

DOCKETED

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Comments regarding 2019 Building Energy Efficiency Standards (BEES) Zero Net Energy (ZNE) Strategy (Docket 17-BSTD-01)

Additional submitted attachment is included below.



Submitted via [e-file](#)

May 5, 2017

California Energy Commission
1516 9th Street
Sacramento, CA 95814

Attn.: Mazi Shirakh, PE, ZNE Lead and Advisor for Building Energy, Standards Office
Christopher Meyer, Manager, Building Standards Office
Bill Pennington, Senior Technical and Program Advisor to the Energy Efficiency Division

Subject: Comments regarding **2019 Building Energy Efficiency Standards (BEES) Zero Net Energy (ZNE) Strategy** (Docket 17-BSTD-01)

Dear Messrs. Shirakh, Meyer and Pennington:

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 is the national driving force behind solar energy and is building a [strong solar industry to power America](#) through advocacy and education. As the national trade association in the U.S., we represent all organizations that promote, manufacture, install and support the development of solar energy. SEIA works with its 1,000 [member companies](#) to champion the use of clean, affordable solar in America by expanding markets, removing market barriers, strengthening the industry and educating the public on the [benefits of solar energy](#).

Since 1977, CALSEIA has advanced the common interests of the solar industry, helping make California's solar market the most robust in the United States. Comprised of over 450 contractors, manufacturers, distributors, developers, engineers, consultants and educational organizations, CALSEIA represents a [diverse membership](#) committed to growing the California solar industry, including storage and solar thermal technologies. CALSEIA [engages with local and state decision makers](#) to ensure California remains a solar energy leader through good public policy and regulations that provide clarity, transparency, and certainty.

SEIA and CALSEIA actively support energy code and standards development that encourages Energy Efficiency (EE) measures **and** Renewable Energy (RE) together with the specific goals of achieving Zero



Net Energy (ZNE). Any movement toward ZNE buildings requires EE+RE to develop collaboratively, and not as EE versus RE. As such, SEIA and CALSEIA are very supportive of high-quality building envelopes and the flexibility for builders to choose the most cost-effective solutions using EE+RE.

Flexibility in energy codes and standards ensures a builder has the discretion to include innovative technologies in a compliance path that meets California's energy conservation goals as well as carbon-reduction goals of AB32.

SEIA and CALSEIA appreciate the opportunity to provide these initial comments to the Commission as related to the 2019 Building Energy Efficiency Standards ZNE Workshop as noted in the documents shared on the Commission's website.

Recommendation 1:

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.

Reason: At the ZNE Workshop on April 20th, several reasons were presented on why the Commission should reverse its position of residential ZNE by 2020, and push the realization of the residential ZNE goal out in the future by one or more code cycles. The result would be 2019 standards that are "close to zero," with combined EDR scores of approximately 20.

During the April 20th ZNE Workshop, Commission staff commented that the standards have done well in driving down regulated loads, and that non-regulated loads such as lighting and plug loads have become a larger percentage of the overall load. A move to ZNE with PV systems addresses those unregulated loads in addition to the regulated loads. California should not defer the opportunity of using sunlight to offset these unregulated loads until another code cycle.

The Commission has been working on a glide-path to ZNE homes for a decade. While Commission staff contends that lessons have been learned that change their view on the wisdom of moving towards ZNE homes, evidence of the current state of the utility system, as well as studies which show actions needed to meet 2030 and 2050 climate goals, show that new homes offsetting their annual load with solar is still the wisest path forward for the energy standards.

By 2030 approximately 60% of electricity sales needs to come from renewable energy to meet climate goals, this as electricity consumption rises, particularly from electrifying building uses. A 2013 study by LBNL shows that all building energy use needs to be electric by 2050; all new energy use on the *margin* needs to be electric beginning in 2025.

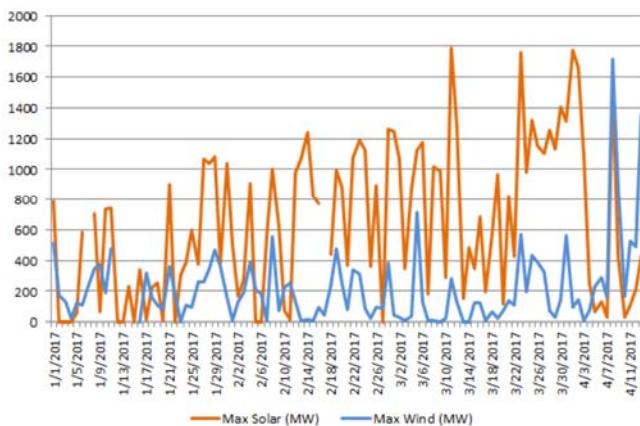
Concerns about the "duck curve" should not be allowed to stop California's progress toward ZNE buildings. Grid integration issues are manageable today even with solar generation exceeding 50% of the CAISO load in certain hours. The state is on a path to addressing duck curve issues, and many

strategies (such as demand response, regional coordination, electrification of transportation and buildings) will be critical to meeting carbon reduction targets required by AB 32 and the state’s long term climate goals.

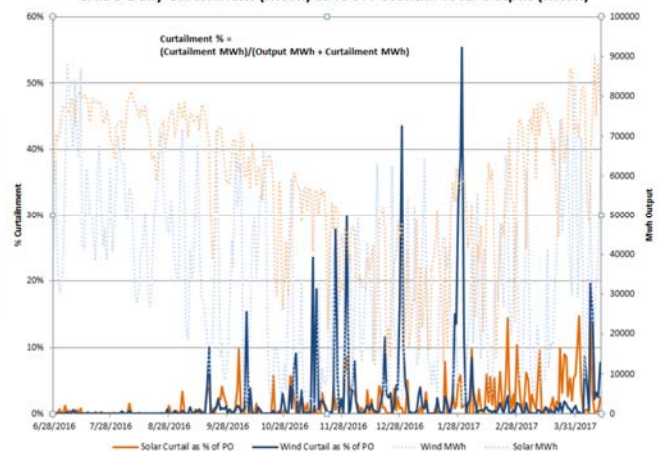
These activities should not be the sole driving factor in developing these regulations as the situation is much more dynamic than what was presented at the workshop. The broader discussions on grid management are inappropriate to address in the BEES, as intensive work is being conducted in other venues, all of which could shift the dynamics driving the technical regulation development. The 30-year cost effectiveness evaluation for ZNE homes built under the 2020 BEES stretches to 2050, at which time deep decarbonization must be achieved. Grid Integration and grid harmonization issues are very near term with respect to the life of the buildings that will be subject to the 2019 BEES.

Finally, new homes with PV installed with original construction are presently a very small population when compared with installed PV capacity in California. ZNE’s connection to the duck curve is remote, and the duck curve becomes an issue only in the spring when loads are light. The ScottMadden Energy Industry Update (December 2016) study shows distributed generation is not materially driving duck curve concerns. Renewable curtailment is still relatively small. On only a few days in 2017 has curtailed solar generation exceeded 10% of potential generation. On most days, it has only been 0-5%. The amount of generation that has been curtailed this Spring has not exceeded 1.8GW at any time, despite high hydroelectric generation driven by heavy winter snows. Perhaps additional analysis is needed to assess the contribution of ZNE homes under the 2020 BEES, compare with all other renewable contributors.

CAISO - Maximum Curtailment (MW)



CAISO Daily Curtailment (MWh) as % of Potential Total Output (MWh)



Recommendation 2:

SEIA and CALSEIA recommend that the compliance credit for PV systems be maintained in the 2019 standards and not switched off only two cycles after it was enacted.



