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December 9, 2024

VIA Email and Overnight Mail

Nora Vargas, Chair
Board of Supervisors
c/o Andrew Potter, Executive Officer/Clerk of the Board
County of San Diego
Fourth Floor, Room 402
San Diego, California 92101
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Re: **Agenda Item No. 30: New Requirements for Battery Energy Storage System (BESS) Projects in Unincorporated Areas and CEQA Findings**

Dear Chair Vargas, Vice Chair Lawson-Remor, Mr. Anderson, Ms. Montgomery Steppe, Mr. Desmond, and Mr. Potter:

We write on behalf of International Brotherhood of Electrical Workers Local 569 regarding the proposed Interim Fire Protection ("IFP") Guidelines for Battery Energy Storage System ("BESS") Projects.¹ We commend the County of San Diego ("County") Board of Supervisors for its forward-thinking approach in developing the IFP Guidelines to detect and respond to the health and safety threats posed by BESS fires. However, we urge the Board to address a critical gap in the proposed guidelines related to fire prevention: workforce qualifications and training. Establishing workforce safety standards for the installation, maintenance, repair, and decommissioning of BESS facilities is critical to ensure safe and consistent integration of BESS systems and their components.

¹ Memorandum to Board of Supervisors, County of San Diego from Ebony N. Shelton, Chief Administrative Officer, County of San Diego re: New Requirements for Batter Energy Storage System (BESS) Projects in Unincorporated Areas and CEQA Findings (Districts: All) (Dec. 10, 2024) attach. B (Interim Fire Protection Guidelines for BESS Facilities).
7447-007j

Faulty assembly and integration increase the potential for BESS failures. While the standards contained in the current proposal are important to improve safety when BESS fire incidents occur, even more important is to reduce the likelihood of BESS fire incidents occurring in the first place. Minimum workforce standards reduce the likelihood of incidents that can lead to dangerous BESS fires and explosions by ensuring that BESS systems are installed and maintained safely and effectively.

To address this issue and minimize the potential for catastrophic incidents, we recommend that the IFP Guidelines require:

1. **Certified Electricians for Larger BESS Projects:** All electrical work on BESS projects with an energy capacity exceeding 70 kilowatt-hours (“kWh”) be performed by certified electricians and a minimum of 15% of the onsite electricians hold an Energy Storage and Microgrid Training and Certification (“ESAMTAC”).
2. **Skilled and Trained Workforce for Utility-Scale BESS:** A Skilled and Trained Workforce, as defined in Public Contract Code § 2600 *et seq.*, be used to complete any utility-scale BESS project and a minimum of 15% of the onsite electricians hold an ESAMTAC.

These recommendations build upon the IFP Guideline’s existing licensing requirements for fire safety systems and align with state laws, California Fire Code (“CFC”) provisions, and best practices from other jurisdictions.

A. The San Diego County Fire Protection District and the County Possess Broad Authority to Adopt Workforce Guidelines for BESS Projects

The San Diego County Fire Protection District (“SDCFPD”) holds broad authority under the CFC and its regulatory jurisdiction to establish workforce guidelines for electrical work performed on BESS facilities. Chapter 1 of the CFC grants fire code officials the authority to create safety requirements for matters that are not provided for in the existing fire code. Specifically, Section 102.9 provides: “Requirements that are essential for the public safety of an existing or proposed activity, building or structure, or for the safety of the occupants thereof, that are not specifically provided for by this code, shall be determined by the fire code official.”² This provision empowers fire code officials to address emerging technologies or

² California Fire Code § 102.9.
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unique risks, such as those posed by BESS, by developing standards that go beyond existing fire safety measures.

Given the complexity and potential hazards of BESS systems, workforce guidelines are necessary to ensure that individuals performing electrical work on these systems possess the specialized skills and qualifications needed to effectively reduce safety risks. The addition of workforce standards to the IFP Guidelines would align with Section 102.9's directive to establish safety requirements that are essential for public welfare. By exercising its authority under the CFC, the SDCFPD can proactively address the unique challenges associated with BESS installations and operations.

