

## IEEE Power and Energy Society Entity Annual Report

2023

**Entity:** Transmission and Distribution Committee  
**Website:** <https://cmte.ieee.org/pes-td/>  
**Chair:** Eriks Surmanis  
**Vice-Chair:** Julio Romero Agüero  
**Secretary:** Robert Schaerer  
**Immediate Past Chair:** Surya Santoso

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

The Transmission and Distribution Committee (henceforth, the T&D Committee) revised its Organization and Procedures (O&P) Manual in 2022. The T&D Committee Policies and Procedures for Standards Development (P&P) are due to expire at the end of 2024. Committee leadership looks forward to utilizing the new baselines expected in the Spring of 2024 to revise its P&Ps.

The T&D Committee is comprised of 7 responsible subcommittees and 1 non-responsible subcommittee with a total of 86 WGs/TFs. During 2023, the T&D Committee approved 19 conference papers for publication and 14 panel sessions for presentation at the IEEE PES GM 2023. The majority of panel sessions were industry-oriented, with chairs or panelists from the industry and utility sectors.

Two of our committee members are closely involved with the 2024 IEEE PES T&D Conference, to be held in Anaheim, CA in May, 2024. One is serving as the Local Organizing Committee Co-Chair and the other is serving as the Technical Program Chair. They will be developing the technical program for the conference, along with overseeing the selection of the panels, poster papers, and Smart Cities and Innovation Stages presentations.

The T&D Committee, through its officers and members, contributed to the Technical Council and PES in many ways, such as participation in the PES Fellow Nominations Committee, R9 T&D Satellite Committee, Entity Proposal Management (EPM) Process, Local Technical Activities Committee (LTAC), PES Climate Change Inventory, the development of whitepapers for ITS LC, and review and trial of MemberPlanet platform, and others.

The T&D Committee is the Standards Committee for 58 standards development projects and 70 active standards. Additionally, the T&D Committee is a Co-Standards Committee-sponsor committee of nine standards development projects: P1547, P1547.10, P1547.2, P1613, P1793, P2426, P2800.2, P2852, and P2973. Four of those Co-Standards projects are within PES, but three others are led by IEEE Standards Committee 21, one by the IEEE SA Entity Collaborative Activities Governance (CAG) Board, and one by the Systems, Man, and Cybernetics Society.

As part of Entity Proposal Management (EPM), the T&D Committee is participating in 15 standards development projects and 21 active standards.

Despite its modest size, the T&D Committee manages and oversees a large number of PES projects, specifically 14% and 15% of all active PES standards and PARs, respectively. Below is a summary of



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standards that were and are under revision, waiting for approval, or approved, overseen by each Subcommittee under the T&D Committee:

### **CAPACITOR SUBCOMMITTEE**

- IEEE 824 – IEEE Standard for Series Capacitor Banks in Power Systems is set to expire on December 31, 2024. The Ballot comment review process is addressing the remaining 3 technical comments with a goal to circulate the updated draft for ballot by mid-February, 2024 and review latest comments during PES GM 2024.
- IEEE 1726 – IEEE Guide for the Functional Specification of Fixed-Series Capacitor Banks for Transmission System Applications. The working group has a goal to send P1726 out for ballot PES GM 2024, after the editorial changes have been received.
- IEEE 18 – IEEE Standard for Shunt Power Capacitors. P18 is set to expire on December 31, 2024. The P18 Ballot comment review process is ongoing and should be completed by the end of February, 2024 in order to have the ballot recirculated before the next meeting to happen during PES GM 2024.
- IEEE 1036 – IEEE Guide for the Application of Shunt Power Capacitors has a PAR that expires on December 31, 2025. Work continues on the draft and will be reviewed at PES GM 2024.
- IEEE Std 1531-2020 IEEE Guide for the Application and Specification of Harmonic Filters. The working group is considering requesting a PAR in order to incorporate comments and revisions for the next revision cycle.

### **DISTRIBUTION SUBCOMMITTEE**

The Distribution SC had one individual standard (2845) and two entity standard (2748 and P2749) published in 2023. Below is an update on each of our PARs:

- IEEE 2856 - Guide for the Definition of Resiliency and Measuring the Resiliency of the Electrical Distribution System. Guide is under development by the working group with a goal of reviewing a draft in June, 2024.
- IEEE 1695 – Guide to Understanding, Diagnosing and Mitigating Stray Contact Voltage. PAR active. Still in progress. The ballot was sent out in 2023 and the working group is currently resolving comments with the goal of completing the effort in 2024.
- IEEE 1656 - Guide for Testing the Electrical, Mechanical, and Durability Performance of Wildlife Protective Devices on Overhead Power Distribution Systems Rated up to 38 kV. Currently in Inactive-Reserved status.
- IEEE 3102 - Standard for Conservation Voltage Reduction (CVR) Data Collection and Management Procedures PAR recently approved. The working group is reviewing comments from the ballot pool and expects to complete the effort in 2024.
- IEEE 1854 - Guide for Smart Distribution Applications PAR active. Work is still in progress, and the working group has a goal of circulating a draft in February, 2024 and balloting in the Spring in order to complete the effort in 2024.
- IEEE 2845 - Draft Trial-Use Standard for Testing and Evaluating the Dielectric Performance of Celebratory Balloons in Contact with Overhead Power Distribution Lines Rated up to 38kV System Voltage was published in December, 2023.

- IEEE 2748 - Recommended Practice for Fault Diagnosis and Protection in Smart Distribution System. Entity project published in December 2023.
- IEEE 2749 - Recommended Practice for Risk Identification and Evaluation of Smart Power Distribution System. Guide was published in 2023.
- IEEE 1782 - Guide for Collecting, Categorizing and Utilization of Information Related to Electric Power Distribution Interruption Events. Guide approved and published in 2022.
- IEEE 1366 - Guide for Electric Power Distribution Reliability Indices. Guide approved and published in 2022.
- IEEE 1885 - Guide for Assessing, Measuring and Verifying Volt-Var Control Optimization on Distribution Systems. Guide approved and published in 2022.
- IEEE 1806 - IEEE Guide for Reliability-Based Placement of Overhead and Underground Switching and Overcurrent Protection Equipment up to and Including 38 kV. Guide approved and published in 2021. A corrigenda will be sent for balloting in 2024 to make required corrections to several tables.

## **ENGINEERING IN THE SAFETY, MAINTENANCE AND OPERATION OF LINES (ESMOL) SUBCOMMITTEE**

Below is an update on each of our PARs:

- 516 IEEE Guide for Maintenance Methods on Energized Power Lines - Last edition in 2021 to look at scope and make changes. Corrigendum published in July 2023, correcting typographical errors in two equations. A study group was formed to determine the scope for the next revision cycle.
- 957 IEEE Guide for Cleaning Insulators - Submitted to RevCom for publication.
- 1048 IEEE Guide for Protective Grounding of Power Lines – Working group continues efforts to finish Revision 1048b in 2024.
- 1067 IEEE Guide for In-Service Use, Care, Maintenance, and Testing of Conductive Clothing for Use on Voltages up to 765 kV AC and +/-750 kV DC – Working group expects to ballot before PES GM 2024.
- 1070 IEEE Guide for the Design and Testing of Transmission Modular Restoration Structure Components – Project in Inactive-Reserved status. Working group forming to submit PAR and start work on a draft revision in 2024.
- 1307 IEEE Standard for Fall Protection for Electric Utility Transmission and Distribution on Poles and Structures – Looking at including Substation fall protection and will be working on a draft PAR.
- 1882 Guide for Establishing, Benchmarking and Maintaining a Work Program for Energized Transmission Lines - Ready to go for ballot
- 2798 Guide for Helicopter Operation Procedures for the Utility Industry - Standard ready to go for ballot. Going out for NesCom approval. PAR extension was submitted and should be approved at the end of January, 2024.



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## HVDC & FACTS SUBCOMMITTEE

HVDC & FACTS is seeing a strong interest in its activities and publications, due to the rapid ongoing energy transition.

The Subcommittee is committed to promoting diversity, recognition of outstanding contributors, disseminating state of the art knowledge through panel sessions, Tutorials, webinars in PESGM and T&D Conferences; publishing PES Reports; in addition to developing new Standards. The Subcommittee comprises five Working Groups. The IEEE P2745 Unified Power Flow Controller (UPFC) Working Group also reports to this Subcommittee. Our significant accomplishments in 2023 are as follows:

- **Introducing Diversity**  
The Subcommittee intends to continue its efforts in having a diverse leadership
- **Award Nominations**  
The Subcommittee strongly believes that several individuals, Working Groups are making outstanding contributions, which need to be recognized. The Subcommittee made special efforts to nominate worthy individuals for all the three T&D Committee awards - Best Paper, Outstanding Guide, Outstanding Report; and one PES level award.
  - i) Uno Lamn Uno Lamm Award : Rambabu Adapa for advancing DC system representation in transient stability and electromagnetic transient programs, forwarding research in conversion of AC lines to DC lines, and advancing HVDC related education globally.
  - ii) Nari Hingorani Award Committee:
    - a. Custom Power Award: not awarded in 2023
    - b. FACTS Award: Deepakraj Divan for contributions to distributed and decentralized dynamic control of transmission and distribution systems.
- **3 new fellows are linked to the HVDC and FACTS Subcommittee:**
  - Indirect link to subcommittee:
    - Jun Liang– for contributions to DC grid’s modeling and control
    - Zheng Zhou– for contributions to electromagnetic transients simulation and the study of HVDC dynamics
    - Bo Zhang– for contributions to nonlinear analysis in power electronics
  - Action point for next year(s)
    - Had informational meeting with candidate fellows, we expect > 5 applications directly related to the subcommittee
- **State of the art Knowledge exchange/dissemination through Panel Sessions.**
  - The subcommittee proposed 6 panel sessions for IEEE PESGM 2023, which were a general success

- The subcommittee proposed several panel sessions for IEEE PESGM 2024, of which 3 (possibly more?) were accepted
- Interest in participation/organizing in Supersessions has also been expressed.
- Tutorial regarding "Studies for Planning of HVDC" is submitted for GM 2023
- Supported the tutorial "Dynamic Grid Stabilization with Grid- Forming + Energy Storage Technologies"
- IEEE HVDC & FACTS subcommittee discussed in detail the concerns on quality and abundance of IEEE standards in the HVDC & FACTS domain which the HVDC & FACTS subcommittee seemed to be not (fully) involved. These decisions were taken:
  - The HVDC and FACTS subcommittee sets up a standards mirror committee
  - That mirror committee elects/appoints a chair, who will act as standards responsible of the subcommittee, and is added to the board of the subcommittee (next to chair, vice chair and secretary)
  - The subcommittee interacts with the T&D committee (and if needed with IEEE SA) to investigate how we can ensure that IEEE standards retain the necessary quality and has the involvement of all relevant stakeholders (Veto right + no bypassing)
  - All standards supported by the HVDC and FACTS subcommittee shall have involvement of the subcommittee
- New WG on low frequency AC systems
- New ad-hoc committee on “end-to-end DC systems”
- Plans for next year
  - Trying to get a supersession on HVDC & FACTS
  - Having multiple, short online meetings, to better follow up the progress and action points

## OVERHEAD LINES SUBCOMMITTEE

In 2023, the OHL SC had 25 individual standards and ten entity projects under its purview. Below is an update on each of our PARs:

- IEEE 2819 - Recommended Practice for Measuring Method of Electromagnetic Environment for the Corridor of High-voltage Overhead Power Transmission Lines in Parallel Mixed with Alternating Current and Direct Current
  - Published June 10, 2022
- IEEE 2870 - Guide for Grip Test Method for Fittings of High-Temperature, Low-Sag Overhead Conductor Under Tension and Electric Current Co-Effect
  - Published March 31, 2022
- IEEE 2871 - Standard for Wedge-Shaped Groove Clamps
  - Published May 27, 2022

