IEEE Power and Energy Society
Entity Annual Report
2024

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

PSDP Officers update:

- **Dr Abhisekh Banerjee : new TCPC (August 2024)**
- **Prof Ahda Pavani : Secretary : SC : PSS**
- **Prof Claudia Rahmaan: Secretary : SC:PSSC (Jan 25)**
- **Dr Dinemayer Silva: Chair : SC : PSSC (Jan 25)**
- **Federico Milano – Secretary PSDP (Jan 2025)**
- **Glauco Taranto- Vice Chair : PSDP (Jan 2025)**
- **Henry Huang – Chair : PSDP (Jan 2025)**

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:

- PES-TR109: CIGRE JWG C4/C2.58 on Evaluation of Voltage Stability Assessment Methodologies in Transmission Systems – Udaya Annakkage and Jose Rueda Torres – Both PES and CIGRE completed.
- PES-TR113: Simulation methods, models, and analysis techniques to represent the behavior of bulk power system connected inverter-based resources – Antonello Monti and Ryan Quint- completed

1.2 Panel Sessions

- Application of Machine Learning in Dynamic Security Assessment Physics-informed learning over synchrophasors: Kishan Prudhvi Guddanti, Martin Wolter / Tong Huang

Not available from PES Resource Centre

- Generic models of renewable resources in commercial transient stability programs – new models, new dynamics, and recent experiences: Juan J Sanchez-Gasca
https://resourcecenter.ieee-pes.org/conferences/general-meeting/pes_cvs_gm24_psdppl08_072324_sld

- Representation and Characterization of (New Types of) Dynamic Interactions in Converter Dominated Power Systems: Panos Papadupoulos, Augusti Egea
https://resourcecenter.ieee-pes.org/conferences/general-meeting/pes_cvs_gm24_psdppl10_072324_sld

- Analytical Methods for Stability Analysis in Future IBR-Dominated Power Systems: Ian Hiskens , Deepak Ramasubramanian , Sijia Geng
https://resourcecenter.ieee-pes.org/conferences/general-meeting/pes_cvs_gm24_psdppl11_072424_sld

- Screening Methods and Processes to Identify Situations for EMT Studies: Deepak Ramasubramanian
https://resourcecenter.ieee-pes.org/conferences/general-meeting/pes_cvs_gm24_psdppl09_072424_sld

- The roles of Pumped Storage Hydro in modern power systems: Eduard Muljadi, Shruti Rao
https://resourcecenter.ieee-pes.org/conferences/general-meeting/pes_cvs_gm24_psdppl06_072424_sld

- Experiences in Use of Transient Stability Assessment Tools in Control Centers: Sarma NDR Nuthalapati, Ajjarapu Venkataramana
https://resourcecenter.ieee-pes.org/conferences/general-meeting/pes_cvs_gm24_psdppl07_072324_sld

- Restoration for IBR-dominated Power Systems: Wei Sun, Yujia Li

Not available from PES Resource Centre

PSDP has proposed several Panel Sessions for the 2025 IEEE/PES General Meeting in Austin, Texas in July 27-31, 2025.

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 recent reports from the Resource Center are PSDPC Technical report such as: Forced Oscillations in Power Systems (TR 110)
- 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:
    - 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) 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 2023 for their outstanding achievements:

PES and External Awards:

- Dr Maria D Illic was awarded the 2024 IEEE PES Prabha Kundur Power System Dynamics and Control Award: For pioneering contributions to hierarchical and distributed modelling and control of large power systems
- Joe H Chow: was awarded the 2024 IEEE Herman Halperin Electric Transmission and Distribution Award "For contributions to the modeling and control of large-scale power transmission systems."

