

ADAMS BROADWELL JOSEPH & CARDOZO

A PROFESSIONAL CORPORATION

ATTORNEYS AT LAW

520 CAPITOL MALL, SUITE 350
SACRAMENTO, CA 95814-4721

TEL: (916) 444-6201
FAX: (916) 444-6209

tenslow@adamsbroadwell.com

SO. SAN FRANCISCO OFFICE

601 GATEWAY BLVD., SUITE 1000
SO. SAN FRANCISCO, CA 94080

TEL: (650) 589-1660
FAX: (650) 589-5062

KEVIN T. CARMICHAEL
CHRISTINA M. CARO
THOMAS A. ENSLOW
KELILAH D. FEDERMAN
ANDREW J. GRAF
TANYA A. GULESSERIAN
KENDRA D. HARTMANN*
DARIEN K. KEY
RACHAEL E. KOSS
AIDAN P. MARSHALL
TARA C. RENGIFO
MICHAEL R. SEVILLE

Of Counsel

MARC D. JOSEPH
DANIEL L. CARDOZO

*Not admitted in California.
Licensed in Colorado.

**MEMO IN SUPPORT OF ALTERNATE PROPOSAL FOR AMENDMENT OF
C-46 LICENSE TO CLARIFY BATTERY ENERGY STORAGE SCOPE**

TO: David Fogt, Registrar of Contractors
Contractors State License Board

FROM: Thomas A. Enslow
Counsel for IBEW-NECA Labor Management Cooperation Committee

DATE: January 19, 2022

RE: Alternate Proposal for C-46 Amendments re Battery Energy Storage
Based on Size, Rather Than Occupancy

We are providing this memorandum to the Contractors State License Board (“CSLB”) on behalf of the IBEW-NECA Labor Management Cooperation Committee (“LMCC”) regarding potential amendments to allow C-46 solar contractors to install battery energy storage systems when paired with solar photovoltaic systems (“Solar PV”). We have reviewed CSLB’s suggestion for a proposed amendment to the C-46 solar contractor license regulation that would expressly allow C-46 contractors to install battery energy storage systems that are paired with PV Solar systems in certain occupancies and expressly prohibit C-46 contractors from installing battery energy storage systems in all other occupancies. CSLB’s proposal to set limits based on the type of building occupancy is problematic because it does not limit the size of these systems. It also does not appear to be based on any evidentiary justification and thus could be challenged as arbitrary and capricious.

The LMCC disagrees that there is any compelling justification to expand the scope of the C-46 contractor license regulation to further overlap with the scope of the C-10 electrical contractor's license. However, if the CSLB were to amend the C-46 license to expressly allow some installation of battery energy storage systems when paired with Solar PV, a limit based on the size of the battery energy storage system would make more sense from a technical, safety, economic and regulatory perspective.

We propose setting a limit based on the kilowatt (kW) and kilowatt (kWh) thresholds already used by state and national code bodies for setting safety standards. A copy of the proposed language is attached, both in a clean version (Exhibit A) and a redlined version (Exhibit B) showing the changes to CSLB's initial proposal. Our proposed thresholds are also more consistent with the existing contractor classification regulatory framework allowing incidental and supplemental work because they are based on recognizing that, at a certain size threshold, a battery energy storage system is so large that it cannot reasonably be considered incidental and supplemental to a Solar PV system installation. At some size limit, it must be considered its own separate system.

Finally, our proposed threshold creates no economic or policy concerns because it is large enough that well over 80% of battery energy storage system projects that are paired with Solar PV projects would be allowed to be installed by C-46 contractors under the CSLB incidental and supplemental provisions. Furthermore, our proposal clarifies that C-46 contractors that don't also have a C-10 or other applicable license may be the prime contractor for a paired Solar PV/battery energy storage system project of any size as long as they subcontract installation of any battery energy storage systems that exceed these thresholds to a contractor with an applicable license.

I. NO COMPELLING JUSTIFICATION EXISTS FOR FURTHER EXPANDING THE C-46 CONTRACTOR LICENSE TO OVERLAP WITH THE C-10 LICENSE

As a preliminary matter, the LMCC objects to CSLB allowing jurisdiction creep from one specialty contractor license to another specialty contractor license, particularly without any compelling justification. There is no documented safety,

economic or workforce availability reasons to allow C-46 contractors to expand their license to encompass installation of battery energy storage systems.

First, allowing this expansion is not needed to ensure availability of contractors or workers to install battery energy storage systems. As of March 2021, there are a total of 25,386 C-10 contractors in the state. All of these contractors are licensed to install both battery energy storage and PV installations, either separately or concurrently. In contrast, there are only 1,244 C-46 contractors. Of these C-46 contractors, more than a third (444) already have a c-10 license and only 341 don't already have a C-10, A or B contractor's license that would allow them to independently install a battery energy storage system without an expansion of the C-46 license scope.

