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BESS Model Ordinance and Guide

Contents

Introduction

This Battery Energy Storage Systems (BESS) Model Ordinance and Guide is intended to assist local planning authorities (LPAs) with the development of their own ordinances and regulations for utility-scale BESS land use. This ordinance is provided as a template for LPAs to adapt based on their local processes and requirements and does not substitute for zoning regulations that identify the proper locations and regulations that address BESS from a land use perspective. LPAs are not required to adopt any components of the template ordinance language.

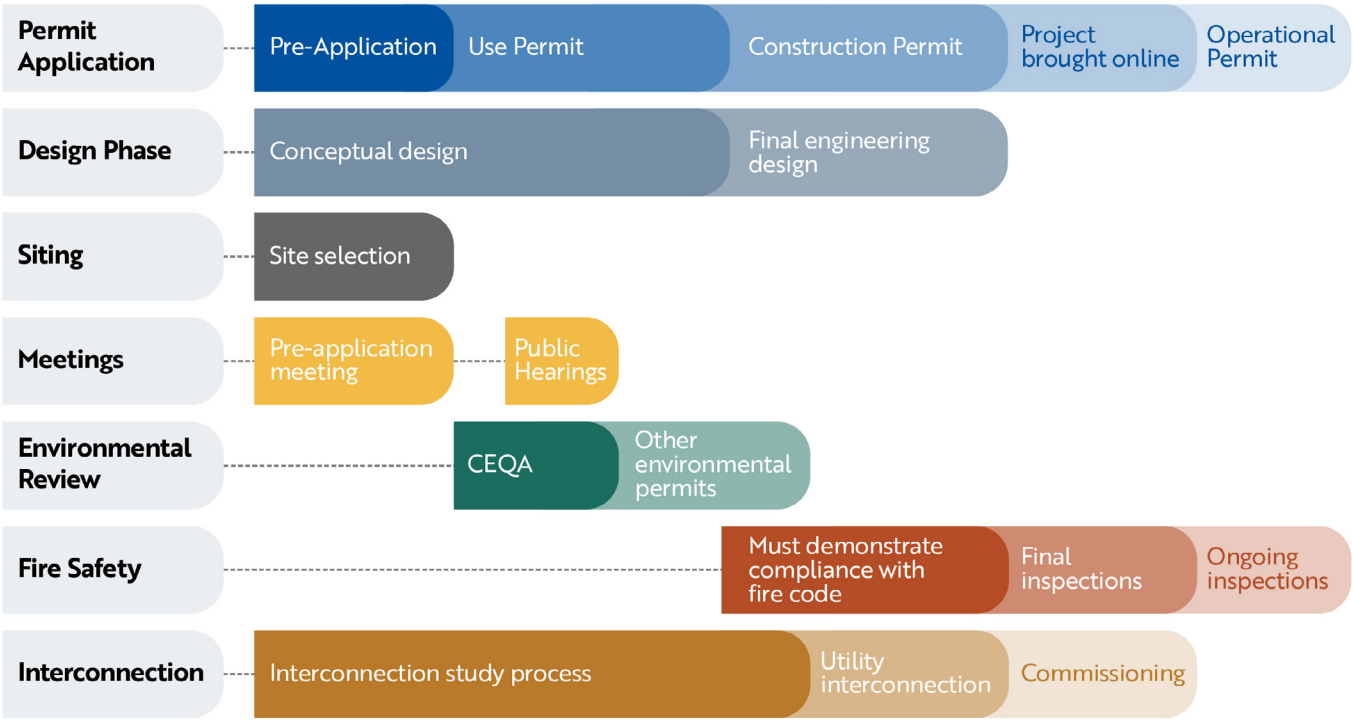
Projects will still require local approvals, including but not limited to construction and operational permits from fire and building code officials. Additional approvals — such as a Coastal Development Permit — may also be necessary depending on the project location. Jurisdictions are encouraged to involve relevant local authorities and stakeholders when tailoring this ordinance for adoption.

The rest of this section provides background on the following: 1) an overview of the BESS permitting process; 2) an overview of the code adoption cycles related to BESS; 3) the code adoption process, and; 4) using the BESS Model Ordinance and Guide. This background is provided to provide context for topics that come up throughout the BESS ordinance template, which addresses the installation, operation, maintenance, and decommissioning of a battery energy storage system (a definition of Battery Energy Storage system is provided in the "Applicability" section).

Overview of BESS Permitting Process

The figure below depicts the core permitting process for utility-scale BESS in California. As described above, there may be additional permits that are needed for a BESS project depending on the site. For example, projects developed on a site regulated by the California Coastal Commission may require a coastal development permit and projects that have the potential to impact a protected species may require an Incidental Take Permit from the California Department of Fish & Wildlife (CDFW).

Figure 1. Core Permitting Process for Utility-Scale BESS in California



As shown in the diagram, the land use permit (also referred to a "use permit" in this Guide) is the first permit to be issued and is followed by construction and operational permits. Projects tend to be at a conceptual design at the time of a use permit application, which has implications for the types of requirements and tests that are applicable for a use permit versus for other permits that may be required later in the development process . For example, many of the fire safety-related analyses and tests require the engineering design to be finalized to yield accurate results; therefore, many of these tests may be appropriate to exclude, or include as a condition of approval for the use permit. An operational permit must typically be issued annually to ensure that BESS remain compliant with local fire code(s) throughout the entire project lifetime.

Overview of Fire Codes and Standards

BESS projects must demonstrate compliance with the applicable local fire code(s) to be issued a construction permit. In California , fire codes are adopted at the county, city, or town level and must, at minimum, align with the California Fire Code (CFC) requirements. In other words, the local fire code can have more stringent requirements than the CFC, but not less stringent requirements. Therefore, any ordinance language deferring to safety requirements in local county, city, or town fire codes inherently requires compliance with the CFC.

Interactions Between the California Fire Code, International Fire Code, and NFPA 855

The International Fire Code (IFC) is a code template developed by the International Code Council (ICC) that provides comprehensive fire prevention and safety regulations. The IFC is updated every three years. The CFC is based on the IFC and is updated on a triennial cycle using the latest vintage of the IFC. The California Office of the State Fire Marshal (OSFM) is responsible for adoption of the CFC and makes amendments to the IFC that is specific for the state.

The current (2024) IFC bases many of its ESS requirements on the 2023 National Fire Protection Association (NFPA) standards, particularly NFPA 855, the Standard for the Installation of Stationary Energy Storage Systems. The NFPA develops and publishes consensus standards and template codes intended to minimize the risk and effects of fire and other hazards. NFPA standards are widely used by fire departments, building officials, and industry professionals to ensure safety in construction, operation, and emergency response. However local county, city, or town fire codes will determine requirements for localities in California. The NFPA updates its standards every three years, with a 2026 edition to be released in fall 2025.

Once the CFC is updated and adopted into Title 24 of the California Code of Regulations, local authorities are typically required to update their own fire codes for local enforcement within 180 days. These updates must be adopted by ordinance by the relevant governing body[1]. Jurisdictions may amend any standards if necessary to address local climatic, geological, or topographical conditions, but standards cannot be less restrictive than those outlined within Title 24. These amendments must be separately filed for each condition and must be submitted anew for each code cycle.

References to CFC, IFC, and NFPA 855 in Guide

This guide references local fire code in the template ordinance language since these will be the most stringent requirements applicable to a BESS project. Reference to the local fire code in ordinance language is intentionally left without a year/vintage specified so that the ordinance will be automatically updated for each new vintage of code that is enacted.

This guide also includes information on CFC requirements where applicable in yellow call-out boxes to provide context on the minimum requirements common to all localities across the state.

[1] Contract cities, which outsource municipal services to another municipality, county government, or special district, must adopt their own codes as well. These codes will typically incorporate the Authority-Having Jurisdiction's code by reference.

Overview of Local Land Use Ordinance Adoption Process

The adoption of a land use ordinance is guided by specific procedural requirements managed by LPAs in compliance with relevant California laws and regulations. A brief summary of the common steps in the land use ordinance adoption process is outlined below:

1. **Formal initiation process:** The process for developing and adopting a land use ordinance is often initiated through a resolution of intention issued by the local planning department or a request from the local Board of Supervisors, City Council, or other similar governing body
2. **Issuance of staff proposal:** The planning department issues a proposal for a land use ordinance
3. **Determination of CEQA compliance:** Any discretionary action or permit is required to submit an Environmental Impact Report (EIR) as defined by the California Environmental Quality Act (CEQA). Ordinance adoption is a discretionary action and therefore must undergo a CEQA-compliant EIR process. A full environmental review under CEQA may not be needed if the relevant local planning authorities issue a Negative Declaration or Mitigated Negative Declaration of significant impacts
4. **Hold public hearings:** A minimum of two public hearings are typically held during the ordinance adoption process, unless local planning authorities had previously issued a Negative Declaration or Mitigated Negative Declaration
    a. **Planning level public hearing:** The planning department makes its recommendation regarding ordinance adoption and discusses the EIR findings
    b. **Board of Supervisors/City Council public hearing:** The Board of Supervisors, City Council, or other similar governing body considers the environmental findings and approves (or rejects) the ordinance

LPAs may have additional processes, such as meetings or additional public hearings, that are included or required as part of the land use ordinance adoption process.

Using the BESS Model Ordinance and Guide

Sections of this guide in ***'italics'*** may be adopted into a local land use ordinance. Specific names, titles, or selected values that should be tailored to the adopting jurisdiction are indicated in brackets (e.g., [County/City/Town]). Sections in blue call-out boxes provide informational background and context for use by LPAs as they develop a BESS ordinance. Although the local fire code is referenced in the ordinance language, given the minimum compliance of local fire code with CFC as discussed in the "Overview of Code Adoption Cycles" above, requirements in the current edition of the CFC (2022) are discussed in commentary to provide context for minimum requirements that BESS will be subject to.

Ordinance regulations and additional context were developed in consultation with local planning authorities, developers, fire safety experts, state agencies, and land use/environmental lawyers through a series of one-on-one interviews, focus groups, and written comments. However, regulations provided within this document may not be comprehensive enough to meet all needs of an LPA. **Local officials should solicit legal and regulatory advice from their own teams to ensure compatibility with local laws and regulations.**

Acronym Table

AHJ	Authorities Having Jurisdiction
BESS	Battery Energy Storage System
BTM	Behind-the-Meter
CFC	California Fire Code
CIP	Critical Infrastructure Protection
COD	Commercial Operation Date
FEMA	Federal Emergency Management Agency
FHSZ	Fire Hazard Severity Zones
HMA	Hazard Mitigation Analysis
IDLH	Immediate Dangerous to Life or Health
ICC	International Code Council
IFC	International Fire Code
LPA	Local Planning Authority
LSFT	Large Scale Fire Testing
NIOSH	National Institute for Occupational Safety and Health
NERC	North American Electric Reliability Corporation
NFPA	National Fire Protection Association
PEL	Permissible Exposure Limits
PCS	Power Conversion System
SGMA	Sustainable Groundwater Management Act
UL	Underwriters Laboratories

Definitions

Note: Definitions should be reviewed for applicability to local use as well as changing energy storage technology. Several definitions are adapted from the American Clean Power (ACP) Model Ordinance for Utility-Scale Battery Energy Storage Systems[2].

Augmentation: Process of adding capacity, components, or technology upgrades to an existing Energy Storage System (ESS) to increase its performance, efficiency, or lifespan without fully replacing the original system.

Authority Having Jurisdiction: government agencies, departments, or officials that are legally empowered to review, approve, and enforce compliance with applicable laws, codes, and regulations. In the renewable permitting process, this may include local planning departments, local building departments, local and state fire officials, and/or state agencies.

Battery: One or more cells connected electrically in series, parallel, or both, to provide the required operating voltage and current levels.

Battery Energy Storage System (BESS): See **Energy Storage System (ESS)**. BESS refers specifically to chemical energy storage systems utilizing electrochemical cells to store and discharge electrical energy.

Behind-the-Meter (BTM) Battery Energy Storage System: a Battery Energy Storage System (BESS) that is located on the customer's side of the utility meter.

Conditional Use Permit: A type of discretionary permit that requires review and approval from the applicable local jurisdiction, such as planning commission or zoning board.

Commissioning: The process of verifying and documenting that an Energy Storage System and its associated components are designed, installed, tested, and capable of being operated and maintained according to relevant operational and safety standards as determined by the interconnecting utility or balancing authority.

Decommissioning: The safe dismantling, removal, and proper disposal or recycling of all or parts of an Energy Storage System, including batteries and associated infrastructure, following the end of its useful life or termination of operation.

[2] "Model Ordinance: Utility-Scale Battery Energy Storage Systems." American Clean Power (ACP). https://cleanpower.org/resources/model-ordinance-utility-scale-battery-energy-storage-systems/

Dedicated-Use Building: A structure that is specifically designed and constructed to house Energy Storage System equipment and is used exclusively for that purpose, with no unrelated occupancy or use.

Discretionary Permit: A permit that requires a decision-maker to exercise judgement and deliberation, rather than only applying a set of rules. This type of permit includes conditional-use and special-use permits.

Energy Storage System (ESS): One or more devices, assembled together, capable of storing energy to supply electrical energy at a future time. ESS may include batteries, control systems, inverters, safety systems, metering, and other associated components[3].

Engineered Analysis: A technical evaluation prepared by a qualified professional that demonstrates that a proposed fire protection solution meets or exceeds the intent of the applicable fire code.

Facility: A site or structure where one or more Battery Energy Storage Systems (BESS) are installed and operated, including all associated equipment and infrastructure.

Generation Tie (Gen-Tie): A transmission or distribution line that connects a BESS facility to the electrical grid, enabling the transfer of stored or generated energy to offsite locations.

International Fire Code (IFC): A model code developed by the International Code Council (ICC) that provides comprehensive fire prevention and safety regulations. The California Fire Code (CFC) is largely conformant with the IFC, with some modifications including the incorporation of specific NFPA standards.

Large-Scale Fire Testing (LSFT): This testing method assesses the fire risks and explosion hazards associated with BESS. LSFT evaluates if a fire originating in one BESS enclosure may propagate to an adjacent BESS.

Local Planning Authority: The local government agencies, departments, or officials that are legally empowered to review, approve, and enforce land use-specific laws, codes, and regulations.

Ministerial Permit: A permit that is automatically issued if an application meets all necessary requirements.

National Fire Protection Agency (NPFA): A U.S.-based organization that develops and publishes consensus codes and standards intended to minimize the risk and effects of fire and other hazards. NFPA standards are widely used by fire departments, building officials, and industry professionals to ensure safety in construction, operation, and emergency response.

NFPA 855 (Standard for the Installation of Stationary Energy Storage Systems): a national fire code published by the NFPA that provides minimum safety requirements for the installation of stationary ESS, including battery systems. NFPA 855 covers topics such as fire safety, spacing, containment, thermal management, signage, emergency response planning, and coordination with local fire authorities.

Non-participating Property Line: The property line of a parcel in which the owner has not entered a written agreement with the facility owner to allow the facility owner to lease or purchase part or all of their property.

Participating Property Line: The property line of a parcel in which the owner has entered a written agreement with the facility owner to allow the facility owner to lease or purchase part or all of their property.

Special-Use Permit: A discretionary permit that allows certain land uses not typically permitted by right in a zoning district but may be approved if specific conditions are met and the use is found compatible with surrounding properties. They are functionally similar to Conditional Use Permits, with the main difference being the terminology preferred by the local jurisdiction.

Stationary Energy Storage Systems: An Energy Storage System that is permanently installed at a fixed location and not designed for transportation or mobile use.

Thermal Runaway: A condition in which an increase in the internal temperature of a battery energy storage system leads to a feedback loop of further increases in temperature. This can lead to decomposition of materials, release of flammable gases, and potentially fire or explosion.

Underwriters Laboratories (UL): UL is a not-for-profit organization dedicated to developing and operating testing laboratories to evaluate materials, products, and systems for hazards that pose risks to life and property.

[3] Source: American Clean Power (ACP) Model Ordinance: Utility-Scale Battery Energy Storage Systems

Applicability

Requirements of this Ordinance are to apply to all battery energy storage systems (BESS) with a rated nameplate capacity greater than or equal to 1 MWh permitted, constructed, or commissioned in [County/City/Town] after the effective date of this Ordinance. This Ordinance pertains to the issuance of a Use Permit by the [County/City/Town Planning Commission/Department].

This ordinance applies to all BESS technology types. This ordinance does not apply to behind-the-meter (BTM) BESS. This ordinance does apply to the energy storage components of any hybrid system. This ordinance does not apply to the maintenance or repair of facilities permitted and/or installed prior to the effective date.

A single facility shall include any infrastructure included, but not limited to, electricity-generating equipment, battery energy storage modules, transformers, inverters, collection systems, and access roads designed to support delivery of electricity across a single gen-tie route to a single point of interconnection within California on the CAISO, LADWP, WAPA, BANC, SMUD, PacifiCorp, TID or IID networks.

A BESS facility permitted under this [County/City/Town Ordinance Name] may be repaired or augmented without obtaining a new or amended use permit, provided that the Augmentation is substantially conformant, as defined in [local General Plan], to the intent of the original permit. The permittee must provide notice to the [County/City/Town Planning Department] at least [90] business days prior to commencement of Augmentation activities at the site and shall submit an updated site plan that identifies any changes resulting from Augmentation that were not contemplated in the initial land use permit application, if applicable.

[County/City/Town Planning Department] must provide public notice, published on the [County/City/Town website or other form of notification], at least [180] days in advance of any changes to use permit requirements. The notice does not need to include specific details of the upcoming changes, only that the requirements will be changing.

Applicability Threshold Commentary: This ordinance is intended to be applicable to all BESS technologies greater than or equal to 1 MWh. 1 MWh is the lower end of the size of a utility-scale BESS and was therefore deemed an appropriate threshold for this ordinance. Units of MWh were selected because energy provides a consistent and meaningful basis for characterizing the overall scale of BESS.

Existing Requirements in Local Code/Ordinances Commentary: It is possible that local code/ordinances already address thresholds and processes for modifications. If this threshold for modifications is already covered, that language may not be needed in the BESS ordinance.

Substantial Conformance Commentary: Both during the development phase prior to construction and during any augmentation periods after construction, it is common for BESS developers to make small modifications to the project area and footprint to accommodate situations including,but not limited to, changes in equipment supply, title insurance requirements, any applicable environmental mitigation measures, and access road needs. In many cases, BESS developers are required to submit revised land use permit applications when undergoing these minor modifications. To improve the efficiency of BESS permitting and minimize iteration between planning staff and developers, LPAs should use a definition of substantial conformance that would allow for minor deviations that do not materially change the intent of the original land use permit approval. Examples of substantial conformance may include:

- An increase in the site footprint by up to [10%], provided the project remains compliant with the setback conditions of the underlying zoning district and the expanded site does not contain sensitive receptors
- An increase in the height of structures by up to [10%], provided the project remains compliant with the height restrictions of the underlying zoning district
- Changes in the layout and orientation of equipment, provided the project remains compliant with the setback conditions of the underlying zoning district
- Any other change that reduces the overall environmental impact of the project

Local General Plans may already include a definition of substantial conformance that is applicable to BESS. If such definition is not already included or a modified definition is needed for BESS, LPAs can add one to the above ordinance language.

If Augmentation is not already covered in existing regulations, LPAs should consult with local fire code officials on requirements that may be needed within the use permit to ensure continued safety of the installation. Most safety evaluations of an augmented system will fall under a construction and/or operational permit rather than a use permit.

Notice of Upcoming Code Changes Commentary: By providing a public notice of upcoming code changes (suggested 180-day notice above), developers are given advanced warning that projects in preparation for use permit applications for submittal and review will be subject to revised regulations. This may be covered through the formal initiation process that is outlined in the "Overview of Local Ordinance Adoption" section above. Based on this notice, developers may wait to submit an application to avoid encountering regulations that have changed after application submission. Developers are still encouraged to engage early with LPAs even if a notice of upcoming code changes has not been issued to align the preparation of a permit application with any anticipated code revisions and avoid time-consuming or costly design changes.

Permit Types and Application Requirements

Discretionary vs. Ministerial Permit by Land Use Classification

BESS permits may be awarded on a discretionary or ministerial basis through an application for a Use Permit, depending on the existing land use designation of the project site footprint. The table below outlines the permit type (discretionary or ministerial) by land use classification.

Table 1. Permit Type by Land Use Classification

Land Use	Permit Type
Residential	Discretionary
Commercial (Neighborhood Commercial and General Commercial)	Discretionary
Commercial (Regional Commercial and Planned Commercial)	Ministerial (Permitted / Zoning Clearance)
Industrial	Ministerial (Permitted / Zoning Clearance)
Degraded or nonproductive agricultural lands	Ministerial (Permitted / Zoning Clearance)
Agricultural (other than degraded or nonproductive lands)	Discretionary
Mixed-Use	Discretionary
Public Lands / Open Space / Recreation	Discretionary

If projects sited across multiple parcels with different land use designations include any parcels that require a discretionary permit, the project must pursue a discretionary use permit; if all parcels are eligible for a ministerial permit, then the project may pursue a ministerial permit.

Permit Terminology Commentary: The terminology "Discretionary" is used above but LPAs may adjust to use the terms "Conditional" or "Special Use" depending on the terminology preferred in their jurisdiction. The terminology "Ministerial" is used above but LPAs may adjust to use the term "By-Right" depending on the terminology preferred in their jurisdiction. Some California jurisdictions divide ministerial permits into two categories - "Permitted Uses," referring to structures that can be constructed outright, and "Zoning Clearance," referring to structures that must go through an administrative review process to confirm alignment with existing land use regulations. Either one may be appropriate for BESS under certain land use classifications, depending on LPA preferences around site plan review.

Overview of Rationale for Discretionary and Ministerial Permitting for BESS Commentary: Both ministerial and discretionary permits require compliance with existing codes and regulations. Both permit types can require environmental review, aesthetic guidelines, and additional safety requirements, depending on criteria outlined for each permit type.

Discretionary permits require projects to go through the California Environmental Quality Act (CEQA) process for determining environmental impact. Projects may not require a full Environmental Impact Report (EIR) under CEQA if the project is issued a Negative Declaration or Mitigated Negative Declaration of significant impacts, meaning the project would undergo a relatively simpler environmental review process. Discretionary permits also require approval from a predesignated local approval body, often a County Board of Supervisors, for projects requiring a full EIR. Discretionary permits may be required in areas where LPAs want to exercise discretion in allowing a BESS project to be built.

Ministerial permits offer a streamlined permitting process that is insulated from discretion and that does not go through the CEQA process.[4] Ministerial permits are issued by-right if the project satisfies all pre-defined criteria for permit application completeness. Pre-defined criteria can include environmental, safety, and aesthetic requirements and require LPA review of the project application to deem whether the permit application meets all criteria and is "complete." Ministerial permits may be appropriate for zones in which LPAs are comfortable with land use compatibility with the project type. Allowing by-right construction of BESS in particular predesignated regions can help LPAs direct BESS developers towards selecting project locations viewed as most amenable for BESS development. Although CEQA is not required for ministerial permits, a thorough environmental review process can still be required as a base condition and conducted on a programmatic basis across any tracts eligible for a ministerial permitting designation.

Many behind-the-meter energy uses, such as electric vehicle charging, small thermal generators, and rooftop solar installations, are eligible for ministerial permits, even in residential zones. This guide, however, focuses on large-scale clean energy projects that may not be as well-suited for ministerial permits in all land use zones.

Examples of Ministerial Permitting for Energy and Industrial Infrastructure Commentary: Permitting standards for BESS and other clean energy infrastructure should generally align with existing standards for public utility or other energy infrastructure. Ministerial permitting already exists for energy and industrial infrastructure in many zoning districts across California. For example:

- Kings County allows the development and construction of oil and gas wells by-right in industrial and agricultural zones.
- Sacramento County allows major utility uses by-right in commercial, industrial, agricultural, and recreation zones (see Table 3.1-F). These are defined in Chapter 7 of the Zoning Code as "generating plants, electrical substations, above ground electrical transmission lines, refuse collection or disposal facilities, water reservoirs, water or wastewater treatment plants, and similar facilities of public agencies or public utilities."
- Los Angeles County allows electric generating stations with a "ministerial site plan review" in industrial zones M-1.5, M-2, and M-2.5 (see Table 22.22.030-B), meaning these projects can be approved by-right after the completion of a defined set of pre-application criteria is verified.

It is important to note that some energy-related uses retain discretionary elements in the approval process despite their ministerial classification in the zoning code. For example, the CEC retains exclusive discretionary permitting authority for thermal generating stations larger than 50 MW. That said, there is clear precedent for classifying energy uses as ministerial at the land use level.

[4] Ministerial permits do not have to go through the CEQA process, unless any environmental impacts are identified as part of the pre-application process that would trigger discretionary review at the state level (in which case, the project would go through the discretionary permitting process) (CA Code of Regulations Tit. 14, § 15268).

Alternative Pathways to Ministerial Permitting for BESS Commentary: An alternative solution to establishing an entire land use type as eligible for ministerial permits that would also provide LPAs with the ability to classify particular tracts as suitable for BESS development is the creation of a BESS overlay or combining district, which would sit on top of existing zoning designations and create special allowances for BESS construction that abides by certain development standards included in the ordinance.

There is some precedent for using overlay or combining districts to streamline clean energy development in California. Kern County's Wind Energy Combining District, for example, allows for the by-right construction of wind energy systems that comply with a defined set of base conditions. The county retains discretion over the boundaries of the district, which ensures that new developments comply with these conditions.

Industrial Land Use Permits Commentary: Industrial zones are generally well-suited to accommodate utility-scale BESS infrastructure due to their existing land use designations and supporting infrastructure. Industrial zones are also likely to be in areas with less sensitive habitat and wildlife, therefore making it appropriate to conduct an environmental review at the local level rather than through CEQA.

Residential Land Use Permits Commentary: In contrast to industrial land uses, residential areas are primarily intended for housing and different types of dwellings, meaning that siting BESS facilities in these areas may warrant a greater degree of discretion to ensure compatibility with existing uses.

