📅 September 4-6 📍 Muğla/TÜRKİYE

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SEST
2023

6th International Conference on Smart Energy Systems and Technologies

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2023
6th International Conference on Smart Energy Systems and Technologies

SEST 2023 is organized by Department of Electrical and Electronics Engineering, Mugla Sitki Kocman University.

Disclaimer: Although effort has been made to ensure that all the information provided in this booklet is accurate and that the conference program shall take place as planned, the organization reserves the right to make changes at any time if deemed necessary. Changes will be communicated electronically via the conference website, social media accounts or e-mail to registered participants.

The organization shall not be liable for any personal accident and/or loss or damage to the property of participants during the conference. Participants are responsible for making their own arrangements regarding insurance.

Welcome Message

AKIN TASCIKARAOGLU
GENERAL CHAIR

On behalf of all Chairs and Committees, it is my pleasure to welcome you to the city of Mugla for the 6th edition of the International Conference on Smart Energy Systems and Technologies – SEST 2023.

Since its first edition in 2018, the SEST Conference Series has been committed to establishing itself as an attractive venue to present top-tier scientific research in Smart Energy Systems and Technologies. I want to use this opportunity to recognise the exceptional contributions of all the Chairs, Technical Program Committee members and external reviewers. Their efforts were pivotal in realising this ambition by upholding a comprehensive three-stage review process of all the submitted papers.

In the first stage, abstracts were assessed regarding their scope and quality/interest. Of the 219 abstracts (from 39 countries and five continents) submitted, 19.63% (43 abstracts) were rejected. The Authors of the remaining abstracts were invited to submit the corresponding full paper.

In the second stage, 121 full papers were submitted. They were thoroughly evaluated by 67 Technical Program Committee members and 326 external reviewers, averaging 4.8 reviews per paper.

In the third stage, the Technical co-Chairs evaluated the revised full papers and the corresponding response letters.

Following this thorough review process, 78 full papers were accepted for presentation. The SEST 2023 acceptance rate from abstract submission to full paper acceptance (disregarding the full papers not submitted) was 47.6%.

Alongside the main technical program, which comprises 16 paper presentation sessions, we also have the privilege of hosting six outstanding Keynote Speakers. They are all world-renowned experts in their field, and they will discuss the most pressing and timely topics in their keynote addresses.

I would also like to acknowledge the support of our industrial partners, ADM Electricity Distribution. Not only did their financial contributions facilitate the conference's organisation, but their involvement in organising demo sessions enriched the conference program.

I firmly believe that the diverse technical program of

SEST 2023 will provide many opportunities to discuss and reflect on current and future engineering challenges of smart energy system design and operation.

Finally, I hope that you will enjoy this year's edition of the conference by actively participating in the technical sessions, taking advantage of the social program to expand your network and, ultimately, go back home with pleasant memories of Mugla and Türkiye.

I wish everyone a productive conference.

Akın Taşcıkaraoğlu
General Chair of SEST 2023

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Ayşe Kübra Erenoğlu, Yildiz Technical University, Türkiye

Conference Venue

The technical program of SEST 2023 (parallel sessions, keynote addresses and special/demo sessions) will take place at the **Ataturk Congress and Cultural Center.**

Address: Kötekli, Muğla Uni., 48000 Central/Muğla

Information for Participants

Registration

The registration desk is located on the ground floor of the Ataturk Congress and Cultural Center. Registration will be possible on:

Monday 8:30-17:00
Tuesday 8:30-17:00
Wednesday 8:30-12:00

Attendees and accompanying persons will receive an identification badge. The badge must be displayed to join the coffee breaks, lunches, welcome reception, and conference dinner. Participants are kindly requested to visibly carry their badges during the conference.

Local Time
In September, the local time is UTC+3 (Türkiye is one hour ahead of Central European Summer Time.). All times indicated in this booklet are local.

Attendance certificates

Participants can request an electronic attendance certificate by sending an e-mail sest2023mugla@gmail.com from the e-mail address used during registration. Attendance certificates will be available within two weeks after the conference. Note that attendance certificates are not issued in case of no-shows.

SEST 2023 Social Media

We recommend that you follow our Twitter (@sest2023) and LinkedIn (linkedin.com/in/sest-conference2023) accounts. Announcements during the conference will be posted there.

Coffee breaks and lunch

Lunch will be served in the restaurant area of Mugla Sitki Kocman University. Refreshments will be available at special spots at the Ataturk Congress and Cultural Center. Special dietary requirements are accommodated according to the information provided during registration. In case of allergies or special dietary requirements please consult the explanatory labels. If in doubt, please ask the staff.

Note that the Welcome Reception and the Conference Dinner will take place at two different locations (see pages 40 and 41).

Other Services
Internet access

Free internet access is offered at all the locations.

Parking

A parking area is available in front of the Ataturk Congress and Cultural Center, and it will be free of charge for all participants.

Information for Presenters

All the technical sessions will take place at the Ataturk Congress and Cultural Center. The rooms are equipped with a laptop (Microsoft Windows) and a projector. Microsoft PowerPoint and Adobe Acrobat are available. Therefore, the Authors should prepare their presentation as a .pptx or .pdf file (it is recommended to prepare both).

Parallel sessions have a total duration of 75 minutes. Presenting authors should be in the designated room at least 15 minutes before the beginning of the session to meet the session chair and provide their presentation file by using a USB stick. Each presentation should not exceed 12 minutes, followed by around 3 minutes of Q&A and discussion. Please respect the allotted time; otherwise, the session chair may have to interrupt you.

Note that the presentation of an accepted paper is a prerequisite for its inclusion in the final conference proceedings.

Presentation certificates
Presenting authors can request an electronic presentation certificate by sending an e-mail to sest2023mugla@gmail.com indicating the ID of the paper.

SEST 2023 Reviewer Recognition
To recognize the voluntary contribution of the external reviewers to the success of the SEST 2023 review process, three SEST 2023 Outstanding Reviewer Award winners will be announced by the Technical Chairs during the Opening Session.

SEST 2023 Best Paper Awards
The Authors of all the accepted papers are eligible for receiving one of the three SEST 2023 Best Paper Awards. The awards will be presented during the Conference Dinner.

SEST 2023 Best Presentation Awards
On the advice of Session Chairs, a limited number of SEST 2023 Best Presentation Awards will be presented during the Closing Session.

Program at a glance

MONDAY 4/9	
08:30	Registration Opens
09:00-09:45	Opening Session
9:45-11:15	Keynote Address 1 Keynote Address 2
11:15-11:45	Coffee Break
11:45-13:00	Parallel Sessions 1-2
13:00-14:30	Lunch
14:30-15:45	Parallel Sessions 3-4
15:45-16:15	Coffee Break
16:15-17:30	Parallel Sessions 5-6

TUESDAY 5/9	
08:30	Registration Opens
09:00-10:30	Keynote Address 3 Keynote Address 4
10:30-11:00	Coffee Break
11:00-12:15	Parallel Sessions 7-8
12:15-13:45	Lunch
13:45-15:00	Parallel Sessions 9-10
15:00-15:30	Coffee Break
15:30-16:45	Parallel Sessions 11-12

WEDNESDAY 6/9	
08:30	Registration Opens
09:00-10:30	Keynote Address 5 Keynote Address 6
10:30-11:00	Coffee Break
11:00-12:15	Parallel Sessions 13-14
12:15-13:45	Lunch
13:45-15:00	Parallel Sessions 15-16
15:00-15:30	Coffee Break
15:30-16:30	Closing Session

SOCIAL PROGRAM

18:15-20:00	Welcome Reception	16:45-18:30	Excursion	
		18:30-21:30	Gala Dinner	

Keynote Addresses

On Monday, Tuesday and Wednesday, consecutive keynote addresses will take place. Each keynote address will have a duration of 30-35 minutes, followed by 10-15 minutes of discussion.

MONDAY 4/9, 9:45-11:15

"Challenges in Developing Clean and Sustainable Power Systems" – Zhe Chen

"Smart technologies enabling the energy transition for a sustainable development" – Chiara Boccaletti

TUESDAY 5/9, 9:00-10:30

"Concepts, methods, and tools for designing and validating cyber-physical energy systems" – Thomas I. Strasser

"Ongoing challenges in the integration of distributed energy resources" – Andrew Keane

WEDNESDAY 6/9, 9:00-10:30

"The resilience of active electric distribution systems" –Aydoğan Özdemir

"HVDC grids: a fundamental upgrade for a sustainable power system" – Dirk Van Hertem

ZHE CHEN   AALBORG UNIVERSITY, DENMARK

"Challenges in Developing Clean and Sustainable Power Systems"

TIME: 9:45-10:30

ABSTRACT

Power systems are in transition towards a clean and sustainable energy systems as a part of Green Transition. Traditional fossil fuel-based energy technology is being replaced by clean energy technologies, such as wind and PV generators, green hydrogen electrolysis, heat pumps and various storages, etc. A modern power system is emerging, the significant features of the emerging power system is that renewable energy and power electronics are gaining dominant roles in power grids. The power systems are becoming very different from the system dominated by the traditional fossil fuel-based synchronous generator technology, the characteristics of power systems would significantly be changed which presents many challenges. The speech will brief the development and applications of renewable energy and power electronic technologies, describe the impacts and challenges of power electronic based technologies on the power systems, including flexibility, stability and protection etc. The presentation will also discuss the possible solutions to improve the security and the performance of modern power systems.

BIO

Dr Chen received his Ph.D. degree in Power and Control, from University of Durham, England, he has been a full Professor with the Department of Energy Technology, Aalborg University, Denmark since 2002. Professor Chen is the leader of Wind Power System Research program at the Department of Energy Technology, Aalborg University. His main current research interests are wind energy, power electronics, power system and modern energy systems. He has led many international and national research projects and has more than 800 technical publications. He is a panel member and a review expert for many international funding organizations. Dr. Chen is a member of editor boards of many international journals, including Associate Editor of the IEEE Transactions on Power Electronics, Subject Editor (wind turbine control) of IET Renewable Power Generation, Editor-in-Chief of MDPI Wind, etc. He is a Fellow of IET, a Chartered Engineer in the U.K., a Fellow of IEEE, a member of Danish Academy of Technical Sciences.

CHIARA BOCCALETTI   SAPIENZA UNIVERSITY OF ROME, ITALY

"Smart technologies enabling the energy transition for a sustainable development"

TIME: 10:30-11:15

ABSTRACT

Today, humanity is facing unprecedented challenges, related to the exponential growth of the world population, the depletion of natural resources, the climate change, etc.. In this context, the growing demand for energy can no longer be tackled with a traditional approach, since the paradigms have changed dramatically. For instance, renewable energy sources should progressively replace traditional sources, and they should be fully integrated into the existing power system even in the short term. In other words, it is evident that there are no alternatives to a sustainable development. But what is the exact definition and meaning of this concept? To which extent the energy transition is really sustainable? What is the role of smart technologies in the transition towards a sustainable energy system? To answer these crucial questions, it is necessary to adopt a holistic approach.

BIO

Chiara Boccaletti received the M.S. degree inmechanical engineering and the Ph.D. degree in energetics from the Sapienza University of Rome, Italy, in 1991 and 1995, respectively. Dr. Boccaletti received the National Energy and Environment Award for her Ph.D. dissertation in 1998. She is with the Department of Astronautics, Electrical and Energetic Engineering of Sapienza University of Rome, where she is currently an Associate Professor. Her teaching interests cover power plants based on renewable energy sources, cogeneration, and trigeneration. Her current research interests include design, analysis, and optimization of electrical machines, condition monitoring and diagnostics of electrical machines and drives, and systems based on renewable energies.

THOMAS I. STRASSER   AUSTRIAN INSTITUTE OF TECHNOLOGY, AUSTRIA

"Concepts, methods, and tools for designing and validating cyber-physical energy systems"

TIME: 9:00-9:45

ABSTRACT

A driving force for the realization of a sustainable energy supply is the integration of renewable energy resources. Due to their stochastic generation behaviour, energy utilities are confronted with a more complex operation of the underlying power grids. Proper operational concepts and intelligent automation provide the basis to turn the existing power system into an intelligent entity, a smart grid. During the last two decades, a growing number of various research, technology development, and innovation activities have already been carried out in this domain. While reaping the benefits that come along with those intelligent behaviours, it is expected that system-level design and testing will need to play a significantly larger role in the development and roll-out of future solutions and technologies. Design and validation approaches, concepts, and corresponding tools for smart grids and smart energy systems (also referred to as cyber-physical energy systems) are still not mature enough for effective usage.

A key element in this context is the human factor as well as educated professionals, engineers, and researchers understanding the needs and methods for complex smart grids and smart energy systems validation in a multi-domain and cyber-physical manner. This keynote aims to tackle the above-mentioned requirements by highlighting proper concepts, methods, and tools for designing and validating cyber-physical energy systems.

BIO

Thomas I. Strasser received a master's and a PhD degree from the Technische Universität Wien (TU Wien) and he was awarded the Venia Docendi (habilitation) in the field of automation from the same university. For several years, he has been a senior scientist in the Center for Energy of the AIT Austrian Institute of Technology. His main responsibilities involve the strategic development of smart grid automation and validation research projects as well as the mentoring/supervising of junior scientists and PhD candidates. Before joining AIT, Dr Strasser spent more than 6 years as a senior researcher investigating advanced and reconfigurable automation and control systems at PROFACTOR research. He is also active as a docent at TU Wien.

ANDREW KEANE   UNIVERSITY COLLEGE DUBLIN, IRELAND

"Ongoing challenges in the integration of distributed energy resources"

TIME: 9:45-10:30

ABSTRACT

The ongoing integration of renewable distributed energy resource is posing many well-established challenges for distribution networks and providing the focus of several research programmes worldwide. The evolution of the distribution system operator function is well flagged but how the DSO operates alongside demand aggregators and other market players within increasingly near real time markets is yet to be fully resolved. The combination of all the above leads to increased uncertainty, increased data availability, and the need for real time decision making often in a decentralised manner. This keynote will present an overview of how this landscape is changing including some recent research results on topics relevant to the questions posed. The overarching theme being who makes what decision when and with what data available. A central question is how distribution system operators can maintain system reliability and power quality standards while also facilitating multiple commercial entities operating in a distributed real time network environment.

BIO

Andrew Keane is Director of NexSys and the Energy Institute at University College Dublin. Andrew is a Professor in the School of Electrical & Electronic Engineering at UCD where he leads a group focussed on power system planning and operation, especially distribution networks. Andrew's research interests include the impact of new energy resources on the power system from the residential network up to the high voltage transmission system. Current research topics focus upon the interaction between power electronic systems and the power system, often arising from renewable and distributed energy resources. Andrew is Director of NexSys an All Island major research programme involving 42 academics from across nine universities on the Island of Ireland. NexSys targets the development of credible pathways to a Net Zero Carbon Energy System. Previously, Andrew has served as Head of the School of Electrical & Electronic Engineering at UCD and held positions in industry with ESB Networks in Dublin and Smarter Grid Solutions in Glasgow. In 2015 he co-founded NovoGrid a grid automation company developing software solutions for renewable generators and utilities. He is a Senior Member of the IEEE and past chair of the IEEE Power and Energy Society UK and Ireland Chapter.

AYDOĞAN ÖZDEMİR   ISTANBUL TECHNICAL UNIVERSITY, ISTANBUL

"The resilience of active electric distribution systems"

TIME: 9:00-9:45

ABSTRACT

Power system reliability refers to the probability of the satisfactory provision of power and energy to meet load demands and the ability to withstand disturbances. It is related the low impact/high-frequency events and is generally measured by several interruption indices defined by relevant standards. Power system resilience is the ability to limit the extent, severity, and duration of system degradation following extreme (low-frequency/high-impact) events. Initial resiliency concerns were generally focused on the transmission system. On the other hand, large-scale penetration of renewable energy resources and energy storage systems into the distribution grid has increased the role of electric distribution systems in the power delivery network. In this regard, planning and operation of distribution system resilience are getting more interest from utilities and researchers with the dramatically increasing number of natural extreme events (e.g., hurricanes, earthquakes, and floods) and man-made attacks (cyber and physical attacks). There are several efforts for developing control and operation methods and planning strategies to improve grid resilience against such events.

This presentation aims to provide a detailed overview of distribution system resilience, the classification, assessment, metrics for measuring resilience, possible methods for enabling resilience, and the associated challenges.

BIO

Aydogan Ozdemir was born in Artvin, Turkey, in January 1957. He received the B.Sc., M.Sc., and Ph.D. degrees in electrical engineering from Istanbul Technical University, Istanbul, Turkey, in 1980, 1982, and 199y. He is currently a full Professor at IstanbulTechnical University. His current research interests are in electric power systems and high-voltage engineering, emphasizing asset management, reliability analysis and intelligent method applications in power system modeling, simulation, analysis and control, smart grids, and building automation systems. He has published more than 150 technical papers and conducted several research activities. He is a Member of the National Chamber of Turkish Electrical Engineering and a Senior Member of IEEE PES.

DIRK VAN HERTEM   KU LEUVEN, BELGIUM

"HVDC grids: a fundamental upgrade for a sustainable power system"

TIME: 9:45-10:30

ABSTRACT

High Voltage Direct Current (HVDC) was traditionally used for long distance bulk power transfer, or the connection for asynchronous zones. With the development of Voltage Source Converter HVDC, also new applications have arisen. HVDC is increasingly used to integrate renewables and to provide additional reinforcements with the power system. A next step is the development of HVDC grids, where meshing at the DC side allows for a more cost effective, with lower losses and a potentially higher reliability. However, such a meshed HVDC grid behaves fundamentally different from traditional systems. This talk will discuss the transition to meshed HVDC grids, the challenges in developing and protecting such a system, and the possible changes to the existing manner in which we think of HVDC grid

BIO

Dirk Van Hertem graduated as a M.Eng. in 2001 from the KHK, Geel, Belgium and as a M.Sc. in Electrical Engineering from the KU Leuven, Belgium in 2003. In 2009, he has obtained his PhD, also from the KU Leuven. In 2010, Dirk Van Hertem was a member of EPS group at the Royal Institute of Technology (KTH), in Stockholm. Since spring 2011 he is back at the University of Leuven where he is currently professor and member of the ELECTA division. His special fields of interest are decision support for grid operators, power system operation and control in systems with FACTS and HVDC and building the transmission system of the future, including offshore grids and the supergrid concept. The research activities of Prof. Van Hertem are all part of the EnergyVille research center, where he leads the Electrical Networks activities and is director of the HC3 competence center. Dr. Van Hertem is an active member of both IEEE and Cigré.

Parallel Sessions

		ROOM	SESSION	TITLE	CHAIR
MONDAY 4/9	**11:45-13:00**	B	1	Power System Dynamics, Control & Power Quality I	Kyriaki-Nefeli Malamaki
		C	2	Electricity Markets	Gerardo Osório
	11:30-15:45	B	3	Forecasting	Gerardo Osório
		C	4	Power System Planning	Sıtkı Güner
	16:15-17:30	B	5	Power Electronic Systems & Applications, Electric Machines	Gerardo Osório
		C	6	Electric Mobility	Fatma Yıldız Ta cıkarao lu
TUESDAY 5/9	**11:00-12:15**	B	7	Virtual Power Plant	Andrea Mazza
		C	8	Demand Side Management	Hamza Salih Erden
	12:45-15:00	B	9	Power System Operation I	Ignacio Hernando Gil
		C	10	Multi-energy Systems	Georgios Kryonidis
	15:30-16:45	B	11	Power System Dynamics, Control & Power Quality II	Gianfranco Chicco
		C	12	Distributed Energy Resources	Andrea Mazza
WEDNESDAY 6/9	**11:00-12:15**	B	13	Energy Storage	Sıtkı Güner
		C	14	Power System Dynamics, Control & Power Quality III	Oğuzhan Ceylan
	13:45-15:00	B	15	Power Systems Protection, Security and Reliability	Sıtkı Güner
		C	16	Power System Operation II	Anya Heider

SESSION 1 (MONDAY, SEPTEMBER 4)

Power System Dynamics, Control & Power Quality I
ROOM: B   TIME: 11:45 – 13:00   CHAIR: KYRIAKI-NEFELI MALAMAKI

8 | **Ramp-Rate Limitation of Renewable Energy Sources for Voltage Quality Improvement in Distribution Networks: An Experimental Study**

Stelios Dimoulias, Kyriaki-Nefeli Malamaki, Andrei Mihai Gross, Francisco de Paula García-López, Georgios C. Kryonidis, Manuel Barragan-Villarejo

11 | **Influence of Electric Vehicle Charging on the Grid Access Impedance from 20 kHz to 500 kHz**

Jon González-Ramos, Itziar Angulo, Igor Fernández, Alexander Gallarreta, Amaia Arrinda, David de la Vega

19 | **Flexible Operation of an EV Parking Lot for Voltage Control of a Distribution Network**

Tohid Harighi, Alberto Borghetti, Michele De Santis, Anna Rita Di Fazio, Mario Russo

23 | **Safe Reinforcement Learning for Mitigation of Model Errors in FACTS Setpoint Control**

