IEEE I&CPS
—Asia 2023—

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IEEE INDUSTRY APPLICATIONS SOCIETY
Linking Research to Practice

Integration of Energy,
Information and Transportation for Green Future

2023 IEEE IAS Industrial and Commercial Power System Asia

Chongqing, China | July 7-9, 2023

CONFERENCE PROGRAM

TABLE OF CONTENTS

Welcome to IEEE I&CPS 2023

It is with great honor and pleasure to extend a warm invitation to you all for the upcoming 2023 IEEE IAS Industrial and Commercial Power System Asia (IEEE I&CPS Asia 2023). This prestigious event will take place in the vibrant city of Chongqing, China from July 7th to July 9th, 2023.

Under the theme of "Integration of Energy, Information, and Transportation for Green Future," our conference aims to provide participants with a high-quality experience. Keynote sessions, technical sessions, tutorial sessions, and special sessions will offer numerous opportunities for productive exchanges and the establishment of future partnerships.

This event will focus on a wide range of topics, including power systems engineering, energy systems, smart grids, renewable energy integration, and energy storage technologies. In addition, there will be exciting activities such as IAS committee meetings, the Ph.D. Dissertation Challenge, a special panel, a welcome reception, and a banquet dinner. We eagerly anticipate your active participation in these events.

We extend our deepest gratitude to our esteemed keynote speakers, Prof. Bikash Pal from Imperial College London, Prof. Claudio Canizares from the University of Waterloo and Prof. Zechun Hu from Tsinghua University. We are also delighted to welcome Ruijin Liao from Chongqing University and Yi Han from China Electrotechnical Society, who will provide a warm welcome at the opening ceremony.

This year, IEEE IAS I&CPS Asia 2023 received an overwhelming response from universities, research institutions, and industries worldwide. We received a substantial number of paper submissions, 394papers after carefully selected have been included in the regular paper program. We extend our sincere gratitude to the diligent authors and reviewers for their contributions during the rigorous review process.

We would like to express our heartfelt thanks to all the units and schools that attended this meeting.

In conclusion, I would like to express our gratitude to all the participants and wish each of you a productive and enjoyable conference experience in the beautiful city of Chongqing, China.

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Wei-Jen Lee, University of Texas at Arlington

Ruijin Liao, Chongqing University

Yi Han, China Electrotechnical Society

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SS001: Multi-market Equilibrium Analysis: Challenges and Solutions

Chair(s):

Donghan Feng, Shanghai Jiao Tong University
Yun Zhou, Shanghai Jiao Tong University
Hengjie Li, Lanzhou University of Technology

SS002: Resilience Enhancement Strategies for The New-type Power System Resist Extreme Events

Chair(s):

Yichen Shen, Shanghai Jiao Tong University
Heng Zhang, Shanghai Jiao Tong University
Shenxi Zhang, Shanghai Jiao Tong University

SS003: Smart and Interactive Energy Management for Multi-agent New Types of Power Systems

Chair(s):

Tianguang Lu, Shandong University
Changsen Feng, Zhejiang University of Technology
Kaiqi Sun, Shandong University

SS004: Joint Planning and Operation of Energy-transportation Integration System

Chair(s):

Qian Zhang, Chongqing University
Zhaohao Ding, North China Electric Power University

SS005: High-Quality Power Supply Technologies of Low-Carbon Distribution Systems

Chair(s):

Lu Zhang, China Agricultural University
Bo Zhang, China Agricultural University

SS006: Optimal Planning and Operation of Regional Integrated Energy Systems Under the Scalable Aggregation of Flexibility Resources

Chair(s):

Fangyuan Si, Tsinghua University

SS007: Key Technology of Power Balance Capability Evaluation and Improvement Considering Large-Scale Renewable Energy Integration

Chair(s):

Shuanglei Feng, China Electric Power Research Institute
Peng Li, Shandong University

SS008: National K&D Program "Research on Key Technologies and Simulation Platform of Collaborative Operation of Active Distribution Power System based on Multiple Flexibility Mining"

Chair(s):

Ming Yang, Shandong University
Zhaohao Ding, North China Electric Power University

SS009: Renewable Power Forecast Accuracy Improvement Technology and Its application

Chair(s):

Bo Wang, China Electric Power Research Institute
Jie Shi, University of Jinan

SS010: Flexible Mechanism, Analysis and Control of Power Systems with High Penetration of Renewable Energy

Chair(s):

Jia Liu, Hangzhou Dianzi University
Zao Tang, Hangzhou Dianzi University
Tingjian Liu, Sichuan University

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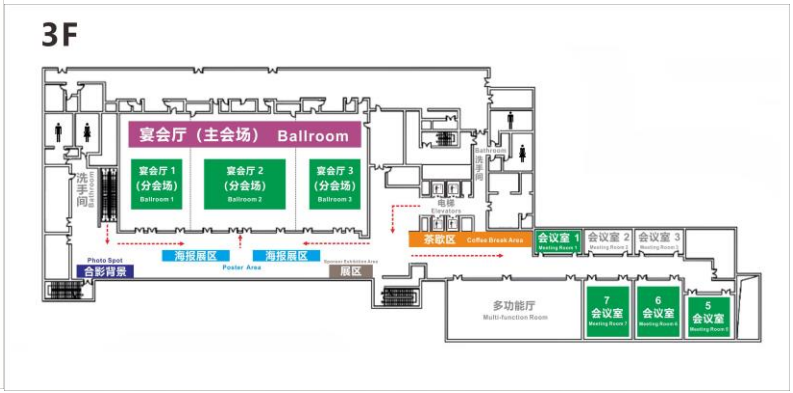
CONFERENCE VENUE

Holiday Inn Chongqing University Town

No. 26 South Road, University Town, Shapingba District. Chongqing, P.R.China

CONFERENCE ROOMS:

Level	Meeting Room	July 7	July 8	July 9
3F	Ballroom		★	★
3F	Ballroom 1		★	★
3F	Ballroom 2		★	★
3F	Ballroom 3		★	★
3F	Meeting Room 1		★	★
3F	Meeting Room 5		★	★
3F	Meeting Room 6		★	★
3F	Meeting Room 7	★	★	★



AGENDA OVERVIEW

Sign-in & Conference Materials Collection	**7/7-7/9 10:00-18:00** @Lobby of Holiday Inn Chongqing University Town

July 7, 2023 | Friday		
Time	**Activity**	**Venue**
12:00-14:00	**Tutorial: AI and Optimization Techniques for Low-Carbon Power System Operation**	Meeting Room 7
14:00-14:30	Coffee Break @ Foyer of Meeting Room 7	
14:30-17:00	**IAS Committee Activity**	
18:00-20:00	Dinner @ TASTE All Day Dining Restaurant	

July 8, 2023 | Saturday		
Time	**Activity**	**Venue**
	Opening Ceremony Chair: **Sidun Fang**, Chongqing University	
8:45-8:50	**Opening Remarks** **Ruijin Liao**, Chongqing University	Ballroom
8:50-8:55	**Opening Remarks** **Yi Han**, China Electrotechnical Society	
8:55-9:00	**TPC Report** **Sidun Fang**, Chongqing University	
	Keynote Speech Chair: **Sidun Fang**, Chongqing University	
09:00-09:50	**Keynote Speech 1: Energy Storage Systems** **Claudio Cañizares**, University of Waterloo	
09:50-10:20	Coffee Break @ Foyer of Ballroom	
10:20-11:10	**Keynote Speech 2: Frequency Security and Stability Constrained Power System Dispatch and Control Considering High Penetration of Renewable Energy** **Zechun Hu**, Tsinghua University	Ballroom
11:10-12:00	**Keynote Speech 3: Stability Modelling and Analysis of Converter Driven Power System** **Bikash Pal**, Imperial College London	

12:00-13:30	Lunch @ TASTE All Day Dining Restaurant	
13:30-15:00	**Session 1:** Smart Grid-Novel Information Technologies for Smart Grid	Ballroom 1
	Session 2: Flexible Mechanism, Analysis and Control of Power Systems with High Penetration of Renewable Energy **(Special Session)**	Ballroom 2
	Session 3: Key Technology of Power Balance Capability Evaluation and Improvement Considering Large-Scale Renewable Energy Integration **(Special Session)**	Ballroom 3
	Session 4: Energy Systems-Multi-energy System	Meeting Room 7
	Session 5: Renewable Energy Integration-High Penetration of Renewable Energy	Meeting Room 1
	Session 6: Power System Engineering--Power System Operation	Meeting Room 5
	Session 7: Power System Engineering--Power System Planning	Meeting Room 6
15:00-15:30	Coffee Break @ Foyer of Ballroom	
15:30-17:30	**Panel:** Women Participation in Energy, Information and Transportation for Green Future	Ballroom 1
	Session 8: Energy Storage Technologies-Energy Storage Planning and Operation	Ballroom 2
	Session 9: Key Technology of Power Balance Capability Evaluation and Improvement Considering Large-Scale Renewable Energy Integration **(Special Session)**	Ballroom 3
	Session 10: Energy Systems-Multi-energy System	Meeting Room 7
	Session 11: National K&D Program "Research on Key Technologies and Simulation Platform of Collaborative Operation of Active Distribution Power System based on Multiple Flexibility Mining" **(Special Session)**	Meeting Room 1
	Session 12: Power System Engineering--Power System Operation	Meeting Room 5
	Session 13: Power System Engineering-Power System Control	Meeting Room 6
Banquet & Award Ceremony Chair: **Sidun Fang**, Chongqing University		
18:30-20:30	**Best Paper / Best Student Paper / Best Industrial Paper** Chaired by **Ruijin Liao**, Chongqing University	Ballroom
	Lucky Draw Chaired by **Zhenyuan Zhang**, University of Electronic Science and Technology of China	

July 9, 2023 | Sunday		
Time	**Activity**	**Venue**
09:00-10:15	**Session 14:** High-Quality Power Supply Technologies of Low-Carbon Distribution Systems **(Special Session)**	Ballroom 2
	Session 15: Resilience Enhancement Strategies for The New-type Power System Resist Extreme Events **(Special Session)**	Ballroom 3
	Session 16: Smart Grid-Microgrid	Meeting Room 7
	Session 17: Power System Engineering-Power System Operation	Meeting Room 1
	Session 18: Renewable Energy Integration-Renewable Energy Development and Integration	Meeting Room 5
	Session 19: Joint Planning and Operation of Energy-transportation Integration System **(Special Session)**	Meeting Room 6
10:00-12:00	**Ph.D. Dissertation Challenge**	Ballroom 1
10:15-10:45	Coffee Break @ Foyer of Ballroom	
10:45-12:00	**Session 20:** High-Quality Power Supply Technologies of Low-Carbon Distribution Systems **(Special Session)**	Ballroom 2
	Session 21: Resilience Enhancement Strategies for The New-type Power System Resist Extreme Events **(Special Session)**	Ballroom 3
	Session 22: Smart Grid-Microgrid	Meeting Room 7
	Session 23: Smart Grid-Low-carbon Power System	Meeting Room 1
	Session 24: Renewable Energy Integration-Renewable Energy Development and Integration	Meeting Room 5
	Session 25: Joint Planning and Operation of Energy-transportation Integration System **(Special Session)**	Meeting Room 6
12:00-13:30	Lunch @ TASTE All Day Dining Restaurant	
13:30-15:30	**Session 26:** Renewable Power Forecast Accuracy Improvement Technology and Its application **(Special Session)**	Ballroom 1
	Session 27: Multi-market Equilibrium Analysis: Challenges and Solutions **(Special Session)**	Ballroom 2
	Session 28: Optimal Planning and Operation of Regional Integrated Energy Systems Under the Scalable Aggregation of Flexibility Resources **(Special Session)**	Ballroom 3
	Session 29: Renewable Energy Integration-Renewable Energy Development and Integration	Meeting Room 7
	Session 30: Power System Engineering-Power System Protection	Meeting Room 1
	Session 31: Energy Systems-Distributed Energy Resources	Meeting Room 5
	Session 32: Smart Grid-Novel Information Technologies for Smart Grid	Meeting Room 6
15:30-16:00	Coffee Break @ Foyer of Ballroom	

16:00-18:00	**Session 33:** High-Quality Power Supply Technologies of Low-Carbon Distribution Systems **(Special Session)**	Ballroom 2
	Session 34: Smart and Interactive Energy Management for Multi-agent New Types of Power Systems **(Special Session)**	Ballroom 3
	Session 35: Energy Storage Technologies-Real-time Monitoring of Energy Storage	Meeting Room 7
	Session 36: Power System Engineering-Power System Protection	Meeting Room 1
	Session 37: Energy Systems-Energy Efficiency & Energy Systems-Low-carbon Energy System	Meeting Room 5
	Session 38: Renewable Energy Integration-Evaluation of Renewable Energy & Renewable Energy Integration-High Penetration of Renewable Energy	Meeting Room 6

KEYNOTE SPEAKER

Host	Sidun Fang, Chongqing University
Venue	Ballroom
Time	09:00-09:50, July 8, 2023
Online Zoom ID	816 1606 9040
Link	https://us02web.zoom.us/j/81616069040

Claudio Cañizares

University of Waterloo

Bio: Dr. Claudio Cañizares is a University Professor and the Hydro One Endowed Chair at the Electrical and Computer Engineering (E&CE) Department, and the Executive Director of the Waterloo Institute for Sustainable Energy (WISE) at the University of Waterloo, where he has held various academic and administrative positions since 1993 and has received multiple recognitions, especially the 2021-2022 Awards of Excellence in Graduate Supervision at both the University and Faculty of Engineering levels. He obtained the Electrical Engineer degree from the Escuela Politécnica Nacional (EPN) in Quito-Ecuador in 1984, where he held different academic and administrative positions between 1983 and 1993, and his MSc (1988) and PhD (1991) degrees in Electrical Engineering are from the University of Wisconsin-Madison. His research activities focus on the study of stability, control, optimization, modeling, simulation, and computational issues in bulk power systems, microgrids, and energy systems in the context of competitive energy markets, smart grids, and energy access. In these areas, he has led or been an integral part of many grants and contracts from government agencies and private companies worth millions of dollars, and has collaborated with multiple industry and university researchers in Canada and abroad, supervising/co-supervising close to 180 research fellows and graduate students. He has authored/co-authored over 370 publications that have exceeded 29,000 citations at a 77 H-index, including journal and conference papers, technical reports, book chapters, disclosures and patents, and has been invited to deliver keynote speeches, seminars, tutorials, and presentations at many prestigious venues worldwide. He is the Editor-In-Chief of the Institute of Electrical & Electronic Engineering (IEEE) Transactions on Smart Grid; the 2022-2023 IEEE Division VII Director of the IEEE and Power & Energy Society (PES) Boards; and a Fellow of the IEEE, a Fellow of the Canadian Academy of Engineering, and a Fellow of the Royal Society of Canada, where he was the Director of the Applied Science and Engineering Division of the Academy of Science from 2017 to 2020. He is also the recipient of the 2017 IEEE PES Outstanding Power Engineering Educator Award, the 2016 IEEE Canada Electric Power Medal, and of multiple IEEE PES Technical Council and Committee awards and recognitions, holding leadership positions in several IEEE-PES Committees, Working Groups, and Task Forces.

Speech Title: Energy Storage Systems

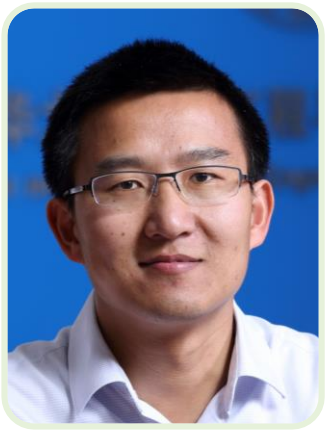
Abstract: As the penetration of variable renewable generation increases in power systems, issues such as grid stiffness, larger frequency deviations, and grid stability are becoming more relevant. In this context, Energy Storage Systems (ESSs) are proving to be effective in facilitating the integration of renewable resources, and thus are being widely deployed in both microgrids and large power grids. This talk will review several energy storage technologies, particularly Compress Air Energy Storage (CAES), flywheels, batteries, and thermal energy systems, and their modeling and applications for power systems. An overview will be provided of the work being carried out by Prof. Canizares' group at the University of Waterloo on all these energy storage systems, focusing on novel models and applications in microgrids and distribution and transmission grids for system stability and control, in particular for frequency regulation.

KEYNOTE SPEAKER

Host	Sidun Fang, Chongqing University
Venue	Ballroom
Time	10:20-11:10, July 8, 2023
Online Zoom ID	816 1606 9040
Link	https://us02web.zoom.us/j/81616069040

Zechun Hu

Tsinghua University



Bio: Zechun Hu is an associate professor (tenured) of Tsinghua University at Department of Electrical Engineering. He received the B.S. and Ph.D. degrees from Department of Electrical Engineering, Xi'an Jiao Tong University, Xi'an, China, in 2000 and 2006, respectively. He worked in Shanghai Jiao Tong University after graduation and was a research officer of University of Bath, UK from 2009 to 2010. He joined Tsinghua University in 2010. His major research interests include optimal planning and operation of power systems, electric vehicle integration into power system, energy storage systems, and electricity markets. In the past 12 year, he has worked on more than 20 projects to solve the problems of the optimal integration of electric vehicle into power systems and more than 10 projects related to power system frequency control, which are supported by the government, domestic and international companies. He has published more than 240 peer-reviewed papers (with more 180 journal papers) that have more than 10000 citations and two books. He was selected as the Most Cited Chinese Researchers of 2020-2022 by Elsevier. He won serval first-grade prizes awarded by Ministry of Education of China, Chinese Electrotechnical Society, etc. He served/serves as an associate editor of IEEE Transactions on Transportation Electrification, IET Smart Grid, Energy Conversion and Economics, Power System Technology. He received the best paper award by IEEE Transactions on Power Systems in 2020.

Speech Title: Frequency Security and Stability Constrained Power System Dispatch and Control Considering High Penetration of Renewable Energy

Abstract: With the rapid increase of renewable energy integration, power system dispatch and control are facing challenges to maintain the frequency security and stability requirements because of the volatile, randomness and low-inertia characteristics of the renewable generations. Traditional, for the classical power system dispatch problems, e.g. unit commitment and economic dispatch, the frequency security and stability constraints are not considered. And, only the traditional generators are considered for frequency control resources. However, with the increase of power fluctuation and reduce of inertia in modern power systems, more and more researchers are considering frequency security constraints in the dispatch problems. And new control resources and strategies are proposed for frequency regulation to maintain both frequency control performance and frequency security of the evolving power system. This presentation will cover the primary, secondary and tertiary frequency control problems. Framework and basic principles of these frequency control problems will be briefly reviewed first. For tertiary frequency control, the unit commitment and economic dispatch problems considering the frequency security constraints will be discussed. The emphasize will be on the methods to deal with linearization of nonlinear frequency security constraints. The economic dispatch method considering the secondary frequency control cost will be also introduced. For the secondary frequency control problem, the stability analysis of load frequency control systems with multiple delays will be explained. Then a reinforcement learning based coordinated but differentiated load frequency control method considering multi-type frequency regulation resources will be introduced and simulation results will be shown. Making use of the flexibility of the inverter-Based Resources, the idea of setting the primary frequency control parameters dynamically to ensure frequency stability will be explained. Finally, the future research directions will be discussed.

KEYNOTE SPEAKER

Host	Sidun Fang, Chongqing University
Venue	Ballroom
Time	11:10-12:00, July 8, 2023
Online Zoom ID	816 1606 9040
Link	https://us02web.zoom.us/j/81616069040

Bikash Pal

Imperial College London

Bio: Bikash Pal is a Professor of Power Systems at Imperial College London (ICL). He is research active in power system stability, control, and estimation. Currently he is leading a six university UK-China research consortium on Resilient Operation of Sustainable Energy Systems (ROSES) as part of EPSRC-NSFC Programme on Sustainable Energy Supply. He led UK-China research consortium project on Power network stability with grid scale storage (2014-2017): He also led an eight- university UK-India research consortium project (2013-2017) on smart grid stability and control. His research is conducted in strategic partnership with ABB, SIEMENS, GE Grid Solutions, UK, and National Grid, UK. UK Power Networks. SIEMENS R&D collaborated with him to develop fast power flow and volt-var control tools in Spectrum Power, an advanced module for distribution management system solution from SIEMENS. This is now commissioned in distribution control centres in Columbia, Bosnia Norway and Azerbaijan serving 15 million customers in these countries. GE commissioned sequel of projects with him to analyse and solve wind farm HVDC grid interaction problems (2013-2019). Prof Pal was the chief technical consultant for a panel of experts appointed by the UNFCCC CDM (United Nations Framework Convention on Climate Change Clean Development Mechanism). He has offered trainings in Chile, Qatar, UAE, Malaysia and India in power system protections, stability and control topics. He has developed and validated a prize winning 68-bus power system model, which now forms a part of IEEE Benchmark Systems as a standard for researchers to validate their innovations in stability analysis and control design. He was the Editor-in-Chief of IEEE Transactions on Sustainable Energy (2012-2017) and Editor-in-Chief of IET Generation, Transmission and Distribution (2005-2012). He is Vice President, PES Publications (2019-). In 2016, his research team won the President's outstanding research team award at Imperial College London (ICL). He is Fellow of IEEE for his contribution to power system stability and control. He is an IEEE Distinguished Lecturer in Power distribution system estimation and control. He has published about 125 papers in IEEE Transactions and authored four books in power system modelling, dynamics, estimations and control. He was Otto Monstead Professor at Denmark Technical University (DTU) (2019) and Mercator Professor sponsored by German Research Foundation (DFG) at University of Duisburg-Essen in 2011. He worked as faculty at IIT Kanpur, India. He holds a Visiting Professorship at Tsinghua University, China.

Speech Title: Stability Modelling and Analysis of Converter Driven Power System

Abstract: The number of power electronics converters connected to electrical networks has been growing exponentially as they are part of all new generation connected to the grid. While the rapid control and fast electronic switching available with this technology offer flexibility in network operation, the dynamic interactions between several of them threaten the operational stability of the transmission grid is a concern. It is required to develop a methodology for identifying the risks associated with the stability and control interaction before a new power electronic device (e.g. Windfarm, interconnector, STATCOM) is introduced to the network The talk will focus on an analytical framework in impedance domain to quantify the interaction between the new plant and the rest of the network for setting additional grid connection study specifications which will include detail technical study to check and mitigate the risks associated with new power electronics interfaced generation. The framework developed is to support MMC technology, control delay, system strength and FRT capability of dynamic voltage support devices and windfarm through technical case study conducted at the research group of Bikash Pal at Imperial College London. Future research challenges and opportunities will be highlighted.

TUTORIAL

Room	Meeting Room 7	Time	12:00-14:00, July 7, 2023
Online Zoom ID	816 1606 9040	Link	https://us02web.zoom.us/j/81616069040

Tutorial: AI and Optimization Techniques for Low-Carbon Power System Operation

Chair: Wei Lin, The Hong Kong Polytechnic University

Abstract:

Over the last few decades, climatic changes have become a global concern due to the burning of fossil fuels, while CO2 from power sectors neared 14.6 Gt in 2021. Numerous countries have proposed national strategies for low-carbon power systems to promote energy shares of renewable resources. However, such renewable resources cast challenges in securely and economically operating power systems. In this session, we will discuss how to resolve these challenges by leveraging the latest AI and optimization techniques. Particularly, we will focus on the following three sub-sections:

- AI for Renewable Generations in Low-Carbon Power System. The integration of renewable energy resources is crucial for transitioning towards low-carbon power systems, however, their variable and uncertain nature can lead to instability and secure operation challenges. This sub-section focuses on utilizing AI to overcome these challenges by accurately predicting the intermittency of renewable energy sources and forecasting energy output via advanced machine learning models, leading to more stable and efficient power system planning and operation. The potential of AI to enhance the reliability and efficiency of renewable energy integration will be highlighted.
- Deep Learning-based Transmission Line Screening for Unit Commitment (UC). To attain low-carbon power systems, transmission line screening plays a crucial role in enhancing the efficiency of the transmission grid, reducing energy waste, and minimizing the environmental impact of transmission infrastructure. In this sub-section, a deep learning-based approach will be introduced to identify superfluous network constraints that can be safely removed from UC. This is achieved through a novel regression-based classification approach, where a regression model is used to predict line loading levels by leveraging the temporal relationship between past line loading levels, nodal demands, and future line loading levels, and various thresholds are applied to categorize transmission line capacity constraints as essential or not for UC.
- Optimization-Based Management of Distributed Energy Resources (DERs). With the benefits of near-zero carbon emissions and lower operating costs, DERs have been experiencing tremendous expansion in distribution networks. The management of numerous DERs needs to be optimized by the distribution network operator within limited time considering their different stakeholders. One challenge is the non-convexities arising from operational constraints. In this sub-section, a novel linear model will be introduced to efficiently manage DERs by providing theoretical guarantees on 1) physical implementations of the resultant dispatch, and 2) dispatch incentivize of different stakeholders.

Speakers:

Name	Affiliation	Speech Title
Bing Yan	Rochester Institute of Technology	Deep Learning-based Transmission Line Screening for Unit Commitment (UC)
Wenjie Zhang	The Hong Kong Polytechnic University	Uncertainty Quantification in Generation (Storage)
Wei Lin	The Hong Kong Polytechnic University	Distributed Energy Resource (DER) Coordination with Performance Guarantees

Speaker

Bing Yan

Rochester Institute of Technology

Bio: Dr. Bing Yan is currently an assistant professor in the Department of Electrical and Microelectronic Engineering at Rochester Institute of Technology. She received the B.S. degree in information management and information system from Renmin University of China in 2010, M.S. degrees in electrical engineering and statistics from University of Connecticut in 2012 and 2017, respectively, and Ph.D. degree in electrical engineering from University of Connecticut in 2016. Before joining Rochester Institute of Technology, she was an assistant research professor in the Department of Electrical and Computer Engineering, University of Connecticut. Dr. Yan's research interests include operation optimization of smart power and energy systems, planning and scheduling of intelligent manufacturing systems, self-optimizing factories, and mathematical optimization of large-scale mixed-integer linear programming problems. She published more than 40 peer-reviewed journal articles and conference proceedings in power and energy society, and robotics and automation.