Reason: The Commission’s legacy is based on cost-effective improvements being incorporated into the standards. At the ZNE Workshop on April 20th, Commission staff made the strong statement that PV systems are cost-effective in all 16 California climate zones. Builders and energy consultants should have the flexibility to choose the most cost-effective means of compliance.

Solar continues to experience substantial reductions in cost. Insight into PV system performance as part of the structure’s overall performance has more transparency than traditional or advanced energy efficiency measures. Advanced PV monitoring and performance tools allow insight into measurable performance metrics.

National Weighted Average System Price	Q1 2014	Q2 2014	Q3 2014	Q4 2014	Q1 2015	Q2 2015	Q3 2015	Q4 2015	Q1 2016	Q2 2016	Q3 2016	Q4 2016
Residential Rooftop	\$3.83	\$3.74	\$3.63	\$3.54	\$3.59	\$3.50	\$3.55	\$3.50	\$3.21	\$3.14	\$2.98	\$2.89

SEIA Solar Market Insight 2016 Year in Review

Energy policies and regulations that are switched on and switched off create a moving target and an undue burden on the solar industry or on any specific generation industry. Solar integrators have substantial capital outlay in their decision to expand into new markets. Warehouses must be established; fleet vehicles purchased; employees hired; supply chain established; customers acquired. When policies and regulations pivot in a drastically converse direction compared to the long-term goal, the market changes can be very disruptive, putting solar jobs, investment and innovation capital at stake.

The compliance credit for solar thermal systems has existed in the BEES for decades with no controversy. It is only because of the success of renewable energy systems and the growth of the PV market that this one technology is being singled out and treated by some as a threat instead of a market-ready, cost-effective solution. The growth of the PV industry in California is in large part owing to the SB1 Million Solar Roofs Initiative, which is related to the AB32 Global Warming Solutions Act that resulted in the residential ZNE 2020 goals. As directed by AB 2188 Expedited Solar Permitting Act, the California Governor’s Office of Planning and Research initiated the California Solar Permitting Guidebook to remove barriers to rapid deployment of solar energy systems. The California Energy Commission should support and remain consistent with actions and goals of the California Legislature and the California Governor’s Office.

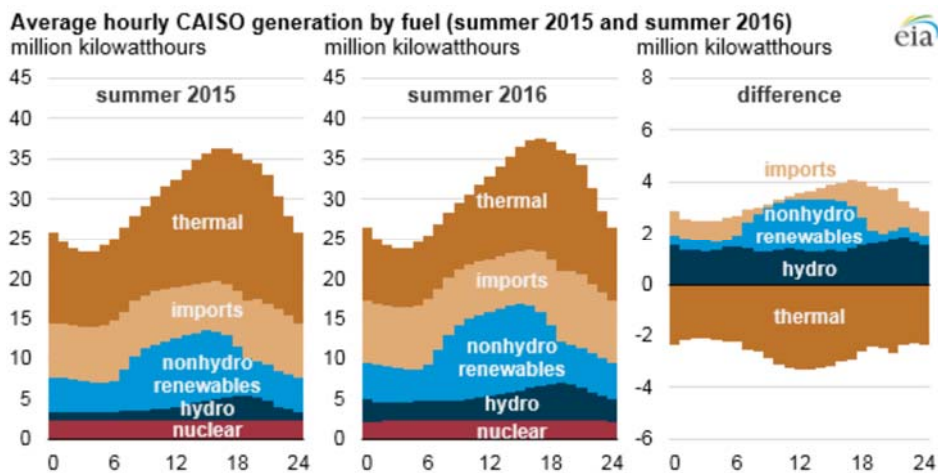
Recommendation 3:

To address concerns regarding “the duck curve” and grid penetration, we recommend that the Commission consider provisions and compliance options that pair PV systems with Energy Storage Systems.

