

IEEE Power and Energy Society Entity Annual Report

2018

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

Chair: Luiz Barroso

Vice-Chairs: Fran Li

Secretary: Jianhui Wang

TCP: François Bouffard

Past-chair: Hong Chen

1. Significant Accomplishments:

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 subcommittees:

- ✓ Bulk Power System Operation;
- ✓ Bulk Power System Planning;
- ✓ Distribution System Operation and Planning;
- ✓ Power System Economics;
- ✓ Technologies and Innovation.

PSOPE is one of the largest committees in the IEEE PES.

As opposed to many of the PES Committees, PSOPE does not do standards. Each of its subcommittees produces two types of deliverables: (i) organization of panel sessions and tutorials at the General Meeting on relevant topics; (ii) production of reports, papers and webinars to be made available at the [PES ResourceCenter](#). PSOPE's [webpage](#) is updated and describes in details the scope of each subcommittee.

PSOPE meets yearly, at the PES General Meeting. Two meetings are carried out: an administrative meeting, restricted to PSOPE's officers, and a "main committee" meeting, open to all.

PSOPE produces two types of technical deliverables: those related to the PES GM – as panel sessions, super sessions, awards, etc – and those non-related to the PES GM – as reports, webinars, papers, etc.

Significant accomplishments in 2018

2018 was the second year PSOPE in full-swing operation after it was established in 2016. PSOPE's accomplishments in 2018 have come on five sides: (i) on the good outcome of the committee's activities

in the 2018 PES General Meeting (GM); (ii) activities non-related to the IEEE PES GM, which were webinars and paper; (iii) actions to promote PSOPE; (iv) on the participation of the committee in the PES Technical Retreat; and (v) on the introduction of a new set of administrative procedures to improve its governance and to stimulate meritocracy and focus on non PES-GM deliverables. They are detailed below.

(i)PSOPE in the 2018 PES GM

On the first item, PSOPE had a very successful technical program at 2018 GM. The main numbers of papers are depicted in the table below:

Total papers submitted	436
Committee Conference paper quota	201
Transaction papers	63
Conference paper accepted*	212
Conference paper rejected	161 (49% acceptance ratio, down from 54% in 2017)
Paper forum session	60
Papers in the Poster session	132
*20 papers were nominated “best papers” (out of PES best conference papers)	

PSOPE conducted 28 panel sessions in total, as listed below. All these panels were selected through voting process.

1. Consideration of Meteorology in Power System Operations with Increased Variable Renewables
2. Next Generation of Control Center EMS
3. New Modeling and Solution Approaches for State Estimation
4. Challenges and Solutions in Implementing Synchrophasor Applications at the Control Center
5. Addressing Voltage Control Challenges for High Penetration of Distributed Energy Resources (DER)
6. Addressing Uncertainty, Data Quality and Accuracy in State Estimation
7. Adapting Transmission Planning to the Scaling-up of Distributed and Variable Resources
8. Energy Internet: Concept and Key Technologies
9. International Practices in Power System Planning: Processes, Methods and Techniques
10. Computational Challenges in Power System Planning
11. Asset Management in the IoT World: better decisions, or well documented failures?

12. Recent Developments in Data and Information Exchange to Enable Enhanced TSODSO Interaction
13. Standards for Off-Grid Developing Community Applications
14. Simulation and Analysis Methods for Hosting Capacity Calculation with DERs
15. DERMS: Tools and Best Practices
16. New Challenges for Network Charging in Low Carbon Transition
17. Business Models for Energy Storage
18. Revisiting Electricity Markets: Lessons Learned and Future Needs
19. The Role of DERs in the Transmission-Distribution Coordination
20. Power System Restructuring in Newly Industrialized Countries
21. Prosumage and Future Utilities in a Distributed Resource Electricity System
22. Natural Disaster Mitigation Methods and Operation Technology
23. Advanced modeling and algorithms to increase flexibility and resilience in energy systems
24. Applying Advanced Big Data Technologies into Practical Industry Use Cases
25. Advanced Methods in Grid Operation and Planning with High Penetration of Distributed Energy Resources
26. Cyber Physical Power System Simulation: Technology and Practice
27. Decentralized Computing in Wide Area Monitoring Protective and Control Systems (WAMPACs)
28. Local Energy Markets (DSOs) & Coordination with Wholesale Energy Markets

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

At the GM 2018, PSOPE conducted 26 committee meetings during 2017 GM, as follows:

Main committee

1. PSOPE Committee AdCom
2. PSOPE Main Committee Meeting

Subcommittees

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

8. Working Group on State Estimation Algorithms
9. Working Group on Conventional & Renewable Energy Supply
10. Working Group on Modern & Future Distribution System Planning
11. Working Group on Test Systems for Economic Analysis
12. Working Group on Power System Restoration
13. Working Group on the Economics of Energy Storage
14. Working Group on Transmission System Planning



15. Working Group on Network Charging
16. Working Group on the Assessment of Power System Flexibility
17. Working Group on Asset Management
18. Working Group on Sustainable Energy Systems for Developing Communities
19. Working Group on Demand Response
20. Working Group on Energy Forecasting
21. Working Group on Natural Disaster Mitigation & Operation Technology
22. Working Group on Distribution Management Systems
23. Working Group on the Energy Internet

Task Forces

24. Task Force on Benchmarks for Validation of Emerging Power System Algorithms
25. Task Force on Advanced Future Bulk Power Systems with Massive Distributed Resources
26. Task Force on Bulk Power System Operations with Variable Generation
27. Task Force on Decision Support Tools for Energy Storage Investment and Operations
28. Task Force on Next-Generation EMS for Advanced future bulk power systems: Challenge, Architecture and Concept
29. Task Force on Real-Time Contingency Analysis
30. Task Force on Voltage Control for Smart Grids
31. Task Force on Future TSO-DSO Interaction: Challenges, Business Cases and Solutions
32. Task Force on Ultra-wide-area HVDC Overlay Studies
33. Task Force on Advanced Methods for Computational Intensive Power System Planning Applications
34. Task Force on Synchrophasor Applications in Power System Operation and Control
35. Task Force on Dynamic Parameter and State Estimation
36. Task Force on Enabling Paradigms for High-performance Computing in Wide Area Monitoring Protective and Control systems (WAMPACs)

These committee meetings were very well attended, and significantly increased international and industry participation.

Three interesting new TF/WGs were established after 2018 GM to capture industry's hot topics:

- ✓ Task Force: Innovative Faster Than Real-Time Computing Technologies for Power System Online Applications
- ✓ Task Force: Solving Large Scale Optimization Problem in Electricity Market and Power System Applications
- ✓ Working Group: Microgrid Business Model and Use Case Development

PSOPE has also created a “structural” task force on the “definition of foundational terms used in Power System Operation, planning and Economics”. This task Force examines the definition of the foundational terms used in Power System Operation, planning and Economics (PSOPE) through reviewing available reference material and consultations with the PSOPE members and domain experts. The Task Force delivery is a report defining the terms and listing all the reference material available. The task force is expected to complete its work within one year from its initiation date.



(ii) Non-PES GM deliverables

To bring values 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 webinars, report and papers. The following webinar was delivered in 2018:

- [Energy Integration Assessment of Renewable-Dominated Regions based on Stochastic co-optimization of G, T and Probabilistic Reserves](#)

More webinars are underway.

The Technology and Innovation SC has provided an update of PGLib-OPF benchmark library by adding 9 new base networks and 18 variants of those networks. The PGLib-OPF has inaugurally released in 2017 (<https://github.com/power-grid-lib/pglib-opf/>).

PSOPE has also continued to support the Technical Council initiatives on technical policy by providing comments to policy papers. In 2018 the committee was active - through its technology & innovation subcommittee - in providing comments to the IEEE PES Emerging Technologies White Paper 2018.

(iii) Actions to promote PSOPE

PSOPE has also taken three actions to promote the committee:

- ✓ Preparation of a flyer, following a similar look and feel to all of the committee flyers, with consistent messaging and branding. The flyer was printed and distributed during the Monday evening Poster Session at the PES General Meeting.
- ✓ 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.
- ✓ PSOPE was the highlight (“technical committee of the month”), with a description of the committee activities, in the IEEE PES [e-bulletin](#) Newsletter (November 2018).

(iv) Technical retreat

PSOPE participated in the IEEE-PES Technical Council 2018 Strategic Planning Retreat, carried out in Scottsdale, AZ, during Nov 29-30, 2018.

(v) New administrative settings aiming to non-PES GM deliverables

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 session (slots) for the GM. Those not producing a concrete deliverable plan will be disbanded. WG and TF chairs were requested to prepare a balance of its recent deliverables and of its

planned ones, so that the committee can have a deliverable plan. With the implementation of the platform 123Signup by the Technical Council, it is expected the committee will have a common platform to share information and track its deliverables.

Also, in an attempt to have a better information sharing between all committee members, each PSOPE SC now has space in Google Docs where information on the subcommittee activities are made available to all officers.

Also, on what concerns the PES GM, PSOPE has always had a challenge on how to define an objective criterion for the allocation of panel sessions slots among the SC. This is critical because of the size of the committee and the “hard fight” for panel sessions slots within the SC and WG/TF. After a consultation with the Committee-level officers, from 2018, a panel slot allocation formula was proposed by TCPC agreed and already applied for the 2019 PES GM. This is a measure to increase the objectiveness and transparency of the committee. The formula is as follows:

$$NPSC = NPT \times (1/4 \times NPSC(y-2)/NPT(y-2) + 1/2 \times NPSC(y-1)/NPT(y-1) + 1/4 \times NWSC/NWT)$$

where,

PT = total number of PSOPE panels for the next GM

NPSC = number of panels allocated to subcommittee SC for the next GM

NPT(y-1) = total number of PSOPE panels at the last GM (2018)

NPT(y-2) = total number of PSOPE panels at the GM from 2 years ago (2017)

NPSC(y-1) = number of panels by subcommittee SC at the last GM

NPSC(y-2) = number of panels by subcommittee SC at the GM from 2 years ago

NWSC = number of active working groups and task forces of subcommittee SC

NWT = total number of active working groups and task forces in PSOPE

Also, formal guidelines for panel session organization in PES GM were defined as follows:

- ✓ The Committee-level preference is to have 2-hour panels with a limited number of panelists (5-6). It is still possible to organize 4-hour panels. Note, however, that 4-hour long panels consume 2 panel slots each.
- ✓ Panel organizers have to play an active role in the organization of their panels. Panels should have a common thread and not be a succession of individual unrelated presentations. It is recommended that panel organizers discuss with their speakers ahead of time how each speaker is addressing different aspects of the panel’s theme. A good way forward is to demand panelists to answer some questions or respond to some statement from their personal/business/research/policy perspective. Moreover, each panel session should allocate some time to take questions from the audience and to allow the panelists to engage with each other and the audience. At least 15-20

minutes should be allocated for discussions. A good guide to make sure discussions are lively and interesting for the audience is for the panel chairs to have a some questions ready for all or a subset of the panelists to get the conversation started. Also, it might be interesting to have one of the organizers produce a short text highlighting the main points of each speaker and a summary of the Q&A/discussion at the end. This is worthy to document the proceedings of the session for those who may have missed it.

2. 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.

3. 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 of their careers and organizations

4. Recognition of Outstanding Performance:

As a result of an action taken in 2017, a new Award Subcommittee was in full function for the 2018 PES GM and the following awards and IEEE PES Technical Committee Certificates of Appreciation were presented to the following committee members during 2018 PES GM:

- PSOPE Prize Paper Award

Hamid Shaker and Hamidreza Zareipour

“A Data-Driven Approach for Estimating the Power Generation of Invisible Solar Sites,” IEEE Transactions on Smart Grid, Vol. 7, Pages: 2466-2476, September 2016.

- PSOPE Distinguished Individual Service Award

Hong Chen

Citation: Outstanding leadership and contributions to technical committee restructuring of IEEE PES



- IEEE PES Technical Committee Certificate of Appreciation

Outgoing (Sub) Committee Chair Federico

Milano

Citation: For outstanding service to Technologies and Innovation Subcommittee

It is also worth mentioning that PSOPE won the 2018 Technical Committee of the Year award.

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

PSOPE coordinates with several other PES committees, notably AMPS, PDSP and T&D, SBLC, and WSPCC. Coordination sometimes includes joint sponsorship of GM sessions. PSOPE has supported the work of several task forces by providing operational perspectives via a liaison.

The Distribution System Operation and Planning Subcommittee is organizing a Joint workshop with CIGRE B3.48 on April 4 2019 on Substation Asset Management on AEP campus in Columbus, OH.

6. 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 smart-grid technologies, DER Enabled ADMS and Distributed Energy

Resource Management Systems (DERMS), as well as market design challenges to support reliable and efficient system operation.

7. Significant Plans for the Next Period:

PSOPE will sponsor and organize technical activities related to 2019 GM, and other IEEE PES conferences, such as T&D, 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 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,

PSOPE is organizing the Supersession “Risk-Based Transmission Planning and Operation” for the 2019 IEEE PES General Meeting.

Submitted by: Luiz Barroso

Date: 1/30/2019