The importance of workforce qualifications is already recognized in the CFC, which establishes minimum workforce standards for specialized work on critical fire safety systems. For example, Section 904.1.1 mandates that service personnel maintaining automatic fire-extinguishing systems (excluding automatic sprinkler systems) must hold a fire sprinkler fitter license. This requirement underscores the CFC's recognition that high-risk, complex systems demand skilled professionals to ensure safe and effective handling.

Additionally, the County has broad authority to adopt workforce standards under its inherent police power. Article IX, Section 7 of the California Constitution authorizes the County to "make and enforce within its limits all local, police, sanitary, and other ordinances and regulations not in conflict with general laws." This police power allows the County to enact laws, within constitutional limits, to protect the order, safety, health, morals, and general welfare of society.³ This encompasses the authority to establish minimum knowledge and skill requirements for workers on private construction projects within its jurisdiction.

Establishing minimum standards for the skill and knowledge required to perform electrical work on BESS projects is a reasonable exercise of the County's police powers. Incorrectly performed electrical work can result in catastrophic fires, explosions, or environmental damage, posing significant risks to life, property, and public resources. Workforce requirements – such as mandating certifications, training, and experience specific to energy storage systems – help ensure that individuals performing this critical work are adequately equipped to prevent these risks.

³ *In re Ramirez* (1924) 193 Cal. 633, 649-50.
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Other California jurisdictions have successfully implemented workforce standards for technical and safety-critical tasks, highlighting the importance of qualified professionals in protecting public safety. For example, Los Angeles County requires that technicians working for contractors that perform plumbing or gas fitting work must meet certain workforce qualification requirements, including passing a competency examination.⁴ The City of Los Angeles imposes similar requirements to ensure that individuals performing these tasks are adequately trained and qualified.⁵

In addition, the California Legislature has imposed skilled and trained workforce requirements on hazardous construction work in refineries and certain chemical facilities.⁶ These statutes increase safety by ensuring that a certain percentage of workers performing construction or maintenance on the site have completed comprehensive, state-approved apprenticeship programs.

The County thus not only has broad authority to adopt standards for electrical work on BESS facilities, but there is also ample precedent for imposing workforce standards on potentially hazardous construction work across the state. BESS installations involve advanced technologies and high-energy systems that demand specialized training and expertise to implement. Establishing minimum workforce standards would directly address the significant risks posed by unqualified personnel working on complex energy storage technologies. Without clear countywide workforce standards, the risk of errors and failures during BESS installation and operation remains unacceptably high.

BESS workforce guidelines would also support California's broader policy goals regarding clean energy and safety. The state is aggressively pursuing renewable energy adoption, including integration of BESS to support grid reliability and decarbonization. However, the safe deployment of these systems is critical to their long-term success. By implementing workforce requirements, the County would ensure that BESS installations under its jurisdiction contribute to California's energy goals without compromising public safety.

In sum, the SDCFPD and the County have clear legal authority under the CFC and the County's police powers to adopt workforce guidelines and requirements for electrical work on BESS facilities. Such measures are not only legally sound but also critical to public safety, consistent with state policy, and

⁴ Los Angeles County Plumbing Code § 105 *et seq.*

⁵ Los Angeles Plumbing Code § 94.103.13.0.

⁶ See Health & Safety Code §§ 25536.7, 25536.8.

necessary for addressing the unique challenges posed by BESS. Accordingly, the adoption of workforce standards as part of both the interim and permanent County BESS guidelines would be a prudent and lawful exercise of the County's police power and a critical step toward ensuring the safe and effective deployment of BESS.

B. The IFP Guidelines Inconsistently Establish Contractor Licensing Requirements for Some Aspects of BESS Installations While Overlooking Workforce Standards for Electrical Work

Section 2.2 of the draft IFP Guidelines establishes licensing requirements for certain aspects of BESS installations. Specifically, a C-16 license is required for automatic sprinkler systems and water supplies and a C-10 license is required for fire alarm systems and gas detection systems.⁷ But the draft guidelines lack licensing requirements for installing other BESS electrical components, leaving a gap in the draft safety regulations that is inconsistent with the County's exercise of authority to set minimum standards for other aspects of BESS installation.

