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CALSSA response to FDAS BESS RFI

Additional submitted attachment is included below.

CALIFORNIA SOLAR + STORAGE ASSOCIATION
smart local energy

December 12, 2025

California Energy Commission
Docket Unit, MS-4
715 P Street
Sacramento, CA 95814

Re: Docket No. 25-FDAS-01—Comments on CEC Request for Information (RFI), Flexible Demand in California for Battery Energy Storage Systems (BESS)

California Energy Commissioners and Staff:

The California Solar & Storage Association (CALSSA) appreciates the opportunity to provide comments in response to the Commission's Request for Information (RFI) on Flexible Demand for Battery Energy Storage Systems (BESS).

CALSSA is an association of distributed clean energy providers across the state. Our members have installed the majority of behind-the-meter (BTM) BESS in California, and our comments are based on feedback provided by these members. While CALSSA appreciates the Commission's efforts to create appliance standards for customer appliances, CALSSA is concerned that creating such standards for residential BESS will not encourage additional load flexibility from these systems and will instead hamper the state's efforts to install BTM batteries by layering redundant administrative requirements on top of what already exists. Batteries are very different from the appliances for which the Commission has developed or is planning to develop appliances standards, such as pool controls, electric storage water heaters, low-voltage thermostats, or electric vehicle chargers because load flexibility is the primary purpose for BESS. Unlike the appliances listed above, which have a primary purpose other than load flexibility and therefore may need requirements and/or standards to enable them to provide load flexibility, batteries are primarily designed and optimized to manage energy use, such as shifting customer load per customers' utility rate and existing price signals, thus providing load flexibility. They do not serve other purposes like household appliances do. Thus, load flexibility is already an inherent part of BTM BESS.

To efficiently and successfully use BESS to unlock load flexibility, the Commission should focus on developing more types of price signals and value streams that batteries can follow. Therefore CALSSA requests that the Commission focus its attention there rather than developing flexible demand standards for BESS. As an example, Commission staff overseeing the Demand Side Grid Support (DSGS) program recently reported that over 767 MW of BTM BESS participated in DSGS in 2025, which represents roughly 30% of the total BTM BESS installed capacity in California already participating in a load flexibility program.[1] Additionally, other BESS systems participate in other demand and supply-side programs, such as the California Independent System Operator (CAISO) energy markets, utility demand response programs, and resource adequacy. Thus, a significant percentage of BTM BESS are already providing additional flexibility beyond standard customer load flexibility, which calls into question why the Commission is seeking to implement additional load flexibility standards for these systems. Attempting to regulate BESS as if they were a type of appliance whose energy use would be unmanaged in the absence of flexible demand appliance standards fundamentally misunderstands the difference between BESS and such appliances. With this context in mind, CALSSA responds to the Commission's questions below.

1. **Scope: Should the CEC consider expanding the scope of FDAS to include commercial-scale, greater than 20kWh, BESS? What are the potential benefits, limitations, and challenges of including commercial BESS alongside residential systems in this regulation? Are there specific market segments, system sizes, or control capabilities that would make commercial BESS appropriate for inclusion?**

The Commission should not include residential storage systems in the FDAS regulation, and nor should it consider expanding the scope of FDAS to commercial BESS. As noted in the introduction, BTM BESS, both residential and non-residential, are already installed with the primary purpose of providing load flexibility. Adding appliance flexibility standards would be redundant, unnecessary, and cumbersome for BESS manufacturers and operators to implement. BTM BESS are already installed with the hardware, software, and communication capabilities they need to receive and respond to price signals and therefore do not need additional oversight to ensure this happens.

2. **Control Point: Should the CEC consider defining the "controllable node" as the point of regulation for residential BESS instead of focusing on multimode inverters? The controllable node refers to the component within a system that manages battery charging and discharging in response to external signals and user preferences. Would this approach better reflect the diversity of system designs and control architectures currently in use? What benefits or challenges might this shift present?**

No, the Commission should not do this as it would not facilitate greater BTM BESS load flexibility.

3. **Capabilities: What software and hardware capabilities could enable residential BESS to relieve/eliminate grid congestion? How can control software be configured to respond to automated and/or manual override signals from the customer's BESS?**

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[1] https://dsgs.olivineinc.com/faq/#acc-w21g721-2 Option 3, which is for BTM BESS, has over 767 MW enrolled. According to the latest numbers on the DG Stats page, California has roughly 2.5 GW of installed capacity https://www.californiadgstats.ca.gov/charts/

For BESS systems themselves, no additional software or hardware capabilities are needed to enable BTM BESS to relieve grid congestion. However, to enable them to relieve grid congestion, information on grid needs and payment for services from distribution grid operators is necessary. If this information and payment is available to BTM BESS, these systems already have all the software and hardware needed to respond to these signals. Thus, effort should be put toward creating grid congestion programs as a means to enable this service.

