes of SB 100. CESA, however, is supportive of most of the modifications RESOLVE has undergone since its inception in the CPUC’s IRP process, especially regarding the ability of storage candidate resources to “share energy” between days. The CPUC should similarly apply the same changes to the RESOLVE model used in the IRP proceeding.
- **Transmission planning cannot be done solely in an *ex post* fashion:** CESA notes that the modeling approach followed by the Joint Agencies might result in suboptimal portfolios if transmission opportunities and needs are solely considered after the selection of candidate resources has finished – *i.e.*, *ex post* to the capacity expansion optimization. Thus, CESA supports the idea proposed by the Balancing Authority of Northern California (BANC) to institute a statewide transmission planning committee.
- **Reliability concerns within the CAISO footprint can be solved with modifications to existing market mechanisms:** CESA agrees with the importance of the reliability and operational concerns shared by the CAISO and BANC during the workshop. Considering the significant future need for flexible and ramping capacity in the state, energy storage resources are especially well positioned to cover those requirements. Nevertheless, CESA urges the CAISO and the Joint Agencies to use current market signals, such as prices and bid floors and ceilings, to ensure resources operate in conjunction with grid needs.
- **Energy and capacity needs can be addressed in ways that minimize fossil fuel use:** CESA noted that several stakeholders were supportive of maintaining gas infrastructure indefinitely in order to minimize the risks associated with ramping and low solar irradiance periods. CESA believes that steps, such as incenting the hybridization of existing gas plants and the use hydrogen as a drop-in fuel, must be taken to minimize the use of these fuels. Furthermore, long-duration storage technologies are a no-regrets investment that can address energy needs during low irradiance periods.

SB 100 Overview and E3’s Modeling Approach

The Joint Agencies should clarify and interpret SB 100’s intent to phase out the use of fossil fuels

Many stakeholders likely believe that the spirit of SB 100 targets is the complete phase out of fossil fuels in California’s electric sector. Section 2; 399.11, (b) of SB 100 clearly states that one of the benefits associated with increasing the share of renewable energy resources within

the state is the displacement of fossil fuel consumption.¹ SB 100 notes that this benefit, both individually and in conjunction with the others listed, justifies the existence and expansion of the Renewables Portfolio Standard (RPS) Program.

In contrast, CEC staff noted at the workshop that their current interpretation of SB 100 focuses only in the kWh sold at retail – *i.e.*, it excludes losses at the transmission or distribution level. This interpretation could allow up to 9% of the generation associated with retail sales to be supplied by carbon-emitting resources. Given the weight the Legislature has placed on fossil fuel displacement, some may interpret this as being contrary to the spirit of this Legislative act if the Joint Agencies did not consider a future where all kilowatt-hours (kWh) associated with retail sales, including losses, are supplied by renewable energy resources and other zero-carbon resources. CESA recognizes that the Joint Agency Report is an iterative process, which will allow further assumption revisions. However, CESA believes that an important discussion is needed on whether gas can be retained to provide reliability services. While SB 100 goals are presented in terms of energy as a product such that gas may no longer bid or be scheduled for energy, the Joint Agencies should consider whether some select gas resources can and should continue to provide reliability services, such as contingency reserves, while still meeting the zero-carbon goals from an energy perspective. Further discussion is warranted in order to adopt a consensus-based interpretation of the bill and the resulting policy for all planning purposes.

RESOLVE is not currently equipped to solve for long-duration storage needs

CESA is supportive of some of the modifications Energy + Environmental Economics (E3) has done to the RESOLVE model. In particular, we are pleased to see E3 has expanded the pool of candidate resources, including, for example, technologies such as hydrogen fuel cells. Generally, the Joint Agencies and E3 should flexibly conduct this modeling exercise while incorporating additional candidate resources, which have unique and different cost structures and capabilities, thus enabling the model to better select a realistic and diversified capacity portfolio. In this sense, CESA urges E3 to include other zero-carbon technologies, especially a wider range of long-duration technologies. For example, in their LA100 Initiative, LADWP has modeled compressed air energy storage (CAES), which was selected and frequently utilized in many of their long-term planning scenarios through 2045, highlighting the importance of such resources. The model should be flexible and nimble enough to add other long-duration storage resources that may play an important role in our SB 100 future scenarios, including CAES, liquid air energy storage (LAES), thermal storage, and others. CESA could facilitate industry collaboration to support the incorporation of these additional candidate resource technologies.

On a similar note, CESA would like to echo some of the suggestions shared during the workshop regarding the modeling of hydrogen as a drop-in fuel. CESA believes this can be easily achieved by E3 as it would only require the inclusion of: (1) improvement costs for existing gas generators; and (2) expected hydrogen costs as a function of electrolyzer costs and expected energy prices. Just as hydrogen conversion should be modeled as an option in RESOLVE, CESA

¹ SB 100, Section 2, 399.11 (b), (1), available at https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB100

recommends that E3 model gas hybridization – *i.e.*, the pairing of energy storage with existing gas plants. This configuration minimizes gas use while improving the asset’s operating characteristics. CESA believes all these modifications are positive and should be similarly applied to the RESOLVE model used in the IRP proceeding.

