5.12 Energy Storage Systems in R-3 Occupancies (2025)

Reference: 2025 California Fire Code (CFC) Section 1207 (effective 1-1-2026); 2025 California Building Code (effective 1-1-2026); 2026 NFPA 70 - National Electric Code (effective 9-9-2025).

Purpose: To provide guidance and clarify requirements to satisfy the 2025 California Fire Code Section 1207.11 and CSFM Information Bulletin 21-004.

Scope: This bulletin applies to the installation of Energy Storage Systems (ESS) in R-3 occupancies not exceeding the maximum energy ratings of individual ESS units and installation location(s) per 2025 CFC Section 1207.11.4.

Permit Required: For R-3 occupancies, a DBI permit (or an electrical permit) with SFFD review and approval is required for the installation of ESS unit(s) exceeding 1 kWh. The installation of gypsum board, impact protection, and/or rated enclosure needs to be reviewed and approved on a building permit. This applies to all projects including projects permitted using *SolarApp+*.

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I. ENERGY RATING REQUIREMENTS AND INFORMATION (CFC SECTION 1207.11.4)

1. **Maximum ESS Ratings.** Individual ESS units shall have a maximum rating of 20 kWh. The ratings of the ESS in each location shall not exceed the ratings in CFC Table 1207.11.4 below. The total aggregate ratings of ESS on the property shall not exceed **600 kWh**.

2. **Exceeding ESS Ratings.** ESS installations shall be installed in accordance with 2025 CFC Sections 1207.1 through 1207.9 which apply to non-R-3 occupancies that exceed either:
   A. The individual ESS unit rating of 20 kWh, or
   B. The maximum aggregate ratings for a location, or
   C. The aggregate capacities listed below (Figure 1), or
   D. Reduced separation between the ESS batteries of less than 3 feet, or
   E. Reduced distance between the ESS proposed location and the property line, egress doors, garage doors, windows, etc.

3. **Large-Scale Fire Test Report.** It shall be required to submit a large-scale fire test report due to exceeding the ESS rating for any condition or a reduction in separation/ distance mentioned above. An authorized third party shall be required to submit a DBI administrative bulletin AB-005 under the following conditions:

   A. Shall be a licensed fire protection engineer in the state of California.

   B. Shall state that they reviewed the large-scale fire test report of the unit/group level installation. In their professional opinion, they authorize the installation at the exceeding rating, reduced separation or distance, and they shall place their stamp and sign their through the stamp.

   C. They shall stamp every page of the large-scale fire test report & sign their name through the stamp.

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4. **ESS Unit/Group & Capacity Determination.** The following shall apply for ESS Unit/Group & capacity determinations (Reference CFC Sections 202, 1207.11.1, 1207.11.2.1, 1207.11.4):

   A. **Total Rated Capacity.** An ESS unit shall be the total rated capacity per the UL 9540 listing certification. Modular, scalable or stackable-unit battery systems designed to be expanded in customizable configurations shall be reviewed at the maximum capacity per the UL 9540 listing.

      Example: "Model Z" 15kWh ESS + additional 10 kWh battery = 25kWh; if "Model Z" is UL 9540 listed for a maximum of up to 4 additional batteries, it shall be reviewed as 55kWh (15 + 10 + 10 + 10 + 10 = 55)

   B. **3 Feet Spacing.** ESS consisting of modular, scalable or stackable-unit battery units shall comply with the 3 foot spacing requirements when consisting of separate battery units that are connected with exterior cables. Request for approval of the reduction of separation distance shall require a Pre-Application Meeting.

   C. **AHJ Interpretation.** Any model configuration not addressed herein shall be interpreted by AHJ.

5. **Multiple ESS Systems On Same Building.** Aggregate energy capacity ratings of ESS per location shall be determined based on the total ESS within the building and shall not be based on any one individual ESS system. Reference: CFC Section 1207.11.4.