4. **Technology: How can a standard that integrates battery operation with grid conditions account for different BESS (AC coupled versus DC coupled) and use cases (self-consumption, backup power, and DR events)? What technical constraints could limit a BESS's ability to participate in flexible demand programs?**

Rather than developing standards, the Commission should develop grid services programs and price signals. Grid services programs should be agnostic to BESS configurations (ie whether AC or DC coupled) and use cases. Grid services programs that provide price signals will enable BESS operators to optimize battery cycling per those signals. Operators are well equipped to develop protocols that allow for optimization for BESS that are either AC coupled or DC coupled. It should not matter to the grid services program how the BESS is coupled or its use case during non-event days and times as long as the BESS provides the type of service the program calls for.

What are the various operational modes (ex. backup, self-consumption, etc.) used for BESS, and how does BESS software prioritize between modes?

Depending on whether the BESS is interconnected under net energy metering (NEM) 1 or 2 or under the Net Billing Tariff (NBT), residential BESS systems are typically operated for time-of-use optimization or self-consumption. While many residential BESS systems can provide backup, that is not often the primary use case. Most often, customers decide the battery mode and can change or modify modes on phone apps. Software enables selection among the different modes according to customers' choice and installers' and manufacturers' guidance.

What hardware and software are needed to enable BESS to provide grid services and optimize costs for customers? What percentage of residential BESSs currently receive grid signals (e.g., electricity prices, GHG emissions, and California Independent System Operator Flex Alerts) to schedule load shifting, demand response?

The hardware and software to enable BESS to provide grid services already comes standard with BTM BESS. Nearly all systems installed are currently ready and available to provide grid services, and the missing element is the actual grid services programs.

Virtually all residential BESS installed in California today receive price signals, mostly in the form of customer electricity prices. Most systems installed under the Self-Generation Incentive Program (SGIP) receive a GHG emissions signal to ensure that they are reducing GHG emissions. Of the ~2.5 GW of BTM BESS installed in California, roughly a third participated in grid services/demand response programs in 2025, primarily through the Commission's DSGS program. These systems receive dispatch signals from a manufacturer, aggregator, or other battery provider. Those signals can be based on CAISO wholesale energy prices, Flex Alerts and Energy Emergency Alerts, and other signals. No additional hardware or software was required for systems to participate in the programs—battery providers already equip BESS with all hardware and software needed for them to be grid responsive.

5. **Connectivity: What are the most common methods for communicating grid signals to BESSs (e.g., Ethernet, Wi-Fi, Cellular)? What are the costs and benefits of these methods that are identified? What are the strategies and technologies employed to enhance communication and connectivity for BESS in areas with limited infrastructure, poor communication, and connectivity?**

CALSSA does not have information on the most prevalent communication methods for BESS, but this is not an issue on which the Commission should impose regulations. Allowing the market to use multiple methods and refine those through experience and as new technologies become available should be the standard.

6. **Protocols and Interoperability: What are the communication protocols or components of existing communication protocols that are used to enable load shifting capabilities for residential BESSs? What are the advantages and disadvantages of each of the communication protocols? What is the implementation status of these communication protocols? What are the industry-wide standard communications protocols currently in use or planned for BESS? What are the gaps and challenges to implementing load shifting capabilities? How can the standard ensure interoperability between BESS and other flexible demand appliances (e.g. EVSE, space conditioning and electric water heating), and various control systems (such as home management systems)?**

The UL 1741 standard governs grid interactive inverters, including those used by BESS. UL 1741 (including Supplements A and B) incorporates IEEE 1547-2018 requirements for communication and control which requires inverters to implement one of three communication protocols as a local interface: IEEE 2030.5 CSIP, DNP3 (IEEE 1815), or SunSpec Modbus. While IEEE 1547 does not explicitly require load flexibility capabilities, it does require the ability to adjust the power output.

Additionally, CPUC Rule 21 requires inverters installed in California to support IEEE 2030.5 CSIP, which includes the ability to control the active power of a device and includes a Demand Response and Load Control function set. Thus, load flexibility communication and controls are already standard through interconnection, and additional appliance standards would not provide incremental benefit to what already exists.

7. **Cost Optimization and MIDAS Integration: How can a residential BESS best minimize customers' electricity costs both with and without self-generation (such as solar PV)? How can residential BESSs best utilize the CEC's Market Informed Demand Automation Server (MIDAS), which provides free access to utilities' time-varying rates, GHG emission signals, and California Independent System Operator (California ISO) Flex**

Alerts? More details can be found here: Market Informed Demand Automation Server (MIDAS) (ca.gov).

> **a. Are there options for BESS systems to leverage signals from CEC MIDAS? What are the key functionalities that are required for BESS to respond to CEC MIDAS signals? Are there changes to MIDAS that would better support BESS load flexibility than the existing configuration?**
>
> **b. Are there any strategies to best utilize BESS with Demand Response events? What is the role of BESS charging and discharging from the grid?**

BESS operators develop optimization software that is capable of receiving multiple price signals and prioritizing BESS operation to optimize economic returns. Whether the signal is MIDAS, the utilities' time-of-use rate, CAISO market prices, or others, the battery optimization engines will incorporate all this information and operate the battery in the most optimal way. Again, this should not be a process that is regulated by the Commission as that would stifle innovation for companies that develop and refine BESS optimization engines.

