

IEEE Power and Energy Society Entity Annual Report

2023

Entity: Energy Internet Coordinating Committee

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

Chair: Hongbin Sun

Vice-Chair: Mohammad Shahidehpour

Secretary: Xuanyuan(Sharon) Wang

Technical Program Chair: Qinglai Guo

Webmaster: Xinwei Shen

Immediate Past Chair: None

1. Significant Accomplishments:

- 1) We held an Annual Meeting in 2023, gathering 34 experts and scholars from different countries and regions.



The 2023 Annual Meeting of EICC

(On Site Meeting)

Tues. July 18 @ 10:30 – 11:30 (UCT-05:00) Eastern Time, US

Welcome, Introductions, Sign-in

There are 34 attendees.

Prof. Qinglai Guo (TCPC) welcomed all attendees on behalf of EICC chair Prof. Hongbin Sun. Prof. Guo chaired the meeting, gave a brief introduction to the EICC structure.

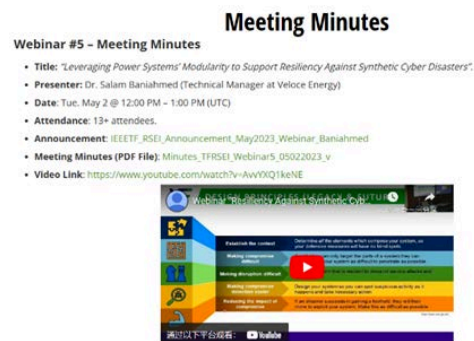
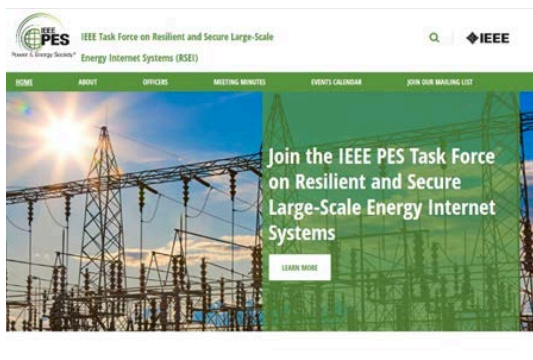
Every attendee gave a brief self-introduction.

- Held on Tues. July 18 @ 10:30 – 11:30 (UCT-05:00) Eastern Time, US
 - 34 attendees from EICC officers/liasons/steering committee members
 - ◆ We reported and discussed the EICC annual activities
 - ◆ Task Force Report and Comments are also included
 - ◆ A call for panel proposals on PES GM 2024
 - ◆ Future plan discussions
- 2) There are 5 TFs in operation now in EICC. They are:
- Task Force (TF) on Resilient and Secure Large-Scale Energy Internet Systems
Chair: Dr. Charalambos Konstantinou, KAUST, USA;
Co-Chair: Dr. Reza Arghandeh, Western Norway University of Applied Science, Norway
 - Task Force on Research Development Annual Report of the Energy Internet
Officers: Dr. Feng GAO
 - Task Force on State Estimation for Integrated Energy Systems
Officers: Dr. Junbo Zhao and Dr. Ye Guo
Coordination with Bulk Power System Operation Subcommittee

- Task Force on Networked Microgrids in Energy Internet
Chair: Zuyi Li, Illinois Institute of Technology, United States;
Co-chair: Yan Xu, Nanyang Technological University, Singapore.
- Task Force on Cloud-Based Control and Co-Simulation of Multi-Party Resources
Chair: Dr. Yan Xu, Nanyang Technological University, Singapore;
Co-Chair: Dr. Graeme Burt, University of Strathclyde, UK.

A good example: TF on Resilient and Secure Large-Scale Energy Internet Systems (TF RSEI)

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



- Coordination Plans

“C. Konstantinou is now the co-chair of IEEE TF on Cyber-Physical Interdependence for Power System Operation and Control under the PES Bulk Power System Operation Subcommittee. He will coordinate with that TF and gather inputs from them to yield broader impacts on our new TF across the power community. We are also communicating with other TF and WGs. For example, we proposed a panel proposal in PES GM 2023 as part of our IEEE TF on Resilient and Secure Large-Scale Energy Internet Systems (EICC) efforts in coordination with WG on Cyber Security in Power Systems (CAMS/AMPS)”.

- Liaisons

Prof. Kai Strunz (ED&PG), Prof. S. McArthur(AMPS), Dr. Pengwei Du (PSOPE)

- 2023 IEEE conf. on Energy Internet & Energy Systems Integration (**IEEE EI²**) was successfully held in Hangzhou, China on 15-18th, Dec.
 - It was launched in 2017 and has been successfully held 7 times.
 - Co-sponsored by IEEE PES, CSEE, Zhejiang Univ., Tsinghua DEE/EIRI/SIGS, Taiyuan Univ. of Tech, etc.
 - “Secure, Economic and Low-carbon Interconnected Energy System”
 - 900+ papers from 17 countries.
 - 60+ sub-meetings.
 - 700+ registered.



4) IEEE TF on IESs SE Technical Report

- Chair: Dr. Junbo Zhao, UCONN, U. S.;
- Co-Chair: Dr. Ye Guo, Tsinghua SIGS
- Title: State Estimation for Integrated Energy Systems: Motivations, Advances, and Challenges
- 60+ pages

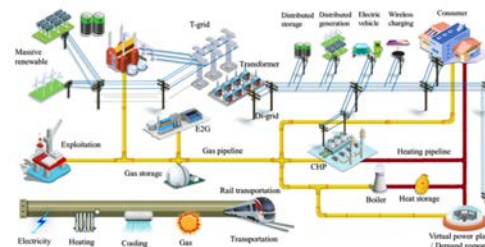
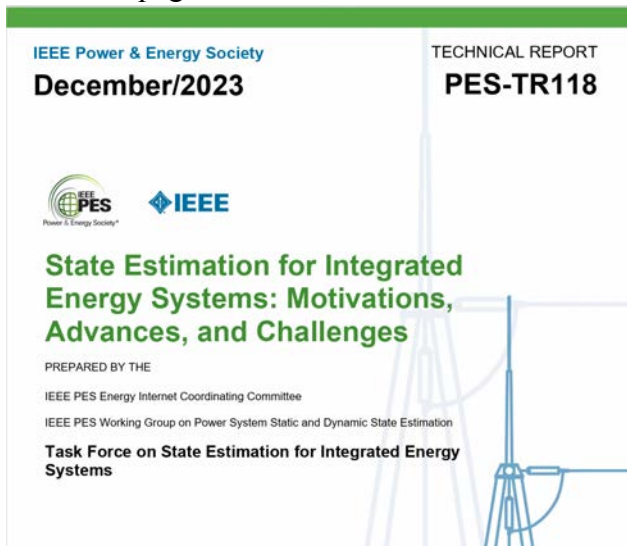


Figure 2: Structure of an IES.

The development of IES, i.e., the coordination of different energy sectors, can achieve the following benefits:

- Exploiting synergies and complementary advantages of various energy sectors for system design and operation.
- Carbon emission reduction by increasing the whole system's energy efficiency and flexibility.
- Facilitating the integration of local sustainable and renewable energy resources.
- Reduction of operational or delay of capital expenditure on energy systems.
- Cost-effective provision of flexibility to the electric power system.
- Improved system reliability and resilience.
- Opportunities for business innovation [10].

5) In PES GM 2023, in EICC,

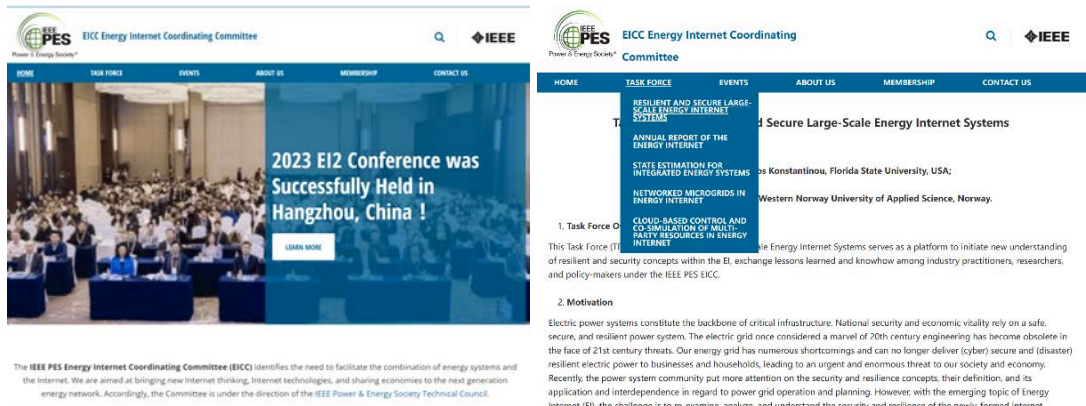
- a) 30 papers were received, 17 of them were accepted and presented at PES GM 2023.
- b) 2 panels session and 1 poster session in EICC
 - i. Data-Driven Approach for Multi-Party Resources in Energy Internet
 - ii. Digital Twins Applications in the Energy Internet Era

6) In PES GM 2024, in EICC,

- a) We have received **26 conference paper submissions** up to now.
- b) Also, we will organize 2 2-hour panels in total, entitled

- i. Definitions, Challenges, and Enabling Techniques for Energy Internet Paradigm
- ii. Towards a Resilient Energy Internet in a Changing Climate

7) We updated our website with the help of the PES technical council, with the latest events and TF's information in it, illustrated below:



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

1) Currently, there are 5 TFs in operation in EICC on different topics, for instance, Resilient and Secure Large-Scale Energy Internet Systems, State Estimation for Integrated Energy Systems, Cloud-Based Control, and Co-Simulation of Multi-Party Resources in Energy Internet.

