Future Focus Areas for ESS
Fire Safety Requirements

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Legacy Stationary Battery Systems (Pre-2015)

- Emergency/standby power & UPS
- Lead acid battery hazards - hydrogen gas production and corrosive liquid spills
2015 IFC and NFPA 1 Battery Systems Protection

(Lead-acid) battery systems allowed in incidental use areas

1 or 2 hour fire-rated separations

Hazmat requirements exempted

Spill control, ventilation, smoke detection

Codes did not adequately protect new battery technologies or applications
2015 Energy Storage Systems Considerations

New applications

- Grid balancing and resiliency
- Mitigating renewable energy intermittency
- UPS

New battery technologies – Lithium-ion, flow, sodium sulfur, etc.

Utility, commercial and residential applications
FCAC ESS Working Group Strategy

- Working group developed ESS proposals for the IFC, IRC
- Goal - have requirements in the 2018 fire codes to address hazards
- Conservative requirements due to lack of field experience, fire testing and research.
2018 Fire Codes – New Protection Concepts

- Hazard mitigation analysis
- Indoor and outdoor location limitations
- Battery management systems
- Automatic fire sprinklers
- UL 9540 equipment listing
- Technology specific protection
Other arrangements based on large scale fire testing
2018 IRC Stationary Battery Systems

UL 9540 Listing

Installed per the manufacturer's instructions

Cannot be installed within habitable space of a dwelling unit

Electrical installation same as residential PV systems
New 2021 IFC Protection Concepts
(NFPA 855 essentially the same)

Commissioning, decommissioning, operation and maintenance

Fire remediation and hazard mitigation

Fire detection and suppression system enhancements

UL 9540A large scale fire testing

Explosion control

Mobile ESS
2021 IFC Location Specific Criteria

- Mixed Occupancy Building
- Outdoor Cabinets
- Dedicated ESS Building
- Outdoors Near Building
- Rooftop Installations
- Outdoors Remote
2021 IRC ESS Changes

ESS listed per UL 9540 and marked “For use in residential dwelling units” are allowed in dwelling units.

Max. 20 KWh size, aggregate quantities, unit-to-unit separation, and location requirements

Interconnected fire detection in dwelling and attached garages

Gypsum wallboard requirements for indoor locations
Potential Future Codes and Standards Activities

Fifteen NFPA 855 task groups formed
NFPA 855 scoping
NFPA 855 reorganization & technical requirement cleanup
NFPA 855 guide, if approved by the Standards Council
Energy/battery management systems criteria
Potential Future Codes and Standards Activities (continued)

Taking advantage of UL 9540 and UL 9540A developments
Re-examine hazard mitigation analysis criteria
Advance fire remediation practices
Fire suppression and control
Discussion