PRE-SESSION MEETINGS LEVEL 0

There will be a pre-session briefing meeting for each main and RIF session for the preparation of the session with the chair and rapporteurs. All those involved will be requested to attend (Chairs, rapporteurs, speakers and technical assistants).

FOR MAIN ORAL SESSIONS LEVEL 0

DAY	TIME	SESSION	ROOM
Monday 12 June	18.00	MAIN ORAL SESSION S1	ROOM N (TUTORIAL 1)
Monday 12 June	18.00	MAIN ORAL SESSION S3	ROOM O (TUTORIAL 2)
Tuesday 13 June	18.00	MAIN ORAL SESSION S2	PLENARY ROOM 1
Tuesday 13 June	18.00	MAIN ORAL SESSION S6	PLENARY ROOM 4
Wednesday 14 June	18.00	MAIN ORAL SESSION S4	PLENARY ROOM 1
Wednesday 14 June	18.00	MAIN ORAL SESSION S5	PLENARY ROOM 4

FOR RIF SESSIONS LEVEL 0

DAY	TIME	SESSION	ROOM
Tuesday 13 June	16.00	RIF SESSION S2	PLENARY ROOM 2
Wednesday 14 June	16.00	RIF SESSION S4	PLENARY ROOM 2
Wednesday 14 June	16.00	RIF SESSION S5	PLENARY ROOM 3
Thursday 15 June	16.00	RIF SESSION S1	PLENARY ROOM 2
Thursday 15 June	16.00	RIF SESSION S3	PLENARY ROOM 3

UPLOAD ROOM LEVEL 0

If you need to **update your presentation in Rome**, you can go to the **Upload Room** located on LEVEL 0 inside the conference rooms area, preferably the day before your presentation. There is no possibility of uploading your presentation in the conference rooms.

Upload Room opening hours:

Monday 12 June	15.00 – 18.00
Tuesday 13 June	08.15 – 18.00
Wednesday 14 June	08.30 – 18.00
Thursday 15 June	08.30 – 18.00

POSTER SESSIONS LEVEL 1

Poster area – Level 1 (FORUM) next to the Exhibition.
Posters should be set up between **08.30 – 09.00** the day of their presentation and removed from **18.00 – 18.30** the very same day.
Once set up, posters may be left for free viewing during the whole day.
E-posters will give permanent access to the poster files.

POSTER TOURS

Each CIRED Technical Session will organise 8 guided tours (except for Session 2 – only 4 tours). Authors are requested to be present during the poster tour hosting their presentation.

12 JUNE

TUTORIALS 9.30 – 13.45 + lunch until 15.00
*ACCESS RESERVED TO HOLDERS OF A REGISTRATION FOR TUTORIAL **1** OR **2**.*
Level 0 ❚ **TUTORIAL 1 >** ROOM N ❚ **TUTORIAL 2 >** ROOM O
Tutorials offer the attendees the opportunity to enhance their knowledge in specific areas.

OPENING FORUM 15.00 *OPEN TO ALL*
Auditorium (access from Level 1)
THE OPENING FORUM OF THIS EDITION OF CIRED WILL HOST KEYNOTE SPEECHES AS WELL AS A PANEL DEBATE ONE POWER DISTRIBUTION SYSTEMS FOSTERING SUSTAINABILITY.
Guests will then be invited to the Welcome drinks reception on the Exhibition floor Level 1 (until 20.00).

13 – 14 – 15 JUNE

ACCESS RESERVED TO REGISTERED CONFERENCE PARTICIPANTS.

MAIN SESSIONS
Level 0 ❚ PLENARY ROOMS 1 & 4
Led by experts, Chairs and Rapporteurs, the main sessions comprise presentations by a limited number of selected authors.

POSTER SESSIONS
The Poster area is located next to the Exhibition on Level 1 (FORUM)
Each author of an accepted paper will be given the possibility to display his/her work during the interactive guided poster tours of the relevant session. These poster sessions are a unique opportunity for an in-depth discussion with presenting authors.

Tuesday 13 June	Sessions ❹ & ❺
Wednesday 14 June	Sessions ❶ & ❸
Thursday 15 June	Sessions ❷ & ❻

ROUND TABLES
Level 0 ❚ PLENARY ROOMS 2 & 3
Round Tables will focus on particularly topical subjects, giving delegates the opportunity to listen to experts and participate in lively discussions.

RIF SESSIONS
Level 0 ❚ PLENARY ROOMS 2 & 3
Research and Innovation Forums (RIFs) will highlight interesting research papers for in depth discussion.

PROCEEDINGS (FULL PAPERS)

The proceedings are accessible to conference participants ONLY.
> log in with the e-mail address used during the registration process on
www.conftool.org/cired2023
> available also on the CIRED 2023 APP

ACCESS RESERVED TO REGISTERED CONFERENCE PARTICIPANTS.

PROGRAMME OVERVIEW CIRED 2023

DOWNLOAD THE CIRED 2023 APP
to see the last updates
*Available on the Apple Store
and Google Play Store*

CONFERENCE ROOMS LEVEL 0 ■ **POSTER AREA** LEVEL 1 (FORUM) ■ **AUDITORIUM** ACCESS FROM LEVEL 1

Monday 12 June	TUTORIALS 9.30 – 13.45 TUTORIAL 1 (Room N – Level 0) / TUTORIAL 2 (Room O – Level 0)	OPENING FORUM (OPEN TO ALL) 15.00 – 18.00 Auditorium (access from Level 1)	WELCOME RECEPTION 18.00 – 20.00 Exhibition Floor Level 1 (FORUM)
	MAIN SESSIONS	**ROUND TABLES (RT)** **RESEARCH AND INNOVATION FORUMS** (RIF Sessions)	**POSTER SESSIONS**

ROOMS LEVEL 0		PLENARY ROOM 1	PLENARY ROOM 4	PLENARY ROOM 2	PLENARY ROOM 3	POSTER AREA Level 1 (FORUM)	
		SESSION 1 Network Components	**SESSION 3** Operation	**SESSION 2** Power Quality and Electromagnetic Compatibility	**SESSION 6** Customers, Regulation, DSO Business & Risk Management	**SESSION 4** Protection, Control & Automation	**SESSION 5** Planning of Power Distribution Systems
Tuesday 13 June	09.00 10.30	BLOCK 1: Disruptive Innovation, New Usages and Prospective	BLOCK 1: Strategy & Management 1	RT1: Safety and Earthing Facing Modern Technologies	RT2: Dynamic Network Tariffs and Local Flexibility Markets Main results of CIRED WG 2020-2		
	11.00 12.30	BLOCK 2: Diagnostics and Sensors for Asset Management	BLOCK 2: Strategy & Management 2	RT3: Power Quality and Other Challenges in DC Grids	RT4: Electrification		
	14.30 16.00	BLOCK 3: Context Evolution Driving Development and Studies on Components	BLOCK 3: Operation	RT5: Turning Data Into Information – Future Needs in Power Quality Data Analysis	RT6: Effective Innovation		
	16.30 18.00	BLOCK 4: Data, Models and Prediction for Components	BLOCK 4: New Use Cases	RIF SESSION 2: Power Quality Challenges Related to E-mobility	RT7: Cybersecurity		
		SESSION 2 Power Quality and Electromagnetic Compatibility	**SESSION 6** Customers, Regulation, DSO Business & Risk Management	**SESSION 4** Protection, Control & Automation	**SESSION 5** Planning of Power Distribution Systems	**SESSION 1** Network components	**SESSION 3** Operation
Wednesday 14 June	09.00 10.30	BLOCK 1: EMC, Earthing and Safety	BLOCK 1: Regulation	RT8: Applications of Flexibility in Planning and Operation	RT9: Capacity management for PV and EV		
	11.00 12.30	BLOCK 2: Equipment Related Power Quality Aspects	BLOCK 2: DSO	RT10: Digital Primary Substation	RT11: Accelerating the Energy Transition, From Authorisation Through to Commissioning		
	14.30 16.00	BLOCK 3: System Related Power Quality Aspects	BLOCK 3: Customer	RT12: Remote Control and Automation Techniques to Improve Continuity of Supply: Performance Requirements and Evaluation.	RT13: New Role of Smart Metering Functionalities		
	16.30 18.00	BLOCK 4: Standards, Measurements, Regulations and Advanced Data Analysis	BLOCK 4: Digitalization	RIF SESSION 4: Protection, Control & Automation	RIF SESSION 5: Planning of Power Distribution Systems		
		Gala dinner Villa Miani (on extra booking)		*Gala dinner Villa Miani (on extra booking)*			
		SESSION 4 Protection, Control & Automation	**SESSION 5** Planning of Power Distribution Systems	**SESSION 1** Network Components	**SESSION 3** Operation	**SESSION 2** Power Quality & Electromagnetic Compatibility	**SESSION 6** Customers, Regulation, DSO Business & Risk Management
Thursday 15 June	09.00 10.30	BLOCK 1: Automation	BLOCK 1: Risk Assessment and Asset Management	RT14: Smart Networks: From the Secondary Station to the LV Networks	RT15: Digital Solutions for Maintenance		
	11.00 12.30	BLOCK 2: Control & Cyber Security	BLOCK 2: Network Development	RT16: Lifetime Extension Options for Electrical Equipment Main results of CIRED WG 2020-1	RT17: Storage Technologies as An Opportunity for Distribution Systems		
	14.30 16.00	BLOCK 3: Communication & Protection	BLOCK 3: Distribution Planning	RT18: Green Network Solutions	RT19: Microgrids: Load Management in Low-Voltage Grids		
	16.30 18.00	BLOCK 4: Protection	BLOCK 4: Methods and Tools	RIF SESSION 1: Network Components	RIF SESSION 3: Operation		
Friday 16 June		TECHNICAL VISITS (Technical Visit 1: Departure at 08.30 - Technical Visit 2: Departure at 09.00)					

Programme updated on 24 April 2023. Subject to changes at any time. Cancellation may occur.

TUTORIALS
9.30 – 13.45 + lunch > 15.00 *ACCESS RESERVED TO HOLDERS OF A REGISTRATION FOR TUTORIAL 1 OR 2.*
Level 0 ▮ **TUTORIAL 1 >** ROOM N ▮ **TUTORIAL 2 >** ROOM O

TUTORIAL 1 ▮ **DATA SHARING & CYBERSECURITY IN SMART GRIDS**

AIM OF THE TUTORIAL:
The purpose of the tutorial is to present how do deal with privacy issues in smart distribution grids, regarding both data sharing in big data analytics and the cybersecurity aspects.
The first part of this tutorial will be dedicated on how to break the data barrier and promote data sharing. After giving a broad overview of new technologies for data sharing (blockchains, noise-injection techniques, etc.), efforts will be devoted to two aspects, i.e., i) privacy-preserving data analytical methods, and ii) data pricing or valuation approaches.
To that end, the relevant statistical methods and data-driven approaches in distribution systems will be introduced, along with recent advances in privacy-preserving settings (e.g., federated learning, differential privacy, etc.) to enable data sharing.
In complement, the data trading mechanisms and data value quantification methods in power and energy industries will be summarized and compared.
The second part of the tutorial is focused on the discussion of cybersecurity issues and techniques related to SCADA networks, intrusion detection, and the security of end and legacy devices. The objective is not only to understand the critical risks and technologies used today, but also to foresee innovations that can improve the cybersecurity and resilience of smart distribution networks of the future.

SPEAKERS:
Allyson Bessani (University of Lisbon, Portugal)
Jean-François Toubeau (KULeuven, Belgium)
Yi Wang (University of Hong Kong, Hong Kong)

TUTORIAL 2 ▮ **RENEWABLE ENERGY COMMUNITIES: WHAT? WHY? HOW?**

AIM OF THE TUTORIAL:
This tutorial comprehensively reviews the current state-of-the-art on **Renewable Energy Communities**. It is motivated by the diversity of points of view, definitions, and hypotheses adopted by **academic** and **industrial** professionals, mainly associated with the **uncertainties** in terms of legislation and regulation, which are still well present.
The Tutorial will be presented by a team of speakers from academia, as well as from the public (DSO) and commercial sectors.

SPEAKERS:
François Bordes (WeSmart, Belgium)
Bertrand Cornélusse (ULiège, Belgium)
Zacharie De Grève (UMons, Belgium)
Simone Paoletti (University of Siena, Italy)
David Vangulick (ORES, Belgium)

Titles and speakers are subject to change at any time. Cancellation may occur.

OPENING FORUM ▮ 15.00 – 18.00 *AUDITORIUM (ACCESS FROM LEVEL 1)*
FREE ACCESS FOR ALL PARTICIPANTS (EXHIBITORS AND CONFERENCE ATTENDEES)

15.00 ▮ **WELCOME**
ANTONIO CAMMAROTA, Chair of the Italian CIRED National Committee

OPENING SPEECHES
The role of CIRED: **PIERRE MALLET**, Chair of the CIRED Board of Directors
The Energy Transition: Representative of Italian Institutions
The role of DSOs: **ANTONIO CAMMISECRA**, Head of Enel Grids BL
The role of Equipment Manufacturers: **MARIA ANTONIETTA PORTALURI**, General Manager ANIE

16.15 ▮ **PANEL DEBATE ON POWER DISTRIBUTION SYSTEMS FOSTERING SUSTAINABILITY**
MODERATOR: RICCARDO LAMA, CEI Chair

VINCENZO RANIERI, Chair EU DSO Entity
Prof. BIRGITTE BAK-JENSEN, Aalborg University, Department of Energy Technology
GWENOLE COZIGOU, EU Commission, Director for industrial transformation and advanced value chains
YANN FROMONT, President T&D Europe
Q&A Session

17.30 ▮ **CIRED TECHNICAL SESSIONS : WHAT'S ON FOR CIRED 2023?**
MARKUS ZDRALLEK, Chair of the CIRED Technical Committee

17.45 ▮ **HOW CIRED 2023 WILL WORK?**
FRÉDÉRIC OLIVIER, Representative of the CIRED 2023 Organizing Committee

**THE OPENING FORUM WILL BE FOLLOWED
BY THE WELCOME RECEPTION IN THE EXHIBITION HALL**
(LEVEL 1 – 18.00 > 20.00)

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CONFERENCE **PROGRAMME**

Papers have been selected for presentation and discussion during the technical sessions (main, poster and RIF Sessions). The conference will be structured around the 6 technical sessions:

SESSION 1
Network Components

SESSION 2
Power Quality & Electromagnetic Compatibility

SESSION 3
Operation

SESSION 4
Protection, Control & Automation

SESSION 5
Planning of Power Distribution Systems

SESSION 6
Customers, Regulation, DSO Business & Risk Management

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Programme updated on 26 April 2023. Titles and speakers are subject to change at any time. Cancellation may occur. Download the APP to see the last updates.

LEVEL 0 ▌ PLENARY ROOM 1

SESSION **1** deals with all aspects related to the components used in the electricity distribution networks: cables, overhead lines, primary and secondary substations, transformers, switchgear, protection and monitoring systems, power electronics. It covers topics related to the life cycle of assets from design to end of life management. The session also covers environmental concern including eco-design and life cycle analysis, standardisation, ergonomics and safety. It aims at providing an overview of the state-of-the-art and proposals for future components, including those needed for smart grids, E-mobility, smart cities and microgrids, as well as components for more resilient networks in the context of climate change anticipation. This session is an opportunity for DSOs and manufacturers to share their challenges.

		BLOCK **1** ▌ 09.00 – 10.30
BLOCK 1 09.00 – 10.30 **DISRUPTIVE INNOVATION, NEW USAGES AND PROSPECTIVE** LEVEL 0 PLENARY ROOM 1	10763	**Smart Secondary Substation development and demonstration under FLEXIGRID project** JON Aguirre Valparis (1), Alejandro Blasco (1), Miguel Alvarez (1), Antonio González (2) 1: ORMAZABAL, Spain; 2: EDP REDES ESPAÑA
	10998	**MADELAINE – A Multi-Adaptive and Cost-Efficient DC Charging System for EV Car Parks** Daniel Stahleder (1), Stephan Ledinger (1), Florian Mader (2), Dominik Hartmann (2), Markus Litzlbauer (3), Manuel Schmutz (3), Felix Lehfuss (1) 1: AIT Austrian Institute of Technology, Austria; 2: WEB Windenergie; 3: ENIO
	11045	**Recent superconducting cable installation in Chicago paves the way for a Resilient Electric Grid (REG) system** Arnaud Allais (1), Nicolas Lallouet (1), Jean-Maxime Saugrain (1), Beate West (2), Erik Marzahn (2), Frank Frentzas (4), Mike Ross (3) 1: Nexans, France; 2: Nexans, Germany; 3: American Superconductor, USA; 4: COMED, USA
	11050	**Requirements For Large Scale Battery Storages In Low Voltage Grids – Lessons Learned From A Smart Grid Project** Navreet Dult, Benjamin Petters Avacon Netz GmbH, Germany
	11469	**Distributed Smart Soft Open Point** Wenlong Ming (1), Jinlei Chen (1), Jianzhong Wu (1), James Yu (2), Ali Kazerooni (2), Ranit Edgar (2), Alastair Ferguson (3) 1: Cardiff University, United Kingdom; 2: Scottish Power Energy Networks; 3: Polaris Diagnostics & Engineering Ltd
	10784 BYAA awardee	**Silicon Carbide Enabled Medium Voltage DC Transmission Systems for Rapid Electric Vehicle Charging in the UK** Arkadeep Deb (1), Jose Ortiz-Gonzaelz (1), Ruizhu Wu (2), Saeed Jahdi (3), Walid Issa (4), Olayiwola Alatise (1) 1: University of Warwick, United Kingdom; 2: Chongqing Jinkang E-powertrain, China; 3: University of Bristol; 4: Sheffield Hallam University

BLOCK 2 ▮ 11.00 – 12.30

BLOCK 2
11.00 – 12.30

DIAGNOSTICS AND SENSORS FOR ASSET MANAGEMENT

LEVEL 0 PLENARY ROOM 1

10120 — **Failure Prediction for Circuit Breakers: Vibration and Trip Coil Current Feature Extraction for Machine Learning Applications**
Jan Henning Jürgensen, Henrik Bohm, Camilla Hansson, Mikael Sollén, Anders Norström
Vattenfall Eldistribution AB, Sweden

10235 — **Concept Of A Partial Discharge Analysis By Applying Specific Digital Twins**
Erhard Aumann (1,2), Franck Voufo (3), Thomas Hammer (1), Svetlana Gossmann (1), Dirk Westermann (2)
1: Siemens AG, Germany; 2: Technische Universität Ilmenau; 3: Robert Bosch GmbH, Germany

10447 — **Innovant Densimeter for GIS Tank, Insensitive to Temperature Variation**
Philippe Brun (1), Diego Alberto (1), Raimund Summer (2)
1: Schneider Electric, France; 2: Schneider Electric, Germany

10687 — **On-line Monitoring Condition of On-load Tap Changer of Power Transformers**
Mauricio Cuevas (1), Damien Bortolotti (1), Mohammed Zouiti (2)
1: EDF, France; 2: ENEDIS, France

10699 — **Diagnostic Techniques Of MV Cable Joints Under Different Environmental Conditions**
Giovanni Pirovano (1), Johnny Borghetto (1), Alfredo Contin (2), Andrea Morotti (3), Andrea Pegoiani (3), Samuele Forciniti (3)
1: RSE, Italy; 2: University of Trieste, Italy; 3: Unareti, Italy

11027 — **Field Experience of On-site Cable Testing of 66 kV Offshore Array Cables**
Uwe Kaltenborn (1), Olaf Schacht (1), Christopher Donaghy-Spargo (2), Alex MacPhie (2)
1: HIGHVOLT Prüftechnik Dresden GmbH, Germany; 2: JDR Cable System Ltd.

BLOCK 3 ▮ 14.30 – 16.00

BLOCK 3
14.30 – 16.00

CONTEXT EVOLUTION DRIVING DEVELOPMENT AND STUDIES ON COMPONENTS

LEVEL 0 PLENARY ROOM 1

10225 — **Enel's Circular by Design Approach for Grid Components**
Massimo Bartolucci (1), Giuseppe Di Tommaso (1), Fabrizio Gasbarri (1), Lourdes Garcia (2), William Di Tullio (1), Luca Di Rocco (1), Samuele Giovannetti (1), Maria Cristina Papetti (1), Marina Lombardi (1)
1: Enel, Italy; 2: Enel, Spain

10596 — **Sustainable Power Transformers: Enel Grids use of natural ester insulating fluid in large power transformers**
Miguel Angel Caballero, Marianna Rizzo, Juan Manuel Rey, Flavio Mauri, Fabrizio Gasbarri, Enrico Valigi, Francesco Amadei
Enel Grids

11223 — **Fast-tracking Licencing Of Temporary Lines And The Use Of Mobile Maintenance Kits With MV Aerial Bundled Cables**
Rui Bandeirinha, Carlos Manuel Duarte, António Tomás, Jorge Miguel Antunes
E-REDES, Portugal

CONTEXT EVOLUTION DRIVING DEVELOPMENT AND STUDIES ON COMPONENTS

10642 — **Solving the Problem of Wooden Poles Ignition due to Insulator Contamination - In Theory and Practice**
Domagoj Milun, Dinko Marijan, Josip Srdanović
HEP DSO, Croatia

11056 — **A Simplified Tool For The Life Cycle Analysis Of A Medium Voltage Switchgear**
Teresa Bas (1), Jesus Izcara (2), Iñigo Aizpuru (3), Jose Ramon Tejedo (1)
1: Iberdrola Distribucion Electrica; 2: Ormazabal; 3: Ihobe

11175 — **Improve Operator Safety and Protect Wildlife in Overhead Distribution Networks**
Iban Landeta Zarate (1), Iñaki Apraiz Alvarez (1), Juan Carlos Pérez Quesada (1), Mikel Irizar Moyua (2)
1: Schneider Electric (MESA PLANT), Spain; 2: Iberdrola, Spain

BLOCK 4 ▮ 16.30 – 18.00

BLOCK 4
16.30 – 18.00

DATA, MODELS AND PREDICTION FOR COMPONENTS

LEVEL 0 PLENARY ROOM 1

10331 — **Analysis Of Data Gathered During The Application Of LLPDs On MV Feeder Of E-distribuzione**
Luigi D'Orazio (1), Gianluca Di Felice (2), Jean Baptiste Frain (3), Amedeo Andreotti (4), Naganathini Ravichandran (4), Ivano Gentilini (1), Daniela Proto (4), Antonello Greco (1), Ludovico Spitilli (2)
1: ENEL, Italy; 2: e-distribuzione, Italy; 3: Streamer, Switzerland; 4: University of Naples, Italy

10505 — **Cost Efficient Management Of Digital Secondary Substations, On The Example Of The Process Interface And Detection Unit (PIDU)**
Andreas Hettich (1), Fabian Zehner (1), Gerald Jacob (2), Christian Ruester (2)
1: Netze BW GmbH, Germany; 2: A. Eberle GmbH & Co. KG, Germany

10611 — **Monitoring And Rating Of The Low Voltage Grid Utilization**
Jonas Claus (1), Günter Schulz (1), Markus Kosch (2), Thomas Schwierz (3), Christian Rehtanz (3)
1: ct.e Controltechnology Engineering GmbH, Germany; 2: AVU Netz GmbH, Germany; 3: Institute of Energy Systems, Energy Efficiency and Energy Economics, TU Dortmund, Germany

11083 — **Cyclic Loadability Of Entire HV/MV-Substations**
Jur Erbrink, Rory Leich, Robert Vosse, Sjoerd Nauta, Jurriaan Smit
Alliander, The Netherlands

11094 — **Inrush-Currents of Series Combination of Transformer with in-phase Regulation and Phase Shifting Transformer at the Interface between Transmission and Distribution Networks**
Jiachen Bai (1), Fekadu Shewarega (1), Hendrik Vennegeerts (1), Roman Lechner (2), Günter Etz (2), Markus Unterholzer-Moser (3)
1: University Duisburg-Essen, electrical Energy Systems (eES), Germany; 2: Netz Niederösterreich GmbH, Austria; 3: Austrian Power Grid (APG), Austria

11517 — **Vibration-Based Extraction of Switching Times for Circuit Breaker Monitoring Using Machine Learning**
Aydin Boyaci, Ido Amihai, Simon Penner, Vadim Migunov, Theresa Loss, Maurizio Zajadatz, Michael Suriyah, Thomas Leibfried, Nico Seidel
ABB AG Corporate Research Center Germany, Germany

MAIN SESSION 3
OPERATION

LEVEL 0 ▮ PLENARY ROOM 4

MAIN SESSION 3
OPERATION

LEVEL 0 ▮ PLENARY ROOM 4

SESSION **3** deals with operational use of components (Session 1) and systems (Session 4) in public, industrial and private distribution networks in normal operation as well as in any case of disturbance. Session 3 covers all aspects of grid operation including strategies and management topics, challenges and new application, the integration of DER and special applications. Focus is on the use of new technologies like artificial intelligence and the operational challenges to integrate and operate new types of load like electric vehicles and storage.

	BLOCK **1** ▮ 09.00 – 10.30	
BLOCK 1 09.00 – 10.30 STRATEGY & MANAGEMENT 1 LEVEL 0 PLENARY ROOM 4	10135	**Digitizing Grid And Vegetation Inspection With Remote Sensing And Artificial Intelligence** Sophie Crommelinck, Katharina Gill, Jürgen Scholz, Mario Gnädig, Bartholomäus Surmann Netze BW GmbH, Germany
	10983	**Data Analytics For Pruning Optimization Around Power Lines** Charles Demay, Pierre Achaichia, Philippe Tuloup ENEDIS, France
	10134	**An Automated System for Overhead Line Inspection with Traveling Wave Measurement and Unmanned Aerial Vehicles** Frederik Puhe (1), Maximilian Schmalen (1), Björn Keune (1), Carsten Hermanns (1), Mitja Wittersheim (2), Johannes Bleser (3) 1: Westnetz GmbH, Germany; 2: Beagle Systems GmbH, Germany; 3: Siemens AG, Germany
	11065	**A Platform For Real-time Monitoring And Detection Of Conductor Integrity Related Health Hazards In Distribution Networks** Guilherme Freire (1), João Campos (1), Joana Faria (1), Philip Marsh (2) 1: ENEIDA.IO, Portugal; 2: Powerco, New Zealand
	10599	**Feeder Remote Terminal Unit of Distribution Automation System for Detecting Impact and Tilt Change applied to Distribution Equipment** GyuHo Han, Haeyung Jeong, Yeonho Lee, Seongwon Cho KEPCO KDN, Korea, Republic of (South Korea)
	10359	**Detection of Weather Induced Events on Overhead Power Lines** Daniel Mitcan, Bertrand Godard Ampacimon SA, Belgium

	BLOCK **2** ▮ 11.00 – 12.30	
BLOCK 2 11.00 – 12.30 STRATEGY & MANAGEMENT 2 LEVEL 0 PLENARY ROOM 4	11073	**Assessing the Pros and Cons of Different Operating Envelope Implementations Across Australia** Arthur Gonçalves Givisiez, Luis F. Ochoa, Michael Z. Liu, Vincenzo Bassi The University of Melbourne, Australia
	11232	**Determination of Q(P)- And Q(U)-Characteristics By Means Of Time-Series Based Optimal Power Flow Calculations To Optimize Distribution Grid Operation** Manuel Schwenke, Jutta Hanson, Rafael Steppan, Anna Pfendler Technical University Darmstadt, Germany

BLOCK 2 11.00 – 12.30 STRATEGY & MANAGEMENT 2 LEVEL 0 PLENARY ROOM 4	11292	**C-HIL Environment for Parameter Optimization of Grid Friendly Charging Control** Alfred Einfalt, Albin Frischenschlager, Lukas Schroeer, Andreas Schildorfer, Anton Steinwendtner Siemens AG OEsterreich, Austria
	10992	**Operational Strategies for Maximising the Value of Customer Flexibility** Danny Pudjianto, Goran Strbac Imperial College London, United Kingdom
	10471	**Scalable Uncertainty Aware Ancillary Services Procurement Tool For Active Distribution Systems** Muhammad Usman (1), Baara Mohandes (1), Florin Capitanescu (1), Andre Guimaraes Madureira (1), Martin Bolfek (2), Zdravko Matišić (2), Filipe Joel Soares (3), Nuno Fonseca (3), Henrique Teixeira (3), Carlos Mateo (4) 1: Luxembourg Institute of Science and Technology, Luxembourg; 2: Hrvatska Elektroprivreda Operator Distribucijskog Sustava, Croatia; 3: Institute for Systems and Computer Engineering, Technology and Science, Portugal; 4: Institute for Research in Technology, Comillas Pontifical University, Spain
	11127	**Performance Analysis of a State Estimator for Low Voltage Unbalanced Grids Using Different Advance Metering Infrastructure Technologies** Mahmoud Rashad Ahmed (1), José Manuel Cano (1), Bassam Mohamed (2), Pablo Arboleya (1) 1: University of Oviedo, Spain; 2: Plexigrid, Spain

	BLOCK **3** ▮ 14.30 – 16.00	
BLOCK 3 14.30 – 16.00 OPERATION LEVEL 0 PLENARY ROOM 4	11093	**High-level Resilience Strategizing Using Data-Driven Inputs** Xavier Weiss (1), Lars Nordström (1), Arne Berlin (2) 1: KTH Royal Institute of Technology, Sweden; 2: Vattenfall Eldistribution AB
	10573	**Fitness-check for Power Plants in Distribution Networks for Black Start and Regional Islands** Darko Brankovic (1), Robert Schürhuber (1), Andreas Abart (2), Norbert Rechberger (3) 1: Graz University of Technology, Austria; 2: Netz Oberösterreich; 3: Energie AG Erzeugung GmbH
	10986	**Advanced Concept of Efficient Use of Transformers Leveraging the Dynamic Thermal Rating Technology** Andrej Souvent (1), Miha Rot (6), Tim Gradnik (5), Andrej Spec (2), Polona Koprivc (2), Nejc Petrovič (3), Gregor Omahen (4), Gregor Kosec (6) 1: Operato d.o.o., Slovenia; 2: SODO d.o.o., Slovenia; 3: Elektro Gorenjska, d.d., Slovenia; 4: ELES, d.o.o., Slovenia; 5: EIMV, Slovenia; 6: Jožef Stefan Institute, Slovenia
	10405	**Real-time Circulating Currents Calculation In The Distribution Management System** Jan Van de Vyver, Cedric Lahousse, Tine Vandoorn Fluvius System Operator CV, Belgium

LEVEL 0 ▮ PLENARY ROOM 4

MAIN SESSION 3
OPERATION

LEVEL 0 ▮ PLENARY ROOM 2

ROUND TABLES

BLOCK **3**
14.30 – 16.00

OPERATION

LEVEL 0
PLENARY ROOM 4

10749 — **Improved Load and Generation Forecasting for Extended Day–Ahead Estimates in the Nordic Grid**
Swaechchha Dahal (1,2), Gunne John Hegglid (1), Thomas Øyvang (1)
1: University of South Eastern Norway, Norway; 2: Kathmandu University, Nepal

10529 — **Pilot Application of a Rule–Based TSO–DSO Coordination Concept in Switzerland**
Vanessa Schröder (1), Evangelos Vrettos (2), Martina Bossio (3), Michael Auer (1), Raphael Wu (2), Christophe Fritsch (2), Rafaela Tsaousi (2), Raffael La Fauci (1)
1: Elektrizitätswerk der Stadt Zürich, Switzerland; 2: Swissgrid AG, Switzerland; 3: Zürcher Hochschule für angewandte Wissenschaften (IEFE), Switzerland

BLOCK **4** ▮ 16.30 – 18.00

10754 — **Detecting Power Outages In Low–Voltage Networks From Telecommunications Networks Data**
Marleen Bahe (1), Matthias Herlich (1), Peter Dorfinger (1), Josef Leist (2), Christian Wohlsein (2), Markus Radauer (3), Gerald Hörack (3), Walter Schaffer (3)
1: Salzburg Research Forschungsgesellschaft mbH, Austria; 2: Salzburg AG, Austria; 3: Salzburg Netz GmbH, Austria

10672 — **An Experience Of Detection And Classification Of Quality–Of–Service Problems In MV/LV Distribution Substations Using Artificial Intelligence: Senegal Case Study**
Mouhamad Al Mansour Kébé, Maodo Sene, Nafissatou Diagne
Senelec, Senegal

BLOCK **4**
16.30 – 18.00

NEW USE CASES

LEVEL 0
PLENARY ROOM 4

10274 — **Smart Metering And Grid Data Services: French Experience And International Perspectives**
Victoria Tan (2), Laurent Karsenti (3), Sébastien Brun (1)
1: Enedis, France; 2: Enedis, France; 3: Enedis, France

10372 — **Digital Twins Handling : The Real Deployment Stakes!**
Laurent Guise (1), Gilles Nativel (2), Guillaume Denis (3), Djibril Diop (6), Eric Suignard (5), Philippe Tailhades (4), Benoît Jeanson (3), Thierry Coste (5)
1: EnergySemantic.com, France; 2: ENEDIS, France; 3: RTE, France; 4: GIMELEC, France; 5: EDF, France; 6: Schneider–Electric, France

10515 — **Implications of Forecast Uncertainty on the Optimal Operation of Renewable Energy Communities**
Robin Sudhoff (1,2), Sebastian Schreck (1,2), Sebastian Thiem (1), Stefan Niessen (1,2)
1: Siemens AG, Technology, Germany; 2: TU Darmstadt, Technology and Economics of Multimodal Energy Systems, Germany

10900 — **The Lac–Mégantic Microgrid: A Shared Vision of Energy Transition and the new role for Microgrid Control**
Kevin Morrissey (1), Mark Jaggassar (1), David–Olivier Goulet (2), Robert MacDonald (1), Mark Collins (1)
1: Smarter Grid Solutions; 2: Hydro–Québec

LEVEL 0
PLENARY ROOM 2

ROUND TABLES ▮ 09.00 – 16.00

09.00 10.30

RT1:
SAFETY AND EARTHING FACING MODERN TECHNOLOGIES
Conveners: **Katrin Friedl** (TU Graz, Austria) & **Herwig Renner** (TU Graz, Austria).
Speakers: **Bill Carman** (Bill Carman Consulting, United Kingdom), **Christian Ehlert** (Avacon Netz GmbH, Germany), **Kristof Vliegen** (Fluvius, Belgium).
The increased integration of new technologies such as large PV parks close to high-voltage power systems or a change in neutral point grounding affects all connected or nearby earthing systems. In principle, the necessary proof of the adequacy of the earthing system can be provided either by simulations, tests or a combination of two.
While new analysis tools offer more possibilities in predicting and analysing projects they can also give an overconfident appearance of safety/accuracy. In reality, however, the environment in which earthing systems operate can be much more variable and therefore more difficult to model. On the other hand, earthing test methods or earth fault measurements provide real values for earthing impedance or touch voltage.
However, testing cannot be used for planned projects, giving only sample information about the existing configuration and requires a certain amount of time and effort. In addition, analytical models are often required to interpret the results of such tests. Another major issue is the testing and simulation of interconnected or global earthing systems with regard to electrical safety. This round table presents a selection of the problems often encountered in connection with simulation or testing of earthing systems and is intended to initiate discussion on possible solutions.

11.00 12.30

RT3:
POWER QUALITY AND OTHER CHALLENGES IN DC GRIDS
Convener: **Jan Desmet** (Ghent University, Belgium).
Speakers: **Hakim Azaioud** (Ghent University, Belgium), **Isabelle Gal** (Schneider Electric, France), **Tero Kaipia** (Zero Hertz Systems & LUT University, Finland).
DC grids are a strongly emerging technology, especially in transmission networks. However, such grids are increasingly making their appearance in medium- and low-voltage networks.
In this round table, several experts in the field not only explain the challenges and bottlenecks in the use of DC grids, but also present their views on power quality-related aspects, both in low- and medium-voltage networks.
Next to this also the aspects and challenges with respect to the standardization of DC networks both in the domain of topologies and advisable voltage levels will be discussed. On top of that the advantages of the use of DC networks, especially related to the use of renewable energy from energy efficiency point of view will be highlighted.

LEVEL 0
PLENARY ROOM 2

14.30
16.00

RT5:
TURNING DATA INTO INFORMATION – FUTURE NEEDS IN POWER QUALITY DATA ANALYSIS
Convener: **Jan Meyer** (TU Dresden, Germany).
Speakers: **René Braunstein** (Energienetze Steiermark GmbH, Austria), **Michael Freiburg** (TH Köln – University of applied sciences, Germany), **Marco Lindner** (TransnetBW GmbH, Germany), **Sarah Rönnberg** (Lulea University of Technology, Sweden), **Gaurav Singh** (EPRI, USA), **Max Ulrich** (Camille Bauer Metrawatt AG, Switzerland).

The interest in monitoring Power Quality has significantly increased during the last years. More and more network operators implement monitoring campaigns with several hundreds, sometimes more than thousands of monitors.

These monitors generate an immense amount of data, which contains precious information about the behaviour and characteristics of networks, its components and connected installations. Extracting and utilizing this information can help network operators in many different areas, like asset management, component diagnosis or disturbing source identification. Nowadays, this information is still rarely used beyond the comparison of measured levels with existing standards.

This round table discusses the needs and opportunities of advanced analysis of large Power Quality monitoring data from the viewpoint of different stakeholders, namely distribution and transmission system operators, monitor manufacturers, consultants and academics. This way it aims to identify promising ideas and approaches to what is effectively needed in order to support DSOs and TSOs in the efficient operation of future electricity networks.

	RIF SESSION 2 ▮ 16.30 – 18.00	
	10703	**Analysing Electric Vehicle Charging Power Quality in Large-Scale Charging Sites – A Data-Driven Approach** Toni Simolin, Antti Hildén, Pertti Pakonen, Pertti Järventausta Tampere University, Finland
	10538	**Electric Vehicle Charging Stations and their Impact on Power Quality** Francisc Zavoda CRHQ (Centre de recherche d'Hydro-Quebec), Canada
16.30 – 18.00 **POWER QUALITY CHALLENGES RELATED TO E-MOBILITY** LEVEL 0 PLENARY ROOM 2	**10157**	**Harmonic and Supraharmonic Emissions of Fast Charging Infrastructure – Field Measurements in LV Grids** Manuel Wingenfelder (1), Daniela Frank (1), Constantin Reese (2), Lutz Hofmann (1) 1: Leibniz University Hanover, Institute of Electric Power Systems, Electric Power Engineering, Germany; 2: enercity AG, municipal utilities Hanover
	10202	**The Impact of a Bi-directional V2G Electric Vehicle Charging Station to the Frequency Dependent Grid Impedance (10 – 150 kHz)** Bernhard Grasel (1), José Baptista (2), Manfred Tragner (1), Subin Puthenkalam (3) 1: FH Technikum Wien, Austria; 2: University of Trás-os-Montes and Alto Douro; 3: Magna International
	11079	**Modeling and Simulation of the Impact of a Fast Charging Infrastructure on Harmonic Disturbance Levels** Sascha Müller (1), Jan Meyer (1), Julius Jacob (2) 1: TU Dresden, Germany; 2: SachsenEnergie AG, Germany
	11021	**Earthing Design of EV Charging Substations in Fuel Stations – UK Requirements and Experience** Dionysis Skevis (1), Mark Davies (1), Denis Baudin (1), Stephen Tucker (2) 1: RINA, United Kingdom; 2: UK Power Networks, United Kingdom

LEVEL 0 ▮ PLENARY ROOM 3   ROUND TABLES

LEVEL 0 ▮ PLENARY ROOM 3   ROUND TABLES

LEVEL 0 PLENARY ROOM 3

ROUND TABLES ▮ 09.00 – 18.00

09.00 10.30

RT2:
DYNAMIC NETWORK TARIFFS AND LOCAL FLEXIBILITY MARKETS MAIN RESULTS OF CIRED WG 2020-2
Convener: **Ben Gemsjäger** (Siemens AG, Germany).
Speakers: **Sonja Baumgartner** (LEW Verteilnetz GmbH, Germany),
Nuran Cihangir Martin (Stedin, Netherlands),
Laurence Hunter (National Grid, United Kingdom),
Oliver Koch (University of Wuppertal, Germany),
Sambeet Mishra (University of South-Eastern Norway, Norway).

Due to the digitalization of the energy system (e.g. smart meter rollout, digital twin) and a wide spectrum of Distributed Energy Resources (DER: distributed renewable generation, demand response, energy storage, electric vehicles, heat pumps, ..), generation becomes more volatile and consumers more flexible in their demand patterns. In consequence consumers or prosumers can be providers of flexibility services to system operators.

This round table will cover experiences from existing implementations of dynamic tariffs and local flexibility markets, discussing the required/ evaluated technologies and roles of different stakeholders involved, as well as challenges (e.g. regulatory) and potential next steps in the development of dynamic network tariffs and local flexibility markets in Europe.

11.00 12.30

RT4:
ELECTRIFICATION
Convener: **Dag Eirik Nordgård** (SINTEF, Norway).
Speakers : **Sabine Erlinghagen** (Siemens Grid Software, Germany),
Vincenzo Ranieri (EU DSO Entity, Belgium/Italy),
Richard Vidlicka (CEZ, Czech Republic).

The energy transition is imposing substantial changes on the energy business in general, and on the electricity distribution companies in particular. The electricity distribution networks are a critical enabler for the forthcoming electrification of energy demanding processes throughout society – for example electrification of transport and heating. This will lead to a significant increase in electric energy consumption in years to come. In addition, distribution networks need to handle large and growing influx of local distributed generation resources, disruptively changing the way distribution networks are operated.

DSOs have a huge task ahead making their networks ready to handle massive electrification. This task calls for both increased and flexible utilisation of existing networks, as well as upgrading and expanding the electricity distribution infrastructure.

In this round table prominent executives connected to the DSO business share their views on the challenges facing the DSOs in coming years, how this will impact the business, and possible solutions to tackle this task – sharing their strategic views on the electrification challenge.

LEVEL 0 PLENARY ROOM 3

14.30 16.00

RT6:
EFFECTIVE INNOVATION
Convener: **Peter Söderström** (Vattenfall Distribution, Sweden).
Speakers: **Luís Cunha** (E-Redes, Portugal),
Nikos Hatziargyriou (National Technical University of Athens, Greece),
Ralf Korntner (Siemens, Germany),
Anne-Lise Laurain (EPRI, USA),
Luca Lo Schiavo (Arera, Italy).

DSOs are in the middle of the energy transition towards a sustainable and reliable energy system. The transition is a significant challenge for the DSO's and is further challenged through the security situation in the world and the ever increasing speed of society change. Current solutions are in many cases not sufficient to meet the challenges so innovative solutions is required.

DSO innovation can be conducted in many different ways and involves tools, methods, equipment, business models and know-how, all in the end within the framework of the regulation. This round-table will show and discuss different ways of conducting innovation in the DSO business, the experiences and best practices.

16.30 18.00

RT7:
CYBERSECURITY
Convener: **Peter Kjær Hansen** (Green Power Denmark, Denmark).

Cyber security will be an ongoing task for the DSOs worldwide in the future. Though, pandemics like the COVID19, extreme weather and other major incidents may challenge the DSO business, the cyber threat might be the biggest single threat for the DSOs. Just before Christmas 2022 the EU Commission and the EU Parliament agreed on the updated Directive for Network and Information Security (NIS2) and the Directive for Critical Entities Resilience (CER). These to directives will together with the coming EU Cyber Resilience Act (CRA) and the EU Network Code for Cyber Security (NCCS) be four important pillars which the DSOs in the EU must comply to.

In this Round Table on Cyber Security the panel will discuss the importance of DSOs being cyber secure – and to what extend that is at all possible and how it can be done? The panel will also discuss to what extend new regulation (like the NIS2 and the NCCS) will result in higher level of security of supply– or will it only introduce more paper, procedures and policies? But how can procedures and policies be transformed to real security of supply? And what about new products and services, which will be integrated in the already existing long line up of legacy systems? And finally: The need for co-operation, information sharing and trust among stakeholders though we are monopolies and/or competitors. Its only just begun – but how to catch up with a moving target in a hurry?

