

Energy Storage Safety Working Group

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Hosted by

DOE-OE Energy Storage Program
Sandia National Laboratories
Pacific Northwest National Laboratory

ESSPT Member Organizations and Primary Points of Contact



- **DOE Energy Storage Program (OE)**
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- **Sandia National Laboratories (SNL)**
 - **Stan Atcitty**, Manager, Energy Storage Technology and Systems
- **Pacific Northwest National Laboratory (PNNL)**
 - **Vincent Sprenkle**, Technical Group Manager, Electrochemical Materials and Systems Group
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Laurie Florence, Principal Engineer

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Alternate contacts: Haresh Kamath, Brittany Westlake

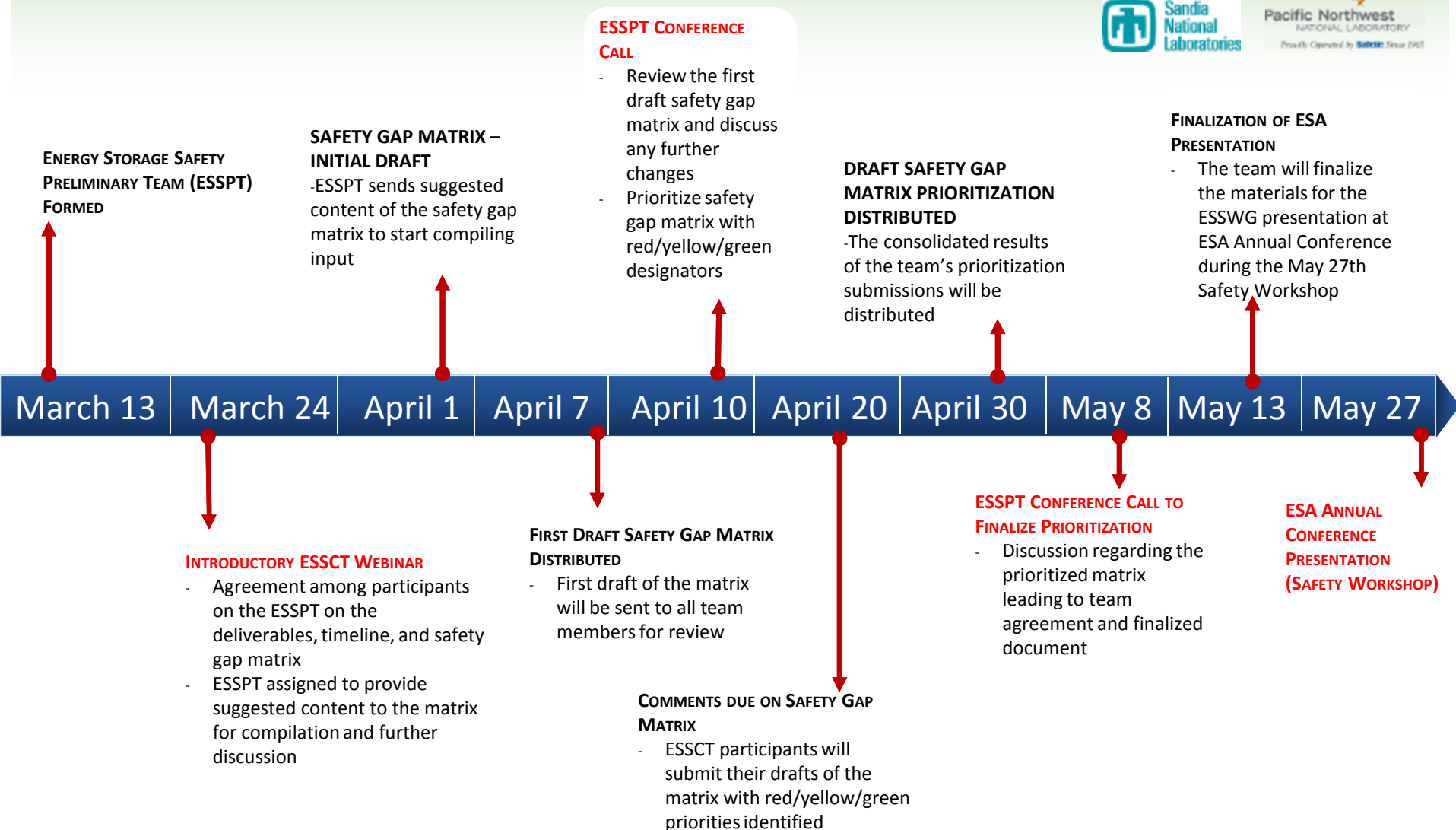
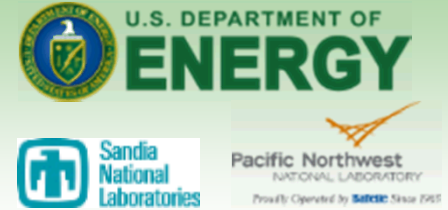
National Electric Manufacturers Association (NEMA)

