

2017

Entity: Wind and Solar Power Coordinating Committee

Chair: Debra Lew

Vice-Chair: Robert Zavadil

Secretary: Durgesh Manjure

Technical Committee Program Chair: Andrew Leon

Web Master: Miaolei Shao

The role of WSPCC is to 1) coordinate wind and solar activities within PES and ensure that critical issues are addressed while minimizing overlap, and 2) to coordinate PES work with relevant industry groups such as AWEA, UVIG, NREL, NERC, and CIGRE.

1. Significant Accomplishments:

Wind and solar power continues to grow at a rapid pace in the utility industry and commensurate with that growth, activities in this area have also grown quickly. In 2017, WSPCC coordinated across 22 different committees, subcommittees, working groups or task forces on various aspects of wind and solar, as shown in Table 1.

During the 2016 meeting, the need for updated best practice documents on wind and solar integration was discussed. In 2017, WSPCC worked with Charlie Smith of UVIG, the guest editor of the IEEE PES Magazine, to have the following articles written by 50 co-authors in the Nov/Dec 2017 issue:

- *It's Indisputable: Five Facts About Planning and Operating Modern Power Systems*
- *Maintaining Balance: The Increasing Role of Energy Storage for Renewable Integration*
- *Uncertainty Forecasting in a Nutshell: Prediction Models Designed to Prevent Significant Errors*
- *The Power of Small: The Effects of Distributed Energy Resources on System Reliability*
- *Paving the Way: A Future Without Inertia is Closer Than You Think*
- *Electricity Markets and Renewables: A Survey of Potential Design Changes and Their Consequences*
- *Wide-Area Planning of Electric Infrastructure: Assessing Investment Options for Low-Carbon Futures*

Table 1 – Summary of Existing Wind and Solar Subcommittees, Working Groups, and Task Forces in PES Technical Committees in 2016.

PES Committee	SC, WG or TF Name	SC, WG or TF Leader & Email
Analytic Methods for Power Systems (Joydeep Mitra mitraj@msu.edu)	Capacity Value of Solar TF under Reliability, Risk and Probability Applications SC	Chris Dent is Vice-chair of SC and lead of TF (chris.dent@durham.ac.uk)
	EMT Modeling of Wind Turbine Generators and Parks TF under former General Systems SC of T&D	Juan Martinez-Velasco (Martinez@ee.upc.edu)
Electric Machinery (Kiruba Haran kharan@illinois.edu)	Wind Energy Machines and Systems SC	Mohamed El-Sharkawi (elsharkawi@ee.washington.edu)
Energy Development & Power Generation - (Ward Jewell ward.jewell@wichita.edu)	Distributed Energy Resources SC	K. Strunz (kai.strunz@tu-berlin.de)
	Integration of Renewable Energy SC	Tom Key (tkey@epri.com)
	Wind and Solar Plant Collector Design WG	Doug Price (doug.price@dnvgl.com)
	Wind Farm Collector System Grounding for Personal Safety TF	Gopal Padmanabhan (Gopal.Padmanabhan@res-americas.com)
	Wind and Solar Power Plants System Impacts and Interconnection Requirements WG	Chris Brooks (cbrooks@thinkesc.com)
	Renewable Technologies SC	Rama Ramakumar (rama.ramakumar@okstate.edu)
	Technologies for GHG Mitigation & Adaptation SC	Pengwei Du (pengwei.du@ercot.com)
Energy Storage and Stationary Battery (Chris Searles chris.searles@baebatteriesusa.com)		
Power System Dynamic Performance (Pouyan Pourbeik ppourbeik@peace-pllc.com)	Dynamic Performance of Renewable Energy Systems WG	Pouyan Pourbeik (ppourbeik@peace-pllc.com)
Power System Operation, Planning &	Integration of Wind and Solar Generation into Power System Operations TF	Jianhui Wang (jianhui.wang@anl.gov)



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Economics (Hong Chen hong.chen@pjm.com)	Bulk Power System Operations with Variable Generation TF	Aidan Tuohy (atuohy@epri.com)
	Conventional & Renewable Energy Supply Planning TF	Joseph Yan (joseph.yan@sce.com)
Power System Relaying & Control (Mike McDonald mikemcdonald@amere.com)	Modifications to Fault Study Programs for Wind Turbine Generators WG (PSRC CTF24)	Sukumar Brahma (sbrahma@nmsu.edu) or Evangelos Farantatos (efarantatos@epri.com)
	Guide for Protection of Wind Plants WG (PSRC CTF25)	Martin Best (mbest@ucseng.com)
Surge Protective Devices (Ronald Hotchkiss ronhotchkiss@msn.com)	Wind Power Facilities Electrical Protection Guide WG	Kenneth Brown (kbrown@leviton.com)
	Photovoltaic Facilities Electrical Protection Guide WG	A.J. (Tony) Surtees (surtees@ieee.org)
Transformers Steve Antosz (santosz@comcast.net)	Standard Requirements for Wind Turbine Generator Transformers WG P60076-16	David Buckmaster (dbuckmaster@tflc.us)
	Guide for Application in Distributed Photovoltaic Transformers in Power Generation Systems WG PC57.159	Hemchandra Shertukde (shertukde@hartford.edu)
Transmission & Distribution Dan Sabin (dsabin@electrotek.com)	Distributed Resources Integration Working Group	Julio Romero Aguero (julio@quanta-technology.com)

