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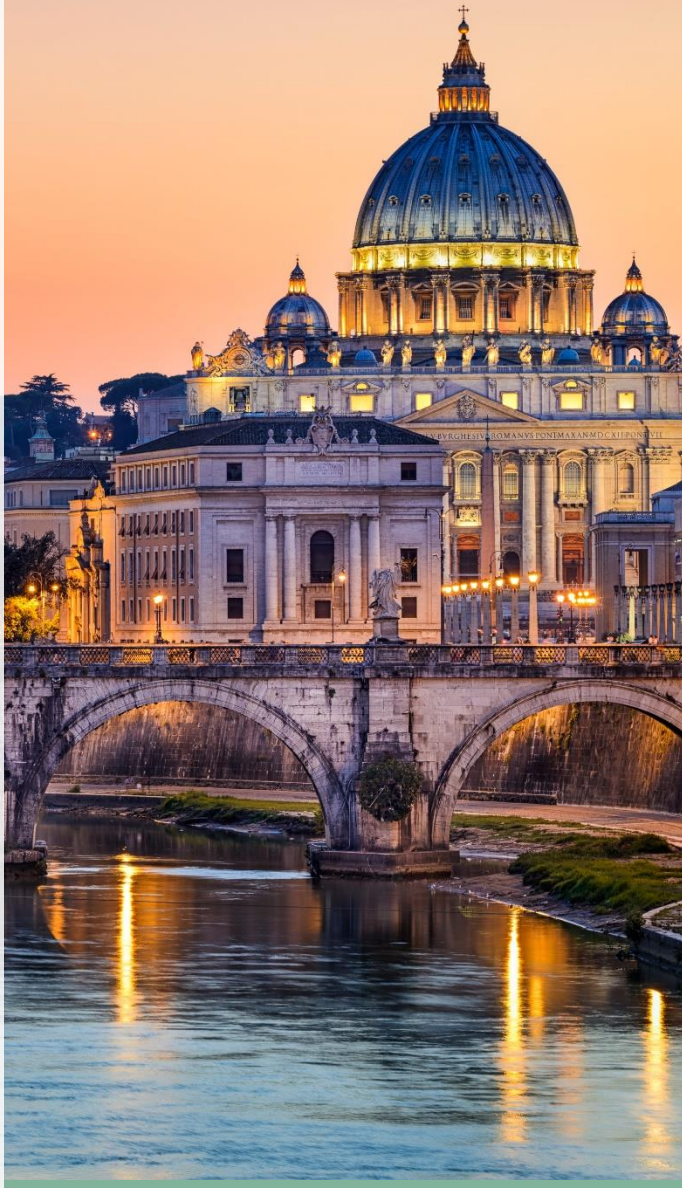

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12-15 JUNE 2023

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1: G&W Electric, United States of America; 2: ABB, Germany; 3: Kema Labs, Netherlands; 4: Super Grid Institute, France

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Dadam, Alessandro P (1); de Almeida, Geraldo R (2); Pinheiro, Walter (2); N Araujo, Simone C (2)
1: Celesc Distribuição S.A., Brazil; 2: Tag Inovacao Tecnologica

1483 *Life-Expectance Evaluation for SF6-free Switchgear using C4-FN Mixtures*

Laso Rubio, Andres; Mainwaring, Ian; Yeaton, Traci; Darko, Kennedy; Uzelac, Nenad
G&W electric, United States of America

1486 *Improved Condition Monitoring Using Internally Mounted PD Sensors Within Network Components And Switchgear Enclosures*

Morris, Jack; Smith, Colin; Mynampati, Sai J; Eastham, Carl
IPEC Ltd., United Kingdom

1504 *Battery Energy Storage System with Batteries of Second Life*

Omae, Camila (1); Arioli, Vitor (2); Padela, Fernando (2); Riboldi, Victor (1); Freitas, Nathalia (1); Ohashi, Ricieri (2)
1: CPFL ENERGIA, Brazil; 2: CPQD, Brazil

1510 *Industry State-of-Art and Opportunities for the Use of Drones in Power Grid Inspections*

Landas, Nathan; Rodrigues, Yuri
Seattle Pacific University, United States of America

1517 *Vibration-Based Extraction of Switching Times for Circuit Breaker Monitoring Using Machine Learning*

Boyaci, Aydin; Amihai, Ido; Penner, Simon; Migunov, Vadim; Loss, Theresa; Zajadatz, Maurizio; Suriyah, Michael; Leibfried, Thomas; Seidel, Nico
ABB AG Corporate Research Center Germany, Germany

1521 *Application of Diagnostic Criteria on Service Aged MV XLPE Cables Removed from Service*

Hvidsten, Sverre (1); Liland, Knut Brede (1); O'Shaughnessy, James (2); Looby, Tom (2)
1: SINTEF, Norway; 2: ESB, Ireland

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1313 *Enhancement of Reliability Indices For A Medium Voltage Distribution Network By Upgrading To Automated System*

Mahmoud, Enas; Asim, Islam
North Cairo Electricity company, Egypt

1315 *Fault Analysis in Unbalanced Microgrids in Four-Wire Distribution Network*

Santos Dohler, Jessica (1); G. Oliveira, Janaina (1,2); Boström, Cecilia (1)
1: Uppsala University, Sweden; 2: University of Federal de Juiz de Fora, Brazil

1321 *Harmonic Pollution Caused by Charging Electric Vehicles in a Mobility House – an Experimental Study in Uppsala, Sweden*

Wallberg, Alexander (1); Flygare, Carl (1); Hjalmarsson, Johannes (1); Fjellstedt, Christoffer (1); Aalhuizen, Christoffer (1); Castellucci, Valeria (1); Waters, Rafael (1,2)
1: Division of Electricity, Department of Electrical Engineering, Uppsala University, Sweden; 2: Foundation STUNS Energi

1324 *Impacts of the Energy Transition on Voltage Dips in the Medium Voltage Networks*

Torkzadeh, Roozbeh (1); Waes, Jeroen van (2); Ćuk, Vladimir (1); Cobben, Sjef (1)
1: Eindhoven University of Technology, The Netherlands; 2: TenneT TSO BV, The Netherlands

1328 *Multimode Synchronous Resonance Detection in Converters Dominated Power System using Synchro-waveforms*

Zaman, Taimur (1); Feng, Zhiwang (1); Syed, Mazheruddin (1); Burt, Graeme (1); Soraytec, Benedikt Pilscheur (3); Flynn, David (2)
1: University of Strathclyde, United Kingdom; 2: University of Glasgow; 3: Soraytec

1333 *Planning And Operation Of An Intelligent Voltage Regulator For PQ Improvement In PV-Rich Power Distribution Systems*

Di Gregorio, Rocco (1); Trevisan, Riccardo (2); Ghiani, Emilio (2)
1: Volta S.p.a.; 2: Università degli Studi di Cagliari, Italy

1334 *New Approaches for Quantifying Impact of Power Quality Disturbances*

Sabin, Daniel (1); Bickel, Jon (2)
1: Schneider Electric, United States of America; 2: Schneider Electric, United States of America

1347 *Radiated Emissions from an Electric Railway: Review of Methods and Measurements mainly from 9 kHz to 150 kHz*

Westerlund, Per (1); Sadeghi, Babak (1); Salles, Rafael S. (1); Wilén, Jonna (2)
1: Luleå University of Technology, Sweden; 2: Umeå University, Sweden

1349 *Laboratory Study On Rapid Voltage Changes Induced By Small Scale Photovoltaic Generation*

Supponen, Antti (1); Haapaniemi, Jouni (2); Räisänen, Otto (2); Haakana, Juha (2); Vilppo, Julius (2); Lassila, Jukka (2); Repo, Sami (1)
1: Tampere University, Finland; 2: Lappeenranta-Lahti University of Technology LUT

1353 *Three-phase Two-wire Distribution System: Analysis of the Voltage Unbalance Phenomenon*

de Freitas Silveira, Leonardo (1); de Lima Oliveira, Aécio (1); Cardoso Junior, Ghendy (1); Marchesan, Gustavo (1); Kraulich, Leyla (1); da Silva dos Santos, Leonardo Felipe (1); Spagnolo Martins, Miguel (1); Matias Rêgo, Rogimar (2)
1: Universidade Federal de Santa Maria, Brazil; 2: Grupo Equatorial Energia / CEEE-D

1360 *Performance Evaluation of Instrument Transformers in Power Quality Measurements: Activities and Results from 19NRM05 IT4PQ Project*

Crotti, Gabriella (1); Meyer, Jan (2); Letizia, Palma Sara (1); Agazar, Mohamed (3); Istrate, Daniela (3); Chen, Yeying (4); Mohns, Enrico (4); van den Brom, Helko (5); Muñoz, Fabio (5); Cayci, Huseyin (6); Mazza, Paolo (7); Stiegler, Robert (2); Luiso, Mario (8); Tinarelli, Roberto (9); Mingotti, Alessandro (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

1362 *Impact Analysis Of Severe Weather Events In The Rest Of The Year KPI*

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E-REDES, Portugal

1388 *Evaluation and Mitigation of a Harmonic Resonance at 13.8-kV Feeder*

Soares, Thiago; Tostes, Emilia; Bezerra, Ubiratan

Universidade Federal do Pará, Brazil

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Schulze, Roberto; Gopp, David; Sperling, Erik

OMICRON electronics GmbH

1450 *Investigation of Supraharmonic Emission from a Microgrid*

Tefferi, Mattewos (1); Nakamura, Nick (2); Singh, Gaurav (3); Barnes, Brad (4); Uzelac, Nenad (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

1464 *Analysis of Transmission Line Modelling in the MATLAB/Simscape Software Package*

Aboutaleb, Abdellatif (1,2); Roumeliotis, Georgios G. (1); Desmet, Jan (1); Knockaert, Jos (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

1512 *A Novel Method for Automatic Categorizing Power Distribution Disturbance Using DTCW and SVM Classification Combination*

Khoshbaten, Mahdi; Keikhaei, Shahram

Khorasan Razavi Electrical Distribution Company, Iran

1515 *Power Quaility Monitoring-based Distribution Network Characteristic Analysis Using Artificial Intelligence*

Son, Sung-Yong

Gachon University, South Korea

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Baeza, Tomas; Andersson, Peter; Appelgren, Filiph; Joona, Jari

Hitachi Energy

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Rosseel, Arnaud; Bakshideh Zad, Bashir; De Grève, Zacharie; Vallée, François
University of Mons, Belgium

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Lee, Jin-Oh; Jeon, Jin-Hong
Korea Electrotechnology Research Institute, South Korea

273 *Electrical Energy Flexibilities' Prediction and Validation of a Real Non-Residential Building Through Methods of Machine Learning*

Forchheim, Maximilian Hendrik; Kırant-Mitić, Tuğçin; Cano-Tirado, David; Zdrallek, Markus
University of Wuppertal, Germany

274 *Smart Metering And Grid Data Services : French Experience And International Perspectives*

Tan, Victoria (2); Karsenti, Laurent (3); Brun, Sébastien (1)
1: Enedis, France; 2: Enedis, France; 3: Enedis, France

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Saracco, Patrick
Cyberhawk, United Kingdom

290 *Benefits for the Distribution Network from the Installation of Synchronized Edge Devices*

Mingotti, Alessandro (1); Peretto, Lorenzo (1); Cirocco, Alessandro (2); Forciniti, Samuele (2); Pegoiani, Andrea (2); Ruffini, Andrea (2)
1: University of Bologna, Italy; 2: Unareti S.p.A

298 *Deterministic Optimal Reconfiguration of Electric Distribution Systems*

Caceres, Nestor (1); da Silva Viana, Sidney (2); Chaparro, Enrique (3)
1: Itaipu Technological Park – PTI; 2: Itaipu Technological Park – PTI; 3: Itaipu Binacional, Paraguay

