Collaborative e□orts between industry and government partners are essential for creating e□ective rules and ordinances for siting and permitting battery energy storage systems as energy storage continues to grow rapidly and is a critical component for a resilient, e□icient, and clean electric grid.

Background

Energy storage refers to a variety of technologies that can store energy for later use when it is most valuable. This includes technologies like batteries, pumped hydropower, and flywheels, among many others in development or initial deployment. Energy storage is critical to an e□icient, clean electric grid. In addition to supporting the

Energy storage systems can also be housed in buildings or within existing infrastructure. This option can allow for the integration of energy storage into existing sites, including urban spaces or previously operating fossil fuel generation facilities, where there may be increased demand for immediately dispatchable energy.

Zoning Districts: Because of the flexibility and variety of beneficial applications of stand-alone energy storage systems, policymakers should not limit energy storage projects to a specific set of zoning districts. When careful and conscientious development practices are employed, energy storage systems can appropriately integrate within any type of zoning district. For this reason, concerns about locational suitability, should be considered on a case-by-case basis.

Setbacks: Energy density is a unique advantage to energy storage siting that allows it to be deployed in a wide variety of locations and applications. and provide meaningful benefits to the communities it serves. Furthermore, given the fundamental di□erences between battery storage and other facilities categorized as power generation, battery storage project setbacks should be standardized independently of other types of electricity infrastructure.

Screening & Security Barriers: In many instances, walls, fences, building façade design, and other features can be utilized to screen an energy storage project or blend it in with its surroundings. Design constraints such as siding requirements for buildings may not be appropriate for 'o□-the-shelf,' pre-manufactured, containerized systems purchased and deployed by energy storage developers. Such requirements may impose safety risks by voiding warranties or reducing e□ectiveness of HVAC & thermal management systems critical to the operation of battery storage systems. Energy storage projects proposed in industrial areas do not require blending with adjacent uses.

ENVIRONMENTAL REVIEW & COMPLIANCE

Energy storage facilities have minimal environmental impact. They do not produce any emissions or discharge waste under normal operations, and often require a much smaller footprint than other utility-scale electrical infrastructure or generation facilities.

Water Quality: Energy storage facilities do not discharge wastewater into bodies of water; therefore, they fall within

PROJECT CONSTRUCTION & OPERATION

Like other construction projects, battery energy storage developers work with local and state governments to develop and share site plans. Generally, typical construction equipment is utilized and projects can be constructed in accordance with the applicable criteria used for other developments, such as limiting heavy equipment operations to daytime hours. Project construction and operational planning also includes the development of emergency service plans and ongoing maintenance plans, similar to other utility infrastructure projects. This work also includes a delineation of a project's footprint within the proposed project site and the type of enclosure utilized to house the battery systems, among other engineering and construction specifications. Other relevant matters include planning related to exterior landscaping and physical facility security. While traffic volumes and sound levels may increase during periods of construction, consistent with other private construction or public works projects, traffic should not be expected to substantially increase once a facility is complete and operating.

INTERCONNECTION

The operator of an energy storage system will seek to execute an interconnection service agreement with the relevant electric utility or cooperative. Typically, this application and execution of an interconnection service agreement begins with an interconnection study process which will be completed later in the permitting process of an energy storage project. Technical requirements for interconnection and interoperability are detailed in the IEEE 1547 series of standards for distributed energy resources and the IEEE 2800 series for transmission-connected systems.

SAFETY CODES & STANDARDS RELEVANT TO ENERGY STORAGE SYSTEMS

Numerous nationally and internationally recognized standards and codes have been developed to inform safe manufacturing, construction, installation, and operation of energy storage systems. Laboratories certified by the Department of Labor Occupational Safety and Health Administration's (OSHA) Nationally Recognized Testing Laboratories (NRTL) Program have spent years developing industry best practices and procedures that are used to mitigate risks and promote safe operation of energy storage facilities. These codes and standards include, but are not limited to, the following:

- **2021 International Fire Code:** contains regulations to safeguard against fires and other hazards and addresses general precautions, emergency planning and preparedness, fire department access and water supplies, automatic sprinkler systems, fire alarm systems, special hazards, and other matters.
- **2021 NFPA 1 Fire Code:** advances fire and life safety for the public and first responders as well as property protection by providing a comprehensive, integrated approach to fire code regulation and hazard management.
- **NFPA 855 Standard for the Installation of Stationary Energy Storage Systems:** provides the minimum requirements for mitigating the hazards associated with energy storage systems.
- **UL 9540 Energy Storage Systems and Equipment:** presents a safety standard for energy storage systems and equipment intended for connection to a local utility grid or standalone application.
- **UL 9540A Test Method:** delineates procedures for testing the fire safety hazards associated with propagating thermal runaway within battery systems.

PARTNERSHIPS WITH FIRST RESPONDERS

Energy storage system operators develop robust emergency response plans relevant and applicable to each individual energy storage facility. These plans are developed based on a standard template of national best practices that are customized for each facility. These best practices include extensive collaboration with first responders. These plans address emergency situations that might be encountered at an energy storage site, including extreme weather, fires, security incidents and more. These plans also address emergency response roles and highlight the importance of coordinating with first responders—particularly during planning—to ensure a complete, detailed understanding of potential emergencies and the proper safety responses.

Discussions with first responders involves the sharing of important information and consultation on project design, including appropriate placement of roads, entry points, and staging locations, as well as the dissemination of site maps, appropriate signage, emergency contacts, and other safety-relevant items. Partnerships between developers, operators, and first responders may include initial trainings, as well as ongoing follow-up activities and trainings. Energy storage developers and operators are eager to work with local officials to develop a strong partnership and an appropriate plan for their project.

Additional Resources

Energy Storage Systems: