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## Docket No. 21-ESR-01 - Response of Sunrun, Inc. to Request for Information on Clean Energy Alternatives for Reliability

*Additional submitted attachment is included below.*

sunrun

November 30, 2022

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

**Re: Docket No. 21-ESR-01 - Response of Sunrun, Inc. to Request for Information on Clean Energy Alternatives for Reliability**

California Energy Commissioners and Staff:

Sunrun, Inc. appreciates the opportunity to provide this response to select questions within the Request for Information (RFI) on Clean Energy Alternatives for Reliability. Sunrun contributed to, and is supportive of, the comments of the California Solar and Storage Association (CalSSA) and the California Energy Storage Association (CESA). These comments are in addition to, and reinforce points within, the comments of these two organizations.

**Resource Characterization**

*1) Please provide a general overview of the resource, including the following: Resource category (e.g., supply, demand) and type (e.g., solar) and scale (e.g., utility, distributed)?*

Sunrun, Inc. exclusively serves the residential market in California - both single family and multi-family. As such, these comments focus exclusively on behind-the-meter (BTM), customer-sited technologies in the residential sector. Sunrun contributed to, and strongly supports, the comments of the California Solar and Storage Association (CaLSSA) to allocate funding for behind the meter (BTM) batteries located at a customer site.

Sunrun, Inc. recommends that the CEC consider all devices that cleanly and reliably enable customers to shift their loads, thereby facilitating flexible load. These devices include, but are not limited to: batteries, heat pump water heaters, vehicle-to-grid/home (V2X), smart

panels/power management, heat pump thermal storage, and smart thermostats. We make this recommendation with an eye to not only this RFI but also the legislature's direction to the Energy Commission to create a load shift goal, in Public Resources Code Section 25302.7.[1] Sunrun notes that flexible loads are important in all seasons of the year. Winter flexibility is important and such technologies as heat pump thermal storage are well designed to address winter morning peaks.

*2) How does the resource compare to conventional generation in terms of greenhouse gas and priority pollutant emissions?*

None of the devices Sunrun recommends for consideration in CERIP or DEBA emit greenhouse gasses. Some of these devices - BTM batteries and V2X in particular - are capable of shifting customer load from times of day with higher grid GHG emissions to times with lower grid GHG emissions. Some of these devices will replace gas appliances in the home and will therefore drive up customer electric demand. Coupling with load shifting technology, and on-site renewable generation, the GHG emissions associated with this increase can be mitigated or eliminated entirely.

*3) How does the resource support reliability (e.g., supply, permanent load reduction, net peak reduction, or emergency asset?) (List all that apply.) How can the resource be used as an incremental on-call resource during emergencies?*

Customer load shift resources are capable of serving all of these reliability needs - depending on how they are used. There are several programs today that utilize these or similar technologies for regular customer use as well as in emergencies. The oldest example of this in the residential sector are programs to cycle air conditioners, and shut them off, during times of grid stress.

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[1] "*By June 1, 2023, the commission, in consultation with the Public Utilities Commission and the Independent System Operator, shall adopt a goal for load shifting to reduce net peak electrical demand and shall adjust this target in each biennial integrated energy policy report prepared pursuant to Section 25302 thereafter. In developing this target, the commission shall consider the findings of the 2020 Lawrence Berkeley National Laboratory report on the Shift Resource through 2030 and other relevant research. The commission, in consultation with the Public Utilities Commission and the Independent System Operator, shall recommend policies to increase demand response and load shifting that do not increase greenhouse gas emissions or increase electric rates.*"

Thermostat programs have been around for decades, and were the original Bring Your Own Device (BYOD) programs.

Battery programs are new and evolving with the technology - these resources can and are dispatched in emergencies. For example, in 2022, from Sept 1 to Sep 8th, Sunrun dispatched a daily average of over 18,000 batteries representing over 17,000 customers statewide (an equivalent of over 90 MW of nameplate capacity), with over 1 GWh of energy dispatched between 4 and 9pm from our solar-paired battery systems. During the critical period of 6-9pm, our inverters recorded 651 MWh delivered from our batteries.

The same is true for traditional demand response programs - they can and are dispatched in emergencies. Sunrun recommends that the CEC look to these examples, while also bearing in mind that, for BTM resources that can export, no existing program gives full credit for exports. ELRP allows for measuring exports under several of its participation options, but the program is new and does not award capacity payments. Measuring and forecasting the full value of exporting BTM resources requires first measuring performance at the battery meter and not the host load.