First, the inclusion of licensing requirements for sprinkler and fire alarm systems demonstrates that both the SDCFPD and the County recognize their legal authority to adopt workforce guidelines governing the installation of BESS facilities. By setting these minimum standards, the County acknowledges the critical importance of ensuring qualified professionals are engaged in the design and installation of fire safety systems integral to BESS projects. Similar requirements should be incorporated for all aspects of BESS electrical installation.

Second, while the proposed sprinkler and fire alarm installer licensing requirements are appropriate, these only improve safety after a fire incident occurs. They fail to provide any measures to reduce the likelihood of an incident occurring in the first place. Poor installation, including grounding errors, electrical connection errors, substandard wiring, inadequate surge protection, and improper handling of equipment are all significant causes of BESS failures and fire incidents.

The County should amend the proposed standards to also ensure that individuals performing electrical work on BESS projects possess the specific training and experience required to mitigate fire and safety risks associated with electrical installation.

⁷ Interim Fire Protection Guidelines for BESS Facilities at p. 7.
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C. The IFP Guidelines Should Establish Minimum Workforce Training Standards for Technicians that Perform Electrical Work on Large BESS Projects

There are three requirements that are readily available to ensure that installers of BESS projects have sufficient training and experience to substantially reduce the risk of installation errors that can lead to, or exacerbate, BESS fire incidents: (1) requiring the use of state certified electricians to perform all electrical work on BESS projects with energy capacity over 70 kWh; (2) requiring that at least 15% of the onsite certified electricians performing electrical work hold an ESAMTAC credential; and (3) requiring the use of a skilled and trained workforce as defined in Public Contract Code section 2600 *et seq.*

1. The IFP Guidelines Should Require All Technicians that Perform Electrical Work on BESS Projects Over 70 kWh To Be State-Certified General Electricians

At the barest minimum, the IFP Guidelines should require all technicians that perform electrical work on BESS projects with energy capacity over 70 kWh to be state-certified general electricians. The easiest way to accomplish this would be to require all electrical work on BESS projects to be performed by C-10 electrical contractors. C-10 contractors are required by law to only use state-certified electricians to perform electrical work. What most people don't realize is that other contractors, including General A and B contractors, are not required to use state-certified electricians to perform electrical work. Instead, they can hire someone off the street with no training or experience to do this work.

2. The IFP Guidelines Should Require At Least 15% of Technicians that Perform Electrical Work on BESS Projects to Hold an Energy Storage and Microgrid Training and Certification Credential

While state-certified electricians are required to meet certain minimum training requirements and pass an exam demonstrating competence on basic electrical safety and installation practices that are relevant to safe installation of BESS, the state general electrician-certification requirements do not provide or require specific training in the safe installation of BESS. The only certification that demonstrates specific training and qualification in the installation of BESS is ESAMTAC. This certification is specifically designed to provide electricians with the advanced training necessary for safely handling BESS ensuring they are prepared to mitigate the unique fire and safety risks posed by these systems.

Because the risk of BESS fires increases exponentially with the storage capacity of the BESS, the County should revise the proposed IFP Guidelines to require that, in addition to requiring that all technicians performing electrical work are certified-state electricians, at least 15% of the onsite certified electricians performing electrical work on a BESS project with an energy storage capacity exceeding 70 kWh must hold ESAMTAC credential.

3. The IFP Guidelines Should Require a Skilled and Trained Workforce for All Utility-Scale BESS Projects

Utility-scale BESS is a transformative technology critical to California's clean energy goals. However, BESS systems also present unique hazards that require a highly skilled and trained workforce. Operating with high-capacity energy storage and high-voltage electrical infrastructure, utility-scale BESS pose significant risks if improperly installed or maintained. The scale and complexity of these systems amplify the risks, making utility-scale BESS installations fundamentally different from smaller projects. Addressing these challenges demands workers with advanced technical training, a deep understanding of electrical work, and specialized safety knowledge. A skilled and trained workforce is critical to ensure that these energy systems are constructed and maintained safely, reliably, and in alignment with public safety standards.