307 *On Dynamic Behaviour of Active Distribution Grids during Flexibility Coordination*

Klein-Helmkamp, Florian; Linnartz, Philipp; Elbil, Kardeniz; Ulbig, Andreas
IAEW at RWTH Aachen University, Germany

320 *Holistic Emergency Preparation of a DSO*

Wernegger, Hans-Jürgen; Schmaranz, Robert; Ruhhütl, Martin
KNG-Kärnten Netz GmbH, Austria

330 *V2X Integration in Self-Consumption Energy Management System*

Mateus, Joao (1); Matias, Samuel (1); Furtado, António (2); Silva, Tarcísio (2); Morais, Hugo (3); Dias, Luiz (1); Mendes, Gisela (1)
1: EDP NEW R&D, Portugal; 2: EDA, Portugal; 3: INESC-ID/IST, Portugal

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D'Orazio, Luigi (1); Zanellini, Fabio (2); De Berardinis, Ettore (3); Corsi, Niccolò (4)
1: ENEL, Italy; 2: Falck Renewables, Italy; 3: CESI, Italy; 4: e-distribuzione, Italy

338 *Using Local Renewable Energy To Energize a Portion of a LV Grid in Islanded Mode*

Marchand, Jane (1); Buire, Jérôme (1); Debusschere, Vincent (1); El-Jarrai, Nabil (2); Pompee, Jean (2); Alvarez-Herault, Marie-Cécile (1); Hadjsaid, Nouredine (1,3)
1: Univ. Grenoble Alpes, CNRS, Grenoble INP*, G2Elab, F-38000 Grenoble, France; 2: Enedis, France; 3: Nanyang Technological University, Singapore 639798, Singapore

343 *An Innovative Toolbox for the Optimal Design and Operation of Integrated Local Energy Communities*

Di Somma, Marialaura (1); Papadimitriou, Christina (2); Morch, Andrei (3); Sæle, Hanne (3); Richardson, Peter (4); Coccia, Alessio (4)
1: ENEA, Italy; 2: Eindhoven University of Technology; 3: SINTEF Energy Research; 4: EPRI Europe

349 *Load And Generation Forecast On Substation Level*

Ruhhütl, Martin; Schmaranz, Robert; Dietrichsteiner, Thomas
KNG-Kärnten Netz GmbH, Austria

353 *Determination of the Topology of Low-Voltage Distribution Grids using Cluster Methods*

Tischbein, Franziska Maria; Kean, Kilian; Vertgewall, Chris Martin; Ulbig, Andreas
IAEW at RWTH Aachen University, Germany

358 *Integration Of Battery Aging Model In Ancillary Services And Self-consumption Combined Strategies*

Ferrando, Laurine (1,2); Caire, Raphael (1); Frey, David (1); Guenee, Jean-Marc (2)
1: Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, Grenoble, France; 2: Wattmen, Saint-Priest-En-Jarez, France

366 *Phase Identification of Single-phase Users in a Distribution Network*

Davidov, Sreten; Curk, Jurij
Elektro Ljubljana d.d., Slovenia

372 *Digital Twins Handling : The Real Deployment Stakes!*

Guise, Laurent (1); Nativel, Gilles (2); Denis, Guillaume (3); Diop, Djibril (6); Lambert, Eric (5); Tailhades, Philippe (4); Jeanson, Benoît (3); Coste, Thierry (5)
1: EnergySemantic.com, France; 2: ENEDIS, France; 3: RTE, France; 4: GIMELEC, France; 5: EDF, France; 6: Schneider-Electric, France

375 *The Next Generation of ADMS Functions for Predictive Management of DER*

Viegas, Paulo (1); Simões, José (1); Silva, Pedro (1); Cabral, Dora (1); Gomes, Miguel (1); Gonçalves, Luis (2); Costa, Carlos (2); Bessa, Ricardo (3); Pereira, Jorge (3,4); Benedicto, Pedro (3); Simões, Micael (3); Andrade, Ricardo (3); Viana, João (3); Araújo, Maria (5); Azevedo, Manuel (5); Krivoglazova, Aleksandra (5)
1: EFACEC, Portugal; 2: ARMIS, Portugal; 3: INESC TEC, Portugal; 4: Faculty of Economics - University of Porto, Portugal; 5: PH Energia, Portugal

377 *E-REDES's New Method To Identify Non-optimal LV (Low Voltage) Grid Reconfiguration After Outages and Planned Maintenance Actions*

Lopes Mourão, Rita; Fonseca, David; Louro, Miguel; Sousa, José
E-REDES, Portugal

387 *Evaluation of Quota-based Predictive Congestion Management in Active Distribution Networks*

Müller, Sharon (1); Rudion, Krzysztof (1); Frankenbach, Marc-Aurel (2); Exner, Carmen (2)
1: University of Stuttgart, Stuttgart, Germany; 2: Netze BW GmbH, Stuttgart, Germany

389 *Evaluation of Transit Power Flows in High Voltage Distribution Grids using Fuzzy Logic*

Burkhardt, Paul; Rudion, Krzysztof
University of Stuttgart, Germany

390 *The Use Of Digital Data For A New Innovative Quality Level Of Asset Management For Transformer*

Viereck, Karsten; Saveliev, Anatoli
Maschinenfabrik Reinhausen GmbH, Germany

394 *Optimizing DER Reactive Power Setpoint For DSO Operational Planning For MV Grid*

Addala, Amel (1); Bouzigon, Benoit (2); Laugère, Andréa (1); Zorgati, Riadh (1)
1: EDF Lab Paris Saclay; 2: Enedis

405 *Real-time Circulating Currents Calculation In The Distribution Management System*

Van de Vyver, Jan; Lahousse, Cedric; Vandoorn, Tine
Fluvius System Operator CV, Belgium

415 *Analysis and Modelling Insights from Reactive Power Measurements of Low Voltage Users*

Vanin, Marta (1,2); Ergun, Hakan (1,2); D'hulst, Reinhilde (2,3); Vanthournout, Koen (2,3); Van Hertem, Dirk (1,2)
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420 *Joint Energy, Reserve, and Flexibility Scheduling of DERs in Distribution Network*

Pourghaderi, Niloofar (1); Fotuhi-Firuzabad, Mahmoud (1); Moeini-Aghtaie, Moein (1); Kabirifar, Milad (1); Lehtonen, Matti (2)
1: Sharif University of Technology, Iran; 2: Aalto University, Finland

427 *A Virtual Energy Storage System for Renewable Generation Integration in Distribution Networks*

Sami, Saif (1); Zhou, Yue (1); Qadrdan, Meysam (1); Prokofyev, Evgeny (2); Pampliega, David (2); Wu, Jianzhong (1)
1: Cardiff university, United Kingdom; 2: Schneider Electric, Spain

448 *Thermal Monitoring of Medium Voltage Switchgears: Testing in Operation Environment*

Migunov, Vadim (1); Gitzel, Ralf (1); Kaul, Holger (1); Zajadatz, Maurizio (2); Suriyah, Michael (2); Leibfried, Thomas (2); Boyaci, Aydin (1); Seidel, Nico (3)
1: ABB, Germany; 2: Karlsruher Institut für Technologie (KIT), Germany; 3: SUEC Coburg, Germany

456 *A Digital Twin for MV Switchgear Condition Monitoring Data*

Gitzel, Ralf (1); Migunov, Vadim (1); Tornede, Tanja (2)
1: ABB, Germany; 2: Universität Paderborn, SICP

458 *LV Grid state estimation using local flexible assets: A Federated Learning approach*

Čaušević, Selma; Sharma, Shreshtha; Ben Aziza, Syrine; van der Veen, Aliene; Lazovik, Elena
Netherlands Organisation for Applied Scientific Research (TNO), The Netherlands

460 *A Novel Evaluation Method of Virtual Power Plant Effect on Distribution Networks Using Fuzzy Logic*

Hwang, Jihui; Lee, Jin-Oh; Kim, Gyeong-Hun; Jeon, Jin-Hong
Korea Electrotechnology Research Institute, South Korea

461 *Assessment of the impact of Hybrid Distributed Generation / Batteries Energy Storage Systems on DSO Operational Planning*

Junior, Jamilson (1); Girault, Ludovic (2); Alchourroun, Matthieu (2); Morais, Hugo (1); Bouzigon, Benoit (3)
1: INESC-ID/IST, Portugal; 2: EDF R&D; 3: ENEDIS

471 *Scalable Uncertainty Aware Ancillary Services Procurement Tool For Active Distribution Systems*

Usman, Muhammad (1); Capitanescu, Florin (1); Guimaraes Madureira, Andre (1); Bolfek, Martin (2); Matišić, Zdravko (2); Joel Soares, Filipe (3); Fonseca, Nuno (3); Teixeira, Henrique (3); Mateo, Carlos (4)
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479 *Decentralized Smart Charging of Large-Scale EVs using Adaptive Multi-Agent Multi-Armed Bandits*

Zafar, Sharyal (1); Féraud, Raphaël (2); Blavette, Anne (3); Camilleri, Guy (4); Ben Ahmed, Hamid (1)
1: SATIE Lab, ENS Rennes, France; 2: Orange Labs, France; 3: SATIE Lab, ENS Rennes & CNRS, France; 4: IRIT Lab, UPS Toulouse, France

489 *Grid Serving Charging Control of Electric Vehicles*

Hertlein, Timo (1,2); Bauer, Anne (1); Weindl, Christian (2)
1: Siemens AG, Germany; 2: Coburg University of Applied Sciences and Arts

490 *Energy Charging of a fleet of electric vehicles based on Reinforcement Learning*

Amaris, Hortensia; Alonso, Mónica; Moreno, María Angeles; Gauchia, Lucia; de la Escalera, Arturo; Martin, David
University Carlos III Madrid, Spain

492 *Optimal Dispatching of Virtual Inertia in Microgrids with High Penetration of Inverter-based Resources*

Kelada, Fadi (1); Buire, Jérôme (1); Hadjsaid, Nouredine (1,2)
1: Univ. Grenoble Alpes, CNRS, Grenoble INP, G2ELab, 38000 Grenoble, France; 2: Nanyang Technological University, Singapore 639798, Singapore

507 *Comparison of Learning Methods for Distribution System Identification under realistic Conditions*

de Jongh, Steven; Mueller, Felicitas; Osterberg, Fabian; Suriyah, Michael; Leibfried, Thomas
Karlsruhe Institute of Technology (KIT), Germany

511 *Balancing PV Generation In Low Voltage Grids With Limited Data*

Jätz, Christoph (1); Petters, Benjamin (1); Dult, Navreet (1); Ahmadifar, Amir (2); Monti, Antonello (2)
1: Avacon Netz GmbH; 2: RWTH Aachen

515 *Implications of Forecast Uncertainty on the Optimal Operation of Renewable Energy Communities*

Sudhoff, Robin (1,2); Schreck, Sebastian (1,2); Thiem, Sebastian (1); Niessen, Stefan (1,2)
1: Siemens AG, Technology, Germany; 2: TU Darmstadt, Technology and Economics of Multimodal Energy Systems, Germany

529 *Pilot Application of a Rule-Based TSO-DSO Coordination Concept in Switzerland*

Schröder, Vanessa (1); Vrettos, Evangelos (2); Bossio, Martina (3); Auer, Michael (1); Wu, Raphael (2); Fritsch, Christophe (2); Tsaousi, Rafaela (2); La Fauci, Raffael (1)
1: Elektrizitätswerk der Stadt Zürich, Switzerland; 2: Swissgrid AG, Switzerland; 3: Zürcher Hochschule für angewandte Wissenschaften (IEFE), Switzerland

532 *Short-circuit levels information exchange between DSO and TSO, an Approach from the Portuguese Demonstration of the OneNet Project*