*An expansion of the C-46 license scope would thus only benefit the 341 C-46 contractors who do not currently also have a C-10 or A and B license compared to the over 26,000 C-10 and C-46 contractors that can already install both PV and battery energy storage systems. **Allowing C-46 contractors to install battery energy storage systems would thus only increase the number of overall contractors that can do this work by 1.3%.***

Furthermore, the number of C-46 contractors that also hold a C-10 contractor license has been rapidly expanding, demonstrating that requiring a C-10 license to install battery energy storage systems is not a burdensome barrier to the concurrent installation of both a PV system and a battery energy storage system. C-46 Contractors that want to install battery energy storage systems can, and do, apply to add the C-10 classification to their licenses. "A licensee may make application for classification and be classified in more than one classification if the licensee meets the qualifications prescribed by the board for such additional classification or classifications."¹ Holding an additional classification does not increase the fee for renewing the license.² In 2019, 375 contractors held both C-46 and C-10 licenses; two years later 444 contractors hold both C-10 and C-46. This is approximately a 20% increase in two years. This increase reflects the recognition by most C-46 contractors that if they want to expand the scope of their business beyond PV installation, they need to obtain the applicable contractor's license for that new work.

¹ Cal. Bus. & Prof. Code § 7059.

² 16 CCR § 811.

Second, there is no evidence that allowing installation of battery energy storage systems by C-46 contractors using workers that are not certified electricians would significantly reduce costs over the installation of battery energy storage systems by C-10 contractors using certified electricians. The increase labor cost from using a C-10 contractor employing certified electricians has been estimated at just \$100 per system when comparing with a C-46 contractor that uses low-paid non electrician. There cost differential between the average solar worker and average non-union electrician is in the range of \$12.00 – 17.00 per hour. According to the CalSSA video produced for the CSLB, installing a residential battery energy storage system is no more than a one-hour job. Even if CalSSA's estimate was wildly optimistic and it took six to eight hours, the additional cost would be in the range of \$90.00 – 120.00. That aligns well with the CSLB's estimate (based on a Stanford study) that the increased cost would be around \$100. A typical California residential battery energy storage system installed cost (without PV) is in the range of \$12,000 – 16,000. \$100 is less than 1% of \$12,000 which means that such a small difference would not have any discernible impact on affordability or achieving policy objectives.

Finally, a regulatory change to expand the C-46 license would also require an analysis of the economic impact on C-10 contractors and C-10 contractor employees from allowing C-46 contractors to now perform their work using lower paid, non-electricians. Such a change will put C-10 contractors that invest in properly certified electricians at a competitive disadvantage and would put *downward wage pressure on certified electricians who currently perform this work* as they would now be competing for work against untrained, low-wage non-electricians.

Any analysis of whether C-46 contractors should be allowed to install battery energy storage systems should start with the initial fundamental question of why such expansion into work already performed by C-10 contractors would be necessary. Here, there is little justification for lowering safety standards, endangering the public and putting downward pressure on wages for installers of battery energy storage systems just for the benefit of 341 out of approximately 26,000 contractors.

Nonetheless, in the interests of compromise and support for the State's greenhouse gas reduction efforts, the LMCC would not object to a clarification of the C-46 contractor scope that would allow battery energy storage systems below a reasonable threshold size to be considered incidental and supplemental work.

II. CSLB'S PROPOSAL TO ALLOW C-46 TO INSTALL BATTERY ENERGY STORAGE SYSTEMS IN CERTAIN OCCUPANCIES IS PROBLEMATIC BECAUSE IT DOES NOT LIMIT SIZE AND LACKS SUFFICIENT JUSTIFICATION

CSLB's initial draft proposal would amend their C-46 regulations to state that a C-46 Solar Contract may not install a battery energy storage system as an incidental and supplemental installation to a Solar PV system except in the following applications:

(1) In, on, or around detached one and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress and structures accessory thereto that are subject to Section 1.1 of the California Residential Code, Title 24, Part 2.5.

(2) In, on, or around buildings or structures or portions thereof that are designated as or can be classified as Business Group "B" occupancies as described by Section 304.1 of California Building Code, Title 24, Part 2.

(3) In, on, or around a building or tenant space used for assembly purposes with an occupant load of less than 50 persons pursuant to Section 303.1.1 of California Building Code, Title 23, Part 2.

This proposal is problematic because it does not provide any size limit for the energy storage system. Business Group "B" occupancies are very broad and could include facilities with very large electrical loads. Business Group "B" includes civic administration buildings, outpatient clinics, colleges and universities, data processing centers, food processing, laboratories, radio and tv stations, and air traffic control towers. Data processing centers, for example, can require electrical loads that are greater than some utility scale energy storage projects. One recent report stated that a Google data center is installing a 3-megawatt, 2-hour-duration battery system.³ At a certain size, it is no longer reasonable to consider an energy storage system to be incidental and supplemental to installation of a Solar PV system, no matter what the occupancy.

³ <https://www.greentechmedia.com/articles/read/google-to-install-its-first-battery-backup-system-at-data-center>.

In addition, the proposal to set limits based on building occupancy does not appear to be based on any evidentiary justification. Without an evidentiary basis, this proposed regulatory change would be vulnerable to legal challenge as arbitrary and capricious.

III. RECOMMENDED ALTERNATIVE PROPOSAL BASED ON POWER AND STORAGE CAPACITY

To address these concerns, we recommend proposing alternative language that would state that any energy storage system above a certain power and storage capacity would be considered separate systems and thus could not be installed by C-46 contractors even when installed as part of a solar PV project. Instead of occupancy, this proposal would set a limit based on system size using thresholds already adopted in existing state and national code standards for safety. This proposal also sets a size limit that would allow C-46 contractors to install over 80% of paired battery energy storage system project under their incidental and supplemental license exception. This proposal would also clarify that C-46 contractors may subcontract installation of paired battery energy storage system systems that exceed these thresholds – allowing the C-46 contractor to be the prime contractor on any size project.

A. Proposed C-46 Amendment to Allow Installation of Paired Battery Energy Storage Systems Below a Certain Size Threshold

A copy of the proposed language is attached, both in a clean version and a redlined version showing the changes to CSLB's initial proposal. The operative language of the proposed amendment states:

For the purposes of this section, a battery energy storage system, as defined in section 810, shall not be considered part of, required in, or incidental and supplemental to the installation of, a photovoltaic solar energy system unless it has a power capacity below 20kW and a storage capacity below the storage system threshold quantity set forth in Table 1206.2 of the 2019 California

Fire Code. A battery storage system that meets or exceeds either of these thresholds shall be considered a separate system and shall not be considered incidental and supplemental to the installation of a photovoltaic solar energy system. A solar contractor may subcontract installation of a battery energy storage system of any size with an appropriately licensed contractor.

Table 1206.2 in the Fire Code imposes much stricter safety and installation requirements on energy storage systems that exceed the following kw capacity thresholds:

BATTERY TECHNOLOGY	CAPACITY
Flow batteries (including vanadium, zinc-bromide, polysulfide-bromide, and other flowing electrolyte-type technologies)	20 kWh
Lead-acid, all types	70 kWh
Lithium, all types	20 kWh
Nickel cadmium (Ni-Cd)	70 kWh
Sodium, all types	20 kWh
Other battery technologies	10 kWh

In addition to these general standards for all occupancies, Chapter 15 of the NFPA 855 states that no single battery energy storage system unit in a one- or two-family dwelling or townhouse may exceed 20kWh in capacity.⁴

B. The CSLB Record Contains Substantial Evidence that Battery Energy Storage Systems Pose Significant Fire and Life Safety Risks

During prior proceedings, the LMCC and other stakeholders submitted extensive document of the significant fire and life safety risks associated with battery energy storage systems such as electric shocks, fire, flash burns, explosions, and exposure to hazardous chemicals and gases.⁵ Because most battery energy

⁴ NFPA 855 Table 1.3.

⁵ See, e.g., *Battery Energy Storage Systems: A Guide for Electrical Contractors*, Department of Commerce, Government of Western Australia (March 2017); S. Vorrath, *Household Battery Storage Is a Game Changer – But Is It Safe?*, *One Step Off The Grid* (Nov. 25, 2015), <https://onestepoffthegrid.com.au/household-battery-storage-is-a-game-changer-but-is-it-safe/>; *Fire*

storage systems cannot be powered off during maintenance, electrocution and short-circuiting is a major risk which can cause burns and, in extreme cases, fire and explosions from surges in heat.⁶ Arc flashes resulting from short circuiting can result in temperatures above 12,000 degrees Celsius.⁷ Lithium-ion batteries contain a flammable electrolyte which makes them prone to “thermal runaway”—when damage and overcharging lead to a positive feedback loop of more heat production and eventual overheating.⁸ Thermal runaway incidents result in excessively high temperatures, gas build-up, and potential explosive rupture of the battery cell.⁹

These studies included substantial evidence that *the fire and life safety risks of battery energy storage systems increase with larger systems*.¹⁰ “Larger cells exhibit slower heat transfer to their exteriors, and they usually have higher capacities. Thus, they have the potential to convert more electrical energy to internal heat.”¹¹ The San Francisco Fire Department says that “lithium-ion batteries in buildings with capacities larger than 20 kilowatt-hours must comply with city and California fire codes for stationary battery systems” in order to mitigate the risks of these higher capacity systems.¹² “Generally higher battery energy storage capacities have

Codes for Energy Storage Systems, Klausbruckner & Associates (Jan. 2017), <http://www.klausbruckner.com/blog/fire-codes-for-energy-storage-systems/>; U. Irfan, *Battery Fires Reveal Risks of Storing Large Amounts of Energy*, Scientific American (Nov. 2011), <https://www.scientificamerican.com/article/battery-fires-risks-storing-lareg-amounts-energy/>; *Lithium-ion Battery Energy Storage Systems: The Risks and How to Manage Them*, AIG Energy Industry Group; A. Blum & R. Thomas Long Jr., *Hazard Assessment of Lithium Ion Battery Energy Storage Systems*, Fire Protection Research Foundation (Feb. 2016), p. 25–28.

⁶ *Battery Energy Storage Systems: A Guide for Electrical Contractors*, Department of Commerce, Government of Western Australia (March 2017), p. 3.

⁷ *Battery Energy Storage Systems: A Guide for Electrical Contractors*, Department of Commerce, Government of Western Australia (March 2017), p. 3.

