

2019

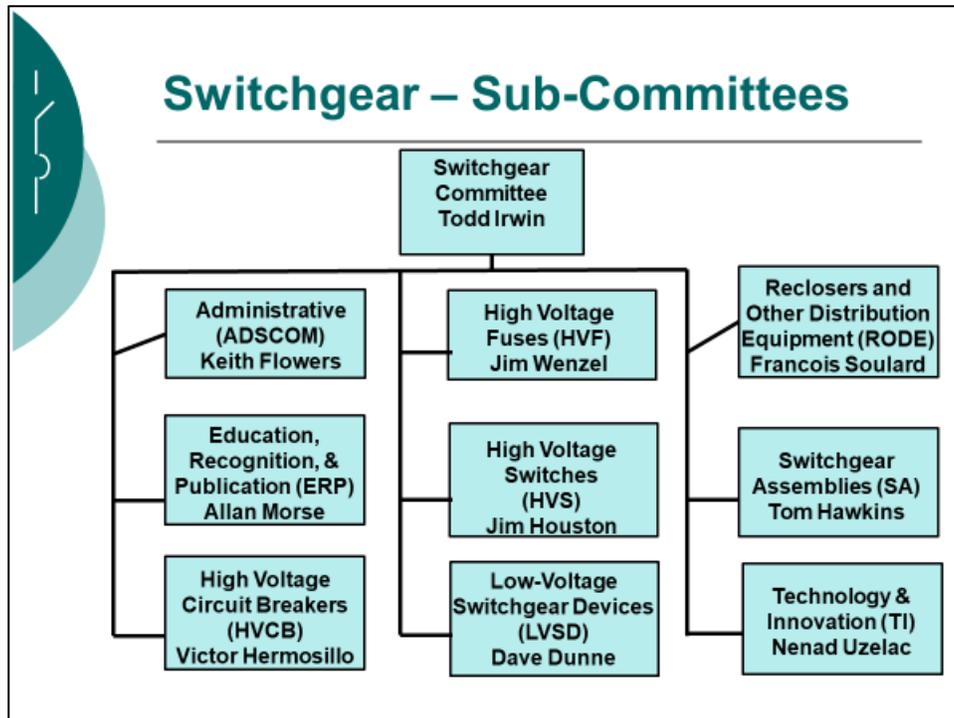
Entity: Switchgear Committee
Website: <http://www.ewh.ieee.org/soc/pes/switchgear/>

Chair: Todd Irwin
Vice-Chair: Keith Flowers
Secretary: Doug Edwards
Immediate Past Chair: Paul B. Sullivan

1. Significant Accomplishments:

Organization

The Switchgear Committee seven technical subcommittees (HV Circuit Breakers, HV Fuses, HV Switches, LV Switchgear Devices, RODE [Reclosers and Other Distribution Equipment], Switchgear Assemblies (SA) and Technology & Innovation (T&I) have approximately 30 active working groups or task forces preliminary to formation of working group. The Switchgear Committee sponsors approximately 61 active standards and has approximately three new standards in development. The list of active working groups fluctuates, with working groups disbanded as their projects are completed, and with new working groups forming on a continuing basis. The figure below shows the seven technical subcommittees plus the Switchgear Committee Administrative Subcommittee (ADSCOM) and Education, Recognition, and Publication Subcommittee (ERP) complete with 2019 chair of each.



2019 Committee officers served a 2-year term (2018-2019) according to normal practice. Selection of a new Secretary/Treasurer was announced at the Fall meeting and planned officer rotation will take place January 1, 2020. Updated officer information has been provided to Technical Council.

Revisions of the Switchgear Committee Organization & Procedures and Working Group Policies & Procedures were completed in 2019. Committee officers provided training sessions for members and guests at the 2019 spring meeting in Burlington, VT.

Standards Activities

An active plan was executed to revise all relevant standards that were due for administrative withdrawal at the end of 2018, complying with the changes enacted by IEEE-SA in 2008 that ended reaffirmations and imposed a requirement to revise or withdraw standards that were not revised within ten years of approval. While some work remains, all relevant documents due to expire at the end of 2018 have been revised before expiration.

The Switchgear Committee actively works to harmonize requirements in various standards with the requirements of the relevant IEC standards. At present, requirements for HV circuit breakers are fundamentally harmonized although not 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.

In 2019, three standards, guides, or recommended practices updated or created by the Switchgear Committee, or co-sponsored by the Switchgear Committee were approved by the Standards Board. The approved documents and the subcommittee responsible for the document revisions are shown below.

