DOCKETED

Docket Number:	17-BSTD-01
Project Title:	2019 Building Energy Efficiency Standards PreRulemaking
TN #:	221582
Document Title:	SEIA & CALSEIA Comments on Pre-Rulemaking 2019 BEES, Part 6, Oct. 4-5 Workshop
Description:	N/A
Filer:	System
Organization:	Joseph H. Cain, P.E.
Submitter Role:	Public
Submission Date:	10/20/2017 4:59:07 PM
Docketed Date:	10/20/2017

Comment Received From: Joseph H. Cain, P.E.
Submitted On: 10/20/2017
Docket Number: 17-BSTD-01

SEIA & CALSEIA Comments on Pre-Rulemaking 2019 BEES, Part 6, Oct. 4-5 Workshop

Additional submitted attachment is included below.

October 20, 2017

Commissioner Andrew McAllister
Energy Commission Staff
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Re: Docket 17-BSTD-01 2019 Building Energy Efficiency Standards Pre-Rulemaking: 2019 Residential Standards: Residential Solar Photovoltaic, Storage, Energy Design Rating and Grid Impacts;

Dear Commissioner McAllister and staff:

I. INTRODUCTION

The Solar Energy Industries Association (SEIA®) and the California Solar Energy Industries Association (CALSEIA) appreciate the efforts of the California Energy Commission (Commission) to promote energy efficiency and to promote the development of renewable energy in striving towards Zero Net Energy (ZNE) goals.

SEIA and CALSEIA submitted joint comments in response to previous CEC Workshops.

II. ZNE, SOLAR & STORAGE

The 2019 standards should take California all the way to Zero Net Energy for new homes, as discussed, debated, and promoted for almost a decade.

As stated in our previous comments, SEIA and CALSEIA encourage the Commission to carry through all the way to ZNE goals with the 2019 development cycle.

SEIA and CALSEIA recommend that the compliance credit for PV systems be maintained in the 2019 standards, as modified by a PV plus storage strategy.

SEIA and CALSEIA strongly support flexibility for the builder to choose the most cost-effective solution that leads to ZNE. We support a holistic approach, where energy efficiency (EE) and

renewable energy (RE) measures are fully integrated into a whole-building compliance model, such that EE and RE have equal importance and equal standing.

As stated in our previous comments, we recommend the Commission transition the existing PV compliance credit into a PV-plus-storage compliance credit. PV paired with battery storage provides a benefit at the meter that is similar to an efficiency measure. At a minimum, the existing scheme could be modified such that PV plus storage is given the same compliance credit constraint as in the current cycle, based on the energy savings of high performance attics (HPA) plus high performance walls (HPW). This compliance credit would not necessarily replace HPA or HPW, but could be used for any compliance measure. To that extent, we also recommend that the definition for EDR under section 150.1 in subchapter 8 is updated accordingly to reflect this change.

We would like to emphasize the durability of PV systems over the lifetime of a building and all such important systems such furnaces, condensing units, cooling coils and water heaters, may requirement replacement to continue the effective performance of the building environment. All such beneficial systems should be treated fairly in consideration of codes development.

III. ENERGY STORAGE

Definition of Energy Storage System

SEIA and CALSEIA recommend incorporating a definition of energy storage system or battery storage system. This definition (or definitions) could be included in Section 100.1 and referenced in Joint Appendix JA11 and elsewhere.

We recognize creating definitions for these types of systems and components can be challenging, owing to the range of definitions in other codes & standards. For example, definitions can be found in the following documents:

- National Electrical Code (NEC), NFPA 70 (Public Input process for 2020 edition is underway)
- UL 1973 - Standard for Batteries for Use in Light Electric Rail (LER) Applications and Stationary Applications
- UL 9540 Standard for Energy Storage Systems and Equipment
- NFPA 855, an installation standard for energy storage systems
- 2018 International Fire Code (IFC)
- 2018 International Residential Code (IRC)

The 2018 International Residential Code for one- and two-family dwellings contains the following definition in Section R202. The 2018 IRC language was used as the basis for California Residential Code Section R202 in the Intervening Code Cycle, and is found in the Final Express Terms, linked below.

BATTERY SYSTEM, STATIONARY STORAGE. A rechargeable energy storage system consisting of electrochemical storage batteries, battery chargers, controls, and associated electrical equipment designed to provide electrical power to a building. The system is typically

used to provide standby or emergency power, and uninterruptable power supply, load shedding, load sharing or similar capabilities.

https://www.documents.dgs.ca.gov/bsc/2016InterCycle/ApprovedStandards/Aug2017/SFM-02-16-AppvdFET-Pt2.5.pdf

SEIA, under the collaborative effort with the PV Industry Forum, recently submitted a Public Input to revise the NEC 2020 edition definitions as noted below. Therefore, SEIA recommends that the following definition be adopted by California:

> **Energy Storage System, Self-Contained.** Energy storage systems where the components such as cells, batteries or modules and any necessary controls, ventilation, illumination, fire suppression or alarm systems are assembled, installed and packaged into a singular energy storage container or unit.
>
> Informational note: Self-contained systems are tested and listed to safety standards relevant to the system, and readily connected on-site to the electrical system and in the case of multiple systems to each other.

> **Energy Storage System (ESS).** One or more components assembled together capable of storing energy for providing electrical energy at a future time. These systems can have ac or dc output for utilization and can include inverters and converters to change stored energy into electrical energy.
>
> Informational Note: ESS(s) can include batteries, capacitors, and kinetic energy devices (e.g. flywheels and compressed air).

IV. JOINT APPENDIX 11 (JA11) Energy Storage Systems

SEIA and CALSEIA believe substantial edits are required for Joint Appendix JA11 for Battery Storage Systems.

Some edits and comments are included in the following section. We would be happy to work with the Commission to further improve JA11.

Joint Appendix JA11

Appendix JA11 – Qualification Requirements for Battery Storage System

JA11.1 Purpose and Scope

Joint Appendix JA11 provides the qualification requirements for energy storage system to meet the requirements for energy storage compliance credit(s) available in the performance standards set forth in Title 24, Part 6, Sections 150.1(b), 140.1(a)2 and 140.1(b)3. The primary function of the energy storage system is daily cycling for the purpose of load shifting and/or solar self-consumption. Some other possible use cases for energy storage systems include; demand charge management, power factor correction, and fast frequency response. Energy storage systems can be used as a standalone system, or in combination with an on-site photovoltaic system.

JA11.2 Qualification Requirements

To qualify as an energy storage system for use for compliance with applicable performance compliance credits, the energy storage system shall be certified to the Energy Commission according to the following requirements:

JA11.2.1 Safety Requirements

The energy storage system shall be tested in accordance with the appropriate requirements given in UL1973 and UL9540. Inverters used with energy storage systems shall be tested in accordance with UL1741 and UL 1741 Supplement A (as applicable).

JA11.2.2 Minimum Performance Requirements

The battery storage system should meet or exceed the following performance specification:

(a) Usable capacity of at least 3 kWh.

(b) Continuous charging and discharging rate of at least 1 kW.

(c) Round-trip efficiency of at least 85 percent.

(d) Warranty period of 10 years . Prorated warranties based on calendar life or cycle life shall be acceptable.

JA11.2.3 Control Requirements

JA11.2.3.1 General

The requirements in this section are applicable to all control strategies.

(a) The energy storage system shall have the capability of being remotely programmed to change the scheduled charge and discharge periods. Also, the battery storage system shall allow the occupant to program the charge and discharge periods. At the minimum, the system shall be capable to program a separate summer schedule and a winter schedule.

(b) During discharge, the energy storage system shall be programed to first meet the electrical load of the dwelling. If during the discharge period the electrical load of the dwelling is less than the maximum discharge rate, the battery storage system may discharge active power into the grid provided that discharging to the grid is permitted by the Area EPS operator.