Lacerda, Madalena (1); Glória, Gonçalo (2); Cardenas, Mateo (2); Egorov, Aleksandr (2); Cardoso, Sara (1); Damas Silva, Carlos (1); Louro, Miguel (1); Pestana, Rui (3); Lucas, Alexandre (4)
1: E-REDES, Portugal; 2: R&D Nester, Portugal; 3: REN, Portugal; 4: INESC TEC, Portugal

534 *Development Of A Control System Simulator Based On A Digital Twin For Cyber-Physical Energy Systems*

van der Velde, Dennis (1); Fatemi, Armin (2); Hacker, Immanuel (1); Ulbig, Andreas (2)
1: Fraunhofer FIT, Germany; 2: RWTH Aachen, Germany

573 *Fitness-check for Power Plants in Distribution Networks for Black Start and Regional Islands*

Brankovic, Darko (1); Schürhuber, Robert (1); Abart, Andreas (2)
1: Graz University of Technology, Austria; 2: Netz Oberösterreich

585 *Probability of Critical System States by Processing Bayesian Distribution System State Estimation Output*

Wagner, Eva (1,2); Duckheim, Mathias (1); Metzger, Michael (1); Stursberg, Paul (1); Niessen, Stefan (1,2)
1: Siemens AG, Germany; 2: TU Darmstadt, Germany

598 *Investigation of Grid-Serving Flexibility Provision by Electric Vehicles in a Distribution Grid*

Kratz, Kevin; Müller, Sharon; Rudion, Krzysztof
University of Stuttgart, Germany

619 *Machine Learning Algorithms Application in Real-world Low-observable Distribution Systems*

Matijašević, Terezija; Antić, Tomislav; Capuder, Tomislav
University of Zagreb Faculty of Electrical Engineering and Computing, Croatia

624 *Modelling of a Heat Network Infrastructure to Investigate the Stability of a Gas-independent, Sectoral-coupled Multi-energy System*

Feldhoff, Elisabeth; Duphorn, Tom; Schlegel, Steffen; Westermann, Dirk
Ilmenau University of Technology, Germany

626 *Mapping Low Voltage Distribution Cabinets Using Artificial Intelligence*

Berggreen, Mads Dyhr; Hansen, Nicolai Marcher; Uhd, Lars Møller
N1 A/S, Denmark

627 *AI-based Analysis Study for Deriving Distribution Transformer Turns Ratio and Appropriate MV Operating Range*

Nam Koong, WON (1); Weon, Jong-Nam (1); Jung, Won-Wook (1); Kim, Yun-Su (2)
1: KEPCO, South Korea; 2: Gwangju Institute of Science and Technology

637 *Accuracy of New Algorithms for the Sensitivity-based Estimation of Idle Capacities in Distribution Networks*

Schultis, Daniel-Leon
AIT Austrian Institute of Technology GmbH, Austria

667 *Field Validation of Distribution System State Estimation Based on a Limited Number of D-PMUs*

Vasapollo, Riccardo (1); Zanni, Lorenzo (1); Romano, Paolo (1); Gross, Daniel (2); Mashayekhi, Elaheh (2)
1: Zaphiro Technologies, Switzerland; 2: Netze BW GmbH

668 *Robust Determination of Reactive Power Potentials from Subordinate Networks in Close-to-Real-Time Operation*

Sennewald, Tom; Tysler, Patryck; Westermann, Dirk
TU Ilmenau, Germany

672 *An Experience Of Detection And Classification Of Quality-Of-Service Problems In MV/LV Distribution Substations Using Artificial Intelligence: Senegal Case Study*

Kébé, Mouhamad Al Mansour; Sene, Maodo; Diagne, Nafissatou
Senelec, Senegal

676 *Digital Twin Based on CIM CGMES for Smart Grid and Data Based Use Cases*

Baumgartner, Lukas; Wäfler, Jonas
ewz, Switzerland

688 *Impact Analysis of optimal Appliance Control on the Energy Consumption for an existing Smart Home*

Mueller, Felicitas; de Jongh, Steven; Schneider, Anna; Suriyah, Michael; Leibfried, Thomas
Karlsruhe Institute of Technology (KIT), Germany

731 *Model Predictive Control for Smart Grid Charging of Autonomous Electric Vehicle Fleet using Local Renewable Energy Generation*

Ali, Haider (1); Francois, Bruno (1); Brotcorne, Luce (2); Foroozandeh, Zahra (3); Soares, João (3)
1: L2EP - Ecole Centrale de Lille, France; 2: INRIA Lille, INOCS; 3: GECAD - Instituto Superior de Engenharia do Porto, ISEP

732 *Techno-economic Estimation of Reactive Power Related Additional Losses in Wind Farms During Reactive Power Supply*

Korff, Felix (1,2); Köppe, Hartmudt (2); Engel, Bernd (2)
1: E5, Technical University of Darmstadt, Germany; 2: elenia, Technical University of Braunschweig, Germany

779 *Automated Emergency Power Supply For Drinking Water Supply By A Hydro Power Plant In Islanded Grid Operation*

Timmermann, Johanna (1); Bernecker-Castro, Claudia (1); Lechner, Tobias (2); Seifried, Sebastian (2); Menker, Dirk (3); Dellmann, Christian (4); Störzer, Günther (5); Finkel, Michael (2); Witzmann, Rolf (1)
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781 *Global Sensitivity in PD Monitoring: Case Study for Primary AC Cable Line in Operation*

Shevchenko, Iaroslav (1,2); Steiner, Christoph (2); Kleiner, Christian (3); Steiner, Peter (3); Höer, Martin (2); Kaltenborn, Uwe (2); Steiner, Thomas (2); Schwarz, Harald (1)
1: Brandenburg University of Technology Cottbus-Senftenberg; 2: Highvolt Prüftechnik Dresden GMBH; 3: Technische Universität Dresden

799 *Maximising the Utility of Measurement Data for an Open, Non-Synthetic and Unbalanced Distribution System using State Estimation*

Deakin, Matthew (1); Vanin, Marta (2); Fan, Zhong (3); Dean, Matthew (3); Dean, Ashley (3); Shaw, Ian (3)
1: Newcastle University, United Kingdom; 2: KU Leuven, Belgium; 3: Keele University, United Kingdom

818 *Flexibility Coordination Mechanism Between A Distribution System Operator And A Virtual Power Plant Involving Wind Parks And A Battery Energy Storage System*

Cihangir Martin, Nuran; van Lith, Floris; Poiesz, Niels; Bierling, Paul; Vinke, Peter; van der Molen, Anne
Stedin, The Netherlands

853 *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*

Nozlan, Muhammad Fazli; Ariffin, Mohd Faris
Tenaga Nasiona Berhad (TNB), Malaysia

878 *Using Light Electric Vehicles For V2G services in the Arctic*

Bremdal, Bernt (1,2); Dadman, Shayan (1)
1: UiT Campus Narvik; 2: Smart Innovation Norway

883 *Coupling Optimal Energy Management and Allocation through Keys of Repartition in Energy Communities*

Mustika, Alyssa Diva (1,2); Rigo-Mariani, Rémy (1); Debusschere, Vincent (1); Pachurka, Amaury (2)
1: Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, France; 2: Beoga, France

884 *The New Condition-Based Maintenance of MV Cable Lines Supported by Diagnostic Data*

Noske, Slawomir (1); Grzelka, Sebastian (1); Kołodziejczyk, Krzysztof (2)
1: ENERGA-OPERATOR SA, Poland; 2: Globema Sp. z o.o.

895 *EV Charging Microgrid: Electrical and Operation Modeling of Energy Management*

Lopes da Paixão, Joelson; da Rosa Abaide, Alzenira; Passinato Sausen, Jordan; Nogueira Fontoura da Silva, Leonardo; Knak Neto, Nelson
UFSM, Brazil

900 *The Lac-Mégantic Microgrid: A Shared Vision of Energy Transition and the new role for Microgrid Control*

Morrissey, Kevin (1); Jaggassar, Mark (1); Goulet, David-Olivier (2)
1: Smarter Grid Solutions, United States of America; 2: Hydro Quebec, Canada

901 *Stochastic Reliability-Constrained Scheduling of Multi-Resource Microgrids*

Omri, Mahsa (1); Jooshaki, Mohammad (2,3); Fotuhi-Firuzabad, Mahmud (1,3); Lehtonen, Matti (3)
1: Sharif University of Technology, Iran; 2: Geologian Tutkimuskeskus (GTK), Finland; 3: Aalto University, Finland

905 *Coordination Operation of Electricity and Natural Gas Network Considering Power-to-Gas based on the Symmetrical Semidefinite Programming*

Min, Liang (1); Yang, Jin (1); Lou, Chengwei (1); Yu, James (2); Yu, Zhibin (1)
1: University of Glasgow, United Kingdom; 2: SP Energy Network

907 *A Business Model Analysis Of Different Long Duration Energy Storage Systems In GB Energy Market Conditions*

Carbonell, Borja; Moreira, Roberto
EDF Energy R&D, United Kingdom

920 *DR Business Model Suggestion Applying IoT Solutions with Mesh Network Technology Based on IEEE 802.15.4*

Jang, Si hyeong (1); Lee, Jun ho (2); Kim, Jung won (3); Hong, Jae myeon (4)
1: KEPCO ES, South Korea; 2: KEPCO ES, South Korea; 3: KEPCO ES, South Korea; 4: Merlot Laboratories Inc., South Korea

938 *DSO's Strategic Behavior Model with Demand Flexibility in Energy and Reserve Markets Under TSO-DSO Coordination Scheme*

Cho, Yongjun (1); Kim, Jinho (1); Choi, Jiwon (2)
1: Gwangju Institute of Science and Technology, South Korea; 2: Dongguk university, Korea, Republic of(South Korea)

941 *Development of a Real-time Estimation for a Pv Generation In a Distribution Network of South Korea*

Weon, Jong-Nam; Jung, Won-Wook; Shim, Jae-Seong; Kim, Jeong-Hun; Cho, Sung-Min
KEPCO Research Institute, South Korea

945 *Increased Electrical Transmission And Resilience Of Distribution Systems By The Use Of Optical Fibre Systems*

Gräf, Thomas
Hochschule für Technik und Wirtschaft Berlin, Germany

968 *Techno-economic Comparison Of Reactive Power Control Modes For Distributed Generators For Voltage Regulation In LV Grids*

Gisbert, Cyril (1); Fournel, Josselin (1); Rias, Géraud (2); Gondolo, Mathieu (2)
1: EDF R&D, France; 2: Enedis, France

983 *Data Analytics For Pruning Optimization Around Power Lines*

Demay, Charles; Achaichia, Pierre; Tuloup, Philippe
ENEDIS, France

986 *Advanced Concept of Efficient Use of Transformers Leveraging the Dynamic Thermal Rating Technology*

Souvent, Andrej (1); Spec, Andrej (2); Koprivc, Polona (2); Petrovič, Nejc (3); Omahen, Gregor (4); Gradnik, Tim (5); Rot, Miha (6); Kosec, Gregor (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

987 *Data Analytics Model For Enhanced Utilization Of Grid Capacity*

Simonsen, Stig (1); Øyvang, Thomas (2); Grindbakken, Ole Kristian (1)
1: Lede AS, Norway; 2: USN, Norway

992 *Operational Strategies for Maximising the Value of Customer Flexibility*

Pudjianto, Danny; Strbac, Goran
Imperial College London, United Kingdom

997 *Development of Support System for Restoration of Power Outage in Distribution Facilities*

Kimura, Taku; Takeuchi, Shunsuke; Fujimoto, Keiichi; Furuta, Kyozo; Morita, Keisuke; Kawachi, Yuki; Kano, Noriaki
KANSAI Transmission and Distribution, Inc., Japan

1003 *Distribution Network Reconfiguration Strategy with Soft Open Point using GA and PSO*

