MEMORANDUM

To: County Commissioners Court and County Fire Marshal
From:
Date:
Re: Public Safety Risk Assessment for Battery Energy Storage System (BESS) Facilities in Unincorporated Areas

I. Introduction

This memorandum provides an updated assessment of the specific fire, explosion, and public safety risks associated with Battery Energy Storage Systems (BESS) proposed for development in unincorporated areas of [County Name]. It is intended to support potential action by the County Commissioners Court and the County Fire Marshal to require pre-construction fire safety review and permitting for such facilities under the County's existing public safety authority.

II. Overview of BESS Fire and Safety Risks

Battery Energy Storage Systems continue to pose distinct fire and explosion risks due to their reliance on high-density lithium-ion chemistries. The most significant hazards include:

1. Thermal runaway leading to uncontrollable fires.
2. Emission of toxic gases such as hydrogen fluoride.
3. Re-ignition of battery fires after initial suppression.
4. Explosion risks from confined flammable gas accumulation.
5. Challenges to local emergency response capacity and environmental safety.

III. Emergency Response and Public Safety Implications

A. Limited local fire service capacity to manage lithium-ion battery fires.
B. Risk to adjacent properties, public health, and first responders.
C. Potential for environmental contamination from chemical runoff.

IV. Recent Case Studies: 2023–2025

1. **Moss Landing Energy Storage Fire (California, February 2023)**

A thermal event at the 400 MW/1,600 MWh Moss Landing BESS resulted in system shutdown and prolonged fire risk. The incident involved overheating and mechanical failure within multiple battery modules, requiring extensive cooling and system isolation. Although no injuries occurred, the incident exposed gaps in monitoring, containment, and emergency response protocols.

2. **Chandler, Arizona BESS Fire (United States, March 2023)**

A 10 MW BESS operated by Salt River Project caught fire, prompting evacuations of nearby businesses and homes. The fire burned for several hours, with responders forced into defensive posture due to toxic gas emission and explosion risk. The event led to immediate suspension of other BESS projects pending safety reviews.

3. **South Korea Industrial BESS Explosion (Gimpo, July 2024)**

An explosion at a large-scale lithium-ion BESS in an industrial park killed three workers and injured multiple firefighters. The event was traced to internal cell failure and inadequate gas management design. Following the incident, South Korea's government imposed stricter mandatory separation distances and emergency venting requirements for all BESS projects.

4. **Liverpool BESS Overheat Incident (United Kingdom, May 2023)**

A 49 MW BESS in the Liverpool area suffered a major overheating event resulting in toxic gas release and temporary evacuation of surrounding areas. Although no fire occurred, authorities flagged deficiencies in early warning systems and suppression readiness. The incident triggered review of all BESS sites across the UK.

5. **Victoria, Australia Megapack Fire (Melbourne, January 2025)**

A new Tesla Megapack installation outside Melbourne experienced a full battery fire during grid testing. The fire burned for two days despite foam suppression efforts. This incident renewed public scrutiny of BESS fire risks and led to national guidelines mandating independent third-party fire risk assessments for all new battery storage sites.

V. Common Risk Factors Identified

- Thermal runaway due to electrical or mechanical failure.

- Delayed or failed detection of early-stage overheating.
- Inadequate gas release, ventilation, and suppression system design.
- Limited firefighting capability specific to battery chemistries.
- Public health threats from smoke, toxic gas, and contaminated runoff.

VI. Recommended Risk Mitigation Actions for the County

To mitigate risks identified in these recent incidents, the following steps are recommended for all proposed BESS facilities in [County Name]:

1. Require submission of detailed site plans, MSDS, and suppression system specifications.
2. Require pre-construction fire safety review by the County Fire Marshal.
3. Mandate an Emergency Response Plan including response time estimates and public evacuation routes.
4. Consider requiring independent third-party risk assessments for large-scale systems.
5. Deny occupancy or operation permits until full compliance with fire safety requirements is demonstrated.

VII. Conclusion

The most recent case studies confirm that BESS fires and explosions remain a present and growing risk in jurisdictions across the globe, including in the United States. The risks are complex, difficult to mitigate without advance planning, and present a clear public safety justification for the adoption of pre-construction review, permitting, and operational controls within Lamar County.