THE POSTER AREA IS OPEN FROM 09.00 TO 18.00
Access with or without a guided tour for registered delegates only

TUESDAY 13 JUNE

POSTER SESSION 4
LEVEL 1 ▮ FORUM
PROTECTION, CONTROL & AUTOMATION

	GUIDED TOURS 1 & 2 ▮ 09.00 – 10.30	
10126	**A1 An Operational Data-Driven Malfunction Detection Framework for Enhanced Power Distribution System Monitoring – The DeMaDs Approach** David Fellner (1), Thomas I. Strasser (1,2), Wolfgang Kastner (2), Behnam Feizifar (3), Ibrahim F. Abdulhadi (3) 1: AIT Austrian Institute of Technology, Austria; 2: Technische Universität Wien (TU Wien); 3: University of Strathclyde	
10478	**A2 DLR as the Tool for Providing Flexibility Services in the Distribution Network** Adam Babs (1), Tomasz Samotyjak (1), Marcin Tarasiuk (1), Slawomir Noske (2) 1: Institute of Power Engineering, Poland; 2: ENERGA-OPERATOR SA	
10562	**A3 Distribution Automation System Field Test in Jakarta MV Network** Anggoro Primadianto, Karina Monica, Riki Waberta, Andi Tobing PLN Indonesia, Indonesia	
10590	**A4 A Dynamic Voltage Controller For LV Grids Based On Flexible PV Systems And The Smart Metering Infrastructure** Ali Hamdan, Benoit Vinot, Florent Cadoux Roseau Technologies, France	
10628	**A5 Developing Low-Voltage Operational Functionalities** Mikko Haapamäki (1), Mika Loukkalahti (1), Juho Kuokkanen (1), Mika Nousiainen (1), Pirjo Heine (1), Matti Lehtonen (2) 1: Helen Electricity Network Ltd., Finland; 2: Aalto University, Finland	
10751	**A6 Delivering The Benefits From A Common Disturbance Information Platform To Prevent Unplanned Outages** Paul Morris (1), Mashood Tahir (2), Sid Hoda (2), Samuel Jupe (2) 1: National Grid Electricity Distribution, United Kingdom; 2: Nortech Management Ltd	
10769	**A7 Automated Detection of Non-Compliance with DER Interconnection Requirements and the Laboratory Testing of an EDF developed solution** Quentin Morel (1), Jingyuan Wang (1), Charles Brewster (2), Aminul Huque (2) 1: EDF, United States of America; 2: EPRI, United States of America	
10773	**A8 Economic Model Predictive Control for the Energy Management Problem of a Virtual Power Plant Including Resources at Different Voltage Levels** Luca Santosuosso (1), Simon Camal (1), Alessandro Di Giorgio (2), Francesco Liberati (2), Andrea Michiorri (1), Guillaume Bontron (3), George Kariniotakis (1) 1: MINES Paris PSL, France; 2: Sapienza University of Rome, Italy; 3: Compagnie Nationale du Rhône, France	
11040	**A9 A Collaborative Engineering and Validation Framework for Smart Grid Automation Applications – The PowerTeams Approach** Christof Brandauer (1), Stefan Linecker (1), Filip Pröstl Andrén (2), Catalin Gavriluta (2), Thomas Strasser (2), Armin Veichtlbauer (3), Gerald Steinmaurer (3), Jürgen Resch (4), Sebastian Schöndorfer (4) 1: Salzburg Research, Austria; 2: AIT Austrian Institute of Technology, Austria; 3: FH Oberösterreich, Austria; 4: COPA-DATA, Austria	

PANELS
A1 > A18

**TOUR 1
CONTROL 1**
09.00 – 10.30

LEVEL 1
FORUM

11125	**A10 Automatic System for Evaluation of Lightning Events in Power Grid** Martin Knenicky (1), Martin Svancar (1), Lubomir Kocis (1), Petr Spurny (2), Radek Ovesny (2) 1: EGU – HV Laboratory a.s., Czech Republic; 2: CEPS, a.s., Czech Republic
11156	**A11 From blackouts to flexibility: case study from Burkina Faso** Sebastijan Ursic (1), Luc Richaud (2), Marine Cornelis (3) 1: INEA d.o.o, Slovenia; 2: Odit-e, France; 3: Next Energy Consumer, Italy
11180	**A12 5G-Based Fault location, Isolation, and Service Recovery** Mohand Ouamer Nait Belaid (1,2), Vincent Audebert (1), Boris Deneuville (1), Rami Langar (2) 1: EDF SA, France; 2: Gustave Eiffel University, France
11214	**A13 A secure Automation Solution to Provide Flexibility at Low-Level Grid – Middleware Services** Razgar Ebrahimy (1), Mohsen Banaei (1), Juan Jacobo Peralta Escalante (2), Manuel Diaz Rodríguez (3), Krzysztof Piotrowski (4), Jaime Chen Gallardo (3), Henrik Madsen (1) 1: Technical University of Denmark; 2: Centro de Estudios de Materiales y Control de Obra, S.A. (CEMOSA); 3: Softcrits; 4: Innovations for High Performance Microelectronics (IHP)
11284	**A14 First Practical Results Of Continuous Grid-Serving Power Control In Low-Voltage Network Via Novel Power Management Concept** Ghayathri Suriyamoorthy (1), Kamil Korotkiewicz (1), Martin Stiegler (1), Peter Kellendonk (2), Wolfgang Zander (3) 1: PSI GridConnect GmbH, Germany; 2: EEBus Initiative e.V., Germany; 3: BET GmbH, Germany
10958	**A15 Supervised Learning for Fault Classification Using Hybrid Training Datasets** Archana Ranganathan (1), Simon Tindemans (2), Frans Provoost (3) 1: Alliander N.V.; 2: Technische Universiteit Delft; 3: Qirion B.V.
11293	**A16 AI To Detect Anormal Switching Operations** Georg Achleitner (1), Werner Schöffer (2), Juergen Plesch (2), Wolfgang Huska (1) 1: Austrian Power Grid AG, Austria; 2: ARTEMES, Austria
11370	**A17 Intermittent Earth Fault Detection in Distribution Network based on the voting classification technique** Meysam Pashaei (1), Suzana Pil Ramli (2), Arta Asadi (2), Alireza Pourdaryaei (3), Mazaher Karimi (1), Kimmo Kauhaniemi (1) 1: University of Vaasa, Finland; 2: Islamic Azad University, Iran; 3: Hormozgan Regional Electric Company, Bandar Abbas, Iran
11384	**A18 Solving Issues Of The Distribution Network Of Harstad (Norway) In Real Time Using Machine Learning-Based Observability To Place Flexibility Orders** Benoît Grosjean (1), Luc Richaud (1), Nuno Pinho da Silva (2), Ângelo Casalairo (2), Gregor Černe (3) 1: Odit-e, France; 2: R&D Nester, Portugal; 3: INEA d.o.o, Slovenia

PANELS
A1 > A18

**TOUR 1
CONTROL 1**
09.00 – 10.30

LEVEL 1
FORUM

PANELS
C15 > C30

**TOUR 2
COMMU-
NICATION 1**
09.00 – 10.30

LEVEL 1
FORUM

10115	**C15 Data hub based secure integration of DER Assets with Utilities, DSO and Retail** Nirmal Thaliyil, Nobin Mathew Kalki Communication Technologies Pvt Ltd, India
10204	**C16 Innovative 5G Transmission For Anti–islanding Protection In MV Distributive Network** Etienne Toutain (1), Patrick Coudray (1), Emmanuel Villalta (2), Pierre Renaldo (3), Philippe Dauchy (4), Nicolas Bihannic (5), Philippe Bertazzon (1) 1: EDF, France; 2: ENEDIS, France; 3: Wavestone, France; 4: Nokia, France; 5: Orange, France
10256	**C17 An Implementation of IEC 61850 for Microgrid Control** Yiming Wu, Firas Daraiseh, Elise Ramqvist, Annika Larsson, Ulrika Morild Vattenfall AB, Sweden
10299	**C18 TLC Strategy For Power Distribution Grids** Daniele Rufini, Danilo vincenzo Zollo, Sara Turco, Gianluca Onori, Renzo Valente, Enrico Valigi, Francesco Amadei Enel Grids, Italy
10352	**C19 The Potential of Emerging Communications Technologies in Distribution Grid Management** Seppo Borenius (1), Pekka Kekolahti (1), Matti Lehtonen (1), Raimo Kantola (1), Heli Kokkoniemi–Tarkkanen (2), Jose Costa–Requena (1) 1: Aalto University, School of Electrical Engineering, Finland; 2: VTT Technical Research Centre of Finland
10643	**C20 Use of Low–Cost RF Mesh WAN Based Feeder Pillar Monitoring System** V T Narayanan, Vikas Koul, Nisha Dubal, Soumya Sidhamwar, Stuti Kachhwaha, Prasad Khadpe Tata Power, India
10725	**C21 5G Edge for Power System Applications** Heli Kokkoniemi–Tarkkanen (1), Petra Raussi (1), Seppo Horsmanheimo (1), Petri Hovila (2), Anna Kulmala (2), Seppo Borenius (3) 1: VTT Technical Research Centre of Finland, Finland; 2: ABB, Finland; 3: Aalto University, Finland
10760	**C22 E–REDES' IEC61850 Specification for PAS Interoperability** João Ricardo (1), Hugo Melo (2), Miguel Castanheira Marques (2), Celso Filipe Silva (2), André Pereira (2), José João Cardoso (2), Elisa Abrantes (2), Luís Pires (2), José António Gonçalves (2) 1: EDP Labelec, Portugal; 2: E–REDES, Portugal
10816	**C23 Primary Substation Protection and Control System: Future Architecture Proposal** Hugo Melo, José Gonçalves, Filipe Vale, Luís Pires E–REDES, Portugal
10999	**C24 A 5G Communication–Based Wide Area Protection Concept for Enabling Resilient and Reliable Loss of Mains Protection** Ontrei Raipala (1), Anna Kulmala (1), Petri Hovila (1), Boris–Emanuel Yazadzhiyan (2), Rui Dantas (2), Colin Scoble (2) 1: ABB, Finland; 2: UK Power Networks, UK

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PANELS
C15 > C30

**TOUR 2
COMMU-
NICATION 1**
09.00 – 10.30

LEVEL 1
FORUM

11042	**C25 Validation Of MPLS–TP For Tele–Protection / Current Differential Protection Services Via Proof Of Concept** Davy Haegdorens (1), Mohd Mokhlis Abdul Wahib (2), Gurdial Singh Nacatar Singh (3), Mohd Nasim Zakaria (3), Muzalifah Hanim Zarmani (4), Ahmad Farid Mohd Perdaus (3), Rahimah Uzir (3) 1: OTN Systems, Belgium; 2: Tele–Flow Corporation Sdn Bhd, Malaysia; 3: Tenaga Nasional Berhad, Malaysia; 4: TNB Researcher Sdn Bhd, Malaysia
11124	**C26 Building a Realistic Sampler to Emulate Communication Delays in PLC–Operated Low Voltage Networks** Mahmoud Rashad Ahmed, José Manuel Cano, Pablo Arboleya University of Oviedo, Spain
11207	**C27 Four Problems for Digital Substations I wish to be solved** Fred Steinhauser OMICRON electronics, Austria
11373	**C28 Concept And Implementation Of A Gird Simulation Framework Utilizing Containerized IEC 61850 Compatible IED** Shuo Chen (1,2), Jeromie Morris (3), Zhiyu Lu (1,2), Gerd Heilscher (1) 1: Ulm University of Applied Sciences, Germany; 2: Ulm University, Germany; 3: Netze BW GmbH, Germany
11389	**C29 Low Voltage as the final frontier for Broadband over Power Line** Inigo Berganza, Alberto Sendin, Raquel Ayala, Sebastian Gomez Iberdrola, Spain
11506	**C30 Real Time Digital Simulation and IEC 61850 Standard: Interoperability Test Between OPAL–RT and Typhoon HIL Simulators** Adriano Morais (1), Jhonathan Cassol (1), Ângelo Felipe Sartori (1), Daniel Bernardon (1), Diomar Lima (1), Wagner Hokama (2), Julia Beatriz Conceição (2), Ulisses Netto (3) 1: Universidade Federal de Santa Maria, Brazil; 2: CPFL Energia; 3: Federal University of Technology – Parana – Brazil

GUIDED TOURS **3 & 4** ▮ 11.00 – 12.30

PANELS
A19 > B10
+ M1 > M6

**TOUR 3
CONTROL 2
COMMU-
NICATION 2**
11.00 – 12.30

LEVEL 1
FORUM

10481	**A19 Optimised Operational Management Of Distribution Grids By Utilising Flexibilities Through Automation Of Electrical Assets Using A Multi–Agent–System Approach** David Riebesel, Simon Schramm, Gert Mehlmann, Matthias Luther Friedrich–Alexander Universität Erlangen–Nürnberg, Institute of Electrical Energy Systems, Germany
10602	**A20 A Real–Time Optimal Operation Strategy for Active and Reactive Power Sources in Smart Distribution Systems** Akbar Bayat (1), Amir Bagheri (2), Saeed Behzadi (2) 1: Zanjan Electric Distribution Company Zanjan, Iran; 2: Department of Electrical Engineering, University of Zanjan, Zanjan, Iran

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**PANELS
A19 > B10
+ M1 > M6**

**TOUR 3
CONTROL 2
COMMU-
NICATION 2**
11.00 – 12.30

LEVEL 1
FORUM

10736	**A21 Converter–Driven Stability In A Distribution Grid With High Penetration Of Inverter–Based Generation** Phuong Huynh Minh (1), Arshpreet Singh (1), Vincent Debusschere (1), Nouredine Hadjsaid (1,3), Marie–Cécile Alvarez–Hérault (1), Xavier Legrand (2), Benoit Bouzigon (2) 1: University Grenoble Alpes, CNRS, Grenoble INP, G2ELab; 2: Enedis; 3: Nanyang Technological University
10815	**A22 Selfhealing – FLISR in Underground and Overhead Real the First Performance Results** José Gonçalves, Rita Ramilo Cadete, João Carvalho, Rui Parreira, João Nunes Carreira, Carlos Fortunato, Paulo Ribeiro, Sérgio Lopes, João Rosa, Ricardo Nunes, João Basílio, Miguel Grossinho E–REDES, Portugal
10955	**M6 A Study on the Fault Current Limiting and Interrupting Operation Technology of MVDC Systems Using a Protective Equipment** Kyu–Hoon Park, Muhammad Usman, Il Kwon, Yu–Jin Kwak, Bang–Wook Lee Hanyang University, Korea, Republic of (South Korea)
11144	**M5 A24 PMU–Based State Estimation and Fault Analysis in Active Distribution Grids: A Case Study for Kythnos Island, Greece** Themistoklis Xygkis, Orestis Darmis, Georgios Karvelis, Aris Dimeas, George Korres, Nikos Hatziargyriou National Technical University of Athens, Greece
11189	**M4 Equivalent DC Impedance of a Three–phase Impedance through an Inverter** Quentin Delhaye, Marc Bekemans, Emmanuel De Jaeger UCLouvain, Belgium
11218	**M3 Semi–Distributed Automatic Scheme for Self–Healing Implementation in Distribution System** Candra Agus Dwi Wahyudi, Karina Monica, Luthfi Arsyadani PT PLN (Persero), Indonesia
11248	**M2 Implementation Of An Advanced Remote Engineering Platform** Indrek Künnapuu (1), Rene Voog (2), Ameen Hamdon (3) 1: Elektrilevi OÜ; 2: Enefit Connect OÜ; 3: SUBNET Solutions Inc.
11306	**M1 An Edge–Fog Computing Approach For Advanced Distribution Management Systems For The Low–Voltage Network** Matias Ariel Kippke, Leo Marcelo Villalba, Pablo Arboleya Arboleya Universidad de Oviedo – Laboratory for Electrical Energy Management Unified Research (LEMUR), Spain
11318	**B1 Control Architecture and Algorithms for Isolated Microgrids** Cosimo Iurlaro (2), Lucio Barbato (1), Gianpatrizio Bianco (1), Sergio Bruno (2), Gianni Ceneri (1), Massimo La Scala (2), Luigi Mascolo (1), Marco Menga (1), Chiara Micillo (3), Francesco Renna (1), Gianluca Sapienza (1) 1: Gridspertise Srl, Italy; 2: Politecnico di Bari, Italy; 3: e–distribuzione SpA, Italy

**PANELS
A19 > B10
+ M1 > M6**

**TOUR 3
CONTROL 2
COMMU-
NICATION 2**
11.00 – 12.30

LEVEL 1
FORUM

11401	**B2 Demonstration of a Concept for the Data Management and Monitoring of Larger Scale DER Utilizing a Time–series Database** Zhiyu Lu (1,2), Shuo Chen (1,2), Gerd Heilscher (1) 1: Ulm University of Applied Sciences, Germany; 2: Ulm University,Germany
10429	**B3 Distributed Ledger Technology for Monitoring Operations Carried out on the Embedded Generation Units** David Vangulick (1,2), Saul Escalona (2), Damien Ernst (2) 1: ORES, Belgium; 2: ULIEGE
10446	**B4 A Cyber–Physical Digital Twin Approach to Replicating Realistic Multi–Stage Cyberattacks on Smart Grids** Ömer Sen (1), Nathalie Bleser (2), Martin Henze (3), Andreas Ulbig (2) 1: Fraunhofer FIT, Germany; 2: IAEW at RWTH Aachen, Germany; 3: Fraunhofer FKIE, Germany
10612	**B5 Is the Cybersecurity Standard IEC62443 Applicable to Distribution Substations?** Juha Rintala (1), Mika Loukkalahti (2), Shyam Musunuri (3), Joose Haapaniemi (4), Christoph Hampel (3) 1: Siemens Osakeyhtiö; 2: Helen Sähköverkko Oy; 3: Siemens AG; 4: Helen Oy
10777	**B6 Secure and Resilient IoT and Cloud–Based Infrastructure for Electric Vehicles Recharge Systems** Elisa Albanese, Roberta Terruggia Ricerca sul Sistema Energetico – RSE S.p.A., Italy
10808	**B7 Root/Chain of Trust in Complex Energy Distribution Systems** Imanol Garcia–Pastor, Sandra Plaza, Manuel Morillo Ingeteam Power Technology, Spain
11181	**B8 Operational Considerations for Substation Security** Abhilash Appukuttan, Andrew Darby, Abraham Varghese GE, United Kingdom
11197	**B9 Interoperability Raises Two Challenges: Cybersecurity & Maintenance** Mathieu Salles, Hervé Bigeard Schneider Electric, France
11474	**B10 Performance Evaluations For The Configuration Of IEC 62351 Cybersecurity Profiles In Energy Telecontrol Scenarios** Mauro G. Todeschini, Giovanna Dondossola RSE S.p.A., Italy
10178	**C31 Detection and Location of Single Phase Faults in New 10(20) kV Distribution Networks** Seila Gruhonjic Ferhatbegovic (1), Zijad Bajramovic (1,2) 1: PE Elektroprivreda B&H, Bosnia and Herzegovina; 2: Faculty of Electrical Engineering, University of Sarajevo
10210	**C32 A Study on Automatic Fault Isolation of Closed Loop System in Power Distribution System** Chung min Lee, Sang hyun Park, Hak Yeol Park, Soon gu Kang, Un jung Jeong Distribution Business Department / KEPCO KDN, Korea, Republic of (South Korea)

**PANELS
C31 > D14
TOUR 4
PROTECTION 1**
11.00 – 12.30

10488

C33 Estimation Of TOVs Due To Single Phase To Earth Fault By Means Validated Model By Comparison With Measurements From Real Fault Tests
Luigi D'Orazio (1), Alberto Cerretti (1), Gianluca Sapienza (2), Stefano Riva (2), Pietro Paulon (2)
1: ENEL, Italy; 2: Grispertise, Italy

10519

C34 A Robust Fault Location Method for MV Distribution Feeders
Alexandre Bach, Trung Dung Le, Marc Petit
Université Paris-Saclay, CentraleSupelec, CNRS, Laboratoire de Génie Electrique et Electronique de Paris, 91192, Gif-sur-Yvette, France. Sorbonne Université, CNRS, Laboratoire de Génie Electrique et Electronique de Paris, 75252, Paris, France

10526

C35 Fault Location Method for Medium Voltage Cables Using Measured Sheaths Current in the Presence of Renewable Energy Resources
Arman Ghaderi Baayeh, Michael Kleemann
KU Leuven, Technology Campus Ghent, Belgium

10788

C36 Field Validation of a Novel Fault Location Solution Using Synchronized Phasor Measurements in Active Distribution Networks
Mayank Nagendran, Lorenzo Zanni, Paolo Romano, Marco Pignati
Zaphiro Technologies, Switzerland

10951

D1 Fault Location for Multi-Terminal Lines
Cezary Dzienis (1), Joerg Blumschein (2), Jens Hauschild (3), Fabian Baltrusch (1)
1: University of Applied Sciences, Germany; 2: Siemens AG; 3: 50Hertz Transmission

10974

D2 Phase-to-Earth Faults Causing Inaccuracy of Distance Protection in Low Impedance Earthed Power Systems
Rainer Luxenburger (1), Gregor Policht (2), Michael Albert (1)
1: OMICRON, Germany; 2: Netze BW GmbH

11304

D3 High Impedance Fault Detection for MV Distribution Networks
Roberto Cimadevilla, Alex Moreno
ZIV, Spain

10266

D4 Pilot Test of the Method Vdip for an Earth Fault Localization
David Topolanek (1), Vaclav Vycital (1), Vit Krcal (1), Jan Grossmann (2), Michal Jurik (3)
1: Brno University of Technology, Czech Republic; 2: ELVAC a.s.; 3: EG.D, a.s.

10401

D5 Optimising the Safety, Reliability and Efficiency of rural distribution networks
Hugh Borland (1), Wojciech Petrowski (2)
1: Anseris IQ, Ireland; 2: Anseris IQ, Poland

10504

D6 Differential Voltage Grid Protection
Mauro Sergio Silveira, Alexandre Vieira de Oliveira, Eliana Roratto de Andrade, Heliton de Oliveira Vilibor, Odair José Schirmer, Leonardo do Nascimento Pereira
CPFL, Brazil

PANELS
C31 > D14

**TOUR 4
PROTECTION 1**
11.00 – 12.30

LEVEL 1
FORUM

10647

D7 Novel Touch Voltage-Based Earth-Fault Current Protection For Ensuring Dependability And Electrical Safety In Modern Compensated MV-Distribution Networks
Ari Wahlroos (1), Janne Altonen (1), Sakari Kauppinen (2), Hanna-Mari Aalto (3), Risto Pitkänen (4)
1: ABB Oy, Finland; 2: ALVA Sähköverkko Oy, Finland; 3: Elenia Verkko Oyj, Finland; 4: Finland

10655

D8 The impact of Neutral Treatment and Earth Fault Protection on Resiliece and Reliability of High Voltage Grid
Klaus Winter (1), Johan Hollander (2), Viacheslav Levashov (2)
1: Holmgren Institute Stockholm; 2: Swedish Neutral Company

10744

D9 Improved Method for Earth Fault Location in MV Distribution Networks with Compensated Neutral Grounding
Elie Salhab (1,2), Marc Petit (2), Trung Dung Le (2), Dominique Croteau (1), Quentin Lebourg (1)
1: EDF R&D, France; 2: CentraleSupélec, GeePs, France

11172

D10 Evaluation and Influences of Harmonic Earth Fault Currents
Ari Nikander, Pertti Pakonen
Tampere University, Finland

11343

D11 Improvement Of Cable Fault Performance Using A Ground Resistor In Series With An Artificial Neutral
Andre Neves, Luis Rosa, Jose Soares, Paulo Bras, Paulo Lopes, Ines Almeida, Hugo Melo, Miguel Louro
E-REDES, Portugal

10344

D12 Requirements For Generating Plants To Be Connected In Parallel With Distribution Networks - Focus On EN 50549 Series
Alberto Cerretti (1), Christian Noce (2), Herve Rochereau (3), Thoms Schaupp (4)
1: ENEL, Italy; 2: Enel X, Italy; 3: EDF, France; 4: TransnetDW GmbH, Germany

10717

D13 A Validation of IED for Networked Distribution System
Woo-Hyun Kim, Woo-Kyu Chae, Hyeon-Myeong Lee, Ju-Yong Kim
KEPRI, Korea, Republic of (South Korea)

11311

D14 Protection System Analysis in Microgrids with DSO Static Generation
Bruno Ceresoli (3), Lucio Barbato (1), Gianpatrizio Bianco (1), Gianni Ceneri (1), Ettore De Berardinis (3), Luigi Mascolo (1), Chiara Micillo (2)
1: Gridspertise Srl, Italy; 2: e-distribuzione SpA, Italy; 3: CESI SpA, Italy

PANELS
C31 > D14

**TOUR 4
PROTECTION 1**
11.00 – 12.30

LEVEL 1
FORUM

POSTER SESSION 4
PROTECTION, CONTROL & AUTOMATION

LEVEL 1 ▮ FORUM

POSTER SESSION 4
PROTECTION, CONTROL & AUTOMATION

LEVEL 1 ▮ FORUM

GUIDED TOURS 5 & 6 ▮ 14.30 – 16.00

10116	**B11 Standard IEC 61850 based real-time DER interface for The Netherlands** René Troost (1), Sjors van der Heijden (1), Rik Fonteijn (2), Alain Stuivenvolt (2), Davood Mohammadi Sooran (4), Bas Mulder (4), Joris van Leeuwen (5), Rob van Olst (3), Nuno Pereira (6), Elvira Sanchez Ortiz (6), Bart Pluijms (3) 1: Stedin; 2: Enexis; 3: Alliander; 4: TenneT; 5: Holland Solar / NWEA / EnergieSamen; 6: ENCS
10276	**B12 Success deployment of 6 digital substations in Vietnam 2020-21 – Return of experience** Van Ngo Ha (2), Tuan Thanh Bui (3), Hung Hoang (4), Dang-Thoang Vo (4), Chin-Fei Chow (5), Chee Pinp Teoh (1) 1: GE Renewal Energy, United Kingdom; 2: EGRID, Vietnam; 3: AIT Corporation, Vietnam; 4: GE Renewal Energy, Vietnam; 5: GE Renewal Energy, Singapore
10314	**B13 An Efficient Hybrid Control and Protection Strategy for Frequency Regulation of Low-Inertia Power System** Ahmed Elmelegi (1), Loai Nasrat (2), Mokhtar Aly (3), Emad A. Mohamed (2) 1: Upper Egypt Electricity Distribution Company, Egypt; 2: Aswan University, Faculty of Engineering, Egypt; 3: San Sebastian University, Chile
10473	**B14 Practical Review And Advancements In Testing Multi-Vendor Digital Substations** Rick Loenders (1), Thomas Lisiecki (2), Iskender Yesil (2), Dirk Van Hertem (1) 1: KULeuven; 2: Tractebel, Belgium
10690	**B15 Frequency Droop Characteristic for Grid Forming Battery Inverters – Operation in Islanded Grids with the Infeed of Distributed Generation Systems** Tobias Lechner (1), Sebastian Seifried (1), Johanna Timmermann (2), Claudia Bernecker-Castro (2), Georg Kerber (3), Kathrin Schaarschmidt (4), Steffen Herrmann (5), Michael Finkel (1), Rolf Witzmann (2) 1: Augsburg University of Applied Sciences, Germany; 2: Technical University of Munich, Germany; 3: Munich University of Applied Sciences, Germany; 4: LEW Verteilnetz GmbH, Germany; 5: AVS Aggregatebau GmbH, Germany
11018	**B16 Alternative Low-Frequency Demand Disconnection (LFDD) Solutions for UK Distribution Network Operator Implementation** Abdullah Emhemed (1), Nathan Bryson (2), Ryan Huxtable (3), Can Li (4) 1: WSP UK Limited, United Kingdom; 2: WSP UK Limited, United Kingdom; 3: National Grid; 4: National Grid ESO
11033	**B17 Decentralized Management of Distributed Energy Resources for Frequency Support – Finnish Pilot** Matti Aro (1), Jerome Ferrari (2), Mikael Opas (1), Raphael Caire (2) 1: VTT Technical Research Centre of Finland, Finland; 2: Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, Grenoble, France

PANELS
B11 > B31

**TOUR 5
AUTOMATION 1**
14.30 – 16.00

LEVEL 1
FORUM

11078	**B18 Automated MV Switching Based On AMI Data** Rui Filipe Parreira, José Eduardo Sousa, João Nunes Carreira E-Redes, Portugal
10104	**B19 Generation of Synthetic Examples Using Generative Adversarial Networks (GAN) to Extend a Database of Fault Signals on Power Distribution Lines** Javier Granado Fornás (1), Elías Herrero Jaraba (2), Andrés Llombart Estopiñan (1) 1: Fundación Circe, Spain; 2: Universidad de Zaragoza
10191	**B20 Machine Learning Based Grid Optimization Algorithm for Real-time Applications** Andreas Winter (1,2), Michael Igel (1), Peter Schegner (2) 1: Hochschule für Technik und Wirtschaft des Saarlandes, Germany; 2: Technische Universität Dresden, Germany
10378	**B21 A Physical-Neural Network Approach For Residential Load Forecasting With Dynamic Load Control** Taha Nakabi (1), Christina Brester (2), Mikko Kolehmainen (2), Harri Niska (2) 1: Tecnotree Ltd; 2: University of Eastern Finland, Finland
10450	**B22 Performance Evaluation of an Autoencoder State Estimator with Realistic Low Voltage Grids Reconstructed from Open Data** Elio El Semaan (1,2,3), Dat Tien Nguyen (1,2), Alessio Iovine (2), Trung Dung Le (1), Philippe Dessante (1), Keddy Kamga (3), Dominique Croteau (3), Mouna Rifi (3) 1: GeePs, CentraleSupélec, France; 2: L2S, CentraleSupélec, France; 3: EDF R&D, France
10524	**B23 AI-Based Controller for Grid-forming Inverter-Based Generators Under Extreme Dynamics** Hassan Issa (1), Vincent Debusschere (2), Lauric Garbuio (2), Philippe Lalanda (1), Nouredine Hadjsaid (2) 1: Univ. Grenoble Alpes; 2: Grenoble INP
10597	**B24 Machine-Learnt State Estimation For Optimization In Low Voltage Distribution Grids** Sarah Reisenbauer (1), Bharath-Varsh Rao (1), Gregor Taljan (2) 1: AIT Austrian Institute of Technology GmbH, Austria; 2: Energienetze Steiermark GmbH
11022	**B25 Object Detection Algorithms Applied On Low Voltage Grid Equipment** Mohcine El Harras (1), Christophe Birkle (2), Julien Bruschi (1), Samuel Sallaud (1) 1: EDF R&D, France; 2: Enedis, France
11276	**B26 Edge Computing for Improving Energy Management in Smart Homes** Surender Redhu (1), Aditya Singh (2), Bernt A. Bremdal (1,3) 1: Smart Innovation Norway, Norway; 2: Indian Institute of Technology Kanpur, India; 3: University of Tromsø, Norway

PANELS
B11 > B31

**TOUR 5
AUTOMATION 1**
14.30 – 16.00

LEVEL 1
FORUM

PANELS
B11 > B31

**TOUR 5
AUTOMATION 1**
14.30 – 16.00

LEVEL 1
FORUM

10156	**B27 Voltage Regulations Solutions for Low Voltage Distribution Network with Large PVs Integration: Performance Analysis with A Real Swiss Case** Baoling Guo (1), Ludovic Pignat (2), Julien Pouget (1), Nicolas Jordan (1), Didier Blatter (1), Guido Köppel (3) 1: HES–SO, 1950, Sion, Valais, Switzerland; 2: OIKEN, 1950, Sion, Valais, Switzerland; 3: Enbag group, 3900, Brig, Valais, Switzerland
10166	**B28 Analysis of Control Algorithms on Different Low–Voltage Grid Clusters** Veronika Barta (1), Sonja Baumgartner (2), Armin Dulisch (1), Stephanie Uhrig (1), Rolf Witzmann (3) 1: HM University of Applied Sciences Munich, Germany; 2: LEW Verteilnetz GmbH; 3: TUM Technical University of Munich
10189	**B29 Detection of Neutral Loss in Distribution Networks Using Smart Meters Records** Tania Vázquez E-REDES (EDP networks Spain), Spain
10226	**B30 Optimized Provision of Local Ancillary Services With Sensitivity Factors Using Prosumer Flexibility** Carsten Wegkamp, Mattias Hadlak, Henrik Wagner, Julius Kohlhepp, Bernd Engel Elenia, Technische Universität Braunschweig, Germany
10238	**B31 Evaluating State Estimation Performance On Distribution Circuits With High PV Penetration** Jens Schoene, Muhammad Humayan EnerNex, United States of America

PANELS
D15 > E8

**TOUR 6
PROTECTION 2**
14.30 – 16.00

LEVEL 1
FORUM

10284	**D15 Experimental Validation of a Novel Stator Interturn Fault Detection Method in Induction Motor** Simi Valsan, Arinjai Gupta, Ranjeet Kumar ABB, India
10541	**D16 A Comparison Between Different Inertia Estimation Algorithms in Smart Grids Applications** Davide Gotti (1), Pablo Ledesma Larrea (1), Hortensia Amaris Duarte (1), Samuele Grillo (2) 1: Universidad Carlos III de Madrid, Spain; 2: Politecnico di Milano, Italy
10729	**D17 Implementation and Test of Frequency Estimation Methods for RoCoF–based Load Switching in Islanded Grids** Sebastian Seifried (1), Simon Fischer (1), Dominik J. Storch (1), Tobias Lechner (1), Michael Finkel (1), Rolf Witzmann (2) 1: University of Applied Sciences Augsburg; 2: Technical University of Munich
10856	**D18 Distribution Network Fault Prediction Utilising Protection Relay Disturbance Recordings and Machine Learning** Ebrahim Balouji (1), Karl Bäckström (1), Viktor Olsson (1), Petri Hovila (2), Henry X. Niveri (2), Anna Kulmala (2), Ari Salo (3) 1: Eneryield; 2: ABB; 3: Vaasan Sähköverkko

PANELS
D15 > E8

**TOUR 6
PROTECTION 2**
14.30 – 16.00

LEVEL 1
FORUM

10988	**D19 Hardware–In–The–Loop Investigation Of Distance Protection Algorithm In Grids With Dominant Decentralized Generation Units** Manuel Galler, Philipp Hackl, Robert Schürhuber University of Technology Graz, Austria
11038	**D20 A New Adaptive Auto Reclosure Approach With Secondary Arc Detection** Angelika Vogel, Yilmaz Yelgin Siemens AG, Germany
11382	**D21 Advancing the Capabilities of OpenDSS: A Directional Overcurrent Relay Feature for Modelling Modern Microprocessor Network Protector Operation Modes** Celso Rocha (1), Andres Ovalle (1), Aadityaa Padmanabhan (1), Sean McGuinness (2) 1: Electric Power Research Institute (EPRI), United States of America; 2: EPRI Europe DAC, Ireland
11383	**D22 EPRI Distribution Protection Analysis Toolkit** Andres Ovalle (1), Sean McGuinness (2), Aadityaa Padmanabhan (1), Celso Rocha (1), John Bannon (3), Mychal Kistler (3), Arun Doodnauth (3) 1: Electric Power Research Institute, United States of America; 2: EPRI Europe DAC, Ireland; 3: PPL Electric Utilities, United States of America
10187	**D23 Experience Sharing : Self Powered Relays – Simulated Over Current Phase & Earth Fault Testing** Vijay Shah, Yogesh Bhamare, Arpita Leua, Harshit Surati ABB India Ltd, India
10435	**D24 Open Phase Fault Analysis in MV Distribution Grids with Resonant Grounding** Tomáš Škumát, Martin Horák Západoslovenská distribučná, a. s., Slovak Republic
10551	**D25 A Study on the Protection Scheme for LVDC Distribution System in Commercial Buildings** Ducksu Lee, Jonghyun Lee, Seongyong Lee, Jihong Kim HYUNDAI ELECTRIC & ENERGY SYSTEMS CO., LTD., Korea, Republic of (South Korea)
10582	**D26 HIL Testing and Future–Proofing of UFLS Schemes** Patrick Favre–Perrod (1), Marco Burri (5), Michael Schueller (2), Nicolas Stieger (2), Walter Sattinger (3), Bruno Wartmann (4) 1: HES–SO, Switzerland; 2: OST, Switzerland; 3: Swissgrid, Switzerland; 4: ewz, Switzerland; 5: BKW, Switzerland
10646	**E1 Multidomain Considerations Of Secondary Maintenance Approaches To Ensure The Reliability Of Network Protection Systems** Oliver Skrbinjek (1), Horst Paar (1), Christian Michalka (2), Richard Marenbach (2) 1: Energienetze Steiermark GmbH, Austria; 2: OMICRON electronics Deutschland GmbH

POSTER SESSION 4
LEVEL 1 ▮ FORUM
PROTECTION, CONTROL & AUTOMATION

POSTER SESSION 4
LEVEL 1 ▮ FORUM
PROTECTION, CONTROL & AUTOMATION

**PANELS
D15 > E8**

**TOUR 6
PROTECTION 2**
14.30 – 16.00

**LEVEL 1
FORUM**

10877	**E2 Performance Of A Digital Distance Protection Relay During Short Circuits In Presence Of A Converter Connected Grid** Maximilian Heinz Brestan (1), Manuel Galler (1), Georg Achleitner (2), Lothar Fickert (1), Robert Schuerhuber (1) 1: Graz University of Technology, Austria; 2: Austrian Power Grid, Austria
10995	**E3 Challenge: Frequency Measurement In Different Applications** Michael Albert, Rainer Luxenburger OMICRON electronics Deutschland GmbH, Germany
11037	**E4 Key Performance Indicators (KPI) For The Testing Process Of An IED** Michael Albert OMICRON electronics Deutschland GmbH, Germany
11128	**E5 Optimized Low Voltage Power Fuses For Current Requirements In Low Voltage Power Grids** Lukas Büttner (1), Christian Hildmann (1), Stephan Schlegel (1), Markus Lippold (2) 1: TU Dresden, Germany; 2: SIBA GmbH
11200	**E6 Interconnected Grid Protection Systems – Reference Grid For Testing An Adaptive Protection Scheme** Tobias Lorz (1), Johann Jaeger (1), Antigona Selimaj (4), Immanuel Hacker (4), Andreas Ulbig (4), Jan-Peter Heckel (6), Christian Becker (6), Markus Dahlmanns (5), Ina Berenice Fink (5), Klaus Wehrle (5), Gerrit Erichsen (3), Michael Schindler (7), Rainer Luxenburger (8), Guosong Lin (2) 1: FAU Erlangen-Nuernberg, Germany; 2: Siemens AG; 3: Schleswig-Holstein Netz AG; 4: RWTH-Aachen - IAEW; 5: RWTH-Aachen – COMSYS; 6: TUHH - IEET; 7: Lechwerke AG; 8: OMICRON electronics GmbH
11274	**E7 Secondary Wiring Checks by Combining Sawtooth Polarity Detection and Voltage Measurement** Josef Schmidbauer (1), Tim Walker (2) 1: OMICRON Electronics, Austria; 2: OMICRON Electronics, USA
11280	**E8 Functional Testing of Virtualized and Centralized Protection Systems** Janne Starck (1), Jani Valtari (1), Robert Coggan (2), Juanita Dominguez (2), Christopher Pritchard (3) 1: ABB, Finland; 2: Energy Queensland, Australia; 3: Omicron, Austria

| GUIDED TOURS 7 & 8 ▮ 16.30 – 18.00 |

**TOUR 7
AUTOMATION 2**
16.30 – 18.00

| 10291 | **B32 QUEST - An Overarching System Control Solution**
Mark Collins (1), Milena Jajcanin (2), Kieran Bailey (3), Colin MacKenzie (1), Stephen Stott (3), Elizabeth Macharia (4)
1: Smarter Grid Solutions, United Kingdom; 2: Schneider Electric, Serbia; 3: Electricity North West Ltd., United Kingdom; 4: Fundamentals Ltd., United Kingdom |

**PANELS
B32 > C14**

**TOUR 7
AUTOMATION 2**
16.30 – 18.00

**LEVEL 1
FORUM**

10296	**B33 GEMS: Development Of Automated Generator Dispatch For The Purpose Of Maximising Built Asset Utilization** Daniel Lafferty, Jennifer MacKenzie, Cristina Fundulea, Catherine Edwards, Bojana Djukic, Diyar Kadar SP Energy Networks, United Kingdom
10303	**B34 Voltage Regulation in a LV Distribution Network (With Renewables, Storage Systems and Electric Vehicles) – An Optimization Formulation** Michel Minoux (1), Dominique Croteau (2), Andrea Laugere (2), Riadh Zorgati (2) 1: Paris-Sorbonne University; 2: EDF Lab Paris Saclay, France
10880	**B35 Voltage Regulation in the LV Network with Variable Generation Based on Online Measurements from Smart Meters with the use of the On-Load Tap Changer** Slawomir Noske (1), Adam Babs (2), Lukasz Kajda (2), Miroslaw Matusewicz (1) 1: ENERGA-OPERATOR SA, Poland; 2: Institute of Power Engineering Poland
11085	**B36 Load Modelling for Volt-var Optimization Control in Limited Network Visibility – a Case Study in Malaysia** Chin Kim Lo (1), Shong Ching Calvin Ku (2), Azlan Abdul Rahim (1) 1: TNB Research Sdn. Bhd., Malaysia; 2: Tenaga Nasional Berhad, Malaysia
11173	**C1 Development of Local Autonomous Method for Power Distribution System with Battery Storage System** Naoyuki Takahashi, Kentaro Fukushima, Hiroyuki Hatta Central Research Institute of Electric Power Industry, Japan
11216	**C2 Architecture of Advanced Distribution Grid Voltage Control Method Utilizing Edge Computing Solution** Sami Repo (1), Antti Supponen (1), Kalle Ruuth (1), Kenneth Rosenørn (2), Michael Møller (3) 1: Tampere University, Finland; 2: Green power Denmark; 3: RAH A/S
11419	**C3 Decentralized Grid Control Using Power Grid State Estimation** Eberhard Waffenschmidt, Markus de Koster, Christian Hotz, Sergej Baum, Ingo Stadler TH-Köln, Germany
11479	**C4 Development of Photovoltaic Power Generation Output Estimation Method Using Distribution System Sensor Information** Kentaro Nagata, Naoyuki Takahashi, Satoshi Uemura Central Research Institute of Electric Power Industry, Japan
10249	**C5 Smart Meters for Grid State Identification with Use Case for Agent-based Local Energy and Flexibility Markets** Markus Koch (1), Martin Asman (1), Markus Zdrallek (1), Ghayathri Suriyamoorthy (2), Kamil Korotkiewicz (2) 1: University of Wuppertal, Germany; 2: PSI Grid Connect GmbH, Germany

10286

C6 Using Smart Meters Infrastructure to Implement Smart Street Lighting
Mostafa Hoorzad, Amir Khazaee, Hossein Delavaripour, Ramin Afshar
Mashhad Electric Energy Distribution Company, Iran, Islamic Republic of

10305

C7 Metric for Analysing Cooperative and Competitive Algorithms for Distributed Frequency Control in Microgrids
Maximilian Kilthau (1), Alexandra Karmann (1), Christian Derksen (2), Alexander Fay (1)
1: Helmut Schmidt University / University of the Federal Armed Forces Hamburg, Germany; 2: University of Duisburg-Essen, Germany

10600

C8 An Interoperability-by-Design Approach For Designing Smart Grid Solutions
Jawad Kazmi (1), Mark Stefan (1), Marjolaine Farre (2)
1: AIT Austrian Institute of Technology GmbH, Austria; 2: Trialog, France

10603

C9 Microgrid Control Strategy to Achieve Seamless Transition from Grid Connected to Islanded Mode
Samuel Kamajaya (1,2), Jerome Buire (1), Raphael Caire (1), Seddik Bacha (1), Jean Wild (2)
1: Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, Grenoble, France; 2: Schneider Electric, France

10604

C10 Microgrid Realtime Control for Transient Modes: Development, Simulation and Experimental Validation in Full-scale
Thai Phuong Do, Said Daoudi, Gregory Pais, Emile Bigot, Yassine Naimi, Xavier Le Pivert
Univ . Grenoble Alpes, CEA, Liten, Campus Ines, 73375 Le Bourget du Lac, France

10971

C11 LV Automation Solutions for Resilient, Flexible and Optimized Smart Distribution Grids
Imanol López Goiti (1), Haritz Zubia Urrutia (2), Esther Plasencia Alonso (3), Markel Sanz Heras (4)
1: Merytronic; 2: Ariadna Grid; 3: Pronutec; 4: i-DE

11058

C12 Cognitive Data Fusion for Improving Flexibility in Smart Homes
Surender Redhu (1), Rameez Raja (1,2), Bernt A. Bremdal (1,3)
1: Smart Innovation Norway, Norway; 2: Østfold University College, Norway; 3: University of Tromsø, Norway

11368

C13 Grid-Forming Control Modelling and Validation for Distribution Systems with Networkable Microgrids
Jay Ramesh Sawant, Rishabh Jain, Annabelle Pratt
National Renewable Energy Laboratory, United States of America

11480

C14 The Smart Grid Lab in Hesse – Active Maximization of Annual Usage Time of Electrical Grids Using Flexibilities while Ensuring Data Security and Resilience at the same time
Peter Birkner (1), Anja Schaldach (2), Ingo Jeromin (3), Athanasios Krontiris (4), Till Neukamp (6), Sophia Pfeffer (5)
1: House of Energy e.V., Germany; 2: House of Energy e.V., Germany; 3: Darmstadt University of Applied Sciences

PANELS
B32 > C14

**TOUR 7
AUTOMATION 2**
16.30 – 18.00

LEVEL 1
FORUM

10451

E9 A Standards-Based Engineering Framework for Virtualized Protection, Automation, and Control Systems
Nadine Kabbara (1,3), Thierry Coste (1), Jerome Cantenot (1), Adrien Vialle (1), Hugo Morais (2), Madeleine Gibescue (3)
1: EDF R&D, France; 2: INESC-ID, Portugal; 3: Utrecht University, Netherlands

10656

E10 Virtualised Centralised Protection and Control – Constellation Project Case Study
Anna Kulmala (1), Ontrei Raipala (1), Petri Hovila (1), Boris-Emanuel Yazadzhiyan (2), Rui Dantas (2), Colin Scoble (2)
1: ABB, Finland; 2: UK Power Networks

10702

E11 Real-Time Performance of Virtualised Protection and Control Software
Sandro Schönborn, Robert Birke, David Kozhaya, Thanikesavan Sivanthi
ABB Corporate Research, Switzerland

10855

E12 Real-Life Pilot Of Virtual Protection And Control – Experiences And Performance Analysis
Jani Valtari (1), Anna Kulmala (1), Sandro Schoenborn (2), Robert Birke (4), David Kozhaya (2), Jyrki Reikko (3)
1: ABB Oy, Finland; 2: ABB Corporate Research, Switzerland; 3: Caruna Oy, Finland; 4: University of Torino, Italy

11222

E13 Challenges and Considerations for the Design and Implementation of a Centralized Protection and Control Solution for MV Networks
Ana Cristina Aleixo (1), Rui Dias Jorge (1), Fernando Gomes (1), Lourenço Antunes (1), João Paulo Barraca (2), Ricardo Carvalho (2), Mário Antunes (2), Diogo Gomes (2), Clara Gouveia (3), António Carrapatoso (3), Everton Alves (3), José Andrade (3), Luís Gonçalves (4), Francisco Falcão (4), Bruno Pinho (4), Luís Pires (5)
1: Efacec; 2: IT – Instituto de Telecomunicações; 3: INESC TEC – Institute for Systems and Computer Engineering, Technology and Science; 4: ARMIS; 5: E-REDES

11227

E14 Software Defined Substation Automation
Peter Hemmer, Edwin Melenhorst, Raymond Woertman
Locamation, Netherlands, The

10326

E15 Conceptual Design of Special Protection Scheme for Enhancing Renewable Energy Integration
Jirapa Kamsamrong (1), Mohannad Aldebs (2), Henrik Kringel (3), Jürgen Meister (1)
1: OFFIS Institute, Germany; 2: TenneT TSO GmbH; 3: 50Hertz Transmission GmbH

10336

E16 Evaluation Effects And Preliminary Designing of Sheath Reactors For Mitigation of Overcurrent Flowing Through The Earthed Elements of Underground Cables Following Cross Country Faults On MV Network
Luigi D'Orazio (1), Alberto Cerretti (1), Alberto Geri (2), Fabio Massimo Gatta (2)
1: ENEL, Italy; 2: University of Rome «La Sapienza», Italy

PANELS
E9 > E25

**TOUR 8
PROTECTION 3**
16.30 – 18.00

LEVEL 1
FORUM

POSTER SESSION 4
LEVEL 1 ▮ FORUM   **PROTECTION, CONTROL & AUTOMATION**

POSTER SESSION 5
LEVEL 1 ▮ FORUM   **PLANNING OF POWER DISTRIBUTION SYSTEMS**

**PANELS
E9 > E25**

**TOUR 8
PROTECTION 3**
16.30 – 18.00

LEVEL 1
FORUM

10527	**E17 Arc Flash Mitigation on Main LV Switchboards by Protecting HV/LV Transformers Using Circuit Breakers** Isabelle Gal, Nicolas Choulet Schneider Electric, France
10550	**E18 Characterisation of Sequence Components of Islanded Microgrid with Low Fault Current** Nadia Afrin, Mark Hibbert, Aidan McDonnell eleXsys energy, Australia
10592	**E19 Generic Methodology For Protection Plan Analysis With Inverter-Based Grid Forming And Grid Feeding Resources** Maxime Velay, Gaetan Villeret, Benoit Jacquet, Florence Lemaitre, Boris Deneuville EDF, France
10689	**E20 On-line and Adaptive Protection System to Resolve Load Blinding Protection Scheme Limits in Networks with Highly Integrated DERs** Reza Ganjavi (1), Colin Scoble (2), Rui Dantas (2), Boris Yazadzhiyan (1), Hakan Kasap (1), Sebastian Hann (3), Georg Janick Meyer (3), Johann Jaeger (3), Nishanta Bhadra (1) 1: Siemens AG, Germany; 2: UK Power Networks; 3: Friedrich–Alexander University
10793	**E21 TVP Liquid Immersed Transformers Protection Against Fast Transients** Pawel Klys (1), Suhel Patel (2) 1: Hitachi Energy Poland; 2: Hitachi Energy India
10824	**E22 Short-Circuit Currents Characterization for Future Converter-Based Power Systems** Deepak Deepak (1), Matthias Buchner (1), Krzysztof Rudion (1), Christoph John (2), Hans Abele (2) 1: University of Stuttgart, Germany; 2: Transnet BW, Germany
10953	**E23 Investigating the Impact of Topology Changes and Distributed Renewable Generation on the Protection Behaviour at Medium-voltage Level** Antigona Selimaj, Pascal Ritzka, Immanuel Hacker, Maxim Müllender, Andreas Ulbig RWTH Aachen University, Germany
11326	**E24 Centre of Angles based Remedial Action Scheme using Synchrophasor Measurements in SP Transmission Network** Shafqat Hussnain, Muhammad Junaid SP Energy Networks, United Kingdom
11337	**E25 A New Approach To Protection In An Unconventional Distribution** Leonardo Felipe da Silva dos Santos (1), Miguel Spagnolo Martins (1), Leyla Kraulich (1), Leonardo de Freitas Silveira (1), Gustavo Marchesan (1), Aécio de Lima Oliveira (1), Ghendy Cardoso Junior (1), Rogimar Matias Rêgo (2) 1: Universidade Federal de Santa Maria, Brazil; 2: Grupo Equatorial Energia / CEEE-D

**PANELS
F1 > F21**

**TOUR 1
RISK ASSESSMENT AND ASSET MANAGEMENT1 & NETWORK DEVELOPMENT1**
09.00 – 10.30

LEVEL 1
FORUM

GUIDED TOURS 1 & 2 ▮ 09.00 – 10.30	
10370	**F1 Data-driven AI Network Analysis** Andrea Vermigli, Giulia Serafini, Gabriele Licasale, Alessio Montone Enel Grids
11202	**F2 AI Supported Analysis Of Faults Caused By Atmospheric Exposures In Medium and Low Voltage Grids For Evaluation And Development Of Asset Management Strategies** Sebastian Storch (1), Martin Uhrig (2), Michael Finkel (1) 1: Augsburg University of Applied Sciences, Germany; 2: LEW Verteilnetz GmbH
10474	**F3 The Reliability Of The Electrical Distribution System Using The Markov Modeling Methodolog** Enrico Carletti, Luciano Cocchi, Francesco Amadei, Giovanni Franzone, Jessica Rizzati, Massimo Bolognesi, Pierpaolo Moschella Enel Italy
11279	**F4 Identification of a Causal Weather-QoS Model for Analysis and Planning of Distribution Networks** Letizia Ambrosetti, Alessandro Perina, Francesco Adinolfi, Carlo Laderchi, Gabriele Licasale, Alessio Montone Enel Grids, Italy
11076	**F5 Machine Learning-based Identification and Mitigation of Vulnerabilities in Distribution Systems against Natural Hazards** Balaji V Venkatasubramanian (1), Mohamed Lotfi (1), Pierluigi Mancarella (2), André Águas (3), Mohammad Javadi (4), Leonel Carvalho (4), Clara Gouveia (4), Mathaios Panteli (1) 1: University of Cyprus, Cyprus; 2: University of Manchester, UK; 3: E-REDES, Portugal; 4: INESC TEC, Portugal
10306	**F6 Six-Sigma Technique to Identify Resilience Events on Electrical Networks** Valerio Vallocchia, Agostino Galati, Carlos Alcaine Baquedano, Lilia Consiglio Enel Grids, Italy
10794	**F7 Towards Resilient Electricity Distribution Systems in Africa** Florian Sparavier (1), Céline Ramstein (2), Sébastien Leyder (1) 1: Engie Impact, Belgium; 2: World Bank, USA
11015	**F8 A Climate Change Adaptation Action Plan For The Electricity Sector: E-REDES Experience** Inês Gomes, Inês Silva, Paulo Alberto, Ricardo Prata, Carlos Lopes E-REDES, Portugal
11457	**F9 Measuring the Power Grid Resilience: A Case Study Applied to Brazilian Distribution Companies** Joisa Dutra (1), Lucas Amaro (2), Rafael Souza (1), Henrique Ennes (1), Camila Albertin (2), Rafael Gomes (2) 1: Fundação Getulio Vargas; 2: Grupo CPFL Energia