Ryan Franks, Technical Program Manager

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ESSPT Milestone Timeline



Energy Storage Safety Working Group (ESSWG) Mission and Vision



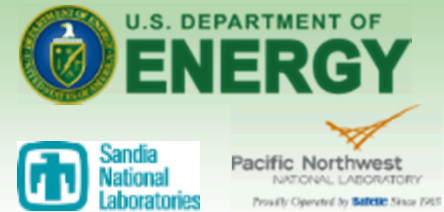
Mission

Establish a DOE-facilitated Energy Storage Safety Working Group (ESSWG) involving representatives of the stakeholder community having key competencies and an interest in energy storage system (ESS) development and deployment to plan and execute paths forward to address safety gaps, previously identified and prioritized by the Energy Storage Safety Preliminary Team (ESSPT), needed to support the timely and safe deployment of stationary energy storage systems.

Vision

The ESSWG enables timely deployment of safe energy storage systems consistent with the December 2014 [DOE OE Energy Storage Safety Strategic Plan](#) by following the framework outlined by the ESSPT, which specifically prioritizes the work needed to address gaps in the knowledge associated with energy storage system safety, and carrying out safety related research, education and training, technical support, and codes/standards development activities.

Energy Storage Safety Working Group (ESSWG) Scope of Work

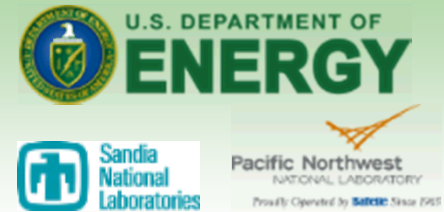


The activity will focus on the safety of all stationary ESSs, and projects to address the gaps will be organized and conducted through coordinated actions focusing on the priority gaps identified by the ESSPT in each of three ESSWG areas:

- *Safety Validation and Risk Assessment*
- *Codes and Standards*
- *Safety Outreach and Incident Response*

To facilitate work on each gap, the ESSWG will leverage past efforts such as those conducted under the DOE Energy Storage Safety Strategic Plan, the Energy Storage Integration Council (ESIC), Energy Storage Association, and other stakeholder organizations.

