

IEEE Power and Energy Society Entity Annual Report

2023

Entity:	Switchgear Committee
Website:	http://www.ewh.ieee.org/soc/pes/switchgear/
Chair:	Doug Edwards
Vice-Chair:	Donnie Swing
Secretary:	John Webb
Immediate Past Chair:	Keith Flowers

1. Significant Accomplishments:

Governance Documents

The Switchgear Committee “Policies and Procedures for Standards Development” (P&P) manual (2023-09-01) was approved by the IEEE Standards Association Standards Board (IEEE SASB). Per AudCom conventions, a Working Group Policies and Procedures (WG P&P) manual must be reviewed within six (6) months. This WG P&P submittal is in process and scheduled for completion in early 2024.

The Switchgear Committee “Organization and Procedures” (O&P) manual (2023-12-12) was revised to correspond with the Switchgear Committee’s P&P Manual, and to bring it in line with the PES Tech Council 2022 O&P baseline document. The O&P Manual was approved by PES Tech Council (2024-01-13).

Committee officers provided training sessions for members (both voting and non-voting) concerning each of these documents.

Association Management System

With the loss of 123Signup and the pending rollout of Member Planet, the PES Standards Committees do not currently have an Association Management System (AMS).

The Switchgear Committee is managing registration and attendance tracking as follows:

- Conference registrations are managed via CVENT in conjunction with IEEE Meetings, Conferences, and Events (MCE).
- Meeting attendance is managed by various systems (e.g. Excel, IEEE myProject, or IMeetCentral) by the preference of the officers of the group/sub-group.

Standards Activities

A majority of the Switchgear Committee standards are required to complete their next revision and ballot cycle in the 2026 – 2028 time frame. This time frame is due to our successful execution of getting all the Switchgear Committee’s standards revised in advance of the 2018 deadline imposed by IEEE Standards Association addressing the IEEE SA transition from 5-year maintenance cycles to 10-year maintenance cycles. Due to this increased number of standards being due in the same time frame, the Switchgear

Committee Officers and Subcommittee Chairs are executing a developed plan that spreads out the workload by revising non-controversial standards sooner than required and amending on some larger standards in advance of revisions.

NesCom Approvals

The scheduling of standards' activities resulted in a lot of PARs (Amendment, Corrigendum, New, Revision, and Extension Request) starting in 2021.

Approved PAR's by year – past three (3) years:

- 2021 – 11 PARs
- 2022 – 10 PARs
- 2023 – 18 PARs

In 2023, the PES Technical Council Entity Proposal Management Committee (EPM) referred eight (8) entity PARs to the Switchgear Committee for consideration. This equates to approximately 20% of the PARs reviewed by the EPM. Of the eight (8) projects that were assigned to the Switchgear Committee:

- Six (6) projects were determined to be within the scope of the committee, and the Switchgear Committee assumed oversight of the PARs.
- Two (2) projects were determined to be outside of the scope of the Switchgear Committee, but remained assigned to the Switchgear Committee for oversight at the request of IEEE CAG and with the concurrence of IEEE PES Technical Council.
- There were three (3) additional entity PARs from previous year submittals that the Switchgear Committee was requested to reconsider approving PARs. None of these moved forward as PARs in 2023.

RevCom Approval

In 2023, the following five (5) Switchgear Committee standards were approved by the Standards Board:

- IEEE Std C37.20.3
IEEE Standard for Metal-Enclosed Interrupter Switchgear Rated above 1 kV AC up to and Including 48.3 kV AC
- IEEE Std C37.68
IEEE Approved Draft Standard for Design, Test, and Application Requirements for Microprocessor-Based Controls of Distribution Pad-mount, Dry Vault, Wet Vault, and Polemount Switchgear Rated Above 1 kV and Up to and Including 38 kV
- IEEE Std C37.75
IEEE Standard for Pad-Mounted, Pole-Mounted, and Submersible Switchgear Enclosures and Associated Control Enclosures – Coastal and Non-Coastal Environmental Integrity
- IEEE Std C37.100.7
IEEE Approved Draft Guide for the Evaluation of Performance Characteristics of Non-Sulfur Hexafluoride Insulation and Arc Quenching Media for Switchgear Rated Above 1000 V

- IEEE Std C37.30.6
IEEE Guide for Electric Motor Operators Applied to High Voltage Air Switches Rated Above 1000 V

The Switchgear Committee actively works to harmonize requirements in various standards with the requirements of the relevant IEC standards. At present, requirements for high-voltage circuit breakers are substantially harmonized although not fully interchangeable with IEC. Requirements for other portions of the Switchgear Committee standards are harmonized with IEC to varying degrees, determined primarily by differences in the user practices between the IEC and ANSI/IEEE markets.

Working Group Activity Statistics

Collectively and currently, the Switchgear Committee has:

- 86 active standards
- 45 active WGs, PAR study groups, or task force groups preliminary to formation of WGs.
 - New versus Updates
 - 8 new PAR WGs
 - 37 revision, corrigendum, or amendments WGs
 - Individual versus Entity
 - 41 PARs on Individual basis
 - 4 PARs on Entity basis.

The list of active WGs fluctuates, with WGs disbanded as their projects are completed, and with new WGs forming on a continuing basis.

External PAR Management

The PES Technical Council EPM (formed in 2020) addresses disposition of external projects that have scope statements that appear to be applicable to PES Standards Committees.

Keith Flowers, Switchgear Standards Coordinator represents the Switchgear Committee and Substations Committee within EPM. His term will extend for six years (through 2027).

Supporting the PES EPM, the Switchgear Committee executes review of projects arising from outside of the Switchgear Committee (primarily Entity PARs) via the Switchgear Committee External Project Approval Group (EPAG).

Process details were created for EPAG in 2022 and have proven to work satisfactorily.

Highlights of the EPAG structure and processes are:

- The EPAG is overseen by the Administrative Subcommittee.
- The EPAG membership consist of:
 - The Standards Coordinator serves as Chair of EPAG.
 - The Subcommittee Chairs (or their proxy) serve as voting members.
 - The Committee Chair, Vice-Chair, Secretary, and Immediate Past-Chair serve as ex-officio members.
- The meetings are open meetings, free to be attended by any interested Committee member.
- EPAG decisions are communicated to PES Tech Council EPM or to the submitter (as appropriate).

Switchgear Committee Volunteers' Other Leadership Roles

Some of the Switchgear Standards Committee members are significant contributors to the IEEE Standards Association governance process, PES, other IEEE Standards activities, and other Standards Development Organization activities.