*4) How many new MWs and MWhs can the resource provide per year, taking into account resource characteristics and known barriers between now and 2035? How is that different if used incrementally as an emergency asset during an extreme heat event?*

Customer demand for these technologies will greatly accelerate in the near future - particularly for energy storage as the state moves to adopt a new net energy metering structure that will greatly encourage customers to pair solar systems with batteries. A similar trend is and will continue to occur with electric vehicles of all classes. As gas is increasingly taken out of buildings, demand for such technologies as thermal HVAC and heat pump water heaters will continue to grow. In addition to its own analysis, Sunrun encourages the CEC staff to look at

existing analysis and tools to assess the potential for technology availability and load flexibility. A nonexhaustive list of such studies are:

- *The National Potential for Load Flexibility: Value and Market Potential Through 2030.* Brattle Group. 2019.[2]
- *2015 California Demand Response Potential Study – Charting California's Demand Response Future: Interim Report on Phase 1 Results.* Lawrence Berkeley National Laboratory. 2016.[3]
- *2025 California Demand Response Potential Study - Charting California's Demand Response Future: Final Report on Phase 2 Results*. Lawrence Berkeley National Laboratory. 2017.[4]
- *The California Demand Response Potential Study, Phase 3: Final Report on the Shift Resource through 2030.* Lawrence Berkeley National Laboratory. 2020.[5]
- *NREL Storage Futures Study: Distributed Solar and Storage Outlook*. National Renewable Energy Laboratory (NREL). [6]
    - Prasanna, Ashreeta, Kevin McCabe, Ben Sigrin, and Nate Blair. Storage Futures Study: Distributed Solar and Storage Outlook: Methodology and Scenarios. Golden, CO: National Renewable Energy Laboratory. NREL/TP-7A40-79790. https://www.nrel.gov/docs/fy21osti/79790.pdf.
- *Behind-the-Meter Solar+Storage: Market data and trends.* Lawrence Berkeley National Laboratory. July 2021.[7]

The Commission's own Integrated Energy Policy Report (IEPR) includes a projection of needed customer side generation. It is Sunrun's understanding that the CEC will utilize the NREL Distributed Generation Market Demand (dGEN) Model[8], to assist in forecasting BTM storage going forward. The results could be used to inform funding targets for CERIP and any future program.

To the question of incrementality, Sunrun agrees with the comments of the California Solar and Storage Association (CalSSA) that any storage device that receives funding under CERIP or

[2]https://www.brattle.com/wp-content/uploads/2021/05/16639_national_potential_for_load_flexibility_-_final.pdf
[3] https://eta-publications.lbl.gov/sites/default/files/2015_dr_potential_study_phase1_final_report.pdf
[4] https://escholarship.org/content/qt2m68c4xh/qt2m68c4xh.pdf
[5]https://eta-publications.lbl.gov/sites/default/files/ca_dr_potential_study_-_phase_3_-_shift_-_final_report.pdf
[6] https://www.nrel.gov/docs/fy21osti/79790.pdf
[7] https://eta-publications.lbl.gov/sites/default/files/btm_solarstorage_trends_final.pdf
[8] https://www.nrel.gov/analysis/dgen/

DEBA be considered fully incremental as its deployment and installation would not have occurred but for the funding under either program. Given that these are customer sited resources primarily, much will depend on how the customer uses their resource on a daily basis, and what percentage of battery reserve (~20% today) will be set aside for the customer. If a battery discharges in response to emergency events, it is reasonable that the full discharge of that battery was deployed for the emergency event as the discharge from that battery both met customer host load in an extreme event, and exported any excess energy for use locally. Thus, it is not necessary to compare output to customer host load nor baseline the customer response.

*6) What is the average length of time from ordering or purchasing the resource to operation? How long does that typically take in today's market? What conditions must be met to deploy the technology rapidly? (e.g., transmission interconnection, building electrification or upgrades, etc.)*

The median timeline for installing a residential solar and storage system in California is 2.5 - 3 months. Other load shift technologies do not face interconnection or permission to operate (PTO) requirements. Their cycle times depend primarily on whether a main panel upgrade (MPU) or other significant home electrical system upgrades are needed to accommodate the measure. Such upgrades are required many times when customers add a battery, and the need for electrical upgrades will only increase as electrification increases.

