



10 April 2019

# Agenda Main Sessions and RIF

15:00:54

## MS11 – Block 1: Asset management and condition assessment of Network Components – Cables, lines and associated components

|                                |            |
|--------------------------------|------------|
| Main session                   | 04/06/2019 |
| Session 1 - Network components | 09:00      |
| Room N103                      | 10:30      |

### 43 Field Study of Intermittent Faults in Low-Voltage Underground Cable Systems

Armand van Deursen, Eindhoven University of Technology (Netherlands) • Peter Wouters, Eindhoven University of Technology (Netherlands) • Han Slootweg, Eindhoven University of Technology / Enexis Netbeheer (Netherlands) • Fred Steennis, DNV GL Energy & Eindhoven University of Technology (Netherlands)

### 757 Measuring PD propagation in complex MV distribution network configurations

Sonia Raquel Barrios Pereira, Ormazabal Corporate Technology (Spain) • Ian Gilbert, Ormazabal Corporate Technology A.I.E (Spain) • Iñaki Orue, Ormazabal Corporate Technology A.I.E (Spain) • Patrick Mulroy, Ormazabal Corporate Technology A.I.E (Spain) • Aritz Hurtado, Ormazabal Corporate Technology A.I.E (Spain)

### 774 Utility pole deterioration modeling by machine learning with big data of distribution facility inspection result

Masaru Yamanaka, Kansai Electric Power Co.,Inc. (Japan) • Tatsuya Tokunaga, Kansai Electric Power Co.,Inc. (Japan) • Tatsushi Matsuki, Kansai Electric Power Co.,Inc. (Japan)

### 940 DISTRIBUTION SURGE ARRESTER MONITORING

Michel CORDONNIER, Enedis (France) • Christian GAZZOLA, DERVASIL (France) • Damien Jeanneau, Sicame (France) • Iulia IVAN, Enedis (France) • Denis SPORTIELLO, Enedis (France) • Alban-Marie LIMONET, Enedis (France)

### 1128 Condition Monitoring of Surge Protective Devices by Measuring the Magnetic Field of Discharge Currents in

Stefan Joerres, University of Kassel (Germany) • Albert Claudi, University of Kassel (Germany) • Gernot Finis, Phoenix Contact GmbH & Co.KG (Germany) • Martin Wetter, Phoenix Contact GmbH & Co.KG (Germany)

### 1369 Propagation Characteristics of Partial discharge Signals in Medium Voltage Branched Cable Joints using HFCT

Muhammad Shafiq, University of Vaasa (Finland) • Guillermo Robles, Carlos III University of Madrid (Spain) • Kimmo Kauhaniemi, University of Vaasa (Finland) • Brian Stewart, University of Strathclyde (United Kingdom) • Matti Lehtonen, Aalto University (Finland)

## MS51 – Block 1: Risk Assessment and Asset Management

|  |            |
|--|------------|
| Main session                                       | 04/06/2019 |
| Session 5 - Planning of power distribution systems | 09:00      |
| Room N104  | 10:30      |

### 623 Multi-dimension Evaluation and Investment Route for Next-generation Smart Distribution Network

Hongjun Gao, Sichuan Univerisity (China) • Junyong Liu, Sichuan Univerisity (China) • Youbo Liu, Sichuan Univerisity (China) • Lin Lv, Sichuan Univerisity (China) • Jiayi Wang, Sichuan Univerisity (China) • Zhihui Feng, Sichuan Univerisity (China)

- 754 **Clustering and determination of relevant network operating points in analytical reliability calculations**  
 Fabian Möhrke, University of Wuppertal (Germany) • Kristof Kamps, University of Wuppertal (Germany) • Markus Zdrallek, University of Wuppertal (Germany) • Philipp Awater, Power Technologies International Siemens AG (Germany) • Michael Schwan, Power Technologies International Siemens AG (Germany) • André Osterholt, MVV Netze GmbH (Germany)
- 2330 **Enel's way to SAIDI**  
 Francesco Amadei, Enel Global I&N (Italy) • Enrico Valigi, Enel (Italy) • Christian D'Adamo, Enel Global I&N (Italy)
- 898 **Optimal Resource Allocation for Reducing Distribution System Risk Induced by Hurricane**  
 HANG ZHANG, Guangzhou Power Supply Bureau Co., Ltd. (China) • LIN GAN, Guangzhou Power Supply Bureau Co., Ltd. (China) • WENXIONG MO, Guangzhou Power Supply Bureau Co., Ltd. (China) • HONGBIN WANG, Guangzhou Power Supply Bureau Co., Ltd. (China) • YU QIN, Guangzhou Power Supply Bureau Co., Ltd. (China) • LINHUAN LUO, Guangzhou Power Supply Bureau Co., Ltd. (China) • JIAXING HE, Guangzhou Power Supply Bureau Co., Ltd. (China) • ZEJUN YANG, Tsinghua University (China)
- 1618 **Resilience Enhancement of MV Distribution Grids Against Snowstorms**  
 Mauro De Masi, e-distribuzione (Italy) • Giovanni Valtorta, e-distribuzione (Italy) • Elvira Amicarelli, e-distribuzione (Italy) • Andrea Suich, e-distribuzione (Italy) • Andrea Danesin, e-distribuzione (Italy) • Francesco Dura, e-distribuzione (Italy) • Ettore De Berardinis, CESI (Italy) • Alessio MARCELLI, e-distribuzione (Italy)
- 995 **Power Transformers: Predictive Maintenance**  
 Sílvia Rodrigues, Jungle (Portugal) • Maria Inês Verdelho, EDP Distribuição (Portugal) • Ana Filipa Ribeiro, EDP Distribuição (Portugal) • Luís Cordeiro, EDP Inovação (Portugal)

## RIF3 – Research and Innovation Forum Session 3

RIF 04/06/2019

Session 3 - Operation, control and protection 09:00

Room N101-102 10:30

- 1222 **Soft-open points for medium voltage networks – A case study**  
 Patrick Favre-Perrod, University of Applied Sciences and Arts Western Switzerland (Switzerland) • Chloé Dour, University of Applied Sciences Western Switzerland (Switzerland) • Mohamed Allani, University of Applied Sciences Western Switzerland (Switzerland) • Arnoud Bifrare, Romande Energie SA (Switzerland) • Mauro Carpita, University of Applied Sciences Western Switzerland (Switzerland) • Thomas Pidancier, University of Applied Sciences Western Switzerland (Switzerland) • Sébastien Wasterlain, University of Applied Sciences Western Switzerland (Switzerland)
- 1141 **Current based Distance Protection in Closed-Ring Grids with Distributed Generation**  
 Martin Biller, Friedrich-Alexander University Erlangen-Nuremberg (FAU) (Germany) • Johann Jaeger, Friedrich-Alexander University Erlangen-Nuremberg (FAU) (Germany)
- 867 **Modelling and Control of DC Microgrids in Residential Buildings**  
 Sergio Motta, VTT (Finland) • Antti Alahäivälä, VTT (Finland) • Poria Hasanpor Divshali, VTT Research Center of Finland (Finland) • Riku Pasonen, VTT (Finland) • Anna Kulmala, VTT Technical Research Centre of Finland (Finland) • Kari Mäki, VTT Research Center of Finland (Finland) • YoungPyo Cho, KEPCO Research Institute (Korea, Republic of) • HongJoo Kim, KEPCO Research Institute (Korea, Republic of)
- 2313 **DESIGNING A LABORATORY SETUP TO EXPERIMENT WITH SMART METERING FOR SMART LOW VOLTAGE GRID**  
 Ali Hamdan, Grenoble INP (France) • Florent CADOUX, Fondation Partenariale de Grenoble INP (France) • Christine Collet, Grenoble INP (France)
- 1520 **Multi-Agent-Based Grid Automation: Field test experiences of the distributed grid state control**  
 Marcel Ludwig, University of Wuppertal (Germany) • Schaugar Azad, University of Wuppertal (Germany) • Kamil Korotkiewicz, University of Wuppertal (Germany) • Markus Zdrallek, University of Wuppertal (Germany)
- 1800 **Analysis of practical issues in the development of voltage control system for Low Voltage DC Distribution System**  
 Phi Hai Trinh, Kookmin University (Korea, Republic of) • Hector Cho, Kookmin University (Korea, Republic of) • Van Thinh Huynh, Kookmin University (Korea, Republic of) • Il-Yop Chung, Kookmin University (Korea, Republic of) • SeokWoong Kim, KEPCO Research Institute (Korea, Republic of) • JuYoung Kim, KEPCO Research Institute (Korea, Republic of)

## 1586 **Avoid technical problems in LV networks: from data-driven monitoring to predictive control**

Micael Simões, INESC TEC (Portugal) • Gil Sampaio, INESC TEC (Portugal) • André Madureira, INESC TEC (Portugal) • Ricardo Bessa, INESC TEC (Portugal) • Jorge Pereira, INESC TEC & FEP (Portugal) • Diogo Lopes, EDP Distribuição (Portugal) • Rita Pires, EDP Distribuição (Portugal) • Pedro Matos, EDP Distribuição (Portugal)

## 558 **Experimental investigation of distribution grid restoration concepts using neighboring islanded LV-microgrids**

Philipp Linnartz, Institute for High Voltage Technology – RWTH Aachen University (Germany) • Nicolas Schulte, Institute for High Voltage Technology – RWTH Aachen University (Germany) • Sandor Simon, Institute for High Voltage Technology – RWTH Aachen University (Germany)

## 241 **Evaluation and Comparison of Islanding Detection Methods by extended Analysis of the Non Detection Zone**

Sebastian Palm, TU Dresden (Germany) • Peter Schegner, Technische Universitaet Dresden (Germany)

## **MS12 – Block 2: Asset management and condition assessment of Network Components – Substations, switchgear and transformers**