JA11.2.3.2 Basic Control

To qualify for the Basic Control, the energy storage system shall be commissioned in the default operation mode to allow charging only from an on-site photovoltaic system when the photovoltaic system production is greater than the on-site electrical load. The energy storage system shall be capable of being discharged when the photovoltaic system production is less than the on-site electrical load.

JA11.2.3.3 Advanced Control

To qualify for the Advanced Control, the battery storage system shall allow charging only during off-peak hours, and begin discharging during the peak hours. The operation schedule shall be capable of being preprogramed prior to installation updated remotely, or programmed during the installation of the system.

JA11.2.3.4 Demand Response Control

To qualify for the Demand Response Control, the battery storage system shall be controlled by the Area EPS Operator or third-party aggregator as part of a demand response program.

[New]

JA11.2.3.5 *Flexible Control*

To qualify for Flexible Control, the battery storage system shall be operated in a manner that increases self-consumption, responds to utility rates, responds to demand response signals, and/or other strategies that align with EDR value.

<End of comments on JA11>

V. JOINT APPENDIX 12 (JA12) PV Systems

SEIA and CALSEIA believe substantial edits are required for Joint Appendix JA12 for PV Systems. We would be happy to work with the Commission to further improve JA12.

SEIA and CALSEIA are concerned that Joint Appendix JA12 for PV systems is overly restrictive. We understand some of the language was derived from the New Solar Homes Partnership (NSHP) criteria. However, not all the NSHP technical criteria are directly suitable for codification.

An orientation range of 110 to 270 degrees – which is a range of less than 180 degrees – might be the most commonly desirable range, but it should not be an absolute limit on orientation. For example, a single ridge home with the ridge at an orientation of 190 degrees would have two roof planes oriented at 100 degrees and 280 degrees, both of which are outside the range of 100 to 270 degrees. Therefore, this home could not qualify. To resolve this example case and others, SEIA and CALSEIA recommend setting performance criteria rather than prescriptive constraints. In reviewing the system performance requirements provided by staff during the October 5 workshop, we would like to further understand where staff derived these specific requirements.[1] We are still evaluating the requirements and plan to further comment on specific system performance requirements in the future.

We believe Solar Assessment Tool Measurements are inappropriate for new home construction. Computer modeling based on project plans is the fundamental tool for system design. It is overly restrictive to assume there is a stopping point in construction where someone would go on the roof to take measurements. We do not see indication of when this inspection point would be carried out – i.e., after sheathing installation but before frame inspection when the roof is stacked – and how that would affect the overall inspection process. We also request more information on how the data will be used if at all. We recommend a complete strike-out of Solar Assessment Tool Measurements from JA12. If not a complete strike-out, we believe it should be optional (but likely not used).

We also believe Dwelling Monitoring Capability is another feature that would not be used. Even when wishing to monitor system performance at the home site, web-based portals and mobile devices are used. We recommend complete strike-out of Dwelling Monitoring Capability. This

[1] Refers to the following requirements provided during workshop: PV systems or strings installed within the California Flexible Initiative (CFI) orientation of 150 to 270 degrees from true north shall annually produce at least 1,450 kWh per nominal kW of installed PV system. PV systems or strings that are installed within 110 to 149 degrees from true north shall annually produce at least 1,600 kWh per nominal kW of installed PV system.

would also streamline and simplify JA12. Finally, for the remote monitoring capability, we recommend that any monitoring is done at the system level. Requiring monitoring down to the module level would be unnecessary and inconsistent with standard industry practice for designing, measuring and monitoring power output.

Additional edits and comments are found below:

Joint Appendix JA12

– Qualification Requirements for Photovoltaic System

Purpose and Scope

Joint Appendix JA12 provides the qualification requirements for photovoltaic system to meet the prescriptive or performance standards set forth in Title 24, Part 6, Sections 150.1(b) and 150.1(c)

System Performance

PV systems covered by these qualification requirements shall have a performance of no less than 70% of an optimally mounted PV system with no shading. A computer analysis of the expected performance shall be provided for each separate PV system address. The computer analysis shall include the layout of the PV system including orientations and shading conditions. The computer analysis shall show the optimal performance of a PV system at the site address and show that the actual performance is at least 70% of the optimal performance.

