

SANTA ROSA FIRE DEPARTMENT
FIRE PREVENTION
INFORMATIONAL BULLETIN

August 24, 2020



ENERGY STORAGE SYSTEMS
IN RESIDENTIAL GROUP R-3 & R-4 OCCUPANCIES

PURPOSE

In accordance with California Fire Code Sections 104.1, effective 9/1/2020 this informational bulletin is intended to assist energy storage system (ESS) designers and installers and to clarify Santa Rosa Fire Department's ESS requirements for residential Group R-3 & R-4 Occupancies, allowing the use of the California Office of the State Fire Marshal (OSFM) Intervening Code Cycle Final Express Terms package recently ratified by the Building Standards Commission (BSC). This informational bulletin is intended to allow these requirements to be implemented locally prior to the state's official adoption.

CODE REFERENCE

2019 California Code of Regulations Title 24, Parts: 2.5 California Residential Code (CRC), 3 California Electrical Code (CEC), Part 4 California Mechanical Code (CMC), Part 9 California Fire Code (CFC) (more specifically those sections identified in the Final Express Terms submitted by the OSFM and ratified by the (BSC) on 8/14/2020).

SCOPE

This informational bulletin shall apply to the installation, operation, maintenance, repair, retrofitting and testing of energy systems used for generating or storing energy in residential Group R-3 and R-4 Occupancies. It shall not apply to equipment associated with the generation, control, transformation, transmission, or distribution of energy installations that is under the exclusive control of an electric utility or lawfully designated agency.

Where approved, the aggregate nameplate kWh energy of all ESS in a fire area shall not exceed the maximum quantity specified for any of the energy systems identified. Where required by the fire code official, a hazard mitigation analysis shall be provided and approved in accordance with CFC Section 104.7.2 to evaluate any potential adverse interaction between the various energy systems and technologies.

PERMITS

For residential Group R-3 and R-4 Occupancies a fire construction permit in accordance with this informational bulletin and CFC 105.7.2 is required for all ESS systems exceeding 1.00 kWh.

Energy capacity is the total energy capable of being stored (nameplate rating), not the usable energy rating. For units rated in Amp-Hours, kWh shall equal rated voltage multiplied by the amp-hour rating divided by 1,000.

CONSTRUCTION DOCUMENTS

The following information shall be provided with the permit application:

1. Location and layout diagram of the room or area in which the ESS is to be installed.
2. Details on the separation assemblies enclosing the ESS.
3. The quantities and types of ESS to be installed.
4. Manufacturer's specifications, ratings and listings of each ESS.
5. Description of energy (battery) management systems and their operation.
6. A single-line diagram is required and shall indicate location and content of required signage.
7. Details on fire suppression, smoke or fire detection, thermal management, ventilation, exhaust and deflagration venting systems, if provided.
8. Support arrangement associated with the installation, including any required seismic restraint.

EQUIPMENT LISTING

ESS shall be listed and labeled for use in accordance with UL 9540, UL 1741 and UL 1973 standards shall be applicable where appropriate. ESS listed and labeled solely for utility or commercial use shall not be used for residential applications.

LOCATION

ESS shall be installed only in the following locations:

1. Detached garages and detached accessory structures.
2. Attached garages separated from the dwelling unit living space in accordance with CRC Section R302.6.
3. Outdoors or on the exterior side of exterior walls located not less than 3 feet from doors and windows directly entering the dwelling unit. *Note: For the purposes of this criteria a private garage not used for living purposes is not considered as a portion of the dwelling unit.*
4. Enclosed utility closets, basements, storage or utility spaces within dwelling units with finished or noncombustible walls and ceilings. Walls and ceilings of unfinished wood-framed construction shall be provided with not less than 5/8-inch Type X gypsum wallboard.

ESS shall not be installed in sleeping rooms, closets, spaces opening directly into sleeping rooms or in habitable spaces of dwelling units.

ENERGY RATING

Individual ESS units shall have a maximum rating of 20 kWh. The aggregate rating structure shall not exceed:

1. 40 kWh within utility closets and storage or utility spaces.
2. 80 kWh in attached or detached garages and detached accessory structures.
3. 80 kWh on exterior walls.
4. 80 kWh outdoors on the ground.

ESS installations exceeding the permitted individual or aggregate ratings shall be installed in accordance with CFC.

