

## IEEE Power and Energy Society Entity Annual Report

# 2025

**Entity: Power System Operation, Planning and Economics Committee (PSOPE)**

**Chair: François Bouffard**

**Vice Chair: Ramteen Sioshansi**

**Secretary: Zhaoyu Wang**

**TCPC: Zhaoyu Wang (Senior TCPC), Mohammad Khodayar (Junior TCPC – academic), Xuan Wu (Junior TCPC – industrial)**

**Past Chairs: Jianhui Wang (2022-2023), Fangxing Fran Li (2020-2021), Luiz Barroso (2018-2019), Hong Chen (2016-2017)**

### 1. Background on PSOPE

PSOPE covers the philosophies, methodologies, practices and tools for operation, planning and economics of interconnected and insular power systems. It sponsors five technical subcommittees (SCs) and an Awards SC. They are listed as follows:

- Bulk Power System Operation (BPSO) SC;
- Bulk Power System Planning (BPSP) SC;
- Distribution System Operation and Planning (DSOP) SC;
- Power System Economics (PSE) SC;
- Technologies and Innovations (T&I) SC; and
- Awards SC

PSOPE is one of the largest committees in IEEE PES. It is also one of the broadest in terms of scope.

As opposed to many of the PES Committees, PSOPE has not had a historical focus on *standards*. Each of its subcommittees produces two types of deliverables: (i) organization of panel sessions and tutorials at annual general meetings on relevant topics; (ii) production of reports, papers and webinars to be made available at the [PES Resource Center](#). PSOPE's [webpage](#) is updated and describes in detail the scope of each subcommittee. During 2025 PSOPE started the transition to become a standard-setting technical committee. It is expected that PSOPE will gain this status officially during 2026. More details concerning this are provided in Section 8 of this report.

PSOPE meets yearly, at the annual PES general meeting. Two meetings are organized: an “administrative committee” (AdCom) meeting, which is restricted to PSOPE’s officers, and a “main committee” (Main) meeting, which is open to all interested members and attendees.

## 2. Significant Accomplishments

PSOPE’s primary accomplishments during 2025 are fivefold: (i) PSOPE’s activities during the 2025 PES General Meeting (GM); (ii) materials posted to the PES Resource Center; (iii) actions to promote PSOPE across IEEE PES and beyond with a special focus on industry practitioners; and (iv) continued efforts aimed at increasing the productivity of subcommittees, task forces, and working groups. These accomplishments are detailed below.

### *(i) PSOPE in 2025 PES GM*

On the first item, PSOPE had a very successful technical program at 2025 PES GM. The numbers of papers submitted and included in the meeting program are summarized in the table below, which provides a comparison with the 2024 PES GM:

	<b>2024</b>	<b>2025</b>
Total papers submitted	339 (out of 1331 for the full conference, 26%)	387 (out of 1348 for the full conference, 29%)
Committee Conference paper quota	169	193
Transaction papers	50	41
Conference paper accepted	162 (out of 689 for the full conference, 24%)	192 (out of 689 for the full conference, 28%)
Conference paper rejected	177 (48% acceptance)	195 (49% acceptance)
Best paper	15	19
Paper forum session	45	57
Poster session	102	135

PSOPE sponsored one tutorial:

1. Methods to Address Emerging Challenges and Opportunities in Transmission Planning (4 hours)

PSOPE conducted 25 2-hour long panel sessions in total, as listed below. All these panels were selected through a voting process by members and objective criteria.

The complete list of sessions is provided below (with comparisons to 2024 figures).