Doug Edwards (Switchgear Committee Chair)

- IEEE Standards Association Standards Board (SASB)
 - Standards Board 2017, 2020 – 2024
 - SASB AudCom 2016 – 2024
 - NesCom 2022 – 2024
- IEEE QUSCom (formerly SCC14)
 - Past Chair 2022 – 2023
 - Secretary and Active: Various WGs
- Accredited Standards Committee (ASC) C37 Member – Present
- NEMA Member – Present

Ted Burse (Switchgear Committee former Chair)

- IEEE Standards Association Standards Board (SASB)
 - Standards Board 2009 – 2020, 2022 – 2024
 - SASB Vice-Chair 2016, 2019, 2022 – 2023
 - ProCom 2012 – 2020, 2023
 - ProCom Chair 2016 – 2017, 2019 – 2020, 2022 – 2023

Keith Flowers (Switchgear Committee Past-Chair)

- Switchgear Committee 2017 – 2024
(Secretary/Vice-Chair, Chair, Past Chair)
- Technical Activities Board Committee 2021 – Present
(Corresponding Member-At-Large)
- QUSCom Standards Committee 2021 – Present
(Secretary/Vice-Chair, Chair)
- PES Technical Council EPM 2020 – 2027
(Member-At-Large)

Todd Irwin (Switchgear Committee Past-Chair)

- PES Standards Coordinating Committee (Chair) 2021 – Present
- Switchgear Committee Marketing and Communications 2021 – Present

John Webb (Switchgear Committee Secretary and Treasurer)

- NEMA Technical Comm SG8 (Power Switchgear) 2014 – Present
- Accredited Standards Committee ASC C37: Chair 2016 – Present
- USNC to IEC: Chair SC17A (HV Apparatus) 2015 – Present
- IEC USNC Expert for IEC 62271-100 2012 – Present
- IEC USNC Expert for IEEE/IEC 62271-37-013 2014 – Present
- IEC USNC Expert for IEC 62271-322 2023 – Present
- CIGRÉ Committee A3: Regular Alternate Member 2024 – Present
- NEMA SF6 & Alternatives Coalition 2022 – Present

Nenad Uzalec (Switchgear Committee Education, Publications, and Recognitions Committee Chair)

- CIGRE Study Committee A3 (Chair) 2022 – 2024
- CIGRE Technical Council 2018 – Present
- CIGRE TC Liaison to IEEE PES 2023 – Present
- Technical Organizing Committee of Conferences, Symposiums and Colloquiums (member) 2018 - Present

Eldridge Byron (member)

- IEC 62271-106 (Convener) 2018 – 2023

Ian Rosker (member)

- IEC 62271-111 (Convener) 2023 – Present

Financial

The Switchgear Committee continues to maintain sound financial condition.

The Switchgear Committee plans, executes, and finances our conferences with assistance by IEEE Meetings, Conferences, and Events (MCE) team for hotel contract negotiation. Revenue comes from registration fees charged to attendees and from support from corporations and individuals. Corporate supporters are recognized for their contributions, but marketing or commercial activities are not permitted during our conferences. Expenses are those related to conferences (catering, audio/visual, social events, and similar).

The Treasurer maintains the IEEE NexGen reports and as needed reports issues to the Committee officers. Discrepancies in any account are quickly identified and resolved. The Committee has enough financial reserves to handle upcoming conference commitments.

The Switchgear Committee offers complementary registration (waives all registration fees) for:

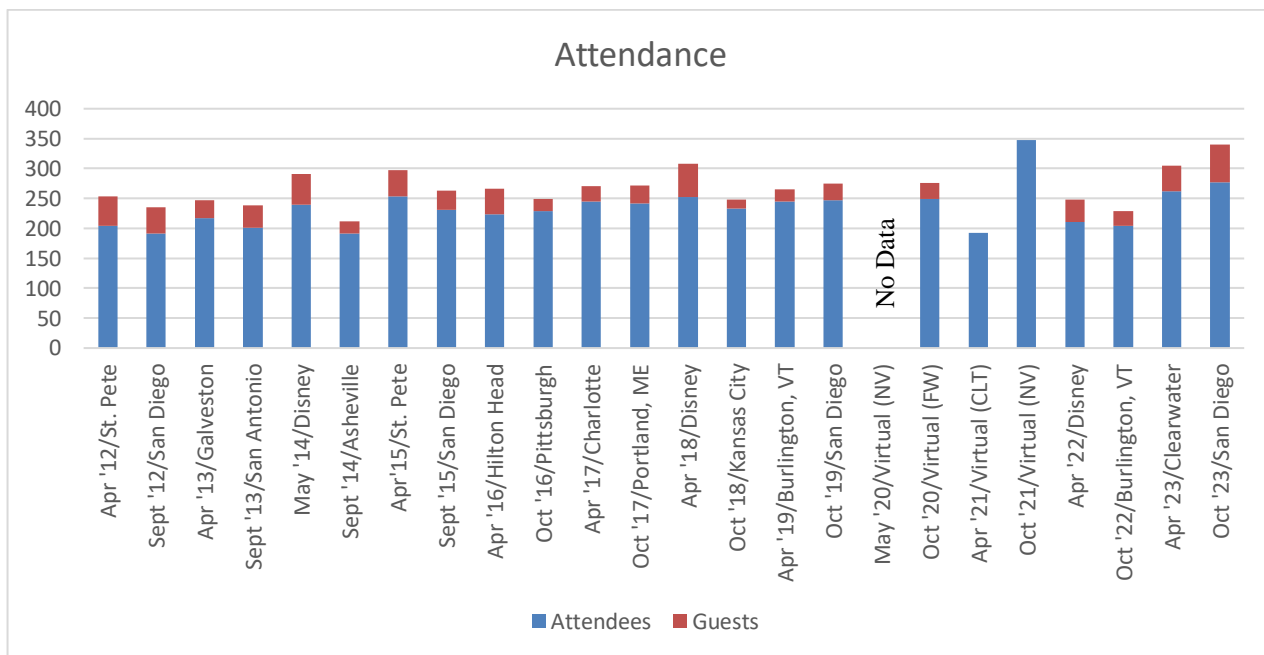
- Honorary Members
- Student Member attendees of the Committee conferences.

IEEE Annual Audit was successfully executed in 2022.

Conference Attendance

The Switchgear Committee holds two (2) in-person conferences each year with one (1) in the Spring and one (1) in the Fall. Attendance at these conferences is on an upward trend rising from around 110 participants in 2003 to our highest attendance ever in the Fall of 2023 with 340 individuals and 34 first-time attendees. This increase in attendance and first-time attendees is attributed to:

- Appealing conference locations
- Appealing social events and tourism opportunities
- Diversifying locations to attract local individuals who might not otherwise be able to justify the travel costs for attendance
- Recognizing first-time attendees and encouraging continuing participation with discounts available for next meeting.



Conferences & Other Standards Organizations

The Switchgear Committee plans our conference as we meet outside the PES JCTM and PES General Meeting. Although conferences are separate from other PES Technical Committees, the Switchgear Committee provides meeting accommodations for several outside entities whose activities are of interest to the Committee during our scheduled conferences, including:

- IEC USNC Technical Activities Group (TAG) meetings
- Short-Circuit Testing Liaison of the Nations of the Americas (STLNA)
- ANSI Accredited Standards Committee ASC C37
- Utility Users Group Meeting
- IEC Maintenance Team meetings on request of the MT Convenor.

The Switchgear Committee also sponsors a Women in Engineering Networking Luncheon at each of our in-person conferences. Since its inception, this initiative has grown from two (2) to three (3) participants to approximately 15 participants.

The Switchgear Committee has several entity projects arising out of Asia, and expects increased attendance related to this activity furthering the diversity of the committee.

Future Conference Locations/Venues and Contracts

Contracts are in place for conferences for the next three (3) years through the Fall of 2026 as shown below.

The Switchgear Committee Meeting Planning Group is actively pursuing booking locations for 2027 and 2028 in order to have contracts five (5) years out. The goal is to have contracts in place by mid-2024.