Title: Deep Learning-based Transmission Line Screening for Unit Commitment (UC)

Abstract: To attain low-carbon power systems, transmission line screening plays a crucial role in enhancing the efficiency of the transmission grid, reducing energy waste, and minimizing the environmental impact of transmission infrastructure. In this talk, a deep learning-based approach will be introduced to identify superfluous network constraints that can be safely removed from UC. This is achieved through a novel regression-based classification approach, where a regression model is used to predict line loading levels by leveraging the temporal relationship between past line loading levels, nodal demands, and future line loading levels, and various thresholds are applied to categorize transmission line capacity constraints as essential or not for UC.

Speaker

Wenjie Zhang

The Hong Kong Polytechnic University

Bio: Dr. Wenjie Zhang holds a Bachelor of Engineering degree from the School of Artificial Intelligence and Automation at Huazhong University of Science and Technology in China, which he obtained in 2015. In 2020, he received his Doctor of Philosophy in electrical and computer engineering from the National University of Singapore. In 2019, he served as a visiting scholar at Stanford University. Since 2019, Dr. Zhang has worked as a lead data scientist and AI consultant for several public companies in the FinTech and semiconductor domains. Currently, he is a Research Assistant Professor in the Department of Electrical Engineering at the Hong Kong Polytechnic University. Dr. Zhang's research interests focus on explainable and trustworthy AI and its applications in smart grids, with a broad scope encompassing big data analytics and multimodal learning. He has secured more than seven internal industrial funding awards as the principal investigator and served as a principal researcher in four national research projects supported by government agencies such as the Energy Market Authority in Singapore and AI@SG.

Title: Uncertainty Quantification in Generation (Storage)

Abstract: Uncertainty quantification (UQ) is essential in managing power generation and storage systems due to unpredictable elements such as fluctuating renewable energy production and power demand. This presentation will provide an overview of the significance and challenges associated with UQ in the domain of energy generation and storage. To tackle these challenges, the presentation will introduce methods for accurate UQ in generation and storage at two distinct levels. Specifically, at the generation level, a probabilistic approach with quantile forecasts will be presented for quantifying uncertainties in power production, including the related applications and implementation strategies. At the storage level, techniques to manage and quantify uncertainties in energy storage systems that are "invisible" will be discussed, which involve integrating these systems into the grid. These methods aim to improve the reliability and efficiency of the overall energy system by effectively quantifying uncertainties.

Speaker

Wei Lin

The Hong Kong Polytechnic University

Bio: Dr. Wei Lin received his B.E., and Ph.D. degrees from Chongqing University, China, in 2016, and 2021, respectively. He was a visiting research scholar at the University of Connecticut, from 2019 to 2020. Before working as a postdoctoral fellow at The Hong Kong Polytechnic University on September 2022, he was a postdoctoral fellow at The Chinese University of Hong Kong. His research interests include the coordination of complex systems, electricity markets, and AI in energy. He has published more than 20 peer-reviewed papers in recognized journals and conferences. He participated in more than 10 projects, including National Key R&D Programs of China, HK RGC projects, and ISO-NE projects. He was a committee member of the 2022 IEEE ISGT-Asia, the technical program chair of the CEEPE 2022, and the skeleton member of the IEEE PES Composite System Reliability Task Force. He is an owner of the 2022 Power Science and Technology Progress Award (Third-class Prize) of Chinese Society for Electrical Engineering.

Title: Distributed Energy Resource (DER) Coordination with Performance Guarantees

Abstract: With the benefits of near-zero carbon emissions and lower operating costs, DERs (e.g., rooftop PV, distributed generators, battery storages) have been experiencing tremendous expansion in distribution networks. A good coordination manner plays a vital role in managing such DERs. This presentation will briefly review the opportunities and challenges of DER coordination. To securely and efficiently manage such DERs, this presentation will introduce techniques with performance guarantees for DER coordination at two different levels. Particularly, for the distribution-level coordination, a linear model with feasibility guarantees will be exhibited to manage DERs within the distribution network itself, together with the relevant extended applications and implementation strategy. For the transmission-level coordination, the techniques to aggregate DERs as virtual power plants will be introduced under performance guarantees.

IAS Committee Activity

Room	Meeting Room 7	Time	14:30-17:00, July 7, 2023

IAS Committee Activity

Chair: Sidun Fang, Chongqing University

Abstract:

With the growing concerns for the environmental crisis, renewable energy integration becomes an irreversible trend for the future energy system. IEEE Industry Applications Society (IAS) always focus on the application-oriented research and has launched two committees under ESC: MG&VPP and DER in 2022. This is the first joint committee activity in China and we have invited three experts in this field to discuss the emerging research topics in uncertainties of DER and the control for networked systems.

Speakers

Name	Affiliation	Speech Title
Yu Wang	Chongqing University	Coordinated Control of Cyber-Physical Networked Microgrids
Yue Song	Tongji University	Network-based power system analysis
Zhenyuan Zhang	University of Electronic Science and Technology of China	Dynamic Equivalent Modeling and Uncertainty Quantification of High-penetration Renewable Energy Power Systems

Speaker

Yu Wang

Chongqing University

Bio: Yu Wang (Senior Member, IEEE) received the B.Eng. degree in School of Electrical Engineering and Automation from Wuhan University, Wuhan China, and the M.Sc. and Ph.D. degree in Power Engineering from Nanyang Technological University, Singapore. Currently, he is a professor at Chongqing University. He was a Marie Skłodowska-Curie Individual Fellow with Control and Power Group, Department of Electrical and Electronic Engineering, Imperial College London. His research interests include microgrid control and stability, power system operation and control, and artificial intelligence in smart grid.

Title: Coordinated Control of Cyber-Physical Networked Microgrids

Abstract: The electrical system of networked microgrids and communication-assisted control system form typical cyber-physical power systems. In the physical layer, the integration of a large number of distributed, power electronic-based, uncertain resources presents significant challenges to the stable and secure operation of networked microgrids, requiring the development of more flexible and efficient control and operation methods. In the cyber layer, the presence of numerous low-security, multi-agent, and distributed control and communication nodes significantly increases the cyber risks in this system. It necessitates the analysis, control, and operation design of solutions to enhance the system cyber resilience. This report will first introduce the research background and relevant projects, followed by discussing the issues and challenges of coordinated control in networked microgrids. Subsequently, we will provide a detailed overview of our research work in the field of coordinated control in cyber-physical networked microgrids, including multi-time-delay stability analysis, cyber-resilience control, hierarchical distributed control design, and secure reinforcement learning for networked microgrid frequency control.

Speaker

Yue Song

Tongji University

Bio: Yue Song (Member, IEEE) received the B.S. and M.S. degrees in electrical engineering from Shanghai Jiao Tong University, Shanghai, China, in 2011 and 2014, respectively, and the Ph.D. degree in electrical engineering from The University of Hong Kong, Hong Kong, in 2017. He was a Research Assistant Professor with the Department of Electrical and Electronic Engineering, The University of Hong Kong. He is currently an Associate Professor with the Department of Control Science and Engineering, Tongji University, His research interests include control theory, network science, and optimization theory with application to energy systems.

Title: Network-based power system analysis

Abstract: The traditional power system analysis is oriented to the node side, e.g., how the models and parameters of generators and loads influence the system performance. Meanwhile, power network topologies are simply treated as some coefficients in the system model. However, power systems are essentially complex systems with network topology embedded into dynamics. The growing flexibility in network topologies in future grids (enabled by advanced power electronics and controls) further necessities the study of power systems from a network perspective. This talk surveys the recent progress on network-based results that explicitly explore the role of network topology in system dynamics and dispatch. It establishes a new analytical framework where the system behaviors are characterized by graph concepts using graph theory tools. The obtained results provide new insights into some classic stability topics that have not been satisfactorily addressed by the traditional node-based analysis. Also, it helps to exploit the capability of network flexibility in security issues in high-renewable systems.

Speaker

Zhenyuan Zhang

University of Electronic Science and Technology of China

Bio: Zhenyuan Zhang, Professor in School of Mechanical and Electrical Engineering, at the University of Electronic Science and Technology of China (UESTC), Chengdu, China. His focus lies in smart grids and arc flash research, but he has also been involved in power system analysis, renewable energy, electrical safety analysis, and power market researches. He has published more than 90 technical papers, where more than 40 SCI journal papers, and has participated in more than 20 research projects as Principal Investigator or Co-Principal Investigator from many sources of funding. He served as the Secretary of IEEE IAS ESC/DER Committee, Associate Editor of IEEE Transactions on Industry Applications, Associate Editor of International Journal of Numerical Modelling: Electronic Networks, Devices and Field, Editor of Protection and Control of Modern Power Systems. He has been invited to delivery keynote speeches and invited talks at major international conferences and universities. He was the General Chair of 2021 AEEES, Secretary in General of 2019 IEEE ISGT ASIA and 2021 IEEE I&CPS ASIA, TPC Vice-Chair of 2020 IEEE I&CPS ASIA. He is of receipt of several IEEE awards, such as Prize Paper Award of IEEE Transactions on Industry Applications, IEEE IAS Ralph Lee Award, IEEE PES-China Outstanding Volunteer Award, IEEE IAS I&CPS Department Prize Paper Awards, IEEE IAS Electrical Safety Prevention through Design Engineering Education Initiative, etc.

Title: Dynamic Equivalent Modeling and Uncertainty Quantification of High-penetration Renewable Energy Power Systems

Abstract: Due to the unsustainable fossil fuel consumption and its raised environmental concerns, large-scale exploitation and utilization of renewable energy, such as wind power generation, became one of the most prominent features of modern power system. To ensure the system stability and pre-diagnosis the operation risks, an accurate dynamic models of renewable energy resources, such as wind farm is necessary for large-scale power system analysis.

However, the detailed wind farm model may contain dozens or even hundreds of wind turbines and bunch of other servicing facilities, which could significantly enlarge the size of model and then lead "curse of dimensionality". Therefore, the equivalent model, on the basis of reasonable reduction from detailed model, is essential to be developed. This presentation will introduce the current research development on large-scale renewable energy dynamic equivalent modeling, and its corresponding applications on power system stability assessment. The method of time-series based clustering, multi-objective optimization based on-line parameter identification, multi-machine equivalent modeling, and probabilistic stability assessments are also discussed.

PANEL

Room	Ballroom 1	Time	15:30-17:30, July 8, 2023
Online Zoom ID	816 1606 9040	Link	https://us02web.zoom.us/j/81616069040

Panel: Women Participation in Energy, Information and Transportation for Green Future

Abstract:

Innovative, energetic, creative, and sustainable minds of women are helping to drive the changes in the "Energy, Information and Transportation for Green Future". Together we are moving to a more sustainable future. Discover how women professionals in IEEE Industry Applications Society and IEEE Power Engineering Society can support the tomorrow to create a better future. Introduce the IEEE Industry Applications Society (IAS), IEEE Power & Energy Society (PES) and IEEE PES Women in Power (WIP) to encourage more females to join in, for powering a sustainable green future.

Panel Chair

Prof. Juan Yu

Chongqing University

Bio: Yu Juan, IEEE Senior member, professor, serves as deputy director of the Center for Electric Power and Energy Reliability Research, Chongqing University. She is mainly engaged in deep learning and big data technology applications, risk assessment and control of electric power and energy systems. She hosted and participated in more than 40 scientific research projects, and published more than 100 papers. 36 national invention patents were granted. She won the first prize of China Electric Power Science and Technology Award, the first prize of Chongqing Science and Technology Award, the second prize of Science and Technology Award of the Ministry of Education, and the nomination prize of 100 Excellent Doctoral Dissertations in China. She used to serve Chairman of Task Force on Reliability Assessment of IEEE PES, Chairman of IEEE PES Chongqing chapter, and other international academic organizations and conferences.

Welcome Speeches

Name	Affiliation
Prof. Ruijin Liao	IEEE I&CPS-Asia 2023 Conference Chair
Dr. Jessica Bian	President, IEEE Power Engineering Society (PES)
Prof. Chaohong Bie	President, IEEE PES China Chapter Council (IEEE PCCC) Vice President, Xi 'an Jiaotong University
Prof. Ruomei Li	Honor President, IEEE PES Women in Engineering (WIP)

Speaker

Prof. Ruijin Liao

IEEE I&CPS-Asia 2023 Conference Chair

Bio: Prof. Ruijin Liao is a professor at the School of Electrical Engineering of Chongqing University, a doctoral supervisor, a special Professor of Cheung Kong Scholars of the Ministry of Education, a winner of the National Outstanding Youth Science Fund, a national candidate for the Millions of Talents Project, a cross-century Outstanding talent of the Ministry of Education, a highly cited Scholar of Elsevier 2019-2021, and a member of the Department of Energy and Transportation of the Ministry of Education. Leader of the innovation research group of the National Natural Science Foundation, Chief scientist of the National Key Research and Development Plan, member of the seventh Discipline evaluation group of the Academic Degrees Committee of The State Council (Electrical Engineering).

His research interests include multi-physical field simulation analysis and software development of electric power equipment, advanced digital twin technology of electric power equipment, advanced electrical material technology, intelligent monitoring of energy storage, intelligent integrated energy technology and intelligent monitoring and life management of electric power equipment.

Speaker

Dr. Jessica Bian

President, IEEE Power Engineering Society (PES)

Bio: Jessica Bian is a visionary leader and architect who has spearheaded the electric industry's reliability metrics and grid-risk assessment. She is currently with Grid-X Partners. Before that, she was with the Federal Energy Regulatory Commission, Washington, D.C. Previously, she was the director of performance analysis at the North American Electric Reliability Corporation (NERC) in Atlanta, Georgia. Under her leadership, a total of 18 industry-wide reliability indicators were established for the first time to determine grid reliability, adequacy, and associated risks. She is widely recognized as a pioneer and trusted world leader in the field.

Before joining NERC, Bian was with PJM, ERCOT, and Westinghouse Electric. She received her B.Sc. degree from the Taiyuan University of Technology, China, her M.Sc. degree from the Electric Power Research Institute, Beijing, China, and her Ph.D. degree from Tulane University, New Orleans, Louisiana. Bian has had more than 70 articles published, and she received the 2014 PES Wanda Redder Pioneer in Power Award for her technical achievements. She is a Senior Member of the IEEE and the IEEE PES President.

Dr. Jessica Bian is the President of the IEEE Power & Energy Society (PES). is a visionary leader and architect who has spearheaded the electric industry's reliability metrics and grid-risk assessment. She is currently with Grid-X Partners. Before that, she was with the Federal Energy Regulatory Commission, Washington, D.C. Previously, she was the director of performance analysis at the North American Electric Reliability Corporation (NERC) in Atlanta, Georgia. Under her leadership, a total of 18 industry-wide reliability indicators were established for the first time to determine grid reliability, adequacy, and associated risks. She is widely recognized as a pioneer and trusted world leader in the field.

Speaker

Prof. Chaohong Bie

President, IEEE PES China Chapter Council (IEEE PCCC)

Vice President, Xi 'an Jiaotong University

Bio: Prof. Chaohong Bie is the President of IEEE PES China Chapter Council (IEEE PCCC). She is a professor and doctoral supervisor from Xi 'an Jiaotong University. She is a Distinguished Professor of Changjiang Scholars. She is currently the vice president of Xi 'an Jiaotong University as well as the Dean of School of Electrical Engineering. She is the Director of Shaanxi Smart Grid Key Laboratory.

She is long engaged in electric power system planning and the basis of reliability theory key technology research and development, efficient algorithm in complex power system reliability assessment theory and power system modeling and many random factors and probabilistic analysis. She has made series of research achievements, form the key technology of new energy power system comprehensive planning.

She has presided over the development of the first microgrid standard in the world, promulgated and implemented it, and filled the international gap. For this, she won the IEC 1906 Award. In the past five years, she has published more than 60 academic papers, and was selected as the Elsevier 2020 and 2021 China Highly Cited Scholar.

Speaker

Prof. Ruomei Li

Honor President, IEEE PES Women in Power (WIP)

Bio: Dr. Ruomei Li received her Ph.D. from University of Bath, UK, in 2000; M.E. from CEPRI in 1989; and B.E. from Hefei University of Technology, China, in 1982. During 1994-1995, Ruomei has been a visiting scholar in UMIST, UK, upon Lee Kai Hueng Fellowship Foundation.

From 2004, Ruomei Li worked in Chinese Society of Electrical Engineering (CSEE) as Deputy Secretary, Secretary General (2004-2013), responsible for the whole management of CSEE with 120,000 membership. She has developed & enhanced the partnership of CSEE with international organizations and companies, including IEEE PES, CGRE, CIRED, IET, ICEE, ASME, WFEO, etc.

Ruomei Li is the initiator of women activities in Electrical Engineering field in IEEE PE, CSEE & GIGRE. From 2012 she has organized national and international (PES, CSEE, CIGRE) WIE events every year in China and abroad. She is WIE Chair/Co-chair of CIGRE in 2013-2018, Chair of WIP and China WIP in 2019-2021. She is the Council member of CWAST (2014-2019) and become the Board of Supervisors in 2019.

Invited Speeches

Name	Affiliation	Speech Title
Prof. Yuanyuan Sun	Shandong University	Harmonic Modeling and Analysis in Power Electronics Dominated Power System
Dr. Taosha Jiang	Beijing Huairou Laboratary	HVDC Technology and Challenges for a Green Future
Prof. Yuanyuan Wang	Changsha University of Science and Technology	Novel Fault Protection Principle for a Windformer in Large-scale Offshore All-DC Wind Farm
Dr. Bei Han	Shanghai Jiao Tong University	Dynamic Topology Awareness for Resilient Distribution Network
Dr. Qian Zhang	Chongqing University	Bidding Strategy for Wind Power and Large-scale Electric Vehicles Participating in Day-ahead Energy and Frequency Regulation Market

Speaker

Prof. Yuanyuan Sun
Shandong University

Bio: Yuanyuan Sun, IEEE Member, professor of Shandong University, Ph.D. Supervisor, assistant dean of the School of Electrical Engineering, Party Branch Secretary of Power Electronics and Power Transmission Research Institute, the industry-leading talent of Jinan, secretary-general of Low Voltage DC Technical Subcommittee of IEEE PES DC Power System Satellite Committee-China, deputy secretary-general of the Shandong Electrotechnical Society, deputy director of China Association of Building Energy Efficiency-Photovoltaic, Energy storage, Direct current, and Flexibility Professional Committee, standing director of Power Quality Subcommittee of the IEEE PES Transmission & Distribution Satellite Committee-China, Editor of Journal Power System Protection and Control, and the director of IEEE PES WIP Shandong Chapter.

Her current research interests include power quality of power systems, flexible DC systems, and intelligent distribution networks. She has been a project leader in more than 30 projects, including National Natural Science Foundation of China projects, Sub-Project of National Key R&D Program of China projects, Shandong Provincial Key R&D Program of China project, Shandong Natural Science Foundation project and Science and Technology Project of SGCC. She has published more than 100 papers including in SCI/EI, has more than 20 invention patents, and has obtained 9 software copyrights. She has won one first prize in scientific and technological progress at the provincial and ministerial level and two silver prizes at the International Exhibition of Inventions of Geneva.

Title: Harmonic Modeling and Analysis in Power Electronics Dominated Power System

Abstract: With the continuous development of power electronic technology, the integration scale of multiple sources and loads which are based on the power electronic converters is expanding in the power system. Under this condition, the power quality in the distribution network represents the characteristics of high harmonic contents. It is urgent to analyze these power quality issues in the power electronics dominated power system. Based on the harmonic coupling characteristic, the harmonic coupling matrix models of multiple sources and loads are constructed, including the photovoltaic, residential load, rectification load, and electric vehicles, etc. Also, the non-characteristic harmonics of the rectifier load are analyzed under unbalanced power supply conditions. The proposed model is the frequency domain and shows the coupling relationship between voltage and current harmonics. According to the harmonic analysis, the harmonic coupling characteristics for different harmonic sources are presented, and the coupling relationship can be distinguished by analyzing the physical meanings and the laws of matrix elements. On this basis, the proposed model can be used to analyze the harmonic influence of the power system.

Speaker

Dr. Taosha Jiang
Beijing Huairou Laboratary

Bio: Taosha Jiang (IEEE Senior Member 2019) is a Technical Expert from Beijing Huairou Laboratory. She received the B.S. degree from Xi'an Jiaotong University, Xi'an, China, in 2005, the M.S. degree from Chongqing University, Chongqing, China, in 2009, and the Ph.D. degree from Mississippi State University, Mississippi State, USA, all in Electrical Engineering. Taosha Jiang worked as a Senior Research Scientist at the ABB U.S. Research Center, Raleigh, NC, USA, from 2014 to 2021. Her research interests include solid-state circuit breakers, advanced protection solutions for DC power systems, and HVDC converter technologies.

Title: HVDC Technology and Challenges for a Green Future

Abstract: High Voltage Direct Current (HVDC) technologies have emerged as critical enablers for the large-scale transmission of energy over long distances. In the context of China's renewable energy utilization, HVDC plays a pivotal role and continues to gain significance. This presentation aims to provide a comprehensive overview of HVDC technologies, emphasizing their technological advantages. The discussion will encompass three main categories: Line

Commutated Converter (LCC), Voltage Source Converter (VSC), and emerging HVDC technologies. Throughout the presentation, key features, benefits, and practical applications of each technology will be explored, shedding light on the immense potential they hold for China's green energy landscape.

Speaker

Prof. Yuanyuan Wang

Changsha University of Science and Technology

Bio: Yuanyuan WANG, IEEE senior member, Professor, Ph.D supervisor, Visiting scholar of University of Sydney, and Deputy Director of Department of Scientific Research of Changsha University of Science and technology. As a Principal investigator, she has presided over 2 projects and 1 youth project of the National Natural Science Foundation of China; Presided over 1 project of Hunan Provincial Key Research and Development Program. Obtained 25 invention patents, including 5 conversion patents. As the first author, she has published more than 40 papers in academic journals including IEEE Transactions on Power Delivery, IEEE Transactions on Energy Conversion, etc. Won multiple academic awards, including the first prize of technological invention in Hunan Province (ranked 6th), the first prize of Science and Technology Progress Award of Hunan Province (ranked 7th), China Patent Excellence Award (ranked 4th).

Title: Novel Fault Protection Principle for a Windformer in Large-scale Offshore All-DC Wind Farm

Abstract: A Windformer is a special type of generator, whose output voltage can jump from 690V of traditional wind power generator to more than 12kV, and can be directly connected to the power network without the need for a step-up transformer. Using Windformer in the full DC mode of offshore wind farms can reduce or even eliminate AC transformers and frequent rectifiers and inverters, which is significantly superior to the current offshore SC-HVDC mode in cost and efficiency. This project is proposed a new fault protection of the grid-connected system of Windformers under the condition of completely changing the structure layout of the main electrical circuit and the grid-connected mode of the generator. The research progress are as follows: equivalent distributed parameter circuit model of the Windformer considering cable-windings with graded insulation is established, multidimensional fault features are extracted using multi-scale time convolutional networks, a novel protection scheme considering capacitive current compensation is proposed for the full DC offshore wind power grid connection system. This research is committed to providing theoretical and technical support for the large-scale, long-distance power generation, transmission, and grid connection of offshore wind farms.

Speaker

Dr. Bei Han

Shanghai Jiao Tong University

Bio: Han Bei, Associate Professor of Shanghai Jiao Tong University. Member of IEEE PES and Shanghai Chapter Leader of IEEE PES WIP, Senior Member of CSEE, and Member of CSEE Association of Female Science and Technology Workers. She has been dedicated in applying complex system theory in dynamic analysis of power system, including dynamic topology awareness in active distribution network and multi-microgrids, and also coordinated operation of hybrid AC-DC networks.

Title: Dynamic Topology Awareness for Resilient Distribution Network

Abstract: With growing complexity and uncertainty from distributed generations and active customers, distribution networks are facing more unexpected events and topology changes, and limited available measurements may depress the observability of distribution network. Meanwhile, massive data from various types of customers, can be valuable for power utilities. This makes privacy and data security a critical issue, while being endowed with operation and market flexibilities. Here we would discuss the issue and make some proposes for Dynamic Topology Awareness (DTA) both on algorithmic solutions and on platform structure.

Speaker

Dr. Qian Zhang

Chongqing University

Bio: Dr. Zhang received her Ph.D. degree in Electrical Engineering from Chongqing University, Chongqing, China, in 2009. She has been the associate professor in the College of Electrical Engineering of Chongqing University since 2011. She is now the Deputy Director of the Department of Electrical theory and New Technology. Her research interests include the joint planning and operation of energy-transportation integration system, the technologies of vehicle-to-grid, and power market.

Title: Bidding Strategy for Wind Power and Large-scale Electric Vehicles Participating in Day-ahead Energy and Frequency Regulation Market

Abstract: Aiming at the problem of insufficient research on the interactions of various participants in energy and frequency regulation (FR) market that takes into account the participation of wind power (WP) and large-scale electric vehicles (EV), a bidding strategy for WP and large-scale EVs in day-ahead energy-FR market is proposed. Firstly, based on the analysis of the influence factors of the whole process EV behavior boundaries, a classification and aggregation method of EV cluster is proposed. Then, considering EV battery loss and wind power deviation penalty, a two-layer model is established. The upper layer is the bidding model of maximum revenue of wind power producer (WPP) and electric vehicle aggregator (EVA), and the lower layer is the clearing model with the lowest system operation cost for the power trading center. The competitive relationship between EVA and WPP is described based on Nash game.

