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February 18, 2024

City of Surprise
Community Development
16000 N. Civic Center Plaza
Surprise, AZ 85374

RE: City of Surprise Battery Energy Storage System (BESS) Ordinance (Chapter 106, Article X, Sec. 106-10.22)

Dear Mr. Abrams and Community Development Staff,

The Arizona Solar Energy Industries Association (AriSEIA) is the State's solar, storage, and electrification trade association. We are active on energy policy issues at every level of government in Arizona. We have previously engaged on the City of Eloy, Mohave County, City of Buckeye, Town of Chino Valley, and Yavapai County solar/storage ordinances. Between Option 1 and Option 2, we prefer Option 2. However, we recommend the City consider an Option 3. Namely, we think the ordinance should be split between battery energy storage systems (BESS) and hazardous materials. The setbacks for those different types of facilities should be different and combining them increases fear and misinformation about BESS and clean energy broadly. Additionally, the definitions need to be modified and should be clear that they do not apply to solar or to distributed generation or storage. Finally, we continue to recommend the setbacks be based on evidence and best practices. **We recommend that the City reduce the BESS 1,500' setback from residential property (B) requirement to 150'.** We also recommended adding a waiver provision to the Article.

Glossary

It is unclear why there are multiple definitions for battery storage and additional definitions for energy storage. The ordinance should keep the first definition for BESS. Energy Production should be completely removed from the glossary and title as the ordinance applies to storage and not generation, such as solar. Nothing in the glossary pertains to manufacturing. The definitions for Battery Storage and Manufacturing, Energy Production and Storage Facilities, and Energy Storage Facilities are redundant. The section on Hazardous Material should be a separate ordinance. The glossary should be clear that the ordinance only applies to utility/grid scale projects and not any distributed, behind the meter projects, such as residential or commercial.

Setbacks

The setbacks in (A) and (B) should be from the structure, not the property line. If the intent of the setback is for evacuation purposes, it makes sense to only measure from a dwelling unit. The 1,500 setback in (B) is not based on a setback from any other jurisdiction, a recommendation from the National Fire Protection Association (NFPA), or best practices. The American Planning Association found the national setback average for BESS-specific setbacks used distances of 50-150 feet from property lines.[1] The BESS 1,500' setback requirement is significantly above BESS setback standards in other jurisdictions and will restrict clean energy development in the City of Surprise. While the

[1] American Planning Association, Zoning Practice, P.10 (Mar. 2024), *available here* https://planning-org-uploaded-media.s3.amazonaws.com/publication/download_pdf/Zoning-Practice-2024-03.pdf.

NFPA recommends 100', we recommend no more than 150' based on the Phoenix Regional Standard Operating Procedures Battery Energy Storage Systems policy.[2] In the event the City will not consider the most conservative end of the range based on a nationwide review, we recommend no larger than a 500' setback, commensurate with subsection (A).

The American Clean Power Association (ACP) provides a helpful FAQ that covers questions about battery safety and air emissions.[3] ACP also has a Claims v. Facts one-pager on battery safety, included again as **Attachment B.** "It should also be noted that the average emissions rates of equivalent masses of plastics exceed those of batteries."[4] Additionally, sampling was done by the Environmental Health Division and the U.S. Environmental Protection Agency (EPA) after the Moss Landing incident and "no threat to human health or the surrounding environment" was found.[5] All electricity generation and energy storage creates some amount of risk. However, battery incidents represent only 2% of battery installations.[6] Setbacks for batteries should not be more onerous than setbacks for other energy storage devices, such as those that contain fossil fuels.

In (B) we agree that any setback required should be from the dwelling unit like the Yavapai County ordinance, not the lot line. And it should be measured from the actual BESS structures, not an overall project site that might also include solar.

Waiver Provision

The Ordinance should include a waiver provision in the event a project proposal conflicts with some component of the Ordinance, but is otherwise an ideal site. The City of Eloy Solar and BESS Ordinance includes such a provision.[7]

We have attached a draft Option 3 as **Attachment A.** Thank you for your time and consideration and we look forward to continuing to engage with the City on this Ordinance as the stakeholder process progresses.

Respectfully,

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[2] City of Phoenix, Battery Energy Storage Systems, April 2023, *available here* https://www.phoenix.gov/firesite/Documents/205.20A%20Battery%20Energy%20Storage%20Systems.pdf.
[3] American Clean Power Association, Energy Storage: Safety FAQ, *available here* https://cleanpower.org/wp-content/uploads/gateway/2023/07/ACP-ES-Product-4-BESS-Safety-FAQs-230724.pdf.
[4] Consolidated Edison and NYSERDA, Considerations for ESS Fire Safety, Feb. 9, 2017, at iii, *available here* https://www.nyserda.ny.gov/-/media/Project/Nyserda/files/Publications/Research/Energy-Storage/20170118-ConEd-NYSERDA-Battery-Testing-Report.pdf.
[5] County of Monterey, Air Quality Testing Information and Process During Moss Landing Fire Incident, Sept. 30, 2022, *available here* https://www.countyofmonterey.gov/Home/Components/News/News/9345/1336.
[6] California Public Utility Commission, Energy Storage Procurement Study: Safety Best Practices, 2023, *available here* https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/energy-storage/2023-05-31_lumen_energy-storage-procurement-study-report-attf.pdf.
[7] Eloy Ordinance, 21-3-1.39, *available here* https://codelibrary.amlegal.com/codes/eloyaz/latest/eloy_az/0-0-0-9381.