INSTALLATION

ESS shall be installed in accordance with California Electrical Code, this informational bulletin and the manufacturer's instructions and their listing. Inverters shall be listed and labeled in accordance with UL 1741 or provided as part of the UL 9540 listing. Systems connected to the utility grid shall use inverters listed for utility interaction.

Individual units shall be separated from each other by at least 3 feet except where smaller separation distances are documented to be adequate based on large-scale fire testing in accordance with 9540A. The testing shall be conducted or witnessed and reported by an approved testing laboratory and show that a fire involving one ESS will not propagate to an adjacent ESS, and where installed within buildings, enclosed areas and walk-in units will be contained within the room, enclosed area or walk-in unit for a duration not less than 2 hours. The test report shall be provided to the fire code official for review and approval in accordance with Section 104.7.2.

Externally operable means of simultaneously disconnecting conductors shall be readily accessible and located within sight of the battery system and capable of being locked in the open position. Where ESS input or output terminals are more than 5-feet from connected equipment, or where circuits from these terminals pass through walls or partitions the installation shall comply with the following:

1. A disconnecting means shall be provided at the ESS end of the circuit.
2. A second disconnecting means located at the connected equipment shall be installed where the disconnecting means in #1 is not within sight of the connected equipment.

Where the disconnecting means in (1) is not within sight of the disconnecting means of (2), placards or

directories shall be installed at the locations of all disconnecting means indicating the location of all other disconnecting means. Disconnecting means shall be legibly marked in the field.

A permanent plaque or directory denoting all electrical sources on or in the premises shall be installed at each service equipment location and locations of all electric power production sources capable of being interconnected, or at an approved readily visible location(s). The plaque or directory shall be marked with wording "CAUTION: MULTIPLE SOURCES OF POWER." Any posted diagrams shall be correctly oriented with respect to the diagram's location.

FIRE DETECTION

Rooms and areas within dwelling units, basements, and attached garages in which ESS are installed shall be protected by smoke alarms in accordance with CRC Section R314. A listed heat detector shall be installed in locations within dwelling units and attached garages where smoke alarms cannot be installed based on their listing.

PROTECTION FROM IMPACT

ESS installed in a location subject to vehicle damage shall be protected by approved barriers. (See *Figure A below*)

ELECTRIC VEHICLE USE

The temporary use of an owner or occupant's electric powered vehicle to power a dwelling unit while parked in an attached or detached garage or outdoors shall comply with the vehicle manufacturer's instructions and the CEC.

VENTILATION

Indoor installations of ESS that include batteries that produce hydrogen or other flammable gases during charging shall be provided with mechanical ventilation in accordance with CMC and the following:

1. The exhaust ventilation system shall be designed to limit the maximum concentration of flammable gas to 25% of the lower flammable limit (LFL) of the total volume of the room, area or walk-in unit during the worst-case event of simultaneous charging of batteries at the maximum charge rate, in accordance with nationally recognized standards.
2. Mechanical exhaust ventilation shall be provided at a rate of not less than 1 cu. Ft. -/min/ft. of floor area of the room, area, or walk-in unit. The ventilation shall be either continuous or shall be activated by gas detection system in accordance with the following:
 - a. Mechanical exhaust ventilation shall be provided capable of powering the required load for a duration of not less than 2 hours.
 - b. Required mechanical exhaust ventilation systems shall be installed in accordance with the manufacture's installation instructions and the CMC.
 - c. Required mechanical exhaust ventilation systems shall be supervised by an approved central station service in accordance with NFPA 72 or shall initiate an audible and visible signal at an approved constantly attended on-site location.
 - d. Where required rooms, areas, and walk-in units containing ESS shall be protected by an approved continuous gas detection system that complies with CFC Section 916 and the following:
 - i. The gas detection system shall be designed to activate the mechanical ventilation system when the level of flammable gas in the room, area, or walk-in unit exceeds 25% of the LFL.
 - ii. The mechanical ventilation system shall remain on until the flammable gas detection is less than 25% of the LFL.

- iii. The gas detection system shall be provided with a minimum of 2 hours of standby power in accordance with this bulletin.
- iv. Failure of the gas detection system shall annunciate a trouble signal at an approved central station service in accordance with NFPA 72 or shall initiate an audible and visible trouble signal at an approved constantly attended on-site location.

TOXIC AND VERY TOXIC GAS

ESS that have the potential to release toxic or highly toxic gas during charging, discharging and normal use conditions shall not be installed within residential Group R-3 or R-4 occupancies.

FIGURE A