Closing Remarks:

Name	Affiliation
Dr. Hui Hou	IEEE Senior Member, IEEE PES WIP Member
Prof. Sidun Fang	I&CPS-Asia 2023 Technical Program Committee Co-chair

Speaker

Dr. Hui Hou

IEEE Senior Member, IEEE PES WIP Member

Bio: Dr Hui Hou received the B.S. degree from Wuhan University, Wuhan, in 2003, and the Ph.D. degree from the Huazhong University of Science and Technology, Wuhan, in 2009. She is currently is currently an Associate Professor and Ph.D supervisor at the Department of Electrical Engineering, School of Automation, Wuhan University of Technology. She is a senior member of IEEE, and has been an active volunteer in IEEE PES WIP since 2019. During 2015-2016, she was a visiting scholar at the University of Sydney. Her research interests include risk assessment of power system, energy internet, electric vehicles, etc. She is now an associate editor for PCMP (Protection and Control of Modern Power Systems) and a member of China Electric Power Research Institute Journals Center Youth Expert Group.

Speaker

Prof. Sidun Fang

I&CPS-Asia 2023 Technical Program Committee Co-chair

Bio: Sidun Fang (Senior Member, IEEE) was born in Chongqing, China, in 1991. He received the B.E. degree from the School of Electrical Engineering, Chongqing University, Chongqing, China, in 2012, and the Ph.D. degree in power system and its automation from the School of Electronics Information and Electrical Engineering, Shanghai Jiao Tong University, Shanghai, China, in 2017. He is currently a full Professor in Chongqing University, and his research interests include integrated energy system and energy-transport integration. Dr. Fang was the recipient of the Outstanding Graduate Prize of Shanghai Jiao Tong University. His doctoral dissertation was nominated as the Excellent Dissertation Papers in Shanghai Jiao Tong University in 2017. He is also an Associate Editor for IEEE Transactions on Industrial Cyber-Physical Systems, IEEE Transactions on Industry Applications and IET Renewable Power Generation.

PH.D DISSERTATION CHALLENGE

Room	Ballroom 1	Time	10:00-12:00, July 9, 2023
Online Zoom ID	816 1606 9040	Link	https://us02web.zoom.us/j/81616069040

Award Chair:

Name	Affiliation
Wei-Jen Lee	University of Texas at Arlington

Award Committee Members:

Name	Affiliation
Akshay Rathore	Singapore Institute of Technology
Bo Hu	Chongqing University
Wu Yuan-Kang	NCUU

Session Chair:

Name	Affiliation
Sidun Fang	Chongqing University

Candidates:

Name	Affiliation	Speech Title
Qi Wang	Tsinghua University	Research on Decomposition Methods for the Coordinated Scheduling of Hierarchical Electrical Power Grids
Pudong Ge	Imperial College London	Resilience-Oriented Control Framework of Digitized Power Systems from a Cyber-Physical Perspective
Jiaxin Dong	Nanyang Technological University	Grid Connected Converter Topology for Optimum Operation and Efficiency
Pei Yong	Tsinghua University	Theory and Methods for ICT Energy Storage Resources to Participate in Power System Operation
You Lin	Massachusetts Institute of Technology	Advances in Modern Power System Operation and Optimization
Yujie Sheng	Tsinghua University	Coordinated Analysis and Optimization of Coupled Power-Traffic Networks: From Cyber-Physical-Social Perspective

Lingming Kong	University of Macau	Spatial-temporal Scheduling of Commercial Electric Vehicles in Power-transportation Coupled Networks for Ancillary Service Provision

Candidate

Qi Wang

Tsinghua University

Bio: Qi Wang (S'19) is currently pursuing the Ph.D. degree in the Electrical Engineering Department, Tsinghua University, Beijing, China. His supervisor is Prof. Wu Wenchuan (IEEE Fellow, Winner of Science Fund for Distinguished Young Scholars). His research interests include coordinated optimization for hierarchical electrical power grids. 1) He has been involved as a Leading Student Researcher in the implementations and demonstrations of more than ten engineering projects, such as the National Key R&D Program (The high-tech programs for the 2022 Winter Olympics). And he also participates in the source code developments of several core moderation modules (C++, more than 5700 lines). 2) He has published 7 papers as the first/corresponding author, including 2 SCI journal papers in Q1, 4 EI papers, and 1 Peking University core journal paper; in addition, he also has 2 SCI journal papers under review. Moreover, it is also noteworthy that he has also applied for 7 invention patents as the first student inventor, of which 2 Chinese patents are granted, and 3 US patents are accepted, and he has also applied for 4 software copyrights as the first student investigator, of which 3 have been granted. 3) He has received honors and awards such as Excellent Comprehensive Scholarship, Outstanding Student Cadre, and Excellent Social Practice Scholarship from Tsinghua University.

Title: Research on Decomposition Methods for the Coordinated Scheduling of Hierarchical Electrical Power Grids

Abstract: Since large-scale renewables are integrated into different voltage levels, the traditional isolated operation of interconnected power grids is uneconomical and meets operational risk due to lack of coordination. Moreover, with the increasing integration of distributed energy resources, the coupling between power grids becomes closer and more complex. Therefore, the coordination between control centers at different levels is indispensable. However, existing distributed algorithms cannot meet the requirements of the actual power grid operation. Specifically, existing approaches may either encounter numerical problems or converge slowly when the nonlinear AC optimal power flow (ACOPF) models are applied. In order to improve computational efficiency, we propose a nested decomposition method for the coordinated operation of the multilevel ACOPF problem, which has superlinear convergence and can achieve the optimal solution. During each iteration, a projection function, which embodies the optimal objective value of a lower level power grid projected onto its boundary variable space, is computed with second-order exactness. Numerical tests are conducted with three trilevel power grids of different scales, verifying that the computational efficiency and scalability of the proposed algorithm are superior to those of existing methods.

Candidate

Pudong Ge

Imperial College London

Bio: Pudong Ge received the BEng and MEng degrees in electrical engineering from Nanjing University of Science and Technology, and Southeast University, Nanjing, China, in 2016 and 2019, respectively. He is currently a 4th-year PhD student in Control and Power (CAP) research group at Imperial College London. He was the receipt of Global Fellowship funded by Turing Grant, and currently is doing his visiting at NTU, Singapore. His research interests focus on power system digitization, cyber-physical energy resilience and distributed control algorithms. He has published nearly 20 SCI/EI papers, including 7 first-author papers on high-reputation international journals, and has participated in several international cooperation projects towards future resilient and smart cities mainly funded by EPSRC, Royal Society, ESRC.

Title: Resilience-Oriented Control Framework of Digitized Power Systems from a Cyber-Physical Perspective

Abstract: Climate change drives the energy supply transition from traditional fossil fuel-based power generation to renewable energy resources. This transition has been widely recognised as one of the most significant developing pathways promoting the decarbonisation process toward a zero-carbon and sustainable society. Rapidly developing renewables gradually dominate energy systems and promote the current energy supply system towards decentralisation and digitisation. The manifestation of decentralisation is at massive dispatchable energy resources, while the digitisation features strong cohesion and coherence between electrical power technologies and information and communication technologies (ICT). Massive dispatchable physical devices and cyber components are interdependent and coupled tightly as a cyber-physical energy supply system, while this cyber-physical energy supply system currently faces an increase of extreme weather (e.g., earthquake, flooding) and cyber-contingencies (e.g., cyberattacks) in the frequency, intensity, and duration. Hence, one big challenging problem is to find an appropriate cyber-physical solution to accommodate increasing renewables while enhancing power supply resilience.

The main focus of this thesis is to blend centralised and decentralised frameworks to propose a collaboratively centralised-and-decentralised resilient control framework for energy systems i.e., networked microgrids (MGs) for mitigating simultaneously cyber-physical contingencies. To achieve this, we investigate challenges in different areas using a concept of microgrid ranging from a centralised-to-decentralised transitional control framework coping with cyber-physical out of service, a cyber-resilient distributed control methodology for networked MGs, a UAV assisted post-contingency cyber-physical service restoration, to a fast-convergent distributed dynamic state estimation algorithm for a class of interconnected systems.

Candidate

Jiaxin Dong

Nanyang Technological University

Bio: Jiaxin Dong (Student Member, IEEE) received his B.S. degree in Electrical Engineering from Southeast University, China, in 2016. Currently, he is in the final year of his Ph.D. program in the School of Electrical and Electronic Engineering at Nanyang Technological University, Singapore. Since January 2021, he has been working as a research engineer at the Rolls-Royce@ NTU corporate lab.

Jiaxin has made significant contributions to the field, with 9 published technical papers and active involvement in various industrial projects related to high-power power electronics. His research interests encompass a wide range of areas, including modulation and control of power converters, multilevel converters, renewable energy, energy storage, more-electrical aircraft, and fuel cell systems. In recognition of his academic achievements, Jiaxin received the Rolls-Royce @ NTU scholarship in 2021. Additionally, he was awarded in the Nanyang Technological University 3-minute presentation competition in 2023. These accolades highlight his exceptional abilities and dedication to his field.

Title: Grid Connected Converter Topology for Optimum Operation and Efficiency

Abstract: The growing interest in clean energy has popularized power electronic converters due to their high efficiency and power density. Isolated bidirectional dc-dc converters, particularly the dual-active-bridge (DAB) topology, are crucial for battery-energy-storage-systems (BESSs). However, the DAB-based topology for high-power applications remains a challenge. This research aims to design a DAB-based topology with improved efficiency and reduced cost compared to current solutions. A hybrid Si and SiC neutral-point-clamped (NPC) DAB topology for 1.5-kV, 150-kW BESSs is proposed, which achieves a good trade-off between the efficiency and cost. To further enhance efficiency for proposed topology, a hybrid modulation method using duty ratio and phase-shift-modulation is proposed. The efficiency performance under hybrid modulation is improved and is higher than that under triple-phase-shift modulation. Furthermore, AI-based control methods are explored for optimizing zero-voltage-zero-current-switching (ZVZCS) performance. The efficiency performance under whole power range is optimized. The research objectives are topologies, modulation methods and AI-based control method.

Candidate

Pei Yong

Tsinghua University

Bio: Dr. Pei Yong received the B.S. degree in 2018 from Tsinghua University, Beijing, China, and the Ph.D. degree in 2023 from the same university. He also held the visiting graduate position with the Laboratory for Information and Decision Systems, Massachusetts Institute of Technology, Cambridge, MA, USA, in 2022. After obtaining his Ph.D. degree, he joined the School of Electrical Engineering at Chongqing University. His research interests include power system reliability, renewable energy integration, energy storage, and ICT infrastructures.

Title: Theory and Methods for ICT Energy Storage Resources to Participate in Power System Operation

Abstract: With the increase in renewable energy penetration, power systems require more flexible resources to deal with uncertainties and fluctuations. Meanwhile, as China proposes to speed up the construction of new infrastructure, the load demand for information systems, such as data centers and cellular base stations, will continue to rise. Accordingly, the energy storage resources (ESR) allocated by information systems to provide the uninterruptable power supply will increase significantly. Under the trend of information and energy coupling, waking up the ESR of information systems, which is currently a sleeping resource, can make it one of the important links for the coordination and interaction between information systems and power systems, and create a win-win situation between them. This dissertation proposes a theory to evaluate the dispatchable capacity of the ESR of information systems. Then, based on the proposed theory, methods for the ESR of information systems to participate in the power system operation optimization are established. In order to quantify the capacity contributions of the ESR of information systems to power system adequacy, this dissertation proposes a method to calculate the capacity value of the ESR of information systems. In order to realize the optimal allocation of the ESR of information systems, this dissertation proposes an electricity supply planning method for information system stations toward decarbonization. In summary, this dissertation builds the theoretical and methodological foundations for the ESR of information systems to participate in power systems. It is hoped that this dissertation can provide useful references for realizing the coordination of information systems and power systems through techniques such as virtual power plants (VPP).

Candidate

You Lin

Massachusetts Institute of Technology

Bio: You Lin, IEEE Senior Member, is a Postdoctoral Associate at the Laboratory for Information & Decision Systems, Massachusetts Institute of Technology, Cambridge, Massachusetts, USA. She received her B.S. and M.S. Degrees in Electrical Engineering from Shandong University, Jinan, China, and her Ph.D. degree in Electrical Engineering from Southern Methodist University, Dallas, TX, USA. Dr. Lin was the founding chair of IEEE Student Branch Industry Application Society (IAS) Chapter at Shandong University and Zhejiang University. She was a council member of IEEE IAS in 2018. She was one of the general chairs of the first IEEE Student Conference on Electric Machines and Systems (IEEE SCEMS 2018), Huzhou, China. Currently she is the CMD women in engineering chair of IEEE IAS. Her research interests include machine/deep learning and their applications in data analysis and optimization in renewable energies, power systems, smart buildings, and transportation electrification.

Title: Advances in Modern Power System Operation and Optimization

Abstract: The modern power system has witnessed an increasing penetration of distributed energy resources and modern loads with variable frequency drives. The increasing complexity brings great challenges to modern power system operations. Significant efforts have been made to develop more accurate power system operation and optimization methods. The tradeoff between computation and the model structure makes the problem nontrivial to solve and analyze.

Enabled by the wide deployment of PMUs and advanced machine learning algorithms, we improve the conventional power system operation and optimization techniques by improving the accuracy of power system measurements, implementing new power system modeling structures, and performing parameter reduction. In this thesis, the improved autoencoder models are firstly proposed to do data cleaning including outlier detection and the reconstruction of the true values of missing values and outliers. Then, an updated component-based load model is developed by adding a new load component with a variable frequency drive. The Fokker-Plank operator and tensor structure are utilized to do the sensitivity analysis and parameter reduction. To cope with the difficulty in solving parameters of the complex component-based load model, a free-form dynamic load model is proposed by synthesizing a large number of basic physics-driven mathematical functions, which is proved to have excellent accuracy and generalization performance. Experiments based on the simulated data verify the effectiveness and advantages of the proposed methods compared with state-of-the-art methods.

Candidate

Yujie Sheng

Tsinghua University

Bio: Yujie Sheng received his B.S. degree in electrical engineering from Xi'an Jiaotong University, Xi'an, China, in 2019. He is currently pursuing the Ph.D. degree in electrical engineering supervised by Professor Qinglai Guo at the Department of Electrical Engineering, Tsinghua University, Beijing, China. His research interests include the coordinated analysis and optimization of coupled power-traffic networks under a growing penetration of electric vehicles.

He is a student member of IEEE and IET. He is also a reviewer for several high-reputation journals such as IEEE Transactions on Smart Grid and IEEE Transactions on Transportation Electrification. He was a recipient of the Excellent Student Award of XJTU in 2017 (10 winners each year, TOP 0.1%), and the Best Conference Paper Awards from Tsinghua-IET Electrical Engineering Academic Forum in 2022 and IEEE International Electrical and Energy Conference (CIEEC) in 2023, and the Top 1% winner of Shanghai New Energy Vehicle Big Data Contest in 2021.

Title: Coordinated Analysis and Optimization of Coupled Power-Traffic Networks: From Cyber-Physical-Social Perspective

Abstract: This paper summarizes the Ph. D. research work carried out by Yujie Sheng on the coordinated analysis and optimization of coupled urban power networks and traffic networks under high penetration of electric vehicles (EVs), which aims at risk mitigation and flexibility exploitation under such network coupling. Considering the complex social behavior of numerous EV drivers, as well as the massive data acquisition and incentive regulation of network operators, the problem is studied from a Cyber-Physical-Social System (CPSS) perspective.

This research work first establishes the model of coupled power-traffic networks from the social and physical perspective combing multi-source big data mining and network dynamic modeling. Then, from the cyber side, data openness and information sharing during the long-term pricing cooperation and competition between power, traffic, and charging network operators are investigated. Third, a day-ahead coordinated dispatching framework is proposed for the interaction between EV mobility-on-demand fleets and power systems considering their different spatial-temporal dispatching scales. Finally, an intra-day joint security assessment framework is proposed to analyze the potential risks brought by the power-traffic coupling. As a solution to such risks, price guidance to EVs is introduced to preventively reallocate the charging loads.

The research work has been further developed into charging facility planning and EV-grid integration platforms and verified in 4 provinces (Zhejiang, Tianjin, Guangzhou, and Shanghai).

Candidate

Lingming Kong

University of Macau

Bio: Lingming Kong is a PhD student at the State Key Laboratory of Internet of Things for Smart City (SKL-IOTSC) , University of Macau (UM) under the supervision of Prof. Hongcai Zhang and Prof. Ningyi Dai. My research interests include electric vehicles, power-transportation coupled network and related optimization work. Before joining UM, I received a BEng in Automation from Shandong Univ., and MSc in ECE from NUS and ME in HKUST. Currently, I am working on the economic dispatch issue of electric buses (EBs) in active distribution network.

Title: Spatial-temporal Scheduling of Commercial Electric Vehicles in Power-transportation Coupled Networks for Ancillary Service Provision

Abstract: With the increasing global power generation level, electric vehicles (EVs) have emerged as promising contributors to ancillary services for the grid. Their role in ensuring grid stability and reliability has become increasingly significant. commercial EVs (CEVs), such as electric buses, benefiting from their large passenger and battery capacity, can effectively serve as both transportation tools within transportation networks and mobile energy storage units within power networks. Leveraging vehicle-to-grid (V2G) technology, EVs can provide valuable ancillary services to the power network, encompassing frequency regulation, peak shaving, spinning reserves, voltage support, and black start capability. To foster the mutually beneficial synergy between power-transportation coupled networks (PTCNs), it becomes crucial to optimize the operation of both networks effectively. Additionally, the vulnerability of PTCNs to natural disasters necessitates appropriate optimization of CEV operations to fulfill both the system's trip demands and restoration requirements. This thesis proposal aims to establish a comprehensive framework for CEVs' provision of ancillary services in PTCNs, including reserve supply during normal periods, pre-disaster preparation, and post-disaster restoration services. The spatial-temporal scheduling model determines the optimal plug-in locations, charging/discharging profiles for CEVs, and the reconfigured topology of the power network. The coupled constraints of power and transportation systems will be explicitly incorporated into the model. To address uncertainties arising from vehicle energy consumption, chance-constrained programming can be reformulated using second-order cones and efficiently solved utilizing off-the-shelf solvers. Numerical experiments will be conducted to validate the superiority of the proposed models, utilizing the IEEE standard distribution network and the Sioux Falls transportation network as test cases.

TECHNICAL SESSION

Room Ballroom 1 Time 13:30-15:00, July 8, 2023

Session 1: Smart Grid-Novel Information Technologies for Smart Grid

Chair: Xin Ding, University of Shanghai for Science and Technology

Time	Paper ID	Presenter	Affiliation
13:30-13:45	1155	Zifan Zhou	Southeast University
13:45-14:00	1899	Hao Sun	Zhejiang University
14:00-14:15	1902	Kunming Li	Jiangsu Frontier Electric Power Technology Co., Ltd.
14:15-14:30	2010	Siyang Liao	Wuhan University
14:30-14:45	2946	Yalin Li	Tianjin University
14:45-15:00	3047	Di Zhang	South China University of Technology

Paper ID	Title & Author
1155	Interpolated Average Value Model of Voltage Source Converter for Real-time Simulation Zifan Zhou, Fei Zhang, Dongli Jia and Wei Gu
1899	Adaptive Ensemble Ultra-short Term Forecasting of Wind Power Considering Curtailment Data Identification Hao Sun, Yan Peng, Can Wan, Yanhui Chen, Chengyu Lu and Junchao Ma
1902	Research on Data Quality Verification Service Based on Power Marketing System Kunming Li, Lingli Long, Quan Sun, Jike Ma, Cong Ji and Gonghai Chen
2010	Hybrid Dynamic Simulation Method of Current-controlled Voltage Sources for Dynamic Error Tracing Lihong Ma, Dan Qin, Kaijian Feng, Jifang Chen, Meiyin Wang, Chengyi Wen, Yangcheng Zeng and Siyang Liao
2946	Global Attention-Based Approach for Substation Devices Classification and Localization Zhimin Guo, Yalin Li, Yangyang Tian, Hao Liu, Shaoguang Yuan and Chunyu Hou
3047	Toward the Imputation and Prediction of Condition Monitoring Data with Missing Values Di Zhang, Canbing Li and Jizhong Zhu

TECHNICAL SESSION

Room Ballroom 2 Time 13:30-14:30, July 8, 2023

Session 2: Flexible Mechanism, Analysis and Control of Power Systems with High Penetration of Renewable Energy (Special Session)

Chairs: Jia Liu, Hangzhou Dianzi University
Zao Tang, Hangzhou Dianzi University
Tingjian Liu, Sichuan University

Abstract

Aiming to achieve energy low-carbon transition, the capacity of renewable energy, such as wind and solar energy, increases sharply and the renewable energy would be the main body of the future power supply framework. However, given uncertainties associated with renewable energy generation, there are many technical challenges to realize the renewable energy substitution from the perspectives of power, energy and social duty. Among economy, security and reliability of power systems, flexibility becomes a new focus property in the presence of renewable energy. Once the flexibility of a power system is not enough, renewable energy curtailment or load shedding may occur, which would reduce the renewable energy accommodation capability or power supply reliability. Thus, it is worthy to exploit the theories and methods for flexible mechanism, operation optimization and expansion planning of power systems with high penetration of renewable energy. This special session focuses on flexible characteristic and mechanism for high renewable energy power systems, multi-objective coordinated power system planning methods, large-scale distributed flexible sources clustering approaches, flexibility evaluation and operation optimization, etc.

Time	Paper ID	Presenter	Affiliation
13:30-13:45	174	Fang Cao	North China Electric Power University
13:45-14:00	1514	Wenhui Kang	North China Electric Power University
14:00-14:15	4754	Zao Tang	Hangzhou Dianzi University
14:15-14:30	6590	Zao Tang	Hangzhou Dianzi University

Paper ID	Title & Author
174	A Revised Model for Carbon Emission Quotas in Electric Power Sector to Promote Clean Energy Development Luyuan Zhang, Yongting Wang, Yixin Zou, Lanxin Wang, Yuxu Deng and Fang Cao
1514	Design of a Standard Energy Block Trading Mechanism with High Percentage of New Energy Access Jianhui Zheng, Xiaomin Lin, Qingwei Li, Dunnan Liu, Weijia Guo, Wenhui Kang and Yang Yang
4754	A Stochastic Optimal Planning Methodology for User-side Energy System with Multiple Energy Forms Jia Liu, Mojiang Yu, Zao Tang, Yi Tang and Pingliang Zeng
6590	A Robust Model Predictive Control Based Frequency Regulation Approach for Wind-Storage Joint System Zao Tang, Wenjie Jia, Jia Liu, Yi Tang and Pingliang Zeng

TECHNICAL SESSION

Room Ballroom 3 Time 13:30-14:45, July 8, 2023

Session 3: Key Technology of Power Balance Capability Evaluation and Improvement Considering Large-Scale Renewable Energy Integration (Special Session)

Chairs: Shuanglei Feng, China Electric Power Research Institute
Peng Li, Shandong University

Abstract

Over the past few decades, the growth of wind power and solar power has increased rapidly in China. In 2021, the increment of renewable energy generation installed capacity is 0. 134 GW, accounting for 76. 1% of the total amount of the increment of power generation installed capacity in China. The integration of large-scale renewable energy has significantly enhanced the fluctuation and uncertainty of power, resulting in serious power balance problem of power grids. This Special Session aims to assess and improve the power balance capability of power grids through some technologies, e.g., enhancing renewable power forecast accuracy, improving collaborative dispatch, and mining flexibility.