ATTACHMENT A

Option 3

Supplemental development standards.

Sec. 101-2.2. - Glossary of terms.

***Battery Energy Storage System (BESS)* - Electrochemical devices that charge, or collect, energy from the grid or a generation facility, store that energy, and then discharge that energy at a later time to provide electricity or other grid services at the grid scale. This ordinance is not meant to apply to behind the meter projects.**

***BESS Cabinet* – An enclosure within a BESS that houses the electrochemical device that charges or collects and stores energy to discharge later and related components.**

Chapter 106 - ZONING AND USE STANDARDS

ARTICLE X. - USE SPECIFIC STANDARDS

Sec. 106-10.22. – Battery Storage

A. Shall be located no closer than one hundred and fifty (150) feet to an existing residential dwelling unit on a residentially-zoned parcel, measured in a straight line in any direction from the outermost BESS cabinet to the closest exterior wall of the main residential dwelling unit.

B. Shall have prepared and approved by the City of Surprise Fire Department, an Emergency Mitigation Plan prior to review by Planning and Zoning Commission. The Plan should be updated prior to building permit issuance to include technology-specific details no available at the time of review by Planning and Zoning Commission.

C. Shall have prepared a noise study of the project that depicts the impact to surrounding properties and provides mitigation criteria to ensure the post-construction noise levels associated with the project's operation do not exceed an exterior noise level of **60 dBA** at the nearest existing dwelling unit.

D. Shall have prepared and reviewed with the City of Surprise Fire Department, a Commissioning Plan in accordance with NFPA 855 prior to commissioning.

E. Shall have prepared and reviewed with the City of Surprise Fire Department, a Decommissioning Plan in accordance with NFPA 855 prior to commissioning.

F. Energy storage facilities shall:

   (I) Incorporate an 8-foot-to 12-foot high perimeter wall or fence to prevent unauthorized access to the facility and screen the Battery energy storage systems. Wall(s) or fence(s) shall be designed to include changes in the surface plane, variable heights, articulated recesses and offsets to avoid the construction of long, unbroken and monotonous expanses of wall(s) or fence(s).

   (II) Minimize grading to maintain natural landform.

   (III) Maintain a 10-foot landscape setback along the outside perimeter of the project site, no landscaping shall be located inside the perimeter wall.

   (IV) Landscaping within the front yard, or any street side/rear yard area shall be landscaped in accordance with the city's Land Development Ordinance.

   (V) Storage facilities shall be self-contained and shall not contain any internal access for human occupancy.

   (VI) Shall have a report detailing 24/7 security surveillance and notification systems prior to commissioning.

G. The ability to modify or waive any provision of this ordinance may only occur with a formal written request to the City Council by the applicant.

ATTACHMENT B

Claims vs. Facts

Energy Storage Leading on Safety


Photo credit: Fluence

Utility-scale battery energy storage is safe and highly regulated, growing safer as technology advances and as regulations adopt the most up-to-date safety standards.

Background

Energy storage systems (ESS) are critical to a clean and efficient electric grid, storing clean energy and enabling its use when it is needed. Installation is accelerating rapidly—as of Q3 2023, there was seven times more utility-scale energy storage capacity operating than at the end of 2020. This growth is driving job creation, investment in American manufacturing, and is improving grid resilience and energy security.

However, because energy storage technologies are generally newer than most other types of grid infrastructure like substations and transformers, there are questions and claims related to the safety of a common battery energy storage technology, lithium-ion (Li-ion) batteries. All of these questions and claims can be addressed with facts. The industry continues to address these concerns to ensure community confidence in this increasingly essential electric grid infrastructure.

CLAIM: The incidence of battery fires is increasing.

FACTS: Energy storage battery fires are decreasing as a percentage of deployments.

- Between 2017 and 2022, U.S. energy storage deployments increased by more than 18 times, from 645 MWh to 12,191 MWh[1], while worldwide safety events over the same period increased by a much smaller number, from two to 12[2].
- During this time, codes and standards regulating energy storage systems have rapidly evolved to better address safety concerns.


Photo credit: Fluence

CLAIM: Today's larger battery systems use tens of thousands of cells, so fires are inevitable.

FACTS: Cell failure rates are extremely low, and safety features in today's designs further reduce the probability of fires.