PANELS
F1 > F21

**TOUR 1
RISK
ASSESSMENT
AND ASSET
MANAGEMENT1
& NETWORK
DEVELOPMENT1**
09.00 – 10.30

LEVEL 1
FORUM

10234
F10 Case Study: Using A Probabilistic Calculation To Determine The Lifetime Costs Of Assets With Alternative Gas Insulation
Saskia Düsdieker, Katrin Veith, Frank Jenau
TU Dortund University, Germany

10347
F11 Design to Shared Value Methodology Applied to Power Grid Technologies Adoption
Carmen Santucci, Enrico Valigi, Francesco Amadei, Daniela Errico
Enel SpA, Italy

10908
F12 MV Network Maintenance Planning Decision Support Tool Considering Flexibility Of DER
Bruna Tavares (1), Jorge Pereira (1), Clara Gouveia (1), Fábio Retorta (1), Rita Lopes Mourão (2), Miguel Louro (2)
1: INESC TEC, Portugal; 2: E-REDES, Portugal

10922
F13 Distribution Asset Thermal Ratings with Evolving Load Profiles
Inalvis Fernandez Alvarez, Jouni Peppanen, Robert Sheridan, Timothy Raymond
Electric Power Research Institute, United States of America

10383
F14 Climate Adaptation Plan for Distribution Networks
Anna Lisa Frau, Gabriele Licasale, Alessio Pastore, Alessandro Rodella, Valerio Vallocchia
Enel Grids, Italy

11356
F15 Overhead Lines and Underground Cables Asset Management – Best Practices and Challenges
Ricardo Prata (1), Martin Podlogar (2), Patrick Zander (4), Odilon Faivre (5), Anne-Soizic Ranchere (6), Masoud Davoudi (3)
1: E-REDES, Portugal; 2: Elektro Ljubljana, Slovenia; 3: PG&E, USA; 4: Omicron, Germany; 5: Enedis, France; 6: Nexans, France

11302
F16 Integrated Physical And Probabilistic Modelling Of Low Voltage Cable Temperatures, Stress Cycles, And Damage
Gordon McFadzean (1), Megan Taylor (2), Zoe Hodgins (2), Gruffudd Edwards (1), Nicole Lee (2), Rosemary Tawn (1), Ben Ingham (3)
1: TNEI Services Ltd, United Kingdom; 2: Frazer-Nash Consultancy, United Kingdom; 3: Electricity North West Ltd, United Kingdom

10567
F17 Increase Hosting Capacity through Voltage Control Devices Setting Optimization Technology
WON Nam Koong (1), Won Wook Jung (1), Sung Min Cho (1), Hyeong Jin Lee (1), Pyeong Ik Hwang (2)
1: KEPCO, Korea, Republic of (South Korea); 2: Pusan National University

10753
F18 Smart Recharging Infrastructure for Companies' EV Fleets: Technical Realization and Load Balancing Potential
Andrea Cazzaniga, Giuseppe Mauri, Filippo Colzi
RSE, Italy

PANELS
F1 > F21

**TOUR 1
RISK
ASSESSMENT
AND ASSET
MANAGEMENT1
& NETWORK
DEVELOPMENT1**
09.00 – 10.30

LEVEL 1
FORUM

10833
F19 Optimised Approach to Grid Development under Consideration of Digital Solutions
Daniel Schacht (1), Christoph Schönhofen (1), Patrick Niewerth (1), Rainer Bäsmann (2)
1: FGH GmbH, Germany; 2: N-ERGIE Netz GmbH, Germany

10837
F20 Sizing Of A Power Electronics-Based Voltage Regulating Device To Support The Integration Of Photovoltaics And Electric Vehicles In LV Grids
Sabine Vieira Reinert Frello (1), Victor Lavaud (1), Romain Trimbur (1), David Frey (1), Marie-Cecile Alvarez-Herault (1), Yvon Besanger (1), Nouredine Hadjsaid (1), Michel Cordonnier (2), Guillaume Langlet (2), Leonard Bacaud (2)
1: University Grenoble Alpes, France; 2: Enedis

10860
F21 Increasing Network Intelligence: Implementing Distributed Local Automation to Reduce Power Interruptions in Distribution Networks
Aisan Rasouli (1), Christine Korssell (2), Yiming Wu (3), Anders Johnsson (2)
1: Sweco Sverige AB; 2: Vattenfall Eldistribution AB, Sweden; 3: Vattenfall AB, Sweden

PANELS
I2 > I23

**TOUR 2
NETWORK
DEVELOPMENT 2
& DISTRIBUTION
PLANNING 1**
09.00 – 10.30

LEVEL 1
FORUM

10509
I2 Grid Futurability – Network Development Strategy
Anna Lisa Frau, Agostino Galati, Marta De Vita, Gabriele Licasale
Enel Grids, Italy

10510
I3 Primary Substation Open Standardisation Through Building Information Modelling (BIM) Implementation
Alessio Gentile, Sergio Mangialavori, Germana Giannini, Giovanni Battista Franzone, Francesco Amadei
Enel Grids, Italy

10657
I4 Investment Planning For Electrification Of Transport In An Industrial Port
Farrukh, Farhan (1); Dunks, Ciara (2); Dypvik, Per Olav (3); Nygård, Heidi S. (4)
1: Smart Innovation Norway; 2: Reiner Lemoine Institut; 3: Borg Havn IKS; 4: NMBU

10707
I5 P2P Trading of RTPV Energy on Blockchain Platform
Reji Kumar Pillai, Reena Suri, Parul S
India Smart Grid Forum, India

10828
I6 The Portuguese DAR(Distribution Automation Roadmap) Toward a More Demanding Electricity Grid
José Gonçalves (1), Pedro Miguel (2), Luís Pires (1), Romeu Vitorino (3)
1: E-REDES, Portugal; 2: INESC Coimbra, Portugal; 3: IPleiria, Portugal

10921
I7 Leveraging Solar Energy Development To Achieve 100% Electrification Ratio In Nusa Tenggara Timur – Indonesia
Daniel Tampubolon, Albertus Hendriyanto, Bellarminus Mari
PT PLN INDONESIA, Indonesia

PANELS
I2 > I23

**TOUR 2
NETWORK
DEVELOPMENT 2
& DISTRIBUTION
PLANNING 1**
09.00 – 10.30

LEVEL 1
FORUM

11048	**I8 Dimensioning And Sizing Of An Energy Storage For Ports When Considering Both Fast And Slow Load Variations** Jonatan Ralf Axel Klemets (1), Kyrre Kirkbakk Fjær (1), Jens Eirik Hagen (2), Eirill Bachmann Mehammer (1), Henrik Strand (1) 1: SINTEF Energy Research, Norway; 2: Port of Oslo, Norway
11345	**I9 IANOS Project: Integrated Solutions to Decarbonise and Improve the Resilience of Electrical Power and Energy Systems in Geographical Islands** Eduardo Ruano Rodrigues (1), Ana Carvalho (1), Carlos Martins (2) 1: EDP; 2: EDA
11405	**I10 Systematic Application of Series Compensation in Distribution Networks with Control and Protection** Cíntia Veiga Claudio (1), Guilherme Ferretti Rissi (1), Carlos Eduardo Cauduro Figueiredo (1), Luis M. Duarte (2), Nelson Clodoaldo de Jesus (2), Willian Souza de Jesus (2), Seun Ahn (3), Massayuki Suzuki (3), Mateus Teixeira Duarte (4), Flávio R. Garcia (5), Patrick R. Almeida (5), João R. Cogo (2) 1: CPFL ENERGIA; 2: GSI – Engenharia e Consultoria Ltda; 3: APPITEC; 4: UFPR; 5: Bree
10455	**I11 Planning Principles for Hybrid AC/DC Underlay Grids in the Medium-Voltage Level** Maxim Müllender (1), Julian Saat (1), Lasse Empen (2), Andreas Ulbig (1) 1: IAEW at RWTH Aachen University, Germany; 2: RWTH Aachen University, Germany
10574	**I12 Economic and Technical Benefits of Integrated Power and Gas Grid Planning in Distribution Grids** Joshua Jakob (1), Marlon Koralewicz (1), Marco Kerzel (1), Markus Zdrallek (1), Louis Wayas (2), Wolfgang Köppel (2), Bastian Bauhaus (3) 1: University of Wuppertal, Germany; 2: DVGW Research Centre, Germany; 3: SWKiel Netz GmbH, Germany
11043	**I13 MVDC Grids to Facilitate the Roll out of Renewables – Findings of CIRED-WG 2021-1** Stephan Rupp (1), Sebastian Brüske (1), Graeme Burt (2), Agusti Egea-Alvarez (2), Uwe Schichler (3), Gerhard Jambrich (4) 1: Maschinenfabrik Reinhausen, Germany; 2: University of Strathclyde, UK; 3: Technical University Graz; Austria; 4: AIT Austrian Institute of Technology GmbH, Austria
10398	**I14 ENeuron Project – Facilitating The Energy Transition In A Military Campus By Optimizing A Local Energy Community** Carlos Cardoso (1), Rafael Rodrigues (1), Francisco Gomes (2), João Piedade (2), Gisela Mendes (3), Raquel Figueiredo (4), Rui Martins (4), Diogo Cabral (4,5) 1: EDP Labelec, Portugal; 2: Marinha – Portuguese Navy, Portugal; 3: EDP NEW R&D, Portugal; 4: Smart Energy Lab, Portugal; 5: Högskolan I Gävle, Sweden
10440	**I15 Main-Grid Versus Renewable MicroGrid Energy Supply A Case Study of Isolated Rural Areas in the Sultanate of Oman** Ahmed Ibrahim Abri (1), Dr. Dharmasa P P (2) 1: Mazoon Electricity Company, Oman; 2: National University

PANELS
I2 > I23

**TOUR 2
NETWORK
DEVELOPMENT 2
& DISTRIBUTION
PLANNING 1**
09.00 – 10.30

LEVEL 1
FORUM

10521	**I16 Planning Methods For DC Lateral Electrification In Rural Africa** Lucas Richard (1,2), Marie-Cécile Alvarez-Herault (1), David Frey (1), Bertrand Raison (1), Nicolas Saincy (2) 1: G2Elab, France; 2: Nanoé, France
10764	**I17 Towards the Optimisation of a DC Nanogrid Considering Technical and Environmental Criteria** Colette Garron (1,2,3), Delphine Riu (2), Nicolas Chaintreuil (1) 1: Univ. Grenoble Alpes, CEA, Liten, Campus Ines, 73375 Le Bourget du Lac, France; 2: Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, F-38000 Grenoble, France; 3: French Environment and Energy Management Agency 20, avenue du Grésillé– BP 90406 49004 Angers Cedex 01 France
10789	**I18 Self-sufficiency and Lifetime Improvement of Community BESS on an LVDC Backbone Compared to Individual BESS** Hakim Azaioud (1), Robbert Claeys (1), Jos Knockaert (1), Lieven Vandevelde (2,3), Jan Desmet (1) 1: EELab/Lemcko, Ghent University, Belgium; 2: EELab, Ghent University, Belgium; 3: Corelab MIRO, Flanders Make
11001	**I19 MVDC Distribution System Application Scenarios and Economic Analysis** Hongjoo Kim, Jintae Cho, Youngpyo Cho, Hosung Ryu, Jiwon Kee, Juyong Kim KEPCO/South Korea, Korea, Republic of (South Korea)
11413	**I20 Optimal Planning of University Campus Microgrid with High Penetration of Renewable Energy and Storage: UCCS Campus Case Study** Tarek Masaud, David Michon, Emmanuel Nwaulu University of Colorado at Colorado Springs, United States of America
11426	**I21 DC Interface For Industrial And Residential Applications** Mikael Opas, Marius Baranauskas, Kalle Rauma VTT Technical Research Centre of Finland, Finland
11250	**I22 Experience In The Implementation Of Isolated Electrical Energy Generation Systems From Renewable Energy Sources– Solar Villages** Miguel Quispe Reyes, Daniel Alejandro Nieto Lépez, Martin Lamas, Rodrigo Ces Gomez EJE SA, Argentine Republic
10570	**I23 A Comparative Study of Optimal Planning of Distribution Systems: AC/DC Architecture vs. Conventional Strategies** Heitor Farias de Barros (1), Marie-Cécile Alvarez Hérault (1), Bertrand Raison (1), Quoc Tuan Tran (2) 1: Univ. Grenoble Alpes, CNRS, Grenoble INP*, G2Elab, F-38000 Grenoble, France; 2: CEA–INES, Le Bourget du Lac, France

GUIDED TOURS 3 & 4 ▮ 11.00 – 12.30	

**PANELS
F22 > G18**

**TOUR 3
DISTRIBUTION
PLANNING 2**
11.00 – 12.30

LEVEL 1
FORUM

10272	**F22 Flexibility as a Cost-effective Solution Applied to MV Lines Investment Deferral: Guidelines to Study and Pinpoint Opportunities** Julien Lucas, Jerome Moiziard Enedis, France
10454	**F23 Flexibility Inside: How To Seamlessly Embed Flexibility In Dso Activity** Hubert Dupin, Pâmela Catrinque Martins Enedis, France
10144	**F24 Co-simulation Framework for the Provision of Flexibility Services for Distribution System Operators Using Electric Heating Systems** Yassine Naimi, Valentin Chesnet, Xavier Le Pivert CEA, France
10164	**F25 Planning Tool Of LV Network Of A MicroGrid Using Geographic Information Systems** Humberto Carneiro de Sousa (1), Isaac Boates (2), Sarah Nasr (1), Ali El Akoum (1), Philippe Lazzerini (3), Victoria Tan (4), Jean Philippe Cosperec (4) 1: EDF R&D, France; 2: EIFER, Germany; 3: EDF International Division; 4: EDF International Networks, France
10192	**F26 Partitioning of Distribution System into Resilient Clustered Microgrids Using Complex Network Approach** Divyanshi Dwivedi (1,2), Pradeep Kumar Yemula (2), Mayukha Pal (1,3) 1: ABB Ability Innovation Center, Asea Brown Boveri Company, Hyderabad 500084, India; 2: Department of Electrical Engineering, Indian Institute of Technology Hyderabad, Kandi, Sangareddy, Telangana 502285, India; 3: Corresponding Author
10251	**G1 Mitigating and Preventing Electricity Distribution Congestion and Constraints Through Energy System Integration: an Integrated Energy System Analysis at DSO level** Arjan van Voorden, Arjen Jongepier, Sangitha Harmsen, Tjebbe Vroon, Theo de Kruijf Stedin, Netherlands, The
10292	**G2 Technical Benefit Assessment for Network Automation Plans** Marta De Vita, Anna Lisa Frau, Agostino Galati, Carlos Alcaine Baquedano, Lilia Consiglio Enel Grids, Italy
10297	**G3 Nested Energy Management System to Improve the Resilience of Remote Interconnected Microgrids.** Fundiswa Mthethwa, Chandima Gomes, David Dorrell University of the Witwatersrand, South Africa
10762	**G4 Assessing The Impact Of Uncertainties Impact On The Techno-economic Performance Of Microgrids** Elsy El Sayegh (1,2), Benoît Jacquet (1), Julien Bruschi (1), Sarah Nasr (1), Nabil Sadou (2), Pierre Haessig (2), Hervé Gueguen (2) 1: EDF R&D, France; 2: CentraleSupélec, IETR, France

**PANELS
F22 > G18**

**TOUR 3
DISTRIBUTION
PLANNING 2**
11.00 – 12.30

LEVEL 1
FORUM

10766	**G5 Distribution Network Spare Capacity Unlocking Strategy (scus) to Integrate Heterogeneous Flexibilities** Jianwei Li, Shuang Cheng, Melissa Mitchell, Furong Li University of Bath, United Kingdom
10845	**G6 Probabilistic Impact Analysis Of Residential Batteries Providing FCR And aFRR On Low Voltage Grid** Lionel Delchambre (1), Tom Carron (2), Patrick Hendrick (1), Hamada Almasalma (3), Pierre Henneaux (1), Abdramane Bathily (3) 1: ULB, Belgium; 2: Sibelga, Belgium; 3: VITO, Belgium
10929	**G7 Modeling PV Facility Side – Impacts and Recommendations** Jouni Peppanen, Devin Van Zandt Electric Power Research Institute, United States of America
10943	**G8 Understanding the Effects of EV Management and TOU Tariffs on Customers and Distribution Networks** Jing Zhu, William J. Nacmanson, Luis F. Ochoa The University of Melbourne, Australia
10959	**G9 Future Of Thermal Plants On Microgrids With High Renewable Share** Matthieu Chiodetti (1), Thibaut Lafont (1), Hugo Gevret (1), Clément Huet (2), Pierre Mocellin (2) 1: EDF R&D, France; 2: EDF SEI, France
11016	**G10 Operation And Planning Services For Active Distribution Networks – A BD4OPEM Project Use Case: Spanish Pilot** Alejandro Hernandez-Matheus, Antonio Emmanuel Saldaña González, Rafaela Ribeiro, Mònica Aragüés-Peñalba, Eduard Bullich-Massagué CITEA - UPC, Spain
11030	**G11 Distribution Planning Tool using Flexible Strategies: Case Study in Spanish Pilot** Antonio Saldana-González (1), Mónica Aragüés-Peñalba (1), Andreas Sumper (1), Ramón Gallart-Fernández (2), Lluís Cànaves-Navarro (2) 1: Universidad Politécnica de Cataluña, Spain; 2: Estabanell Distribució, Spain
11034	**G12 The impact of Reinforcement Learning-based Energy Management on a microgrid physical structure** Taheni Swibki (1), Ines Ben salem (1), Youssef Kraiem (2), Lilia El Amraoui (1), Dhaker Abbes (2) 1: Smart Electricity & ICT, SEICT, LR18ES44, National Engineering School of Carthage (ENICarthage), University of Carthage, TUNISIA; 2: Univ. Lille, Arts et Metiers Institute of Technology, Centrale Lille, Junia, ULR 2697 – L2EP, Lille, France
11066	**G13 Methods and Future Scenarios for Strategic Grid Development of Full Low and Medium Voltage DSO Supply Areas** Helfried Brunner (1), Clemens Korner (1), Thomas Wieland (2), Stephan Brandl (3), Maximilian Ortner (4) 1: AIT Austrian Institute of Technology; 2: Netz Oberösterreich GmbH; 3: KNG Kärnten Netz GmbH; 4: TINETZ Tiroler Netze GmbH

PANELS
F22 > G18

**TOUR 3
DISTRIBUTION
PLANNING 2**
11.00 – 12.30

LEVEL 1
FORUM

11231	**G14 The Benefits Of Smart4RES Predictive Analytics** Catarina Martins (1), Maria Inês Marques (1), Ricardo Bessa (2), Ferinar Moaidi (2), Simon Camal (3) 1: EDP NEW, Portugal; 2: INESC TEC, Portugal; 3: MINES Paris – PSL University, France
11391	**G15 Contributions to Energy Management of Single-Phase AC Microgrids Used in Isolated Communities.** Aziz Oloroun-Shola Bissiriou, Ricardo L. of A. Ribeiro, Thiago de O. A. Rocha Universidade Federal do Rio Grande do Norte, Brazil
11406	**G16 Integrated Method for Distribution Grid Expansion Planning Considering Operational Strategies of Residential Technologies** Luis Böttcher (1), Klemens Schumann (1,2), Arthur Pereira Novaes (1), Andreas Ulbig (1,2) 1: IAEW at RWTH Aachen University, Germany; 2: Fraunhofer Center Digital Energy
11462	**G17 Distribution System Planning with models of flexibility markets** Gianni Celli, Marco Galici, Fabrizio Pilo University of Cagliari, Italy
11456	**G18 Effects Of Demand Side Management Programs in Modern Distribution Planning – Challenges and Opportunities** Davis Montenegro, Alison O'Connell, Jason Taylor EPRI, United States of America

PANELS
I24 > J4

**TOUR 4
NETWORK
DEVELOPMENT 3
& DISTRIBUTION
PLANNING 3**
11.00 – 12.30

LEVEL 1
FORUM

10512	**I24 A 2030 Snapshot of Public Smart EV Charging Stations** Alastair Oldfield (1), Calum Watkins (2), Robert MacDonald (2), John Orr (1) 1: SP Energy Networks, United Kingdom; 2: Smarter Grid Solutions, United Kingdom
10714	**I25 How Can Flexibility Support Power Grid Resilience Through The Next Level Of Flexibility And Alternative Grid Developments** Santiago Gallego Amores (1,2), Emil Hillberg (3), Antonio Iliceto (2), Ewa Mataczyńska (4), Albana Ilo (5) 1: i-DE, Redes Eléctricas Inteligentes (Iberdrola), Spain; 2: ETIP SNET; 3: RISE Research Institutes of Sweden; 4: Institute for Energy Policy, Poland; 5: TU Wien, Austria
11273	**I26 Domestic Demand Shift Trial for Local Network Management and Distributed Generation Curtailment Avoidance** Kailash Singh (1), Russell Bryans (1), Malcolm Bebbington (1), Guy Shapland (1), Gerard Boyd (1), Wendy Mantle (1), Kieron Stopforth (2), Simona Burchill (2) 1: Scottish Power Energy Networks, United Kingdom; 2: Octopus Energy, United Kingdom
10105	**I27 Innovative Digital Solutions That Enable Local Energy Communities to Provide Flexibility Services to the DSO: the Avacon Approach** Ilaria Losa (1), Benjamin Georg Petters (2), Navreet Dult (2) 1: RSE, Italy; 2: AVACON, Germany

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PANELS
I24 > J4

**TOUR 4
NETWORK
DEVELOPMENT 3
& DISTRIBUTION
PLANNING 3**
11.00 – 12.30

LEVEL 1
FORUM

10159	**I28 Enabling Distributed Energy Resources to Participate in Wholesale Energy Market and Provide Flexibility Services** Peter K.C. Wong (1), John Theunissen (2) 1: Eagles Engineering Consultants Pty Ltd, Australia; 2: AusNet Services, Australia
10540	**I29 Conceptualization of Flexibility Solutions as an Alternative to Traditional Investment** Inês Roça (1), Luís Coelho (2), Rui Bento (3) 1: E-Redes, Portugal; 2: E-Redes, Portugal; 3: E-Redes, Portugal
10692	**I30 Decision Support for Matching Flexibility Measures to Flexibility Needs in Power System Planning** Stian Nessa (1), Kasper Emil Thorvaldsen (1), Susanne Sandell (1), Hanne Sæle (1), Maren Istad (1), Edda Abelvik-Engmark (2), Marianne Blikø (2) 1: SINTEF Energy Research, Norway; 2: Kongsberg Digital, Norway
10695	**I31 How To Ensure Interoperability In Demand Response Systems: The Examples Of The European Projects H2020 GIFT And MAESHA** Dune Sebilleau, Marjolaine Farré, Olivier Genest Trialog, France
10755	**I32 Generic Technology Models To Simulate Flexible Operation In Multi-Energy Cellular Energy Systems** Sasan Jacob Rasti (1), Hendrik Kramer (2), Felix Flatter (3), Peter Schegner (1), Weber Christoph (2), Goetz Stefan (3) 1: TU Dresden, Germany; 2: University of Duisburg-Essen, Germany; 3: University of Kaiserslautern-Landau, Germany
11133	**I33 Optimal Scheduling of Energy Storage System in Distribution Grids Using Service Stacking** Johannes Hjalmarsson (1), Alexander Wallberg (1), Carl Flygare (1), Cecilia Boström (1), Fredrik Carlsson (2) 1: Uppsala University, Sweden; 2: Vattenfall R&D, Sweden
11501	**I34 Flexible Methodology for Battery Swapping Stations Planning Operation in Support of Distribution Grids** Héricles Eduardo Oliveira Farias (1), Camilo Alberto Sepulveda Rangel (1), Luciane Neves Canha (1), Bernardo Ziquinatti Franciscatto (1), Henrique Klein (1), Victor Santos Martins Gomes (2) 1: FEDERAL UNIVERSITY OF SANTA MARIA, Brazil; 2: Energy2Go
10108	**I35 A Risk-Based Approach for Development Planning of Radial Distribution Networks** Zeljko Popovic (1), Stanko Knezevic (2), Dragana Radojcic (2) 1: University of Novi Sad, Serbia; 2: Schneider Electric, Serbia
10193	**I36 Causal Network Analysis To Study Evolution Of Distribution System With DER Integration** D. Maneesh Reddy (1,2), Divyanshi Dwivedi (1,3), Pradeep Kumar Yemula (3), Mayukha Pal (1,4) 1: ABB Ability Innovation Center, Asea Brown Boveri Company, Hyderabad 500084, India.; 2: Department of Mechanical and Aerospace Engineering, Indian Institute of Technology Hyderabad, Kandi, Sangareddy, Telangana 502285, India.; 3: Department of Electrical Engineering, Indian Institute of Technology Hyderabad, Kandi, Sangareddy, Telangana 502285, India.; 4: Corresponding Author

**PANELS
I24 > J4**

**TOUR 4
NETWORK
DEVELOPMENT 3
& DISTRIBUTION
PLANNING 3**
11.00 – 12.30

LEVEL 1
FORUM

10315
J1 Correlation Analysis on the Application Potential of Voltage Regulating Distribution Transformers in Medium- and Low-Voltage Grids
Patrick Wintzek (1), Markus Zdrallek (1), Julia Wack (2), Franco Pizzutto (2)
1: University of Wuppertal, Germany; 2: Maschinenfabrik Reinhausen GmbH, Germany

10874
J2 System Integration For Enhanced Network Planning And Operation With A Focus On Customer Interaction
Walter Schaffer, Christoph Groiß, David Grubinger, Gerald Hörack, Sandra Renner
Salzburg Netz GmbH, Austria

10966
J3 Integration Of Flexibility Solutions In The Multi-year Planning Of Distribution Grids With Large Amounts Of Renewable Energy Sources: Development Of A Decision-support Tool For The DSO
Amine El makhroubi (1), Héloïse Baraffe (1), Juliette Morin (1), Mathieu Rainot (2), Juliette Chatel (2)
1: EDF R&D, France; 2: Enedis, France

10967
J4 Restructured Active Distribution Network Planning Considering Agents' Investment Budget Uncertainty
Milad Kabirifar (2), Mahmud Fotuhi-Firuzabad (2), Moein Moeini-Aghtaie (2), Niloofar Pourghaderi (2), Matti Lehtonen (1)
1: Aalto University, Finland; 2: Sharif University of Technology

GUIDED TOURS 5 & 6 ▌ 14.30 – 16.00

**PANELS
G19 > H16**

**TOUR 5
DISTRIBUTION
PLANNING 4**
14.30 – 16.00

LEVEL 1
FORUM

10354
G19 Representing Topology Uncertainty For Distribution Grid Expansion Planning
Domenico Tomaselli (1), Paul Stursberg (1), Michael Metzger (1), Florian Steinke (2)
1: Siemens AG, Germany; 2: TU Darmstadt, Germany

10346
G20 SENS – Tool for Planning and Operation of Smart Distribution Networks
Tomislav Antić, Alen Hrga, Tomislav Capuder
University of Zagreb Faculty of Electrical Engineering and Computing, Croatia

10480
G21 Assessment Of The Impact Of Future Electrification Scenario On An Urban Distribution Network
Giacomo Vigano' (1), Chiara Michelangeli (1), Marco Rossi (1), Diana Moneta (1), Daniele Clerici (1), Andrea Morotti (2), Caterina Pasetti (2), Alessandro Bosisio (3)
1: Ricerca sul Sistema Energetico, Italy; 2: Unareti spa; 3: University of Pavia

10575
G22 Decision Support Tool For The Development Of Power Distribution Networks Based On AI Planning
Sandra Castellanos (2,1), Marie-Cecile Alvarez-Herault (1), Philippe Lalanda (1)
1: Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, 38000 Grenoble, France; 2: Univ. Grenoble Alpes, CNRS, Grenoble INP, LIG, 38000 Grenoble, France

10485
G23 Techno-Economical Approach on Establishing Zero Down Time Area To Promote Premium Reliability in Super Priority Tourism Destination
Revi Aldrian, Daniel Tampubolon, Margi Setiyono, I Wayan Harimbawa, Fauzi Arubusman
PT PLN (Persero), Indonesia

**PANELS
G19 > H16**

**TOUR 5
DISTRIBUTION
PLANNING 4**
14.30 – 16.00

LEVEL 1
FORUM

10506
G24 New Approach into Material Supply Chain to Boost Industrial Capability
Silvia Mannucci, Andrea Balena, Andrea Campi, Matteo Carraro, Francesco Amadei, Claudio Liberatore
Enel Grids, Italy

10588
G25 Increasing the Renewables' Hosting Capacity by Topology Optimization of Neighbouring Medium Voltage Grids
Achraf Kharrat (1), Marcel Böhringer (1), Jutta Hanson (1), Lars Weispfenning (2), Athanasios Krontiris (2), Ingo Jeromin (2), David Petermann (3), Nicole Büchau (3)
1: Technical University of Darmstadt, Germany; 2: Darmstadt University of Applied Sciences, Germany; 3: e-netz Südhessen AG

10669
G26 Integration of Environmental and Economical Impacts of Electricity Consumption in an Energy Community Based on Coalition Game.
Adrien Bossu (1), Benoit Durillon (1), Arnaud Davigny (1), Hervé Barry (2), Sabine Kazmierczak (2), Benoît Robyns (1), Fateh Belaïd (3), Christophe Saudemont (1)
1: Univ. Lille, Arts et Metiers Institute of Technology, Centrale Lille, Junia,ULR 2697–L2EP, F-59000 Lille, France; 2: Lille Catholic Institut (ICL), FGES, Faculty of Business, Economics, and Sciences,59000 Lille, France; 3: Faculty of Management, Economics \& Sciences, Lille Catholic University,UMR 9221–LEM–Lille Economie ´ Management, F-59000, Lille, France

10593
H1 A Novel DSO Approach In Proactively Upgrading The LV Distribution Network For Electrification Of Heat And Transport
Padraig Coughlan, Francisco Romo, Tara Ni Reachtagain, Dan Catanase, Jack Herring, Clem Power
ESB, Ireland

10636
H2 Network Reconfiguration Under a Stochastic Optimisation Framework for Day-Ahead Operation Planning for Future Distribution Networks
Gregorio Higuera, Behzad Kazemtabrizi
Durham University, United Kingdom

10891
H3 Polygonal Optimisation Of Topologies For LV Network Schematics
Alexander Angelov, Luke Hart, Diptargha Chakravorty
TNEI Services Ltd., United Kingdom

11425
H4 Distribution Planning Model Requirements for Smart Community Integration
Mark McGranaghan (1), Treisa Ravi Sahaya (2), Jouni Peppanen (3)
1: EPRI Europe, Ireland; 2: University College Dublin, Ireland; 3: EPRI, USA

10975
H5 Digitized Complex Project Management
Mario Fernandez (2), Valentina Loreto (1), Federico Pollachini (1), Juan Refoyo (2), Alessio Gentile (1), Germana Giannini (1), Giovanni Franzone (1), Francesco Amadei (1)
1: ENEL GRIDS, Italy; 2: ENEL GRIDS, Spain

POSTER SESSION 5
PLANNING OF POWER DISTRIBUTION SYSTEMS

LEVEL 1 ▮ FORUM

POSTER SESSION 5
PLANNING OF POWER DISTRIBUTION SYSTEMS

LEVEL 1 ▮ FORUM

PANELS
G19 > H16

**TOUR 5
DISTRIBUTION
PLANNING 4**
14.30 – 16.00

LEVEL 1
FORUM

10976	**H6 A Surrogate Model of Distribution Networks to support Transmission Network Planning** Matteo Rossini, Marco Rossi, Dario Siface Ricerca sul Sistema Energetico – RSE SpA, Italy
10984	**H7 SILVERSMITH – An Investigation Into Low Voltage Network Management** Thomas Stone (1), Sebastian Lindmark (1), Laurence Hunter (2) 1: EA Technology, United Kingdom; 2: National Grid, United Kingdom
11026	**H8 A Study of Mid to Long-term Distribution Planning Based on PV Installation Forecasting** Jintae Cho (1), Hongjoo Kim (1), Hosung Ryu (1), Jiwon Lee (1), Juyong Kim (1), Yongju Son (2), Sungyun Choi (2) 1: KEPCO, Korea, Republic of (South Korea); 2: Korea University, Korea, Republic of (South Korea)
11069	**H9 Large-Scale Grid Investment Strategy In Low-Voltage Networks** Jur Erbrink, Peter van Oirsouw, Johan Kroeze, Bart Pluijms, Lars Hoefnagel, Atze Peters Alliander, The Netherlands
11143	**H10 Study of Low-voltage Distribution Grid Connection Dimensioning Principles Considering Distributed Generation in Finland** Jouni Haapaniemi (1), Otto Räisänen (1), Antti Supponen (2), Juha Haakana (1), Julius Vilppo (1), Jukka Lassila (1), Sami Repo (2) 1: Lappeenranta-Lahti University of Technology LUT, Finland; 2: Tampere University, Finland
11162	**H11 Regionalised Approach to Heat Pump Allocations and its Impact On LV Network Reinforcement Requirements** Barbara Herndler (1), Roman Schwalbe (1), Clemens Korner (1), Thomas Wieland (2), Stephan Brandl (3), Maximilian Ortner (4) 1: Austrian Institute of Technology, Austria; 2: Netz Oberösterreich GmbH; 3: KNG – Kärnten Netz GmbH; 4: TINETZ – Tiroler Netze
11329	**H12 Predicting Local Effects of Energy Transition Through Development of a Network Observation Tool** Julien Vandeburie, Thomas Wehenkel, Simon Gerard RESA, Belgium
11443	**H13 Enel Grid+: the Advanced Platform for Network Analysis and Planning** Gabriele Licasale (1), Raffaele Scarantino (1), Francesco Viapiana (1), Andrea Vermigli (1), Massimiliano Alloni (2), Pierluigi Bianchi (2), Giulia Ravarino (1) 1: Enel Grids; 2: Enel Grids, Italy
11484	**H14 Efficiency Comparison of Programmed SAID in Investments in the Distribution System** Taric Saldanha, Diogo Boff, Ingrid Kirsch, Rodrigo Figueiredo, Paulo Pereira, Lucas Chiara UNISINOS, Brazil

**TOUR 5
DISTRIBUTION
PLANNING 4**
14.30 – 16.00

PANELS
J5 > J25

**TOUR 6
DISTRIBUTION
PLANNING 5**
14.30 – 16.00

LEVEL 1
FORUM

11491	**H15 Hosting Capacity Portal of All Voltages Levels** Renan Machado Sales (1), Daniel Szente Fonseca (1), Marcelo Aparecido Pelegrini (1), Gustavo Travassos Aguiar da Silva (2), José Antônio de Souza Brito (2) 1: Sinapsis Inovação em Energia, Brazil; 2: Neoenergia S.A.
11006	**H16 Hierarchical Large-Scale Distribution Grid Simulation Across Multiple Voltage Levels Using Smart Meter Data** Nikolaos Efkarpidis, Stephan Koch, Damiano Toffanin, Patrick Lieberherr, Dominique Baudenbacher, Sudipta Saraswati Secure Switzerland AG, Switzerland
10174	**J5 Hosting Capacity for Electric Vehicles in Urban Medium Voltage Grids with Different Building Structure and Charging Strategies** Simon Kreutmayr (1), Simon Niederle (2), Christoph J. Steinhart (3), Christian Gutzmann (3), Michael Finkel (1), Rolf Witzmann (2) 1: Augsburg University of Applied Sciences, Germany; 2: Technical University of Munich; 3: SWM Infrastruktur GmbH & Co. KG
10464	**J6 Probabilistic Evaluation of Plug-in Electric Vehicles Impacts on the Steady-State Performance of a Distribution Network in Stockholm** Priscila Costa Nascimento, Monika Topel Capriles KTH Royal Institute of Technology, Sweden
10630	**J7 The Impacts Of Electric Vehicles And Photovoltaics On The Substations Of A Medium Sized Swedish City** Mahmoud Shepero (1), David Lingfors (1), Joakim Widén (1), Joakim Munkhammar (1), Nicholas Etherden (2) 1: Div. of Civil Engineering and Built Environment, Uppsala University, Sweden; 2: Vattenfall AB
10698	**J8 Analysis of Stochastic Load Behaviors on Fast Charging Stations Operational Planning and Business Model** Leonardo N. F Silva (1), Alzenira R. Abaide (1), Jordan P. Sausen (1), Joelson L. Paixão (1), Ilana F. Santos (2) 1: Federal University of Santa Maria, Brazil; 2: Equatorial Energia
10704	**J9 Discharge Depth Control as a Solution for the Economic Viability of Vehicle-to-Grid Technology** Dušan Popović WSP, Serbia
10768	**J10 Minimizing The Impacts Of EV Chargers On The Power Grid Thanks To An Optimizing Tool** Quentin Morel (1), Sena Soysal (1), Julie Tisserand (2), Karima Boukir (3) 1: EDF, United States of America; 2: EDF, Paris Saclay; 3: Enedis, Paris
10906	**J11 Impact of Electric vehicle charging on Italian LV distribution network** Fabrizio Pilo, Giuditta Pisano, Simona Ruggeri University of Cagliari, Italy

PANELS
J5 > J25

**TOUR 6
DISTRIBUTION
PLANNING 5**
14.30 – 16.00

LEVEL 1
FORUM

10961

J12 Selection of Representative Urban Low-Voltage Grids for Electric Vehicle Integration Studies
Simon Niederle (1), Simon Kreutmayr (2), Christoph J. Steinhart (3), Christian Gutzmann (3), Rolf Witzmann (1), Michael Finkel (2)
1: Technical University of Munich, Germany; 2: Augsburg University of Applied Science, Germany; 3: SWM Infrasttruktur GmbH & Co. KG, Germany

11005

J13 Challenges and Needs for High Power Combined Charging of Ferries and Electric Vehicles – A Norwegian Scenario Case Study
Eirill Bachmann Mehammer (1), Venkatachalam Lakshmanan (1), Jonatan Ralf Axel Klemets (1), Andrè Gjørven (2), Bendik Nybakk Torsæter (1)
1: SINTEF Energy Research, Norway; 2: Mellom AS, Norway

11082

J14 A Planning Toolkit to Evaluate Shore-side Infrastructure Requirements for Electrified Water-based Transportation
Lewis Hunter, Stuart Galloway
University of Strathclyde, Glasgow, Scotland

11161

J15 Impact of EV Regionalisation on Network Reinforcement Requirements
Barbara Herndler (1), Roman Schwalbe (1), Clemens Korner (1), Tobias Riedlinger (2), Thomas Wieland (3), Stephan Brandl (4), Maximilian Ortner (5)
1: AIT Austrian Institute of Technology, Austria; 2: University of Wuppertal, Germany; 3: Netz Oberösterreich GmbH; 4: KNG – Kärnten Netz GmbH; 5: TINETZ – Tiroler Netze GmbH

11165

J16 Integration of a Multi-megawatt Charging Station in the Medium Voltage Network
Barbara Herndler, Cham Kpu Gerald, Yannick Wimmer
Austrian Institute of Technology, Austria

11220

J17 Load Scheduling and V2G to Minimize Power Demand – Exploring Potential for Airport Parking Facility, Norway.
Thomas Martinsen, Georg Devik, Heidi S Nygård
Norwegian University of Life Sciences, Norway

11266

J18 Load Demand and Grid Integration of Electric Ferries: A Case Study in the Three Major Italian Lakes
Massimo Ceraolo (2), Giovanni Lutzemberger (2), Giuseppe Mauri (1), Paolo Mazzucchelli (3), Sara Salamone (1)
1: RSE S.p.A., Italy; 2: University of Pisa; 3: Gestione Governativa Navigazione Laghi

11428

J19 Smart Charging of Electric Vehicles Based on Scheduling Theory
Heidi S. Nygård, Ingrid Maria Mørch, Olvar Bergland
NMBU, Norway

11445

J20 Coordinated Deployment Of Electric Taxi Minibuses To Enhance Solar Photovoltaic Hosting Capacity Of Residential Networks
Lewis Waswa, Justice Munyaradzi Chihota, Bernard Bekker
Stellenbosch University

PANELS
J5 > J25

**TOUR 6
DISTRIBUTION
PLANNING 5**
14.30 – 16.00

LEVEL 1
FORUM

11493

J21 Model for Determining the Charging Time of Electric Vehicles in Fast Charging Stations
Caroline Beatriz Fucks Darui (1,2), Alzenira da Rosa Abaide (1), Matheus Souza da Cruz (1), Nelson Knak Neto (1), Tiago Guterres Lucca (1), Leonardo Silva (1)
1: Universidade Federal de Santa Maria, Brazil; 2: Universidade Regional Integrada do Alto Uruguai e das Missões – URI campus Santo Ângelo, Brazil

10379

J22 Efficient Integration of Electric Vehicles Through Optimal Charging and Reactive Power Support
Damir Jakus, Josip Vasilj, Bosko Poljak, Danijel Jolevski
University of Split – FESB, Croatia

10449

J23 MWOA for Optimal Integration of Hybrid Renewable Resources into the Distribution Systems for Techno-Economic Benefits
Ahmed Sami (1), ElSaeed Othman (2), Mohammed Ebrahim (3)
1: Ministry of Electricity and Renewable Energy, Egypt; 2: Faculty of Engineering – Al Azhar University; 3: Faculty of Engineering at Shoubra – Benha University

10721

J24 The Use of Distributed Energy Resources to Mitigate the Negative Imbalance Between Bulk Purchase Versus Distribution Tariffs in South Africa
Aiden Kyle Rhode, Bernard Bekker, Christo Nicholls
Stellenbosch University, South Africa

11025

J25 A New Optimization Method Brings Distribution Grids Performance To The Next Level Thanks To Digital Transformation
Thi Thu Ha Pham, Jerome Brun, Julien Mecreant, Nicolas Choulet
Schneider Electric, France

GUIDED TOURS 7 & 8 ▌ 16.30 – 18.00

PANELS
H17 > I1

**TOUR 7
METHODS
AND TOOLS 1**
16.30 – 18.00

LEVEL 1
FORUM

10161

H17 Development Of A Model To Optimize The Energy Efficiency Of Residential Building And Their Impact On The Low Voltage Grid
Michael Dahms, Torsten Sowa
amperias GmbH, Germany

10295

H18 Voltage Demand Relationship Modelling for Future Energy Scenarios
Mark Collins (1), Mark Rafferty (1), Colin MacKenzie (1), Kieran Bailey (2), Maurice Lynch (2), Darren Moran (1)
1: Smarter Grid Solutions, United Kingdom; 2: Electricity North West Ltd., United Kingdom

10327

H19 Use Of Linky Smart Meter Data To Enhance The Diversity Factor Assessment In Real Networks
Guilherme Ramos Milis (1,2), Marie-Cécile Alvarez-Herault (2), Raphaël Caire (2), Christophe Gay (1), Bruno Gourguechon (1)
1: Enedis, France; 2: Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, Grenoble, France

**PANELS
H17 > I1**

**TOUR 7
METHODS
AND TOOLS 1**
16.30 – 18.00

**LEVEL 1
FORUM**

10453	**H20 Comparison of RMS and EMT Models of an Inverter-Based Generator with Fast-Frequency Response** Anna Pfendler, Patrick Riess, Soham Choudhury, Rafael Steppan, Aaron Hebing, Jutta Hanson Technical University of Darmstadt, Department of Electrical Engineering and Information Technology, Institute of Electrical Power Supply with Integration of Renewable Energy, Germany
10496	**H21 Data-driven Assessment of Aggregated EV Charging Potential for Flexibility Procurement** Emir Nukic, Jelena Ponocko The University of Manchester, United Kingdom
10517	**H22 Comprehensive Building Clustering as an Abstraction Method for Planning of Power Distribution Systems** Paul Maximilian Röhrig (1,2), Nils Körber (1,2), Andreas Ulbig (1,2) 1: IAEW at RWTH Aachen University; 2: Fraunhofer FIT Aachen
10651	**H23 Data Driven Photovoltaic Regionalization Approach for Distribution System Operator Supply Areas** Paul Zehetbauer (1), Clemens Korner (1), Thomas Wieland (2), Stephan Brandl (3), Maximilian Ortner (4) 1: AIT Austrian Institute of Technology GmbH, Austria; 2: Netz Oberösterreich GmbH, Austria; 3: KNG - Kärnten Netz GmbH, Austria; 4: TINETZ - Tiroler Netze GmbH, Austria
10737	**H24 Analysis Of The Renewable Energy Sources Generation Simultaneity In Croatia And The Impact On The Network Management** Minea Skok (1), Lahorko Wagmann (2), Mario Maricevic (1) 1: EIHP, Croatia; 2: HERA, Croatia
10746	**H25 Validation of Gaussian Mixture LV Load Models using Measurements** Anton Ishchenko, Sai Suprabhath Nibhanupudi, Colin Willemsen Phase to Phase B.V., The Netherlands
10765	**H26 Low Carbon Customers: Analysis of Loading of Domestic Electric Vehicle and Heat Pump Transformers in Ireland** Jack Herring, Clem Power, Tara Ní Reachtagain, Francisco Romo, Dan Catanase, Padraig Coughlan, Emma Silke ESB, Ireland
10790	**H27 The Impact of COVID-19 on Electricity Demand in Portugal** Joana Teixeira (1), Inês Ferrão (1), Sérgio Gonçalves (1), Anderson Soares (1), Nuno Lourenço (2), António Rua (2) 1: E-REDES, Portugal; 2: Banco de Portugal, Portugal
10800	**H28 Autocalibration of a Bottom-up Methodology for Long Term Electricity Consumption Forecasting** Kevin Bellinguer (1), Benjamin Grept (1), Antoine Chevalier (2), Robin Girard (1), Alexis Bocquet (1) 1: Mines Paris – PSL University; 2: ENEDIS

**PANELS
H17 > I1**

**TOUR 7
METHODS
AND TOOLS 1**
16.30 – 18.00

**LEVEL 1
FORUM**

10821	**H29 Deployment Of Forecasting Tools In Diverse Demonstration Areas To Improve Energy Scheduling Of Microgrids** Ana Turk (1), George Sideratos (2), Kamini Shahare (3), Aysegül Kahraman (1), Alexandros Paspatis (2), Guangya Yang (1), Arghya Mitra (3), Dipanshu Naware (3), Panos Kotsampopoulos (2) 1: Technical University of Denmark, Denmark; 2: National Technical University of Athens; 3: Visvesvaraya National Institute of Technology
10835	**H30 A Prediction Tool To Evaluate EV Charging Demand Based On Socio-Demographic Indicators** Marc Cañigueral, Joaquim Meléndez University of Girona, Spain
11101	**H31 Post-Covid Customer Service Behavior Forecasting Using Machine Learning Techniques** Leonardo do Nascimento Pereira, Vitor Augusto de Freitas Silva, Marcella Manconi Shimizu, Jorge Gabriel Rodrigues da Cruz CPFL Energia, Brazil
11183	**H32 Electric Vehicle Charging Measurements in the Nordic Environment – Charging Profile Dependence on Ambient Temperature** Ville Tikka, Otto Räisänen, Jouni Haapaniemi, Gonçalo Mendes, Jukka Lassila, Samuli Honkapuro LUT University, Finland
11188	**H33 Forecasting For Electricity Grid Planning: Current Challenges And Future Improvements** Age Van Der Mei (1), Elias Hartvigsson (2), Balint Hartman (3), Ricardo Pastor (5), Daphne Geelen (4), Jan-Peter Doomernik (4) 1: Duinn, The Netherlands; 2: Endre, Sweden; 3: Budapest University of Technology and Economics, Hungary; 4: Enexis DSO, The Netherlands; 5: R&D NESTER, Portugal
11123	**H34 Anticipating Aggregated Demand From Charging EV In Collective Car Park With A Multi-Agent System** Ilyes Kabbourim (1), Remi Driat (1), Giovanni Mattarolo (1), Somsakun Maneerat (2), Ghislain Agoua (2), Jérôme Cantenot (2), Ricardo Jover (2), Clément Christophe (2), Benoît Grossin (2) 1: Enedis, France; 2: EDF R&D, France
11241	**H35 Meteorological Benchmark Forecasts for Energy Management Systems** Michael Spiegel (1), Thomas Strasser (1,2) 1: AIT Austrian Institute of Technology, Austria; 2: Technische Universität Wien (TU Wien), Austria
11427	**H36 Support Vector Machine For Classification Of Households' Heating Type Using Load Curves** Kristoffer Fürst, Peiyuan Chen, Irene Yu-Hua Gu Chalmers University of Technology
11481	**I1 The Impact Of Forecasting Accuracy On The Economic Performance of Flexibility Provision** Gary Howorth (1), Ivana Kockar (1), Paul Tuohy (1), Graeme Flett (1), John Bingham (2) 1: University of Strathclyde, United Kingdom; 2: Engineering Technology Centre Ltd (ETC), United Kingdom

**PANELS
J26 > L1**

**TOUR 8
METHODS
AND TOOLS 2**
16.30 – 18.00

LEVEL 1
FORUM

10107	**J26 Large Scale Detection Of Voltage Level Violations In LV-grids Using Smart Meters** Bart Kers (1), Marco Hoek (2) 1: Stedin, The Netherlands; 2: Technolution, The Netherlands
10209	**J27 Quasi-Dynamic Line Rating Spatial and Temporal Analysis for Network Planning** Stella Hadiwidjaja (1), Sergio Daniel Montana Salas (2), Andrea Michiorri (2) 1: National University of Singapore (NUS); 2: MINES Paris – PSL
10501	**J28 Evaluation Of Dynamic Active Distribution Network Equivalents With Grid Forming Converters In The Context Of System Stability Studies** Jakob Ungerland (1), Wolfgang Biener (1), Hendrik Lens (2) 1: Fraunhofer Institute for Solar Energy Systems; 2: University of Stuttgart
10520	**J29 Bridging The Gap From Geographical To Electrical Modeling** Sébastien Vallet, Benoit Vinot, Florent Cadoux Roseau Technologies, France
10827	**J30 Experiences With Ampacity Rating Calculations For Wind Farm Export Cable** Henrik Strand (1), Espen Eberg (1), Nina Marie Thomsen (1), Kristian Thinn Solheim (1), Kim Ove Asklund (2) 1: SINTEF Energy Research, Norway; 2: Elvia, Norway
10382	**J31 Determining the Accuracy of Average Fault Rates in Assessing the Risks of Individual Circuits** Felix Peterken, Paul Morris National Grid, United Kingdom
10846	**J32 FASIT, The Norwegian Reliability Data Collection System – Experiences And Utilitarian Values** Arnt Ove Eggen (1), Jørn Heggset (2), Ketil Sagen (3), Camilla Aabakken (4), Bjørn Tore Hjartsjø (5), Egil Arne Østingsen (6), Svein Olav Gjerstad (7) 1: SINTEF Energy Research, Norway; 2: Statnett SF, Norway; 3: Fornybar Norge, Norway; 4: The Norwegian Energy Regulatory Authority, Norway; 5: Lede AS, Norway; 6: Elmea AS, Norway; 7: Nettselskapet AS, Norway
10873	**J33 Low-Voltage Topology Identification from Incomplete Smart Meters Data : Spain Experiment** Rémi Côme (1), Clémentine Benoit (1), Carlos Gaitan Poyatos (2), Santiago Cascante Nogales (2), Francisco Javier Leiva Rojo (2) 1: Odit-e, France; 2: Enel, Spain
11305	**J34 Phase Identification using Smart Meter Data** Andrew Urquhart (1), Iro Psarra (2), Alex Gardner (2), Jenny Woodruff (3), Nadim Al-Hariri (2), Murray Thomson (1) 1: Loughborough University; 2: CGI; 3: National Grid Electricity Distribution
10371	**J35 Case-Based Probabilistic Load-Flow Calculation Considering The Correlative Interdependence Of Loads** Tim Pfueller, Jutta Hanson Technical University of Darmstadt

**PANELS
J26 > L1**

**TOUR 8
METHODS
AND TOOLS 2**
16.30 – 18.00

LEVEL 1
FORUM

10397	**J36 Voltage Congestion Monitoring Through Machine Learning** Rémy Cleenwerck (1,2), Wouter Parys (1), Jan Desmet (2), Thierry Coosemans (1) 1: EVERGi, Vrije Universiteit Brussel, Belgium; 2: EELAB/Lemcko, Universiteit Gent, Belgium
10348	**K1 Graph Computing Techniques for Power Flow Resolution Considering Real Distribution Networks** Francesca Soldan, Enea Bionda, Carlo Tornelli RSE S.p.A., Italy
10468	**K2 Power Grid Model: a High-Performance Distribution Grid Calculation Library** Yu Xiang, Peter Salemink, Bram Stoeller, Nitish Bharambe, Werner van Westering Alliander N.V., The Netherlands
10607	**K3 A Multiconductor Approach To Study Power Flows In Asymmetric And Unbalanced Electric Distribution Networks** Massimiliano Coppo (1), Roberto Turri (1), Alberto Cerretti (2), Massimo Bolognesi (2), Rosalba Russo (3), Giovanni Franzone (2) 1: Università Padova; 2: Enel grids srl; 3: e-distribuzione spa
11054	**K4 Hosting Capacity Using Real Time-Series for PV, EV, Load and Background Voltage** Taís Tavares de Oliveira (1), Nicholas Etherden (1,2) 1: Luleå University of Technology, Sweden; 2: Vattenfall R&D, Sweden
10301	**K5 Non-technical Losses Identification in Distribution Grids: A Hybrid Approach** Marc Jené-Vinuesa, Mònica Aragüés-Peñalba, Andreas Sumper Universitat Politècnica de Catalunya, Spain
10424	**K6 A Novel Approach on Monitoring Technical and Non-technical Losses in Distribution Networks** Vahid Mottaghi (1), Maria Rashki Ghaleno (2), Mohammad Hekmat (2), Fateme Daburi Farimani (2), Navid Yektay (2) 1: Esfahan Electricity Power Distribution Company (EEPDC); 2: Sunflower Industrial Research Company (SIRCO)
10836	**L1 Data-driven Techniques to Improve the Reliability of Low Voltage Electricity Networks Through Dynamical Evaluation of Non-technical Losses** Marc Girona-Badia (1), Gerard Mor (1), Gerard Laguna (1), Jordi Cipriano (1), Alvaro Luna (2) 1: Centre Internacional de Mètodes Numèrics en Enginyeria(CIMNE), Spain; 2: Universitat Politècnica de Catalunya(UPC),Spain

SESSION **2** deals with any phenomena related to power quality (PQ). This includes e.g. flicker, unbalance, distortion in the frequency range from DC up to 500 kHz as well as events like sags or swells. The session covers also all aspects of electromagnetic compatibility (EMC) including emission, immunity, its coordination and the related standardisation. Conducted and radiated electromagnetic interferences, electric and magnetic fields (EMF) and grounding issues are also included.