Time	Paper ID	Presenter	Affiliation
13:30-13:45	2339	Peng Li	Key Laboratory of Power System Intelligent Dispatch and Control, Shandong University
13:45-14:00	2486	Yanni Zhang	University of Jinan
14:00-14:15	3030	Yi Zhang	Key Laboratory of Control of Power Transmission and Conversion, Ministry of Education Shanghai Jiao Tong University
14:15-14:30	4438	Xianpei Wang	Wuhan University
14:30-14:45	4582	Xiyang Guan	Shandong University

Paper ID	Title & Author
2339	Decentralized Coordinated Robust Dispatch of Multi-area Interconnected Integrated Electricity and Heating System Min Jiao, Peng Li, Ming Yang, Longxiao Han, Qiushi Wang, Yixiao Yu and Menglin Li
2486	Capacity Allocation of the Hybrid Wind-PV-Storage System Based on Improved Fish Swarm Optimization Algorithm Yanni Zhang, Jie Shi, Yan Ma and Zuan Fu
3030	Payment and Incentive Allocation Method in Demand Response Programs based on Causer Pays Principle Yi Zhang, Shuai Fan, Yan Meng and Guangyu He
4438	Establishment of Short-Term Load Forecasting Model Based on Combinatorial Optimization Method JiaWen Zhang, Xing He, YaTian Hu, Cheng Zhang, ChongChong Dong, XianPei Wang, WenJia Cai and YanTing Xiao
4582	A Power Grid Capacity Margin Model and Calculation Method Considering the Interaction of Source-Load-Storage Xiao Liu, Hao Wang, Guangyuan Yu, Baoyong Wang, Yi Sun and Xiyang Guan

TECHNICAL SESSION

Room: Meeting Room 7 | Time: 13:30-15:00, July 8, 2023

Session 4: Energy Systems-Multi-energy System

Chair: Hui Li, University of Macau

Time	Paper ID	Presenter	Affiliation
13:30-13:45	5403	Xiaoxue Ge	Shandong University
13:45-14:00	635	Faisal Sattar	Dubai Electricity and Water Authority
14:00-14:15	1621	Feng Ling	Hunan University
14:15-14:30	1901	Hua Liu	State Grid Zhoushan Power Supply Company
14:30-14:45	2562	Yujie Sheng	Tsinghua University
14:45-15:00	2956	Jinlei Xia	Shanghai Jiao Tong University

Paper ID	Title & Author
5403	Research on Profit Analysis of E-NG Vehicle Charging Station Improved from Split Type Xiaoxue Ge, Chenxian Guo, Zhijie Liu, Ke-Jun Li and Zichen Wang
635	Integration of Distributed Energy Resources into a Virtual Power Plant–A Pilot Project In Dubai Faisal Sattar, Ali Husnain and Tareg Ghaoud
1621	Two-stage Mixed Game for Coordinated Planning of PV capacity in Distribution System with Multiple Integrated Energy Microgrids Xiaoyan Zhao, Kun Yang, Wei Lan, Feng Ling, Xuebo Qiao and Yong Li
1901	Analysis of Harmonic Amplification at Grid Connecting Point of An Offshore Wind Farm Zhang Ping, Liu Zhoubin and Sun Weizhen
2562	A Low-carbon Dispatching Framework of Electrified Mobility-on-Demand Fleets Yujie Sheng, Mengjie Liu, Chuanjie Lin and Qinglai Guo
2956	Research on Pumped Storage Capacity Allocation of Cascade Hydro-Wind-Solar-Pumped Storage Hybrid System Considering Economy and Operational Stability Yong Zhou, Jinlei Xia, Lingling Wang and Chuanwen Jiang

TECHNICAL SESSION

Room: Meeting Room 1 | Time: 13:30-15:15, July 8, 2023

Session 5: Renewable Energy Integration-High Penetration of Renewable Energy

Chair: Xiangjun Quan, Southeast University

Time	Paper ID	Presenter	Affiliation
13:30-13:45	431	Shufang Dai	Shanghai Jiao Tong University Shanghai
13:45-14:00	835	Yuhan Wang	Southeast University
14:00-14:15	853	Peng Lu	Tsinghua University
14:15-14:30	1683	Zhenshan Huang	Shandong University
14:30-14:45	1765	Yundie Guan	Southeast University
14:45-15:00	3138	Tianrun Qi	State Key Laboratory of Alternate Electrical Power System with Renewable Energy Sources North China Electric Power University
15:00-15:15	1468	Hanxing Zhang	Sichuan Energy Internet Research Institute Tsinghua University

Paper ID	Title & Author
431	IoT Intelligent Sensing Terminal Test Platform Lidan Zhou, Shufang Dai, Qing Liu, Gang Yao, Siyang Liu and Hongyu Wang
835	Decision-making Support Method for Control Strategies of Hybrid Cascaded MTDC System Yuhan Wang and Zhou Li
853	Research on the Day-ahead Dispatch Strategy for Multi-energy Power Systems Considering Wind and PV Uncertainty Peng Lu, Ning Zhang, Yan Zhang, Zhentao Han, Ershun Du, Jiawen Gao, Peng Wang and Jinming Bao
1683	Design and Implementation of Micro Energy Control Unit (MECU) for Utility-scale Renewable Energy Integration Zhenshan Huang, Ke-Jun Li, Yuanzong Song, Zhijie Liu, Liangzi Li and Zhonglin Guo
1765	Agent-based Modeling of Small-scale Clean Energy System using Deep Reinforcement Learning Yundie Guan, Xinyi Yang, Yadi Zhuang, Duoer Hu and Tao Chen
3138	Numerical Simulation Study of Power Electronic Transformer Insulation System based on Space Charge Characteristics under Combined Electrothermal Stress Tianrun Qi, Hanwen Ren, Qingmin Li, Jian Wang, Haoyu Gao, Yidan Ma, Yiqun Ma and Tao Xiao
1468	Research on Electric Power Spot Market Settlement Mechanism based on Mid-and-long Term Contract Physical Delivery Mingbo Wu, Yuhao Duan, Yadong Wen, Jianping Zhao, Kangping Liu, Zhiyi Yang, Nan Jiang and Hanxing Zhang

TECHNICAL SESSION

Room: Meeting Room 5 | Time: 13:30-15:00, July 8, 2023

Session 6: Power System Engineering--Power System Operation

Chair: Tao Niu, Chongqing University

Time	Paper ID	Presenter	Affiliation
13:30-13:45	326	Baoling Xie	Harbin Engineering University
13:45-14:00	498	Li Hu	University of Electronic Science and Technology of China
14:00-14:15	1038	Qirui Feng	Shanghai University of Electric Power
14:15-14:30	1252	Yiming Ren	Taiyuan University of Technology
14:30-14:45	1698	Yuheng Zhao	Zhejiang University
14:45-15:00	2105	Binglong Liu	China University of Petroleum (East China)

Paper ID	Title & Author
326	A Sequence Component Based Power Flow Algorithm for Islanded Hybrid AC/DC Microgird Baoling Xie, Fang Lu, Yubin Tian and Bo Wang
498	Uncertainty Quantification of Power Flow in Distributed System Considering the Random and Fuzzy Characteristics Li Hu, Zhenyuan Zhang, Yang Xu and Kaiwen Zheng
1038	Research on Frequency Support Technology of Offshore Wind Farm Based on Improved Grey Wolf Algorithm Cai Hui, Sun Wentao, Peng Zhuyi, Xu Sixuan, Wang Quanquan and Qi Wanchun
1252	Analysis on Response Characteristics of Control and Protection Systems in event of Measurement Anomalies for UHVDC Transmission System Shuai Yuan, Gong Cheng, Yiming Ren, Qingsheng Zhao, Dingkang Liang and Minhong Yuan
1698	Resilience Enhancement of Urban Integrated Energy Systems in Ice Storms Yuheng Zhao, Can Wan, Xuejun Hu and Yanbo Jia
2105	Study on the Mould Formation Method of High Power Electric Fracturing Pump Lixia Zhang, Binglong Liu and Wei Kang

TECHNICAL SESSION

Room: Meeting Room 6 | Time: 13:30-15:00, July 8, 2023

Session 7: Power System Engineering--Power System Planning

Chair: Dundun Liu, University of Macau

Time	Paper ID	Presenter	Affiliation
13:30-13:45	2818	Bo Jie	The University of Tokyo
13:45-14:00	3063	Yijun Zheng	Xi'an Jiao Tong University
14:00-14:15	3661	Chenyang Fu	Guangdong University of Technology
14:15-14:30	4666	Jiao Peng	Wuhan University of Technology
14:30-14:45	5758	Wanglin Cao	Key Laboratory of the Ministry of Education on Smart Power Grids (of Tianjin University)
14:45-15:00	9996	Han Jian	North China Electric Power University

Paper ID	Title & Author
2818	Mathematical Analysis of Time-series & Meteorological Factors in Electricity Demand Forecasting Based on Carbon Neutrality Bo Jie, Jumpei Baba and Akiko Kumada
3063	An Improved Scatter Search Algorithm for A Generator Maintenance Scheduling Model Based on Probabilistic Production Simulation Yijun Zheng, Ziqiang Wang, Jianshe Li, Jiyao He, He Huang and Liang Zhang
3661	Expansion Planning of the Target Connection Mode in Medium Voltage Distribution Network with Complex Connection Fude Dong, Peng Zhou, Yuantu Xu, Deqiang Zhu, Rongjie Huang, Haobin Zou, Chenyang Fu and Xinghua Wang
4666	A Theoretical Line Loss Calculation Model based on Analytic Hierarchy Method Jiao Peng, Aihong Tang, Muran Yang, Yinsheng Niu and Jianhua Yang
5758	A Medium Voltage Network Planning Method Considering the Probability of Distributed Generation and Flexible Load Rate Constraints Ziyi Liu, Yue Guo, Yudi Ding, Wenjun Xu, Xia Pan, Boran Cao and Shangxing Ye
9996	The Effect of Renewable Energy Development and Market-oriented Reform on Low-carbon Transformation of Power Industry: An agent-based approach Li Yan, Zhao Qixin, Su Yaheng, Li Yujia and Han Jian

TECHNICAL SESSION

Room Ballroom 2 Time 15:30-17:45, July 8, 2023

Session 8: Energy Storage Technologies-Energy Storage Planning and Operation

Chair: Binghe Liu, Chongqing University

Time	Paper ID	Presenter	Affiliation
15:30-15:45	931	Wang Yan	Shandong University
15:45-16:00	2466	Bo Peng	State Grid Shandong Integrated Energy Service Co., Ltd
16:00-16:15	6021	Siqu Liu	China State Shipbuding Corporation Systems Engineering Research Institute
16:15-16:30	6283	Mingliu Liu	State Grid Hubei Electric Power Research Institute; Wuhan University
16:30-16:45	7966	Tong Wang	North China Electric Power University
16:45-17:00	9272	Yanda Huo	China Electric Power Planning & Engineering Institute
17:00-17:15	9312	Li Chen	Hohai University
17:15-17:30	6755	Tongshen Liu	Xiangtan University

Paper ID	Title & Author
931	Wind-storage Control Strategy Considering the Electro-thermal Coupling Characteristics of Overhead Lines Yong Dai, Can Cui, Wei Zhang, Fei Yuan, Peng Rong, Wenming Liu, Xiao Liu, Yong Wang, Chengfu Wang and Yan Wang,
2466	Research on the Evaluation Method of Aggregation Flexibility for Multi-node Distributed Energy Storage System Hui Zhang, Mengmeng Jiang, Junhao Lin, Teng Wang, Ruiqi Wang, Le Yang, Guanghua Guo and Yan Lian
6021	Dynamic Scheduling Method of Multi-element Energy Storage System based on Deep Reinforcement Learning Siqu Liu, Jie Yang and Daomeng Cai
6283	Learning-based Micro Energy Storage System Control for Voltage Governance in Rural Areas Mingliu Liu, Zaixun Ling, Yibo Cui, Xin Mei and Deshi Li
7966	Transient Frequency Coordinated Control Strategy for Wind Farm Augmented With Energy Storage Wei Zhao, Peng Xu, Fuqiang Li, Yan Pan, Lin Pei and Tong Wang

9272	Lightweight Data-driven Planning Method for Hybrid Energy Storage Systems Yanda Huo, Zhen Wu, Jianfeng Dai, Wei Duan and Jintao Jiang
9312	Optimal Control Strategy of Echelon Battery Energy Storage System Based on Battery Health State Li Chen, Zhixin Fu, Junpeng Zhu and Yue Yuan
6755	State of Health Estimation for Lithium-ion Batteries by Using Partial Battery Data with A Hybrid Neural Network Model Tongshen Liu, Wei Huang, Rui Pan, Yiling Wang, Mao Tan and Jie Chen

TECHNICAL SESSION

Room Ballroom 3 Time 15:30-17:00, July 8, 2023

Session 9: Key Technology of Power Balance Capability Evaluation and Improvement Considering Large-Scale Renewable Energy Integration (Special Session)

Chairs: Shuanglei Feng, China Electric Power Research Institute
Peng Li, Shandong University

Abstract

Over the past few decades, the growth of wind power and solar power has increased rapidly in China. In 2021, the increment of renewable energy generation installed capacity is 0. 134 GW, accounting for 76. 1% of the total amount of the increment of power generation installed capacity in China. The integration of large-scale renewable energy has significantly enhanced the fluctuation and uncertainty of power, resulting in serious power balance problem of power grids. This Special Session aims to assess and improve the power balance capability of power grids through some technologies, e.g., enhancing renewable power forecast accuracy, improving collaborative dispatch, and mining flexibility.

Time	Paper ID	Presenter	Affiliation
15:30-15:45	5095	Teng Xue	Chongqing University
15:45-16:00	5143	Qiushi Wang	Key Laboratory of Power System Intelligent Dispatch and Control, Shandong University
16:00-16:15	6115	Xianpei Wang	Wuhan University
16:15-16:30	6201	Zhengnan Gao	Dalian University of Technology
16:30-16:45	6432	DeQiang Kong	University of Jinan
16:45-17:00	7971	Jiayi Luo	Shanghai Jiao Tong University

Paper ID	Title & Author
5095	High-frequency Oscillation Suppression Strategy Based on Arm Current Feedforward Virtual Damping in SVG for Photovoltaic Plants Chenghui Tong, Xiong Du, Yong Ren, Xutao Li, Liang Yin, Teng Xue and Junliang Liu
5143	Robust Dispatch of IEHS Considering Interaction Mechanism between Multiple DHNs and EPS Min Jiao, Peng Li, Ming Yang, Qiushi Wang, Yixiao Yu and Menglin Li
6115	An Algorithm for Demand Response Potential Assessment JiaWen Zhang, Cheng Zhang, Xing He, ChongChong Dong, Yanting Xiao, Lei Zhang, You Wu and XianPei Wang
6201	Real-Time Congestion Management of Power Transmission Grid Based on Measurement Data Cleaning Technology Zhengnan Gao, Meijie Liu, Shubo Hu, Tian Jin, Xueli Lu and Hui Sun
6432	A Novel Storage Energy Dispatch Improvement Model Based on Chameleon Swarm Algorithm Deqiang Kong, Jie Shi and Jie Gao
7971	Coherency Identification for VSC interfaced DERs Considering Network Topologies Weijia Tang, Yongyong Jia, Jiayi Luo and Bei Han

TECHNICAL SESSION

Room: Meeting Room 7 | Time: 15:30-17:00, July 8, 2023

Session 10: Energy Systems-Multi-energy System

Chair: Chi Kong Wong, University of Macau

Time	Paper ID	Presenter	Affiliation
15:30-15:45	6866	Hui Li	University of Macau
15:45-16:00	6957	Peng Wen	GUODIAN Nanjing Automaiton, Co., LTD
16:00-16:15	8178	Hang Cui	Shanghai University of Electric Power
16:15-16:30	8606	Yiran Chen	Hohai University
16:30-16:45	9301	Wenliang Yao	Shandong University
16:45-17:00	9362	Jichen Qu	Shandong University

Paper ID	Title & Author
6866	Frequency-Constrained Dispatching Method for an Integrated Electricity-Heat Microgrid with Synergic Primary Frequency Regulation Resources Hui Li, Hongcai Zhang, Ji Zhang and Chi Kong Wong
6957	Study on Day-ahead Optimization Strategy of Integrated Energy System Based on Distributionally Robust Optimization in Electricity Spot Market Quan Ding, Xiaobo Dou, Guoming Qian and Peng Wen
8178	Chain Reaction Analysis of Integrated Energy System Considering Energy Hub Failures Qiong Wu, Hongbo Ren, Shanshan Shi, Chen Fang, Sha Wan and Hang Cui
8606	Research on Cost Optimization of Integrated Energy System Based on Power Demand Response Yiran Chen, Chong Wang and Ping Ju
9301	Low-carbon Economic Scheduling considering Multiple Park-level Integrated Energy Systems Cooperation in Uncertain Environment Yan Cheng, Peng Yu, Jiawei Xing, Yong Li, Wenliang Yao, Kang Wang, Shumin Sun and Shibo Wang
9362	Research on Hybrid Energy Management Strategy for zero-carbon ships Jichen Qu, Hui Wang, Jian Zhou and Boyang Zhang

TECHNICAL SESSION

Room	Meeting Room 1	Time	15:30-17:00, July 8, 2023

Session 11: National K&D Program "Research on Key Technologies and Simulation Platform of Collaborative Operation of Active Distribution Power System based on Multiple Flexibility Mining" (Special Session)

Chairs: Ming Yang, Shandong University
Zhaohao Ding, North China Electric Power University

Abstract

In recent years, the large-scale distributed renewable energy sources have integrated into active distribution networks (ADNs). Its randomness and volatility have brought severe challenges to the safe and economic operation of ADNs. Although the existing research considers the uncertainty of renewable energy and allocates regulating capacity to deal with operational risks, increasingly scale of renewable energy integration and inadequate regulation capacity have brought great challenges to the safety of power system operating. New operational optimization approaches are required. Therefore, with the support of National K&D Program (2019YFE0118400), we organize this Special Session to promote the collaborative operation of ADNs.

Time	Paper ID	Presenter	Affiliation
15:30-15:45	1117	Ziyang Xiang	Shanghai Jiao Tong University
15:45-16:00	2179	Lin Wei	Key Laboratory of Power System Intelligent Dispatch and Control of Ministry of Education, Shandong University
16:00-16:15	2771	Shuai Zhang	Institute of Electrical Engineer, Chinese Academy of Sciences
16:15-16:30	9102	Wanting Zheng	University of the Chinese Academy of Sciences
16:30-16:45	9637	Chuanqi Wang	Shandong University
16:45-17:00	721	Xinran Li	North China Electric Power University

Paper ID	Title & Author
1117	Strategic Bidding of Load Aggregator in Demand Response Market considering Shared Energy Storage Ziyang Xiang, Chunyi Huang and Kangping Li
2179	Classification Method of Customer based on Load Curve Image Information Lin Wei, Li Zhang, Yuxi Wang, Xinyan Su and Ming Yang
2771	Interaction Characteristics Modeling of Microgrid Clusters Based on Federated Learning Yanhong Yang, Hao Xiao, Shuai Zhang, Jun Yang, Dexin Li, Jiarui Wang, Xinying Wang

	and Sheng Chen
9102	Improved Temporal Convolutional Network Based Ultra -Short-Term Photovoltaic Power Prediction Hao Xiao, Wangting Zheng, Hai Zhou, Tengfei Ma, Li Ma and Wei Pei
9637	A Spatiotemporal Interpolation Approach for Distributed PV Power Based on WPT and DTW Chuanqi Wang, Ming Yang, Yixiao Yu, Menglin Li, Xudong Zheng and Qiangsheng Bu
721	Cost Efficient Job Scheduling Scheme for Large Scale Data Center Xinran Li and Zhaohao Ding

TECHNICAL SESSION

Room: Meeting Room 5 | Time: 15:30-17:30, July 8, 2023

Session 12: Power System Engineering--Power System Operation

Chair: Heng Zhang, Shanghai Jiao Tong University

Time	Paper ID	Presenter	Affiliation
15:30-15:45	2877	Suxian Liu	Shandong university
15:45-16:00	3544	Huang Yong	Hohai University
16:00-16:15	4228	Ying Liu	Taiyuan University of Technology
16:15-16:30	4485	Ben Zhang	Harbin Engineering University
16:30-16:45	5080	Kaiwen Zheng	University of Electronic Science and Technology of China
16:45-17:00	4906	Bo Wang	Harbin Engineering University
17:00-17:15	5747	Yingqi Liang	National University of Singapore
17:15-17:30	7461	Dexin Meng	Hohai University

Paper ID	Title & Author
2877	Research on Vibration of Converter Transformer under DC Bias Magnetism The Suxian Liu, Guan Wang, Li Zhang and Xiaohui Zhu
3544	Research on Self-balancing Scheduling Control Strategy for Distribution Network based on Soft Open Points Interconnection Shuai Liu, Qingwei Guan, Yong Huang, Zonglei Li, Lianglu Ren, Guanglu Pan and Junpeng Zhu
4228	Research on Operation Error Detection Model of Metering Device Ying Liu, Qingsheng Zhao, Dingkang Liang, Yuhuan Han, Yi Zhang and Hehong Guo
4485	Simulation Model Building and Experimental Verification of LCC-S wireless Power Transfer System Applied to Autonomous Underwater Vehicles Ben Zhang, Yaping Zhu, Chunlin Zhang and Yong Lu
5080	TCN-LSTNet with Sliding Time Window Featured Short-Term Load Forecasting for Integrated Energy System Kaiwen Zheng, Zhenyuan Zhang, Yuchen Han, Li Hu and Ying Liu
4906	Distribution Network Topology Identification based on Multi-Prosumer Data Bo Wang, Fang Lu, BaoLing Xie and YuBin Tian
5747	Robust Learning-assisted Data-driven Congestion Management via Sparse Sensitivity Estimation Yingqi Liang, Junbo Zhao and Dipti Srinivasan
7461	Local Management Scheduling Strategy for Uncertainty of Distribution Station Area Based on Low Voltage Flexible DC Interconnection Qingwei Guan, Peng Kong, Dexin Meng, Xiaozhi Li, Xiaochen Xie, Zhining Li and Junpeng Zhu

TECHNICAL SESSION

Room: Meeting Room 6 | Time: 15:30-17:45, July 8, 2023

Session 13: Power System Engineering-Power System Control

Chair: Yinquan Yu, East China Jiaotong University

Time	Paper ID	Presenter	Affiliation
15:30-15:45	1201	Zhengfu Yang	State Grid Xiong'an Sgitg Digital Technology Co., Ltd.
15:45-16:00	1873	Yingjun Liu	Huazhong University of Science and Technology
16:00-16:15	3868	Mingkang Wu	Electric Power Research Institute, China Southern Power Grid
16:15-16:30	3957	Zhiyuan Xu	North China Electric Power University
16:30-16:45	4453	Zichen Wang	Shandong University
16:45-17:00	4522	Yanli Du	Northeast Electric Power University
17:00-17:15	8590	Yupeng Ren	Zhejiang University
17:15-17:30	8887	Qi Chen	Shandong University
17:30-17:45	2862	Xinying Liu	Liaoning Technical University

Paper ID	Title & Author
1201	Research on a Novel Multi Port Energy Router Architecture and Collaborative Control Strategy Qiang Li, Wenjing Li, Yang Li, Zhengfu Yang, Lvchao Huang, Jinguo Fang and Yuanyuan Hu
1873	Voltage Support Control Strategy for Distributed Synchronous Condenser Based on an Excitation System with Full-Controlled Devices Yingjun Liu, Dan Wang, Weiyong Jiang, Shiqi Fu, Yanmei Wang, Xiaoying Yang, Jiandong Zheng and Chengxiong Mao
3868	Security and Stability Control Strategy Optimization for Power Grid Load Intensive Area Based on Real-time Simulation Mingkang Wu, Yihua Zhu, Dongxu Chang, Yukun Zhu, Binjiang Hu and Wencong Wu
3957	Optimal Virtual Power Plant Operation and Incentive Compatible Profit Allocation Scheme Qiushuang Li, Zhifan Liu, Xin Zhao, Yan Li, Chenhui Li and Ying Bai
4453	Submodule Capacitor Lifetime Increment Method for Modular Multilevel Converters Zichen Wang, Zhijie Liu, Zhonglin Guo, Ke-Jun Li and Xiaoxue Ge.

4522	Coordinated Control Strategy for Improving Frequency Stability of UHVDC System Shouqi Jiang, Yanli Du, Lixin Wang and Jiaxin Zhang
8590	An Aggregated Frequency Response Model for Power Systems with Renewables Yupeng Ren, Can Wan, Rongcan Xiao and Yunyi Li
8887	Decentralized Robust Emergency Voltage Control of Power System with Large-scale Wind Power Integrated Via VSC-MTDC Qi Chen, Qi Zhao, Wen Zhang and Hua Ye
2862	Construction and Model Analysis of Boost Boost Circuit Based on Fuzzy and Cascaded PI Dual Control Ye Qiwen, Ma Zhilin and Liu Xinying

TECHNICAL SESSION

Room: Ballroom 2 | Time: 09:00-10:20, July 9, 2023

Session 14: High-Quality Power Supply Technologies of Low-Carbon Distribution Systems (Special Session)

Chairs: Lu Zhang & Bo Zhang
China Agricultural University

Abstract

Driven by the carbon-neutral target, large-scale of distributed flexibility resources will be integrated into the distribution system, including various types of renewable energies, energy storage systems, flexible loads, energy prosumers and flexible devices. Constructing an innovative low-carbon distribution system with flexibility resources is crucial in realizing the carbon neutrality. However, the integration of large-scale flexibility resources also brings new challenges to the power supply reliability and operation control of distribution systems. Therefore, to deal with the risks caused by the flexibility resources and improve the power supply quality of low-carbon distribution systems, the issues in optimizing operation, stability analysis and advanced control of the low-carbon distribution systems should be paid major attention.

Time	Paper ID	Presenter	Affiliation
09:00-09:20	Invited Speaker	Bo Zhang	China Agricultural University
09:20-09:40	Invited Speaker	Qiang Fu	Sichuan University
09:40-10:00	Invited Speaker	Weidong Chen	Electric Power Research Institute of Guangxi Power Grid Company, Ltd.
10:00-10:20	Invited Speaker	Chen Wang	State Grid Beijing Electric Power Research Institute

Speaker

Bo Zhang

China Agricultural University

Bio: Dr. Bo Zhang received the B.S. degree in electrical engineering and Ph.D. degree in agricultural electrification and automation from China Agricultural University, Beijing, China, in 2016 and 2023, respectively. Her main research interests include hybrid AC/DC distribution network, renewable energy generation, and economic operation of active distribution network. She has published more than 20 peer-reviewed papers in recognized journals and conferences. She participated in more than 10 projects including National Key R&D Programs of China and National Natural Science Foundation of China.

Title: Coordinated Restoration Method of Hybrid AC/DC Distribution Network with Electric Buses Considering Transportation System Influence

Abstract: The post-disaster restoration capabilities for critical loads in distribution networks need to be enhanced. In recent years, electric buses (EBs) have been widely used with the carbon-neutral target, which can be dispatched and discharged for load restoration considering their mobility and the V2G technology. However, the restoration capabilities of EBs are limited by the transportation system while the AC distribution network can hardly achieve power transfer between lines due to the radial constraint. Therefore, this report presents a coordinated restoration method of hybrid AC/DC distribution network with EBs, aiming to enhance the post-disaster restoration capabilities of the distribution networks.

Speaker

Qiang Fu

Sichuan University

Bio: Dr. Qiang Fu received the Ph.D. degree from the School of Electrical and Electronic Engineering at North China Electric Power University, Beijing, China, in 2020. He has been an Associate Research Fellow at the College of Electrical Engineering at Sichuan University, Chengdu, China since 2020. His main research interest includes the stability analysis and control of AC/DC hybrid power systems, particularly in relation to the integration of renewable energy. He has published more than 40 papers including 18 IEEE Trans. papers and 8 Proceedings of the CSEE papers. Dr. Fu is a Guest Editor of Science Progress and Energies, an active reviewer for multiple IEEE Transactions Journals, and a Young Expert at the China Electric Power Research Institute Journals Center. He was awarded the 2022 Best Reviewer award for "Proceedings of the CSEE" and "Automation of Electric Power Systems", as well as the 2022 Excellent Youth Talent Award for his contributions to Power System Stability and Control Subcommittee.