⁸ *Battery Energy Storage Systems: A Guide for Electrical Contractors*, Department of Commerce, Government of Western Australia (March 2017), p. 1; *Lithium-ion Battery Energy Storage Systems: The Risks and How to Manage Them*, AIG Energy Industry Group, p. 5–6.

⁹ *Lithium-ion Battery Energy Storage Systems: The Risks and How to Manage Them*, AIG Energy Industry Group, p. 5.

¹⁰ [Exhibit 7] Exponent Failure Analysis Associates, Inc., *Lithium-Ion Batteries Hazard & Use Assessment*, Fire Protection Research Foundation, pp. 61–62.

¹¹ *Id.*

¹² M. Chediak, *Big-Battery Boom Sparks City Fears*, L.A. Times (June 7, 2018), https://enewspaper.latimes.com/infinity/article_share.aspx?guid=01f277ed-aaf5-494a-8d13-e1bb3f459391.

a higher risk of arc flash.”¹³ The graphs below illustrate the positive correlation between kWh capacity and the risk and intensity of a fire.¹⁴

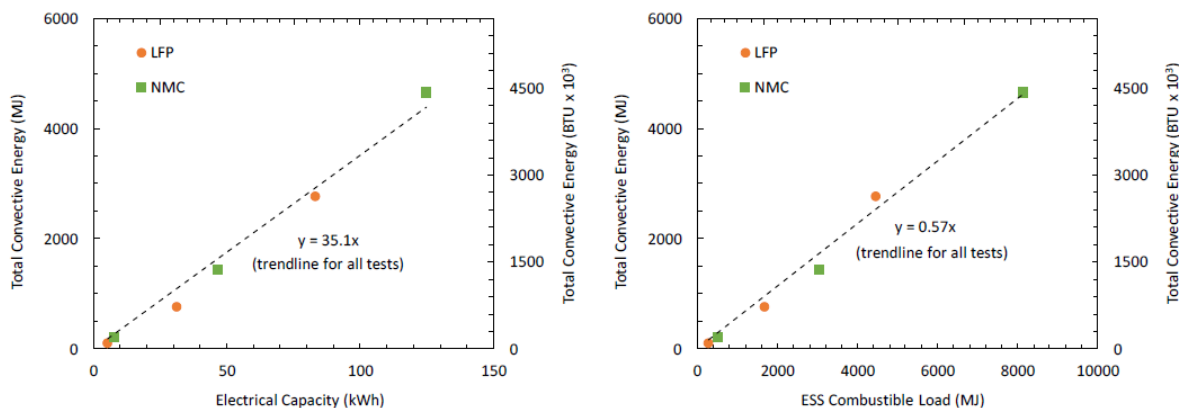


Figure 7-4: Total convective energy as a function of electrical capacity (left) and combustible load (right) for the LFP and NMC tests.

The evidence that the fire and life safety risks posed by battery energy storage systems increase with the size of the system supports setting a size threshold above which installation of a battery energy storage systems should no longer be considered incidental and supplemental to the installation of PV systems by C-46 contractors.

Both State and National code and standard setting bodies have consistently identified battery energy storage systems above the 10kWh to 70 kWh threshold sizes as posing a significant enough risk to require additional standards for installation, permitting, hazards assessment, and other safety measures.¹⁵ The California Fire Code (CFC)—California Code of Regulations, Title 24, part 9—requires battery energy storage systems above these thresholds to comply with the following additional requirements:

- Flame-arresting safety caps¹⁶

¹³ [Exhibit 2] Letter from former San Jose Fire Captain Matthew Paiss (Feb. 20, 2018), p. 1.

¹⁴ [Exhibit 8] B. Ditch, D. Zeng, Development of Sprinkler Protection Guidance for Lithium Ion Based Energy Storage Systems, FM Global (June 2019), Figure 7-4.

¹⁵ See e.g., CFC § 1206.2; CFC Table 1206.2; NFPA 855 § 1.3; NFPA 855 Table 1.3.

¹⁶ CFC § 1206.2.10.6.

- Thermal runaway management¹⁷
- Smoke detection and fire suppression systems¹⁸
- Gas detection and ventilation¹⁹
- Spill control and neutralization capabilities²⁰
- Seismic protection²¹
- Failure modes and effect analysis (FMEA) or other approved hazard mitigation analysis must be done when some technologies are used to ensure that fires and explosions will be contained²²
- Battery energy storage system location and room design are technology-, size-, and configuration-dependent²³

In addition, the California Fire Code section 1206.2.2 sets forth specific permit application requirements for battery energy storage systems above these thresholds, including providing the following information:

- Location and layout design of storage room
- Details on hourly fire-resistant-rated assemblies
- Quantities and types of storage batteries and systems
- Manufacturer’s specifications, ratings and listings of storage batteries and battery systems
- Location and content of signage
- Details on fire suppression, smoke detection and ventilation systems
- Rack storage arrangement, including seismic support criteria

NFPA 855, Standards for the Installation of Stationary Energy Storage Systems is a national standard which “provides the minimum requirements for mitigating the hazards associated with [battery energy storage systems].”²⁴ This

¹⁷ CFC § 1206.2.10.7.