Shading Verification

The shading conditions on the PV system shall be consistent with those used in the performance calculations. The performance calculations shall be based on one of the following:
(1) done either assuming that the prescriptive shading criterion is met,
(2) based on the specific shading characteristics using a Solar Assessment Tool, or
(3) a computer model of the shading showing compliance with minimum performance requirements of this Appendix.

Prescriptive Shading Criterion

The prescriptive shading criterion is that no obstruction is closer than a distance ("D") of twice the height ("H") it extends above the PV array. (See Figure JA12-1 for an artistic depiction of "H" and "D.") As the figure illustrates, the distance "D" must be at least two times greater than the distance "H." All obstructions that project above the point on the array that is closest to the obstruction shall meet this criterion for the array to be considered minimally shaded. Obstructions that are subject to this criterion include:

- Any vent, chimney, architectural feature, mechanical equipment, or other obstruction that is on the roof or any other part of the building.

- Any part of the neighboring terrain.
- Any tree that is mature at the time of installation of the PV system.
- Any tree that is planted on the building lot or neighboring lots or planned to be planted as part of landscaping for the building. (The expected shading shall be based on the mature height of the tree.)
- Any existing neighboring building or structure.
- Any planned neighboring building or structure that is known to the applicant or building owner.
- Any telephone or other utility pole that is closer than 30 feet from the nearest point of the array.

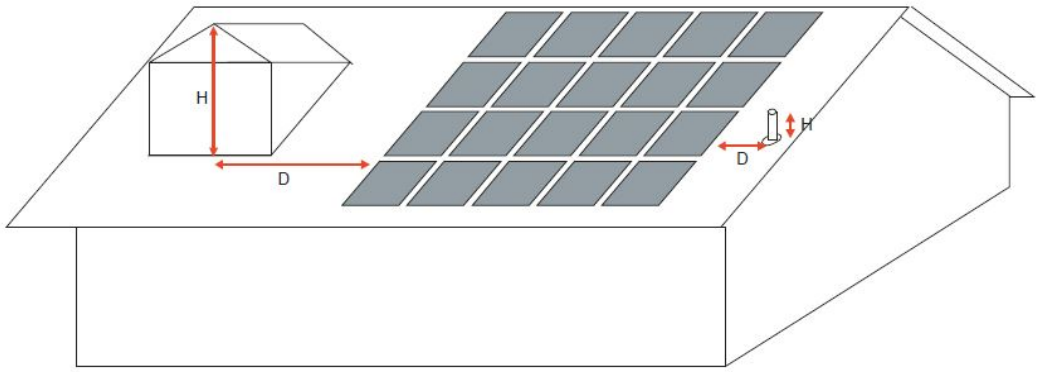

Figure JA12-1: The Minimal Shading Criterion Artistic Depiction of "H" and "D"

Solar Assessment Tool Measurements

Measurements made with a solar assessment tool shall ascertain the extent of the shading conditions on the PV system from existing obstructions. At each measurement point, the tool shall be placed on the PV array, leveled, and oriented consistent with the manufacturer's instructions. Once the tool is properly positioned, it shall determine the obstructions that cast shade and the month and time of day when shading will occur. The tool shall enable these determinations using either a digital photograph or a manual tracing on an angle estimator grid overlay. The installer shall keep documentation of the shading shown on the tool, the location of the tool on the array, and the shading obstructions that are indicated on the tool.
Measurements shall be made at all the major corners of the array with no adjacent measurement being more than 40 feet apart. (See example in Figure JA12-2.) The points of measurement shall be distributed evenly between two major corners if they are more than 40 feet apart such that the linear distance between any sequential points is no more than 40 feet. However, if any linear edge of the array has no obstructions that are closer than two times the height they project above the closest point on the array, then the intermediate measurements along that edge do not need to be made. Measurements made at each major corner and intermediate point shall be combined into a single data set and converted into an annual solar access percentage to be compared to the solar access entered into the performance calculation.