Title: DC Voltage Oscillation in VSC-based DC Transmission Power Systems

Abstract: For sustainable energy supply, the establishment of two- or multi-terminal DC (MTDC) systems, both onshore and offshore, has gained significant attention. However, most research has focused on the impact of interconnecting DC power systems on the stability of AC power systems, while overlooking the inherent self-instability within the DC power systems. This report presents analyzed results on subsynchronous oscillations in VSC-based DC power systems, aiming to inspire engineers and researchers to pay closer attention to the proper operation of DC power systems.

Speaker

Weidong Chen

Electric Power Research Institute of Guangxi Power Grid Company, Ltd.

Bio: Weidong Chen was born in Nanning, Guangxi, China on July 14, 1983. He received the B.S. degree in electrical engineering from Sichuan University, Chengdu, China, in 2010. He is currently the Deputy director of Intergrated Energy Research Department at Electric Power Research Institute of Guangxi Power Grid Co.,Ltd, Nanning, China. His main research interests include power quality, renewable energy, and microgrids.

Title: Evaluation Software and Demonstration Projects for Flexible Interconnection in Low-Voltage Station Area

Abstract: The traditional transformation scheme of distribution station area can not make full use of the complementarity of the spatial distribution of source-load resource. The flexible DC interconnection station area can realize the flexible transfer of power in space, improve the distribution of power flow, and meet the safe, reliable and high-quality energy consumption needs of tourist villages. Therefore, this report will display the flexible interconnection evaluation software and demonstration projects for low-voltage station area, among which the flexible interconnection evaluation software for low-voltage station area includes three scenarios, namely, the selection of flexible interconnection station area, the analysis of complementarity of station area and the display of evaluation indexes. At the same time, the low-voltage platform area flexible interconnection demonstration projects will be introduced to help the implementation of the "carbon peak and carbon neutrality" strategy on the distribution network side.

Speaker

Chen Wang

State Grid Beijing Electric Power Research Institute

Bio: Chen Wang was born in Beijing, China, in 1994. He received the B.S. and M.S. degree in electrical engineering from China Agricultural University, Beijing, China, in 2017 and 2021.He is currently working as an Engineer with State Grid Beijing Electric Power Research Institute. His research interests include hybrid ac/dc distribution network, renewable energy generation, and resilience of distribution networks.

Title: New Power System Constructing Critical Technology during Regional Urbanization Development in "Dual Carbon Goal" background

TECHNICAL SESSION

Room: Ballroom 3 | Time: 09:00-10:15, July 9, 2023

Session 15: Resilience Enhancement Strategies for The New-type Power System Resist Extreme Events (Special Session)

Chairs: Yichen Shen & Heng Zhang & Shenxi Zhang
Shanghai Jiao Tong University

Abstract

In the new-type power system with renewable energy as the main power source, there are few power generation units (such as coal-fired and gas-fired power units) with strong support capacity, and the ability of the system to resist the impact of natural disasters is weak. In addition, a large number of advanced information equipment are used in the new-type power system, which is vulnerable to man-made attacks. The safe and reliable operation of the new-type power system will face severe challenges under natural disasters (such as typhoons, earthquakes, etc.) and man-made attacks (for example, cyber-physical attacks). Before disasters, optimal planning of generators, transmission, and distribution networks need to be considered on a long time scale, while hardening planning for power facilities should be employed on a short time scale. During disasters, it is necessary to improve the capacity to absorb energy released by disasters and the power supply capacity for important loads through preventive scheduling. After disasters, the system should have the rapid recovery ability to ensure the power supply for loads.

Time	Paper ID	Presenter	Affiliation
09:00-09:15	1347	Yuexin Song	Institute of Electrical Engineering, Chinese Academy of Sciences
09:15-09:30	1455	Xinyi Chen	Shanghai Jiao Tong University
09:30-09:45	1811	Kunpeng Zhang	East China Jiaotong University
09:45-10:00	2135	Zijun Yuan	Shanghai JiaoTong University
10:00-10:15	4181	Zijun Yuan	Shanghai Jiao Tong University

Paper ID	Title & Author
1347	Short-Term Power Forecasting for Wind Power Generation Under Extreme Weather Conditions Yuexin Song, Yizhi Chen, Chenghong Tang, Wei Wang, Hao Xiao, Wei Pei and Yanhong Yang
1455	Multi-Scenario Transmission Network Expansion Planning Considering Deep Peak Regulation under Static Security Constrains Yingbei Yao, Kanqin Zhuang, Zheng Wang, Lu Liu, Haozhogn Cheng and Su Ma
1811	Resilience Enhancement Strategies for High Speed Train Traction Motor Power System with Coupled Faults Kunpeng Zhang, Hao Li, Yinquan Yu, Bin Jiang, Hui Yang and Chunlan An
2135	Resilient Transmission Network Hardening Planning Coordinated with Distribution Network Defensive Strategies Against Typhoons Zijun Yuan, Heng Zhang, Lu Liu, Shenxi Zhang, Haozhong Cheng, Jianqin Liu, Ying Wang and Defu Cai
4181	The Extraction Method of Critical Indexes for Transmission System with Low Carbon Consideration Da Sang, Li Li, Yunfei Zhao, Xinmiao Yao and Haozhong Cheng

TECHNICAL SESSION

Room: Meeting Room 7 | Time: 09:00-10:15, July 9, 2023

Session 16: Smart Grid-Microgrid

Chair: Tengfei Ma, Institute of Electrical Engineering, CAS

Time	Paper ID	Presenter	Affiliation
09:00-09:15	2404	Kaiping Qu	China University of Mining and Technology
09:15-09:30	2518	Xiaowei Pu	Institute of Electrical Engineer, Chinese Academy of Sciences
09:30-09:45	2677	Yayue Cao	School of Control Science and Engineering, Shandong University
09:45-10:00	2756	Yongkun Deng	Shanghai Jiao Tong University
10:00-10:15	4392	Jinshuo Su	Electric Power Research Institute, Guizhou Power Grid Company Ltd.

Paper ID	Title & Author
2404	A Constrained Robust Optimization for Day-ahead Scheduling of Microgrids with Source-demand Uncertainty Yuxuan Jiang, Shubo Liu, Chunlin Zhong, Chao Fang, Kaiping Qu and Weihang Su
2518	Interactive Power Prediction Model for Virtual Power Plant Based on Wave-Attention Network Xiaowei Pu, Hao Xiao, Wei Pei, Tengfei Ma, Zhiming Guo and Jian Zhao
2677	Sampling Aliasing Analysis for Parallel Grid-Tie Inverters Based on Frequency-Domain Model Yang Li, Hai Zhang, Zongjie Liu, Yayue Ca, Tao Xu and Feng Gao
2756	Monopolar Fault Reconfiguration for Resilient Protection of Bipolar DC Distribution System Yongkun Deng, Miao Zhu, Jianjun Ma and Yucheng Gui
4392	Modeling and Simulation for Microgrids with Distributed Energy Resources of Low-carbon Parks Zhukui Tan, Lei Yu, Yang Wang, Xinhao Lin, Zihong Song, Shuo Tang and Jinshuo Su

TECHNICAL SESSION

Room: Meeting Room 1 | Time: 09:00-10:15, July 9, 2023

Session 17: Power System Engineering-Power System Operation

Chair: Congyue Zhang, Southeast University

Time	Paper ID	Presenter	Affiliation
09:00-09:15	8658	Xiaoli Yan	Qilu University of Technology (Shandong Academy of Sciences)
09:15-09:30	8872	Wanglin Cao	Digital Grid Research Institute, China Southern Power Grid.
09:30-09:45	8916	Yibo Li	Shandong University
09:45-10:00	9106	Guannan Wang	Power Dispatching & Control Center, State Grid Jibei Electric Power Company Limited
10:00-10:15	9163	Haotian Song	Tsinghua University Weiyang College

Paper ID	Title & Author
8658	Study of Transformer Loss and Temperature Rise under DC Bias Magnetism Based on Finite Element Method Xiaoli Yan, Xia Dong, Guozheng Han, Xiulan Yin, Xiaodong Yu and Zhengyi Jiao
8872	Research on Short-term Power Load Forecasting Method based on PCA-VMD-LSTM-MTL Wei Jia, Jiefeng Chen, Shaowei Luo, Yuchun Huang and Bin Zhang
8916	Maximum Power Tracking for Low Frequency Offshore Wind Farm Based on Wind Speed Prediction by Convolutional Neural Network Algorithm Qian Zhou, Dandan Zhu, Yibo Li, Yafeng Jiang, Qiuwei Wu and Jian Chen
9106	Day-ahead Scheduling Strategy for Bulk Power System Based on Accurate Prediction of Wind Power Output Guannan Wang, Xinyue Wu, Xiaowei Fan, Bin Wang, Jun Zhang and Haitao Liu
9163	Data-driven Electricity Market Price Risk Evaluation Based on Price Elasticity Indicator Haotian Song, Qinghu Tang, Hongye Guo, Jianing Liu, Zhuo Su and Qixin Chen

TECHNICAL SESSION

Room: Meeting Room 5 | Time: 09:00-10:15, July 9, 2023

Session 18: Renewable Energy Integration-Renewable Energy Development and Integration

Chair: Ran Yao, Chongqing University

Time	Paper ID	Presenter	Affiliation
09:00-09:15	2739	Yanfei Ling	Southeast University
09:15-09:30	3236	Hong Lu	Sichuan University
09:30-09:45	3561	Jianzhou Feng	Tsinghua University
09:45-10:00	3632	Yuchong Huo	Nanjing University of Science and Technology
10:00-10:15	4328	Haohan Liao	China Agricultural University

Paper ID	Title & Author
2739	An Intelligent Adversarial Deep Forecasting Model for Load Demand Using Hybrid Modified DA-GAN Yanfei Ling, Xiaofei Li, Chi Li and Tao Chen
3236	A Grid-forming Control Method of Modular Multilevel Converter with Integrated Distributed Photovoltaic and Battery Energy Storage System Hong Lu, Xianyong Xiao, Guangfu Tang, Zhiguang Lin, Zhiyuan He and Chong Gao
3561	Joint Planning of Multi-type Energy Storages and Flexible Resources for High-penetration Renewable Energy Integration Jianzhou Feng, Zechun Hu, Peng Zhang, Shaorong Cai and Xiaoyu Duan
3632	Model Predictive Control Based Power Scheduling of Offshore Wind Farm for Primary Frequency Support Considering Turbulent Wind Uncertainty Qiang Li, Chenggen Wang and Qun Li
4328	Feature Dimensionality Reduction for Ultra-Short-Term Wind Power Forecasting Based on Global Surrogate Model Haohan Liao, Yongning Zhao, Yuan Zhao, Lin Ye and Yingying Zheng

TECHNICAL SESSION

Room: Meeting Room 6 | Time: 09:00-10:00, July 9, 2023

Session 19: Joint Planning and Operation of Energy-transportation Integration System (Special Session)

Chairs: Qian Zhang, Chongqing University
Zhaohao Ding, North China Electric Power University

Abstract

The construction of new power system with non-carbon energy sources and the development of a zero-emission low-carbon transportation system are important measures to achieve China's "3060 dual-carbon" goal. Multi-energy coupling provides an effective way to enhance the flexibility of power system and promote the consumption of renewable energy. Cooperative dispatching of different energy sources through multi-energy coupling can make full use of the complementary and synergistic effects of each energy source and realize the optimal allocation of resources on a larger scale. New energy vehicles can not only reduce carbon emissions, but also serve as an effective dispatching resource for the interaction of "source-network-load-storage", and participate in large-scale renewable energy consumption. The electricity-hydrogen integrated system with new energy vehicles can effectively tap the potential of renewable energy consumption of the electric power system, transportation system and hydrogen energy system, and promote the decarbonization of the energy-transportation system.

Time	Paper ID	Presenter	Affiliation
09:00-09:15	852	Chen Li	State Key Laboratory of Power Transmission Equipment & System Security and New Technology Chongqing University
09:15-09:30	879	Ziyin He	Wuhan University of Technology
09:30-09:45	2612	Yiwen Huang	Shanghai Jiao Tong University
09:45-10:00	2678	Fengchen Song	University of Jinan

Paper ID	Title & Author
852	An Optimal Dispatching Method of Power Systems Considering Virtual Inertia Provided by Fuel Cells Chen Li, Zhouyang Ren and Wenyuan Li
879	Interval Multi-objective Optimization Combined with Deep Reinforcement Learning for Building Energy Management System Hui Hou, Ziyin He, Yanchao Lu and Jie Yang
2612	Optimal Operation of Seaport Integrated Energy Systems with Coordination between Logistic and Energy Systems Yiwen Huang, Wentao Huang, Ran Li and Nengling Tai
2678	Research on Distribution Network Joint Planning and Profit Distribution under The Liberalization of Incremental Power Distribution Service Kai Zheng, Jun Zhao, Kangzhuang Guo, Shangbin Wang, Chen Yuan and Luhao Wang

TECHNICAL SESSION

Room Ballroom 2 | Time 10:45-12:00, July 9, 2023

Session 20: High-Quality Power Supply Technologies of Low-Carbon Distribution Systems (Special Session)

Chairs: Lu Zhang & Bo Zhang
China Agricultural University

Abstract

Driven by the carbon-neutral target, large-scale of distributed flexibility resources will be integrated into the distribution system, including various types of renewable energies, energy storage systems, flexible loads, energy prosumers and flexible devices. Constructing an innovative low-carbon distribution system with flexibility resources is crucial in realizing the carbon neutrality. However, the integration of large-scale flexibility resources also brings new challenges to the power supply reliability and operation control of distribution systems. Therefore, to deal with the risks caused by the flexibility resources and improve the power supply quality of low-carbon distribution systems, the issues in optimizing operation, stability analysis and advanced control of the low-carbon distribution systems should be paid major attention.

Time	Paper ID	Presenter	Affiliation
10:45-11:00	1208	Wenbo Wu	University of Jinan
11:00-11:15	2271	Kaibo Kong	China Agricultural University
11:15-11:30	1938	Wen Zhang	Shandong Agricultural University
11:30-11:45	4293	Yujing Zhang	China Agricultural University
11:45-12:00	6836	Jingli Zhang	Hitachi Energy China

Paper ID	Title & Author
1208	Interharmonics Suppression Scheme in PV System with Reference Phase Correction MPPT Algorithm Wenbo Wu, Guangqian Ding, Xinmeng Zhang, Ying Li and Chunlei Wu
2271	A Method for Analyzing Boundary Conditions of Typical Power Supply Structure in AC/DC Hybrid Distribution Network with Large-scale Photovoltaic Access Wei Li, Hao Bai, Weichen Yang, Yu Fu, Yongxiang Cai, Yuanhong Ye and Heng Tang
1938	Fault Level Prediction Method for Urban Distribution Network Considering Class-Imbalance Problems Wen Zhang, Xinzhe Zhang, Huawei Mou and Shenghui Fu
4293	Power Balancing Control Method for Flexible Interconnected Three-phase Four-wire Low-voltage Distribution Area Yang Wang, Wei Li, Yongxiang Cai, Wei Wu, Tong Liu, Lin Yang, Yuansheng Liang and Yang Li
6836	Operation Mode and Economic Analysis of Virtual Power Plant Jingli Zhang, Meng Cheng, Qianliang Xiang and Hailian Xie

TECHNICAL SESSION

Room Ballroom 3 Time 10:45-11:45, July 9, 2023

Session 21: Resilience Enhancement Strategies for The New-type Power System Resist Extreme Events (Special Session)

Chairs: Yichen Shen & Heng Zhang & Shenxi Zhang
Shanghai Jiao Tong University

Abstract

In the new-type power system with renewable energy as the main power source, there are few power generation units (such as coal-fired and gas-fired power units) with strong support capacity, and the ability of the system to resist the impact of natural disasters is weak. In addition, a large number of advanced information equipment are used in the new-type power system, which is vulnerable to man-made attacks. The safe and reliable operation of the new-type power system will face severe challenges under natural disasters (such as typhoons, earthquakes, etc.) and man-made attacks (for example, cyber-physical attacks). Before disasters, optimal planning of generators, transmission, and distribution networks need to be considered on a long time scale, while hardening planning for power facilities should be employed on a short time scale. During disasters, it is necessary to improve the capacity to absorb energy released by disasters and the power supply capacity for important loads through preventive scheduling. After disasters, the system should have the rapid recovery ability to ensure the power supply for loads.

Time	Paper ID	Presenter	Affiliation
10:45-11:00	7743	Jinhua He	Tsinghua University
11:00-11:15	8488	Chao Sun	Shanghai Jiao Tong University
11:15-11:30	8597	Lianrui Ma	Anshan power supply company
11:30-11:45	9724	Zhengkun Xin	Xi'an Jiaotong University

Paper ID	Title & Author
7743	Robust Coordinated Dispatch Strategy for the Power System with Large Offshore Wind Power Integration Under a Typhoon Jinhua He, Zechun Hu, Yang Liu, Zhiyuan Bao and Yu Zhu
8488	Scenario Reconstruction Model for Wind and Photovoltaic Power Considering Spatio-temporal Correlation and Credibility Chao Sun, Lu Liu, Haozhong Cheng, Xinyi Chen, Yingbei Yao, Kanqin Zhuang, Zheng Wang
8597	A Non-destructive Flaw detection Diagnosis Model for Transmission Lines based on UAV Charged X-ray Intelligent Detection Ma LianRui, Tong Ming, Li Wan Liang, Liu GuanNan and Fu ShaoPeng
9724	Rapid Assessment of Distribution Systems Resilience Based on Analytical Method Zhengkun Xin, Wang Luo, Gengfeng Li, Qiwei Peng, Zhaohong Bie, Xiaolong Hao, Wei Zhang and Zhichao Wu

TECHNICAL SESSION

Room: Meeting Room 7 | Time: 10:45-12:15, July 9, 2023

Session 22: Smart Grid-Microgrid

Chair: Tengfei Ma, Institute of Electrical Engineering, CAS

Time	Paper ID	Presenter	Affiliation
10:45-11:00	5263	Yaoyu Huang	State Key Laboratory of Power Transmission Equipment & System Security and New Technology Chongqing University
11:00-11:15	8170	Jiahao Ye	Xinjiang University
11:15-11:30	8310	Xiangyu Jiang	Power Electronics and Energy Management Key Laboratory (Ministry of Education of China) Huazhong University of Science and Technology
11:30-11:45	1359	Tengfei Ma	Institute of Electrical Engineering, Chinese Academy of Sciences
11:45-12:00	8752	Yi He	Hohai University
12:00-12:15	2712	Shuai Zhang	Institute of Electrical Engineer, Chinese Academy of Sciences

Paper ID	Title & Author
5263	Electricity Trading Strategy for Home Users Based on Coalition Cooperation Game Qian ZHANG, Yaoyu Huang, Yue Hu, Xiaohan Wu and Chunyan Li
8170	A Global and Locally Enhanced Water Cycle Algorithm for Dynamic Economic Dispatch of Power Systems Jiahao Ye, Lirong Xie, Lan Ma, Yifan Bian and Hu Zhang
8310	Fault-tolerant Strategy for MMC with Maximum Line-to-line Voltage Capacity Xiangyu Jiang, Mengwei Li, Xiongfeng Fang, Qiang Dong, Kai Zhang and Jian Xiong
1359	The Distributed Coordinated Operation Strategies of Distribution Network and Multi-micro Energy Grids Tengfei Ma, Wei Pei, Hao Xiao, Chenghong Tang and Shuai Zhang
8752	Robust Optimal Economic Dispatch of Microgrid with Stepwise Demand Response Mechanism Yi He, Yonghui Sun, Wei Zhou, Pengpeng Wu, Li Chen and Yunfan Meng
2712	Non-Cooperative Game Theory-based Optimization strategy of P2P Power Usage Quotas Transaction in Communities Shuai Zhang, Tengfei Ma, Wei Pei, Xueting Cheng and Yueshuang Bao

TECHNICAL SESSION

Room: Meeting Room 1 | Time: 10:45-11:45, July 9, 2023

Session 23: Smart Grid-Low-carbon Power System

Chair: Changzhen Shao, Chongqing University

Time	Paper ID	Presenter	Affiliation
10:45-11:00	183	Qing Wang	Marketing Service Center (Metering Center) Shandong Electric Power Company
11:00-11:15	3206	Linjun Lv	Guangdong University of Technology
11:15-11:30	4259	Kexu Sun	Shandong University
11:30-11:45	9071	Siqi Chen	North China Electric Power University

Paper ID	Title & Author
183	A Carbon Emission Measurement Method and Module System for the Steel Industry Qing Wang, Zhen Jing, Pingxin Wang, Yan Du, Xi Zhao and Zhiru Chen
3206	Dynamic Time-sharing Tariff Orderly Charging Strategy for Optical Storage Charging Stations in Commercial Areas Lv Linjun and Zhang Zhaoyun
4259	Research on the Mechanism of Reactive Circulation Generation and its Inhibition in New Energy Stations Kexu Sun, Feng Zhang, Guanghao Wu and Bertrand Cornélusse
9071	A Multi-market Collaborative Trading Model for Load Aggregator Hao Lv, Yiming He, Linlin Hu, Siqi Chen, Runpeng Ma and Ninglu Ma

TECHNICAL SESSION

Room: Meeting Room 5 | Time: 10:45-12:15, July 9, 2023

Session 24: Renewable Energy Integration-Renewable Energy Development and Integration

Chair: Tao Chen, Southeast University

Time	Paper ID	Presenter	Affiliation
10:45-11:00	5180	Yuanzong Song	Shandong University
11:00-11:15	5269	Quanquan Wang	State Grid Jiangsu Electric Power Co., Ltd.
11:15-11:30	5968	Decai Li	China Electric Power Research Institute
11:30-11:45	6524	Xingyuan Xu	South China University of Technology
11:45-12:00	6444	Jiachen Li	Shandong University
12:00-12:15	6647	Xin Wang	Hunan University of Technology

Paper ID	Title & Author
5180	Analysis of Transient Response Time for PV Source Simulators and a Design of PV Source Simulator Test Platform Yuanzong Song, Zhijie Liu, Ke-Jun Li, Zhenshan Huang, Liangzi Li and Zhonglin Guo
5269	Security-constrained Fast Production Cost Minimization Simulation Based on Time Domain Partitioning Method Wenjia Zhang, Zhuyi Peng, Quanquan Wang and Wanchun Qi
5968	Generic EMT Modelling of PMSG Wind Turbine for Digital-analog Hybrid Bulk Grid Simulation Decai Li, Yiying Zhu, Yalou Li, Xiaoli Zhang, Xiao Lei and Guangheng Pang
6524	A Novel Coordination Bidding Mechanism of Virtual Power Plant based on Stackelberg Game Weiliang Huang, Yuxiang Huang, Dongxu Li, Xingyuan Xu, Zhiwen Yu and Haoyong Chen
6444	An Improved Maximum Power Point Tracking Method Under Partial Shading Condition Jiachen Li, Zhijie Liu, Kejun Li, Zhonglin Guo, Bingkun Li and Jing Feng
6647	Hybrid Energy Storage Control Based on Prediction and Deep Reinforcement Learning Compensation for Wind Power Smoothing Xin Wang, Jianshu Zhou and Bin Qin

TECHNICAL SESSION

Room: Meeting Room 6 | Time: 10:45-11:45, July 9, 2023

Session 25: Joint Planning and Operation of Energy-transportation Integration System (Special Session)

Chairs: Qian Zhang, Chongqing University
Zhaohao Ding, North China Electric Power University

Abstract

The construction of new power system with non-carbon energy sources and the development of a zero-emission low-carbon transportation system are important measures to achieve China's "3060 dual-carbon" goal. Multi-energy coupling provides an effective way to enhance the flexibility of power system and promote the consumption of renewable energy. Cooperative dispatching of different energy sources through multi-energy coupling can make full use of the complementary and synergistic effects of each energy source and realize the optimal allocation of resources on a larger scale. New energy vehicles can not only reduce carbon emissions, but also serve as an effective dispatching resource for the interaction of "source-network-load-storage", and participate in large-scale renewable energy consumption. The electricity-hydrogen integrated system with new energy vehicles can effectively tap the potential of renewable energy consumption of the electric power system, transportation system and hydrogen energy system, and promote the decarbonization of the energy-transportation system.

Time	Paper ID	Presenter	Affiliation
10:45-11:00	3225	ZIyi Wang	Tianjin HDYD Technology Company Ltd.
11:00-11:15	3334	Jinxi Zhang	University of Macau
11:15-11:30	4478	Yubin Tian	Harbin Engineering University
11:30-11:45	7902	Jiakun Dai	Sichuan University

Paper ID	Title & Author
3225	Capacity Compensation Price Evaluation Considering Economic Benefit of Energy Market in a Power Spot Market Keyuan Fu, Mei Wang, Bo Sui, Yang He, Fangzhao Deng, Hujun Li, Zhenli Deng, Ziyi Wang, Shouhang Du and Shu Wang
3334	Coordinated Ride-hailing Order Scheduling and Charging for Autonomous Electric Vehicles based on Deep Reinforcement Learning Jinxi Zhang, Lingming Kong and Hongcai Zhang
4478	Joint Generation and Voyage Scheduling for All-Electric Ships Considering the Impact of Wind and Wave Yubin Tian, Fang Lu, Bo Wang and Baoling Xie
7902	A Correlation-XGBoost based Distributed Photovoltaic Output Prediction Method considering Regional Meteorological Factor Jiakun Dai, Yue Xiang and Qingwei Tang

TECHNICAL SESSION

Room Ballroom 1 Time 13:30-15:15, July 9, 2023

Session 26: Renewable Power Forecast Accuracy Improvement Technology and Its application (Special Session)

Chair: Bo Wang, China Electric Power Research Institute
Jie Shi, University of Jinan

Abstract

The proportion of renewable power generation in the power system is gradually increasing. Accurate renewable power forecast can weaken the impact of its strong volatility and high uncertainty on the economic operation of power system. The traditional single static forecast model is no longer suitable for the current complex and changeable forecast scenarios. Multiple information integration, dynamic model combination, prediction error correction and other methods can further improve the accuracy of power prediction. This Special Session aims to improve the dynamic characteristics and accuracy of renewable power forecast.

Time	Paper ID	Presenter	Affiliation
13:30-13:45	468	Jiajiong Song	Huazhong University of Science and Technology
13:45-14:00	5082	Xinnan Yu	Northeast Electric Power University
14:00-14:15	6001	Yuhan Xiong	Huazhong University of Science and Technology
14:15-14:30	7682	Ruofan Chen	Electric Power Research Institute of China Southern Power Grid Company Limited
14:30-14:45	7830	Zhaolong Tang	Huazhong University of Science and Technology
14:45-15:00	8926	Heng Wang	Qilu University of Technology (Shandong Academy of Sciences)
15:00-15:15	9247	Shengpu Gao	Shenzhen Power Supply Co., Ltd.

Paper ID	Title & Author
468	Wind Power Prediction under Extreme Weather Conditions of Low Temperature based on TimeGAN and GWO-BiLSTM Jiajiong Song, Xiaosheng Peng, Zimin Yang, Guoyuan Qin, Ruofan Chen, Peijie Wei and Yuhan Xiong
5082	An Ultra-short-term Wind Power Forecasting method based on Data-physical Hybrid-driven Model Wang Da, Shi Yv, Deng Weiying, Guan Xiaozhuo, Yang Mao and Yu Xinnan
6001	A Definition and Prediction Method for Wind Power Low Output Events Yuhan Xiong, Xiaosheng Peng, Chaohui Zhou and Qingliang Wang
7682	Wind Power Interval Prediction Based on CGAN and KELM under Extreme Weather Scenarios Weisi Deng, Zhongfu Dai, Ruofan Chen, Haohuai Wang, Siyu Lu, Chonghao Li and

	Baorong Zhou
7830	Short-term Wind Power Prediction Based on HDBSCAN with Outlier Factor Method and CNN-BiLSTM Zhaolong Tang, Xiaosheng Peng, Taoyu Lu, Lifu Luo, Jingchen Zhou and Xu Liu
8926	Short-term Wind Power Prediction based on Variational Mode Decomposition and Hybrid Neural Networks Heng Wang, Xiaodong Yu, Xuanzhou Yu, Zhao Jiang, Shangqing Song, Rui Xu and Hongzhi Zang
9247	Generation Method for Medium and Long-term Photovoltaic Power Time Series Considering Variable Order Time Series Characteristics Shengpu Gao, Yufei Li and Jun Zhong

TECHNICAL SESSION

Room Ballroom 2 Time 13:30-15:45, July 9, 2023

Session 27: Multi-market Equilibrium Analysis: Challenges and Solutions (Special Session)

Chairs: Donghan Feng, Shanghai Jiao Tong University
Yun Zhou, Shanghai Jiao Tong University
Hengjie Li, Lanzhou University of Technology

Abstract

Market equilibrium analysis is a quantitative analysis tool to verify the effectiveness of power market mechanism design. However, the power market is currently characterized by diversification of market players, diversification of trading varieties, and complexity of organizational timing, making it difficult to solve and analyze market equilibrium. On the one hand, the market participants involve four categories of generation, grid, load and energy storage, and the game process among them is difficult to be mathematically expressed. On the other hand, the multi-market environment formed by carbon market, green certificate market and other financial derivatives makes the decision-making dimension increase, which makes it difficult to solve the equilibrium. Therefore, it is very meaningful to explore the solution and analysis method of market equilibrium in multi-market environment to help the design of power market mechanism.

Time	Paper ID	Presenter	Affiliation
13:30-13:45	1424	Qiyuan Liu	Shanghai Jiao Tong University
13:45-14:00	2318	Yuanhao Feng	Shanghai Jiao Tong University
14:00-14:15	4440	Hanwen Li	North China Electric Power University
14:15-14:30	4664	Wenlong Li	Shanghai Jiao Tong University
14:30-14:45	6445	Huanran He	North China Electric Power University
14:45-15:00	7851	Zeqi Liang	Shanghai Jiao Tong University
15:00-15:15	8076	Mo Qi	Shanghai University of Electric Power
15:15-15:30	9200	Linye Tang	Hohai University
15:30-15:45	9722	Zihao Tian	Shanghai Jiao Tong University

Paper ID	Title & Author
1424	Equilibrium Analysis for Electricity Market Considering Carbon Emission Trading Based on Multi-agent Deep Reinforcement Learning Qiyuan Liu, Donghan Feng, Yun Zhou, Hengjie Li, Kaiyu Zhang and Shanshan Shi

2318	Optimal Investment Strategy for Wind Power under Electricity-carbon-green Certificate Trading: based on Multi-agent Deep Reinforcement Learning Xiaogang Li, Yuanhao Feng, Min Wu, Zhongyang Chen, Yun Zhou and Donghan Feng
4440	Price Linkage Formulas for Medium and Long-term Interprovincial Power Contracts Hong Zhang, Xiaogang Li, Min Wu, Zhongyang Chen, Hanwen Li
4664	Identification and Analysis for Price Multiplicity in Multi-interval Real-time Market Wenlong Li, Donghan Feng, Yun Zhou, Shaolun Xu, Bonan Huang and Huangru Zhu
6445	Ancillary Service Market Equilibrium Analysis for Multi-agent Load Aggregators in Distribution System Huanran He, Peng Wang, Yangling Wang and Haili Wang
7851	Low-carbon Economic Dispatch of Park Integrated Energy System under Electricity-carbon-green certificate Market Zeqi Liang, Yun Zhou, Donghan Feng, Lingyu Guo, Yang Du and Zhongguang Yang
8076	Analysis of Market Equilibrium under the Coupling of Carbon Market and Electricity Market Mo Qi, Shengsheng Deng and Yuxiang Huang
9200	A P2P Trading Mechanism Participated with Shared Energy Storage Operator Based on Stackelberg Game Linye Tang, Lei Gan, Xingying Chen, Kun Yu and Peng Chen
9722	Method of Eliminating Transmission Line Overload in Electricity Spot Market Zihao Tian, Donghan Feng, Yun Zhou, Shaolun Xu, Ling Luo and Jing Liu

TECHNICAL SESSION

Room Ballroom 3 Time 13:30-15:45, July 9, 2023

Session 28: Optimal Planning and Operation of Regional Integrated Energy Systems Under the Scalable Aggregation of Flexibility Resources (Special Session)

Chair: Fangyuan Si, Tsinghua University

Abstract

Maintaining a real-time balance between energy supply and demand is fundamental to ensuring energy systems' safe and stable operation. However, in the context of China's low-carbon energy strategy, the rapid development of new energy sources such as wind and solar power, which are characterized by intermittency and volatility, poses significant challenges to system stability and safety. Increasingly, the imbalance between supply and demand has led to issues such as wind and solar energy curtailment and periodic shortages in energy supply. Moreover, China's current energy structure is still dominated by thermal power, and the availability of fast, flexible, and low-carbon regulation resources is relatively limited. Furthermore, as energy forms such as electricity, heat, cold, and natural gas become increasingly coupled in multiple stages, relying solely on a single energy system and traditional control modes that follow the load is no longer sustainable. Therefore, it is necessary to promote regional integrated energy systems (RIES) on the user side to integrate distributed generation, combined cooling, heating, and power (CCHP), energy storages, and multi-energy loads into system scheduling and operation.

Time	Paper ID	Presenter	Affiliation
13:30-13:45	451	Jiaxin Ma	Management Science Research Institute of Guangdong Power Grid Corporation
13:45-14:00	1704	Feilong Fan	Shanghai Jiao Tong University
14:00-14:15	154	Wenrui Huang	Tsinghua University
14:15-14:30	3434	Wenjie Qiao	Northeastern University
14:30-14:45	5069	Jiayi Luo	Shanghai Jiao Tong University
14:45-15:00	6352	Wenjie Qiao	Northeastern University
15:00-15:15	7255	Wenru Li	Anhui University
15:15-15:30	9294	Yu Wang	Northeastern University
15:30-15:45	5957	Wenrui Huang	Tsinghua University

Paper ID	Title & Author
451	Research on Micro-grid Planning Technology under the Background of Carbon Neutrality and New Power System Xing Lu, Haoyang Feng, Jiaxin Ma and Ming Zeng
1704	Topology and Configuration Optimization of Wind-solar-hydrogen Combined System Shan Jiang, Huiqun Huang, Boyan Chi, Xiaoman Cao, Na Shu and Feilong Fan
154	Research on Battery Energy Storage Health Index Based on Equipment Health Model Peng LI, Wenrui HUANG, Ziyi ZHANG, Lin CHENG, Weiwei YANG, Louy Sokleang and Xuyan ZHOU
3434	A Multi-Discriminator Weighted Adversarial Network for Cross-Domain Unknown Wind Turbine Fault Diagnosis Yinghua Han, Huaiyuan Qi, Fangyuan Si, Kangping Li and Qiang Zhao
5069	Low-carbon Economic Optimization for Park Integrated Energy System Considering Multi-network Integration Jiayi Luo, Feilong Fan, Nengling Tai, Zhanpeng Chen, Chuanqing Pu and Xipeng Zhang
6352	An Economic Scheduling Method for Coordinated Integrated Energy Systems and Transportation Networks Wenjie Qiao, Yinghua Han, Fangyuan Si, Ning Zhang, Jinkuan Wang and Qiang Zhao.
7255	An Improved Sampled–Date-Based Distributed Event-Triggered Secondary Control in Islanded Microgrids Wenru Li, Yuan Fan and Xiaohan Fang
9294	An Improved SD-Jaya Algorithm for Multi-Objective Edge Computing Problem in IRS-Aided Charging Electric Vehicular Networks Xin Song, Yu Wang, Runfeng Zhang, Siyang Xu, Yuqi Zhang and Zhigang Xie
5957	Research on Distributed Flexible Resource Planning Method for Integrated Energy System Hongtao LI, Wenrui HUANG, Zijin LI, Hao TIAN, Chen WANG and Louy Sokleang

TECHNICAL SESSION

Room: Meeting Room 7 | Time: 13:30-15:30, July 9, 2023

Session 29: Renewable Energy Integration-Renewable Energy Development and Integration

Chair: Qiushi Cui, Chongqing University

Time	Paper ID	Presenter	Affiliation
13:30-13:45	7075	Peijie Zhang	China University of Mining and Technology
13:45-14:00	7860	Xunjun Chen	Zhejiang University
14:00-14:15	8079	Sun Chao	Huazhong University of Science and Technology
14:15-14:30	8623	Junying Li	Southeast University
14:30-14:45	9224	Pan Qi	Wuhan University
14:45-15:00	9355	Hao Wang	Monash University
15:00-15:15	9379	Zhihui Li	North China Electric Power University
15:15-15:30	9550	Shiji Pan	China Agricultural University

Paper ID	Title & Author
7075	Joint Energy and Frequency Regulation Market Clearing Considering Wind Power Uncertainty Yemin Wu, Jiyao Wang, Chenyu Peng, Chunyu Chen, Xuemei Dai and Jianxiao Wang
7860	Continuous Fault Ride-Through Control of Wind Turbine using Energy Storage based DVR Xunjujn Chen, Guangchao Geng and Quanyuan Jiang
8079	Systematic Controller Design for DFIG-Based Wind Turbines to Enhance Synchronous Stability During Weak Grid Fault Chao Sun, Yihang Yang, Donghai Zhu, Xudong Zou and Yong Kang
8623	Comparison of Structure and Control Strategy for Offshore Wind Power Integration Using HVDC Junying Li, Xiaodong Liu, Yuhan Wang and Zhou Li
9224	Research on Transient Reactive Power Support Enhancement Technology for Doubly Fed Wind Turbine Generator Xiaojiu Ma, Weiyang Zhao, Deping Ke, Yang Liu, Xin Sun, Jian Xu, Qionglin Li and Yafei Zhang
9355	Cross-Entropy-Based Approach to Multi-Objective Electric Vehicle Charging Infrastructure Planning Jinhao Li, Yu Hui Yuan, Qiushi Cui and Hao Wang
9379	Experimental Study on the Damage Mechanism of High-Frequency Partial Discharge of Multilayer PI Films Under Repetitive Electrical Stress Zhihui Li, Yaoxuan Han, Zengqi Xie, Qingmin Li, Jian Wang, Hanwen Ren and Zhongdong Wang
9550	Anomalous Update Identification Based on Cosine Similarity for Collaborative Wind Power Forecasting Shiji Pan, Yongning Zhao, Yao Ru and Lin Ye

TECHNICAL SESSION

Room: Meeting Room 1 | Time: 13:30-15:30, July 9, 2023

Session 30: Power System Engineering-Power System Protection

Chair: Bo Jie, The University of Tokyo

Time	Paper ID	Presenter	Affiliation
13:30-13:45	295	Ruting Tang	Xi'an Jiaotong University
13:45-14:00	777	Zhongxiao Jia	Changsha University of Science & Technology
14:00-14:15	3575	Weiming Zhang	Taiyuan University of Technology
14:15-14:30	4157	Zhongxue Chang	Xi'an Jiaotong University
14:30-14:45	5030	Wenqiang Yang	China Electric Power Research Institute Co., Ltd
14:45-15:00	5172	Juanjuan Pan	China University of Mining and Technology
15:00-15:15	5594	Tengyi Zhang	Chongqing University
15:15-15:30	6605	Yucen Han	University of Electronic Science and Technology of China

Paper ID	Title & Author
295	A Thevenin Model for Internal Electromagnetic Transient Characteristics Study of the MMCs Ruting Tang, Jun Zhang, Xinyu Ma and Shuhong Wang
777	A Novel Controllable Oscillating Homopolar Coupling DC Circuit Breaker for VSC-based DC grids Zhongxiao Jia, Xiangyu Pei and Yingang Tu
3575	Commutation fault identification of UHVDC transmission system based on dissipated energy Weiming Zhang, Shuai Yuan, Gong Cheng, Qingsheng Zhao, Dingkang Liang and Minhong Yuan
4157	Phase Current based Fault Section Location for Single-Phase Grounding Fault in Non-Effectively Grounded Distribution Network Zhongxue Chang, Nana Chang, Weibin Tan, Wei Zhang, Zhihua Zhang and Guobing Song
5030	Analysis of Short Circuit Protection Failure and Component Defects of Low Voltage Switchgear Yang Wenqiang, Jin Jianwei, Dai Jing, Wu Chunjiu, Wei Yuanjian and Yan Bofeng
5172	Multi-objective fault recovery strategy for distribution networks with distributed generation Juanjuan Pan and Tianwen Ge
5594	Terahertz Nondestructive Testing For Debonding Defects of Insulating paperboard Wei Lu, Tengyi Zhang, Jiajun Li, Fuzeng Zhang, Xiaoguo Chen, Kai Zhou and Kai Liu
6605	Line Selection Strategy for Single-phase Grounding Fault in Distribution Network Considering Bidirectional Power Flow Yucen Han, Zhenyuan Zhang, Kaiwen Zheng and Yang Xu

TECHNICAL SESSION

Room: Meeting Room 5 | Time: 13:30-15:15, July 9, 2023

Session 31: Energy Systems-Distributed Energy Resources

Chair: Suhan Zhang, The Hong Kong Polytechnic University

Time	Paper ID	Presenter	Affiliation
13:30-13:45	2406	Yuchen Zhang	Shanghai University of Electric Power
13:45-14:00	4236	Baichuan Teng	Shanghai Jiao Tong University
14:00-14:15	4459	Xinhui Zhou	Shandong University
14:15-14:30	6017	Chunyan Nie	Southeast University
14:30-14:45	6473	Pianchao Shi	Shanghai Jiao Tong University
14:45-15:00	6588	Gang Yao	Power Dispatch Control Center of Guizhou Power Grid Company Ltd. Guiyang, China
15:00-15:15	6702	Fangrui Kang	Xi'an Jiaotong University

Paper ID	Title & Author
2406	Comprehensive Evaluation of Industrial Integrated Energy System Based on Grey Correlation Analysis and Entropy Weight Method Qiong Wu, Hongbo Ren, Shanshan Shi, Fang Chen, Sha Wan and Yuchen Zhang
4236	Coordinated Control and Operation Stability Analysis of Multi-port DC substation applied in Power Distribution System aichuan Teng, Jianjun Ma, Chuanchuan Hou and Miao Zhu
4459	Generalized Load Modeling of Compressed Air Energy Storage Xinhui Zhou, Zhenshu Wang, Zhenhua Xu and Kang Wang
6017	A Novel Non-Isolated Bidirectional 48V-12V DCX Converter With Transformer-Coupled Gate Driver Song Ding, Chunyan Nie, Ziyan Zhou and Qinsong Qian
6473	Architecture Design of Reconfigurable Sensing Terminal Platform Considering Distributed Energy Lidan Zhou, Pianchao Shi, Gang Yao, Hongyu Wang, Jian Li and Siyang Liu
6588	Research on Source-load Cooperative Scheduling Strategy based on Probabilistic Distance Fast Reduction Method Gang Yao, Huaying Su, Sheng Chen, Qinfeng Ma, Jiang Dai and Su An
6702	Research on Control Strategy of an Isolated Two-stage Battery Storage Converter Fangrui Kang, Zijun Liu, Xiao Zhang, Zhang Wen, Hao Yi and Fang Zhuo

TECHNICAL SESSION

Room: Meeting Room 6 | Time: 13:30-15:30, July 9, 2023

Session 32: Smart Grid-Novel Information Technologies for Smart Grid

Chair: Di Zhang, South China University of Technology

Time	Paper ID	Presenter	Affiliation
13:30-13:45	3619	Keren He	Hunan University
13:45-14:00	4194	Zhenyu Xu	Chongqing University State Key Laboratory of Power Transmission Equipment & System Security and New Technology
14:00-14:15	5307	Yabin Shang	Beijing Jiaotong University
14:15-14:30	5886	Jingyue Sang	Peking University
14:30-14:45	7023	Yigong Zhang	Chongqing University
14:45-15:00	7304	Le Zhang	South China University of Technology
15:00-15:15	8423	Yang Shen	Hunan University
15:15-15:30	7864	Shuyun Wang	Jiangsu Frontier Electric Technology Co. Ltd

Paper ID	Title & Author
3619	Spatiotemporal Precise Routing Strategy for Multi-UAV-based Power Line Inspection Using Hybrid Network of FANET and Satellite Internet Keren He, Quan Zhou, Yang Shen, Jiachen Gao and Zhikang Shuai
4194	Two-stage Optimal Operation Strategy of Distribution Network considering Orderly Charging and Discharging of Electric Vehicles Guangde Dong, Yongtao Chen, Xiaojun Zhu, Tao Chen, Zhenyu Xu, Niancheng Zhou and Yuhe Tian
5307	Collaborative Optimization of Transmission and Distribution Networks based on Feasible Domain Projections Yabin Shang, Xiaojun Wang, Zhao Liu, Zeikai Xu and Jinghan He
5886	Forms of the Energy Internet under Digital Transformation Guannan He, Jingyue Sang, Puxiang Tan, Jianxiao Wang and Jie Song
7023	Resource Demand Analysis of IoT Terminal Chips Based on Atomic Service Modeling Yigong Zhang, Yongjie Nie, Siyang Liu, Jian Li, Yuxing Mao, Tianyan Jiang, Xianping Zhao and Tiejun Cao
7304	An Online Fault Feeder Detection Method based on Incremental and Federated Learning Le Zhang, Jizhong Zhu, Di Zhang and Yixi Chen
8423	Sattellite Internet-based High-Precision Space-Ground Coordinated Ultra-short-term Photovoltaic Power Prediction Yang Shen, Quan Zhou, Jiawei Zhou, Binghua Song and Zhikang Shuai
7864	Reasonable Value Calculation of Synchronous Line Loss in Power Distribution Station Area Xinjia Li, Shuyun Wang, Fan Shao, Lei Zhao and Yonghui Yan

TECHNICAL SESSION

Room Ballroom 2 Time 16:00-17:30, July 9, 2023

Session 33: High-Quality Power Supply Technologies of Low-Carbon Distribution Systems (Special Session)

Chairs: Lu Zhang & Bo Zhang
China Agricultural University

Abstract

Driven by the carbon-neutral target, large-scale of distributed flexibility resources will be integrated into the distribution system, including various types of renewable energies, energy storage systems, flexible loads, energy prosumers and flexible devices. Constructing an innovative low-carbon distribution system with flexibility resources is crucial in realizing the carbon neutrality. However, the integration of large-scale flexibility resources also brings new challenges to the power supply reliability and operation control of distribution systems. Therefore, to deal with the risks caused by the flexibility resources and improve the power supply quality of low-carbon distribution systems, the issues in optimizing operation, stability analysis and advanced control of the low-carbon distribution systems should be paid major attention.

Time	Paper ID	Presenter	Affiliation
16:00-16:15	5510	Bo Zhang	China Agricultural University
16:15-16:30	7773	Bo Zhang	China Agricultural University
16:30-16:45	5991	Yujing Zhang	China Agricultural University
16:45-17:00	7884	Jiaguo Li	China agricultural university
17:00-17:15	7910	Chunxue Zhao	China Agricultural University
17:15-17:30	8729	Yi Lei	Tsinghua Sichuan Energy Internet Research Institute

Paper ID	Title & Author
5510	Control Strategy and Parameter Design of Flexible Devices in DC-Interconnected Low-Voltage Distribution Networks Bo Zhang, Qiming Zhang, Lu Zhang, Yongxiang Cai, Chunxue Zhao and Jiaguo Li
7773	Analysis of Multiple Source Load Characteristics and its Impact on the Distribution Network Zhuopeng Diao, Zhikai Pang, Jian Fang, Fan Yang and Xiang Lin
5991	Fault Emergency Repair Strategy Considering the Integration of Distribution Networks and Transportation Networks Yang Wang, Wei Li, Yongxiang Cai, Hongyan He, Shuhui Pan, Mao Miao and Zihong Song
7884	A DC Interconnection Transformation Method of Low-voltage Distribution Network Considering Power Outage Risk Assessment in Station area Hao Bai, Yongxiang Cai, Yongjun Wang, Wei Li, Xiaomeng He, Qinghai Zhu, Shiqi Li and Zufeng Wang
7910	Centralization-distributed Control Strategy for Medium and Low Voltage AC/DC Hybrid Distribution Network Wanxi Chen, Cao Chen, Jiayang Ruan, Lina Ai, Chunxue Zhao and Yujing Zhang
8729	Green Low-carbon Evaluation Method based on Optimal Combination Weighting of Moment Estimation Theory Xuejin Huang, Zongyang Liu, Min Yue, Keteng Jiang, Haibo Li, Yi Lei and Han Yang

TECHNICAL SESSION

Room Ballroom 3 Time 16:00-17:15, July 9, 2023

Session 34: Smart and Interactive Energy Management for Multi-agent New Types of Power Systems (Special Session)

Chairs: Tianguang Lu, Shandong University
Changsen Feng, Zhejiang University of Technology
Kaiqi Sun, Shandong University

Abstract

Driven by the goals of clean energy and zero carbon emissions, the power industry is undergoing significant transformations. The government of China plans to build a new type of power system featuring a gradual increase in the proportion of new energy sources and the large-scale deployment of clean power resources nationwide. The ever-increasing penetration of uncertain inverter-based distributed energy resources (DERs), such as wind and rooftop PV, will inevitably pose a considerable influence on the power system, bringing reliability, economic and resiliency concerns. Hence, it is imperative and essential to improve the comprehensive regulation capability of the power system, accelerate construction of flexible regulation power, guide self-supplied power plants, traditional high-energy industrial loads, industrial and commercial interruptible loads, electric vehicle charging networks and virtual power plants to participate in system regulation, to build a strong smart grid and improve grid security level.

Time	Paper ID	Presenter	Affiliation
16:00-16:15	4888	Fengchen Song	State Key Laboratory of Power Grid Safety China Electric Power Research Institute
16:15-16:30	5198	Guisen Ye	Shandong University
16:30-16:45	5707	Jiayao Chen	North China Electric Power University
16:45-17:00	6251	Yuchen Liu	Zhejiang University of Technology
17:00-17:15	9066	Yujia Guo	Southern University of Science and Technology

Paper ID	Title & Author
4888	Distributed Optimization Operation of Multi-microgrid with Electricity-carbon Trading Fengchen Song, Kaicheng Liu, Luhao Wang, Shengnan Zhao, Quanpeng Lv and Linlin Wang
5198	Coordinated Optimization Scheduling of Geo-distributed Multiple Data Centers and Electricity Retailers Based on Cooperative Game Theory Guisen Ye, Feng Gao and Zhengyi Wang
5707	The Coordinated Charging Pricing Approach for Charging Stations with Multi-agent Deep Reinforcement Learning Fangyu Wang, Qian Chen and Liping Yang
6251	Source-Load Synergistic Optimization for Power System Considering Low-Carbon Demand Response Guofeng Wang, Yuchen Liu, Yongqi Liu, Changsen Feng and Youbing Zhang
9066	Multi-stage Pricing Strategy of Charging Station based on EV Charging Load Forecasting Xun Li, Peng Huang, Jing Ge, Yujia Guo, Mengge Shi and Youwei Jia

TECHNICAL SESSION

Room: Meeting Room 7 | Time: 16:00-18:00, July 9, 2023

Session 35: Energy Storage Technologies-Real-time Monitoring of Energy Storage

Chair: Ji Wu, Hefei University of Technology
Fangfang Yang, Sun Yat-Sen University

Time	Paper ID	Presenter	Affiliation
16:00-16:15	740	Laiqiang Kong	Chongqing University
16:15-16:30	1755	Jun Zhong	Shenzhen Power Supply Co. Ltd
16:30-16:45	4809	Bozhao Zhang	Southwest Jiaotong University
16:45-17:00	5435	Luo Lei	Hefei University of Technology
17:00-17:15	7345	Xiaofeng Zhu	East China JiaoTong University
17:15-17:30	8185	Pengfei Xie	Shanghai Jiao Tong University
17:30-17:45	9148	Wenfan Li	Northwest Institute of Mechanical and Electrical Engineering
17:45-18:00	5077	Wanwan Xu	Chongqing University

Paper ID	Title & Author
740	A Capacity Degradation Estimation Error Correction Method for Lithium-ion Battery Considering the Effect of Sequential Depth of Discharge Laiqiang Kong, Sidun Fang, Tao Niu, Guanhong Chen and Ruijin Liao
1755	Optimal Anomaly Threshold Selection for Monitoring Grid-Connected Lithium-ion Battery Storage Systems Jun Zhong, Yan Li and Jie Tian
4809	State-of-Charge Estimation of Lithium-Ion Batteries based on Data-Model Fusion Method Bozhao Zhang, Bin Gou, Yanzhang Xu and Zongshuo Yue
5435	Capacity Estimation of Lithium-Ion Batteries using Electrochemical Impedance Spectroscopy and Optimized Extreme Learning Machine Ji Wu, Lei Luo, Jinhao Meng and Mingqiang Lin
7345	Faulty Diagnoses of PMSM in Flywheel Energy Storage Based on Phase Current Signal and Convolutional Neural Network YinQuan Yu, XiaoFeng Zhu and Yong Hao
8185	Research on SoC Architecture Model And Its Application In BMS Scenario Pengfei Xie, Lidan Zhou, Gang Yao, Hongyu Wang, Jian Li and Siyang Liu
9148	Online SoC Estimation for Lithium-ion Batteries Based on the OCV Online Calculation and Coulomb Counting Method Wenfan Li, Ren Ren, Haifeng Ma, Yaoxiong Wang, Junxiong Wang and Wei yang
5077	Comprehensive Evaluation Method of Energy Storage Capacity Configuration Based on Retired Battery Capacity Degradation Model Xiaolin Chen, Fuxin Chen, Chenxuan Xu, Chen Lu, Wanwan Xu and Junjie Tang

TECHNICAL SESSION

Room: Meeting Room 1 | Time: 16:00-17:00, July 9, 2023

Session 36: Power System Engineering-Power System Protection

Chair: Yu Wang, Chongqing University

Time	Paper ID	Presenter	Affiliation
16:00-16:15	7448	Yaru Sheng	Tianjin University
16:15-16:30	7530	Tengyi Zhang	Chongqing University
16:30-16:45	7569	Bingkun Li	Shandong University
16:45-17:00	8275	Zhuofan Tian	Hebei University of Technology

Paper ID	Title & Author
7448	Directional Relay of Wind Farm Transmission Line Based on Traveling Wave Polarity Comparison Zhongchen Yuan, Yongwu Zhang, Yaru Sheng, Jiakai Huang, Jiawei He and Bin Li
7530	Characteristic Analysis and Category Recognition of Insulating Paperboard Surface Pattern based on Image Morphology Calculation Guofang Luo, Tengyi Zhang, Chen Fang, Jiankan Zhou and Zhihui Wang
7569	An Enhanced Instantaneous Calculation Method of Communication Voltage Magnitude for Predicting CF in HVDC System Bingkun Li, Zhijie Liu, Jing Feng, Kejun Li, Jiachen Li and Liangzi Li
8275	A Forced Oscillation Source Location Method in Power Systems Using Variational Mode Decomposition and Dissipation Energy Flow Zhuofan Tian, Zhuoyan Hou and Xiao Jiang

TECHNICAL SESSION

Room: Meeting Room 5 | Time: 16:00-17:45, July 9, 2023

Session 37: Energy Systems-Energy Efficiency & Energy Systems-Low-carbon Energy System

Chair: Tong Zhang, Cardiff University

Time	Paper ID	Presenter	Affiliation
16:00-16:15	280	Zhen Xing	Chongqing University
16:15-16:30	768	Peiyan Teng	Southwest Jiaotong University
16:30-16:45	3921	Meng Yuan	Zhejiang University
16:45-17:00	4872	Jianwei Chen	Zhejiang University
17:00-17:15	5705	Songzheng Zhang	Hohai University
17:15-17:30	7747	Yunpeng Jiang	Chongqing University
17:30-17:45	9327	Yijia Chen	Shanghai Jiao Tong University

Paper ID	Title & Author
280	Characteristic Parameters Analysis of Bond-wire Failure for Multi-chips Parallel IGBT Modules Yuan Min, Zhen Xing, Xueni Ding, Hui Li, Ran Yao, Wei Lai, Cheng Yang, Wenxing Han and Yannan Yuan
768	Research on Quantitative Model of Metro Traction Energy Consumption Considering Temporal and Spatial Characteristics of Passenger Flow Peiyan Teng, Ding Feng and Sheng Lin
3921	Model Predictive Control of Distributed Adjustable Jet Pump in District Heating System Considering Renewable Energy Access Meng Yuan, Xiaojie Lin and Wei Zhong
4872	Multi-Stage Planning of Park-Level Integrated Energy System Considering Ladder-Type Carbon Emission Trading and Green Certificate Trading Jianwei Chen, Jian Wang, Wei Xue, Kai Zou, Jianbo Huang, Zhejing Bao and Miao Yu
5705	Active Vibration Suppression of Floating Wind Turbine based on Fuzzy PID Controller Wancheng Wang, Songzheng Zhang and Xinlu Wu
7747	Optimal Operation of Integrated Electricity-Gas Systems Considering Hydrogen Injection Yunpeng Jiang, Zhouyang Ren, Peng Liu and Yue Yin
9327	Multimode Bipolar Hybrid Asymmetrical Dual Active Bridge Converter for Bipolar DC System Yijia Chen, Jianjun Ma, Miao Zhu and Jingwei Liu

TECHNICAL SESSION

Room: Meeting Room 6 | Time: 16:00-18:00, July 9, 2023

Session 38: Renewable Energy Integration-Evaluation of Renewable Energy & Renewable Energy Integration-High Penetration of Renewable Energy

Chair: Yangming Chen, Chongqing University

Time	Paper ID	Presenter	Affiliation
16:00-16:15	4739	Xu Zhang	Zhejiang University
16:15-16:30	6173	Zhenhua Xu	Shandong University
16:30-16:45	7888	Minghao Huang	Zhejiang University
16:45-17:00	1289	Rui Mu	Tianjin University
17:00-17:15	2285	Chenhao Sun	Shandong University of Science and Technology
17:15-17:30	3492	Wang Kang	Shandong University
17:30-17:45	4620	Guangheng Pang	China Electric Power Research Institute Co. Ltd.
17:45-18:00	7585	Qingyun Ni	Nanjing University of Science and Technology

Paper ID	Title & Author
4739	A Copula-Based Evaluation Method for the Available Inertia of Wind Farm Zhenhua Lv, Qiang Li, Xu Zhang, Dan Sun and Heng Nian
6173	Evaluating of Distributed Photovoltaic Hosting Capability in Distribution Stations Considering Chance Constrained Zhenhua Xu, Zhenshu Wang, Kang Wang and Xinhui Zhou
7888	Research on Load Capacity Improvement of Electric Vehicles based on Orderly Charging Hao Jiao, Jinming Chen, Xindong Zhao, Yajuan Guo and Yi Yang
1289	Transient Fault Current Calculation Method of Photovoltaic Grid-Connected System Considering the Dynamic Response of Phase-Locked Loop Rui Mu, Jiawei He, Bin Li, Wenbo Wang, Cheng Yao and Yongwu Zhang
2285	CVaR-Constrained Robust Unit Commitment for Power System with Concentrating Solar Power Feng Song, Fucheng Wu, Xueqing Zhang, Le Dong, Dang Xiong and Jingrui Li
3492	Multi-Scale Optimal Dispatch of Power System with Pumped Storage Units Considering New Energy Uncertainty Kang Wang, Zhenshu Wang, Xinhui Zhou, Zhenhua Xu, Mingming Ding and Xuejie Wang
4620	Methods and Application of New Energy Power Plant Equivalent Modelling for Massive New Energy Electro-magnetic Simulation Guangheng Pang, Yiying Zhu, Chong Liu, Weiwei Wang, Lin Liu and Limin Yang
7585	Study of Frequency Response Control Strategy for Wind-Storage System Considering Lithium Battery Life Loss Qingyun Ni, Jing Bu, Yuchong Huo, Qun Li and Qiang Li

POSTER SESSION

Room: Foyer of Ballroom Time: 10:00-12:00, July 8, 2023

Session 1: Energy Systems & Energy Storage Technologies

No. Paper ID	Presenter Affiliation	Title Author
01 **2063**	Yueming Ding Rizhao Power Supply Company, State Grid Shandong Electric Power Company	Operation Optimization of Active Distribution Network Considering Linearized Power Flow Constraints Yueming Ding, Yunxiang Cheng, Jun Lu, Wei Jia, Zhicai Xiang and Rongxi Cui
02 **2648**	Shuhe Zhan Shanghai Jiao Tong University	A V2G Schedulable Capacity Evaluation Method for Residential Quarters with A High Proportion of EVs Chen Fang, Kaiyu Zhang, Shuhe Zhan, Shanshan Shi, Yun Zhou and Donghan Feng
03 **3240**	Yannan Dong Shenyang University of Technology	A Sliding Model Control Strategy of Buck Converter in Photovoltaic Hydrogen Production System Zijiao Han, Feng Li, Yangyang Ge, Yiming Chang, Jianan Zhang and Yannan Dong
04 **5681**	Chen Xing State Grid Henan Economic Research Institute	Research on the Pricing Mechanism of Wheeling Cost Suitable for Distributed Generation Liu Jun Hui, Yang Meng, Zhang Yi Han, Chen Xing, Chai Zhe, Lu Yao and Meng Xin Ran
05 **8827**	Yanfeng Wang New Power System Research Department State Key Laboratory of HVDC (Electric Power Reseach institute of China Southern Power Grid Comnany Limited	Distributed Photovoltaic Power Forecast Methods: a Review Haohuai Wang, Baorong Zhou, Weisi Deng, Zhongfu Dai, Chonghao Li, Siyu Lu and Yanfeng Wang
06 **8896**	Chenhao Sun Shandong University of Science and Technology	Multi-time Scale Optimal Power Flow Strategy for DC Distribution Network Based on Model-driven Feng SONG, Xueqing ZHANG, Kai KANG, Le DONG, Dang XIONG and Chenhao SUN
07 **1297**	Aoyu Fang Shandong University	A Simple Average Current Sampling Method for Three-Phase Interleaved Three-Level DC-DC Converter Aoyu Fang, Hui Wang, Tao Zhang and Cheng Wang

08 **2920**	Xuanzhou Yu Qilu University of Technology (Shandong Academy of Sciences)	A Review of Estimation Methods for the State of Energy of Lithium Batteries for Electric Vehicles Xuanzhou Yu, Xiaodong Yu, Shulin Liu, Rui Xu and Hongzhi Zang
09 **6565**	Ziyu Yang Zhejiang University	Development of a Steady-state Model of a District Heating System based on Heat Current Method Ziyu Yang, Xiaojie Lin and Wei Zhong
10 **8249**	Fu Liang Chongqing University	The Thin Film Evaporation of R32/ R600 Mixture: A Molecular Dynamic Simulation Fu Liang, Yi Que, Peng Li and Hongting Chen
11 **8957**	Siqing Guo Shanghai Jiao Tong University	Voyage Optimization for Swappable Battery-powered Inland Containerships: Considering Heterogenous Flow Velocity and Multi-battery Swapping Siqing Guo and Lei Dai
12 **3783**	Huang Tan Institute of Metrology, China Electric Power Research Institute	Research on Carbon Emission Monitoring Indicator System of Power Users Huang Tan, Haibo Yu, Tianyang Chen and Wenyu Qiao
13 **4721**	Zhang Jie Naval University of Engineering	Dynamic Characteristics Simulation of Medium Voltage DC Off-grid Hydrogen Production System Zhang Jie, Xiao Fei ,Ma Fan and Xiao Runlong
14 **6475**	Zhou Wei Hohai University	Low-carbon Economic Dispatch of Park-level Integrated Energy System Considering Carbon Trading and Flexible Response of Supply Side Wei Zhou, Chenxu Yin, Zhaoqing Zhang, Yunfan Meng, Li Chen and Yonghui Sun
15 **7032**	Haohong Peng EVE Energy Storage Co., Ltd.	Hybrid Power Systems for Vessels with Lithium-ion Battery System: an Application Case Haohong Peng, Haohao Yi, Chaojun Feng, Jibing Jiang and Xiang Chen
16 **8250**	Hanxing Zhang Research Institute of Energy Internet, University of Tsinghua	Assessing the Utilization of Clean Power in Megacities through an AHP-based Approach Zhengchao Liu, Yabin Chen, Chao Gao, Wei Xu, Hanxing Zhang and Yuanji Cai
17 **8386**	Zheyu Jin Shandong University	Anomaly Detection of Wind Turbine Generator Based on LSTM and Kshape Clustering Zheyu Jin, Ming Yang, Xiangjun Zeng and Chen Feng
18 **425**	Kexuan Liu China University of Petroleum (East China)	Research on Secondary Frequency Regulation of Thermal Power Unit Assisted by PV Storage System Lixia Zhang, Kexuan Liu and Wei Kang

19 **2072**	Dawei Chen State Grid Fujian Electric Power Research Institute	Convex Relaxation of Non-Isothermal Optimal Power and Gas Flow Dawei Chen, Can Wan, Chong Wang, Jinyu Chen and Yunyi Li
20 **2650**	Ziyu Li Hohai university	Study on Energy Power Supply and Demand Early Warning System Deng Zhenli, Li Hujun, Li Ziyu, Deng Fangzhao, Tian Chunzheng and Zhu Junpeng
21 **4518**	Azam Ghezelbash Institute of Cleaner Production Technology Pukyong National University Busan	Integrating Power to Hydrogen in a Virtual Power Plant: a Cost-benefit Analysis Azam Ghezelbash, Vahid Khaligh and Jay Liu
22 **4824**	Yichen Luo Sichuan University	A Two-stage Robust Scheduling Optimization of an Energy Hub with Multiple Chance Constraints Yichen Luo, Xiao Xu and Zhenyuan Zhang, Pan Li, Junyong Liu and Weihao Hu
23 **6168**	Vahid Khaligh Institute of Cleaner Production Technology Pukyong National University Busan	Robust Optimal Framework of Carbon Capture, Storage and Utilization in a Microgrid with Power to Gas Facilities Vahid Khaligh, Azam Ghezelbash and Jay Liu
24 **6506**	Hao Zhang Jibei Power Exchange	Integrated Energy System Multi-Horizon Investment Optimization Considering Grid and Renewable Constraints Hao Zhang, Qingfeng Tang, Du Xu and Jin Wang
25 **6783**	Yuge Duan Beijing Jiaotong University	Research on Orderly Charging of Electric Vehicles Considering Renewable Energy Consumption Ning Wu, Jing Xiao, Shuai Han, Xiaorui Wu and Wenlan Gong
26 **9617**	Baoguang Xu North China Electric Power University	Multi-objective Optimal Operation Model of Customer-Side Integrated Energy System Shen Weijie, Xu Baoguang, Tian Xiao, Zhang Jiayun, Zeng Ming and Xie Chuansheng
27 **9950**	Danyan Gu Southeast University	Identification of Vulnerable Components Link in Electric-gas Coupling Integrated Energy System based on Maximum Flow Theory Chao Shen, Liang Hua, Xiao Hu and Danyan Gu
28 **414**	Aodong Chen China Agricultural University	Design and Simulation of Islanded Voltage Stabilization in Wind Power, Photovoltaic, and Energy Storage Microgrids Aodong Chen, Yingying Zheng, Wenjing Zhao, Yongning Zhao, Lin Ye and Peng Lu

29 **772**	Xin Wang Hunan University of Technology	Energy Management and Capacity Allocation Optimization of Urban Rail Energy Storage System based on Multi-objective Grasshopper Algorithm Xin Wang, Yongyi Tan, Shifa Lin, Xiyang Zhang, Xinyang Yu and Bin Qin
30 **1539**	Chen Xi North China Electric Power University	Optimal Configuration of Long-Duration Hydrogen Energy Storage for High Proportion New Energy Power System Dong Peng, Xi Chen, Hongyang Liu, Ning Guo and Hongwei Wang
31 **2701**	Xinying Zhou Electrical Engineering North China Electric Power University	Bidding Strategy of Energy Storage Clusters facing high penetration New Energy Sources Jun Shu, Xinying Zhou and Yalin Mao
32 **3301**	Sheng Jiang Shanghai Jiao Tong University	Model Predictive-Based Load Frequency Control Considering Hybrid Pumped-Battery Storages Yimin Qian, Sheng Jiang, Qiao Chen, Wanfang Liu, Zengrui Huang, Xiaoping Li, Hubing Zhou, Kai Ding and Shanshan Ke
33 **3479**	Zhongyuan Qiang Southeast University	Full Topology Simulation Model and Control Strategy for Photovoltaic System and Energy Storage System under New Power System Zhongyuan Qiang, Dongli Jia, Wei Gu and Chang Chen
34 **3684**	Tianyu Ma Xi'an University of Technology	Discussion on Performance of Several Typical Capacitive Equalization Topologies under Different SOC Distributions Xinghua Liu, Tianyu Ma, Jiaqiang Tian, Zhichao Gao, Guoyi Chang, Jianning Yin and Qingping Zhang
35 **4366**	Siyu Wang Zhengzhou University	A Optimal Multi-mode Power Allocation Strategy for Fuel Cell/Battery System Based on Particle Swarm Optimization Duo Yang, Siyu Wang, Hanwen Fu and Yazhe Zhong
36 **5511**	Jiongcheng Guo South China University of Technology	Optimal Capacity Configuration of Hydrogen Storage Systems Connecting the Electricity-Heat Network Jiongcheng Guo, Weisi Deng, J.H. Zheng and Zhigang Li
37 **8118**	Hui Hou Wuhan University of Technology	Review on Energy Storage Participation in Capacity Configuration and Scheduling Optimization in Modern Power System Yuhao Wang, Peipei Meng, Xinzhi Ding, Lin Hu, Xixiu Wu and Hui Hou

38 **2160**	Haoran Ma Hefei University of Technology	Energy Management Strategy for Fuel Cell Vehicle based on Working Condition Identification Xianwen Zhang, Haoran Ma, Tao Wang, Muyao Wu and Li Wang
39 **7702**	Pan Zhao East China Jiaotong University	Research on Torque Control Current Injection Method of PMSM in Flywheel Energy Storage Based on Electromagnetic-thermal Bidirectional Coupling Numerical Method Yinquan Yu and Pan Zhao
40 **9836**	Zhichao Gao Xi'an University of Technology	Improved Gated Recurrent Unit Network with Sparrow Search Algorithm for Lithium-ion Battery State of Health Estimation Xinghua Liu, Zhichao Gao, Jiaqiang Tian, Tianyu Ma, Siqi Li, Jianning Yin and Qingping Zhang
41 **8315**	Shaohua Li Hohai University	Estimation of State-of-health for Lithium-ion Battery Based on Increment Capacity Analysis Method and Long Short-term Memory Neural Network Shaohua Li, Zhixin Fu, Junpeng Zhu and Yue Yuan
42 **5749**	Yun Chen University of Electronic Science and Technology of China	A Modeling and Simulation of Optimization-Based Methods in Microgrid Energy Storage System Yun Chen, Zhenyuan Zhang, Yang Xu and Saijia Liu
43 **4984**	Yongping Li Wuhan University of Technology	Energy Management and Simulation Verification of Hybrid Power Ship based on Double-layer ECMS Yongping Li, Ailong Fan, Sidun Fang and Yiran Li

POSTER SESSION

Room: Foyer of Ballroom Time: 14:00-17:00, July 8, 2023

Session 2: Renewable Energy Integration

No. Paper ID	Presenter Affiliation	Title Author
01 **254**	Zeyu Duan Chongqing University	An IGBT Device Health Status Assessment Method Considering the Influence of Operating Conditions Cheng Yang, Zeyu Duan, Ran Yao, Hui Li, Wei Lai, Yuan Min, Yannan Yuan and Wenxing Han
02 **804**	Yu Zhou Shanghai University of Electric Power	Comprehensive Cost-Benefit Assessment of Offshore Wind Power Based on Improved VIKOR Method Shuxin Tian, Yu Zhou, Yang Fu, Liang Ji and Zhenkun Li
03 **4193**	Jeark Armingol Principe University of the Philippines Diliman	Remote Sensing-based Estimation of Potential Solar PV Power Output Considering the Effects of High Temperature, Dust and Precipitation: Case of the Philippines Jeark A. Principe, Ma. Divina Angela I. Bauzon, Marielle E. Sotto and Jayson M. Cañete
04 **5350**	Jeark Armingol Principe University of the Philippines Diliman	Outdoor Performance Analysis of Mono-Si and Poly-Si Solar PV Panels in the Philippines Jeark A. Principe, Lheander G. Gerna, Ian B. Benitez, Jessa A. Ibañez, Jayson M.Cañete and Candy C. Mercado
05 **5677**	Ian B. Benitez University of the Philippines Diliman	Techno-Economic Evaluation of Horizontal Axis Tidal Stream Turbines in San Bernardino Strait, Philippines Ian B. Benitez and Louis Angelo M. Danao
06 **7028**	Chao Wang Xinjiang University	Review of Research on New Energy Ramp Events Chao Wang, Hong Lin, Ming Yang and Xiaoling Fu
07 **9345**	Xiaoning Liu Shandong University	Relative Health Status Assessment and Power Allocation of Wind Turbines Based on SSA Optimized VMD Xiaoning Liu, Fang Shi and Zongshuai Jin
08 **9443**	Yu Jin Beijing Jiaotong University	Research on Emergency Assessment and Recovery Strategy of Highway Energy System Based on Earthquake Disaster Scenario Yu Jin, Mingchao Xia, Qifang Chen and Yiming Xian

09 **153**	Shiran Cao Hunan University	Dynamic Voltage Support Capability Assessment of Distributed Generators in Microgrid Shiran Cao, Wen Huang, Lipeng Zhu, Jiayong Li, Yang Shen, Wei Zhang and Zhikang Shuai
10 **1427**	Yiqin Cai Xi'an Jiaotong University	Calculation of Errors in Current Transformer with DC Magnetic Bias Xie Qianxian, Yang Jianming, Hou Jing, Song Hongtian, Cai Yiqin and Xu Chi
11 **6981**	Yiming Luo Liaoning Technical University	Distribution Network Reliability Analysis under Large-scale Photovoltaic Access Luo Yiming, Tian Peigen, Xiao Xl, Tu Naiwei, Sun Pei and Chen Lina
12 **7731**	Tong Wang North China Electric Power University	Nonlinear Model Order Reduction Method of PMSG-based Wind Farm for Large Disturbance Lin Cheng, Jili Wang, Xianbo Ke, Zhiyong Han and Dongping Ai
13 **8387**	Yuan Yuan State Grid Jiangsu Electric Power Co., Ltd. Yancheng Power Supply Branch	Control Strategy For A Two-stage PV Grid-side Inverter With Active Participation In Frequency Regulation Yuan Yuan, JingJing Bai, HongYi Zhou, Wang Jiang and ZhiCheng Yu
14 **9517**	Yuhan Liu Technical and Economic Consulting Centre of Electric Power Construction, CEC	A New Generation Cost Analysis Method of High Renewable Penetration Power Grid Liangdong Qin, Ying Wang, Ling Wei, Yuhan Liu and Wanying Xie
15 **996**	Zhang Long Zhejiang University	An Extended SFR Model of Offshore Wind Farm Integrated by VSC-HVDC for Frequency Support Xiangyun Fu, Jiakang Song, Fuchang Yue, Hong Li, Guangxi Li and Han Liu
16 **2326**	Kaizhe Nie Shandong University	Single-Phase Grid-connection Inverter Control Strategy Based on Echo State Network Kaizhe Nie and Feng Gao
17 **2389**	Weichao Zhang China Electric Power Research Institute	Hosting Capacity Quantification of Smart PV Inverters in Distribution Networks based on Difference-of-convex Programming Weichao Zhang, Wanxing Sheng, Keyan Liu and Yao Zhang
18 **2887**	Junhao Lian South China University of Technology	A Novel Cooperative Strategy of Virtual Power Plant for Energy and Peak Regulating Market Dongxu Li, Yuxiang Huang, Meng Ye, Junhao Lian, Jie Guo and Haoyong Chen

19 **2925**	Yuying Zhang University of Science and Technology Beijing	Wind Turbine Blade Damage Detection Based on the Improved YOLOv5 Algorithm Yuying Zhang, Long Wang, Chao Huang and Xiong Luo
20 **3166**	Jian Cui Tsinghua University	Configuration Optimization Methods for the Energy Storage Capacity of Wind, Photovoltaic, Hydrogen and Energy Storage Off-Grid Systems with Stability and Economy Zhongjie Yan, Jian Cui, Lu Qu, Xiaozong Deng, Lina Li, Fan Wang, Yv Zhang and Xiaofang Wang
21 **4139**	Li Pan Sichuan University	Chance-constrained Scheduling for Wind-Hydrogen System with Bilateral Contract Decomposition, Day-Ahead Market Bidding and Hydrogen Production Li Pan, Xiao Xu, Zhenyuan Zhang, Weihao Hu and Junyong Liu
22 **4494**	Huiyu Song Electric Power Control Center of Jiangmen Power Supply Bureau	Comprehensive Evaluation of Photovoltaic Power Prediction Error based on TOPSIS Considering the Influence of Cloud Motion Xiaoguang Huang, Dayang Li, Huiyu Song, Chunlin Lai, Jianbo Li and Siyang Wan
23 **5315**	Pengfei Zhao Shanghai Power Exchange Center Co., Ltd.	Study on Operation Mechanism of Balancing Market in Germany and Its Enlightenment for China Pengfei Zhao, Jing Yang, Jie Lu, Bonan Huang, Huangru Zhu and Yijun Huang
24 **5383**	Dongdong Huang State Grid Nantong Power Supply Company	Voltage/Frequency Control Based on Adaptive Sliding Mode Control in Off-Grid Photovoltaic Systems Dongdong Huang, Zhujian Ou and Yu Hu
25 **5479**	Zhuoheng Wang Chongqing University	Collaborative Line-Transformer Relationship Identification Based on Shapelet Transformation in IoT Zhuoheng Wang, Siyang Liu, Yongjie Nei, Hao Wu, Jian Li, Xianping Zhao and Qiushi Cui
26 **5693**	Lun Dong Sichuan University	A priority Scheduling Strategy of a Microgrid using a Deep Reinforcement Learning Method Lun Dong, Yuan Huang, Xiao Xu, Zhenyuan Zhang, Li Pan, Junyong Liu and Weihao Hu
27 **5863**	Yuchen Guo North China Electric Power University	Research on Combination Strategy of Distributed Energy Resources based on Cooperative Game Heping Jia, Yuchen Guo, Dunnan Liu and Xilinx Du

