



# ENERGY STORAGE SYSTEMS

## ELECTRICAL SAFETY FOR FIRST RESPONDERS

UNDERSTAND THE UNIQUE RISKS WHEN ENERGY STORAGE SYSTEMS ARE INVOLVED

### ▶ WHERE ARE ENERGY STORAGE SYSTEMS LOCATED?



Residential settings, usually near electrical panel



Microgrids



Commercial



Critical infrastructure

Utilities



### ▶ MITIGATION AND EMERGENCY RESPONSE

Qualified personnel should be contacted to find system status and response procedures



Is the system **active** or **shut down**?



Are there **abnormal temperature readings**? Is there **smoke** or **toxic** or **flammable gas** present?



Has the **fire suppression system** been activated?

### ▶ IDENTIFY THE HAZARD



**Location** and **type** of battery system



Reference any **pre-planning documents**



Reference any **safety data sheets**

### ▶ SHUTDOWN



Communicate shutdown to **all personnel**. Level of shutdown may depend on level of incident



**Secure all non-essential power**. May require qualified person to assist



Shut down **small breakers** before main breaker

### ▶ WATCH



Hazardous energy may still be available in the battery **even after shutdown**



Shut off **main battery disconnect**; energy storage systems may still provide power



**Do not enter** utility substations, battery installations, or other facilities. Do not attempt to operate equipment without **qualified utility personnel**



Continue to **monitor** energy storage systems to avoid future fires. **May take hours or days**



**Monitor air** and provide proper ventilation



Avoid **any liquid**. Beware of **trapped gas** and **explosion hazards**. Do not approach or attempt entry of a battery room suspected of **thermal runaway** and **off-gassing** if life is not at risk

### ▶ INCIDENT

#### Electrolyte Spills

Identify **chemistry** involved to know the response

Reference any **pre-plan info** available

Interview **knowledgeable staff**



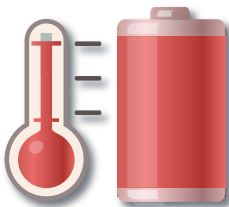
PPE and SCBA offer **limited protection**

**Dike area** around spread – clean up needs to be completed by **qualified personnel**

#### Overheated Batteries

Overheating can be evident by **bulging** or **other deformities**

**Air monitoring** and **ventilation** should be ongoing



If you can see the battery, **monitor them with a thermal imager** for changes to temperature

When batteries are shut off, **they should cool**, but it may take time. If temperatures do not go down or go up, **there may be a fire**

Ensure full **PPE** and **SCBA** are being used in firefighting operations

Review **safety data sheets** or **pre-plans** to know battery chemistry and hazards

Secure **water supply**

#### Energy Storage System Fires

**Evacuate area** affected by fire

Consider **turning off HVAC** but keep dedicated exhaust for energy storage systems



After fire, **monitor for flammable or toxic gases**. Always **monitor for pockets of stranded gas**. Never attempt to overhaul a **damaged ESS**

Attempt to **extinguish the fires** (Not for NaS battery-type fires). **Apply water directly to cells** if possible to remove heat. If direct water application isn't possible, **apply water to protect exposures**

Continue **temperature monitoring**. May take hours or days to cool. Continued explosive and toxic off-gassing, and re-ignition, is possible

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