6. **Additions to Existing ESS and PV.** Additions to existing ESS and PV (Photovoltaic) systems shall comply with current codes, including rapid shutdown.

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TABLE 1207.11.4 MAXIMUM AGGREGATE RATINGS OF ESS

LOCATION	MAXIMUM AGGREGATE RATINGS (kWh)	INSTALLATION REQUIREMENTS
Within utility closets, basements, and storage or utility spaces located within dwellings	40	
In attached garages	80	
On or within 3 feet ofexterior walls of dwellingsand attached garages	100	
On or within 3 feet ofexterior walls of dwellingsand attached garages	200	Exterior walls and eavesare constructed withnoncombustible surfaces.[a]
In detached garages anddetached accessorystructures	200	
In detached garages anddetached accessorystructures	600	Detached garage ordetached accessorystructure is a minimum 10feet away from propertylines and dwellings.
Outdoors on the ground	200	ESS is a minimum 3 feetaway from property linesand dwellings.
Outdoors on the ground	600	ESS is a minimum 10 feet away from property lines and dwellings.

For SI: 1 foot = 304.8 mm

a. Noncombustible wall surface shall extend in accordance with all thefollowing:
   1. A minimum of 5 feet horizontally from the edge of the ESS.
   2. A minimum of 1 foot vertically below the bottom edge of the ESS.
   3. A minimum of 8 feet vertically above the ESS, or to a noncombustible eave, whichever is less.

The code official is authorized to approve reductions of installation requirements based on large-scale fire testing complying with Section 1207.1.5.

Figure 1: *CFC Table 1207.11.4 - Maximum Aggregate Ratings of ESS*

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II. CONSTRUCTION PLAN DOCUMENTS

Submitted plans shall contain the following applicable information:

1. **Building Information.** Provide occupancy type, construction type, number of stories, existing sprinklers and/or fire alarm, etc.

2. **Location and Layout Diagram.** Provide location and layout diagram of the room or area in which the ESS is to be installed and the room's relation to the entire story/level. Include an elevation view, show all openings (doors, windows), and call out required distance separations including property line and egress paths. Plans and elevations shall be to scale.

3. **Details for Fire-Resistance Rating.** Provide details on the hourly fire-resistance rating of the assemblies upon which the ESS is to be installed (e.g., gypsum board, plywood, exposed studs).

4. **Equipment Schedule.** Provide quantities and type(s) of ESS to be installed, including but not limited to the following: manufacturer's specifications, ratings and listings of each ESS; battery technology, total capacity (vs. usable energy), quantity (new and existing), make/model number. Include product cut sheets on plans and listing and/or certification documentation on plans [See SAMPLE below]

5. **Installation Compliance Certification Statement.** Plans shall include the following designer- signed statement indicating installation compliance: *"The ESS installed are in full compliance with the specific ESS listing requirements, UL 9540, and California Building Standards Code."*

6. **Design Contractor Information & Signature.** Plans shall bear valid California-licensed design professional stamp or contractor license number, name of associated license holder and signature; plans shall be securely bound together, and the first sheet shall have affixed an original signature, and an index of all sheets included; the remaining sheets may have a signature facsimile with the contractor license information.

EQUIPMENT SCHEDULE (SAMPLE)				
Tag	**Quantity**	**Manufacturer**	**Model**	**Description**
A	28	LG	LG365QIC-V5	Modules, 365W, Monocrystalline/N -Type, White Backsheet, Anodized Aluminium Frame, Voc= 42.8V, Isc= 10.80A
B	28	ENPHASE	IQ7PLUS-72-2-US	Microinverters, 240V, Max Continuous Output Power = 290W, Max Continuous Output Current = 1.21A
C	1	ENPHASE	3CX-IQ-AMI-240-3C	PV Combiner Box, 125A, Enphase IQ AC Combiner Box With Integrated 10A Envoy Breaker
D	1	SQUARE D	DU222RB	AC Disconnect, 3R, 60A, 2P, 120/240V/AC
E	1	SQUARE D	HOM4280225P C	Backup Loads Panel, 225A, 200A Main Breaker
F	1	TESLA	BACKUP GATEWAY 2 1232100-XX-Y	Backup Gateway, 200A, 120/240V, NEMA 3R
G	2	TESLA	POWERWALL 2 2012170-XX-Y	ESS Unit, 14 kWh Total, 13.5 kWh Useable, 240V Single Phase