Main session

04/06/2019

Session 1 - Network components

11:00

Room N103

12:30

## 383 **Partial Discharge alert system in medium voltage switchgear**

Carlo Gemme, ABB (Italy) • Francesco Guastavino, University of Genova (Italy) • Kai Hencken, ABB (Switzerland) • Andrej Krivda, ABB (Switzerland) • Yannick maret, ABB (Switzerland) • Marco Testa, ABB spa (Italy) • Federico Gallesi, University of Genova (Italy)

## 835 **Integrating Life Cycle Assessment in operational Asset Management decision making: A case study on asset**

Willem Haanstra, University of Twente (Netherlands) • Rolf Gelpke, University of Twente (Netherlands) • co den Hartog, Liander N.V. (Netherlands) • Ihsan Karakoc, Liander Assetmanagement (Netherlands)

## 1129 **Ageing behaviour of medium-voltage substations**

Petros Dalamaras, University of Wuppertal (Germany) • Markus Zdrallek, University of Wuppertal (Germany) • Ulrich Groß, Rheinische NETZGesellschaft mbH (Germany) • Martin Knapp, Rheinische NETZGesellschaft mbH (Germany) • Heike Schulze, Mitteldeutsche Netzgesellschaft Strom mbH (Germany) • Patrick Klöckner, MVV Netze GmbH (Germany) • Axel Straube, SWS Netze Solingen GmbH (Germany) • Ralf Gawlitta, SWS Netze Solingen GmbH (Germany)

## 1613 **Smart Secondary Substation. A reality and a big opportunity for innovative solutions for predictive maintenance**

Iñaki Apellaniz, Ormazabal (Spain) • Joseba Arostegui, Ormazabal (Spain) • José Ramón Tejedo, Iberdrola (Spain) • Juan Antonio Sánchez, Ormazabal (Spain)

## 1843 **Study of new Smart technical solutions for voltage control of LV distribution networks in France : Tests and**

Christian GUILLAUME, EDF (France) • Loïc Joseph-Auguste, EDF (France) • Christian Jecu, EDF (France) • Michel CORDONNIER, Enedis (France)

## 2089 **Mitigation of lock-in effect for compact substations with transformers meeting future EU efficiency regulations**

Radoslaw Szewczyk, DuPont (Poland) • Philippe Trifigny, Cahors (France) • Jean-Claude Duart, DuPont (Switzerland)

## **MS52 – Block 2: Network Development**

Main session

04/06/2019

Session 5 - Planning of power distribution systems

11:00

Room N104

12:30

## 60 **A Planning Method of On-load Capacity Regulating Distribution Transformers in Urban Distribution Networks**

Lin GAN, China Southern Power Grid (China) • Wenxiong MO, China Southern Power Grid (China) • Jian FANG, China Southern Power Grid (China) • Yi RAO, China Southern Power Grid (China) • Yu TAN, China Southern Power Grid (China) • Hang ZHANG, China Southern Power Grid (China)

- 1027 **Meshing AC distribution networks: the opportunities of MVDC links**  
Alessio Clerici, RSE spa (Italy) • Riccardo Chiumeo, RSE spa (Italy) • Chiara Gandolfi, RSE spa (Italy) • Roberto Zuelli, RSE spa (Italy) • Salvatore Pugliese, Unareti spa (Italy) • Stefano Fratti, Unareti spa (Italy)
- 1052 **Development of Advanced Distribution Automation System with Failure Cause Estimation Function**  
Kentaro Fujimoto, Kansai Electric Power Co (Japan) • Tatsuki Inuzuka, Hitachi,Ltd. (Japan)
- 1417 **Integration and aggregation of distributed energy resources – operating approaches, standards and guidelines**  
Jim Reilly, Reilly and Associates (USA) • Geza Joos, McGill University (Canada)
- 1874 **Techno-economic analysis of network configuration of PV based off-grid distribution system**  
Iurii Demidov, Lappeenranta University of Technology (Finland) • Andrey Lana, Lappeenranta University of Technology (Finland) • Antti Pinomaa, Lappeenranta University of Technology (Finland) • Jarmo Partanen, LUT University (Finland) • Olli Pyrhonen, Lappeenranta University of Technology (Finland)
- 1982 **A Multi-Energy Microgrid Integrating Bio-Gas Production for Local and Market Services Provision**  
Edoardo Corsetti, RSE (Italy) • Ada Del Corno, RSE (Italy) • Carlo Sandroni, RSE S.p.A (Italy)

## MS13 – Block 3: Innovation in Network Components – Cables, lines and new types of components

|                                |            |
|--------------------------------|------------|
| Main session                   | 04/06/2019 |
| Session 1 - Network components | 14:30      |
| Room N103                      | 16:00      |

- 662 **A disruptive method for vegetation management on Enedis' Medium**  
Michel CORDONNIER, Enedis (France) • Paolo GUZZINI, Delair (France)
- 1033 **Lessons learnt from the eco-design process for an elbow connector for medium voltage networks**  
Lucie Domingo, Nexans (France) • Stefaan Van den Broeck, Nexans (Belgium)
- 1606 **Comparative research between XLPE and P-laser MV-cable**  
Piet Soepboer, Enexis Netbeheer (Netherlands) • Tjeerd Broersma, Enexis Netbeheer (Netherlands) • Blandine Hennuy, ENGIE-Laborelec (Belgium) • Robin Simal, ENGIE-Laborelec (Belgium) • Jos van Rossum, Prysmian Netherlands (Netherlands) • Sander Lauwers, Prysmian Netherlands (Netherlands) • Robert Bartholomeus, Prysmian Netherlands (Netherlands)
- 1617 **The Operational Performance and Benefits of an MVDC Device Integrated within a 33kV Distribution Network**  
Jonathan Berry, Western Power Distribution (United Kingdom) • Yiango Mavrocostanti, Western Power Distribution (United Kingdom)
- 1784 **Smart Metering 2G – Evolution of a Smart Metering experience**  
Alessandro Pitì, e-distribuzione (Italy) • Antonio Cammarota, E-distribuzione Spa (Italy) • Gianni Ceneri, e-distribuzione (Italy) • Alessandra Boscagin, e-distribuzione (Italy) • Daniele Mardero, e-distribuzione (Italy) • Antonio Signorini, e-distribuzione (Italy)
- 2117 **Development of a web-based user-friendly cable ampacity calculation tool**  
Espen Eberg, SINTEF Energy Research (Norway) • Kåre Espeland, REN AS (Norway) • Svein M. Hellesø, SINTEF Energy Research (Norway) • Sverre Hvidsten, SINTEF Energy Research (Norway) • Kristan T. Solheim, SINTEF Energy Research (Norway)

## MS53 – Block 3: Distribution Planning

|  |            |
|--|------------|
| Main session                                       | 04/06/2019 |
| Session 5 - Planning of power distribution systems | 14:30      |
| Room N104  | 16:00      |

- 2317 **Comparison of models and tools for distribution planning**  
Gianni Celli, University of Cagliari (Italy) • Fabrizio Pilo, University of Cagliari (Italy) • Simona Ruggeri, University of Cagliari (Italy) • Heloise Baraffe, EDF R&D (France) • Josselin Fournel, EDF R&D (France) • Gilles Malarange, EDF R&D (France) • Juliette Morin, EDF R&D (France)
- 773 **Baselines for evaluating demand response in the EcoGrid 2.0 project**  
Emil Larsen, Danish Energy (Denmark) • Kenneth Rosenørn, Danish Energy (Denmark) • Anna Jónasdóttir, Danish Energy (Denmark)
- 784 **Reliability Calculations with Smart Grid Technologies in Distribution Grids**  
Kristof Kamps, University of Wuppertal (Germany) • Fabian Möhrke, University of Wuppertal (Germany) • Markus Zdrallek, University of Wuppertal (Germany) • Philipp Awater, Power Technologies International Siemens AG (Germany) • Michael Schwan, Power Technologies International Siemens AG (Germany) • André Osterholt, MVV Netze GmbH (Germany) • Frank Aschenbroich, EWR GmbH (Germany)
- 1133 **Low voltage electrification approach in rural areas: arbitration between on and off-grid solutions**  
Mehdi Othmani, Engie (Belgium) • Ibrahim Abada, Engie (Belgium) • Léa Tatry, Engie (Belgium) • Tanguy Port, Tractebel (Belgium) • Gauthier Roig, Tractebel (Belgium) • Midas Caubergs, Tractebel (Belgium)
- 2326 **Microgrid Value Stacking to Defer Distribution Capacity Upgrades of Radial Feeders**  
Hamideh Bitaraf, ABB (USA) • Britta BUCHHOLZ, ABB (Germany) • Pablo ASTORGA, ABB (Spain) • John GLASSMIRE, ABB (USA)
- 938 **Evaluation of grid relieving measures for integrating electric vehicles in a suburban low-voltage grid**  
Bernd Thormann, Montanuniversitaet Leoben (Austria) • René Braunstein, Energienetze Steiermark GmbH (Austria) • Johannes Wisiak, Energienetze Steiermark GmbH (Austria) • Franz Strempl, Energienetze Steiermark GmbH (Austria) • Thomas Kienberger, Montanuniversitaet Leoben (Austria)
- 1673 **Local e-mobility prediction and deviated grid development based on data analysis**  
Florian Schaber, Westnetz GmbH (Germany) • Helmut Lühsen, Westnetz GmbH (Germany) • Dieter Juchem, Westnetz GmbH (Germany)

## MS14 – Block 4: Innovation in Network Components – Substations, switchgear and transformers

|                                |            |
|--------------------------------|------------|
| Main session                   | 04/06/2019 |
| Session 1 - Network components | 16:30      |
| Room N103                      | 18:00      |