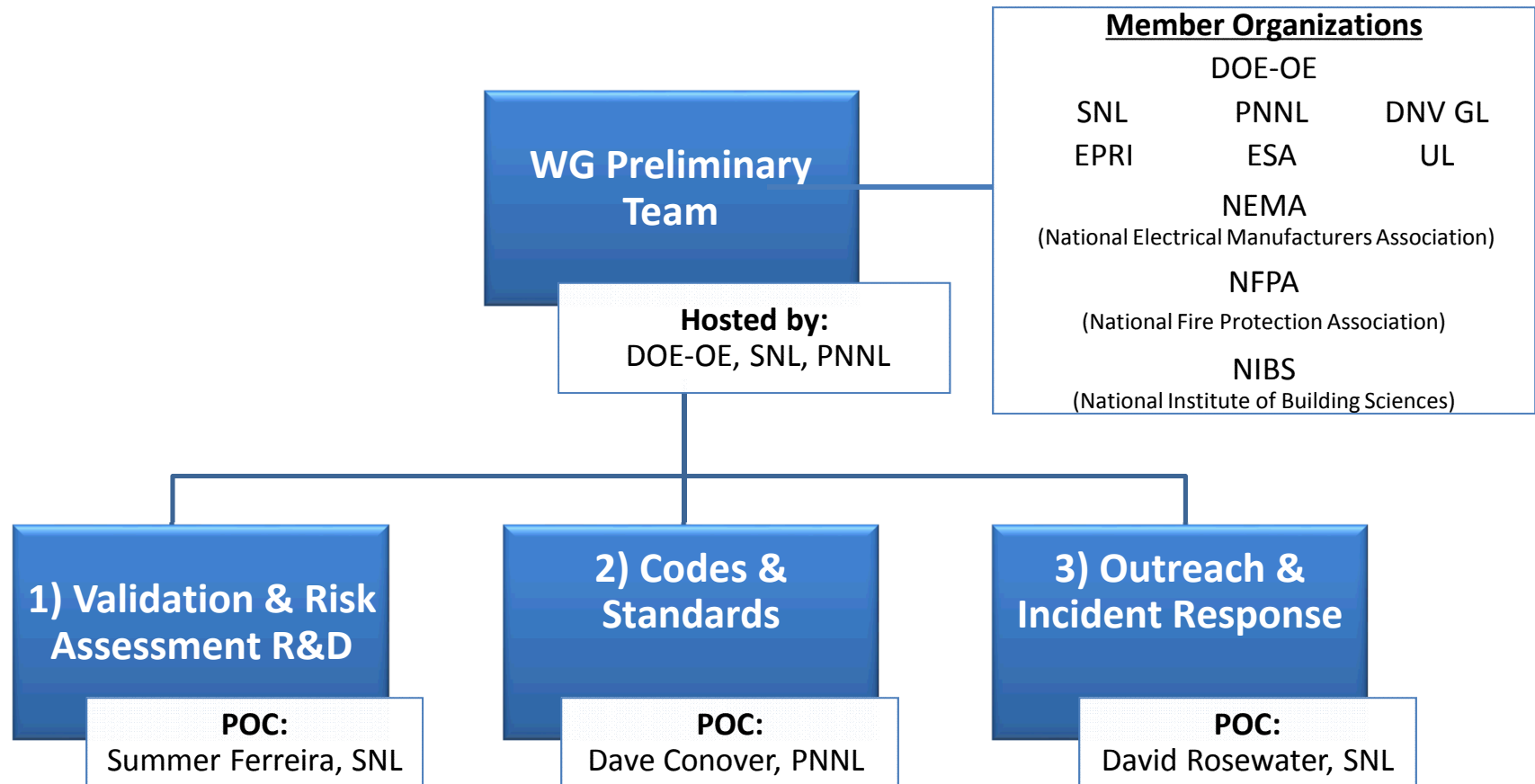
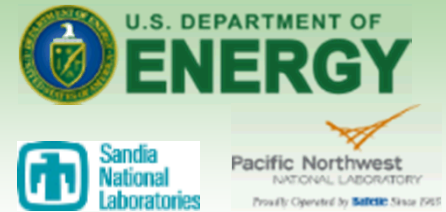
Energy Storage Safety Working Group (ESSWG) Prioritization



Prioritization Process

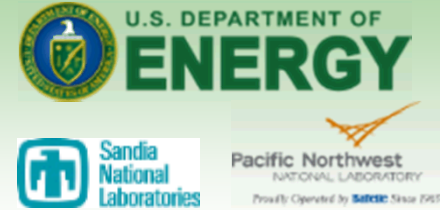
- A survey of the safety challenges was conducted by the ESSPT to collect a list of the **issues and issue categories**.
- The issues were then sorted into the strategic objective areas Safety Validation and Risk Assessment Issues, Codes and Standards issues, and Safety Outreach and incident Response issues
- A second survey was then performed which asked the ESSPT to provide **Ease** and **Impact** rankings for each issue
- The responses were then collected and reviewed as a group to **identify the top issues in each strategic objective area**

Energy Storage Safety Working Group (ESSWG) Organizational Structure



Identified three immediate subject areas and a short list of top priorities in each area.