Figure 2: *Equipment Schedule (Sample)*

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III. INSTALLATION REQUIREMENTS

1. **Individual ESS Unit Spacing.** Individual ESS units shall be separated by at least 3 feet of spacing*. Modular ESS products shall be considered as an individual unit and shall be limited to the maximum total individual unit capacity of 20 kWh.

   ***Note:** A reduction of the 3-feet spacing requirement for individual ESS units may be reviewed and approved by the AHJ when complying with CFC Sections 1207.1.5 and 104.8.2. Applicants shall submit copies of both the UL 9540A testing report and the installation instructions showing the recommended reduced spacing between the ESS units being installed. If the minimum spacing varies between the two documents, the more restrictive separation distance will be approved.*

2. **ESS System Installation Locations.** An ESS System is defined as all ESS units tied into the same PV modules, distribution panel and other such supportive components. The following items shall apply for the installation locations for the ESS System:

   A. Installation location requirements shall comply with 2025 CFC Section 1207.11.3.

   B. Any eaves, structures, decking, or other such construction protruding more than 2 feet from the exterior wall upon which the ESS is installed shall be located at least 3 feet from the ESS.

3. **Disconnecting Means For ESS**. ESS shall be provided with an external disconnecting means installed in an accessible location on the exterior of the building at a minimum of three (3) feet from the ESS. The disconnecting means may be configured to also activate the PV rapid shutdown. Plans require identification of the location and function of all disconnecting means provided. If plans have been submitted, the location shall be approved during plan review. Disconnecting means require the proper labeling and shall be tested during field inspection by the SFFD District Inspector. (Reference: CFC Sections 1207.11.5, 1207.4.1; CEC).

IV. CLEARANCE TO EXPOSURES

1. **All Installations.** The following items shall apply for all installations:

   A. **Means of Egress.** ESS shall be installed at a minimum of three (3) feet from the public way/egress pathway.

2. **Interior Installations.** The following shall apply for interior installations (e.g., utility closets, attached garage, detached garage, etc.):

   A. **Combustible Storage.** Clearance of three (3) feet shall be provided in front of electrical equipment for maintenance purposes in compliance with California Electrical and Mechanical Codes and kept clear of all combustible storage. Residences that have ESS batteries must abide by California Fire Code Section 315 regarding storage and fire hazards.

   B. **Minimum Room Size.** For interior installations, minimum room size varies based on the lithium-ion ESS model. This is generally determined by a UL 9540A live-fire test so that the concentration of flammable gas released does not exceed 25% LEL for the smallest intended room installation size. Minimum room size is not always provided in the manufacturer's installation guide. Installers and designers are required to be familiar with room size requirements of the ESS model they are proposing to install. Installations in rooms, garages or utility closets smaller than the minimum room size shall require ventilation and gas monitoring per CFC 1207.11.8 and 1207.6.1.

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3. **Exterior Installations.** The following items shall apply for exterior installations (e.g., outdoors and on exterior walls):

   A. **1 Hour Free-Standing Fire Barrier.** ESS mounted exterior must have a 1-hour free standing fire barrier (suitable for exterior use) and extending three (3) feet above and three (3) feet beyond the physical boundary of the ESS installation to protect the exposure.

   B. **Other Exterior Walls.** The exterior wall upon which the ESS is installed shall be located at least 12 inches from other exterior walls of the same building in either direction.

V. CONSTRUCTION REQUIREMENTS

1. **Applicable Requirements.** Comply with applicable requirements of 2025 California Fire Code Section 1207.11.3 for ESS installations in an attached garage.

2. **Interior Walls and Ceilings.** All walls and ceilings within a space housing an ESS must feature a noncombustible finish. If new and/or existing interior walls and ceilings that do not have a noncombustible finish, a noncombustible finish of not less than 1 hour shall be installed. The 1 hour rating can be achieved by installing a 5/8 inch Type X gypsum board.

3. **Table R302.6.** In addition to the requirements in #2 above, existing finished walls and ceilings shall comply with the requirements of Table R302.6 referenced in the California Fire Code and found in the California Residential Code. Per Table R302.6, existing walls and ceilings may require upgrades to achieve the required fire separation.

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SEPARATION	MATERIAL
From the residence and attics.	Not less than 1/2-inch gypsum board or equivalent applied to the garage side.
From habitable rooms above the garage.	Not less than 5/8-inch Type X gypsum board or equivalent.
Structure(s) supporting floor/ceiling assemblies used for separation required by this section.	Not less than 1/2-inch gypsum board or equivalent.
Garages located less than three (3) feet from a dwelling unit on the same lot.	Not less than ½-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area.

Figure 3: *Table R302.6 - Dwelling-Garage Fire Separation*

VI. FIRE DETECTION REQUIREMENTS FOR R-3 OCCUPANCIES

Reference CFC Section 1207.11.6 and CA State Fire Marshal Information Bulletin 21-004. There are several ways to meet the intent of this requirement. Below are examples that may apply (this pertains to R-3 occupancies ONLY):

1. **Existing Fire Sprinkler Monitoring System.** The following shall apply for R-3 buildings with an existing fire sprinkler monitoring system:
   A. **Verify.** Verify system has a UL 864/CSFM listed Fire Alarm Control Unit (FACU).
   B. **Reference.** Provide DBI Permit Application (PA) number under which system was installed for reference on plans.
   C. **Permit Scope.** A licensed electrical contractor shall apply for a "Fire-Only" permit with the following scope: "*Expand existing sprinkler monitoring system to provide heat detection & notification for a newly installed ESS*".

2. **Existing Fire Alarm System**. The following shall apply for R-3 buildings with an existing fire alarm system:
   A. **Verify.** Verify system has a UL 864/CSFM listed Fire Alarm Control Unit.
   B. **Reference.** Provide DBI PA number under which system was installed for reference on plans;
   C. **Permit Scope.** A licensed electrical contractor shall apply for a "Fire-Only" permit with scope: "*Expand existing fire alarm system to provide heat detection & notification for a newly installed ESS*".

3. **Existing UL 539/CSFM listed Interconnected Heat Alarms (hard-wired with battery backup) AND Garage/Unconditioned ESS Area Not Exceeding 100 degrees F at All Times.** The following shall apply for R-3 buildings with UL 539 interconnected existing UL 539/CSFM listed interconnected heat alarms (hard-wired with battery backup) and garage/unconditioned ESS area not exceeding 100 degrees F at all times:
   A. **Permit Application.** A licensed contractor or design professional** shall apply for a DBI permit to install UL 539/CSFM listed interconnected heat alarms above the ESS area(s) (i.e., add additional heat alarms to existing system); may be included on the same permit as the ESS installation.
   B. **Contractor/Design Professional Information.** Plans must be stamped by a design professional or indicate a licensed contractor name and valid CA license number**.
   C. **Statement.** The plans shall include the following statement: "*The temperature in the garage/ESS area shall not exceed 100 degrees Fahrenheit at all times*".
   Note: *A "Fire-Only" permit is not required for UL 539 heat alarms installation.*