- 28 **SF6 Alternative – What to learn from the high voltage experience**  
yannick KIEFFEL, GE Grid Solutions (France) • Arnaud Ficheux, GE Grid Solutions (France) • Robert Luescher, GE Grid Solutions (Switzerland) • Elodie Laruelle, GE Grid Solutions (France) • Louis Maksoud, GE Grid Solutions (France)
- 770 **Innovative SF6 free switch with shunt vacuum interruption technology**  
Christophe Prevé, Schneider Electric (France) • Romain Maladen, Schneider Electric (France) • François TRICHON, Schneider Electric (France) • Daniel Piccoz, SASU Daniel PICCOZ (France)
- 1084 **Eco-efficient puffer-type load break switch for medium voltage applications**  
Elham Attar, ABB AS (Norway) • Magne Saxegaard, ABB (Norway) • Maik Hyrenbach, ABB AG (Germany) • Pouria Homayonifar, ABB (Norway) • Tor Bratsberg, ABB (Norway) • Ole Granhaug, ABB (Norway) • Nina Støa-Aanensen, Sintef (Norway) • Erik Jonsson, Sintef (Norway)
- 1100 **Smart Switchgear for Extreme Installation Environments**  
Blair Kerr, G&W Electric Co. (USA) • Janet Ache, G&W Electric Co. (USA) • Nenad Uzelac, G&W Electric Co. (USA) • Stephen Linn, G&W Electric Co. (USA)
- 1646 **Start&Stop system for more efficient Smart Transformers at renewable power plants. Beyond the Ecodesign**  
LUIS DEL RIO ETAYO, ORMAZABAL CORPORATE TECHNOLOGY (Spain) • BITTOR VILLAMERIEL, ORMAZABAL CORPORATE TECHNOLOGY (Spain) • IBON LARRACOECHA, ORMAZABAL CORPORATE TECHNOLOGY (Spain) • RAFAEL AGUNSO, ORMAZABAL CORPORATE TECHNOLOGY (Spain) • PABLO CIRUJANO, ORMAZABAL COTRADIS (Spain)

## 2173 **Technical requirements of Smart Transformer for Deployment in Grid Application**

Ali Kazerooni, WSP (United Kingdom) • Giovanni De Carne, Kiel University (Germany) • Markus Andersen, Kiel University (Germany) • Marco Liserre, Kiel University (Germany) • Michael Eves, SP Energy networks (United Kingdom) • James Yu, SP Energy networks (United Kingdom)

## MS54 – Block 4: Methods and Tools

Main session

04/06/2019

Session 5 - Planning of power distribution systems

16:30

Room N104

18:00

### 257 **The Application of NILM in Demand Response**

Tian Liu, Guangzhou Power Supply Bureau (China) • Wenxiong Mo, Guangzhou Power Supply Bureau (China) • Hongbin Wang, Guangzhou Power Supply Bureau (China) • Le Luan, Guangzhou Power Supply Bureau (China) • Zhong Xu, Guangzhou Power Supply Bureau Co. Ltd (China) • Kai Zhou, Guangzhou Power Supply Bureau (China) • Yanjun Feng, Jiangsu Intelever Energy Technology Co., Ltd. (China) • Meng Fu, Southeast University (China)

### 891 **Data Analytics and Stochastic Simulation Methods for Risk-Controlled Network Planning: Validation Case Study**

André Águas, EDP Distribuição (Portugal) • Vera Pereira, EDP Distribuição (Portugal) • Inês Roça, EDP Distribuição (Portugal) • Luísa Jorge, EDP Distribuição (Portugal) • Ricardo Prata, EDP Distribuição (Portugal) • João Machado, AmberTREE (Portugal) • Pedro Carvalho, AmberTREE (Portugal) • Luís Marcelino Ferreira, Ambertree (Portugal)

### 1825 **Synthesizing Electromobility Charging Profiles**

Noah Pflugardt, Bern University of Applied Sciences (Switzerland) • Urs Muntwyler, Bern University of Applied Sciences (Switzerland)

### 2107 **Modelling of Synthetic Power Distribution Systems in Consideration of the Local Electricity Supply Task**

Jacob Tran, FGH e.V. (Germany) • Pascal Pfeifer, FGH e.V. (Germany) • Christoph Wirtz, FGH e.V. (Germany) • Dominik Wursthorn, FGH e.V. (Germany) • Hendrik Vennegeerts, FGH e.V. (Germany) • Albert Moser, FGH e.V. / RWTH Aachen (Germany)

### 1728 **Effects of Distribution System Characteristics on TSO-DSO Ancillary Services Exchange**

Giacomo Viganò, RSE (Italy) • Marco Rossi, RSE (Italy) • Diana Moneta, RSE (Italy)

### 1798 **TLC Pointer – THE USE OF GEOSPATIAL DATA FOR NON TECHNICAL LOSSES DETECTION**

Paolo Santi, Senseable City Lab, Massachusetts Institute of Technology (USA) • Massimo Zerbi, Enel Global Infrastructures And Networks (Italy) • Carlo Ratti, Senseable City Lab, Massachusetts Institute of Technology (USA) • Domenico Tresoldi, Enel Global Infrastructures And Networks (Italy) • Carlo Papa, Enel Foundation (Italy) • Giuseppe Montesano, Enel Foundation (Italy)

## RIF4 – Research and Innovation Forum Session 4

RIF

04/06/2019

Session 4 - Distributed energy resources and efficient utilisation of electricity

16:30

Room N105-106

18:00

### 1058 **Combining distributed synchronized high frequency measurements with a control system for smart low voltage**

Gerwin Hoogsteen, University of Twente (Netherlands) • Marco E. T. Gerards, University of Twente (Netherlands) • Johann L. Hurink, University of Twente (Netherlands) • Gerard J. M. Smit, University of Twente (Netherlands) • Omar Mansour, Smart State Technology (Netherlands) • Dennis Bijwaard Smart State Technology, Smart State Technology (Netherlands)

### 1156 **Uniform Web of Things based Access to Distributed Energy Resources via Metadata Registry**

Aleksei Mashlakov, LUT University (Finland) • Antti Keski-Koukkari, VTT Technical Research Centre of Finland (Finland) • Ville Tikka, Lappeenranta University of Technology (Finland) • Anna Kulmala, VTT Technical Research Centre of Finland (Finland) • Sami Repo, Tampere University of Technology (Finland) • Samuli Honkapuro, LUT University (Finland) • Matti Aro, VTT Technical Research Centre of Finland (Finland) • Peyman Jafary, Tampere University (Finland)

### 1334 **Smart hubs – DC interconnection and management of PV, EV and ESS**

Neal Wade, Newcastle University (United Kingdom) • Chris Mullen, Newcastle University (United Kingdom) • Mansoureh Zangiabadi, Newcastle University (United Kingdom) • Martin Feeney, Newcastle University (United Kingdom) • Rob Carpenter, Flexisolar (United Kingdom) • Nigel Jakeman, Turbo Power Systems (United Kingdom) • Olivia Carpenter, Ricardo (United Kingdom)

### 1416 **Blockchain-based self-consumption optimization in local energy communities**

Regina Hemm, AIT Austrian Institute of Technology GmbH (Austria) • Mark Stefan, AIT Austrian Institute of Technology GmbH (Austria) • Friederich Kupzog, AIT Austrian Institute of Technology GmbH (Austria) • Michael Niederkofler, Energie Kompass GmbH (Austria) • Andreas Schneemann, Energie Kompass GmbH (Austria)

### 1806 **INNOVATIVE ELECTRICITY NETWORK OPERATION PLANNING TOOL FOR TSOs AND DSOs**

Ataollah Moghim Khavari, DERlab (Germany) • Melios Hadjikypris, UCY (Cyprus) • Giorgio Graditi, ENEA (Italy) • Marialaura Di Somma, ENEA (Italy) • Anna Wakszyńska, IEn (Poland) • Sawsan Henein, AIT (Austria)

### 2080 **Active Response to Distribution Network Constraints**

Nathaniel Bottrell, Ricardo Energy and Environment (United Kingdom) • Simon Terry, Ricardo Energy and Environment (United Kingdom) • Nick Ash, Ricardo Energy and Environment (United Kingdom) • Luca Grella, UK Power Networks (United Kingdom)

## MS31 – Block 1: Operation (Part 1)

Main session

05/06/2019

Session 3 - Operation, control and protection

09:00

Room N103

10:30

### 215 **Grid Operation 2025 - Digitalisation for Distribution System Operators**

Robert Schmaranz, KGN-Kärnten Netz GmbH (Austria) • Walter Schaffer, Salzburg Netz GmbH (Austria) • Ursula Tauschek, Österreichs Energie (Austria) • Roland Bergmayer, Energienetze Steiermark GmbH (Austria) • Gernot Bitzan, Energie Klagenfurt GmbH (Austria) • Leopold Fiedler, Netz Oberösterreich GmbH (Austria) • Klaus Schüller, TINETZ-Tiroler Netze GmbH (Austria) • Robert Stacher, Wiener Netze GmbH (Austria)

### 1207 **Augmented Reality Opportunities in EDP Distribuição**

Bernardo Almeida, EDP Distribuição (Portugal) • Ricardo Jorge Santos, EDP Distribuição (Portugal) • António Fonseca, EDP Distribuição (Portugal) • Constança Casquinho, Nova SBE (Portugal) • Filipe Guerreiro, Fujitsu (Portugal)

### 220 **Augmented Reality in Grid Operation - a new Approach to Support Manual Switching Operations**

Robert Schmaranz, KGN-Kärnten Netz GmbH (Austria) • Stefan Schöner, OMICRON electronics GmbH (Austria) • Mario Liesinger, KNG-Kärnten Netz GmbH (Austria) • Daniela Smith, OMICRON electronics GmbH (Austria)