*8) Is the target customer primarily residential, commercial, agricultural or industrial?*

Sunrun serves single and multifamily residential customers in California. Our multifamily business serves exclusively low income customers. These comments are written with these specific customers in mind. With that being said, these technologies are available to all customer classes.

*9) What are the key non-financial barriers to the development and implementation of this resource (including, but not limited to, permitting, interconnection, supply chain, customer acceptance, and alignment with policy goals)?*

In addition to supply chain constraints, which are affecting the entire economy, both permitting and interconnection hurdles are the biggest non-financial barriers today. Permitting can cause lengthy project delays, as each jurisdiction has a distinct process and requirements. Sunrun has supported SolarApp, which is an automatic permitting software. Primary current reasons for delay in the interconnection process in most utility service territories relates to two barriers:

1. Disallowance of third party licensed electricians to perform so-called hot work in PG&E and SDG&E service territories when customers require a main panel upgrade, which is often the case when adding batteries, EV chargers, and any other significant technology investment; and,
2. Design issues associated with pairing storage systems with solar systems at multi-family properties that are under a virtual net metering (VNEM) tariff.

The first barrier can delay a single project by weeks or months given inadequate utility personnel, which creates a very frustrating customer experience. The second barrier can and has delayed projects by a year or more, and can wind up derailing these projects altogether.

*10) What are the key financial barriers to the development and implementation of this resource?*

Lack of appropriately aligned incentives is a barrier, particularly in the affordable multifamily housing sector. For affordable multi-family housing, there has been no demand for the state's primary solar incentive program for the past year, due to the misalignment between that program's incentive step down schedule and customer economics. A petition to modify the step down schedule was filed by the Center for Sustainable Energy and supported by Sunrun is pending before the California Public Utilities Commission (CPUC). Lack of available incentives for energy storage and other load shift technologies is also a financial barrier. The primary

incentive program for BTM energy storage is the Self Generation Incentive Program (SGIP). The program no longer has funding available for new general market or equity residential applications. $900 Million may be added to the program in next year's budget cycle.

Customers on CARE rates represent about 20% of Sunrun's installed solar volume in the residential sector in California today. Under the new proposed NEM 3.0 framework, there is concern that these customers will no longer realize savings in the future, which will likely significantly reduce solar and storage penetration in this sector.

*11) What types of benefits or impacts is the resource anticipated to have on low income and disadvantaged communities, and tribes, if any in terms of development and deployment?*

The technologies in these comments, when installed at low income single or multifamily residences, will assist customers in managing their energy bills, enhance customer reliability and resiliency, and eliminate the emissions associated with conventional technology. The scale of these benefits depends largely on program design and incentive levels. Any emergency program that a customer participates in should also earn the customer additional value for participation in emergency events.

## Input on Distributed Electricity Backup Assets Program Design

*1) What size of resource and what types of customers should the program target?*

Sunrun serves the single and multi family residential markets and, as such, recommends that behind-the-meter, residential customer-sited resources be eligible for the program.

*2) What types of incentive structures and amounts are needed to accelerate the development and deployment of this resource; and,*
*3) What types of conditionalities and measurement and verification requirements should the program include to ensure funded resources participate and deliver during emergency events?*

The DEBA incentive structure should both incentivize performance and provide a sufficiently secure payment stream to cause the technology to be installed in the first place. Any incentives provided through DEBA should function as a base incentive sufficient to quickly deploy BTM storage resources. The simplest and most effective way to ensure that DEBA-funded customer-side resources perform during emergency events is to require participation in either a market-integrated or non-market-integrated program that will be triggered during such events. There is no need to develop additional requirements or criteria beyond this. Several current programs that meet this definition include: Emergency Load Reduction Program (ELRP), Demand Side Grid Support (DSGS) program, IOU and CCA demand response programs, and capacity contracts for wholesale market integrated demand response resources.

As for measurement and verification, each of the aforementioned programs has their own approach to measuring performance. For resources that are capable of performing as both supply and demand, and namely behind the meter batteries, measurement and verification must both 1) be based on the submetered performance of the behind the meter device, and 2) include export beyond customer host load. Sunrun advocates for not baselining response to emergency events, as the system is receiving the full benefit of that device in both reducing customer load and any exports, during emergency events.

Respectfully submitted,

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