- One estimate from 2012 quotes a failure rate ranging from 1 in 10 million to 1 in 40 million cells[3], and there are undoubtedly improvements from these levels.
- Lithium-ion batteries experience extremely low failure rates, as shown by electric vehicle data.
  - Tesla alone sold nearly 900,000 vehicles in the first half of 2023[4]. These sales of new vehicles represent around three-quarters of a billion cells, but safety events involving all EVs on the road globally, from all manufacturers, amounted to just a few dozen fires.
- Today's energy storage systems (ESSs) predominantly use safer lithium-iron phosphate (LFP) chemistry, compared with the nickel-manganese-cobalt (NMC) technology found in EVs.
  - LFP cell failure results in less energy release and a lower probability of fire.
- ESS designs incorporate features to avoid propagation of cell failure within the battery, contributing to improved safety.

1 US Energy Storage Monitor, Q1 2023 full report and 2022 Year in Review, Wood Mackenzie Power & Renewables/American Clean Power Association, https://www.woodmac.com/industry/power-and-renewables/us-energy-storage-monitor/

2 Electric Power Research Institute, BESS Failure Event Database, https://storagewiki.epri.com/index.php/BESS_Failure_Event_Database

3 D. Doughty, Vehicle Battery Safety Roadmap Guidance, National Renewable Energy Laboratory, October 2012, https://doi.org/10.2172/1055366.

4 EV sales: Hyundai overtakes GM, but Tesla's U.S. dominance continues

CLAIM: E-bike and e-scooter fires have resulted in deaths—so large batteries for energy storage may be even more deadly.

FACTS: No deaths have resulted from energy storage facilities in the United States. Battery energy storage facilities are very different from consumer electronics, with secure, highly regulated electric infrastructure that use robust codes and standards to guide and maintain safety.

- E-mobility devices have been lightly regulated in the past, and some products have used poor-quality battery cells and ineffective safety systems.
  - They are also charged inside homes, sometimes along egress routes, creating a high level of risk.
- Like EV batteries, ESS battery systems are highly regulated and subject to stringent certification and testing requirements.
  - The difference in regulation is evident in vehicle statistics. Worldwide, for the first half of 2023, EV FireSafe cites 500+ light electric vehicle (E-bike and E-scooter) battery fires, but only 44 passenger EV fires[5].
  - Additionally, utility-scale energy storage systems are located within secure facilities with site plans explicitly designed around maximizing safety of those operating the facilities and their neighbors.
- The ESS industry meets with and shares best practices with first responders and communities.
  - Lessons learned from earlier ESS incidents have been reflected in the evolution of codes and standards. Often, companies go beyond mandatory testing to test more extreme failure scenarios.
- Altogether, like other electric grid infrastructure, energy storage systems are highly regulated and there are established safety designs, features, and practices proven to eliminate risks to operators, firefighters, and the broader community.
- The industry is committed to meeting these standards, such as NFPA 855, which are regularly updated to reflect the latest evidence-based best practices.

Photo credit: AES

CLAIM: Battery fires emit toxic fumes and pose a risk to the community

FACTS: Past incidents demonstrate that fires are contained within the facility, and air quality in neighboring areas remains at safe levels.

- Laboratory testing of emissions from Li-ion cells in thermal runaway shows that emissions are similar to those found in plastics fires[6].
- During an ESS battery fire, only trace amounts of chemicals are detected in sampling around the event, and overall air quality remains at safe levels.
- During a fire at a Tesla Megapack at Moss Landing in California, air-quality testing showed no hazards to human health[7].

CLAIM: Fire suppression systems should be mandatory for all lithium-ion battery systems.

FACTS: Regulations that aren't vetted by organizations like the National Fire Protection Association or are inconsistent with the International Fire Code may make projects less safe.

- Established national and international codes and standards already require BESS to incorporate the appropriate safety features to contain any potential fires or thermal events.
- Successful suppression of a fire does not guarantee that the underlying thermal runaway event has been terminated, so containing a fire is the best way to protect first responders and communities.
- The energy storage industry is working to avoid events such as the explosion at an installation in McMicken, Arizona, in which four firefighters were injured[8]. Prior to this event, the industry was focused on extinguishing fires as quickly possible, but McMicken showed that explosion can be a greater hazard and fire containment is a better strategy.
- The accepted best practice for the rare ESS fires that do occur is to contain them, managing the burn of the limited affected unit in a controlled manner while protecting nearby structures and equipment. This strategy eliminates any explosion hazard, avoids issues with stranded energy and reignition, and minimizes contaminated runoff of firefighting water.
- Codes and standards are changing to reflect this practice, placing an emphasis on explosion prevention. One proposal for the 2026 edition of NFPA 855, *Standard for the Installation of Stationary Energy Storage Systems*, would forbid installation of traditional clean-agent or aerosol fire suppression systems unless testing demonstrates that use of such systems does not create an explosion risk.

5 EV FireSafe, All Electrified Transport LIB Fire Incidents, Global, 1st January to 30th June 2023, https://www.evfiresafe.com/ev-battery-fire-overview.
6 DNV-GL, Considerations for ESS Fire Safety, Report for Consolidated Edison and NYSERDA, 2017
7 Air quality testing showed no hazards to human health amid battery fire in Moss Landing
8 Arizona ESS Explosion Investigation and Line of Duty Injury Reports Now Available