### 1789 **Analysis of voltage patterns for topology identification and GIS correction**

Luc Richaud, Odit-e (Spain) • Rémi Pellerej, Odit-e (France) • Clémentine Benoit, Odit-e (France) • Enrique Ramos, Schneider-Electric (Spain)

### 590 **LV Grid Data Analysis demonstrated at DSO Arbon Energie**

Ingo Herbst, Siemens AG (Switzerland) • Slobodan Lukovic, USI Lugano (Switzerland) • Alberto Gasparin, USI Lugano (Switzerland) • Nicola Schulz, FHNW Brugg (Switzerland) • Jens Witzig, FHNW Brugg (Switzerland) • Silvan Kieber, Arbon Energie AG (Switzerland)

### 547 **Driving reliability with machine learning and improving operation by digitalization of medium power**

Karsten Viereck, Maschinenfabrik Reinhausen GmbH (Germany) • Anatoli Saveliev, Maschinenfabrik Reinhausen GmbH (Germany)

## MS41 – Block 1: Co-ordination, flexibility and services

Main session

05/06/2019

Session 4 - Distributed energy resources and efficient utilisation of electricity

09:00

Room N104

10:30

- 870 **A Smart Contracting Framework for Aggregators of Demand-Side Response**  
Sergio Elizondo, Heriot-Watt University (United Kingdom) • Stephen Wattam, Upside Energy Ltd (United Kingdom) • Valentin Robu, Heriot-Watt University (United Kingdom) • Rachel Jones, Upside Energy Ltd (United Kingdom) • Graham Oakes, Upside Energy Ltd (United Kingdom)
- 1137 **A smart grid alternative to network reinforcement for HV/MV substations constraints : Active power curtailment**  
Leticia De Alvaro Garcia, Enedis (France) • Xavier Debold, Enedis (France) • Mathieu Gondolo, Enedis (France)
- 1295 **Provision of flexibility services through energy communities**  
Massimiliano Garella, DTU (Denmark) • Tiago Sousa, DTU (Denmark) • Pierre Pinson, DTU (Denmark)
- 1732 **Enhanced Transmission and Distribution System Coordination and Control Utilising Distribution Network**  
Ali R. Ahmadi, UK Power Networks (United Kingdom) • Michael Gordon, National Grid (United Kingdom) • Matthew White, UK Power Networks (United Kingdom) • Alan Minton, National Grid (United Kingdom) • Sotiris Georgiopoulos, UK Power Networks (United Kingdom) • Dionysios Stamatiadis, UK Power Networks (United Kingdom)
- 1992 **Storage and Energy Management enabling Grid and Market Services: SENSIBLE's Portuguese real demonstration**  
Filipe Guerra, EDP NEW R&D (Portugal) • Ricardo André, EDP NEW R&D (Portugal) • Ricardo Jorge Santos, EDP Distribuição (Portugal) • Alexis Bocquet, MINES-ParisTech, PERSEE (France) • Catherine Murphy-O'Connor, Indra (Portugal) • Clara Gouveia, INESC TEC (Portugal) • José Damásio, Siemens S.A. (Portugal) • Salvador Rodriguez, GPTech (Spain)
- 2055 **Integration of distributed reactive power sources through Virtual Power Plant to provide voltage control to**  
Danny Pudjianto, Imperial College London (United Kingdom) • Predrag Djapic, Imperial College London (United Kingdom) • Goran Strbac, Imperial College London (United Kingdom) • Biljana Stojkovska, National Grid ESO (United Kingdom) • Ali R. Ahmadi, UK Power Networks (United Kingdom) • Inma Martinez, National Grid ESO (United Kingdom)

## MS32 – Block 1: Operation (Part 2)

|   |            |
|---|------------|
| Main session                                  | 05/06/2019 |
| Session 3 - Operation, control and protection | 11:00      |
| Room N103                                     | 12:30      |

- 1657 **Partial Discharge Assessment with Ultrasound and TEV (Transient Earth Voltage) in Medium Voltage Substation**  
Agik Promento Yahya, PT PLN (Persero) (Indonesia) • Azkia Azkia, PT PLN (Persero) (Indonesia) • Ricky Cahya Andrian, PT PLN (Persero) (Indonesia)
- 872 **TDX-Assist: Beyond state of art in TSO-DSO interoperability – The Portuguese demonstrator**  
Tiago Simão, EDP Distribuição (Portugal) • Pedro Gama, EDP Distribuição (Portugal) • Miguel Louro, EDP Distribuição (Portugal) • Leonel Carvalho, INESC TEC (Portugal) • Gonçalo Glória, NESTER (Portugal) • Rui Pestana, REN (Portugal) • Francisco Reis, REN (Portugal) • João Silva, INESC TEC (Portugal)
- 1918 **The development of DNO flexibility services to fit within the existing UK market for ancillary services.**  
Matthew Watson, Western Power Distribution (United Kingdom) • Gary Swandells, Smart Grid Consultancy (United Kingdom) • Roger Hey, Western Power Distribution (United Kingdom)
- 896 **Research on Power Equipment Rainstorm Warning Combined with Weather Forecast Data Interpolation and**  
YIPING CUI, Guangzhou Power Supply Co. Ltd. (China) • LE LUAN, Guangzhou Power Supply Co. Ltd. (China) • YUQUAN LIU, Guangzhou Power Supply Co. Ltd. (China) • WENXIONG MO, Guangzhou Power Supply Co. Ltd. (China) • Xin Li, Guangzhou Power Supply Co. Ltd. (China) • HONGBIN WANG, Guangzhou Power Supply Co. Ltd. (China)
- 1209 **“Outage Forecast” – A Real Application of Machine Learning on Grid Operation Management Strategies**  
Bernardo Almeida, EDP Distribuição (Portugal) • Gonçalo Faria, EDP Distribuição (Portugal) • Tiago Soares, EDP Distribuição (Portugal) • Ricardo Jorge Santos, EDP Distribuição (Portugal) • José Ferreira Pinto, EDP Distribuição (Portugal) • Tiago Santos, Smartwatt (Portugal) • Isabel Preto, Smartwatt (Portugal) • Cláudio Monteiro, FEUP (Portugal)
- 1086 **Over-specification due to lack of knowledge**  
Gerard Schoonenberg, Eaton (Netherlands) • Maarten van Riet, Alliander (Netherlands)



## MS42 – Block 2: Planning for and understanding the impact of DER

Main session

05/06/2019

Session 4 - Distributed energy resources and efficient utilisation of electricity

11:00

Room N104

12:30

### 308 Recommended Distributed Energy Resource Modeling Practices in North America

Ryan Quint, North American Electric Reliability Corporation (USA) • Irina Green, California Independent System Operator (USA) • Deepak Ramasubramanian, Electric Power Research Institute (USA) • Pouyan Pourbeik, PEACE (USA) • Jens Boemer, Electric Power Research Institute (USA) • Anish Gaikwad, Electric Power Research Institute (USA) • Dmitry Kosterev, Bonneville Power Administration (USA) • Mohamed Osman, North American Electric Reliability Corporation (USA)

### 1319 Conditions for increasing DER anti-islanding protection frequency range

Miguel Veríssimo, EDP Distribuição (Portugal) • André Neves, EDP Distribuição (Portugal) • Miguel Louro, EDP Distribuição (Portugal) • Nuno Lopes Filipe, EDP CENT / Labelec (Portugal) • Andreia Leiria, EDP Labelec (Portugal) • Luís Marcelino Ferreira, Ambertree (Portugal) • Pedro Carvalho, AmberTREE (Portugal) • Fernando Carvalho, Ambertree (Portugal)

### 1330 Real case islanding detection on the Distribution network by using microPMU units

Miguel Veríssimo, EDP Distribuição (Portugal) • Pedro Aleixo, EDP Distribuição (Portugal) • André Falcão, EDP Distribuição (Portugal) • André Neves, EDP Distribuição (Portugal) • Miguel Louro, EDP Distribuição (Portugal) • Celso Filipe Silva, EDP Distribuição (Portugal) • João Carvalho, EDP Distribuição (Portugal) • Fernando Pimenta, Infocontrol (Portugal)

### 1818 Regionalized Aggregation of Distributed Energy Resources and Distribution Networks for Large-scale Dynamic

Thomas Würfl, Technical University of Munich (Germany) • Dominic Hewes, Technical University of Munich (Germany) • Lorenz Viernstein, Technical University of Munich (Germany) • Daniel Stenzel, Technical University of Munich (Germany) • Rolf Witzmann, Technical University of Munich (Germany) • Sascha Altschäffl, TenneT TSO GmbH (Germany) • Jörg Michael Schmidt, TenneT TSO GmbH (Germany) • Jörg Jahn, TenneT TSO GmbH (Germany)

### 1994 Coordinated operation of a grid scale energy storage system with tap changer for voltage control on primary

Alejandro Nieto, UK Power Networks Services (United Kingdom) • Maria-Aliki Efstratiadi, UK Power Networks Services (United Kingdom) • Kieran Coughlan, UK Power Networks Services (United Kingdom) • Alastair Currie, UK Power Networks Services (United Kingdom)

### 2210 Sizing of a battery energy storage system to minimize underfrequency load shedding in island power systems

Lukas Sigrist, Universidad Pontificia Comillas (Spain) • Luis Rouco, Universidad Pontificia Comillas (Spain) • Clara Jiménez, Universidad Pontificia Comillas (Spain)

## MS33 – Block 2: Control

Main session

05/06/2019

Session 3 - Operation, control and protection

14:30

Room N103

16:00

### 1928 Improved Supervision and Control of the LV Portuguese Network

Rita Pires, EDP Distribuição (Portugal) • Bernardo Almeida, EDP Distribuição (Portugal) • Miguel Louro, EDP Distribuição (Portugal) • Tiago Simões, EDP Distribuição (Portugal) • Pedro Nunes, EDP Distribuição (Portugal) • Mónica Vaz, CGI (Portugal) • Hugo Calado, CGI (Portugal) • Guilherme Pires, CGI (Portugal)