Kim, Hyun-Woo; Ahn, Seon-Ju; Yun, Sang-Yun; Choi, Joon-Ho
Chonnam National University, South Korea

1017 *Demonstrating Interactions of Distribution Network and Local Energy Communities Operating in Hierarchically Autonomous Control Architecture Paradigm*

Degefa, Merkebu Zenebe; Rana, Rubi; Taxt, Henning
SINTEF Energy Research, Norway

1018 *Alternative Low-Frequency Demand Disconnection (LFDD) Solutions for UK Distribution Network Operator Implementation*

Emhemed, Abdullah (1); Bryson, Nathan (2); Huxtable, Ryan (3); Li, Can (4)
1: WSP UK Limited, United Kingdom; 2: WSP UK Limited, United Kingdom; 3: National Grid; 4: National Grid ESO

1020 *The Use of a Probabilistic Forecasts to Manage Risk of Congestion or Voltage Violations in a Distribution Network*

Carstens, Herman; Artoisenet, Pierre
N-SIDE, Belgium

1033 *Decentralized Management of Distributed Energy Resources for Frequency Support – Finnish Pilot*

Aro, Matti (1); Ferrari, Jerome (2); Opas, Mikael (1); Caire, Raphael (2)
1: VTT Technical Research Centre of Finland, Finland; 2: Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, Grenoble, France

1035 *Distribution Smart Transformer Pilot Experience for LV Grid Real Time Operation*

Del Río Etayo, Luis (1); Mulroy, Patrick (1); Garcia Ribote, Iker (1); Lumbreras, Itziar (2); Layo, Luis (2)
1: Ormazabal; 2: i-DE

1046 *An Impact of Electrical Distribution Networks on the Operation of AC 25 kV Railway System*

Pavlovsky, Vsevolod (1); Steliuk, Anton (2); Zakharov, Andriy (3); Makogonchuk, Vasyl (4)
1: DMCC Europe, France; 2: DMCC Engineering, Ukraine; 3: DMCC Europe, France; 4: DMCC Engineering, Ukraine

1049 *DeepGrid: Bringing the Operational Awareness to the LV Grid*

Couto, Rui (1); Faria, Joana (1); Sampaio, Gil (2); Bessa, Ricardo (2); Rodrigues, Francisco (3); Santos, Ricardo (3)
1: ENEIDA.IO, Portugal; 2: INESC TEC, Portugal; 3: E-Redes, Portugal

1060 *The Implementation of Linear Asset Management As A Framework Solution In Distribution Electricity Network in Indonesia*

Fernando, Very; Mulyodinoto, Kharisma Utomo; Pardiasnyah, Indratno; Aldrian, Revi; Noval, Yopi Ardian; Swastika, Akbar Reza
PT PLN (Persero), Indonesia

1065 *A Platform For Real-time Monitoring And Detection Of Conductor Integrity Related Health Hazards In Distribution Networks*

Freire, Guilherme (1); Campos, João (1); Faria, Joana (1); Marsh, Philip (2)
1: ENEIDA.IO, Portugal; 2: Powerco, New Zealand

1071 *Congestion Anticipation and Preemptive Resolution in Distribution Networks Using Grid Internal and Redispatch Measures*

Schmitt, Susanne (1); Harjunkoski, Iiro (1); Dalle-Ave, Giancarlo (2); Subasic, Milos (1); Noglik, Peter (1)
1: Hitachi Energy, Germany; 2: Hitachi Energy, Canada

1073 *Assessing the Pros and Cons of Different Operating Envelope Implementations Across Australia*

Gonçalves Givisiez, Arthur; Ochoa, Luis F.; Liu, Michael Z.; Bassi, Vincenzo
The University of Melbourne, Australia

1089 *Dynamic Operation of MV Grids Based on Losses Optimisation*

Nunes Carreira, João; Pedro Baptista, João; Carrilho, Diogo; Monteiro, Alexandre; Roca, Ines
E-REDES, Portugal

1093 *High-level Resilience Strategizing Using Data-Driven Inputs*

Weiss, Xavier (1); Nordström, Lars (1); Berlin, Arne (2)
1: KTH Royal Institute of Technology, Sweden; 2: Vattenfall Eldistribution AB

1097 *Chance-Constrained Method for Reserve Provision in EV-based DC Microgrids*

Marasciuolo, Francesca; Dicorato, Maria; Forte, Giuseppe
Politecnico di Bari, Italy

1103 *Essential Aspects of Operational Risk Assessment and its Application: Issues and Challenges*

Nazir, Zunaira; Bollen, Math
Luleå Tekniska Universitet, Sweden

1105 *Management of the Distribution System Operation During the Crisis – Earthquakes in Republic of Croatia in 2020*

Cavlovic, Marina (1,2); Piric, Damir (2); Perisa, Ivan (2)
1: SAG 3, Croatia; 2: HEP ODS Ltd, Croatia

1109 *Optimal Cross-Voltage Operation of Active Distribution Networks Considering Flexibility and Production Schedule of an Industrial Customer with Various Business Models*

Mohseni, Nasratullah
University of Bremen, Germany

1118 *IoT enabled System for High Voltage Disconnector Advanced Asset Management*

Beltrán Hernández, Mikel (1); Landeta Zarate, Iban (1); Pérez Quesada, Juan Carlos (1); Alonso Alfayate, José Enrique (2)
1: Schneider Electric (MESA site), Spain; 2: Red Eléctrica de España, S.A.U., Spain

1124 *Building a Realistic Sampler to Emulate Communication Delays in PLC-Operated Low Voltage Networks*

Rashad Ahmed, Mahmoud; Cano, José Manuel; Arboleya, Pablo
University of Oviedo, Spain

1127 *Performance Analysis of a State Estimator for Low Voltage Unbalanced Grids Using Different Advance Metering Infrastructure Technologies*

Rashad Ahmed, Mahmoud (1); Cano, José Manuel (1); Mohamed, Bassam (2); Arboleya, Pablo (1)
1: University of Oviedo, Spain; 2: Plexigrid, Spain

1137 *Peak Rebound Estimation of Electric Vehicle Chargers due to Load Shifting Strategies*

Kwon, Minho; Kim, Jinho; Baek, Keon; Lee, Eunjung
Gwangju Institute of Science and Technology, South Korea

1147 *Impact of Charging Stations on Voltage Quality - Island and Grid Operation of Real Installation*

Mastny, Petr; Moravek, Jan; Vojtek, Martin; Vrana, Michal; Vrtal, Matej
Brno University of Technology, Czech Republic

1148 *Demonstration for New Type SVR Using Commercial Distribution System with DERs*

Takahashi, Naoyuki; Tachibana, Yuya; Uemura, Satoshi
Central Research Institute of Electric Power Industry, Japan

1153 *Generating Additional Markets for Mature Access to Flexibility*

Lynch, Jacob; Mavrocostanti, Yiango
National Grid, United Kingdom

1170 *An Automation Approach Towards The Preparation Of Switching Orders Involved In The Planned Outages of Network Elements*

Bausier, Jérôme
N-SIDE, Belgium

1176 *Partial Discharge Diagnostics on Medium-Voltage Switchgears - Measurement Methods and Benefits*

Zajadatz, Maurizio; Suriyah, Michael; Leibfried, Thomas
Karlsruhe Institute of Technology (KIT), Germany

1177 *Optimal Scheduling of EVs Route Considering Integrated Power and Transportation System*

Chae, Myeongseok (1); Won, Dongjun (1); Cha, Hee june (2)
1: Inha University, South Korea; 2: Incheon International Airport Corporation

1179 *Performance Evaluation and Operational Logistics in Energy Distribution Utility Fleet Electrification*

Zamboni, Lucca (1); Dias, Bruno Martin de Alcântara (2); Silva, Cynthia Thamires da (2); Martini, José Sidnei Colombo (1); Rodrigues, Andre Polatschek (3); Freitas, Nathalia Rubo Nobre de (3)
1: GESEL - Grupo de Estudos do Setor Elétrico - Brazil; 2: USP - Universidade São Paulo - Brazil; 3: CPFL Energia

1184 *E-REDES Adopt New Monometallic Technology and Predictive Algorithm to Minimize and Predict LV Neutral Loss Failures Detection*

Marques, Carolina; Gaspar, Cláudia; Vieira Santos, Carlos; Mendes Santos, Jorge; Margarido Morgado, Susana; Nunes Carreira, João; Princípe Santos, Ricardo; Gomes, Alcides; Alves Dias, Jorge; Lourenço, Frederico; Azar, Jad; Duarte, Patrícia; Fonseca, Luís; Veríssimo, Miguel; Louro, Miguel
E-REDES, Portugal

1190 *Challenges in Proactive Congestion Management in Distribution Grids - Practical Findings from the flexQgrid Project*

Frankenbach, Marc-Aurel (1); Schubert, Carolin (1); Exner, Carmen (1); Höck, Ariane (2)
1: Netze BW GmbH, Germany; 2: FZI Research Center for Information Technology

1224 *Vision For Smart Grid Interoperability: Standards Based Integration Of E-Mobility, Prosumer, And Grid*

Sharma, Mayank; Berry, Tom
Schneider Electric, France

1230 *Auto Transfer Of Source At Substation*

Sonule, Liladhar; Mattoo, Nittin; Paradkar, Tejaswita; Potdar, Ajay; Gokani, Hitesh
Tata Power Company Limited, India

1232 *Synthesizing Q(P)- And Q(U)-characteristics By Means Of Time-series Based Optimal Power Flow Calculations*

Schwenke, Manuel; Hanson, Jutta
Technical University Darmstadt, Germany

1253 *Mapping Maintenance Road on Iran Power Distribution Network*

Khayyamim, Tara; Khayyamim, Sara; Safaei, Arman; Gilvanejad, Mojtaba
Niroo Research Institute, Islamic Republic of Iran

1259 *Modeling of Frequency Reserve Provision for energy Storage Systems*

Mohamed, Ahmed (1); Rigo-Mariani, Rémy (2); Debusschere, Vincent (1)
1: Univ. Grenoble Alpes; 2: CNRS

1260 *Modeling Active Grid Operation In A Testbed For Cyber-Physical Systems*

Fatemi, Armin (1); Schmidtke, Florian (2); Ulbig, Andreas (1)
1: IAEW at RWTH Aachen University, Germany; 2: Fraunhofer FIT, Germany

1261 *Use of Voltage Regulation on HV/MV Substations to Increase Hosting Capacity in the LV Grid*

Jargstorf, Johannes; Boeraeve, Ward; Lauwers, Piet
Fluvius System Operator CV, Belgium

1263 *Solving AC Power Flow with Graph Neural Networks*

Böttcher, Luis (1); Wolf, Hinrikus (2); Jung, Bastian (1); Lutat, Philipp (1); Trageser, Marc (1); Pohl, Oliver (3); Ulbig, Andreas (1); Grohe, Martin (2)
1: IAEW at RWTH Aachen University, Germany; 2: Computer Science at RWTH Aachen University, Germany; 3: Schleswig Holstein Netz AG, Germany

1267 *Day-Ahead Forecast Of Low Voltage Network State To Prevent Outages – Real-World Experimentation In Ouagadougou, Burkina Faso*

Grosjean, Benoit (1); Rigal, Bruno (1); Richaud, Luc (1); Bayanma, Camille (2)
1: Odit-e, France; 2: SONABEL, Burkina Faso

1268 *Simulating Integration Of New Flexibilities And DER In A Low-Voltage Grid*

Forestier, Arthur; Lucas, Chloé
Odit-e, France

1292 *C-HIL Environment for Parameter Optimization of Grid Friendly Charging Control*

Einfalt, Alfred; Frischenschlager, Albin; Schroer, Lukas; Schildorfer, Andreas
Siemens AG OEsterreich, Austria

1314 *A Data-driven Flexibility Region Estimation Method for Virtual Power Plant*

