

## IEEE Power and Energy Society Entity Annual Report 2022

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| <b>Entity:</b>               | <b>Substations Committee</b>  |
| <b>Website:</b>              | <a href="https://cmte.ieee.org/pes-substations/">https://cmte.ieee.org/pes-substations/</a> |
| <b>Chair:</b>                | <b>Patrick Fitzgerald</b>   |
| <b>Vice-Chair:</b>           | <b>Joe Warner</b>   |
| <b>Secretary:</b>            | <b>Matt Bauer</b>   |
| <b>Immediate Past Chair:</b> | <b>Joseph Gravelle</b>  |

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

The Substations Committee hosted its first in person Annual Meeting since 2019 due to the COVID-19 pandemic. The meeting took multiple renegotiations and schedule changes due to the pandemic. The meeting was held in Nashville, Tennessee on May 21<sup>st</sup> through the 26<sup>th</sup>.

The Substations Committee currently has forty-four (44) working groups organized in five (5) subcommittees. They work on forty-two (42) standards. At the end of 2022, the substations Committee had twenty-seven (27) approved Project Authorization Requests (PAR) for standards work. Eight (8) of those were to create new standards and the remainder to maintain existing standards.

The Substations Committee sponsored an eight (8) hour tutorial at the 2022 IEEE PES T&D meeting titled “Stabilizing the Future Transmission Grid Using Dynamic Var Technologies,” as well as a four (4) hour panel session titled “Harmonic Voltage Distortions in Static Var System Applications.”

The Substations Committee also sponsored two (2) four (4) hour panel sessions at the 2022 IEEE PES General Meeting, one titled “Towards interoperability in VSC-HVDC Networks,” and the other titled “Large-scale Interconnected HVdc Networks – Value Proposition/Plans, Technologies, and Gaps.”

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

The IEEE PES Substations Committee is the professional home for designers and engineers involved in the design, construction and operation of electrical substations used for generation, transmission, and distribution. Moreover, committee activities include development of not only industry standards, but also educational material such as technical papers, white papers, presentations, tutorials, webinars, and panel discussions related to areas of interest.

The most notable activity of the Substations Committee is standard development and maintenance. This work includes the creation and revision of standards and guides through subcommittees and working groups. These standards are widely utilized and provide the most direct benefit to the industry and PES Members.

The Substations Committee has five technical subcommittees supporting forty-four technical working groups. The technical subcommittees and their scopes are as follows:

- a. Electrical Substation Design Subcommittee (SCD0): Responsible for treatment of matters pertaining to the electrical design and construction of transmission and distribution substations. These matters include air insulated station clearances and insulation levels, cable systems, air insulated bus design, seismic design, specification development and auxiliary systems.
- b. Substation Civil Design (SCE0): Responsible for treatment of matters relating to the civil and environmental design and construction of transmission and distribution substations. These matters include community acceptance, oil spill containment, fire protection, animal deterrents and physical and Electronic Security.
- c. Substation Grounding and Lightning (SCG0): Responsible for treatment of matters relating to grounding and lightning design of transmission and distribution substations. These matters include safety, direct lightning stroke shielding, measuring earth resistivity, ground impedance and surface potentials of a grounding system, grounding safety and permanent connections.
- d. FACTS & HVDC Stations (SCIO): Responsible for treatment of all matters relating to design, construction, and operation of AC substations using HV power electronics as part of the electrical power system, including FACTS and HVDC converter stations at the Transmission and Distribution level. This includes the application of HV power semi-conductor equipment and all other components insofar as they affect the design, construction, and operation of such substations. Interest in such components is limited to their effects on overall station parameters and does not include the detailed design of the equipment itself.
- e. Gas Insulated Substations (SCK0): Review, study and document design, application, installation, testing, operating and maintenance practices for gas insulated substations (GIS) and transmission lines (GIL). Identify the need for and sponsor the preparation of criteria, guides, tutorials, and standards as related to the gas insulated substations and transmission lines.

PES member involvement in working groups and subcommittees provides invaluable industry insight and knowledge sharing for members.

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

Participants have benefited from their collaboration on technical problems with industry leaders and experts, discussing contemporary industry problems and concerns, and the satisfaction of creating standards and guides that are useful to the industry. Committee meetings have included presentations of experts in specific fields and debating of ideas and industry practices, including CIGRE member input. Substations Committee members have also benefited from their exposure to technical paper reviews and technical paper presentations.

Active participants also have opportunities to take on leadership roles and improving their leadership skills as well as mentoring skills working with teams with a variety of experience in technical and organizational activities.

Substations are considered strategic assets, and many components are now reaching the end of their

original design life. Valuable information is exchanged on modern design approaches and explaining new technology, as well as the issues specific to new technology and suggested improvements for the electric power industry market; for example, Voltage-Source Converters (VSC) and alternative gases for insulation.

