

IEEE Power and Energy Society Entity Annual Report

2024

Entity: Transformers Committee
 Website: www.transformerscommittee.org
 Chair: David Wallach
 Vice-Chair: Bill Griesacker
 Secretary: Scott Reed
 Immediate Past Chair: Ed teNyenhuis

1. Significant Accomplishments:

1. Committee Structure

The Transformers Committee manages about 177 standards through 12 standards development subcommittees, 1 administrative subcommittee, and 1 meeting planning subcommittee. The following figure shows the current subcommittees. An asterisk (*) indicates a subcommittee that does not develop standards.

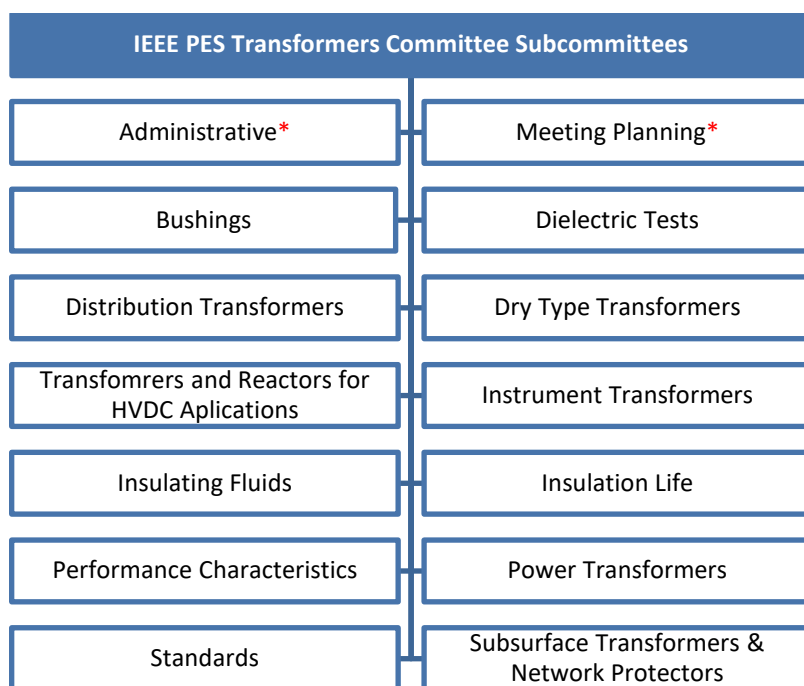


Figure 1: Transformers Committee Subcommittee List

Committee Meetings

The Transformers Committee held two meetings in 2024:

- Spring meeting was held in Vancouver, BC, Canada on March 10 – 14, 2024
- Fall meeting was held in St. Louis, MO on October 27 – 31, 2024

The Transformer Committee has the below firm dates and venues for future meetings:

Meeting	Location	Dates
Spring 2025	Denver CO, USA	March 23-27, 2025
Fall 2025	Coconut Point, FL, USA	October 19-23, 2025

New Voting Members

Ten new voting members were approved by the Administrative Subcommittee during 2024 bringing the current number of voting members to 193. Figure 2 shows the total number of voting members after each of the Spring (S) and Fall (F) committee meetings. There is a significant reduction in voting members in 2024 as the Transformers Committee performed its biannual audit of membership to meet the requirements of being a member of the IEEE, IEEE PES, and IEEE SA. In addition, member attendance is reviewed and if attendance requirements are not met then members are notified and move to the past member list.