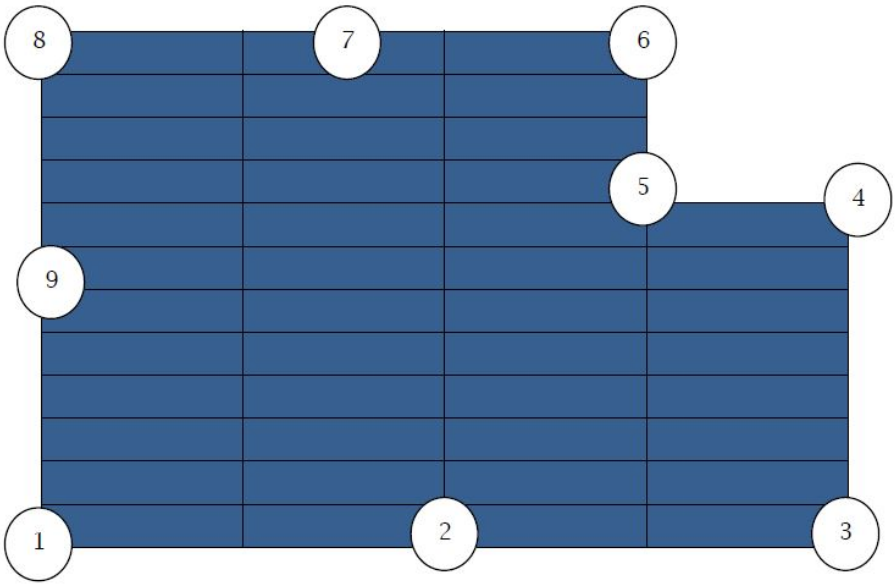

Figure JA12-2: Example of Points Where Measurement Shall Be Made Using a Solar Assessment Tool

System Monitoring Requirements

Dwelling Monitoring Capability

The PV system shall be equipped with a display located at the dwelling unit that at a minimum displays the following information:

(a) Number of PV modules.

(b) Current kW production of the entire PV system.

(c) Running total of daily kWh production.

Remote Monitoring Capability

The PV system shall have a web based portal and a mobile device application that at a minimum provide the dwelling occupants access to the following information:

(a) The nominal kW rating the PV system.

(b) Number of PV modules and the nominal watt rating of each module.

(c) Hourly (or 15 minute interval), daily, monthly, and annual kWh production in numeric and graphic formats.

(d) Running total of daily kWh production.

(e) Daily kW peak power production.

(f) Current kW production of the entire PV system.

System Performance Requirements

PV systems or strings installed within the California Flexible Initiative (CFI) orientation of 150 to 270 degrees from true north shall annually produce at least 1,450 kWh per nominal kW of installed PV system. PV systems or strings that are installed within 110 to 149 degrees from true north shall annually produce at least 1,600 kWh per nominal kW of installed PV system.

Certificates and Availability

The PV installer shall certify on the Certificate of Installation that all provisions of JA12 are met and document all measurements made with a solar assessment tool if applicable. The Certificate of Installation shall be available on the building site for inspections.

<End of comments on JA12>

VI. COMMUNITY SOLAR/OFFSITE SOLAR PROVISIONS

SEIA and CALSEIA are strongly supportive of the creation of an offsite solar option for Title 24 code compliance.

The rules suggested in the draft regulations provide a means by which the code can accommodate offsite solar systems, though we agree with Staff's earlier assessment, expressed in the August 22nd, 2017 workshop that current utility tariffs limit, or make impossible, use of this new community solar provision in the code. SEIA encourages the Public Utilities Commission to address this issue through an expansion of VNEM tariffs or other, comparable, tariff options. We agree with Staff's conclusion, conveyed in earlier workshops, that the Green Tariff Shared Renewables program is unlikely to be an appropriate program for facilitating Title 24 code compliance.