High Voltage Circuit Breakers Subcommittee (HVCB)

- **C37.011** – Guide for the Application of Transient Recovery Voltage for AC High-Voltage Circuit Breakers with Rated Maximum Voltage above 1000V

Switchgear Assemblies (SA)

- **C37.20.9** – Standard for Metal-Enclosed Switchgear Rated 1 kV to 52 kV Incorporating Gas Insulating Systems
- **C37.24-2017/Cor 1-2019** – IEEE Guide for Evaluating the Effect of Solar Radiation on Outdoor Metal-Enclosed Switchgear

We expected fewer published standards documents in 2019 thanks to a particularly heavy workload in 2018 due to expiration of numerous documents in that year. As of January 2020, the Committee had 27 active standards working groups.

Some of our members are significant contributors to the IEEE Standards Association governance process. Ted Burse and Doug Edwards were members of the 2019 Standards Board. Doug Edwards was a member of AUDCOM and REVCOM. Ted Burse was PES SCC Chair, a member of NESCOM and the Chair of PROCOM.

Financial

The Switchgear Committee plans and executes their own meetings with support from IEEE MEC team for hotel contract negotiation. Revenue comes from registration fees charges attendees and from support from corporations. Expenses are those related to meetings (catering, audio/visual, social events, and similar.)

The Switchgear Committee continues to maintain sound financial condition. This is a significant improvement over the Committee financial condition less than 10 years ago. The Treasurer provides monthly reports to Committee officers to report on the health of the Committee. Discrepancies in any account are quickly identified and resolved. The Committee has enough financial reserves to handle varying meeting commitments.

Sound financial planning and management have enabled the Switchgear Committee to give back to the IEEE by making an annual financial contribution to the IEEE PES Scholarship Plus Fund.

IEEE Annual Audit was successfully completed for 2018.

Meetings

The Switchgear Committee holds two meetings each year, one in the Spring and one in the Fall. Attendance at these meetings is on an upward trend, rising from around 110 participants in 2003 to an average of 280 individuals over the past 3 years. Over the same period, we have had an average of 32 first time attendees at each meeting. This is in part due to a strategy of expanding the number of meeting locations to encourage the attendance of local individuals who might not otherwise be able to justify the travel costs for attendance. The Switchgear Committee meets outside the JCTM and PES General Meeting and therefore plans their own meetings. Contracts have been signed for the next three meetings plus the Fall 2023 meeting, as shown below. Our Meeting Planning Group is actively pursuing future locations for the coming years.

Spring 2020	May 4-7, 2020	Peppermill Resort Reno LV
Fall 2020	October 3-8, 2020	Sheraton Fort Worth Fort Worth TX
Spring 2021	April 19-22, 2021	Hilton Charlotte University Charlotte NC
Fall 2023	October 8, 2023	Catamaran Resort San Diego, CA

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

- Identify potential meeting sites.
- Distribute RFQ to meeting facility/hotel properties where the Switchgear Committee wants to hold a meeting.
- Performing an initial review of all received proposals.

- Assisting with final contract negotiations with the chosen meeting facility/hotel property.
- Coordinating IEEE Legal of all Switchgear Committee contracts for meeting venues or other activities (such as social events held outside of the meeting venues).

Additionally, the Switchgear Committee has established a standing position of “Meeting Planner” to coordinate with the hotel after the contract is signed to manage the sleeping rooms, meeting rooms, menus, and audio-visual needs. This shifted the responsibility from the Vice-Chair and provides continuity and experience in this role. The meeting planner role has enabled the switchgear committee to better manage meeting expenses and is a major contributor to the overall financial health of the Switchgear Committee.

Website

The Switchgear Committee website continues to be updated to a more interesting format and included 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 webmaster for update of the Subcommittee website.

Central Desktop

Switchgear Committee officers uses Central Desktop to store important Committee related documents including items such as meeting contracts, meeting planning information, and Committee procedures. Using Central Desktop 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.

The officers have found that using Central Desktop is an excellent tool and highly recommends other Technical Council Committees also considering using it.

Central Desktop is being used by a few Working Groups and training is planned for Spring 2020 meeting to assist and promote use by Working Groups.

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

The Switchgear Committee creates and maintains standards that benefit the stakeholders 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 except 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 accommodate newer technologies.
- Continuing Education Units (CEU's) are being made available for participations in various Working Group and educational sessions.
- Educational sessions in 2019 included: "California Air Resources Board and SF6 Emissions Tracking", "Shunt Reactor Switching: Theory and Practice", "What is the PES Resource Center", and "HV Fuse Tutorial and Application Guide or how I learned to stop worrying and love the fuse protection".

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.
- The Switchgear Committee has participation by a significant number of persons who have formally retired from the business world, yet continue to participate, in several cases without financial support from their former employer or some other firm. It is reasonable to surmise that such individuals would not do so except that participation provides them some measure of satisfaction.
- Participants in the standards process benefit from recognition within their employer organizations as "experts" in their technical field, and particularly if they participate in some officer capacity in working groups or in the committee structure.
- The Switchgear Committee provides recognition to working group members and committee officers, typically with a plaque. When standards are published, the participants are also recognized in the front matter of the document.
- Tutorials are provided at each Switchgear Committee meeting. This provides meeting participants to get free training on current topics. Switchgear Committee members who are experts in their field typically provide the training.
- The Switchgear Committee recommends that the promotion of such benefits to potential participants, particularly 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 (ERP) Subcommittee oversees all the activities related to nominations, recognitions, awards, prizes, and certificates of appreciation for exceptional individuals and groups. Annually ERP 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 Working Group.



Doug Edwards (long-time member) was nominated and awarded Standards Medallion Award in 2019 “For outstanding achievement in circuit breaker and switchgear standards development.”

Pat Dilillo (long-time member) was recognized as an IEEE Life Senior Member in 2019.

A new IEEE Fellows nominating group was created to identify potential fellows from our membership and to support the process for nomination.

In 2019 we elevated 7 new people to members of the Switchgear Committee bringing total membership to 79 (+13 honorary members). This was in recognition of the contributions from each individual along with recommendations from Subcommittee Chairs. We also elevated eight people to Honorary Member.

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

ERP 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 numerous people receiving that accomplishment. Numerous Switchgear Committee people were elevated to Senior Member in 2019. Senior Members are recognized through special ribbons on name badges worn during the Committee face to face meetings. ERP continues to work to nominate appropriate Switchgear Committee attendees for IEEE Fellow.

ERP 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.):**

Switchgear Committee keeps a close liaison with CIGRE Study Committee A3 (High Voltage Equipment). Nenad Uzelac is an official US Representative to CIGRE SC A3 and was elevated to convener in 2018, as well as the liaison between IEEE Switchgear Committee and CIGRE A3.

The switchgear committee submitted a position letter to ANSI ASC C84 in response to suggested changes to the maximum operating voltage limits defined in ANSI C84.1. The letter summarized concerns created by increasing the maximum voltage to 110% of nominal voltage in industrial control and utility applications.

The switchgear committee has also actively monitored IEEE 1547 and IEEE 1547.1 for influence on switchgear standards.

A number of projects and standards are in process or published that are joint efforts with other IEEE PES sponsors or with the IEC. Among these are:

- IEC 62271-111 / IEEE C37.60, dual logo IEEE/IEC, 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 62271-37-082, dual logo, IEEE/IEC, High-voltage switchgear and controlgear - Part 37-082: Measurement of sound pressure levels on alternating current circuit-breakers.
- Sponsored by IEEE PES Switchgear Committee, co-sponsored by IEEE PES Substations Committee.
 - C37.100.7: Guide for the Performance Characteristics of Alternative Gases
- Sponsored by IEEE PES Substations Committee, co-sponsored by IEEE PES Switchgear Committee.
 - C37.122: IEEE Standard for High Voltage Gas-Insulated Substations Rated Above 52 kV
 - C37.122.2 IEEE Guide for the Application of Gas-Insulated Substations 1 kV to 52 kV
 - C37.122.3 IEEE Guide for Sulphur Hexafluoride (SF6) Gas Handling for High-Voltage (over 1000Vac) Equipment
 - C37.20.9, Metal Enclosed Switchgear Rated 1kV to 52 kV Incorporating Gas Insulation Systems
 - P2829 Guide for Handling Non-Sulphur Hexafluoride (SF6) Gas Mixtures for High Voltage Equipment
 - C37.017 IEEE Standard for Bushings for High-Voltage [over 1000 V (ac)] Circuit Breakers and Gas-Insulated Switchgear
- Sponsored by IEEE PES Transformers Committee, co-sponsored by IEEE PES Switchgear Committee.
 - PC57.12.30 Standard for Pole-Mounted Equipment--Enclosure Integrity for Coastal Environments
 - PC57.12.31 Standard for Pole-Mounted Equipment--Enclosure Integrity
 - C57.142 Guide to Describe the Occurrence and Mitigation of Switching Transients Induced by Transformers, Switching Device, and System Interaction
- IEEE C37.301, Partial Discharge Measurements. A working group has been formed and PAR will be submitted for review and update of this document. Members from HVTT participated in the first WG meeting and have been invited to take an active role in the WG.
- New Work proposals were received:
 - IEC SC 17C : ASSEMBLIES – “AC metal enclosed busbar trunking systems (BTS) including solid and air insulated design for rated voltages above 1 kV and up to and including 52 kV”. SA reviewed this for possible overlap/conflict with IEEE C37.23 Metal- Enclosed Bus. A Motion carried for SA to revise C37.23 with an invitation for IEC 17C participation to help include the IEC busbar trunking systems (BTS) anticipated requirements, with the Switchgear Committee as the sponsor
 - China State Grid is seeking sponsorship of their PAR “Recommended practices for Specifications and Test Requests of Insulated Tubular Conductors for Rated Voltages from 6 kV up to and including 35 kV”. SA reviewed this for sponsorship and possible overlap/conflict with IEEE C37.23 Metal- Enclosed Bus. SA membership viewed this as not in scope and a Motion carried to not sponsor the document
- The working group for C37.13 IEEE Standard for Low-Voltage AC Power Circuit Breakers Used in Enclosures is working with NEMA to enable IEEE to take ownership of C37.50 testing requirements and incorporate them into C37.13
- Accredited Standards Committee C37, 13 IEEE PES Switchgear Members also participate as members of this committee.

6. New Technologies of Interest to the Committee:

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

- A new working group was established to develop a 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 CB and GIS 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
- 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.
- A new task force was formed to discuss the aging of lubricants

7. Significant Plans for the Next Period:

The Committee has the following significant plans for 2019.

- Continue to maintain financial stability of the Committee. There has been a modest increase in meeting fees to offset rising costs.
- Continue to plan and hold two face-to-face Committee each year at locations that attract meeting participation.
- Work with selected subcommittees having a heavy workload of standards to be revised 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 work to further market Committee meeting 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 meetings.
- Encourage increasing participation of young engineers in the standards development process. A mentoring project is under consideration for the next year.

8. 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.

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
79 (+13 Honorary)	0	0	3

9. Problems and Concerns:

The largest concern of the Switchgear Committee in 2019 were the impacts of ANSI C84.1 and IEEE 1547 on switchgear standards. This includes increasing maximum operating voltage levels above long time established limits. The Switchgear Committee recommends that Technical Council and all Technical Committees review for impact as the strategy for raising maximum operating voltage to 110% will have a dramatic impact on equipment and apparatus. There will also be additional burden on users, specifiers and manufacturers to define applicable standards and operating limits for projects and equipment.

There were also numerous problems when updating IEEE Std C37.100.1. The project to revise IEEE C37.100.1 had been underway since 2011 reached the point of final submission to RevCom in 2017. At that time, there was a significant problem with getting copyright permission from IEC. Much of the IEEE C37.100.1 document was the exact text from the corresponding IEC document. Initial indication to the working group was this duplication would not be a problem for IEC.

One of the objectives of the project as stated in the original PAR was to “further harmonization between the IEEE and the IEC standards”. Harmonization means developing uniform requirements for global application for the benefit of all stake-holders, the equipment manufacturers, users, and the laboratories that test and certify the equipment.

Faced with the impending December 2018 expiration and thereby administrative withdrawal of C37.100.1-2007, the working group, in June 2018, was restructured and repurposed with a new task:

- 1) Revert back to C37.100.1-2007
- 2) Update to the latest IEEE formatting and front matter
- 3) Make no technical changes (editorial and referential as needed) in order to preserve copyright from 2007 (editorial and referential as needed)

An extraordinary effort from the working group as well as outstanding participation from the members of the switchgear committee contributed to the success of this process. A new working group has been established to consider the next steps with C37.100.1.

This experience has brought to light the fact that efforts by the members of IEEE and IEC to develop consistent (harmonized) standards may conflict with the business objectives of the respective organizations.

The Switchgear Committee has no other significant pressing issues and concerns but lists the following items for awareness.

- Relations with IEEE-SA remain excellent, and IEEE-SA staff personnel continue to be extremely helpful to the Switchgear Committee.

Submitted by: Todd Irwin, Chair IEEE PES Switchgear Committee (2018-2019)

Date: January 24, 2020