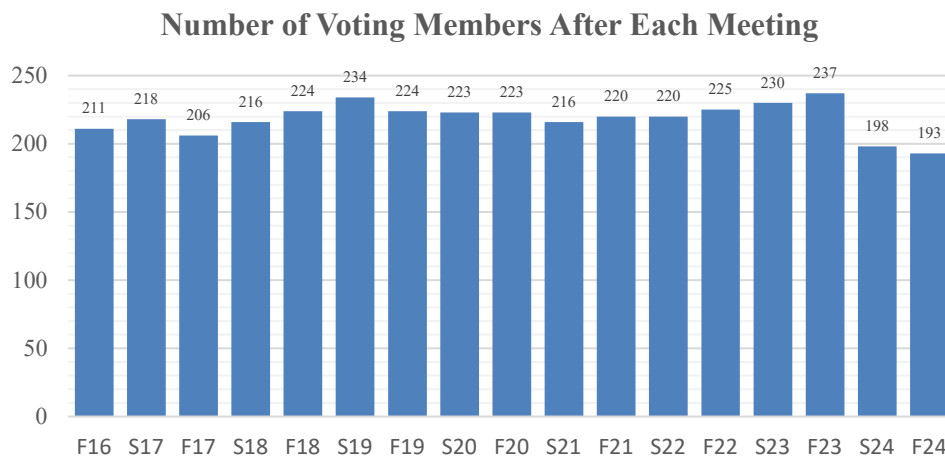


Figure 2: Number of Voting Members After Each Meeting

Standards Activity

In 2024, 9 revisions, 4 new standards and 0 corrigendas were completed and approved by the Standards Association Board. In addition, the Standards Association Board approved 3 PARs for a new standards, 1 PAR for modification, and 9 PARs for extensions.

As of December 31, 2024, there were 55 active PARs distributed as follows:

PARs – revision.....	44
PARs – new	10
PARs – amendments	1

During the Spring 2024 Committee meeting in Vancouver, BC and the Fall 2024 Committee meeting in St. Louis, MO, approximately 75 subcommittee, working group, and task force meetings were held over 3 ½ days. Administrative Subcommittee meetings were held on the first day of each Committee meeting.

A list of the activity groups that met during the Fall 2024 meeting is shown below:

GENERAL:

- Administrative SC
- Transformers Committee Main Meeting
- Newcomers Orientation
- Meetings Planning

WORKING GROUPS/TASK FORCES:

Bushing SC

- WG Bushing Application Guide C57.19.100
- TF Std Require for Bushings C57.19.01
- TF Std Require Bushings above 5kA in Bus Encl. C57.19.04

Distribution Transformers SC

- TF Transf Efficiency & Loss Evaluation (DOE Activity)
- WG 3-ph Padmount Dist Transf. C57.12.34
- WG PC57.15 Std Req Terms & Test Code for V Step Regs
- WG Encl Int C57.12.28, C57.12.29, C57.12.31, C57.12.32
- WG Distr Substation Transf PC57.12.36
- WG Electronic Test Data PC57.12.37
- WG Req for Dist Trf Tank Pressure Coordination C57.12.39
- WG PC57.15 Std Req Terms & Test Code for V Step Regs

Dielectric Test SC

- TF PD Testing of DTR, Wind & Solar Transf
- TF DFR Test Guide C57.161
- TF Core Ground & Winding Insul. Resistance - Perf & Int.
- TF on Revision of Impulse Tests C57.12.00 & C57.12.90
- WG Detection of Acoustic Emissions from PD C57.127
- TF Cont. Revision to Low Frequency Tests C57.12.90
- WG Recommend Practice Routine Impulse Tests C57.138

Dry Type SC

- TF PAR Study Group Guide for TVA Dry-Type Coil C57.12.58
- WG Dry Type Gen. Requirements C57.12.01
- WG Test for Eval of Insulation for Dry-Type Transfs P259
- TF PAR Study Group Unit Substation Transf C57.12.55
- WG Practice for Install & Operation of Dry Type PC57.94
- WG PC57.12.59
- WG Dry Type Test Code C57.12.91

HVDC Converter Transformers & Smoothing Reactors SC

- PAR Study IEC_ IEEE 60076-57-129 HVDC Converter Trfs

Insulating Fluids SC

- WG Guide DGA in Ester-Immersed Transformers PC57.155

- WG Guide for DGA in Silicone PC57.146
- WG Guide DGA Applied to Factory Temp Rise Test C57.130
- TF Guide for Corrosive Sulfur In Oil- Immersed Trfs & Reactors
- WG DGA in Mineral Oil Transf C57.104
- WG Guide for DGA in LTCs C57.139

Insulation Life SC

- TF PAR Study Group Temp Rise Test beyond NP C57.119
- WG App of High-Temp Insulation Mats IEEE 1276 Annex B
- TF - Test Degredation of Cellulose in Liquid Type Transfs
- TF Continuous Rev Clause 11 Temp Rise Tests C57.12.90