SEIA provides the following observations and suggestions, which we have reflected in the suggested revisions to section 10-115(a)-(b) which can be found in the following section.

1) The building code should first encourage builders to site solar systems on site where feasible, but allow for the option to replace onsite solar generation, or a portion thereof, with an offsite project if site constraints or sub-optimal estimated production prevents utilization of on-site generation.

2) Offsite systems should be durable, but a guarantee of 20 years is not feasible for storage systems and would be creating a higher standard than existing warranty requirements dictated by the Self-Generation Incentive Program (SGIP), administered by the Public Utilities Commission. If necessary, we encourage the Energy Commission to rely on relevant requirements or standards, which have been fully vetted by stakeholders, set by the CPUC for SGIP participants.

3) If an off-site system is a shared system, in particular one that serves customers from different neighborhoods or different housing developments, physical inspection of an

array concurrent with inspection of the building will create logistical challenges outside the control of the applicant (e.g., the applicant cannot dictate specific inspection timing by building departments) while yielding little in terms of demonstrating compliance. This is true even in planned housing developments where numerous homes are likely to participate in an offsite project, but where the individual homes will be inspected at different times.

4) Solar systems are subject to a local government permitting process which will ensure that they are built to relevant codes and standards. Such an inspection will not review the contractual arrangements that ensure that the generation from that system are allocated to the homes claiming this project's generation for code compliance. A certificate of completion of the project and demonstration of necessary contracts is sufficient.

5) We support some ongoing compliance documentation, even though such documentation is exceptional in the building code- a homebuilder is under no obligation to demonstrate that building components are not replaced, or compromised, by homeowners once the home has been permitted. In the community solar/storage context an ongoing, annual, compliance mechanism has merit, though in many cases it would need to be conducted by an entity other than the homebuilder (we've termed this entity, such as a solar system owner or operator, the homebuilder's "agent") as the homebuilder will likely not maintain an ongoing relationship with the homeowner and/or the offsite solar system. We believe section B is written to be flexible enough that a homebuilder, or their "agent", can put forward a reasonable means of demonstrating performance of the community solar/storage system over time.

SEIA proposed revisions to community solar draft regulations

10-115 – COMMUNITY SHARED SOLAR ELECTRIC GENERATION SYSTEM OR COMMUNITY SHARED BATTERY STORAGE SYSTEM OFFSET OF ONSITE SOLAR ELECTRIC GENERATION OR BATTERY STORAGE REQUIREMENTS

(a) Community Shared Solar Electric Generation System or Battery Storage System Offset. A community shared solar system, other community shared renewable system, community shared battery storage system, or combination of the aforementioned systems (hereinafter referred to as a community shared solar or battery storage system) may be approved by the Commission as a partial or total offset of an onsite solar electric generation system and/or battery storage system that is otherwise required by Section 150.1(b)2 of Title 24, California Code of Regulations, Part 6*, in cases where it is infeasible or impractical for on-site solar to offset some or all of the building's demand*. To be approved, the community shared solar electric generation or community shared battery storage system shall meet the following requirements:

1. Enforcement Agency. The community shared solar electric generation system and/or community shared battery storage system shall be installed and *proper documentation, such as a certificate of completion and participation contract, shall be made available to the applicable enforcement agency* ~~available for enforcement agency site inspection~~, no

later than the point in time the enforcement agency must physically verify compliance of the building which would otherwise be required to have an onsite solar electric generation and/or battery storage system, and shall not cause delay in the process of enforcement agency review and approval of that building. ~~The enforcement agency shall have jurisdiction and facilitated access to make site inspections.~~ All documentation for the community solar electric generation system and/or community solar battery storage system that is required to create development entitlements for the building shall be completed prior to building permit application.

2. Energy Performance. The community shared solar electric generation system and/or community shared battery storage system shall be demonstrated to provide ~~the same~~ *similar* or better energy performance equal to the partial or total offset of the energy performance of the onsite solar electric generation and/or battery storage system that would otherwise have been required for the building, computed by compliance software certified for use by the Commission.