Since they've been approved by the PES technical council, as well as our liaisons from other TCs, the TF members can expand their network with other scientists/engineers with similar interests, and improve the coordination between different entities on related topics.

2) Each year, the IEEE EI² conference is given a specific topic based on the latest trend in power engineering. In 2023, the topic has been “**Secure, Economic and Low-carbon Interconnected Energy System**”, which helped PES members rethink the development of our energy system, and also know more about the “Interconnected Energy System” and “Carbon neutrality” globally, thus benefiting every PES member and attendee.

3. Benefits to Volunteer Participants from the Committee Work:

They could increase their visibility in this research area, and get connected with some senior-level experts.

4. Recognition of Outstanding Performance:

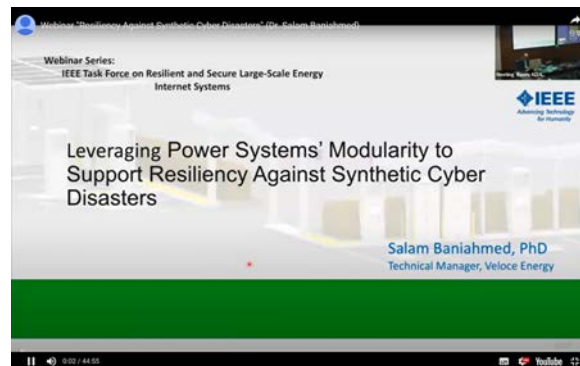
TF on Resilient and Secure Large-Scale Energy Internet Systems and their officers should be highly praised because their TF's work was rather well last year.

- Website: <https://cmte.ieee.org/pes-rsei/meeting-minutes/>
- Scope with detailed coordination plan with TCs
- 54 members currently
- Some webinars during 2022-2023
- Organized a panel session at IEEE PES GM 2023

Meeting Minutes

Webinar #5 – Meeting Minutes

- Title: "Leveraging Power Systems' Modularity to Support Resiliency Against Synthetic Cyber Disasters"
- Presenter: Dr. Salam Baniahmed (Technical Manager at Veloc Energy)
- Date: Tue, May 2 @ 12:00 PM - 1:00 PM (UTC)
- Attendance: 13+ attendees.
- Announcement: [IEEE PES Announcement_May2023_Webinar_Baniahmed](#)
- Meeting Minutes (PDF File): [Minutes_TFRSEI_Webinar5_05022023_v](#)
- Video Link: <https://www.youtube.com/watch?v=AvvYXQ1keNE>



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





We have confirmed 9 liaisons with PSOPE, SBLC, etc, listed below:

- Prof. Kai Strunz ED&PG TU Berlin
- Dr. Pengwei Du PSOPE Electric Reliability Council of Texas, Taylor, USA
- Eriks Surmanis T&D Power Delivery Consultants
- Prof. Stephen McArthur AMPS University of Strathclyde
- Dr. Babu Chalamala ESSB Sandia National Laboratories
- Prof. Claudio Canizares PSDP University of Waterloo
- Jeff Joy ICC Seattle City Light
- Bruce Forsyth Transformers Bruce Forsyth and Associates, PLLC, USA
- Linquan Bai SBLC UNC Charlotte

6. New Technologies of Interest to the Committee:

Pave the way towards low-carbon and carbon-neutral Integrated Energy Systems/Multi-energy carriers.

Related topics include but are not limited to:

-  Energy Hub
-  Multi-energy systems planning
-  Multi-energy systems operation
-  Multi-energy systems economy

7. Global Involvement & YP Involvement

PES is looking to increase involvement with members from Regions 8, 9 and 10 (Africa, Europe, Middle East, Latin America, Asia and Pacific). Please provide the following information.

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	Officers from regions 8,9 and 10	Subcommittee officers from regions 8, 9 and 10	Subcommittee members from regions 8,9, and 10
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8. Problems and Concerns:

- 1) Without on-site meetings, the working efficiency and enthusiasm of members from TFs and subcommittees could be reduced.
- 2) Lack of experience on how to encourage and improve activities of TFs.
- 3) Limited to technology and time, the frequency of website maintenance is usually low.

9. Significant Plans for the Next Period:

- 1) Try to encourage and improve the activities of TF in EICC.
- 2) The website construction on the concept of “Energy Internet” is not as helpful as planned, we still need better ideas to help IEEE PES members and engineers from all over the world to better understand the “Energy Internet” and contribute to this area.
- 3) Define the exact meaning and scope of “Energy Internet” at the level of Transactions or Journal papers, just like similar efforts had been made on the topics of resilience and stability. This achievement will bring real further impetus and visibility to the “Energy Internet” movement.

Submitted by: EICC officers

Date: 2024.2.19