

## IEEE Power and Energy Society Entity Annual Report

2023

**Entity:** Energy Storage and Stationary Battery Committee (ESSB)

**Website:** <https://cmte.ieee.org/pes-essb/>

**Chair:** Steve Vechy

**Vice-Chair:** Jason Wallis

**Secretary:** Rich Hutchins

**Immediate Past Chair:** Babu Chalamala

### **1. Significant Accomplishments:**

*(Please explain why these are significant and include details and examples)*

We continued the expansion of the technical activities of ESSB to include extensive engagement with other PES technical committees, IEEE coordinating committees, growing the technical programming at the PES General Meeting, GridEdge, T&D and EESAT, development of new standards in emerging areas, and a greater reach out to membership across all areas of energy storage and battery technologies.

Significant accomplishments include:

- ESSB Committee Winter and Summer general meetings were held in person and augmented with virtual attendance options. The committee hosted the Winter General Meeting in Savannah, GA with 98 attendees in person. The Summer General Meeting was hosted in King of Prussia, PA, with over 95 members in attendance. Both meetings included technical symposiums on items of interest to the committee members.
- ESSB presented a half day tutorial session and 6 panel sessions at the PES General Meeting in Orlando. The energy storage tutorial on Sunday was sold out with several folks on the waiting list. All panel sessions were well attended too.
- Following the success of the inaugural EESAT conference now led by IEEE and organized by the ESSB committee, EESAT 2024 is planned to be held in San Diego Jan 29/30, 2024, in conjunction with the winter ESSB committee meeting scheduled Jan 31 and Feb 1&2.
- We continued the development of collaborations through the recently established Energy Storage Collaborative Team (ESCT)
- Continued growth of energy storage related technical sessions and panels at IEEE PES General Meeting

### **2. Benefits to Industry and PES Members from the Committee Work:**

*(Provide specific examples and explain what the benefits are)*

ESSB provides an excellent opportunity for the industry and PES members with continuing education, outreach, and the opportunity to develop IEEE led global standards related to energy storage, stationary batteries and charging systems. The committee is also a great avenue for outreach and engagement with utilities, regulatory bodies at the state and federal levels.

### **3. Benefits to Volunteer Participants from the Committee Work:**

*(Provide specific examples and explain what the benefits are)*

The EESB committee is in a technical domain with a rapidly growing interest across many cross-cutting areas including grid modernization, firming of renewables with energy storage, batteries and charging infrastructure for the electrification of transportation, and a growing range of applications for stationary batteries in traction, UPS, and backup power applications. Participation in the committee work provides a range of opportunities for members and volunteers. Benefits include:

- Continuing education through seminars and tutorials offered by ESSB and content on the PES Resource Center
- Networking opportunities through participation in ESSB Winter and Summer meetings. Both the meeting have seminars and tutorials providing opportunities for continuing education for members. The meetings also provide opportunities for knowledge-sharing, learning, and networking.
- Leadership roles in standards development through contribution to standards activity through various working groups.
- Opportunity to participate in a range of technical activities in PES conferences on topics related to energy storage, stationary batteries, electrification, and grid modernization.
- Expanded horizons of many seasoned volunteer members to the possibilities and opportunities in the battery energy storage systems market.

### **4. Subcommittee Reports**

ESSB has three subcommittees: Energy Storage (ES), Stationary Batteries (SB), and DC & Related Systems (DCRS). The China Satellite Chapter of ESSB also has a growing membership and technical programming to support member needs in China.

#### **ES, SB and DCRS Subcommittee Reports:**

All three subcommittees support IEEE led standards development and have a number of Working Groups (WG) that are involved in developing standards and related activities.

Important standards related updates include:

- Currently managing close to 50 standards and projects
  - 28 active standards (including 2 entity standards)
  - 9 inactive standards
  - 18 approved PAR's
  - 3 documents in ballot stage – 1187, 1188, 2686
- Work continues (with possible publication in 2024) on IEEE P2962 for Li-ion installation, operation, and maintenance, a joint effort begun by KEPIC. The working group is resolving comments on their 2<sup>nd</sup> internal round of draft document review and we expect this to exit the WG early 2024 following our winter 2024 meeting.

- A new (updated) edition of IEEE 1188 (VRLA maintenance) with new additional information/guidance on internal ohmic testing, maintenance decisions based on criticality, replacement percentages within strings, and ripple current is preparing for recirculation ballot and expected to be published in 2024.
- Work continues apace on new IEEE 1679.3 (flow batteries) and 1679.4 (alkaline battery technologies other than Ni-Cd)
- Work continues apace on a new standard IEEE 2685 on stationary engine starting energy storage (e.g., batteries) devices
- IEEE P2686 (BMS) ballot pool has been formed and voting is imminent
- Work continues apace on IEEE P2688 (ESMS)
- A P3189 for outdoor enclosures working group is drafting the new document
- The P2688 Energy Storage Management Systems (ESMS) working group continues to make substantial progress in drafting this important document specifying the input signals, output commands, and actions that the ESMS can perform.
- IEEE-1115 (Recommended Practice for Sizing Nickel-Cadmium Batteries for Stationary Applications) has been updated by the WG and is in ballot process now

## **Codes & Standards Working Group**

Codes & Standards Working Group (CSWG) continues to provide significant input and support to UL, NFPA, and IFC entities. Chris Searles was recently added to the NFPA855 committee as an alternate to Bill Cantor, further solidifying a voice at the table and continuity and congruence from the standards development process through to the codes writing process.

CSWG also is taking an active role in other meetings including PES T&D and PES GM, IEEE ISGT, Battcon, and NFPA conferences.

The CSWG has also developed the first codes symposium to be held at the upcoming ESSB Winter General Meeting including key SME's involved in the code writing process to present. The flyer for the event is below.



## IEEE PES/ESSB COMMITTEE

IEEE PES Energy Storage and Stationary Battery Committee (ESSB)  
ESSB Safety Codes & Working Group

Date: December 18, 2023  
Subject: **ESSB Safety Codes & Standards Symposium**  
**Wednesday, January 31, 2024**  
Doubletree by Hilton Hotel San Diego – Mission Valley

We are pleased to announce a special Energy Storage Safety Codes and Standards Symposium at the Doubletree by Hilton Hotel – Mission Valley, San Diego. This will be part of the IEEE ESSB General Meeting on January 31.

NFPA 855 is considered by most in the energy storage industry as the bellwether standard to govern safety for ESS installations. It involves permitting, hazard mitigation analysis, required equipment testing, and overall system operations management and reporting. The standard is generally referenced as part of the two major fire protection codes, the *International Fire Code (IFC)* and *NFPA 1, The Fire Code*. *UL 9540* and a few other UL standards are at the heart of testing and listing requirements contained in NFPA 855.

This symposium will explain the integral relationship of the International Code Council's three I-Codes (the International Fire Code (IFC), the International Building Code (IBC), and the International Residential Code (IRC)) and how this group of codes use the work of the Fire Code Action Committee and Building Code Action Committee (FCAC/BCAC) to formulate updates to these codes, and how they relate to the tenets of NFPA 855. To address this overall and somewhat complex process are three distinguished subject matter experts:



Robert (Bob) Davidson is Managing Partner of Davidson Code Concepts, LLC., with 33 years of experience in both volunteer and career fire service. For over 25 years he was a safety codes enforcer, retiring from the South Brunswick NJ Township Code Enforcement Department as Fire Marshal in charge of the Fire Safety Division with responsibility for enforcement of the NJ Uniform Fire Code. Bob is a legacy member of the original NFPA 855 Committee, the chair of the current Fire Code Action Committee (FCAC) Energy Workgroup addressing energy related code development of the International Codes Council (ICC). He also is a major contributor to NFPA 1, as well as a respected SME who now consults with various regulatory groups concerning ESS installation projects and safety codes training.



Beth Tubbs is the Chief Fire Protection Engineer, Codes and Standards for the International Code Council (ICC) and serves as secretariat to the IFC, IEBC and the ICC Performance Code. She is the lead staff member for the Fire Code Action Committee (FCAC). Tubbs is a registered Fire Protection Engineer (FPE) in Massachusetts and California. She also is a fellow of the Society of Fire Protection Engineers (SFPE) and Immediate Past President of the Board of Directors for the SFPE.



LaTanya Schwalb is the Principal Engineer for stationary battery systems, energy storage systems, fuel cells, and hydrogen generators at UL Solutions, Northbrook, IL, succeeding Laurie Florence after her retirement. LaTanya has more than 20 years of experience in product safety certification and is instrumental in the development of technical requirements and interpretation of UL standard requirements, including UL 9540 and UL 1973, two key standards relating to NFPA 855. LaTanya will bring the group up to date on the recent standard development efforts for the UL 9540A test method, as well as how it, UL 9540, and UL 1973 are related, and their linkage to NFPA 855 requirements.

There will be a 45 minute Q&A discussion for questions from all members and guests. If you are an ESS professional or fire protection engineer, designer, developer, installation technician/supervisor/manager, or a codes AHJ or regulator, this is a symposium you will not want to miss. Register today on the Meetings tab.

## 5. Meetings Update

### ESSB Winter and Summer Meetings

The ESSB Winter General Meeting was organized in Savannah, GA, January 16-20, 2023. The meeting was attended by 95 members in person and about 10 members participating virtually. The meeting was supported by Zinc 5, an advanced NiZn battery technology manufacturer. Here is the agenda for the meeting:

### AGENDA for the IEEE PES ESSB MEETING January 16-20, 2023 Savannah, GA



Date	Time	VIENNESE BALLROOM #1	VIENNESE BALLROOM #1	PACIFIC GALERIE
Monday, January 16	8:00am – 5:00pm	<b>Registration</b>		
	10:00am – 12:00pm	Technical Symposium #1: Status of grid level energy storage (FoM)		
	1:30 – 3:15pm	ESSB General Meeting		
	3:45 – 5:30pm	Sub-Committee Reports (SB, DCRS)		
Tuesday, January 17	8:00 – 9:30am	Sub-Committee Reports (ES)		
	10:00am – 12:00pm	Technical Symposium #2: Charging rqmts (incl fast charge) for non- lead/NiCd		
	1:30 – 3:15pm	946/1375 Battery Protection	1679.4 Alkaline Characterization	Breakouts as needed
	3:45 – 5:30pm			Breakouts as needed
Wednesday, January 18	8:00 – 9:45am	Safety Codes & Standards WG	Nuclear WG	Breakouts as needed
	10:15am – 12:00pm			Breakouts as needed
	1:30 – 3:15pm	3189 Battery Enclosure	1188 VRLA IOM	Breakouts as needed
	3:45 – 5:30pm	3163 Lithium Sizing	1187 VRLA Installation	Breakouts as needed
	6:00-8:00	Evening Social – location and details to be determined		
Thursday, January 19	8:00 – 9:45am	1679.1 Lithium Characterization	1491 Battery Monitoring	Breakouts as needed
	10:15am – 12:00pm	2962 Lithium IOM		Breakouts as needed
	1:30 – 3:15pm	2685 Engine Start	2688 Energy Storage Mgmt.	Breakouts as needed
	3:45 – 5:30pm		2686 BMS in ES Application	Breakouts as needed
Friday, January 20	8:00 – 9:45am	1189 Battery Selection	1361 PV	Breakouts as needed
	10:15am – 12:00pm	450 VLA IOM	1561 Lead in remote hybrid systems	Breakouts as needed
	12:00 – 1:00pm	Wrap-Up Meeting		

In addition to regular WG meetings, the Winter Meeting included one, 2-hour technical symposium which provided continuing education:

- Status of Grid Level Energy Storage (FOM) was postponed to a later date
- Charging Requirements (including Fast Charge) for non-lead/NiCd technologies
  - Sodium Metal Chloride Charging – Andrew Miraldi
  - NiZn Charging – Dan Lambert
  - Li-ion Charging – Jim McDowall
  - SuperCap Charging – Rich Hutchins

The Charging Requirements technical symposium presentation from the 2023 Winter Meeting is posted on the IEEE PES Resource Center.

The Summer General Meeting of ESSB was held in King of Prussia, PA on June 12-15, 2023. We took the opportunity to reduce the total number of days from 5 to 4 as the members prefer a shorter meeting and the advent of remote WG virtual meetings has helped to streamline the standards development process and reduced needs for in-person WG meetings for our committee. The meeting was attended by 95 in-person members and about a dozen virtual members. It was locally supported by our committee members from EnerSys.

Here is the agenda for the meeting:

IEEE ESSB Summer Meeting King of Prussia, PA June 12-15, 2023			
Date	Time	Steelwork A LARGE ROOM (60)	Steelwork B SECOND ROOM (40)
Monday June 12, 2023	7:30am - 5:00pm	Registration	
	7:00 - 8:00am	Breakfast (Steelwork C)	
	8:00 - 10:00am	Tech Symposium #1: Fleet Current	
	10:00 - 10:30am	Break (Steelwork C)	
	10:30am - 12:30pm	Tech Symposium #2: Long-Duration Energy Storage	
	12:30 - 1:30pm	Lunch (Steelwork C)	
	1:30 - 3:15pm	ESSB General Meeting	
	3:15 - 3:45pm	Break (Steelwork C)	
	3:45 - 4:15pm	ESSB General Meeting	
	4:15-4:30pm	Subcommittee Meeting 1: Storage Battery (SB)	
	4:30 - 4:45pm	Subcommittee Meeting 2: DC & Related System (DCRS)	
4:45 - 5:00pm	Subcommittee Meeting 3: Energy Storage (ES)		
Tuesday June 13, 2023	7:30am - 5:00pm	Registration	
	7:00 - 8:00am	Breakfast (Steelwork C)	
	8:00 - 9:45am	1679.1 Characterize Li-Ion	485 Sizing Pb
	9:45 - 10:15am	Break (Steelwork C)	
	10:15am-12:00pm	1679.4 Characterize Alkaline	1187 Installation VRLA
	12:00 - 1:00pm	Lunch (Steelwork C)	
	1:00 - 2:45pm	3163 Sizing Li-Ion	1188 Maintenance VRLA
	2:45 - 3:15pm	Break (Steelwork C)	
	3:15 - 5:00pm	2962 Install, Maint, Test Li-Ion	1189 Selection Pb
	5:30 - 8:30pm	SPONSOR SOCIAL RECEPTION* @ The Workhorse Brewing Company 250 King Manor Drive, King of Prussia, PA, 19406	
	Wednesday June 14, 2023	7:30am - 5:00pm	Registration
7:00 - 8:00am		Breakfast (Steelwork C)	
8:00 - 9:45am		Safety Codes WG	1493 Battery Monitoring
9:45 - 10:15am		Break (Steelwork C)	
10:15am-12:00pm		Safety Codes WG	3189 Outdoor Batt Enclosures
12:00 - 1:00pm		Lunch (Steelwork C)	
1:00 - 2:45pm		2686 BMS	Nuclear WG
2:45 - 3:15pm		Break (Steelwork C)	
3:15 - 5:00pm	2688 ESS	1565 Pb In Remote Hybrid	
Thursday June 15, 2023	7:30 - 8:00am	Breakfast (Steelwork C)	
	8:00 - 9:45am	1361 PV Pb	2685 Engine Start
	9:45 - 10:15am	Break (Steelwork C)	
	10:15am - 12:00pm	1881 Glossary	946/1375 DC System Design
	12:00 - 1:00pm	Subcommittees Wrap-Up	

\* The Workhorse Brewing Company is about two miles from the hotel.  
 The Alloy hotel will provide a complimentary shuttle to and from the Social Reception for those that don't want to drive.  
 June 01, 2023 Rev-5



Agenda included two, 2-hour technical symposia on Float Current and Long Duration Energy Storage (LDES):

#### Float Current

- Reading and Interpreting battery Float Currents – Curtis Ashton
- Float Current Sensing – Rich Hutchins
- Float Current – Bob Beck

#### LDES

- Power Electronics and System Integration for Long Duration Energy Storage – Oindrilla Dutta
- LDES Applications, Technology and Challenges – Allen Zhang
- Evaluation of LDES Technologies – Jim McDowall
- Topics and Technologies for LDES – Ray Byrne

#### Tutorials

ESSB sponsored a half day long tutorial program on Grid Energy Storage – Meeting the Challenges of a Decarbonized Future at the 2023 IEEE PES GM, Denver, Co, New Orleans, LA, on April 25, 2022. The tutorial was sold out and several folks were unable to register due to the popularity of the subject matter.

#### IEEE EESAT Conference Summary

Following the success of the inaugural IEEE ESSB organized Electrical Energy Storage Application and Technology (EESAT) conference on the campus of the University of Texas at Austin on November 7-9, 2022 (<https://cmte.ieee.org/pes-eesat/>), EESAT 2024 will be collocated with the winter ESSB meeting in San Diego on Jan 29 and 30, 2024 at the Doubletree by Hilton San Diego - Mission Valley. The conference – EESAT 2024 The Energy Storage Revolution – will feature technical papers, panels, posters, and an exhibition from several conference supporters. The agenda for the conference can be found here: <https://cmte.ieee.org/pes-eesat/2024-eesat-agenda/>

The key organizers of the 2022 EESAT meeting are:

David Rosewater, Conference Chair  
Tom Carpenter, Conference Treasurer  
Michael Hoff, Technical Program Chair  
Curtis Ashton, Publicity & Outreach Chair  
David Sokoloff, Marketing & Communications Chair  
Roseann Jones, IEEE PES Liaison Coordinator  
John Teehan, Registration Coordinator  
Chris Searles, EESAT Chair Emeritus  
Steve Vechy, Chair of ESSB  
Bansi Patel, Local Arrangements Chair

## **6. Recognition of Outstanding Performance:**

With a large number of working groups and growing collaborative work, the committee has a number of dedicated volunteers who provide tremendous service to IEEE PES and the industry through standards development and other technical activities. There are not that many opportunities to recognize the outstanding service of our members. Here we would like to highlight recognize the following:

- IEEE SA Emerging Technology Award for IEEE 1547.9 – 2022 – IEEE Guide for Using IEEE Std 1547 for Interconnection of Energy Storage Distributed Energy Resources with Electric Power Systems. This important document is the result of the collaborative effort between ESSB and SC-21 which provided co-chairs for the development.
  - IEEE ESSB Chair: James (Jim) McDowall
  - IEEE SC21 Chair: Eugene (Michael) Ropp
  - WG Members – 69 participants
  - Publication Date – September 16, 2021

## **7. Coordination with Other Entities (PES Committees, CIGRE, standards, etc.):**

ESSB has a range of collaborations with ILTSC, SCC21, IAS, the Energy Storage Committee of ASME, and NFPA.

The joint IEEE-SA SC(C) 21 and ESSB collaboration called the ESCT liaised with other SDO committees on energy storage, including IEEE PES's RSICC, the IEEE IAS DataCenter Energy Storage committee, IEC TC120, EPRI, MESA SunSpec, and the ASME ESS committee.

## **8. New Technologies of Interest to the Committee:**

There are a range of new topics of interest to the committee. These include the development and applications of energy storage for a range of new applications. We currently have new Working Groups coming up to address the following:

- Long duration energy storage is an emerging area of interest
- Fast charging and the role of energy storage in charging infrastructure
- Data standards for ESS: Work has begun with EPRI to start work on a PAR to issue portions of their joint EPRI/Sandia data guide as an IEEE standard. This will hopefully be the first of many such collaborations between EPRI and ESSB.

## **9. Global Involvement**



PES is looking to increase involvement with members from Regions 8, 9 and 10 (Africa, Europe, Middle East, Latin America, Asia and Pacific). Please provide the following information. **(not sure where to get 2023 data)**

Total Number of committee members	Officers from regions 8,9 and 10	Subcommittee officers from regions 8, 9 and 10	Subcommittee members from regions 8,9, and 10
86	2	2	4

EESB Satellite Committee – China has over 200 PES members. We are working on developing a framework to coordinate activities with the China Satellite Committee.

**10. Problems and Concerns:**

ESSB WG leadership is primarily led by members in US. We anticipate significant growth in new standards activities from the ESSB Satellite Committee – China. We also see opportunity to bring new members from other regions outside the US. Finding additional volunteer leaders to support the expected growth is challenging.

**11. Significant Plans for the Next Period:**

- Continue recruiting new members
- Set the framework of collaboration with other entities via MoUs
- Keep building ESSB related technical program at the PES GM, T&D, ISGT, GridEdge and other venues.
- Continue to develop the Electrical Energy Storage Applications and Technology (ESSAT) into a standalone technical conference led by ESSB.
- Continue to grow the engagement with the ESSB Satellite Technical Committee – China.
- Continuing our excellent outreach work with tutorials

**Submitted by:**  
**Steve Vechy, ESSB Chair**  
**Jason Wallis, ESSB Vice Chair**  
**Rich Hutchins, ESSB Secretary**

**Date: Jan 29, 2024**