### **Bulk Power Systems Planning (BPSP) SC (4; 4 in 2024)**

1. Grid Strengthening Technologies for Inverter-Based Resource Integration
2. Climate Risks and Uncertainties – Shaping the Future of Integrated Resource Planning
3. Transmission Planning for an Evolving Load Landscape

## Computational Challenges for Integrating Operation and Markets in Power System Planning **Bulk Power Systems Operations (BPSO) SC (6; 5 in 2024)**

1. Wildfire Impacts on the Electric Power Grid: Perspectives from Industry and Academia
2. Towards More Efficient Grid Control Room Operations: Human Factors Considerations
3. Reliability Impacts of Emerging Large Loads on the Bulk Power System
4. Improve Grid Resiliency and Reliability Using Distributed and AI-based Applications
5. Climate Risks and Uncertainties – Shaping the Future of Integrated Resource Planning
6. Transmission Planning for an Evolving Load Landscape

## **Distribution System Operation & Planning (DSOP) SC (4; 4 in 2024)**

1. Grid-Edge Orchestration and Optimization to Enhance Grid Reliability and Resilience
2. DER Management System (DERMS) and Virtual Power Plant (VPP) Field Deployments
3. Powering the Future: Smart Grid Solutions for Electrification and Capacity Challenges
4. Load Forecasting and Grid-Edge Flexibility: Key Elements of Integrated Grid Planning

## **Power System Economics (PSE) SC (5; 4 in 2024)**

1. Managing reserve procurement in a future grid that is made up of emission free resources
2. Do Flexibility Needs and Attributes Impact the Resource Adequacy Problem and its Solutions?
3. Future Energy Communities: Optimization, Control, and Markets with Human Factors
4. Hierarchical Multi-Tier Energy Market Architecture: The Emergence of Distribution Local Markets
5. Financing the Energy Transition: Market Impacts for Transmission & Distribution

## **Technologies & Innovation (T&I) SC (6; 5 in 2024)**

1. Leveraging Cloud Technologies to Accelerate Grid Decarbonization and Digitalization
2. Operations of the future: next generation risk management, market design, technologies and optimization tools for control room
3. Digital Twin of Large-Scale Power Systems: Enablers, Experiences, and Lessons Learned
4. Advancing Hydrogen Integration in Power Systems: Innovations, Infrastructure, and Impacts
5. AI-Powered Grids: Leveraging LLMs and Cloud to Redefine Intelligence for Power Systems
6. Quantum Computing for Power System Optimization

All these panel sessions were very well attended, and received very positive feedback and compliments from attendees.

PSOPE panel chairs provide a short summary of the proceedings of their panel session. The primary reason for this is to create a record of the panel session to (1) offer people who could not attend a digest of the panel deliberations, (2) provide a record and evidence of Subcommittee, Working Group, and Task Force activities and relevance, and (3) provide feedback to the conference organizers. The reports will be curated and made available to the community on the PSOPE website. Presentations from the panel sessions are also made available through some of the subcommittee websites when possible.

During the 2025 PES GM, PSOPE conducted the following 43 Committee, Subcommittee, Working Group, and Task Force meetings.

### **Plenary committees (2)**

1. PSOPE Committee AdCom
2. PSOPE Main Committee Meeting

### **Subcommittees (5)**

3. Bulk Power System Operations Subcommittee
4. Bulk Power System Planning Subcommittee
5. Distribution System Operation & Planning Subcommittee
6. Power System Economics Subcommittee
7. Technologies & Innovation Subcommittee

### **Working Groups (16)**

8. BPSO - Working Group on Power System Static and Dynamic State Estimation
9. BPSO - Working Group on Power System Restoration
10. BPSP - Working Group on Integrated Resource Planning
11. BPSP - Working Group on Transmission System Planning
12. BPSP - Working Group on Assessment of Power System Flexibility
13. BPSP - Working Group on Integrated Energy System/Multi-energy Network Modeling and Planning
14. DSOP - Working Group on Modern & Future Distribution System Planning
15. DSOP - Working Group on Asset Management
16. DSOP - Working Group on Distribution Management System
17. PSE - Working Group on Economics of Emerging Technologies
18. PSE - Working Group on Market Design and Operation
19. PSE - Working Group on Energy Policy and Regulation
20. PSE - Working Group on Energy Forecasting and Analytics
21. PSE - Working Group on Investments in Infrastructure
22. TI - Working Group on Machine Learning for Power Systems
23. TI - Working Group on Cloud for Grid Modernization and Digitization