Jeong, Hwanmin; Kim, Donghoon; Kim, Jinho
Gwangju Institute of Science & Technology, South Korea

1327 *Virtual Reality in Electrical Distribution: Applications and Future Trends*

Nosrati, Komeil (1); Saleh Alsaleh, Saleh Ragheb (1); Onile, Abiodun Emmanuel (2); Belikov, Juri (2); Tepljakov, Aleksei (1); Petlenkov, Eduard (1)
1: Department of Computer Systems, Tallinn University of Technology, Estonia; 2: Department of Software Science, Tallinn University of Technology, Estonia

1335 *Enhancing Power Transformer Maintenance Planning Through Data Analytics and Risk Based Maintenance for Improved Work Management and Cost Optimization*

Yang Ghazali, Young Zaidey
Tenaga Nasional Berhad, Malaysia

1336 *Demand Response Using Remote Modification Of Smart-Meters' Subscribed Power To Protect Low-Voltage Feeders In Ouagadougou, Burkina Faso*

Grosjean, Benoît (1); Lassauce, Antoine (1); Richaud, Luc (1); Bayanma, Camille (2); Mouchel, Yann (3); Siarras, Sébastien (4); Mouad, Khalil (5)
1: Odit-e, France; 2: SONABEL, Burkina Faso; 3: Smartside, France; 4: GridPocket, France; 5: Institut Smart Grid, France

1339 *Rethink Grid Management – Challenges, Use Cases And Design Principles For The Next Generation Of Grid Operation Systems*

Gemsjaeger, Ben (1); Wenz, Robert (1); Ebert, Dr. Michael (1); Kvistad, Sigurd (2); Holene, Jens Tore (2); Åsrud, Jørgen Sivertsen (2)
1: Siemens AG, Germany; 2: Elvia AS

1342 *Investigation of Stacked Applications for Energy Storage Systems*

Schmidtke, Florian (1,2); Hacker, Immanuel (2,1); Ulbig, Andreas (1,2)
1: IAEW at RWTH Aachen University, Germany; 2: Fraunhofer FIT, Germany

1344 *Enhanced Virtual Power Plant Design And Implementation Lessons*

Howorth, Gary (1); Kockar, Ivana (1); Tuohy, Paul (1); Flett, Graeme (1); Bingham, John (2)
1: University of Strathclyde, United Kingdom; 2: Engineering Technology Centre Ltd (ETC), United Kingdom

1348 *An Integrated Approach for Energy Management Optimizations in Customer Premises*

Azamat, Mana; Schütz, Johann
OFFIS, Germany

1351 *Economical Operation Strategy of Multi-Energy VPP on Distribution Network*

Lee, Jin-Wook; Son, Sung-Yong
Gachon University, South Korea

1357 *How To Control The Vegetation In Overhead Lines? – Analytics4Vegetation*

Borges, Ricardo (1); Meneses, Maria Nela (2); Santos, Fátima (3); Lopes, Inês (4); Correia, Miguel (5); Costa, Gabriel (6)
1: E-REDES, Portugal; 2: E-REDES, Portugal; 3: E-REDES, Portugal; 4: E-REDES, Portugal; 5: EY-Ernst & Young; 6: EY-Ernst & Young

1359 *Frequency Response Of An Autonomous Microgrid Under The Influence Of Enhanced Spatial And Orientational Smoothing Of Photovoltaic Output*

Riaz, Nida; Peltonen, Lasse; Hildén, Antti; Repo, Sami; Järventausta, Pertti
Tampere University, Finland

1371 *Platform for Traceability and Inspection Management Through the Use of Artificial Intelligence Techniques*

Wellington Barboza, Felipe (1); Tiemi Takeuchi, Jéssica (1); Carrasco Baptista, Fabio (1); Pedro Klock Ferreira, João (2); Britto Bessa, Miguel (2); de Souza Rodrigues, Vitor (2)
1: CPFL Energia S.A.; 2: Concert Technologies S.A.

1390 *Distributed Energy Resource Optimisation, Conflict Of Interests And Flexibility Markets*

Markkula, Joni; Järventausta, Pertti
Tampere University, Finland

1398 *Linear State Estimation in Distribution System Using Smart Meter Data*

Lopez-Ramirez, Izar (1); Piyasinghe, Lakshan P. (3); Zamora, Inmaculada (2); Rodriguez-Seco, Emilio (1)
1: TECNALIA, Basque Research and Technology Alliance (BRTA)., Spain; 2: Department of Electrical Engineering Engineering, University of the Basque Country (UPV/EHU); 3: Hubbell, Inc.

1401 *Demonstration of a Concept for the Data Management and Monitoring of Larger Scale DER Utilizing a Time-series Database*

Lu, Zhiyu; Chen, Shuo; Heilscher, Gerd
Ulm University of Applied Sciences, Germany

1408 *Black Start In Distribution Grids Through Solid-State Transformer*

Couto, Mário; Coccia, Alessio
Electric Power Research Institute, Ireland

1409 *"Energy Package" as a Tool to Reduce Environmental Footprint and Withhold Grid Capacity Limit at Harbour Areas*

Ilieva, Iliana (1); Wingstedt, Anja (1); Lundestad, Tore (2); Johnsen, Pål Erling (2)
1: Smart Innovation Norway, Norway; 2: BORG HAVN IKS

1420 *Vegetation Management Optimization At E-REDES Through Advanced Analytics Applied To Satellite Imagery*

Costa, Ruben (1); Santos, Ricardo (1); Cristino, Paulo (1); Borges, Ricardo (1); Silva, Frederico (1); Rodrigues, Bruno (1); Corrêa, Francisco (2); Charpentier, Remi (2)
1: E-REDES, Portugal; 2: Tesselo

1423 *Challenge of Integration BESS on Distribution Active Network Management Scheme*

Tejero Calvo Calvo, Gonzalo; Chen, Minjiang; Fox, Jonathan; Boyd, Gerard; Neilson, David
SP Energy Networks, United Kingdom

1429 *Near Real-Time Topology Estimation in LV Network with PLC Smart Meters*

Suarez-Ramon, Lucía (2); Arboleya, Pablo (1)
1: University of Oviedo, Spain; 2: EDP Redes España

1434 *Impact of Three-Phase Inverter-Based Generating Units With Asymmetrical Power Redistribution on the Low-Voltage Network Operation*

Vrana, Michal; Klusacek, Jan; Moravek, Jan; Drapela, Jiri; Mastny, Petr; Vrtal, Matej
Brno University of Technology, Czech Republic

1442 *GridDrone: Use of Drones to Perform Thermographic, Distance Measurement and Visual Inspection of the HV and MV Aerial Network*

Rodrigues, Francisco (1); Santos, Ricardo (1); Borges, Ricardo (1); Coelho, André (2); Välja, Tom (3); Stern, Madis (3)
1: E-Redes, Portugal; 2: EDP Labelec; 3: Hepta Airborne

1447 *Architectural And Systems Approach To Sustainable Digital Transformation Of Distribution Utilities*

Sharma, Mayank (1); Narang, Nand Kishor (2); Berry, Tom (1)
1: Schneider Electric, France; 2: Narnix Technolabs

1478 *A Novel Method To Efficiently Reduce The Impact of Increasing Penetration Of Electric Bus Fleets on the Electric Grid*

Jiope, Herman
Renewable Energy, Germany

1503 *Electrifying East Nusa Tenggara with Smart Microgrid - Study Case on Semau Subsystem*

Tampubolon, Daniel; Siahaan, Halomoan; Hendriyanto, Albertus
PT PLN INDONESIA, Indonesia

1508 *Novel Framework for Hybrid EV Charging Stations Placement Focused on Footprint Reduction in Power System Operation*

Rodrigues, Yuri; Sy, David
Seattle Pacific University, United States of America

1520 *Transactive-based Control of Electrical Distribution and Transportation Networks Considering Congestion Issue*

Fattaheian Dehkordi, Sajjad (1,2); Lehtonen, Matti (1)
1: Aalto University, Finland; 2: Sharif University of Technology

Session 4 : Protection, Control & Automation

104 *Generation of Synthetic Examples Using Generative Adversarial Networks (GAN) to Extend the Database of Fault Signals on Power Distribution Lines*

Granado Fornás, Javier (1); Herrero Jaraba, Elías (2); Llombart Estopiñan, Andrés (1)
1: Fundación Circe, Spain; 2: Universidad de Zaragoza

115 *Data hub based secure integration of DER Assets with Utilities, DSO and Retail*

Thaliyil, Nirmal
Kalki Communication Technologies Pvt Ltd, India

116 *Standard IEC 61850 based real-time DER interface for The Netherlands*

Troost, René (1); van der Heijden, Sjors (1); Fonteijn, Rik (2); Stuivenvolt, Alain (2); Mohammadi Sooran, Davood (4); Mulder, Bas (4); van Leeuwen, Joris (5); van Olst, Rob (3)
1: Stedin; 2: Enexis; 3: Alliander; 4: TenneT; 5: Holland Solar / NWEA / EnergieSamen

126 *An Operational Data-Driven Malfunction Detection Framework for Enhanced Power Distribution System Monitoring – The DeMaDs Approach*

Fellner, David (1); Strasser, Thomas (1,2); Kastner, Wolfgang (2)
1: AIT Austrian Institute of Technology, Austria; 2: Technische Universität Wien (TU Wien)

128 *Analysis of Application of 5G Control and Protection in Distribution Networks and Test of Slicing Schemes*

Xiaofeng, Zou (1,2); Xinchen, Cai (2); Chunjie, Li (2); Bing, Shen (2)
1: East China Electric Power Test and Research Institute, China, People's Republic of; 2: State Grid Shanghai Municipal Electric Power Company, China, People's Republic of

156 *Voltage Regulations Solutions for Low Voltage Distribution Network with Large PV Integration: Performance Analysis with A Real Swiss Case*

Guo, Baoling (1); Pignat, Ludovic (2); Pouget, Julien (1); Jordan, Nicolas (1); Baltter, Didier (1); Köppel, Guido (3)
1: HES-SO, 1950, Sion, Valais, Switzerland; 2: OIKEN, 1950, Sion, Valais, Switzerland; 3: Enbag group, 3900, Brig, Valais, Switzerland

166 *Analysis of Control Algorithms on Different Low-Voltage Grid Clusters*

Barta, Veronika (1); Baumgartner, Sonja (2); Uhrig, Stephanie (1); Witzmann, Rolf (3)
1: HM University of Applied Sciences Munich, Germany; 2: LEW Verteilnetz GmbH; 3: TUM Technical University of Munich

178 *Detection and Location of Single Phase Faults in New 10(20) kV Distribution Networks*

Gruhonjic Ferhatbegovic, Seila (1); Bajramovic, Zijad (1,2)
1: PE Elektroprivreda B&H, Bosnia and Herzegovina; 2: Faculty of Electrical Engineering, University of Sarajevo

276 *Success deployment of 6 digital substations in Vietnam 2020-21 – Return of experience*

Ha, Van Ngo (2); Bui, Tuan Thanh (3); Hoang, Hung (4); Vo, Dang-Thoang (4); Chow, Chin-Fei (5); Teoh, Chee Pinp (1)
1: GE Renewal Energy, United Kingdom; 2: EGRID, Vietnam; 3: AIT Corporation, Vietnam; 4: GE Renewal Energy, Vietnam; 5: GE Renewal Energy, Singapore

282 *Real-Time Implementation of Dynamic State Estimation for Microgrid Load Bus Protection*

Basu, Sarbajit (1); Barnes, Arthur K. (2); Mate, Adam (2); Lavrova, Olga (1); Fobes, David (2)
1: New Mexico State University, United States of America; 2: Los Alamos National Laboratory, United States of America

284 *Experimental Validation of a Novel Stator Interturn Fault Detection Method in Induction Motor*