Conference	Specific Dates	Conference Hotels & Locations
Spring 2024	March 31 – April 4	Westin Beach Resort Fort Lauderdale, FL
Fall 2024	October 13 – 17	OMNI Hotel Oklahoma City, OK
Spring 2025	April 6 – 11	Wyndham Grand Orlando Resort Bonnet Creek, Orlando, FL
Fall 2025	October 8 – 12	Peppermill Resort Reno, Nevada
Spring 2026	April 26 – 30	Sheraton Sand Key Resort Clearwater Beach, FL
Fall 2026	October 4 – 9	Catamaran Resort San Diego, CA

IEEE Conference Insurance

During the COVID pandemic, the risk associated with the potential cost for cancelled conferences was highlighted.

The [IEEE Conference Insurance Program](#) was researched. Although there are options for applying for insurance, unfortunately the Switchgear Committee conferences do not qualify for complimentary insurance available for IEEE Conferences as meetings primarily associated with standards development do not qualify as “Conferences.” The Committee remains concerned that purely technical conferences, which have limited resources and are relatively low risk with respect to the dollars involved are unable to qualify for this insurance while much larger events, with substantial resources and corporate commitments and much higher financial risk are able to obtain insurance at no cost.

Fall 2025 Risk

Due to COVID, the Spring 2020 conference venue contract needed to be cancelled and was rescheduled to Fall 2021. Subsequently the 2021 contract had to also be cancelled. The venue, of the now twice cancelled contract, negotiated a solution to shift the contract to the Fall 2025. After allowing the

Switchgear Committee to push the conference out twice, the final contract agreement came with a 100% cancellation fee for the 2025 conference. This risk is substantial but was the only solution available.

IEEE Meetings, Conferences, and Events (MCE)

The Switchgear Committee conference planning process continues to leverage resources from the IEEE Meetings, Conferences, and Events (MCE) organization. MCE personnel assist with:

- Identifying potential conference sites
- Distributing RFQ to conference facility/hotel properties which the Switchgear Committee targets for a conference
- Performing an initial review of all received proposals
- Assisting with final contract negotiations with the chosen conference facility/hotel property
- Coordinating IEEE Legal review of all Switchgear Committee contracts for conference venues or other activities (such as social events held outside of the conference venues).

Conferences & Meeting Formats: In-Person, Virtual, and Hybrid

The Switchgear Committee Conferences are conducted In-Person only. Evaluations was made to review options in consideration of the [IEEE SA Best Practices Five \(5\) Basic Principles of standards development](#) of:

1. Openness
2. Due Process
3. Balance
4. Right of Appeal
5. Consensus.

The evaluations included economical sound solutions and fair solutions for registrants.

Sub-group meetings (e.g. subcommittee, WG, task force, ad hoc) are being executed as in-person meetings when held during the week of the Switchgear Committee conferences.

Sub-group meetings held at other times, the most common examples being WG meetings, are held as virtual meetings. Although not restricted from doing so, no Switchgear Committee WG's meeting during the JTCM. Some virtual meetings have taken advantage of the services offered by IEEE SA and Tech Council including the Tech Council Webex accounts. The majority of virtual meetings are hosted on individual volunteer's Webex and Microsoft Teams accounts.

Hybrid meetings are discouraged from being held during the Switchgear Committee In-Person Conference weeks. The preferred and chosen option for meetings that need to include virtual attendees (upholding the IEEE-SA Five (5) Basic Principles) is to hold a virtual only meeting at a time not conflicting with the in-person conference. Hybrid meetings during an in-person conference are allowed on a case-by-case basis for special circumstances.

The recommendation to discourage holding hybrid meetings was based on consideration of the IEEE SA Best Practices Five (5) Basic Principles of standards development including:

- *In order for fairness (Openness & Due Process), does everyone have to be on-line in order to make sure everyone gets a fair shake at participating?*
Yes - Recommendation references are per [IEEE-SA S&SI SMDC Hybrid Meeting Practices Guide \(2023-09-18\)](#) which includes reference to [IEEE 802 Hybrid Meeting Training - EC-23/0025r0](#) “Successful Mixed-mode Meeting Protocol.”
- *Are we able to effectively accomplish our business in current twice yearly in-person conferences and virtual meetings, without the addition of hybrid meeting options?*
Yes
- *Does the meeting format support consensus building?*
Review is that there are typically issues with participants keeping engaged and providing benefit to our attendees and the engineering standards community.
- *Lessons Learned*
Per review at the IEEE PES Tech Council Retreat (November 2023), experience is that other similar technical committees have similar issues with Hybrid meetings.
- *Is there a potential for loss of attendance issue (Openness and Balance)?*
The Switchgear Committee has been growing in numbers and participation under the current methodology.

The recommendation to discourage holding hybrid meeting also includes financial considerations. Review is that a fair allocation of registration fees would require increasing the registration cost for remote participants to levels that would greatly exceed the total cost (including in-person participants cost for travel, hotels, and food) for in-person participants. Despite being well-justified, it would be hard to avoid the perception that the high cost of virtual registration is arbitrary or at worse punitive.

Minutes of Meetings & Public Access

The Switchgear Committee supports IEEE-SA Openness Principle of having all meeting minutes and governance document publicly available. The specific example of interest are minutes of meetings.

Minutes of meetings and Governance documents are available without any additional access limitations via the Switchgear website. This setup is recommended as a Best Practice instead of limiting access such as by posting minutes via iMeet Central.

Website

The Switchgear Committee website continues to be updated to maintain an easy to use format and to provide public access to minutes of past meetings (from 1990 to date) and many technical presentations. A template was created that the Switchgear Committee Subcommittees use to submit updated information. The template is used by the web administrator for update of the Subcommittee website.

The Switchgear Committee website is still hosted on a legacy IEEE platform and has not migrated to the recently available WordPress option. If Tech Council standardizes on new website templates, it may prove beneficial to migrate to WordPress. However, the current website structure is well received by the volunteers and leadership and does not drive the investment of time to make a change. The potential need in the future will be driven by the need to address transition of volunteer web administrators.

iMeet Central (formerly Central Desktop)

Switchgear Committee officers use iMeet Central to store important Committee related documents including meeting contracts, conference planning information, and Committee procedures. Using iMeet Central to store this information ensures each officer has access to the documents that officer may need. This reduces the need to contact other officers and request specific information, and facilitates information sharing during officer rotation.

As a Best Practice, the officers have found that iMeet Central is an excellent tool and highly recommend other Technical Council Committees use it.

iMeet Central is being used by a few WGs for centralized file storage.

iMeet Central is not recommended as the sole method of posting minutes of meetings as discussed above because this prevents easy access to the public.