		BLOCK 1 ▮ 09.00 – 10.30
	10288	**Evolution Of Earthing Impedance** Quentin Antoine (1), Sophie Van Wynendaele (1), David Decoux (2), David Valmacco (3), Bastien Noël (4) 1: ENGIE Laborelec, Belgium; 2: Ores, Belgium; 3: Resa, Belgium; 4: Sibelga, Belgium
	10536	**Practical Comparison Of Earth Impedance Testing Methods** Josef Schmidbauer, Friedrich Almer OMICRON electronics GmbH, Austria
BLOCK 1 09.00 – 10.30 EMC, EARTHING AND SAFETY LEVEL 0 PLENARY ROOM 1	10680	**Evaluation of High Harmonic Components in the Residual Earth Fault Current with Regards to the Earth Potential Rise and Personal Protection** Benjamin Küchler (1), Karla Frowein (2), Peter Schegner (2), Uwe Schmidt (1) 1: Hochschule Zittau/Görlitz – University of Applied Sciences, Germany; 2: Dresden University of Technology, Germany
	10935	**Solar Farm Earthing – Not Just an Extra-large Substation – Special Requirements Met by Risk-based Design and Focused Testing** William Carman (1), Matthew Bale (2) 1: Bill Carman Consulting, Australia; 2: Safearth Consulting, Australia
	10942	**Switching Overvoltages Caused by Shunt Reactor Switching and Mitigation Methods** Philipp Hackl (1), Katrin Friedl (1), Robert Schürhuber (1), Britta Heimbach (2), Bruno Wartmann (2), Andri Casura (2) 1: Graz University of Technology, Austria; 2: ewz, Switzerland
	11067	**Effect of Time Delay of High-speed Autoreclosing on Variable Frequency Drives and Other Loads** Pertti Pakonen, Ari Nikander, Pekka Verho Tampere University, Finland
		BLOCK 2 ▮ 11.00 – 12.30
EQUIPMENT RELATED POWER QUALITY ASPECTS	10659	**Psophometric Indices Analysis for Waveform Distortion from Rolling Stocks in Electrified Traction Systems** Rafael S. Salles (1), Sarah K. Rönnberg (1), Andrea Mariscotti (2) 1: Luleå University of Technology, Sweden; 2: University of Genova
	10181	**Advanced Techniques For Troubleshooting Solar Arrays And Generator Connections** Robert Weller (1), Kate Edwards (2), Duncan Dalton (2) 1: Electrical Investigation Ltd, United Kingdom; 2: Outram Research, United Kingdom

Programme updated on 26 April 2023. Titles and speakers are subject to change at any time. Cancellation may occur. Download the APP to see the last updates.

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BLOCK 2 11.00 – 12.30 EQUIPMENT RELATED POWER QUALITY ASPECTS LEVEL 0 PLENARY ROOM 1	11225	**Impact of Changing Frequency Standards on Grid-connected PV and Battery Inverters in the German Low Voltage System** Johanna Geis-Schroer, Gregor Bock, Michael Suriyah, Thomas Leibfried Karlsruhe Institute of Technology (KIT), Germany
	10229	**Requirements For Grid Supporting Inverter In Relation With Frequency And Voltage Support** Carina Lehmal, Ziqian Zhang, Herwig Renner, Robert Schürhuber Graz University of Technology, Austria
	10483	**Analysis and Modelling of Temporary Overvoltage Events and Comparison with OVRT Requirements** Christoph Wirtz (1), Max Murglat (1), Simon Krahl (1), Albert Moser (2) 1: FGH e.V., Aachen, Germany; 2: IAEW RWTH Aachen University, Aachen, Germany
	10893	**Modeling of Power Cables for Measurement Calibration and PLC Simulation up to 20 MHz** Amaia Arrinda, Jon Gonzalez Ramos, Asier Herranz, Alexander Gallarreta, Igor Fernández, David de la Vega, Itziar Angulo University of the Basque Country, Spain
		BLOCK 3 ▮ 14.30 – 16.00
BLOCK 3 14.30 – 16.00 SYSTEM RELATED POWER QUALITY ASPECTS LEVEL 0 PLENARY ROOM 1	11450	**Investigation of Supraharmonic Emission from a Microgrid** Mattewos Tefferi (1), Nick Nakamura (2), Gaurav Singh (3), Brad Barnes (4), Nenad Uzelac (1) 1: G&W Electric, United States of America; 2: Powerside, United States of America; 3: EPRI, United States of America; 4: Ameren Illinois, United States of America
	11146	**Power Quality Analysis of LVDC Distribution System using Real-time Simulator** Seokwoong Kim, Jintae Cho, Youngpyo Cho, Hongjoo Kim, Wookwon Kim, Juyong Kim KEPCO Research Institute, Korea, Republic of (South Korea)
	10638	**Modelling of Voltage Unbalance in Large Real Medium Voltage Distribution Networks** Adnan Bosovic (1), Herwig Renner (2), Andreas Abart (3), Ewald Traxler (3), Jan Meyer (4), Friedemann Möller (4), Mustafa Music (1)1: Public Electric Utility Elektroprivreda of Bosnia and Herzegovina d.d. – Sarajevo, Bosnia and Herzegovina; 2: Graz University of Technology, Austria; 3: Netz Oberösterreich GmbH, Austria; 4: Technische Universitaet Dresden, Germany
	10674	**Probabilistic Estimation of Harmonic Distortion in Non-Radial Distribution Network** Yuqi Zhao (1), Jovica Milanović (1), Pablo Rodríguez-Pajarón (2), Araceli Hernández (2) 1: the University of Manchester, United Kingdom; 2: Universidad Politécnica de Madrid, Spain
	10587	**Verification of Tool for Allocation of Harmonic Current Emissions Considering Frequency-Dependent Impedance** Tor Inge Reigstad (1), Bjørn Inge Oftedal (2), Thor Holm (3), Bendik Nybakk Torsæter (1), Henning Taxt (1) 1: SINTEF Energy Research, Norway; 2: REN AS; 3: PQA AS

11081	**Assessment of Harmonic Emission Level of Customer Installations Considering Actual Level of Cancellation** Morteza Pourarab (1), Jan Meyer (1), Oliver Domianus (1), Thomas Naef (2), Max Ulrich (2), Roger Rölli (2) 1: Technische Universitaet Dresden, Germany; 2: Camille Bauer Metrawatt AG, Switzerland

BLOCK **4** ▮ 16.30 – 18.00

**BLOCK 4
16.30 – 18.00**

STANDARDS, MEASURE-MENTS, REGULATIONS AND ADVANCED DATA ANALYSIS

**LEVEL 0
PLENARY ROOM 1**

10618 BYAA awardee	**Impact of Reserve Market Participation on Power Quality of Flexibility Resources and Local Electricity Networks** Antti Hildén (1), Pertti Pakonen (1), Joni Markkula (1), Eero Paavilainen (2), Mikko Kettunen (3), Pertti Järventausta (1), Pekka Verho (1) 1: Tampere University; 2: Siemens Oy; 3: Lempäälän Lämpö Oy
10493	**Monitoring Voltage Quality in Sweden** Herlita Bobadilla Robles, Albin Emanuelsson, Abdirizak Aden, Carl Johan Wallnerström Swedish Energy Markets Inspectorate, Sweden
11206	**New Interharmonic Subgroup Concept for Quantifying and Limiting Distortion in Distribution Networks: Further Developments and Experimental Validation** Roberto Langella (1), Jiri Drapela (2), Mark Halpin (3), Jan Meyer (4), David Mueller (5), Harish Sharma (6), Alfredo Testa (1), Neville R. Watson (7), David Zech (8) 1: University of Campania «Luigi Vanvitelli», Italy; 2: Brno University of Technology; 3: Auburn University; 4: Technische Universität Dresden; 5: EnerNex; 6: Southern Company Services; 7: University of Canterbury; 8: Duke Energy
11023	**Impact of Discontinuous Measurements on the Trend Analysis of Power Quality Parameters** Max Domagk (1), Jan Meyer (1), Karl Scheida (2), Rene Braunstein (3), Ewald Traxler (4), Roland Zoll (5) 1: TU Dresden, Germany; 2: Oesterreichs Energie, Austria; 3: Energienetze Steiermark, Austria; 4: Netze Oberösterreich, Austria; 5: Wiener Netze, Austria
11087	**Automated Load Control Detection Using Power Quality Data And Machine Learning** Christina Brester (1), Antti Hildén (2), Mikko Kolehmainen (1), Pertti Pakonen (2), Harri Niska (1) 1: University of Eastern Finland, Finland; 2: Tampere University, Finland
10324	**Deep Learning Graphical Tool Inspired by Correlation Matrix for Reporting Long-term Power Quality Data at Multiple Locations** Roger de Oliveira, Naser Nakhodchi, Rafael Salles, Sarah Ronnberg Luleå University of Technology, Sweden

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SESSION **6** The energy transition is impacting the DSO's business management. The vision to be the enabler of the transition is clear; however, the grid infrastructure is nothing that can be changed over-night. While traditional assets typically have long life-times, new business tools, methods and processes need to be adapted and demonstrated to match new priorities and the necessary speed of transition. The focus of Session 6 is to take the DSO business perspective including regulation compliance, cooperation with stakeholders including sector integration, reasonable risk management for flexibility and cybersecurity, customer expectation and overall business digitalization.

BLOCK **1** ▮ 09.00 – 10.30

**BLOCK 1
09.00 – 10.30**

REGULATION

**LEVEL 0
PLENARY ROOM 4**

10268	**Swedish Approach For The Assessment And Monitoring Of The Smart Grid Development** Maria Dalheim, Herlita Bobadilla Robles, Mohamadreza Baradar, Carl Johan Wallnerström The Swedish Energy Markets Inspectorate, Sweden
10393	**The UMEI – Universal Market Enabling Interface. Enabling Standard Interaction with Various Flexibility Markets to Procure Grid Services** Carlos Damas Silva (1), Gesa Milzer (4), Arnaud Debray (2), Mahtab Kaffash (3), Narve Sætre (4), Chloé Dumont (2), Evelyn Heylen (3), Øystein Dyvik Eide (4), Giancarlo Marzano (2) 1: E-REDES, Portugal; 2: N-SIDE, Belgium; 3: Centrica Business Solutions, Belgium; 4: NODES, Norway
10445	**Regulatory Learnings from EU Funded Flexibility Projects. The i-DE Case: Preparing the Future DSO.** Santiago Gallego Amores (1), David Martín Utrilla (1), José Pablo Chávez Ávila (2), Beatriz Alonso Santos (1) 1: i-DE, Redes Eléctricas Inteligentes, Spain; 2: IIT-Universidad Pontificia Comillas, Spain
10576	**Volumetric Or Capacity-based Grid Tariffs: A Case Study For Residential Consumers In Flanders** Robbert Claeys (1), Rémy Cleenwerck (1,2), Jos Knockaert (1), Jan Desmet (1) 1: Ghent University, Belgium; 2: Vrije Universiteit Brussel, Belgium
10758	**Market-Based Flexibility Services For Congestion Management – A Comprehensive Approach Using The Example Of German Distribution Grids** David Brummund (1), Gesa Milzer (2), Reinhilde D'hulst (3), Paul Kratsch (4), Md Umar Hashmi (5), Louise Adam (6), Gil Sampaio (7), Mahtab Kaffash (8) 1: MITNETZ STROM; 2: NODES AS; 3: VITO; 4: E.ON; 5: KU Leuven/EnergyVille; 6: N-SIDE; 7: INESC TEC; 8: Centrica Business Solutions
11131	**Practical experiences of Flexibility market for DSO in Slovenia** Jurij Curk, Boris Turha Elektro Ljubljana, Slovenia

	BLOCK **2** ▮ 11.00 – 12.30	
	10386	**Asset Owner Perspective on Managing Growth and Reinvestment Needs** Markus Taaveniku (1), Marcus Halvarsson (1), Matthias Hopfensitz (2), Heiko Spitzer (2) 1: Vattenfall Eldistribution AB, Sweden; 2: entellgenio GmbH, Germany
	11400	**Standardization ISO55000 & PAS55** Ivan Valbuena, Carolina Morales Enel Colombia, Colombia
BLOCK **2** 11.00 – 12.30 **DSO** LEVEL 0 PLENARY ROOM 4	10228	**Assessment and Visualisation of Extreme Weather Impacts and Climate Change Risks on Distribution Network Operation** Lizaveta Troshka National Grid, United Kingdom
	10215	**Real Time Quality Monitoring Of Electrical Distribution Network Affected By Heatwaves: A Data-oriented Approach** Giulia Muscarà (1), Gianluca Di Felice (1), Francesco Paolo Palazzotto (1), Roberto Brandi (1), Niccolò Corsi (1), Massimo Pompili (2), Luigi Calcara (2) 1: e-distribuzione, Italy; 2: University of Rome La Sapienza, Italy
	10522	**Non-firm Grid Connections For Low-Voltage Generators: A Case Study** Louise Muller, Florent Cadoux Roseau Technologies, France
	10280	**Assessing Gender Equality in the Distribution Sector** Sarah Ouziaux ENGIE IMPACT - BRUXELLES, Belgium
	BLOCK **3** ▮ 14.30 – 16.00	
	10143	**Advanced Electrical Energy Storage Technologies And Their Applications On Customer Side** Christian Noce, Luigi Lanuzza, Martina Radicioni Enel X SrL, Italy
BLOCK **3** 14.30 – 16.00 **CUSTOMER** LEVEL 0 PLENARY ROOM 4	10117	**Pilot Project where a Battery Energy Storage System is used for Fast Frequency Reserve** Hanne Sæle (1), Maren Istad (1), Signe Marie Oland (2) 1: SINTEF Energi AS, Norway; 2: Lede AS, Norway
	10236	**End-use Sector Coupling To Turn Customer Plants Into Prosumers Of Electricity And Gas** Andrea Ademollo (1), Albana Ilo (2), Carlo Carcasci (1) 1: University of Florence, Italy; 2: TU Wien, Austria
	10154	**Potential of a Decentralized Load Management Concept and Transferability to Various Countries** Sonja Baumgartner (1), Veronika Barta (2), Stephanie Uhrig (2), Rolf Witzmann (3) 1: LEW Verteilnetz GmbH, Germany; 2: HM University of Applied Sciences Munich; 3: TUM Technical University of Munich

BLOCK **3** 14.30 – 16.00 **CUSTOMER** LEVEL 0 PLENARY ROOM 4	10411	**Public Consultation Platform for Network Development Plan** Tiina Salmi (1), Harri Salomäki (2), Ilkka Luoma (3) 1: Elenia Oy; 2: Elenia Verkko Oyj; 3: Vincit Oyj
	10970	**Developing An Electricity Network For Net Zero** Shauna Graham, Jonathan Pollock, Anne Clarke NIE Networks, United Kingdom
	10497 BYAA awardee	**Vehicle-to-Home or Battery Energy Storage Systems – A Comparison of the Potential Usage in Smart Homes** Charlotte Wagner (1), Kathrin Walz (1), Krzysztof Rudion (1), Dario Burghof (2), Ingo Mauser (2) 1: Institute of Power Transmission and High Voltage Technology (IEH), University of Stuttgart, Germany; 2: SENEC GmbH
	BLOCK **4** ▮ 16.30 – 18.00	
	10919	**Data Quality Challenges in Existing Distribution Network Datasets** Frederik Geth (1), Marta Vanin (2), Dirk Van Hertem (2) 1: GridQube, Australia; 2: KU Leuven and EnergyVille, Belgium
	11256	**Making The Most Of Existing Data – A Data Lake Approach To Risk Quantification** Joanne Peacock, Dawn O'Brien EA Technology, United Kingdom
BLOCK **4** 16.30 – 18.00 **DIGITALIZATION** LEVEL 0 PLENARY ROOM 4	10267	**Anonymisation Score For Time Series Consumption Data** Cecilia Gerlitz (1), Axel Eriksson (1), Camilla Hansson (2) 1: Vattenfall AB, Sweden; 2: Vattenfall Eldistribution AB, Sweden
	11009	**Open Data; Delivering Results For Data Stakeholders** Lewis Jones, Liam McSweeney National Grid Electricity Distribution, United Kingdom
	10384	**SIORD, a New DSO-shared Data Hub to Monitor and Control Distributed Energy Resources in Spain** Daniel Davi-Arderius (1), Moises Canales Laso (2), Albert Estapé Vilà (3), David Martin Utrilla (4), Alberto Suárez Fontenla (5), Marta Viñas Gómez (6), Marta Castro Pérez-Chirinos (7) 1: e-Distribución Redes Digitales, Spain; 2: Viesgo Distribución (Grupo EDP); 3: ASEME; 4: I-DE Redes Eléctricas Inteligentes, S.A.U.; 5: Unión Fenosa Distribución; 6: CIDE; 7: AELEC
	10138	**EleniaGO – Crowdsourcing Maintenance Inspections** Harri Salomäki (1), Pauliina Salovaara (1), Heikki Malkamäki (2) 1: Elenia Verkko Oyj; 2: Ambientia Oy

	ROUND TABLES ▌ 09.00 – 16.00

**LEVEL 0
PLENARY ROOM 2**

**09.00
10.30**

RT8:
APPLICATIONS OF FLEXIBILITY IN PLANNING AND OPERATION
Convener: **Viviana Vitto** (Enel Grids, Italy)
Speakers: **Martin Braun** (Fraunhofer IEE and University of Kassel, Germany),
Pedro Carvalho (University of Lisbon, Portugal),
Serena Cianotti (Enel Grids, Italy),
Hubert Dupin (Enedis, France),
Camille Hamon (RISE, Sweden).
Power system flexibility is the ability to adapt to dynamic and changing conditions, for example, balancing supply and demand by the hour or minute, or deploying new generation and transmission resources over a period of years. DSOs have to face the ability to manage changes, and to be able to improve the resilience characteristics of the grids, including planning and adequate operation.

**11.00
12.30**

RT10:
DIGITAL PRIMARY SUBSTATION
Convener: **Fredi Belavic** (Austrian Power Grid, Austria)
Digitalisation is the key enabling factor for decarbonizing the electrical energy generation and key for interoperability of decentralized energy generation and integration of volatile renewable energy sources. Digitalisation is also required to manage the exchange of the information on all levels of the electrical network, distribution and transmission.
The Scope of the round table is to give an overview of state-of-the-art end development direction of primary substations on a high level and to identify the requirements, challenges, opportunities, benefits, and restrictions for primary substations, depending on the degree of digitalisation. The focus is on the use cases enabled by the digitalisation such as extended monitoring, improved asset management, supervision and control capabilities, automation and protection, improved engineering process.

**14.30
16.00**

RT12:
REMOTE CONTROL AND AUTOMATION TECHNIQUES TO IMPROVE CONTINUITY OF SUPPLY: PERFORMANCE REQUIREMENTS AND EVALUATION
Convener: **Giovanni Valtorta** (e-distribuzione, Italy)
Remote control and automation techniques are becoming more and more strategic to operate the distribution system and manage faults and their reliability is key to improve the continuity of supply. The aim of the RT is to illustrate the available solutions and the challenges for DSO, manufacturer and TLC operators in the next future and to launch the CIRED WG on the same topic.

	RIF SESSION 4 ▌ 16.30 – 18.00

16.30 – 18.00

**PROTECTION,
CONTROL
& AUTOMATION**

**LEVEL 0
PLENARY ROOM 2**

10725
5G Edge for Power System Applications
Heli Kokkoniemi-Tarkkanen (1), Petra Raussi (1), Seppo Horsmanheimo (1), Petri Hovila (2), Anna Kulmala (2), Seppo Borenius (3)
1: VTT Technical Research Centre of Finland, Finland; 2: ABB, Finland; 3: Aalto University, Finland

10808
Root/Chain of Trust in Complex Energy Distribution Systems
Imanol Garcia-Pastor, Sandra Plaza, Manuel Morillo
Ingeteam Power Technology, Spain

10166
**BYAA
awardee**
Analysis of Control Algorithms on Different Low-Voltage Grid Clusters
Veronika Barta (1), Sonja Baumgartner (2), Armin Dulisch (1), Stephanie Uhrig (1), Rolf Witzmann (3)
1: HM University of Applied Sciences Munich, Germany; 2: LEW Verteilnetz GmbH; 3: TUM Technical University of Munich

10191
Machine Learning Based Grid Optimization Algorithm for Real-time Applications
Andreas Winter (1,2), Michael Igel (1), Peter Schegner (2)
1: Hochschule für Technik und Wirtschaft des Saarlandes, Germany; 2: Technische Universität Dresden, Germany

11022
Object Detection Algorithms Applied On Low Voltage Grid Equipment
Mohcine El Harras (1), Christophe Birkle (2), Julien Bruschi (1), Samuel Sallaud (1)
1: EDF R&D, France; 2: Enedis, France

10451
A Standards-Based Engineering Framework for Virtualized Protection, Automation, and Control Systems
Nadine Kabbara (1,3), Thierry Coste (1), Jerome Cantenot (1), Adrien Vialle (1), Hugo Morais (2), Madeleine Gibescue (3)
1: EDF R&D, France; 2: INESC-ID, Portugal; 3: Utrecht University, Netherlands

10729
Implementation and Test of Frequency Estimation Methods for RoCoF-based Load Switching in Islanded Grids
Sebastian Seifried (1), Simon Fischer (1), Dominik J. Storch (1), Tobias Lechner (1), Michael Finkel (1), Rolf Witzmann (2)
1: University of Applied Sciences Augsburg; 2: Technical University of Munich

10744
Improved Method for Earth Fault Location in MV Distribution Networks with Compensated Neutral Grounding
Elie Salhab (1,2), Marc Petit (2), Trung Dung Le (2), Dominique Croteau (1), Quentin Lebourg (1)
1: EDF R&D, France; 2: CentraleSupélec, GeePs, France

10877
Performance Of A Digital Distance Protection Relay During Short Circuits In Presence Of A Converter Connected Grid
Maximilian Heinz Brestan (1), Manuel Galler (1), Georg Achleitner (2), Lothar Fickert (1), Robert Schuerhuber (1)
1: Graz University of Technology, Austria; 2: Austrian Power Grid, Austria

LEVEL O ▮ PLENARY ROOM 3   ROUND TABLES

LEVEL O ▮ PLENARY ROOM 3   RIF SESSION 5

	ROUND TABLES ▮ 09.00 – 16.00

LEVEL O
PLENARY ROOM 3

09.00 10.30	**RT9:** CAPACITY MANAGEMENT FOR PV AND EV
11.00 12.30	**RT11:** ACCELERATING THE ENERGY TRANSITION, FROM AUTHORISATION THROUGH TO COMMISSIONING

Convener:
Riccardo Lama (E-distribuzione, Italy)
Speakers:
Jean Galand (Enedis, France)
Juan Noval Ortiz (E-distribuzione, Italy)
Joao Filipe Nunes (E-Redes, Portugal)

Energy transition involves a significant change in the way in which energy is produced, transmitted, distributed, and consumed. Final energy uses will shift to electricity consumption at a faster pace than in the last decades; public infrastructures will be built not only to distribute electricity, but also to deliver EV charging services; hard-to-abate industrial sectors will open to innovative electric technologies. Public funds will be directed to steer that path. In this context, it is important that the evolution of the electric system can proceed in an organized way, so that no part of the system is left behind but at the same time no one is waiting for the others. In such complex projects, permitting and execution are crucial: efficient, careful, coordinated processes can propel the ambitious plans that are needed to enable energy transition, while bureaucracy and disorder can seriously affect, and even frustrate, them. The panel deals with positive examples of projects and initiatives whose development has been supported by effective authorization processes and commissioning.

14.30 16.00	**RT13:** NEW ROLE OF SMART METERING FUNCTIONALITIES

	RIF SESSION 5 ▮ 16.30 – 18.00

16.30 – 18.00

PLANNING OF POWER DISTRIBUTION SYSTEMS

LEVEL O
PLENARY ROOM 3

11302	**Integrated Physical And Probabilistic Modelling Of Low Voltage Cable Temperatures, Stress Cycles, And Damage** Gordon McFadzean (1), Megan Taylor (2), Zoe Hodgins (2), Gruffudd Edwards (1), Nicole Lee (2), Rosemary Tawn (1), Ben Ingham (3) 1: TNEI Services Ltd, United Kingdom; 2: Frazer-Nash Consultancy, United Kingdom; 3: Electricity North West Ltd, United Kingdom
10108	**A Risk-Based Approach for Development Planning of Radial Distribution Networks** Zeljko Popovic (1), Stanko Knezevic (2), Dragana Radojcic (2) 1: University of Novi Sad, Serbia; 2: Schneider Electric, Serbia
10354	**Representing Topology Uncertainty For Distribution Grid Expansion Planning** Domenico Tomaselli (1), Paul Stursberg (1), Michael Metzger (1), Florian Steinke (2) 1: Siemens AG, Germany; 2: TU Darmstadt, Germany
10360	**Consistency Assessment Method of Urban Distribution Network Planning Geospatial Layout Based on Fractal Theory** Jiamin Yin (1), Wangtao Ji (2), Chengmin Wang (1), Ning Xie (1), Zhipeng Chen (1) 1: Shanghai Jiaotong University, China; 2: Proinvent Technology, China
10575	**Decision Support Tool For The Development Of Power Distribution Networks Based On AI Planning** Sandra Castellanos (2,1), Marie-Cecile Alvarez-Herault (1), Philippe Lalanda (1) 1: Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, 38000 Grenoble, France; 2: Univ. Grenoble Alpes, CNRS, Grenoble INP, LIG, 38000 Grenoble, France
10669	**Integration of Environmental and Economical Impacts of Electricity Consumption in an Energy Community Based on Coalition Game.** Adrien Bossu (1), Benoit Durillon (1), Arnaud Davigny (1), Hervé Barry (2), Sabine Kazmierczak (2), Benoît Robyns (1), Fateh Belaïd (3), Christophe Saudemont (1) 1: Univ. Lille, Arts et Metiers Institute of Technology, Centrale Lille, Junia,ULR 2697–L2EP, F–59000 Lille, France; 2: Lille Catholic Institut (ICL), FGES, Faculty of Business, Economics, and Sciences,59000 Lille, France; 3: Faculty of Management, Economics \& Sciences, Lille Catholic University,UMR 9221–LEM–Lille Economie ´ Management, F–59000, Lille, France

POSTER SESSION 1
NETWORK COMPONENTS

LEVEL 1 ▌ FORUM

	GUIDED TOURS 1 & 2 ▌ 09.00 – 10.30 & 11.00 – 12.30
10335	**A1 Fault Ride Through Of DC Solid State Transformer In Medium Voltage DC Systems** Pierre Le Métayer (1,2), Drazen Dujic (3), Cyril Buttay (2), Piotr Dworakowski (1) 1: Supergrid Institute, 69621 Villeurbanne, France; 2: Univ Lyon, CNRS, INSA Lyon, Université Claude Bernard Lyon 1, Ecole Centrale de Lyon, Ampère, UMR5005, 69621 Villeurbanne, France; 3: Power Electronics Laboratory, EPFL, Lausanne Switzerland
10403	**A2 Estimation Of The Parameters Of A LVAC Cable For A LVDC Grid Application** Ferréol Binot (1), Frédéric Reymond-Laruina (2), Loïc Queval (3), Marc Petit (3) 1: Centrale Lille – L2EP, France; 2: EDF R&D, France; 3: CentraleSupélec – GeePs, France
10466	**A3 DC short-circuit Behaviour of LVAC Fuses** Djamel Hadbi (1), Luis Chinchilla Delgado (1), Frederic Reymond-Laruina (1), Michel Cordonnier (2) 1: EDF Lab les Renardières; 2: Enedis Direction technique
10467	**A4 Impacts of Low Voltage Distribution Grid Resilience Constraintes on AC/DC Converter Sizing** Frédéric Reymond-Laruina (1), Marc Petit (2), Loïc Queval (2), Djamel Hadbi (1), Philippe Egrot (1), Michel Cordonnier (3), Stéphane Mercier (4) 1: EDF Lab les Renardières; 2: Laboratoire de Génie Electrique et Electrotechnique de Paris; 3: Enedis Direction technique; 4: Socomec
10584	**A5 Hydrogen Filled DC Circuit Breakers for Electrical Vehicles Batteries** Pedro Sanchez (1), Araitz Iturregi (1), Diego Gonzalez (2), Pablo Eguia (1), Roman Fuchs (3) 1: University of the Basque Country UPV/EHU, Spain; 2: Leibniz Institute for Plasma Science and Technology INP Greifswald, Germany; 3: Ostschweizer Fachhochschule, Switzerland
10610	**A6 Development of Underground Cable for Low Voltage DC of 1MW Class** Youngpyo Cho, Junwoo Lee, Seokwoong Kim, Juyong Kim KEPCO Research Institute, Korea, Republic of (South Korea)
10730	**A7 Study Of Surge Protection In MVDC Networks Using A Solid-State Breaker/Limiter** Alessio Clerici, Riccardo Chiumeo, Diego Raggini, Alessandro Veroni RSE spa, Italy
10784	**A8 Silicon Carbide Enabled Medium Voltage DC Transmission Systems for Rapid Electric Vehicle Charging in the UK** Arkadeep Deb (1), Jose Ortiz-Gonzaelz (1), Ruizhu Wu (2), Saeed Jahdi (3), Walid Issa (4), Olayiwola Alatise (1) 1: University of Warwick, United Kingdom; 2: Chongqing Jinkang E-powertrain, China; 3: University of Bristol; 4: Sheffield Hallam University

PANELS
A1 > B9
+ M1 > M6

**TOUR 1
DISRUPTIVE
INNOVATION,
NEW USAGES
AND
PROSPECTIVE**
09.00 – 10.30
11.00 – 12.30

LEVEL 1
FORUM

80

POSTER SESSION 1
NETWORK COMPONENTS

LEVEL 1 ▌ FORUM

10897	**A9 Direct Current Circuit Breaker With Adjustable Current Injection** Wolfgang Grieshaber, Dan-Lucius Penache, Yang Yang, Florent Robert SuperGrid Institute, Villeurbanne, France
11254	**A10 Tubular DC Breaker** James Mannekutla (1), Johan Nohlert (1), Thomas Eriksson (1), Alessio Bergamini (2) 1: ABB AB, Corporate Research, Västerås, Sweden; 2: ABB S.p.A. SACE, Bergamo, Italy
11264	**A11 Research Of Components For An Increase Of Transmission Capacity In Distribution Grids By Changing Existing AC Links Into DC Links** Robert Adam (1), Christian Hildmann (1), Matthias Hemken (1), Karsten Backhaus (1), Stephan Rupp (2) 1: Technische Universität Dresden IEEH, Germany; 2: Maschinenfabrik Reinhausen GmbH
10364	**A12 A Novel Power Electronic Meshing Solution for Radial Medium Voltage Distribution Networks** Bhargav Swaminathan, Benoît George, Aurel Garry EDF R&D, France
11145	**A13 Hybrid Power Solution Modelling Based on Artificial Intelligence** Antonin Colot (2), Bertrand Bastin (1), Bastien Ewbank (2), Fabrice Frebel (1,2), Benoit Bidaine (1), Bertrand Cornelusse (2) 1: CE+T Power, Belgium; 2: ULiège – Belgium
11251	**A14 Innovative Solutions for the Replacement of Underground Transformers** Alexandra Campbell, Ali Kazerooni, David Neilson, James Yu, Matthew Jones, Malcolm Bebbington SP Energy Networks, United Kingdom
11317	**A15 Lessons from the Installation and Commissioning of Novel Power Electronics for Active Response** Brendan Page (1), Andrew Burton (2) 1: Ricardo Energy and Environment, United Kingdom; 2: UK Power Networks, United Kingdom
11469	**A16 Distributed Smart Soft Open Point** Wenlong Ming (1), Jinlei Chen (1), Jianzhong Wu (1), James Yu (2), Ali Kazerooni (2), Ranit Edgar (2), Alastair Ferguson (3) 1: Cardiff University, United Kingdom; 2: Scottish Power Energy Networks; 3: Polaris Diagnostics & Engineering Ltd
11282	**A17 A Smart Meter Based Charging System for Public EV Charge Points** Anish Babu, Ryan Sims University of Strathclyde, United Kingdom
10322	**A18 DC Electric Vehicle Charging Infrastructure – Methods for Periodic Verification** Daniel Herbst (1), Martin Fürnschuß (1), Robert Schürhuber (1), Peter Reichel (2), Felix Lehfuß (3), Christian Auer (4), Ernst Schmautzer (5) 1: Graz University of Technology, Austria; 2: OVE Austrian Electrotechnical Association, Austria; 3: AIT Austrian Institute of Technology, Austria; 4: KS Engineers, Austria; 5: ESC Graz, Austria

PANELS
A1 > B9
+ M1 > M6

**TOUR 1
DISRUPTIVE
INNOVATION,
NEW USAGES
AND
PROSPECTIVE**
09.00 – 10.30
11.00 – 12.30

LEVEL 1
FORUM

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PANELS
A1 > B9
+ M1 > M6

TOUR 1
DISRUPTIVE
INNOVATION,
NEW USAGES
AND
PROSPECTIVE

09.00 – 10.30
11.00 – 12.30

LEVEL 1
FORUM

10998	**A19 MADELAINE – A Multi-Adaptive and Cost-Efficient DC Charging System for EV Car Parks** Daniel Stahleder (1), Stephan Ledinger (1), Florian Mader (2), Dominik Hartmann (2), Markus Litzlbauer (3), Manuel Schmutz (3), Felix Lehfuss (1) 1: AIT Austrian Institute of Technology, Austria; 2: WEB Windenergie; 3: ENIO
10395	**A20 Validation Tests of Battery Based Mobile Generators for Islanding Operation During Works on the Distribution Grid** Janailson Rodrigues Lima (1), Etienne Toutain (1), Ali El Akoum (1), Jeremy Leplus (2), Sebastien Cantet (2) 1: EDF R&D, France; 2: Enedis
10502	**A21 A Generic and Scalable Dynamic Model for Stationary Battery Energy Storage Systems** Julian Richter, Marc Sladek, Matthias Luther Friedrich-Alexander-Universität Erlangen-Nürnberg, Institute of Electrical Energy Systems, Germany
11050	**A22 Requirements For Large Scale Battery Storages In Low Voltage Grids - Lessons Learned From A Smart Grid Project** Navreet Dult, Benjamin Petters Avacon Netz GmbH, Germany
11504	**M6 Battery Energy Storage System with Second Life EV Batteries** Camila Omae (1), Vitor Arioli (2), Aghatta Moreira (2), Victor Riboldi (1), Nathalia Freitas (1), Ricieri Ohashi (2) 1: CPFL ENERGIA, Brazil; 2: CPQD, Brazil
11045	**M5 Recent superconducting cable installation in Chicago paves the way for a Resilient Electric Grid (REG) system** Arnaud Allais (1), Nicolas Lallouet (1), Jean-Maxime Saugrain (1), Beate West (2), Erik Marzahn (2), Frank Frentzas (4), Mike Ross (3) 1: Nexans, France; 2: Nexans, Germany; 3: American Superconductor, USA; 4: COMED, USA
11059	**M4 Superconducting Systems, a New Tool for Railway Power Grids** Jean-Maxime Saugrain (1), Arnaud Allais (1), Hervé Caron (2) 1: NEXANS, France; 2: SNCF, France
10369	**M3 Improvement Of Thermal Performance Of Medium Voltage Circuit Breakers By The Implementation Of Heat Pipes** Philipp Masmeier, Michael Weuffel, Patrick Rumpelt, Oliver Baier ABB AG Medium Voltage Products, Germany
10641	**M2 «Improvement of Lightning Resistance for Distribution Facilities»** Uki Kanenari, Junki Oasa, Yuusuke Nishihiro, Tsuyoshi Iinuma, Noriaki Kano, Yuki Kawachi, Keisuke Morita KANSAI Transmission and Distribution, Inc., Japan
10648	**M1 Modelling the Potential of Enhanced Capacity Transformers for Optimizing Material Efficiency and Asset Utilization** Roberto Fernandez (1), Fernando Nuno (2), Alberto Cracco (3) 1: Cargill Bioindustrial, Spain; 2: European Copper Institute; 3: Westrafo

PANELS
A1 > B9
+ M1 > M6

TOUR 1
DISRUPTIVE
INNOVATION,
NEW USAGES
AND
PROSPECTIVE

09.00 – 10.30
11.00 – 12.30

LEVEL 1
FORUM

10954	**B1 Improving the Earth Electrode of Pole Mounted Transformers** Malusi Mathonsi Eskom SOC, South Africa
11435	**B2 Evaluation Of Novel Corrosion Protected Aluminium Earth Wire For Use In Underground Cable Networks** David Söderberg Erdal (1), Ingvar Hagman (2), Christian Andersson (2), Dietmar Gleich (2), Anders Persson (3) 1: Vattenfall Eldistribution AB, Sweden; 2: NKT (Sweden) AB; 3: Dala Energi AB
10586	**B3 Evaluation And Research Trends On Controlled Switching And Transients Mitigation** Simone Carnì (1,2), Marco Riva (1), Simone Negri (2), Roberto Sebastiano Faranda (2) 1: ABB S.p.A., Italy; 2: Politecnico di Milano, Italy
10649	**B4 World's First Enhanced-Cooled Dry-Type Transformer For Wind Off-Shore** Mariano Berrogain (1), Antonio Nogues (1), Muge Ozerten (2), Aitor Sanz (3), Juan-Pedro Gracia (1), Patricia Gonzalez (1) 1: Hitachi Energy Spain SAU, Spain; 2: Hitachi Energy Ltd, United States; 3: Saitec Offshore Technologies S.L.U.
10713	**B5 Innovative Distribution Automation for Low Voltage Networks to accomplish the new challenges arising from the energy transition** Miren De la Cruz Tovar, Iñaki Apellaniz, Juan José Carmona, Roberto Martinez, Javier Cormenzana, Koldobika Zuazo Ormazabal, Spain
10763	**B6 Smart Secondary Substation development and demonstration under FLEXIGRID project** JON Aguirre Valparis (1), Alejandro Blasco (1), Miguel Alvarez (1), Antonio González (2) 1: ORMAZABAL, Spain; 2: EDP REDES ESPAÑA
10865	**B7 Automated Shunt Reactors For MV Feeders Upper Voltage Constraints** Leonard Bacaud, Thibaud Sourty, Dany Tsoumtsa Yimdju, David Rottner, Michel Cordonnier, Jean-Pierre Gontier ENEDIS, France
11029	**B8 Distribution Smart Transformer with an Innovative OLTC Switching Technology for LV Grid Real Time Operation** Pablo Cirujano, Ibon Larracoechea, Luis Del Río Etayo Ormazabal
11291	**B9 Capacitive Transfer System Cable for Efficient Power Delivery in a 33kV Distribution System** Alexander Yanushkevich, Edward Mair, Mansour Salehi-Moghadam Enertechnos, United Kingdom

	GUIDED TOURS 2 ▌ 09.00 – 10.30 & 11.00 – 12.30	
	10206	**C7 FORM: A Novel Principle for DLR** David Skrovanek (1), Christian Grosser (2), Georg Letsch (2), Uwe Ziebold (3) 1: University of Wisconsin–Madison, USA; 2: PI-COM Ingenieurbüro e.K., Germany; 3: 50Hertz Transmission GmbH, Germany
	10484	**C8 Influence of Low Power Transformers (LPVT) on the Results of VLF Diagnostic Tests on Medium Voltage Cables** Hamed Rezaei (1), Axel Winter (1), Manfred Bawart (2) 1: TE connectivity, Germany; 2: BAUR GmbH
	10537	**C9 Fault Location System for MV Distribution Underground Network** Francisc Zavoda (1), Luc Provencher (1), Sébastien Leprohon (1), Frédéric Gervais (2), Dany Oielett (1) 1: CRHQ (Centre de recherche d'Hydro-Québec), Canada; 2: Hydro-Québec
PANELS C7 > D3	10867	**C10 Real Time Live Line High Voltage Measurement of Instrument Transformer's Ratio and Phase Displacement Errors** Uroš Kovačević (1), Vladeta Milenković (2), Nenad Kartalović (3), Miodrag Stojanović (4), Dusan Vukotic (5) 1: Faculty of Mechanical Engineering, Innovation Center, University of Belgrade, Serbia; 2: Netico Solutions doo; 3: Electrical Engineering Institute Nikola Tesla; 4: University of Niš, Faculty of Electronic Engineering; 5: DSO, ELektrodistribucija Srbije Ltd
TOUR 2 DIAGNOSTICS AND SENSORS FOR ASSET MANAGEMENT 09.00 – 10.30 11.00 – 12.30	11000	**C11 Low-Voltage Network Point Measurement And Monitoring** Sudipta Saraswati, Mukesh Hingar, Jayant Kamra Secure Switzerland AG
LEVEL 1 FORUM	11289	**C12 Realising the Benefit of Short-Term Post-Fault Ratings using Smart OHL Sensors for Increased DER Integration** Samuel Jupe (1), Liza Troshka (2), Samuel Casallas (1), Sven Hoffmann (2) 1: Nortech Management Limited, United Kingdom; 2: National Grid Electricity Distribution, United Kingdom
	11433	**C13 Insight In The MV-grid With Low Effort Accurate RMU Retrofit Measurement To Accelerate Hosting Capacity And Energy Transition.** Wouter van den Akker (1), Denny Harmsen (1), Martin Binnendijk (2), Elise Morskieft (2), Gerard Schoonenberg (2), Peter Meijer (2) 1: Alliander; 2: Eaton
	10120	**C14 Failure Prediction for Circuit Breakers: Vibration and Trip Coil Current Feature Extraction for Machine Learning Applications** Jan Henning Jürgensen, Henrik Bohm, Camilla Hansson, Mikael Sollén, Anders Norström Vattenfall Eldistribution AB, Sweden

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	10231	**C15 IoT Sensors To Increase Resilience Against Critical Weather Events** Andrea Cielo (1), Giorgio Ghillardi (2), Valerio Vallocchia (3) 1: Gridspertise; 2: Enel S.p.A.; 3: Enel Grids
	10380	**C16 TNB Distribution Network's Asset Management Strategy Future Outlook through Advanced Asset Analytics** Muhammad Al Jundi Abdullah (1), Avinash Ashwin Raj Raja Gopal (2), Yogendra S. Balasubramaniam (2) 1: Tenaga Nasional Berhad, Malaysia; 2: TNB Research, Malaysia
	10447	**C17 Innovant Densimeter for GIS Tank, Insensitive to Temperature Variation** Philippe Brun (1), Diego Alberto (1), Raimund Summer (2) 1: Schneider Electric, France; 2: Schneider Electric, Germany
PANELS C7 > D3	10687	**C18 On-line Monitoring Condition of On-load Tap Changer of Power Transformers** Mauricio Cuevas (1), Damien Bortolotti (1), Mohammed Zouiti (2) 1: EDF, France; 2: ENEDIS, France
TOUR 2 DIAGNOSTICS AND SENSORS FOR ASSET MANAGEMENT 09.00 – 10.30 11.00 – 12.30	10937	**C19 Asset Management Prepared Smart Secondary Substation** Ian Paul Gilbert, Juan Antonio Sanchez, Miren De La Cruz, Jon Aguirre, Iñaki Apellaniz Ormazabal, Spain
LEVEL 1 FORUM	11366	**C20 TNB Experience in The Use of Smart Meter For Real Time Monitoring on The Thermal Performance of In-Service Distribution Transformer** Young Zaidey Yang Ghazali (1), Mohd Azhar Abd Aziz (2) 1: Tenaga Nasional Berhad, Malaysia; 2: TNB Research Sdn. Bhd., Malaysia
	11397	**C21 Monitoring of Gas Evolution of Power Transformers Integrating Nanotechnology and Intelligent Techniques** Camila Albertin (1), Floriano Neto (2), Vagner Vasconcellos (3) 1: CPFL Paulista, Brazil; 2: CPFL Geração de Energia S.A; 3: CPFL Paulista, Brazil
	10235	**C22 Concept Of A Partial Discharge Analysis By Applying Specific Digital Twins** Erhard Aumann (1,2), Franck Voüfo (3), Thomas Hammer (1), Svetlana Gossmann (1), Dirk Westermann (2) 1: Siemens AG, Germany; 2: Technische Universität Ilmenau; 3: Robert Bosch GmbH, Germany
	10400	**C23 New Approach for Online Detection of Partial Discharges in Cable Systems via VDS Ports** Manfred Bawart, Marco Engel BAUR GmbH, Austria
	10434	**C24 Low Cost, High Performance Monitoring System for Renewable Distribution Systems** Thomas Gräf Hochschule für Technik und Wirtschaft Berlin, Germany

**PANELS
C7 > D3**

**TOUR 2
DIAGNOSTICS
AND SENSORS
FOR ASSET
MANAGEMENT**
09.00 – 10.30
11.00 – 12.30

LEVEL 1
FORUM

10470	**C25 Sensitivity Evaluation of Partial Discharge Measurement Method for XLPE Cable Joint** Ryo Shutani, Shin-ichi Kobayashi, Tomoya Ogawa, Yuki Wakabayashi, Hiroyuki Futami Chubu Electric Power Grid Co., Inc., Japan
10723	**C26 Improvements on the Automatic Assessment of the Reliability of Distribution Grids Through Online Condition Monitoring** Giacomo Ciotti, Andrea Caprara, Paolo Pieroni Techimp - Altanova group, Italy
11014	**C27 Partial Discharge Measurement of Polymer Insulator under Artificial Contamination** Bikash Kafle (1), Elin Fjeld (2) 1: Kathmandu University, Nepal; 2: University of South-Eastern, Norway
11140	**C28 Deploying Intelligent PD Monitoring Solutions In Distribution Grid** Javier Ortego (1,3), José David Bielva (2), Antonio González (2), Ruben García (2), Fernando Garnacho (3,4) 1: Ampacimon; 2: EDP Redes España; 3: Universidad Politécnica de Madrid; 4: FFII-LCOE
11171	**C29 Smart Bushing PD Sensor Testing for Switchgear Application** Abbas Ghaderi (1), Lorenzo Peretto (1), Elisa Scala (2), Andrea Nalli (2), Mattewos Tefferi (3), Nenad Uzelac (3), Ana Milosevic (4), Nenad Kartalovic (4) 1: University of Bologna, Italy; 2: G&W Altea, Italy; 3: G&W Electric Co. USA; 4: Electrical Engineering Institute Nikola Tesla, Serbia
11331	**C30 Partial Discharge Characterization Through Innovative Continuous Monitoring of Medium Voltage Substation** Diana El Khoury (1), Maxime Durand (1), François Gentils (1), Davide Fabiani (2) 1: Schneider Electric Industries SAS, France; 2: University of Bologna, Italy
11338	**C31 Advanced Switchgear Diagnostics Through PD Monitoring Correlated With Environmental And Operating Parameters** Diego Alberto (1), Diana El Khoury (1), Andrea Cavallini (2), Emiliano Centenaro (1), Venanzio Ferraro (1) 1: Schneider Electric Industries SAS, France; 2: University of Bologna, Italy
10186	**C32 System Issues & Mitigations – Reclosers Installations Experience From Developing Countries** Vijay Shah (1), V Ramesh (1), Gary Foubert (2) 1: ABB India Ltd, India; 2: ABB SpA Dalmine, Italy
10533	**C33 Acquisition And Evaluation Of The Breakdown Voltage As A Result Of The Layout And The Statistical Spread Of Vacuum Gaps** Patrick Rumpelt, Michael Weuffel, Thomas Schmölzer ABB AG, Electrification – Distribution Solutions business line

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**PANELS
C7 > D3**

**TOUR 2
DIAGNOSTICS
AND SENSORS
FOR ASSET
MANAGEMENT**
09.00 – 10.30
11.00 – 12.30

LEVEL 1
FORUM

10679	**C34 Vacuum Interrupter With Rmf Contacts: Arc Movement Observation And Modelling To Master Electrical Endurance** Jerome Douchin, Anthony Papillon, Jean-Pierre Gauthier Schneider Electric, France
10699	**C35 Diagnostic Techniques Of MV Cable Joints Under Different Environmental Conditions** Giovanni Pirovano (1), Johnny Borghetto (1), Alfredo Contin (2), Andrea Morotti (3), Andrea Pegoiani (3), Samuele Forciniti (3) 1: RSE, Italy; 2: University of Trieste, Italy; 3: Unareti, Italy
10719	**C36 The Impact Of The Joint Pending Time On Its Support Regarding Its Electrical Properties** Marie-Laure Parussolo-Paupardin (1), Mehdi Kanoun (1), Housssam Tanzeghti (2), Christophe Lin (2) 1: EDF R&D, France; 2: Enedis, France
10830	**D1 A Review of Medium Voltage Vacuum Interrupter BIL Performance** Stefan Micic, Blair Kerr, Kennedy Darko G&W Electric Company, United States of America
11027	**D2 Field Experience of On-site Cable Testing of 66 kV Offshore Array Cables** Uwe Kaltenborn (1), Olaf Schacht (1), Christopher Donaghy-Spargo (2), Alex MacPhie (2) 1: HIGHVOLT Prüftechnik Dresden GmbH, Germany; 2: JDR Cable System Ltd.
11052	**D3 Diagnostic Tools (DGA) for Resilient Transformers with Aramid-Based Insulation Systems** Radoslaw Szewczyk (1), Jean-Claude Duart (1), Helena Wilhelm (2), Paulo Fernandes (2) 1: DuPont; 2: Vegoor Tecnologia Aplicada

GUIDED TOURS 3 & 4 ▮ 14.30 – 16.00 & 16.30 – 18.00

**PANELS
B10 > C6**

**TOUR 3
CONTEXT
EVOLUTION
DRIVING
DEVELOPMENT
AND
STUDIES ON
COMPONENTS**
14.30 – 16.00
16.30 – 18.00

LEVEL 1
FORUM

10332	**B10 Adoption Of Recycled and Bio-Based Material For Power Distribution Cables Manufacturing To Achieve A Significant Reduction In CO2 Emissions.** Lucia Georgantellos, Jean Pierre Goossens Alayon, Enrico Valigi, Francesco Amadei ENEL, Italy
10469	**B11 Alternative Solutions Considered by Enedis to Reduce Electrical Equipment Carbon Footprint Within the Framework of a Global Environmental Approach** Franck Gaillard (1), Florimond Soriano (1), Mamadou-Lamine Coulibaly (1), Djamel Hadbi (1), Jean-Pierre Gontier (2) 1: EDF Lab les Renardières; 2: Enedis Direction technique
10795	**B12 Life Cycle Assessment Of SF6 vs. Pure Air Medium Voltage Equipment** Thierry Cormenier (1), Frederic Marty (2), Geoffrey Medjadj (2), François Trichon (2), Dominique Serve (2), Benjamin Canaguier (3), Raimund Summer (4) 1: Schneider Electric, Lattes, France; 2: Schneider Electric, Grenoble, France; 3: Schneider Electric, Paris, France; 4: Schneider Electric, Regensburg, Germany

PANELS
B10 > C6

**TOUR 3
CONTEXT
EVOLUTION
DRIVING
DEVELOPMENT
AND
STUDIES ON
COMPONENTS**

14.30 – 16.00
16.30 – 18.00

LEVEL 1
FORUM

11056	**B13 A Simplified Tool For The Life Cycle Analysis Of A Medium Voltage Switchgear** Teresa Bas (1), Jesus Izcara (2), Iñigo Aizpuru (3), Jose Ramon Tejedo (1) 1: Iberdrola Distribucion Electrica; 2: Ormazabal; 3: Ihobe
11116	**B14 What Should DSOs Focus On For Reducing The Impacts On Climate Change When Developing And Operating Electricity Networks? A Case Study Of The Power Distribution Network In A Rural Area In Central Norway** Regina Skattenborg, Irmeline de Sadeleer, Anne Rønning NORSUS, Norway
10242	**B15 C4F7N and C5F10O Gases Used as Substitution of SF6 Have Neurotoxic, Mutagenic and Teratogenic Effects on Rats/Mice** Weihao Liu (1), Shuangshuang Tian (1), Zian Yuan (1), Xiaoxing Zhang (1), Fanchao Ye (2), Yi Li (2) 1: Hubei Engineering Research Center for Safety Monitoring of New Energy and Power Grid Equipment, Hubei University of Technology, Wuhan 430068, China; 2: School of Electrical Engineering and Automation, Wuhan University, Wuhan, China
10250	**B16 Symmetry Breaking Due to Capacitive Ground Coupling in a Vacuum Interrupter** Gabriel Lantz, Michal Studniarek, Thierry Delachaux, Irène Cucchi, Jarmo Kalilainen, Felix Rager, Frank Kassubek, Matthias Bator Corporate Research Center ABB Swtzerland Ltd
10557	**B17 Influence of Magnetic Fields to the Arc in a Polymer Materials Pipe** Kiryu Terada, Tadashi Koshizuka, Kunihiko Hidaka Tokyo Denki University
10868	**B18 Avoiding Uncertanties on Safety and Reliability in 24kV SF6 Free Secondary Distribution Switchgear** Jose Manuel Inchausti, Joseba Arostegui, Sergio Sebastián Ormazabal, Spain
10890	**B19 Environmental Issues of SF6–Free Gas Insulated Switchgear** Eivind Gramme Lede, Norway
10894	**B20 Natural Origin Gases & Vacuum Interrupter – A Reliable and Sustainable Alternative to SF6 Medium Voltage Gas Insulated Switchgear** Karthik Reddy Venna (1), Christophe Preve (2), Manjunath Ramesh (3), Frits Besseling (4) 1: Siemens AG, Germany; 2: Schneider Electric, France; 3: Nuventura, Germany; 4: Eaton, Netherlands
10994	**B21 Analysis of Long–Term Effects During Development of SF6–free Gas Insulated Switchgears** Achim Kalter (1), Dominik Becht (1), Karsten Esser–Rank (1), Patrick Halbach (1), Thomas Hammer (1), Hansgeorg Haupt (2), Bastian Woelke (3) 1: Siemens AG, Germany; 2: TU Darmstadt, Germany; 3: Westnetz GmbH, Germany

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PANELS
B10 > C6

**TOUR 3
CONTEXT
EVOLUTION
DRIVING
DEVELOPMENT
AND
STUDIES ON
COMPONENTS**

14.30 – 16.00
16.30 – 18.00

LEVEL 1
FORUM

11483	**B22 Life–Expectance Evaluation for SF6–free Switchgear using C4–FN Mixtures** Andres Laso Rubio, Ian Mainwaring, Traci Yeaton, Kennedy Darko, Nenad Uzelac, Karen Mann G&W electric, United States of America
10225	**B23 Enel's Circular by Design Approach for Grid Components** Massimo Bartolucci (1), Giuseppe Di Tommaso (1), Fabrizio Gasbarri (1), Lourdes Garcia (2), William Di Tullio (1), Luca Di Rocco (1), Samuele Giovannetti (1), Maria Cristina Papetti (1), Marina Lombardi (1) 1: Enel, Italy; 2: Enel, Spain
10325	**B24 Adoption of Recycled Fiberglass Distribution Network Components. Background, Pilot Projects and Future Developments.** Giovanni Rizzello, Jean Pierre Goossens Alayon, Enrico Valigi, Francesco Amadei, Fabrizio Gasbarri Enel, Italy
10745	**B25 Secondary Material Analysis** Luca Marcolongo, Gozde Kaya Avsar ABB SpA, Italy
10774	**B26 Standardized Rules For Environmentally Conscious Design And Assessments Of Electrical Equipment** Thierry Cormenier (1), Roselyne Thai (2), Takako Hiruta (3), Martial Patra (4), Pauline Mourlon (4), François Trichon (2), Dominique Serve (2) 1: Schneider Electric, Lattes, France; 2: Schneider Electric, Grenoble, France; 3: Schneider Electric, Tokyo, Japan; 4: Schneider Electric, Paris, France
10212	**B27 Pro–Active Approach To Mitigating Bird Mortalities On Distribution Networks** Andreas Beutel (1,2), Rudi Kruger (1), Bruce McLaren (1), Denise Hewitt (1), Nishanth Parus (2), Chandima Gomes (2) 1: Eskom Holdings SOC Ltd, South Africa; 2: University of the Witwatersrand
11175	**B28 Improve Operator Safety and Protect Wildlife in Overhead Distribution Networks** Iban Landeta Zarate (1), Iñaki Apraiz Alvarez (1), Juan Carlos Pérez Quesada (1), Mikel Irizar Moyua (2) 1: Schneider Electric (MESA PLANT), Spain; 2: Iberdrola, Spain
11234	**B29 Analysis Of The Exposure Of Workers To Electric And Magnetic Fields During Maintenance Works On Distribution Overhead Power Lines** Maja Grbić, Aleksandar Pavlović Electrical Engineering Institute Nikola Tesla, Serbia
11372	**B30 20 Years Of Birdlife Protection At E–REDES** Filipa Capela (1), Inês Cândido Silva (1), Vitor Batista (2), Jorge Mendes Santos (1), Pedro Sá Furtado (1), Inês Gomes (1), Sílvia Monteiro (1) 1: E–REDES – Distribuição de Eletricidade S.A., Portugal; 2: EDP – Energias de Portugal S.A, Portugal

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POSTER SESSION 1
NETWORK COMPONENTS

LEVEL 1 ▮ FORUM

PANELS
B10 > C6

TOUR 3
CONTEXT
EVOLUTION
DRIVING
DEVELOPMENT
AND
STUDIES ON
COMPONENTS

14.30 – 16.00
16.30 – 18.00

LEVEL 1
FORUM

10253	**B31 Secure Power Supply Of MV Grids – Neutral Isolated – By Means Of GE Directly Connected To Medium Voltage** Luca Giansante, Fabrizio Gasbarri, Andrea Anesa, Francesco Amadei, Enrico Valigi Enel Grids, Italy
10652	**B32 "End-To-End Testing" of Enedis' Smart Equipment for Secondary Substations** Janailson Rodrigues Lima (1), Franck Serafini (1), Fabienne Montel-Ragu (1), Cedric Cholin (2), Mikaël Chochois (2) 1: EDF R&D, France; 2: Enedis, France
11223	**B33 Fast-tracking Licencing Of Temporary Lines And The Use Of Mobile Maintenance Kits With MV Aerial Bundled Cables** Rui Bandeirinha, Carlos Manuel Duarte, António Tomás, Jorge Miguel Antunes E-REDES, Portugal
10211	**B34 Assessment of Breakdown Voltage for Low Density Polyethylene Cables Using Nano Aluminium Dioxide Filler** Eman El_Sherkawy (1), Loai S. Nasrat (2), Mahmoud Rihan (3) 1: The High Institute of Engineering and Technology, Egypt; 2: Faculty of Engineering Aswan University, Egypt; 3: Faculty of Engineering South Valley University, Egypt
10271	**B35 Connection of Medium Voltage Cables with Conductor Temperatures up to 110 °C – Design of a "temperature Sink"** Kai Bentkowski (1), Gert Stauch (1), Haim Klaus-Dieter (2) 1: BBC Cellpack GmbH, Germany; 2: University of applied sciences Zittau, Germany
10294	**B36 Adoption Of High Capacity Low Sag Conductors On High Voltage Power Lines** Josè Manuel Lopez Villena, Roberto Emma, Remo Gingillino, Genis Egea Brufau, Fabrizio Gasbarri, Enrico Valigi, Francesco Amadei ENEL, Italy
10309	**C1 On the Adhesion Efficiency of the PE/resin and PVC/resin Interfaces for Low Voltage Joint Applications** Mehdi Kanoun (1), Marie-Laure Parussolo-Paupardin (1), Damien Veillot (2), Christophe Lin (2) 1: EDF, France; 2: Enedis, France
10596	**C2 Sustainable Power Transformers: Enel Grids use of natural ester insulating fluid in large power transformers** Miguel Angel Caballero, Marianna Rizzo, Juan Manuel Rey, Flavio Mauri, Fabrizio Gasbarri, Enrico Valigi, Francesco Amadei Enel Grids
10642	**C3 Solving the Problem of Wooden Poles Ignition due to Insulator Contamination - In Theory and Practice** Domagoj Milun, Dinko Marijan, Josip Srdanović HEP DSO, Croatia

POSTER SESSION 1
NETWORK COMPONENTS

LEVEL 1 ▮ FORUM

PANELS
B10 > C6

TOUR 3
CONTEXT
EVOLUTION
DRIVING
DEVELOPMENT
AND
STUDIES ON
COMPONENTS

14.30 – 16.00
16.30 – 18.00

LEVEL 1
FORUM

PANELS
D4 > E11

TOUR 4
DATA,
MODELS
AND
PREDICTION
FOR
COMPONENTS

14.30 – 16.00
16.30 – 18.00

LEVEL 1
FORUM

11126	**C4 Non Intrusive Repair Of a Belgrade Fluid Filled Cable With a Self-healing Dielectric Fluid** Rhys Rhodes (1), Maggie Svensson (2), Henryk Herman (1), Gary Stevens (1), Christopher Miners (2), Siddharth Uppal (3), Christian Kretzschmar (3), Pane Ivetic (4), Branko Dordevic (5), Mirko Borovic (5), Ivana Mitic (5) 1: Kinectrics UK Ltd, United Kingdom; 2: Energi Cable Engineering, United Kingdom; 3: NKT, Denmark; 4: MINS Elektro, Serbia; 5: Elektromreza Srbjie, Serbia
11350	**C5 Polymeric Composite Crossarms as an Alternative to a Traditional Metallic Solution on E-REDES Medium Voltage Overhead Networks** Pedro Sá Furtado, Jorge Mendes Santos, Hilário Lopes, Filipa Capela E-REDES, Portugal
11472	**C6 Hardware of Aerial Distribution Networks, for Use on the Seashore, Corrosion Resistant, Corona Discharges and Leakage Current** Alessandro P Dadam (1), Geraldo R de Almeida (2), Walter Pinheiro (2), Simone C N Araujo (2) 1: Celesc Distribuição S.A., Brazil; 2: Tag Inovacao Tecnologica
10114	**D4 Statistically Validated Lifetime Assessment and Health Index Using Survival Analysis Stratifications** Mischa Vermeer, Gerard Cliteur, Bernd van Maanen DNV, Netherlands, The
10237	**D5 Profitability Of Condition Monitoring In The Electric Distribution Grid** Hugo Vincenti, Sylvie Koziel, Patrik Hilber KTH (Royal Institute of Technology), Sweden
10331	**D6 Analysis Of Data Gathered During The Application Of LLPDs On MV Feeder Of E-distribuzione** Luigi D'Orazio (1), Gianluca Di Felice (2), Jean Baptiste Frain (3), Amedeo Andreotti (4), Naganathini Ravichandran (4), Ivano Gentilini (1), Daniela Proto (4), Antonello Greco (1), Ludovico Spitilli (2) 1: ENEL, Italy; 2: e-distribuzione, Italy; 3: Streamer, Switzerland; 4: University of Naples, Italy
10339	**D7 New Tool For The Improvement Of Maintenance And Expected Life Monitoring Procedures Of Surge Arresters Installed On Overhead MV Lines** Luigi D'Orazio (1), Gianluca Di Felice (1), Marina Bernardi (2), Stefano Malgarotti (2), Bruno Mario Ceresoli (2), Matteo Corti (2) 1: ENEL, Italy; 2: CESI, Italy
10595	**D8 Distribution Transformer Ageing: Possible Load Increase on an Actual Use Case** Nathalie Barnel (1), Michel Cordonnier (2), Marie Laure Parussolo-Paupardin (3) 1: EDF, France; 2: ENEDIS, France; 3: EDF, France

PANELS
D4 > E11

TOUR 4
DATA,
MODELS
AND
PREDICTION
FOR
COMPONENTS
14.30 – 16.00
16.30 – 18.00

LEVEL 1
FORUM

10685	**D9 Rethinking Data Requirements For The Reliability Assessment Of Medium Voltage Cables** Konrad Sundsgaard (1,2), Jens Zoëga Hansen (1), Guangya Yang (2) 1: Green Power Denmark; 2: Technical University of Denmark
10700	**D10 Predictive Maintenance On Overhead Medium Voltage Network Using Transient Faults Data** Odilon Faivre, Martial Joseph, Jérémie Mérigeault, Ilyes Kabbourim, Alain Tholon, Nicolas Bailloeuil Enedis, France
10805	**D11 Fault Activity Trajectory Estimation – Time To Fuse Blow** Samir Alilat (1), Jonathan Rodgers (1), Emilio Vicari (2), Davide Cagnoni (2), Francesco Sciocchetti (3), Irene Parigi (2) 1: Kelvatek, United Kingdom; 2: Camlin Technologies; 3: Camlin Energy
10834	**D12 Failure Statistic for Medium Voltage Cable Systems in Denmark** Jens Zoëga Hansen Green Power Denmark, Denmark
11167	**D13 Lifetime Extension Options for Electrical Equipment** Lina Bertling Tjernberg (1), Stephanie Uhrig (2) 1: KTH, Sweden; 2: HM Hochschule München University of Applied Sciences, Germany
11215	**D14 Implementation of Asset Condition Models at E-REDES: What Comes Next?** Miguel Freitas, Cristina Carvalho, Fernando Moreira, Diogo Moreira, Ana Delfino, André Neves E-REDES, Portugal
11246	**D15 Power Transformer Life Extension By An Optimized Mid-life Maintenance** Michel Cordonnier, Mohammed Zouiti, Ortega Eric Enedis, France
11270	**D16 Optimizing the Life-Span of (Smart) Transformers: A Review on Smart Services** René Kuchenbuch, Mana Azamat, Johann Schütz OFFIS, Germany
10316	**D17 Deep Learning-Based Automatic Detection of Defective Steel Bars in Concrete Poles** Junhyeong Pak, Yoonbo Shim, Jonghyup Song, Sang Jun Kim, Jae Heon Lee, Sangoh Jeong Korea Electric Power Corporation (KEPCO), South Korea
10611	**D18 Monitoring And Rating Of The Low Voltage Grid Utilization** Jonas Claus (1), Günter Schulz (1), Markus Kosch (2), Thomas Schwierz (3), Christian Rehtanz (3) 1: ct.e Controltechnology Engineering GmbH, Germany; 2: AVU Netz GmbH, Germany; 3: Institute of Energy Systems, Energy Efficiency and Energy Economics, TU Dortmund, Germany

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PANELS
D4 > E11

TOUR 4
DATA,
MODELS
AND
PREDICTION
FOR
COMPONENTS
14.30 – 16.00
16.30 – 18.00

LEVEL 1
FORUM

10743	**D19 Online Automated System for Incipient Fault and Failure Detection of Distribution Apparatus Using Waveform Disturbances** Jeffrey Wischkaemper, B. Don Russell, Carl Benner, Karthick Manivannan Texas A&M University, United States of America
11517	**D20 Vibration-Based Extraction of Switching Times for Circuit Breaker Monitoring Using Machine Learning** Aydin Boyaci, Ido Amihai, Simon Penner, Vadim Migunov, Theresa Loss, Maurizio Zajadatz, Michael Suriyah, Thomas Leibfried, Nico Seidel ABB AG Corporate Research Center Germany, Germany
10173	**D21 Influence of Circuit Breaker Mounting on its Lifetime** Ondrej Frantisek (1), Carlos Crespo Hornillos (1), Alessandro Bonfanti (2), Alessandro Stucchi (2), Claudio Cenci (2), Corrado Rizzi (2), Dukkaiappan Subbiah Thevar (3) 1: ABB AG Research Center, Germany; 2: ABB SpA, Italy; 3: ABB AG, Germany
10939	**D22 Green Design with Amorphous Metal for Dry Type Distribution Transformers** Kacey Lee (1), Radoslaw Szewczyk (2), Zhongdong Bai (3), Ning Li (4), Chengxiang Jin (5) 1: DuPont Korea, Korea, Republic of (South Korea); 2: DuPont Poland; 3: CEEG China; 4: CEEG Chuna; 5: CEEG China
11083	**D23 Cyclic Loadability Of Entire HV/MV-Substations** Jur Erbrink, Rory Leich, Robert Vosse, Sjoerd Nauta, Jurriaan Smit Alliander, The Netherlands
11094	**D24 Inrush-Currents of Series Combination of Transformer with in-phase Regulation and Phase Shifting Transformer at the Interface between Transmission and Distribution Networks** Jiachen Bai (1), Fekadu Shewarega (1), Hendrik Vennegeerts (1), Roman Lechner (2), Günter Etz (2), Markus Unterholzer-Moser (3) 1: University Duisburg-Essen, electrical Energy Systems (eES), Germany; 2: Netz Niederösterreich GmbH, Austria; 3: Austrian Power Grid (APG), Austria
11108	**D25 Thermal Performance For Three-Windings Transformers With Axially Stacked Windings** Pablo Pacheco Ramos (1), Jason Varnell (1), Miguel Martinez Ronderos (2), Inna Gerasimova (3), Esther Esteban Cabellos (2), Sergey Snagovskoy (3) 1: DOBLE ENGINEERING, United States of America; 2: IBERDROLA, Spain; 3: FARAMAX TRAFO, Spain
11182	**D26 Simulation Study and Field Experience from Switching of Transformer with Minimal Inrush Current** Elisabeth Lindell (1), Andrea Bianco (2), Stefan Halén (1), Carlo Taborelli (2) 1: ABB AB, Sweden; 2: ABB S.p.A., Italy

POSTER SESSION 1
NETWORK COMPONENTS

LEVEL 1 ▮ FORUM

PANELS
D4 > E11

**TOUR 4
DATA,
MODELS
AND
PREDICTION
FOR
COMPONENTS**
14.30 – 16.00
16.30 – 18.00

LEVEL 1
FORUM

11272	**E1 Synchronous Circuit Breaker For Transient Suppression In Distribution Network: VD4–CS Pilot** Andrea Ferruccio (1), Andreas Brandt (2), Matteo Minuti (1), Carlo Taborelli (1), Antonio Ragonese (3), Andrea Pegoiani (3), Samuele Forciniti (3) 1: ABB S.p.A.; 2: ABB AG; 3: Unareti S.p.A.
11407	**E2 Core Vibration Modelling for Secondary Distribution Transformers** Andre Würde (1), Jannis Nikolas Kahlen (2), Albert Moser (1) 1: IAEW, RWTH Aachen, Germany; 2: Umlaut SE, Germany
11437	**E3 Zero–Sequence Blocking Transformers For Use In MV Distribution Systems – Design Comparison Of Single–Core Vs Multi–Core Designs** David Söderberg Erdal (1), Maarit Juhola (2) 1: Vattenfall Eldistribution AB, Sweden; 2: KKM Power OY, Finland
10133	**E4 Real And Virtual Testing Of The Future Electrical Power Systems** Iñaki Orue, Leire Redondo, Nabil Akroud, Ian Paul Gilbert Ormazabal, Spain
10392	**E5 Digital Twins Used For Condition Assessment Of Transformer Fleets – The Challenges of turning Data into Reality** Bastian Fischer, Dr Karsten Viereck, Christian Hofmeister Maschinenfabrik Reinhausen GmbH, Germany
10660	**E6 Enel Grids Network Digital Twin®: The Foundation Layer Of Integrated Suite For Distribution Systems Design** Massimo Maffeis (1), Roberto Casavecchia (1), Andrea Casini (1), July Marcela Aparicio Cabrera (2), Mario Larcher (5), Antonio Nappi (1), Michele Portas (1), Federico Pollacchini (1), Mario Fernandez (3), Giovanni Franzone (1), Francesco Amadei (1), Fernanda A. Paletta Piovezan (4), Ignacio Garcia Berenguer (4), Gianluca Toffoletto (4), Fabio Giammanco (1) 1: Enel Grids, Italy; 2: Enel Grids, Colombia; 3: Enel Grids, Spain; 4: Gridspertise; 5: Enel, Italy
10778	**E7 How To Build Catalogue Data For Digital Twins Of High–Voltage Switchgear** Thierry Cormenier (1), François Trichon (2), Dominique Serve (2), Mayank Sharma (2), Tom Berry (2) 1: Schneider Electric, Lattes, France; 2: Schneider Electric, Grenoble, France
10505	**E8 Cost Efficient Management Of Digital Secondary Substations, On The Example Of The Process Interface And Detection Unit (PIDU)** Andreas Hettich (1), Fabian Zehner (1), Gerald Jacob (2), Christian Ruester (2) 1: Netze BW GmbH, Germany; 2: A. Eberle GmbH & Co. KG, Germany
11164	**E9 Virtualization and Management Technologies of Smart Substations** Carsten Krüger, Jirapa Kamsamrong, Sebastian Lehnhoff OFFIS e.V., Germany

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POSTER SESSION 1
NETWORK COMPONENTS

LEVEL 1 ▮ FORUM

11257	**E10 Cyber Security Of An Industrial IoT Gateway Device – A Threat Model View And Security Aspects** A Pavan Kumar Tatavarthi (1), Prof. Bijaya Ketan Panigrahi (2) 1: ABB, India; 2: IIT Delhi
11341	**E11 Standardization of Smart Distribution Substations in Cologne** Stephan van der Broeck, Sigrid Plötz, Mirko Wahl, Judith Schramm, Ulrich Groß Rheinische NETZGesellschaft mbH, Germany

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WEDNESDAY 14 JUNE

LEVEL 1 ❚ FORUM

POSTER SESSION 3
OPERATION

	GUIDED TOURS 1 & 2 ❚ 09.00 – 10.30
10109	**F1 Hosting Capacity Improvement in Low Voltage Distribution Networks: A Risk-based Approach** Zeljko Popovic (1), Neven Kovacki (1), Marko Obrenic (1), Branislav Brbaklic (2) 1: University of Novi Sad, Serbia; 2: Schneider Electric, Serbia
10168	**F2 Reallocation of Step Voltage Regulators in Distribution Networks to Overcome the Effects of Load Growth** Ali Radwan Middle Egypt Electricity Distribution Company, Egypt
10330	**F3 V2X Integration in Self-Consumption Energy Management System** Samuel Matias (1), Joao Mateus (1), Manuel Pereira (2), Tarcísio Silva (3), António Furtado (3), Charalampos Ziras (4), Mattia Marinelli (4), Luiz Dias (1), Rafael Rodrigues (1), Hugo Morais (2) 1: EDP NEW R&D, Portugal; 2: INESC-ID/IST, Portugal; 3: EDA, Portugal; 4: DTU, Denmark
10358	**F4 Integration Of Battery Aging Model In Ancillary Services And Self-consumption Combined Strategies.** Laurine Ferrando (1,2), Raphael Caire (1), David Frey (1), Jean-Marc Guenee (2) 1: Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, Grenoble, France; 2: Wattmen, Saint-Priest-En-Jarez, France
10375	**F5 The Next Generation of ADMS Functions for Predictive Management of DER** Paulo Viegas (1), José Simões (1), Pedro Silva (1), Dora Cabral (1), Miguel Gomes (1), Luis Gonçalves (2), Carlos Costa (2), Ricardo Bessa (3), Jorge Pereira (3,4), Pedro Benedicto (3), Micael Simões (3), Ricardo Andrade (3), João Viana (3), Maria Araújo (5), Manuel Azevedo (5) 1: EFACEC, Portugal; 2: ARMIS, Portugal; 3: INESC TEC, Portugal; 4: Faculty of Economics - University of Porto, Portugal; 5: PH Energia, Portugal
10420	**F6 Joint Energy, Reserve, and Flexibility Scheduling of DERs in Power Distribution Networks** Niloofar Pourghaderi (1), Mahmoud Fotuhi-Firuzabad (1,2), Moein Moeini-Aghtaie (1), Milad Kabirifar (1), Matti Lehtonen (2), Payman Dehghanian (3) 1: Sharif University of Technology, Iran, Islamic Republic of; 2: Aalto University, Finland; 3: George Washington University, USA
10427	**F7 A Virtual Energy Storage System to Compensate for the Uncertainty in Distributed Renewable Generation** Saif Sami (1), Yue Zhou (1), Meysam Qadrdan (1), Evgeny Prokofyev (2), David Pampliega (2), Jianzhong Wu (1) 1: Cardiff University, United Kingdom; 2: Schneider Electric, Spain
10460	**F8 A Novel Evaluation Method of Virtual Power Plant Effect on Distribution Networks Using Fuzzy Logic** Jihui Hwang, Jin-Oh Lee, Gyeong-Hun Kim, Jin-Hong Jeon Korea Electrotechnology Research Institute, Korea, Republic of (South Korea)

PANELS
F1 > F17

**TOUR 1
STRATEGIES
AND
MANAGEMENT**
09.00 – 10.30

**LEVEL 1
FORUM**

10461	**F9 Assessment of the impact of Hybrid Distributed Generation / Batteries Energy Storage Systems on DSO Operational Planning** Jamilson Junior (1), Ludovic Girault (2), Matthieu Alchourroun (2), Hugo Morais (1), Benoit Bouzigon (3) 1: INESC-ID/IST, Portugal; 2: EDF R&D; 3: ENEDIS
10471	**F10 Scalable Uncertainty Aware Ancillary Services Procurement Tool For Active Distribution Systems** Muhammad Usman (1), Baara Mohandes (1), Florin Capitanescu (1), Andre Guimaraes Madureira (1), Martin Bolfek (2), Zdravko Matišić (2), Filipe Joel Soares (3), Nuno Fonseca (3), Henrique Teixeira (3), Carlos Mateo (4) 1: Luxembourg Institute of Science and Technology, Luxembourg; 2: Hrvatska Elektroprivreda Operator Distribucijskog Sustava, Croatia; 3: Institute for Systems and Computer Engineering, Technology and Science, Portugal; 4: Institute for Research in Technology, Comillas Pontifical University, Spain
10489	**F11 Grid Serving Charging Control of Electric Vehicles** Timo Hertlein (1,2), Joerg Ochs (1), Christian Weindl (2), Tobias Blenk (2) 1: Siemens AG, Germany; 2: Coburg University of Applied Sciences and Arts
10598	**F12 Investigation of Grid-Serving Flexibility Provision by Electric Vehicles in a Distribution Grid** Kevin Kratz (1), Sharon Müller (1), Krzysztof Rudion (1), Christian Körner (2) 1: University of Stuttgart, Germany; 2: Stuttgart Netze GmbH, Germany
10731	**F13 Model Predictive Control for Smart Grid Charging of Autonomous Electric Vehicle Fleet using Local Renewable Energy Generation** Haider Ali (1), Bruno Francois (1), Luce Brotcorne (2), Zahra Foroozandeh (3), João Soares (3) 1: L2EP - Ecole Centrale de Lille, France; 2: INRIA Lille, INOCS; 3: GECAD - Instituto Superior de Engenharia do Porto, ISEP
10771	**F14 Optimal Management of Flexibility Services at LV Distribution Grid Level** Riccardo Nebuloni (1), Valentin Ilea (1), Cristian Bovo (2), Alberto Berizzi (1), Carlo Arrigoni (3), Roberto Bonera (4), Brunella Conte (3), Franco Conti (3) 1: Politecnico di Milano, Italy; 2: Università degli Studi di Pavia, Italy; 3: Siemens, Italy; 4: Freelancer
10818	**F15 Flexibility Coordination Mechanism Between A Distribution System Operator And A Virtual Power Plant Involving Wind Parks And A Battery Energy Storage System** Nuran Cihangir Martin, Floris van Lith, Niels Poiesz, Paul Bierling, Peter Vinke, Anne van der Molen Stedin, Netherlands, The
10878	**F16 Using Light Electric Vehicles For V2G services in the Arctic** Shayan Dadman (1), Bernt Bremdal (1,2) 1: UiT Campus Narvik; 2: Smart Innovation Norway

PANELS
F1 > F17

**TOUR 1
STRATEGIES
AND
MANAGEMENT**
09.00 – 10.30

**LEVEL 1
FORUM**

10511

F17 Balancing PV Generation In Low Voltage Grids With Limited Data
Christoph Jätz (1), Benjamin Petters (1), Navreet Dult (1), Amir Ahmadifar (2), Antonello Monti (2)
1: Avacon Netz GmbH; 2: RWTH Aachen

11089

H18 Dynamic Operation of MV Grids Based on Losses Optimisation
João Nunes Carreira, João Pedro Baptista, Diogo Carrilho, Alexandre Monteiro, Ines Roca
E-REDES, Portugal

10216

H19 Reactive Power Forecasting At The Transmission-Distribution Interfaces Using Physics Based Machine Learning
Arnaud Rosseel, Bashir Bakshideh Zad, Zacharie De Grève, François Vallée
University of Mons, Belgium

10394

H20 Optimizing DER Reactive Power Setpoint For DSO Operational Planning For MV Grid
Amel Addala (1), Benoit Bouzigon (2), Andréa Laugère (1), Riadh Zorgati (1)
1: EDF Lab Paris Saclay; 2: Enedis

10732

H21 Techno-economic Estimation of Reactive Power Related Additional Losses in Wind Farms During Reactive Power Supply
Felix Korff (2,1), Hartmudt Köppe (2), Bernd Engel (2)
1: E5, Technical University of Darmstadt, Germany; 2: elenia, Technical University of Braunschweig, Germany

10124

H22 Expansion of the Distribution Network Capacity by Monitoring low voltage Capacitors due to Changes in Topology
Kazem Ghaffari vostakolaie, Reza Ghaffari
Mazandaran electric power distribution company, Iran, Islamic Republic of

10188

H23 Low Voltage Grid "Flex-efficiency": Automatized Low Voltage Switchgear
Tania Vázquez
E-REDES (EDP networks Spain), Spain

10349

H24 Load And Generation Forecast On Substation Level
Martin Ruhhütl, Robert Schmaranz, Thomas Dietrichsteiner
KNG-Kärnten Netz GmbH, Austria

10387

H25 Evaluation of Quota-based Predictive Congestion Management in Active Distribution Networks
Sharon Müller (1), Krzysztof Rudion (1), Marc-Aurel Frankenbach (2), Carmen Exner (2)
1: University of Stuttgart, Stuttgart, Germany; 2: Netze BW GmbH, Stuttgart, Germany

10389

H26 Evaluation of Transit Power Flows in High Voltage Distribution Grids using Fuzzy Logic
Paul Burkhardt (1), Krzysztof Rudion (1), Andreas Frank (2), Alexander Probst (2)
1: University of Stuttgart, Germany; 2: Netze BW GmbH, Germany

PANELS
H18 > I2

TOUR 2 OPERATION CENTER
09.00 – 10.30

LEVEL 1
FORUM

10405

H27 Real-time Circulating Currents Calculation In The Distribution Management System
Jan Van de Vyver, Cedric Lahousse, Tine Vandoorn
Fluvius System Operator CV, Belgium

10986

H28 Advanced Concept of Efficient Use of Transformers Leveraging the Dynamic Thermal Rating Technology
Andrej Souvent (1), Miha Rot (6), Tim Gradnik (5), Andrej Spec (2), Polona Koprivc (2), Nejc Petrovič (3), Gregor Omahen (4), Gregor Kosec (6)
1: Operato d.o.o., Slovenia; 2: SODO d.o.o., Slovenia; 3: Elektro Gorenjska, d.d., Slovenia; 4: ELES, d.o.o., Slovenia; 5: EIMV, Slovenia; 6: Jožef Stefan Institute, Slovenia

10987

H29 Data Driven Analytical Model Optimizing Grid Capacity Utilization
Stig Simonsen (1), Thomas Øyvang (2), Ole Kristian Grindbakken (1)
1: Lede AS, Norway; 2: USN, Norway

11071

H30 Congestion Anticipation and Preemptive Resolution in Distribution Networks Using Grid Internal and Redispatch Measures
Susanne Schmitt (1), Iiro Harjunkoski (1), Giancarlo Dalle-Ave (2), Milos Subasic (1), Peter Noglik (1)
1: Hitachi Energy, Germany; 2: Hitachi Energy, Canada

11103

H31 Essential Aspects of Operational Risk Assessment and its Application: Issues and Challenges
Zunaira Nazir
Luleå Tekniska Universitet, Sweden

11190

H32 Challenges in Proactive Congestion Management in Distribution Grids – Practical Findings from the flexQgrid Project
Marc-Aurel Frankenbach (1), Carolin Schubert (2), Carmen Exner (1), Sheau-Yu Lin (1), Ariane Höck (3)
1: Netze BW GmbH, Germany; 2: EnBW AG, Germany; 3: FZI Research Center for Information Technology, Germany

11409

H33 "Energy Package" as a Tool to Reduce Environmental Footprint and Withhold Grid Capacity Limit at Harbour Areas
Iliana Ilieva (1), Emil Wingstedt (1), Anja Wingstedt (1), Tore Lundestad (2), Pål Erling Johnsen (2), Ole Jakob Sørdalen (3)
1: Smart Innovation Norway, Norway; 2: BORG HAVN IKS; 3: Pixii

10377

H34 E-REDES's New Method To Identify Non-optimal LV (Low Voltage) Grid Reconfiguration After Outages and Planned Maintenance Actions
Rita Lopes Mourão, Gonçalo Santos, David Fonseca, Miguel Louro, José Sousa
E-REDES, Portugal

10749

H35 Improved Load and Generation Forecasting for Extended Day-Ahead Estimates in the Nordic Grid
Swaechchha Dahal (1,2), Gunne John Hegglid (1), Thomas Øyvang (1)
1: University of South Eastern Norway, Norway; 2: Kathmandu University, Nepal

PANELS
H18 > I2

TOUR 2 OPERATION CENTER
09.00 – 10.30

LEVEL 1
FORUM

LEVEL 1 ∎ FORUM

PANELS
H18 > I2

**TOUR 2
OPERATION
CENTER**
09.00 – 10.30

LEVEL 1
FORUM

10761 — **H36 Geolocalized Photovoltaic Energy Prediction Methodology using Machine Learning**
Nicolas Chianella (1), Dominique Genoud (1), Jean-Marie Alder (2), Olivier Arbellay (1), Jérôme Treboux (1), Jérémie Vianin (2), David Wannier (2)
1: Institute of Informatics, HES-SO Valais Wallis, Switzerland;
2: Institute of Sustainable Energy, HES-SO Valais Wallis, Switzerland

11170 — **I1 An Automation Approach Towards The Preparation Of Switching Orders Involved In The Planned Outages of Network Elements**
Jérôme Bausier (1), Pierre Stoupy (2), Rafael Michiels (3)
1: N-SIDE, Belgium; 2: ELIA, Belgium; 3: N-SIDE, Belgium

11339 — **I2 Rethink Grid Management – Challenges, Use Cases And Design Principles For The Next Generation Of Grid Operation Systems**
Ben Gemsjaeger (1), Robert Wenz (1), Dr. Michael Ebert (1), Sigurd Kvistad (2), Jens Tore Holene (2), Jørgen Sivertsen Asrud (2), Sergio Manno (3), Emmanuele Maria Petruzziello (3), Nikolai Demydov (1)
1: Siemens AG, Germany; 2: Elvia AS, Norway; 3: IRETI S.p.A., Italy

GUIDED TOURS 3 & 4 ∎ 11.00 – 12.30

PANELS
F18 > G6

**TOUR 3
STRATEGIES
AND
MANAGEMENT**
11.00 – 12.30

LEVEL 1
FORUM

10992 — **F18 Operational Strategies for Maximising the Value of Customer Flexibility**
Danny Pudjianto, Goran Strbac
Imperial College London, United Kingdom

11109 — **F19 Optimal Cross-Voltage Operation of Active Distribution Networks Considering Flexibility and Production Schedule of an Industrial Customer with Various Business Models**
Nasratullah Mohseni, Sergio Contreras, Johanna Myrzik
University of Bremen, Germany

11148 — **F20 Demonstration for New Type SVR Using Commercial Distribution System with DERs**
Naoyuki Takahashi, Yuya Tachibana, Satoshi Uemura
Central Research Institute of Electric Power Industry, Japan

11177 — **F21 Optimal Scheduling of EVs Route Considering Integrated Power and Transportation System**
Myeongseok Chae (1), Hee june Cha (2), Dongjun Won (1), Taesic Kim (3)
1: Inha University, Korea, Republic of (South Korea);
2: Incheon International Airport Corporation; 3: Department of Electrical Engineering and Computer Science Texas A&M University-Kingsville, Kingsville, TX 78363, USA

11179 — **F22 Performance Evaluation and Operational Logistics in Energy Distribution Utility Fleet Electrification**
Lucca Zamboni (1), Bruno Martin de Alcântara Dias (2), Cynthia Thamires da Silva (2), José Sidnei Colombo Martini (1), Andre Polatschek Rodrigues (3), Nathalia Rubo Nobre de Freitas (3)
1: GESEL – Grupo de Estudos do Setor Elétrico – Brazil;
2: USP – Universidade São Paulo – Brazil; 3: CPFL Energia

LEVEL 1 ∎ FORUM

PANELS
F18 > G6

**TOUR 3
STRATEGIES
AND
MANAGEMENT**
11.00 – 12.30

LEVEL 1
FORUM

11224 — **F23 Vision For Smart Grid Interoperability: Standards Based Integration Of E-Mobility, Prosumer, And Grid**
Mayank Sharma, Tom Berry
Schneider Electric, France

11260 — **F24 Modeling Active Grid Operation In A Testbed For Cyber-Physical Systems**
Armin Fatemi (1), Florian Schmidtke (2), Thomas Offergeld (1), Lukas Winkler (1), Gökhan Akbaba (1), Andreas Ulbig (1)
1: IAEW at RWTH Aachen University, Germany; 2: Fraunhofer FIT, Germany

11292 — **F25 C-HIL Environment for Parameter Optimization of Grid Friendly Charging Control**
Alfred Einfalt, Albin Frischenschlager, Lukas Schroeer, Andreas Schildorfer, Anton Steinwendtner
Siemens AG OEsterreich, Austria

11342 — **F26 Investigation of Stacked Applications for Battery Energy Storage Systems**
Florian Schmidtke (1,2), Immanuel Hacker (2,1), Armin Fatemi (1), Andreas Ulbig (1,2)
1: IAEW at RWTH Aachen University, Germany; 2: Fraunhofer FIT, Germany

11344 — **G1 Enhanced Virtual Power Plant Design And Implementation Lessons**
Gary Howorth (1), Ivana Kockar (1), Paul Tuohy (1), Graeme Flett (1), John Bingham (2)
1: University of Strathclyde, United Kingdom; 2: Engineering Technology Centre Ltd (ETC), United Kingdom

11348 — **G2 An Integrated Approach for Energy Management Optimizations in Customer Premises**
Mana Azamat, Johann Schütz
OFFIS, Germany

11423 — **G3 Challenge of Integration BESS on Distribution Active Network Management Scheme**
Gonzalo Tejero Calvo Calvo (1), Minjiang Chen (1), Jonathan Fox (2), Matthew Jones (1), Gerard Boyd (1), David Neilson (1)
1: SP Energy Networks, United Kingdom; 2: Frazer Nash Consultancy

11451 — **G4 Operation of Electrical Vehicle Recharging Station with a Photovoltaic System to Reduce the Impact on the Distribution Network**
Samuel D. Vasconcelos (1), José F.C. Castro (1), Leonardo Limongi (1), Gustavo M.S. Azevedo (1), Davidson C. Marques (1), Pedro A. Rosas (1), Fabricio Bradaschia (1), Amanda L. Fernandes (2), Jun QI (2), Luciano Tavares (3), Antônio V. M. L. Filho (4), Nicolau K. L. Dantas (4)
1: Federal University of Pernambuco – UFPE; 2: CPFL Energy; 3: Advanced Institute of Technology and Innovation – IATI; 4: Institute of Technology Edson Mororó Moura – ITEMM

11463
G5 An Improved GA-based Approach for Reduced Non-discriminatory Renewable Energy Curtailment
André Pedroso (1), Giuseppe Zanatta (2), Ângela Ferreira (1), Ana Pereira (1), Yahia Amoura (1), Rui Lopes (1), Eduardo Ângelos (3), Fillipe Vasconcelos (3), Manuel Lemos (3), Gabriel Pino (3)
1: Research Centre in Digitalization and Intelligent Robotics (CeDRI), Instituto Politécnico de Bragança, Portugal; 2: Instituto Politécnico de Bragança, Portugal; 3: GML Transmission Line Solutions, S.A., Brazil

11520
G6 Transactive-based Control of Electric Vehicle Charging Stations Considering Network Congestion
Sajjad Fattaheian Dehkordi (1,2)
1: Aalto University, Finland; 2: Sharif University of Technology

10177
I3 Islanding Detection with Universal Grid-forming Inverter-based Generation
Hannu Laaksonen
University of Vaasa, Finland

10492
I4 Placement of Virtual Inertia in Islanded Distribution Networks With High Penetration of Inverter-based Resources
Fadi Kelada (1), Jérôme Buire (1), Nouredine Hadjsaid (1,2)
1: Univ. Grenoble Alpes, CNRS, Grenoble INP, G2ELab, 38000 Grenoble, France; 2: Nanyang Technological University, Singapore 639798, Singapore