- IEEE 1308 - Recommended Practice for Instrumentation: Specifications for Magnetic Flux Density and Electric Field Strength Meters - 10 Hz to 3 kHz published in October, 2023.
- IEEE 2683 - Guide to Strength Loss in Tubular Steel Poles published in February, 2023.
- IEEE 738 - Standard for Calculating the Current-Temperature Relationship of Bare Overhead Conductors published in December, 2023.
- Projects nearing completion that plan to go to ballot in 2024:
  - IEEE P563 - Guide on Conductor Self-Damping Measurements
  - IEEE P664 - Guide for Laboratory Measurement of the Power Dissipation Characteristics of Aeolian Vibration Dampers for Single Conductors
  - IEEE P751 - Guide for Wood Structures Used for Overhead Electric Transmission Lines
  - IEEE P987 - Guide for Application of Composite Insulators for Overhead Electric Power Lines
  - IEEE P1227 - Guide for the Measurement of DC Electric-Field Strength and Ion Related Quantities
  - IEEE P1410 - Guide for Improving the Lightning Performance of Electric Power Overhead Distribution Lines
  - IEEE P2797 - Guide for Forecast and Early Warning of Icing on Overhead Transmission Lines in Micro-topographic Areas
  - IEEE P2954 - Recommended Practice for Overhead Transmission Line Design (Ballot pool open)
- Projects in progress with plans to complete in 2024:
  - IEEE P691 - Guide for Transmission Structure Foundation Design and Testing
  - IEEE P1218 - Trial-Use Guide for Maintenance of Wood Transmission and Distribution Line Structures
  - IEEE P1243 - Guide for Improving the Lightning Performance of Transmission Lines
  - IEEE P1808 - Guide for Collecting and Managing Transmission Line Inspection and Maintenance Data
  - IEEE P2833 - Guide for Overhead Transmission Lines with Composite-Insulated-Crossarm Supports
  - IEEE PC135.100 - Standard for Line Hardware on Overhead Line Construction
  - IEEE PC135.90 - Standard for Pole Line Hardware for Overhead Line Construction
- Projects in progress with plans to complete in 2026 (or earlier):
  - IEEE P524 - Guide to the Installation of TL Conductors
  - IEEE P977 - Guide to Installation of Foundations
  - IEEE P1724 - Guide for the Preparation of a T-Line Design Criteria Document
  - IEEE P1829 - Guide for Conducting Corona Tests on Hardware for OHL
  - IEEE P2942 - Guide for In-Service Application, Care, Maintenance, and Testing of Insulating Flexible Sling for Live Working
  - IEEE P3132 - Guide for Spacers and Spacer-Dampers on Bundled Conductors
  - IEEE PC135.80 - Standard for Fasteners for Overhead Line Construction

## **POWER QUALITY SUBCOMMITTEE**

Below is an update on each of our PARs:

- IEEE 1159.3 - Recommended Practice for Power Quality Data Interchange Format (PQDIF).
  - Active PAR, expect balloting in 2024.
- IEEE 1159 - Recommended Practice for Monitoring Electric Power Quality.
  - Active PAR, expect balloting in 2024.
- IEEE 1409 - Guide Technology Methods for Power Quality Improvement in Electric Power Systems.
  - Active PAR, expect balloting in 2024.
- IEEE 1453 - Standard for Measurement and Limits of Voltage Fluctuations and Associated Light Flicker on AC Power Systems. Published in June, 2022.
- IEEE 1564 - Guide for Voltage Sag Indices.
  - Active PAR, in draft.
- IEEE 3139 - Guide for Power Quality Data Analytics. Expected date of draft submission for initial ballot is November 2024.
- IEEE 2844 - Recommended Practice for Limiting Voltage Imbalance in Electric Power Systems
  - Active PAR, in draft.
- IEEE 519 - Standard for Harmonic Control in Electric Power Systems. PAR request expected in early 2024.
- IEEE 1250 – Voltage Quality Working Group. PAR request expected in early 2024.

