

# IEEE Power and Energy Society Entity Annual Report

**2023**

**Entity:** Committee on Analytic Methods for Power Systems (AMPS)

**Website:** <https://cmte.ieee.org/pes-amps/>

**Chair:** Stephen S. Miller

**Vice-Chair:** Yanfeng Gong

**Secretary:** Zhenyu (Henry) Huang

**Immediate Past Chair:** Kwok Cheung

**Technical Committee Program Chair:** Zita A. Vale

## 1. Significant Accomplishments:

This committee is composed of six subcommittees:

- [Big Data Analytics Subcommittee \(BDAS\)](#)
- [Computing and Analytic Methods Subcommittee \(CAMS\)](#)
- [Distribution System Analysis Subcommittee \(DSAS\)](#)
- [Intelligent Systems Subcommittee \(ISS\)](#)
- [Risk, Reliability and Probability Applications Subcommittee \(RRPAS\)](#)
- [Transient Analysis and Simulation Subcommittee \(TASS\)](#)

The AMPS Committee and its subcommittees met in-person at the IEEE PES General Meeting (GM) in Orlando on July 19, 2023. OnLine meetings were held:

Thursday, November 2, 2023

Friday, September 1, 2023

Officer rotations will occur at the end of 2024. The table below shows the 2022 officers and 2024 officers.

Position	2022	2024
Chair	Kwok Cheung	Stephen Miller
Vice-Chair	Stephen Miller	Yanfeng Gong
Secretary	Yanfeng Gong	Zhenyu (Henry) Huang
TCPC	Zhenyu (Henry) Huang	Zita A. Vale
Past-Chair	Kevin Schneider	Kwok Cheung
Awards Chair	Kevin Schneider	Kwok Cheung



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Standards Coordinator	Chris Dent	Chris Dent
Web Master	Dagmar Niebur	Junbo Zhao

For PESGM 2022, AMPS reviewed over 227 technical papers for the GM and accepted 108, plus 33 transaction papers. AMPS has had the highest or second highest number of papers among technical committees for several years. The number of submissions for the 2022 PES GM under AMPS increased by 35% as compared to 2021. Note that the submission in 2021 was down approximately 50% as compared to 2020. The variation in paper submission of our committee is consistent with those of the other committees and is attributed to various pandemic recovery conditions around the world.

The Technical Council of PES has established paper quotas in such a way that each subcommittee has been requested to accept no more than half of the papers sent to them for review, although the committee TCPC retains overall control of the review process.

Accepted papers are presented at the GM in one of three formats: in a poster session; in a paper forum, or at a panel session. The detailed breakdown of paper submission to each subcommittee is shown in the following table:

Subcommittee Name	Submitted Conference Papers	Accepted Conference Papers	Transactions Papers
	2023 (2022) (2021)	2023 (2022) (2021)	2023 (2022) (2021)
Total Committee	74	42	
Computer Analytical Methods	32 (22) (23)	16 (12) (11)	? (6) (3)
Distributed System Analysis	64 (66) (61)	31 (32) (38)	11 (9) (6)
Intelligent System	28 (37) (25)	13 (14) (11)	(4) (3)
Big Data Analysis	20 (40) (13)	10 (20) (5)	(5) (6)
Transient Analysis and Simulation	28 (33) (24)	14 (16) (11)	(4) (9)
Reliability and Risk Analysis	20 (29) (22)	6 (14) (11)	6 (5) (5)
<b>Total</b>	<b>266 (227) (168)</b>	<b>132 (108) (87)</b>	<b>? (33) (32)</b>



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In 2023 74 papers were reviewed at the committee level. We are missing complete transaction paper information. This information is drawn from the TCPC’s summary email “Re: IEEE PES GM2023\_Technical Sessions Planning Meeting-and-ReviewProcess,” dated 7/1/62023.

At the 2023 GM, the AMPS Committee also sponsored 23 panel sessions and all conducted panel sessions are 2-hr sessions with a total duration of 46 hours which is approximately a 41% decrease compared to 2022 (2022: Total 39 panel sessions, 78 hours; 2021: Total 31 panel sessions, 64 hours).

The details of all panel sessions are listed below.