10779
I5 Automated Emergency Power Supply For Drinking Water Supply By A Hydro Power Plant In Islanded Grid Operation
Johanna Timmermann (1), Claudia Bernecker-Castro (1), Tobias Lechner (2), Sebastian Seifried (2), Dirk Menker (3), Christian Dellmann (4), Günther Störzer (5), Michael Finkel (2), Rolf Witzmann (1)
1: Technical University of Munich, Germany; 2: Augsburg University of Applied Sciences, Germany; 3: KIMA Automatisierung Gesellschaft für elektronische Steuerungstechnik und Konstruktion mbH, Germany; 4: LEW Wasserkraft GmbH, Kraftwerkstechnik, Germany; 5: LW Zweckverband Landeswasserversorgung, Germany

10307
I6 On Dynamic Behaviour of Active Distribution Grids during Flexibility Provision
Florian Klein-Helmkamp, Philipp Linnartz, Kardeniz Elbil, Andreas Ulbig
IAEW at RWTH Aachen University, Germany

10529
I7 Pilot Application of a Rule-Based TSO-DSO Coordination Concept in Switzerland
Vanessa Schröder (1), Evangelos Vrettos (2), Martina Bossio (3), Michael Auer (1), Raphael Wu (2), Christophe Fritsch (2), Rafaela Tsaousi (2), Raffael La Fauci (1)
1: Elektrizitätswerk der Stadt Zürich, Switzerland; 2: Swissgrid AG, Switzerland; 3: Zürcher Hochschule für angewandte Wissenschaften (IEFE), Switzerland

PANELS
I3 > I23

**TOUR 4
OPERATION
CENTER**
11.00 – 12.30

LEVEL 1
FORUM

10532
I8 Short-Circuit Currents Information Exchange Between DSO and TSO, an Approach From the Portuguese Demonstration of the OneNet Project
Madalena Lacerda (1), Gonçalo Glória (2), Mateo Cardenas (2), Rui Pestana (3), Aleksandr Egorov (2), Carlos Damas Silva (1), Alexandre Lucas (4), Miguel Louro (1)
1: E-REDES, Portugal; 2: R&D Nester, Portugal; 3: REN, Portugal; 4: INESC TEC, Portugal

10668
I9 Robust Determination of Reactive Power Potentials from Subordinate Networks in Close-to-Real-Time Operation
Tom Sennewald, Patryck Tysler, Nadja Isabelle Hiersemann, Dirk Westermann
TU Ilmenau, Germany

10320
I10 Holistic Emergency and Crisis Management of an Austrian DSO
Hans-Jürgen Wernegger, Robert Schmaranz, Martin Ruhhütl
KNG-Kärnten Netz GmbH, Austria

10997
I11 «Development of Support System for Restoration of Power Outage in Distribution Facilities»
Taku Kimura, Shunsuke Takeuchi, Keiichi Fujimoto, Kyozo Furuta, Keisuke Morita, Yuki Kawachi, Noriaki Kano
KANSAI Transmission and Distribution, Inc., Japan

11105
I12 Management of the Distribution System Operation During the Crisis – Earthquakes in Republic of Croatia in 2020.
Marina Cavlovic (1,2), Damir Piric (2), Ivan Perisa (2)
1: SAG 3, Croatia; 2: HEP ODS Ltd, Croatia

10333
I13 Suppling Of Portion Of MV Network During Blackout Periods Involving Generators Of Grid Users
Luigi D'Orazio (1), Fabio Zanellini (2), Ettore De Berardinis (3), Niccolò Corsi (4)
1: ENEL, Italy; 2: Renantis, Italy; 3: CESI, Italy; 4: e-distribuzione, Italy

10573
I14 Fitness-check for Power Plants in Distribution Networks for Black Start and Regional Islands
Darko Brankovic (1), Robert Schürhuber (1), Andreas Abart (2), Norbert Rechberger (3)
1: Graz University of Technology, Austria; 2: Netz Oberösterreich; 3: Energie AG Erzeugung GmbH

10585
I15 Calculating Probability of Critical System States by Using Bayesian Distribution System State Estimation
Eva Buchta (1,2), Mathias Duckheim (1), Michael Metzger (1), Paul Stursberg (1), Stefan Niessen (1,2)
1: Siemens AG, Germany; 2: TU Darmstadt, Germany

10734
I16 Simulating the Voltage Stability in a Power System Network using OpenModelica and Comparing the Results with PowerFactory
Nimmi Regmi (1), Dietmar Winkler (2), Shailendra Kumar Jha (1)
1: Kathmandu University; 2: University of South-Eastern Norway

PANELS
I3 > I23

**TOUR 4
OPERATION
CENTER**
11.00 – 12.30

LEVEL 1
FORUM

PANELS
I3 > I23

**TOUR 4
OPERATION
CENTER**
11.00 – 12.30

LEVEL 1
FORUM

11093	**I17 High-level Resilience Strategizing Using Data-Driven Inputs** Xavier Weiss (1), Lars Nordström (1), Arne Berlin (2) 1: KTH Royal Institute of Technology, Sweden; 2: Vattenfall Eldistribution AB
11408	**I18 Black Start In Distribution Grids Through Solid-State Transformer** Mário Couto, Alessio Coccia Electric Power Research Institute, Ireland
10145	**I19 Impact of Cyberattacks Targetting Distributed Photovoltaic Inverters** Marta Gomis Domènech, Yassine Naimi, Xavier Le Pivert Univ. Grenoble Alpes, CEA, Liten, Campus INES, Le Bourget du Lac – France
10534	**I20 Towards a Control System Simulator Based on a Digital Twin for Cyber-Physical Power Systems** Dennis van der Velde (1), Armin Fatemi (2), Immanuel Hacker (1), Raphael Bäumer (3), Michael Andres (1), Andreas Ulbig (2) 1: Fraunhofer FIT, Germany; 2: IAEW at RWTH Aachen, Germany; 3: RWTH Aachen, Germany
10415	**I21 Analysis and Insights from Reactive Power Measurements of Low Voltage Users** Marta Vanin (1,2), Hakan Ergun (1,2), Reinhilde D'hulst (2,3), Koen Vanthournout (2,3), Dirk Van Hertem (1,2) 1: KU Leuven, ESAT – Electa, Kasteelpark Arenberg 10, 3001 Heverlee, Belgium; 2: EnergyVille, Thor Park 8310, 3600 Genk, Belgium; 3: VITO NV, Boeretang 200, 2400 Mol, Belgium
10667	**I22 Field Validation of Distribution System State Estimation Based on a Limited Number of Measurement Devices** Riccardo Vasapollo (1), Lorenzo Zanni (1), Paolo Romano (1), Daniel Gross (2), Elaheh Mashayekhi (2) 1: Zaphiro Technologies, Switzerland; 2: Netze BW GmbH
10624	**I23 Modelling of a Heat Network Infrastructure to Investigate the Stability of a Gas-independent, Sectoral-coupled Multi-energy System** Elisabeth Feldhoff, Tom Duphorn, Steffen Schlegel, Dirk Westermann Ilmenau University of Technology, Germany

GUIDED TOURS 5 & 6 ❚ 14.30 – 16.00	
11232	**G7 Determination of Q(P)- And Q(U)-Characteristics By Means Of Time-Series Based Optimal Power Flow Calculations To Optimize Distribution Grid Operation** Manuel Schwenke, Jutta Hanson, Rafael Steppan, Anna Pfendler Technical University Darmstadt, Germany
11455	**G8 A Methodology for the Evaluation of Congestion Induced Costs in Distribution Grid Operation** Damianos Cheilas, Henrik W. Bindner, Tilman Weckesser Technical University of Denmark

Programme updated on 26 April 2023. Titles and speakers are subject to change at any time. Cancellation may occur. Download the APP to see the last updates.

PANELS
G7 > G23

**TOUR 5
STRATEGIES
AND
MANAGEMENT**
14.30 – 16.00

LEVEL 1
FORUM

10134	**G9 An Automated System for Overhead Line Inspection with Traveling Wave Measurement and Unmanned Aerial Vehicles** Frederik Puhe (1), Maximilian Schmalen (1), Björn Keune (1), Carsten Hermanns (1), Mitja Wittersheim (2), Johannes Bleser (3) 1: Westnetz GmbH, Germany; 2: Beagle Systems GmbH, Germany; 3: Siemens AG, Germany
10135	**G10 Digitizing Grid And Vegetation Inspection With Remote Sensing And Artificial Intelligence** Sophie Crommelinck, Katharina Gill, Jürgen Scholz, Mario Gnädig, Bartholomäus Surmann Netze BW GmbH, Germany
10359	**G11 Detection of Weather Induced Events on Overhead Power Lines** Daniel Mitcan, Bertrand Godard, Rena Kuwahata Ampacimon SA, Belgium
10390	**G12 The Use Of Digital Data For A New Innovative Quality Level Of Asset Management For Transformer** Karsten Viereck, Anatoli Saveliev Maschinenfabrik Reinhausen GmbH, Germany
10448	**G13 Thermal Monitoring of Medium Voltage Switchgears: Testing in Operation Environment** Vadim Migunov (1), Ralf Gitzel (1), Holger Kaul (1), Aydin Boyaci (1), Maurizio Zajadatz (2), Michael Suriyah (2), Thomas Leibfried (2), Nico Seidel (3) 1: ABB, Germany; 2: Karlsruher Institut für Technologie (KIT), Germany; 3: SUEC Coburg, Germany
10456	**G14 A Digital Twin for MV Switchgear Condition Monitoring Data** Ralf Gitzel (1), Vadim Migunov (1), Tanja Tornede (2) 1: ABB, Germany; 2: Universität Paderborn, SICP
10757	**G15 Development of a Robotic System for Inspecting Overhead Power Distribution Lines** Roberto Kinceler (1), Alessandro Pedro Dadam (1), Gustavo Queiroz Fernandes (2), Marina Baldissera de Souza (2), Daniel Martins (2) 1: Centrais Elétricas de Santa Catarina, Brazil; 2: Federal University of Santa Catarina, Brazil
10797	**G16 Wireless Self-powered Monitoring System for Underground Cable Jonts: a Real Use-case** Antonio-Miguel Munoz-Gomez (1), Jesus Muñoz-Cruzado-Alba (1), Javier Granado-Fornas (1), José F. Sanz-Osorio (2) 1: Circe, Spain; 2: University of Zaragoza, Spain
10853	**G17 Single Point Lidar Technology For Ground Clearance Measurement In Medium Voltage Overhead Lines With The Deployment Of Unmanned Aerial System (UAS) In TNB Distribution Network Division** Muhammad Fazli Nozlan, Mohd Faris Ariffin Tenaga Nasiona Berhad (TNB), Malaysia

POSTER SESSION 3
OPERATION

LEVEL 1 ▮ FORUM

PANELS
G7 > G23

**TOUR 5
STRATEGIES
AND
MANAGEMENT**
14.30 – 16.00

LEVEL 1
FORUM

10945	**G18 Increased Electrical Transmission And Resilience Of Distribution Systems By The Use Of Optical Fibre Systems** Thomas Gräf Hochschule für Technik und Wirtschaft Berlin, Germany
11065	**G19 A Platform For Real-time Monitoring And Detection Of Conductor Integrity Related Health Hazards In Distribution Networks** Guilherme Freire (1), João Campos (1), Joana Faria (1), Philip Marsh (2) 1: ENEIDA.IO, Portugal; 2: Powerco, New Zealand
11118	**G20 IoT enabled System for High Voltage Disconnector Advanced Asset Management** **Mikel Beltrán Hernández (1), Iban Landeta Zarate (1), Juan** Carlos Pérez Quesada (1), José Enrique Alonso Alfayate (2) 1: Schneider Electric (MESA plant), Spain; 2: Red Eléctrica, Spain
11176	**G21 Partial Discharge Diagnostics on Medium-Voltage Switchgears – Measurement Methods and Benefits** Maurizio Zajadatz, Christophe Lemmer, Aaron Fischer, Michael Suriyah, Thomas Leibfried Karlsruhe Institute of Technology (KIT), Germany
11442	**G22 GridDrone: Use of Drones to Perform Thermographic, Distance Measurement and Visual Inspection of the HV and MV Aerial Network** Francisco Rodrigues (1), Ricardo Santos (1), Ricardo Borges (1), André Coelho (2), Tom Välja (3), Madis Stern (3) 1: E-Redes, Portugal; 2: EDP Labelec; 3: Hepta Airborne
11460	**G23 Optimized Deployment of Online Partial Discharge Monitoring Solutions for Branched MV Networks** Moussa Kafal, Dimitri Charrier, Samuel Griot, Aymeric Andre NEXANS, France

PANELS
I24 > J3

**TOUR 6
NEW USE
CASES &
SPECIAL
APPLICATIONS**
14.30 – 16.00

LEVEL 1
FORUM

10772	**I24 How Disruptive Artificial Intelligence Solutions Can Enhance Safety Of Field Operations In The Electrical Sector** Fabrizio Chiovoloni (3), Nerea Gonzalez Gomez (4), Andrea Iaccarino (1), Stefano D'Angelo (1), Carlos Gaitan Poyatos (2), Janira Petruzzi (1) 1: Enel Grids, Italy; 2: ENEL IBERIA, S.R.L.U.; 3: Enel Global Services S.r.l.; 4: ENDESA MEDIOS Y SISTEMAS, S.L.U.
11454	**I25 Electrical Safety Performance Assessment of MV/LV Distribution Substations** Yaser Raeisi Gahrooei (1), Davide Pavanello (1), Jessye Amrani (1), Xavier Emery (2) 1: HES-SO Valais, Switzerland; 2: OIKEN, Switzerland
11327	**I26 Extended Reality in Power Distribution Grid: Applications and Future Trends** Komeil Nosrati (1), Saleh Ragheb Saleh Alsaleh (1), Abiodun Emmanuel Onile (2), Vjatšeslav Škiparev (2), Juri Belikov (2), Aleksei Tepljakov (1), Eduard Petlenkov (1) 1: Department of Computer Systems, Tallinn University of Technology, Estonia; 2: Department of Software Science, Tallinn University of Technology, Estonia

POSTER SESSION 3
OPERATION

LEVEL 1 ▮ FORUM

PANELS
I24 > J3

**TOUR 6
NEW USE
CASES &
SPECIAL
APPLICATIONS**
14.30 – 16.00

LEVEL 1
FORUM

10265	**I27 Power Flow Analysis of Multi-Terminal Medium Voltage Bipolar DC Distribution Networks** Jin-Oh Lee, Jin-Hong Jeon Korea Electrotechnology Research Institute, South Korea
10273	**I28 Electrical Energy Flexibilities' Prediction and Validation of a Real Non-Residential Building Through Methods of Machine Learning** Maximilian Hendrik Forchheim, Tuğçin Kırant-Mitić, David Cano-Tirado, Markus Zdrallek University of Wuppertal, Germany
10274	**I29 Smart Metering And Grid Data Services : French Experience And International Perspectives** Victoria Tan (2), Laurent Karsenti (3), Sébastien Brun (1) 1: Enedis, France; 2: Enedis, France; 3: Enedis, France
10290	**I30 Benefits for the Distribution Network from the Installation of Synchronized Edge Devices** Alessandro Mingotti (1), Lorenzo Peretto (1), Alessandro Cirocco (2), Samuele Forciniti (2), Andrea Pegoiani (2), Andrea Ruffini (2) 1: University of Bologna, Italy; 2: Unareti S.p.A
10372	**I31 Digital Twins Handling : The Real Deployment Stakes!** Laurent Guise (1), Gilles Nativel (2), Guillaume Denis (3), Djibril Diop (6), Eric Suignard (5), Philippe Tailhades (4), Benoît Jeanson (3), Thierry Coste (5) 1: EnergySemantic.com, France; 2: ENEDIS, France; 3: RTE, France; 4: GIMELEC, France; 5: EDF, France; 6: Schneider-Electric, France
10479	**I32 Decentralized Smart Charging of Large-Scale EVs using Adaptive Multi-Agent Multi-Armed Bandits** Sharyal Zafar (1), Raphaël Féraud (2), Anne Blavette (3), Guy Camilleri (4), Hamid Ben Ahmed (1) 1: SATIE Lab, ENS Rennes, France; 2: Orange Labs, France; 3: SATIE Lab, ENS Rennes & CNRS, France; 4: IRIT Lab, UPS Toulouse, France
10490	**I33 Energy Charging of a fleet of electric vehicles based on Reinforcement Learning** Hortensia Amaris, Mónica Alonso, María Angeles Moreno, Lucia Gauchia, Arturo de la Escalera, David Martin University Carlos III Madrid, Spain
10672	**I34 An Experience Of Detection And Classification Of Quality-Of-Service Problems In MV/LV Distribution Substations Using Artificial Intelligence: Senegal Case Study** Mouhamad Al Mansour Kébé, Maodo Sene, Nafissatou Diagne Senelec, Senegal
10676	**I35 Digital Twin Based on CIM CGMES for Smart Grid and Data Based Use Cases** Jonas Wäfler, Lukas Baumgartner, Raffael La Fauci ewz, Switzerland

PANELS
I24 > J3

**TOUR 6
NEW USE
CASES &
SPECIAL
APPLICATIONS**
14.30 – 16.00

LEVEL 1
FORUM

10754	**I36 Detecting Power Outages In Low-Voltage Networks From Telecommunications Networks Data** Marleen Bahe (1), Matthias Herlich (1), Peter Dorfinger (1), Josef Leist (2), Christian Wohlsein (2), Markus Radauer (3), Gerald Hörack (3), Walter Schaffer (3) 1: Salzburg Research Forschungsgesellschaft mbH, Austria; 2: Salzburg AG, Austria; 3: Salzburg Netz GmbH, Austria
11003	**J1 Distribution Network Reconfiguration Strategy with Soft Open Point using GA and PSO** Hyun-Woo Kim, Seon-Ju Ahn, Sang-Yun Yun, Joon-Ho Choi Chonnam National University, Korea, Republic of (South Korea)
11429	**J2 Near Real-Time Topology Estimation in LV Network with PLC Smart Meters** Lucía Suarez-Ramon (2), Pablo Arboleya (1), Jose Manuel Carou Álvarez (2) 1: University of Oviedo, Spain; 2: EDP Redes España
11449	**J3 Application of Graph Theory in Urban Infrastructure Analysis** Matej Vrtal, Vit Krcal, Petr Toman Brno University of Technology, Czech Republic

GUIDED TOURS 7 & 8 ▮ 16.30 – 18.00

**PANELS
G24 > H17**

**TOUR 7
STRATEGIES
AND
MANAGEMENT**
16.30 – 18.00

LEVEL 1
FORUM

10148	**G24 On-line Medium Voltage Panel & Transformer Maintenance** Anggoro Primadianto, Cyrillus Ekana, Yosephus Devalesy, Wahyu Prabowo PLN Indonesia
10884	**G25 The New Condition-Based Maintenance of MV Cable Lines Supported by Diagnostic Data** Slawomir Noske (1), Sebastian Grzelka (1), Krzysztof Kołodziejczyk (2) 1: ENERGA-OPERATOR SA, Poland; 2: Globema Sp. z o.o.
10983	**G26 Data Analytics For Pruning Optimization Around Power Lines** Charles Demay, Pierre Achaichia, Philippe Tuloup ENEDIS, France
11060	**H1 The Implementation of Linear Asset Management As A Framework Solution In Distribution Electricity Network in Indonesia** Very Fernando (1), Kharisma Utomo Mulyodinoto (1), Indratno Pardiasnyah (1), Revi Aldrian (1), Yopi Ardian Noval (1), Nanda Tommy Wirawan (2) 1: PT PLN (Persero), Indonesia; 2: University Of Putra Indonesia, Indonesia
11253	**H2 Mapping Maintenance Road on Iran Power Distribution Network** Tara Khayyamim, Sara Khayyamim, Bita Nouparvar, Arman Safaei, Mojtaba Gilvanejad Niroo Research Institute, Islamic Republic of Iran

**PANELS
G24 > H17**

**TOUR 7
STRATEGIES
AND
MANAGEMENT**
16.30 – 18.00

LEVEL 1
FORUM

11357	**H3 How To Control The Vegetation In Overhead Lines? – Analytics4Vegetation** Ricardo Borges (1), Maria Nela Meneses (1), Artur Jorge Figueiredo (1), Fátima Santos (1), Inês Lopes (1), Miguel Correia (2) 1: E-REDES, Portugal; 2: EY-Ernst & Young
11371	**H4 Platform for Traceability and Inspection Management Through the Use of Artificial Intelligence Techniques** Felipe Wellington Barboza (1), Jéssica Tiemi Takeuchi (1), Fabio Carrasco Baptista (1), João Pedro Klock Ferreira (2), Miguel Britto Bessa (2), Vitor de Souza Rodrigues (2) 1: CPFL Energia S.A.; 2: Concert Technologies S.A.
10353	**H5 Determination of the Topology of Low-Voltage Distribution Grids using Cluster Methods** Franziska Maria Tischbein (1), Kilian Kean (1), Chris Martin Vertgewall (1), Andreas Ulbig (1), Lena Altherr (2) 1: IAEW at RWTH Aachen University, Germany; 2: FH Aachen University of Applied Sciences
10366	**H6 Phase Identification of Single-phase Users in a Distribution Network** Sreten Davidov, Jurij Curk Elektro Ljubljana d.d., Slovenia
10458	**H7 LV Grid state estimation using local flexible assets: A Federated Learning approach** Selma Čaušević, Shreshtha Sharma, Syrine Ben Aziza, Aliene van der Veen, Elena Lazovik Netherlands Organisation for Applied Scientific Research (TNO), Netherlands, The
10741	**H8 Validating Real LV Feeder Models Using Smart Meter Data: A Practical Experience From Project EDGE** Michael Z. Liu (1), Angela Simonovska (1), Luis F. Ochoa (1), Peter K.C. Wong (2), Kenneth Chew (2), John Theunissen (2) 1: The University of Melbourne, Australia; 2: AusNet Services, Australia
10968	**H9 Techno-economic Comparison Of Reactive Power Control Modes For Distributed Generators For Voltage Regulation In LV Grids** Cyril Gisbert (1), Josselin Fournel (2), Géraud Rias (2), Mathieu Gondolo (2) 1: EDF R&D, France; 2: Enedis, France
11035	**H10 Distribution Smart Transformer Pilot Experience for LV Grid Real Time Operation** Luis Del Río Etayo (1), Patrick Mulroy (1), Iker Garcia Ribote (1), Itziar Lumbreras (2), Luis Layo (2) 1: Ormazabal; 2: i-DE
11049	**H11 DeepGrid: Bringing the Operational Awareness to the LV Grid** Rui Couto (1), Joana Faria (1), José Oliveira (1), Gil Sampaio (2), Ricardo Bessa (2), Francisco Rodrigues (3), Ricardo Santos (3) 1: ENEIDA.IO, Portugal; 2: INESC TEC, Portugal; 3: E-Redes, Portugal

PANELS
G24 > H17

**TOUR 7
STRATEGIES
AND
MANAGEMENT**
16.30 – 18.00

LEVEL 1
FORUM

11127

H12 Performance Analysis of a State Estimator for Low Voltage Unbalanced Grids Using Different Advance Metering Infrastructure Technologies
Mahmoud Rashad Ahmed (1), José Manuel Cano (1), Bassam Mohamed (2), Pablo Arboleya (1)
1: University of Oviedo, Spain; 2: Plexigrid, Spain

11184

H13 E-REDES Adopt New Monometallic Technology and Predictive Algorithm to Minimize and Predict LV Neutral Loss Failures Detection
Carolina Marques, Cláudia Gaspar, Carlos Vieira Santos, Jorge Mendes Santos, Susana Margarido Morgado, João Nunes Carreira, Ricardo Princípe Santos, Alcides Gomes, Jorge Alves Dias, Frederico Lourenço, Jad Azar, Patrícia Duarte, Luís Fonseca, Miguel Veríssimo, Miguel Louro
E-REDES, Portugal

11261

H14 Use of Voltage Regulation on HV/MV Substations to Increase Hosting Capacity in the LV Grid
Johannes Jargstorf, Ward Boeraeve, Piet Lauwers Fluvius System Operator CV, Belgium

11268

H15 Simulating Integration Of New Flexibilities And DER In A Low-Voltage Grid
Arthur Forestier (1), Chloé Lucas (1), Philippe Deschamps (1), Christophe Dufour (2)
1: Odit-e, France; 2: SICAE de la Somme et du Cambraisis, France

11336

H16 Demand Response Using Remote Modification Of Smart-Meters' Subscribed Power To Protect Low-Voltage Feeders In Ouagadougou, Burkina Faso
Benoît Grosjean (1), Antoine Lassauce (1), Luc Richaud (1), Camille Bayanma (2), Yann Mouchel (3), Sébastien Siarras (4), Khalil Mouad (5)
1: Odit-e, France; 2: SONABEL, Burkina Faso; 3: Smartside, France; 4: GridPocket, France; 5: Institut Smart Grid, France

11398

H17 Linear State Estimation in Distribution System Using Smart Meter Data
Izar Lopez-Ramirez (1), Lakshan P. Piyasinghe (3), Inmaculada Zamora (2), J. Emilio Rodriguez-Seco (1)
1: TECNALIA, Basque Research and Technology Alliance (BRTA)., Spain; 2: Department of Electrical Engineering Engineering, University of the Basque Country (UPV/EHU), Spain; 3: Hubbell, Inc., USA

10343

J4 An Innovative Toolbox for the Optimal Design and Operation of Integrated Local Energy Communities
Marialaura Di Somma (1), Christina Papadimitriou (2), Andrei Morch (3), Hanne Sæle (3), Peter Richardson (4), Alessio Coccia (4), Amedeo Buonanno (1)
1: ENEA; 2: Eindhoven University of Technology; 3: SINTEF Energy Research; 4: EPRI Europe

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PANELS
J4 > J17

**TOUR 8
NEW USE
CASES &
SPECIAL
APPLICATIONS**
16.30 – 18.00

LEVEL 1
FORUM

10515

J5 Implications of Forecast Uncertainty on the Optimal Operation of Renewable Energy Communities
Robin Sudhoff (1,2), Sebastian Schreck (1,2), Sebastian Thiem (1), Stefan Niessen (1,2)
1: Siemens AG, Technology, Germany; 2: TU Darmstadt, Technology and Economics of Multimodal Energy Systems, Germany

10883

J6 Coupling Optimal Energy Management and Allocation through Keys of Repartition in Energy Communities
Alyssa Diva Mustika (1,2), Rémy Rigo-Mariani (1), Vincent Debusschere (1), Amaury Pachurka (2)
1: Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, France; 2: Sween, France

10895

J7 EV Charging Microgrid: Electrical and Operation Modeling of Energy Management
Joelson Lopes da Paixão, Alzenira da Rosa Abaide, Jordan Passinato Sausen, Leonardo Nogueira Fontoura da Silva, Nelson Knak Neto
UFSM, Brazil

10900

J8 The Lac-Mégantic Microgrid: A Shared Vision of Energy Transition and the new role for Microgrid Control
Kevin Morrissey (1), Mark Jaggassar (1), David-Olivier Goulet (2), Robert MacDonald (1), Mark Collins (1)
1: Smarter Grid Solutions; 2: Hydro-Québec

10901

J9 Stochastic Reliability-Constrained Scheduling of Multi-Resource Microgrids
Mahsa Omri (1), Mohammad Jooshaki (2), Mahmud Fotuhi-Firuzabad (1,3), Matti Lehtonen (3)
1: Sharif University of Technology, Iran; 2: Geologian Tutkimuskeskus (GTK), Finland; 3: Aalto University, Finland

11017

J10 Demonstrating Interactions of Distribution Network and Local Energy Communities Operating in Hierarchically Autonomous Control Architecture Paradigm
Merkebu Zenebe Degefa, Rubi Rana, Henning Taxt
SINTEF Energy Research, Norway

11147

J11 Impact of Charging Stations on Voltage Quality – Island and Grid Operation of Real Installation
Petr Mastny, Jan Moravek, Martin Vojtek, Michal Vrana, Matej Vrtal
Brno University of Technology, Czech Republic

11359

J12 Frequency Response Of A Microgrid Under The Influence Of Enhanced Spatial And Orientational Smoothing Of Photovoltaic Output
Nida Riaz, Lasse Peltonen, Antti Hildén, Sami Repo, Pertti Järventausta
Tampere University, Finland

POSTER SESSION 3
OPERATION

LEVEL 1 ▌ FORUM

PANELS
J4 > J17

**TOUR 8
NEW USE
CASES &
SPECIAL
APPLICATIONS**
16.30 – 18.00

LEVEL 1
FORUM

11459	**J13 Assessment of Battery Energy Storage System Operating Modes in a Microgrid for EV Charging** Maria Clara D. G. N. Martins (1), José F.C. Castro (1), Davidson C. Marques (1), Pedro Rosas (1), Guilherme Rissi (2), Amanda L. Fernandes (2), Xuan Luo (2), Luiz H. A. de Medeiros (1), Alexander B. Lima (1), Gustavo M.S. Azevedo (1), Marcio E. Brito (1), Geraldo L. Maia (1), Andrea S. M. Vasconcelos (3) 1: Federal University of Pernambuco – UFPE; 2: CPFL Energy; 3: Institute of Technology Edson Mororó Moura – ITEMM
11503	**J14 Electrifying East Nusa Tenggara with Smart Microgrid – Study Case on Semau Subsystem** Daniel Tampubolon, Halomoan Siahaan, Albertus Hendriyanto PT PLN INDONESIA, Indonesia
10905	**J15 Coordination Operation of Electricity and Natural Gas Network Considering Power-to-Gas based on the Symmetrical Semidefinite Programming** Liang Min (1), Jin Yang (1), Chengwei Lou (1), James Yu (2), Zhibin Yu (1) 1: University of Glasgow, United Kingdom; 2: SP Energy Network
10920	**J16 DR Business Model Suggestion Applying IoT Solutions with Mesh Network Technology Based on IEEE 802.15.4** Si hyeong Jang (1), Jun ho Lee (2), Jung won Kim (3), Jae myeon Hong (4) 1: KEPCO ES, Korea, Republic of (South Korea); 2: KEPCO ES, Korea, Republic of (South Korea); 3: KEPCO ES, Korea, Republic of (South Korea); 4: Merlot Laboratories Inc., Korea, Republic of (South Korea)
11046	**J17 An Impact of Electrical Distribution Networks on the Operation of AC 25 kV Railway System** Vsevolod Pavlovsky (1), Anton Steliuk (2), Andriy Zakharov (3), Vasyl Makogonchuk (4) 1: DMCC Europe, France; 2: DMCC Engineering, Ukraine; 3: DMCC Europe, France; 4: DMCC Engineering, Ukraine

MAIN SESSION 4
PROTECTION, CONTROL & AUTOMATION

LEVEL 0 ▌ PLENARY ROOM 1

SESSION 4 deals with design and implementation of systems for protection, control and automation in distribution networks. The consideration of historical grown concepts as well as the latest developments in the world of protection, control, communication, and automation are topics in this session. Emphasis is also placed on practical application and experience in operating the systems. But the latest developments, scientific findings and considerations as well as algorithms and simulations are also of great importance.

	BLOCK 1 ▌ 09.00 – 10.30

BLOCK 1
09.00 – 10.30

AUTOMATION

LEVEL 0
PLENARY ROOM 1

10249	**Smart Meters for Grid State Identification with Use Case for Agent-based Local Energy and Flexibility Markets** Markus Koch (1), Martin Asman (1), Markus Zdrallek (1), Ghayathri Suriyamoorthy (2), Kamil Korotkiewicz (2) 1: University of Wuppertal, Germany; 2: PSI Grid Connect GmbH, Germany
11480	**The Smart Grid Lab in Hesse – Active Maximization of Annual Usage Time of Electrical Grids Using Flexibilities while Ensuring Data Security and Resilience at the same time** Peter Birkner (1), Anja Schaldach (2), Ingo Jeromin (3), Athanasios Krontiris (4), Till Neukamp (6), Sophia Pfeffer (5) 1: House of Energy e.V., Germany; 2: House of Energy e.V., Germany; 3, 4, 5, 6 : Darmstadt University of Applied Sciences, Germany
10296	**GEMS: Development Of Automated Generator Dispatch For The Purpose Of Maximising Built Asset Utilization** Daniel Lafferty, Jennifer MacKenzie, Cristina Fundulea, Catherine Edwards, Bojana Djukic, Diyar Kadar SP Energy Networks, United Kingdom
11434	**Impact of Three-Phase Inverter-Based Generating Units With Asymmetrical Power Redistribution on the Low-Voltage Network Operation** Michal Vrana, Jan Klusacek, Jiri Dvoracek, Jan Moravek, Jiri Drapela, Petr Mastny, Matej Vrtal Brno University of Technology, Czech Republic
10378	**A Physical-Neural Network Approach For Residential Load Forecasting With Dynamic Load Control** Taha Nakabi (1), Christina Brester (2), Mikko Kolehmainen (2), Harri Niska (2) 1: Tecnotree Ltd; 2: University of Eastern Finland, Finland
10473	**Practical Review And Advancements In Testing Multi-Vendor Digital Substations** Rick Loenders (1), Thomas Lisiecki (2), Iskender Yesil (2), Dirk Van Hertem (1) 1: KULeuven; 2: Tractebel, Belgium

	BLOCK 2 ▮ 11.00 – 12.30	

BLOCK 2
11.00 – 12.30

**CONTROL
& CYBER
SECURITY**

LEVEL 0
PLENARY ROOM 1

10126	**An Operational Data-Driven Malfunction Detection Framework for Enhanced Power Distribution System Monitoring – The DeMaDs Approach** David Fellner (1), Thomas I. Strasser (1,2), Wolfgang Kastner (2), Behnam Feizifar (3), Ibrahim F. Abdulhadi (3) 1: AIT Austrian Institute of Technology, Austria; 2: Technische Universität Wien (TU Wien); 3: University of Strathclyde	
11180	**5G-Based Fault location, Isolation, and Service Recovery** Mohand Ouamer Nait Belaid (1,2), Vincent Audebert (1), Boris Deneuville (1), Rami Langar (2) 1: EDF SA, France; 2: Gustave Eiffel University, France	
10815	**Selfhealing – FLISR in Underground and Overhead Real the First Performance Results** José Gonçalves, Rita Ramilo Cadete, João Carvalho, Rui Parreira, João Nunes Carreira, Carlos Fortunato, Paulo Ribeiro, Sérgio Lopes, João Rosa, Ricardo Nunes, João Basílio, Miguel Grossinho E-REDES, Portugal	
11144	**PMU-Based State Estimation and Fault Analysis in Active Distribution Grids: A Case Study for Kythnos Island, Greece** Themistoklis Xygkis, Orestis Darmis, Georgios Karvelis, Aris Dimeas, George Korres, Nikos Hatziargyriou National Technical University of Athens, Greece, Greece	
10446	**A Cyber-Physical Digital Twin Approach to Replicating Realistic Multi-Stage Cyberattacks on Smart Grids** Ömer Sen (1), Nathalie Bleser (2), Martin Henze (3), Andreas Ulbig (2) 1: Fraunhofer FIT, Germany; 2: IAEW at RWTH Aachen, Germany; 3: Fraunhofer FKIE, Germany	
11474	**Performance Evaluations For The Configuration Of IEC 62351 Cybersecurity Profiles In Energy Telecontrol Scenarios** Mauro G. Todeschini, Giovanna Dondossola RSE S.p.A., Italy	

	BLOCK 3 ▮ 14.30 – 16.00	

BLOCK 3
14.30 – 16.00

**COMMUNI-
CATION
& PROTECTION**

LEVEL 0
PLENARY ROOM 1

10256	**An Implementation of IEC 61850 for Microgrid Control** Yiming Wu, Firas Daraiseh, Elise Ramqvist, Annika Larsson, Ulrika Morild Vattenfall AB, Sweden	
11207	**Four Problems for Digital Substations I wish to be solved** Fred Steinhauser OMICRON electronics, Austria	
10656	**Virtualised Centralised Protection and Control – Constellation Project Case Study** Anna Kulmala (1), Ontrei Raipala (1), Petri Hovila (1), Boris-Emanuel Yazadzhiyan (2), Rui Dantas (2), Colin Scoble (2) 1: ABB, Finland; 2: UK Power Networks	

BLOCK 3
14.30 – 16.00

**COMMUNI-
CATION
& PROTECTION**

LEVEL 0
PLENARY ROOM 1

11222	**Challenges and Considerations for the Design and Implementation of a Centralized Protection and Control Solution for MV Networks** Ana Cristina Aleixo (1), Rui Dias Jorge (1), Fernando Gomes (1), Lourenço Antunes (1), João Paulo Barraca (2), Ricardo Carvalho (2), Mário Antunes (2), Diogo Gomes (2), Clara Gouveia (3), António Carrapatoso (3), Everton Alves (3), José Andrade (3), Luís Gonçalves (4), Francisco Falcão (4), Bruno Pinho (4), Luís Pires (5) 1: Efacec; 2: IT – Instituto de Telecomunicações; 3: INESC TEC – Institute for Systems and Computer Engineering, Technology and Science; 4: ARMIS; 5: E-REDES	
11227	**Software Defined Substation Automation** Peter Hemmer, Edwin Melenhorst, Raymond Woertman Locamation, Netherlands, The	
11382	**Advancing the Capabilities of OpenDSS: A Directional Overcurrent Relay Feature for Modelling Modern Microprocessor Network Protector Operation Modes** Celso Rocha (1), Andres Ovalle (1), Aadityaa Padmanabhan (1), Sean McGuinness (2) 1: Electric Power Research Institute (EPRI), United States of America; 2: EPRI Europe DAC, Ireland	

	BLOCK 4 ▮ 16.30 – 18.00	

BLOCK 4
16.30 – 18.00

PROTECTION

LEVEL 0
PLENARY ROOM 1

10550	**Characterisation of Sequence Components of Islanded Microgrid with Low Fault Current** Nadia Afrin, Mark Hibbert, Aidan McDonnell eleXsys energy, Australia	
11326	**Centre of Angles based Remedial Action Scheme using Synchrophasor Measurements in SP Transmission Network** Shafqat Hussnain, Muhammad Junaid SP Energy Networks, United Kingdom	
10178	**Detection and Location of Single Phase Faults in New 10(20) kV Distribution Networks** Seila Gruhonjic Ferhatbegovic (1), Zijad Bajramovic (1,2) 1: PE Elektroprivreda B&H, Bosnia and Herzegovina; 2: Faculty of Electrical Engineering, University of Sarajevo	
10266	**Pilot Test of the Method Vdip for an Earth Fault Localization** David Topolanek (1), Vaclav Vycital (1), Vit Krcal (1), Jan Grossmann (2), Michal Jurik (3) 1: Brno University of Technology, Czech Republic; 2: ELVAC a.s.; 3: EG.D, a.s.	
10435	**Open Phase Fault Analysis in MV Distribution Grids with Resonant Grounding** Tomáš Škumát, Martin Horák Západoslovenská distribučná, a. s., Slovak Republic	
10582	**HIL Testing and Future-Proofing of UFLS Schemes** Patrick Favre-Perrod (1), Marco Burri (5), Michael Schueller (2), Nicolas Stieger (2), Walter Sattinger (3), Bruno Wartmann (4) 1: HES-SO, Switzerland; 2: OST, Switzerland; 3: Swissgrid, Switzerland; 4: ewz, Switzerland; 5: BKW, Switzerland	

MAIN SESSION 5
LEVEL 0 ▮ PLENARY ROOM 4   **PLANNING OF POWER DISTRIBUTION SYSTEMS**

MAIN SESSION 5
LEVEL 0 ▮ PLENARY ROOM 4   **PLANNING OF POWER DISTRIBUTION SYSTEMS**

SESSION **5**   deals with short- and long-term development of high, medium and low voltage distribution networks, concerning the changing requirements for electricity distribution including, but not limited to, smart grids and active distribution networks, electrification and electromobility, energy storage, flexibility, distributed energy resources integration, present and future customer quality of supply requirements, and optimum asset utilisation techniques and strategies. Papers dealing with meeting the energy transition goals, rural electrification, and strategies to increase resiliency are also expected.

BLOCK 1 ▮ 09.00 – 10.30

BLOCK 1
09.00 – 10.30

RISK ASSESSMENT AND ASSET MANAGEMENT

LEVEL 0
PLENARY ROOM 4

10474	**The Reliability Of The Electrical Distribution System Using The Markov Modeling Methodolog** Enrico Carletti, Luciano Cocchi, Francesco Amadei, Giovanni Franzone, Jessica Rizzati, Massimo Bolognesi, Pierpaolo Moschella Enel Italy
11076	**Machine Learning-based Identification and Mitigation of Vulnerabilities in Distribution Systems against Natural Hazards** Balaji V Venkatasubramanian (1), Mohamed Lotfi (1), Pierluigi Mancarella (2), André Águas (3), Mohammad Javadi (4), Leonel Carvalho (4), Clara Gouveia (4), Mathaios Panteli (1) 1: University of Cyprus, Cyprus; 2: University of Manchester, UK; 3: E-REDES, Portugal; 4: INESC TEC, Portugal
10739	**Quantifying Resiliency Benefits of Networked Microgrids using PowerModelsONM.jl** David Fobes (1), Russell Bent (1), Rishabh Jain (2), Francisco Flores-Espino (2), Annabelle Pratt (2), Ryan Mahoney (3), George Walker (3), David Pinney (3), Trupal Patel (4), Matt Reno (4) 1: Los Alamos National Lab, United States of America; 2: National Renewable Energy Lab, United States of America; 3: National Rural Electric Cooperative Association, United States of America; 4: Sandia National Lab, United States of America
10255	**Investment Efficiency Assessment On The Electric Grid by Group Of Control** Guilaumé Kevin, Lacombe Bertrand, Sevault Pierre, Lacroix Bastien, Dirion Jean-Louis, Faivre Odilon Enedis, France
10383	**Climate Adaptation Plan for Distribution Networks** Anna Lisa Frau, Gabriele Licasale, Alessio Pastore, Alessandro Rodella, Valerio Vallocchia Enel Grids, Italy
11356	**Overhead Lines and Underground Cables Asset Management – Best Practices and Challenges** Ricardo Prata (1), Martin Podlogar (2), Patrick Zander (4), Odilon Faivre (5), Anne-Soizic Ranchere (6), Masoud Davoudi (3) 1: E-REDES, Portugal; 2: Elektro Ljubljana, Slovenia; 3: PG&E, USA; 4: Omicron, Germany; 5: Enedis, France; 6: Nexans, France

BLOCK 2 ▮ 11.00 – 12.30

BLOCK 2
11.00 – 12.30

NETWORK DEVELOPMENT

LEVEL 0
PLENARY ROOM 4

10455	**Planning Principles for Hybrid AC/DC Underlay Grids in the Medium-Voltage Level** Maxim Müllender (1), Julian Saat (1), Lasse Empen (2), Andreas Ulbig (1) 1: IAEW at RWTH Aachen University, Germany; 2: RWTH Aachen University, Germany
10574	**Economic and Technical Benefits of Integrated Power and Gas Grid Planning in Distribution Grids** Joshua Jakob (1), Marlon Koralewicz (1), Marco Kerzel (1), Markus Zdrallek (1), Louis Wayas (2), Wolfgang Köppel (2), Bastian Bauhaus (3) 1: University of Wuppertal, Germany; 2: DVGW Research Centre, Germany; 3: SWKiel Netz GmbH, Germany
11043	**MVDC Grids to Facilitate the Roll out of Renewables – Findings of CIRED-WG 2021-1** Stephan Rupp (1), Sebastian Brüske (1), Graeme Burt (2), Agusti Egea-Àlvarez (2), Uwe Schichler (3), Gerhard Jambrich (4) 1: Maschinenfabrik Reinhausen, Germany; 2: University of Strathclyde, UK; 3: Technical University Graz; Austria; 4: AIT Austrian Institute of Technology GmbH, Austria
10512	**A 2030 Snapshot of Public Smart EV Charging Stations** Alastair Oldfield (1), Calum Watkins (2), Robert MacDonald (2), John Orr (1) 1: SP Energy Networks, United Kingdom; 2: Smarter Grid Solutions, United Kingdom
10714	**How Can Flexibility Support Power Grid Resilience Through The Next Level Of Flexibility And Alternative Grid Developments** Santiago Gallego Amores (1,2), Emil Hillberg (3), Antonio Iliceto (2), Ewa Mataczyńska (4), Albana Ilo (5) 1: i-DE, Redes Eléctricas Inteligentes (Iberdrola), Spain; 2: ETIP SNET; 3: RISE Research Institutes of Sweden; 4: Institute for Energy Policy, Poland; 5: TU Wien, Austria
11273	**Domestic Demand Shift Trial for Local Network Management and Distributed Generation Curtailment Avoidance** Kailash Singh (1), Russell Bryans (1), Malcolm Bebbington (1), Guy Shapland (1), Gerard Boyd (1), Wendy Mantle (1), Kieron Stopforth (2), Simona Burchill (2) 1: Scottish Power Energy Networks, United Kingdom; 2: Octopus Energy, United Kingdom

BLOCK 3 ▮ 14.30 – 16.00

10636 BYAA awardee	**Network Reconfiguration Under a Stochastic Optimisation Framework for Day-Ahead Operation Planning for Future Distribution Networks** Gregorio Higuera, Behzad Kazemtabrizi Durham University, United Kingdom
11425	**Distribution Planning Model Requirements for Smart Community Integration** Mark McGranaghan (1), Treisa Ravi Sahaya (2), Jouni Peppanen (3) 1: EPRI Europe, Ireland; 2: University College Dublin, Ireland; 3: EPRI, USA

LEVEL 0 ▮ PLENARY ROOM 4

MAIN SESSION 5
PLANNING OF POWER DISTRIBUTION SYSTEMS

BLOCK 3
14.30 – 16.00

DISTRIBUTION PLANNING

LEVEL 0
PLENARY ROOM 4

10272	**Flexibility as a Cost-effective Solution Applied to MV Lines Investment Deferral: Guidelines to Study and Pinpoint Opportunities** Julien Lucas, Jerome Moiziard Enedis, France
10454	**Flexibility Inside: How To Seamlessly Embed Flexibility In Dso Activity** Hubert Dupin, Pâmela Catrinque Martins Enedis, France
11456	**Effects Of Demand Side Management Programs in Modern Distribution Planning – Challenges and Opportunities** Davis Montenegro, Alison O'Connell, Jason Taylor EPRI, United States of America
10379	**Efficient Integration of Electric Vehicles Through Optimal Charging and Reactive Power Support** Damir Jakus, Josip Vasilj, Bosko Poljak, Danijel Jolevski University of Split - FESB, Croatia

BLOCK 4 ▮ 16.30 – 18.00

BLOCK 4
16.30 – 18.00

METHODS AND TOOLS

LEVEL 0
PLENARY ROOM 4

10475	**Modelling and Validation of Latent Heat Storage Systems for Demand Response Applications** Rakesh Sinha, Pavani Ponnaganti, Jayakrishnan R Pillai, Birgitte Bak-Jensen, Carsten Bojesen Aalborg university, Denmark
11123	**Anticipating Aggregated Demand From Charging EV In Collective Car Park With A Multi-Agent System** Ilyes Kabbourim (1), Remi Driat (1), Giovanni Mattarolo (1), Somsakun Maneerat (2), Ghislain Agoua (2), Jérôme Cantenot (2), Ricardo Jover (2), Clément Christophe (2), Benoît Grossin (2) 1: Enedis, France; 2: EDF R&D, France
11481	**The Impact Of Forecasting Accuracy On The Economic Performance of Flexibility Provision** Gary Howorth (1), Ivana Kockar (1), Paul Tuohy (1), Graeme Flett (1), John Bingham (2) 1: University of Strathclyde, United Kingdom; 2: Engineering Technology Centre Ltd (ETC), United Kingdom
10382	**Determining the Accuracy of Average Fault Rates in Assessing the Risks of Individual Circuits** Felix Peterken, Paul Morris National Grid, United Kingdom
10348	**Graph Computing Techniques for Power Flow Resolution Considering Real Distribution Networks** Francesca Soldan, Enea Bionda, Carlo Tornelli RSE S.p.A., Italy
10301	**Non-technical Losses Identification in Distribution Grids: A Hybrid Approach** Marc Jené-Vinuesa, Mònica Aragüés-Peñalba, Andreas Sumper Universitat Politècnica de Catalunya, Spain

LEVEL 0 ▮ PLENARY ROOM 2

ROUND TABLES

ROUND TABLES ▮ 09.00 – 16.00

LEVEL 0
PLENARY ROOM 2

09.00 10.30

RT14: SMART NETWORKS : FROM THE SECONDARY STATION TO THE LV NETWORKS
Convener: **Pedro Carreira** (E-Redes, Portugal)
Speakers: **Miren de la Cruz** (Ormazabal, Spain)
Pedro Del Rosal (E-Redes, Spain)
Sandrine Hartmann (Enedis, France)
Carsten Krüger (Offis E.V., Germany)
Juan Ortiz Noval (E-distribuzione, Italy)
Stephan van der Broeck (Rheinische NETZGesellschaft mbh, Germany)
Secondary Substations (SS) and LV Networks play an increasingly important and smart role in the distribution network in the energy transition context. Together with smart metering infrastructure, intelligent integration of distributed energy resources and optimisation of energy flows on the LV grid, they are the first layer to provide solutions to improve the flexibility of the global distribution system. Will Dynamic voltage regulation, energy storage management, new-generation IoT-based monitoring, HEMS and DER vertical integration in the global distribution system and, more generally, local intelligence for control and management of MV and LV networks be an integral part of the future secondary substation and LV network? This round table will promote a "think-tank" about the concept of the future Secondary Substation and LV Network, bringing to the discussion vision and the most advanced experiences.