Organization

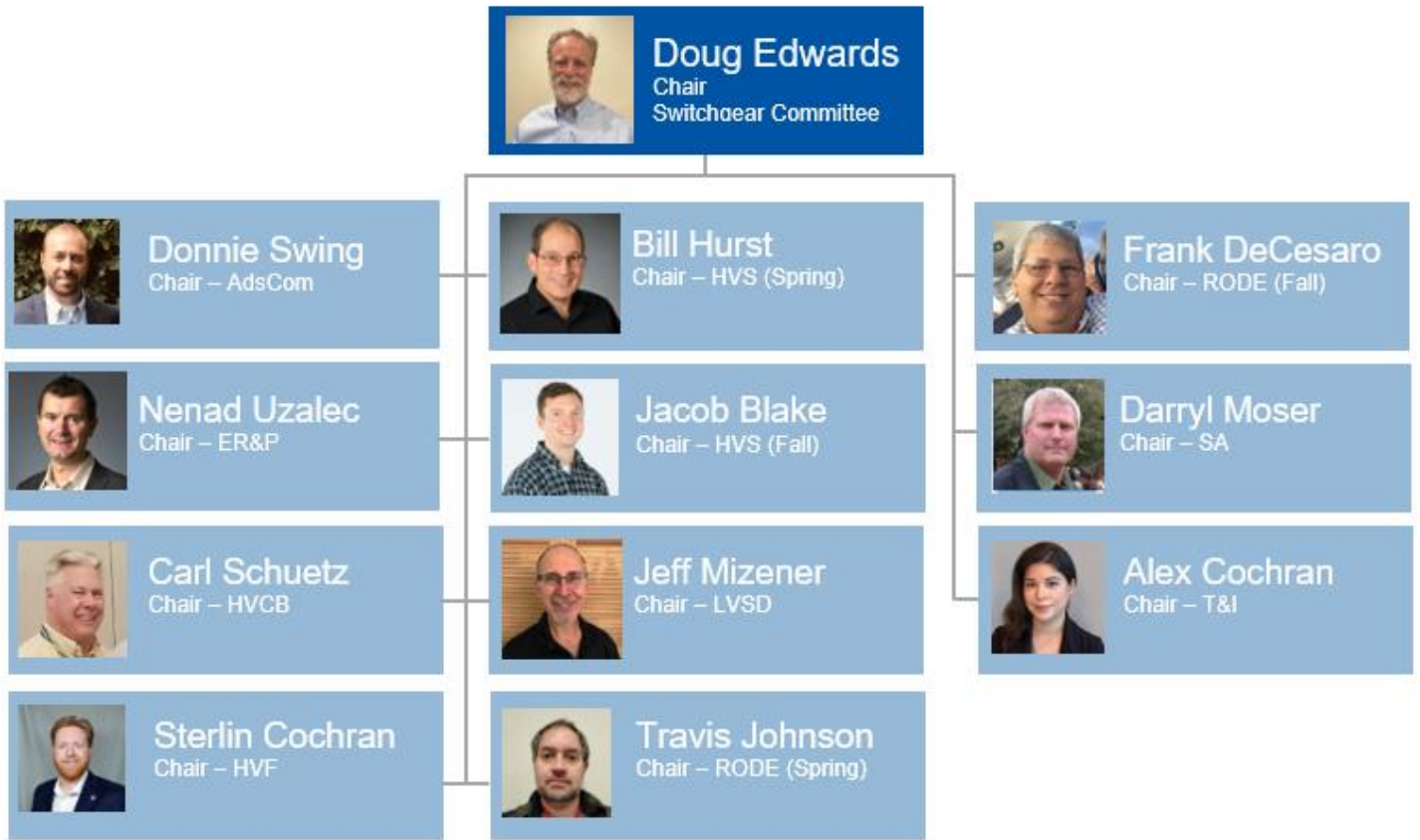
The Switchgear Committee is organized into seven (7) technical subcommittees including six (6) Responsible Subcommittees and one (1) Technical Subcommittee. The seven (7) subcommittees are:

- Administrative (AdsCom)
- High-Voltage Circuit Breakers (HVCB)
- High-Voltage Fuses (HVF)
- High-Voltage Switches (HVS)
- Low-Voltage Switchgear Devices (LVSD)
- Reclosers and Other Distribution Equipment (RODE)
- Switchgear Assemblies (SA)
- Technology & Innovation (T&I).

The responsibilities of these subcommittees are clear per their titles with the following additional clarifications:

- AdsCom oversees all sponsored standards activities, as well as direct oversight of standards activities which either 1) cross boundaries between Switchgear Committee subcommittees, or 2) are co-sponsored documents between the Switchgear Committee and another standards development body. For example, the Switchgear Committee is co-sponsoring standards being developed within the IEEE PES Substations Committee, the IEEE PES Transformers Committee, and the IEEE Industrial Applications Society (IAS).
- T&I facilitates and conducts research related to switchgear, circuit breakers and fuses that are covered under IEEE switchgear standards.

Main and Subcommittee Chairs¹



¹ In 2023 two (2) of the subcommittees transitioned chairs mid-year.

Administrative Committee (AdsCom), Joint Sponsored WGs, and Liaison with other IEEE Standards Committee and Standards Development Organizations (SDOs)



Rotation of Officers

The Switchgear Committee officer rotation took place January 1, 2023, with Doug Edwards appointed as Chair. The next officer rotation will occur at the end of 2024.

All officer and liaison updates were provided to the Technical Council Secretary. Change of positions are communicated when the changes occur throughout the year.

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

The Switchgear Committee creates and maintains standards that benefit humanity in many ways, including but not limited to:

- Users, producers, testing firms, and third-party certification bodies benefit by having performance requirements that are consistent and that give confidence that products carrying equal ratings exhibit equal performance.
- Users and producers benefit by having known performance-oriented requirements rather than rote construction mandated (but not necessarily performance-oriented) requirements. This allows producers to introduce new technologies that produce equal performance without conflicting with arbitrary standards-mandated construction requirements.
- Users, producers, testing firms, and third-party certification bodies benefit from having relatively stable standards for products, as revisions of standards are generally made at intervals of seven to ten years.
- Users, producers, testing firms, and third-party certification bodies benefit from the creation of new standards covering areas previously not addressed in standards, such as testing of equipment under conditions of internal arcing faults, special interrupting applications such as transformer-limited faults, and conversions of existing equipment to implement newer technologies.

3. Benefits to Volunteer Participants from the Committee Work

Participation in standards activities provides a solid basis for education of new participants, while providing a forum to capture the knowledge of experienced participants.

First and foremost, the Switchgear Committee Officers would like to recognize that the Committee enjoys participation by a significant number of domain experts who have formally retired from the business world, yet continue to participate, in several cases without financial support from their former employer or any other firm. It is reasonable to surmise that such individuals would not do so except that participation provides them some measure of satisfaction; their depth of knowledge and “mentoring mentality” provide a tremendous benefit to the Committee membership and guests.

Participants in the standards process benefit from recognition within their employer organizations as “experts” in their technical field, particularly if they participate in some officer capacity in WGs or in the committee structure.

The Standards Association and Switchgear Committee provides recognition to WG members and committee officers, typically with a plaque when standards are published that are presented in front of the Committee at our semi-annual conferences. The participants are also recognized in the front matter of the document, gaining positive “internet immortality”.

The Committee had historically hosted a minimum of two educational seminars/tutorials (free-of-charge) during each of its Spring and Fall conferences. A highlight of the Fall 2023 conference was the addition of a half-day program dedicated to technical presentations encompassing 13 technical subjects plus a panel session during this conference.