Planning and Operational Practices of Distribution Utilities in the Extreme Weather Events	Distribution System Analysis
Exploring Feasibility of Machine Learning for Grid Resilience Assessment	Reliability and Risk Analysis
High-Performance Electromagnetic Transients Simulation for Power Electronics Dominated Power Systems	Computer Analytical Methods
Composite System Reliability Challenges for Grid Decarbonization Efforts	Reliability and Risk Analysis
Machine Learning Applications in Power Distribution System Operation	Big Data Analytics
Full EMT Simulation of Large Power Systems	Transient Analysis and Simulation
Big Data for Enhanced Grid Performance with Considerations of Data Barriers and Privacy	Big Data Analytics
Data-Driven Distribution System State Estimation: Challenges and Solutions	Distribution System Analysis
Intentional and unintentional islanding of IBR and Distributed Energy Resource Islanding Detection TF Meeting	Transient Analysis and Simulation
Emerging High Performance Computing (e.g. Quantum Computing) Applications in Power Grid	Computer Analytical Methods
Inverter-based Resource Oscillations: Real-World Events and Root Cause Analysis	Transient Analysis and Simulation
Benchmarking of artificial intelligence methods for energy generation and consumption forecasting	Intelligent Systems
Multi-agent decision support in local electricity markets	Intelligent Systems
Synchrophasor Data Analytics	Big Data Analytics
Digital Twins for Power System Modeling, Control and Optimization	Intelligent Systems
Advanced Clustering Techniques for Power System Data Analysis: Beyond k-Means	Intelligent Systems
Facilitating DERs and Services Using Operating Envelopes - Insights from Real Implementations	Distribution System Analysis
The synergy of multi-agent systems and machine learning in power system applications	Intelligent Systems
Power Grid Resilience Enhancement: Tools and Investment for Automated Operation	Reliability and Risk Analysis
Modeling Equity in Power Systems	Computer Analytical Methods
Public Data Repositories for Power Systems Operation and Machine Learning Applications	Big Data Analytics



Application of Big Data and AI/ML in monitoring, operations, planning and protection	Big Data Analytics
Machine Learning and Modern Heuristic Optimization Optimization for Planning and Operation of Active Distribution Networks	Intelligent Systems

AMPS is the sponsor for 5 standards:

- RRP 762 Standard Definitions for Use in Reporting Electric Generating Unit Reliability, Availability, and Productivity – 2023
- IEEE 859 WG Standard Terms for Reporting and Analyzing Outage Occurrences and Outage States of Electrical Transmission Facilities - 2018
- DSAS 1729 IEEE Recommended Practice for Electric Power Distribution System Analysis
- 2882 Guide for Validation of Software Models of Renewable and Conventional Generators for Power System Studies
- 2869 Guide for the Synchronous Monitoring of Direct Current (DC) Bias Magnetic Current Distribution in Power Grid (Entity)

762 was published as approved in 2023. The WG led by Doug Logan made a substantial revision to incorporate performance measures for “renewable” or “variable energy resource” (VER) generators such as wind and solar generation resources.

IEEE 859 was renewed with minor clarifications, resulting in the new 2018 edition. 859 is an issue for future renewal.

1729 Recommended Practice (RP) for Electric Power Distribution System Analysis is being updated. And is due for renewal at the end of 2024. There is an active PAR for renewal and there has been a dedicated WG under DSAS for IEEE 1729.

2882 Guide for Validation of Software Models of Renewable and Conventional Generators for Power System Studies had an active PAR but the WG and kickoff meeting were not accomplished.

Note that the four standards and RPs discussed above are under the *individual* process in which the WG comprises Standards Association (SA) individual members participating as individuals. AMPS is often time requested to be engaged in oversight of standards activity under the *entity* process, in which organizations participate in the standards WG who are corporate members of the SA. AMPS currently also oversees one entity activity, namely IEEE 2869: Synchronous Monitoring of Direct Current (DC) Bias Magnetic current Distribution in Power Grid. IEEE 2869 which was initiated 2021.

Within the AMPS Committee, and the Subcommittee, there are multiple Working Groups and Task Forces (TF). In 2023, A few proposals for new Working Groups and Task Forces were evaluated. 2 TFs were elevated to become WGs with extended scope. 4 TFs were terminated, and 2 new TFs were newly formed. Current AMPS has a total of 24 Working Groups and 25 Task Forces.

Two new working groups were approved:

- WG Cloud for Grid Modernization and Digital Transformation. This was conversion the TF on Application of Cloud Computing in Power Systems to a WG. Because of the group’s success and because it is crosses the interests of multiple subcommittees, we decided to put the WG under the main AMPS committee with administration by BDAS.
- Working Group on Distribution System Behind-The-Meter connected Distributed Energy Resources: Visibility, Analytics and Control. This working group derived from an active TF in the SBLC. The task force wishes to be a part of a committee that supports Working Groups.

There were also two new task forces under our BDA Subcommittee

- TF on Big Data & Analytics for Security and Resilience of Power Systems
- TF Big Data Analytics for Synchro-Waveform Measurements

The AMPS P&P manual was revised with final approval occurring in 2024.

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

The work of the AMPS Committee facilitates publication and presentation of technical work within the scopes of the subcommittees within its jurisdiction, by forming a structure for scheduling paper and panel sessions as well as reviewing papers and technical reports. Where a sufficient body of “best practice” exists, the Committee organizes a Working Group to propose new IEEE Standards and continue to revise existing Standards.

