

IEEE Power and Energy Society Entity Annual Report

2023

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

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 completed /submitted for approval:

- TF: Methods for Analysis and Quantification of Power System Resilience (TR 108) by PSDP and AMPS – chaired by Alex Stankovic –completed.

https://resourcecenter.ieee-pes.org/publications/technicalreports/PES_TP_TR108_PSDP_AMPS_052223.html

- TF: Forced Oscillations in Power Systems (TR 110)-PSDP by Frankie Zhang and Udaya Annakkage –completed.

https://resourcecenter.ieee-pes.org/publications/technical-reports/PES_TP_TR110_PSDP_52223.html

- TR of CIGRE JWG C4/C2.58 on Evaluation of Voltage Stability Assessment Methodologies in Transmission Systems – Udaya Annakkage and Jose Rueda Torres – PES approved but awaiting CIGRE approval.

1.2 Panel Sessions

- IBR and DER driven T&D Interactions in Dynamic Security Assessment: Co-chairs: Alok Kumar Bharati and Alexander Flueck
https://resourcecenter.ieee-pes.org/conferences/general-meeting/pes_cvs_gm23_0717_psdpp104
- Evaluation of Voltage Stability Assessment Methodologies in Transmission Systems: Co-chairs: José Rueda and Udaya Annakkage.
https://resourcecenter.ieee-pes.org/conferences/general-meeting/pes_cvs_gm23_0718_psdpp103
- Modeling of Inverter-Based Resources for Large System Stability Studies: Chair: Deepak Ramasubramanian
https://resourcecenter.ieee-pes.org/conferences/general-meeting/pes_cvs_gm23_0718_psdpp101



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- Integrating Relay Models with RMS Dynamic Simulations: Co-chairs: Glauco Taranto and Bruno Leonardi
https://resourcecenter.ieee-pes.org/conferences/general-meeting/pes_cvs_gm21_0828_2236
- Future electricity systems: How to handle millions of power electronic-based devices and other emerging technologies: Co-chairs: Claudia Rahmann, Amarsagar Reddy, Ramapuram Matavalam and Marija Ilic.
https://resourcecenter.ieee-pes.org/conferences/general-meeting/pes_cvs_gm23_0719_psdpl06
- Past, Present, and Future with Synchrophasor Technology: Mani Venkatasubramanian
https://resourcecenter.ieee-pes.org/conferences/general-meeting/pes_cvs_gm23_0719_psdpl05
- Advanced pumped-storage hydro providing ancillary services : Co-chairs: Eduard Muljadi and Shruti Dwarkanath Rao.
https://resourcecenter.ieee-pes.org/conferences/general-meeting/pes_cvs_gm23_0720_psdpl07
- Speeding up dynamic security assessment: Co-chairs: Martin Wolter and Zhenyu (Henry) Huang
https://resourcecenter.ieee-pes.org/conferences/general-meeting/pes_cvs_gm23_0720_psdpl08

PSDP has proposed several Panel Sessions for the 2024 IEEE/PES General Meeting in Seattle, Washington in July 21-25, 2024.

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 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). PSDP sponsored TF/WG reports are very useful to our researchers and industry power professionals. One 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 in the environment of new IBR technologies, 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:

- o encouraging members to participate in different committee activities;
 - o promoting and organizing panel sessions of interest to PSDPC members;
 - o imposing term limits (2 years) on committee officers and on subcommittee (SC) and WG Chairs (4 years) to allow for continuous renewal and involvement by the membership in the committee's leadership; and
 - o 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 2023 for their outstanding achievements:

PES and External Awards:

- Prof. Mani Venkatasubramanian was awarded the 2023 IEEE PES Prabha Kundur Power System Dynamics and Control Award for the development of synchro phasor-based monitoring of power system oscillations that are used in grid control centres all over the world.
- PSDP members being elevated to 2023 Fellow grade:
 - a. **Bernard Lesieutre**– for contributions to electric power system dynamic modeling, simulation and power engineering education
 - b. **Christian Rehtanz**– for contributions to wide area monitoring, protection and control systems for electrical power grids
 - c. **Hassan Bevrani**– for contributions to microgrid control

PSDPC Awards:

- The 2023 Prize Paper Award was presented to ``*Integrating Relay Models in Three-Phase RMS Dynamic Simulation*`` : Authors: Glauco N. Taranto, Tatiana M. L. Assis, José M. T. Marinho - IEEE TRANSACTIONS ON POWER SYSTEMS, VOL. 36, NO. 5, September 2021
- PSDP Recognition Award was presented to Zhenyu Huang for his outstanding leadership as Chair of the Working Group on Dynamic Security Assessment
- PSDP Recognition Award was presented to Rodrigo Ramos for his outstanding work and leadership as Webmaster of the Power System Dynamic Performance Committee

- PSDP Distinguished Service Award went to Zhenyu (Henry) Huang for his distinguished service and leadership in the IEEE Power Systems Dynamic Performance Committee
- PSDP Recognitions Award was presented to Leonardo Lima for his outstanding work and leadership as Chair of the Power System Dynamic Performance Committee
- PSDP Recognitions Award was presented to Glauco Taranto for his outstanding work and leadership as Chair of the Power System Stability Subcommittee
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- PSDP Recognition Award was presented for their outstanding work as Technical Committee program chairs and reports to:
 - a. Prof CY Chung, Hong Kong Polytechnic University
 - b. George Stefopoulos of US Department of Energy

5. Remembrance of outstanding PSDP members

The following three members who have outstandingly contributed to the technical activities of PSDP committee and thousands of researchers through their books and technical works in power system modelling and control over their lifelong service were remembered:

- a. Dr Paul de Mello
- b. Prof M A Pai
- c. Prof Peter Sauer

6. 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.

7. PSDP in Technical Council Retreat in Scottsdale:

The retreat was held in Scottsdale, Arizona between Nov 9-11. PSDP Vice Chair Zhenyu (Henry) Huang attended the meeting. Henry contributed to the following discussions:

- a. Streamlining Satellite Technical Committees' websites.
- b. Ensuring the quality of entity-based standards.
- c. IEEE Smart Grid Program as Smart Grid and Grid Modernization Coordination Committee and its scope definition.
- d. More web-based resources on electric vehicles and digital twins technology through iGET and RSICC. Henry suggested that the coordination committees should be proactive in gathering and disseminating information on hot topics such as offshore wind, grid forming technologies, etc.
- e. Restructuring of review metric for industry papers in PES conferences
- f. Putting PESGM transactions papers into poster session/paper forum/panel/breakfast session in view of low attendance in transaction paper session.
- g. Panel sessions at GM2023 had actual attendance much off from their estimates. The TC asked TCPCs to get back estimates for room assignments.
- h. Enhanced promotion efforts from panel session chairs and panelist for increased attendances and reductions of time conflicts in similar panel topics from different TCs.
- i. Panel session quotas for all TCs in GM2024 and its entry into MIRA by Nov 20.
- j. Discussions on the progress of MemberPlanet

8. 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 recent and proposed 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.
- Dynamics, stability, and control of power systems with high penetration of variable renewable generation.
- Machine Learning
- Synchrophasors
- Generic models of renewable resources
- Analytical Methods for Large-Signal Stability Analysis of
- IBR-Based Power Systems
- Pumped Storage Hydro
- Experiences in Use of Transient Stability Assessment Tools in Control Centers
- Restoration of 100% renewable energy resourced power systems

9. Global Involvement & YP Involvement

The PSDPC is one of the most diverse Technical Committees in the PES. Below are estimated numbers of members from Regions 8, 9 and 10 (Africa, Europe, Middle East, Latin America, Asia and Pacific).

Please also provide information on the number of young professionals that are involved in your committee.

Total Number of committee members	Number of Young Professionals (under 35 years of age) – Including committee & subcommittee	Officers from regions 8,9 and 10	Subcommittee officers from regions 8, 9 and 10	Subcommittee members from regions 8,9, and 10
146	35%	2 (50%)	2 (50%)	35%

10. Problems and Concerns:

None to report.

11. Significant Plans for the Next Period:

Submitted by: **Bikash Pal, Chair**
 Henry Huang, Vice-Chair

Date: **January 23rd, 2024**



Glauco Taranto, Secretary
Leonardo Lima, Past Chair