¹⁸ CFC § 1206.2.11.

¹⁹ CFC §§ 1206.2.11.3, 1206.2.11.4.

²⁰ CFC § 1206.2.11.5

²¹ CFC § 1206.2.4

²² CFC § 1206.2.3.

²³ CFC § 1206.3.2.

²⁴ NFPA 855 § 1.2.

standard uses the same thresholds as the CFC, above which additional fire, life, and safety requirements are imposed. NFPA 855 sets forth similar standards to the CFC but provides more detail on the specific requirements.²⁵

The CSLB may choose to use the 10 kWh / 20 kWh / 70 kWh technology-based thresholds set forth in the CFC and NFPA 855, or it may choose to set a single threshold in order to ease compliance and enforcement. The CFC and NFPA 855 both adopt a catchall threshold of 10 kWh for types of batteries not otherwise specifically enumerated. This 10 kWh catchall threshold would provide a uniform regulatory standard for every battery type, even as new technologies are developed. In the alternative, the CSLB could set a 20kWh threshold, which is the threshold for Lithium-Ion batteries. Lithium-Ion batteries are the most prominent battery type in residences, so a 20kWh threshold would be reasonable as well.

These existing industry thresholds provide a rational and reasonable basis for the CSLB to determine that battery energy storage systems above these thresholds are too large to be considered incidental and supplemental to the installation of a Solar PV system.

C. Economic and Policy Justification for a 20kW/20kWh Threshold

The size thresholds proposed by the LMCC also have economic and policy justification since these thresholds would allow just about all paired residential and small non-residential battery energy storage systems to be installed by C-46 contractors under their incidental and supplemental exception. A review of the market found that over 95 Percent of residential battery energy storage systems have a storage capacity of under 20kWh and that over 79% of all battery energy storage systems installed through the CPUC SGIP program from 2017-2019 had a storage capacity under 20kWh. In addition, over 99% of the over 14,000 residential battery energy storage systems installed through the CPUC SGIP program from 2017-2019 had a power capacity under 20kW and approximately 90% of the residential battery energy storage systems on the market have a power capacity under 10 kW.

²⁵ See, e.g., NFPA 855 §§ 4.1.3.2 (detailing emergency operations plan), 4.12.1 (laying out requirements for explosion prevention deflagration venting systems), 4.13 (providing for permanent source of water for use in fire suppression), 6.1.2–6.1.3 (setting forth need for commissioning plan).

Finally, our proposal clarifies that a solar contractor may subcontract installation of any size battery energy storage system to an appropriately licensed contractor. This means that a C-46 contractor may be the prime contractor on any paired Solar PV/ battery energy storage system project no matter what the size. Under this proposal, no reasonable argument exists that these regulations would have any impact on the ability of C-46 contractors to continue to operate and to continue to employ their existing personnel.

1. Over 95 Percent of Residential Battery Energy Storage Systems Have a Storage Capacity of Under 20kWh

A review of the 2020 review of all residential battery energy storage systems on the market found:

- A 2020 market review found 85 residential Battery Energy Storage Systems on the market
- 54 had a storage capacity under 10kWh
- 27 had a storage capacity between 10 and 20kWh
- 4 had a storage capacity over 20kWh (and none were over 30kWh)

Home Battery Storage Systems	BESS Count	Percent
Under 10 kWh	54	63.5%
10 kWh to 20 kWh	27	31.8%
Over 20 kWh	4	4.7%
Total	85	100%

*Data obtained from: <https://www.energysage.com/solar/solar-energy-storage/what-are-the-best-batteries-for-solar-panels/>; <https://www.energy-storage.news/news/siemens-launches-own-junelight-lithium-home-energy-storage-systems>; <https://www.businessinsider.com/rechargeable-battery-options-compete-tesla-2017-5>; <https://solartechonline.com/residential-energy-storage/>; <https://news.energysage.com/tesla-powerwall-vs-sonnen-eco-vs-lg-chem/>; <https://www.solarquotes.com.au/battery-storage/comparison-table/>; <https://www.cleanenergyreviews.info/hybrid-solar-battery-energy-storage-system-review>

2. According to the CPUC SGIP Database, 80 Percent of All Residential Battery Energy Storage Systems Incentives from 2017 to August 2019 Were for Projects with an Aggregate Storage Capacity of Under 20 kWh

A review of the CPUC SGIP database of all residential battery energy storage system incentives from 2017 to 2019 found that almost 80 percent were for projects with a power capacity under 20 kWh.

- 13,248 residential Battery Energy Storage System projects received CPUC SGIP rebates from 2017 to August 2019 with information about storage capacity
- 63, or 0.48 percent, had a total storage capacity under 5kWh
- 6,164, or 46.53 percent, had a total storage capacity between 5 and 10kWh
- 4,234, or 31.96 percent, had a total storage capacity between 10 and 20kWh
- 2,558, or 19.31 percent, had a total storage capacity between 20 and 30kWh
- 229, or 1.73 percent, had a total storage capacity over 30kWh

Residential Electrochemical Storage Rate kWh	BESS Count	Percent
Below 5 kWh	63	0.48%
5 kWh to 10 kWh	6,164	46.53%
10 kWh to 20 kWh	4,234	31.96%
20 kWh to 30 kWh	2,558	19.31%
Over 30 kWh	229	1.73%
Total	13,248	100.00%

*Data obtained from: <https://www.cpuc.ca.gov/sgip/> - SGIP Weekly Projects & Budget Reports:
https://www.selfgenca.com/documents/reports/statewide_projects,
SGIP Weekly Statewide Report - 09/16/2019 - Column I

3. Over 90 Percent of Residential Battery Energy Storage Systems Have a Power Capacity of under 10 kW

A review of the 2020 review of all residential battery energy storage systems on the market found:

- 85 residential Battery Energy Storage Systems on the market
- 49 had a power capacity under 5kW
- 20 had a power capacity between 5 and 8kW
- 6 had a power capacity between 8 and 10kW
- 3 had a power capacity over 10kW
- The remaining 7 Battery Energy Storage Systems on the market did not have power capacity data available for this analysis

Home Battery Storage Systems	BESS Count	Percent
Below 5 kW Output	49	57.7%
5 kW to 8 kW Output	20	23.5%
8 kW to 10 kW Output	6	7.1%
Over 10 kW Output	3	3.5%
Not Available	7	8.2%
Total	85	100%

*Data obtained from: <https://www.energysage.com/solar/solar-energy-storage/what-are-the-best-batteries-for-solar-panels/>; <https://www.energy-storage.news/news/siemens-launches-own-junelight-lithium-home-energy-storage-systems>; <https://www.businessinsider.com/rechargeable-battery-options-compete-tesla-2017-5>; <https://solartechonline.com/residential-energy-storage/>; <https://news.energysage.com/tesla-powerwall-vs-sonnen-eco-vs-lg-chem/>; <https://www.solarquotes.com.au/battery-storage/comparison-table/>; <https://www.cleanenergyreviews.info/hybrid-solar-battery-energy-storage-system-review>

4. According to the CPUC SGIP Database, Over 80% of all residential Battery Energy Storage Systems Incentives Were For Projects with a Power Capacity Under 10 kW and Over 99% Were Under 20 kW

A review of the CPUC SGIP database of all residential battery energy storage system incentives from 2017 to 2019 found that over 80% were for projects with a power capacity under 10kW and 99% were for projects with a power capacity under 20kW.

Residential Electrochemical Storage Rate kW	BESS Count	Percent
Below 5kW	6,290	44.36%
5kW to 10kW	5,058	35.67%
10kW to 20kW	2,706	19.08%
20kW to 30kW	107	0.75%
Above 30kW	18	0.13%
Total	14,179	100.00%

*Data obtained from: <https://www.cpuc.ca.gov/sgip/> - SGIP Weekly Projects & Budget Reports:
https://www.selfgenca.com/documents/reports/statewide_projects,
SGIP Weekly Statewide Report - 09/16/2019 - Column H

A separate, additional review of state data on the installation of all (commercial and residential) rooftop solar projects and the installation of paired Solar PV/ battery energy storage system projects from January 2015 to December 2020 found that rooftop solar-paired storage projects are primarily concentrated in systems sized at less than 20kw; with fewer than 2% of the projects exceeding 20kw of storage.

LicClass	<10kw	10-20kw	20-40kw	40-60k w	60-80k w	80-100k w	100-250k w	250-500k w	500-1000k w	>1000k w	Grand Total
	19,99										26,16
C-10	6	5,891	175	12	10	3	47	13	17	3	7

C-46 no A,B,C-10	630	113	6	-	-	1	1	1	1	-	753
Other	1,900	415	74	18	17	7	33	34	11	7	2,516
Grand Total	22,52										29,43
	6	6,419	255	30	27	11	81	48	29	10	6

5. Contractors Who Only Have C-46 Licenses Install Just 6% of All Solar PV Systems and Less than 3% of All Paired Solar PV/Battery Energy Storage Systems

The proposed thresholds would also have no practical impact on the installation of Solar PV projects or the installation of paired Solar PV/ battery energy storage system projects because contractors who only have C-46 licenses install just 6% of all solar PV systems and less than 3% of all paired Solar PV/ battery energy storage systems.

A review of state data on the installation of rooftop solar projects and the installation of paired Solar PV/ battery energy storage system projects from January 2015 to December 2020 found contractors holding a C-46 license without a C-10 or General Contractors license were responsible for 6% of the installations.

LicClass	Installations	% Share Installations	Installed PV System Size (kW AC)	% Share Installed PV Capacity	Avg. Size (kW AC)	Contractors	Installations per Contractor
C-10	600,916	76%	4,217,082	73%	7.0	2,290	262.4
C-46 no A,B,C-10	48,126	6%	382,138	7%	7.9	421	114.3
Other	139,820	18%	1,155,005	20%	8.3	1,730	80.8
Grand Total	788,862	1	5,754,225	1	7.3	4,441	177.6

For solar paired storage, contractors holding a C-10 license performed 89% of the more than 29,000 solar-paired storage installations in California. Contractors holding a C-46 license without either an A, B, or C-10 classification performed only 753 rooftop solar-paired storage installations, 3% of the total.

LicClass	Installations	% Share	Installed Storage Size (kW AC)	% Share Installed PV-Storage Capacity	Avg. Size (kW AC)	Contractors	Installations per Contractor
C-10	26,167	89%	192,976	77%	7.4	470	55.7
C-46 no A,B,C-10	753	3%	6,205	2%	8.2	106	7.1
Other	2,516	9%	51,591	21%	20.5	174	14.5
Grand Total	29,436	1	250,772	1	8.5	750	39.2

These numbers are not surprising considering that contractors holding only a C-46 license without either an A, B, or C-10 classification represent less than 1.3% of the over 26,000 C-10 and C-46 contractors that have licenses allowing for the installation of Solar PV systems.

The proposed regulations will thus affect less than 1.3% of all contractors that can currently install solar PV systems and would allow that small subset of contractors to install battery energy storage systems in over 80% of all paired Solar PV projects *despite currently only installing 3% of all paired rooftop Solar PV projects*. In addition, the proposed regulations would allow those contractors to install PV systems even when the battery energy storage system exceeds the proposed thresholds as long as they subcontract installation of the battery energy storage system to an appropriately licensed subcontractor.

IV. CSLB PROPOSED DEFINITION OF AN ENERGY STORAGE SYSTEM ALSO REQUIRES AMENDMENT

The CSLB initial proposed amendment adopts the definition of battery energy storage system that is contained in Section 810 of the California Fire Code:

§ 810. Definitions

(a) For purposes of this division, “battery energy storage system” means 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. A battery energy storage system is used to provide standby or emergency power, and uninterruptable power supply, load shedding, load sharing or similar capabilities

We are concerned that this definition's use of the term "and associated electrical equipment" could be interpreted too broadly in the context of the contractor license regulations. This language could be interpreted to encompass other electrical equipment that simply transmits or uses the energy from the battery energy storage system, such as building electrical wiring and outlets, connected HVAC or electrical vehicle charging equipment, or other electrical equipment intended to rely on the battery energy storage system.

To address this concern, we propose modifying that definition as follows, for purposes of the CSLB regulation:

(a) For purposes of this division, "battery energy storage system" means a rechargeable energy storage system consisting of electrochemical storage batteries, battery chargers, controls, and associated electrical equipment components designed to provide absorb, store and dispatch electrical power to a building for the purpose of providing A battery energy storage system is used to provide standby or emergency power, an uninterruptable power supply, load shedding, load sharing or similar capabilities.

This revision clarifies that any unspecified associated equipment must actually be a component of the energy storage system.

V. CONCLUSION

The LMCC respectfully submits this alternative proposal for the CSLB consideration. Please let us know if you have any questions or require any of the underlying data or documents cited in this memorandum.

EXHIBIT A

EXHIBIT A

IBEW NECA LMCC ALTERNATE PROPOSED C-46 CONTRACTOR CLASSIFICATION AMENDMENT RE BATTERY ENERGY STORAGE

§ 810. Definitions

(a) For purposes of this division, “battery energy storage system” means a rechargeable energy storage system consisting of electrochemical storage batteries, battery chargers, controls, and associated components designed to absorb, store and dispatch electrical power to a building for the purpose of providing standby or emergency power, an uninterruptable power supply, load shedding, load sharing or similar capabilities to a building.

(b) For the purposes of this ~~chapter~~ division, “Board” means the Contractors State License Board and “Code,” unless otherwise defined, means the Business and Professions Code.

Note: Authority cited: Section 7008, Business and Professions Code. Reference: Section 7008, Business and Professions Code.

§ 832.10, Class C-10 - Electrical Contractor

An electrical contractor places, installs, erects or connects any electrical wires, fixtures, appliances, apparatus, raceways, conduits, battery energy storage systems, solar photovoltaic cells or any part thereof, which generate, transmit, transform or utilize electrical energy in any form or for any purpose.

Note: Authority cited: Sections 7008 and 7059, Business and Professions Code. Reference: Sections 7058 and 7059, Business and Professions Code.

§ 832.46. Class C-46 - Solar Contractor

(a) A solar contractor installs, modifies, maintains, and repairs thermal and photovoltaic solar energy systems.

(b) A licensee classified in this section shall not undertake or perform building or construction trades, crafts, or skills, except when required to install a thermal or photovoltaic solar energy system.

(c) For the purposes of this section, a battery energy storage system, as defined in section 810, shall not be considered part of, required in, or incidental and supplemental to the installation of, a photovoltaic solar energy system unless it has a power capacity below 20kW and a storage capacity below the storage system threshold quantity set

forth in Table 1206.2 of the 2019 California Fire Code. A battery storage system that meets or exceeds either of these thresholds shall be considered a separate system and shall not be considered incidental and supplemental to the installation of a photovoltaic solar energy system. A solar contractor may subcontract installation of a battery energy storage system of any size with an appropriately licensed contractor.

Note: Authority cited: Sections 7008 and 7059, Business and Professions Code.
Reference: Sections 7058 and 7059, Business and Professions Code.