## **3. Benefits to Volunteer Participants from the Committee Work:**

The subcommittees under AMPS provide a network of engineers with common technical interests. Participation in WG/TF activities and technical paper/report reviews exposes members to the latest developments and advances in many topics of technical interests. Participants also have the great opportunities to co-work with and learn from many top-tier, experienced engineers and researchers of our industry.

## **4. Recognition of Outstanding Performance:**

As with other Technical Committees, the AMPS Committee maintains an Awards Working Group with the structure that the chair is the AMPS past-chair and its members are the subcommittee past-chairs. This structure ensures that the members are aware of recent activities occurring in the subcommittees. In 2023 the following awards were made:

<b>Recipient</b>	<b>Award</b>
Tong Huang; Sicun Gao, Le Xie	Technical Committee Prize Paper Award



Task Force on Cloud Computing for Power Grid	Recognition Award for Outstanding Technical Report
Zhengyu (Henry) Huang	Distinguished Individual Service Award
Sukumar Mishra	Award for Outgoing Committee or Subcommittee Chairs
Hiroyuki Mori	Award for Outgoing Committee or Subcommittee Chairs
Zhengyu (Henry) Huang	Award for Outgoing Committee or Subcommittee Chairs
Siddharth Sridhar	Award for Outgoing Committee or Subcommittee Chairs
Chris Dent	Award for Outgoing Committee or Subcommittee Chairs
Masood Parvania	Award for Outgoing Committee or Subcommittee Chairs
Barry Mather	Award for Outgoing Committee or Subcommittee Chairs
Yanfeng Gong	Award for Outgoing Committee or Subcommittee Chairs
Juan Martinez	Award for Outgoing Committee or Subcommittee Chairs
Le Xie	Award for Outgoing Committee or Subcommittee Chairs
Kevin Schneider	Award for Outgoing Committee or Subcommittee Chairs

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

At the end of 2023 the coordinating committee representatives were renewed and will begin to reengage with the various technical committees. The current representatives are shown in the table below.

Coordinating Committee	Representative
Energy Internet Coordinating Committee (EICC)	Stephen McArthur
Intelligent Grid & Emerging Technologies (iGET)	Yanfeng Gong
Marine Systems (MSCC) Kevin Schneider	Kevin Schneider



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Renewable Systems Integration (RSICC)	Kwok Cheung
Standards Committee (SA)	Chris Dent

We do not have a representative to CIGRE but should establish one.

**6. New Technologies of Interest to the Committee:**

The key areas of “new” technology interest are related to the areas of Machine Learning (ML) and Artificial Intelligence (AI) applications to power systems problems and methodologies for modeling Inverter Based Resources (IBR) in the power system.

**7. Global Involvement**

PES is looking to increase involvement with members from Regions 8, 9 and 10 (Africa, Europe, Middle East, Latin America, Asia and Pacific). AMPS has an international membership basis.

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
~900	3	26	186

The estimate for committee membership includes voting and non-voting members and is based on the number of invitations we sent in March 2023 for Member Planet. By searching for emails that end in \*.?? But not \*.ca we estimate that approximately 186 must be in regions 8, 9, and 10. We are including our standards and EICC coordinators in the count of region 8, 9 and 10 officers. Subcommittee officers were estimated based on emails the same way.

**8. Problems and Concerns:**

AMPS has not yet found a way to participate in and manage Entity Standards. The key issue is finding and motivating AMPS membership to participate in the process. Unlike Individual Standards where an individual is vested in proposing a PAR and creating a standard, the Entity request arrive unexpectedly and unannounced so that finding someone to serve as liaison is not easy. Coupled with sometimes difficult communication protocols, this results in standard that are within the AMPS domain being passed up.

In March we spent significant time encouraging sign up for Member Planet. As of the end of the year there was no further project. Managing our membership is becoming a significant concern, to the point that we must consider an alternative if the delay is going to persist.

**9. Significant Plans for the Next Period:**



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The last approved revision of the AMPS Organization and Procedures (O&P) is dated 2016. Several attempts have been made to update the manual but the process has not been completed. The goal is to complete this in 2024.

The AMPS Policy and Procedures (P&P) manual has been submitted, but we still need to complete or adopt a Standards WG P&P.

We would like to find a way to leverage the Transaction Paper Presentations. We can start by committing ourselves to understanding the current process and helping to organize it early in the process. We will need help with publicizing and perhaps logistics.

We would also like to improve the best paper ranking process. Internally we will concentrate on engaging TCPC's editorial capability. Provided it is reasonable and possible, we suggest that the automated ranking include all the reviews, not just the last round.

**Submitted by:** Stephen S. Miller

**Date:** 11/12/2024