

2017

Entity: Power System Dynamic Performance Committee (PSDPC)

Chair: Claudio Cañizares, University of Waterloo, Canada

Vice-Chair: Costas Vournas, NTUA, Greece

Secretary: Leonardo Lima, Kestrel Power Engineering, US

1. Significant Accomplishments:

1.1. Task Forces / Working Groups:

As usual, PSPDC Working Groups (WGs) and Task Forces (TFs) have been very active and successful. Thus, the TFs that successfully completed their work resulting in published PES Technical Reports/papers were:

- TF on Test Systems for Voltage Stability and Security Assessment published its Technical Report (PES-TR19 available at the PES Resource Center) and is working on a summary paper to submit to the IEEE Transactions on Power Systems.
- TF on Contribution to Bulk System Control and Stability by Distributed Energy Resources Connected at Distribution Networks published its Technical Report (PES-TR22 available at the PES Resource Center).

New TFs that had their first meeting at the 2017 PES GM were:

- TF on Methods for Analysis and Quantification of Power System Resilience (co-sponsored by CAMS).
- TF on Oscillation Source Location.
- TF on Power System Restoration with Renewable Energy Sources.
- TF on Stability Definitions and Characterisation of Dynamic Behaviour in Systems with High Penetration of Power Electronic Interfaced Technologies.

1.2. Panels Sessions

At each PES GM, the Committee actively sponsors at least 5 panel sessions, as per its maximum TC allocation. All have been highly attended and successful sessions on relevant industry and research issues in the area of power system dynamics. The following Committee sponsored panel sessions were successfully presented at the 2017 GM:

- Impact of the Use of Node-Breaker Representation in Power Flow and Transient Stability Analysis Software on Dynamic Performance
- Sharing Experiences and Insights Involving the Application of Generic Wind And Photovoltaic Transient Stability Models
- Industry Experiences in Dynamic-System Operational Monitoring and Control Using PMUs

- Integration of Distribution Systems, Data Assimilation, and Advanced Modelling into On-Line DSA
- Report on Measurements, Monitoring, and Reliability Issues Related to Primary Governor Frequency Response

The following 5 panel sessions are planned for the 2018 GM:

- Impact of the Use of Node-Breaker Representation in Power Flow and Transient Stability Analysis Software on Dynamic Performance (repeat of 2017 GM panel due to high demand)
- Modelling of Inverter-Based Generators in Transmission and Distribution Dynamic Studies
- Finding the Sources of Sustained Oscillations – From Theory to Industry Practice
- Real-time Voltage Control and Stability Monitoring
- New Control Functionalities of Inverter-Coupled Distributed Generation to Support Stability in Power System Restoration

1.3.Tutorials

The PSDPC has in recent years sponsored several successful tutorials. The following 2 tutorials were sponsored by the PSDPC for the 2017 GM:

- Stability Analysis of Uncertain Power Systems (not delivered)
- Managing Uncertainties in the Future Grid: Evolution of EMS Control Centers - Synchrophasor Solutions (delivered)

The following 2 tutorials were sponsored for the 2018 GM:

- Dynamic Modeling of Offshore Wind Farms for Transient and Dynamic Analysis and Control System Design (to be delivered)
- Stability Analysis of Uncertain Power Systems (pending)

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

The benefits of the work of the PSDPC 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).
- 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 related to power system dynamic performance.

3. Benefits to Volunteer Participants from the Committee Work:

The benefits to the PSDPC 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: (a) encouraging members to participate in different committee activities; (b) promoting and organizing panel sessions of interest to PSDPC members; (c) 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 (d) 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 PSDPC members were recognized in 2017 for their outstanding achievements:

PES and External Awards:

- Nikolaos (Niko) Hatziagyriou was awarded the 2017 IEEE PES Prabha S. Kundur Power System Dynamics and Control Award, for contributions in the dynamic performance and control of power systems with dispersed energy resources.
- Ongun Alsac and Brian Stott were awarded the 2017 IEEE PES Charles Concordia Power System Engineering Award, for leadership in the development of computational algorithms for power flow analysis and security constrained optimal power flow solution.
- Claudio Cañizares was awarded the 2017 IEEE PES Outstanding Power Engineering Educator Award, for fostering partnerships between industry and power engineering education and for developing innovative online power engineering programs.
- Zhenyu (Henry) Huang was elected IEEE Fellow for contributions to dynamic analysis and high performance computing in power systems.
- Göran Andersson was awarded a University of Waterloo Honorary Doctorate and delivered the July 15, 2017 Convocation address.
- Joe Chow was elected to the US National Academy of Engineering on February 2017.

PSDPC Awards:

- Distinguished Service Award to Claudio Cañizares for distinguished service and leadership in the PSDPC.
- Outstanding Technical Report to "Test Systems for Voltage Stability Analysis and Security Assessment" led by Thierry Van Cutsem.
- Prize Paper Award to "Accelerated and Localized Newton Schemes for Faster Dynamic Simulation of Large Power Systems," IEEE Trans. on Power Systems, vol. 28, no. 4, November 2013, by Davide Fabozzi, Angela S. Chieh, Bertrand Haut, and Thierry Van Cutsem.
- Recognition Award to Glauco Taranto for his excellent work and dedication as PSDPC Webmaster.

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 2017, we again hosted several CIGRE WG meetings on the Sunday of the PES GM.

Many of the members of these CIGRE WGs have also actively participated 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 2017, PSDPC members have participated and contributed to the PSRC Committee WG J13 “Modeling of Generator Controls for Coordinating Generator Relays” work and associated report.

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.
- 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.

7. Problems and Concerns:

None to report.

8. Significant Plans for the Next Period:

Continue to maintain the high quality and output of our TFs and WGs, and continue to increase the attractiveness of the various PSDPC activities to industry. Presently, there are 5 Panel Sessions planned by the committee for the 2018 GM, as previously mentioned.

8. Global 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).

Total Number of committee members	Officers from regions 8,9 and 10	Subcommittee officers from regions 8, 9 and 10	Subcommittee members from regions 8,9, and 10
137 (>40 from 8,9,10)	2 out of 4 officers	2 out of 4 officers	Do not have exact numbers but more than 35 –40%

Submitted by: Claudio Cañizares, Chair
Costas Vournas, Vice-Chair
Leonardo Lima, Secretary

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