Commercial Land Use Permits Commentary: Commercial zones can vary in terms of density and allowable uses, with many LPAs differentiating between high-density commercial areas in city centers or adjacent to residential uses and lower-density commercial areas located off freeways or arterial roads. LPAs should consider the underlying land use designations governing commercial development to determine the correct approach for permitting BESS in these zones. For example, a project located in a central neighborhood with proximity to residential and mixed-use spaces may warrant discretionary review, while a project located in a freeway-adjacent industrial park in proximity to a utility substation may be better suited for ministerial review.

It is worth noting that AB 130 and SB 131, which were signed into law in June 2025, require the California Office of Land Use and Climate Innovation to develop a map of urban sites that will be eligible for streamlined CEQA review for infill housing by no later than July 1, 2027. Further, SB 6, passed in 2022, preempts certain housing bans in commercial zones, although LPAs retain discretion to require Conditional Use Permits in affected tracts. In any industrial or commercial zones where ministerial permitting may be appropriate for BESS development, LPAs should ensure that appropriate setbacks from residential uses are incorporated as base conditions for land use permit applications.

Agricultural Land Use Permits Commentary: The table above recommends making degraded or nonproductive agricultural lands eligible for ministerial permits; because these lands are degraded or nonproductive, there are reduced opportunities for agricultural activities and clean energy may be deemed as compatible uses. Clean energy projects, unlike other types of commercial or industrial developments, are temporary installations and lands used for these projects can be reverted to their pre-project state at the end of the project's useful lifetime, typically 25-35 years. This may, in some cases, allow for the degraded or nonproductive land to recover and be used again for agricultural activities after the useful life of the project. Clean energy projects may also be favorable for degraded or nonproductive lands to allow landowners an alternative means of income while their land cannot be used for agricultural activities. BESS may be even more favorable to site on agricultural land compared to solar given its smaller footprint and ability to continue using surrounding land.

The definition of "degraded or nonproductive" should be determined by each LPA based on their familiarity with the local land types and uses. For example, Kings County developed its own definitions of priority agricultural land to provide guidance to solar developers on preferred site locations (See Sec. 1112). Several options for agricultural land types that could be eligible for ministerial permits are discussed below.

Options for Agricultural Lands Eligible for Ministerial Permits - SGMA Lands

One option that LPAs could reference in defining "degraded or nonproductive lands" eligible for ministerial permits is the Sustainable Groundwater Management Act (SGMA) of 2014. These lands, which have typically been identified as critically overdrafted basins by the California Department of Water Resources, may be well-suited for BESS development given reduced opportunities for irrigation and agricultural uses and the temporary nature of BESS installations to enable resuming agricultural activities after the useful lifetime of the BESS if water levels have been restored. The figure below provides a map of basins that are designated as critically overdrafted in California.

Figure 2. SGMA Critically Overdrafted Basins[5]

[5] California Department of Water Resources. Critically Overdrafted Basins. https://water.ca.gov/programs/groundwater-management/bulletin-118/critically-overdrafted-basins.

Options for Agricultural Lands Eligible for Ministerial Permits – CA Department of Conservation Agricultural Land Classifications

Another option that LPAs could reference in determining agricultural lands eligible for ministerial permits are the agricultural land classifications from the California Department of Conservation.[6] Prime Agricultural Land, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance are deemed particularly well-suited for agricultural activities and therefore may warrant a discretionary permit to ensure compatibility between BESS and existing land uses. If LPAs determine that other agricultural lands beyond those listed are compatible with BESS, those projects could be made eligible for ministerial permits. The map below illustrates agricultural land use classifications as defined by the California Department of Conservation, as of the 2022 Farmland Conservation Report.

Figure 3. California Department of Conservation Land Use Classifications

[6] California Department of Conservation. Important Farmland Categories. https://www.conservation.ca.gov/dlrp/fmmp/Pages/Important-Farmland-Categories.aspx.

Mixed and Public Land Use Permits Commentary: Mixed-use and public lands represent special cases and should also be evaluated with greater scrutiny, given their diverse functions and heightened public interest. "Open Space" is included with public lands and recreation in the table above to require a discretionary permit. Based on local General Plans[7], LPAs may assess whether "Open Space" lands may be eligible to receive a ministerial permit.

Fire Hazard Severity Zones Commentary: The ordinance template does not disallow BESS from being sited in Fire Hazard Severity Zones (FHSZs). FHSZs are geographic areas classified by the California Department of Forestry and Fire Protection (CAL FIRE) as Moderate, High, or Very High FHSZs. Classifications are determined based on the likelihood and potential behavior of wildfire in that area.

The additional threat of wildfires for BESS sited on Moderate, High, or Very High FHSZs should be addressed through vegetation control, fire safety tests, hazard mitigation analysis, and emergency response plans (see more details in "Vegetation Management" and "Fire Safety" sections for these requirements). Additional best practices that can be required (for any development project, inclusive of BESS development) by LPAs to mitigate risks related to Moderate, High, or Very High FHSZs according to developers who participated in focus groups include:

- Minimum mandated clearances from vegetated property lines to create natural firebreaks.
- Dedicated water availability on site (hydrants or tanks) for defensive firefighting operations in case of wildfire.
- Provision of firewalls adjacent to BESS containers in FHSZs if BESS containers do not come with pre-designed fire rated enclosures for a minimum of 1 hour/2 hours.

FEMA Floodplains Commentary: The ordinance template does not prevent BESS from being sited on Federal Emergency Management Agency (FEMA) floodplains. A FEMA floodplain is land identified by FEMA as having a defined level of flood risk. This designation is often used to determine insurance requirements and building codes. Some examples of best practices based on input from developers who participate in focus groups include:

- Having BESS container floors and other equipment to be at least 6" above maximum expected Base Flood Elevation.
- Having all structures to be designed to withstand a certain amount of standing water for several hours.

All cabling and other electrical infrastructure to be selected to be suitable for wet locations.

[7] Local General Plans refers to the foundational long-term planning documents that counties and cities in California are required to adopt per California Government Code §65300

Application Requirements

Overview of Application Requirements Commentary: Application requirements are divided into the following categories in this section:

1. Pre-application Conditions for Ministerial Permits
2. Application Conditions for Discretionary Permits
3. Conditions of Approval for Use Permits (Ministerial and Discretionary)
4. Additional Considerations for Use Permits (Ministerial and Discretionary)

Applications for both ministerial and discretionary permits should include detailed project information and site plans, an assessment of environmental and cultural impacts, any mitigation plans that may be required based on the results of these assessments, and preliminary emergency response plans. A key difference between ministerial and discretionary permit requirements is the timeline of submission of some materials. Projects eligible for a ministerial permit submit all documentation required for approval along with permit application; because this documentation is prepared ahead of the application, these materials are referred to as "pre-application conditions."

Discretionary permits, on the other hand, involve an ongoing review process led by the LPA in accordance with CEQA with some elements of the application process, including public hearings and the preparation and submittal of environmental reports, taking place after the permit application is submitted and prior to the LPA's issuance of discretionary approval. Therefore, materials for a discretionary permit are referred to as "application conditions."

Pre-Application Conditions for Ministerial Permits

An application for a ministerial land use permit shall include the following information:

1. A project summary, including, to the extent available:

A. A narrative description of the project including relevant context in non-technical terms and including the project location

B. A description of the applicant, project owner and operator; including the names, addresses, and phone numbers of the applicants, owners and operators.

C. Total nameplate capacity and intended maximum discharge duration of the BESS facility

D. Typical equipment manufacturers of key equipment (modules, inverters, racking system)

E. Electrical diagram detailing the system layouts and interconnection

2. A preliminary site plan for the installation of the BESS facility showing:

A. The planned location of each of the primary structures

B. Property lines (including identification of adjoining properties), setback lines, public access roads and turnout locations

C. Substation(s), including electrical cabling from the BESS modules to the substation's ancillary equipment, proposed options for intertie transmission lines from the facility to the utility substation with clearly identified county or city-maintained roads, public or private access easements

Note: public access easements, including use of public road rights-of-way, may require the processing of a franchise agreement)

D. Layout of all structures within the geographical boundaries of any applicable setback

Letters of consent to process the application from all surface property owners on which the BESS facility is located, or signature of the property owners on the application

3. *Preliminary Emergency Response Plan, as outlined in the "Fire Safety" section of this ordinance*

4. *A summary of the community outreach and education efforts undertaken and planned by the applicant, including a description of any public meetings and / or meetings with elected officials*

5. *Any reports, approvals or requirements demonstrating compliance with any mitigation measures incorporated into an environmental document (such as a programmatic EIR) adopted for the implementation of ministerial permitting for specific parcels*

6. *Demonstration that the project will not present adverse environmental impacts incremental to those already contemplated in the environmental document (such as a programmatic EIR) adopted for the underlying zoning district. This may include the preparation of resources such as:*

   A. Phase I Environmental Site Assessment

   B. Cultural Resources Survey

   C. Traffic Impact Assessment

7. *Any other information required by the [County/Town/City] as part of its zoning regulations, including all studies, reports, certifications, and approvals demonstrating compliance with the provisions of all applicable federal, state, and local regulations*

Application Conditions for Discretionary Permits

An application for a discretionary land use permit shall include the following information:

1. *A project summary, including, to the extent available:*

   A. A narrative description of the project including relevant context in non-technical terms and including the project location

   B. A description of the applicant, project owner and operator; including the names, addresses, and phone numbers of the applicants, owners and operators.

   C. Total nameplate capacity and intended maximum discharge duration of the BESS facility

   D. Typical equipment manufacturers of key equipment (modules, inverters, racking system)

   E. Electrical diagram detailing the system layouts and interconnection

2. *A preliminary site plan for the installation of the BESS facility showing the planned location of each of the primary structures, property lines (including identification of adjoining properties), setback lines, public access roads and turnout locations, substation(s), transmission lines, and layout of all structures within the geographical boundaries of any applicable setback*

3. *Preliminary Emergency Response Plan, as outlined in the "Fire Safety" section of this ordinance*

The preparation and submission of an EIR as well as any required public hearings should take place in accordance with any regulations or requirements established under CEQA.

Conditions of Approval for Use Permits (Ministerial and Discretionary)

Both ministerial and discretionary use permits should be awarded conditional upon the complete submission of the following safety and operational plans prior to receiving a construction permit:

1. *Hazard Mitigation Analysis and Large-Scale Fire Testing, as outlined in the "Fire Safety" section of this ordinance*

2. *Signatures from all surface property owners on which the BESS facility is located*

3. *Stormwater assessment including a Stormwater Pollution Prevention Plan to minimize, mitigate, and repair any impacts to site drainage during site preparation and project construction*

4. *Vegetation management plan (construction and operations)*

5. *Decommissioning Plan complying with the requirements of the "Decommissioning Plan" section of this ordinance*

Conditions of Approval for Use Permit Commentary: As discussed in the "Fire Safety" section, many fire safety and operational standards and tests are covered in construction permit requirements and are not needed in a use permit. Furthermore, the details needed to conduct and evaluate many fire safety standards and tests are typically finalized later in the development process, once the project has selected an engineering, procurement, and construction (EPC) contractor. However, local planning authorities, developers, fire officials, and fire safety experts, indicated in focus group feedback that several fire safety requirements may still be useful to include in a use permit application as a condition of approval to provide reassurance to the public of the safety measures required to promote the safety of these systems.

In practice, conditions of approval would enable LPAs to issue conditional approval of a use permit; that approval would be revoked or finalized after issuance of a construction permit. Because conditions of use permit approval are structured such that meeting construction permit requirements would satisfy these conditions of approval, it should never be the case that a construction permit is issued by use permit conditions of approval are not met.

LPAs may have their own process for adding conditions of approval to issuance of a use permit, in which case those processes can be followed for these requirements. Ordinance language for LPAs without their own process for adding conditions of approval is suggested in the relevant sections. LPAs should still solicit legal and regulatory advice from their own teams to ensure compatibility with conditions of approval.

Additional Considerations for Use Permit Conditions (Ministerial and Discretionary)

An application for a discretionary or ministerial use permit may optionally include the following information:

1. ***A plan for periodic Augmentation to maintain or nominally increase the nameplate capacity of the BESS facility. Augmentation outlined in this plan and that maintains substantial conformance with the original permit approval will not require a Use Permit Amendment.***
2. ***Status of interconnection request (e.g. Phase I Study, Phase II Study, Interconnection Agreement or queue number).***

Optional Augmentation Plans Commentary: Although listed as an optional submittal, LPAs may elect to require or allow developers to optionally submit a plan for periodic project Augmentation. A plan for periodic project Augmentation may be helpful to ensure upfront alignment between an LPA and developer on the changes that will and will not trigger the need for a Use Permit Amendment. The "Applicability" section includes additional detail on Augmentation.

Optional Status of Interconnection Queue Commentary: LPAs may optionally request that developers provide the high-level status of their interconnection request. This would be particularly appropriate for LPAs that receive a large number of permit applications to help prioritize the order of application review. For projects requesting interconnection through CAISO, this information could include indication of which phase of the interconnection process the project is in (e.g. Phase I Study, Phase II Study, Interconnection Agreement) or queue number.

The further along a project is in the CAISO interconnection process, the more likely the project is to come online if granted a permit; therefore, this information can help LPAs understand the likelihood for projects to come online if granted a permit and more accurately assess the cumulative land use impacts of all clean energy permit requests in their jurisdiction. Projects in the interconnection queue get whittled down due to several factors, such as if study results find that prohibitively expensive upgrades are required to bring the project online. Under its Interconnection Process Enhancements, CAISO also caps its interconnection studies to 150% of the available and planned transmission capacity in specific zones. Project scores, based on commercial interest, project viability, and system need, are used to inform the order in which projects are advanced into the study and any projects that do not fit in the 150% capacity are withdrawn from the queue. Due to this nature of projects getting whittled down in the interconnection queue, developers also tend to submit interconnection requests for more projects than they anticipate developing; this further exacerbates the artificial inflation of projects in the queue and potentially also the projects requesting use permits from local planning authorities.

However, it is worth noting that interconnection queue status can change quickly; for example, the withdrawal of other projects from the study process can impact the status of any particular project in the queue. Therefore, interconnection queue status alone should not be relied on for assessing the timeframe for when a project could begin construction.

Notice of Withdrawal of Interconnection Request Commentary: A best practice for developers is to notify an LPA as soon as their project is withdrawn from the queue. If developers do not proactively notify LPAs, LPAs could also periodically request updated interconnection queue status for projects that have submitted permit applications.

Pre-Application Meetings Commentary: A best practice is for LPAs to offer and/or encourage developers to participate in pre-application meetings to facilitate the preparation of the application. Pre-application meetings can help avoid incomplete or improperly prepared applications, which can cause permitting delays by requiring revisions or curative work.

Permit Fees

Local resolutions governing permit fees and review costs should be updated to include BESS upon adoption of this ordinance. Permit fees must be set by the relevant [County/City/Town Planning Department] and should generally be capped at the actual cost of application review.

Permit Fees Commentary: The above ordinance language generally recommends permit fee costs be roughly equivalent to the cost of application review, but does not prescribe a method for setting permit fees. Local planning authorities who participated in interviews and focus groups recommended real-time billing as one method to determine the actual cost of application review. Real-time billing by LPAs would charge for time spent on reviewing a submitted application. An applicant must submit a deposit upfront and that deposit will go towards paying for local permitting staff time for application review. If the full deposit is not spent, the remaining amount will be returned to the applicant. If the cost to review nears the deposit amount, the local permitting staff would alert the applicant and determine if an additional deposit is needed. If LPAs prefer other methods besides real-time billing, they should use any alternative methods best suited for their staff and systems.

Design Standards

System Type and Location

Outdoor Installations as Best Practice Commentary: Input and feedback from fire officials and fire safety experts indicated that it is best practice is for BESS facilities to be located outdoors given their safety advantages relative to indoor facilities. Safety advantages of outdoor BESS are listed below:

- Outdoor environments may provide airflow and cooling, reducing the risk of heat buildup that can lead to thermal runaway
- Appropriately spaced outdoor environments reduce the risk that a BESS fire will spread to adjacent structures
- Emergency responders have cited outdoor environments for ease of access and fire management

The largest BESS fires in California (Moss Landing Energy Storage Facility, Gateway Energy Storage Facility) have occurred in indoor facilities. Indoor facilities are the minority of existing facilities. Data collected by the California Public Utilities Commission (CPUC) in January 2025 indicated that approximately 4% of existing facilities in California are indoor facilities while 96% of existing facilities are located outdoors.[8] During interviews and focus groups, fire safety experts encouraged LPAs to dissuade developers from pursuing indoor systems.

SB283, which is currently progressing through the state legislature, would direct the Office of the State Fire Marshal to "review and consider proposing provisions that restrict the location of energy storage systems to dedicated-use noncombustible buildings or outdoor installations."[9]

California Fire Code: The system type and location refer to whether the system is located indoors or outdoors and for indoor systems, if the building is dedicated or non-dedicated use, and for outdoor systems, if the building is near exposures or remote. The current (2022) CFC sets different requirements, including fire suppression systems, size and separation, and maximum allowable quantities, for indoor dedicated-use systems, indoor nondedicated-use systems, outdoor remote systems, and outdoor near exposure systems.[10] Note that CFC requirements for each system type and location will be covered by fire code requirements that must be met for a construction permit.

8 California Public Utilities Commission. 2025 Battery Energy Storage System Facility Survey. https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/safety-and-enforcement-division/esrb/generation/bess/2025-battery-energy-storage-system-facility-survey.pdf.

9 Senate Bill No. 283. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202520260SB283.

10 California Building Standards Code Title 24, Part 9. (2022). California Fire Code Sections 1207.7 and 1207.8. https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf.

Setbacks

BESS must, at minimum, comply with [County/City/Town] fire code requirements related to setbacks, clearances, separations, and buffers for the applicable technology type and location.

Purpose of Setbacks Commentary: Setbacks are the minimum allowable distance between the BESS and nearby buildings, structures, or property lines. A core objective of setbacks is to prevent spread in the event of a fire. Setbacks are also an important tool that LPAs can use to ensure that land will be used in a way that is safe and acceptable to the local community. Setbacks can serve additional purposes, such as mitigation of visual impacts, noise impacts, and wildfire risk mitigation. These purposes are additionally covered in other requirements ("Visual", "Noise", and "Vegetation Management"), so it is not strictly necessary that those considerations be addressed through setbacks.

Overview of Setback Options for Lithium-ion Battery Technologies Commentary: BESS must, at minimum, comply with local fire code requirements related to setbacks and buffers for the applicable technology type and location. Beyond the minimum requirements for BESS compliance with local fire code setbacks, LPAs may choose to set additional setback requirements for BESS based on the needs and concerns of the local community.

This guide provides three different options for setbacks for lithium-ion BESS technologies and outlines the reasons why an LPA might select each setback option as well as remaining concerns for each option. These three options are summarized in the table below.

Table 2. Options for Setbacks for Lithium-ion BESS Technologies

Option #	Option	Setback
1	Minimum compliance with local fire code	10 ft (CFC) Applicable setback in local fire code varies by jurisdiction
2	Minimum requirement for fire apparatus access roads	Typically 30 ft (requires consultation with local fire officials)
3	>50 ft	>50 ft

Setbacks are distinguished between flammable technologies (Lithium-ion technologies) and non-flammable technologies given the increased distances that may be warranted for flammable technologies.

Option 1: Minimum compliance with local fire code

A Lithium-ion BESS facility shall comply with [County/City/Town] fire department or fire code official requirements.

Rationale for Minimum Compliance with Local Fire Code Commentary: This option allows BESS to be built within the shortest setback that is compliant with local fire code. Some LPAs may be willing to adopt the minimum compliance for certain land use zones, such as commercial and industrial zones, or building/property types, such as unoccupied buildings. For example, San Diego County requires "10 ft of separation between adjacent enclosures within the property" but requires a 100 ft setback for residential, institutional, or educational buildings[11] (see ">50 ft" option for additional details). Los Angeles County is currently working to update its BESS ordinance but in its current (summer 2025) version of its BESS ordinance, Los Angeles County requires a 10 ft setback from property lines and buildings. Rancho Cucamonga requires a 10 ft setback from all property lines except residential property lines (requires a 1,000 ft setback from residential property lines).[12]

California Fire Code: The current (2022) CFC requires 10 ft of separation between outdoor ESS units and the following:

1. Lot lines
2. Public ways
3. Buildings
4. Stored combustible materials
5. Hazardous materials
6. High-piles stock
7. Other exposure hazards.

The current (2022) CFC allows the setback to be reduced to 3 ft if: 1) a 1-hour free-standing fire barrier is provided, 2) noncombustible exterior walls with specified criteria are provided, or 3) if weatherproof enclosures with specified criteria that have been demonstrated to not ignite during large-scale fire testing (Section 1207.8.3).[13]

The current (2022) CFC does not list setback requirements for indoor facilities; instead, the current (2022) CFC requires fire-resistance-rated separations for indoor facilities. The current (2022) CFC specifies that, where approved by the fire code official, fire suppression systems are permitted to be omitted in dedicated-use buildings located more than 100 ft from buildings, lot lines, public ways, stored combustible materials, hazardous materials, high-piled stock and other exposure hazards.[14]

Consultation with Local Fire Code Officials: LPAs should consult with the local fire code official to understand any additional requirements set by the local fire code for outdoor or indoor BESS.

11 San Diego County Fire Protection District. (2025). Interim Fire Protection Guidelines for BESS Facilities. https://www.sandiegocounty.gov/content/dam/sdc/sdcfa/documents/development-services/BESS%20Directive%2005.15.2025_FINAL.pdf.

12 City of Rancho Cucamonga. Chapter 17.109: Battery Energy Storage Facilities. https://ecode360.com/45989304#45989307.

13 California Building Standards Code Title 24, Part 9. (2022). California Fire Code Section 1207.8.3. https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf.

14 California Building Standards Code Title 24, Part 9. (2022). California Fire Code Section 1207.7.4 and Table 1207.7. https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf.

Option 2: Minimum requirement for fire apparatus access roads

BESS must comply with any applicable CA and [County/City/Town] fire code requirements for fire apparatus access roads.

Emergency Response Vehicle Access Needs Commentary: First responders, including fire officials, should be consulted to understand any requirements to ensure that emergency response vehicles have adequate access for setting up and conducting suppression activities and managing incidents. If these requirements should be incorporated into a setback. These requirements may include a setback for one or all sides of the BESS facility based on fire apparatus access road needs. These requirements may vary by jurisdiction based on the specific equipment and procedures used.

In its draft BESS ordinance, Solano County made a staff recommendation for a "30-ft-wide fire rated access road [that] must encircle the entire module array inside security perimeter fence."[15] This effectively sets a 30 ft setback (although Solano County also proposed in its staff recommendation greater setbacks for the front and rear of the facility, discussed in Option 3 below). Fire safety experts indicated that a 30 ft access road is commonly referenced for access road requirements to allow for a 20 ft fire access road (which allows two fire apparatus vehicles or typical width to pass one another) plus two 5 ft shoulders (one on either side of the road).

Option 3: >50 ft

The minimum setback of a BESS from the following boundaries is [>50 ft]:

1. ***[Buildings]***
2. ***[Stored combustible materials]***
3. ***[Hazardous materials]***
4. ***[High-piles stock]***
5. ***[Other exposure hazards.]***

Examples and Rationale for >50-10 ft Setbacks Commentary: While a scientific basis for >50 ft setbacks across all sites has not been established, engineered analysis results could demonstrate that this setback is appropriate for specific sites. If engineered analysis results suggest a larger setback is required, this would be enforced for the construction permit.

[15] Solano County. Solano County Ordinance NO. 2025. https://solano.legistar.com/gateway.aspx?M=F&ID=a45632f8-fdcc-4838-b6e6-455bfe141ec5.docx.

Local planning authorities may choose >50 ft setbacks as a more conservative option than minimum compliance with local fire code, especially for residential buildings and/or sensitive receptors. Sensitive receptors can include, but are not limited to, children, elderly individuals, individuals with chronic illnesses or respiratory conditions, and mobility-impaired or disabled individuals. For example, San Diego County has adopted a 100 ft setback for residential, institutional, and educational buildings while allowing compliance with minimum local fire code requirements for all other building types. Orange County has proposed a 100 ft setback from lot lines of community buildings and residential uses unless the applicant justifies a modified setback distance.[16] The City of San Marcos has adopted a 100 ft setback for residential, institutional, and educational lot lines and uses Hazard Mitigation Analysis to determine setbacks for other types of lot lines.[17]

Several jurisdictions have adopted even more restrictive setbacks. For example, the City of Rancho Cucamonga has established a 1,000 ft setback from residential lot lines.[18]

The rationale for more conservative setbacks for sensitive receptors is to ensure that human exposure to toxic emissions is limited. Therefore, LPAs may find it appropriate to set more conservative setbacks to buildings with populations that cannot easily relocate, such as residential buildings and hospitals.

It may be useful for an LPA to distinguish between the types of boundaries when determining which boundaries may warrant a setback that exceeds local fire code requirements. For example, there is a difference in exposure that would occur to a property line boundary versus an occupied building.

Findings from BESS Fire Incidents in California Commentary: Findings from BESS fires in California have not suggested that a >50 ft setback is needed to protect nearby residents or occupants. Nearly 15,000 air samples at over 1,300 different sites collected just over 12 hours after the Moss Landing BESS fire began did not ever record any emissions of carbon monoxide (CO), particulate matter (PM 2.5 and PM 10), hydrogen chloride (HCl), hydrogen fluoride (HF), volatile organic compounds (VOCs), or a number of other emissions that were at or above the Office of Environmental Health Hazard Assessment (OEHHA) Acute Reference Exposure Levels (RELs). These levels are a reference for "airborne concentration level at or below which no adverse health effects are anticipated" for a one-hour exposure duration.[19]

The City of Escondido released data after the SDG&E Escondido Substation Fire, showing no readings of HF or hydrogen sulfide, with the nearest air monitor being at 50 ft from the site. The Gateway fire in San Diego County also displayed no elevated levels of toxic gases with air monitoring.[20]

Developer Concerns with >50 ft Setbacks Commentary: Developers have expressed that >50 ft setbacks are very restrictive, particularly in urban sites where standalone BESS are more likely to be sited, and that setbacks >100 ft become prohibitively restrictive for many sites. Setbacks of this magnitude may also necessitate larger land areas for the project. The figures below illustrate the impact of setback requirements on buildable areas, highlighting the challenges developers face when adapting to various setback mandates – particular when trying to site projects on narrow or irregular lots. Note that the "buildable area" displayed below excludes any setbacks internal to the project boundary (such as any separation between containers), so the actual area occupied by BESS would be further constrained.

[16] Orange County Public Works. (2025). Proposed Zoning Code Amendment Text – CA 24-03. https://ocds.ocpublicworks.com/sites/ocpwocds/files/2025-08/Attachment%202%20-%20Proposed%20Zoning%20Code%20Amendment%20Text%20-%20CA%2024-03.pdf

[17] City of San Marcos and San Marcos Fire Department. Protection Guidelines for Lithium-Ion BESS Facilities. https://www.san-marcos.net/home/showpublisheddocument/29316/638779698333530000

[18] City of Rancho Cucamonga. Chapter 17.109: Battery Energy Storage Facilities. https://ecode360.com/45989304#45989307

[19] County of Monterey. Moss Landing Vistra Battery Fire Dashboard. https://experience.arcgis.com/experience/0045660d4525482588730b41260c1004/page/Dashboard

[20] Nikolewski, R. (2024). Studies of Battery Storage Fires Show No Public Health Impact. https://www.sandiegouniontribune.com/2024/06/20/fire-in-otay-mesa-puts-battery-storage-projects-under-scrutiny/

Figure 4. Illustrative Buildable Area by Setback Requirement – Square Lot

Setback Requirement (ft)	1 Acre Lot	5 Acre Lot	20 Acre Lot
	Buildable Area (% of Lot)		
10'	82%	92%	96%
30'	51%	76%	88%
50'	27%	62%	80%
100'	0.2%	33%	62%
300'	0%	8%	13%

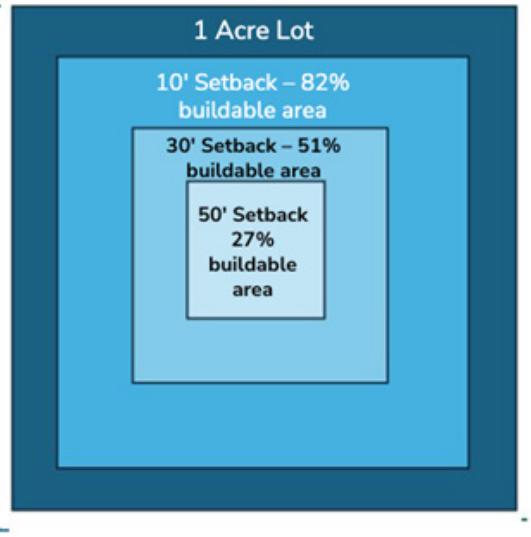
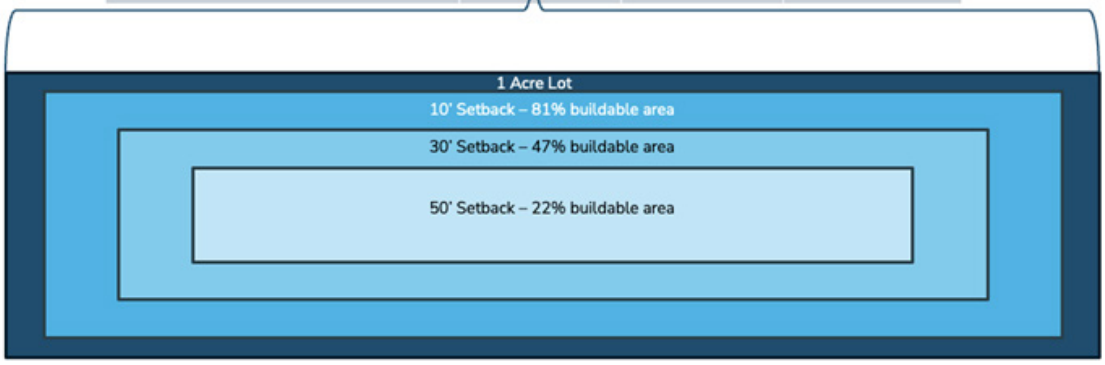


Figure 5. Illustrative Buildable Area by Setback Requirement – Narrow Lot[21]

Setback Requirement (ft)	1 Acre Lot	5 Acre Lot	20 Acre Lot
	Buildable Area (% of Lot)		
10'	81%	91%	96%
30'	47%	74%	87%
50'	22%	59%	78%
100'	0%	28%	59%
300'	0%	0%	5%



It is possible that developers may pursue a use permit through the CEC opt-in program to override restrictive local regulations, including setbacks, if the CEC determines that the project is required for Public Convenience and Necessity.

[21] Assumes lot dimensions with a 1.4:1 aspect ratio

Other Considerations for Determining Setbacks

Indoor Facilities Commentary: LPAs may impose more conservative setbacks for indoor facilities with decreased ventilation.

Engineered Analysis Commentary: The planning department may consider results from an engineered analysis to inform a safe setback for a specific site. The engineered analysis may include a large-scale fire testing (LSFT), Hazard Mitigation Analysis (HMA), dispersion analysis, explosion prevention and control, and/or Heat Flux Analysis. An engineered analysis is required by fire code for issuance of a construction permit. An engineered analysis, however, requires finalization of project details, such as the product used, for analysis to yield accurate results. These details are often finalized by the time of the construction permit application, but not at the time of a use permit application. Therefore, it would likely be challenging for LPAs to require engineered analysis to inform site-specific setbacks at the time of a use permit.

An LPA may choose to use results from an engineered analysis to communicate and demonstrate safety of a BESS site to the public. LPAs may be particularly interested in evaluating and communicating that safety information when the BESS site is located near sensitive receptors, which can include, but are not limited to, children, elderly individuals, individuals with chronic illnesses or respiratory conditions, and mobility-impaired or disabled individuals. LPAs may also be particularly interested in conducting engineered analysis for a site located in an area with heightened risk of natural disasters, such as flooding or earthquakes, or raises other concerns.

Some LPAs have considered using engineered analysis as a way of allowing applicants to demonstrate that a setback other than the default setback required for the use permit is safe. This theoretically allows LPAs to demonstrate a willingness to collaborate with developers and encourage utilization of the local permitting process (rather than the CEC opt-in program) to maintain local permitting control and safety. However, given that some of the project details necessary for an engineered analysis are not finalized at the time of a use permit application, it may not be possible to use engineered analysis to inform setbacks for a use permit. Orange County, for example, has outlined in its proposed ordinance the ability for BESS applicants to demonstrate justification for a setback modified from the 100 ft setback otherwise required from lot lines of community buildings and residential uses.[22] The City of San Marcos uses a Hazard Mitigation Analysis to determine setbacks for lot lines other than residential, educational, and institutional lot lines.[23]

If an LPA does choose to consider engineered analysis, the LPA should consult with the fire code official to understand the inputs or parameters of the analysis/tests. Some local fire departments, such as San Diego County Fire Protection District, have outlined the input requirements for engineered analysis in their jurisdiction.[24] Alternatively, fire departments can rely on the selected engineer to determine the appropriate inputs to use for an engineered analysis.

Results of tests conducted in an engineered analysis do not directly list appropriate setbacks, but other results pertaining to fire safety properties of the project design can be used to inform safe setbacks. For example, a Hazard Mitigation Analysis (HMA) can provide data-driven insights into the potential dispersion of toxic emissions based on fire scenarios, battery chemistry, and local environmental conditions. HMA modeling of worst-case release events, such as high wind conditions, can help determine the distance that harmful concentrations of airborne pollutants may travel, which could evaluate the safety of setback distances to nearby populations and to sensitive receptors.

[22] Orange County Public Works. (2025). Proposed Zoning Code Amendment Text – CA 24-03. https://ocds.ocpublicworks.com/sites/ocpwocds/files/2025-08/Attachment%202%20-%20Proposed%20Zoning%20Code%20Amendment%20Text%20-%20CA%2024-03.pdf

[23] City of San Marcos and San Marcos Fire Department. Protection Guidelines for Lithium-Ion BESS Facilities. https://www.san-marcos.net/home/showpublisheddocument/29316/638779698333530000

[24] San Diego County Fire Protection District. (2025). Interim Fire Protection Guidelines for BESS Facilities. https://www.sandiegocounty.gov/content/dam/sdc/sdcfa/documents/development-services/BESS%20Directive%2005.15.2025_FINAL.pdf.

Setbacks for Non-Flammable Battery Chemistries

A BESS facility with technology demonstrated to be non-flammable shall comply with [County/City/Town] fire code setback requirements.

Non-Flammable Technologies Commentary: Non-flammable technologies include aqueous flow batteries, zinc-based batteries, molten salt batteries, and lead-acid batteries. This may include any other chemistries for which the applicant can provide documentation, such as UL 9540A test results or other third-party tests, demonstrating non-flammability.

California Fire Code: The current (2022) CFC does not distinguish between flammable and non-flammable technologies for its separation requirements; similarly to for Lithium ion BESS, the CFC requires 10 ft of separation between outdoor ESS units and the following:

1. Lot lines
2. Public ways
3. Buildings
4. Stored combustible materials
5. Hazardous materials
6. High-piles stock
7. Other exposure hazards.[25]

[25] California Building Standards Code Title 24, Part 9. (2022). California Fire Code Section 1207.8.3. https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf.

Permitting, Safety, and Environmental Compliance

Physical Security

BESS facilities shall comply with physical security requirements, such as perimeter fences, security, barriers, and buffering, specified in the CA Code of Regulations and [County/City/Town] fire code.

Purpose of Physical Security Requirements Commentary: Physical security requirements are important to protect the public from electrical and fire hazards and prevent unauthorized access.

California Code of Regulations: The 2022 CA Code of Regulations Section 2812.1 requires enclosures for high-voltage electrical installations to be secured with a minimum 8-foot fence, or a floor to ceiling barrier if the ceiling is less than 8 feet. Alternatively, compliance can be met with a 7-foot fence topped by at least 1 foot of barbed wire or equivalent, using three or more strands. Where any exposed energized part is more than 8 feet above ground, the enclosure must be at least 10 feet in height, unless the energized part is located more than 5 feet horizontally from the enclosure.

California Fire Code: The current (2022) CFC also requires BESS to be secured against unauthorized entry and safeguarded in an approved manner that does not inhibit air flow or exhaust.[26]

Consultation with Local Fire Code Officials: LPAs should consult with local fire code officials to understand if there are any additional requirements not set by the local fire code that should be included in the use permit requirements for physical security. There may be additional regulations and requirements for site safety and security that are not specific to the electrical components and ESS, but that may apply to BESS.

Signage

The facility must provide safety signage compliant with [County/City/Town] fire code.

Purpose of Signage Commentary: Signage is important to ensure that emergency responders understand the site and the hazards of the facility and specific equipment.

California Fire Code: The current (2022) CFC lists all signage requirements, including signage required on entry doors or areas and on enclosures of BESS cabinets and walk-in units located outdoors. Signage requirements include labeling specifications and contact information for authorized and fire mitigation personnel.[27]

[26] California Building Standards Code Title 24, Part 9. (2022). California Fire Code Sections 1207.4.9. https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf.

[27] California Building Standards Code Title 24, Part 9. (2022). California Fire Code Sections 1207.4.8. https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf.

Fire Safety

Fire Safety Requirements Covered Through Fire Code Commentary: A primary objective and responsibility of LPAs is to confirm that any projects granted land use permits will be safely installed and operated in their community. Several serious BESS fire incidents in the state have demonstrated the importance and necessity of safety regulations for BESS. In the development of the BESS ordinance, the project team has found that many of the necessary BESS fire safety regulations are adequately covered in California and local fire code requirements. BESS projects must demonstrate compliance with these requirements to be issued building and construction permits. Therefore, many fire safety-related requirements may be redundant if listed in a use permit.

Furthermore, many fire safety-related regulations require finalization of the project design to assess the specific characteristics and hazards of that product and site layout. Project design is typically not finalized at the time of a use permit – developers tend to apply for a use permit with a conceptual project design and finalize the project design ahead of applying for a construction permit.

Outreach with local planning authorities, fire safety experts, and developers indicated several fire safety requirements that could be appropriate to include in a use permit application either as a condition of approval or as a preliminary draft. The recommendations on appropriateness for inclusion in a use permit based on outreach are summarized in the table below.

Table 3. Recommendations for Fire Safety Requirements in Use Permit

Fire Safety Requirement	Recommendation for Use Permit
Site Accessibility	Not Include (covered in construction permit)
Equipment Certification	Not Include(covered in construction permit)
Large-Scale Fire Testing	Condition of Approval
Explosion Prevention and Control	Not Include (covered in construction permit)
Hazard Mitigation Analysis	Condition of Approval
Dispersion Analysis (”Plume Modeling”)	Not Required for Any Permits
Emergency Response Plan	Preliminary ERP (Final ERP covered in construction permit)
Safety Systems	Not Include (covered in construction permit)
Training	Not Include (covered in construction permit)

LPAs may still choose to list these fire safety-related requirements to instill public confidence in the issuance of BESS project use permits; however, LPAs should also consider the potential for increased review and project development timelines and confusion from redundant requirements if some of these fire safety-related requirements are adopted. Increased education and awareness that many of the fire safety-related regulations are covered through compliance with fire code required for a construction permit may increase LPA and public comfort with not including these requirements in the use permit.