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

Due to the COVID-19 pandemic the substations committee withheld multiple years of awards to be presented in person. The following individual awards were presented at the 2022 Substation Annual Meeting for appreciation for outstanding service:

|                       |   |
|-----------------------|---|
| DJ Moreau             | IEEE PES Substations Committee Award of Appreciation For outstanding service as the Chair of the D0 Electrical Substation Design Subcommittee of the IEEE PES Substations Committee 2019 – 2020 |
| Jorge Marquez-Sanchez | IEEE PES Substations Committee Award of Appreciation For outstanding service as the Chair of the M0 Meetings Subcommittee of the IEEE PES Substations Committee 2014 – 2020                     |
| Matthew Bauer         | IEEE PES Substations Committee Award of Appreciation For outstanding service as the Chair of the E0 Civil Substation Design Subcommittee of the IEEE PES Substations Committee 2015 – 2020      |
| Matthew Vacha         | IEEE PES Substations Committee Award of Appreciation For outstanding service as the S0 Standards Coordinator Chair of the IEEE PES Substations Committee 2015 – 2020                            |
| Joe Gravelle          | IEEE PES Substations Committee Award of Appreciation For outstanding service as the Chair of the IEEE PES Substations Committee 2019 – 2020   |
| Patrick Fitzgerald    | IEEE PES Substations Committee Award of Appreciation For outstanding service as the Vice Chair of the IEEE PES Substations Committee 2019 – 2020  |
| Joe Warner            | IEEE PES Substations Committee Award of Appreciation For outstanding service as the Secretary of the IEEE PES Substations Committee 2019 – 2020   |
| Alex Kladiva          | IEEE PES Substations Committee Award of Appreciation For outstanding service as the Chair of the E0 Civil Substation Design Subcommittee of the IEEE PES Substations Committee 2020 – 2021      |
| Steven (Scott) Scharf | IEEE PES Substations Committee Award of Appreciation For outstanding service as the Chair of the K0 Gas Insulated Substations Subcommittee of the IEEE PES Substations Committee 2018 - 2020    |



Michael Nadeau

IEEE PES Technical Committee Technical Committee Distinguished Individual Service Award. For outstanding service in leading to the successful revision, balloting, and publication of IEEE 1267 – Guide for Development of Specifications for Turnkey Substations.

The following IEEE PES Technical Committee Working Group Awards were also presented at the 2022 Substation Annual Meeting:

**IEEE PES TECHNICAL COMMITTEE WORKING GROUP AWARD**

Working Group G4 For successful balloting of IEEE 1246 – IEEE Guide for Temporary Protective Grounding Systems Used in Substations.

Jesse Rorabaugh, Chair  
Jon Martin, Vice Chair  
David Lane Garrett, Past Chair

Ehsan Azordegan  
Bryan Beske  
William Carman  
Jeffrey Drummond  
Joseph Gravelle  
Martin Havelka  
Terri Hopkins

Richard Keil  
Reginaldo Maniego  
Carl Moller  
Stephen Palmer  
Anil Babu Poda  
Eduardo Ramirez Bettoni  
Christian Robles

Will Sheh  
Curtis Stidham  
Brian Story  
Keith Wallace  
Don Wengerter

**IEEE PES TECHNICAL COMMITTEE WORKING GROUP AWARD**

Working Group E7: For successful balloting of IEEE 1402 – IEEE Guide for Physical Security of Electric Power Substations.

Arthur Graves, Chair  
Mark Smedvig, Secretary

Greg Ardrey  
Matthew Bauer  
Gary Beane  
Geoffrey Biela  
Mike Brown  
Christopher Carson  
W. Bruce Dietzman  
Brian Farmer

Keith Graham  
Alan Gaetz  
Roderick Giron  
Charles Haahr  
Paul Kruger  
Chun (Charlie) Li  
Reginaldo Maniego  
Olivialin Miller

Jeremy McNutt  
Charles Steven McCarley  
Shaskikant Patel  
Craig Preuss  
Thomas Proios  
Alonso Rodriguez  
Jesse Shank  
Logan Trombley



IEEE PES TECHNICAL COMMITTEE WORKING GROUP AWARD

Working Group K1: For successful balloting of IEEE C37.122 – IEEE Standard for High-Voltage Gas-Insulated Substations Rated Above 52kV.

Ryan Stone, Chair  
Arnaud Ficheux, Vice Chair  
Jennings Graham, Secretary

George Becker  
Eldridge Byron  
Vincent Chiodo  
Edward Crocket  
Markus Etter  
Patrick Fitzgerald  
Cullen Gabler  
David Giegel  
Pablo Gonzalez Touza

Peter Grossmann  
Alexander Jaeger  
Sang Tae (Brandon) Kim  
Hermann Koch  
Chun (Charlie) Li  
Nicholas Matone  
Jeremy McNutt  
Michael Novev  
Pathik Patel

Bobby Rich  
Jesse Rorabaugh  
Pravakar Samanta  
Steven (Scott) Scharf  
Tyler Schumacher  
Devki Sharma  
James Stage  
Carl Schuetz  
Xi Zhu

IEEE PES TECHNICAL COMMITTEE WORKING GROUP AWARD

Working Group K15: For successful balloting of IEEE C37.122.7 – IEEE Guide for Field Testing of Gas-Insulated Substations Rated Above 52kV.