Instrument Transformers SC

- WG Power-Line Carrier Coupling Cap & Volt Transf C57.13.9
- TF Instrument Transf. Accuracy
- WG Requirements for Instrument Transformers PC57.13
- TF to Merge C57.13.5 into C57.13

Performance Characteristics SC

- TF CO2 Emissions in the Construction of Transformers
- TF Audible Sound Revision to Test Code
- TF PCS Cont. Revisions to C57.12.00
- WG Std Distributed Photo-Voltaic Transf (DPVTs) C57.159
- TF PCS Cont. Rev. to Test Code C57.12.90
- WG Sw Transients Ind by TR/Bkr Interaction PC57.142
- WG Guide for App of Tert & Stabilizing Windings C57.158
- WG Neutral Grounding Devices C57.32

Power Transformers SC

- WG Guide for Tank Rupture Mitigation C57.156
- WG Class 1E Transf.for Nuclear Power Gen Std. 638
- WG Guide for Phase Shifting Transf C57.135
- TF Guide Eval & Recon of Liquid Immerse Transf C57.140
- WG Std Reqs for Liquid-immersed Power Trans C57.12.10
- WG Failure Investigation & Reporting PC57.125
- WG Guide for Life Tests of Switch Contacts C57.157
- WG Condition Assessment Guide PC57.170
- WG Standard Requirements for Arc Furnace Transf. C57.17
- WG Liquid Immersed Phase- Shifting Transf 60076-57-1202
- WG Guide for Install & Maintenance of Power Trf C57.93
- WG Guide for Paralleling Transformers C57.153

Standards SC

- TF IEEE-IEC Cross Reference
- WG Reverse Power Flow Effects on Trans PC57.133
- WG Guide for Field Testing PC57.152

Subsurface Transformers and Network Protectors SC

- WG 1ph Submersible Transformers PC57.12.23
- WG Liquid-immersed Sec. Network TRs C57.12.40
- WG Guide for Mitigating Corrosion on Sub Trfs C57.12.53

PES Conferences

The Transformer Committee was involved in the below 2024 IEEE PES conferences:

- IEEE PES Transmission & Distribution Conference & Exposition (T&D), May 6-9, 2024, Anaheim, CA. The Transformers Committee had 10 approved papers.
- IEEE PES General Meeting, July 21-25, 2024, Seattle, WA. The Transformers Committee had 4 approved papers.

Technical Tutorials

The Transformer Committee presents technical tutorials on timely industry subjects at the Spring and Fall meetings. The tutorials have multiple technical experts as presenters and are comprehensive. These tutorials are well attended, and all past tutorials (40+) can be found on the Transformer Committee website. These tutorials are excellent technical reference resources for the industry. Below are 4 tutorials presented in 2024:

- *New Revision of IEEE C57.163 GIC Guide and Recommended GIC Specification Requirements*
- *Dry-Type Pole-Mounted Transformers: Innovative Solution to Increase Safety in Overhead Distribution Networks*
- *Guide for the Condition Assessment of Liquid Immersed Transformers, Reactors and Their Components” & Part 2: “Application of Probabilistic Bayesian Networks on Transformer Condition Assessment”*
- *Pragmatic Approach to Seismic Protection of High Voltage Transformer Bushings*

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

The Transformers Committee is one of the largest and most active technical committees of the IEEE Power and Energy Society (PES). The continuing scope of the Committee is to develop and update standards and guidelines for the design, testing, repair, installation, operation and maintenance of transformers, reactors and associated components that are used within electric utility and industrial power systems. The Committee is made up of technical and managerial representatives from manufacturers, consultants, vendors and end users of electrical transformers and components. Participating in Transformer Committee activities provides the opportunity to network with industry experts from around the world, to share and learn about non-proprietary or otherwise unprotected technology, and to generally assist in the globalization of industry standards. This privilege allows participants to remain informed of the latest trends and developments in the transformer industry.

Participants benefit from learning opportunities, such as sharing ideas and seeking input from other engineers and technical people facing similar technical challenges to their own. Tutorials are offered to provide growth opportunities as well as opportunities for participants to share their own knowledge and experiences by volunteering to be a tutorial presenter. Tutorials are recorded and available in a password-protected area of the Committee’s website for reference by Committee participants and their financial sponsors.