If an LPA does choose to include fire safety-related requirements in its use permit, the LPA should consult and work closely with the local fire official to understand and ensure alignment with fire code requirements.

Additional details on fire safety-related regulations covered in the fire code are provided in the commentary below.

Equipment Certification

Equipment Certification Commentary: Certification and standards establish safety and performance requirements for products, components, and systems, serving as benchmarks to mitigate risks to life and property. Underwriter Laboratory (UL) standards are widely recognized by industry, regulators, and code authorities. Certifications are issued by a Nationally Recognized Testing Laboratory (NRTL), a third-party laboratory approved by the Occupational Safety and Health Administration (OSHA). UL standards are developed for different BESS technologies.

As part of the construction permit process, the fire official with jurisdiction is responsible for reviewing certification submissions required for compliance with local fire code. The fire code official may opt to utilize third-party engineering or specialists to support the review of certifications.

Additional details on UL 9540, UL 1741, and UL 1973 certifications required by the current (2022) CFC are provided in Appendix A: Fire Safety Standards.10

Large-Scale Fire Testing

The BESS must meet all requirements for large-scale fire testing in [County/City/ Town] fire code as a condition of approval for receipt of a conditional use permit, or as a base condition for eligibility for a ministerial permit.

Large-Scale Fire Testing Commentary: Large-scale fire testing (LSFT) is conducted to assess how materials, systems, and entire assemblies behave under realistic fire conditions. By understanding the potential fire behavior of a battery system through LSFT, both code officials and fire departments can make more informed decisions about site approvals, safety infrastructure, and fire prevention and mitigation strategies. For example, LSFT results can help confirm the safety of the separation spacing between BESS units based on fire prorogation behavior demonstrated in a LSFT.

LSFT can also help inform emergency response planning, such as how to ventilate enclosures, the protective gear that may be needed, and the fire suppression strategies that are most effective for specific battery chemistries and configurations. Additional detail on emergency response planning is included in the "Emergency Response Plan" section.

LSFT requires finalization of project design and product, which as discussed above, is not common at the time of a use permit application. However, feedback from LPAs, fire safety experts, and developers suggested it is appropriate for LPAs to require large-scale fire testing (LSFT) compliant with CFC and local fire code as a condition of approval for a use permit, with the actual LSFT to be conducted prior to the issuance of a construction permit.

Additional details on UL 9540A are included in Appendix A: Fire Safety Standards.

California Fire Code: The current (2022) CFC requires that large-scale fire testing is conducted in accordance with UL 9540A. The current (2022) CFC requires that the test be conducted or witnessed and reported by an approved testing laboratory and shows that a fire involving one BESS will not propagate to the nearest BESS for a duration equal to the fire-resistance rating of the room separation.[28] The test report must be provided to the fire code official for review and approval.

[28] California Building Standards Code Title 24, Part 9. (2022). California Fire Code Section 1207.1.5 (specifies Section 1207.7.4). https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf.

Explosion Prevention and Control

Explosion Prevention and Control Commentary: Fire safety requirements also include requirements around explosion prevention and control.

California Fire Code: The current (2022) CFC requires that ESS comply with Section 911 on Explosion Control.[29] Section 911 includes requirements for deflagration, which references NFPA 68.[30] NFPA 68 is a standard for explosion control and provides guidance on how to safely relieve pressure during deflagration.

Section 911 also includes requirements for explosion prevention systems, which references NFPA 69.[31] NFPA 69 is a standard for explosion prevention with requirements for design, installation, and maintenance aimed at preventing explosions from occurring.

Hazard Mitigation Analysis

The owner of the BESS shall submit a Hazard Mitigation Analysis in accordance with [County/City/Town] fire code following completion of final design plans as a condition of approval for the use permit.

Hazard Mitigation Analysis Commentary: The Hazard Mitigation Analysis (HMA) identifies potential risks associated with the BESS, such as thermal runaway or toxic gas emissions.

An HMA requires finalization of project design and product, which as discussed above, is not common at the time of a use permit application. Feedback from LPAs, fire safety experts, and developers, suggested it is appropriate for LPAs to require HMA compliant with CFC and local fire code as a condition of approval for a use permit, with the actual HMA to be conducted prior to the issuance of a construction permit. LPAs should consult with the local fire code official to determine if this condition of approval has been met. It is possible that a third-party consultant is hired to conduct and/or review the HMA; it is still recommended that LPAs consult directly with the local fire code official to ensure that this condition of approval is met.

[29] California Building Standards Code Title 24, Part 9. (2022). California Fire Code Sections 1207.6.3, Table 1207.6 https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf.

[30] California Building Standards Code Title 24, Part 9. (2022). California Fire Code Sections 911.2 and 911.4. https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf.

[31] California Building Standards Code Title 24, Part 9. (2022). California Fire Code Section 911.3. https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf

Dispersion Analysis ("Plume Modeling") Commentary: Dispersion analysis, also called plume modeling, can be conducted as part of the HMA to assess the dispersion of toxic gases that are emitted during a BESS fire and the associated hazards posed by these emissions.

Plume modeling can be used to inform emergency response planning, such as establishing safe evacuation zones and approach distances for emergency responders. Emergency response planning does not, however, require plume modeling. Many projects developed in California to date have developed Emergency Response Plans and setbacks without plume modeling.

A threshold of significance must be determined to be able to evaluate plume modeling results in the context of threat posed from gases released during a BESS fire. Appendix B: Thresholds of Significance provides additional discussion of potential options that could be used for evaluating plume modeling results.

One of the reasons why plume modeling has not been required to develop emergency response plans is because plume modeling is only able to provide insights into a specific snapshot of conditions. Ambient weather conditions, including wind, are key inputs to plume modeling, but only a snapshot of potential weather conditions can be reflected in a given plume analysis. Therefore, plume modeling cannot be used to determine with certainty the impacts of an incident. Some LPAs and fire safety experts have suggested that worst-case scenario inputs, such as high wind speeds, could be used to capture the worst possible impacts of an incident. There are, however, still many nuances and limitations around plume modeling that have led fire safety experts to recommend against relying on plume modeling for demonstrating compliance with permitting requirements.

California Fire Code: The current (2022) CFC requires a failure modes and effects analysis (FMEA) or other approved HMA to be conducted.[32] Plume modeling is not required for BESS in the current (2022) CFC.

Emergency Response Plan

The owner of the BESS must submit a preliminary Emergency Response Plan to the [County/City/Town Planning Department]. The preliminary Emergency shall identify information that cannot be completed for the land use permit but will be completed for the version of the Emergency Response Plan that is required for the construction permits. The Emergency Response Plan must be [reviewed by / developed in consultation with] the [County/City/Town] Fire Authority, health department, and emergency management department.

Overview of Emergency Response Plan Commentary: An Emergency Response Plan (ERP) outlines procedures for safely responding to fires, explosions, leaks, or other incidents involving the BESS. Details such as project design, product, and contacts must be finalized for a final ERP.

Rationale for Preliminary ERP Commentary: According to the CA Public Utilities Code, an Emergency Response Plan must be developed before the commencement of operations. Feedback from LPAs, fire safety experts, and developers, however, suggested that a preliminary ERP with clear indication of information that cannot yet be complete could be appropriate as a use permit requirement. LPAs should consult with local code officials, including local fire code officials, to align requirements for the preliminary ERP with requirements for a final ERP.

[32] California Building Standards Code Title 24, Part 9. (2022). California Fire Code Section 1207.1.4. https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf

ERP Templates Commentary: Several templates and guides for Emergency Response Plans have been issued that could be a helpful reference for LPAs. For example, Fire & Risk Alliance has a BESS Emergency Response Plan Guide that had been developed for the New York Battery and Energy Storage Technology Consortium[33] and American Clean Power (ACP) has an Energy Storage Emergency Response Template.[34]

ERP Best Practices Commentary: The following best practices for ERPs were identified through input and feedback from LPAs, fire officials, fire safety experts, and developers:

1. Consider when shelter-in-place may be more appropriate than evacuation orders. For example, shelter-in-place orders with directions to keep windows closed can be more effective at preventing exposure compared to evacuation orders. Shelter-in-place orders can be more appropriate when there is no risk of an explosion or risk of fire spread and when toxic gases are emitted for short durations. Gas detectors or air monitors are useful tools that can be used to detect toxic emissions during an incident to inform the appropriateness of shelter-in-place versus evacuation orders at various distances from the facility. Dispersion analysis can also help inform when shelter-in-place versus evacuation orders may be appropriate.
2. Require witness testing by the fire authority of safety tests.
3. Safety tests should be conducted on permanent as opposed to temporary power such as generators.
4. Conduct quality control testing for the full scale of the project, as opposed to only on a subset of equipment, to ensure of the ability of the site to function as a whole.
5. Require a post-emergency reporting procedure to provide learnings from incidents.

AB 615 Commentary: AB 615, which has passed the CA Assembly and is awaiting Senate vote as of August 2025, would introduce requirements for Emergency Response Plans prepared in coordination with local emergency management and first responders for projects pursuing certification under the CEC's Opt-In Program. AB 615 would not impact projects proceeding through the local permitting process.

California Fire Code: The current (2022) CFC requires an approved fire safety and evacuation plan to be prepared and maintained for occupancies with lithium-ion batteries or lithium metal batteries[35] but does not have requirements specifically for unoccupied utility-scale BESS. The 2025 CFC that will go into effect on January 1, 2026 will include a requirement for BESS to include a fire safety and evacuation plan in accordance with Section 404.[36]

[33] Fire & Risk Alliance. (2023). Battery Energy Storage System Emergency Response Plan Guide. https://cdn.ymaws.com/ny-best.org/resource/resmgr/resource_library/ny-best_fra_erp_guide_final1.pdf

[34] American Clean Power (ACP). (2022). Energy Storage Emergency Response Template. https://cleanpower.org/resources/energy-storage-emergency-response-template/

[35] California Building Standards Code Title 24, Part 9. (2022). California Fire Code Section 403.10.6. https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf.

[36] California Building Standards Code Title 24, Part 9. (2025). California Fire Code Section 1207.1.5. https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf.

California Public Utilities Code: CA Public Utilities Code Section 761.3 was amended by California State Senate Bill (SB) 38, passed in 2023, to include requirements for emergency response planning for to BESS 20 MW or more or that occupies 10,000 square feet or more of physical space. It is worth noting that in addition to new installations that are referenced throughout this guide, Public Utilities Code Section 761.3 also applies to existing facilities.

California Public Utilities Code Section 761.3 requires BESS owners to:

1. Establish response procedures for an equipment malfunction or failure
   a. Include procedures that provide for the safety of surrounding residents, neighboring properties, emergency responders, and the environment.
2. Establish notification and communication procedures between the BESS facility and local emergency management agencies.

Safety Systems

Safety Systems Commentary: Requirements for safety systems, including detection and alarm systems, emergency and standby power systems, and fire suppression are covered under CFC and based on feedback from LPAs, fire officials, fire safety experts, and developers, are not needed to be listed for use permit requirements since these will be covered in a construction permit. Seismic design is covered under CA Building Code and does not need to be listed in use permit requirements. Additional information on safety systems can be found in Appendix C: Safety Systems.

Training

Training Not Needed in Use Permit Commentary: Training requirements are included for the construction and operational permits; therefore, additional training requirements are not needed in the use permit.

Beyond requirements set by fire code and enforced in construction and operational permits, BESS may also be subject to requirements set by private insurance. BESS typically requires insurance to be able to access project financing.

Training Best Practices Commentary: Best practices for training for maintenance personnel and emergency responders of BESS facilities based on input and feedback from LPAs, fire officials, fire safety experts, and developers that may be included in building, construction, or operations permits are listed below:

1. All agencies involved in emergency procedures should be involved in this training, including but not limited to the fire authorities, operators, maintenance personnel, the emergency response department and the health department.

2. Cover training under different emergency scenarios. Scenarios could include naturally occurring incidents such as flooding or other severe weather events. Training could also cover different equipment failure scenarios.

3. Include all groups and agencies that may be involved in responding to BESS incidents in training. This could include but is not limited to the local fire department, health department, emergency management department, facility operators, and maintenance personnel.

California Fire Code: The current (2022) CFC requires "Training of facility operating and maintenance staff" as part of a project's Commissioning Plan.[37]

Vegetation Management

The BESS facility must provide a vegetation management plan compliant with [County/City/Town] fire code as a condition of approval.

Purpose of Vegetation Management Commentary: Vegetation management can help minimize the risk of fire spread in the event of BESS ignition.

CA Code of Regulations and CA Public Resources Code as Benchmarks Commentary: The CA Code of Regulations and CA Public Resources Code sets requirements for buildings and structures for fire clearance that although not applicable by law to BESS, could serve as a useful benchmark for assessing separation distances and control measures that may be warranted for fire risks. The 2022 CA Code of Regulations (Title 14 Section 1299.03) requires a 10-foot clearance of combustible vegetation around the perimeter of the building/structure.