Presentations topics included:

- Thermographic Surveys: Annual and/or Continuous Thermal Monitoring (CTM) Inspections
- Protection and Switchgear Standards: Arc Flash, Monitoring, and Relaying Applications
- Current Interruption in SF6-free Switchgear
- Wildfire Mitigation at Southern California Edison
- Measuring High Frequency Transients
- Environmental Aspects in Standardization for Electrical Equipment
- PFAS Regulation in Europe
- Challenges for Utilities in Energy Transition
- F-Gas Regulation in Europe
- Insulating Gas Analysis
- Recent Switchgear Committee standards publications:
 - C37.20.2 - IEEE Standard for Metal-Clad Switchgear
 - C37.122 - HV Gas Insulated Substations above 52kV
 - IEEE SCATE WG
 - C37.30.6 - A New Guide for Motor Operators
 - C37.75 - Pad-Mounted, Pole-Mounted, and Submersible Switchgear Enclosures
 - C37.100.7 - Non-SF6 Insulation and Arc Quenching Media
- Microgrid Panel Session

These technical presentations provide conference participants with free training on current topics.

Switchgear Committee conferences are a gathering of industry experts across academia, government regulators, third-party certifiers, consultants, specifiers, end users, and manufacturers. As a result, there are tremendous opportunities to network with a wide variety of experts from diverse global regions. Not only are there great social opportunities, but the discussions often facilitate best practice discussions between individuals from all around the world.

The Switchgear Committee issues (since Fall 2019) professional development hours (PDHs) through the IEEE Certificate Program (<https://www.ieee.org/education/certificates/offerings.html>). While each certificate costs the Committee \$5 (USD), the Committee has absorbed that expense and does not pass the fees along to attendees. The Switchgear Committee officers feel that this is a tremendous value to the attendees. The participation is similar to 2022 statistics.

- For the Spring 2023 conference, 28 individuals (approximately 10.8% of the attendees) were accredited for a combined 520.25 PDH (a slight reduction in the typical PDH requests as compared to 2022).
- For the Fall 2023 conference, 22 individuals (approximately 7.9% of the attendees) were accredited for a combined 445.75 PDH.

The Switchgear Committee recommends that the promotion of such benefits to potential participants, assists users who struggle to secure management support for Committee activities, both financial and time. The Switchgear Committee has taken action to support participants with a simple one-page “[brochure](#)” detailing the virtues of Committee participation as well as a justification letter template that may be used by participants.

4. Recognition of Outstanding Performance

Education, Recognition, and Publication (ER&P) Subcommittee oversees all the activities related to nominations, recognitions, awards, prizes, and certificates of appreciation for exceptional individuals and groups. Annually ER&P considers nominations for the following awards:

- PES Prize Paper award
- PES Outstanding WG award
- PES Award for outstanding Standard or Guide
- TC award for prize paper
- TC award for outstanding service to the Committee
- TC award for outstanding WG.

ER&P stimulates and encourages nominations for Senior Membership of IEEE and IEEE Fellows. Our continuous push to encourage Committee members to become Senior Members has resulted in people receiving that accomplishment. Numerous Switchgear Committee people were elevated to Senior Member in 2023. Senior Members are recognized through special ribbons on name badges worn during the Committee face to face conferences. ER&P continues to work to nominate appropriate Switchgear Committee attendees for IEEE Fellow. An IEEE Fellows nominating group was created to identify potential fellows from our membership and to support the process for nomination. No individuals were nominated for Fellow in 2023.

Contact and networking was made with the IEEE-SA Fellows review committee with some mentoring advice provided to improve future applications.

The Switchgear Committee continues to grow in IEEE Life Members. This level of expertise brings tremendous experience and intangible benefits to the Switchgear Committee. The Switchgear Committee member count in 2023 is 21 volunteers as “Senior Life Member” (or greater).

- Roy Alexander, Fellow Life Member
 - Former Switchgear Committee Chair
 - Honorary Member
 - Current WG Chair
- Peter Baen, Senior Life Member
 - Current WG Chair
- John Brunke, Fellow Life Member
 - Former Switchgear Committee Chair
 - Honorary Member
- Ted Burse, Senior Life Member
 - Former Switchgear Committee Chair

- Eldridge Byron, Senior Life Member (deceased 2023)
 - WG Chair
- Frank Decesaro, Senior Life Member
 - Current Subcommittee Officer
 - Current WG Chair
- Pat Delilo, Senior Life Member
- Denis Dufournet, Fellow Life Member
- Leslie Falkingham, Fellow Life Member
 - Current WG Chair
- Dave Gohil, Senior Life Member
- Jack Harley, Fellow Life Member
 - Current WG Chair
- Dave Johnson, Life Member
- John Leach, Senior Life Member
 - Former Switchgear Committee Officer
 - Honorary Member
- Bill Long, Life Member
 - Former Switchgear Committee Chair
 - Honorary Member
- Don Martin, Senior Life Member
- Miklos Orosz, Senior Life Member
- Ted Olsen, Senior Life 60-year Member
 - Former Switchgear Committee Chair
 - Honorary Member
- Devki Sharma, Senior Life Member
 - Current WG Chair

- Dean Sigmon, Senior Life year Member
 - Former Switchgear Committee Chair
 - Former Standards Coordinator
 - Honorary Member
- Kirk Smith, Senior Life Member
 - Honorary Member
 - Current WG Chair
- Marcelo Valdes, Fellow Life Member
 - Current WG Chair

IEEE-SA and PES Awards of 2023 included:

- Dean Sigmon – IEEE-SA Standards Medallion
For influential leadership in the IEEE Power & Energy Society Switchgear Committee and for advancing new methods of educating users, manufacturers, students, and industry.
- Karla Trost – IEEE-SA Standards Medallion
For exceptional leadership and contributions to the development of IEEE C37.75-2023 and IEEE C37.68.
- Various WG Awards

Beyond the standard IEEE-SA and PES Awards, the Switchgear Committee made recognition to the following individuals:

- Michael Wactor was recognized for his thirteen years of service as the Standards Coordinator for the Switchgear Committee. Michael retired from the Standards Coordinator position at the end of 2022.
- Pat DiLillo was recognized with Switchgear Distinguished Service Award for his years of long-standing contributions to the Switchgear Standards community.
- Eldridge Byron was recognized for his long-standing contributions to the Switchgear Committee and his additional activities serving as a liaison to Substations and to several IEC technical committees.
- Deceased: Two (2) members and valuable contributors to the Switchgear Committee that had passed away were honored:
 - Mr. Eldridge Byron, who was active for at least 30 years in the committee and chaired several WG's.
 - Dr. Mischa Steurer, who had chaired the new standard C37.302 – Guide for Fault Current Limiter testing.

In addition, all outgoing officers, including subcommittee chairs, are presented with certificates of appreciation.

ER&P oversees the paper review process for all papers that relate to Switchgear Committee technical areas, whether for conferences such as the IEEE PES T&D, the PES General Meeting, for Transactions, or other publications.

5. Coordination with Other Entities (PES Committees, CIGRE, standards, etc.)

Historically, the Switchgear Committee has invested heavily in collaboration with other entities. Year 2023 was no exception to that model.

ANSI ASC C37

NEMA holds the secretariat position with a number of ANSI certified industry standards relating to the design testing and conformance testing of switchgear and switchgear devices. These standards are sponsored by Accredited Standards Committee (ASC) C37. Currently there are 13 Switchgear Committee delegates to ASC C37, providing strong member representation and coordination/cooperation with this technical committee.

CIGRE

Switchgear Committee keeps a close liaison with CIGRE Study Committee A3 (High Voltage Equipment). Many of the Switchgear Committee members are active in A3, however, Nenad Uzelac (Education and Recognition Chair) is past USNC Representative to CIGRE SC A3 (T&D Equipment) and was elevated to CIGRE Technical Council Group A (Equipment) and chair of Study Committee A3 in 2018 having been relieved as USNC A3 by another Switchgear Committee member, Albert Livshitz. The A3 position informally serves as the liaison between IEEE Switchgear Committee and CIGRE A3. Another regular attendee of the Switchgear Committee meetings, George Becker, is the USNC representative to SC B3 (Substations and Electrical Installations).

IEEE Industrial Application Society (IAS)

The Switchgear Committee has historically had much unofficial involvement within the IEEE Industrial Application Society – in particular the annual Electrical Safety Workshop and annual Petroleum and Chemical Industry Committee (PCIC) conference. The Switchgear Committee and IAS further built upon this relationship in 2020 with an agreement to co-sponsor:

- IEEE Std 2969: Guide for Continuous Thermal Monitoring of Switchgear and Motor Control Centers up to 52kV
Work on this document started in early 2021, with regularly schedule (~monthly) teleconferences of the WG and its subgroups (task forces) and in-person conferences held in at various Standards Committee conferences (PE/SWG, IAS/PCIC, and IAS-ESC/ESW).

IEEE High-Voltage Test Techniques (HVTT)

HVTT is planning to create a new document concerning partial discharge measurements as would be performed in a test lab. The Switchgear Committee current concept to develop a new Recommended Practice for field monitoring and trending of partial discharge measurements associated with switchgear.

IEEE PES Substations Committee

The following standards are co-sponsored between the Switchgear Committee and the Substations Committee:

- IEEE Std C37.017: IEEE Standard for Bushings for High-Voltage [over 1000 V (ac)] Circuit Breakers and Gas-Insulated Switchgear
- IEEE Std C37.20.9a: IEEE Standard for Metal-Enclosed Switchgear Rated 1 kV to 52 kV Incorporating Gas Insulating Systems Amendment

- IEEE Std C37.122: IEEE Standard for High Voltage Gas-Insulated Substations Rated Above 52 kV
- IEEE Std C37.122.2: IEEE Guide for the Application of Gas-Insulated Substations 1 kV to 52 kV
- IEEE Std C37.122.3: IEEE Guide for Sulphur Hexafluoride (SF₆) Gas Handling for High-Voltage (over 1000 Vac) Equipment
- IEEE Std C37.122.10: IEEE Guide for Handling Non-Sulphur Hexafluoride (SF₆) Gases for High-Voltage Equipment Rated above 1000 Vac
- IEEE Std C37.302: IEEE Guide for Fault Current Limiter (FCL) Testing of FCLs Rated above 1000 V AC
- IEEE Std 1860: IEEE Recommended Practice for Voltage Regulation and Reactive Power Compensation at 1 MV Alternating Current (ac) and Above
- IEEE Std 1861: IEEE Recommended Practice for On-Site Acceptance Tests of Electrical Equipment and System Commissioning of 1 MV Alternating Current (ac) and Above
- IEEE Std 1862: IEEE Recommended Practice for Overvoltage and Insulation Coordination of Transmission Systems at 1 MV Alternating Current (ac) and Above
- IEEE Std 3443: IEEE Guide for Substation Physical Resilience

IEEE PES Transformers Committee

The following standards are co-sponsored between the Switchgear Committee and the Transformers Committee:

- IEEE Std C57.12.30: IEEE Standard for Pole-Mounted Equipment – Enclosure Integrity for Coastal Environments
- IEEE Std C57.12.31: IEEE Standard for Pole-Mounted Equipment – Enclosure Integrity
- IEEE Std C57.142: IEEE Guide to Describe the Occurrence and Mitigation of Switching Transients Induced by Transformers, Switching Device, and System Interaction
- IEEE Std 1860: IEEE Recommended Practice for Voltage Regulation and Reactive Power Compensation at 1 MV Alternating Current (ac) and Above
- IEEE Std 1861: IEEE Recommended Practice for On-Site Acceptance Tests of Electrical Equipment and System Commissioning of 1 MV Alternating Current (ac) and Above
- IEEE Std 1862: IEEE Recommended Practice for Overvoltage and Insulation Coordination of Transmission Systems at 1 MV Alternating Current (ac) and Above
- IEEE Std 3443: IEEE Guide for Substation Physical Resilience

IEEE PES Transmission and Distribution Committee (T&D)

The following standards are co-sponsored between the Switchgear Committee and the Transmission and Distribution (T&D) Committee:

- IEEE Std 1860: IEEE Recommended Practice for Voltage Regulation and Reactive Power Compensation at 1 MV Alternating Current (ac) and Above

IEEE PES Surge Protective Devices Committee (SPDC)

The following standards are co-sponsored between the Switchgear Committee and the Transmission and Distribution (T&D) Committee:

- IEEE Std 1862: IEEE Recommended Practice for Overvoltage and Insulation Coordination of Transmission Systems at 1 MV Alternating Current (ac) and Above

IEEE Traction Power Systems Standards Committee (VTS/TPSSC)

The following standards are co-sponsored between the Switchgear Committee and the Traction Power Systems Standards Committee:

- IEEE Std 2969: IEEE Standard for Low-Voltage DC (3200 V and below) Power Circuit Breakers Used in Enclosures

IEEE Entity Collaborative Activities Governance Board (CAG)

The following standards are co-sponsored between the Switchgear Committee and the Entity Collaborative Activities Governance Board (CAG):

- IEEE Std 1860: IEEE Recommended Practice for Voltage Regulation and Reactive Power Compensation at 1 MV Alternating Current (ac) and Above
- IEEE Std 1861: IEEE Recommended Practice for On-Site Acceptance Tests of Electrical Equipment and System Commissioning of 1 MV Alternating Current (ac) and Above
- IEEE Std 1862: IEEE Recommended Practice for Overvoltage and Insulation Coordination of Transmission Systems at 1 MV Alternating Current (ac) and Above

IEEE Quantities, Units and Letter Symbols Standards Committee (QUSCom)

The Switchgear Committee recognizes the benefits on standardization of units and systems of measurement. To that end, four (4) Switchgear Committee members are active members of QUSCom, with two having been elevated to Chair and Past-Chair of QUSCom and WG Chair/Secretary of five (5) associated standards (IEEE Std 260.1, IEEE Std 280, IEEE Std 945, IEEE Std 1541, and SI 10).

IEEE SC 21

The Switchgear Committee has also actively monitored IEEE 1547 and IEEE 1547.1 for influence on switchgear standards. Many of the voltage regulation issues noted by the ANSI ASC C84 Committee originated with the IEEE Std 1547 and the IEEE Std 1547.x series. Several joint discussion group meetings have occurred, and the IEEE SC 21 and Switchgear Committee leadership are working towards forming a joint task force to review and recommend solutions for mitigating the overvoltage concerns.

IEC

The Switchgear Committee hosts working sessions of the IEC U.S. National Committee Technical Advisory Group (TAG), with a number of Switchgear Committee members serving as experts on various IEC maintenance teams.