To ensure the safe and effective installation of utility-scale BESS, the County should adopt skilled and trained workforce requirements, as outlined in Public Contract Code § 2600 *et seq.* These requirements mandate that a percentage of workers on a project be graduates of state-approved apprenticeship programs. Apprenticeship training is widely recognized as the gold standard for workforce development because it provides workers with the specialized knowledge and skills necessary to safely construct and maintain complex infrastructure.

California has already recognized the value of skilled and trained workforce standards in other safety-critical sectors. For example, Health and Safety Code § 25536.7 mandates the use of skilled and trained workforce for construction, demolition, and maintenance of oil refineries. This requirement reduces risks to workers and surrounding communities by ensuring that high-hazard facilities are built and maintained by qualified professionals. Utility-scale BESS facilities share many of the same safety challenges as oil refineries, including fire hazards, high-capacity energy systems, and the potential for catastrophic failures if improperly installed or maintained. Extending skilled and trained workforce requirements to BESS projects would apply this proven regulatory model to a rapidly expanding energy sector with comparable risks.

Adopting such requirements would not only enhance safety and reliability but also advance California's clean energy goals objectives. By fostering a highly qualified workforce, the County can ensure responsible development of critical energy infrastructure. Requiring skilled and trained workers safeguards public safety, prevents costly failures, and ensures that the benefits of utility-scale BESS projects are realized without compromising on quality or equity.

D. IBEW's Proposed Workforce Standards Directly Target the Leading Cause of BESS Failures

While the draft IFP Guidelines appropriately address permitting, design, and emergency response considerations for BESS, they fail to adequately address the most common root cause of BESS failures: problems arising from integration, assembly, and construction.

A key source cited within the BESS Best Practices Guide, a report by the Electric Power Research Institute ("EPRI"), highlights this issue.⁸ EPRI, which maintains the most comprehensive database of stationary BESS failures, identifies "Integration, Assembly, and Construction" as the most frequent root cause of failures.⁹ These failures often stem from poor integration, component incompatibility, incorrect installation, or inadequate commissioning processes.¹⁰ To mitigate these risks and ensure safe and reliable operation of BESS facilities, EPRI emphasizes the importance of workforce training and rigorous quality checks during installation and commissioning.¹¹

Despite these clear recommendations, neither the BESS Best Practices Guide nor the draft IFP Guidelines address workforce training or qualification requirements to prevent these failures. This omission leaves a significant gap in the County's efforts to ensure the safety and reliability of BESS projects.

Incorporating workforce standards into the IFP Guidelines would directly address this gap by ensuring that the individuals performing critical electrical work

⁸ County of San Diego, San Diego County BESS Best Practices: Policy Recommendations for Battery Energy Storage Systems Projects (Nov. 8, 2024) (hereinafter "BESS Best Practices Report"), appen. D, available at <https://engage.sandiegocounty.gov/26597/widgets/91161/documents/61679>; see also Electric Power Research Institute, Insights from EPRI's Battery Energy Storage Systems (BESS) Failure Incident Database: Analysis of Failure Root Cause (May 2024) p. 8 (hereinafter "EPRI Report", available at <https://restservice.epri.com/publicdownload/000000003002030360/0/Product>.

⁹ EPRI at p. 8.

¹⁰ EPRI at p. 4.

¹¹ EPRI at p. 12.

are equipped with the necessary training and certifications. These standards would enhance public safety, reduce the likelihood of system failures, and improve the overall reliability of BESS installations. By adopting workforce requirements, the County can take a proactive step toward mitigating the most prevalent risks associated with BESS and safeguard its constituents.

E. Conclusion

The IFP Guidelines represent a significant safety step toward ensuring the safety and reliability of BESS systems. However, to fully address the unique hazards posed by these advanced energy systems, the County must incorporate workforce standards that require specialized training and certifications for those performing electrical work on BESS installations. By adopting the measures set forth in the attached supplement, the County will proactively mitigate the leading causes of BESS failures, enhance public safety, and align with California's broader policy goals for clean energy and sustainable development.

These workforce requirements are not only a practical and lawful exercise of the County's regulatory authority but also a critical component of ensuring that BESS projects deliver their intended benefits without compromising safety or reliability. We urge the County to amend the IFP Guidelines to include these vital standards, protecting the community while fostering a skilled workforce capable of supporting California's clean energy future.

We appreciate the opportunity to provide input on this important matter and welcome further discussions to support the County in implementing these recommendations.

Sincerely,



Andrew J. Graf

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ATTACHMENT

SUPPLEMENT TO THE INTERIM FIRE PROTECTION GUIDELINES FOR BESS PROJECTS

13. Workforce Standards

13.1 All electrical work on a BESS project with an energy capacity exceeding 70 kilowatt-hours (kWh) must be performed by state-certified general electricians, electrician trainees, or registered apprentice electricians employed by a C-10 licensed contractor and at least 15% of the onsite electricians must hold an Energy Storage and Microgrid Training and Certification (ESAMTAC).

13.1.1 Findings

- Minimum training and experience requirements are necessary to reduce the safety risks associated with poor integration, assembly, and construction of BESS systems.
- State-certified general electricians are documented to have at least 8,000 hours of electrical work experience and have passed a state electrical exam on general electrical safety and installation requirements.
- Trainee electricians and registered apprentice electricians are individuals actively working to become general electricians and are legally permitted to perform electrical work under supervision.
- ESAMTAC credentials ensure that general electricians possess specific skills and knowledge to handle BESS-specific electrical work in addition to minimum experience and knowledge required for certification as a general electrician.
- The number of ESAMTAC-certified electricians in the County is more than sufficient to ensure compliance with these standards, and will continue to expand rapidly.
- The 70-kWh threshold aligns with the energy system thresholds established by the California Fire Code (and the pending Contractor State Licensing Board standards limiting the size of BESS that may be installed by solar contractors that do not also hold a C-10 license) and ensures the focus remains on larger, more complex systems, without unduly burdening smaller residential or commercial systems that pose a lower level of risk.

13.1.2 Supporting Standards

- In May 2024, Electric Power Research Institute (EPRI) published *Incidents from EPRI's BESS Failure Incident Database*, which developed a categorization system for BESS failures, aggregated failure data to better understand trends, and provide recommendations for future safety improvements.

- EPRI reviewed 26 BESS incidents which had sufficient information to assign a root cause and to identify the element that experience failure.
 - The most common root cause for BESS failure is “Integration, Assembly, and Construction,” which includes failures due to poor integration, incompatibility of components, incorrect installation, or inadequate commissioning.
 - To reduce the risks associated with category of failures, EPRI recommends workforce training during energy storage commissioning and installation.
- 13.2 A skilled and trained workforce, as defined in Public Contract Code § 2600 *et seq.*, shall be used to complete any utility-scale BESS project and a minimum of 15% of the onsite electricians hold an ESAMTAC.
- 13.2.1 Findings
- Utility-scale BESS projects present unique hazards due to their size and complexity.
 - Minimum training and experience requirements are necessary to reduce the safety risks associated with poor integration, assembly, and construction of BESS systems.
 - Skilled and trained workforce requirements ensure that a high level of competency is required of the workers who build utility-scale BESS projects by requiring a certain percentage of workers to be graduates of state-approved (union or non-union) apprenticeship programs.
 - State-approved apprenticeship programs provide substantially more robust and comprehensive electrical safety and installation training than required for a general electrician certification.
 - Skilled and trained workforce requirements have been imposed on other potentially hazardous large industrial projects, such as certain refinery and chemical plants.
 - ESAMTAC credentials ensure that technicians possess the necessary skills and knowledge to handle BESS-specific electrical work.
 - There are enough ESAMTAC-certified electricians in the County to ensure compliance with these standards.