### **Task Forces (20)**

24. BPSO - Task Force on Dynamic Parameter Visibility: Identifiability, Algorithms and Uncertainty Quantification
25. BPSO - Task Force on Advanced Intelligence Techniques for Resilient Power System Restoration
26. BPSO - Task Force on Water Power Nexus
27. BPSO - Task Force on BPS-Connected Inverter-Based Resource (IBR) Operation Challenges
28. BPSO - Task Force on Wildfire-Aware Risk Management
29. BPSO - Task Force on Operational Tools for Enabling Resiliency
30. BPSO - Task Force on Cyber-Physical Interdependence for Power System Operation and Control
31. BPSO - Task Force on Risk Mitigation for Bulk Power System Operation
32. BPSO - Task Force on Energy Equity and Energy Justice in Power Systems

33. BPSO - Task Force on Coordinated Restoration for Resilient Multi-Energy Networks
34. BPSP - Task Force on Advanced Methods for Computational Intensive Power System Planning Applications
35. BPSP - Task Force on Design BPS-Connected Inverter-Based Resource (IBR) Models for Grid Planning
36. DSOP - Task Force on Control and Operation of Distributed Energy Resources
37. DSPO - Task Force on Future TSO-DSO Interactions: Challenges, Business Cases and Solutions
38. PSE - Task Force on Redefining Demand Response in the DER Era
39. TI - Task Force on Hydrogen Integration into Power Systems
40. TI - Task Force on Reinforcement Learning for Power System Dynamic Controls
41. TI - Task Force on Power System Synthetic Data Generation and Sharing
42. TI - Task Force on Empowering the Future of Power Systems Operation and Control with Quantum Computing
43. TI - Task Force on Digital Twin of Large-Scale Power Systems for Adoption of Emerging Technologies

These committee, working group, and task force meetings were often well attended, and increased significantly international and industry participation. Each of the subcommittees and the working groups and task forces within them have promoted diversity and inclusion in participation, and have also promoted a healthy mix of industry and academic participation.

*The committee officers thank all session organizers and chairs for putting together a very successful technical program for PSOPE. Special thanks go to the sub-committee vice-chairs for their hard work and enthusiasm with the running of the review process!*

*(ii) Non-PES GM deliverables*

To bring value to the industry, and also advertise committee activities, PSOPE has been encouraging members on developing deliverables that go beyond panel sessions at the PES GM, such as toolkits, webinars, reports, papers.

Technical Reports:

- D. Vaidhynathan, R. Flores et al., **Interoperability Profile Recommendations of Hydrogen Assets**. Technical Report PES-TR128, Feb. 18, 2025.
- D. L. Donaldson, M. Deakin et al., **A Framework to Identify and Map Uncertainties in Distribution System Planning**. Technical Report PES-TR129, Feb. 23, 2025.
- A. Buettner, A. J. Lamadrid et al., **AI for Power System Resilience: Resources Toward Various Extreme Events and Operational Scenarios**. Technical Report PES-TR135, Sept. 25, 2025.
- A. Wigand, A. Abiri Jahromi, et al., **Digital Twin of Large-Scale Power Systems – Fundamentals, Challenges, and Future Prospects**. Technical Report PES-TR137, Dec. 19, 2025.

Webinars:

- D. Qiu, **AI-Driven Decarbonization for Power Systems**. On-demand webinar, Mar. 20, 2025.

- X. Li, **Inertia-Aware Frequency-Constrained Power System Operations**. On-demand webinar, May 22, 2025.
- D. Van Hertem, G. La Pera, S. Willems, **The Future of the European Grid**. On-demand webinar, Oct. 14, 2025.

*(iii) Actions to promote PSOPE*

PSOPE has also continued the actions to promote the committee:

- A committee flyer, following a similar look and feel to all of the committee flyers, with consistent messaging and branding. The flyer is printed and distributed during the Monday evening Poster Session at the PES General Meeting. Committee officers manned the poster during the poster session to promote its activities and answer questions from attendees.
- Committee Palm Card: printed as a 2-sided piece and distributed at the PES General Meeting at registration, at the PES booth, during the poster session and other places where appropriate. The idea is that potential new members can see at a glance what our committee is about and know who to contact for more information if they are interested.
- Development of a number of IEEE websites of WGs and TFs to allow easier search for current and past focused activities.
- Continuing the practice initiated in 2023, PSOPE has adopted a policy to attract industry-driven panel sessions for the 2026 General Meeting. To that effect, the committee has instigated a industry track that requires industry-only panelists and organizers. The objective is to increase the value of committee participation by industry members.

*(iv) Improving Governance Procedures*

PSOPE's officers have been working jointly to stimulate all of its working groups (WG) and task forces (TF) to produce deliverables that go beyond panel sessions in PES GM. WG and TF should not be simple placeholders for panel sessions (slots) for the GM. Those not producing a concrete deliverable plan will be disbanded. In addition, in an attempt to have better outreach and information sharing, WG and TF officers were encouraged to create their own IEEE-style websites.

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

By presenting and discussing the operational, planning and economics aspects of power system technologies and operations, PSOPE activities serve as a bridge between academic research and practical applications, help guide research and development activities. In addition, PSOPE shares information about industry experiences and key challenges to provide feedback to the industry regarding the effectiveness of new techniques and methodologies.

The panel sessions, TF/WG/SC/Committee meetings also serve as live forums for academic researchers and industrial practitioners to listen to each other, provide networking opportunities among international participants to establish communication and collaboration.

#### 4. Benefits to Volunteer Participants from the Committee Work

With more committee activities, such as delivering webinars, preparing reports and papers, organizing and chairing panel sessions, paper forum, transaction paper sessions, as well as creating and organizing Task Forces, Working Groups, PSOPE has attracted more volunteers. Through their contacts with other participants, volunteer participants in PSOPE work gain knowledge and experiences they can apply in their jobs, which can benefit their careers and organizations.

#### 5. Recognition of Outstanding Performance

PSOPE has an Award Subcommittee in full function. The following awards and IEEE PES Technical Committee Certificates of Appreciation were presented to the following committee members during the 2025 PES GM:

- *PSOPE Technical Committee Prize Paper Award*  
Zixiao Ma, Qianzhi Zhang, Zhaoyu Wang, “Safe and Stable Secondary Voltage Control of Microgrids Based on Explicit Neural Networks,” *IEEE Transactions on Smart Grid*, vol.14, no.5, pp. 3375-3387, Sept. 2023.
- *IEEE PES Technical Committee Distinguished Individual Service Award*  
Erik Ela, past chair of Power System Economics Subcommittee.
- *Outgoing Subcommittee Chair Recognition*  
Erik Ela is the outgoing PES subcommittee chair, and he was presented with a distinguished service award.
- *Technical Committee Outstanding Technical Report*  
“IEEE Power and Energy Technology Assessment and Roadmap,” IEEE PES Technical Report Task Force in IEEE PES Technical Council.
- *IEEE Fellows (Class of 2025)*
  - Nirmal K. Nair
  - Rana Mukerji
  - Alfredo Vaccaro
  - Andrew Keane
  - Kory Hedman
  - Yong Fu

#### 6. Coordination with Other Entities (PES Committees, CIGRÉ, standards, etc.)

PSOPE coordinates with several other PES committees, notably AMPS, PDSP and T&D, SBLC, and RSICC. At the committee level, we have appointed three new representatives or coordinators: Representative to Standard Coordinating: Dr. Xuan Wu, Pedernales Electric Cooperative; Liaison to

Energy Internet Coordinating Committee (EICC), Dr. Pengwei Du, ERCOT; and Liaison to Renewable Systems Integration Coordinating Committee (RSICC): Dr. Xin Fang, Mississippi State University. At the time of reporting, the representative to the new Artificial Intelligence in Power Systems Coordinating Committee (AIPSCC) is yet to be appointed. Finally, the outgoing committee chair François Bouffard is PSOPE's representative to IEEE PES SETCom.