### 1238 Reactive operation for Smart LV Grids

Alfred Einfalt, Siemens AG Oesterreich (Austria) • Konrad Diwold, Pro2Future (Austria) • Ralf Mosshammer, Siemens AG Oesterreich (Austria) • Andreas Lugmaier, Siemens AG Oesterreich (Austria) • Robin Freyth, Siemens AG Oesterreich (Austria)

### 2293 Microgrid Controller and Distributed Energy Resource Functionality Verification via Laboratory and Field

Arindam Maitra, EPRI (USA) • Gaurav Singh, EPRI (USA) • Jane Shi, EPRI (USA) • Annabelle Pratt, NREL (USA) • Prabakar Kumaraguru, NREL (USA) • Christian Jecu, EDF (France) • Loïc Joseph-Auguste, EDF (France)

### 663 Implementation and Optimal Operation of Campus MicroGrid-EMS System Considering Multi-MG Power Trading

ByungChul Kim, KEPCO KDN (Korea, Republic of) • HyeYoon Jeong, KEPCO KDN (Korea, Republic of) • SoonYeol Kwon, KEPCO KDN (Korea, Republic of)

- 232 **Applications of Phasor Measurement Units in distribution grids - Practical return of experience**  
 Quentin ANTOINE, ENGIE Laborelec (Belgium) • Stijn Uytterhoeven, ENGIE Laborelec (Belgium) • Lorian Pellichero, ORES (Belgium)
- 1083 **Self-healing distribution grid based on adaptive protection and IEC61850 decentralized architecture**  
 Tomislav Sinjeri, HEP DSO Elektra Koprivnica (Croatia) • Josip Tosic, Siemens d.d. (Croatia) • Vladimir Gagić, Siemens d.d. (Croatia) • Zvonimir Livaić, Siemens d.d. (Croatia) • Rodrigo Braga, Siemens AG (Germany)

## MS43 – Block 3: Optimising DER (Part 1)

|   |            |
|---|------------|
| Main session  | 05/06/2019 |
| Session 4 - Distributed energy resources and efficient utilisation of electricity | 14:30      |
| Room N104   | 16:00      |

- 69 **Grid-friendly Operation of a Hybrid Battery Storage System**  
 Lukas Held, Karlsruhe Institute of Technology (Germany) • Nicolas Gerhardt, Karlsruhe Institute of Technology (Germany) • Martin Zimmerlin, Karlsruhe Institute of Technology (Germany) • Michael R. Suriyah, Karlsruhe Institute of Technology (Germany) • Thomas Leibfried, Karlsruhe Institute of Technology (Germany) • Michael Armbruster, Stadtwerke Buhl (Germany)
- 334 **SPORE multifluid microgrid tests and results in the tropics**  
 Jean Wild, Schneider Electric Industries SAS (France) • Xiaoyong Peng, ENGIE Lab Singapore (Singapore) • Antoine Ballereau, ENGIE Lab Singapore (Singapore) • Quentin ANTOINE, ENGIE Laborelec (Belgium) • Laurie PAZIENZA, ENGIE Laborelec (Belgium) • Soni Wibisono, Schneider Electric Singapore (Singapore) • Tushar Menon, Schneider Electric Singapore (Singapore)
- 644 **Integrating Smart Storage and Aggregators for Network Congestion Management & Voltage Support in a Pilot**  
 Sharmistha Bhattacharyya, Enexis (Netherlands) • Ton van Cuijk, Enexis (Netherlands) • Rik Fonteijn, Eindhoven University of Technology (Netherlands)
- 936 **Residential Battery Controller For Solar PV Impact Mitigation: A Practical and Customer-friendly Approach**  
 Kyriacos Petrou, The University of Melbourne (Australia) • Andreas Procopiou, The University of Melbourne (Australia) • Luis F. Ochoa, The University of Melbourne (Australia) • Tom Langstaff, AusNet Services (Australia) • John Theunissen, AusNet Services (Australia)
- 1150 **Electric Vehicles as flexibility providers for distribution systems. A techno-economic review.**  
 Felipe Gonzalez-Venegas, PSA Groupe/CentraleSupélec-GeePs (France) • Marc Petit, GeePs-CentraleSupélec (France) • Yannick Perez, LGI-CentraleSupélec (France)
- 1413 **Impact and Value of Energy Storage on a High-DER Penetration Distribution Feeder in Southern California**  
 Jouni Peppanen, Electric Power Research Institute (USA) • Jorge Araiza, Jr, Southern California Edison (USA) • Ramakrishnan Ravikumar, Electric Power Research Institute (USA) • Tanguy Hubert, Electric Power Research Institute (USA) • Giovanni Damato, Electric Power Research Institute (USA) • Loic Gaillac, Southern California Edison (USA) • Matthew Kedis, Southern California Edison (USA)

## MS34 – Block 3: Protection

|   |            |
|---|------------|
| Main session                                  | 05/06/2019 |
| Session 3 - Operation, control and protection | 16:30      |
| Room N103                                     | 18:00      |

- 917 **Study on Accuracy of Distribution Fault Point Localization by Resonance Frequency Analysis**  
 Ryota Yamamoto, Tokyo Electric Power Company Power Grid, Inc. (Japan) • Kentaro Hirose, Tokyo Electric Power Company Holdings, Inc. (Japan) • Takaki Yasui, Tokyo Electric Power Company Holdings, Inc. (Japan)
- 94 **Evaluation of the new method Vdip for an earth fault location**  
 David Topolanek, Brno University of Technology (Czech Republic) • Petr Toman, Brno University of Technology (Czech Republic) • Viktor Jurak, Brno University of Technology (Czech Republic) • Michal Jurík, E.ON Distribuce (Czech Republic) • Jan Jiricka, E.ON Distribuce, a.s. (Czech Republic) • Jiří Drápela, Brno University of Technology (Czech Republic)

- 66 **First results concerning localisation of earthfaults in compensated 20-kV-networks based on travelling waves**  
Gernot DRUML, Sprecher Automation GmbH (Germany) • Oliver SKRBINJEK, Energie Steiermark (Austria) • Walter HIPPE, Energie Steiermark (Austria) • Lothar Fickert, TU-Graz (Austria) • Uwe Schmidt, University Zittau (Germany) • Peter Schegner, Technische Universität Dresden (Germany)
- 1049 **Locating Single Phase-to-Earth Faults in Compensated and Isolated Distribution Networks Applying Travelling**  
Cezary Dzienis, Siemens EM DG (Germany) • Wolfgang Leitner, NetzOOE (Austria) • Andreas Jurisch, Siemens EM DG (Germany) • Andreas Abart, Netz Oberösterreich GmbH (Austria)
- 341 **5G networks enabling new smart grid protection solutions**  
Petri Hovila, ABB Oy (Finland) • Petri Syväluoma, ABB (Finland) • Heli Kokkonen-Tarkkanen, VTT (Finland) • Seppo Horsmanheimo, VTT (Finland) • Seppo Borenius, Aalto University (Finland) • Zexian Li, Nokia Bell Labs (Finland) • Mikko Uusitalo, Nokia Bell Labs (Finland)
- 1537 **Smart Grid Protection and Automation Enabled by IEC 61850 Communications Over 5G Networks**  
Ana Cristina Aleixo, EFACEC (Portugal) • José Cabaça, Altice Labs (Portugal) • Pedro Neves, Altice Labs (Portugal) • Rui Dias Jorge, EFACEC (Portugal) • Rogério Dias Paulo, EFACEC (Portugal) • Alberto Rodrigues, EFACEC (Portugal)

## MS44 – Block 3: Optimising DER (Part 2)

|   |            |
|---|------------|
| Main session  | 05/06/2019 |
| Session 4 - Distributed energy resources and efficient utilisation of electricity | 16:30      |
| Room N104   | 18:00      |

- 1496 **Technical Solutions for Increasing DER Hosting Capacity in Distribution Grids in the Czech Republic in Terms of**  
Stanislav Hes, CEZ Distribuce, a.s. (Czech Republic) • Jan Kula, CEZ Distribuce, a.s. (Czech Republic) • Jan Svec, CEZ Distribuce, a.s. (Czech Republic)
- 1571 **Results from the project “eTaxi for Vienna” concerning the integration of EVs in the distribution grid**  
Dominik Fasthuber, TU Wien (Austria) • Johannes Asamer, AIT (Austria) • Martin Reinthaler, AIT (Austria)
- 1599 **Combined Solar Photovoltaic and Energy Storage Sizing in Constrained Distribution Networks**  
Matthew Deakin, University of Oxford (United Kingdom) • Jouni Peppanen, Electric Power Research Institute (USA) • Tanguy Hubert, Electric Power Research Institute (USA) • Ramakrishnan Ravikumar, Electric Power Research Institute (USA) • Andres Cortes, Electric Power Research Institute (EPRI) (USA)
- 1607 **Integrating DER Management Systems into Industrial Energy Management - Deployment Results**  
Graham Ault, Smarter Grid Solutions (United Kingdom) • Rachael Taljaard, Smarter Grid Solutions (United Kingdom) • Robert Swan, Smarter Grid Solutions (United Kingdom) • Robert MacDonald, Smarter Grid Solutions (United Kingdom) • Finlay McNicol, Smarter Grid Solutions (United Kingdom) • Hugo Gil, Smarter Grid Solutions (USA) • Sam Ashfield Murphy, Laing O'Rourke (United Kingdom) • Torsten Hildebrandt, SimPlan (Germany)
- 2135 **Optimal allocation of energy storage and conversion technologies in an urban distributed energy system**  
Christoph Maier, TU Wien, Institute of Energy Systems and Electrical Drives (Austria) • Sabina Nemeč-Begluk, TU Wien, Institute of Energy Systems and Electrical Drives (Austria) • Wolfgang Gawlik, TU Wien, Institute of Energy Systems and Electrical Drives (Austria)
- 2285 **DERMS Reference Control Methods for DER Group Management**  
Dean Weng, Electric Power Research Institute (USA) • Ajit Renjit, Electric Power Research Institute (USA) • Tanguy Hubert, Electric Power Research Institute (USA) • Brian Seal, Electric Power Research Institute (USA)