A number of projects and standards are in process or published that are dual-logo or joint efforts with the IEC. Among these are:

- IEC 62271-111 / IEEE C37.60, dual logo High-voltage switchgear and controlgear – Part 111: Overhead, pad-mounted, dry vault, and submersible automatic circuit reclosers and fault interrupters for alternating current systems up to 38 kV (revision in process)

- IEC/IEEE 62271-37-082, High-voltage switchgear and controlgear - Part 37-082: Standard practice for the measurement of sound pressure levels on alternating current circuit-breakers
- IEC/IEEE 62271-37-013 High-voltage switchgear and controlgear - Part 37-013: Alternating current generator circuit-breakers
- The Switchgear Committee invited IEC SC 17C (in 2020) to participate in the revision of IEEE C37.23 Metal-Enclosed Bus. Discussions are pending for potentially adding a subclause in IEC 62271-200 or 62271-201 to cover similar scope/technology.

NEMA

A number of NEMA WGs include Switchgear Committee members as a number of scopes of the standards are quite related.

Revisions are underway for IEEE Std C37.13, IEEE Standard for Low-Voltage AC Power Circuit Breakers Used in Enclosures migrating the low-voltage power circuit breaker design test requirements from NEMA C37.50 into IEEE Std C37.13. This revision provides significant benefit to the industry as the construction, markings, preferred ratings, and test protocols will be contained in a singular standard. When completed this will align these key documents.

STLNA

In conjunction with the Switchgear Committee Conferences, the Committee hosts a meeting of Short-Circuit Testing Liaison of the Nations of the Americas (STLNA). The STLNA takes advantage of this gathering of technical experts to discuss testing techniques, procedures, and other challenges that laboratories face in testing and certification of switchgear and switchgear devices. Many STLNA members are active Switchgear Committee participants as well, and further enhances the synergies and alignment between these two entities.

In 2022, the Switchgear Committee agreed to take on secretariat responsibilities within STLNA. However, based on reviews with IEEE-SA Staff, the conclusion is that as STLNA deliverables include providing comments on and clarifications of standards developed by other Standard Development Organizations (SDO's), e.g., IEC standards, the IEEE is not allowed to provide clarification of other SDO's documents, such a structure is NOT allowed. The Switchgear Committee will continue to support STLNA with meeting rooms and member participation.

6. New Technologies of Interest to the Committee

The committee has several projects or task forces involved in new technologies:

High-Voltage DC Distribution Equipment

In recent years there have been a number of high-voltage dc networks implemented. Additionally, there are a number of proposed dc grids. Due to the proliferation of high-voltage dc systems throughout the world, the Switchgear Committee has opened PARs for high-voltage dc circuit breakers and high-voltage dc switches. PARs were approved by IEEE SA in 2020, with work accomplished in 2023.

Active Arc-flash Mitigation Systems

When IEEE Std C37.20.7 was introduced, the scope was limited to medium-voltage arc-resistant switchgear. The subsequent revisions added low-voltage switchgear, low-voltage switchboards, low-voltage motor control, medium-voltage motor control, metal-enclosed bus, gas-insulated switchgear, and high-voltage outdoor circuit breakers. The associated ratings and test procedures were accounting for providing passive arc-flash mitigation techniques. The document is being revised to add ratings and test protocols to cover active arc-flash mitigation techniques. Also, active arc-flash mitigation devices have become more prevalent in safety systems and the standard will provide means of evaluating and communicating the performance expectations of utilizing such devices. The WG is in Ballot Comment Resolution stage at the end of 2023.

Thermal Monitoring of Switchgear

Current thermal monitoring inspection practices tend to center around the periodic infrared thermographic inspections. However, this practice is under increasing scrutiny because, at best, it only provides partial data points infrequently collected somewhat independent of connected equipment performance. In an increasingly arc-flash conscious world, the required manual interface with equipment that is often energized is elevating costs and concerns. This type of technology shifts from labor intensive maintenance practices to safer, more efficient, less costly data collection with options for automated data collection is being well received.

Sulfur Hexafluoride (SF₆) Alternatives

Revisions are underway to develop Guides for the handling SF₆ and non-SF₆ gases.

Also, C37.100.7 Guide for the Evaluation of Performance Characteristics of Non-Sulfur Hexafluoride Insulation and Arc Quenching Media for Switchgear Rated above 1000 V. The purpose of this guide is to consider the entire spectrum of circuit breakers and gas-insulated switchgear performance characteristics relative to SF₆ alternatives. The guide identifies areas where there may be some question about the performance evaluation methodology and provide guidance for addressing those issues. Close coordination with CIGRE activities will occur throughout the process. For example:

- D1.67 dielectric strength of SF₆ alternatives
- B3.45 application of SF₆ alternatives
- A3.41 switching and interrupting performance

Solid Dielectrics

The Solid Dielectric Task Force (SDTF) is exploring materials, application and environmental conditions, and tests for new insulation systems in which insulation is molded as an integral element of an assembly that includes the interrupting or switching device, e.g., such as for an outdoor distribution recloser. The task force anticipates issuing their final report in the near future.

Distributed Energy Resources (DERs)

Switchgear Committee members are active with the IEEE Std 1547 WG to address discrepancy with Switchgear standards to address occurrences of $\geq 200\%$ of rated voltage across an open gap in switchgear due to phase angle differences, when both sides of the gap are energized via independent power sources.

Aging of Electrical Equipment

Two actions are ongoing in the area of dealing with aged electrical equipment:

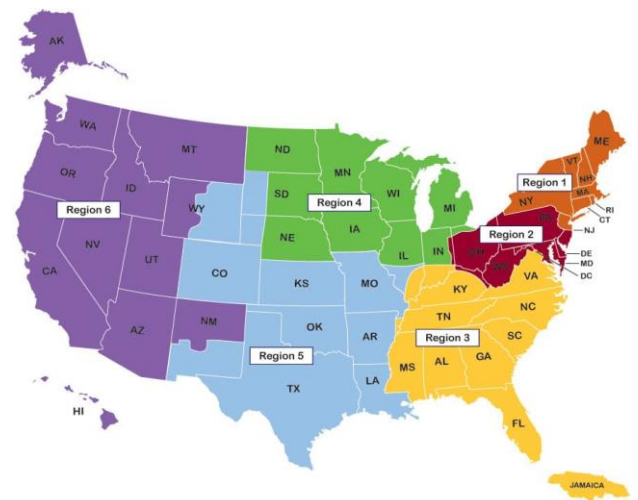
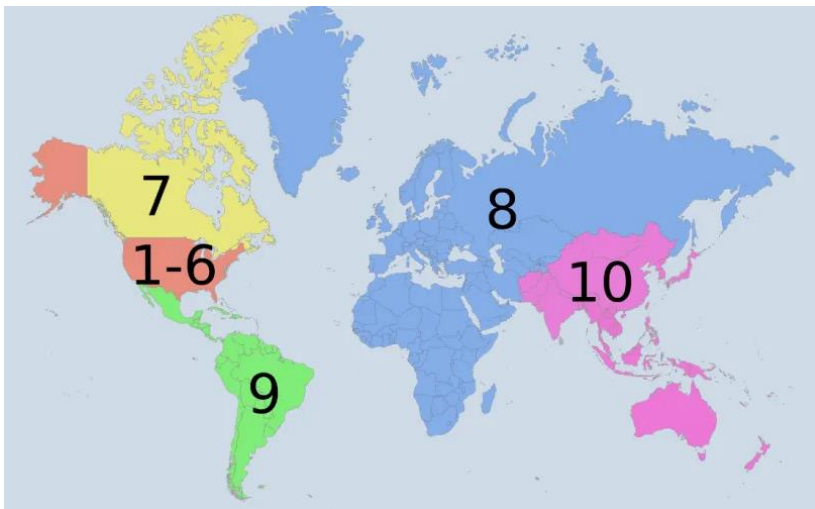
- There is a need to standardize the expected life information for lubricants used in switchgear equipment. C37.100.8 WG was formed and a PAR approved to develop methodologies for establishing the expected life of lubricants as used in switchgear equipment.
- The Technology and Innovation Subcommittee Aging of Switchgear Task Force conducted a survey in collaboration with the Centre for Energy Advancement through Technological Innovation (CEATI) about maintenance and replacement challenges in the relevant industry segment. This survey, together with general information about aging processes and condition assessments will be published in a technical report. Most of the work for the report has already been completed with the official release of the report expected in 2024.