Benchmarks for Fire Hazard Severity Zones Commentary: Similarly, although additional vegetation control measures for Moderate, High Fire, or Very High Fire Hazard Severity Zones (FHSZ) do not apply to BESS, additional vegetation control measures for these zones for buildings/structures could be referenced as a benchmark. The CA Public Resource Code Section 4291 requires a defensible space of 100 ft from buildings/structures located in State Responsibility Areas (SRAs), which often intersect with Very High FHSZ. This space is divided into three zones:

1. Zone 0 (called the "Ember-Resistant Zone"). Zone 0 must have no combustible vegetation or materials.
2. Zone 1 (called the "Lean, Clean, and Green Zone" is within the first 30 ft of the building/structure. Zone 1 imposes strict vegetation management measures, such as removing dead and dry vegetation and irrigation and spacing of plants.
3. Zone 2 (called the "Reduced Fuel Zone") is the remaining 70 ft from the building/structure. Zone 2 must utilize fuel reduction methods.

Examples of Vegetation Management Requirements Commentary: Several ordinances, including the Los Angeles County ordinance, include the same vegetation control standards as IFC and NFPA 855.

California Fire Code: The current (2022) CFC does not explicitly list vegetation control requirements for ESS.

Consultation with Local Fire Code Officials: LPAs should consult with local fire code officials to understand requirements in the local fire code for vegetation control and management, particularly those that may be useful to include in requirements for a use permit.

[37] California Building Standards Code Title 24, Part 9. (2022). California Fire Code Section 1207.2.1. https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf.

Environmental Compliance

Projects applying for discretionary use permits shall comply with all applicable California Environmental Quality Act (CEQA) requirements.

Projects applying for ministerial use permits shall comply with any mitigation measures identified in the programmatic EIR prepared for the underlying zoning district. Projects applying for ministerial permits shall also submit environmental and cultural resource surveys evaluating whether the project introduces incremental environmental impacts beyond those contemplated in the programmatic EIR prepared for the underlying zoning district. If so, the project must comply with any recommended mitigation measures identified by the LPA as a condition for application completeness.

An applicant shall notify and consult with relevant local, state, and federal environmental jurisdictions and agencies regarding the proposed project and potential protected resources that may be present before submission of a site plan application.

CEQA Commentary: LPAs are typically the lead agency for the CEQA process for clean energy projects. Therefore, LPAs will be involved in the determination of any requirements based on CEQA review of the project. Requirements from CEQA may include describing any avoidance, minimization, or mitigation measures for protected resources incorporated into the project plan. If consultation is required, the applicant shall coordinate with relevant local, state, or federal agencies and jurisdictions.

Endangered Species Act Commentary: For projects that impact any state or federally listed protected species, projects must also provide mitigation that is roughly proportional to the level of impact to the protected species as part of the California Endangered Species Act (CESA) and federal Endangered Species Act.

Soil, Water, and Air Sampling Commentary: Local jurisdictions may opt to require soil, water, and/or air sampling to provide a baseline against which soil and water samples after an incident can be compared. Most BESS ordinances passed in California to date have not included explicit requirements for soil, water, or air sampling.

Stormwater Assessment

An applicant shall provide a stormwater assessment including a Stormwater Pollution Prevention Plan compliant with [County/City/Town] construction permit requirements as a condition of approval.

Stormwater Assessment Commentary: A stormwater assessment is conducted to minimize, mitigate, and repair any impacts to site drainage during site preparation and project construction. A stormwater assessment, including a Stormwater Pollution Prevention Plan, is required for issuance of a construction permit to any ground-disturbing development, including a BESS; therefore, it is not necessary for a stormwater assessment to be included as part of a use permit application. However, LPAs may choose to include a stormwater assessment as a condition of approval to instill confidence that this assessment will be complete for the proposed project.

Commissioning Plan

Purpose of Commissioning Plan Commentary: A commissioning plan is developed to ensure that the BESS is constructed, tested, and operates safely, reliably, and in compliance with codes and standards.

Commissioning Plan Not Needed in Use Permit Commentary: A commissioning plan is required for an operational permit and therefore is not necessary to also include as a requirement in a use permit application. If LPAs do want to include a commissioning plan as a requirement for the use permit, it could be included as a condition of approval.

California Fire Code: The current (2022) CFC requires a commissioning plan to be approved by the building and fire departments prior to initiating commissioning. The commissioning plan must include details on fire and safety system testing and verification, the commissioning process and responsibilities, and documentation and training for operations and maintenance. [38]

Operation and Maintenance

Operation and Maintenance Not Needed in Use Permit Commentary: Operation and maintenance requirements are covered through fire code that BESS must comply with to receive a construction permit; therefore, it is not necessary to include operation and maintenance requirements in a use permit.

CPUC General Order 167-C Requirements Commentary: In 2025, the CPUC issued General Order 167-C, which outlines operations and maintenance requirements for operating BESS. In addition to complying with CFC and local fire code, BESS may also be subject to complying with General Order 167-C. CPUC General Order 167-C requires BESS operators to develop and implement comprehensive Maintenance Plans that comply with the CPUC's Maintenance Standards. These plans must be submitted for review and certification, ensuring that facilities are maintained to prevent safety incidents and ensure reliable operation.[39]

California Fire Code: The current (2022) CFC requires the BESS to be operated and maintained in accordance with the manufacturer's instructions and requirements for an operation and maintenance manual. The operation and maintenance manual must include details such as a schedule for inspecting and recalibrating ESS controls and a schedule for servicing and maintenance actions.[40]

[38] California Building Standards Code Title 24, Part 9. (2022). California Fire Code Section 1207.2.1. https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf.

[39] California Public Utilities Commission. (2025). General Order 167-C. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M558/K715/558715484.pdf.

[40] California Building Standards Code Title 24, Part 9. (2022). California Fire Code Sections 1204.3 and 1207.2.2. https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf.

Decommissioning

The BESS owner shall provide a decommissioning plan that ensures that the facility is dismantled, removed, and the site restored to a condition reasonably similar to its original state once the system has reached the end of its useful life or is otherwise no longer in operation for a continuous period of 12 months. The decommissioning plan shall contain:

1. An estimate of when the decommissioning should be triggered for solar and any accompanying infrastructure, based on lease tenor, asset life, and equipment performance

2. The time required to decommission and remove the BESS and any ancillary structures

3. A detailed description of the dismantling and removal of system components, including if those components have been damaged by a fire or other event

4. A recycling and disposal plan of system components

5. A site restoration plan including mitigation of any environmental impacts

6. A cost estimate for implementing the decommissioning plan, along with financial assurances required for system removal. The financial assurance should include a bond, guarantee or letter of credit, and may be posted in increments (e.g. 25% at COD, 50% 5 years post COD, and 100% 10 years post COD)

The energy system and all structures associated with it shall be removed within 6 months of the beginning of decommissioning.

The BESS owner shall notify the [County/City/Town Planning Department] [6 months] prior to the decommissioning of the system.

Purpose of Decommissioning Plan Commentary: A decommissioning plan is an important assurance that the land will be restored to its pre-project state after the useful lifetime of the project.

Decommissioning Plan Requirements in Use and Construction Permits Commentary: A decommissioning plan is required as part of a construction permit to ensure that the project is dismantled in a safe manner. Based on feedback from LPAs and developers, it is also appropriate to include decommissioning plan requirements that may not be captured in fire code requirements as part of the use permit. For example, the CFC does not explicitly require a bond or other financial guarantee as part of such a decommissioning plan but LPAs may want to include this type of guarantee for a use permit.

Best Practices for Decommissioning Commentary: A best practice during decommissioning is to recover, reuse, and/or recycle any valuable raw materials.

Decommissioning Post-Incident Commentary: Any decommissioning or cleaning activities needed if an incident were to occur would likely be conducted at the federal level, such as through the federal Environmental Protection Agency (EPA). Therefore, the local use permit likely does not need to include post-incident decommissioning requirements.

If found to be the party responsible for the incident, developers would likely be responsible for paying for post-incident decommissioning or cleaning activities. It is possible that the developer's insurance would help cover these costs.

California Fire Code: The current (2022) CFC requires a decommissioning plan to be submitted at commissioning, describing how the system will shut down safely under two scenarios: an operational shutdown and a shutdown following damage such as fire of failure.[41]

Consultation with Local Fire Code Officials: LPAs should consult with local fire and building code officials to ensure alignment of any overlapping or similar decommissioning requirements in the local fire and/or building code.

Additional Considerations

This section outlines additional considerations not covered in the above sections that LPAs may optionally want to make in the development of their BESS ordinance.

Visual Impacts

The facility must comply with any [County/City/Town] visual requirements for the relevant zoning district.

Overview of Visual Impact Commentary: BESS units are typically housed in cabinet-like enclosures or containerized structures resembling standard shipping containers or large electrical equipment. These enclosures are often arranged in rows on concrete piers or metal piles and may include associated equipment such as transformers, inverters, and cooling units.

Compliance with Local Visual Requirements Commentary: If BESS is already subject to regulations outside a BESS-specific ordinance that would govern visual impacts, LPAs may find it redundant to include the language above in a BESS ordinance. Any additional visual requirements in the fire code will be required for a construction permit and therefore are not needed in the use permit.

Potential CEQA Mitigation Measures Commentary: It is possible that additional requirements may be introduced from CEQA mitigation measures. Requirements for walls and fences may also be introduced in the "Security" and/or "Vegetation Management" sections.

California Fire Code: The current (2022) CFC does not include specific requirements for visual buffers or aesthetic screening but does include safety-related requirements that can affect how and where buffers are designed:

- Setback and access: Setback areas must not be obstructed in a way that prevents fire access, emergency ventilation, or inspection.
- Visual screen must not block or delay emergency response[9]

[41] California Building Standards Code Title 24, Part 9. (2022). California Fire Code Sections 1207.2 https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf.

Lighting

The BESS shall comply with [County/City/Town] lighting requirements and regulations.

Compliance with Lighting Requirements Commentary: If BESS is already subject to regulations outside a BESS-specific ordinance that would govern lighting requirements, LPAs may find it redundant to include the ordinance language above in a BESS ordinance.

Any additional lighting requirements in the fire code will be required for the building and construction permits and therefore are not needed in the use permit. Lighting requirements from the local fire or building code may include but are not limited to providing sufficient illumination for inspection, maintenance, and emergency response.

Dark Sky-Friendly Lighting Solutions Commentary: Several California counties (e.g. San Diego County, Kern County) and municipalities (e.g. Malibu, Cupertino, Borrego Springs) have enacted ordinances requiring dark sky-friendly lighting solutions. These requirements were enacted to minimize light pollution, protect natural environments, and avoid public nuisances.

California Fire Code: The current (2022) CA Electrical Code references NFPA 70 for lighting requirements for site security.

Sound

Average sound measured at the nearest occupied structure must not exceed the auditory limits established for each applicable land use zone as set in the [County/City/Town] regulations. If applicants choose to conduct ambient sound testing using a method approved by the local authority, the auditory limit can be reduced to ambient sound levels measured in the study.

A BESS facility may exceed these limits only upon agreement with an affected property owner through recorded sound waiver easement agreement. Evidence or affidavit of any applicable sound waiver easement agreement shall be provided at the time of application.

Sound-dampening measures, such as architectural barriers and vegetative screening, may be used to reduce auditory impacts of BESS.

Overview of Sounds Impacts Commentary: Noise from BESS is produced from inverters, ventilation systems, and transformers. BESS can produce noise levels from 60 to 80 dB. 60 dB corresponds to noise levels of a typical conversation. 80 dB corresponds to noise levels inside a typical car.[42] The sound levels from a BESS may depend on facility orientation and operation, such as the level of fans.

[42] Twitchell, J., Powell, D., & Paiss, M. (2023). Pacific Northwest National Laboratory. Energy Storage in Local Zoning Ordinances. https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-34462.pdf.

Requirements Given Unique Local Factors

Requirements Given Unique Local Factors Commentary: LPAs may have unique local factors that may warrant additional assessments, tests, or permit requirements. It is possible that some of these additional requirements are not needed in the use permit given coverage in the construction permit. It is also possible that these requirements are already governed through existing regulations or requirements that would be applicable to a BESS sited in or near a specific building or land use type. For example, Solano County includes requirements for plume modeling and toxic gas dispersion analysis given the potential proximity of BESS to the Travis Air Force Base and other local airports.

Consultation with Local Code Officials: LPAs should consult with local fire and building code officials to understand if there are any additional requirements that should be included in the use permit given any unique local factors.

On-Site Water Requirements

On-Site Water Requirements Not Needed in Use Permit Commentary: On-site water requirements will be covered through construction permit requirements; therefore, it is not necessary to list these requirements in a use permit.

Best Practices for On-Site Water Requirements Commentary: Although fire officials and fire safety experts have indicated that best practice has shifted away from using water to suppress a BESS fire, on-site water requirements in CFC Section 507 ("Fire Protection Water Supplies") may still be applicable to a BESS site. For example, on-site water may be required for a BESS site for wetting surrounding vegetation or other combustibles.

Regardless of any on-site water requirements, practices for responding to BESS fire incidents outlined in the Emergency Response Plan should be referenced.