Dave Giegel, Chair  
Jennings Graham, Vice Chair  
William Munn, Secretary

Arun Arora  
George Becker  
Edward Crockett  
Markus Etter  
Patrick Fitzgerald  
Pablo Gonzalez Touza  
Peter Grossmann  
Alexandra Jaeger  
Hermann Koch

Billy Lao  
Chun (Charlie) Li  
Jorge Marquez-Sanchez  
James Massura  
Nicholas Matone  
Dave Mitchell  
Michael Novev  
Pathik Patel  
Bobby Rich

Jesse Rorabaugh  
Pravakar Samanta  
Steven (Scott) Scharf  
Devki Sharma  
Dave Solhtalab  
James Stage  
Ryan Stone



**IEEE PES TECHNICAL COMMITTEE WORKING GROUP AWARD**

Working Group D8: For successful balloting of IEEE 1267 – Guide for Development of Specifications for Turnkey Substations.

Douglas Sharpe, Chair  
Michael Nadeau, Vice Chair  
Matthew Vacha, Secretary  
Aaron Wilson, Technical Editor

Gary Beane  
Joshua Berkow  
Nicholas Matone

Jonathan McDonald  
Robert Nowell  
Shashikant Patel

Brian Pearson  
Boris Shvartsberg  
Vivek Singh

IEEE PES Technical Committee Working Group Recognition Award for Outstanding Technical Report.

Static VAR Compensators Task Force 2 Designing a STATCOM/SVC – Harmonic Analysis from Input to Impact. For demonstrating Technical Skill and leadership in the area of Transmission dynamic reactive power converters, specifically harmonic performance.

David Langner – Chair

Sep Boshoff  
Martin Cameron  
John Chahwan

Mikael Halonen  
Geeza Joos  
Julie Lacroix

Jan Paramalingam  
Joe Warner

**IEEE PES TECHNICAL COMMITTEE WORKING GROUP AWARD**

Working Group D1: For successful balloting of IEEE 1427 – Guide for Recommended Electrical Clearances and Insulation Levels in Air Insulated Electrical Power Substations.

Charles Haahr, Chair  
David Stamm, Vice Chair  
Keith Graham, Secretary

Radoslav Barac  
Vipul Bhagat  
Steven Brown  
Kevin Buhle  
Dennis Decosta  
Bruce Dietzman  
Arthur Graves  
Dave Kelley

Debra Longtin  
Reginaldo Maniego  
William Munn  
Robert Nowell  
Brian Pearson  
Reynaldo Ramos  
John Randolph  
Christian Robles

Donald Rogers  
Hamid Sharifnia  
Oscar Santos  
Boris Shvartsberg  
Ryan Stargel  
Kenneth Strahl  
Kha Tran

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

The PES Substations Committee has determined that it is desirable to establish formal and direct liaisons with other IEEE Societies or groups, or other bodies, for the purpose of maintaining an efficient exchange of information on activities and related areas of mutual interest. This information exchange is accomplished through liaison representatives, appointed by the Substations Committee with the agreement and approval of the other group with which the liaison is to be established. The liaison representative will provide reports to the Substations Committee on activities of the other group, based on personal participation in these activities if possible. Depending on the preference of the other group, the liaison representative may also report to them on Substations Committee activities. Active Substation liaisons include:

- a. CIGRE B3
- b. NESC
- c. IEC
- d. Switchgear Committee

Additionally, the Substation Committee works on fifteen (15) co-standards shared with other IEEE PES Technical Committees. Committees include Switchgear, Power System Communications and Cybersecurity, Transformers, Power System Relaying and Control, and Transmission and Distribution.

**6. New Technologies of Interest to the Committee:**

No new significant technologies of interest to the Committee were identified in 2022

**7. Global Involvement & YP Involvement**

The Substations Committee has a program to help support young professionals and experienced contributors with a scholarship program that will allow members from these groups to get financial assistance for meeting registration and hotel accommodations to attend working group meetings.

Due to the loss of our Membership Management System and the ongoing delays with implementing a new system. Updated membership numbers and details are not accessible for 2022. The numbers below represent our 2021 numbers which should be a good representation of 2022.

| Total Number of committee members | Number of Young Professionals (under 35 years of age) – Including committee & subcommittee | Officers from regions 8,9 and 10 | Subcommittee officers from regions 8, 9 and 10 | Subcommittee members from regions 8,9, and 10 |
|-----------------------------------|--|----------------------------------|--|---|
| 569                               | Unknown  | 0                                | 6  | 50  |

**8. Problems and Concerns:**

Committee membership management, working group roster management, and participant communication has been a significant challenge in 2022 without a Membership Management System.

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

The Substations Committee will be hosting its next Annual meeting in Philadelphia, PA. on May 1-5 in 2023.

The Substation Committee is currently working on reviewing and updating our Organization and Procedures Manual. This effort will bring more clarity and organization to the operation and scope of the Substations Committee and are associated subcommittees and working groups.

**Submitted by:**



Matthew W. Bauer  
IEEE Substations Committee Secretary

**Date: January 31, 2023**