11.00 12.30

RT16: LIFETIME EXTENSION OPTIONS FOR ELECTRICAL EQUIPMENT MAIN RESULTS OF CIRED WG 2020-1
Conveners: **Lina Bertling Tjenberg** (KTH Royal Institute of Technology, Sweden)
& Stephanie Uhrig (University of Applied Science Munich, Germany)
Speakers: **Alexei Babizki** (Maschinenfabrik Reinhausen GmbH, Germany)
Fredi Belavic (Austrian Power Grid, Austria)
Carlo Gemme (G&W Electric, Italy)
François Trichon (Schneider Electric, France)
Electrical equipment is a considerable economic asset for DSOs. Many network equipment in distribution networks have long intrinsic lifespans, most of which exceed 40 years. However, some equipment components age faster than others or become obsolete due to changes in the technologies. Environmental or safety requirements may also appear and pose problems of equipment compliance. The development of smart grids to achieve energy transition objectives can also lead to functional requirements that some legacy generation electrical energy distribution assets do not meet. Faced with the constraints mentioned above, solutions for extending the life of equipment and/or modifying/upgrading critical parts and/or implementing monitoring can prove effective in many cases, compared to a complete renewal of equipment. In addition, today's technologies such as ioT, big data and AI offer new possibilities to optimize the lifespan of equipment. A CIRED working group (WG 2020-1) has been devoted to this subject, the main results of which will be presented during the round table. Beyond that, the round table will be an opportunity to discuss experiences and prospects for extending the life of network equipment.

14.30 16.00

RT18: GREEN NETWORK SOLUTIONS
Convener: **Uwe Kaltenborn** (HIGHVOLT Prüftechnik Dresden GmbH, Germany)
Speakers: **Thierry Cormenier** (Schneider Electric, France)
Irmeline de Sadeleer (Norsus, Norway)
Guillaume Langlet (Enedis, France)
Sílvia Monteiro (E-Redes, Portugal)
Rhys Rhodes (Kinectrics UK Ltd, United Kingdom)
Hanna Schmiegel (Omexom, Germany)
Considering climate change as one of the most important challenges to mankind, the reduction of CO2 emission along the complete electricity value chain is of major importance. In the last years green network components and products with alternative gaseous insulation and polymer-based solid and liquid insulation materials were introduced to the field. Here the roundtable will challenge the penetration of the installed based, limitations, restrictions and alternative ways to make CO2 reduction a commercial success.
As CIRED stands for a holistic view, the roundtable will also discuss eco-design perspectives and life cycle analyses (LCA) including the impact of grid installations to wildlife and fauna. Here the ecological impact of design, engineering, production, installation and commissioning, operation and dismantling and recycling of products and components of distribution networks will be in the focus. An operational aspect of increasingly importance is minimizing impact to wildlife and flora as well as to guarantee biodiversity. We are urged to find opportunities for optimised technical solutions meeting divergent targets of economy, ecology and regulations.

LEVEL 0 ▌ PLENARY ROOM 2   RIF SESSION 1

	RIF SESSION 1 ▌ 16.30 – 18.00
10335	**Fault Ride Through Of DC Solid State Transformer In Medium Voltage DC Systems** Pierre Le Métayer (1,2), Drazen Dujic (3), Cyril Buttay (2), Piotr Dworakowski (1) 1: Supergrid Institute, 69621 Villeurbanne, France; 2: Univ Lyon, CNRS, INSA Lyon, Université Claude Bernard Lyon 1, Ecole Centrale de Lyon, Ampère, UMR5005, 69621 Villeurbanne, France; 3: Power Electronics Laboratory, EPFL, Lausanne Switzerland
10466	**DC short–circuit Behaviour of LVAC Fuses** Djamel Hadbi (1), Luis Chinchilla Delgado (1), Frederic Reymond–Laruina (1), Michel Cordonnier (2) 1: EDF Lab les Renardières; 2: Enedis Direction technique
10467	**Impacts of Low Voltage Distribution Grid Resilience Constraintes on AC/DC Converter Sizing** Frédéric Reymond–Laruina (1), Marc Petit (2), Loïc Queval (2), Djamel Hadbi (1), Philippe Egrot (1), Michel Cordonnier (3), Stéphane Mercier (4) 1: EDF Lab les Renardières; 2: Laboratoire de Génie Electrique et Electrotechnique de Paris; 3: Enedis Direction technique; 4: Socomec
11254	**Tubular DC Breaker** James Mannekutla (1), Johan Nohlert (1), Thomas Eriksson (1), Alessio Bergamini (2) 1: ABB AB, Corporate Research, Västerås, Sweden; 2: ABB S.p.A. SACE, Bergamo, Italy
10700	**Predictive Maintenance On Overhead Medium Voltage Network Using Transient Faults Data** Odilon Faivre, Martial Joseph, Jérémie Mérigeault, Ilyes Kabbourim, Alain Tholon, Nicolas Bailloeuil Enedis, France
10316	**Deep Learning–Based Automatic Detection of Defective Steel Bars in Concrete Poles** Junhyeong Pak, Yoonbo Shim, Jonghyup Song, Sang Jun Kim, Jae Heon Lee, Sangoh Jeong Korea Electric Power Corporation (KEPCO), South Korea

16.30 – 18.00

NETWORK COMPONENTS

LEVEL 0
PLENARY ROOM 2

LEVEL 0 ▌ PLENARY ROOM 3   ROUND TABLES

LEVEL 0
PLENARY ROOM 3

	ROUND TABLES ▌ 09.00 – 16.00
09.00 10.30	**RT15:** **DIGITAL SOLUTIONS FOR MAINTENANCE** Convener: **Carsten Böse** (Erlanger Stadtwerke AG, Germany) Speakers: **Odilon Faivre** (Enedis, France) **Sławomir Noske** (ENERGA–OPERATOR SA, Poland) **Sebastiano Scarpaci** (Hitachi Energy, Italy) **Karl Schoaß** (Kärnten Netz GmbH, Austria) Digital solutions becoming more and more important to organise daily work. In the field of maintenance solutions do not only cover the workforce management but also allows to evaluate the condition and the importance of each electrical equipment. At the end this will lead to a systematic maintenance strategy. Round table 15 will discuss the benefits and also highlights the challenges to implement digital solutions form manufacturer and utility side.
11.00 12.30	**RT17:** **STORAGE TECHNOLOGIES AS AN OPPORTUNITY FOR DISTRIBUTION SYSTEMS** Convener: **Ricardo Jorge Santos** (E–Redes, Portugal) Speakers: **Leonel Carvalho** (INESC–TEC, Portugal) **Jan Moravek** (Brno University, Czech Republic) **Roberto Moreira** (EDF, France) **Jesus Varela** (Iberdrola, Spain) **Chris Wering** (Cooper Power Systems Division, Australia) Energy storage can be both an opportunity and a threat for distribution system operators (DSOs). On the one hand, energy storage technologies can help DSOs manage peak demand, integrate renewable energy sources, and improve system efficiency. This can result in cost savings, and increased system resilience. On the other hand, energy storage can also present challenges for DSOs. If not managed properly, the addition of energy storage to the grid can cause voltage fluctuations, overload transformers, and disrupt the balance between supply and demand. To address these challenges, DSOs must develop new strategies for managing energy storage on their grids. This may include implementing new technologies to monitor and control energy storage systems, developing new policies and regulations to support their integration, and collaborating with stakeholders to ensure a coordinated and efficient transition to a more decentralized and distributed energy system. In this session, we will lightly explore the existing technology, the current status of the regulatory framework and debate the technical and business use cases that are being considered by the DSO's around the world when deploying ESS. This roundtable will also provide valuable insights about some existing projects with ESS at the distribution grid level and further explore the challenges when planning, deploying and operating these types of assets.
14.30 16.00	**RT19:** **MICROGRIDS: LOAD MANAGEMENT IN LOW–VOLTAGE GRIDS**

LEVEL 0 ◼ PLENARY ROOM 3   RIF SESSION 3

	RIF SESSION 3 ◼ 16.30 – 18.00	
	11176	**Partial Discharge Diagnostics on Medium–Voltage Switchgears – Measurement Methods and Benefits** Maurizio Zajadatz, Christophe Lemmer, Aaron Fischer, Michael Suriyah, Thomas Leibfried Karlsruhe Institute of Technology (KIT), Germany
	10461	**Assessment of the impact of Hybrid Distributed Generation / Batteries Energy Storage Systems on DSO Operational Planning** Jamilson Junior (1), Ludovic Girault (2), Matthieu Alchourroun (2), Hugo Morais (1), Benoit Bouzigon (3) 1: INESC–ID/IST, Portugal; 2: EDF R&D; 3: ENEDIS
	10741	**Validating Real LV Feeder Models Using Smart Meter Data: A Practical Experience From Project EDGE** Michael Z. Liu (1), Angela Simonovska (1), Luis F. Ochoa (1), Peter K.C. Wong (2), Kenneth Chew (2), John Theunissen (2) 1: The University of Melbourne, Australia; 2: AusNet Services, Australia
16.30 – 18.00	**10387**	**Evaluation of Quota–based Predictive Congestion Management in Active Distribution Networks** Sharon Müller (1), Krzysztof Rudion (1), Marc–Aurel Frankenbach (2), Carmen Exner (2) 1: University of Stuttgart, Stuttgart, Germany; 2: Netze BW GmbH, Stuttgart, Germany
OPERATION	**11408**	**Black Start In Distribution Grids Through Solid–State Transformer** Mário Couto, Alessio Coccia Electric Power Research Institute, Ireland
LEVEL 0 PLENARY ROOM 3	**10637**	**Accuracy Analysis of a Sensitivity–Based Distribution System Model for the Centralized Redispatch of Distributed Flexibilities** Daniel–Leon Schultis AIT Austrian Institute of Technology GmbH, Austria
	11351	**An Economical Operation Strategy of Multi–Energy Virtual Power Plant in a Distribution Network** Jin–Wook Lee (1), Kyu–Sang Cho (2), Sung–Yong Son (1) 1: Gachon University, Korea, Republic of (South Korea); 2: ATE Solutions, Korea, Republic of (South Korea)
	10338 BYAA awardee	**Using Local Renewable Energy To Energize a Portion of a LV Grid in Islanded Mode** Jane Marchand (1), Jérôme Buire (1), Vincent Debusschere (1), Nabil El–Jarrai (2), Jean Pompee (2), Marie–Cécile Alvarez–Herault (1), Nouredine Hadjsaid (1) 1: Univ. Grenoble Alpes, CNRS, Grenoble INP*, G2Elab, F–38000 Grenoble, France; 2: Enedis, France
	10883	**Coupling Optimal Energy Management and Allocation through Keys of Repartition in Energy Communities** Alyssa Diva Mustika (1,2), Rémy Rigo–Mariani (1), Vincent Debusschere (1), Amaury Pachurka (2) 1: Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, France; 2: Sween, France

LEVEL 0 ◼ PLENARY ROOM 3   RIF SESSION 3

16.30 – 18.00	**11147**	**Impact of Charging Stations on Voltage Quality – Island and Grid Operation of Real Installation** Petr Mastny, Jan Moravek, Martin Vojtek, Michal Vrana, Matej Vrtal Brno University of Technology, Czech Republic
OPERATION LEVEL 0 PLENARY ROOM 3	**11359**	**Frequency Response Of A Microgrid Under The Influence Of Enhanced Spatial And Orientational Smoothing Of Photovoltaic Output** Nida Riaz, Lasse Peltonen, Antti Hildén, Sami Repo, Pertti Järventausta Tampere University, Finland

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THE POSTER AREA IS OPEN FROM 09.00 TO 18.00
Access with or without a guided tour for registered delegates only

THURSDAY 15 JUNE

POSTER SESSION 2
POWER QUALITY & ELECTROMAGNETIC COMPATIBILITY

LEVEL 1 ▮ FORUM

GUIDED TOUR 1 ▮ 09.00 – 10.30	
10197	**A1 Transient overvoltages caused by four pole Miniature Circuit Breakers (MCB) in three-phase circuits** Kristof Vliegen (1), Quentin Antoine (2) 1: Fluvius, Belgium; 2: ENGIE Laborelec, Belgium
10213	**A2 Medium Voltage Cable Network in the Mountains – Verification of the Earth Potential Rise Voltage by Calculation** Christoph Groiß (1), Katrin Friedl (2) 1: Salzburg Netz GmbH, Austria; 2: TU Graz, Austria
10283	**A3 Assessing the Bonding Distance of the HV Grounding System and Instrumentation to Reduce Electromagnetic Interferences Due to Lightning Strikes in the EMTP-RV Environment** Mahmoud Eshagh Ahmadi, Mostafa Hoorzad, Mobin Davoudi Samangani, Mohammad Shahabi Mashhad Electric Energy Distribution Company, Iran, Islamic Republic of
10288	**A4 Evolution Of Earthing Impedance** Quentin Antoine (1), Sophie Van Wynendaele (1), David Decoux (2), David Valmacco (3), Bastien Noël (4) 1: ENGIE Laborelec, Belgium; 2: Ores, Belgium; 3: Resa, Belgium; 4: Sibelga, Belgium
10289	**A5 Impact of Protective Multiple Earthing (PME) in TN-C Earthing Schemes in Public Low Voltage Networks** Quentin Antoine (1), Kristof Vliegen (2), Wouter Dierckx (2), Henri Grandjean (3), Bastien Noël (4), Minh-Duc Hoang (5) 1: ENGIE Laborelec, Belgium; 2: Fluvius, Belgium; 3: Ores, Belgium; 4: Sibelga, Belgium; 5: Resa, Belgium
10334	**A6 Influence Of Current Flowing On The Sheaths During The Standard Conditions And Preconditioning Of Hot Spots Of Joints** Luigi D'Orazio (1), Alberto Cerretti (1), Alessandro Fatica (2), Niccolò Corsi (2) 1: ENEL, Italy; 2: e-distribuzione, Italy
10356	**A7 The Benign Earthing System: A New Method to Classify the Earthing of Substations** Christian Ehlert (1), Christin Schmoger (2) 1: Avacon Netz GmbH, Germany; 2: E.DIS Netz GmbH, Germany
10368	**A8 Application of Artificial Neural Networks for Overhead Distribution Lines Magnetic Flux Density Estimation** Ajdin Alihodzic, Adnan Mujezinovic, Emir Turajlic, Nedis Dautbasic, Maja Muftic Dedovic University of Sarajevo - Faculty of Electrical Engineering, Bosnia and Herzegovina
10443	**A9 Earth Resistivity Tomography Simulations Over An Earthing System** Benjamin Jauk, Robert Schürhuber, Katrin Friedl Graz University of Technology, Austria

PANELS
A1 > B8

TOUR 1
EMC,
EARTHING
AND
SAFETY
09.00 – 10.30

LEVEL 1
FORUM

10444	**A10 The First Outlook on The Implementation of Groundless Lightning Arrester in Indonesia, Case Study: East Nusa Tenggara Province, Indonesia** Hendra Aditia, Ragil Wicaksana, Yuniarto Prayitno, Revi Aldrian, Akbar Swastika PT PLN (Persero), Indonesia
10463	**A11 Effective Lightning Mitigation Method on Unshielded Distribution Line by Using High Charge Ratings Externally Gapped Line Arresters (EGLA)** Florent Giraudet (1), Partal Ertugrul (2), Murat Serkan Sert (2), Meric Ger (2) 1: METARRESTERS, Consultant, Germany; 2: ADM Elektrik Dağıtım, Distribution System Operator, Turkey
10503	**A12 Sensitivity Of Household Appliances To Supply Voltage** Dumitru Mecineanu (1), Ludovic Bertin (1), Aurel Garry (1), Nicolas Carteau (2) 1: EDF R&D, France; 2: Enedis, France
10536	**A13 Practical Comparison Of Earth Impedance Testing Methods** Josef Schmidbauer, Friedrich Almer OMICRON electronics GmbH, Austria
10640	**A14 Steady-State Zero-Sequence Currents in a Transmission System: a Parameter Analysis** Sjoerd Nauta (1), Jeroen van Waes (2), Leonel Noris (2), Kees Koreman (2) 1: Alliander, The Netherlands; 2: TenneT TSO B.V., The Netherlands
10680	**A15 Evaluation of High Harmonic Components in the Residual Earth Fault Current with Regards to the Earth Potential Rise and Personal Protection** Benjamin Küchler (1), Karla Frowein (2), Peter Schegner (2), Uwe Schmidt (1) 1: Hochschule Zittau/Görlitz – University of Applied Sciences, Germany; 2: Dresden University of Technology, Germany
10683	**A16 Methodology For The Evaluation By Simulation Of Electromagnetic Fields In Live Working Areas In Substations** João Tarquínio (1), Andreia Leiria (1), Francisco Bessa Silva (2), José Manuel Cardoso (3), José Mendes Ribeiro (3) 1: EDP Labelec; 2: EDP SA; 3: E-REDES
10849	**A17 Realistic Maximum Touch Voltages in Global Earthing Systems** Katrin Friedl, Lothar Fickert, Benjamin Jauk, Robert Schürhuber Graz University of Technology, Austria
10899	**A18 Floating Neutral Detection Using a 2S Form Meter: Large Distribution Lines With Multiple Houses And Rooftop PV Effect** Ibon Vicente (1), Lakshan Piyasinghe (2), Amaia Arrinda (3), J. Emilio Rodríguez-Seco (1) 1: TECNALIA, Basque Research and Technology Alliance (BRTA), Spain; 2: Hubbell Inc., USA; 3: Unversity of the Basque Country, Spain

PANELS
A1 > B8

TOUR 1
EMC,
EARTHING
AND
SAFETY
09.00 – 10.30

LEVEL 1
FORUM

PANELS
A1 > B8

TOUR 1
EMC,
EARTHING
AND
SAFETY
09.00 – 10.30

LEVEL 1
FORUM

10935	**A19 Solar Farm Earthing – Not Just an Extra-large Substation – Special Requirements Met by Risk-based Design and Focused Testing** William Carman (1), Matthew Bale (2) 1: Bill Carman Consulting, Australia; 2: Safearth Consulting, Australia
10942	**A20 Switching Overvoltages Caused by Shunt Reactor Switching and Mitigation Methods** Philipp Hackl (1), Katrin Friedl (1), Robert Schürhuber (1), Britta Heimbach (2), Bruno Wartmann (2), Andri Casura (2) 1: Graz University of Technology, Austria; 2: ewz, Switzerland
10944	**A21 Investigations Of 3D Meshed Earthing Systems** Martin Fürnschuß (1), Stephan Pack (2), Ernst Schmautzer (3), Robert Schürhuber (4) 1: Institute of Electrical Power Systems, Graz University of Technology, Austria; 2: Institute of High Voltage Engineering and System Performance, Graz University of Technology, Austria; 3: ESC Engineering Service & Consulting, Graz, Austria; 4: Institute of Electrical Power Systems (Head of the institute), Graz University of Technology, Austria
10947	**A22 Does Transformer Inrush Challenge Future Grids? – Laboratory Insights** Alexander Winkens (1), Florian Klein-Helmkamp (1), Markus Stroot (1), Mathias Knaak (1), Andreas Ulbig (1), Tilman Wippenbeck (2) 1: RWTH Aachen University, Germany; 2: Westnetz GmbH, Germany
10978	**B1 Development of Measuring a Combined Impedance of Ladder Networks Using Unbalanced Current on Neutral Line in 4-wire Distribution System** Dae Young Kim, Sunkyu Choi, Junhyuk Kang KEPCO, Korea, Republic of (South Korea)
11021	**B2 Earthing Design of EV Charging Substations in Fuel Stations – UK Requirements and Experience** Dionysis Skevis (1), Mark Davies (1), Denis Baudin (1), Stephen Tucker (2) 1: RINA, United Kingdom; 2: UK Power Networks, United Kingdom
11024	**B3 Managing Impressed Voltages Near High Voltage Installations – UK Requirements, Common Problems and Solutions** Paul Jones, Mark Davies RINA, United Kingdom
11028	**B4 A New Algorithm to Estimate Uniform Soil Resistivity For Earthing Design Calculations** Stephen Lilley (1), Paul Jones (1), Mark Davies (1), Stephen Tucker (2) 1: RINA, United Kingdom; 2: UK Power Networks, United Kingdom
11067	**B5 Effect of Time Delay of High-speed Autoreclosing on Variable Frequency Drives and Other Loads** Pertti Pakonen, Ari Nikander, Pekka Verho Tampere University, Finland

PANELS
A1 > B8

TOUR 1
EMC,
EARTHING
AND
SAFETY
09.00 – 10.30

LEVEL 1
FORUM

11347	**B6 Radiated Emissions from an Electric Railway: Review of Methods and Measurements mainly from 9 kHz to 150 kHz** Babak Sadeghi (1), Per Westerlund (1), Rafael S. Salles (1), Jonna Wilén (2) 1: Luleå University of Technology, Sweden; 2: Umeå University, Sweden
11431	**B7 Investigating The Impact Of External Fields On The Accuracy Of LPVTs** Roberto Schulze, Erik Sperling, David Gopp OMICRON electronics GmbH
11448	**B8 Evaluation On Safety Of People On Ground Generated Voltages In Unconventional Networks.** Miguel Martins (1), Pedro Henrique Sebastiany (1), Roberta Stefanello (1), Leonardo Felipe Da Silva Santos (1), Leyla Kraulich (1), Leonardo De Freitas Silveira (1), Diego Ramos (1), Ghendy Cardoso Jr. (1), Rogimar Rêgo (2) 1: Universidade Federal de Santa Maria, Brazil; 2: Grupo Equatorial / CEEE-D

GUIDED TOUR 2 ▮ 11.00 – 12.30

PANELS
B9 > B32

TOUR 2
EQUIPMENT
RELATED
POWER
QUALITY
ASPECTS
11.00 – 12.30

LEVEL 1
FORUM

10665	**B9 A Practical Method for Improving Low Voltage Ride-Through Capability of Inverter-based AC Microgrid** Gary Chang (1), Kha T. Nguyen (1), Guan-Yi Li (1), Roberto Langella (2) 1: National Chung Cheng University, Taiwan; 2: Univ. of Campania «Luigi Vanvitelli», Italy
10131	**B10 Analysis of Harmonic Current Injections of Electric Vehicles** Pablo Rodríguez-Pajarón (1), Leo Casasola (1), Alberto Contreras (1), Araceli Hernández (1), Jovica Milanovic (2) 1: Universidad Politécnica de Madrid, Spain; 2: The University of Manchester
10157	**B11 Harmonic and Supraharmonic Emissions of Fast Charging Infrastructure – Field Measurements in LV Grids** Manuel Wingenfelder (1), Daniela Frank (1), Constantin Reese (2), Lutz Hofmann (1) 1: Leibniz University Hanover, Institute of Electric Power Systems, Electric Power Engineering, Germany; 2: enercity AG, municipal utilities Hanover
10176	**B12 Minimization Strategies Of Harmonics in Microgrid Connected Wind-Driven PMSG** Maged Nashed, Mona Eskander Electronic Research Institute, Egypt
10181	**B13 Advanced Techniques For Troubleshooting Solar Arrays And Generator Connections** Robert Weller (1), Kate Edwards (2), Duncan Dalton (2) 1: Electrical Investigation Ltd, United Kingdom; 2: Outram Research, United Kingdom
10196	**B14 Power Quality Impact on Light Intensity and Flicker Sensitivity of LED Lamps** Elena Gutierrez-Ballesteros (1), Sarah Rönnberg (1), Aurora Gil-de-Castro (2) 1: Luleå University of Technology, Sweden; 2: Universidad de Córdoba, Spain

POSTER SESSION 2
LEVEL 1 ▮ FORUM   **POWER QUALITY & ELECTROMAGNETIC COMPATIBILITY**

PANELS
B9 > B32

TOUR 2
EQUIPMENT
RELATED
POWER
QUALITY
ASPECTS
11.00 – 12.30

LEVEL 1
FORUM

10200	**B15 Comparing Methods to Mitigate The Effect of Grid Voltage Sag And Frequency Variation on The Operation of Variable Speed Drives** Maged Nashed, Mona Eskander Electronic Research Institute, Egypt
10229	**B16 Requirements For Grid Supporting Inverter In Relation With Frequency And Voltage Support** Carina Lehmal, Ziqian Zhang, Herwig Renner, Robert Schürhuber Graz University of Technology, Austria
11333	**B17 Planning And Operation Of An Intelligent Voltage Regulator For PQ Improvement In PV-Rich Power Distribution Systems** Rocco Di Gregorio (1), Stefan Hoppert (2), Riccardo Trevisan (3), Emilio Ghiani (3) 1: Volta S.p.a.; 2: A-eberle GmbH; 3: Università degli Studi di Cagliari, Italy
10483	**B18 Analysis and Modelling of Temporary Overvoltage Events and Comparison with OVRT Requirements** Christoph Wirtz (1), Max Murglat (1), Simon Krahl (1), Albert Moser (2) 1: FGH e.V., Aachen, Germany; 2: IAEW RWTH Aachen University, Aachen, Germany
10518	**B19 Comparative Analysis of Grid Forming Inverters Based Power Systems in Phasor Domain and Electromagnetic Transient Domain** Said Daoudi, Thai Phuong Do Univ . Grenoble Alpes, CEA, Liten, Campus Ines, 73375 Le Bourget du Lac, France
10538	**B20 Electric Vehicle Charging Stations and their Impact on Power Quality** Francisc Zavoda CRHQ (Centre de recherche d'Hydro-Quebec), Canada
10556	**B21 Managing Distribution Network Stability with Penetration of Distributed Energy Resources** Mohammad Rhaiz Abdul Aziz, Mohd Syahir Kyairi Ahmad Fuad, Hidzar Radzi Mohd Husin Tenaga Nasional Berhad, Malaysia
10591	**B22 A Study on the Application of Power Electronics Technology in Secondary Substation to Improve Power Quality** Boo-Hyun Shin (1), Hye-seon Lee (1), Dong-yeol Shin (1), Soo-yong Hur (2), Sung-Min Kim (2) 1: KEPRI / KEPCO, Korea, Republic of (South Korea); 2: KEPCO, Korea, Republic of (South Korea)
10617	**B23 A Case Study on the Introduction of Power Electronic Technology for Stabilization of Power System and Development of Phase Converter of Power Distribution System** Hyeseon Lee, Boohyun Shin, Byungsung Lee, Sooyoung Hur, Sungmin Kim KEPCO, Korea, Republic of (South Korea)

PANELS
B9 > B32

TOUR 2
EQUIPMENT
RELATED
POWER
QUALITY
ASPECTS
11.00 – 12.30

LEVEL 1
FORUM

10659	**B24 Psophometric Indices Analysis for Waveform Distortion from Rolling Stocks in Electrified Traction Systems** Rafael S. Salles (1), Sarah K. Rönnberg (1), Andrea Mariscotti (2) 1: Luleå University of Technology, Sweden; 2: University of Genova
10742	**B25 A Four-Leg Converter Control Scheme for Current Imbalance Compensation in Microgrids** Simon Resch, Luther Matthias Friedrich-Alexander Universität Erlangen-Nürnberg, Germany
10893	**B26 Modeling of Power Cables for Measurement Calibration and PLC Simulation up to 20 MHz** Amaia Arrinda, Jon Gonzalez Ramos, Asier Herranz, Alexander Gallarreta, Igor Fernández, David de la Vega, Itziar Angulo University of the Basque Country, Spain
10969	**B27 A Classification Of Grid Forming Converter Control And Its Application To Improve Power System Stability And Resilience** Rebekka Denninger, Philipp Ernst, Sönke Rogalla, Bruno Burger Fraunhofer ISE, Germany
11088	**B28 Supraharmonic In Low-Voltage Distribution Grids. Analysis Of the Specific Case Of The Interleaved Boost Converter** Erzen Muharemi (1), Emmanuel De Jaeger (1), Jos Knockaert (2) 1: UCLouvain, Belgium; 2: UGent, Belgium
11225	**B29 Impact of Changing Frequency Standards on Grid-connected PV and Battery Inverters in the German Low Voltage System** Johanna Geis-Schroer, Gregor Bock, Michael Suriyah, Thomas Leibfried Karlsruhe Institute of Technology (KIT), Germany
11233	**B30 Accurate Power Control of Grid forming Power Converters for Improving Large-Signal Stability** Yousef Khayat, Peiyuan Chen, Massimo Bongiorno, Bengt Johansson Chalmers University of Technology, Göthenburg, Sweden
11464	**B31 Analysis of Transmission Line Modelling in the MATLAB/Simscape Software Package.** Abdellatif Aboutaleb (1,2), Georgios G. Roumeliotis (1), Jan Desmet (1), Jos Knockaert (1) 1: Ghent University, Faculty of Engineering and Architecture, Department of Electromechanical, Systems, and Metal Engineering, Research Group EELab/Lemcko, Kortrijk, Belgium; 2: Department of Electrical Engineering, Faculty of Engineering, Menoufia University,32511 Menoufia, Egypt
11518	**B32 Dynamic Reactive Power Compensation For Improved Mining Production** Tomas Baeza, Peter Andersson, Filiph Appelgren, Jari Joona Hitachi Energy

POSTER SESSION 2
LEVEL 1 ▮ FORUM **POWER QUALITY & ELECTROMAGNETIC COMPATIBILITY**

	GUIDED TOUR 3 ▮ 14.30 – 16.00
10121	**B33 Harmonics in the Transmission and Distribution Grid and their Relation to Geomagnetically Induced Currents** Alexandre Malfoy (1), Roger de Oliveira (2), Sarah Ronnberg (2) 1: Bordeaux Institute of Technology – ENSEIRB – MATMECA; 2: Luleå University of Technology
10130	**B34 Case Studies of Estimation of Harmonics in partly monitored Residential Networks** Pablo Rodríguez-Pajarón (1), Araceli Hernández (1), Yuqi Zhao (2), Jovica Milanovic (2) 1: Universidad Politécnica de Madrid, Spain; 2: The University of Manchester
10142	**B35 Transfer of Supraharmonics through a MV/LV Transformer** Tim Slangen (1), Erik de Jong (2), Vladimir Cuk (1), Sjef Cobben (1) 1: Eindhoven University of Technology, Netherlands; 2: KEMA Labs, Netherlands
10179	**B36 Comparative Study of Unipolar and Bipolar Industrial DC Microgrids Through Linear Power Flow** Eduardo Vasquez Mayen, Emmanuel De Jaeger UCLouvain, Belgium
10202	**C1 The Impact of a Bi-directional V2G Electric Vehicle Charging Station to the Frequency Dependent Grid Impedance (10 – 150 kHz)** Bernhard Grasel (1), José Baptista (2), Manfred Tragner (1), Subin Puthenkalam (3) 1: FH Technikum Wien, Austria; 2: University of Trás-os-Montes and Alto Douro; 3: Magna International
10270	**C2 Continuous Non-invasive Resonance Detection in Residential Low-Voltage Networks** Shrinath Kannan, Jan Meyer, Peter Schegner TU Dresden, Germany
10428	**C3 Impedance Characteristics at Socket Outlets in Residential and Commercial Buildings in the Frequency Range 2–150 kHz** Victor Khokhlov (1), Robert Stiegler (1), Jan Meyer (1), Stefano Lodetti (2), Peter Davis (2), Paul Wright (2), Igor Fernandez (3), Jon Gonzalez-Ramos (3), Alexander Gallarreta (3), David de la Vega (3) 1: Technische Universität Dresden, Germany; 2: National Physical Laboratory (NPL), United Kingdom; 3: University of the Basque Country (UPV/EHU), Spain
10431	**C4 Operation of Micro Sources and Impact of High Penetration on Low Voltage Distribution Grid** Martin Kaspirek, Martin Kurfirt, Tomas Valta, Daniel Kouba, Zdenek Maca EG.D (E.ON group), Czech Republic
10513	**C5 Harmonic Distortion in Microgrids in Islanded Operation** Angela Espin-Delgado (1), Sarah Rönnberg (2) 1: RISE Research Institutes of Sweden, Sweden; 2: Luleå University of Technology, Sweden

PANELS
B33 > C27

TOUR 3 SYSTEM RELATED POWER QUALITY ASPECTS
14.30 – 16.00

LEVEL 1
FORUM

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10531	**C6 A Case Study on the Changes in Short Circuit Power to Analyze the Impact on Voltage Dips** Joris Hoeksema (1), Roozbeh Torkzadeh (1), Jeroen van Waes (2), Sjef Cobben (1), Vladimir Cuk (1) 1: Eindhoven University of Technology, Netherlands, The; 2: TenneT TSO BV, Netherlands, The
10587	**C7 Verification of Tool for Allocation of Harmonic Current Emissions Considering Frequency-Dependent Impedance** Tor Inge Reigstad (1), Bjørn Inge Oftedal (2), Thor Holm (3), Bendik Nybakk Torsæter (1), Henning Taxt (1) 1: SINTEF Energy Research, Norway; 2: REN AS; 3: PQA AS
10633	**C8 The Beat Phenomenon and Flicker Caused by the Difference in Switching Frequencies between Two Grid-connected Inverters** Kentaro Fukushima, Naotaka Okada Central Research Institute of Electric Power Industry, Japan
10638	**C9 Modelling of Voltage Unbalance in Large Real Medium Voltage Distribution Networks** Adnan Bosovic (1), Herwig Renner (2), Andreas Abart (3), Ewald Traxler (3), Jan Meyer (4), Friedemann Möller (4), Mustafa Music (1) 1: Public Electric Utility Elektroprivreda of Bosnia and Herzegovina d.d. – Sarajevo, Bosnia and Herzegovina; 2: Graz University of Technology, Austria; 3: Netz Oberösterreich GmbH, Austria; 4: Technische Universitaet Dresden, Germany
10658	**C10 Survey of Harmonic Distortion Measurements from Customer Grid Supply in Trains** Rafael S. Salles (1), Sarah K. Rönnberg (1), Rebecca Asplund (2) 1: Luleå University of Technology, Sweden; 2: Trafikverket, Sweden
10662	**C11 Large Scale Flexibility Requirements for Voltage Control in Low Voltage Distribution Network Analysis** Blaž Dobravec, Viktor Andonovič, Nejc Petrovič Elektro Gorenjska d.d., Slovenia
10674	**C12 Probabilistic Estimation of Harmonic Distortion in Non-Radial Distribution Network** Yuqi Zhao (1), Jovica Milanović (1), Pablo Rodríguez-Pajarón (2), Araceli Hernández (2) 1: the University of Manchester, United Kingdom; 2: Universidad Politécnica de Madrid, Spain
10691	**C13 «Combining Single Phase and Three Phase EV Charging: A way for increasing Harmonic Hosting Capacity»** Manav Giri, Naser Nakhodchi, Sarah Rönnberg Luleå University of Technology, Sweden
10703	**C14 Analysing Electric Vehicle Charging Power Quality in Large-Scale Charging Sites – A Data-Driven Approach** Toni Simolin, Antti Hildén, Pertti Pakonen, Pertti Järventausta Tampere University, Finland

PANELS
B33 > C27

TOUR 3 SYSTEM RELATED POWER QUALITY ASPECTS
14.30 – 16.00

LEVEL 1
FORUM

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PANELS
B33 > C27

TOUR 3
SYSTEM
RELATED
POWER
QUALITY
ASPECTS
14.30 – 16.00

LEVEL 1
FORUM

10787	**C15 Frequency-Dependent Impedance Identification For Lvdc Pq Analysis** César Augusto Slongo (1,2), Xavier Yang (1), Octavian Curea (2), Manuel Billaud (3) 1: EDF R&D, France; 2: ESTIA Institue of Technology, France; 3: Enedis, France
10831	**C16 Analysing The Impact Of Operating Strategies Of Active Customers On Flicker And Voltage Unbalance** Alexander Vanselow (1), Garn Till (2), Albert Moser (3), Bernd Engel (2) 1: FGH e.V., Germany; 2: Technical University Brunswick; 3: RWTH Aachen University
11079	**C17 Modeling and Simulation of the Impact of a Fast Charging Infrastructure on Harmonic Disturbance Levels** Sascha Müller (1), Jan Meyer (1), Julius Jacob (2) 1: TU Dresden, Germany; 2: SachsenEnergie AG, Germany
11081	**C18 Assessment of Harmonic Emission Level of Customer Installations Considering Actual Level of Cancellation** Morteza Pourarab (1), Jan Meyer (1), Oliver Domianus (1), Thomas Naef (2), Max Ulrich (2), Roger Rölli (2) 1: Technische Universitaet Dresden, Germany; 2: Camille Bauer Metrawatt AG, Switzerland
11084	**C19 Analysis of the Propagation of Distortion in the Frequency Range 2–150 kHz using Iterative Harmonic Analysis** Adam Collin (1), Roberto Langella (2), Alfredo Testa (2) 1: The University of Sannio, Italy; 2: The University of Campania, Italy
11117	**C20 Evaluation of Harmonic Transfer Between Transmission and Distribution Network Based on Measurements** Robert Stiegler (1), Jan Meyer (1), Robert Dommerque (2), Mohammad Nazemi (2), Daniel Scherbarth (2) 1: Technische Universität Dresden, Germany; 2: Amprion GmbH
11141	**C21 Opportunistic Impact Of Simultaneous EV Charging On Stochastic Hosting Capacity** Enock Mulenga (1), Taís T De Oliveira (2) 1: Luleå University of Technology, Skellefteå, Sweden; 2: Luleå University of Technology, Skellefteå, Sweden
11166	**C22 A Study on VRE Grid Connection Code for LVDC System** Junwoo Lee, Youngpyo Cho, Seokwoong Kim, Juyong Kim Korea Electric Power Research Institute, Korea, Republic of (South Korea)
11186	**C23 Solar PV Battery Storage Estimation For Overvoltage Mitigation Using Measurement Data** Enock Mulenga (1), Taís T De Oliveira (2) 1: Luleå University of Technology, Skellefteå, Sweden; 2: Luleå University of Technology, Skellefteå, Sweden
11191	**C24 Harmonic Resonances Analysis Methods in Power Distribution Networks** Leopold Herman, Jure Lokar, Bostjan Blazic Faculty of Electrical Engineering, University of Ljubljana, Slovenia

PANELS
B33 > C27

TOUR 3
SYSTEM
RELATED
POWER
QUALITY
ASPECTS
14.30 – 16.00

LEVEL 1
FORUM

11239	**C25 Determination Of Frequency-Dependent Impedances Of Large 110 kV Grids** Matthias Schilcher (1), Jonathan Hänsch (2), Frank Wirtz (3), Uwe Schmidt (4) 1: Bayernwerk Netz GmbH; 2: Amprion GmbH; 3: Bayernwerk Netz GmbH; 4: E.cons Energiesystems Consulting GmbH, Germany
11353	**C26 Analysis of the Voltage Unbalance Phenomenon in a Three-phase Two-wire Distribution System** Leonardo de Freitas Silveira (1), Aécio de Lima Oliveira (1), Ghendy Cardoso Junior (1), Gustavo Marchesan (1), Leyla Kraulich (1), Leonardo Felipe da Silva dos Santos (1), Miguel Spagnolo Martins (1), Rogimar Matias Rêgo (2) 1: Universidade Federal de Santa Maria, Brazil; 2: Grupo Equatorial Energia / CEEE-D
11450	**C27 Investigation of Supraharmonic Emission from a Microgrid** Mattewos Tefferi (1), Nick Nakamura (2), Gaurav Singh (3), Brad Barnes (4), Nenad Uzelac (1) 1: G&W Electric, United States of America; 2: Powerside, United States of America; 3: EPRI, United States of America; 4: Ameren Illinois, United States of America

GUIDED TOUR 4 ❙ 16.30 – 18.00

PANELS
C28 > D21

TOUR 4
STANDARDS,
MEASURE-
MENTS,
REGULATIONS
AND
ADVANCED
DATA ANALYSIS
16.30 – 18.00

LEVEL 1
FORUM

10246	**C28 Unmanned Aerial inspection of distribution power lines; challenges and Lessons Learned** Farhad Khalilzadeh Moghaddam, Alireza Sekandari Shahri, Mohammad Reza Ramezani, Abbas Azari Mashhad Electric Energy Distribution Company, Iran, Islamic Republic of
10269	**C29 Assessment of Technical Feasibility of Non-Invasive Measurement of Grid-Side Harmonic Impedance on Low-Voltage Networks** Shrinath Kannan, Jan Meyer, Peter Schegner TU Dresden, Germany
10318	**C30 Explainable AI-based Intelligent Approaches for Power Quality Prediction in Distribution Networks Considering the Uncertainty of Renewable Energy** Haesung Lee, Hanmin Lim, Byungsung Lee KEPCO Research Institute
10324	**C31 Deep Learning Graphical Tool Inspired by Correlation Matrix for Reporting Long-term Power Quality Data at Multiple Locations** Roger de Oliveira, Naser Nakhodchi, Rafael Salles, Sarah Ronnberg Luleå University of Technology, Sweden
10367	**C32 Power Quality Benchmarking** Denisa Galzina HOPS, Croatia
10374	**C33 Determining Faults Cause Based On Disturbance Records From PQ Monitors** Irena Sagovac, Marijan Lukac HEP ODS d.o.o. Elektra Zagreb, Croatia

**PANELS
C28 > D21**

**TOUR 4
STANDARDS,
MEASURE-
MENTS,
REGULATIONS
AND
ADVANCED
DATA ANALYSIS**
16.30 – 18.00

**LEVEL 1
FORUM**

10417	**C34 Deep Learning for Power Quality with Special Reference to Unsupervised Learning** Roger de Oliveira, Rafael Salles, Sarah Ronnberg Luleå University of Technology, Sweden
10433	**C35 Power Quality Survey in Industrial Zones in Alexandria** Ihab Elfiky, Mohamed Elhoseiny, Hanaa Karawia Alexandria Electricity Distribution Company, Egypt
10493	**C36 Monitoring Voltage Quality in Sweden** Herlita Bobadilla Robles, Albin Emanuelsson, Abdirizak Aden, Carl Johan Wallnerström Swedish Energy Markets Inspectorate, Sweden
10525	**D1 System Strength Measurement, Testing and Validation** Daniel Gheorghe (1), Daniel Landreman (2), Poria Astero (3) 1: Reactive Technologies Ltd, UK; 2: Eaton, USA; 3: Reactive Technologies, Finland
10566	**D2 Innovative High-Power Exiting Inverter for Frequency Dependent Grid Impedance Measurements** Jakob Vellinger, Simon Schramm, Georg Kerber HM Munich University of Applied Sciences, Germany
10578	**D3 Techniques to Generate Test Waveforms for Power Grid Measurement Methods up to 150 kHz** Alexander Gallarreta (1), Igor Fernández (1), Deborah Ritzmann (2), Stefano Lodetti (2), Victor Khokhlov (3), Jan Meyer (3), Paul Wright (2), David de la Vega (1) 1: University of the Basque Country (UPV/EHU), Spain; 2: National Physical Laboratory (NPL), United Kingdom; 3: Technische Universität Dresden (TUD), Germany
10581	**D4 Evaluation of the Light-QP Measurement Method for Extended Measurements** Alexander Gallarreta, Jon González-Ramos, Igor Fernández, David de la Vega, Amaia Arrinda, Itziar Angulo University of the Basque Country (UPV/EHU), Spain
10618	**D5 Impact of Reserve Market Participation on Power Quality of Flexibility Resources and Local Electricity Networks** Antti Hildén (1), Pertti Pakonen (1), Joni Markkula (1), Eero Paavilainen (2), Mikko Kettunen (3), Pertti Järventausta (1), Pekka Verho (1) 1: Tampere University; 2: Siemens Oy; 3: Lempäälän Lämpö Oy
10622	**D6 Assessment of Harmonic Network Impedance through Transient Harmonic Signals measured at an Industrial Power System** Tom Van Acker (1,2), Kris De Wit (1), Jose Antonio de la O Serna (3) 1: BASF Antwerp NV, Belgium; 2: KU Leuven, Belgium; 3: Universidad Autonoma de Nuevo Leon, Mexico
10733	**D7 Harmonics Analysis for Distribution Systems of Urban Areas in Japan** Naotaka Okada CRIEPI, Japan

**PANELS
C28 > D21**

**TOUR 4
STANDARDS,
MEASURE-
MENTS,
REGULATIONS
AND
ADVANCED
DATA ANALYSIS**
16.30 – 18.00

**LEVEL 1
FORUM**

10747	**D8 Applying Machine Learning To Power Quality Signals To Detect Component Failure Signatures And Prevent Unplanned HV Outages** Paul Morris (1), Andrew Forster (2), Samuel Jupe (2) 1: National Grid Electricity Distribution, United Kingdom; 2: Nortech Management Limited, UK
10866	**D9 Harmonic Phasor Measurement Technology from DC to 500 kHz with Time Resolution of a Single Line Cycle** Jan-Philipp Kitzig (1), Gerd Bumiller (2) 1: Ingenieurbüro Kitzig, Germany; 2: Hochschule Ruhr West, University of Applied Sciences, Germany
10879	**D10 Supraharmonics Assessment: Methods Comparison Based on a Used Case in a Metalworking Shop** Philippe Blanchard (1), Roger Bergeron (2), Manouane Caza-Szoka (1), Daniel Massicotte (1) 1: Université du Québec à Trois-Rivières; 2: Les services Électrigénies
10993	**D11 UK Grid Disturbances Measurements From 9 kHz To 150 kHz On A Low Carbon LV Network** Peter Davis, Stefano Lodetti, Deborah Ritzmann, Paul Wright National Physical Laboratory (UK), United Kingdom
11023	**D12 Impact of Discontinuous Measurements on the Trend Analysis of Power Quality Parameters** Max Domagk (1), Jan Meyer (1), Karl Scheida (2), Rene Braunstein (3), Ewald Traxler (4), Roland Zoll (5) 1: TU Dresden, Germany; 2: Oesterreichs Energie, Austria; 3: Energienetze Steiermark, Austria; 4: Netze Oberösterreich, Austria; 5: Wiener Netze, Austria
11087	**D13 Automated Load Control Detection Using Power Quality Data And Machine Learning** Christina Brester (1), Antti Hildén (2), Mikko Kolehmainen (1), Pertti Pakonen (2), Harri Niska (1) 1: University of Eastern Finland, Finland; 2: Tampere University, Finland
11206	**D14 New Interharmonic Subgroup Concept for Quantifying and Limiting Distortion in Distribution Networks: Further Developments and Experimental Validation** Roberto Langella (1), Jiri Drapela (2), Mark Halpin (3), Jan Meyer (5), David Mueller (5), Harish Sharma (6), Alfredo Testa (1), Neville R. Watson (7), David Zech (8) 1: University of Campania «Luigi Vanvitelli», Italy; 2: Brno University of Technology; 3: Auburn University; 4: Technische Universität Dresden; 5: EnerNex; 6: Southern Company Services; 7: University of Canterbury; 8: Duke Energy
11269	**D15 Artificial Expansion of Power Quality Datasets using Generative Adversarial Networks** Markus Stroot (1,2), Katharina Alefs (3), Ömer Sen (1,2), Andreas Ulbig (1,2) 1: IAEW at RWTH Aachen University; 2: Fraunhofer FIT; 3: RWTH Aachen University

PANELS
C28 > D21

TOUR 4
STANDARDS,
MEASURE-
MENTS,
REGULATIONS
AND
ADVANCED
DATA ANALYSIS
16.30 – 18.00

LEVEL 1
FORUM

11286	**D16 Applicability of IEC derived Voltage Unbalance limits in the US Power System: A case study** Gaurav Singh (1), Jan Meyer (2), Joseph Grappe (4), Anthony Murphy (3) 1: Electric Power Research Institute, USA; 2: Technical University of Dresden, Germany; 3: Tennessee Valley Authority, USA; 4: Duke Energy, USA
11328	**D17 Multimode Synchronous Resonance Detection in Converters Dominated Power System using Synchro-waveforms** Taimur Zaman (1), Zhiwang Feng (1), Mazheruddin Syed (1), Benedikt Pilscheur Soraytec (3), David Flynn (2), Graeme Burt (1) 1: University of Strathclyde, United Kingdom; 2: University of Glasgow; 3: Soraytec
11334	**D18 New Approaches for Quantifying Impact of Power Quality Disturbances** Jon Bickel (2), Daniel Sabin (1) 1: Schneider Electric, United States of America; 2: Schneider Electric, United States of America
11360	**D19 Performance Evaluation of Instrument Transformers in Power Quality Measurements: Activities and Results from 19NRM05 IT4PQ Project** Gabriella Crotti (1), Jan Meyer (2), Palma Sara Letizia (1), Mohamed Agazar (3), Daniela Istrate (3), Yeying Chen (4), Enrico Mohns (4), Helko van den Brom (5), Fabio Muñoz (5), Huseyin Cayci (6), Paolo Mazza (7), Robert Stiegler (2), Mario Luiso (8), Roberto Tinarelli (9), Alessandro Mingotti (9) 1: Istituto Nazionale di Ricerca Metrologica (INRIM), Italy; 2: Technische Universität Dresden, Germany; 3: Laboratoire National de métrologie et d'Essais (LNE), France; 4: Physikalisch-Technische Bundesanstalt (PTB), Germany; 5: VSL B.V. (VSL), The Netherlands; 6: Turkiye Bilimsel ve Teknolojik Arastirma Kurumu (TUBITAK), Turkey; 7: Ricerca sul Sistema Energetico - RSE S.p.A, Italy; 8: Dept. of Industrial and Information Engineering, Università della Campania, Italy; 9: Dept. of Electrical, Electronic and Information Engineering, University of Bologna, Italy
11362	**D20 Impact Analysis Of Severe Weather Events In The Rest Of The Year KPI** Andre Branco, Jose Sousa, Joao Cunha, Soraia Fernandes, Hugo Correia, Ricardo Santana, Bruno Gonçalves E-REDES, Portugal
11515	**D21 Power Quaility Monitoring-Based Distribution Network Characteristic Analysis Using Machine Learning** Sang-Hwan Lee (1), Keon-Jun Park (1), Seong-Woo Kim (2), Sung-Yong Son (1) 1: Gachon University, Korea, Republic of (South Korea); 2: Korea District Heating Corporation, Korea, Republic of (South Korea)

