

# IEEE Power and Energy Society Entity Annual Report

2022

**Entity:** IEEE/PES Power System Dynamic Performance Committee  
**Website:** <https://cmte.ieee.org/pes-psdp/>  
**Chair:** Leonardo Lima  
**Vice-Chair:** Bikash Pal  
**Secretary:** Zhenyu (Henry) Huang  
**Immediate Past Chair:** Costas Vournas

## 1. Significant Accomplishments:

### 1.1 Task Forces and Working Groups

All PSPDC Working Groups (WGs) and Task Forces (TFs) have been very active and successful during 2022. The following TFs are near completion of their work and have submitted Technical Reports for approval:

- TF on Oscillation Source Location
- TF on Methods for Analysis and Quantification of Power System Resilience

### 1.2 Panel Sessions

- Identification, location, and mitigation of forced oscillations Panel Session, 2022 IEEE/PES General Meeting, Denver, CO, co-chaired by Kai Sun and Jim Follum.  
[https://resourcecenter.ieee-pes.org/conferences/general-meeting/PES\\_CVS\\_GM22\\_0721\\_3662.html](https://resourcecenter.ieee-pes.org/conferences/general-meeting/PES_CVS_GM22_0721_3662.html)
- Microgrid Dynamic Modeling Panel Session, 2022 IEEE/PES General Meeting, Denver, CO, chaired by Claudio Cañizares.  
[https://resourcecenter.ieee-pes.org/conferences/general-meeting/PES\\_CVS\\_GM22\\_0721\\_1595.html](https://resourcecenter.ieee-pes.org/conferences/general-meeting/PES_CVS_GM22_0721_1595.html)
- High-speed measurements for inverter-based resources Panel Session, 2022 IEEE/PES General Meeting, Denver, CO, chaired by Manish Patel.  
[https://resourcecenter.ieee-pes.org/conferences/general-meeting/PES\\_CVS\\_GM22\\_0720\\_3800.html](https://resourcecenter.ieee-pes.org/conferences/general-meeting/PES_CVS_GM22_0720_3800.html)
- DSA for IBR penetrated power systems: challenges and mitigation measures, Panel Session, 2022 IEEE/PES General Meeting, Denver, CO, co-chaired by Zhenyu (Henry) Huang, Martin Wolter.  
[https://resourcecenter.ieee-pes.org/conferences/general-meeting/PES\\_CVS\\_GM22\\_0720\\_3750.html](https://resourcecenter.ieee-pes.org/conferences/general-meeting/PES_CVS_GM22_0720_3750.html)
- Definition and quantification of power system resilience, Panel Session, 2022 IEEE/PES General Meeting, Denver, CO, co-chaired by Alex Stankovic and Kevin Tomsovic.  
[https://resourcecenter.ieee-pes.org/conferences/general-meeting/PES\\_CVS\\_GM22\\_0720\\_3656.html](https://resourcecenter.ieee-pes.org/conferences/general-meeting/PES_CVS_GM22_0720_3656.html)

- Opportunities and challenges for voltage stability with power-electronics-interfaced components, Panel Session, 2022 IEEE/PES General Meeting, Denver, CO, chaired by Anurag Srivastava.  
[https://resourcecenter.ieee-pes.org/conferences/general-meeting/PES\\_CVS\\_GM22\\_0719\\_3706.html](https://resourcecenter.ieee-pes.org/conferences/general-meeting/PES_CVS_GM22_0719_3706.html)
- Recent experiences and insights on the development and application of generic models used to represent renewable resources in transient stability programs, Panel Session, 2022 IEEE/PES General Meeting, Denver, CO, chaired by Juan Sanchez-Gasca.  
[https://resourcecenter.ieee-pes.org/conferences/general-meeting/PES\\_CVS\\_GM22\\_0719\\_3075.html](https://resourcecenter.ieee-pes.org/conferences/general-meeting/PES_CVS_GM22_0719_3075.html)
- Water power generation - Hydropower and marine energy technology, Panel Session, 2022 IEEE/PES General Meeting, Denver, CO, chaired by Eduard Muljadi.  
[https://resourcecenter.ieee-pes.org/conferences/general-meeting/PES\\_CVS\\_GM22\\_0719\\_3637.html](https://resourcecenter.ieee-pes.org/conferences/general-meeting/PES_CVS_GM22_0719_3637.html)
- Grid control with synchronized measurements, Panel Session, 2022 IEEE/PES General Meeting, Denver, CO, co-chaired by Evangelos Farantatos and Mani Venkatasubramanian.  
[https://resourcecenter.ieee-pes.org/conferences/general-meeting/PES\\_CVS\\_GM22\\_0718\\_1859.html](https://resourcecenter.ieee-pes.org/conferences/general-meeting/PES_CVS_GM22_0718_1859.html)

PSDP has proposed several Panel Sessions for the 2023 IEEE/PES General Meeting in Orlando, FL.

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

The benefits offered by the PSDP Committee to the power and energy industry are as follows:

- Fostering high quality technical work in the area of power system dynamic performance and reporting on this work in the form of public IEEE Technical Reports (available on the PES Resource Center) and other avenues (such as journal and conference papers). It is noted that some of the most downloaded reports from the Resource Center are PSDPC Technical report such as
  - PES\_TR 66 on Microgrid Stability Definitions, Analysis, and Modeling
- Consistently organizing relevant panel sessions describing practical experiences and technical tools related to power system stability, control, and modeling, which address the latest industry initiatives and challenges.
- Providing an open forum for interaction among representatives of manufacturers, vendors, academia, and research institutions to raise, address, and resolve current technical issues facing the power industry, always related to power system dynamic performance.

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

The benefits to the PSDP Committee participants are as follows:

- The Committee actively seeks the active participation of its members in its different activities with the goal of promoting and enhancing their professional development. Examples include:
  - encouraging members to participate in different committee activities;
  - promoting and organizing panel sessions of interest to PSDPC members;

- imposing term limits (2 years) on committee officers and on subcommittee (SC) and WG Chairs (4 years) in order to allow for continuous renewal and involvement by the membership in the committee’s leadership; and
- maintaining a balance between members from industry and academia, as well as between members from North America and outside North America, who serve in the committee and subcommittee leadership positions, to ensure diversity and global representation to the extent possible.
- The Committee provides a forum through Panel Sessions, Special Technical Sessions, and presentation opportunities within its Committee/SC/WG/TF meetings to disseminate the latest important technical issues of interest to industry participants and researchers.
- Participants in the various activities of the PSDPC have the opportunity of establishing contacts with leading international experts in power system dynamic performance.

#### 4. Recognition of Outstanding Performance:

The following PSDP distinguished committee members were recognized in 2022 for their outstanding achievements:

PES and External Awards:

- Pete Sauer, Grainger Chair Emeritus Professor of Electrical Engineering of the University of Illinois at Urbana-Champaign was awarded the 2022 IEEE Nikola Tesla Award for contributions to dynamic modeling and simulation of synchronous generators and for leadership in power engineering education.
- Kenneth E. Martin was awarded the 2022 IEEE Charles Proteus Steinmetz Award for leadership in and sustained contributions to standards for synchrophasor measurements and communications for power system monitoring, protection, and control.
- Thierry Van Cutsem was awarded the 2022 IEEE PES Prabha Kundur Power System Dynamics and Control Award for fundamental contributions to voltage security analysis, protection and control.
- Juan Sanchez-Gasca was awarded the 2022 IEEE PES Charles Concordia Award for contributions to analysis and modeling of transient and small-signal stability of power systems.

PSDPC Awards:

- “Definition and Classification of Power System Stability Revisited & Extended” IEEE Transactions on Power Systems, vol. 36, no. 4, pp. 3271-3281, July 2021  
by N. Hatziargyriou, J. V. Milanović, C. Rahmann, V. Ajjarapu, C. Cañizares, I. Erlich†, D. Hill, I. Hiskens, I. Kamwa, B. Pal, P. Pourbeik, J. J. Sanchez- Gasca, A. Stanković, T. Van Cutsem, V. Vittal, and C. Vournas
- The 2022 Prize Paper Award was presented to “*Parameter Preserving Model Order Reduction of Large Sparse Small-Signal Electromechanical Stability Power System Models*” by Yussef Guardia Ismael Acle, Francisco Damasceno Freitas, Nelson Martins, and Joost Rommes, published in IEEE Trans. on Power Systems, Vol. 34, No. 4, July 2019.
- PSDP Distinguished Service Award went to Arturo Román Messina for his distinguished service and leadership in the IEEE Power Systems Dynamic Performance Committee
- Recognition Award was presented to:

- Ahda Pavani for her excellent work as PSDP Committee's Technical Committee Program Chair

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

The PSDPC coordinates with the CIGRE Study Committee C4 – System Technical Performance, in areas of mutual interest, and has hosted over the past decade numerous meetings of CIGRE Working Group meetings on the Sunday of the IEEE PES General Meeting. These areas included modeling of combined-cycle power plant, modeling of wind turbine generators, wide-area control and measurement, on-line dynamic security assessment, load modeling, and application of phasor measurement units in monitoring and control of system dynamic performance. In 2020, the Joint IEEE/TF/ CIGRE WG C4/C2.58 on Evaluation of Voltage Stability Assessment Methodologies in Transmission Systems started its activities via on-line teleconferences.

Many of the members of these CIGRE WGs have also actively participated in and contributed to our Panel Sessions, WGs, TFs, and many committee and subcommittee activities, resulting in mutually beneficial exchange of areas between the two profession societies. Furthermore, in the past and presently, officers of the PSDPC also have served as CIGRE Study Committee Chairs.

The PSDPC is also closely working with the Power System Relaying and Control (PSRC) Committee, as in the past, on many activities of mutual interest and there are standing liaisons between the two committees. PSRCC members participate in a new PSDPC TF.

The PSDPC also works with the Analytic Methods for Power Systems (AMPS) Committee and the Power System Operation, Planning and Economics (PSOPE) Committee, particularly on the topic of dynamic state estimation and its connections to power system dynamic performance.

The PSDPC works closely with the Energy Development and Power Generation (EDPG) Committee and Electric Machinery (EM) Committee, particularly in Standards developed and sponsored by these Committees. The PSDPC maintains liaisons and several PSDP members are active participants in the WGs from EDPG and EM for development of IEEE Standards.

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

The following is a list of some of the new technologies that are of interest to the PSDPC and are a part of the topics covered by many of our Panel Sessions, WGs and TFs:

- Wind and solar power plants and other forms of renewable and inverter-based energy sources
- Microgrids.
- Dynamic performance of HVDC transmission.
- Application of synchrophasor measurements to dynamic monitoring and control.
- Application of high performance computing to dynamic security assessment.
- Impact and contribution of distributed energy sources, connected to distribution grids, to overall system dynamics, stability, and security.

