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Energy Storage Systems Safety and Reliability Forum April 20-21, 2021

Session 4 – Codes, Standards, and Regulatory Environments





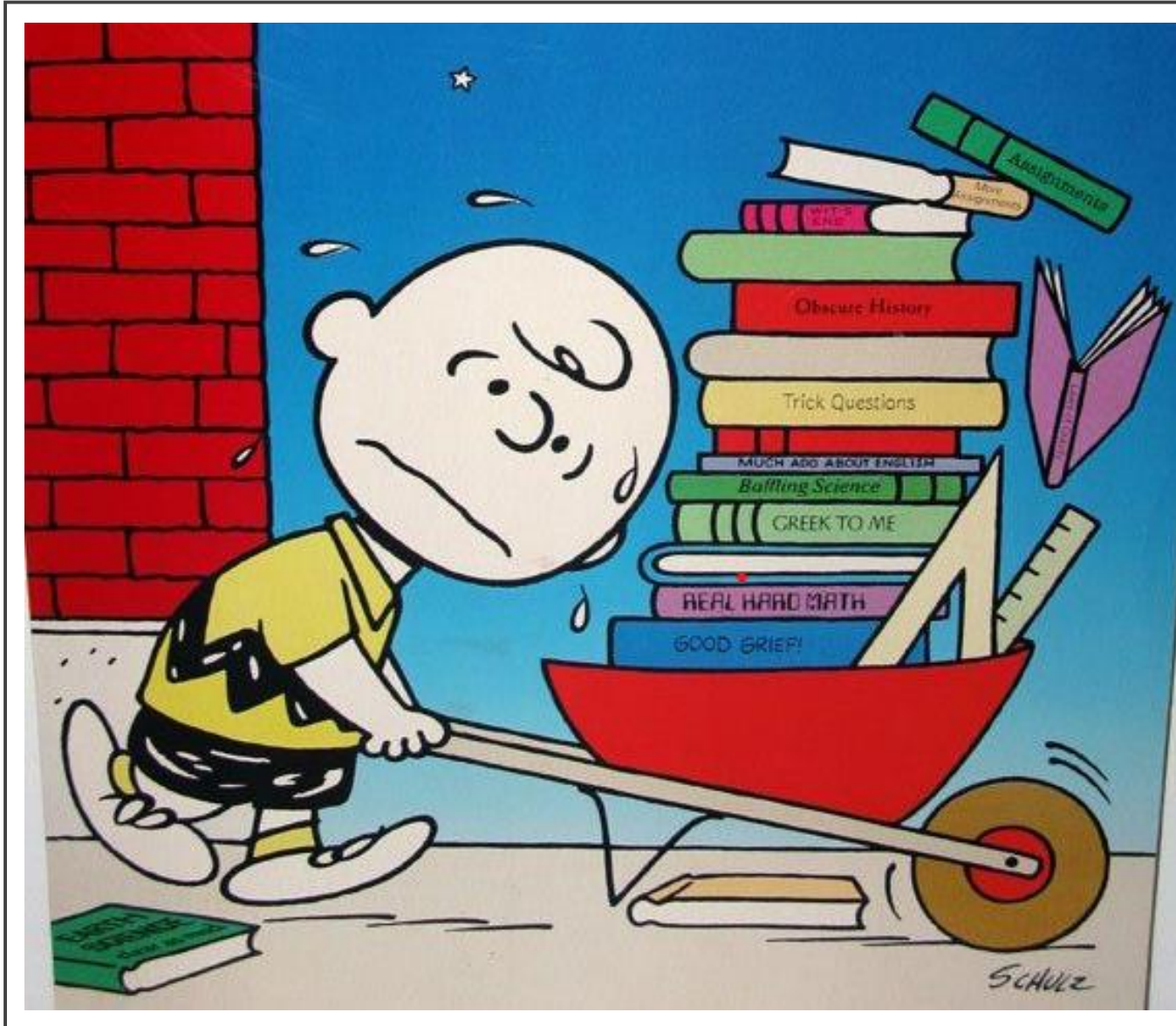
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Session 4 – Codes, Standards, and Regulatory Environments

The Speakers

The ES Safety Collaborative Codes and Standards Update	Chris Searles BAE Batteries USA
NFPA 855, NFPA 70 and NFPA 70B, and It's Effects on Stationary Batteries and Energy Storage Systems (ESS)	Bill Cantor TPI Engineering
UL 9540A – Evolving to Meet the Safety Challenges of BESSs	Laurie Florence UL Laboratories
IEEE P1547.9: A new Standard to Help Streamline Energy Storage Interconnection to Distribution	Michael Ropp Sandia Laboratories
IEEE 1547 and 1547.9 from a User's Perspective	Kevin Whitener Portland General Electric (PGE)
Codes and Standards as Drivers for ESS Battery Design	Jim McDowall Saft America



Welcome to the World of Safety Codes & Standards

Who is in the clouds with ESS Safety Codes/Standards development?



+ a Host of Others

Which ESS Safety Codes/Standards are having the most impact today?

UL 9540/9540A

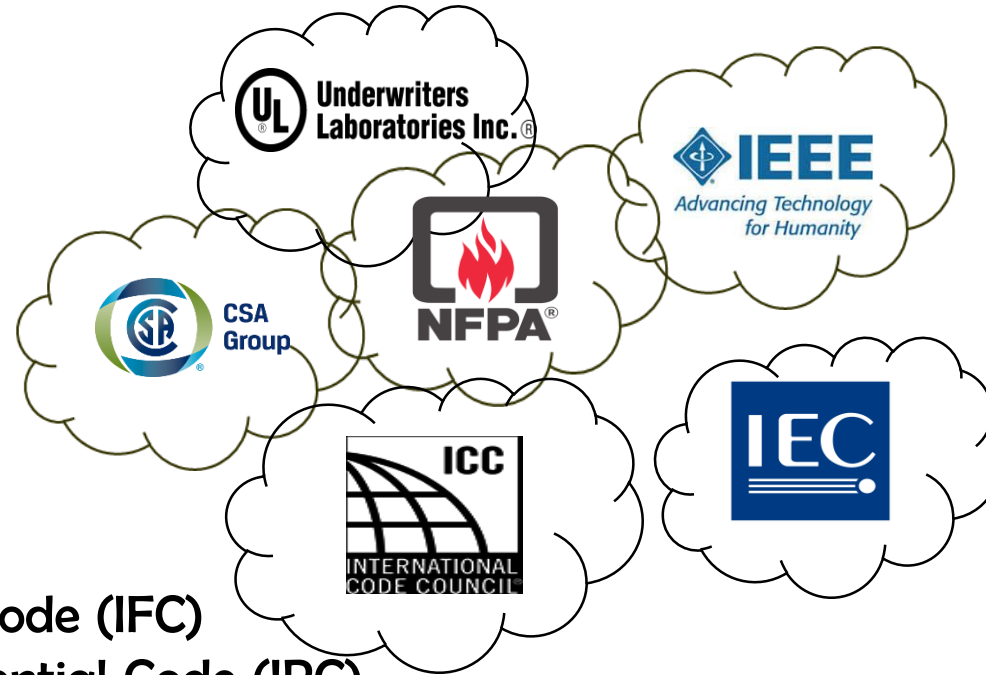
UL 1973

CSA 22.2-2018

ICC International Fire Code (IFC)

ICC International Residential Code (IRC)

Anchor: NFPA 855-2020



IEEE 1547/1547.2/1547.9

IEEE 1635

IEC 62368-1 20xx

IEC 61850



CODES AND STANDARDS UPDATE SPRING 2021

DOE SEASONAL CODES & STANDARDS UPDATE *Four Quarterly Reports*



✓ **SPRING 2021**

✓ **FALL 2022**

✓ **SUMMER 2021**

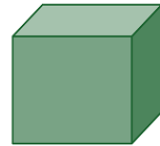
✓ **WINTER 2022**



CODES AND STANDARDS UPDATE SPRING 2021

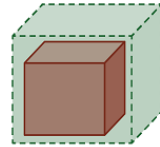


Standards and Model Codes Hierarchy



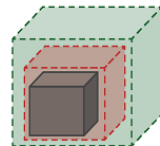
BUILT ENVIRONMENT

- iCodes – IFC, IRC, IBC
- IEEE – C2, SCC 18, SCC21
- NFPA 5000, NFPA 1, ISA



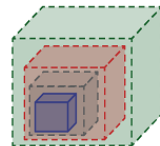
COMPLETE ESS

- UL 9540, MESA
- ASME TES-1, NECA
- NFPA 855
- NFPA 791



INSTALLATION / APPLICATION

- NFPA 70
- IEEE C2
- DNVGL GRIDSTOR
- UL 9540A
- IEEE 1635/ASHRAE 21
- FM GLOBAL 5-33
- IEEE P1578
- NECA 416 & 416



SYSTEM COMPONENTS

- UL 1973
- UL 1974
- UL 810A
- UL1741
- CSA 22.2 No. 340-201
- IEEE 1547
- IEEE 1679 Series

Summary SDO Matrix

ENERGY STORAGE C/S SAFETY COLLABORATIVE STANDARDS DEVELOPMENT ORGANIZATIONS (SDO's)						
ORGANIZATION	Built Environment	Complete ESS	ESS Installations	ESS Components	Reference Items	SDO Website ¹
ASHRAE			1			www.ashrae.org
ASME		2			1	www.asme.org
CSA			1	2		www.csagroup.org
DNV-GL					1	www.dnvgl.com
FM Global		1			1	www.fmglobal.com
ICC	3				2	www.iccsafe.org
IEEE	4	1	3	4	2	www.ieee.org
ISA	2					www.isa.org
MESA		2				www.mesastandards.org
NECA		1	1			https://necanet.org/
NEMA		1		1		www.nema.org
NFPA	2	1	2		1	www.nfpa.org
UL		2		7	1	https://ulstandards.ul.com/
	11	11	8	14	9	
	21%	21%	15%	26%	17%	

Currently there are 53 items included in the ES Codes and Standards Update

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Events and
Important Dates

External Resources

Contact

Even with all of these activities, there will always be the probability of a safety-related incident. However, through this initiative, the risks associated with these incidents can be identified, evaluated for likelihood, assessed for impact, and mitigating actions can be taken in a measured and considered way.

Read more in the [DOE OE Energy Storage Systems Safety Roadmap](#).

Read the current DOE OE Energy Storage Systems Safety Roadmap Focus on Codes and Standards – Winter 2021

CODES AND STANDARDS UPDATE
Winter 2021 (Sorted by SDO)

If you are interested in staying up to date on the latest Safety Collaborative news, [click to subscribe](#).



SAFETY COLLABORATIVE

CODES AND STANDARDS UPDATE SPRING 2021

Acknowledgement

Dr. Imre Gyuk, DOE – Office of Electricity



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