Valsan, Simi; Gupta, Arinjai; Kumar, Ranjeet
ABB, India

286 *Using Smart Meters Infrastructure to Implement Smart Street Lighting*

Hoorzad, Mostafa; Khazaee, Amir; Delavaripour, Hossein; Afshar, Ramin
Mashhad Electric Energy Distribution Company, Iran

296 *GEMS: Development Of Automated Generator Dispatch For The Purpose Of Maximising Built Asset Utilization*

Lafferty, Daniel; McKenzie, Jennifer; Fundelea, Cristina
SP Energy Networks, United Kingdom

299 *TLC Strategy For Power Distribution Grids*

Rufini, Daniele; Zollo, Danilo vincenzo; Turco, Sara; Onori, Gianluca; Valente, Renzo; Valigi, Enrico; Amadei, Francesco
Enel Grids, Italy

303 *Voltage Regulation in a LV Distribution Network (With Renewables, Storage Systems and Electric Vehicles) – An Optimization Formulation*

Minoux, Michel (1); Croteau, Dominique (2); Laugere, Andrea (2); Zorgati, Riadh (2)
1: Paris-Sorbonne University; 2: EDF Lab Paris Saclay, France

304 *A Study on Fault Detection Method of MVDC Power Grid*

Park, Chul-Won; Lee, Kyung-Min; Ham, Jung-Mo; Kim, Dong-Suk
Gangneung-Wonju National University, South Korea

305 *Metric for Analysing Cooperative and Competitive Algorithms for Distributed Frequency Control in Microgrids*

Kilthau, Maximilian (1); Karmann, Alexandra (1); Derksen, Christian (2); Fay, Alexander (1)
1: Helmut Schmidt University / University of the Federal Armed Forces Hamburg, Germany; 2: University of Duisburg-Essen, Germany

314 *An Efficient Hybrid Control and Protection Strategy for Frequency Regulation of Low-Inertia Power System*

Elmelegi, Ahmed (1); Nasrat, Loai (2); Aly, Mokhtar (3); A. Mohamed, Emad (2)
1: Upper Egypt Electricity Distribution Company, Egypt; 2: Aswan University, Faculty of Engineering, Egypt; 3: San Sebastian University, Chile

326 *Special Protection Scheme: A Use Case for Enhancing High Distributed Energy Resources Integration*

Kamsamrong, Jirapa (1); Kringel, Henrik (2); Aldebs, Mohannad (3); Meister, Jürgen (1)
1: OFFIS Institute, Germany; 2: 50Hertz Transmission GmbH; 3: TenneT TSO GmbH

336 *Evaluation Effects And Preliminary Designing Of Shield Reactors For Mitigation Of Overcurrent Flowing Through The Earthed Elements Of Underground Cables Following Cross Country Faults On MV Network*

D'Orazio, Luigi (1); Cerretti, Alberto (1); Geri, Alberto (2); Gatta, Fabio Massimo (2)
1: ENEL, Italy; 2: University of Rome "La Sapienza", Italy

342 *Using Of Neutral Forming Transformer For Earth Fault Selection During The Feeding Of Portion Of Medium Voltage Network In Intentional Island By Means Mobile Suppling Systems And Subsequent Analysis Of Its Stability*

D'Orazio, Luigi (1); Cerretti, Alberto (1); Turri, Roberto (2); Gatta, Fabio Massimo (3); Geri, Alberto (3)
1: ENEL, Italy; 2: University of Padua, Italy; 3: University of Roma "La Sapienza", Italy

344 *Requirements For Generating Plants To Be Connected In Parallel With Distribution Networks - Focus On EN 50549 Series*

Cerretti, Alberto (1); Noce, Christian (2); Rochereau, Herve (3); Schaupp, Thoms (4)
1: ENEL, Italy; 2: Enel X, Italy; 3: EDF, France; 4: TransnetDW GmbH, Germany

352 *The Potential of Emerging Communications Technologies in Distribution Grid Management*

Borenius, Seppo (1); Kekolahti, Pekka (1); Lehtonen, Matti (1); Kantola, Raimo (1); Kokkoniemi-Tarkkanen, Heli (2)
1: Aalto University, School of Electrical Engineering, Finland; 2: VTT Technical Research Centre of Finland

359 *Detection of Weather Induced Events on Overhead Power Lines*

Mitcan, Daniel; Godard, Bertrand; Kuwahata, Rena
Ampacimon SA, Belgium

363 *Real-time Optimal and Fair Control of Photovoltaic Inverters for Management of Grid Voltages, Currents and Power Flows Using Grid Monitoring Data*

Alizadeh-Mousavi, Omid (1); Dimitrakopoulos, Sotirios (1); Jalali, Mahdi (1); Markstaler, Markus (3); Frick, Kevin (2)
1: depsys, Switzerland; 2: Liechtensteinische Kraftwerke, Lichtenstein; 3: Ostschweizer Fachhochschule, Lichtenstein

378 *A Physical-Neural Network Approach For Residential Load Forecasting With Dynamic Load Control*

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1: Tecnotree Ltd; 2: University of Eastern Finland, Finland

401 *Optimising the Safety, Reliability and Efficiency of rural distribution networks*

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Anseris IQ, Ireland

524 *AI-Based Controller for Grid-forming Inverter-Based Generators*

Issa, Hassan (1); Debusschere, Vincent (2); Garbuio, Lauric (2); Lalanda, Philippe (1); Hadjsaid, Nouredine (2)
1: Univ. Grenoble Alpes; 2: Grenoble INP

526 *Fault Location Method for Medium Voltage Cables Using Measured Sheaths Current in the Presence of Renewable Energy Resources*

Ghaderi Baayeh, Arman; Kleemann, Michael
KU Leuven, Technology Campus Ghent, Belgium

527 *Arc Flash Mitigation on Main LV Switchboards by Protecting HV/LV Transformers Using Circuit Breakers*

Gal, Isabelle; Choulet, Nicolas
Schneider Electric, France

528 *Approaches To Voltage Control In QUEST*

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1: Fundamentals Ltd; 2: Smarter Grid Solutions; 3: Electricity North West Ltd

541 *A Comparison Between Different Inertia Estimation Algorithms in Smart Grids Applications*

Gotti, Davide (1); Ledesma Larrea, Pablo (1); Amaris Duarte, Hortensia (1); Grillo, Samuele (2)
1: Universidad Carlos III de Madrid, Spain; 2: Politecnico di Milano

550 *Characterisation of Sequence Components for a Standalone Microgrid with Low Fault Current*

Afrin, Nadia; Hibbert, Mark; McDonnell, Aidan
eleXsys energy, Australia

551 *A Study on the Protection Scheme for LVDC Distribution System in Commercial Buildings*

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562 *Distribution Automation System Field Test in Jakarta MV Network*

Primadianto, Anggoro; Monica, Karina; Tobing, Andi; Waberta, Riki
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1: HES-SO, Switzerland; 2: OST, Switzerland; 3: Swissgrid, Switzerland; 4: ewz, Switzerland

590 *A Dynamic Voltage Controller For LV Grids Based On Flexible PV Systems And The Smart Metering Infrastructure*

Hamdan, Ali; Vinot, Benoit; Cadoux, Florent
Roseau Technologies, France

592 *Generic Methodology For Protection Plan Analysis With Inverter-Based Grid Forming And Grid Feeding Resources*

Velay, Maxime; Villeret, Gaetan; Jacquet, Benoit; Lemaitre, Florence; Deneuville, Boris
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597 *Machine-Learnt State Estimation For Optimization In Low Voltage Distribution Grids*

Reisenbauer, Sarah (1); Rao, Bharath-Varsh (1); Taljan, Gregor (2)
1: AIT Austrian Institute of Technology GmbH, Austria; 2: Energienetze Steiermark GmbH

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Han, GyuHo; Jeong, Haeyoung; Choi, Usic; Choi, Myungki
KEPCO KDN, South Korea

600 *An Interoperability-by-Design Approach For Designing Smart Grid Solutions*

Kazmi, Jawad (1); Stefan, Mark (1); Farre, Marjolaine (2)
1: AIT Austrian Institute of Technology GmbH, Austria; 2: Trialog, France

602 *A Real-Time Optimal Operation Strategy for Active and Reactive Power Sources in Smart Distribution Systems*

Bayat, Akbar (1); Bagheri, Amir (2)
1: Zanjan electric distribution company, Iran; 2: PhD, Assistant Professor, Department of Electrical Engineering, University of Zanjan, Zanjan, Iran,

603 *Microgrid Control Strategy to Achieve Seamless Transition from Grid Connected to Islanded Mode*

Kamajaya, Samuel (1,2); Buire, Jerome (1); Caire, Raphael (1); Bacha, Seddik (1); Wild, Jean (2)
1: Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, Grenoble, France; 2: Schneider Electric, France

604 *Microgrid Realtime Control for Transient Modes: Development, Simulation and Experimental Validation in Full-scale*

Do, Thai Phuong; Daoudi, Said; Le Pivert, Xavier; Naimi, Yassine
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612 *Is the Cybersecurity Standard IEC62443 Applicable to Distribution Substations?*

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1: Siemens Osakeyhtiö; 2: Helen Sähköverkko Oy; 3: Siemens AG; 4: Helen Oy

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Kumar, Deepa Shaji (1); Abdulhadi, Ibrahim (1); Yazadzhiyan, Boris-Emanuel (2); Dantas, Rui (2); Scoble, Colin (2); Kulmala, Anna (3); Raipala, Ontrei (3)
1: PNDC, University of Strathclyde, United Kingdom; 2: UK Power Networks, United Kingdom; 3: ABB, Finland

628 *Developing Low-Voltage Operational Functionalities*

Haapamäki, Mikko (1); Loukkalahti, Mika (1); Kuokkanen, Juho (1); Nousiainen, Mika (1); Heine, Pirjo (1); Lehtonen, Matti (2)
1: Helen Electricity Network Ltd., Finland; 2: Aalto University, Finland

631 *Validation of a Hardware-Independent Optimal Power Flow Algorithm using IEC 61850 Data Models in a Low-Voltage Test Grid*

Schwierz, Thomas; Palaniappan, Rajkumar; Molodchyk, Oleksii; Luff, Ian; Rehtanz, Christian
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643 *Use of Low-Cost RF Mesh WAN Based Feeder Pillar Monitoring System*

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646 *Multidomain Considerations Of Secondary Maintenance Approaches To Ensure The Reliability Of Network Protection Systems*

Skrbinjek, Oliver (1); Paar, Horst (1); Michalka, Christian (2); Marenbach, Richard (2)
1: Energienetze Steiermark GmbH, Austria; 2: OMICRON electronics Deutschland GmbH

647 *Novel Touch Voltage-Based Earth-Fault Current Protection For Ensuring Dependability And Electrical Safety In Modern Compensated MV-Distribution Networks*

Wahlroos, Ari (1); Altonen, Janne (1); Kauppinen, Sakari (2); Aalto, Hanna-Mari (3); Pitkänen, Risto (4)
1: ABB Oy, Finland; 2: ALVA Sähköverkko Oy, Finland; 3: Elenia Verkko Oyj, Finland; 4: Finland

655 *The impact of Neutral Treatment and Earth Fault Protection on Resilience and Reliability of High Voltage Grid*

Winter, Klaus (1); Hollander, Johan (2); Levashov, Viacheslav (2)
1: Holmgren Institute Stockholm; 2: Swedish Neutral Company

656 *Virtualised Centralised Protection and Control – Constellation Project Case Study*

Kulmala, Anna (1); Raipala, Ontrei (1); Hovila, Petri (1); Yazadzhiyan, Boris-Emanuel (2); Dantas, Rui (2); Scoble, Colin (2)
1: ABB, Finland; 2: UK Power Networks