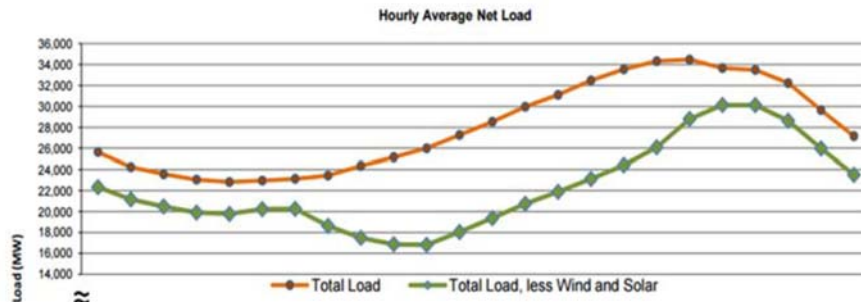
This pairing of PV and ESS compliance credit could be incorporated with language such as: “An electrical energy storage system of not less than 6 kWh of available capacity installed on the building site qualifies for renewable compliance credit.”

Reason: The objective of the 2019 standards should not be to limit the role of PV in compliance methods, but rather to electrify and shape loads, including through energy storage. Decarbonization should be the focus.

The duck curve is a seasonal phenomenon and is more of a reflection on the inflexible fossil-fuel generation fleet than renewable generators. Even as solar is curtailed, over 12 GW of inflexible thermal generation is running. A considerable amount of this inflexible generation is being retired in the coming years. While the “net load” peak has moved into the evening, actual load still peaks in the afternoon, driving distribution and transmission expenditures. This is expected to be reflected in time-of-use rates. It also shows why there is continued value to deploying distributed generation.



Load and Net Load Curves August 7th, 2016 (then the record for solar generation)



Recommendation 4:

SEIA and CALSEIA recommend that if Energy Storage Systems (ESS) are incorporated into the standards, that charge / discharge management remain with the consumer, behind-the-meter.

Reason: The Commission staff indicated utility control of ESS would add value to the storage on the basis of TDV’s for compliance purposes, however, it is unlikely to optimize the real-time performance and cost-effectiveness of ESS for the consumer. As cost-effectiveness is key to the Commission and to driving economies of scale to lower prices, ESS must best serve the consumer.

The argument that a utility must control discharge of a battery for it to have the greatest benefits to some extent undermines TDV values as these should drive battery operation to coincide with the most valuable times for the grid. There may be instances where it makes sense for utilities to deploy, own and control utility-scale batteries at substations or on distribution circuits that serve new communities. This might make it easier for utilities to control the battery (due to fewer units to control) and would eliminate potential conflicts between customer use cases (backup power, TOU management) and utility use cases.

If a TOU period that offers better or more dynamic rates to customers might encourage more opt-in and customer engagement for utility discharge operation, but this should be pursued as optional and subject to compensation to the customer.

Recommendation 5:

SEIA and CALSEIA recommend that the Commission consider all options for EV Charging systems (or at a minimum, EV ready) as a mandatory measure and consider an alternative to pure LCCA that includes carbon reduction in a weighted algorithm.

Reason: Even though staff is bound to cost-effectiveness as fundamental to any mandatory requirements, consideration should also be given to carbon reduction. We understand that the LCCA



calculation can be modified, as it was so to account for TDV. Considering our common goal of a clean energy economy, the Commission should include clean transportation in the energy standards and not only in “reach” codes. The home of the future has a high-quality envelope, renewable energy, energy storage, and EV charging capability.

In particular, high-density, multifamily housing needs EV charging capabilities, to enable those occupants the same opportunities to drive clean air vehicles as afforded others in single-family homes.

Recommendation 6:

SEIA and CALSEIA support the development of model ordinance language, as an on-ramp for requiring PV systems under the current 2016 standards.

Reason: The opportunity to motivate and encourage municipalities to adopt solar-friendly provisions more quickly rewards those communities with energy-saving benefits and positively benefits the environment. However, the Model Local Solar Ordinance language might be unnecessary for the next cycle if the 2019 standards move to true ZNE. We appreciate that the Commission has also included exceptions to the Model Local Solar Ordinance provisions as relates to the practical installation situation.