## RIF2 – Research and Innovation Forum Session 2

|   |            |
|---|------------|
| RIF   | 05/06/2019 |
| Session 2 - Power quality and electromagnetic compatibility | 16:30      |
| Room N101-102   | 18:00      |

- 930 **A power system model for resonance studies**  
Oscar Lennerhag, Independent Insulation Group (Sweden) • Math Bollen, Luleå University of Technology (Sweden)
- 2306 **Impact of distribution network modelling on harmonic impedance in the HV grid**  
Gu Ye, Eindhoven University of Technology (Netherlands) • Arnau Sans Ibos, Eindhoven University of Technology (Netherlands) • Vladimir Cuk, Eindhoven University of Technology (Netherlands) • Jeroen van Waes, TenneT TSO B.V. (Netherlands) • Sjef Cobben, Eindhoven University of Technology (Netherlands)
- 1795 **EVALUATING TEMPORAL VARIATIONS OF HARMONIC IMPEDANCES FOR CONTINUOUS ASSESSMENT OF LOW-**  
Aljaz Spelko, University of Ljubljana (Slovenia) • Igor Papic, University of Ljubljana (Slovenia) • Alfredo Testa, Università della Campania (Italy) • Roberto Langella, Università della Campania "Luigi Vanvitelli" (Italy) • Sasa Z. Djokic, The University of Edinburgh (United Kingdom)
- 902 **Review on Harmonic Impact Assessment Indices and Methods of Multiple Harmonic Sources**  
Shuangting Xu, College of Electrical Engineering and Information Technology, Sichuan University (China) • Xianyong Xiao, College of Electrical Engineering and Information Technology, Sichuan University (China) • Xian Zheng, College of Electrical Engineering and Information Technology, Sichuan University (China) • Ying Wang, College of Electrical Engineering and Information Technology, Sichuan University (China)
- 830 **Impact of Distributed Energy Resources on resonance conditions and harmonic amplification in distribution**  
Grazia Todeschini, Swansea University (United Kingdom) • Senthooan Balasubramaniam, Swansea University (United Kingdom)
- 1513 **An Analysis of Harmonic Disturbances in Distribution Systems Caused by Grid-Connected Inverters: Experimental**  
Naotaka Okada, CRIEPI (Japan) • Kenichiro Sano, Tokyo Institute of Technology (Japan) • Yoshichika Noda, CRIEPI (Japan) • Kentaro Fukushima, CRIEPI (Japan)

## MS21 – Block 1: Electric and magnetic fields, grounding, transients and immunity of systems

|   |            |
|---|------------|
| Main session  | 06/06/2019 |
| Session 2 - Power quality and electromagnetic compatibility | 09:00      |
| Room N103   | 10:30      |

- 1671 **Occupational EMF-Exposure: A Simple Guide for Testing Compliance with Requirements of Directive 2013/35/EU**  
Andreas Abart, Netz Oberösterreich GmbH (Austria) • Ernst Schmautzer, TU Graz (Austria) • Wolfgang Emmer, TU Graz (Austria) • Katrin Friedl, APG (Austria) • Rudolf Mörk Mörkenstein, IES (Austria)
- 550 **Measurement of Earth Fault Current and Earth Potential Rise on Live HV Systems**  
Mark Davies, RINA Consulting (United Kingdom) • Robert Weller, RINA Consulting (United Kingdom) • Paul Jones, RINA Consulting (United Kingdom) • Stephen Tucker, UK Power Networks (United Kingdom) • Hao Guo, Power Networks Demonstration Centre (United Kingdom)
- 1750 **Earthing design incorporating risk quantification – an expensive overhead or key decision-making tool?**  
William (Bill) Carman, Bill Carman Consulting (Australia) • Stephen Palmer, Safearth Consulting (Australia)
- 1096 **Active and passive shield for aerial power lines**  
aldo canova, Politecnico di Torino (Italy) • Luca Giaccone, Politecnico di Torino (Italy) • Vincenzo Cirimele, Politecnico di Torino (Italy)
- 1168 **Understanding the harmonic performance of voltage transformers for distribution system power quality**  
Vidyadhar Peesapati, The University of Manchester (United Kingdom) • Richard Gardner, The University of Manchester (United Kingdom) • James King, Nortech Management Ltd (United Kingdom) • Samuel Jupe, Nortech Management Ltd (United Kingdom) • Jonathan Berry, Western Power Distribution (United Kingdom)

## 763 Immunity Assessment of Household Appliances in the Frequency Range from 2 to 150 kHz

Victor Khokhlov, Technische Universitaet Dresden (Germany) • Jan Meyer, Technische Universitaet Dresden (Germany) • Peter Schegner, Technische Universitaet Dresden (Germany) • Daniel Agudelo-Martínez, Universidad Nacional de Colombia (Colombia) • Andrés Pavas, Universidad Nacional de Colombia (Colombia)

## MS61 – Block 1: Flexibility

Main session

06/06/2019

Session 6 - DSO business environment enabling digitalization and energy transition

09:00

Room N104

10:30

### 48 Effects of flexibility market models on grid management tasks and systems

Christina Sufke, Westnetz GmbH (Germany) • Nele Schlenker, innogy SE (Germany) • Erik Hauptmeier, Westnetz GmbH (Germany)

### 51 Pushing the transition towards transactive grids through local energy markets

Gisela Mendes, EDP NEW R&D (Portugal) • José Rui Ferreira, EDP NEW R&D (Portugal) • Susete Albuquerque, EDP Distribuição (Portugal) • Célia Trocato, EDP Distribuição (Portugal) • Olli Kilkki, Empower (Portugal) • Sami Repo, Tampere University of Technology (Finland)

### 583 Change and change management - unlocking power flexibility meeting Sweden's capacity challenge

Yvonne Ruwaida, Vattenfall Eldistribution AB (Sweden) • John Backe, E:on Energidistribution AB (Sweden) • David Bjarup, E:on Energidistribution AB (Sweden)

### 629 Power-Based Tariff as an Incentive for Distribution System Operator's Customers to Reduce their Peak Powers

Anmari Koski, Elenia Oy (Finland) • Juha Järvenpää, Elenia Oy (Finland) • Johannes Salo, Elenia Oy (Finland) • Mikko Järvinen, Elenia Oy (Finland) • Jouni Pylvänäinen, Elenia Oy (Finland) • Samuli Honkapuro, LUT University (Finland)

### 636 Battery system as a service for a distribution system operator

Ilari Alaperä, Fortum Power and Heat Oy (Finland) • Tomi Hakala, Elenia Oy (Finland) • Samuli Honkapuro, LUT University (Finland) • Jouni Pylvänäinen, Elenia Oy (Finland) • Tero Kaipia, Zero Hertz Systems Ltd (Finland) • Pekka Manner, Fortum Power and Heat Oy (Finland) • Tatu Kulla, Fortum Power and Heat Oy (Finland)

### 1533 Smartcharging electric vehicles based on a flexibility market

Daphne Geelen, Enexis Netbeheer (Netherlands) • Nazir Refa, ElaadNL (Netherlands) • Ralf Spiering, Jedlix (Netherlands)

## MS22 – Block 2: Power Quality issues of new technologies

Main session

06/06/2019

Session 2 - Power quality and electromagnetic compatibility

11:00

Room N103

12:30

### 916 Impact of Fast Charging Stations on Grid Quality

Francisc Zavoda, IREQ(HQ) (Canada) • Rosmery Rozas, Hydro Quebec (Canada) • Jean-Luc Dupré, Hydro Quebec (Canada)

### 527 Power Quality Assessment for AC/DC Hybrid Network Based on New Modelling Methods and On-Site

Shiqiao GAO, EDF(China) Holding Ltd. (China) • xingyan NIU, EDF(China) Holding Ltd. (China) • Xavier YANG, EDF Lab Paris Saclay (France) • Bo ZHAO, Zhejiang EPRI of SGCC (China)

### 370 Overvoltage due to single-phase and three-phase connected PV and what to do about it

Enock Mulenga, Luleå University of Technology (Sweden) • Math Bollen, Luleå University of Technology (Sweden) • Nicholas Etherden, Vattenfall R&D (Sweden)

### 963 PowerQuality improvement in a rural grid by grid storage system

Johannes Ferstl, KNG-Kärnten Netz GmbH (Austria) • Herwig Renner, Graz University of Technology (Austria) • Stephan Brandl, KNG-Kärnten Netz GmbH (Austria)

1895 **Modelling of harmonics produced by Compact Fluorescent Lamps in the frequency range 2-150 kHz**  
Caroline Leroi, Université Catholique de Louvain (UCL) (Belgium) • Emmanuel De Jaeger, Université catholique de Louvain (UCLouvain) (Belgium)

237 **Characterization of Interactions between PV systems and energy efficient lighting (LED)**  
Vineetha Ravindran, Luleå University of Technology (Sweden) • Tatiano Busatto, Luleå University of Technology (Sweden) • Sarah Rönnerberg, Luleå University of Technology (Sweden) • Math Bollen, Luleå University of Technology (Sweden) • Jan Meyer, Technische Universitaet Dresden (Germany)

## MS62 – Block 2: Legacy DSO

Main session 06/06/2019

Session 6 - DSO business environment enabling digitalization and energy transition 11:00

Room N104 12:30

405 **“Integrated Asset Management” for transmission and distribution networks at Vattenfall**  
Markus Taaveniku, Vattenfall Distribution Sweden (Sweden) • Marcus Halvarsson, Vattenfall Distribution Sweden (Sweden) • Alexandra Donners Muhammed, Vattenfall Distribution Sweden (Sweden) • Matthias Hopfensitz, entellgenio GmbH (Germany) • Heiko Spitzer, entellgenio GmbH (Germany)

889 **CNAIM Asset Risk Modelling – Implementation and Opportunities**  
Stefan Sadnicki, Copperleaf (Spain) • Sheng Liu, Strategic Asset Management Consulting (United Kingdom)

1154 **Digital Foundation; providing the necessary vision and tools to enable a connected energy landscape**  
Elwin Koster, Fugro N.V. (Netherlands) • Jan Kema, Fugro N.V. (Netherlands) • Chris Boreland, Fugro N.V. (Netherlands)

1777 **National reporting of faults and interruptions using CIM and MADES/ECP**  
Jørn Heggset, Statnett (Norway) • Ketil Johannessen, Statnett (Norway) • Arnt Ove Eggen, SINTEF (Norway) • Ketil Sagen, Energi Norge AS (Norway)

2149 **Development, applications and benefits of the network digital twin**  
marina lombardi, enel global infrastructure and networks (Italy) • Antonio Cammarota, E-distribuzione Spa (Italy) • Juan Refoyo Mayoral, Enel (Spain)

2312 **Implementation of ISO 55.000 at MITNETZ and lean management processes**  
Adolf Dr. Schweer, Mitteldeutsche Netzgesellschaft Strom mbH (MITNETZ STROM) (Germany) • Hanjo During, Mitteldeutsche Netzgesellschaft Strom mbH (MITNETZ STROM) (Germany) • Ulf Aleit, Mitteldeutsche Netzgesellschaft Strom mbH (MITNETZ STROM) (Germany) • Mareen Schmidt, Mitteldeutsche Netzgesellschaft Strom mbH (MITNETZ STROM) (Germany) • Tom Lux, Mitteldeutsche Netzgesellschaft Strom mbH (MITNETZ STROM) (Germany) • Maurice Kakuschke, Mitteldeutsche Netzgesellschaft Strom mbH (MITNETZ STROM) (Germany)

## MS23 – Block 3: Power Quality simulations, system studies, measurement and mitigation

Main session 06/06/2019

Session 2 - Power quality and electromagnetic compatibility 14:30

Room N103 16:00

416 **Modelling the propagation of harmonic voltages in large medium voltage distribution networks**  
Adnan Bosovic, Public Electric Utility Elektroprivreda of Bosnia and Herzegovina (Bosnia and Herzegovina) • Herwig Renner, Graz University of Technology (Austria) • Andreas Abart, Netz Oberösterreich GmbH (Austria) • Ewald Traxler, Netz Oberösterreich GmbH (Austria) • Jan Meyer, Technische Universitaet Dresden (Germany) • Max Domagk, Technische Universität Dresden (Germany) • Mustafa Music, Public Electric Utility Elektroprivreda of Bosnia and Herzegovina (Bosnia and Herzegovina)

1431 **Characteristics of Fifth and Seventh Harmonics in Japanese Electric Power Distribution System**  
Naotaka Okada, CRIEPI (Japan) • Kenji Yukihiro, CRIEPI (Japan)

- 984 **Measurements and Simulation of Supraharmonic Resonances in Public Low Voltage Networks**  
Matthias Klatt, Technische Universität Dresden (Germany) • Franziska Kaiser, Technische Universität Dresden (Germany) • Jan Meyer, Technische Universität Dresden (Germany) • Christian Lakenbrink, Netze BW GmbH (Germany) • Christoph Gaßner, Bayernwerk Netz GmbH (Germany)
- 1641 **Characterization and Laboratory Performance Testing of Interconnected Star Phase Balancer**  
Antti Supponen, Tampere University (Finland) • Antti Rautiainen, Tampere University (Finland) • Sami Repo, Tampere University of Technology (Finland) • Sami Laitinen, Ensto Finland Inc. (Finland) • Tommi Kasteenpohja, Ensto Finland Inc. (Finland)
- 985 **A Machine Learning Based Tool for Voltage Dip Classification**  
Houriyeh Shadmehr, Ricerca sul Sistema Energetico RSE (Italy) • Riccardo Chiumeo, RSE spa (Italy) • Liliana Tenti, Ricerca sul Sistema Energetico RSE (Italy)
- 1535 **Incipient Fault Prediction in Power Quality Monitoring**  
Volker Hoffmann, SINTEF AS (Norway) • Kasia Michałowska, SINTEF AS (Norway) • Christian Andresen, SINTEF Energy Research AS (Norway) • Bendik Nybakk Torsæter, SINTEF Energy Research AS (Norway)

## MS63 – Block 3: Future DSO

|  |            |
|--|------------|
| Main session   | 06/06/2019 |
| Session 6 - DSO business environment enabling digitalization and energy transition | 14:30      |
| Room N104  | 16:00      |

- 948 **Incentive scheme for efficient grid utilization in the Swedish revenue cap regulation from 2020**  
Carl Johan Wallnerström, The Swedish Energy Markets Inspectorate (Sweden) • Gustav Wigenborg, The Swedish Energy Markets Inspectorate (Sweden) • Yalin Huang, The Swedish Energy Markets Inspectorate (Sweden) • Lars Ström, The Swedish Energy Markets Inspectorate (Sweden) • Tommy Johansson, The Swedish Energy Markets Inspectorate (Sweden)
- 1152 **The perfect storm for monopoly grids: the dual disruptive impact of distributed generation and local competition**  
Age van der Mei, Duinn (Netherlands) • Lennart Lalieu, Enexis Netbeheer (Netherlands) • Jan-Peter Doomernik, Enexis Netbeheer (Netherlands)
- 1840 **Going beyond the AI hype with a bottom-up holistic approach focused on improving business processes and**  
Karl Axel Sträng, Enedis (France) • Claude Bouquet, Enedis (France) • Maxime Dupont, Enedis (France) • Stéphane Gosswiller, Enedis (France) • Richard Bavarin, Enedis (France) • Stéphanie Delaunay, Enedis (France)
- 2026 **Business Models for Electricity Distribution in Europe: Evidence from the JRC DSO Observatory 2018**  
Nikoleta Andreadou, Joint Research Centre, European Commission (Italy) • Marco Flammini, Joint Research Centre, European Commission (Italy) • Silvia Vitiello, Joint Research Centre, European Commission (Italy)
- 2028 **SP Energy Networks: Our Vision of Future DSOs**  
Sofia Cobo de Guzman, SP Energy Networks (United Kingdom) • Wendy Mantle, SP Energy Networks (United Kingdom) • Julian Wayne, Culan Strategy Ltd (United Kingdom) • Gerrard Boyd, SP Energy Networks (United Kingdom) • Malcolm Bebbington, SP Energy Networks (United Kingdom) • Russell Bryans, SP Energy Networks (United Kingdom)
- 2192 **Regulatory incentives for improving the resilience of electricity distribution grids in Italy**  
Luca Lo Schiavo, ARERA (Italian Regulatory Authority) (Italy) • Ferruccio Villa, ARERA (Italian Regulatory Authority) (Italy) • Carlo Turconi, ARERA (Italian Regulatory Authority) (Italy)

## MS24 – Block 4: Quality of supply, monitoring and Big Data analysis, standards and regulatory issues

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|---|------------|
| Main session  | 06/06/2019 |
| Session 2 - Power quality and electromagnetic compatibility | 16:30      |
| Room N103   | 18:00      |

- 538 **Empirical measurements of Power Quality in Danish LV systems**  
Henrik Hansen, Danish Energy (Denmark)
- 1398 **Survey of network impedance in the frequency range 2-9 kHz in public low voltage networks in AT/CH/CZ/GE**  
Robert Stiegler, Technische Universität Dresden (Germany) • Jan Meyer, Technische Universität Dresden (Germany) • Michael Höckel, Bern University of Applied Sciences (Switzerland) • Stefan Schori, Bern University of Applied Sciences (Switzerland) • Karl Scheida, Österreichs E-Wirtschaft (Austria) • Tomáš Hanžlík, EGC – EnerGoConsult CB s.r.o. (Czech Republic) • Jiří Drápela, Brno University of Technology (Czech Republic)
- 744 **Advanced Utilization of Big Data for Real-time Monitoring and DataAnalytics in Sandom Smart Grid**  
Petri Hovila, ABB Oy (Finland) • Aurelien Monot, ABB Corporate Research (Switzerland) • Hannu Laaksonen, University of Vaasa (Finland) • Matti Rita-Kasari, Jubic Oy (Finland)
- 1407 **Suitability of test procedures in IEC 61000-3-2 for assessing harmonic emission of modern mass-market**  
Jan Meyer, Technische Universität Dresden (Germany) • Ana-Maria Blanco, Technische Universität Dresden (Germany) • Roberto Langella, Università della Campania “Luigi Vanvitelli” (Italy) • Sasa Z. Djokic, The University of Edinburgh (United Kingdom)
- 58 **Calculation of Process Immunity Time with Gantt Chart**  
Qing Zhong, South China University of Technology (China) • Qizhang He, South China University of Technology (China) • Wei Huang, Asian Power Quality Initiative (China) • Zhong Xu, Guangzhou Power Supply Bureau Co. Ltd (China) • Chen Wenbo, Nanjing Golden Cooperate DC Power Distribution Technology. Co.,Ltd. (China)
- 1911 **THE NEED TO REDEFINE EMC STANDARDIZATION: POWER SPECTRAL DENSITY LIMITS OF NON-INTENTIONAL**  
Noelia Uribe-Perez, Tecnalía (Spain) • Ibon Arechalde, Tecnalía (Spain) • Alberto Sendín Escalona, Iberdrola España (Spain) • Ainara Fernandez, Iberdrola (Spain) • Juan Sebastián Gómez Guajardo, Iberdrola España (Spain)