## 7. New Technologies of Interest to the Committee

The major new technologies of interest to PSOPE include the impact on power system operation, planning and economics of significant penetration of stochastic generation resources, the operational issues and opportunities related to DER-enabled Advanced Distribution Management Systems (ADMS), Distributed Energy Resources and their aggregation enabled through Distributed Energy Resource Management Systems (DERMS) and Virtual Power Plants (VPP). The rapidly emerging problems associated with data center grow for bulk power system planning and operation is now a top priority for the committee. Lastly, the committee is embracing the game-changing role of artificial intelligence in decision-making related to planning, operation and power system economics.

## 8. Significant Plans for the Next Period

In 2025, PSOPE had the following committee roster and rotations at the subcommittee levels:  
Committee level:

Chair: François Bouffard, McGill University, [francois.bouffard@mcgill.ca](mailto:francois.bouffard@mcgill.ca)  
Vice Chair: Ramteen Sioshansi, Carnegie Mellon University, [rsioshan@andrew.cmu.edu](mailto:rsioshan@andrew.cmu.edu)  
Secretary and Senior TCPC: Zhaoyu Wang, Iowa State University, [wzy@iastate.edu](mailto:wzy@iastate.edu)  
Junior TCPCs: Mohammad Khodayar, Southern Methodist University, [mkhodayar@mail.smu.edu](mailto:mkhodayar@mail.smu.edu) (academic-focus) and Xuan Wu, Pedernales Electric Cooperative, Inc., [xuan.wu@peci.com](mailto:xuan.wu@peci.com) (industrial-focus)

Subcommittee level:

- **BPSP:**  
Chair: Rui Bo, Missouri University of Science and Technology, [rbo@mst.edu](mailto:rbo@mst.edu)  
Vice Chair: Xin Fang, Mississippi State University, [xfang@ece.msstate.edu](mailto:xfang@ece.msstate.edu)  
Secretary: Rafael Ferreira, Siemens PTI, [rafael.sa.ferreira@gmail.com](mailto:rafael.sa.ferreira@gmail.com)
- **DSOP:**  
Chair: Dr. Zhaoyu Wang, ISU, [wzy@iastate.edu](mailto:wzy@iastate.edu)  
Vice Chair/TCPC: Lina He, UIC, [lhe@uic.edu](mailto:lhe@uic.edu)  
Co-Vice Chair/Co-TCPC: Xiangqi Zhu, Oregon State University, [xiangqi.zhu@oregonstate.edu](mailto:xiangqi.zhu@oregonstate.edu)  
Secretary: Yuzhang Lin, NYU, [yuzhang.lin@nyu.edu](mailto:yuzhang.lin@nyu.edu)  
Co-Secretary: Daniel Donaldson, University of Birmingham, [d.l.donaldson@bham.ac.uk](mailto:d.l.donaldson@bham.ac.uk)
- **PSE:**  
Chair: Tongxin Zheng, ISO New England, [tzheng@iso-ne.com](mailto:tzheng@iso-ne.com)

Vice Chair: Rui Bo, Missouri University of Science and Technology, [trbo@mst.edu](mailto:trbo@mst.edu)  
 Co-Secretary: Feng Zhao, ISO New England, [fzhao@iso-ne.com](mailto:fzhao@iso-ne.com)  
 Co-Secretary: Bala Venkatesh, Toronto Metropolitan University, [bala@torontomu.ca](mailto:bala@torontomu.ca)