While some of the changes done to RESOLVE are beneficial, CESA is still concerned about some of the modeling limitations inherent to RESOLVE’s design. RESOLVE’s optimization process represents each year using a set of 37 representative days that emulate distinct weather and load conditions. These days are weighted given their probability and load severity; nevertheless, they are not considered to be consecutive. Since the Technical Workshop, E3 have said that a projected 2045 system could face reliability constraints during winter months due to low solar irradiation. This shows that a system highly reliant on intermittent, weather-dependent, renewable generation cannot be reliably modeled if potential multi-day challenges are not considered. Considering that within the IRP proceeding RESOLVE has already shown that the 2030 grid will be highly dependent on solar PV generation,² CESA urges the Joint Agencies to have RESOLVE modified so it can optimize resource selection considering multi-day capacity needs.³ This reform is urgent as currently RESOLVE might overlook the need for storage assets that are able to arbitrage energy for days or even weeks.

Reliability Considerations in SB 100

Transmission planning cannot be done solely in an ex post fashion

During the workshop, CEC staff showed that four of the eight scenarios considered for this round of modeling will not consider out-of-state transmission as available.⁴ CESA recognizes this has been done to enable cost comparisons among cases and estimate the benefits associated with different transmission-building strategies. Nevertheless, having transmission planning process after resource selection has been carried out hinders the planning efforts and prescribes the set of potential solutions. In order to better understand which resources are best suited to attend the needs associated with SB 100, CESA supports the establishment of a statewide transmission planning council, as proposed by BANC.⁵ A group composed of all California balancing authority areas, the CAISO, and the Joint Agencies could help select a series of representative potential transmission futures. The consideration of different transmission investment scenarios would in turn inform the modeling assumptions regarding resource availability and localization, widening the panorama of solutions for capacity expansion modeling.

² The most recent IRP Proposed Decision notes the selection of over 11 GW of solar PV capacity by 2030.

³ As CESA understands it, E3’s presentation showed how battery storage and PHS are able to share energy between days, a feature that was not previously available when only intra-day optimization could occur. However, it is unclear if this enables inter-day optimization since E3 also shared in its modeling documentation that storage dispatch is constrained by energy neutrality with each dispatch day. See E3 presentation at 24 and 47.

⁴ CEC presentation at 32.

⁵ BANC presentation at 8.

Reliability concerns within the CAISO footprint can be solved with modifications to existing market mechanisms

During their presentation, the CAISO noted that, by 2030, its system could require up to 25 GW of flexible capacity to meet the daily evening ramp.⁶ While the CAISO is aware that fast-response resources such as battery energy storage are uniquely positioned to meet this need, they expressed concerns regarding the operational reliability of these resources. In particular, CAISO is concerned about the storage assets' ability to be charged when ramp-related dispatch is needed.

CESA is sympathetic to the reliability and operational concerns shared by the CAISO during the workshop. Nevertheless, as CESA has stated in other policy forums such as the Energy Storage and Distributed Energy Resources (ESDER) initiative at CAISO, we believe that these risks can be minimized with modifications to current market mechanisms as opposed to prescriptive strategies or requirements (*e.g.*, minimum charge requirements). CESA is concerned that the doubts around the operation of a system devoid of natural gas resources may spark a series of reforms that limit how storage participates in the CAISO market. Rather than constraining the very flexibility that the CAISO requires, CESA urges them to consider the use of price signals and modification of bid floors and ceilings in order to properly incent the desired behavior. Such strategies would allow owners and operators to perceive value while directly contributing to grid reliability.

Energy and capacity needs can be addressed in ways that minimize fossil fuel use

Due to future flexible capacity needs and risks associated with periods of low solar irradiance, the CAISO recommended considering strategically maintaining the gas fleet to provide both energy and capacity.⁷ CESA recognizes that SB 100, as currently interpreted within the modeling done for the CPUC's Integrated Resource Planning (IRP) proceeding, does not require a total phase-out of fossil-fueled generation by 2045. Nonetheless, we are concerned that the CAISO and the Joint Agencies might be overlooking some no-regrets investments that can minimize both the aforementioned risks and the use of fossil fuels.

First, the Joint Agencies should consider energy storage retrofits for existing thermal generation. As discussed earlier in this document, they can improve the operational characteristics of those plants and minimize the emissions associated with electrical generation while maintaining the capacity and reliability provided to the system. CESA supports policies that facilitate retrofitting current thermal generation as to reduce the adverse environmental effects of these assets.

With regards to the risk of cloud coverage and low solar irradiation, CESA notes that this is one of the fundamental reasons multi-day optimization is required. These risks, paired with the reality that the future grid will most likely be solar-heavy, clearly position long duration storage

⁶ CAISO presentation, at 5.

⁷ CAISO presentation, at 6.

investments as a no-regrets strategy. In their presentation, BANC noted that the deployment of these technologies, while necessary, may require a colossal research and development (R&D) effort.⁸ CESA believes that this may be true for some emerging solutions; nevertheless, there are several proven technologies that could prove effective and reliable. Thus, CESA urges the Joint Agencies to look into the modeling done by LADWP, as it represents a good example of how different technologies can provide energy over long periods of low irradiance.

Conclusion

In conclusion, CESA is supportive of the Joint Agencies and their efforts to determine the optimal resource mix to comply with SB 100 in a timely manner. CESA believes that energy storage, in all its forms and applications, is a resource class capable of providing reliability and ratepayer value while furthering the integration of renewables, allowing the phaseout of gas-fired generation, and maintaining the lights on regardless of weather variations. Storage is a no-regrets investment that increases the optionality and flexibility of the grid.

CESA appreciates the opportunity to provide these comments and feedback on the Joint Agency Report's Inputs and Assumptions Workshop. We look forward to collaborating with the CEC, CPUC, CARB, and other stakeholders in this proceeding.

Sincerely,

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⁸ BANC presentation at 7.