Recommendation 7:

SEIA and CALSEIA recommend to revise the Model Local Solar Ordinance, Section C (1) as follows:

Be designed to include the green building measures specified as mandatory under the California Green Building Standards Code (CalGreen) section [4.201] and the efficiency Quality Insulation Installation (QII) requirements of section [A4.203.1.1.2] with the following amendments to section [4.201];

Reason: As CalGreen section A4.203.1.1.2 is specifically a QII requirement and should be referenced as such.

Recommendation 8:

SEIA AND CALSEIA recommend working with stakeholders to define which types of systems and locations of systems are included in the Model Local Solar Ordinance. In the current version, “on-site” is not defined. Community Solar should be specifically considered in the model ordinance language.

Reason: Although other terms are defined in Section (A) of the model ordinance, a system that is “on-site” is not so defined. Requirement C (3) states: “The system shall be located on-site.” Language should be clarified to allow flexibility in the configurations and locations of PV systems in order to meet the requirements in instances where on-site solar may not be feasible given practical challenges such as limited rooftop space or shading. In particular, in those instances a Planned Unit Development (PUD)



with community solar should qualify. Other forms of community solar should be studied and considered for inclusion. In particular, in those instances, a Planned Unit Development (PUD) with community solar should qualify. Other forms of community solar should be studied and considered for inclusion.

Recommendation 9:

SEIA and CALSEIA recommend that the Model Local Solar Ordinance have more clarity that although minimum PV system size is prescribed, the PV system installed on the residence should be appropriately sized, based on orientation, anticipate demand, and perhaps even to allow additional PV capacity for electric vehicle charging.

Reason: Although the tables within the model ordinance already state that the sizes are minimums, it would be helpful to add clarity that PV system size is not constrained and should be appropriately sized for the anticipated demand. We recommend that the sizes in the table are revisited and more information is provided on the assumptions used to derive the minimum sizes.

Recommendation 10:

The cost-effectiveness studies for PV systems are using very conservative cost estimates, and should be re-considered. SEIA and CALSEIA believe PV systems are even more cost-effective than indicated.

Reason: Prices used in the study are average in sales vs. new construction; average cost is too high. California DG Statistics are showing residential cost per Watt in 2016 to be an average of \$4.83/W AC and \$4.67/W AC in 2017, with sample size of approximately 132, 000 and 15,000, respectively. Using all interconnected solar PV net energy metering (NEM) applications in PG&E, SCE and SDG&E service territories for Residential Sector only.

AC cost/Watt is obviously higher than DC cost/Watt because of the difference in AC to DC size, and since the Commission used \$5.29/W DC in their cost effectiveness study from last year, it is likely that the PV cost benefit is substantially higher than the study shows since DC cost should be closer to ~\$4/W DC or less even if you use 2016 average cost/Watt. AC to DC cost/Watt conversion would be the same % used to convert PV size DC to AC kW. The DC cost/Watt can be as low as 80% less than AC depending on conversion ratio.

On page 15 of the CEC's 2016 Annual Progress Report, for market-rate projects with payments approved in 2016, the mean reported cost CEC-AC per installed watt was \$4.32/watt. This means DC \$/W should be below \$4.00 DC for residential new construction.

Recommendation 11:



Model ordinance language could be developed for Energy Storage Systems (ESS), efficient water heating systems, solar thermal (heating and cooling), and EV charging systems. Language could be drafted as sections of one ordinance, to be adopted if desired by local communities.

Reason: Other features that further reduce energy use at the meter and facilitate a clean energy economy should be considered as interim tools that help localities meet true ZNE by 2020. We welcome the opportunity to work with the Commission and other stakeholders to develop these elements.

We look forward to working with the Commission and other stakeholders in this effort to renew and refine the standards and Model Local Solar Ordinance with California's decarbonization and Zero Net Energy goals in mind.

Respectfully submitted,

/s/

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