## MS64 – Block 4: Information Management

|  |            |
|--|------------|
| Main session   | 06/06/2019 |
| Session 6 - DSO business environment enabling digitalization and energy transition | 16:30      |
| Room N104  | 18:00      |

- 141 **Managing OT cyber security risks using BowTies and Risk & Opportunity Based Asset Management at Dutch DSO**  
Maarten Hoeve, European Network for Cyber-Security (Netherlands) • Carlos Montes Portela, Enxsis Netbeheer B.V. (Netherlands) • Gido Brouns, Enxsis Netbeheer B.V. (Netherlands)
- 655 **A HOLISTIC REVIEW OF CYBER RISK FOR THE DISTRIBUTION OF POWER**  
Steve Little, AFIMA (United Kingdom) • Anuj Nayyar, IET (United Kingdom) • David Neilson, SP Energy Networks (United Kingdom)
- 813 **Private LTE Field tests and Results for Smart Grid services**  
Marta Solaz Hernández, Iberdrola Distribución (Spain) • Juan Sebastián Gómez Guajardo, Iberdrola España (Spain) • Alberto Sendín Escalona, Iberdrola España (Spain) • Javier Noguero Oliván, Ericsson (Spain)
- 1340 **Data Platform as an Enabler for Piloting in Smart Otaniemi Ecosystem**  
Anna Kulmala, VTT Technical Research Centre of Finland (Finland) • Teemu Vesänen, VTT (Finland) • Kari Mäki, VTT Research Center of Finland (Finland) • Seppo Horsmanheimo, VTT (Finland) • Kimmo Hätönen, Nokia Bell Labs (Finland) • Pekka Kupila, Nokia Bell Labs (Finland) • Jarno Halme, Nokia (Finland)
- 1451 **Aspects of implementing GIS as a centralized system in enterprise IT/OT environment**  
Aleš Leban, Elektro Primorska d.d. (Slovenia) • Primož Košir, GDI d.o.o. Ljubljana (Slovenia)
- 1655 **CheckIn – Work Force Management Platform**  
José Sousa, EDP Distribuição (Portugal) • Diogo Lopes, EDP Distribuição (Portugal) • David Fonseca, EDP Distribuição (Portugal) • Carlos Oliveira, EDP Distribuição (Portugal) • Patrick Mendes, EDP Distribuição (Portugal) • Vera Pereira, Do It Lean (Portugal) • Tiago Gafeira, Do It Lean (Portugal)



## RIF1 – Research and Innovation Forum Session 1

RIF

06/06/2019

Session 1 - Network components

16:30

Room N101-102

18:00

### 36 Modelling and Testing of Saturated Core Fault Current Limiter

David Klaus, ASG Power Systems (United Kingdom) • Antonio Morandi, University of Bologna (Italy) • Antonio Pellicchia, ASG Superconductors (Italy) • Gianni Grasso, Columbus Superconductors (Jamaica)

### 874 Decomposition and Electrical strength of C5-PFK/Air and C4-PFN/Air mixtures as possible SF6 substitute gases

Guopei Wu, Guangzhou Power Supply Bureau Co., Ltd (China) • Wenxiong Mo, Guangzhou Power Supply Bureau (China) • Libo Lin, Guangzhou Power Supply Bureau Co., Ltd (China) • Qingdan Huang, Guangzhou Power Supply Bureau Co., Ltd (China) • Haoyong Song, Guangzhou Power Supply Bureau Co., Ltd (China) • Weiyan Liao, Guangzhou Power Supply Bureau Co., Ltd (China) • Chentao Li, Guangzhou Power Supply Bureau Co., Ltd (China)

### 1146 Characterization of the frequency-dependent transmission losses of the grid up to 500 kHz

Igor Fernández, University of the Basque Country (UPV/EHU) (Spain) • Itziar Angulo, University of the Basque Country (UPV/EHU) (Spain) • Amaia Arrinda, University of the Basque Country (UPV/EHU) (Spain) • David de la Vega, University of the Basque Country (UPV/EHU) (Spain) • Ibon Arechalde, Tecnalia (Spain) • Noelia Uribe-Perez, Tecnalia (Spain) • Txetxu Arzuaga, ZIV Automation (Spain)

### 1837 Benchmarking Linear and Non-Linear Behaviour of Power Inductors for Switched Mode Power Supplies

Markus Makoschitz, AIT Austrian Institute of Technology GmbH (Austria) • Jon Berrotaran, AIT Austrian Institute of Technology GmbH (Austria) • Sumanta Biswas, AIT Austrian Institute of Technology GmbH (Austria)

### 1845 Comparative Study on Turbulent Flow Structure under Air, CO2 and SF6 Gas Blasting Visualized by Band-Pass

Yuki Inada, Saitama University (Japan) • Hiroyuki Nagai, The University of Tokyo (Japan) • Akiko Kumada, The University of Tokyo (Japan) • Kunihiro Hidaka, The University of Tokyo (Japan) • Yuki Demura, Kanazawa University (Japan) • Yu Tabata, Kanazawa University (Japan) • Yasunori Tanaka, Kanazawa University (Japan) • Tomoyuki Nakano, Central Research Institute of Electric Power Industry (Japan)

### 1909 Decomposition of SF6-free gas mixtures by energy impacts

Achim KALTER, SIEMENS AG (Germany) • Karsten ESSER-RANK, SIEMENS AG (Germany) • Florian KESSLER, SIEMENS AG (Germany) • Henning MILNIKEL, SIEMENS AG (Germany) • Daniel PESCH, SIEMENS AG (Germany) • Roland POHLE, SIEMENS AG (Germany)

### 2050 Fault current limiting circuit breaker in distribution systems

Magnus Backman, ABB Corporate Research (Sweden) • Thomas Eriksson, ABB Corporate Research (Sweden) • Tobias Hintzen, ABB AG (Germany) • John Moutafidis, UK Power Networks (United Kingdom)

### 2059 Research on the improved fault current limiter based on high coupled split reactor

Kaijian WU, State Key Laboratory of Advanced Electromagnetic Engineering and Technology (China) • Zhao YUAN, State Key Laboratory of Advanced Electromagnetic Engineering and Technology (China) • Lixue CHEN, State Key Laboratory of Advanced Electromagnetic Engineering and Technology (China) • Junjia HE, State Key Laboratory of Advanced Electromagnetic Engineering and Technology (China) • Yuan PAN, State Key Laboratory of Advanced Electromagnetic Engineering and Technology (China) • Jingjing YE, State Key Laboratory of Advanced Electromagnetic Engineering and Technology (China)

## RIF5 – Research and Innovation Forum Session 5

RIF

06/06/2019

Session 5 - Planning of power distribution systems

16:30

Room N105-106

18:00

### 212 Advanced Modelling of Inverter-Based Generators for Short-Circuit Current Calculations Based on IEC 60909-

Benjamin Niersbach, Technische Universität Darmstadt (Germany) • Imen Ghourabi, Netze BW GmbH (Germany) • Benjamin Braun, Technische Universität Darmstadt (TU DA) (Germany) • Jutta Hanson, Technische Universität Darmstadt (Germany)

- 316 **Flexible Distribution Network: Definition, Configuration, Operation and Pilot Project**  
Jun Xiao, Tianjin University (China) • Ying Wang, Tianjin University (China) • Fayun Gang, Wuhan Metro Group Co., Ltd (China) • Renle HUANG, Beijing Electric Power Corporation (China) • Lingxiao WEI, Beijing Electric Power Corporation (China)
- 877 **Uncertainty sensitivity assessment on the optimization of the design and operation of complex energy systems:**  
Amélia Nadal, Univ. Grenoble Alpes, CEA, LITEN, DTBH (France) • Alain Ruby, Univ. Grenoble Alpes, CEA, LITEN, DTBH (France) • Cyril Bourasseau, Univ. Grenoble Alpes, CEA, LITEN, DTBH (France) • Delphine Riu, Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab (France) • Christophe Berenguer, Univ. Grenoble Alpes, CNRS, Grenoble INP\*, GIPSA-lab (France)
- 1752 **Analyzing the fractal behaviour of the distribution power grid in the city of Grenoble- France**  
Yousra sidqi, Univ. Grenoble Alpes, CNRS, Grenoble INP\*, G2Elab (France) • Nicolas Retière, Univ. Grenoble Alpes, CNRS, Grenoble INP\*, G2Elab (France) • Pierre Frankhauser, Université de Franche-Comté (France) • Gilles Vuidel, Université de Franche-Comté (France)
- 2018 **Novel Analysis Techniques for LV Network Planning using Smart Meter Data**  
Diptargha Chakravorty, TNEI Services (United Kingdom) • Charlotte Higgins, TNEI Services (United Kingdom) • Gruffudd Edwards, TNEI Services (United Kingdom) • Gordon McFadzean, TNEI Services Ltd (United Kingdom) • Francis Shillitoe, WSP (United Kingdom) • Alan Creighton, Northern Powergrid (United Kingdom)
- 2267 **The Next Generation of Distribution Analysis Tools**  
Davis Montenegro, EPRI (USA) • Mobolaji Bello, EPRI (USA) • Roger Dugan, EPRI (USA) • Jason Taylor, EPRI (USA) • Jeff Smith, EPRI (USA)