PANELS
F1 > F23

TOUR 1
CUSTOMER 1
09.00 – 10.30

LEVEL 1
FORUM

GUIDED TOURS 1 & 2 ▮ 09.00 – 10.30	
10112	**F1 Challenges And Opportunities When E-Mobility Is Incorporated In Argentinian Scenarios** Darío Slaifstein, Fernando Nicchi Universidad de Buenos Aires, Argentine Republic
10117	**F2 Pilot Project where a Battery Energy Storage System is used for Fast Frequency Reserve** Hanne Sæle (1), Maren Istad (1), Signe Marie Oland (2) 1: SINTEF Energi AS, Norway; 2: Lede AS, Norway
10122	**F3 Assessment Of The Significance Of Features For The Identification Of Domestic Appliance** Liya Ma, Maximilian Schmidt, Peter Schegner Technische Universitaet Dresden, Institute of Electrical Power Systems and High Voltage Engineering, Faculty of Electrical and Computer Engineering
10143	**F4 Advanced Electrical Energy Storage Technologies And Their Applications On Customer Side** Christian Noce, Luigi Lanuzza, Martina Radicioni Enel X SrL, Italy
10162	**F5 A New Customer-Oriented Approach For Residential Demand-Side Flexibility: The Case Of The Zeeland Region In The Netherlands** Fabien Berger FRACTAL ENERGY, France
10230	**F6 Viable LINK-based Energy Community: Increasing Flexibility and Resilience of Electricity Infrastructure** Helmut Bruckner (1), Albana Ilo (2), Markus Olofsgard (3), Marketa Adamcova (4) 1: Sonnenplatz Großschönau GmbH, Austria; 2: Technical University Vienna, Austria; 3: AFRY AB, Sweden; 4: LEEF Technologies s.r.o., Czech Republic
10233	**F7 Method for Determining the Impact of Local Energy Markets on the Distribution Grid Expansion** Klemens Schumann (1,2), Luis Böttcher (1), Simon Braun (1), Andreas Ulbig (1,2) 1: IAEW at RWTH Aachen University; 2: Fraunhofer FIT, Aachen, Germany
10236	**F8 End-use Sector Coupling To Turn Customer Plants Into Prosumers Of Electricity And Gas** Andrea Ademollo (1), Albana Ilo (2), Carlo Carcasci (1) 1: University of Florence, Italy; 2: TU Wien, Austria
10254	**F9 Nation-wide Projection of Motivators and Consumer Willingness for Direct Load Control Demand Response in Finland** Araavind Sridhar (1,2), Jan Stoklasa (1), Samuli Honkapuro (1), Fredy Ruiz (2), Salla Annala (1), Annika Wolff (1), Antti Rautiainen (3) 1: LUT University, Finland; 2: Polytechnic University of Milan, Milan, Italy; 3: Pohjois-Karjalan Sähkö

PANELS
F1 > F23

TOUR 1
CUSTOMER 1
09.00 – 10.30

LEVEL 1
FORUM

10285
F10 Behavioral Approaches to Reduce Household Energy Consumption
Mostafa Hoorzad, Parvin Tashakkori Saleh, Sedigheh Ranjbar Pirbasti, Navid Aghli
Mashhad Electric Energy Distribution Company, Iran, Islamic Republic of

10313
F11 Traceability of power generation in a Multi-Energy Virtual Power Plant using Blockchain
João Tadeu Santos (1,2), Célio Bermann (2)
1: SiDi; 2: University of São Paulo

10321
F12 Identification and Characterization of Inverters used for PV Generation and Storage Systems
José Gonçalves (1), Eduardo Rodrigues (1,2), António Grilo (1,2), Pedro Carvalho (1,2), Nuno Creado (3), Hugo Morais (1,2)
1: IST, Portugal; 2: INESC-ID, Portugal; 3: Smart Energy Lab

10345
F13 On the Role of Industrial Kitchens in sustainable Energy Systems: The NexIK Vision
Ana Oliveira (1), Miriam Ribeiro (1), Ricardo Martins (1), Gonçalo Morais (1), Hugo Morais (2), Lucas Pereira (3)
1: IST Lisboa, Portugal; 2: INESC-ID, Portugal; 3: ITI, LARSyS, Técnico Lisboa – Portugal

10376
F14 The EUniversal Portuguese Demonstrator: From MV-LV Coordinated Identification Of Flexibility To Activation Through The UMEI
Rita Lopes Mourão (1), Clara Gouveia (2), Gil Sampaio (2), André Águas (1), Christian Merckx (3), Féres Benothman (3), Gesa Milzer (4), Giancarlo Marzano (5), Mahtab Kaffash (6), Evelyn Heylen (6), Pedro Boto (1), Carlos Damas Silva (1), Chloé Dumont (5), Pierre Crucifix (5), Fábio Retorta (2)
1: E-REDES, Portugal; 2: INESC TEC, Portugal; 3: ENGIE Impact, Belgium; 4: NODES, Norway; 5: N-SIDE, Belgium; 6: Centrica, Belgium

10388
F15 The Interest of Energy Communities in Urban Areas – from a DSO's Perspective
Daphné Benzennou, Odile Macé, Daniel Raes
Sibelga, Belgium

10421
F16 Gamification an Innovative Approach to Reduce Electricity
Hamid Haghjoo (1), Marzeh Zarehzadeh (2), Mehdi Ashkpourmotlagh (3)
1: Hamid haghjoo, Iran, Islamic Republic of; 2: Marzeh zareh zadeh ,Iran, Islamic Republic of; 3: Mehdi ashkpour motlagh

10487
F17 Multi Objective Optimization Of Flexibilities In Ski-Resorts – CO2, Power Peaks, And Day-Ahead Market
Clemens Korner (1), Klara Maggauer (1), Branislav Iglar (1), Susanne Windischberger (1), Hannes Passegger (2), Norbert Dorfinger (3)
1: AIT Austrian Institute of Technology; 2: World-Direct; 3: Salzburg AG

10497
F18 Vehicle-to-Home or Battery Energy Storage Systems – A Comparison of the Potential Usage in Smart Homes
Charlotte Wagner (1), Kathrin Walz (1), Krzysztof Rudion (1), Dario Burghof (2), Ingo Mauser (2)
1: Institute of Power Transmission and High Voltage Technology (IEH), University of Stuttgart, Germany; 2: SENEC GmbH

PANELS
F1 > F23

TOUR 1
CUSTOMER 1
09.00 – 10.30

LEVEL 1
FORUM

10572
F19 Tariff Development for Smart EV Charging for Households
Denis Yeboah (1), Esa Äärynen (1), Pirjo Heine (1), Mahdi Pourakbari (2)
1: Helen Electricity Network Ltd., Finland; 2: Aalto University, Finland

10589
F20 Reducing Power Peaks In Low-Voltage Grids Via Dynamic Tariffs And Automatic Load Control
Katharina Kaiser (1), Markus Kreft (1), Eleni Stai (1), Marina González Vayá (2), Thorsten Staake (1), Gabriela Hug (1)
1: ETH Zurich, Switzerland; 2: Elektrizitätswerke des Kantons Zürich (EKZ), Switzerland

10609
F21 Coordination of Community Electricity Markets and Distribution Network Operation
Irena Dukovska (1), J.G.{Han} Slootweg (1,2), Nikolaos G. Paterakis (1)
1: Eindhoven University of Technology, Netherlands, The; 2: Enexis B.V.

10613
F22 Flexibility Settlement For Congestion Management: Two Practical Studies
Alain Stuivenvolt (1), Rik Fonteijn (1), Hadis Pourasghar Khomami (1), Han Slootweg (1,2)
1: Enexis, Netherlands, The; 2: Eindhoven University of Technology, Netherlands, The

10681
F23 Study of Electrical Consumption Flexibility Offered by HVAC System Based on Rooms Thermal Modelling – Tertiary Building Case Study
Mhamad Shmaysani, Khaled Almaksour, Benoit Durillon, Christophe Saudemont
Univ. Lille, Arts et Metiers Institute of Technology, Centrale Lille, Junia, ULR 2697 – L2EP, F-59000 Lille, France

PANELS
H24 > I4

TOUR 2
DSO 1
09.00 – 10.30

LEVEL 1
FORUM

10136
H24 The Use Of Virtual Reality In The Training Of Employees In Electricity Distribution Companies
Amir Navidi, Ali Mighi, Masoud Ghasemi
Tehran Electric Power Distribution Company, Iran, Islamic Republic of

10185
H25 Risk Management to avoid the Safety accidents
Yu Jung An, Young Ik Lee, Dong Min Kim, Ju Hyuk Im
kepco, Korea, Republic of (South Korea)

10215
H26 Real Time Quality Monitoring Of Electrical Distribution Network Affected By Heatwaves: A Data-oriented Approach
Giulia Muscarà (1), Gianluca Di Felice (1), Francesco Paolo Palazzotto (1), Roberto Brandi (1), Niccolò Corsi (1), Massimo Pompili (2), Luigi Calcara (2)
1: e-distribuzione, Italy; 2: University of Rome La Sapienza, Italy

10228
H27 Assessment and Visualisation of Extreme Weather Impacts and Climate Change Risks on Distribution Network Operation
Lizaveta Troshka
National Grid, United Kingdom

PANELS
H24 > I4

TOUR 2
DSO 2
09.00 – 10.30

LEVEL 1
FORUM

10260	**H28 Electric Energy Distribution – Control of NTL (Non Technical Losses)** Miguel Pulice Edenor, Argentine Republic
10280	**H29 Assessing Gender Equality in the Distribution Sector** Sarah Ouziaux ENGIE IMPACT – BRUXELLES, Belgium
10323	**H30 Optimal Strategies for the Management of Electric Power Distribution Systems Considering Diversified Age Structures of the Electrical Equipment and Their Economic and Technical Implications** Robin Schubert, Markus Zdrallek Institute of Power Systems Engineering, University of Wuppertal, Wuppertal, Germany
10340	**H31 Estimation Of Impact Of Extreme Weather Conditions On Distribution Asset And Improvement Of Operational Procedures Supported By Evolved Tools** Luigi D'Orazio (1), Roberto Calone (1), Gianluca Di Felice (2), Marina Bernardi (3) 1: ENEL, Italy; 2: e-distribuzione, Italy; 3: CESI, Italy
10386	**H32 Asset Owner Perspective on Managing Growth and Reinvestment Needs** Markus Taaveniku (1), Marcus Halvarsson (1), Matthias Hopfensitz (2), Heiko Spitzer (2) 1: Vattenfall Eldistribution AB, Sweden; 2: entellgenio GmbH, Germany
10422	**H33 Extreme Weather and Power Distribution System Resilience** Mohammed Al Ghenaimi Mazoon Electricity Company, Oman
10462	**H34 Climatological Changes And New Applications For System Grid Operators** Kerstin Weindl (1), Lukas Schwalt (2), Klemens Reich (1) 1: Austrian Power Grid, Austria; 2: TU Graz, Austria
10482	**H35 A Framework for Dynamic Risks and Resiliency Assessment of Critical Infrastructure a Case Study on Power Distribution Transformers** Mohsen Farzadmehr (1), Mostafa Aliyari (2), Vahid Baghshani (1), Yonas Zewdu Ayele (2,3) 1: KEDC Company; 2: Østfold University College, Norway; 3: IFE, Institute for Energy Technology
10499	**H36 Technical And Economic Grid Reinforcement Analysis For The Danish DSO Networks** Jasmin Mehmedalic, Peter Kjær Hansen Green Power Denmark, Denmark
10500	**I1 Resilience of the Energy System to Climate Change** Perrin Nicolas (1), Drobinski Philippe (2), Roche Nicolas (1) 1: Enedis, France; 2: LMD – Laboratoire de Météorologie Dynamique, France

PANELS
H24 > I4

TOUR 2
DSO 2
09.00 – 10.30

LEVEL 1
FORUM

10522	**I2 Non-firm Grid Connections For Low-Voltage Generators: A Case Study** Louise Muller, Florent Cadoux Roseau Technologies, France
10625	**I3 Quantitative Approach of A Novel Disaster- Based Vulnerability Index in Distribution System By Utilizing Geographical Information System Study Case in Palu After Disaster** Very Fernando, Revi Aldrian, M.Soffin Hadi, Yohanes Sukrislismono, Indratno Pardiansyah PT PLN (Persero), Indonesia
10844	**I4 Hierarchical Forecasting for the Management of Distribution Grids** Simon Camal (1), Dennis Van Der Meer (1), Fabrizio Sossan (2), Georges Kariniotakis (1) 1: MINES PARIS – PSL University – Research Center PERSEE, France; 2: HES-SO Valais Wallis – Institut de Recherche Energie et Environnement

GUIDED TOURS 3 & 4 ▮ 11.00 – 12.30

PANELS
F24 > G19

TOUR 3
CUSTOMER 2
11.00 – 12.30

LEVEL 1
FORUM

10716	**F24 Grid Performance Optimization Supported By An EV Charging Dynamic Price Formation Model** Diogo Lopes (1), Luís Almeida (2), José Sousa (2), Rita Mourão (2) 1: Capgemini; 2: E-Redes
10728	**F25 E-REDES Technical-Commercial Forum – a New Approach to Address Technical Complaints Involving Client Damages** Patrícia Duarte, Miguel Veríssimo, Jad Azar, Luís Fernandes, Tiago Penedos, Carolina Marques, Jorge Santos E-REDES, Portugal
10752	**F26 A DSO View On Implementing Residential Customer Flexibility In Rural Communities** Ciaran Geaney, Fergal Egan ESB Networks, Ireland
10775	**G1 Preferences in EV's Smart Charging – Customer Survey** Antti Raassina (1), Juhani Lepistö (1), Samuli Honkapuro (2), Ville Tikka (2) 1: Helen Electricity Network Ltd, Finland; 2: LUT University
10786	**G2 Resilience Services from Battery Storage Degradation** Mohamed Galeela, Wentao Zhu, Diptargha Chakravorty TNEI Services, United Kingdom
10829	**G3 EV Charging Evaluation Using Real-world Datasets: A Case Study Of Energy Consumption, Peak Power, Self-consumption And Self-sufficiency** Mohamed Yasko (1,2), Hans Wouters (1,2), Attila Balint (1,2), Johan Driesen (1,2), Wilmar Martinez (1,2) 1: KU Leuven, Belgium; 2: EnergyVille, Belgium
10840	**G4 Flexible activation for grid purposes – Experiences from a Norwegian pilot** Hanne Sæle (1), Mariona Zhuri (2), Andrei Morch (1), Ivan Schytte (2) 1: SINTEF Energi AS, Norway; 2: Lede AS, Norway

PANELS
F24 > G19

TOUR 3
CUSTOMER 2
11.00 – 12.30

LEVEL 1
FORUM

10903
G5 Smart Transformer as an Energy Community Service Node and Integrator of Local Resources
Kari Maki (1), Sergio Motta (1), Marius Baranauskas (1), Mika Sillanpaa (2), Tommi Vahtera (3), Pasi Ylirisku (3), Verneri Kohonen (4)
1: VTT Technical Research Centre of Finland, Finland; 2: MSc Electronics, Finland; 3: THT Control, Finland; 4: Caruna, Finland

10928
G6 Incentive Design for Hybrid ESS Considering Additional Services based on Monte-carlo Simulation
Yong Soon Kim, Gye Hyun Park, Dam Kim, Seung Wan Kim
Chungnam National University, Korea, Republic of (South Korea)

10936
G7 Integrating Digital Building Flexibility through Sub-aggregator Business Model
Kari Maki (1), Matti Aro (1), Utkarsha Agwan (2), Hari Prasanna Das (2), Yu-Wen Lin (2), Costas Spanos (2)
1: VTT Technical Research Centre of Finland, Finland;
2: University of California Berkeley, USA

10952
G8 Optimal Scheduling of Flexible Residential Loads Under Demand Response Programs Considering User Comfort
Mehdi Naserian (2), Mohammad Jooshaki (4), Mahmud Fotuhi-Firuzabad (2), Matti Lehtonen (1), Fei Wang (3)
1: Aalto University, Finland; 2: Sharif University of Technology; 3: North China Electric Power University; 4: Geologian tutkimuskeskus

11051
G9 Grid-Friendly Renewable Energy Communities Using Operating Envelopes Provided by DSOs
Juliana Kainz (1), Robin Sudhoff (2), Ruben Liedy (1), Daniel Hauer (1), Alfred Einfalt (1), Gerhard Engelbrecht (1), Ines Fohler (1), Christopher Kahler (4), Daniel Menz (3), Sebastian Schreck (2), Andreas Schuster (3), Sebastian Thiem (2)
1: Siemens AG OEsterreich, Austria; 2: Siemens AG, Germany; 3: ASCR, Austria; 4: Wiener Netze GmbH, Austria

11053
G10 Environmental And Financial Impact Assessment Of Off-Grid Microgrids Using Energy Storage And PV
Edmund Schaefer (1,2), Yohannes Desta (1), Erik Goselink (1), Gerwin Hoogsteen (2), Johann Hurink (2), Richard van Leeuwen (2)
1: Saxion University of Applied Sciences, University of Twente, Netherlands, The; 2: University of Twente, the Netherlands

11098
G11 Enabling Heavy-Duty Charging Infrastructure in a Capacity Constrained Grid
Olav Henrik Skonnord (1), Iliana Ilieva (1), Stig Ødegaard Ottesen (1), Lars Erik Olsen (2)
1: Smart Innovation Norway, Norway; 2: ASKO, Norway

11099
G12 Review of Emerging Advanced Smart Charging Flexibility Business Models
Goncalo Mendes (1), Ville Tikka (1), Vahid Vahidinasab (2), Jasmhid Aghaei (1)
1: LUT University; 2: Nottingham Trent University

PANELS
F24 > G19

TOUR 3
CUSTOMER 2
11.00 – 12.30

LEVEL 1
FORUM

11152
G13 Exploring The Opportunities Of Sector Coupling – The Conflicting Interests Of Urban And Rural Energy Systems
Tuomas Vanhanen (1,2), Pertti Järventausta (1)
1: Tampere University, Finland; 2: City of Tampere, Finland

11196
G14 Industrial Flexibility Options: Impact And Usage As A Service In The High-Voltage Level
Erik Zipperling (1), Markus Zdrallek (1), Franziska Schmaltz (2)
1: University of Wuppertal, Germany; 2: Yncoris GmbH & Co. KG, Germany

11235
G15 Demonstration Of A Whole Energy Systems Accelerator
Joseph Melone (1), David Wyatt (2), Priya Bhagavathy (1), Federico Coffele (1)
1: PNDC - University of Strathclyde, United Kingdom;
2: Energy Systems Catapult, United Kingdom

11307
G16 Green Fleet Project
Stanislav Hes, Jan Kula, Katerina Penkavova
CEZ Distribuce, a.s., Czech Republic

11320
G17 Use Of Performance Indicators To Encourage Proactive User Behaviours In Renewable Energy Communities
Riccardo Trevisan, Emilio Ghiani, Fabrizio Pilo
Università degli Studi di Cagliari, Italy

11346
G18 Business Models For Virtual Power Plants And Their Impact On Economic Operation
Gary Howorth (1), Ivana Kockar (1), Paul Tuohy (1), Graeme Flett (1), John Bingham (2)
1: University of Strathclyde, United Kingdom; 2: Engineering Technology Centre Ltd (ETC), United Kingdom

11489
G19 Effects of Tariff Structures to the Revenue Streams of Local Energy Systems
Nikolaos Chrysanthopoulos, Dimitrios Papadaskalopoulos, Goran Strbac
Imperial College London, United Kingdom

PANELS
I5 > I19

TOUR 4
DSO 2
11.00 – 12.30

LEVEL 1
FORUM

10852
I5 Why DSO Involvement In Energy Community Planning Is Expedient
Selina Kerscher (1), Naser Hashemipour (2), Pedro Crespo del Granado (2)
1: University of Oviedo supported by Phoenix Contact, Spain; 2: Norwegian University of Science and Technology, Norway

10916
I6 How Energy Efficiency Business affects Power System and New Business Model Suggestion from DSO
DeukSeon Yoon (1), Kyunghoon Kim (2), Junho Lee (3)
1: KEPCO ES, Korea, Republic of (South Korea); 2: KEPCO ES, Korea, Republic of (South Korea); 3: KEPCO ES, Korea, Republic of (South Korea)

10970
I7 Developing An Electricity Network For Net Zero
Shauna Graham, Jonathan Pollock, Anne Clarke
NIE Networks, United Kingdom

PANELS
I5 > I19

TOUR 4
DSO 2
11.00 – 12.30

LEVEL 1
FORUM

10973	**I8 All Models Are Wrong, But Some Are Useful: An Exploration Of Validity And Confidence** Daphne Geelen (1), Veronika Barta (5), Age van der Mei (4), Elias Hartvigsson (2), Jan-Peter Doomernik (1), Ricardo Pastor (6), Balint Hartman (3) 1: Enexis DSO; 2: Endre; 3: Budapest University of Technology and Economics; 4: Duinn; 5: HM University of Applied Sciences Munich; 6: R&D Nester
10979	**I9 Solutions to Manage Local Flexibility Services for the Distribution Grid in the Energy Transition Scenario** Serena Cianotti (1), Giulio Lenaz (2), Macarena Morgaz (3), Pablo Vargas Barrero (4) 1: enel grids, Italy; 2: enel, Italy; 3: enel grids, Spain; 4: enel grids, Colombia
11062	**I10 Development Possibilities of Distribution Network Service Charges of Low-Voltage Customers – Apartment Houses as Energy Communities** Kimmo Lummi, Juha Koskela, Pertti Järventausta Tampere University, Finland
11080	**I11 Technical Impacts of the Deployment of Renewable Energy Communities on Electricity Distribution Grids** Julien Allard (1), Arnaud Rosseel (1), Louise Sadoine (2), Jamal Faraji (1), Thomas Brihaye (2), Filippo Capizzi (3), Boniface Nteziyaremye (4), François Bordes (4), François Vallée (1), Zacharie De Grève (1) 1: University of Mons, Electrical Power Engineering Unit, Power Systems and Markets Research Group Belgium; 2: University of Mons, Dept of Effective Mathematics, Belgium; 3: ENGIE Laborelec, Belgium; 4: WeSmart, Belgium
11236	**I12 Flexibility Solutions To Adapt E-REDES Business Management To Face Network Challenges** Joao Rafael (1), Margarida Siborro Lopes (1), Pedro Godinho Matos (1), Pamela Catrinque Martins (2) 1: E-REDES, Portugal; 2: ENEDIS, France
11247	**I13 Climate Analysis to Prevent Risk to Distribution Network Assets** Charlie Dodds, Susan Miller, Alexandra Campbell, Matthew Jones, Malcolm Bebbington, David Cupples SP Energy Networks, United Kingdom
11255	**I14 Meter Placement Algorithm for Reliable Distribution System State Estimation** Rafael Steppan, Anna Pfendler, Jutta Hanson Technical University of Darmstadt, Germany
11258	**I15 A Long-term Risk-based Approach To Investment Optimisation** Dawn O'Brien, Joanne Peacock EA Technology, United Kingdom
11281	**I16 Modeling of Risk Aversion Linked to Renewable Energy Policy and Decision- Maker Behavior** Dieudonne Ecike Ewanga (1), Irfan Shaikh (2) 1: University of Liège, Belgium; 2: Indian Institute of technology, India

PANELS
I5 > I19

TOUR 4
DSO 2
11.00 – 12.30

LEVEL 1
FORUM

11283	**I17 E-Redes' Asset Management Certification Involves All The Organization And Is Not a Myth** Cristina Carvalho (1), Miguel Freitas (1), Ricardo Prata (1), Jorge Manuel Gomes (1), Nuno Ferreira (1), Pedro Vidal (1), Edmea Adell (2), Olivier Pinto (3) 1: E-REDES, Portugal; 2: Assetsman, France; 3: Nexans, France
11352	**I18 Impact On The Distribution Network Of An Energy Super-Station** Jin-Wook Lee (1), Sung-Won Park (2), Sung-Yong Son (1) 1: Gachon University, Korea, Republic of (South Korea); 2: Youngsan University, Korea, Republic of (South Korea)
11400	**I19 Standardization ISO55000 & PAS55** Ivan Valbuena, Carolina Morales Enel Colombia, Colombia

GUIDED TOURS 5 & 6 ▮ 14.30 – 16.00

PANELS
G20 > H8

TOUR 5
DIGITALIZATION 1
14.30 – 16.00

LEVEL 1
FORUM

10138	**G20 EleniaGO – Crowdsourcing Maintenance Inspections** Harri Salomäki (1), Pauliina Salovaara (1), Heikki Malkamäki (2) 1: Elenia Verkko Oyj; 2: Ambientia Oy
10205	**G21 Electrification Technologies And Grid Services Testing Inside Enel X Labs** Christian Noce, Luigi Lanuzza, Massimiliano Maurizio De Benedetti Enel X SrL, Italy
10217	**G22 Towards the digital transformation of Distribution System Operators using Knowledge Graphs and Conversational AI** Ioan Toma (1), Juergen Umbrich (1), Sonja Laengle (1), Marc Isop (1), Martina Theil (2), Alexander Sas (2), Werner Horst Reinwald (2), Andreas Theil (2), Alexander Wahler (1), Umutcan Simsek (3), Dieter Fensel (3) 1: Onlim Gmbh, Austria; 2: Wiener Netze GmbH, Austria; 3: University of Innsbruck, Austria
10267	**G23 Anonymisation Score For Time Series Consumption Data** Cecilia Gerlitz (1), Axel Eriksson (1), Camilla Hansson (2) 1: Vattenfall AB, Sweden; 2: Vattenfall Eldistribution AB, Sweden
10373	**G24 Using Smart Meter Data to Predict and Identify Consumer Vulnerability** Rob Wadsworth (2), Marnie Ellis (1), Lizaveta Troshka (1), Zoe Hodgins (2) 1: National Grid; 2: Frazer-Nash Consultancy
10384	**G25 SIORD, a New DSO-shared Data Hub to Monitor and Control Distributed Energy Resources in Spain** Daniel Davi-Arderius (1), Moises Canales Laso (2), Albert Estapé Vilà (3), David Martin Utrilla (4), Alberto Suárez Fontenla (5), Marta Viñas Gómez (6), Marta Castro Pérez-Chirinos (7) 1: e-Distribución Redes Digitales, Spain; 2: Viesgo Distribución (Grupo EDP); 3: ASEME; 4: I-DE Redes Eléctricas Inteligentes, S.A.U.; 5: Unión Fenosa Distribución; 6: CIDE; 7: AELEC

PANELS
G20 > H8

TOUR 5
DIGITALIZATION 1
14.30 – 16.00

LEVEL 1
FORUM

10514 — **G26 Central Monitoring Application used at Brno University of Technology**
Tomáš Bajánek (1), Viktor Jurák (2), Jaroslava Orságová (2), Lubomír Novák (2)
1: ABB, Czech Republic; 2: Brno University of Technology, Czech Republic

10560 — **H1 Smart Meters Technology Intervention – benefits to Consumers and Utility**
Ruman Maknojia, Shriram Savarkar, Devanjan Dey, Vishal Agrawal
Tata Power Mumbai Distribution, India

10601 — **H2 New Tool To Improve The Grids Status Monitoring And Customer Connections Process**
Rosalba Russo (2), Francesco Amadei (1), Giovanni Franzone (1), Luciano Cocchi (1), Massimo Bolognesi (1), Alberto Cerretti (1)
1: Enel grids srl; 2: e-ditribuzione spa

10673 — **H3 Renewable Energy Data Platform Including Electric Power Transmission and Distribution System**
SungHo Park, Jaein Kim, Simin Sung, JooYoung Moon
KEPCO(Korea Electric Power Corporation), Korea, Republic of (South Korea)

10684 — **H4 HAPe Optimizing Customer Relation by Automatic Task Distribution Using Constrained Optimization and Natural Language Processing**
Romain Gemignani (1), Eunice Akani (1), Jean-Pierre Delrieux (1), Abdoulaye Sayouti Souleymane (2)
1: ENEDIS, France; 2: Avignon University – France

10785 — **H5 Smart Metering, Monitoring & Optimising LV Network performance**
Gary Macdonald (1), Caroline Loughran (2), Ciaran Higgins (3)
1: Scottish Power Energy Networks, United Kingdom;
2: Scottish Power Energy Networks, United Kingdom;
3: DerryHerk LTD, United Kingdom

10804 — **H6 Cybersecurity In DSO OT Environment Using Advanced Anomaly Detection**
Peter Ceferin (1), Damjan Bobek (2), Aljaž Kmecl (2), Tomi Kolar (2), Igor Štih (1)
1: SmartCom, Slovenia; 2: Elektro Celje, Slovenia

10863 — **H7 Time Series Machine Learning Augmented With Social Network Events To Improve National Electricity Consumption Profile Estimation**
Amr Alyafi (1), Pierre Cauchois (2), Benoit Delinchant (1), Alain Berges (2)
1: G2ELAB, France; 2: ENEDIS, France

10919 — **H8 Data Quality Challenges in Existing Distribution Network Datasets**
Frederik Geth (1), Marta Vanin (2), Dirk Van Hertem (2)
1: GridQube, Australia; 2: KU Leuven and EnergyVille, Belgium

10113 — **I20 Incentive Regulation For Lower Losses And More Efficient Use Of The Grid When Random Photovoltaic DG Is Connected In Argentinian LV Networks**
Alejandro Jurado, Edgardo Vinson, Fernando Nicchi
Universidad de Buenos Aires, Argentine Republic

PANELS
I20 > J3

TOUR 6
REGULATION 1
14.30 – 16.00

LEVEL 1
FORUM

10240 — **I21 Model and Tariff Design for Multifunctional Distribution Networks**
Senad Aganovic (1), Elvisa Becirovic (2), Edina Aganovic (3)
1: Regulatory commission for energy in Federation on Bosnia and Herzegovina; 2: Public Company «Elektroprivreda BiH» d.d. Sarajevo; 3: Independent System Operator in Bosnia and Herzegovina

10268 — **I22 Swedish Approach For The Assessment And Monitoring Of The Smart Grid Development**
Maria Dalheim, Herlita Bobadilla Robles, Mohamadreza Baradar, Carl Johan Wallnerström
The Swedish Energy Markets Inspectorate, Sweden

10317 — **I23 Metrics for the Validation of Agent–Based Local Flexibility Markets**
Alexandra Karmann (1), Maximilian Kilthau (1), Jan–Philip Beck (1), Christian Derksen (2), Kamil Korotkiewicz (3), Martin Asman (4), Alexander Fay (1)
1: Helmut Schmidt University / University of the Federal Armed Forces Hamburg; 2: University of Duisburg–Essen; 3: PSI GridConnect GmbH; 4: University of Wuppertal

10391 — **I24 Relax Regulation and Market Frames to Increase Sector Coupling**
Edoardo Corsetti
RSE, Italy

10393 — **I25 The UMEI – Universal Market Enabling Interface. Enabling Standard Interaction with Various Flexibility Markets to Procure Grid Services**
Carlos Damas Silva (1), Gesa Milzer (4), Arnaud Debray (2), Mahtab Kaffash (3), Narve Sætre (4), Chloé Dumont (2), Evelyn Heylen (3), Øystein Dyvik Eide (4), Giancarlo Marzano (2)
1: E–REDES, Portugal; 2: N–SIDE, Belgium; 3: Centrica Business Solutions, Belgium; 4: NODES, Norway

10407 — **I26 Design of an Auction–based Local Energy Market for Integrated Electricity and Heat Networks Coordinated with Wholesale Market**
Sara Haghifam, Hannu Laaksonen, Miadreza Shafie–khah
Univesity of Vaasa, Finland

10411 — **I27 Public Consultation Platform for Network Development Plan**
Tiina Salmi (1), Harri Salomäki (2), Ilkka Luoma (3)
1: Elenia Oy; 2: Elenia Verkko Oyj; 3: Vincit Oyj

10445 — **I28 Regulatory Learnings from EU Funded Flexibility Projects. The i–DE Case: Preparing the Future DSO.**
Santiago Gallego Amores (1), David Martín Utrilla (1), José Pablo Chávez Ávila (2), Beatriz Alonso Santos (1)
1: i–DE, Redes Eléctricas Inteligentes, Spain; 2: IIT–Universidad Pontificia Comillas, Spain

10465 — **I29 Real–Time Pricing Tariffs for Flexible Energy Storage Systems Considering the Market and Grid Conditions**
Oliver Koch (1), Christian Möller (1), Markus Zdrallek (1), Anders Timo (2)
1: University of Wuppertal, Germany; 2: WSW Energie & Wasser AG

PANELS
I20 > J3

**TOUR 6
REGULATION 1**
14.30 – 16.00

LEVEL 1
FORUM

10495	**I30 An Assessment Of The GB Energy Market's Suitability For Delivering A Customer–Focused Net–Zero** Laurence Hunter (1), Yiango Mavrocostanti (1), Helena Tauber (2), Ann Zhang (2), Alex Whittaker (2), Sarah Deasley (2) 1: National Grid, United Kingdom; 2: Frontier Economics, United Kingdom
10569	**I31 Privacy by Design in Local Electricity Markets: A Differentially Private Market Mechanism** Milad Hoseinpour, Mahmoud–Reza Haghifam Tarbiat Modares University, Iran, Islamic Republic of
10576	**I32 Volumetric Or Capacity–based Grid Tariffs: A Case Study For Residential Consumers In Flanders** Robbert Claeys (1), Rémy Cleenwerck (1,2), Jos Knockaert (1), Jan Desmet (1) 1: Ghent University, Belgium; 2: Vrije Universiteit Brussel, Belgium
10629	**I33 Reactive Power Flows From Mv To Hv Grids** Mauro De Masi (1), Andrea Vincenzo Calamera (1), Giovanni Valtorta (1), Sergio Severa (1), Giulio Lenaz (2) 1: e–distribuzione, Italy; 2: enel, Italy
10653	**I34 Business, Regulatory, and Technical Challenges for Integration of Network Aware Algorithms in Local Flexibility Markets** Pau Plana i Ollé (1), Farhan Farrukh (1), Andrea Mazza (2) 1: Smart Innovation Norway, Norway; 2: Politecnico di Torino
10682	**I35 Business Case of DSO Peak Shaving to Reduce Capacity Payments to Upstream Network Operators** Pau Plana i Ollé (1), Farhan Farrukh (1), Malte Thoma (2), Gesa Milzer (3) 1: Smart Innovation Norway; 2: Badenova gmbh; 3: NODES Market
10697	**I36 Incentive Scheme for Efficient Grid Utilization and Use of Flexibility Services** Marie Swenman, Maria Dalheim, Carl Johan Wallnerström, Staffan Wikstedt, Linn Sjöström, Albin Emanuelsson The Swedish Energy Markets Inspectorate
10709	**J1 Performance Comparison of Three Network Tariffs in Combination With a Local Electricity Market** Sjoerd Doumen, Phuong Nguyen, Koen Kok Eindhoven University of Technology, Netherlands, The
10758	**J2 Market–Based Flexibility Services For Congestion Management - A Comprehensive Approach Using The Example Of German Distribution Grids** David Brummund (1), Gesa Milzer (2), Reinhilde D'hulst (3), Paul Kratsch (4), Md Umar Hashmi (5), Louise Adam (6), Gil Sampaio (7), Mahtab Kaffash (8) 1: MITNETZ STROM; 2: NODES AS; 3: VITO; 4: E.ON; 5: KU Leuven/EnergyVille; 6: N–SIDE; 7: INESC TEC; 8: Centrica Business Solutions
10814	**J3 Remuneration And Coordination Aspects Of Flexibility By Power–to–Gas And Gas–to–Power Technologies In Distribution Networks** Nuran Cihangir Martin, Floris van Lith, Anne van der Molen Stedin, Netherlands, The

GUIDED TOURS **7 & 8** ▮ 16.30 – 18.00

PANELS
H9 > H23

**TOUR 7
DIGITALIZATION 2**
16.30 – 18.00

LEVEL 1
FORUM

10960	**H9 Leveraging Smart Metering Data To Estimate The SAIDI** François Cordel, Emmanuel Viallis, Laure Detoc, Lisa Laisné, Michel Lapacherie Enedis, France
10989	**H10 Data Science Challenges; A Wholes Systems Lens of Solving Energy Issues** Liam McSweeney (1), Stephen Haben (2), Samuel Young (2) 1: National Grid Electricity Distribution, United Kingdom; 2: Energy Systems Catapult
11009	**H11 Open Data; Delivering Results For Data Stakeholders** Lewis Jones, Liam McSweeney National Grid Electricity Distribution, United Kingdom
11010	**H12 Estimating Local Electricity Consumption And Production For Small Geographic Areas using smart meters** Anne De Moliner, Pierre Cauchois Enedis, France
11074	**H13 A State Of the Art Language Model Trained On A Corpus Of Texts Generated From The Set of DSO Activities** Eunice Akani (1), Romain Gemignani (1), Rim Abrougui (2) 1: ENEDIS, France; 2: Aix–Marseille Univ, France
11121	**H14 Automated Development of the Software Model of the Distribution Network Based on Field Collected Data and GIS Coordinates** Vasyl Makohonchuk (1), Vsevolod Pavlovsky (2), Levan Khukhunaishvili (3) 1: DMCC Engineering, Ukraine; 2: DMCC Europe, France; 3: ENERGO–PRO Georgia, Georgia
11130	**H15 EUMED Metering, A CIM–based Exchange Model: First Experiments And Perspectives From A DSO** Fabien Coutant (1), Gilles Nativel (1), Bruno Traverson (2), Eric Lambert (2), Jérôme Fremont (2), Benoît Grossin (2) 1: Enedis, France; 2: EDF R&D, France
11243	**H16 Supervised Machine Learning For False Data Injection Detection: Accuracy Sensitivity** Jaime Turanzas, Monica Alonso, Hortensia Amaris, Josue Gutierrez, Sergio Pastrana Universidad Carlos III de Madrid, Spain
11244	**H17 Smart Metering Project Serbia 2022 Prospective For DSO Operation Improvements** Jovan Vujasinović (1), Saša Gavrilović (2), Nikola Rajaković (1) 1: University of Belgrade; 2: VF Holding doo, Serbia
11256	**H18 Making The Most Of Existing Data – A Data Lake Approach To Risk Quantification** Joanne Peacock, Dawn O'Brien EA Technology, United Kingdom

PANELS
H9 > H23

**TOUR 7
DIGITALIZATION
2**
16.30 – 18.00

LEVEL 1
FORUM

11278	**H19 Creating Bottom Up Load Profiles Using Disaggregation, Clustering and Supervised Machine Learning on Large Smart Meter Dataset** Jacco Heres (1), Martijn van Braak (1), Wieske de Swart (2), Emma Gerritse (2) 1: Alliander, Netherlands; 2: Radboud University, Netherlands
11310	**H20 Leveraging Big Data Technologies For Supporting DSO Operations And Adding Business Value To The Collected Data** Leon Maruša (1), Kristijan Koželj (1), Miran Rošer (1), Boštjan Turinek (1), Rok Dolinšek (2), Jure Kop (2), Andrej Somrak (2) 1: Elektro Celje, Slovenia; 2: Troia, Slovenia
11440	**H21 A Regulatory Asset Management Machine Learning Application** André Sampaio Holanda de Oliveira (2), Wellington Rodrigues da Silva (2), Kleber Hashimoto (1), Denis Antonelli (1), Gustavo Sacchi Silva (1), Cristiano Silva Silveira (1), Vitor Takeda (1), João Vitor Martinho do Prado (1) 1: Daimon Engenharia e Sistemas, Brazil; 2: Enel Brasil, Brazil
11447	**H22 Architectural And Systems Approach To Sustainable Digital Transformation Of Distribution Utilities** Mayank Sharma (1), Nand Kishor Narang (2), Tom Berry (1) 1: Schneider Electric, France; 2: Narnix Technolabs
11498	**H23 Proactive Complaint Management with ClientID** Davide Raposo (1), Inês Graça (1), Isabel Preto (2), Ricardo Santos (1) 1: E-REDES, Portugal; 2: Smartwatt

PANELS
J4 > J23

**TOUR 8
REGULATION 2**
16.30 – 18.00

LEVEL 1
FORUM

10847	**J4 DN-FLEX: Local-flexibility Market Platforms For Distribution Networks** Klemen Knez, Boštjan Blažič University of Ljubljana, Faculty of Electrical Engineering, Slovenia
10887	**J5 Dynamic Network Tariffs for Efficient Distribution System Utilization** Tadej Šinkovec, Maja Savinek Elektro Ljubljana d.d., Slovenia
10896	**J6 Proposal For Improvement Of The Supply Continuity Regulation In Brazil** Cristiano Silveira (1), Gustavo Silva (1), Alden Antunes (1), Carlos Oliveira (1), Maurício Dutra (2), Jyvago Terceiro (2), Thiago Souza (2) 1: Daimon, Brazil; 2: CELESC-DIS, Brazil
10898	**J7 Predicting Peak Prices in the Current Day-Ahead Market** Bernt Bremdal (1,2), Shayan Dadman (2) 1: Smart Innovation Norway; 2: UiT Campus Narvik
10907	**J8 A Business Model Analysis Of Different Long Duration Energy Storage Systems In GB Energy Market Conditions** Borja Carbonell, Roberto Moreira EDF Energy R&D, United Kingdom

PANELS
J4 > J23

**TOUR 8
REGULATION 2**
16.30 – 18.00

LEVEL 1
FORUM

10990	**J9 FLEX – Winter Trial Of Flexibility Services In Northern Ireland** David Mills (1), Thomas Stone (1), Joel McCreery (2), Andres Moreno (2), Cormac Bradley (2) 1: EA Technology, United Kingdom; 2: Northern Ireland Electricity Networks, United Kingdom
11002	**J10 Local flexibility market development at E.ON Hungary** Gabor Mihaly Peter (1), Istvan Taczi (1), Istvan Vokony (2), Peter Mark Sores (2), Balint Hartmann (2), Mark Erdei (3) 1: E.ON Hungary, Hungary; 2: Budapest University of Technology and Economics, Hungary; 3: iContest, Hungary
11070	**J11 Investigating the Role of Flexible Electrical Appliances in a Demand Charge Grid Tariff Scenario – A Norwegian Case Study** Kasper Emil Thorvaldsen, Erlend Kiel, Hanne Sæle Sintef Energy Research, Norway
11092	**J12 Market Participation of Resilience-enabling Technologies While Prioritizing Resilience-as-a-service** Xavier Weiss (1), Lars Nordström (1), Arne Berlin (2) 1: KTH Royal Institute of Technology, Sweden; 2: Vattenfall Eldistribution AB
11107	**J13 Empowering Consumers with 100 % Green Power Solution** Sharad Bakre, Salman Khan, Nilesh Kane The Tata Power Company Limited, India
11111	**J14 Analysis Of The Incentive Program For The Voluntary Reduction Of Electricity Consumption In Brazil In 2021 From The Perspective Of Behavioral Economics** Lindemberg Nunes Reis, Ricardo Brandão Silva, Lucas Malheiros Nunes ABRADEE, Brazil
11135	**J15 From Ordinary Incentives Regulation To Sandboxes: A New Way To Enhance Continuity Of Supply** Mariangela Di Napoli, Mariacristina Dota, Alessandra Marasco, Laura Pimpinella Enel Italia Spa, Italy
11136	**J16 A Framework for Development of Distribution Code towards Decentralized Power System** Chang Min Lee, Eo Jin Choi, Seung Wan Kim Dept. of Electrical and Electronic Engineering, Chungnam National University
11150	**J17 Joint and Sequential DSO-TSO Flexibility Markets: Efficiency Drivers and Key Challenges** Anibal Sanjab (1,2), Luciana Marques (1,2), Helena Gerard (1,2), Kris Kessels (1,2) 1: Flemish Institute for Technological Research (VITO), Belgium; 2: EnergyVille, Belgium
11153	**J18 Generating Additional Markets for Mature Access to Flexibility (GAMMA Flex)** Jacob Lynch (1), Sofia Eng (2), Gary Swandells (3), David Penfold (3) 1: National Grid, United Kingdom; 2: NODES , Norway; 3: Smart Grid Consultancy , United Kingdom

POSTER SESSION 6
CUSTOMERS, REGULATION, DSO BUSINESS & RISK MANAGEMENT

LEVEL 1 ▮ FORUM

PANELS
J4 > J23

**TOUR 8
REGULATION 2**
16.30 – 18.00

LEVEL 1
FORUM

11155	**J19 Simulation And Comparison Of The Impact Of Different Price Tariffs On Grid Utilization** Alexander Vanselow (1), Lukas Kalisch (1), Simon Krahl (1), Albert Moser (2) 1: FGH e.V., Germany; 2: RWTH Aachen University, Germany
11381	**J20 A Scalable Open-Source Co-simulation Framework for Assessing the Effectiveness of Flexibility Activation Mechanisms on Congestion in Dutch Distribution Networks** Bart van der Holst (1), Gijs Verhoeven (1), Edwin Matthijssen (2), Mark Vrijlandt (2), Ruduan Plug (2), Arjen van der Meer (3), Koen Kok (1) 1: Eindhoven University of Technology, Netherlands, The; 2: TNO, Netherlands, the; 3: Delft University of Technology, Netherlands, The
11385	**J21 Flexibility Baselining In The UK – An Assessment Of Historic Methods** Owen Patrick (1), Sarah Sheehy (1), Gordon McFadzean (1), Genghao Tian (2), Nisha Doshi (2), Daniel Burke (2) 1: TNEI, United Kingdom; 2: SSEN, United Kingdom
11394	**J22 A Review on Local Flexibility Market Advancements: Practices in Nordic Countries** Milad Mousavi (1), Manuel Alvarez (1), Jin Zhong (2) 1: Luleå University of Technology, Sweden; 2: The University of Hong Kong
11404	**J23 Method for the Assessment of Structural Parameters for Distribution Grid Cost Drivers** Luis Böttcher, Simon Braun, Antigona Selimaj, Antoni Chajan, Andreas Ulbig IAEW at RWTH Aachen University, Germany

PROCEEDINGS

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TECHNICAL **VISITS**

Two technical visits will take place on Friday 16 June, with a coach departure from the Congress Centre La Nuvola.
Tickets had to be purchased before the Session.

TECHNICAL VISIT 1
E-DISTRIBUZIONE PRIMARY SUBSTATION VILLANOVA DI GUIDONIA
PRIMARY SUBSTATION VILLANOVA DI GUIDONIA AND NEW TECHNOLOGIES EXPERIENCE
The Primary Substation of Villanova di Guidonia is located 40 mn from the conference venue.
Transportation to the Primary Substation will be organized for participants:
▮ Departure at 09.00 from the Conference Centre La Nuvola
▮ Return at La Nuvola around 13.00 (departure from Villanova scheduled at 12.15)

PROGRAMME:
The Primary Substation of Villanova di Guidonia serves over 10.000 grid customers in the North Eastern area outside Rome (cities of Guidonia Montecelio and Tivoli). It is a typical E-Distribuzione standard Primary Substation.
It is equipped with 2 25 MVA HV/MV transformers, 2 HV Hybrid Modules (Air-SF6) and a MV compact air insulated switchgear.
Besides the visit of the Primary Substation and its equipments, participants will be invited to experience the new technologies currently in use in E-Distribuzione. Booths with examples of new technology applications (VR, AR, Drones, 3D Modeling) will be installed inside the PS perimeter. It will also be possible for visitors to test some of them.

TECHNICAL VISIT 2
L'AQUILA E-DISTRIBUZIONE TRAINING CENTRE
The Training Centre of L'Aquila is located 1,5 hours from the conference venue.
Transportation to the Training Centre will be organized for participants:
▮ Departure at 08.30 am from the Conference Centre La Nuvola
▮ Return at La Nuvola around 14.30 (departure from l'Aquila scheduled at 13.00)

PROGRAMME:
1. Presentation of the E-Distribuzione Training Centers and Training Policy (about 45 minutes)
2. Indoor and outdoor training facilities visit (18,500 sqm, about 2 hours):
   ▮ The Primary Substation: HV section, HV/MV transformers and MV section
   ▮ The MV network and switching devices, joints and terminals laboratories, the remote control devices
   ▮ Secondary substations and Pole Mounted Transformers
   ▮ The LV network: LV power components, meters and remote meter management
   ▮ Virtual Reality training system

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