

2019

Entity: Power System Dynamic Performance Committee (PSDPC)

Chair: Costas Vournas, NTUA, Greece

Vice-Chair: Leonardo Lima, Kestrel Power Engineering, US

Secretary: Bikash Pal, Imperial College, UK

1. Significant Accomplishments:

1.1. Task Forces / Working Groups:

All PSPDC Working Groups (WGs) and Task Forces (TFs) have been very active and successful during 2019. The following TF that successfully completed its work resulting in published PES Technical Report has submitted a Power Systems Transactions paper that is under second round of review:

- TF on Test Systems for Voltage Stability and Security Assessment

The following new TF had a first in person meeting, as well as two teleconferences:

- TF on Modeling and Simulation of Large Power Systems with High Penetration of Inverter-Based Generation Chaired by Antonello Monti, RWTH, Germany with Ryan Quint, NERC, USA as Vice-Chair and Deepak Ramasubramanian, EPRI, USA as Secretary.

The following new TFs were established:

- TF on Integrating Relay Models with Electromechanical Simulations, Chaired by Glauco Taranto, with Bruno Leonardi as Secretary, while PSRC Committee members will participate as liaisons.
- Joint CIGRE/IEEE TF on Evaluation of Voltage Stability Assessment Methodologies in Transmission Systems, Chaired by Udaya Annakkage.

1.2. Panels Sessions

At each PES GM, the Committee actively sponsors at least 5 panel sessions, as per its maximum allocation. All have been highly attended and successful sessions on relevant industry and research issues in the area of power system dynamics. The following 5 Committee-sponsored panel sessions were successfully presented at the 2019 GM:

- Experiences and insights on the use of the generic Distributed Energy Resource model (DER) in transient stability simulations, Chaired by Juan Sanchez-Gasca
- Local Frequency Measurement for System Control (joined with PSO) Chaired by Mili Lamine and Federico Milano
- Microgrid Stability Definition, Chaired by Claudio Canizares
- Handling Uncertainties and Use of Equivalents in Dynamic Security Assessment, Chaired by Costas Vournas and Zhenyu Huang
- System Wide Dynamic Model Validation, Chaired by Qiang Zhang and Leonardo Lima



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For General Meeting 2020 PSDPC has plans for 7 panel sessions detailed below. The following 4h panel sessions are proposed by PSDP TFs and WGs:

- Synchronized Point-on-wave measurements: Technology, Requirements and Applications (Proposed by Dynamic Measurements WG)
- Utilizing distribution system assets and DER for transmission system voltage stability (Proposed by Voltage Stability WG)
- Impact of uncertainties on dynamic security assessment (Proposed by DSA WG)
- Modeling and Simulation with High Penetration of Inverter-Based Generators (Proposed by the TF on Modeling and Simulation of Large Power Systems with High Penetration of Inverter-based Generation)

The following 2h panel sessions are also planned for the 2020 GM using the 5th time slot available to PSDPC:

- Revisiting Stability Definitions and Classification (Proposed by TF on Stability Definitions)
- Control Approaches of Inverters in Restorative States (Proposed by TF on Power System Restoration with Renewable Energy Sources)

Finally PSDPC is cosponsoring with NERC the following 4h panel that is related to PSDPC TF on Oscillation Source Location:

- Bulk Power System Oscillations – Identification, Location, and Mitigation

1.3.Tutorials

The PSDPC has in recent years sponsored several successful tutorials. The following tutorials were sponsored by the PSDPC during the 2019 GM:

- Advanced Pumped Storage Hydropower Plants
- Integrated Modeling and Simulation of Transmission, Distribution, and Communication (TDC) Systems

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 two Certificates of Achievement were Awarded to PSDPC by the TC in GM 2019
 - Overall Most Downloaded Products and Individual product in Resource Center
 - Highest % of content on the PES Resource Center
- 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 Committee members were recognized in 2019 for their outstanding achievements:

PES and External Awards:

- Costas Vournas was awarded the 2019 IEEE PES Prabha S. Kundur Power System Dynamics and Control Award.
- Innocent Kamwa was awarded the 2019 IEEE PES Charles Concordia Power System Engineering Award and the 2019 IEEE Charles Proteus Steinmetz Award for sustained leadership in the development of standards for electrical machines
- Q. Huang and V. Vittal were awarded the PES Prize Paper Award for Integrated Transmission & Distribution System Power Flow & Dynamic Simulation Using Mixed Three-Sequence/Three-Phase Modeling
- Pouyan Pourbeik as Co-Chair with Kevin W. Jones and Evangelos Farantatos, Ryan Quint as members received the PES Working Group Recognition Award and Outstanding Technical Report for PES-TR68, Impact of Inverter Based Generation on Bulk Power System Dynamics and Short-Circuit Performance, July 2018

PSDPC Awards:

- The 2019 Prize Paper Award was presented to “Integrated Transmission and Distribution System Power Flow and Dynamic Simulation Using Mixed Three-Sequence/Three-Phase Modeling” by Qihua Huang and Vijay Vittal, published in IEEE Trans. On Power Systems, Volume: 32, Issue: 5 which also received the PES Prize Paper Award.

- PSDP Distinguished Service Award to Venkataramana Ajjarapu for distinguished technical leadership of the Working Group on Voltage Stability
- PSDP Outstanding Technical Report Award to PES-TR 24 “Measurements, Monitoring, and Reliability Issues Related to Primary Governor Frequency Response”, Chair: Howard Illian and Secretary: James Feltes.
- Recognition Awards were presented to:
 - Claudio Cañizares for his outstanding work and leadership as Chair of the Power System Dynamic Performance Committee
 - Innocent Kamwa for his outstanding work and leadership as Chair of the Power System Stability Subcommittee
 - Arturo R. Messina for his outstanding work and leadership as Chair of the Power System Stability Controls Subcommittee
 - Costas Vournas for his outstanding work and leadership as Chair of the Dynamic Security Assessment Working Group
 - Claudio Cañizares for his excellent work and leadership as Chair of the Task Force on Microgrid Stability Analysis and Modeling
 - Udaya Annakkage for his 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 2019, we again hosted CIGRE WG meetings on the Sunday of the PES GM and established one Joint WG/TF with CIGRE.

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. In 2019, PSDPC members have participated and contributed to the PSRC Committee WG J13 “Modeling of Generator Controls for Coordinating Generator Relays” work and associated report and a presentation was made in the PSDP Committee meeting by PSRC Committee liaison Juan Gers. Also PSRCC members participate in a new PSDPC TF.

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 energy sources