Review Timeline

Review Timeline Commentary: Review timelines for a use permit application (i.e. timeline for review once all application requirements have been met and all materials have been submitted) for a BESS can be the same as review timelines for other types of permit applications. Some LPAs have referenced the Permit Streamlining Act[43] as a guideline or best practice that is used to set review timelines. Some LPAs have sought to expedite review timeline for clean energy projects given the acknowledged importance and time-sensitivity of these projects for supporting clean energy.

For discretionary permits, review timelines should include notice of completeness (or notice of deficiency if application is not deemed complete) and should follow timelines and procedures that may be required as part of CEQA or the local permitting process for public hearings or other requirements for public participation.

Cyber Security

Cyber Security Not Needed in Use Permit Commentary: Cyber security requirements are covered in other interconnection requirements and therefore are not necessary to include in a use permit. The California Independent System Operator (CAISO) requires the following as part of interconnection agreements:

1. Communication protocols for telemetry, metering, and control
2. Network security (with recommendations around encryption, network segmentation, security training, and firewalls)
3. Cyber security incident response plans

BESS greater than 75 MW may trigger requirements for compliance with the North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection (CIP) standards, which has requirements on cyber asset identification, asset controls, and system security management.

Fire Water Runoff

Fire Water Runoff Commentary: Fire water runoff refers to the water that is used in firefighting and that flows from the fire. The fire may contain chemicals or hazardous materials.

California Fire Code: The current (2022) CFC does not require containment of fire water runoff.

Consultation with Local Fire Code Officials: While containment of fire water runoff may not be needed under CFC, LPAs should consult with local fire code officials to determine applicable requirements.

[43] The Permit Streamlining Act was enacted in 1977 to expedite the processing of permits for development projects in California. The Permit Streamlining Act sets time limits for permit approval, such as a completeness determination within 30 days of application submittal, Negative Declarations within 180 days of an application being deemed complete, certification of an EIR within one year of an application being deemed complete, and project approval or denial within 180 days from EIR certification.

Resources

A merican Clean Power (ACP): Utility-Scale Battery Energy Storage Systems Model Ordinance. https://cleanpower.org/wp-content/uploads/gateway/2024/06/BESS-Model-Ordinance.pdf

American Clean Power (ACP): Energy Storage Draft Emergency Response Plan. https://cleanpower.org/wp-content/uploads/gateway/2022/11/ACP_Energy_Storage_Emergency_Response_Plan_Template.pdf.

CAL FIRE: Battery Energy Storage Systems. https://osfm.fire.ca.gov/what-we-do/code-development-and-analysis/battery-energy-storage-systems.

CAL FIRE: Fire Hazard Severity Zones. https://osfm.fire.ca.gov/what-we-do/community-wildfire-preparedness-and-mitigation/fire-hazard-severity-zones.

Electric Power Research Institute (EPRI): BESS Failure Incident Database. https://storagewiki.epri.com/index.php/BESS_Failure_Incident_Database.

NFPA: Energy Storage Systems (ESS) and Solar Safety. https://www.nfpa.org/education-and-research/electrical/energy-storage-systems.

NYSERDA: Battery Energy Storage System Model Law. https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Programs/Clean-Energy-Siting/model-law.pdf.

Pacific Northwest National Laboratory: Energy Storage in Local Zoning Ordinances. https://www.pnnl.gov/publications/energy-storage-local-zoning-ordinances.

San Diego County: Battery Energy Storage Systems (BESS) Best Practices Report. https://engage.sandiegocounty.gov/bess-bestpracticestudy.

University of Michigan, Graham Sustainability Institute: Planning and Zoning for Battery Energy Storage Systems: A Guide for Michigan Local Governments. https://graham.umich.edu/media/files/BESS-guide.pdf

University of Michigan, Ford School of Public Policy: Battery Energy Storage System Deployment: Local and State Policy Considerations. https://stpp.fordschool.umich.edu/sites/stpp/files/2024-07/stpp-battery-energy-storage-system-policy.pdf.

Appendix A: Fire Safety Standards

Equipment Certifications

This Appendix provides additional detail on the equipment certifications and fire safety standards that may apply to BESS outside the use permit.

UL 9540

UL 9540 (Standard for Energy Storage Systems and Equipment) is a safety standard for electrochemical, chemical, mechanical, and thermal energy storage systems. UL 9540 is a standard for safety of energy storage systems and covers charging and discharging, protection, control, communication between devices, fluids movement and other aspects. UL 9540 certification confirms that the integrated system can manage faults, prevent thermal events from escalating, and interact safely with the grid and emergency responders.

UL 9540 listing requires a Failure Modes and Effects Analysis (FMEA). The FMEA is conducted to identify potential failure modes, associated hazards, and proposed mitigation strategies to reduce overall system risk.

California Fire Code: The current (2022) CFC requires that ESS be listed in accordance with UL 9540.[44]

UL 1741

UL 1741 (Standard for Inverters, Converters, Controller, and Interconnection System Equipment for Use with Distributed Energy Resources) is a safety standard established for inverters, converters, controllers, and interconnection system equipment used with distributed energy resources. UL 1741 standards are intended to mitigate operational risks associated with voltage, frequency disturbances, or unintended islanding.

While UL 1741 is traditionally associated with distributed energy resources, its applicability extends to utility-scale BESS due to shared interconnection and safety requirements. Utility-scale BESS often utilize the same types of inverters and power conversion systems governed by UL 1741, particularly for grid-tied operation.

California Fire Code: The current (2022) CFC requires that inverters used with ESS be listed and labeled in accordance with UL 1741.[45]

[44] California Building Standards Code Title 24, Part 9. (2022). California Fire Code Sections 1207.3.1. https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf

[45] California Building Standards Code Title 24, Part 9. (2022). California Fire Code Section 1207.3.3. https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf.

UL 1973

UL 1973 (Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power and Light Electric Rail Applications) is a safety standard for battery cells, modules, and packs used in stationary energy storage applications. The UL 1973 standard includes construction requirements, safety performance tests, and production tests. UL 1973 requires two fire exposure tests: an external fire test (to ensure that the BESS will not explode because of exposure to a brush fire) and an internal fire test (ensuring that a single cell failure won't cascade into a fire or explosion). UL 1973 ensures batteries are designed and built to resist electrical failures, mechanical abuse and environmental stresses (temperature extremes). UL 1973 is not specific to any battery technology and applies to a wide range of technologies. The UL 1973, 3rd Edition (2022), also includes informative annexes for sodium-ion, flow, lead-acid, nickel-cadmium, and metal-air batteries to address their specific safety considerations.

California Fire Code: The current (2022) CFC sets requirements for thermal runaway protection and outlines requirements by technology type. The current (2022) CFC permits UL 1973 listing to qualify for thermal runaway protection for Lithium-ion and other ESS technologies.[46]

Large-Scale Fire Testing

UL 9540A

UL 9540A (Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems) is a testing method used to evaluate how an energy storage system reacts to thermal runaway. In order to be listed in accordance with UL 9540, a BESS must be listed and tested in accordance with UL 9540A. The UL 9540A test assesses:

1. Thermal runaway characteristics of the cell, and the composition and flammability of the gases in a cell-level test
2. The likelihood of fire spread between modules, the unit's heat and gas release rates, and the potential for deflagration or re-ignition in a unit-level test
3. The tendency of propagation, and the heat and gas release rate of the module in a module-level test
4. The effectiveness of the fire protection system, as well as the heat and gas release rate of the system in an installation-level test.

[46] California Building Standards Code Title 24, Part 9. (2022). California Fire Code Section 1207.6.5 and Table 1207.6. https://www.iccsafe.org/wp-content/uploads/errata_central/2022-California-Fire-Code-Part-9-Errata-eff.-January-2023-5590S221.pdf.

Appendix B: Thresholds of Significance

This Appendix provides additional detail on the options for thresholds of significance that can be used with results from plume modeling to evaluate the threat posed from gases released during a BESS fire.

Immediately Dangerous to Life or Health (IDLH)

The 2022 CFC requires that toxic and highly toxic gases released during fires do not reach concentrations in excess of the Immediately Dangerous to Life or Health (IDLH) level in the building or evacuation routes. IDLH is defined by the National Institute for Occupational Safety and Health (NIOSH) as threshold at which the concentration of a substance in air (measured in parts per million (ppm) or milligrams per cubic meter (mg/m^3)) above which the following may occur after 30 minutes of exposure:

- Immediate or delayed death, or
- Irreversible adverse health effects, or
- Impairment of the ability to escape from a dangerous environment

Office of Environmental Health Hazard Assessment (OEHHA)

The California Office of Environmental Health Hazard Assessment (OEHHA) provides Reference Exposure Levels (RELs) to assess non-cancer health risks from airborne chemicals. These are non-regulatory health benchmarks intended to protect the general public, including more sensitive populations, and often updated. These RELs are categorized based on exposure duration:

- Acute RELs: 1-hour exposure
- 8-hour RELs: Repeated 8-hour exposures
- Chronic RELs: Long-term exposures (up to a lifetime)

The U.S. Environmental Protection Agency (EPA) provides Acute Exposure Guideline Levels (AEGLs), which are specific concentrations of airborne chemicals at which health effects may start to occur. AEGLs are calculated for five relatively short exposure periods (i.e., 10 minutes, 30 minutes, 1 hour, 4 hours, and 8 hours). AEGLs assigned 1, 2 or 3 according to severity of effects:

- Level 1: Notable discomfort, irritation, or certain asymptomatic non-sensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.
- Level 2: Irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
- wLevel 3: Life-threatening health effects or death.

Emergency Response Planning Guidelines

The American Industrial Hygiene Association (AIHA) provides Emergency Response Planning Guidelines (ERPGs) to assist in planning for accidental chemical releases. ERPGs define three levels:

- ERPG-1: concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing more than mild health effects
- ERPG-2: concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing irreversible or other serious health effects
- ERPG-3: concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing life-threatening health effects

Occupational Safety and Health Administration (OSHA)

The Occupational Safety and Health Administration (OSHA) and Cal OSHA provide Permissible Exposure Limits (PELs), which set federal and state law, respectively, on maximum allowable exposure levels at workplaces. PELs are a time-weighted average over 8 hours and are therefore more applicable to reference for thresholds of significance under normal operation. PELs are more applicable for emissions that are consistently released. Because BESS do not have emissions under normal operations, this threshold of significance is likely not the most applicable for safety under a BESS incident.

Appendix C: Safety Systems

This Appendix provides additional detail on safety systems that may apply to BESS outside the use permit.

Detection and Alarm Systems

The current (2022) CFC Section 1207.5.1 mandates that fire alarm equipment be installed in accordance with NFPA 72, which provides standards for the design, installation, testing, inspection, and maintenance of fire alarm systems, supervisory signaling systems, and emergency communications systems. Additionally, Section 907.2.22 requires automatic smoke or radiant-energy detection systems in rooms housing energy storage systems. The 2023 NFPA 855 has similar requirements for detection and alarm systems (Section 14.6.4). Local fire code officials may have additional requirements for BESS.[9]

Emergency and Standby Power Systems

The CFC Section 1203.2.5 mandates that standby power must be provided for exhaust ventilation systems to ensure the removal of hazardous gases during power outages. The draft 2026 NFPA 855 (Section 9.7.6) includes similar requirements for emergency power for exhaust ventilation (Section 4.10). Local fire code officials may have additional requirements for BESS.[47]

Fire Suppression

The current (2022) CFC requires ESS to be equipped with approved fire suppression systems. The choice of suppression system must be based on the specific hazards associated with the battery technology used (Section 1207.5.4). Local fire code officials may have additional requirements for BESS.

Feedback from fire officials and fire safety experts has indicated that industry consensus has shifted away from using water or clean agents for suppression. Instead, a "let it burn" approach has been recommended as the safest and most effective form of addressing a Lithium-ion BESS fire incident.

The 2023 NFPA 855 (Section 9.5.2.5) and draft 2026 NFPA 855 (Section 9.6.2.4) allow exemptions for fire suppression systems when agreeable with BESS owner and approved by LPA.[48,49] In the draft 2026 NFPA 855 Section 9.6.1.1.1, the fire control and suppression systems, and water supply shall be permitted to be omitted in BESS dedicated buildings located more than 100 ft from certain infrastructure not associated with electrical grid.[38]

Seismic Design

California Building Code (CBC) requires that all structures, including BESS installations, be designed to withstand seismic forces. This translates into meeting seismic requirements in accordance with the applicable building codes. Local building code officials may have additional requirements for BESS.

[47] National Fire Protection Association (NFPA). (2026 draft). NFPA 855 Section 9.7.6 and Section 4.10. https://www.nfpa.org/codes-and-standards/nfpa-855-standard-development/855 (can be accessed for free after registering on the NFPA's website).

[48] National Fire Protection Association (NFPA). (2023). NFPA 855 Section 9.5.2.5. https://link.nfpa.org/free-access/publications/855/2023 (can be accessed for free after registering on the NFPA's website).

[49] National Fire Protection Association (NFPA). (2026 draft). NFPA 855 Section 9.6.2.4 and Section 9.6.1.1.1. https://www.nfpa.org/codes-and-standards/nfpa-855-standard-development/855 (can be accessed for free after registering on the NFPA's website).