PSDP members being elevated to 2024 Fellow grade:

- **Qinglai Guo:** for contributions to system-wide voltage control in power systems
- **S M Muyeen:** for contributions to stable grid-interfaced renewable energy conversion and control
- **Kai Sun :** for contributions to power grid stability analysis and control

- **Xiaorong Xie:** for contributions to analysis of subsynchronous resonance in electrical power systems

PSDPC Awards:

Technical Committee Prize Paper Award

- **Analysis of Energy Flow Method for Oscillation Source Location** [ieeexplore.ieee.org], Yuan Zhi [ieeexplore.ieee.org];Vaithianathan Venkatasubramanian [ieeexplore.ieee.org]

  IEEE TRANSACTIONS ON POWER SYSTEMS, VOL. 36, NO. 2, MARCH 2021, Page(s):1338 – 1349

  Technical Committee Working Group award,

  IEEE Task Force TR 113 "Simulation methods, models, and analysis techniques to represent the behavior of bulk power system connected inverter-based resources"

- PSDP Recognition Award was presented for their outstanding work as Technical Committee program chairs and reports to:

  a. Dr Shruti Rao, GE (Vernova) USA

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 IEEETF/ 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. PSDP in Technical Council Retreat in Piscataway, NJ Hyatt Regency, New Brunswick

The retreat was held in Piscataway between Nov 1-2, 2024. PSDP Vice Chair Zhenyu (Henry) Huang attended the meeting. Henry contributed to the following discussions:

a. Increasing participation in coordinating committees from technical committees. Need to reach deeper in our bench and clarify what to coordinate. Better defined coordinating topics can help increase participation.
b. Streamlining standards management, coordination, and collaboration by refining the standards workflow.
c. Evaluating the need for establishing an AI coordinating committee.
d. Evaluating the need for a IEEE Technical Council Young Professionals Group.
e. Identifying a path forward with MemberPlanet.
f. Allocating/reallocating quotas of panel sessions.
g. Coordinating panel sessions and supersessions to minimize overlaps.

Henry also volunteered to attend the 2025 IEEE PES Joint Technical Committee Meeting (JTCM) on January 12-16, 2025 in Garden Grove, CA.

7. 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.
- Electric Vehicles
- Digital Twin
- Grid Edge
- 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

8. 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	Committee 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%

PES DLP program by PSDP member(s)

IEEE Power and Energy Society runs a successful DLP program. It provides in-person, hybrid, and virtual presentations on topics of interest for local chapter meetings. The panel of Distinguished Lecturers are from across all regions and includes about 70 speakers from academia, industry, government labs and energy consulting. Between December 7th -21st, PSDP member Bikash Pal had the fascinating experience to visit to Bogota (Colombia), Quito (Ecuador), Lima (Peru), Buenos Aires (Argentina), Montevideo (Uruguay), and Santiago (Chile) as a PES DL.
On December 9th, Sebastian Marin (PES Colombia Chapter Chair) and Catleen Natalia Lozano (R9 WiP Coordinator) hosted a very exciting program with about 50 people in attendance from academia and industry from different cities. The main technical talk was on Stability Modelling and Analysis of Converter Driven Power Systems. There were short speeches about chapter activities, benefits of being PES member, and a presentation on PES future strategic directions. Several chapter awards and prizes

were presented. The talk at Quito (Ecuador Chapter) was organized by WiP Rosy Constante, Professor Diego Ortiz, and PES Chapter Chair Santiago Lamba. Besides PES promotion, there were two technical talks, one from Jaime Cepede on Power System Stability Modelling (in Spanish), and Bikash presented on Robust Volt-Var Control. More than 120 people attended this chapter meeting, largely from academia and industry. The talk at Lima on the December 13th, started with PES promotion from the local chapter chair and vice chair, Wilfredo Sifuentes and Anthony Gammon, respectively. Bikash presented two DLP talks: Dynamic Modelling for Analysis of Wind Farm and Grid Interaction and Robust Volt-Var Control in Power Distribution. This Lima Chapter meeting had about 25 PES members and few non-members in attendance. Bikash also had the opportunity to visit the control center of the grid operator of PERU, COES.

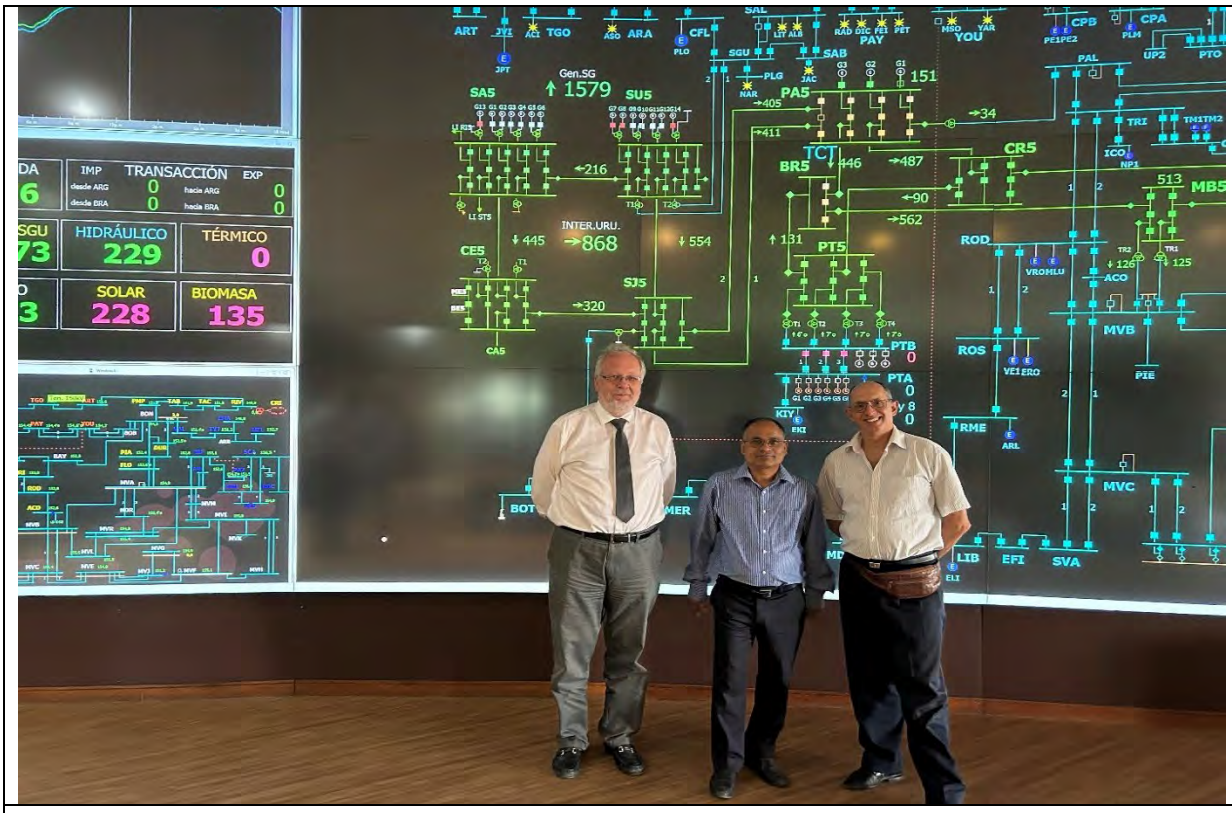
The talk at the University of Buenos Aires on the December 16th, was about Stability Modelling and Analysis of Converter Driven Power Systems. Alberto Escobar (PES Chapter Chair) and Melina Gonzalez (IEEE student branch chapter leader) hosted a successful program. There were other talks on dynamic loading monitoring of transmission systems. The same topic was also shared at the PES Uruguay Chapter under the leadership of Dr Gonzalo Casaravilla, who is the PES Chapter Chair. This lecture followed Bikash'es visit to the Uruguay national energy control center. Uruguay has already reached 100% zero carbon generation, which is a phenomenal success. The sixth venue Bikash visited was the capital city of Santiago in Chile. The PES chapter organized a very well attended program under the leadership of Professor Rodrigo Moreno from the University de Chile on the December 19th with more than 50 attendees, mainly from industry. Bikash visited the grid control center of the Chilean power network coordinator, Electro Nacional.

DLP talk at Bogota on the 9th of Dec 2024

With attendees at Quito after talk on 11th Dec

DLP and membership promotion event at Lima

DLP event at Uni of Buenos Aires (Dec 16th)



DLP speaker's visit to Uruguay Grid Control – the country is running on 100% green energy

DLP and PES Membership promotion event in Santiago , Chile on the 19th December, 2024

9. Problems and Concerns:

None to report.

10. Significant Plans for the Next Period:

Submitted by: **Henry Huang, Chair** **Date: January 31, 2025**
Glauco Taranto, Vice Chair
Federico Milano, Secretary
Bikash Pal, Immediate Past Chair