## TRANSMISSION SUBCOMMITTEE

The Transmission Subcommittee held its first in-person meeting during the most recent JTCM. The Subcommittee has 4 working groups staffed with Chairs. They are

1. Reliability Impacts of Inverter-Based Resources WG (Chris Postma)
  - a. Developing first technical report
2. Generation and Energy Storage Integration WG (Marcelo Elizondo)
  - a. Developing first technical report
3. Transmission Switching WG (Fengyu Wang)
  - a. Developing first technical report
4. Transmission Voltage Optimization WG (Manuel Avendano)
  - a. Developing first technical report

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

The scope of the T&D Committee is the treatment of all matters related to the design, theoretical and experimental performance, installation, and service operation of parts of electric power systems that serve to transmit electric energy between the generating sources and substations or customer points of common coupling through AC or DC lines. In 2023, the Committee provided benefits to the industry by:

- Maintaining, updating, developing, and managing standards and guides on capacitors, distribution systems, lightning, HVDC/FACTS, power quality, and overhead lines, including their safety, operation, and maintenance,
- Disseminating technical know-how and recommended practices through panel sessions, paper publications, standards, and tutorials, and
- Providing the industry with a venue for participating in cutting-edge research and best practices dialogs and the standards-making process.

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

The IEEE PES Transmission & Distribution Committee provides benefits to its volunteer participants in the following ways:

- Offering participants an opportunity to work with acknowledged leaders in shaping the T&D industry and informing them on current and trending T&D issues.
- Affording industry leadership roles and mentoring volunteer participants
- Providing a forum for networking with peers from the T&D industry

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

The following individuals with direct, indirect, past, and current affiliations with T&D Committee were elevated to IEEE Fellow and won the PES Society Level awards this past year:

#### **IEEE Fellows for Class of 2024**

- Michael Ropp– for contributions to distributed energy resources integration in power systems
- Maria Tavares– for contributions to single-phase and three-phase auto-reclosing switching of transmission lines
- Marianna Vaiman– for contributions to transmission and distribution grids

#### **PES Society Level Award**

- Rambabu Adapa – 2023 IEEE PES Uno Lamm High Voltage Direct Current Award
- Deepakraj Divan – 2023 IEEE PES Nari Hingorani Custom Power Award

**PES Technical Committee Award** The T&D Committee submitted nominations for the following recognition:

- IEEE PES Outstanding Working Group for Outstanding Standard or Guide: IEEE 2030.11, IEEE Guide for Distributed Energy Resources Management Systems (DERMS) Functional Specification, Chair: Geza Joos

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

- PES Energy Internet Coordinating Committee
- PES Entity Proposal Management Committee
- PES Intelligent Grid and Emerging Technologies Coordinating Committee
- PES Marine Systems Coordinating Committee
- PES Renewable Systems Integration Coordinating Committee
- Liaisons with numerous IEC, CIRED and CIGRE committees
- Liaisons with numerous NESC and ANSI committees.
- Liaisons with US National Committee for CIRED via IEEE PES Distribution Subcommittee and IEEE PES Power Quality Subcommittee
- Liaison with NEMA via Capacitor Subcommittee
- Liaison with Power and Energy Magazine
- Liaison with Industry Technical Leadership Committee





- Category A Liaison between the PQ Standards Coordinating Subcommittee and IEC Subcommittee 77A

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

Technologies of interest include emerging and mature technologies enhancing the performance of transmission systems, overhead line maintenance, inspection, and safety, smart distribution devices, and power quality instrumentations, algorithms, and analytics.

**7. 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). The T&D Committee continues discussion for establishing IEEE T&D Committee Region 9 Satellite Committee.

Total Number of committee members 1300-1400	Officers from regions 8,9 and 10 1	Subcommittee officers from regions 8, 9 and 10 0	Subcommittee members from regions 8,9, and 10 30
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**8. Problems and Concerns:**

The delayed implementation of the Member Planet membership management platform has caused issues with membership registration, attendance tracking, and other issues. Meanwhile, in-person interaction and networking at the JTCM, PES GM and various individually-held meetings is increasing, and although virtual attendance has gained acceptance, the incorporation of reliable hybrid meeting technology has been problematic from an equipment and internet bandwidth perspective.

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

The T&D Committee continues overseeing, maintaining, and developing standards within its scope. The Committee is committed to supporting the Technical Council’s Entity Proposal Management process.

The T&D Committee, through its officers, plans to develop information sessions to encourage Fellow nominations of its members.

PES is currently working on a mentorship program for Young Professionals since this is the fastest-growing membership segment. Members of the T&D Committee are already participating in this initiative. The T&D Committee will help identify potential additional mentors for this program as needed.

**Submitted by: Eriks V. Surmanis**

**Date: January 31, 2024**