8. **Cybersecurity: What are the cybersecurity challenges and needs associated with communicating signals from the grid or a third-party, and interacting with BESS? How would these cybersecurity protocol challenges be used to address the risks to both customer data and grid reliability? What are the risks and benefits of enabling remote software updates to incorporate new standards, and what processes can be used to mitigate these risks?**

Cybersecurity is a topic taken up in other regulatory venues. The FDAS should not try to regulate BESS cybersecurity as this is already happening elsewhere.

9. **Resilience: In the event of a loss of communication and/or connectivity, how should the residential BESS function? What are the potential risks and benefits of each approach, especially in terms of grid reliability, user experience, and long-term sustainability? What is the current status of interoperability standards that would allow previously installed BESS to point to a different cloud-software control layer if the original control layer is disbanded for business reasons?**

In loss of communication, BESS typically operate under the mode that the customer selected, such as time-of-use or self-consumption. No outside signals are required for the battery to perform this primary function.

10. **Valuation Tools: Staff is considering using the California Public Utilities Commission's (CPUC) Avoided Cost Calculator (ACC) for internal data evaluation while CEC continues to draft a standard for residential BESS. To what extent is the ACC a reliable and valuable tool for forecasting hourly value for electricity import or export to the grid? Are there specific strengths or limitations in the ACC's methodology or assumptions that should be considered when valuing Net Billing Tariff for BESS? Are there other**

sources that CEC staff should consider in valuing or forecasting hourly value for electricity imports or exports to the grid?

CALSSA is very opposed to using the ACC to evaluate the value of BTM BESS. While the ACC provides a generic guide of avoided costs, these are very stagnant values that do not take into consideration changes in grid or energy needs from one year to the next. CALSSA believes that the ACC significantly undervalues the benefits that distributed resources provide.

11. **Customer Experience: What types of information or awareness campaign do the Load Serving Entities (LSE) or other entities provide participants in the BESS installation program to help customers understand the benefits BESS provides? What percentage of customers have a residential BESS? What reasons do customers give for installing BESS at their residence? Do customers with residential BESSs have options for more than one rate structure? What tariff structure or options are utilized by the installed stock of BESS? Do customers with a residential BESS prefer a specific rate structure that LSEs or other entities provide? Do customers who add a BESS to their residence stay with their previous rate structure? What financial incentives or rate structures are most effective in encouraging customers to adopt and use for BESS? What are the estimated costs and benefits for customers of participating in the flexible demand program for BESS, including potential bill savings and the impact on BESS lifespan?**

BESS installers typically provide this information to customers so they are aware of BESS benefits. This type of education is typically what drives customers to install BESS. Utilities and load-serving entities are generally not the primary source of information on BESS benefits for customers.

12. **System Design: When developing policy for residential BESS, should the CEC define all-in-one battery, controls, and inverter systems as distinct from systems where these components are housed separately? What are the benefits and challenges of each configuration in terms of installation flexibility, system scalability, maintenance, and overall cost-effectiveness, and should all-in-one systems be handled differently in regulation?**

The Commission should not pursue this type of policy development as it is unnecessary and will not lead to BTM BESS providing additional load flexibility.

13. **Data Sources: CEC staff based their California residential BESS stock estimates, growth rates, and load shapes on data provided by the CEC 2024 Integrated Energy Policy Report. Are there other California-specific information sources that staff should consider?**

CALSSA is not aware of other sources that should be used.

14. **Multifamily Access: What options are available for tenants and occupants in multifamily buildings to access financial benefits from BESS? How would the control**

software need to change to support load flexibility in this configuration? What, if any, BESS software options exist to allow building owners or operators to manage demand as well as provide grid services? Are there examples of tenant-or resident-owned BESS that could provide these services and could be cost-effectively moved with residents to future residences?

15. **Equity: What are the equity considerations for BESS, and how can FDAS address these issues in regulation? For example, are there concerns that flexible demand will be disproportionately accessible based on income level? Are there other factors or impacts that should be considered if there were to be disproportionate accessibility?**

Regulations should be created and preserved that allow multifamily and low-income housing to receive the same benefits from BTM solar and storage and single-family homes currently have. FDAS is not the venue to enable these types of regulations.

16. **Miscellaneous: After reviewing the scope and questions posed in this request for information, are there additional issues or considerations that should be addressed by CEC staff?**

As stated throughout this response, CALSSA strongly urges the Commission not to pursue appliance standards for BTM BESS as these systems already have the hardware, software, and communication protocols they need to provide load flexibility. Rather, to enable more load flexibility from BTM BESS, the Commission should seek to develop additional sources of value streams and programs in which BTM BESS can participate.

Sincerely,

/s/ Jon Hart
Jon Hart
Policy Director
California Solar & Storage Association