3. ~~Dedicated~~Building Energy Savings Benefits. The community shared solar electric generation system and/or community shared battery storage system shall provide energy *cost* saving benefits to the building that would otherwise have been required to have an ~~un-offset~~ onsite solar electric generation system and/or battery storage system. *These benefits should be proportional to the energy performance of the onsite system which would otherwise be required. The energy savings benefits may be achieved by any combination of onsite and offsite systems or through onsite or offsite systems independently.* The energy savings benefits shall be allocated from the total resource of the community shared solar electric generation system and/or community shared battery storage system in a manner demonstrated to be directly correlated to the energy performance specified by Section 10- 115(a)2. The energy savings benefits allocated to the building shall be in the form of ~~dedicated~~*direct* power, utility energy ~~reduction~~*bill* credits or payments for energy bill reductions resulting from the community shared solar electric generation system and/or community shared battery storage system.

4. Durability. The community shared solar electric generation system and/or community shared battery storage system shall be designed and installed to provide the energy savings benefits to the ~~dedicated~~building specified in Section 10-115(a)3 for a useful life ~~of no less than twenty years.~~ *equivalent to manufacturer's warranty for equipment that would have been deployed at the building.*

5. Additionality. *Once energy savings benefits specified in Section 10-115(a)3 from a community shared solar electric generation system and/or community shared battery storage system are provided to a designated building, those benefits shall in no way be attributed to other purposes or transferred to other buildings or property for as long as the original building remains in operation and able to receive the benefits.* ~~The community shared solar electric generation system and/or community shared battery storage system shall provide the energy savings benefits specified in Section 10-115(a)3 exclusively to the dedicated building. Those energy savings benefits shall in no way be attributed to other purposes or transferred to other buildings or property.~~

6. Accountability and Recordkeeping. Applicants for Commission approval of community shared solar electric generation systems and/or community shared battery storage systems shall, *upon request, make generation data available to any party* ~~be accountable to all parties~~ who relied on these systems for offsets to onsite solar electric generation and/or battery storage system that would otherwise be required, including but not limited to builders of the buildings, owners of the buildings, enforcement agencies, and the Commission. Full recordkeeping regarding the satisfaction of the requirements in Sections 10-115(a)1-6 shall be maintained over the period of time specified in Section 10-115(a)4 for each building for which a partial or total offset is used to demonstrate compliance. Access to these records shall be provided to any entity approved by the Commission for auditing compliance with these requirements.

(b) Application for Commission Approval. Any entity may apply to the Commission for approval to ~~administer a~~*comply with Section 150.1(b)2 of Title 24, California Code of Regulations, Part 6 through the use of a* community shared solar electric generation or community shared battery storage system to offset onsite solar electric generation system and/or battery storage systems.~~for showing compliance with Section 150.1(b)2 of Title 24, California Code of Regulations, Part 6.~~ The application shall demonstrate to the Commission's satisfaction that each of the requirements specified in Section 10-115(a)1-6 will be met and shall include detailed explanation of the actions that will be taken by the applicant*, or their agent,* to ensure that each requirement is met over the period of time specified in Section 10-115(a)4 for each building for which a partial or total offset is used to demonstrate compliance. All applicants have the burden of proof to establish that their application should be granted. The Commission shall have the authority to not approve any application that the Commission determines to be inconsistent with the requirements of Section 10-115. (c) Commission Approval. Community shared solar electric generation systems and/or community shared battery storage systems, which demonstrate to the Commission's satisfaction that all the requirements specified in Section 10-115 will be met, shall be approved.

VII. CONCLUSION

SEIA and CALSEIA would like to thank Energy Commission staff on their continued effort to ensure the 2019 Title 24 moves California toward meeting the 2020 ZNE goal and allows builders the flexibility to utilize the best fit combination of energy efficiency and renewable energy measures under the performance pathway.

Solar and storage have a critical role to play in the building standards compliance going forward and must therefore be valued accordingly with the compliance pathways. We look forward to continuing to provide input to staff as the final 2019 code is developed.

Sincerely,

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