A privilege to all participants and a responsibility of Committee members is to review papers submitted for presentation at various IEEE PES sponsored events. Reviewing papers is an important service to the authors and the industry and allows reviewers access to state-of-the-art information and developments.

3. Benefits to Volunteer Participants from the Committee Work:

A primary benefit to volunteer participants is the opportunity to actively take part in the development of the standards that govern the transformer industry. This participation leads to a well-deserved sense of pride as well as advanced awareness of upcoming changes during the development stages. Each of the 70+ active groups have a Chair and a Secretary, and most also have a Vice Chair. The Committee's Policies and Procedures for Standards Development manual includes term limits for responsible Subcommittee Chair positions, so opportunities for new people to get involved at a higher level are periodically available. All subcommittee, working group, and task force activities are open to any volunteer who is interested in participating.

The ability to meet with other industry experts, hear about the challenges faced by others, and to listen to how problems were solved helps all volunteers grow technically and to be more effective at solving the challenges faced by their individual employers.

The Committee's Standards Coordinator typically offers presentations during one of the lunch breaks focused on providing subcommittee, working group, and task force current and future leaders with information related to standards development, such as the standards development processes, Roberts Rule of Order, and the Committee's Association Management System (AMS) capabilities. These presentations help activity leaders become more effective in their respective roles and help to ensure the integrity of the standards development process is maintained.

4. Recognition of Outstanding Performance:

Transformers Committee awards are typically given to recipients during an awards luncheon at the Spring and Fall meetings. The following awards were presented:

Outstanding Service Awards

For long-term commitment, dedication, and contributions to the Transformers Committee, an Outstanding Service Award was presented to each of the following recipients:

Jim Dukarm
Roger Wicks
Joe Watson
Mike Sharp

IEEE Standards Association Standards Board Working Group Awards

In addition to the Committee Awards above, the IEEE Standards Association Standards Board (SASB) presents its own award to the WG Chair upon publication of a new or revised document and offers the WG Chair the opportunity to nominate significant contributors to the project for an IEEE SASB Certificate of Appreciation. Awards were presented to the following for their contributions to the referenced document:

C57.136™-2023	IEEE Guide for Audible Sound of Liquid-Immersed Power Transformers	
	Working Group Chair	Stephen Antosz
	Working Group Vice Chair	Ramsis Girgis
	Working Group Secretary	Mats Bernesjo
	Plaques	NA
	Certificates of Appreciation	NA

C57.167™-2023	IEEE Guide for Monitoring Distribution Transformers	
	Working Group Chair	Gary Hoffman
	Working Group Vice Chair	Mike Thibault
	Working Group Secretary	NA
	Plaques	Dan Mulkey Gustavo Leal Stephen Shull Jerry Murphy
	Certificates of Appreciation	NA

C57.168™-2023	IEEE Guide for Low-Frequency Dielectric Testing for Distribution, Power, and Regulating Transformers	
	Working Group Chair	Daniel Sauer
	Working Group Vice Chair	NA
	Working Group Secretary	Sergio Hernandez
	Plaques	Bertrand Poulin Hamid Abdelkamel
	Certificates of Appreciation	Ajith Varghese Drew Welton Jeffrey Britton John Foschia Kyle Stechschulte

C57.163-2023	IEEE Guide for Establishing Power Transformer Capability while under Geomagnetic Disturbances	
	Working Group Chair	Daniel Blaydon

	Working Group Vice Chair	Ramsis Girgis
	Working Group Secretary	Scott Digby
	Plaques	Mats Bernesjo
	Certificates of Appreciation	Afshin Rezaei-Zare Gary Hoffman Ion Radu Joe Watson Mark Tostrud

C57.12.200-2022	IEEE Guide for the Dielectric Frequency Response Measurement of Bushings	
	Working Group Chair	Jun Deng
	Working Group Vice Chair	NA
	Working Group Secretary	NA
	Plaques	NA
	Certificates of Appreciation	Charles Sweetser Poorvi Patel Evgeni Ermakov Ismail Guner

C57.12.40-2023	IEEE Standard for Network, Three-Phase Transformers, 2500 kVA and Smaller; High Voltage, 34 500 V and Below; Low Voltage, 600 V and Below; Subway and Vault Immersed	
	Working Group Chair	John Vartanian
	Working Group Vice Chair	NA
	Working Group Secretary	Daniel Schwartz
	Plaques	Brian Klaponski David Blew
	Certificates of Appreciation	Avijit Shingari Jeremy Sewell Michael Zarnowski Nabi Almeida

C57.169-2023	IEEE Guide for Determination of Maximum Winding Temperature Rise in Liquid-Immersed Transformers	
	Working Group Chair	Scott Digby
	Working Group Vice Chair	NA
	Working Group Secretary	Cihangir John Sen
	Plaques	NA
	Certificates of Appreciation	Gilles Bargone Jean-Noel Berube Ricardo Castro-Lopez Hakim Dulac

		Gary Hoffman Ryan Musgrove Jason Varnell Pedro Pedro
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C57.150-2024	IEEE Guide for the Transportation of Transformers and Reactors Rated 10 000 kVA or Higher	
	Working Group Chair	Gregory Anderson
	Working Group Vice Chair	Ewald Schweiger
	Working Group Secretary	Marnie Roussell
	Plaques	NA
	Certificates of Appreciation	Hamid Abdelkamel Mario Alonso Wallace Binder W Boettger Jeremiah Bradshaw Paul Dolloff Marcos Ferreira Eduardo Garcia Jerzy Kazmierczak Peter Kleine Andrew Lawless Mario Locarno Ryan Musgrove Shankar Nambi Kraig Nunn Rakesh Rathi Amitabh Sarkar Alfons Schrammel Cihangir Sen Stephen Shull Alwyn Van Der Walt Roger Verdolin Krishnamurthy Vijayan David Wallach Joe Watson Bruce Webb Daniel Weyer Kris Zibert

C57.12.20™-2023	IEEE Standard for Overhead-Type Distribution Transformers 500 kVA and Smaller; High Voltage, 34 500 V and Below; Low Voltage, 7970/13 800Y V and Below	
	Working Group Chair	Alan Traut

	Working Group Vice Chair	James Smith
	Working Group Secretary	Kendrick Hamilton
	Plaques	NA
	Certificates of Appreciation	Bruce Webb Carlos Gaytan Giuseppe Termini Igor Simonov Joshua Verdell Stephen Shull

C57.12.24™-2023	IEEE Standard for Submersible, Three-Phase Transformers, 3750 kVA and Smaller: High Voltage, 34 500 GrdY/19 920 V and Below; Low Voltage, 600 V and Below	
	Working Group Chair	Benjamin Garcia
	Working Group Vice Chair	Thomas Dauzat
	Working Group Secretary	George Payerle
	Plaques	Dan Mulkey
	Certificates of Appreciation	Alejandro Macias Avijit Shingari Michael Zarnowski Nabi Almeida Jeremy Van Horn Audrey Siebert-Timmer

Prize Paper Award

Three-Phase Three-Legged Wye-Wye Transformers with Only One Neutral Grounded and No Stabilizing Winding–Part I: Zero-Sequence Performance

IEEE TRANSACTIONS ON POWER DELIVERY VOL. 39, NO. 3, Pages 1451 – 1461

Luis A. Alvarez-Gomez, Xose M. Lopez-Fernandez, Francisco de Leon, Angel Ramos

Recognition Award for Outgoing Committee and Subcommittee Chairs

Eric Weatherbee - Bushings Subcommittee Chair (2020 -2024)
Casey Ballard - Dry Type Subcommittee Chair (2019 -2024)
Ulf Radbrandt – HVDC Subcommittee Chair (2019 -2024)
Tom Sizemore – Instrument Subcommittee Chair (2019 -2024)
Rogerio Verdolin – Performance Characteristics SC (2020-2024)
George Payerle – STNP Subcommittee Chair (2019 -2024)
Scott Reed – Insulating Fluids Subcommittee Chair (2020 -2023)
Ed teNyenhuis – Committee Chair (2022-23)