671 *Rapid State Estimation Based On Machine Learning In Hybrid AC/DC Grids*

Reisenbauer, Sarah (1); Dognini, Alberto (2); Monti, Antonello (2)
1: AIT Austrian Institute of Technology GmbH, Austria; 2: RWTH Aachen University

689 *On-line and Adaptive Load Blinding Protection Scheme to Resolve Protection Limits in Networks with Highly Integrated DERs*

Ganjavi, Reza (1); Scoble, Colin (2); Dantas, Rui (2); Yazadzhiyan, Boris (2); Kasap, Hakan (1); Hann, Sebastian (3); Meyer, Georg Janick (3); Jaeger, Johann (3)
1: Siemens AG, Germany; 2: UK Power Networks; 3: Friedrich-Alexander University

690 *Frequency Droop Characteristic for Grid Forming Battery Inverters – Operation in Islanded Grids with the Infeed of Distributed Generation Systems*

Lechner, Tobias (1); Seifried, Sebastian (1); Timmermann, Johanna (2); Bernecker-Castro, Claudia (2); Kerber, Georg (3); Schaarschmidt, Kathrin (4); Herrmann, Steffen (5); Finkel, Michael (1); Witzmann, Rolf (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

702 *Real-Time Performance of Virtualised Protection and Control Software*

Schönborn, Sandro; Kozhaya, David; Birke, Robert; Sivanthi, Thanikesavan
ABB Corporate Research, Switzerland

856 *Distribution Network Fault Prediction Utilising Protection Relay Disturbance Recordings and Machine Learning*

Balouji, Ebrahim (1); Bäckström, Karl (1); Olsson, Viktor (1); Hovila, Petri (2); X. Niveri, Henry (2); Kulmala, Anna (2); Salo, Ari (3)
1: Eneryield; 2: ABB; 3: Vaasan Sähköverkko

877 *Performance Of A Digital Distance Protection Relay During Short Circuits In Presence Of A Converter Connected Grid*

Brestan, Maximilian Heinz; Galler, Manuel; Schuerhuber, Robert
University of Technology Graz, Austria

880 *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*

Noske, Slawomir (1); Babs, Adam (2); Kajda, Lukasz (2); Matusewicz, Miroslaw (1)
1: ENERGA-OPERATOR SA, Poland; 2: Institute of Power Engineering Poland

881 *Application and Field Experience of Earth Fault Protection using Fault Generated Transients*

Yip, Tony (1); Wang, Chao (2); Xu, Bingyin (3)
1: Kehui International Ltd., United Kingdom; 2: Kehui Power Automation Co. Ltd., China; 3: Shandong University of Technology, China

888 *Distance Protection Assessment in Inverter Dominated Power Systems – A case study*

Frangeskou, Christos (1,2); Hadjidemetriou, Lenos (1); Asprou, Markos (1); Panayiotou, Christos (1); Harry, Zavallis (2); Stavros, Stavrinos (2)
1: KIOS Research and Innovation Centre, University of Cyprus; 2: Transmission System Operator Cyprus

925 *Grid Integration Challenges And Control Of Microgrids*

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Deakin University, Australia

951 *Fault Location for Multi-Terminal Lines*

Dzienis, Cezary (1); Blumschein, Joerg (2)
1: University of Applied Sciences, Germany; 2: Siemens AG

953 *Investigating the Impact of Topology Changes and Distributed Renewable generation on the Protection Behavior at High- and Medium-voltage Level*

Selimaj, Antigona; Hacker, Immanuel; Ulbig, Andreas
RWTH Aachen University, Germany

955 *A Study on the Fault Current Limiting and Interrupting Operation Technology of MVDC Systems Using a Protective Equipment*

Park, Kyu-Hoon; Usman, Muhammad; Kwon, Il; Kwak, Yu-Jin; Lee, Bang-Wook
Hanyang University, South Korea

956 *Control and Sizing of Back-to-Back Converter for Smooth Island Transition of Industrial Microgrid*

Sunjaq, Ahmed (1); Chen, Peiyuan (1); Bongiorno, Massimo (1); Svensson, Jan R (2); Majumder, Ritwik (1)
1: Chalmers University of Technology, Sweden; 2: Hitachi Energy

958 *Supervised Learning for Fault Classification Using Hybrid Training Datasets*

Ranganathan, Archana (1); Tindemans, Simon (2); Provoost, Frans (3)
1: Alliander N.V.; 2: Technische Universiteit Delft; 3: Qirion B.V.

971 *LV Automation Solutions for Resilient, Flexible and Optimized Smart Distribution Grids*

López Goiti, Imanol (1); Zubia Urrutia, Haritz (2); Plasencia Alonso, Esther (3); Sanz Heras, Markel (4)
1: Merytronic; 2: Ariadna Grid; 3: Pronutec; 4: i-DE

974 *Phase-to-Earth Faults Causing Inaccuracy of Distance Protection in Low Impedance Earthed Power Systems*

Luxenburger, Rainer (1); Policht, Gregor (2); Fischer, Florian (1); Albert, Michael (1)
1: OMICRON, Germany; 2: Netze BW GmbH

988 *Hardware-In-The-Loop Investigation Of Distance Protection Algorithm In Grids With Dominant Decentralized Generation Units*

Galler, Manuel; Hackl, Philipp; Schürhuber, Robert
University of Technology Graz, Austria

995 *Challenge: Frequency Measurement In Different Applications*

Albert, Michael; Luxenburger, Rainer
OMICRON electronics Deutschland GmbH, Germany

999 *A 5G Communication-Based Wide Area Protection Concept for Enabling Resilient and Reliable Loss of Mains Protection*

Raipala, Ontrei (1); Kulmala, Anna (1); Hovila, Petri (1); Yazadzhiyan, Boris-Emanuel (2); Dantas, Rui (2); Scoble, Colin (2)
1: ABB, Finland; 2: UK Power Networks, UK

1022 *Object Detection Algorithms Applied On Low Voltage Grid Equipment*

El Harras, Mohcine (1); Birkle, Christophe (2); Bruschi, Julien (1); Sallaud, Samuel (1)
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1037 *Key Performance Indicators (KPI) For The Testing Process Of An IED*

Albert, Michael
OMICRON electronics Deutschland GmbH, Germany

1038 *A New Adaptive Auto Reclosure Approach With Secondary Arc Detection*

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Siemens AG, Germany

1040 *A Collaborative Engineering and Validation Framework for Smart Grid Automation Applications – The PowerTeams Approach*

Brandauer, Christof (1); Linecker, Stefan (1); Pröstl Andrén, Filip (2); Gavriluta, Catalin (2); Strasser, Thomas (2); Veichtlbauer, Armin (3); Steinmaurer, Gerald (3); Resch, Jürgen (4); Schöndorfer, Sebastian (4)
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1042 *Validation Of MPLS-TP For Tele-Protection / Current Differential Protection Services Via Proof Of Concept*

Haegdorens, Davy (1); Abdul Wahib, Mohd Mokhlis (2); Nacatar Singh, Gurdial Singh (3); Zakaria, Mohd Nasim (3); Zarmani, Muzalifah Hanim (4); Mohd Perdaus, Ahmad Farid (3); Uzir, Rahimah (3)
1: OTN Systems, Belgium; 2: Tele-Flow Corporation Sdn Bhd, Malaysia; 3: Tenaga Nasional Berhad, Malaysia; 4: TNB Researcher Sdn Bhd, Malaysia

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Redhu, Surender (1); Raja, Rameez (1); Ottesen, Stig Ødegaard (1); Bremdal, Bernt A. (1,2)
1: Smart Innovation Norway, Norway; 2: University of Tromsø, Norway

1064 *HIL-validated Synchrophasor-based Adaptive Protection Scheme For Active Distribution Grids*

Pavanello, Davide (1); Zanni, Lorenzo (2); Paolone, Mario (3); Romano, Paolo (2); Pignati, Marco (2); Buchard, Adrien (4); Raeisi, Yaser (1)
1: Hes-so Valais-Wallis, Switzerland; 2: Zaphiro Technologies SA, Switzerland; 3: EPFL, Switzerland; 4: Groupe SEIC-Télédis, Switzerland

1078 *Automated MV Switching Based On AMI Data*

Parreira, Rui Filipe; Sousa, José Eduardo; Nunes Carreira, João
E-Redes, Portugal

1085 *Load Modelling for Volt-var Optimization Control in Limited Network Visibility – a Case Study in Malaysia*

Lo, Chin Kim (1); Calvin Ku, Shong Ching (2); Abdul Rahim, Azlan (1)
1: TNB Research Sdn. Bhd., Malaysia; 2: Tenaga Nasional Berhad, Malaysia

1090 *Investigation of the Cyber-Resilience of Grid Supporting Control Strategies for Demand Side Management of Electric Vehicles*

Hacker, Immanuel (1); Schmidtke, Florian (2); van der Velde, Dennis (1); Ulbig, Andreas (2)
1: Fraunhofer FIT, Germany; 2: IAEW at RWTH Aachen, Germany

1106 *Fault Calculation Procedure For Adaptive Relay Protection In Distribution Networks With Current Limiters And Electronically-Coupled DERs*

Stefani, Izabela (1); Bekut, Dusko (2); Strezoski, Luka (2)
1: Schneider Electric, Serbia; 2: Faculty of Technical Science

1125 *Automatic System for Evaluation of Lightning Events in Power Grid*

Knenicky, Martin (1); Svancar, Martin (1); Kocis, Lubomir (1); Spurny, Petr (2); Ovesny, Radek (2)
1: EGU - HV Laboratory a.s., Czech Republic; 2: CEPS, a.s., Czech Republic

1128 *Optimized Low Voltage Power Fuses For Current Requirements In Low Voltage Power Grids*

Büttner, Lukas; Hildmann, Christian; Schlegel, Stephan
TU Dresden, Germany

1134 *E-REDES is Testing a Pioneer SCADA Interconnection for DER [250kW; 1MW[*

Carreira, Pedro; Louro, Miguel; Simão, Tiago; Fortunato, Carlos; Fonseca, Pedro
E-REDES, Portugal

1144 *PMU-Based State Estimation and Fault Analysis in Active Distribution Grids: A Case Study for Kythnos Island, Greece*

Xygkis, Themistoklis; Darmis, Orestis; Karvelis, Georgios; Dimeas, Aris; Korres, George; Hatziargyriou, Nikos
National Technical University of Athens, Greece, Greece

1156 *From blackouts to flexibility: case study from Burkina Faso*

Ursic, Sebastijan (1); Richaud, Luc (2); Cornelis, Marine (3)
1: INEA d.o.o, Slovenia; 2: Odit-e, France; 3: Next Energy Consumer, Italy

1172 *Evaluation and Influences of the Harmonic Earth Fault Currents*

Nikander, Ari
Tampere University, Finland

1173 *Development of Local Autonomous Method for Power Distribution System with Battery Storage System*

Takahashi, Naoyuki; Fukushima, Kentaro; Hatta, Hiroyuki
Central Research Institute of Electric Power Industry, Japan

1180 *5G-Based Fault location, Isolation, and Service Recovery*

Nait Belaid, Mohand Ouamer (1,2); Audebert, Vincent (1); Deneuville, Boris (1); Langar, Rami (2)
1: EDF SA, France; 2: Gustave Eiffel University, France

1181 *Operational Considerations for Substation Security*

Appukuttan, Abhilash; Darby, Andrew; Varghese, Abraham
GE, United Kingdom

1185 *A Cyber Threat Model, Impact Analysis and Mitigation to Enhance Cyber Security of Distribution Networks*

Subramaniam Rajkumar, Vetrivel (1); Musunuri, Shyam (2); Stefanov, Alex (1); Thoen, Arnaud (3); Louh, Amadou (3); Palensky, Peter (1)
1: TU Delft, The Netherlands; 2: Siemens AG, Germany; 3: Stedin NV, The Netherlands

1189 *Equivalent DC Impedance of a Three-phase Impedance through an Inverter*

Delhaye, Quentin (1); Bekemans, Marc (2); De Jaeger, Emmanuel (1)
1: UCLouvain, Belgium; 2: Thales Alenia Space, Belgium

1197 *Interoperability Raises Two Challenges: Cybersecurity & Maintenance*

Salles, Mathieu; Bigeard, Hervé
Schneider Electric, France

1200 *Interconnected Grid Protection Systems – Reference Grid For Testing An Adaptive Protection Scheme*

Lorz, Tobias (1); Jaeger, Johann (1); Lin, Guosong (2); Pletzer, Tobias (3); Jurkat, Florian (3); Erichsen, Gerrit (3); Ohlsen, Meike (3); Selimaj, Antigona (4); Hacker, Immanuel (4); Dahlmanns, Markus (5); Fink, Ina Berenice (5); Wehrle, Klaus (5); Heckel, Jan-Peter (6); Babazadeh, Davood (6); Becker, Christian (6); Schindler, Michael (7); Schlump, Markus (7); Luxenburger, Rainer (8); Fischer, Florian (8); Biller, Michael (8); Dauer, Maximilian (2); Hammer, Thomas (2)
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1201 *Wide Area Protection Scheme for an Active Distribution Network*

Al-Maitah, Khaled (1); Al- Odienat, Abdullah (2)
1: Electricity Distribution Company (EDCo), Jordan, Hashemite Kingdom of; 2: Mutah University, Jordan

1207 *Four Problems for Digital Substations I wish to be solved*

Steinhauser, Fred
OMICRON electronics, Austria

1209 *Fault Analysis of Grid Forming Inverter for Microgrid Application*

Al-Maitah, Khaled (1); Al- Odienat, Abdullah (2)
1: Electricity Distribution Company (EDCo), Jordan, Hashemite Kingdom of; 2: Mutah University, Jordan

1214 *A secure Automation Solution to Provide Flexibility at Low-Level Grid – Middleware Services*

Ebrahimy, Razgar (1); Banaei, Mohsen (1); Peralta Escalante, Juan Jacobo (2); Rodríguez, Manuel Diaz (3); Piotrowski, Krzysztof (4); Gallardo, Jaime Chen (3); Madsen, Henrik (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)

1216 *Architecture of Advanced Distribution Grid Voltage Control Method Utilizing Edge Computing Solution*

Repo, Sami (1); Supponen, Antti (1); Ruuth, Kalle (1); Rosenørn, Kenneth (2); Møller, Michael (3)
1: Tampere University, Finland; 2: Green power Denmark; 3: RAH A/S

1218 *Semi-Distributed Automatic Scheme for Self-Healing Implementation in Distribution System*

Wahyudi, Candra Agus Dwi
PT PLN (Persero), Indonesia

1222 *Challenges and Considerations for the Design and Implementation of a Centralized Protection and Control Solution for MV Networks*

Aleixo, Ana Cristina (1); Dias Jorge, Rui (1); Antunes, Lourenço (1); Gomes, Fernando (1); Barraca, João Paulo (2); Carvalho, Ricardo (2); Antunes, Mário (2); Gomes, Diogo (2); Gouveia, Clara (3); Carrapatoso, António (3); Alves, Everton (3); Gonçalves, Luís (4); Falcão, Francisco (4); Querido, José (4); Pinho, Bruno (4); Pires, Luís (5)
1: Efacec; 2: Instituto de Telecomunicações; 3: INESC TEC; 4: ARMIS; 5: E-REDES

1227 *Software Defined Substation Automation*

Hemmer, Peter; Melenhorst, Edwin
Locamation, The Netherlands

1248 *Implementation Of An Advanced Remote Engineering Platform*

Künnapuu, Indrek (1); Voog, Rene (2); Hamdon, Ameen (3)
1: Elektrilevi OÜ; 2: Enefit Connect OÜ; 3: SUBNET Solutions Inc.

1274 *Secondary Wiring Checks by Combining Sawtooth Polarity Detection and Voltage Measurement*

Schmidbauer, Josef (1); Walker, Tim (2)
1: OMICRON Electronics, Austria; 2: OMICRON Electronics, USA

1276 *Edge Computing for Improving Energy Management in Smart Homes*

Redhu, Surender (1); Kushwaha, Deepali (2); Bremdal, Bernt A. (1,3)
1: Smart Innovation Norway, Norway; 2: Indian Institute of Technology Kanpur; 3: University of Tromsø, Norway

1280 *Functional Testing of Virtualized and Centralized Protection Systems*

Starck, Janne (1); Rintamäki, Olli (1); Valtari, Jani (1); Coggan, Robert (2); Pritchard, Christopher (3)
1: ABB, Finland; 2: Energy Queensland, Australia; 3: Omicron, Austria

1284 *First Practical Results Of Continuous Grid-Serving Power Control In Low-Voltage Network Via Novel Power Management Concept*

Suriyamoorthy, Ghayathri (1); Korotkiewicz, Kamil (1); Stiegler, Martin (1); Kellendonk, Peter (2); Zander, Wolfgang (3)
1: PSI GridConnect GmbH, Germany; 2: EEBus Initiative e.V., Germany; 3: BET GmbH, Germany

1285 *Demonstration On Optimal Voltage Control For Medium Voltage Distribution Network*

Supponen, Antti; Ruuth, Kalle; Repo, Sami
Tampere University, Finland

1293 *AI To Detect Anormal Switching Operations*

Achleitner, Georg (1); Schöffer, Werner (2); Plesch, Juergen (2); Huska, Wolfgang (1)
1: Austrian Power Grid AG, Austria; 2: ARTEMES, Austria

1296 *Research Line of Cyber Security Maintenance and Management in Operational Technology Environments*

Puente Torruella, Angel (1); Bru Bru, David (1); Zaballos, Agustin (2)
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1304 *High Impedance Fault Detection for MV Distribution Networks*

Cimadevilla, Roberto; Moreno, Alex
ZIV, Spain

1306 *An Edge-Fog Computing Approach For Advanced Distribution Management Systems For The Low-Voltage Network*

Kippke, Matias Ariel; Villalba, Leo Marcelo; Arboleya Arboleya, Pablo
Universidad de Oviedo - Laboratory for Electrical Energy Management Unified Research (LEMUR), Spain

1309 *State Estimation Algorithm for Optimal Voltage Control in Medium Voltage Network*

Ruuth, Kalle (1); Supponen, Antti (1); Repo, Sami (1); Mutanen, Antti (2)
1: Tampere University, Finland; 2: Elenia Oy

1311 *Protection System Analysis in Microgrids with DSO Static Generation*

Bianco, Gianpatrizio (1); Ceneri, Gianni (1); Ceresoli, Bruno (3); De Berardinis, Ettore (3); Mascolo, Luigi (1); Micillo, Chiara (2)
1: Gridspertise Srl, Italy; 2: e-distribuzione SpA, Italy; 3: CESI SpA, Italy

1318 *Control Architecture and Algorithms for Isolated Microgrids*

Bianco, Gianpatrizio (1); Barbato, Lucio (1); Bruno, Sergio (2); Ceneri, Gianni (1); Iurlaro, Cosimo (2); La Scala, Massimo (2); Mascolo, Luigi (1); Menga, Marco (2); Micillo, Chiara (3); Renna, Francesco (1); Sapienza, Gianluca (1)
1: Gridspertise Srl, Italy; 2: Politecnico di Bari, Italy; 3: e-distribuzione SpA, Italy

1322 *Cloud-Based Management of Grid Automation Devices*

García Zamora, Santitos (1); Hamdon, Ameen (2)
1: ENEL Distribución Perú; 2: SUBNET Solutions inc., Canada

1326 *Centre of Angles based Remedial Action Scheme using Synchrophasor Measurements in SP Transmission Network*

Hussnain, Shafqat; Junaid, Muhammad
SP Energy Networks, United Kingdom

1337 *Three-phase Two-wire Distribution System: Protection schemes in unconventional networks*

da Silva dos Santos, Leonardo Felipe (1); de Lima Oliveira, Aécio (1); Cardoso Junior, Ghendy (1); Marchesan, Gustavo (1); Kraulich, Leyla (1); de Freitas Silveira, Leonardo (1); Spagnolo Martins, Miguel (1); Matias Rêgo, Rogimar (2)
1: UFSM, Brazil; 2: Grupo Equatorial / CEEE-D

1343 *Improvement Of Cable Fault Performance Using A Ground Resistor In Series With An Artificial Neutral*

Neves, Andre; Rosa, Luis; Soares, Jose; Bras, Paulo; Lopes, Paulo; Almeida, Ines; Melo, Hugo; Louro, Miguel
E-REDES, Portugal

1368 *Grid-Forming Control Modelling and Validation for Distribution Systems with Networkable Microgrids*

Sawant, Jay Ramesh; Jain, Rishabh; Pratt, Annabelle
National Renewable Energy Laboratory, United States of America

1369 *Smart Grid Management Units To Increase Resilience And Flexibility*

Hammal, Sami; Alifragis, Vagelis; Mavromatakis, Jason; Livanos, Nikolaos-Antonios
EMTECH SPACE P.C., Greece

1370 *Intermittent Earth Fault Detection in Distribution Network based on the voting classification technique*

Pil Ramli, Suzana (1); Asadi, Arta (2); Pourdaryaei, Alireza (3); Karimi, Mazaher (4)
1: Universiti Malaya, Malaysia; 2: Islamic Azad University, Iran; 3: University of Shiraz, Iran; 4: University of Vaasa, Finland

1373 *Concept and Implementation of a Gird Simulation Framework Utilizing Containerized IEC 61850 Compatible IED*

Chen, Shuo (1); Morris, Jeromie (2); Lu, Zhiyu (1); Heilscher, Gerd (1)
1: Ulm University of Applied Sciences, Germany; 2: Netze BW GmbH, Germany

1374 *Voltage Control In Low-Voltage Distribution Grids Through Flexibility Services*

Petrovic, Nejc; Dobravec, Blaz; Kafol, Ciril
Elektro Gorenjska, Slovenia

1379 *Dependency of Harmonics in the Residual Earth Fault Current – Study of Influencing Factors to Determine Risky Locations*

Frowein, Karla (1); Küchler, Benjamin (2); Schmidt, Uwe (2); Schegner, Peter (1)
1: Technische Universität Dresden, Germany; 2: Zittau/Görlitz University of Applied Sciences, Germany

1382 *Advancing the Capabilities of OpenDSS: A Directional Overcurrent Relay Feature for Modelling Modern Microprocessor Network Protector Operation Modes*

Rocha, Celso (1); Ovalle, Andres (1); Padmanabhan, Aadityaa (1); McGuinness, Sean (2)
1: Electric Power Research Institute (EPRI), United States of America; 2: EPRI Europe DAC, Ireland

1383 *EPRI Distribution Protection Analysis Toolkit*

Ovalle, Andres (1); McGuinness, Sean (2); Padmanabhan, Aadityaa (1); Rocha, Celso (1)
1: Electric Power Research Institute, United States of America; 2: EPRI Europe DAC, Ireland

1384 *Solving Issues Of The Distribution Network Of Harstad (Norway) In Real Time Using Machine Learning-Based Observability To Place Flexibility Orders*

Grosjean, Benoît (1); Richaud, Luc (1); Pinho da Silva, Nuno (2); Černe, Gregor (3)
1: Odit-e, France; 2: R&D Nester, Portugal; 3: INEA d.o.o, Slovenia

1389 *Low Voltage as the final frontier for Broadband over Power Line*

Berganza, Inigo; Sendin, Alberto; Ayala, Raquel; Gomez, Sebastian
Iberdrola, Spain

1419 *Decentralized Grid Control Using Power Grid State Estimation*

Waffenschmidt, Eberhard; Hotz, Christian; