PowerTech 2021

Power for the Sustainable Development Goals

June 28th - July 2nd 2021, Madrid, Spain

GOES VIRTUAL
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We welcome all participants to the 2021 IEEE Madrid PowerTech conference. Finally, despite our initial hope to celebrate Power Tech in person in Madrid, the pandemic made it impossible. In any case, we wish all of you a fruitful and participative conference!

PowerTech is the anchor conference of IEEE PES in Europe. It provides a forum for engineers and scientists in electric power and energy systems to present their work and share information in this area of growing interest and importance in the industry and economy worldwide.

We sincerely thank the International Steering Committee of the PowerTech for the received support to hold this conference for the first time in Spain at Comillas University. Our University, particularly the ICAI School of Engineering, is the alma mater of very prestigious professionals who have devoted their careers to the electric power industry.

Our acknowledgment also goes to all members of the Local Organizing Committee who have worked closely and intensively to prepare all the millions of details that this kind of event requires. Our thanks also to Grupo Pacifico acting as supporting company in the organization.

We sincerely thank our Institution, the Institute for Research in Technology (IIT), and the Engineering School ICAI for the support provided in the administration, organization, and logistics for the conference.

The sponsorships provided by IBERDROLA as principal sponsor, CEPSA, REPSOL, RTDS Technologies, EDP, POWERSYS solutions, AXPO, and ENGIE are greatly appreciated.

The conference lemma “Power for the Sustainable Development Goals (SDGs)” emphasizes the relevance of renewable and digitized power systems in achieving some of the main SDGs: fighting against climate change, affordable and clean energy for all, clean water and sanitation, and sustainable cities and communities, among others. The electrification of mobility, climatization of buildings, and industrial uses are the main drivers for achieving sustainable and CO2-neutral economies by 2050. This conference brings the opportunity to share and discuss challenges, technological solutions, and business and regulatory models for a more sustainable future.

Sincere thanks to all Authors that made this conference possible by means of their participation and papers. Despite uncertainties and challenging circumstances due to the pandemic, we received 532 paper submissions from 49 different countries worldwide. This overwhelming response required organizing a careful and time-demanding review process in which the support of all the members of the International Steering Committee, the International Advisory Committee, the Basil Papadias Award Committee, and the contributions of about 740 reviewers have been crucial. We sincerely thank all of them, as none of this would have been possible without their rigorous assessment, effort, and voluntary assistance. In the end, 402 top-rated papers, including 152 student papers, were finally accepted. All these works address hot-topics that will help power systems to become part of the solution to achieve sustainable development goals. The papers finally presented during the conference will be included in the conference proceedings and submitted to IEEE Xplore® for their publication.

We have prepared a very attractive program that includes not only paper presentations in technical and video-poster sessions but also several plenary and special sessions that will address hot topics on how to achieve the Sustainable Development Goals (SDGs) from the power sector. Precisely, we will have plenary sessions on “Challenges and opportunities in universal electricity access” and “Power System Models for Real Life Problems”. Universal electricity access session will address innovative approaches in regulation, business models, and the use of advanced technologies that can attract the private investment needed to supply reliable, sustainable, and affordable electricity to millions of people. The power system models session will present the main numerical and modeling challenges of future power systems and examples of collaborative efforts between industry and academia. In addition, the program includes four sessions dedicated to presentations of European research projects. We look forward to learning from all the invited prestigious speakers from all over the world.

The Local Organizing Committee wishes all of you a stimulating experience with active participation in the conference, meeting old and new colleagues. Please, do not forget to visit Madrid as soon as possible when this pandemic is over to enjoy our culture, our history, our gastronomy, our sun, and our lifestyle.
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## PROGRAMME AT GLANCE MONDAY 28TH JUNE

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| 02:30 - 04:00 | 08:30 - 10:00 | 14:30 - 16:00 |            | TS01 HVDC Technology I  
**Session chair:** Carlos Ugalde-Loo | TS02  
Optimal scheduling, unit-commitment, and adequacy assessment in the presence of uncertainty and RES  
**Session chair:** Jalal Kazempour | TS03  
New technologies in power industry I  
**Session chair:** Davide Falabretti | TS04  
Energy transition  
**Session chair:** Leonardo Meeus | TS05  
Frequency stability I  
**Session chair:** Pierluigi Mancarella |
| 04:00 - 04:30 | 10:00 - 10:30 | 16:00 - 16:30 |            |            | COFFEE BREAK |                |               |              |
| 04:30 - 06:00 | 10:30 - 12:00 | 16:30 - 18:00 |            | EP01 Innovative solutions for transmission and distribution planning results of the FlexPlan and INTERPLAN Projects  
**Session chair:** Gianluigi Migliavacca | TS06  
Power system dynamics  
**Session chair:** Petros Aristidou | TS07  
Optimization and data-based decision support models  
**Session chair:** Angelo L’Abbate | TS08  
Generation/transmission expansion planning  
**Session chair:** David Pozo | TS09  
Power market design for low carbon and decentralized systems I  
**Session chair:** Maria Vrakopoulou |
| 06:00 - 07:30 | 12:00 - 13:30 | 18:00 - 19:30 |            |            | LUNCH |                |               |              |
| 07:30 - 09:00 | 13:30 - 15:00 | 19:30 - 21:00 |            |            | OPENING CEREMONY |                |               |              |
| 09:00 - 09:30 | 15:00 - 15:30 | 21:00 - 21:30 |            |            | TEA |                |               |              |
| 09:30 - 11:00 | 15:30 - 17:00 | 21:30 - 23:00 |            | EP04 Support actions to policymakers: IEEE EPPC & ISGAN-IEA  
**Session chair:** Luciano Martini | SS03  
Long-term energy scenarios  
**Session chair:** Pedro Linares | TS10  
Optimal energy, management in decentralized systems  
**Session chair:** Luiz Barroso | TS11  
Electric vehicles I  
**Session chair:** Wahiba Yaici | TS12  
State estimation distribution  
**Session chair:** Antonio Gómez-Expósito |
| 11:00 - 12:30 | 17:00 - 18:30 | 23:00 - 00:30 |            | PS01 Big-data and monitoring techniques  
**Session chair:** Antonello Monti | PS02  
Forecasting RES  
**Session chair:** José Portela | PS03  
Power system stability and control  
**Session chair:** Javier Renedo | PS04  
Monitoring and diagnosis  
**Session chair:** Hanza Shafique | PS05  
Electric vehicles  
**Session chair:** Alessandro Massi Pavan |
### PROGRAMME AT GLANCE TUESDAY 29TH JUNE

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| 02:30 - 04:00 | 08:30 - 10:00 | 14:30 - 16:00 |            | TS13  | Frequency stability II  
Session chair: Raphael Caire | TS14  | Active distribution networks I  
Session chair: Pablo Arboleya | TS15  | Electric Vehicles II  
Session chair: Alessandra Parisio | TS16  | Optimal power flow I  
Session chair: Florin Capitanescu | TS17  | Storage I  
Session chair: Samuele Grillo |
| 04:00 - 04:30 | 10:00 - 10:30 | 16:00 - 16:30 |            | COFFE BREAK |              |                |              |              |
| 04:30 - 06:00 | 10:30 - 12:00 | 16:30 - 18:00 |            | EP02  | Challenges for flexibility provision from distributed energy resources  
Session chairs: Kirsten Glønning, Samuel Borroy | SS10  | Sector coupling  
Session chair: Maria Sicilia | TS18  | Small signal stability  
Session chair: Rachid Cherkaoui | TS19  | Load/Generation pattern identification, forecasting and big-data analysis  
Session chair: Javier Reneses | TS20  | Storage II  
Session chair: Roberto Faranda |
| 06:00 - 07:30 | 12:00 - 13:30 | 18:00 - 19:30 |            | LUNCH |              |                |              |              |
| 07:30 - 09:00 | 13:30 - 15:00 | 19:30 - 21:00 |            | PL01  | Challenges and opportunities in universal electricity access  
Session chair: Ignacio Pérez Amlaga | SS01  | Future-proof electricity market design  
Session chair: Pablo Rodilla | SS08  | Educating Future Power Engineers  
Session chair: Carlo Alberto Nucci | TS21  | Power system dynamics and transients I  
Session chair: José María Maza | TS22  | Big-data and computational intelligence  
Session chair: Ali Al-Wakeel | TS23  | Power market design for low carbon and decentralized systems II  
Session chair: Gianfranco Chicco |
| 09:00 - 09:30 | 15:00 - 15:30 | 21:00 - 21:30 |            | TEA |              |                |              |              |
| 09:30 - 11:00 | 15:30 - 17:00 | 21:30 - 23:00 |            | SS01  | Future-proof electricity market design  
Session chair: Pablo Rodilla | SS08  | Educating Future Power Engineers  
Session chair: Carlo Alberto Nucci | TS21  | Power system dynamics and transients I  
Session chair: José María Maza | TS22  | Big-data and computational intelligence  
Session chair: Ali Al-Wakeel | PS07  | Big-data and computational intelligence  
Session chair: Marco Mussetta | PS08  | Demand response, EV and storage  
Session chair: Hans Auer | PS09  | Simulation and control I  
Session chair: Carlos Moreira | PS10  | Microgrids  
Session chair: Martin Braun |
| 11:00 - 12:30 | 17:00 - 18:30 | 23:00 - 00:30 |            | PS06  | Energy Storage Technologies  
Session chair: José Luis Martinez Ramos | PS07  | Big-data and computational intelligence  
Session chair: Marco Mussetta | PS08  | Demand response, EV and storage  
Session chair: Hans Auer | PS09  | Simulation and control I  
Session chair: Carlos Moreira | PS10  | Microgrids  
Session chair: Martin Braun |
## Programme at Glance Wednesday 30th June

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| 02:30 - 04:00 | 08:30 - 10:00 | 14:30 - 16:00 |         | TS24       | Power systems dynamics and transients III  
**Session chair:** João Peças Lopes | TS25       | Planning and operation techniques  
**Session chair:** Luis Baringo | TS26       | Frequency stability III  
**Session chair:** Oriol Gomis Bellmunt | TS27       | Active distribution networks II  
**Session chair:** Francisco Echavarren | TS28       | Microgrids  
**Session chair:** José Luis Rodríguez Amenedo |
| 04:00 - 04:30 | 10:00 - 10:30 | 16:00 - 16:30 |         |            | COFFEE BREAK |              |                |               |              |
| 04:30 - 06:00 | 10:30 - 12:00 | 16:30 - 18:00 |         | EP03       | Implementation of wide-area protection, Automation and Control System applied to crossborder transmission  
**Session chair:** Eduardo Martínez | SS04       | Stability of systems with penetration of renewable  
**Session chair:** Luis Rouco | TS29       | Power system protection  
**Session chair:** Alberto Benítez | TS30       | OPF in distribution networks  
**Session chair:** Javier Contreras | TS31       | Peer to peer and local markets  
**Session chair:** Manuel Matos |
| 06:00 - 07:30 | 12:00 - 13:30 | 18:00 - 19:30 |         |            | LUNCH |              |                |               |              |
| 07:30 - 09:00 | 13:30 - 15:00 | 19:30 - 21:00 |         | PL02       | Power System Models for Real Life Problems  
**Session chair:** Javier García-González & Sonja Wogrin |              |                |               |              |
| 09:00 - 09:30 | 15:00 - 15:30 | 21:00 - 21:30 |         | Announcement 2023 PowerTech venue | TEA |              |                |               |              |
| 09:30 - 11:00 | 15:30 - 17:00 | 21:30 - 23:00 |         | SS02       | Integrated distributed networks  
**Session chair:** Misha Chertkov | SS07       | Digitalization Technologies  
**Session chair:** Miguel Ángel Sánchez | TS32       | New technologies in power industry II  
**Session chair:** George Cristian Lazariou | TS33       | Electromagnetic transients  
**Session chair:** Sonja Monica Berlijn | TS34       | Power quality & control  
**Session chair:** Costas Vournas |
| 11:00 - 12:30 | 17:00 - 18:30 | 23:00 - 00:30 |         | PS11       | Network regulation for decarbonization  
**Session chair:** Michel Rivier | PS12       | Active distribution networks  
**Session chair:** Rafael Cossent | PS13       | Transmission planning and operation  
**Session chair:** José Pablo Chaves | PS14       | Simulation and control II  
**Session chair:** Aurelio García-Cerrada | PS15       | Estimation  
**Session chair:** Lukas Sigrist |
# Programme at Glance Thursday 1st July

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| 02:30 - 04:00 | 02:30 - 04:00 | 02:30 - 04:00 | 02:30 - 04:00 | TS35 HVDC Technology II  
*Session chair:* Marco Liserre | | | | |
| 04:00 - 04:30 | 04:00 - 04:30 | 04:00 - 04:30 | 04:00 - 04:30 | SS05 Challenges and solutions for islands with large-scale integration of renewables  
*Session chair:* João Peças Lopes | | | | |
| 06:00 - 07:30 | 06:00 - 07:30 | 06:00 - 07:30 | 06:00 - 07:30 | PL03 Successful publishing in Power Journals  
*Session chair:* Luis Rouco | | | | |
| 09:00 - 09:30 | 09:00 - 09:30 | 09:00 - 09:30 | 09:00 - 09:30 | SS09 Storage for Power Systems  
*Session chair:* Raúl Rodríguez | | | | |
| 11:00 - 12:30 | 11:00 - 12:30 | 11:00 - 12:30 | 11:00 - 12:30 | PS16 New technologies for power systems  
*Session chair:* Andrés Ramos | | | | |
| 12:00 - 13:30 | 12:00 - 13:30 | 12:00 - 13:30 | 12:00 - 13:30 | BEST STUDENT PAPER AWARD | | | | |
| 13:00 - 14:30 | 13:00 - 14:30 | 13:00 - 14:30 | 13:00 - 14:30 | SS10 Active distribution networks II  
*Session chair:* Marco Liserre | | | | |
| 14:00 - 15:30 | 14:00 - 15:30 | 14:00 - 15:30 | 14:00 - 15:30 | SS11 Characterization and management of flexibility provision  
*Session chair:* Marco Liserre | | | | |
| 15:00 - 16:30 | 15:00 - 16:30 | 15:00 - 16:30 | 15:00 - 16:30 | PS17 Power systems operation and markets  
*Session chair:* Sonja Wogrin | | | | |
| 16:00 - 17:30 | 16:00 - 17:30 | 16:00 - 17:30 | 16:00 - 17:30 | PS18 Power system dynamics and transients  
*Session chair:* Ignacio Egido | | | | |
| 17:00 - 18:30 | 17:00 - 18:30 | 17:00 - 18:30 | 17:00 - 18:30 | PS19 Smart grids for smart cities  
*Session chair:* Pablo Frías | | | | |
OPENING CEREMONY

13:30 - 15:00 | Room Aula Magna

Opening Ceremony

Enrique Sanz Giménez-Rico, SJ, Rector of Comillas University
Ignacio Sánchez Galán, President Iberdrola
Tomás Gómez San Román, General Chair of the PowerTech Madrid 2021
João Abel Peças Lopes, Chair of the PowerTech International Steering Committee
Frank C. Lambert, President IEEE PES
Luis Rouco Rodríguez, Program Chair of the PowerTech Madrid 2021
Javier García González, Publication Chair of the PowerTech Madrid 2021
PLENARY SESSIONS

Tuesday 29th June | 13:30 - 15:00 | Aula Magna
PL01 Challenges and opportunities in universal electricity access
For many of the world's poor, the key impediment to their entry into a modern economy is a lack of access to electricity. Yet, today more than 800 million people still lack access, including half the population of sub-Saharan Africa. Another 2.8 billion suffer from some form of energy poverty, meaning that their access is so limited or unstable that their income and livelihoods are seriously constrained. The major bottleneck that prevents progress of electrification in many countries is the distribution segment. This special session will address innovative approaches in regulation, business models and the use of advanced technologies in distribution – both on- and off-grid – which, with adequate public support, can attract the private investment that is needed to supply reliable, sustainable, and affordable electricity to millions of people and to achieve SDG7.

CHAIR
Ignacio Pérez Arriaga, IIT Comillas, University, Madrid; MIT, Boston; Florence School of Regulation (FSR), EUI, Florence

SPEAKERS
Daniel Willette, ENGIE Energy Access
Pradeep Pursnani, Konexa
Julio Eisman, ICAI Engineers Foundation
Simon Hodson, Gridworks
Marcelo Ramón Castillo, ENEL

Wednesday 30th June | 13:30 - 15:00 | Aula Magna
PL02 Power System Models for Real Life Problems
Decision makers of power systems must benefit from the latest advances in research areas such as optimization/simulation techniques, computer science, etc. To bridge the gap between industry and academia it is necessary to engage researchers in collaboration projects where real-life problems are addressed. This session will present some examples of such collaborative relationships and the main numerical and modeling challenges of future power systems will be identified. In particular, the mathematical and computational challenges related to large system planning under uncertainty will be discussed. Hot topics such as the flexibility provided by the demand side or the role of data analytics in the current digitalization and energy transition process and will also be presented. The pragmatic approaches required by the electric power industry will be discussed, and the active role that IIT has played during the last decades in developing tailor-based models for utilities, regulators, etc. will be shared with the audience.

CHAIRS
Javier García-González, IIT, Comillas University
Sonja Wogrin, IIT, Comillas University

SPEAKERS
Arnaud Renaud, Artelys
Luiz Augusto Barroso, PSR
Asgeir Tomasgard, Norwegian University of Science and technology (NTNU); Norwegian Centre for Energy Transition Strategies (FME NTRANS)
Andrés Ramos, IIT, Comillas University
Alejandro López Aguayo, Iberdrola

Thursday 01st July | 13:30 - 15:00 | Aula Magna
PL03 Successful publishing in Power Journals
Publishing research results in JCR journals has always been a challenge, specially for young researchers. The editors in chief of five of the most respected journals on power engineering will provide an overview of their work and will give some advice on how to succeed in publishing in their journals.

CHAIR
Luis Rouco, IIT, Comillas University

SPEAKERS
Nikos Hatziargyriou, National Technical University of Athens; Editor in Chief of IEEE Transactions on Power Systems
Christian Rehtanz, TU Dortmund University; Editor in-Chief of IET Generation, Transmission and Distribution
Carlo Alberto Nucci, University of Bologna; Editor in-Chief of the Electric Power Systems Research
Vladimir Terzija, Skolkovo Institute of Science and Technology (Skoltech); Editor in Chief of the International Journal of Electrical Power and Energy Systems
Gianfranco Chicco, Politecnico di Torino; Editor-in-Chief of Sustainable Energy Grids and Networks

Supported by: IBERDROLA
SPECIAL SESSIONS

Tuesday 29th June | 15:30–17:00 | Room Goya
SS01 Future-proof electricity market design

Electricity systems worldwide are being challenged by both increasing penetrations of intermittent renewable resources and extreme weather events, which, due to climate change, are presenting a higher frequency and intensity. In terms of market design, these challenges are translated into the need to better reward flexibility and adequacy services, to introduce more granular price signals, and, in general, to create a level playing field where all market players can compete, including demand and distributed energy resources.

Responding to these needs will require reforms and refinements at all levels, encompassing adequacy mechanisms, energy markets, ancillary services and renewables support schemes. This session will assess state-of-the-art practices in the United States, Latin America, and Europe.

CHAIR
Pablo Rodilla, IIT, Comillas University

SPEAKERS
Benjamin Hobbs, Environment, Energy, Sustainability & Health Institute, Johns Hopkins University
Luiz Augusto Barroso, CEO of PSR
David Newbery, University of Cambridge, Ross Baldick, The University of Texas at Austin
Karsten Neuhoff, German Institute for Economic Research; Technical University of Berlin

Wednesday 30th June | 15:30–17:00 | Room Goya
SS02 Integrated distributed networks

Multi-energy systems are undergoing tremendous changes. Opportunities in integrated planning, operation, and modeling of the energy systems, including electric, natural gas, and district heating–cooling systems together with the demand side, are many. Traditionally, the role of electric power has been regarded as an energy carrier between the power plants and the consumers. Consequently, the focus of power system analysis, planning, and operation has been limited to those parts of the system that are between the electrical side of the power generators and the power outlets of the consumers. By expanding the system boundaries to also include the dynamics of supply of primary energy, for example, gas, and the characteristics of consumers’ power consumption, the overall efficiency and security of the power system can be improved. Furthermore, energy requirements of some consumers can be satisfied by different energy carriers. For example, heating can be achieved by electric power, gas, or, if available, district heating networks. An integrated analysis of all these systems would, therefore, offer new possibilities of providing an energy system with additional redundancy and flexibility, resulting in more efficient and resilient energy offerings to the consumers and the society, in general. Energy efficiency and renewable integration are also the drivers for energy system decarbonization. Final energy uses should be optimized especially in buildings and transport. Electrification of mobility and heating and cooling are in line with this trend. Integration of supply networks for electricity, heat and gas including future renewable gases, as hydrogen, poses important challenges in planning and operation of these infrastructures, together with optimization and control of final energy resources. The role of energy communities will be also discussed.

CHAIR
Misha Chertkov, University of Arizona; Skoltech

SPEAKERS
Hans Auer, TU-Wien
Misha Chertkov, University of Arizona; Skoltech
Gianfranco Chicco, Politecnico di Torino
Pierluigi Mancarella, Univ of Melbourne and Manchester
Ben Polly, NREL
Ning Zhang, State Key Laboratory of Power Systems, Tsinghua University
SPECIAL SESSIONS

Monday 28th June | 15:30–17:00 | Room Picasso

**SS03 Long-term energy scenarios**

The decarbonization of energy systems that will have to take place in the coming years will have a large influence on power systems. For example, Europe has pledged to attain climate neutrality by 2050, whereas China or Brasil expect to achieve it in 2060. And all these countries count on a larger penetration of electricity as one of the vectors for decarbonization. Renewable energy technologies will provide a larger share of electricity demand, and this low-carbon electricity will increase its role in buildings and transport. However, the extent to which this will happen, and the speed at which it will proceed depends on many factors, and different institutions have differing views on this. This session will present the views and experience of three major institutions, all renowned for their work on future energy scenarios.

**CHAIR**
Pedro Linares, IIT, Comillas University

**SPEAKERS**
Brent Wanner, IEA
Seb Henbest, BNEF
Jorge Blázquez, BP

Wednesday 30th June | 10:30–12:00 | Room Picasso

**SS04 Stability of systems with penetration of renewable generation**

Stability would be severely threaten if the traditional operation of power systems were to be maintained in a scenario of a high penetration of renewable energy sources connected through power electronic converters. Given the current relevance of this topic, this session seeks a comprehensive revision. Analysis and simulation tools, practical experiences, and solutions will be reported.

**CHAIR**
Luis Rouco, IIT, Comillas University

**SPEAKERS**
Costas Vournas, NTUA
Florian Dorfler, ETH
Gilles Torresan, RTE
Juan Carlos Pérez-Campion, Iberdrola
Kati Sidwall, RTDS Technologies Inc.
Urban Rudez and Rajne Ilievska, University of Ljubljana

Supported by:
SPECIAL SESSIONS

Thursday 01st July | 10:30–12:00 | Room Goya
SS05 Challenges and solutions for islands with large-scale integration of renewables

Several thousand island power system exist worldwide; the number of off-grid systems and of events of resource island systems is increasing. Island power systems face challenges associated with heavy dependence on fossil fuels, high energy costs, limited technical capacity and fragile natural environment. The transition to renewable and sustainable systems is particularly challenging for such systems. This special session will address the challenges and opportunities, and the roles of island in the future. The session will pin point operation and planning issues to accomplish the energy transition, methods and tools needed to cope with, and showcase practical experiences.

CHAIR
João Peças Lopes, INESC TEC, Porto Porto University (FEUP)

SPEAKERS
João A. Peças Lopes, INESC TEC, Porto University (FEUP)
Nikos D. Hatzigiorgiou, National Technical University of Athens
Gayathri Nair, International Renewable Energy Agency (IRENA)
Alberto Barrado, Endesa
Lukas Sigrist, IIT, Comillas University

Thursday 01st July | 10:30–12:00 | Room Picasso
SS06 Big-data and machine learning for power systems

The technological revolution in the power system sector is generating large volumes of data with important impact in the business and functional processes of system operators, generation companies, market players and grid users. In this context, the application of machine learning (ML) and other techniques from the artificial intelligence (AI) broader domain can deliver significant improvement of different key performance indicators, like profit maximization in electricity markets (e.g., participating in continuous intraday markets) or improvement of quality of supply in electrical grids (e.g., avoid cascading events and blackouts). This Special Session will address important challenges and needs, such as: a) data privacy and monetization with collaborative analytics; b) increase the trust of human operators and traders in automated AI through explainability and human-in-the-loop approaches; c) use new data sources, like earth-observation, for monitoring the electrical grid.

CHAIR
Ricardo Bessa, INESC TEC

SPEAKERS
Pierre Pinson, Technical University of Denmark, DTU (Dept. of Technology, Management and Economics)
Damien Ernst, University of Liège
Antoine Marot, RTE
Spyros Chatzivasileiadis, Technical University of Denmark, DTU (Center for Electric Power and Energy)
Reza Arghandeh, Western Norway University of Applied Sciences (Dept. of Computer Science, Electrical Engineering and Mathematical Sciences)
Wednesday 30th June | 15:30–17:00 | Room Picasso
SS07 Digitalization technologies

Digitalization of power networks is a must. Energy transition is requesting an unprecedented active role to the power networks, specially distribution networks to integrate DERs, and without full observability, data processing and automated operation, the efficient transformation will not happen. This session will be dedicated to share, including research, innovation, deployment and operation of technologies used to digitalize power networks. The following main areas will be covered.

Data, sensing and conditioning; Connectivity, telecommunications; Information Processing (Big data, Artificial Intelligence, Machine Learning, Digital twinning) and Cybersecurity.

CHAIR
Miguel Ángel Sánchez Fornié, IIT, Comillas University

SPEAKERS
Bruce Stephen, University of Strathclyde
Markus Hofssaess, EoN
Mónica Aragüés, Technical University of Catalonia
Iker Urrutia, Iberdrola
Marteen Hoove, ENCS
Antonello Monti, RWTH Aachen

Tuesday 29th June | 15:30–17:00 | Room Picasso
SS08 Educating future power engineers

The future of engineering is intrinsically linked to the future of our society and our planet. Global access to energy, environmental care and sustainability, digital transformation of industry and global mobility are major challenges that require the same command of technical knowledge as ever, but demand greater flexibility and versatility than ever before. The training of future power engineers has to adapt in an agile way to the dizzying pace of technological changes, using these changes as leverage for their own teaching methodology through the digitalization of personalized learning, virtual and augmented reality, cooperative and hands-on learning, etc. In parallel, now more than ever, engineering schools must offer an increasingly holistic education, fostering transversal communication skills, international mobility and internships, teamwork, leadership and, above all, maintaining firm their spirit of service to society, and the commitment to fair progress and respect for human beings.

CHAIR
Carlo Alberto Nucci, University of Bologna

SPEAKERS
Babak Enayati, IEEE PES VP of Education
Guiping Zhu, Tsinghua University
Miguel Ángel Sánchez Fornié, IIT, Comillas University
Panos Kotsampopoulos, National Technical University of Athens (NTUA)
Peter Crossley, University of Exeter
Carlo Alberto Nucci, University of Bologna
SPECIAL SESSIONS

Thursday 01st July | 15:30–17:00 | Room Goya

SS09 Storage for Power Systems

To achieve the decarbonization of the energy sector in the medium-long term (2050), an increase of electricity production from variable wind and solar energy is planned for the power system. This variability needs to be balanced out by flexibility from other resources, such as storage. Several storage technologies are, and will be, available, with different characteristics. Even if there is no storage technology suitable for every application, a best suited technology exists for a specific requested performance, either at generation, transmission, distribution or demand side. The EU long-term vision expects a significative growth of storage, especially, of batteries in the power system. In this context, we will have a look at the opportunities and barriers for storage in the EU in the next years. Storage will have to compete in electricity markets with generation and demand. Therefore, the feasibility of the projects will depend on the services it can provide, on the value of these services and on the cost of the technology. In addition, the demand profile modification caused by a massive penetration of storage will have an impact on electricity markets. In this session, we will discuss about all these issues with four experts on the field of storage in Europe.

CHAIR
Nicolaos Cutululis, DTU Wind Energy, Technical University of Denmark

SPEAKERS
Bo Normark, EIT Innoenergy
Jacopo Tosoni, EASE (European Association for the Storage of Energy)
Ricardo Pastor, R&D Nester
Elena Agudo, Repsol

Supported by:

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Tuesday 29th June | 10:30–12:00 | Room Picasso

SS10 Sector coupling

The decarbonization of the energy system will require the deployment of large amounts of variable, renewable electricity generation, which may not be available when consumers demand it. It is therefore important to understand the correlation between generation and demand, the need for storage, and the role that renewable gases may play in providing storage but also final energy to consumers.

CHAIR
Maria Sicilia, ENAGAS

SPEAKERS
Julián Barquín, Endesa
Paul Nillesen, Strategy&PWC
Jasmine Ramsebner, TU Wien.
Jean-Michel Glachant, FSR
Josef Shaoul, Fenix Consulting Delft and IEEE

Supported by:

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EUROPEAN PROJECT SESSIONS

Monday 28th June | 10:30 - 12:00 | Room Goya

EP01 Innovative solutions for transmission and distribution planning: results of the flexplan and interplan projects

The increasing penetration of RES in Europe calls for a new approach for planning which includes storage and DSM as an alternative to traditional grid expansion. The new methodology proposed by the project FlexPlan consists of a set of tools for medium to long term planning of the Pan-European network by addressing a significant number of challenges of the current and the future 2030+ EU power grid, from the perspective of the transmission system, the distribution system, and with a particular focus on the transmission-distribution interface. In this sense, the main goal of the tool is to achieve the planning of an integrated grid from the perspective of a Transmission System Operator (TSO) or a Distribution System Operator (DSO) through handling efficiently and effectively intermittent Renewable Energy Sources (RES) as well as the emerging technologies such as storage, demand response and electric vehicles. In fact, the FlexPlan methodology supports utilizing flexibility potential coming from RES, demand side management (DSM), storage and electric mobility to support grid de-bottlenecking. The methodology is applied to six regional cases which will allow to cast a view to the potential for storage and DSM to support grid planning in Europe till 2050 and will bring to formulate regulatory guidelines. The presentation is going to include a description of the methodology as well as an in-depth description of the regional cases. The approach of two European Project will be presented: FlexPlan and INTERPLAN.

CHAIR
Gianluigi Migliavacca, RSE S.p.A.

SPEAKERS
Gianluigi Migliavacca, RSE S.p.A.
Hakan Ergun, KULeuven/Energyville
Raul Rodriguez, TECNALIA
Helfried Brunner, Austrian Institute of Technology (AIT)
Marialaura di Somma, Italian National Agency for New Technologies (ENEA)
Christina Papadimitriou, FOSS Research Centre for Sustainable Energy, University of Cyprus

Tuesday 29th June | 10:30 - 12:00 | Room Goya

EP02 Challenges flexibility from distributed energy resources

CoordiNet and Interface were both kicked off in January 2019 with the aim to elaborate the recommendations for TSO-DSO-Consumer coordination which could support an enhanced uptake of renewable energy and unlock the value of distributed energy resources in the system. While having elaborated each their project plan with demonstrations in different countries which will test the proposed coordination schemes as well as products and services, the two projects have committed to collaborating and bringing forward their joint conclusions at the end of their work. In this session CoordiNet and INTERFACE will present the preliminary results reached after the first two years of operating and layout the next steps of their work which will point towards the elaboration of a pan-European coordination platform as well as give input to the network codes.

The session will also present the FLEXIGRID Project, which proposes to improve the distribution grid operation making it more flexible, reliable and cost-efficient, through the development of four hardware solutions consisting in (S1) the secondary substation of the future, (S2) new generation of smart meters with improved feeder-mapping capabilities, (S3) protections dealing with high RES penetration and (S4) a multi-purpose concentrator able to control grid assets, called Energy Box. Moreover, the project envisions the development of four additional software modules addressing (S5) fault location and self-healing, (S6) forecasting and grid operation, (S7) grid congestion management and (S8) thermal energy storage optimization. Furthermore, last solution is an open source platform to enable the integration of the different hardware and software solutions at the edge by fully exploiting the data provided by local and distributed energy resources.

CHAIRS
Kirsten Glennung, E.DSO
Samuel Borroy, CIRCE

SPEAKERS
Kirsten Glennung, E.DSO
Marco Baron, Enel Global Infrastructure and Networks
Marco Rossi, Ricerca sul Sistema Energetico (RSE)
Pierre Mann, Institute of High Voltage Equipment and Grids, Digitalization and Energy Economics (IAEW)
Alberto Laso Perez, University of Cantabria
Marilu Efstratiadi, Elin Verdi SA
Vide Markovic, HEP-ODS
Marco Baldini, EDYNA SRL
Samuel Borroy, CIRCE Foundation
**EUROPEAN PROJECT SESSIONS**

**Wednesday 30th June | 10:30–12:00 | Room Goya**

EP03 Implementation of wide-area protection, automation and control system applied to crossborder transmission systems

Wide Area Monitoring Protection And Control (WAMPAC) are systems with increasing implementation in transmission systems. Power oscillation monitoring, wide area protection, feedback and actuation with active elements, system state estimation, islanding detection, among others; are services that can be implemented in WAMPAC systems.

Designing and testing these solutions in laboratory before its implementation in field are needed to verify and debug the behaviour of the proposed solutions. Interoperability between different manufacturers, incidence of the communications in the performance, actuation times of the algorithms, ability to detect and act against different disturbances are some interesting aspects to be verified in laboratory.

To establish a fruitful debate about WAMPAC solutions, this Special Session includes different researchers and technicians that are involved in Working Group 6 of FARCROSS Project. In that project, a DEMO of a Wide Area Protection and Control System will be deployed in Greek Transmission System.

During this Special Session, the presenters will introduce each topic by presenting different oscillation detection and protection algorithms and its applicability and efficiency for real-time applications. These methods will be used in the project for implementation of wide area protection based on PMU measurements and power oscillation damping by interaction with active elements in the grid. Previously to its implementation in the field, a lab-scaled laboratory using RTDS and physical elements (PMUs, PDC; the same than will be used in the real DEMO) is already ready to check the behaviour of the proposed solutions.

The different parts of the session will go through important aspects of Wide-Area applications. The presentations will introduce the debate with the audience by briefly explaining the specific applications developed in the project.

**CHAIR**
Eduardo Martínez, CIRCE

**SPEAKERS**
Anastasis Tzoumpas, UBITECH ENERGY
Konstantinos Plakas, Independent Greek Transmission System Operator (IPTO)
Dalibor Brmobic, Studio Elektronike Rijeka Ltd (STER)
Zafer Korkmaz, Schweitzer Ingeneering Laboratories (SEL)
Anibal Prada, CIRCE
EUROPEAN PROJECT SESSIONS

Monday 28th June | 15:30–17:00 | Room Goya

EP04 Support actions to policymakers: IEEE EPPC & ISGAN-IEA

The presentation will address main challenges on international cooperation to address Smart Grids. The presentation will be focused on IEEE European Public Policy Committee and ISGAN activities.

The IEEE European Public Policy Committee (EPPC) aims at expanding the dialogue between the European engineering community and European public authorities to enable technologists to more easily share their expertise and concerns and to enable European Union (EU) institutions and other policy stakeholders to more easily obtain technologists’ input in matters relating to IEEE’s fields of interest. This talk will present the committee’s activities and discuss engagement opportunities for the wider IEEE membership.

From ISGAN, the presentation will be focused on three main topics.
The first part will present the tools developed for cost-benefit and socio-economic analyses and results from applied case studies.

A second topic will present a critical assessment of two trends which are largely influencing the decisions and the evolutionary process of power grids: the micro and MEGA trends. These trends are both aimed at enabling very high penetration of renewable energy sources in the electric power system, from two perspectives:

- the micro focuses on local solutions, while
- the MEGA focuses on the system or even intra-system wide solutions

From the micro vs MEGA work, it would directly relate to the importance of CBA for investments with considerations from a system over-all perspective. The micro vs. MEGA grids will present several policy recommendations.

A third part will present how regulatory sandboxes can act as a mean to foster innovation when regulatory constraints are in place. Lessons learned and design challenges from different countries will be presented.

CHAIR
Luciano Martini, Research on Energy System (RSE)

SPEAKERS
Jef Beerten, KU Leuven and EnergyVille, Belgium
Luciano Martini, Research on Energy System (RSE)
Fabrizio Pilo, Cagliari University,
Irina Oleinikova, Norwegian University of Science and Technology (NTNU)
Klaus Kubeczko, Austrian Institute of Technology
## Tutorials

PowerTech 2021 tutorials are taking place on Friday 2nd July (full day).

### TT01
**The grid forming converters**

### TT02
*Flexibility and security facing energy transition*

### TT03
**Water-energy systems**

### TT04
**VSC HVDC technology**

### TT05
*Low-carbon Energy system transition*

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**COFFEE BREAK**

**LUNCH**
TT01 THE GRID FORMING CONVERTERS CONNECTED TO THE TRANSMISSION SYSTEM

Today, a major share of the electronic converters is controlled under the presumption that they are connected to a strong AC voltage with a given magnitude and frequency in such a way that the converter can exchange an active and reactive power thanks to a current control. This control strategy of the converter is known as the grid-following control. The limitation of this solution has been well documented in the literature and the grid forming control is proposing a new way to connect the power electronic converters to solve these issues. The proposed tutorial is covering a wide overview about this type of control starting from the origin of the grid forming control in order to define a strong classification for the various types of control. The different solutions for the current limitation are also addressed and the way to resynchronize, with no external information, to the grid after various types of fault is explained. All the concepts will be illustrated by some simulations which are publicly available on github.

SPEAKERS
Xavier Guillaud, Ecole Centrale de Lille
Frederic Colas, Arts et Metiers
Mario Ndreko, Tennet TSO

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LUNCH
TUTORIALS

TT02 FLEXIBILITY AND SECURITY IN POWER SYSTEMS FACING ENERGY TRANSITION

European energy targets derived from the Green Deal promote a low-carbon, secure, reliable, resilient, accessible, cost-efficient, and market-based pan-European integrated energy system supplying all of society and paving the way for a fully carbon-neutral circular economy by the year 2050. This scenario fosters the increase of electrification of demand and the focus on the consumer/prosumer, as well as a high increase of penetration of renewable energy sources, involving plants connected to High Voltage networks and distributed energy resources integrated in Medium and Low Voltage networks.

Such new energy paradigm represents a challenge for Power Systems, which need to integrate all new actors while keeping security of supply. At the same time, the technologies aligned with the new paradigm (power electronics, ICTs, advanced algorithms, among others) provide great tools for Power System Operation, thus enabling features such as increased flexibility, stability or reliability.

This tutorial presents technology developments, based on real projects, aimed at covering the challenges abovementioned, following a bottom-up approach: consumer and prosumer integration, distribution and transmission networks evolution, power electronics and Power System operation.

SPEAKERS

Samuel Borroy Vicente, CIRCE Foundation
Gregorio Fernández Aznar, CIRCE Foundation
Jesús Muñoz-Cruzado Alba, CIRCE Foundation
María Teresa Villén, CIRCE Foundation

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COFFEE BREAK

LUNCH
TT03 INTEGRATED PLANNING OF WATER-ENERGY SYSTEMS FOR ACHIEVING DECARBONIZATION, CLIMATE RESILIENCE AND SUSTAINABLE DEVELOPMENT GOALS

It is increasingly recognised around the globe that planning multi-resource systems, such as water and energy systems, in an integrated fashion, rather than as independent systems, can lead to a more cost-effective and reliable use of resources towards decarbonization, climate resilience and sustainable development goals.

This tutorial presents recently developed state-of-the-art integrated water-energy planning and operation tools. These open-source Python-based tools explicitly address the coupling challenges of the two systems with the aim of achieving the best possible spatial and sectoral distribution of benefits in multi-resource systems.

Real world case studies in Africa and Asia from the €9m FutureDAMS project led by The University of Manchester, United Kingdom, will be used to demonstrate the models. Attendees will gain practical experience using the simulators for energy, water, and water-energy systems.

SPEAKERS
Mathaios Panteli, University of Cyprus
E. A. Martinez Cesena, The University of Manchester
Julien J. Harou, The University of Manchester
José Nicolas Melchor Gutierrez, The University of Manchester
José M. González, The University of Manchester
Mikiyas Eticha, The University of Manchester
Wentao Zhu, The University of Manchester
Ruben Bravo Vargas, The University of Manchester
# TUTORIALS

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TT04 VSC HVDC TECHNOLOGY AND APPLICATION TO ENABLE THE ENERGY TRANSITION

High Voltage Direct Current (HVDC) technology has seen a revival in the last decades, and is an increasingly chosen for the transmission of electric power. The revival has been driven by new technological developments with respect to power electronics (IGBT) realizing Voltage Source Converter (VSC) HVDC. The revival was equally driven by the changing system needs after liberalization, the massive deployment of renewable energy sources and new long distance bulk power requirements.

The tutorial will present the VSC HVDC technology, its principle operations and three new applications:

- Flexible HVDC transmission.
- Large scale offshore deployment with HVDC links.
- DC grid for the backbone of future power systems.

The tutorial will end with an industry panel in which attendees can interact with representatives of HVDC equipment vendors and system operators.

The tutorial is not intended for researchers that aim to gain knowledge on the (detailed) modeling and simulation of HVDC systems.

SPEAKERS

Dirk Van Hertem, KU Leuven
Jef Beerten, KU Leuven
Eduardo Prieto-Araujo, CITCEA-UPC
Oriol Gomis-Bellmunt, CITCEA-UPC

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The revival of HVDC. What is HVDC? Why has HVDC become so important for the energy I Dirk Van Hertem

VSC HVDC transmission system: switches (IGBT, MMC), converters, cables and lines I Jef Beerten

Basic controls of VSC HVDC link I Eduardo Prieto-Araujo

HVDC applications

Flexible HVDC transmission I Eduardo Prieto-Araujo

Large scale offshore deployment with HVDC links I Oriol Gomis-Bellmunt

DC grid for the backbone of future power systems I Oriol Gomis-Bellmunt

LUNCH
TUTORIALS

TT05 AN OPEN PLATFORM FOR SCENARIO ANALYSIS & VISUALIZATION TO ASSESS LOW-CARBON ENERGY SYSTEM TRANSITION PATHWAYS

Open-source models have become an integral part of energy systems analysis. Alas, knowledge about best practices in collaborative development of scientific software and standards for open & FAIR data is often limited. This tutorial introduces the participants to several key concepts like open-source licenses, version control and code review, automated testing, and standards for making data FAIR. We will use the open platform of models and data sources developed in the openENTRANCE as a starting point to discuss the advantages and caveats of open-source tools for scientific analysis of European (and other) CO2 emission reduction targets.

SPEAKERS
Daniel Huppmann, International Institute for Applied Systems Analysis (IIASA)
Pedro Crespo del Granado, Norwegian University of Science and Technology (NTNU)

STRUCTURE

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A short guide to best-practice of collaborative development of open-source scientific software | Daniel Huppmann
The basics of open & FAIR data and commonly used data templates and standards | Daniel Huppmann
COFFEE BREAK
The open ENTRANCE platform of open models & data | Pedro Crespo del Granado
The pyam package – an open-source Python toolbox for analysis and visualization of integrated-assessment and energy-systems scenarios | Daniel Huppmann
LUNCH
### Detailed Program

**Monday, June 28th**

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<th>Time</th>
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| 08:30 - 10:00 | Goya    | TS01 HVDC Technology I  
**CHAIR**  
Carlos Ugalde-Loo, Cardiff University  
ID 5 | Voltage Control of Four-Leg VSC for Power System Applications With Nonlinear and Unbalanced Loads  
Juan Carlos Olives-Camps, Juan Manuel Mauricio, Manuel Barragán-Villarejo, Francisco Jesús Matas-Diaz | Universidad de Sevilla. Departamento de ingeniería eléctrica  
ID 17 | Optimal current reference calculation for MMCs considering converter limitations  
Oriol Gomis-Bellmunt, Eduardo Prieto-Araujo | Centre d’Innovació Tecnològica en Convertidors Estàtics i Accionaments, Departament d’Enginyeria Elèctrica, Universitat Politècnica de Catalunya  
Joaquim Lopéz-Mestre, Daniel Westerman Spier | Control Intel.ligent de l’Energia, coop  
ID 239 | Coordinated design of supplementary controllers in VSC-HVDC multi-terminal systems to damp electromechanical oscillations  
Luis Rouco, Aurelio García-Cerrada, Javier Renedo, Lukas Sigrist | Instituto de Investigación Tecnológica (IIT), ETSI ICAI, Universidad Pontificia Comillas  
| 08:30 - 10:00 | Picasso  | TS02 Optimal scheduling, unit-commitment, and adequacy assessment in the presence of uncertainty and RES  
**CHAIR**  
Jalal Kazempour, Technical University of Denmark  
ID 18 | Studies on Unit Commitment with Pumped Storage in Taiwan Considering High Penetration of Uncertain Renewables  
Gerard Francesco DG. Apolinario, Ying-Yi Hong, Chen-Nien Chung | Chung Yuan Christian University  
Tai-Ken Lu | National Taiwan Ocean University  
Chia-Chi Chu | National Tsing-Hua University  
ID 20 | Time-adaptive unit commitment  
Juan Miguel Morales, Salvador Pineda, Ricardo Fernández-Blanco | University of Málaga  
ID 102 | Wind Power Generation Profiles and Capacity in a Hydro-Based System  
Egill Benedikt Hreinsson | University of Iceland  
ID 192 | Development of innovative probabilistic short-term regional adequacy assessment in Southeast Europe  
Stefan Sulakov, Nikolay Chavdarov | ESO  
Lucas Pons, Manuel Serrano, Rafael Peris, Álvaro Nofuentes | ETRA I+D  
Andrijana Djalovic, Dusan Presic | SCC  
ID 386 | Robust Scenario-Based Approach for the Optimal Scheduling of Energy Hubs  
João Catalão | FEUP and INESC TEC  

**DETAILED PROGRAM**

**MONDAY, JUNE 28TH**

08:30 - 10:00 | Room Velázquez

**TS03 New technologies in power industry I**

**CHAIR**
Davide Falabretti, Politecnico di Milano

**ID 45 | Mitigation of Voltage Unbalances Using a Line Voltage Regulator**
Christian Rehtanz, Robert Jahn, Mara Holt | Institute of Energy Systems, Energy Efficiency and 
Energy Economics (ie3), TU Dortmund University

**ID 204 | Towards a Blockchain Weather Derivative Financial Instrument for Hedging Volumetric Risks of Solar Power Producers**
Paul Cuffe, Olakunle Alao | University College Dublin

**ID 267 | DC-bus energy management of a converter-interfaced renewable energy source comprising an energy storage system**
Georgios C. Kryonidis, Kyriaki-Nefeli D. Malamaki | Aristotle University of Thessaloniki
Umer Mushtaq, Milos Cvetkovic | Delft University of Technology
Juan Manuel Mauricio, Manuel Barragán-Villarejo, Francisco Jesús Matas-Díaz, Andrei Mihai Gross, José María Maza-Ortega, Álvaro Rodríguez del Nozal | Universidad de Sevilla

08:30 - 10:00 | Room El Greco

**TS04 Energy transition**

**CHAIR**
Leonardo Meeus, Vlerick Business School

**ID 108 | An Efficient Robust Approach to the Day-Ahead Operation of an Aggregator of Electric Vehicles**
Salvador Pineda, Juan Miguel Morales, Álvaro Porras, Ricardo Fernández-Blanco | University of Málaga

**ID 138 | Modeling and analysis of electricity consumption in Spanish vulnerable households**
Roberto Barrella, Álvaro Cosín, José Carlos Romero, José Ignacio Linares, Efraim Centeno, Eva Arenas | Chair of Energy and Poverty - ICAI School of Engineering, Comillas Pontifical University

**ID 354 | Feasibility verification of a MILP model by outer approximation for the optimal operation of natural gas networks**
Changyun Wen | Nanyang Technological University
Qiuwei Wu, Enrica Raheli | Technical University of Denmark

**ID 414 | An efficient multi-energy vector power flow modeling and solution approach with unified loop-free formulation for heat and gas hydraulic equations**
Pierluigi Mancarella, Shariq Riaz, Mohammad Mohammadi | University of Melbourne

**ID 527 | A method for planning evolutive design of isolated renewable microgrids with multi-objective optimisation**
Florian Dupriez-Robin, Tuan Quoc Tran | CEA Tech
Mael Riou, Christophe Le Loup | Entech SE
Michel Benne, Dominique Grondin | Université de la Réunion
DETAILED PROGRAM
MONDAY, JUNE 28TH

08:30 - 10:00 | Room Sorolla
TS05 Frequency stability I
CHAIR
Pierluigi Mancarella, The University of Melbourne

ID 30 | Optimal Portfolio of Distinct Frequency Response Services in Low-Inertia Systems
Luis Badesa | Imperial College London

ID 46 | A Method for Evaluating Frequency Regulation in an Electrical Grid
Álvaro Ortega | Institute for Research in Technology, ICAI, Comillas Pontificial University
Federico Milano | School of Electrical and Electronic Engineering, University College Dublin

ID 62 | Importance of Linking Inertia and Frequency Response Procurement: The Great Britain Case
Luis Badesa, Aimon Mirza Baig, Goran Strbac | Imperial College London

ID 135 | Comparing the Damping Capabilities of different Fast-Frequency Controlled Demand Technologies
Johanna Vorwerk, Uros Markovic, Gabriela Hug | ETH Zürich

ID 341 | Robust Controller Design for Frequency Regulation of Power Systems
João Catalao | FEUP and INESC TEC

10:00 - 10:30 Coffee

10:30 - 12:00 | Room Goya
EP01 Innovative solutions for transmission and distribution planning: results of the FlexPlan and INTERPLAN Projects
CHAIR
Gianluigi Migliavacca, RSE S.p.A.

FlexPlan project
Gianluigi Migliavacca | RSE S.p.A.
Hakan Ergun | KULeuven/Energyville
Raul Rodríguez | TECNALIA

INTERPLAN project
Helfried Brunner | Austrian Institute of Technology (AIT)
Marialaura di Somma | Italian National Agency for New Technologies (ENEA)
Christina Papadimitriou | FOSS Research Centre for Sustainable Energy, University of Cyprus
DETAILED PROGRAM
MONDAY, JUNE 28TH

10:30 - 12:00 | Room Picasso
TS06 Power system dynamics
CHAIR
Petros Aristidou, Cyprus University of Technology

ID 38 | Evaluating the Effect of Dynamic and Static Modelling on Cascading Failure Analysis in Power Systems
Robin Preece, Yitian Dai, Matthias Noebels, Mathaios Panteli | The University of Manchester

ID 41 | Contribution of Energy Storage Systems to Long-Term Power System Dynamic Performance
Federico Milano, Taulant Kërçi, Mohammed Ahsan Adib Murad, Ioannis Dassios | School of Electrical and Electronic Engineering, University College Dublin

ID 92 | System impact studies for near 100% renewable energy systems dominated by inverter based variable generation
Nicolaos Cutululis | DTU
Peter Borre Eriksen | Ea analyse
Antje Orths | Energinet
Aidan Tuohy | EPRI
James Charles Smith | ESIG
Jason MacDowell | GE
Lennart Söder | KTH
Ana Estanqueiro | LNEC
Magnus Korpås | NTNU
Hannele HOLTITINEN | Recognis
Til Kristian Vrana | Sintef
Mark O'Malley, Damian Flynn | UCD
Juha Kiviluoma | VTT

ID 304 | Development of a dynamic Combined Heat and Power Plant and Flywheel Energy Storage System Model validated with Field Tests
Christian Rehtanz, Christoph Strunck | Institute of Energy Systems, Energy Efficiency and Energy Economics, TU Dortmund University

10:30 - 12:00 | Room Velázquez
TS07 Optimization and data – based decision support models
CHAIR
Angelo L’Abbate, RSE SpA

ID 15 | Data-Driven Screening of Network Constraints for Unit Commitment
María Asunció Jiménez-Cordero, Salvador Pineda, Juan Miguel Morales | University of Malaga

ID 122 | Optimal Dispatch in a Balancing Market with Intermittent Renewable Generation
Priyanka Shinde | KTH Royal Institute of Technology

ID 252 | Optimal Trading of a Fixed Quantity of Power in an Illiquid Continuous Intraday Market
Anthony Papavasilios | UCLouvain/CORE
Gilles Bertrand | UCLouvain/CORE/FNRS

ID 417 | Optimal Transmission Topology for Facilitating the Growth of Renewable Power Generation
Yannick Pérez | CentraleSupélec
Efthymios Karangolos | Montefiore Institute, University of Liège
Sandrine Bortolotti, Jean-Yves Bourmaud | RTE R&D
Emily Little | RTE R&D, CentraleSupélec

ID 445 | Modeling of Third Party Access Tariffs and Portfolio Gas Purchases of CCGTs in the Self-Unit Commitment Problem
Ignacio Rivera, Fernando Manriño | ENDESA (Enel group)
Pedro Otaola-Arca, Javier García-González | Institute for Research in Technology, ICAI School of Engineering, Universidad Pontificia Comillas
DETAILED PROGRAM
MONDAY, JUNE 28TH

10:30 - 12:00 | Room El Greco
TS08 Generation and transmission expansion planning

CHAIR
David Pozo, Skolkovo Institute of Science and Technology

ID 8 | Annualized versus Overall Investment Cost in Generation Capacity Expansion Planning
Efraim Centeno, Sonja Wogrin I Comillas Pontificia University

ID 14 | Distributionally Robust Transmission Expansion Planning: A Multi-Scale Uncertainty Approach
Alexandre Street, Alexandre Velloso I Pontificial Catholic University of Rio de Janeiro
David Pozo I Skolkovo Institute of Science and Technology

ID 141 | Generation and Transmission Expansion Planning With Respect to Global Warming Potential
Albert Moser, Henrik Schwaeppe I RWTH Aachen University
Paolo Paronuzzi, Michele Monaci I University of Bologna

ID 206 | Coordinated Generation Expansion Planning for Transmission and Distribution Systems
Gabriela Hug, Xuejiao Han, Elena Raycheva, Christian Schaffner I ETH Zurich

ID 281 | Incorporating Line Security Constraints within Network Planning for Dynamic Line Rating Systems
Michael Power, Damian Flynn, Behzad Keyvani Eydi I University College Dublin (UCD)

10:30 - 12:00 | Room Sorolla
TS09 Power market design for low carbon and decentralized systems

CHAIR
Maria Vrakopoulou, The University of Melbourne

ID 31 | Impact of Market Timing on the Profit of a Risk-Averse Load Aggregator
Lars Herre I DTU Technical University of Denmark
Lennart Söder I KTH Royal Institute of Technology
Johanna L. Mathieu I University of Michigan

ID 63 | Identifying Critical Uncertainties Impacting System Adequacy in Integrated Gas and Electricity Networks
Ali Ehsan, Robin Preece I The University of Manchester

ID 215 | Intraday Increasing Block Pricing for the Residential Electricity Sector
Stelios Timotheou, Carolina Cortez I University of Cyprus

ID 310 | Decentralized Optimization and Power Flow Analysis for a Local Energy Community
Han (J.G.) Slootweg, Irena Dukovska, Nikolaos G. Paterakis I Eindhoven University of Technology

ID 369 | A Value-Oriented Price Forecasting Approach to Optimize Trading of Renewable Generation
Georges Kariniotakis, Andrea Michiorri, Akylas Stratigakos I MINES ParisTech, PSL University

12:00 – 13:30 Lunch
DETAILED PROGRAM
MONDAY, JUNE 28TH

13:30 - 15:00 | Room Aula Magna
Opening Ceremony
Enrique Sanz Giménez-Rico I SJ, Rector of Comillas University
Ignacio Sanz Galán, President Iberdrola
Tomás Gómez San Román, General Chair of the PowerTech Madrid 2021
João Abel Peças Lopes, Chair of the PowerTech International Steering Committee
Frank C. Lambert, President IEEE PES
Luis Rouco Rodríguez, Program Chair of the PowerTech Madrid 2021
Javier García González, Publication Chair of the PowerTech Madrid 2021

15:00 – 15:30 Tea

15:30 - 17:00 | Room Picasso
SS03 Long-term energy scenarios
CHAIR
Pedro Linares, IIT, Comillas University
SPEAKERS
Arnaud Rouget I IEA
Seb Henbest I BNEF
Jorge Blázquez I BP

15:30 - 17:00 | Room Velázquez
TS10 Optimal energy management in decentralized
CHAIR
Luiz Barroso, PSR Energy Consulting and Analytics

ID 249 | Microgrid Operational Optimization with Dynamic Voltage Security Constraints
Petros Aristidou I Cyprus University of Technology
Thierry Van Cutsem I Fund for Scientific Research, University of Liege
Agnes Nakiganda I University of Leeds

ID 285 | Control and Co-ordination of Flexibilities for Active Network Management in Smart Grids – Li-ion BESS Fast Charging Case
Hossein Hafezi I Tampere University
Hannu Laaksonen, Chethan Parthasarathy I University of Vaasa

ID 384 | Allocation of Feeder Usage, Losses and Peak Load in Distribution Systems with DG Using Shapley Value
Luiz Carlos Nascimento I Federal University of São João Del Rei – UFSJ, Brazil
Armando Martins Leite da Silva, Delberis Araujo Lima I Pontifical Catholic University of Rio de Janeiro – PUC-Rio, Brazil
Paulo Victor Souza Borges I Pontifical Catholic University of Rio de Janeiro – PUC-Rio, Brazil / Technological Federal Education Center Celso Suckow da Fonseca – CEFET-RJ

ID 387 | Optimal Operation of Active Distribution Systems with Voltage Control and Closed-Loop Topology
João P. S. Catalao I FEUP and INESC TEC
Leonardo H. Macedo, Ruben Romero, Juan M. Home-Ortiz, José R. S. Mantovani I Sao Paulo State University
Renzo Vargas I UFABC

ID 469 | Convex Storage Loss Modeling for Optimal Energy Management
Pierre Haessig I CentraleSupélec, IETR

15:30 - 17:00 | Room Goya
EP04 Support actions to policymakers: IEEE EPPC & ISGAN-IEA
CHAIR
Luciano Martini, Research on Energy System (RSE)
SPEAKERS
Jef Beerten I KU Leuven and EnergyVille, Luciano Martini I Research on Energy System (RSE)
JUNE 28TH - JULY 2ND, 2021
POWER FOR SUSTAINABLE
DEVELOPMENT GOALS
GOES VIRTUAL

DETAILED PROGRAM

MONDAY, JUNE 28TH

15:30 – 17:00 | Room El Greco
TS11 Electric vehicles I

CHAIR
Wahiba Yaici, CanmetENERGY Research Centre / Natural Resources Canada

ID 112 | A Distributed EV Charging Framework Considering Aggregators Collaboration
Vahid Dsifani, Shahab Afshar I University of Tennessee at Chattanooga

ID 117 | MPC-based Voltage Control with Reactive Power from High-Power Charging Stations for EVs
Bendik Nybakk Torsæter, Jonatan Ralf Axel Klemets I SINTEF Energy Research

ID 131 | Experimental Validation of the Real-Time Control of an Electric-Vehicle Charging Station
Jean-Yves Le Boudec, Mario Paolone, Sherif Fahmy, Roman Rudnik I Ecole polytechnique federale de Lausanne - EPFL

ID 222 | Volt-Var Support in Distribution Systems by Controlling Electric Vehicles Charging
Hugo Santos, Carolina Affonso I Federal University of Para Mladen Kezunovic I Texas A&M University

ID 442 | Coordinated Voltage Support with Reactive Power from High-power Charging Stations for EVs
Rubi Rana, Bendik Nybakk Torsæter I SINTEF Energy Research

ID 544 | Deadband Voltage Control and Power Buffering for Extreme Fast Charging Station
Rui Bo, Waqas ur Rehman I Missouri University of Science and Technology

15:30 – 17:00 | Room Sorolla
TS12 State estimation distribution

CHAIR
Antonio Gómez-Expósito, University of Seville

ID 132 | Estimation of PV Location based on Voltage Sensitivities in Distribution Systems with Discrete Voltage Regulation Equipment
Santiago Grijalva, Cristian Gomez-Peces I Georgia Institute of Technology
Matthew J. Reno, Logan Blakely I Sandia National Laboratory

ID 389 | Local Power-Voltage Sensitivity and Thevenin Impedance Estimation from Phasor Measurements
Keith Moffat I UC Berkeley

ID 408 | Very Short-Term Current and Load Forecasting for Distribution Systems in Data Constrained Situations
Rodrigo Z. Fanucchi I COPEL Distribuição S/A
Júlio A. D. Massignan, João B. A. London Junior, José P. R. Fernandes I University of São Paulo

ID 418 | Determination of Dynamic Measurement Intervals for State Estimation in Future Distribution Systems
Sindhura Sirige, Peter Palensky, Aleksandra Lekic, José Luis Rueda Torres I Delft University of Technology
Niels Blaauwbroek I Stedin DSO

ID 461 | Enhancement of Distribution System State Estimation Using Pruned Physics-Aware Neural Networks
Minh-Quan Tran, Phuong H. Nguyen I Eindhoven University of Technology
Ahmed S. Zamzam I National Renewable Energy Laboratory

ID 503 | Estimation of Voltage Unbalance at the Reference Bus in Distribution System State Estimation
Rodrigo Zempulski Fanucchi I COPEL Distribuição S/A
Vitor Henrique Pereira de Melo, João Bosco Augusto London Junior, Julio Augusto Druzina Massignan I University of São Paulo
DETAILED PROGRAM
MONDAY, JUNE 28TH

17:00 – 18:30 | Room Goya
PS01 Big data analysis and monitoring techniques

CHAIR
Antonello Monti, RWTH Aachen University

ID 35 | Analysis of an edge-computing-based solution for local data processing at secondary substations
Néstor Rodríguez Pérez, Miguel Ángel Sanz-Bobi | Comillas Pontifical University

ID 54 | Forecast of Distributed Energy Generation and Consumption in a Partially Observable Electrical Grid: A Machine Learning Approach
Federico Cius, Paolo Bajardi, Alan Perotti, André Panisson | ISI Foundation
Fabio Scarpa, Cristiano Maestri, Dario Polinelli, Leonardo Petrocchi | Terna S.p.A.
Elvio G. Amparore | Università degli Studi di Torino

ID 79 | Component ranking and importance indices in the distribution system
Gustav Stenhag, David Karlsson | Digpro
Sindhu Kanya Nalini Ramakrishna, Patrik Hilber, Sylvie Koziel | KTH Royal Institute of Technology

ID 315 | Use of Smart Metering Data for Distribution Network Operational Status Assessment
Georgeos Andreou | Aristotle University of Thessaloniki
Apostolos Milioudis | Hellenic Distribution Network Operator (HEDNO) S.A.

ID 358 | Comparative Analysis of Electricity Market Prices Based on Different Forecasting Methods
Anke Weidlich, Mustafa Abunofal, Nikhilkumar Poshiya, Ramiz Qussous | University of Freiburg

ID 448 | Network Oriented Approaches Using Smart Metering Data for Non-Technical Losses Detection
Javier Matanza Domingo, Miguel A. Sanz Bobi, Matheus Henrique Medeiros | Comillas Pontifical University
Daniel Picchi | Neoenergia

ID 501 | Sankey Network Diagrams to Depict Bulk Power Transactions for Operator Situational Awareness
Paul Cuffe, Arash Beiranvand | University College Dublin

ID 508 | The Application of Artificial Neural Networks to Pseudo Measurement Modeling in Distribution Networks
Lejla Pasic, Bálint Hartmann, István Vokony, Azra Pasic | Budapest University of Technology and Economics

ID 521 | Manual Configuration and Best Setup of Support Vector Machines for Power Quality Classification
Tim Streubel, Krzysztof Rudion, Adrian Eisenmann | University of Stuttgart
DETAILED PROGRAM

MONDAY, JUNE 28TH

17:00 – 18:30 | Room Picasso
PS02 Forecasting RES

CHAIR
José Portela, IIT, Comillas University

ID 87 | Deep learning-based multi-output quantile forecasting of PV generation
Xavier Fettweis, Jonathan Dumas, Bertrand Cornélusse | Liège University
Colin Cointe | Mines ParisTech

ID 89 | Probabilistic forecasting for sizing in the capacity firming framework
Xavier Fettweis, Jonathan Dumas, Bertrand Cornélusse | Liège University
Simone Paoletti, Antonio Vicino, Antonello Giannitrapani | Università di Siena

ID 95 | An Hour-Ahead Photovoltaic Power Forecasting Based on LSTM Model
Ioannis Panapakidis | University of Thessaly
Despoina Kothona | University of Western Macedonia
Georgios Christoforidis | University of Western Macedonia

ID 111 | Short-term Wind Speed Forecasting using Machine Learning Algorithms
Carolina Alfonso, Roberto de Oliveira, Sebastião Fonseca | Federal University of Para

ID 259 | A hybrid supervised learning model for a medium-term MV/LV transformer loading forecast with an increasing capacity of PV panels
Phuong Nguyen, George Rouwhorst | Eindhoven University of Technology
Han Slootweg | Enexis Netbeheer

ID 280 | Can we improve short-term wind power forecasts using turbine-level data? A case study in Ireland
Bidisha Ghosh, Juan Manuel González Sopeña | Trinity College Dublin
Vikram Pakrashi | University College Dublin

ID 325 | Feature Engineering of Weather Data for Short-Term Energy Consumption Forecast
Juri Belikov, Eduard Petlenkov, Margarita Spichakova, Maria Sinimaa | Tallinn University of Technology

ID 459 | An Open Model for Generating High Resolution Wind Power Production Scenarios
Elis Nycander, Lennart Söder | KTH Royal Institute of Technology
DETAILED PROGRAM
MONDAY, JUNE 28TH

17:00 – 18:30 | Room Velázquez
PS03 Power system stability and control

CHAIR
Javier Renedo, IIT, Comillas University

ID 123 | Optimal Design of Voltage-Frequency Controllers for Microgrids
Mostafa Farrokhabadi | Bluwave-ai
John Simpson-Porco | University of Toronto
Claudio Canizares | University of Waterloo

ID 196 | Frequency Stability of Intentional Controlled Islanding Scheme in the Future European Synchronous Transmission Grid
Jörg Michael Schmidt, Ernest Tchagou, Vladimir Milic | Energy System Planning - Grid Analysis, TenneT GmbH
Mariano Dominguez Librandi, Dominic Hewes, Rolf Witzmann, Lorenz Viernstein, Thomas Würl, Daniel Stenzel | Professorship Power Transmission Systems, Technical University of Munich

ID 231 | Stability limits and tuning recommendation of the classical current control providing inertia support
Jennifer Morris, Sophie Coffey, Agusti Egea-Álvarez | University of Strathclyde

ID 272 | Loss-of-Equilibrium Power System Instability Induced by Converter Operation
Panagiotis Mandoulidis, Costas Vournas, Theodoros Souxes | National Technical University of Athens, School of Electrical and Computer Engineering

ID 276 | Small Signal Interactions Involving a Synchronous Machine and a Grid Forming Converter
Panagiotis Papadopoulos, Agusti Egea-Alvarez, Luke Benedetti | University of Strathclyde

ID 349 | Placement of virtual inertia from HVDC terminals based on a frequency deviation index
Paula B. Garcia Rosa, Salvatore D’Arco | SINTEF Energy Research
Jon Are Suul | SINTEF Energy Research, Department of Engineering Cybernetics - Norwegian University of Science and Technology

ID 388 | Towards Development of Equivalent Model of Hybrid Renewable Energy Source Plant for Small Disturbance Stability Studies
Yue Wang, Ana Radovanovic, Jovica Milanovic | the University of Manchester

ID 411 | Handling a back-to-back converter prototype by the virtual synchronous generator strategy
Juan M. Ramirez | CINVESTAV del IPN
Emmanuel Torres-Montalvo, Universidad de Quintana-Roo

ID 440 | Non-Disruptive MPC-Based Frequency and Voltage Control in Microgrids
Tao Liu, David John Hill, Y. Cheng | The University of Hong Kong

ID 506 | A Method to Determine the Distance to the Critical Oscillatory Stability Limit in Terms of Active Power Injections
Kjetil Uhlen | Norwegian University of Science and Technology
Daniel Müller, Arne Hejde Nielsen, Hjörtur Jóhannsson | Technical University of Denmark
DETAILED PROGRAM

MONDAY, JUNE 28TH

17:00 – 18:30 I Room El Greco
PS04 Monitoring and diagnosis

CHAIR
Hamza Shafique, KTH

ID 78 | Novel Analytical Solution to Ferroresonance in Series Compensated Power Systems due to GICs: A Graphical Approach
Behzad Behdani, Mehdi Allahbakhshi I Shiraz university
Mehdi Gheisari, Alia Asheralieva I SUSTECH

ID 270 | Linear State Estimation Considering Refresh Rates of RTU and PMU Measurements
Baris Bilgic, Aleksandar Jovicic, Gabriela Hug I ETH Zurich

ID 301 | Real-time Context-Aware Operation of Digitalized Power Systems by Reporting Rate Control of PMUs
Davood Babazadeh I Hamburg University of Technology
Anand Narayan, Payam Teimourzadeh Baboli, Pratyush Das, Sebastian Lehnhoff I OFFIS - Institute for Information Technology

ID 336 | Optimal Positioning of PMUs for Fault Detection and Localization in Active Distribution Networks
Mattia Cabiati, Claudio Bossi I Ricerca sul Sistema Energetico - RSE S.p.A.
Bruno Gabriele, Francesco Conte, Federico Silvestro, Giacomo - Piero Schiapparelli I Università degli studi di Genova

ID 372 | Wind Turbine Failure Prediction Model using SCADA-based Condition Monitoring System
Bara Alzawideh I Carl von Ossietzky University of Oldenburg
Isabel Koprek, Susanne Horodyvsky I EWE Offshore, Service & Solutions GmbH
Davood Babazadeh I Hamburg University of Technology
Sebastian Lehnhoff, Payam Teimourzadeh Baboli I OFFIS – Institute for IT

ID 402 | Probabilistic Analysis of Enhanced Transmission Feeder Ratings to Optimize Generator Unit Commitment
Paul Savage, William Winters, Razib Hasan, Daniel Head, Matthew Viele I Consolidated Edison Company of New York
David Allen I The Risk Research Group

ID 468 | Physics-Informed Learning for High Impedance Faults Detection
Deepjyoti Deka, Wenting Li I Los Alamos National Laboratory

ID 485 | Malicious Control of an Active Load in a Mixed-Source Microgrid
Uros Markovic I ETH Zurich
Daniel Arnold I Lawrence Berkeley National Laboratory
Ciaran Roberts, Duncan Callaway I UC Berkeley
JUNE 28TH - JULY 2ND, 2021
POWER FOR SUSTAINABLE DEVELOPMENT GOALS
GOES VIRTUAL

DETAILED PROGRAM
MONDAY, JUNE 28TH

17:00 – 18:30 | Room Sorolla
PS05 Electric Vehicles

CHAIR
Alessandro Massi Pavan, University of Trieste

ID 100 | Power Quality in Islanded Microgrids supplied by Vehicle-to-Grid: Norwegian Pilot Study
Bendik Torsæter, Kjersti Berg, Eirill Mehammer I SINTEF Energy Research
Ola Johansson I Sivilingeniør Carl Christian Strømberg AS

ID 273 | States-Based Energy Management System for a EV Hybrid Charging Station with Z-Source Converters
Juan P. Torreglosa I Electrical Engineering Department, University of Huelva
Francisco Jurado I Research Group in Research and Electrical Technology (PAIDI-TEP-152), University of Jaen
Pablo García-Triviño, Raúl Sarrias-Mena, Enrique González-Rivera, Luis M. Fernández-Ramirez I Research Group in Sustainable and Renewable Electrical Technologies (PAIDI-TEP-023), University of Cadiz

ID 313 | Impacts of Driver Willingness on the Storage Capacity of EV Parking Lots
Sitki Guner I Eskisehir Technical University
Aydogan Ozdemir I Istanbul Technical University

ID 368 | Adaptive Robust Linear Programming Model for the Charging Scheduling and Reactive Power Control of EV Fleets
John Fredy Franco I São Paulo State University (UNESP)
Marcos Julio Rider, Juan Camilo López, Nataly Bahol Arias I State University of Campinas (UNICAMP)

ID 409 | Coordinated Siting and Sizing of Electric Taxi Charging Stations Considering Traffic and Power Systems Conditions
Rajesh Kumar I Malaviya National Institute of Technology
Shashank Vyas I The Energy & Resources Institute

Mario González-Rodríguez, Jean-Michel Clairand I Universidad de las Américas - Ecuador
Guillermo Escrivá-Escrivá I Universitat Politècnica de València

ID 446 | Linear programming to increase the directly used photovoltaic power for charging several electric vehicles
Katrin Schulte, Jens Haubrock I Institute for Technical Energy Systems, University of Applied Sciences Bielefeld

ID 451 | Integrating electric vehicle communication in smart grids
Jens Haubrock, Melina Gurcke, Felix Annen, Amina Berrada I University of Applied Sciences Bielefeld

ID 462 | Day-Ahead Optimal Management of Plug-in Hybrid Electric Vehicles in Smart Homes Considering Uncertainties
João P. S. Catalão I FEUP and INESC TEC

ID 478 | Operational Management of Medium Voltage and Low Voltage Networks under a Smart Grid Environment
Henrique Teixeira I INESC TEC
Manuel A. Matos, João A. Peças Lopes I INESC TEC and Faculty of Engineering of the University of Porto
DETAILED PROGRAM

TUESDAY, JUNE 29TH

08:30 – 10:00 | Room Goya
TS13 Frequency stability II

CHAIR
Raphael Caire, Grenoble Institute of Technology

ID 129 | On the Impact of Topology on the Primary Frequency Control of Virtual Power Plants
Federico Milano, Taulant Kërci, Weilin Zhong | School of Electrical & Electronic Engineering, University College Dublin

ID 130 | Modelling Power-Frequency Interactions between Voltage Source Converters with PLLs and Power Networks with Reduced Inertia
Milan Prodanovic, Javier Roldan-Pérez | IMDEA Energy Institute
Alberto Rodriguez-Cabero | Siemens Gamesa Electric

ID 218 | Primary Frequency Control Provision by Distributed Energy Resources in Active Distribution Networks
PETros Aristidou | Cyprus University of Technology
Ognjen Stanojev, Uros Markovic, Gabriela Hug, Justin Russli-Kueh | ETH Zurich

ID 520 | Frequency Regulation and Operating Reserve Techniques for Variable Speed Wind Turbines
Timothy Littler, Aoife Foley, James Boyle | Queen’s University Belfast

ID 540 | Operational Performance and Stability Analysis of a Three-Phase Grid-Connected PV Inverter
Sergey Yanchenko | Moscow Power Engineering Institute
Zeljko Stojanovic | Polytechnic of Zagreb
Sasa Djokic, Zafar Iqbal | The University of Edinburgh
Aljaz Spelko, Igor Papic | University of Ljubljana

08:30 – 10:00 | Room Picasso
TS14 Active distribution networks I

CHAIR
Pablo Arboleya, University of Oviedo

ID 128 | Probabilistic Adequacy and Transient Stability Analysis for Planning of Fault-initiated Islanding Distribution Networks
Phuong Nguyen, Muhammad Fahad Faizan, Martijn Roos | Eindhoven University of Technology
Han Slowteg, Johan Morren | Enexis Netbeheer & Eindhoven University of Technology

ID 155 | Distribution System Planning under Uncertainty: A Comparative Analysis of Decision-Making Approaches
Carmen Bas Domenech, Pierluigi Mancarella, Shariq Riaz | University of Melbourne

ID 423 | Phase Grouping in PV-Rich LV Feeders: Smart Meter Data and Unconstrained k-Means
Angela Simonovska, Luis F. Ochoa | The University of Melbourne

ID 450 | Coordination of Heterogeneous Deferrable Loads using the F-MBC Mechanism
Simon Tindemans, Hazem Abdelghany, Subhitcha Ramkumar | Delft University of Technology

ID 480 | Model-Free Voltage Calculations for PV-Rich LV Networks: Smart Meter Data and Deep Neural Networks
Vincenzo Bassi, Tansu Alpcan | The University of Melbourne
Luis Ochoa | The University of Melbourne / The University of Manchester
## Detailed Program

**Tuesday, June 29th**

### 08:30 – 10:00 | Room Velázquez

**TS15 Electric Vehicles II**

**Chair**

Alessandra Parisio, University of Manchester

**ID 53** | Charging Scheduling Strategy of an Electric Bus Fleet Based on Reinforcement Learning  
Pedro P. Vergara, Chieh-Hsin Hsu, Phuong Nguyen | Eindhoven University of Technology  
Thinh Pham | TNO

**ID 203** | Agent-Based Analysis of Spatial Flexibility in EV Charging Demand at Public Fast Charging Stations  
Bendik Nybakk Torsæter, Michele Garau | SINTEF Energy Research

**ID 297** | Impact of Electric Vehicle Routing With Stochastic Demand on Grid Operation  
Yury Dvorkin, Samrat Acharya | New York University  
Álvaro González-Castellanos, David Pozo, Oluwaseun Enoch Oladimeji | Skolkovo Institute of Science and Technology

**ID 371** | Probabilistic Assessment of Electric Vehicle Impact on Distribution Network of Surabaya, Indonesia  
Muhammad Fauzy Abdullah | Professional Resources Ltd.  
Bramantyo Anggun Pambudi | PT PLN Unit Induk Distribusi Jawa Timur  
Ali Ehsan, Rian Fatah Mochamad | The University of Manchester

**ID 415** | Electric Vehicle Charging Rescheduling to Mitigate Local Congestions in the Distribution System  
Francesca Santori, Marco Paulucci, Tommaso Bragatto, Massimo Cresta | ASM Terni S.p.A.  
Fabio Massimo Gatta, Marco Maccioni, Alberto Geri, Federico Carere | Sapienza University of Rome

### 08:30 – 10:00 | Room El Greco

**TS16 Optimal Power Flow**

**Chair**

Fiorin Capitanescu, Luxembourg Institute of Science and Technology (LIST)

**ID 198** | A Novel Approximation of Security-Constrained Optimal Power Flow with Incorporation of Generator Frequency and Voltage Control Response  
Iason-Iraklis Avramidis, Fiorin Capitanescu | Luxembourg Institute of Science and Technology  
Evangelos Vrettos, Stavros Karagiannopoulos | Swissgrid

**ID 309** | A Stochastic Multi-period AC Optimal Power Flow for Provision of Flexibility Services in Smart Grids  
Muhammad Usman, Fiorin Capitanescu | Luxembourg Institute of Science and Technology

**ID 376** | A Penalty Method Based on a Gauss-Newton Scheme for AC-OPF  
Quoc Tran-Dinh | The University of North Carolina  
Illyes Mezghani, Anthony Papavasiliou | UCLouvain  
Ion Necoara | University Politehnica Bucharest

**ID 395** | Optimal Power Flow with Substation Reconfiguration  
Anton Hinneck, Janusz Bialek, David Pozo, Basel Morsy | Skolkovo Institute of Science and Technology

**ID 455** | Modeling the overhead line vulnerability to combined wind and snow loads for resilience assessment studies  
Giovanni Pirovano, Diego Cirio, Emanuele Ciapessoni, Andrea Pitto | Ricerca sul Sistema Energetico RSE S.p.A.  
Alessandro Lazzarini, Francesco Marzullo, Francesca Scavo, Federico Falorni | Terna Corporate S.p.A.
DETAILED PROGRAM
TUESDAY, JUNE 29TH

08:30 – 10:00 | Room Sorolla
TS17 Storage I

CHAIR
Samuele Grillo, Politecnico di Milano

ID 66 | Optimisation model with degradation for a battery energy storage system at an EV fast charging station
Magnus Korpås I NTNU
Eirik Haugen I NTNU, SINTEF Energy Research
Bendik Nybakk Torsæter, Kjersti Berg I SINTEF Energy Research

Marcel Böhringer I Technical University of Darmstadt

ID 366 | Optimal Energy Management Strategy for Smart Home with Electric Vehicle
Archie Chapman I The University of Queensland
Gregor Verbic, Yu Yi I The University of Sydney

ID 502 | Battery Degradation-Aware Congestion Management in Local Flexibility Markets
Rachid Cherkaoui, Mohsen Kalantar-Neyestanaki I EPFL
Sigurd Bjarghov, Hossein Farahmand I NTNU

10:00 – 10:30 | Coffee

10:30 – 12:00 | Room Goya
EP02 Challenges for flexibility provision from distributed energy resources

CHAIRS
Kirsten Glennung, E.DSO
Samuel Borroy, CIRCE

CoordiNet and INTERRFACE projects
Kirsten Glennung I E.DSO
Marco Baron I Enel Global Infrastructure and Networks
Marco Rossi I Ricerca sul Sistema Energetico (RSE)
Pierre Mann I Institute of High Voltage Equipment and Grids, Digitalization and Energy Economics (IAEW)

FLEXIGRID Project
Alberto Laso Pérez I University of Cantabria
Marily Efstratiadi I Elin Verd SA
Vide Markovic I HEP-ODS
Marco Baldini I EDYNA SRL
Samuel Borroy I CIRCE Foundation
DETAILED PROGRAM
TUESDAY, JUNE 29TH

10:30 – 12:00 | Room Picasso
SS10 Sector coupling

CHAIR
María Sicilia, ENAGAS

The role of renewable gas in a decarbonized future energy system
Julián Barquín I Endesa

The emergence of the Energy System Operator
Paul Nillesen | Strategy&PWC

Estimating storage needs in Europe for sector coupling based on the correlation between renewable energy sources and heating and cooling demand
Jasmine Ramsebner I TU Wien.

FSR decarbonisation study: the main findings
Jean-Michel Glachant I FSR

What is the future of Power to Gas - Too Cheap to Meter, or Too Expensive to Compete?
Josef Shaoul I Fenix Consulting Delft and IEEE

Supported by: CEPSR

10:30 – 12:00 | Room Velázquez
TS18 Small signal stability

CHAIR
Rachid Cherkaoui, Swiss Federal Institute of Technology of Lausanne

ID 174 | Development of a New 21-Bus Test Power System for Teaching Purposes and Stability Studies using Digsilent Powerfactory
J. Manjula Edirisinghe V.P., Gunne J. Heggild, Thomas Øyvng I University of South-Eastern Norway

ID 254 | Small-Signal Stability Analysis of Voltage Source Inverters Operating under Low Short-Circuit Ratios
Peter Sokolowski, Brendan McGrath, Jack Bryant, Lasantha Meegahapola I RMIT University

ID 346 | Damping of Torsional Vibrations in a Type-IV Wind Turbine Interfaced to a Grid-Forming Converter
Frédéric Colas I Arts et Metiers Institute of Technology
Xavier Guillaud, Artur Avazov I Centrale Lille, KU Leuven
Jef Beerten I KU Leuven ESAT/ELECTA Research Group & EnergyVille

ID 533 | Subsynchronous Control Interaction Damping using Colocated BESS in Large Wind Farms
Papiya Dattaray I EPRI
Vladimir Terzija, Peter Wall I The University of Manchester

ID 555 | Stabilizing Controls for Wind Generators Participating in Transmission V/IQ Support
Theodoros Souxes, Aris Parasidis, Costas Vournas I NTUA
DETAILED PROGRAM
TUESDAY, JUNE 29TH

10:30 – 12:00 | TS19 | Room El Greco
TS19 Load/Generation pattern identification, forecasting and big-data analysis

CHAIR
Javier Reneses, IIT, Comillas University

ID 90 | Real-Time Non-Intrusive Load Monitoring: A Machine-Learning Approach for Home Appliance Identification
Theofilos Papadopoulos, Christos Athanasiadis, Georgios Barzagkar-Ntovom I Democritus University of Thrace
Dimitrios Doukas I NET2GRID BV

ID 182 | Probabilistic Aggregated Load Forecasting with Fine-grained Smart Meter Data
Gabriela Hug, Leandro Von Krannichfeldt, Yi Wang I ETH Zurich

ID 223 | Analysis of Driving Patterns in Car Traffic and their Potential for Vehicle-to-Grid Applications
Kathrin Walz, Yuzhuo Fu, Krzysztof Rudion I University of Stuttgart

ID 246 | Assessing Energy Generation and Consumption Patterns in Times of Crisis: COVID-19 as a Case Study
Juri Belikov I Tallinn University of Technology
Noa Zargari, Ron Ofir, Aviad Navon, Yoash Levron I Technion

ID 291 | A Comparative Study on Graph-based Ranking Algorithms for Consumer-oriented Demand Side Management
Eduard Petenkov, Abiodun Onile, Juri Belikov I Tallinn University of Technology
Yoash Levron I Technion

10:30 – 12:00 | TS20 | Room Sorolla
TS20 Storage II

CHAIR
Roberto Faranda, Politecnico di Milano

ID 120 | Converter-Based Solution for Cancellation of Subsynchronous Oscillations in Local Power Grids
Milan Prodanovic, Pablo Rodriguez-Ortega, Javier Roldán-Pérez I Imdea Energy

ID 134 | Optimal Allocation of ESSs in Active Distribution Networks to achieve their Dispatchability
Ji Hyun Yi, Mario Paolone, Rachid Cherkaoui I École polytechnique fédérale de Lausanne

ID 195 | A Norwegian Case Study on Battery Storage as Alternative to Grid Reinforcement
Magnus Korpås I Norwegian University of Science and Technology (NTNU)
Maren Refsnes Brubæk I SINTEF Energy Research

ID 253 | Black Start Service from Offshore Wind Power Plant using IBESS
Remus Teodorescu, Sanjay Chaudhary I Aalborg University
Bertil Berggren, Jan Svensson I Hitachi ABB Power Grids
Philip Johnson, Lukasz Kociewiak I Orsted Offshore

ID 305 | Show me the money! Profitability of energy storage systems in low-carbon power systems
Sonja Wogrin I Comillas Pontifical University - Graz University of Technology
Diego Alejandro Tejada-Arango I Endesa S.A. - Comillas Pontifical University
Audun Botterud, Stefanos Delikaraoglou I Massachusetts Institute of Technology
JUNE 28TH - JULY 2ND, 2021
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DETAILED PROGRAM
TUESDAY, JUNE 29TH

12:00 – 13:30 Lunch

13:30 – 15:00 | Room Aula Magna
PL01 Challenges and opportunities in universal electricity Access

CHAIRS
Ignacio Pérez Arriaga, IIT Comillas, University
Florence School of Regulation (FSR), EUI

New business model approaches in the deployment of off-grid solutions for rural electrification.
Daniel Willette | ENGIE Energy Access

An integrated on-and off-grid approach to electrification.
Pradeep Pursnani | Konexa

Business models for electrification of the difficult last five percent.
Julio Eisman | ICAI Engineers Foundation

Public private collaboration in overcoming the lack of electricity access
Simon Hodson | Gridworks

New perspectives on electricity distribution in low-income countries.
Marcelo Ramón Castillo | ENEL

15:00 – 15:30 Tea

15:30 – 17:00 | Room Goya
SS01 Future-proof electricity market design

CHASE
Pablo Rodilla, IIT Comillas, University

Electricity market design trends in the US
Benjamin Hobbs | Environment, Energy, Sustainability & Health Institute, Johns Hopkins University

The role of long-term markets to address regulatory and policy investment risks: the good, the bad and the ugly of the Latin American experience
Luiz Augusto Barroso | CEO of PSR

Renewable support mechanisms
David Newbery | University of Cambridge, UK

Discussion Texas (ERCOT)
Ross Baldick | The University of Texas at Austin

Discussion Europe
Karsten Neuhoff | German Institute for Economic Research AND Technical University of Berlin

15:30 – 17:00 | Room Picasso
SS08 Educating Future Power Engineers

CHASE
Carlo Alberto Nucci, University of Bologna

Power System Education under COVID crisis
Babak Enayati | IEEE PES VP of Education

Student-centered Blended Teaching and Learning
Guiping Zhu | Tsinghua University

Education in Digital within the Energy sSector
Miguel Ángel Sánchez Forné | IIT, Comillas University

Emerging Needs and Tools in Power System Education
Panos Kotsampopoulos | National Technical University of Athens (NTUA)

Lifetime Learning in Power Systems and the Impact of Smart Grids
Peter Crossley | University of Exeter

New Trends in Education, with Reference to Electrical Engineering. Lesson Learnt from the Covid Pandemic
Carlo Alberto Nucci | University of Bologna
TUESDAY, JUNE 29TH

15:30 – 17:00 | Room Velázquez
TS21 Power system dynamics and transients I
CHAIR
José María Maza, University of Seville

ID 3 | Identifying and Ranking Sources of SSR Based on the Concept of Subsynchronous Power
Yang Wang I Sichuan University
Guangya Yang I Technical University of Denmark
Bo Gao, Wilsun Xu I University of Alberta

ID 125 | Electromagnetic Time Reversal Similarity Characteristics and Its Application to Locating Faults in Power Networks
Reza Razzaghi I Monash University
Mario Paolone, Farhad Rachidi, Zhaoyang Wang I Swiss Federal Institute of Technology, Lausanne

ID 211 | Visual Tool for Assessing Stability of DER Configurations on Three-Phase Radial Networks
Elizabeth Ratnam I Australian National University
Alexandra von Meier, Brittany Wais, Jaimie Swartz I University of California - Berkeley

ID 392 | Comparison between a crowbar and an R-SFCL to improve Fault Ride-Through Capacity of DFIG-based Wind Turbines
Oriol Gomis-Bellmunt I CITCEA-UPC
Eduardo Nobuhori Asada, Fernando Arduini I University of São Paulo

ID 420 | Detection of Oscillatory Modes in Power Systems using Empirical Wavelet Transform
Petros Aristidou I Cyprus University of Technology
Ambreen Khurram, Arief Gusnanto I University of Leeds

15:30 – 17:00 | Room El Greco
TS22 Big-data and computational intelligence
CHAIR
Ali Al-Wakeel, Cardiff University

ID 4 | Optimized Integration of a Set of Small Renewable Sources into a Bulk Power System
Caio dos Santos, Christiano Lyra, Marcos Julio Rider I University of Campinas

ID 49 | Signal Selection for Oscillation Monitoring with Guarantees on Data Recovery under Corruption
Kaustav Chatterjee, Nilanjan Ray Chaudhuri I The Pennsylvania State University

ID 57 | Secondary Reserve Provision through a Smart Aggregation Strategy of Electric Vehicles
Marcos J Rider, Maria Nataly Bahol Arias I Department of Systems and Energy UNICAMP – University of Campinas
Rubén Romero, Cindy Paola Guzman Lascano I Electrical Engineering Department UNESP – São Paulo State University
John Fredy Franco Baquero I School of Energy Engineering UNESP– São Paulo State University

ID 84 | A Cyber Threat Mitigation Approach for Wide Area Control of SVCs using Stability Monitoring
Peter Sauer, Abhiroop Chattopadhyay I Electrical and Computer Engineering, University of Illinois Urbana-Champaign
Reynaldo Nuqui I Hitachi-ABB Power Grids
Alfonso Valdes I Information Trust Institute, University of Illinois Urbana-Champaign

ID 510 | The Linear Quadratic Phasor Controller for Unbalanced Distribution Networks
Alexandra von Meier, Keith Moffat I UC Berkeley
TUESDAY, JUNE 29TH

15:30 – 17:00 | Room Sorolla
TS23 Power market design for low carbon and decentralized systems II
CHAIR
Gianfranco Chicco, Politecnico di Torino

ID 159 | A Community-Based Energy Market Design Using Decentralized Decision-Making under Uncertainty
Ángel M. González-Rueda I Universidad de Coruña
Madeleine Gibescu, José Luis Crespo-Vázquez I Utrecht University
Tarek AlSkaif I Wageningen University and Research

ID 162 | Stochastic Model Predictive Control for Integrated Energy System to Manage Real-Time Power Imbalances: Case of Denmark
Qiuwei Wu, Ana Turk I Technical University of Denmark (DTU)

ID 176 | Bilateral Market for Distribution-level Coordination of Flexible Resources using Volttron
Juan Carlos Bedoya, Chen-Ching Liu I Virginia Polytechnic Institute and State University
Mohammad Ostadjafari, Anamika Dubey I Washington State University

ID 338 | Monetizing Customer Load Data for an Energy Retailer: A Cooperative Game Approach
Jalal Kazempour, Liyang Han, Pierre Pinson I Technical University of Denmark

ID 460 | A Methodology for Quantifying Flexibility in a fleet of Diverse DERs
Adil Khurram, Mads Almassalkhi, Luis Augusto Duffaut Espinosa I University of Vermont, Burlington, Vermont, USA

17:00 – 18:30 | Room Goya
PS06 Energy Storage Technologies
CHAIR
José Luis Martínez Ramos, University of Seville

ID 44 | Sharing Mobile and Stationary Energy Storage Resources in Transactional Energy Communities
Javad Mohammadi, Uday Sriram I Carnegie Mellon University
Pedro Moura I University of Coimbra

Nilanjan Chowdhury, Dmitry Baimel I Shamoon College of Engineering
Juri Belikov I Tallinn University of Technology
Yoash Levron I Technion

ID 225 | Decentralized Control of Residential Energy Storage System for Community Peak Shaving: A Constrained Aggregative Game
Amit Joshi, Valerio Mariani, Luigi Glielmo I University of Sannio, Benevento, Italy
Hamed Kebriaei I University of Tehran, Tehran, Iran

ID 250 | Electrical performance analysis of an innovative Vanadium redox flow battery stack for enhanced power density applications
Dario Pelosi, Panfilo Andrea Ottaviano, Gianni Bidini, Linda Barelli, Dana-Alexandra Ciupageanu I Università degli Studi di Perugia
Mario De Giorgi, Cosimo Mazzoni, Federico Gallorini I VGA SRL

ID 425 | Tight Robust Formulation for Uncertain Reserve Activation of an Electric Vehicle Aggregator
Hrvoje Pandzic, Tomislav Capuder, Ivan Pavic I University of Zagreb Faculty of Electrical Engineering and Computing

ID 471 | Energy Management System (EMS) of Battery Energy Storage System (BESS) – Providing Ancillary Services
Dan-Eric Archer, Samuel Wingstedt I CheckWatt AB
Hamza Shafique, Lina Bertling Tjernberg I KTH Royal Institute of Technology
H.Shafique; D-E.Archer; S.Wingstedt; L.B.Tjernberg
TUESDAY, JUNE 29TH

17:00 – 18:30 | Room Picasso
PS07 Big data and computational intelligence

CHAIR
Marco Mussetta, Politecnico di Milano

ID 50 | ThevNN: Data-driven Online Thévenin Equivalent Estimation
Stavros Konstantinopoulos, Daniel J Douglas, Denis Osipov, Joe Chow | Rensselaer Polytechnic Institute

ID 168 | Advanced Clustering of Flow-Based Domains for Adequacy Study Purposes
Zacharie De Grève, Behzad Vatandoust, Jean-François Toubeau, Bashir Bakhshideh Zad, François Vallée | Power Systems and Markets Research Group, University of Mons, Belgium

ID 194 | Measurement Data Based Time Stamp Synchronization in Power Quality Data Post Processing
Pertti Pakonen, Antti T. Hildén | Tampere University
Pekka Koponen | VTT Technical Research Centre of Finland

ID 217 | Explanatory and Causal Analysis of the Portuguese Manual Balancing Reserve
Ana Cristina Nunes, Gonzalo Correia, Virgílio Mendes, José Sousa | EDP Produção
João Viana, Ricardo Bessa, Renato Fernandes, José Villar, Miguel Ribero, Carla Gonçalves | INESC TEC (Institute for Systems and Computer Engineering, Technology and Science)

ID 242 | Optimal Operation of Community Energy Storage using Stochastic Gradient Boosting Trees
Pedro P. Vergara | Delft University of Technology
Georgios Tsoulosoglou, Nikolaos G. Paterakis, J.G. (Han) Slootweg, Mauricio Salazar, Juan S. Giraldo | Eindhoven University of Technology

ID 318 | Optimal Day-Ahead Orders Using Stochastic Programming and Noise-Driven Recurrent Neural Networks
Martin Biel | KTH Royal Institute of Technology

ID 406 | Real-time Anomaly Detection and Classification in Streaming PMU Data
Dong Jin | Computer Science Department, Illinois Institute of Technology
Deepjyoti Deka, Marc Vuffray, Andrey Lokhov | Theoretical Division, Los Alamos National Laboratory

ID 428 | The Impact of Cross-Border Transmission Constraints on Resource Adequacy Assessment
Dirk Van Hertem, Tamás Borbáth | KU Leuven - Dept. Electrical Engineering
DETAILED PROGRAM
TUESDAY, JUNE 29TH

17:00 – 18:30 | Room Velázquez
PS08 Demand response, EV and storage

CHAIR
Hans Auer, Technische Universitat Wien

ID 98 | Scalability and Replicability Analysis of Grid Management Services in Low Voltage Networks in Local Flexibility Markets: an InterFlex analysis
Friederich Kupzog, Barbara Herndler, Sergio Potenciano Menci | Austrian Institute of Technology (AIT)
Marisca Zweistra | Elaad
Robert Steegh, Marcel Willems | Enexis

ID 151 | Optimal EV Scheduling in Residential Distribution Networks Considering Customer Charging Preferences
Mailys Le Cam | Grenoble INP
Mustafa Alparslan Zehir | MaREI Centre
Barry Hayes | University College Cork

ID 183 | Regional Coordination of Storage Units for Cross-Border Penetration of Renewable Energy Sources
Carlos Cruzat | The University of Manchester
Mathaios Panteli | University of Cyprus

ID 298 | The Value of Operational Coordination for EV Fleet Aggregators
Oluwaseun Enoch Oladimeji | Institute of Research in Technology, Universidad Pontifica Comillas
Yury Dvorkin | New York University
David Pozo | Skolkovo Institute of Science and Technology

ID 308 | Minimum Battery Energy Storage System Sizing Integrated with a Photovoltaic Plant Considering Practical Limitations
James Hurtt, Kyri Baker | University of Colorado-Boulder

ID 385 | Peer-to-Peer Market with Energy Storage Systems
Elena Gryazina, Tatiana Chernova | Skolkovo Institute of Science and Technology

ID 456 | Demand Response on the Russian Retail Market
Dmitry Senchuk | NP Market Council
David Pozo, Álvaro González-Castellanos, Andrey Poddubny | Skolkovo Institute of Science and Technology

ID 526 | Sector-Coupled District Energy Management with Heating and Bi-Directional EV-Charging
Izgh Hadachi, Marcus Voss, Sahin Albayrak | Technische Universität Berlin (DAI-Labor)

ID 548 | Residential Battery Energy Storage Sizing and Profitability in the Presence of PV and EV
D. John Morrow, Robert Best, Xueqin Liu, Ahmed A. Raouf Mohamed | Queen’s University Belfast
DETAILED PROGRAM

TUESDAY, JUNE 29TH

17:00 – 18:30 | Room El Greco
PS09 Simulation and control I

CHAIR
Carlos Moreira, INESC TEC

ID 29 | Analysing the Use of Graph Theory to Assess Topological Impacts on Transient Stability
Changshi Gao, Robin Preece | The University of Manchester

ID 61 | Artificial Neural Network-based Small Signal Stability Analysis of Power Systems
Antonio Pepicello, Alfredo Vaccaro | University of Sannio

ID 121 | Python Scripting for DlgSILENT PowerFactory: Enhancing Dynamic Modelling of Cascading Failures
Mathaios Panteli, Yitian Dai, Robin Preece | the University of Manchester

ID 160 | Analytical Computation of Power Grids’ Sensitivity Coefficients with Voltage-Dependent Injections
Mario Paolone, Sherif Fahmy | École Polytechnique Fédérale de Lausanne

ID 190 | Modeling the Partial Renewable Power Curtailment for Transmission Network Management
Sorin Olaru, Duc-Trung Hoang, Alessio Iovine | L2S, CentraleSupélec, Paris-Saclay University
Manuel Ruiz, Patrick Panciatici, Jean Maeght | RTE

ID 241 | OPF-driven Under Frequency Load Shedding in Low-inertia Power Grids Hosting Large-scale Battery Energy Storage Systems
Mario Paolone, Asja Derviskadic, Yihui Zuo | Ecole Polytechnique Fédérale de Lausanne

ID 271 | A Review of Wide-Area Monitoring and Damping Control Systems in Europe
Konstantinos Plakas, Christos-Spyridon Karavas, Konstantinos Krommydas, Christos Dikaikos, George Papaioannou, Andreas-Tamaz Kurashvili | Independent Power Transmission Operator

ID 302 | Investigation of the Impact of Load Tap Changers and Automatic Generation Control on Cascading Events
Panagiotis Papadopoulos, Georgios Nakas | University of Strathclyde

ID 499 | A novel transient stability index based on grid reduction method to analyze power systems with high penetration of non-synchronous generation
Istvan Vokony, Istvan Taczi, Balint Hartmann | Budapest University of Technology and Economics

ID 535 | Adversarial Training for a Continuous Robustness Control Problem in Power Systems
Benjamin Donnot, Loic Omnes, Antoine Marot | RTE
DETAILED PROGRAM

TUESDAY, JUNE 29TH

17:00 – 18:30 | Room Sorolla
PS10 Microgrids

CHAIR
Martín Braun, Fraunhofer IEE & Uni Kassel

ID 81 | Residential Demand Side Aggregation of Privacy-Conscious Consumers
Andrey Bernstein I National Renewable Energy Laboratory
Gabriela Hug I Power Systems Laboratory, ETH Zurich
Yun-Xing Chin I Singapore ETH Centre

ID 96 | Multi-Component Risk Assessment Using Cyber-Physical Betweenness Centrality
Kate Davis, Abhijeet Sahu, Amarachi Umunnakwe I Electrical and Computer Engineering, Texas A&M University

ID 107 | Price Forecast Methodologies Comparison for Microgrid Control with Multi-Agent Systems
Mahmoud Shahbazi, Behzad Kazemtabrizi, Marcos Eduardo Cruz Victorio I Durham University

ID 133 | Combining optimization and simulation for microgrid sizing
Bertrand Cornélusse, Selmane Dakir I University of Liège

ID 150 | Determining Operational Constraints for IoT-Based Advance Metering Infrastructure
Pedro de Arquer Fernández, Juan Luis Carús Candás I TSK Electrónica y Electricidad
Pablo Arboleya Arboleya I University of Oviedo

ID 156 | Build zero carbon emission generating station and microgrid clusters based on multi-objective optimization
B. Li I R. Roche

ID 345 | Development of a Blockchain-Based Energy Trading Scheme for Prosumers
Artur Almeida I FEUP
João P. S. Catalão, Matthew Gough I FEUP and INESC TEC
Sergio F. Santos, Mohammad Javadi I INESC TEC
Rui Castro I IST and INESC-ID
Tarek AlSkaif I WUR

ID 404 | Tracing and Securing DER Transactions in the Wholesale Electricity Market using Blockchain
Mladen Kezunovic, Mohammad Khoshjahan, Milad Soleimani I Texas A&M University

ID 488 | Comparative Studies on Cost, Reliability and Resilience of Off-Grid Energy Systems
Eduardo Alejandro Martinez Cesena, Wenzhu Li, Mohamed Galeela I The University of Manchester
Mathaios Panteli I University of Cyprus
Pierluigi Mancarella I University of Melbourne
Detailed Program

Wednesday, June 30th

08:30 – 10:00 | Room Goya
TS24 Power systems dynamics and transients II

Chair
João Peças Lopes, FEUP & INESC TEC

ID 149 | Dynamic Power Electronic Load Model for Transient Stability Analyses

ID 163 | A Novel Approach for the Calculation of Steady States in Transmission Systems Using Simplified Time-Domain Simulation
Patrick Panciatici, Marco Chiaramello, Adrien Guironnet, Quentin Cossart | RTE Réseau de Transport d’Electricité

ID 257 | Topological Stability Analysis of High Renewable Penetrated Systems using Graph Metrics
David John Hill, Wenting Yi | The University of Hong Kong

ID 284 | Fault localization to improve power system quality in distribution networks: a greedy approach to optimize the switching sequence of remotely-controlled devices
Davide Poli, Davide Fioriti | DESTEC, University of Pisa

ID 300 | A Tensor Decomposition Approach for Contingency Screening and Coherency Identification in Power Systems
Emilio Barocio Espejo | Universidad de Guadalajara
Felix Rafael Segundo Sevilla, Petr Korba, Betsy Sandoval | Zurich University of Applied Science

08:30 – 10:00 | Room Picasso
TS25 Planning and operation Techniques

Chair
Luis Baringo, University of Castilla - La Mancha

ID 167 | Identification of clouds using an all-sky imager
Nuno Pinho da Silva, Yang Cao, João Esteves | Centro de Investigação em Energia REN – State Grid, S.A.
Zheng Wang | China Electric Power Research Institute, CEPRI
Rui Pestana | Rede Elétrica Nacional, S.A.

ID 306 | Adaptive Generalized Logit-Normal Distributions for Wind Power Short-Term Forecasting
Pierre Pinson, Amandine Pierrot | Technical University of Denmark

ID 353 | Performance Comparison of Alternating Direction Optimization Methods for Linear-OPF based Real-time Predictive Control
Mario Paolone, Rahul Gupta, Vladimir Sovljarinski | EPFL
Fabrizio Sossan | Mines ParisTech

ID 433 | Techno-Economic Optimization of the Sizing of Large-Scale Linear Photovoltaic Systems
Quoc Tuan TRAN, Hervé COLIN, Tai LE | CEA-LITEN - INES, Department of Solar Technologies
08:30 – 10:00 | Room Velázquez
TS26 Frequency stability III
CHAIR
Oriol Gomis Bellmunt, CITCEA-UPC

ID 80 | Closed-Form Solutions for a Low-Order System Fast Frequency Response Model
Julius Susanto, Alireza Fereidouni, Dean Sharafi | Australian Energy Market Operator
Pierluigi Mancarella | University of Melbourne

ID 124 | Impact of Synchrophasor Estimation Algorithms in ROCOF-based Under-Frequency Load-Shedding
Guglielmo Frigo, Mario Paolone, Yihui Zuo, Asja Derviskadic | Ecole Polytechnique Fédérale de Lausanne

ID 179 | Improved Load Frequency Controller for Reduction of Both Area Control Error and Automatic Frequency Restoration Reserve Energy Cost
Hiroyuki Amano, Keita Tokumitsu | Central Research Institute of Electric Power Industry
Kenichi Kawabe | Tokyo Institute of Technology

ID 235 | Fast Frequency Response Provision from Large-Scale Hydrogen Electrolyzers Considering Stack Voltage-Current Nonlinearity
Antonella Maria De Corato, Mehdi Ghazavi Dozein, Pierluigi Mancarella | The University of Melbourne

ID 262 | Estimation of Time-varying Frequency and its Rate of Change in Low-inertia Power Systems
Peng Li, Aiguo Wu | Automation at Harbin Institute of Technology, Shenzhen
Fei Teng, Zhongda Chu | Imperial College London
Boli Chen | University College London

08:30 – 10:00 | Room El Greco
TS27 Active distribution networks II
CHAIR
Francisco Echavarren, IIT, Comillas University

ID 10 | Probabilistic Stability Assessment for Active Distribution Grids
Johannis Porst | Friedrich-Alexander University Erlangen-Nürnberg - Institute of Electrical Energy Systems
Marcel Sarstedt | Leibniz University Hannover - Institute of Electric Power Systems
Frank Hellmann, Paul Schultz | Potsdam Institute for Climate Impact Research - RD4
Lia Strenge | Technical University of Berlin - Control Systems Group
Sebastian Liemann | Technical University of Dortmund - ie3
Holm Hinners | University of Bremen - Institute of Automation

ID 22 | A Common Information Model Integration in a Graph Database for LV Terminal Distribution Networks with PLC-based Smart Meters
José Manuel Carou, Lucia Suárez-Ramón | ERedes Electrical Distribution, EDP Group
Adrian Miranda | Plexigrid
Pablo Arboleya | University of Oviedo

ID 60 | Validation and Flexibility Region of the Model Order Reduction of an Active Distribution Grid
Holm Hinners, Johanna Myrzik | Universität Bremen

ID 86 | Emergency support of transmission voltages by active distribution networks: a non-intrusive scheme
Luis David Pabon Ospina | Fraunhofer IEE
Thierry Van Cutsem | University of Liege

ID 101 | Self-learning Control for Active Network Management
Adrià Junyent Ferre, Timothy Green, Julio Pérez Olvera | Imperial College
## Detailed Program

**Wednesday, June 30th**

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<td><strong>TS28 Microgrids</strong>&lt;br&gt;&lt;br&gt;<strong>CHAIR</strong>&lt;br&gt;José Luis Rodríguez Amenedo, Carlos III University of Madrid</td>
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<td>Room Goya</td>
<td><strong>EP03 Implementation of wide-area protection, Automation and Control System applied to crossborder transmission</strong>&lt;br&gt;SPEAKERS&lt;br&gt;Anastasis Tzoumpas</td>
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<td>10:30 – 12:00</td>
<td>Room Picasso</td>
<td><strong>SS04 Stability of systems with penetration of renewable</strong>&lt;br&gt;<strong>CHAIR</strong>&lt;br&gt;Luis Rouco, IIT, Comillas University&lt;br&gt;<strong>Voltage Stability Support Offered by Distributed Resources</strong>&lt;br&gt;Costas Vournas</td>
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**10:00 – 10:30 Coffee**
DETAILED PROGRAM

WEDNESDAY, JUNE 30TH

10:30 – 12:00 | Room Velázquez
TS29 Power system protection

CHAIR
Alberto Berizzi, Politecnico di Milano

ID 248 | Load Encroachment in the Presence of Single-Phase Autoreclosure and Bulk Power Transmission
Jakob Schindler, Jonas Prommetta, Johann Jäger | Friedrich-Alexander University Erlangen-Nürnberg (FAU)
Christian Romeis | Siemens AG
Timo Keil | TransnetBW GmbH

ID 289 | Zone I Distance Relaying Scheme of Lines Connected to MMC-HVDC Stations During Asymmetrical Faults: Problems, Challenges and Solutions
Wulin Li, Yaotong Huo, Yingyu Liang | China University of Mining and Technology

ID 311 | Modeling of steady state fault current contribution of inverter-connected generation in PSS/e
Luis Rouco, Javier Renedo, Lukas Sigrist, Francisco Pérez Thoden, Francisco Miguel Echavarren | Universidad Pontificia Comillas

ID 379 | Fiber Optic Current Transformers for Transformer Differential Protection during Inrush Current: a Field Study
Maxim Yanin, Ruslan Kanafeev | JSC PROFOTECH
Nikolay Ivanov, Janusz Bialek, Petr Vorobiev | Skolkovo Institute of Science and Technology

ID 515 | Hardware-in-the-Loop Testing of an Intelligent Electronic Device for Innovative UFLS Protection
Janez Zakonjsek | Relarte Ltd.
Eduard Kushnikov | Relematika Ltd.
Rafael Mihalic, Rajne Ilievska, Urban Rudez | University of Ljubljana, Faculty of Electrical Engineering

10:30 – 12:00 | Room El Greco
TS30 OPF in distribution networks

CHAIR
Javier Contreras, University of Castilla - La Mancha

ID 52 | Differentially Private Optimal Power Flow for Distribution Grids
Pascal Van Hentenryck | Georgia Institute of Technology
Ferdinando Fioretto | Syracuse University, Syracuse
Vladimir Dvorkin, Pierre Pinson, Jalal Kazempour | Technical University of Denmark

ID 201 | Robust voltage regulation for active distribution networks with imperfect observability
Florian Steinke, Edwin Camilo Mora Gil | Technical University of Darmstadt

ID 227 | Distributed Optimal Power Flow with Data Driven Sensitivity Computation
Lisette Cupelli | Rolls Royce Power Systems
Ferdinanda Ponci, Antonello Monti | RWTH Aachen University
Debopama Sensarma | TU Dortmund

ID 288 | Residential PV Settings for MV-LV Networks: A Distributed Three-Phase AC OPF
Luis F. Ochoa, Arthur Gonçalves Givisiez, Michael Z. Liu | The University of Melbourne

ID 330 | Enhanced Wasserstein Distributionally Robust OPF With Dependence Structure and Support Information
Jalal Kazempour | Technical University of Denmark
Adriano Arrigo, François Vallée, Jean-François Toubeau, Zacharie De Grève | University of Mons
DETAILED PROGRAM

WEDNESDAY, JUNE 30TH

10:30 – 12:00 | Room Sorolla

TS31 Peer to peer and local markets

CHAIR
Manuel Matos, FEUP & INESCTEC

ID 181 | Techno-Economic Assessment of PV-Coupled Battery Energy Storage Systems with Different Sizing Methodologies
Christian Bauer, Tom Terlouw | Paul Scherrer Institut
Tarek AlSkaf | Wageningen University and Research

ID 286 | Key Drivers and Future Scenarios of Local Energy and Flexibility Markets
Anh Tuan Le, Ola Carlson, Mohammad Ali Fotouhi Ghazvini, David Steen, Nima Mirzaei Alavijeh | Chalmers University of Technology

ID 327 | The State of the Art in Local Energy Markets: a Comparative Review
Sjoerd Doumen, Koen Kok, Phuong Nguyen | Eindhoven University of Technology

ID 355 | Local Flexibility Mechanisms for Electricity Distribution Through Regulatory Sandboxes: International Review and a Proposal for Spain
Tomás Gómez San Roman, Mauricio Correa, Rafael Cossent | Institute for Research in Technology, Comillas Pontifical University

ID 356 | Fractional Hedonic Coalition Formation Game for Peer to Peer Energy Trading in a Microgrid
John G. Breslin, Maeve Duffy, Sweta Malik, Subhasish Thakur | National University of Ireland, Galway

12:00 – 13:30 Lunch

13:30 – 15:00 | Room Aula Magna

PL02 Power System Models for Real Life Problems

CHAIRS
Javier García-González, IIT, Comillas University
Sonja Wogrin, IIT, Comillas University

Mathematical and computational challenges for the continental-wide planning of the European energy transition
Arnaud Renaud | Artylys

Stochastic optimization, data analytics and high-performance computing applied to energy problems
Luiz Augusto Barroso | PSR

Managing demand side flexibility in the long-term and short-term
Asgeir Tomasgard | Norwegian University of Science and technology (NTNU); Norwegian Centre for Energy Transition Strategies (FME NTRANS)

IIT developing models in its late thirties
Andrés Ramos | IIT, Comillas University

Pragmatic approaches in the long-term modelling
Alejandro López Aguayo | Iberdrola

Supported by
DETAILED PROGRAM

WEDNESDAY, JUNE 30TH

15:00 – 15:30 | Announcement 2023 PowerTech venue | Room Aula Magna

15:30 – 17:00 | Room Goya
SS02 Integrated distributed networks

CHAIR
Misha Chertkov, University of Arizona; Skoltech

Role and potential of energy communities in the decarbonisation of the European energy system
Hans Auer | TU-Wien

A Hierarchical Approach to Multienergy Demand Response: From Electricity to Multienergy Applications
Misha Chertkov | University of Arizona, Tucson and Skoltech, Moscow

Flexibility in multi-energy systems
Gianfranco Chicco | Politecnico di Torino

Flexibility and grid services from hydrogen-based distributed multi-energy systems
Pierluigi Mancarella | Univ of Melbourne and Manchester

Technical Strategies and Open Source Analytics to Support Planning, Design, and Optimization of Multi-Energy Systems in Communities and Districts
Ben Polly | NREL

Multienergy Networks Analytics: Standardized Modeling, Optimization, and Low Carbon Analysis
Ning Zhang | Tsinghua University

15:30 – 17:00 | Room Picasso
SS07 Digitalization Technologies

CHAIR
Miguel Ángel Sánchez Fornie, IIT, Comillas University

Analytics for Supporting High Resolution Distribution Network Observability.
Bruce Stephen | University of Strathclyde, UK

Broadband Power Line Communications in the Smart Grids deployments.
Markus Hofsaess | EoN, Germany

Digitalising distribution grids: Smart meter data analytics.
Mónica Aragüés | Technical University of Catalonia, Spain

Edge computing use as a way to distribute processing and telecommunications requirements for digitalizing power networks.
Iker Urrutia | IBERDROLA, Spain

Cybersecuring legacy power control systems.
Marteen Hoove | ENCS, The Netherlands

5G for energy grids: more than just fast connection
Antonello Monti | RWTH Aachen, Germany
DETAILED PROGRAM

WEDNESDAY, JUNE 30TH

15:30 – 17:00 | Room Velázquez

TS32 New technologies in power industry II

**CHAIR**

George Cristian Lazaroiu, University Politehnica of Bucharest

**ID 71 | Design and Testing of an Arc Resistant Power Transformer Tank**

Samuel Brodeur I Hitachi ABB Power Grids
Jean-Bernard Dastous I Hydro-Québec

**ID 189 | Towards Imposing Load Shedding Hierarchies based on Tokenised Self Assessed Licenses**

Paul Cuffe, Almero de Villiers I University College Dublin

**ID 264 | Application of Robust Receding Horizon controller for Real-Time Energy Management of Reconfigurable Islanded Microgrids**

Saman Nikkhah, Damian Giacouris, Sara Walker, Janusz Bialek, Adib Allahham I Newcastle University

**ID 266 | Using Dueling Double Q-learning for Voltage Regulation in PV-Rich Distribution Networks**

Rafael Augusto de Godoy Rosolen I CPFL Energia
Luis F. Ochoa, Tansu Alpcan I The University of Melbourne
Guiherme Custodio, Fernanda C. L. Trindade I University of Campinas

**ID 522 | Energy-Efficient Optimal Water Flow Considering Pump Efficiency**

Ahmad Taha, Shen Wang, Nikolaos Gatsis, Marcio Giacomoni, Krishna Sandeep Ayyagari I The University of Texas at San Antonio

15:30 – 17:00 | Room El Greco

TS33 Electromagnetic transients

**CHAIR**

Sonja Monica Berlijn, KTH

**ID 85 | A Computationally Improved Heuristic Algorithm for Transmission Switching Using Line Flow Thresholds for Load Shed Reduction**

S M Shafiul Alam I Idaho National Laboratory
Siddharth Suryanarayanan, Tanveer Hussain, Timothy Hansen I South Dakota State University

**ID 185 | Optimal Voltage Sag Mitigation Solution Provision using Customers Approximate Marginal Willingness-to-Pay Function**

Vedanta Pradhan, Shrikrishna A. Khaparde I Indian Institute of Technology Bombay
Sarath Perera, Ashish P. Agalgaonkar I University of Wollongong
Subir Majumder I Washington State University

**ID 212 | Generalized Formulation of Earth-Return Impedance/Admittance and Surge Analysis on Underground Cables**

Jean Mahseredjian, Ilhan Kocar, Akihiro Ametani, Haoyan Xue I Polytechnique Montreal

**ID 213 | Very Fast Transients in a 500 kV Gas-Insulated Substation**

Akihiro Ametani, Haoyan Xue I Polytechnique Montreal

**ID 214 | A Study on External Electromagnetic Characteristics of Underground Cables with Consideration of Terminations**

Kazuo Yamamoto I Chubu University
Akihiro Ametani, Haoyan Xue I Polytechnique Montreal
DETAILED PROGRAM

WEDNESDAY, JUNE 30TH

15:30 – 17:00 | Room Sorolla
TS34 Power quality & control

CHAIR
Costas Vournas, National Technical University of Athens

ID 28 | Control of Offshore Wind Turbines Connected to Diode-Rectifier-Based HVdc Systems
Oscar Saborio-Romano, Paul E. Sørensen, Nicolaos A. Cutululis | DTU, Wind Energy Department
Ali Bidafar | Ørsted

ID 178 | Real-Time Processing and Quality Improvement of Synchrophasor Data
Mario Paolone | École Polytechnique Fédérale de Lausanne
Jean Mahseredjian, Houshang Karimi, Reza Pourramezan | Polytechnique Montreal

ID 244 | Simplified Algorithm for BFOR and Tower Grounding Performances in High Voltage Lines Engineering
Jensen Mahavile | Rural Energy Agency
Stefano Galantino, Pasquale Cannizzo | Studio Ing. G. Pietrangeli S.r.l.
Rosamystica Luteganya | TANESCO

ID 351 | A new hybrid signal analysis method for the evaluation of power quality disturbances
Mauricio Sanabria-Villamizar, Fabian Salazar-Caceres | Universidad de La Salle
Maximiliano Bueno-López | Universidad del Cauca

ID 476 | Modeling of Sensor Faults in Power Electronics Inverters and Impact Assessment on Power Quality
Lenos Hadjidemetriou, Panayiotis M. Papadopoulos, Faizan Mehmood, Marios M. Polycarpou | KIOS Research and Innovation Center of Excellence, Department of Electrical and Computer Engineering, University of Cyprus, Nicosia, Cyprus

17:00 – 18:30 | Room Goya
PS11 Network regulation for decarbonization

CHAIR
Michel Rivier, IIT, Comillas University

ID 152 | Comparative Analysis of Self-Consumption and Energy Communities Regulation in the Iberian Peninsula
José Villar, João Mello, Rogério Rocha | INESC TEC
João T. Saraiva | INESC TEC/ FEUP

ID 292 | Research and Innovation Supporting Energy Transition: Challenges for Wider Participation of Lagging Countries
Venizelos Efthymiou, Christina Papadimitriou | FOSS Research Centre for Sustainable Energy
Irina Antoskova, Anna Mutule | Institute of Physical Energetics
Andrei Morch | SINTEF Energy Research

ID 348 | Optimal Scheduling of Microgrid-Based Virtual Power Plants Considering Demand Response and Capacity Withholding Opportunities
João P. S. Catalão | FEUP and INESC TEC

ID 391 | A Distributionally Robust Framework for Providing Passive Balancing Services
Zacharie De Greve, François Vallée, Jean-François Toubeau, Adriano Arrigo, Jérémie Bottieau | Power Systems & Markets Research Group, University of Mons

ID 443 | A method for optimal integration of energy storage in distribution networks: a business case
Filipe Soares | INESC TEC
Diego Piserà, Federico Silvestro | UNIGE

ID 453 | Characterization of Bidding Zone Robustness under Medium and Long-Term System Evolution Scenarios
Cyril Gisbert | EDF R&D - EFESE
Marc Petit, Martin Hennebel, Thomas Brouhard | Laboratoire de Génie Électrique et Électronique de Paris - Université Paris-Saclay
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<td>Rafael Cossent, IIT, Comillas University</td>
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<td>A Co-simulation Framework for the Provision of Support Services by Smart Residential Users in LV Distribution Systems</td>
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<td>Potential and Barriers to the Evolution of Rooftop Solar in Central VietNam</td>
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<td>Hong Lam Le, Van Minh Ky Hoang, The University of Danang, University of Science and Technology</td>
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<td>Biogas Plant Operation under Distribution Locational Marginal Prices</td>
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<td>Kimsrorn Khon, Vannak Vai, Bun Long, Electrical and Energy Engineering Department, Institute of Technology of Cambodia</td>
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<td>Efficient Assessment of Electricity Distribution Network Adequacy with the Cross-Entropy Method</td>
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WEDNESDAY, JUNE 30TH

17:00 – 18:30 | Room Velázquez
PS13 Transmission planning and operation

CHAIR
José Pablo Chaves, IIT, Comillas University

ID 256 | Integrated Techno-Economic Assessment of Large-Scale Green Hydrogen Production
Pierluigi Mancarella, Guanchi Liu | The University of Melbourne

ID 320 | Exploring grid topology reconfiguration using a simple deep reinforcement learning approach
Simon Tindemans, Medha Subramanian | Delft University of Technology
Benjamin Donnot, Antoine Marot | RTE
Jan Viebahn | TenneT TSO B.V.

ID 397 | Priority Lists for Power System Investments: Locating Phasor Measurement Units
David Pozo | Skolkovo Institute of Science and Technology
Ilgiz Murzakhanov | Technical University of Denmark

ID 403 | Designing modern heuristic algorithms to solve the Transmission Expansion Planning problem
Abraham Duarte, Phillipe Gomes, José Colmenar | Universidad Rey Juan Carlos
João Saraiva | Universidade do Porto

Dirk Van Hertem, Hakan Ergun, Stephen Hardy | KU Leuven

ID 494 | An Optimal Scenario Reduction Method for Stochastic Power System Problems
David Pozo, Alvaro González-Castellanos | Skolkovo Institute of Science and Technology

ID 553 | Assessment of transmission network development with HV operation islands under renewable diffusion
Giuseppe Forte | Politecnico di Bari
Alfonso De Cesare, Benedetto Aluisio, Corrado Gadaleta | Terna S.p.A., Italian Transmission System Operator
Stefano Lauria, Michela Migliori | “Sapienza”, University of Rome
DETAILED PROGRAM
WEDNESDAY, JUNE 30TH

17:00 – 18:30 | Room El Greco
PS14 Simulation and control II

CHAIR
Aurelio García-Cerrada, IIT, Comillas University

ID 164 | An Open-Source Average HVDC Model for Stability Studies
Marianne Saugier, Adrien Guironnet, Quentin Cossart | RTE Réseau de Transport d’Electricité

ID 186 | Lab-Scaled DEMO possibilities for testing WAMPAC solutions before field implementation
Miguel Ángel Olivan Monge, Eduardo Martínez Carrasco, Aníbal Prada Hurtado, María Teresa Villén Martínez | Fundación CIRCE
Christos Dikaïakos | Independent Power Transmission Operator (IPTO)
Yusuf Zafer Korkmaz | Schweitzer Engineering Laboratories

ID 307 | Indian Power System Operations during NCOVID-19 Pandemic
Subrata Mukhopadhyay | Netaji Subhas University of Technology (NSUT)
Aman Gautam, Mohit Kumar Gupta, Rajiv Kumar Porwal, Baba KVS, Narasimhan S, Rahul Shukla, Sushil Soonee, S S Barapanda, Debasis De | POSOCO

ID 317 | Optimal CAM Computation of Kaplan Turbines Accounting for Wear and Tear Originated by Frequency Control
Rachid Cherkaoui, Elena Vagnoni, Francesco Gerini, Mario Paolone | EPFL

ID 332 | Framework to Evaluate Power Portfolio Dispatch Considering Balancing Market Participation
Pedro Vergara | Delft University of Technology
Wouter Schoot | DNV-GL
Alejandro Vas-Corrales, Phuong Nguyen | Eindhoven University of Technology
Lennart Söder | KTH Royal Institute of Technology

ID 422 | An Open Source Power System Simulator in Python for Efficient Prototyping of WAMPAC Applications
Hallvar Haugdal, Kjetil Uhlen | Norwegian University of Science and Technology (NTNU)
Hjörður Jóhannsson | Technical University of Denmark (DTU)

ID 495 | Confidence Bound Assessment of the Dutch EHV/HV Grid Model Focusing on Voltage Dip Studies
Sjef Cobben, Roozbeh Torkzadeh, Vladimir Cuk | Eindhoven University of Technology
Jeroen van Waes | TenneT TSO BV

ID 500 | Dynamic rating of the wind farm transformer from the power system’s perspective
Rikard Karlsson, I Ellevio AB
Patrik Hilber, Kateryna Morozovska | KTH Royal Institute of Technology

ID 529 | Risk-based preventive-corrective security constrained optimal power flow for ac/dc grid
Dirk Van Hertem, Vaishally Bhardwaj, Hakan Ergun | KU Leuven

ID 532 | Reduced Grid Representation through Proper Orthogonal Decomposition
Arnaud Robert, Dirk Van Hertem | KU Leuven
DETAILED PROGRAM

WEDNESDAY, JUNE 30TH

17:00 – 18:30 | Room Sorolla

**PS15 Estimation**

**CHAIR**
Lukas Sigrist, IIT, Comillas University

**ID 32** | *Trust in Power System State Variables based on Trust in Measurements*
Michael Brand, Davood Babazadeh, Sebastian Lehnhoff | OFFIS - Institute for Information Technology

**ID 91** | *Methodology for Power Quality Monitors Allocation Considering Network Topology Changes*
André Luís da Silva Pessoa, Paulo Estevão Teixeira Martins, Mário Oleskovicz | University of São Paulo

**ID 115** | *Smart charging effects on Electric Vehicle charging behavior in terms of Power Quality*
Ludovic Bertin, Kevin Lorenzo | EDF R&D
Karima Boukir | Enedis

**ID 154** | *Non-Intrusive Load Monitoring using Multi-Output CNNs*
David Gómez-Ullate, Daniel Precioso | University of Cádiz

**ID 210** | *Optimization-Based Estimation of Microgrid Equivalent Parameters for Voltage and Frequency Dynamics*
Raymond H. Byrne, Ujjwol Tamrakar | Sandia National Laboratories
Reinaldo Tonkoski, Niranjan Bhujel, Timothy M. Hansen | South Dakota State University

**ID 279** | *Performance Assessment of State Estimation in Cyber-Physical Energy Systems*
Davood Babazadeh | Hamburg University of Technology
Anand Narayan, Sebastian Lehnhoff, Batoul Hage Hassan | OFFIS - Institute for Information Technology
Marcel Klaes | TU Dortmund University

**ID 381** | *Sparse and Orthogonal Method for Fast Bad Data Processing in Distribution System State Estimation*
Renato de Oliveira | Furnas Centrais Elétricas S.A.
Julio Massignan, Gustavo Hebling, João | London Jr. | University of Sao Paulo

**ID 382** | *Assessment of Flicker in a Low Voltage Residential Network*
Pablo Rodríguez-Pajarón, Celia Monja, Araceli Hernández | Escuela Técnica Superior de Ingenieros Industriales (Universidad Politécnica de Madrid)

**ID 484** | *Big Data Analytics for Electricity Theft Detection in Smart Grids*
Nadeem Javaid | Comsats University Islamabad
Kelum Gamage | Glasgow University
Inam Ullah Khan, C. James Taylor, Xiandong Ma | Lancaster University, Lancashire UK
DETAILED PROGRAM

THURSDAY, JULY 01ST

08:30 – 10:30 | Room Goya
TS35 HVDC Technology II

CHAIR
Marco Liserre, KTH

ID 145 | Primary Frequency Regulation using HVDC terminals controlling Voltage Dependent Loads
Matthias Biskoping | ABB Research Center Ladenburg, ABB AG
Giovanni De Carne | Karlsruhe Institute of Technology
Marius Langwasser, Marco Liserre | Kiel University

ID 296 | A novel distributed supplementary control of Multi-Terminal VSC-HVDC grids for rotor angle stability enhancement of AC/DC systems
Valentin Costan | EDF Lab Paris-Saclay
Gilney Damm, Françoise Lannabhi-Lagarrigue | Laboratoire des signaux et systèmes (L2S), Paris-Saclay University
Juan Carlos González-Torres, Abdelkrim Benchab | SuperGrid Institute

ID 342 | Impact on power system transient stability of AC-line-emulation controllers of VSC-HVDC links
Luis Rouco, Lukas Sigrist, Aurelio García-Cerrada, Javier Renedo | Instituto de Investigación Tecnológica (IIT), ETSI ICAI, Universidad Pontificia Comillas

ID 416 | Transient active power control of HVDC links through impedance-based voltage angle comparison
Matthias Luther, Alexander Raab, Johannis Porst, David Riebesel, Friedrich-Alexander University Erlangen-Nuremberg (FAU)
Chris Heyde, Rainer Krebs | Siemens AG

ID 496 | Demonstration of Multi-vendor Protection Systems for Multiterminal VSC-HVDC Networks
Ilka Jahn | KTH Royal Institute of Technology
Mian Wang, Geraint Chaffey, Dirk Van Hertern | KU Leuven / EnergyVille
Keisuke Ishitada, Frederick Page, Mitsubishi Electric
Linash Kunjumuhammed, Mitsubishi Electric Europe

Ian Cowan, Md Habibur Rahman, Bharath Ponnalagan, The National HVDC Centre (part of SHE Transmission)

08:30 – 10:30 | Room Picasso
TS36 Characterization and management of flexibility provision

CHAIR
Anthony Papavasiliou, UCLouvain, Applied Mathematics

ID 146 | Congestion Management Using Aggregated Flexibility at the TSO-DSO Interface
Sharon Müller, Krzysztof Rudion | University of Stuttgart
Daniel Contreras | Universität Stuttgart

ID 170 | Characterizing the Flexibility Provision Capability Area of Active Distribution Networks: A Linear Robust Optimization Method
Rachid Cherkaoui, Mohsen Kalantar-Neyestanaki | EPFL

ID 333 | Flexibility Evaluation of Domestic Electric Water Heater Aggregates
Lorenzo Croci, Diego Cirio | Ricerca sul Sistema Energetico – RSE S.p.A.
Bruno Gabriele, Francesco Conte, Federico Silvestro, Stefano Massucco | Università degli studi di Genova

ID 435 | Ambient Temperature Impact on the Aggregated Demand Response Flexibility in Microgrids
Maximiliano Bueno López | Department of Electronics, Instrumentation and Control, Universidad del Cauca
Federico Martín Ibañez, David Pozo Camara, María Victoria Gasca Segura | Skolkovo Institute of Science and Technology

ID 452 | Design of a Continuous Local Flexibility Market with Network Constraints
Spyros Chatzivasileiadis, Jalal Kazempour, Lars Herre, Eléa Prat | Technical University of Denmark
JUNE 28TH - JULY 2ND, 2021
POWER FOR SUSTAINABLE DEVELOPMENT GOALS
GOES VIRTUAL

DETAILED PROGRAM
THURSDAY, JULY 01ST

08:00 – 10:00 | Room Velázquez
TS37 Active distribution networks III
CHAIR
Anastasios Bakirtzis, Aristotle University of Thessaloniki

ID 97 | Probabilistic Dynamic Model of Active Distribution Networks Using Gaussian Processes
Hendrik Lens, Georgios Mitrentsis | University of Stuttgart

ID 136 | Detection and Mitigation of Extreme Losses in Distribution Networks
José Pedro Paulos | INESC TEC
José Nuno Fidalgo, João Tomé Saraiva | INESC TEC and DEEC/FEUP

ID 258 | Asynchronous algorithm of an endogenous peer-to-peer electricity market
Hamid Ben Ahmed, Thomas Baroche, Roman Le Goff Latimier, Alyssia Dong | ENS Rennes

ID 437 | Overview of key indicators for the categorisation and characterisation of distribution grids
Ekaterina Kuznetsova, Christian Rehtanz, Dzanan Sarajlic | TU Dortmund University

08:00 – 10:00 | Room El Greco
TS38 Smart meters & sensors
CHAIR
Mario Paolone, Swiss Federal Institute of Technology of Lausanne

ID 23 | Hybrid European MV–LV Network Models for Smart Distribution Network Modelling
Matthew Deakin, David Greenwood, Sara Walker | Newcastle University
Phil Taylor | University of Bristol

ID 340 | Advanced Metering Infrastructure for Smart Grid Real-Time Energy Management Using Mesh Networks Based on IEEE802.15.4 and 6LoWPAN
Matthew Deakin, David Greenwood, Sara Walker | Newcastle University
Phil Taylor | University of Bristol

ID 447 | A novel methodology to determine the new functionalities needed in the next generation of smart meters
Íñigo Larumbe Cabanas | i-DE (Iberdrola Group)
Gregorio López López | Institute for Research in Technology ICAI, Comillas Pontifical University
Juan Diego Monterroso Ruiz | Universidad Pontificia Comillas

ID 474 | Performance Evaluation of Intelligent Electronic Devices under Stressed Conditions
Salvatore D’Arco, Santiago Sánchez-Acevedo | Sintef Energi
Rannveig S.J. Løken, Nargis Hurzuk | Statnett

ID 512 | Optimal Placement of Data Concentrators and Repeaters in PLC-enabled Smart Grids
António Grilo | INESC-ID
Abdelali Chaoub, Ahmed Tamtaoui | INPT
Souhaima Stiri | INPT/MASCIR
Brahim Lakssir, Rachid Bennani | MASCIR
DETAILED PROGRAM

THURSDAY, JULY 01ST

08:00 – 10:00 | Room Sorolla
TS39 Planning

CHAIR
Julio Usaola, Carlos III University of Madrid

ID 147 | Open Nodal Power Flow Model of the Nordic Power System
Iasonas Kouveliotis Lysikatos, Aravind S Kumar, Manuel Marin, Lennart Söder, Elis Nylander, Mikael Amelin KTH - Royal Institute of Technology
Jon Olauson Svenska Krafträtet

ID 228 | Estimation of the Global Amount of Mandatory Investments for Distribution Network Expansion Planning
Pedro Miguel Macedo INESC TEC
José Nuno Fidalgo, João Tomé Saraiva INESC TEC and FEUP

ID 261 | Reduction of the Computational Burden of the TEP Problem by a Minimum-Effort Heuristic Algorithm
Philippe Vilaça Gomes Depart. of Computer Science, Rey Juan Carlos University
João Tomé Saraiva, Luiz Eduardo de Oliveira Fac. Eng. Universidade do Porto & INESC TEC
Isabela Miranda de Mendonça Federal Institute of Southeast Minas Gerais, Technology Department
Augusto Cesar Laviola de Oliveira, Camile Aredes Moraes Federal University of Viçosa, Department of Agricultural

ID 287 | Electricity Cost of Green Hydrogen Generation in the Iberian Electricity Market
André Oliveira, José Collado, João Saraiva INESC TEC – Institute for Systems and Computer Engineering, Technology and Science
Alberto Campos, Salvador Domènech Institute for Research in Technology, Technical School of Engineering, Comillas Pontifical University, c/ Santa Cruz de Marcenado

10:00 – 10:30 | Coffee

10:30 – 12:00 | Room Goya
SS05 Challenges and solutions for islands with large-scale integration of renewables

CHAIR
João Peças Lopes, INESC TEC, Porto Porto University (FEUP)

Planning and operation of island power systems with 100% of renewable generation.
Specific grid codes for safe integration of renewable power sources in islands.
João A. Peças Lopes INESC TEC, Porto University (FEUP)

Robust energy management for island systems with high renewable penetration
Nikos D. Hatziargyriou National Technical University of Athens

Transforming small island power systems-Case studies
Gayathri Nair International Renewable Energy Agency (IRENA)

Operational experience with energy storage systems in island power system to improve stability of small island power systems
Alberto Barrado Endesa

System protection in island power systems with high renewable penetration
Lucas Sigrist I IIT, Comillas University
DETAILED PROGRAM
THURSDAY, JULY 01ST

10:30 – 12:00 | Room Picasso
SS06 Big Data and Machine Learning for Power Systems
CHAIR
Ricardo Bessa, INESC TEC

Collaborative and market-based analytics within power and energy systems
Pierre Pinson | Technical University of Denmark, DTU
(Dept. of Technology, Management and Economics)

Reinforcement learning for interacting with energy markets
Damien Ernst, University of Liège

Towards an AI assistant for the human grid operator
Antoine Marot | RTE

Interpretability and verification of neural networks: Removing barriers for power system applications
Spyros Chatzivasileiadis | Technical University of Denmark, DTU

Monitoring electric grids from space using AI
Reza Arghandehe | Western Norway University of Applied Sciences

10:30 – 12:00 | Room Velázquez
TS40 Optimal power flow II
CHAIR
Gabriela Hug, ETH Zurich

ID 233 | Optimal Reactive Power Control of Smart Inverters: Vestfold and Telemark Regional Network
José Luis Rueda | TU Delft
Manuel Andrade | Universidad Autónoma de Nuevo León
Francisco González-Longatt, Martha Nohemi Acosta Montalvo | University of South-Eastern Norway

ID 312 | Optimal Positioning and Sizing of Power Flow Controllers Using a Scenario Based SCOPF Approach
Sven Christian Müller | logarithmo GmbH & Co. KG
Oliver Pohl, Stefan Dalhues, Thomas Schwierz, Bastian Lüttecken | TU Dortmund University

ID 321 | Affinely Adjustable Robust Volt/Var Control for Distribution Systems with High PV Penetration
Sylvie Thiebaux, Paul Scott, Ahmad Attarha, Seyyed Mahdi Noori Rahim Abadi | The Australian National University

ID 498 | Empirical Analysis of the Optimal Capacity Investment Solutions in Distribution Grids
Álvaro González-Castellanos, Luis López, David Pozo | Skolkovo Institute of Science and Technology
# Detailed Program

**Thursday, July 1st**

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<td>El Greco</td>
<td><strong>TS41 Power system dynamics and protection</strong></td>
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<td>10:30 – 12:00</td>
<td>Sorolla</td>
<td><strong>TS42 Forecasting</strong></td>
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THURSDAY, JULY 01st

12:00 – 13:30 | Lunch

13:30 – 15:00 | Room Aula Magna
PL03 Successful publishing in Power Journals

CHAIR
Luis Rouco, IIT, Comillas University

SPEAKERS
Nikos Hatziargyriou I National Technical University of Athens; Editor in Chief of IEEE Transactions on Power Systems
Christian Rehtanz I TU Dortmund University; Editor in-Chief of IET Generation, Transmission and Distribution
Carlo Alberto Nucci I University of Bologna; Editor in-Chief of the Electric Power Systems Research
Vladimir Terzija I Skolkovo Institute of Science and Technology (Skoltech); Editor in Chief of the International Journal of Electrical Power and Energy Systems
Gianfranco Chicco I Politecnico di Torino; Editor-in-Chief of Sustainable Energy Grids and Networks

15:00 – 15:30 | Tea

15:30 – 17:00 | Room Goya
SS09 Storage for Power Systems

CHAIR
Raúl Rodríguez, TECNALIA

Main applications of storage in future networks
Bo Normark I EIT Innoenergy
Opportunities and barriers for storage in EU in the next years
Jacopo Tosoni I EASE (European Association for the Storage of Energy)
Impact of energy storage on electricity markets
Ricardo Pastor I R&D Nester
Storage as a key enabler for fully decarbonized systems
Elena Agudo I Repsol

Supported by: REPSOL
15:30 – 17:00 | Room Picasso

TS43 Active distribution networks IV

CHAIR
Nicolaos Cutululis, DTU Wind Energy, Technical University of Denmark

ID 56 | Prosumer-centric P2P energy market under network constraints with TDF’s penalization
Bruno Dias, Pedro Peters, Daniel Botelho, Camile Moraes, Leonardo de Oliveira | Federal University of Juiz de Fora (UFJF)
Tiago Soares | INESC Technology and Science, (INESC TEC)

ID 367 | Assessing electricity tariffs’ costs allocation in Saudi Arabia: upcoming challenges for a needed redesign
Pablo Dueñas, Carlos Battle | Massachusetts Institute of Technology
Ahmad Alabdulkareem, Abdullah Alfadda, Bader Alaskar, Abdullah Alhadlaq | The Center for Complex Engineering Systems at KACST and MIT

ID 370 | An MPEC Model for the Optimal Operation of Unbalanced Three-phase Distribution Systems
Marcos Julio Rider | State University of Campinas
Nataly Bañol Arias, Juan Camilo López | State University of campinas (UNICAMP)

ID 513 | Blockchain Based Service Restoration in a Power Distribution System During Crisis
Ishfaq Ahmad, Saifullah Khalid | University of Texas at Arlington

ID 523 | Distributed Optimal Reactive Power Control in Islanded Microgrids with Voltage-Source Inverters
Greg Zweigle | Schweitzer Engineering Laboratories
Andrew Cannon, Anamika Dubey | Washington State University
DETAILED PROGRAM

THURSDAY, JULY 01ST

15:30 – 17:00 | Room Velázquez
TS44 Reliability

CHAIR
Federico Silvestro, Universita` di Genova

ID 40 | A Probabilistic and Cost-based Decision Strategy for Power Grid Resilience using Ensemble Forecasting
Matthias Noebels, The University of Manchester
Mathaios Panteli, University of Cyprus

ID 216 | Theoretical and NEC Calculations of Electromagnetic Fields Generated from a Multi-Phase Underground Cable
Kazuo Yamamoto, Chubu University
Akihiro Ametani, Haoyan Xue, Polytechnique Montreal

ID 329 | Power System Flexibility Region Under Uncertainty With Respect to Congestion and Voltage Constraints
Florin Capitanescu, Luxembourg Institute of Science and Technology (LIST)

15:30 – 17:00 | Room El Greco
TS45 Estimation

CHAIR
Ali Abur, Northeastern University, Boston

ID 118 | Beyond Phasors: Modeling of Power System Signals Using the Hilbert Transform
Guglielmo Frigo, Asja Derviskadic, Mario Paolone, Swiss Federal Institute of Technology Lausanne

ID 207 | Iterative Linear State Estimation Using a Limited Number of PMU Measurements
Ali Abur, Ramtin Khalili, Northeastern University

ID 316 | Characterization of Real-World Power System Signals in Non-Stationary Conditions using a Dictionary Approach
Asja Derviskadic, Alexandra Karpilow, Mario Paolone, Guglielmo Frigo, EPFL

ID 479 | Physics-Informed Neural Networks for Non-linear System Identification for Power System Dynamics
Spyros Chatzivasileiadis, George Misiris, Jochen Stiasny, Technical University of Denmark

ID 542 | Enhanced Bad Data Processing for Hybrid Block-Orthogonal State Estimators
Antonio Simões Costa, Larah Ascari, Edson Zanlorensi Jr., Federal University of Santa Catarina

ID 449 | Impact Analysis of Cyber-related Failures on Power System Reliability - A Review
Konstantinos Kopsidas, Omoniyi Akinpelumi, University of Manchester

ID 470 | Distribution Network Marginal Costs: Enhanced AC OPF Including Transformer Degradation
Michael Caramanis, Panagiotis Andrianesis, Boston University

ID 539 | k-ShapeStream: Probabilistic Streaming Clustering for Electric Grid Events
Alexandra von Meier, Mohini Baryya, University of California, Berkeley
John Paparrizos, Michael Franklin, University of Chicago
THURSDAY, JULY 01ST

15:30 – 17:00 | Room Sorolla
TS46 Power system dynamics and transients I
CHAIR
Antonio Simões Costa, Federal University of Santa Catarina
ID 140 | Fault Location in Meshed and Active Power Distribution Networks
Ali Abur, Cesar Galvez I Northeastern University
ID 236 | Evaluation of Simulation Methods for Analysis of Geomagnetic Disturbance System Impacts
Aboutaleb Haddadi I Electric Power Research Institute (EPRI)
Luc Gérin-Lajoie I Hydro-Québec
Reza Hassanl, Jean Mahseredjian I Polytechnique Montreal
Afshin Rezaei-Zare I York University
ID 365 | A Hardware Implementation of an Online Frequency Dynamic Parameter Estimation
Julia Matevosyan I Electric Reliability Council of Texas
Rafael Sevilla I University of Applied Science ZHAW
Roberto Pérez, Juan Quiroz, Héctor Chávez I University of Santiago
ID 489 | Delivery of Primary Frequency Response over Weak Electrical Paths
Mobolaji Bello, Deepak Ramasubramanian, Papiya Dattaray, Vikas Singhvi, Parag Mitra I Electric Power Research Institute
ID 541 | Effects of Supraharmonic Immunity Testing on LED Lighting
Frank Sharp, Gaurav Singh I Electric Power Research Institute
Wei Yuen Teh I University of Tennessee-Knoxville

17:00 – 18:30 | Room Goya
PS16 New technologies for power systems
CHAIR
Andrés Ramos, IIT, Comillas University
ID 36 | A Blockchain Platform for the Decentralized Operation of Active Distribution Networks
Iasonas Kouveliotis Lysikatos I KTH - Royal Institute of Technology
Ilias Kappos, Nikos Hatzigiorgiou I National Technical University of Athens (NTUA)
ID 191 | Software and Communications Platform for Simulation Environment of Complex Energy System (SimCES)
Kari Systä, Antti Supponen, Ville Heikkinä, Otto Hylli, Sami Repo, Petri Kannisto, Timo Aaltonen I Tampere University
Amir Safdarian, Anna Kulmala, Antti Keski-Koukkari I VTT Technical Research Centre of Finland
ID 294 | Analyzing the Potential Production Amount of Synthetic Fuels in Germany
Maximilian Borning, Albert Moser, Julian Walter I IAEW
ID 350 | Towards Development of Equivalent Model of Hybrid Renewable Energy Source Plant for Voltage Stability Studies
Ana Radovanovic, Jovica Milanovic, Aristeidis Siafaras I the University of Manchester
ID 405 | Reliability Analysis in Low Voltage Distribution Network with Peer to Peer Energy Trading
Aydogan Ozdemir, Mahdis Delkhooni I Istanbul Technical University
Keysan Polat I Siemens

ID 424 | A New Reliability and Security Oriented Technique for Optimal DG Placement in a Practical Distribution Network
Olav Bjarte Fosso, Soumya Das I Dept. of Electric Power Engineering, Norwegian University of Science and Technology (NTNU)
Giancarlo Marafioti I Dept. of Mathematics and Cybernetics, Sintef Digital
ID 507 | Data-driven Inverse Optimization with Application to Dynamic Line Rating in Russian Power Grid
Kirill Bubenchikov, David Pozo, Álvaro González-Castellanos I Skolkovo Institute of Science and Technology
DETAILED PROGRAM

THURSDAY, JULY 01ST

17:00 – 18:30 | Room Picasso
PS17 Power system operation and markets

CHAIR
Sonja Wogrin, IIT, Comillas University

ID 2 | Linearized Large-scale Heat Pump Model for Ancillary Service Studies
Theis Bo Harild Rasmussen, Qiuwei Wu I Technical University of Denmark

ID 58 | An Analytical Method for Supply-Demand Situation Awareness of Power Systems Based on Classification of Action Levels to Balance Supply and Demand
Ryuya Tanabe I Central Research Institute of Electric Power Industry (CRIEPI)
Akihiko Yokoyama I The University of Tokyo

ID 172 | Weekly planning of hydropower in systems with large volumes and varying power generation: A literature review
Charlotta Ahlfors, Mikael Amelin I Royal Institute of Technology, KTH

ID 275 | Deterministic Hydro-power Simulation Model for Ethiopia
Mikael Amelin I Dept. of Electrical Engineering KTH Royal Institute of Technology
Getachew Bekele, Firehiwot Girma Dires I school of Electrical and Computer Engineering, Addis Ababa institute of technology

ID 390 | Kullback-Leibler Divergence-Based Distributionally Robust Unit Commitment Under Net Load Uncertainty
Fikret Sivrikaya, Ogun Yurdakul, Sahin Albayrak I Technical University of Berlin

ID 429 | A Flexible Methodology to Obtain a Feasible Thermal Operation in the Medium-Term for Multi-Area Power Systems
Antonio Bello, Javier Reneses, Luis Montero I Institute for Research in Technology (IIT), ICAI School of Engineering, Comillas Pontifical University, Madrid, Spain

Abolfazl Khodadadi, Lennart Söder I KTH Royal Institute of Technology

ID 487 | Optimal discretization of net head dependency in heterogeneous multi-reservoir hydroelectric systems
Carlos Rivero-Honegger, Fernando Mariño-Lizuain I ENDESA (Enel Group)
Ignacio Candela-Ripoll, Javier García-González, Pedro Otaola-Arca I Institute for Research in Technology (IIT) ICAI School of Engineering, Universidad Pontificia Comillas

ID 549 | Survey Results on Local Markets to Enable Societal Value
Marco Baron I Enel Global Infrastructure & Networks
Emil Hillberg, Joni Rossi I RISE Research Institutes of Sweden - Electric Power Systems Unit
José Pablo Chaves Ávila, Orlando Valarezo I Universidad Pontificia Comillas - Instituto de Investigación Tecnológica
DETAILED PROGRAM

THURSDAY, JULY 01ST

17:00 – 18:30 | Room Velázquez
PS18 Power system dynamics and transients

CHAIR
Ignacio Egido, IIT, Comillas University

ID 70 | Analysis of electromagnetic compatibility in photovoltaic installations validated by site measurements
Henrik Olsson I Elsäkerhetsverket
Andreas Theoharis I Karlstad University
Johannes Andersson I Swedish Armed Forces

ID 158 | Temperature-Based Overload Evaluation in Low-Voltage Distribution Lines Considering PVs and EVs: Model Validation and Simulations
Hideharu Sugihara I Osaka University
Tsuyoshi Funaki I Osaka University

ID 169 | Analyzing Controller and Device Interactions in Hybrid Transmission Networks with High Penetration of Renewable Energy – A Review
Robin Preece, Mike Barnes, Youhong Chen I The University of Manchester

ID 226 | Harmonic Impedance Characteristics in an Islanded Microgrid and its impact on Voltage and Current Harmonics
Ana Maria Blanco, Shrinath Kannian, Jan Meyer I TU Dresden
Camilo Garzon, Andrés Pavas I Universidad Nacional de Colombia

ID 229 | Decentralized Underfrequency Load Shedding Based on the Droop Characteristic for Microgrids
Paulo Godoy I Federal University of Itajubá
Guilherme Mota, Adriano Almeida I Western Paraná State University

ID 335 | Experimental investigation of mirror frequency currents emitted by low voltage inverters under distorted grid voltage conditions
Philipp Linnartz, Sandor Simon, Antonello Monti, Matthias Quester, Dominik Willenberg I RWTH Aachen University

ID 337 | A Review on Challenges and Solutions in Microgrid Protection
Rabindra Mohanty, Ola Carlson, Ankur Srivastava, Le Anh Tuan, David Steen, Mohammad Ali Fotouhi Ghazvini I Chalmers University of Technology

ID 357 | Large Temporary Overvoltages in MV Network due to a Series Fault in the HV Subtransmission System
Luigi D’Orazio, Alberto Cerretti I e-distribuzione S.p.A.
Marco Maccioni, Alberto Geri, Fabio Massimo Gatta, Stefano Lauria I Sapienza University of Rome

ID 454 | Power Systems Digital Twin under Measurement and Model Uncertainties: Network Parameter Tuning Approach
Davood Babazadeh I Hamburg University of Technology // OFFIS - Institute for Information Technology
Sebastian Lehnhoff, Payam Teimourzadeh Baboli, Mohammad Aldebs I OFFIS - Institute for Information Technology
Jelke Wibbeke I OFFIS - Institute for Information Technology // Jade University of Applied Science
17:00 – 18:30 | Room El Greco
PS19 Smart grids for Smart cities

CHAIR
Pablo Frías, IIT, Comillas University

ID 6 | Low-voltage network topology and impedance identification using smart meter measurements
Damien Ernst, Amina Benzerga, Daniele Maruli, Sébastien Mathieu, Antonio Sutera, Alireza Bahmanyar | University of Liège

ID 72 | TSO/DSO Coordination for Voltage Regulation on Transmission Level: A Greek Case Study
Athanasios Bachoumis, Marios Sousounis, George P Papaioannou, Christos Kaskouras | Independent Power Transmission Operator (IPTO)
Athanasios Bachoumis | University of Patras

ID 116 | Incorporation of Survey-based Data into an Aggregation Algorithm for Residential Demand Response
Abdullah Algarni, Anthony Maciejewski, Howard Siegel | Colorado State University
Siddharth Suryanarayanan | South Dakota State University

ID 200 | Predictive Control in LV Networks: A 3-Stage Approach based on Smart Sustainable Buildings
Geert Deconinck | KU Leuven
Iason-Iraklis Avramidis, Florin Capitanescu | Luxembourg Institute of Science and Technology
Vasileios Evangelopoulos, Pavlos Georgilakis | National Technical University of Athens

ID 324 | Integrated models for electrical distribution network planning and district-scale building energy use
Tomas Gomez, Carlos Mateo, Luca De Rosa | Institute for Research in Technology (IIT), School of Engineering (ICAI), Universidad Pontificia Comillas
Katherine Fleming, Ben Polly, Tarek Elgindy, Rawad El Kontar | National Renewable Energy Laboratory (NREL)

ID 394 | Evaluation of power flow models for smart distribution grids
Alexandra Varets, Elena Gryazina | Skolkovo Institute of Science and Technology

ID 472 | Procurement Cost Minimization of an Energy Community with Biogas, Photovoltaic, and Storage Units
Fabio Napolitano, Camilo Orozco, Giorgia Pulazza, Fabio Tossani, Alberto Borghetti | University of Bologna

ID 518 | Experimental Characterization of Methods for Connecting Real-Time Simulations and Synchrophasors
Daniel Baltensperger, Kjetil Uhlen | NTNU
Santiago Sánchez-Acevedo, Salvatore D’Arco | SINTEF Energy Research

ID 554 | Data Driven Update of Load Forecasts in Smart Power Systems using Fuzzy Fusion of Learning GPs
Georgios Karagiannis | Durham University
Antonio Martinez-Molina, Miltiadis Alamaniotis | The University of Texas at San Antonio
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