- T & I:  
 Chair: Alfredo Vaccaro, University of Sannio, [vaccaro@unisannio.it](mailto:vaccaro@unisannio.it)  
 Vice-Chair: Song Zhang, Amazon, [songaws@amazon.com](mailto:songaws@amazon.com)  
 Secretary: Feng Qiu, Argonne National Laboratory, [fqiu@anl.gov](mailto:fqiu@anl.gov)
- BPSO:  
 Chair: Anurag Srivastava, West Virginia University, [anurag.srivastava@mail.wvu.edu](mailto:anurag.srivastava@mail.wvu.edu)  
 Vice Chair: Clayton Barrows, National Renewable Energy Laboratory, [clayton.barrows@nrel.gov](mailto:clayton.barrows@nrel.gov)  
 Secretary: Mohammad Khodayar, Southern Methodist University, [mkhodayar@mail.smu.edu](mailto:mkhodayar@mail.smu.edu)
- Awards:  
 Chair: Fei Ding, National Renewable Energy Laboratory, [Fei.Ding@nrel.gov](mailto:Fei.Ding@nrel.gov)  
 Vice Chair: Ying Zhang, Oklahoma State University, [y.zhang@okstate.edu](mailto:y.zhang@okstate.edu)  
 Secretary: Bai Cui, Iowa State University, [baicui@iastate.edu](mailto:baicui@iastate.edu)

PSOPE will sponsor and organize technical activities related to the upcoming 2026 GM, and other IEEE PES conferences, such as the T&D Conference and Expo, Grid Edge, ISGT, further attract more international and industry participation, as well as participation from young engineers and women engineers. The focus will be to strengthen PES awareness, including developing webinars to introduce and promote the committee, and presenting related technical subjects. The governance actions aiming at more concrete deliverables, recognition of meritocracy of the SC/WG/TF will continue and it is hoped that PSOPE will be able to deliver high-quality research and industrial contributions for its members.

The process that started in 2024 to change the committee status from a non-standard setting to a standard setting committee made significant progress in 2025. A unanimous vote from members in support for this initiative was held in June 2025 with a follow-on unanimous vote in favor from the Technical Council held in July. The committee voted on its inaugural P&P manual in November before submitting it for approval to the Technical Council. At the time of reporting, the P&P is set for ratification at the March 2026 AudCom. This will be followed with a corresponding update of the committee's O&P manual. The outgoing committee chair, François Bouffard, has been nominated to shepherd the final steps of the process as chair of PSOPE's Standards Committee. This is an exciting opportunity for PSOPE. Members are looking forward to the next steps.

## 9. 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). PSOPE has been continuously expanding its membership basis.

The state of the art of membership is below (order of magnitude).

Total Number of	Officers from	Subcommittee officers	Subcommittee members
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committee members	regions 8, 9 and 10	from regions 8, 9 and 10	from regions 8, 9, and 10
~500	0	2	250

## 10. Problems and Concerns

One of the concerns for PSOPE is to focus the outreach and activities of its SC on deliverables that go beyond just the organization of panel sessions. We continue to request all SC, WG and TF chairs to produce more reports, webinars, and papers that complement the organization of sessions for the PES GM, in an effort to add more value to the PSOPE members.

PSOPE has also been increasing industry participation through practical and trending topics in its activities, but reaching a fair balance between industry and academic participation in the committee has been a continuous challenge. The effort will continue in 2026, to bring more value to the industry, and is part of a major action by the Technical Council to strengthen PES awareness.

Lastly, our transition to a three-TCPC team has been a immense success. Our Senior TCPC has now moved to an advisory and mentoring role, as the Junior TCPCs and the Senior TCPC are able to better share the load with the large number of papers PSOPE receives. This will become the norm for the foreseeable future.

## 11. Message from the Chair

As mentioned in Section 8. of this report, PSOPE is on a trajectory to become a standard-setting committee. Effort and care will be devoted in establishing the required culture of rigor and collaboration expected in standard activities. We will be publicizing this new opportunity to our members, and encourage them to become IEEE SA members to partake fully in those activities.

Other priorities for 2026 will include the recruitment of a new committee web manager as our websites do need a serious dust off. Another priority will be to reform our processes for our Awards subcommittee. For this, we will survey best practices across IEEE PES and consult with members. Finally, we expect to deploy a new approach for scheduling meetings during the General Meeting.

**Submitted by: Ramteen Sioshansi, Chair and François Bouffard, Past Chair**

**Date: 01/31/2026**