Magnus Tarle, Mats Larsson, Gunnar Ingeström, Lars Nordström, Mårten Björkman

40 | **Investigating the Performance of Voltage Regulation and Power Smoothing Techniques in MV-LV Distribution Networks**

Georgios Kryonidis, Kalliopi Pippi, Angelos Nousdilis, Theofilos Papadopoulos

SESSION 2 (MONDAY, SEPTEMBER 4)

Electricity Markets

ROOM: C   TIME: 11:45 – 13:00   CHAIR: GERARDO OSÓRIO

9 | **A Stochastic Risk-Averse Model to Price Energy in Pool-Based Electricity Markets with Non-Convex Costs and Revenue Caps**

Nuran Cihangir Martin, Bruno Fanzeres

32 | **Optimal management for prosumer resources in energy communities with P2P market considering deviation and previously established agreements**

Andrés Alcántara de Las Heras, Carlos García-Santacruz, Juan Manuel Carrasco Solis, Eduardo Galván Díez

119 | **Parallel SessionsP2P Market Transactions Congestion Impact on the Distribution Network Considering Physical Constraints**

Sérgio Santos, José Branco, Gerardo Osório, João P. S. Catalão

159 | **Chance-Constrained Network-Cognisant Stochastic Bidding Strategy of Distribution System Aggregator**

Mohammad Afkousi Paqaleh, Maria Vrakopoulou, Andrew Keane

202 | **A Privacy-Preserving and Accountable Billing Protocol for Peer-to-Peer Energy Trading Markets**

Kamil Erdayandi, Lucas Cordeiro, Mustafa A. Mustafa

MONDAY 4/9

Parallel Sessions

SESSION 3 (MONDAY, SEPTEMBER 4)

Forecasting

ROOM: B   TIME: 14:30 – 15:45   CHAIR: GERARDO OSÓRIO

78 | **Distributed energy resource flexibility estimation considering uncertainty in distribution networks**

Aleen van der Meer, Alireza Nouri, Andrew Keane

95 | **Comparison of Small EV Charging Station's Load Forecasts and it's Impact on the Operational Costs**

Alexander Stein, Anna Sina Starosta, Bernhard Schwarz, Nina Munzke, Marc Hiller

117 | **State-of-Charge Estimation of Battery Modular Multilevel Inverter Systems Based on Extended and Dual Extended Kalman Filter**

Ali Mashayekh, Sebastian Pohlmann, Michael Hohenegger, Mahdiye Khorasani, Manuel Kuder, Thomas Weyh

174 | **On-line Inertia Estimation in Presence of Distributed Energy Resources**

Juan Diego Rios Penaloza, Anup Joshi, Fabio Napolitano, Fabio Tossani, Alberto Borghetti

185 | **A Kalman Filter Approach for State Estimation in Weakly Monitored Active Distribution Networks**

Diogo M. V. P. Ferreira, Pedro M. S. Carvalho, Marija D. Ilic

SESSION 4 (MONDAY, SEPTEMBER 4)

Power System Planning

ROOM: C   TIME: 14:30 – 15:45   CHAIR: SITKI GÜNER

35 | **Physics-Aware Planning of Broadband Powerline Communication in Low Voltage Distribution Grids**

Philipp Lutat, Louis Molitor, Marcel Kurth, Andre Würde, Andreas Ulbig

39 | **Parallel SessionsExpansion planning algorithm for optimal allocation of energy resources in interconnected multi-energy cells**

M. Adnan Shihab, Sergio F. Contreras, Tom Warendorf, Johanna Myrzik

142 | **Embedding flexibility into grid planning: reduced models of EV fleet charging capabilities**

António Jerónimo, Pedro Carvalho, Célia Jesus, Luís Ferreira, Hugo Morais

143 | **Country-wise open energy planning in high-resolution with PyPSA-Earth**

Davide Fioriti, Maximilian Parzen, Ekaterina Fedotova, Denise Giubilato, Martha Maria Frysztacki, Hazem Abdel-Khalek, Leon Schumm, Stuart James, Davide Poli

194 | **A Novel Framework for Planning Active Distribution Systems and Electric Vehicle Charging Stations Using Spatial Analysis**

Mario A. Mejia, Leonardo H. Macedo, John F. Franco, Gregorio Muñoz-Delgado, Javier Contreras

SESSION 5 (MONDAY, SEPTEMBER 4)

Power Electronic Systems & Applications, Electric Machines

ROOM: B   **TIME: 1**6:15 **– 1**7:30   **CHAIR:** GERARDO OSÓRIO

3 | Assessment of Control Strategies for Single-Phase Grid-Forming Voltage Source Converters

Francisco Jesús Matas-Díaz, Alkistis Kontou, Manuel Barragan-Villarejo, Panos Kotsampopoulos, Jose Maria Maza-Ortega, Nikos Hatziargyriou

13 | A Novel Structure of High Thrust Force Spoke-Type Linear Permanent Magnet Vernier Machine with Reduced Thrust Force Ripple

Reza Jafari, Pedram Asef, Mohammad Ardebili, Mohammad Mahdi Derakhshani

81 | The impact of active power electronics (V2G charger) to a represantitive Austrian electrical distribution grid

Bernhard Grasel, José Baptista, Manfred Tragner

101 | Observer-based Power System Stabilizer for Multi-terminal DC Networks

Otavio Bertozzi, Harold Chamorro, Kumars Rouzbehi, Adrian-Josue Guel-Cortez, Shehab Ahmed

183 | Evaluating Multilevel Converter Performance for Electric Vehicle Propulsion: Power Train Test Bench and WLTP Drive Cycle Analysis

Wolfgang Grupp, Tobias Högerl, Andreas Wiedenmann, Julian Estaller, Wolfgang Bliemetsrieder, Thomas Weyh

SESSION 6 (MONDAY, SEPTEMBER 4)

Electric Mobility

ROOM: C   TIME: 16:15 – 17:30   CHAIR: FATMA YILDIZ TA CIKARAO LU

30 | **Bi-objective Optimization of EV Charging in a Workplace Parking lot**

Mahla Shariatzadeh, Carlos Henggeler Antunes, Marta A. R. Lopes

45 | **Scheduling Electric Vehicle Charging Considering Battery Charging and Swapping Operations**

Parallel SessionsAbdullah Kürşat Aktar, Akın Taşcıkaraoğlu, Ozan Erdinç, Sıtkı Güner

99 | **Data-Driven Optimization of Electric Vehicle Charging Stations**

Angeliki Mathioudaki, Georgios Tsaousoglou, Emmanouel Varvarigos, Dimitris Fotakis

212 | **Deep Reinforcement Learning-Based Navigation Strategy for Social Welfare Maximization of Mobile Charging Station**

Ali Can Erust, Muhammed Ali Beyazıt, Fatma Yildiz Tascikaraoglu, Akin Tascikaraoglu

216 | **Scheduling of Mobile Charging Stations for Electric Vehicle Charging Considering Fairness Rules**

Muhammed Ali Beyazit, Ayşe Kübra Erenoğlu, Akin Tascikaraoglu

SESSION 7 (TUESDAY, SEPTEMBER 5)

Virtual Power Plant

ROOM: B   TIME: 11:00 – 12:15   CHAIR: ANDREA MAZZA

130 | **Assessing the membership of Portugal and Spain in the FCR Cooperation: TSO costs and VPP revenue**

Fernando J. Ribeiro, João A. Peças Lopes, Filipe J. Soares, André G. Madureira

137 | **Optimal Demand Response for a Virtual Power Plant With Distributionally Robust Optimization**

Linlin Hu, Junbo Tang, Xin Liu, Yang Li, Ying Cai, Shunqi Zeng

151 | **Optimal Aggregation Method of a Virtual Power Plant Based on a Nash-Stackelberg Game**

Xin Liu, Xueshan Lin, Tao Huang, Yang Li, Andrea Mazza, Ilea Valentin

165 | **Optimal Coexistence of Active Distribution Networks with Industrial Prosumers Operating as Virtual Power Plants**

Nasrat Mohseni, Sergio Contreras, Johanna Myrzik

214 | **Optimal Participation of Virtual Power Plants in the Electricity Market Considering Multi-Energy Systems**

Mohammad Javadi, Gerardo J. Osório, André S. Parente, João P. S. Catalão

SESSION 8 (TUESDAY, SEPTEMBER 5)

Demand Side Management

ROOM: C   TIME: 11:00 – 12:15   CHAIR: HAMZA SALIH ERDEN

69 | **Parallel SessionsFlexibility Service Providers' Gaming Potential and its Impact on TSO-DSO Coordinated Markets**

Luciana Marques, Anibal Sanjab, Tom Cuypers

94 | **Intelligent Participation of Electric Vehicles in Demand Response Programs**

Cindy P. Guzman, Panagiotis Pediaditis, Alexios Lekidis, Pedro M S Carvalho, Hugo Morais

111 | **A ready-to-use framework for harvesting flexibility using state estimation and use-of-system tariffs: Insights from the H2020 Platone Project**

Panagiotis Pediaditis, Themistoklis Xygkis, George Korres, Nikos Hatziargyriou

200 | **Data Center Energy Optimization under Different Dynamic Pricing Schemes**

Beltus Nkwawir, Hamza Salih Erden, A. Can Duman

SESSION 9 (TUESDAY, SEPTEMBER 5)

Power System Operation I

ROOM: B   TIME: 13:45 – 15:00   CHAIR: IGNACIO HERNANDO GIL

82   **A Novel Formulation of LV Distribution Network Equivalents for Reliability Analysis**

Mike Brian Ndawula, Chenghong Gu, Sasa Djokic, Ignacio Hernando-Gil

44   **Robust dynamic operating envelopes for flexibility operation using only local voltage measurement**

Md Umar Hashmi, Dirk Van Hertem

48   **The Influence of Smart Charging and V2G on the Flexibility Potential and Grid Expansion Needs of German Distribution Grids**

Anya Heider, Florian Moors, Gabriela Hug

68   **Analysis of Accuracy of Flexibility Baseline Prediction Methods for Office Building at Different Measuring Points**

Kasper Emil Thorvaldsen, Venkatachalam Lakshmanan, Hanne Sæle

193   **Optimal Operation of Renewable Energy Communities through Battery Energy Systems: A Field Data-Driven Real Time Simulation Study**

Andrea Prevedi, Juan Diego Rios Penaloza, Tadeo Pontecorvo, Fabio Napolitano, Fabio Tossani, Alberto Borghetti, Carlo Alberto Nucci

Parallel Sessions

SESSION 10 (TUESDAY, SEPTEMBER 5)

Multi-energy Systems

ROOM: C   TIME: 13:45 – 15:00   CHAIR: GEORGIOS KRYONIDIS

89 | **Workflow-based architecture for optimal planning of integrated local multi-energy systems**

Magnus Askeland, Andrei Morch, Christina Papadimitriou, Marialaura Di Somma, Alessio Coccia, Dimitri Pinel, Peter Richardson, Gianluca Sforza

92 | **Parallel SessionsA Detailed Model for Multi-Energy Systems with Integrated Control Schemes**

Styliani Vomva, Anthi Papadopoulou, Georgios Kryonidis, Angelos Nousdilis, Georgios Christoforidis, Grigoris Papagiannis

128 | **Aggregated Model of a Flexible Multi-Energy Distribution System for Coordinated TSO-DSO Fast Frequency Services Provision**

Bojana Barać, Matej Krpan, Tomislav Capuder

117 | **Optimal Design of Multi-Carrier and -Objective Home Energy Management System**

Milad Kazemi, Christina Papadimitriou, Nikolaos Paterakis, Koen Kok, Irena Dukovska

213 | **Economic Operation of a Multi-Energy System Considering the Impacts of Micro-Mobility**

Najmuddin Noorzad, Akin Tascikaraoglu, João P. S. Catalão

SESSION 11 (TUESDAY, SEPTEMBER 5)

Power System Dynamics, Control & Power Quality II

ROOM: B   TIME: 15:30 – 16:45   CHAIR: GIANFRANCO CHICCO

43 | **On the Feasibility of the Light-QP Method for the Assessment of V2G Supraharmonic Disturbances**

Alexander Gallarreta, Bernhard Grasel, Jon González-Ramos, Igor Fernández, Itziar Angulo, Amaia Arrinda, David de la Vega, José Baptista, Manfred Tragner

58 | **Synthetic Assessment of the Centralized Voltage Control Impact on the Radial Network Operation**

Andrea Mazza, Gianfranco Chicco

77 | **Supporting a "glocal" energy transition: from local energy communities to global simulation networks**

Giorgio Benedetto, Andrea Mazza, Ettore Francesco Bompard, Enrico Pons, Antonio De Paola, Dimitrios Thomas, Evangelos Kotsakis, Gianluca Fulli, Antonello Monti, Steffen Vogel, Sergio Bruno, Giovanni Giannoccaro, Massimo La Scala, Andrea Bonfiglio, Mansueto Rossi, Marco Invernizzi, Fabrizio De Caro, Domenico Villacci

114 | **Comparison of Voltage Stability Indices Based on Synchronized PMU Measurements**

Valéria M. de Souza, Hugo R. de Brito, Kjetil O. Uhlen

158 | **Impact of Virtual Synchronous Generators on Power System Frequency Dynamics**

Aihui Fu, Aleksandra Lekić, Eleftherios O. Kontis, Kyriaki-Nefeli D. Malamaki, Georgios C. Kryonidis, Juan Manuel Mauricio, Charis Demoulias, Miloš Cvetković

TUESDAY 5/9

Parallel Sessions

SESSION 12 (TUESDAY, SEPTEMBER 5)

Distributed Energy Resources

ROOM: C   TIME: 15:30 – 16:45   CHAIR: ANDREA MAZZA

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24 **A Predictive Tool for Techno-Economical Analyses of Renewable Energy Communities**

Antonio De Paola, Matteo Lugano, Davide Ferrero, Dimitrios Thomas, Evangelos Kotsakis, Gianluca Fulli, Sergio Olivero

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50 **Parallel SessionsUsing hybrid distributed energy resources as non-wire alternatives that minimise investment costs**

Carlos Garcia-Santacruz, Alejandro Marano-Marcolini, Jose Luis Martinez-Ramos

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126 **Solving scalability issues in calculating PV hosting capacity in low voltage distribution networks**

Tomislav Antić, Alireza Nouri, Andrew Keane, Tomislav Capuder

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141 **Anomaly Detection in Photovoltaic Systems via Deep Learning Autoencoder**

Seyed Mahdi Miraftabzadeh, Michela Longo, Federica Foiadelli, Stefano Bracco

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181 **Reconfiguration to increase photovoltaic hosting capacity in low voltage distribution grids**

Sari Kerckhove, Arpan Koirala, Reinhilde D'Hulst, Dirk Van Hertem

SESSION 13 (WEDNESDAY, SEPTEMBER 6)

Energy Storage

ROOM: B   TIME: 11:00 – 12:15   CHAIR: SITKI GÜNER

WEDNESDAY 6/9

Parallel Sessions

83 | **Stacking Grid and System Services by Multi-Use Operation of Battery Energy Storage Systems**

Florian Schmidtke, Claudius Ziegenrücker, Armin Fatemi, Immanuel Hacker, Andreas Ulbig

118 | **Proton Exchange Membrane Fuel Cell-Based Power Train for Small Airplanes**

Mahdiye Khorasani, Ali Mahsayekh, Christian Trapp

160 | **Lifespan-prolonging Dual Battery System Online Operation Scheduling for In-city Drone Delivery**

Yiliang Yuan, Jiahang Xie

173 | **Optimization of Wind Scheduling for Improved Power Market Integration**

Kristin Serck-Hanssen, Hanna Birgitte Sletta, Umit Cali, Marthe Fogstad Dynge, Michael Martin Belsnes, Jonghwan Kwon

201 | **Automatic Investigation on Switching Efficiency of Reconfigurable Battery Systems**

Andreas Wiedenmann, Johannes Buberger, Tobias Högerl, Wolfgang Grupp, Michael Hohenegger, Manuel Kuder

SESSION 14 (WEDNESDAY, SEPTEMBER 6)

Power System Dynamics, Control & Power Quality III

ROOM: C   TIME: 11:00 – 12:15   CHAIR: OĞUZHAN CEYLAN

115 **Investigations on Secondary Voltage Control for Long-Term Reactive Power Management**

Parallel SessionsHugo R. de Brito, Valéria M. de Souza, Kjetil O. Uhlen

123 **Hosting Capacity Enhancement Using Open-UPQC in LV Distribution Networks**

Ehsan Kazemi-Robati, Hossein Hafezi, Roberto Faranda, Bernardo Silva

125 **Probabilistic Planning of Virtually-Hybrid Harmonic Filters in Modern Distribution Systems**

Ehsan Kazemi-Robati, Hossein Hafezi, Mohammad Sadegh Sepasian, Bernardo Silva

107 **SLP Optimization Based Method to Improve Voltage Profile in Unbalanced Distribution Networks**

Mohammed Bamatraf, Oguzhan Ceylan, Ioana Pisica, Aydogan Ozdemir

SESSION 15 (WEDNESDAY, SEPTEMBER 6)

Power Systems Protection, Security and Reliability

ROOM: B   TIME: 13:45 – 15:00   CHAIR: SITKI GÜNER

5	**Impacts of Remedial Action Schemes on Power System Resilience after Large-Scale Earthquakes**
	Riley Weinmann, Ted K.A. Brekken, Eduardo Cotilla-Sanchez
16	**Security Check considering Japanese Electricity Market for Power System with a Large Photovoltaic Power Generation**
	Mitsuteru Hattori, Taisuke Masuta, Yutaka Tanabe, Kenichi Kawabe
70	**Resilience-Oriented Restoration Strategy of Networked Microgrids Considering Grid Topology Against Data Intrusion Attacks**
	Abdurahman Yaldız, Tayfur Gökçek, Ozan Erdinç, Yavuz Ateş
110	**Investigation of Multi-stage Attack and Defense Simulation for Data Synthesis**
	Ömer Sen, Bozhidar Ivanov, Martin Henze, Andreas Ulbig
161	**Socio-Technical Modelling in Energy Transition: Coupling of Industrial Energy Management and Energy Technology Development Models**
	Tom Warendorf, Ben Vermeulen, Sergio Contreras, Johanna Myrzik

SESSION 16 (WEDNESDAY, SEPTEMBER 6)

Power System Operation II

ROOM: C   TIME: 13:45 – 15:00   CHAIR: ANYA HEIDER

140 | **A New Methodological Approach for Solving Probabilistic SCOPF Using the Inverse Matrix Modification Lemma and Benders Decomposition**

Matias Vistnes, Vijay Venu Vadlamudi, Sigurd Hofsmo Jakobsen, Oddbjørn Gjerde

7 | **Energy Management Strategy for a Microgrid Including All-in-One Electric Vehicle Station, Renewable Energy and Demand Response**

Alper Çiçek, Ayşe Kübra Erenoğlu, Akın Taşcıkaraoğlu, Ozan Erdinc

164 | **Line Parameter and Switching State Identification Method for Radial and Meshed Distribution Networks**

Terezija Matijašević, Tomislav Antić, Tomislav Capuder

169 | **Co-Simulation Model for Optimal Wind-Hydro Coordination Under Environmental Constraints and Wind Farm Control Dynamics**

Torbjørn Indrekvam Horstad, Ümit Cali, Marthe Fogstad Dynge, Magnus Korpas, Spyridon Chapaloglou, Juan F. Gallego Calderon

186 | **Optimal Operation of Gas Networks with Multiple Injections of Green Hydrogen**

João Fontoura, Filipe Soares, António Coelho, Zenaida Mourão

Social Program

**Welcome Reception
(Monday Evening)**

The welcome reception will take place in the main hall of the Sculptor Museum within the university, situated near the conference venue (a 2-minute walk from the Ataturk Congress and Cultural Center). Drinks and snacks will be served.

Conference Dinner
(Tuesday evening)

The Conference Dinner will be hosted at Olta Restaurant.
Shuttle service will be arranged from the conference venue at 16:45 for the excursion and gala dinner. Alternatively, you have the option to individually attend the gala dinner starting from 18:30. Dinner will start at around 19:30. The event will last until approximately 21:30.

Upon arrival, please inform the restaurant staff about dietary preferences and allergies.

If you were informed that your paper has been nominated for a Best Paper Award, we kindly request that at least one of the co-authors attends the dinner (included with your registration).

Address: Olta Balik Restaurant Akyaka, 48650 Ula/Muğla

	2018	2019	2020	2021	2022	2023
Location	Seville, ES	Porto, PT	Istanbul, TR (online)	Vasa, Fl (online)	Eindhoven, NL	Muğla, TR
Technical co-sponsors	IEEE IES	IEEE PES IES	EEE PES, IES IAS	IEEE PES, IES, IAS, PELS	IEEE PES, IES, IAS, PELS	IEEE PES, IES, IAS, PELS
Accepted papers	110	170	101	124	113	78
Reviews/paper	3.7	4.2	5.6	5.7	5.4	4.8
Acceptance rate	64%	58%	44%	39%	48%	47.6%