R&D Prioritization



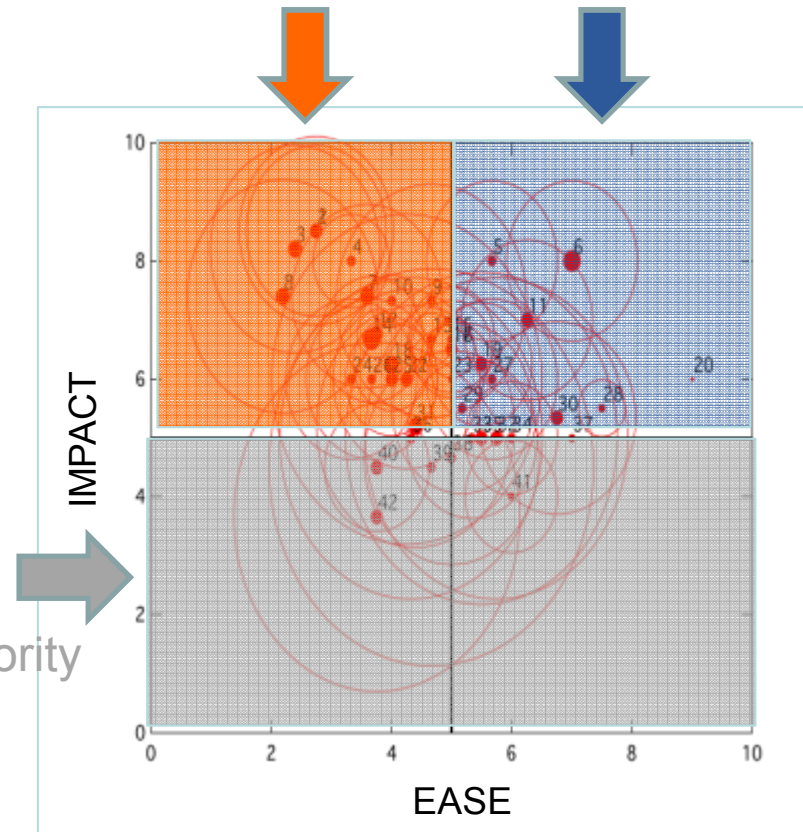
Key need – Identify R&D efforts that will have the largest impact on the safety of the industry.

- Work to date
 - Ongoing work in labs, industry and academia address safety in an ad hoc manner.
 - Focused largely on performance of single cells
- Short term priorities identified:
 - **Fire Suppression testing** and analysis
 - **Thermal runaway** research
 - **System scale burn test**
 - **Commodity classification** development
 - **Fire and vent gas modeling** and analysis
- Longer term priorities: as resources allow.
 - DC fusing recommendations
 - How to handle stranded energy
 - Access control guidance
 - Guide to ESS safety analysis
 - R&D to address gaps found in standards

Safety Validation and Risk Assessment

Quad Chart

Federal R&D Industry



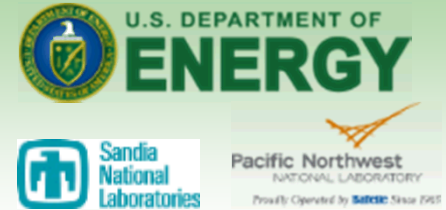
Codes Standards and Regulations Prioritization