28 **7040**	Jianlin Yang State Power Investment Corporation Limited Wind Power Innovation Center	Active Support Control Strategy for Wind-Storage Power Generation Based on Virtual Oscillation Controller Zhanjiang Li, Ping Zhou, Yinuo Li, Jianlin Yang, Wanqiao Liu and Tianyu Wang
29 **8925**	Haoyu Gao North China Electric Power University	Space Charge Ellipsometry Detection Method for the Multi-energy Conversion Equipment Insulation Evaluation Haoyu Gao, Hanwen Ren, Qingmin Li, Tianrun Qi, Yiqun Ma, Tao Xiao and Yidan Ma
30 **9018**	Junjun Xu Nanjing University of Posts and Telecommunications	Decentralized Model Predictive Voltage Control for Distributed Gnereration Clusters of Power systems Wei Cheng, Guangjing Gong, Jungao Huang, Junjun Xu and Kang Chen
31 **9298**	Shengjuan Chen State Grid Chongqing Fengdu Electric Power Supply Branch	Cluster Dynamic Partitioning Strategy Based on Distributed Photovoltaic Output Prediction and Improved Clustering Algorithm Shengjuan CHEN, Xiaolin TAN, Ming HU, Jian CHEN and Jiayong ZHONG
32 **5321**	Lianfu Chen Tsinghua University	Optimal Dispatching Considering the Participation of Flexible Resources on the Load Side in Deep Peak Regulation Market Yue Zhao, Kai Dong, Lianfu Chen, Tong Cheng, Qiuna Cai and Qiaoyu Zhang
33 **3061**	Jiaguo Li China Electric Power Research Institute	Construction Scheme and Operation Simulation Analysis of Hybrid AC-DC Distribution Networks with High-Proportion Photovoltaics Hui Hui and Rui Li
34 **8934**	Yuming Wang Univerity of Jinan	Feature Extraction of PV Output for Optimal Design of a PV-ES Combined System Xiaochen Wang, Zhaohui Shi, Liang Tang, Jie Shi, Lian Liu and Kangzhuang Guo
35 **9339**	Wenhao Chen Guangdong Key Laboratory of Clean Energy Technology, South China University of Technology	Short-term Power Prediction for Centralized Photovoltaic Plants Based on LSTNet-Attention Dayang Li, Jianbo Li, Yankai Lin, Haodong Chen, Guoqing Yang and Wenhao Chen
36 **2935**	Yuming Wang Univerity of Jinan	Short-term Photovoltaic Power Prediction Based on Similar-day Clustering and Multi-layer Perception Xiaochen Wang, Yuming Wang, Zhaohui Shi and Liang Tang

37 **7181**	Qi Song Shanghai Jiao Tong University	Planning of Energy Hub in PIES Considering the Energy Consumption Regulation of Logistics System Qi Song, Shenxi Zhang, Qingqing Pan, Ke Li, Yichen Shen and Haozhong Cheng
38 **7428**	Tong Sun Shanghai Jiao Tong University	Transformer State Data Cleaning Method Based on DBSCAN and ESN Ke Li, Zhengdong Zhang, Bo Lu, Jiayu Kang, Jinglong Jia, Shenxi Zhang and Tong Sun
39 **5348**	Wenzhuo Wang Electric Power Dispatch Center, Northwest Branch of State Grid Corporation of China	Thermal-Hydro-Renewable Joint Stochastic Dispatch Considering Hydro Unit Forbidden Zones and Renewable Curtailments Wenzhuo Wang, Xinyue Wu, Zhiwei Wang, Chenhui Lin, Wujing Li, Wenchuan Wu, Penghan Li and Bin Wang
40 **9030**	Yifan Deng Southeast University	Research on Optimal Dispatch of Dynamic Reorganization Virtual Power Plant Liang Ding, Jie Gao, Yu Jiang, Deng Yifan, Wei Jiang and Fengtong Hu
41 **2980**	Fengtong Hu Southeast University	Response capability Evaluation of Virtual Power Plant Containing Multiple Distributed Resources Zhengwei Jiang, Fengming Zhang, Fengtong Hu, Yinyu Sun, Wei Jiang and Yifan Deng

POSTER SESSION

Room: Foyer of Ballroom
Time: 10:00-12:00, July 9, 2023

Session 3: Smart Grid

No. Paper ID	Presenter Affiliation	Title Author
01 **393**	Luqin Yao Nanjing Normal University	Analysis of Small Disturbance Synchronization Stability of Grid-connected Side of Energy Router Based on VSG Zhijian Wu, Luqin Yao, Yao Xu, Xiaofeng Dong and Qi Wang
02 **5783**	Pingxin Wang Marketing Service Center (Metering Center) Shandong Electric Power Company	Accounting for Carbon Emission Factors Measured by Electricity Users with Proportional Power Flow Tracking Considering Industry Characteristics Pingxin Wang, Zhen Jing, Zhi Zhang, Qing Wang, Hongxia Zhu and Congcong Li
03 **8885**	Jiachen Zhong Nanjing Agricultural University	Implement of Local Trip Detection and Intelligent Repower Method of Smart Meters Longmin Bu, Hong Chen, Wentao Deng and Jiachen Zhong
04 **9629**	Guanghao Wu Shandong University	Research on Recovery Strategy of Wind Turbine Speed Considering Wind Speed Fluctuation Guanghao Wu, Feng Zhang, Yuling Liu and Bertrand Cornélusse
05 **593**	Xiaonan Ma Nanjing Dongbo Smart Energy Research Institute Co., Ltd	An Island Partition Method for New Distribution Network Feipeng Wu, Haotian Li and Xiaonan Ma
06 **1757**	Wenhao Wang South China University of Technology	Hybrid Double Deep Q Network for Active Distribution Network Equivalent Modeling Yingjie Qin, Wenhao Wang, Jiehui Zheng, Zhigang Li and Q.H. Wu
07 **4203**	Guangyuan Xie China University of Petroleum (East China)	Study on the Control Strategy of Input-Series Output-Parallel Phase-Shifted Full Bridge Converter Based on Virtual DC Motor Wei Kang, Guangyuan Xie and Lixia Zhang
08 **4461**	Yuling Liu Shandong University	Economic Operation of CCHP Microgrid With Heat Pump and Energy Storage Yuling Liu, Feng Zhang, Kexu Sun and Guanghao Wu
09 **4517**	Xin Ding University of Shanghai for Science and Technology	A Source-Load Coordinated Control Strategy in An Industrial Aluminum Production Mircrogrid for Smoothing Wind Power Fluctuations Xin Ding, Siyang Liao, Jian Xu and Yuanzhang Sun

10 **8931**	Mingyue Sun Big Data Center State Grid Corporation of China	Research on Stability Control of Microgrid Based on Improved High-order Sliding Mode Super Twisting Algorithm Mingyue Sun, Hanmei Ma, Yanhong Jian, Na Mi and Xiaojing Lin
11 **9423**	Wei Gu Shanghai Maxtropy Technology Co., Ltd.	Demand Response Control of Aggregated HVACs for Providing Peak-shaving Services Considering Diversified User Requirements Peiyu He, Mengzhe Wang, Liping Chai, Sheng Zhou and Wei Gu
12 **230**	Zhiyan Ding China University of Petroleum (East China)	Optimization of Ideal Transformer Interface Algorithm based on Low-pass Filter Kang Wei, Ding Zhiyan and Zhang Lixia
13 **733**	Jun Shi Shenzhen Power Supply Bureau Co., Ltd	A Convolutional Neural Network Model-Based Approach for Multi-Fault Diagnosis of Asynchronous Motors Jun Shi, Jiangnan Li and Tao Wang
14 **884**	Jiaxiang Sun Hohai University	Adjustable Potential Evaluation of Massive Flexible Load Resources from the Perspective of CPS Jiaxiang Sun, Lei Gan, Xingying Chen, Peng Chen and Haochen Hua
15 **1377**	Chen Peng Hunan University	On Cyber-resilient Microgrid: A Variable Trust Protocol Based Control Strategy Chen Peng, Quan Zhou, Yang Shen, Keren He and Zhikang Shuai
16 **1642**	Huixin Yan China Electric Power Research Institute	Load Aggregation Method for Electric Vehicle Based on SOM Neural Network Clustering Liwen Wang, Zhaoyang Yan, Huixin Yan, Jun Liu, Jiantao Liu and Yuyang Wang
17 **2554**	Zhaojun Luo Guodian Nanjing Automation Co., Ltd.	A Chinese Word Segmentation Model for SCD Text in Smart Grid Station: An Attention-BiLSTM-CRF Approach Xiang Zheng, Shaoyu Chen, Junfei Wu, Lixiang Ruan, Zhaojun Luo and Xiaojun Xu
18 **2694**	Haohui Su Extral High Voltage Company of China Southern Power Grid	Research on Network Security Defense in Depth Technology in Cross-Regional Power Transmission Grid Haohui Su, Yu Huang and Yanzhou Chen
19 **2850**	Yang Shen Hunan University	Data-driven Stability Assessment for New Power Systems: Typical Characteristics, Research Framework and Future Prospects Yang Shen, Yanyang Zhu, Keren He, Quan Zhou and Zhikang Shuai
20 **2855**	Bin Pang Zhejiang University	Probabilistic Forecasting of Electric Vehicle Charging Load using Composite Quantile Regression LSTM Yi Chen, Bin Pang, Xinyu Xiang, Tao Lu, Tian Xia and Guangchao Geng

21 **3125**	Chao Ma China Electric Power Research Institute Co., Ltd	Innovative Exploration of Standard Digital Transformation in the Power Field: A New Mode of Blockchain Cooperation on and off the Chain Chao Ma, Tao Deng, Han Zhang, Yuanyuan Su and Ting Lu
22 **3380**	Xu Chi Xi'an Jiaotong University	Current Transformer Saturation Detection and Compensation Correction Technology based on Intelligent Algorithm Dingqu Zhang, Lu Yang, Qiang Song, Feng Chen, Baoshuai Wang, Chi Xu and Yiqin Cai
23 **3697**	Yuanxin Teng Shandong University	Time Series Prediction of Transformer Oil Chromatography based on Attention-PSO-GRU Model Yuanxin Teng, Guan Wang, Xiaomeng Su and Meiying Wu
24 **3750**	Haoyang Zhou Shandong University	Short-term Load Prediction Based on Typical Daily Feature Selection and Time Convolutional Neural Network Hao Liu, Junling Zhang, Shouchen Wei, Xueliang Jiang, Xudong Zheng and Haoyang Zhou
25 **3876**	Guilin Wang STATE GRID SHANGHAI Municipal Electric Power Company	A Communication Capability Enhancement Scheme for Power Load Management System Based on 5G Backhaul Technology Guilin Wang, Qinyi Kang, Lei Wang, Ziteng Liu, Yi Lu and Fei Wang
26 **4799**	Qiyuan Lu North China Electric Power University	Optimal Battery Swapping and Charging Strategy Considering On-site Solar Generation Xijuan Yu, Fangyu Wang and Haiyun Wang
27 **5282**	Xudong Zheng shandong university	Short-term Load Forecast Based on Feature Reconstruction and Bidirectional LSTM Xudong Zheng, Ming Yang, Yixiao Yu, Menglin Li and Chuanqi Wang
28 **5896**	Hanjiang Dong South China University of Technology	Dynamic Load Forecasting With Adversarial Domain Adaptation Based LSTM Neural Networks Hanjiang Dong, Jizhong Zhu, Shenglin Li, Ziyu Chen, Wanli Wu and Xiaodong Li
29 **5988**	Fengzhan Sun Shandong University	Short-term Load Forecast based on Similar Daily Retrieval and Deep Learning Shouchen Wei, Junling Zhang, Xueliang Jiang, Cheng He and Fengzhan Sun
30 **7042**	Jianping Li Zhejiang University	Coordinated Charging of Electric Vehicle Group using Smart Meters Jianping Li, Heyang Yu, Yingning Huo, Chuanzi Xu, Xinyu Xiang and Guangchao Geng

31 **7858**	Shuyu Jia Tsinghua University	Information-Flow-Based Cyber-Physical Power System Unified Modeling and Analysis for Automation Applications in Power Systems Wenyue Xia, Lue Sun, Shuyu Jia, Qinglai Guo, Shunjiang Wang and Pengfei Pan
32 **8055**	Zekai Xu Beijing Jiaotong University	Multi-objective Optimization of Hybrid Energy Storage Economy and Frequency Stability Considering Energy Storage Regulation Ability Yening LAI, Zhongqing SUN, Zekai XU and Zhao LIU
33 **8407**	Runzhu Wang Chongqing University	Generative Data-driven Modeling of Aggregated Demand Curve in Day-ahead Market Runzhu Wang, Changzheng Shao, Yu Wang, Bo Hu and Kaigui Xie
34 **8830**	Chunfeng Zhang South China University of Technology	Time Series Data Augmentation Algorithm Combining Deep Metric Learning and Variational Encoder Hao Qin, Liwei Su, Chongying Jiang, Chunfeng Zhang, Guangbin Wu and Yongjun Zhang
35 **4080**	Junyi Tang Wuhan University of Technology	Resilience Enhancement of Power Distribution System Under Extreme Weather Events: A Review Ruizeng Wei, Huan He, Lei Wang, Yingting Luo, Junyi Tang, Hui Hou, Ziyin He and Xixiu Wu
36 **5154**	Weijia Guo Hohai University	Linear Programming Method of Dynamic Fault Restoration for Distribution Network Considering Balanced Node Yang Chen, Guo Weijia, Li Junting, Zhou li, Dong Xiaofeng, Zhu Qiong and Zhu Junpeng
37 **7279**	Yanjun Li Hangzhou Power Supply Company of State Grid	Multi-objective Reconfiguration of Wind-integrated Distribution Network Considering Network Yanjun Li, Fang Sheng, Yuwei He, Wenchao Chen, Wei Zhang, Jian Jiang, Zhe Yuan and Li Zhu
38 **7881**	Yanjun Li Hangzhou Power Supply Company of State Grid	Multi-Objective Reconfiguration of Distribution Network Based on Gardener Diagram Method Yanjun Li, Jiaxuan Xu, Weixi Wang, Jie Zheng, Chaoting Zhu, Jiang Qian, Jianbiao Cai and Jie Xu
39 **8504**	Yihe Zhang Inha University	A Borden Cable-Based Energy Harvester for Low-Frequency Rotary Motion Yi-He Zhang, Aidan Lee and Chul-Hee Lee

POSTER SESSION

Room: Foyer of Ballroom Time: 14:00-17:00, July 9, 2023

Session 4: Power System Engineering

No. Paper ID	Presenter Affiliation	Title Author
01 2703	Wenge Liu Huazhong University of Science and Technology	A Photovoltaic-Energy Storage Joint System Assisted Scheme for Seamless Closed-Loop Load Transfer Wenge Liu, Lexiang Wang, Chengxiong Mao, Dan Wang and Pengfei Tang and Zhitao Guan
02 5840	Fuquan Huang Shenzhen Power Supply Bureau Co, Ltd	Optimization of CPS control for double deep Q learning based on function regularization Fuquan Huang, Jun Shi, Tian Mao and Shouquan Tang
03 5845	Zhengkun Song Shenzhen Power Supply Bureau of Guangdong Power Grid	Research on Cooperative Control Algorithm Based on Distributed Multi-region Integrated Energy System Zhengkun Song, Renli Cheng, Tian Mao and Shouquan Tang
04 6519	Lei Yun Zhengzhou University of Light Industry	Coordinated Design of Controller Parameters and Locating Optimization of Controller of Wind-thermal-bundled System Lei Yun, Haibei Zhang, Ping He and Mingyang Wang
05 7379	Zhijiang Liu Electric Power Research Institute China Southern Power Grid	Simulation Study of Excitation Characteristics of Transformer Considering DC bias Magnetism Kong Fei, Li Jie, Liu Zhijiang, Li Shuyong, Yu Jiang and Ding Xiaobing
06 8757	Yuanxi Yang China Electrical Power Research Institute	Control strategy for Doubly-fed Induction Generator Considering Crowbar Activation Time Yuanxi Yang, Wuzhi Zhong, Ansi Wang, Xin Wang, Jinyu Yang and Zhengwei Shen
07 957	Donghua Yang Shandong University	Research on Multi-microgrid Distributed Optimization Operation Method Donghua Yang and Ming Yang
08 1109	Bin Zhang Digital Grid Research Institute, China Southern Power Grid.	A Medium and Long Term Load Forecasting Method Based on BP Neural Network and S-shaped Curve Fitting Yangjun Zhou, Liwen Qin, Zhicheng Guo, Shan Li and Bin Zhang

09 **2393**	Yuesheng Yang Taiyuan University of Technology	Value-at-Risk Measurement and Case Analysis of Electricity Consumption Yuesheng Yang, Qingsheng Zhao, Dingkang Liang, Zhiqin Qin, Yi Zhang and Hehong Guo
10 **2468**	Junxiang Yang Shandong University of Science and Technology	Optimal Dispatch of Multi-regional Microgrids based on Network Topology Considering Economy and Low Active Loss Dear Yunwei Li, Zhenyu Wang, Yu Gao, Xun Gong, Yu Jiao and Yong Zhang
11 **2660**	Tinghui Zhou Electric Power Research Institute, CSG	Research of Electromechanical-Electromagnetic Transient Hybrid Simulation System Based on Kubernetes Zhou Tinghui, Sun Zhiyuan, Zhao Ligang and Zhen Hongyue
12 **2879**	Qiu Li North China Electric Power University	Spot Market Risk Pre-control and Emergency Response Strategies for Carbon-neutral Target Hao Lv, Linlin Hu, Yiming He and Qiu Li
13 **3439**	Yansheng Zou Electric Power Research Institute, EHV Company of CSG	Study on the Decline of Voltage Blocking-up Ability of High Power Thyristors Yansheng ZOU, Kai XIAO, Hang LIU, Jianbao GUO, Yilong HUANG and Ning LIANG
14 **4136**	Yuanhe Zhang Shandong University	Bus load Prediction based on Subtraction Clustering and XGboost Shouchen Wei, Junling Zhang, Cheng He, Xueliang Jiang and Yuanhe Zhang
15 **4207**	Jifeng Li Dalian Electric Power Supply Company, State Grid Liaoning Electric Power Supply Co. Ltd	Power Supply Zonal Loads Prediction Considering Matching of Contact Line Characteristics Based on Deep Transfer Learning Jifeng Li, Nan Zou and Jun Wu
16 **4592**	Can Cui Tai'an Power Supply Company State Grid Shandong Electric Power Company	Multi-Timescale Coordinated Scheduling Approach for Active Distribution Network considering Wind Generation Correlation Analysis and improved MPC Can Cui, Yong Dai, Wei Zhang, Kang Wang, Chengfu Wang, Fei Yuan, Qing Wang, Jun Ye, Han Zhang, Guoying Wang and Jianwei Dai
17 **7632**	Yuanhe Zhang Shandong University	Bus Load Prediction Method Based on SSA-GRU Neural Network Junling Zhang, Shouchen Wei, Jun Cheng, Xueliang Jiang and Yuanhe Zhang
18 **9085**	Linnan Zhang Sieyuan Electric Co.,Ltd	Suppression of Low-frequency Oscillations under Different Operation Modes based on SVG Additional POD

		Linnan Zhang, Caimei Chen and Lei Huang
19 **9257**	Xinyi Wang Shanghai University of Electric Power	A Multi-dimensional Indicator Synergistic Approach to The Evaluation of Equal-offer Collusion in Electricity Market Ye Tang, Wenjuan Tan, Can Wan, Xu Zhou, Dongni Wang, Xiangbin Liu and Xinyi Wang
20 **9702**	Lining Hu State Grid Chongqing Electric Power Research	Analysis of Influencing Factors and Risk Assessment of Grid Closing Based on EMD Hu Lining, Zhu Shengyi, Fang Hui and Mu Fan
21 **873**	Jingyu Zhang North China Electric Power University	Design of Generation Capacity Cost Recovery Mechanism for the Early Stage Development of New Power System Haili Wang, Yue Han, Hao Wang, Meng Wang, Feihang Zhou and Hanwen Li
22 **1092**	Yingjin Ye Fujian Economic and Technological Research Institute State Grid Fujian Electric Power Co., LTD.	Research on Effective Asset Risk Assessment of Power Grid Enterprises Based on LBWA-Vague Set Yingjin Ye
23 **1328**	Lei Yu University of Science and Technology	Economic Analysis of the Renovation of Decommissioned Thermal Power Unit to Hgh Inertia Sychronous Compensator Bing Xie, Ke Xu, Lei Yu, Jun Jia, Ni Yang and Yunyun Xie
24 **1777**	Mingyang Liu State Grid Henan Electric Power Research Institute	PSO Algorthm-based Capacity Optimization Method for Synchronous Condensers Mingyang Liu, Guangjie Zhu, Chunsun Tian, Yang Xiao and Hua Wang
25 **2993**	Shaohan Lu Tianjin University	A Method for Energy Supply Unit Partitioning in Multi-energy Distribution System Considering Flexible Adjustment Capability of Demand Response Chao Cai, Jun Han, He Huang, Mingyang Bao, Shaohan Lu, Wenjie Pan, Anjie Fan and Yihan Sun
26 **3547**	Woyang Li Southwest Jiaotong University	Optimization of Mechanical Properties of Insulation Materials for Dry-type Transformers Jing Huang, Bangfa Chen and Woyang Li
27 **4497**	Zilv Li Guangdong University of Technology	Planning for Network Expansion Based on Prim Algorithm and Reinforcement Learning Fude Dong, Zilv Li, Yuantu Xu, Deqiang Zhu, Rongjie Huang, Haobin Zou, Zelin Wu and Xinghua Wang
28 **6129**	Yunfei Zhao Shanghai Chenhua Network Technology Service Co., Ltd	A Capacity Planning Scheme based on Deep Temporal Clustering of 500kV Main Transformers Da Sang, Li Li, Xiaohu Zhang, Yunfei Zhao and Donghua Zhao

29 **7030**	Wenjun Zheng Center for Balance Architecture, Zhejiang University	Investigation and Analysis of Power Load Density for Commercial Buildings Ping Li, Wenjun Zheng, Kai Zheng, Songlin Yuan and Gaojun Ni
30 **7054**	Jiaao Zu North China Electric Power University	Analysis and Quantitative Models of Regulation Potential of Load-side Flexible Resources under Multiple Scenarios Jiang Xu, Ya Dong Wen, Zheng Nan Gao, Yao Jie Jin, Hao Wang, Bao Ming Ma, Hai Li Wang and Jia Ao Zu
31 **7787**	Jingyu Zhang North China Electric Power University	Analytical Model of the Impact of Carbon Market on Electricity Market under Green and Low Carbon Goals Hanwen Li and Yuankang He and Xiaoqiang Sun and Dewei Zhao
32 **8221**	Yingyi Xia Southwest Jiaotong University	A Study on Mechanical Durability of Insulating Materials for Dry-type Transformers Baiquan Chen, Sixiang Chen and Yingyi Xia
33 **4780**	Xuanyuan Wang State Grid Jibei Electric Power Co., Ltd.	Study On the Value Assessment Of Demand-side Resources Based on Grey Correlation Ideal Point Method Xuanyuan Wang, Huan Xie, Zhen Liu, Zesen Wang, Qi Li and Tianxiao Huang
34 **4802**	Weiye Xu Institute of Plasma Physics, Chinese Academy of Sciences	Protection Analysis of Electron Cyclotron Resonance Heating System for Magnetic Confinement Fusion Experimental Facility Weiye Xu, Handong Xu, Jianqiang Feng, Hua Jia, Yong Yang, Zege Wu, Jian Wang and Jian Zhang,
35 **7489**	Weiqi Zhang North China Electric Power University	A Low Group Delay Phasor Estimation Algorithm for Distribution Network Weiqi Zhang and Hao Liu
36 **9444**	Ningning Yan North China Electric Power University	Grounding Optimization Design of Integrated Grounding Device for Low and Medium Speed Maglev Trains Ningning Yan and Jian Wang
37 **9522**	Guoxin Tang The Hong Kong Polytechnic University	Generator Self-excitation and System Over-voltage Calculation of Black Start in Power Grid Guoxin TANG, Huayi WU and Zhao XU
38 **9579**	Wei He Shenzhen Power Supply Bureau Co., Ltd	Transformer Fault etection based on SSA-BP Neural Network Wei He, Jiangnan Li and Tao Wang
39 **2645**	Yang Xu University of Electronic Science and Technology of China	A Dynamic Equivalence Modelling Method for Wind Farms Considering Optimal Yaw Control Strategy Yang Xu, Zhenyuan Zhang, Li Hu, Yucen Han, Kaiming Ye and Yun Chen

40 **9209**	Saijia Liu University of Electronic Science and Technology of China	A Control Strategy of Thermostatically Controlled Loads for Power System Frequency Regulation Saijia Liu, Zhenyuan Zhang, Yun Chen and Li Hu
41 **6635**	Yunxing Gao Tai'an Power Supply Company of State Grid Shandong Electric Power Co., Ltd	A Multi-DT Fast Networking Based on CoAP-MODBUS Yunxing Gao, Jianhua Shang, Leijiao Ge, Hangxu Liu, Bin Wan and Zengyong Han

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