7. Global Involvement

IEEE Region	Number of Members (Voting & Non-Voting) ²	Officers (Main, Subcommittee, & WGs) ³	Voting Members ³	Honorary Members ³	Non-Voting Members ³
Region 1	65	-	2	2	15
Region 2	129	1	15	3	37
Region 3	274	11	31	6	80
Region 4	91	36	14	1	23
Region 5	88	13	10	-	33
Region 6	59	12	3	-	15
Region 7	52	2	3	-	16
Region 8	45	-	-	3	12
Region 9	6	3	-	-	3
Region 10	16	-	-	-	35
Totals ^{2 & 3}	825	78	78	15	235

Notes:

- 1) Counts for total on email distribution list^{2 & 3}.
- 2) Counts are for those participating since 2020 (post COVID).



² Counts for total on email distribution list.

³ Counts are for those participating since 2020 (post COVID).

8. Problems and Concerns

Entity PARs and WGs

The organizational structure and engagement of various staff and volunteers have improved the Entity WG activities. Compliments go to:

- The Switchgear Committee representation on the PES Tech Council EPM
- The Switchgear Committee External Project Approval Group (EPAG) and processes
- Engagement by Switchgear Committee officers
- Support by IEEE-SA Program Manager (in US)
- Engagement with the IEEE-SA staff in China.

However, there are concerns and issues with the managing of Entity WGs with common issues including:

- Responding to NESCom PAR review issues
- Announcing meetings and providing agendas prior to meetings – there were meetings held which were not announced
- Creating and distributing appropriate minutes of meetings
- Having chairs actually run the meetings instead of delegating to non-officers (even non-members)
- Getting WG officers to complete required training, most recently the Understanding IEEE SA's Antitrust, Competition, and Commercial Terms Policies training.

And most importantly,

- Completing work on the drafting of the document – example is C37.86 whose PAR was approved March 22, 2022 and has to date only two substantive sections with drafted text both provided by US Entity contributors.

Currently Switchgear Officers are trying to mentor and support the Entity WGs with their activities (again such as announcing meetings, providing agendas, holding meetings, providing appropriate minutes, and making progress) to uphold appropriate and minimum expectations while being respectful and allowing them the opportunity to work through the standards development task.

Actions taken to date primarily have been:

- The Switchgear Committee Chair has provided direct mentoring of the WG Chairs
- The IEEE-SA staff (US PM and China staff contact) has provided on-the-job type training and support and we walk through various task
- The on-going issues have been communicated to PES Tech Council (i.e., in 2024-01-07 JTCM meetings).

Ongoing plans include continued diligence with support from IEEE PES Localized Technical Activities Committee (LTAC).

Fellows Program

The Switchgear Committee has struggled with Fellow Nominations with the following frustrations expressed by ER&P members:

- Regarding the new “standards” category, the process and evaluation criteria is unclear from review of online documentation.
- The online nomination form was a nice improvement, but it is only visible during the application window, and thus no “pre-work” can be done to draft a strong application.
- The nomination calendar and other website information is out-of-date.
- There is no feedback loop to suggest weaknesses or opportunities for improvement in nomination packages – it is merely “pass-fail” with no additional feedback.

In late 2023, the Switchgear Committee reached out to the IEEE Technical Activities Board Committee on Standards (TAB CoS) for help in this area. TAB CoS was able to connect the Switchgear Committee to the IEEE SA Fellows Committee for some additional training and process recommendations. Some checklists have been developed by the IEEE SA Fellows Committee and some website updates were planned. Due to timing, the Switchgear Committee does not expect to be able to take advantage of this assistance with regard to the Class of 2024 Fellows submissions, however hopes to submit some “pilot” applications for 2025.

ANSI Approval

For the standards overseen by the Switchgear Committee, obtaining ANSI approval is crucial to market acceptance and is to always pursue.

Although procedures are in place for IEEE-SA to always open ANSI Project Initiation Notification System (PINS) accreditation projects for all Switchgear Committee standards projects, some of the Switchgear Committee produced standards slipped through without ANSI PINS, and have lost their ANSI certification. The task to gain ANSI accreditation for all Switchgear Committee standards by the IEEE-SA project management remains pending. That is, at the time of writing this report, the ANSI status for the entire Switchgear Committee standards catalog is unknown, as well as the status of any corrective actions needed to restore ANSI accreditation for the various standards. Anecdotal information suggests that for some standards, the Switchgear Committee has lost not only ANSI accreditation, but the right to the ANSI scope with respect to these standards.

9. Significant Plans for the Next Period

The Switchgear Committee has the following significant plans for 2024 are to:

- Plan and have contracts for Conference for the next five years. Progress is being made with the coordinated efforts with IEEE MCE. A short list of target location and venues have been identified for 2027 and 2028.
- Continue to maintain financial stability of the Committee while increasing the level of social and technical services/benefits expected by participants.
- Work with selected subcommittees having a heavy workload of standards to assure that the workload can be handled within the available resources and time. This requires that projects need to be completed within the four-year validity of a PAR.
- Continue to market Committee conference participation in the standards development process. Committee growth has averaged over 5% annual increase for over 10 years with attendance regularly exceeding 250 people at recent conferences.
- Repeat of a dedicated half-day of technical sessions will be offered. This provides a diversification of activities offered in the Switchgear Committee conferences.
- Encourage increasing participation from young engineers in the standards development process. While college recruitment and local PES chapter recruitments have reaped minimal impact, the Committee strives to look for new ways to encourage a greater spectrum of participation.
- Continue to have registration and booking links and preliminary schedule published before adjournment of the preceding conference. Providing conference details at the preceding conference has been found to be a powerful motivator for generating attendance at the upcoming in-person conference. The “Book Now” availability for the next conference including conference details to justify the opportunities for participation has been well received by volunteers.
- The transition to Member Planet as an association management system is pending roll-out by PES Tech Council. First step was to get member profiles created. Approximately 67% of the Switchgear Committee members and recent conference attendees have created their MP profiles.
- The Switchgear Committee continues to offer leadership and member training at each in-person conference. The targeted training is based on the issues that arise, e.g., myProject, Member Planet, and Robert Rules of Order training are targeted.

Submitted by: Doug Edwards, Chair, IEEE PES Switchgear Committee (2023 – 2024)

Date: January 19, 2024