During the 2017 PES General Meeting in Chicago, there were 92 wind and solar-related sessions. The 2016 PES General Meeting in Boston also included 20 wind and solar-related committee meetings. These include 3 by AMPS, 1 by EMC, 7 by EDPG, 3 by PSDP, 4 by PSOPE, 1 by T&D, and 1 by WSPCC.

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

In its role as a coordinating committee, WSPCC provides the following benefits to the industry and PES members.

At the 2017, WSPCC meeting, forecasting and meteorology were identified as gaps in PES activities. This is important for wind and solar forecasting for day-ahead and real-time operations, as well as the impact of behind-the-meter solar on load forecasting. It was determined that this topic belonged under the PSOPE Power Systems Operations Subcommittee and a panel session is jointly being sponsored with WSPCC on forecasting and meteorology.

In 2017, Debra Lew of WSPCC, in conjunction with Chris Searles from the Energy Storage and Stationary Battery Committee, continued their liaison function from PES to Standards Coordinating Committee (SCC21), which oversees the IEEE 1547 interconnection and 2030 smart grid standards. Debra and Chris are also both on SCC21's Energy Storage Task Force (ESTF). As part of the coordination effort, when SCC21 initiated balloting for P1013 Recommended Practice for Sizing Lead-Acid Batteries for Stand-Alone PV Systems and P1562 Guide for Array and Battery Sizing in Stand-Alone PV Systems, WSPCC provided linkages to relevant working groups in EDPG for PES engagement in these standards.

In July, WSPCC helped to identify a potential conflict between P1547 and EMC Generator Subcommittee C50.13. The overlap in scope was small – synchronous machines greater than 10 MVA and interconnected at less than 34 kV. The frequency ride-through conflict was 0.2Hz difference with P1547 being more stringent. There was also a possible conflict in negative sequence withstand. P1547 staff met with EMC staff to try to take EMC input into account but not all conflicts could be resolved. Note that the Standards Association says it is not prohibited for standards to conflict with each other.

3. Benefits to Volunteer Participants from the Committee Work:

As a coordinating committee, WSPCC does not write standards or conduct technical work. Rather, it coordinates wind and solar activities among PES Technical Committees. WSPCC is a resource for members who want to get more involved with wind and solar. WSPCC can help direct members who are seeking deeper involvement in specific technical areas.

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

WSPCC maintains liaisons with other organizations that work on wind and solar power. These reports are included in WSPCC's annual meeting minutes. Reports from the 2016 Boston meeting included:

- UVIG – Charlie Smith
- AWEA – Michael Goggin or John Dunlop
- CIGRE Wind and Solar Activities – Charlie Smith
- NERC – John Moura
- IEA Wind Task 25 - Charlie Smith, Mark O'Malley
- NREL – Paul Denholm, Yingchen Zhang
- International Wind activities – Antje Orths
- IEC SC 8A – Charlie Smith

5. New Technologies of Interest to the Committee:

WSPCC and the Utility Variable Generation Integration Group began discussions of a 100% Renewables initiative. The goal is to define end-states for the various aspects of power system planning and operations. It may not be possible to reach these end-states with a step by step approach, and in some areas a paradigm shift may be needed to reach these end-states. These areas would include:

- Resource planning
- Transmission planning
- Energy systems integration
- Markets
- Zero inertia
- Weak grids
- Load participation
- Protection
- Operational reliability

6. Significant Plans for the Next Period:

We expect that coordination with SCC21 and implementation of the revised 1547 will be a big part of 2018 activities.

Energy systems integration is becoming more important as 1) we integrate higher levels of wind and solar and need more flexibility from the system, 2) more jurisdictions start looking towards deep decarbonization and want to utilize electrification of other energy sectors as a way to accomplish this, and 3) technology advancement (electric vehicles, smart grid, for example) enables integration of various energy sectors. WSPCC will work with other relevant organizations to consider how to approach energy systems integration.

7. Global Involvement

WSPCC committee members include the following regions:

Total Number of committee members	USA	Canada	Europe	Asia-Pacific	Latin America
155	129	10	11	4	1

Submitted by: Debra Lew, Chair, WSPCC

Date: 1/31/18