§ 831. Incidental and Supplemental Defined.

(a) For purposes of Section 7059, work in other classifications is “incidental and supplemental” to the work for which a specialty contractor is licensed if that work is essential to accomplish the work in which the contractor is classified. A specialty contractor may use subcontractors to complete the incidental and supplemental work, or he may use his own employees to do so.

(b) For purposes of Section 7059 of the Code and this division, installation, connection, modification, maintenance, or repair of a battery energy storage system, as defined in section 810, is not “incidental and supplemental” to the work performed by a licensee classified as a C-46 Solar Contractor pursuant to section 832.46, except in the circumstances described in paragraph (c) of section 832.46.

Note: Authority cited: Sections 7008 and 7059, Business and Professions Code.
Reference: Sections 7058 and 7059, Business and Professions Code.

EXHIBIT B

EXHIBIT B

IBEW NECA LMCC ALTERNATE PROPOSED C-46 CONTRACTOR CLASSIFICATION AMENDMENT RE BATTERY ENERGY STORAGE (REDLINE TO CSLB PROPOSAL)

§ 810. Definitions

(a) For purposes of this division, “battery energy storage system” means a rechargeable energy storage system consisting of electrochemical storage batteries, battery chargers, controls, and associated ~~electrical equipment components~~ designed to ~~provide absorb, store and dispatch~~ electrical power to a building. ~~A battery energy storage system is used to provide for the purpose of providing~~ standby or emergency power, ~~and an~~ uninterruptable power supply, load shedding, load sharing or similar capabilities ~~to a building.~~

(b) For the purposes of this ~~chapter~~ ~~division~~, “Board” means the Contractors State License Board and “Code,” unless otherwise defined, means the Business and Professions Code.

Note: Authority cited: Section 7008, Business and Professions Code. Reference: Section 7008, Business and Professions Code.

§ 832.10, Class C-10 - Electrical Contractor

An electrical contractor places, installs, erects or connects any electrical wires, fixtures, appliances, apparatus, raceways, conduits, ~~battery energy storage systems~~, solar photovoltaic cells or any part thereof, which generate, transmit, transform or utilize electrical energy in any form or for any purpose.

Note: Authority cited: Sections 7008 and 7059, Business and Professions Code. Reference: Sections 7058 and 7059, Business and Professions Code.

§ 832.46. Class C-46 - Solar Contractor

(a) A solar contractor installs, modifies, maintains, and repairs thermal and photovoltaic solar energy systems.

(b) A licensee classified in this section shall not undertake or perform building or construction trades, crafts, or skills, except when required to install a thermal or photovoltaic solar energy system.

~~(c) For the purposes of this section, a battery energy storage system, as defined in section 810, shall not be considered part of, or required in the installation of, a~~

~~photovoltaic solar energy system. A licensee classified in this section shall not install, connect, modify, maintain, or repair a battery energy storage system unless that installation, connection, modification, maintenance, or repair complies with paragraph (d) of this section. For the purposes of this section, a battery energy storage system, as defined in section 810, shall not be considered part of, required in, or incidental and supplemental to the installation of, a photovoltaic solar energy system unless it has a power capacity below 20kW and a storage capacity below the storage system threshold quantity set forth in Table 1206.2 of the 2019 California Fire Code. A battery storage system that meets or exceeds either of these thresholds shall be considered a separate system and shall not be considered incidental and supplemental to the installation of a photovoltaic solar energy system. A solar contractor may subcontract installation of a battery energy storage system of any size with an appropriately licensed contractor.~~

~~(d) A licensee classified in this section may install, connect, modify, maintain, or repair a battery energy storage system in the following applications:~~

~~(1) In, on, or around detached one and two family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress and structures accessory thereto that are subject to Section 1.1 of the California Residential Code, Title 24, Part 2.5.~~

~~(2) In, on, or around buildings or structures or portions thereof that are designated as or can be classified as Business Group "B" occupancies as described by Section 304.1 of California Building Code, Title 24, Part 2.~~

~~(3) In, on, or around a building or tenant space used for assembly purposes with an occupant load of less than 50 persons pursuant to Section 303.1.1 of California Building Code, Title 23, Part 2.~~

Note: Authority cited: Sections 7008 and 7059, Business and Professions Code.
Reference: Sections 7058 and 7059, Business and Professions Code.

§ 831. Incidental and Supplemental Defined.

(a) For purposes of Section 7059, work in other classifications is "incidental and supplemental" to the work for which a specialty contractor is licensed if that work is essential to accomplish the work in which the contractor is classified. A specialty contractor may use subcontractors to complete the incidental and supplemental work, or he may use his own employees to do so.

(b) For purposes of Section 7059 of the Code and this division, installation, connection, modification, maintenance, or repair of a battery energy storage system, as defined in section 810, is not "incidental and supplemental" to the work performed by a licensee classified as a C-46 Solar Contractor pursuant to section 832.46, except in the circumstances described in paragraph (dc) of section 832.46.

Note: Authority cited: Sections 7008 and 7059, Business and Professions Code.
Reference: Sections 7058 and 7059, Business and Professions Code.