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4. **No Existing System AND Garage/Unconditioned ESS Area Not Exceeding 100 degrees F at All Times.** The following shall apply for R-3 buildings with no existing system and garage/unconditioned ESS area is not exceeding 100 degrees F at all times:
   A. **Permit Application.** A licensed contractor or design professional** shall apply for a DBI permit to install UL 539/CSFM listed interconnected heat alarms or UL 217/CSFM listed smoke alarms above the ESS area(s) AND UL 217/CSFM listed smoke alarm inside each dwelling unit in an approved location near the door leading to the garage/ESS space; may be included on the same permit as the ESS installation.
   B. **Contractor/Design Professional Information.** Plans must be stamped by a design professional or indicate a licensed contractor name and valid CA license number**.
   C. **Statement.** The plans shall include the following statement: "*The temperature in the garage/ESS area shall not exceed 100 degrees Fahrenheit at all times*".

   Note: *A "Fire Only" permit is not required for UL 539 heat alarm and UL 217 smoke alarm installations.*

5. **No Existing System AND Garage/Unconditioned ESS Area Exceeds 100 degrees F at Any Time.** The following shall apply for R-3 buildings with no existing system and garage/unconditioned ESS area exceeds 100 degrees F at any times:
   A. **Fire-Only Permit.** A licensed C-10 contractor shall apply for a Fire-Only Permit to install a dedicated function UL 864/CSFM listed FACU in an approved location at the dwelling unit.
   B. **Heat Detectors.** UL 521/CSFM listed heat detectors shall be installed at the ESS area(s) and compatible horns/audible appliances at the ESS at inside the dwelling unit, etc.

***Design Professional:** California State licensed Professional Engineer (PE) or architect; licensed contractors (electrical/C-10) shall obtain a letter from the building owner that includes verification statement and include a copy of letter on plans.*

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VII. ADDITIONAL REQUIREMENTS AND INFORMATION

1. **Impact Protection.** Comply with applicable requirements of 2025 CFC Section 1207.11.7.

2. **Rapid Shutdown of PV System.** The following conditions shall apply for rapid shutdown of a PV system:

   A. **PV System Installation.** PV system circuits installed on or in buildings shall include a rapid shutdown function of a type that deactivates the roof array and open the conductors coming from the roof array to reduce shock hazard for emergency responders in accordance with the National Electric Code (NEC) Section 690.12(A) through (D) and 2025 CFC Section 1205.4.1.

   B. **Existing PV Systems.** Existing PV systems shall be brought up to current code and also require rapid shutdown.

   C. **Rapid Shutdown Locations.** The following conditions shall apply for the location of rapid shutdown:

(1) **1-2 Units.** For 1-2 unit buildings, rapid shutdown shall be on the exterior and front of the building. The rapid shutdown shall be visible and accessible with proper signage. Standalone dwellings are allowed to have rapid shutdown on a different exterior side once placard exists showing location in front of the building.

(2) **3-4 Units.** For 3-4 unit buildings, rapid shutdown is allowed on the roof within ten (10) feet of the PV panels.

(3) **5 Units And Above.** For building 5 units and above, rapid shutdown is allowed on the roof and in the main electrical room.

D. **ESS Line Voltage Disconnect.** ESS must have line voltage disconnect in the same location if rapid shutdown only turns off PV strings.

3. **Verify Smoke/Carbon Monoxide Alarms.** Contractors will verify smoke and carbon monoxide alarms for R-3 the building as per SFFD Administrative Bulletins.

4. **Setbacks for PV on Roof.** PV on roofs shall comply with the California Fire Code. SFFD requires a three (3) foot setback on the street side of the roof as well as secondary roofs on the same dwelling. Dwellings on corner lots are required to have three (3) foot setbacks on both street sides. (Reference: CFC 1205.2.1.1).

5. **Verify UL 3741 (2020 Edition).** UL 3741 (2020 Edition) must be verified and approved by SFFD/Authority Having Jurisdiction.

6. **Skylights.** Thirty-six (36) inch wide pathway shall be provided to skylights.

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