Memorials

Sadly, during 2024 we lost 4 past participants for whom memorials were added to the Committee's Memorials page. Each of these great individuals contributed to the past success of the Transformers Committee and helped build the foundation upon which we continue to grow. Memorials were added for the following:

Thomas Traub (2022, reported in 2024)
Amitav Mukerji
Greg Anderson
Nigel McQuinn

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

The Transformers Committee coordinates with several other PES committees, national and international technical committees, and national and international standards development organizations (SDO's), including ASTM, CIGRE, IEC, CSA, NFPA, NEC, SCC4, Doble, NERC/FERC, and EPRI. This effort includes joint sponsorship of standards with IEC, and established liaisons with CIGRE, IEC TC14, ASTM D27, and SCC4 to support significant activity and the exchange of technical information and keeping each other informed of the latest technology advancements.

6. Coordination and Involvement with Young Professionals:

The Transformers Committee seeks more end users to attend. Often, these new users will also be in the Young Professionals category. To entice attendance, the meeting fees for their first attendance are waived. We are also hearing suggestions from Young Professional feedback during our in-person meetings to have more planned networking opportunities beyond the meetings and welcome reception. The Meeting Planning Committee and the officers are considering options.

7. New Technologies of Interest to the Committee:

The new technologies of interest to the transformers committee continue to be the ongoing growth and changes in monitoring systems and their application in relation to the transformer industry. A desire to provide transformer users with actionable data in a timely manner that helps identify potential problems before they result in unplanned outages or catastrophic failures drives much of the development.

The huge increase expected in renewable energy will disrupt the flow of electricity in the power grid, which will impact transformers, which for the most part was designed for flow in only one direction. The Transformers Committee has approved to prepare a new guide to address this concern, termed "reverse power flow", in new and existing transformers.

The expected massive growth of renewable energy to meet global CO2 emissions will have a significant impact on existing and new transformers. The Transformers Committee has begun to prepare a new guide for CO2 emissions life cycle calculation of transformers.

8. Global Involvement

The Transformers Committee has a diverse group of participants from all around the world. Tables 1 & 2 shows a few participant statistics, with particular emphasis on regions 8, 9, and 10 (Africa, Europe, Middle East, Latin America, Asia and Pacific) which are target regions for PES to increase member involvement.

Table 1: Participation by Home Country Spring Meeting 2024

Country	Count
Argentina	1
Austria	9
Brazil	4
Canada	99
Croatia	9
Finland	1
France	1
Germany	23
Italy	1
Mexico	25
Netherlands	2
Poland	3
Portugal	2
Republic of Korea	5
Spain	3
Sweden	3
Switzerland	2
United Kingdom	1
USA	409
Grand Total	603

Table 2: Participation by Home Country Fall Meeting 2024

Country	Count
Argentina	2
Austria	9
Brazil	7
Canada	59
China	4
Colombia	5
Croatia	13
Finland	1
Germany	19
India	1
Italy	2

Country	Count
Mexico	21
Netherlands	1
Poland	4
Portugal	1
Republic of Korea	7
Spain	4
Sweden	4
U.S. Virgin Islands	1
United Kingdom	1
United States Minor Outlying Islands	8
USA	465
Grand Total	639

9. Problems and Concerns:

The loss of the Association Management System (AMS) and the 123Signup platform continues to hamper the management of activity rosters/attendance and coordinating meeting registration. Attendance records and rosters are presently being done manually for each activity and without central consolidation. The Transformers Committee urges PES continue to urgently work to solve this issue.

10. Significant Plans for the Next Period:

The Transformer Committee saw increased attendance in 2024 and expects to see this trend continue in 2025 meetings. The Transformers Committee will monitor that it continues to have the diversity of technical knowledge and experience needed for standards development. This will include successful succession planning and sufficient opportunities for continued growth of new leaders.

The Transformers Committee seeks to increase involvement of women in leadership and standards development. The officers hosted a breakfast meeting in 2023 and modified this to a luncheon, per feedback from attendees, hosting a women's luncheon at both the Spring and Fall 2024. We plan to continue this Women in Power luncheon session for the foreseeable future.

Submitted by: David Wallach

Date: January 10, 2025