Top Issues in Codes and Standards

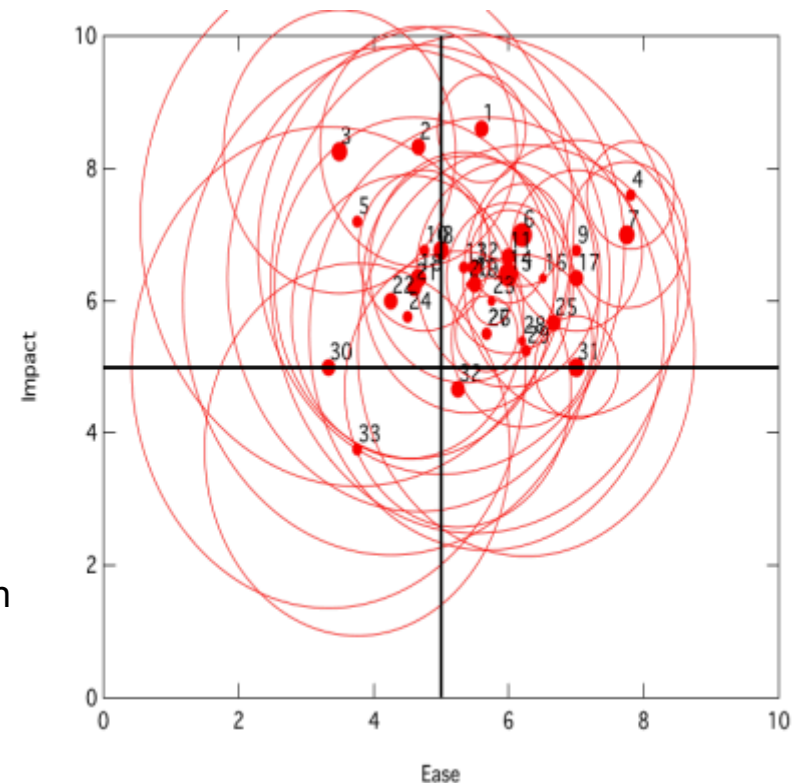
- A single standard is needed to cover energy storage system installations
 - It was identified that a single source reference standard would be the most impactful means of ensuring safety in new energy storage installations.
 - A pre-standard developed now may expedite the typically lengthy development process
- Triage and develop updates to existing codes and standards
 - Existing standards could be updated based on the developed source document as applicable to energy storage systems
- Develop guidance for documenting and validating energy storage system safety under existing codes and standards
 - Document and verify the acceptability of energy storage systems under current standards and model codes

Outreach Prioritization

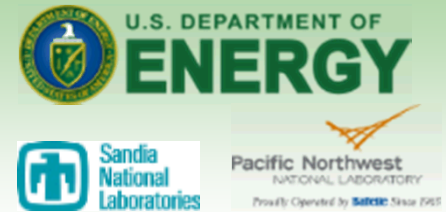


- Key need – the ability to make safety critical information accessible to all stakeholders including first responders, inspectors, and regulators
- Work to date
 - Energy Storage Safety Meeting
 - Energy Storage Safety Strategic Plan
 - Ad-hoc engagement and collaboration between national labs, and industry on safety
- Short term activities
 - Guidance and information on ESS installation and protection design
 - Guidance and information operational safety
 - Develop first responder training material
- Longer term activities
 - First responder knowledge and confidence through demonstrations, videos, guides, and courses
 - Guidance and information on safe transportation

Safety Outreach and Incident Response
Quad Chart



Energy Storage Safety Working Group (ESSWG) Strategic Objectives



Working groups will be guided by volunteers with expertise in the topical areas and conducted through a coordinated effort. WG's will address highest priorities as identified by the ESSPT.

Safety Validation and Risk Assessment R&D

Coordinate with other WG's to **maintain prioritized list of research and development** focuses critical to the industry.

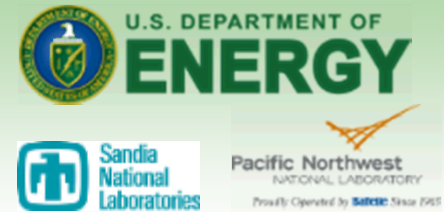
Codes, Standards and Regulations (CSR)

Using the queue of gaps in existing codes and standards generated by the ESSPT, **revise existing CSR** and **develop new CSR** to effectively guide energy storage system safety and do not act as barriers to system deployment.

Safety Outreach and Incident Response

Outline and implement a plan to educate, engage, and train stakeholder communities on applying criteria and practices to ensure that systems are safe when placed into service and the first-responder community is equipped to respond, if there is an incident.

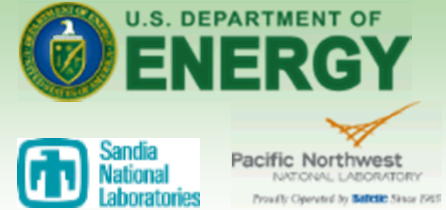
Energy Storage Safety Working Group (ESSWG) Open Invitation



- All ESS stakeholders are invited to participate in these working groups.
- Each WG will establish a path forward and work towards relevant goals as outlined in the slides on R&D, CSR and Outreach.
- Work will start immediately so please get involved. We will be sending out a call. Come to the website and **sign up by June 26th**:

sandia.gov/ess/safety.html

Acknowledgement



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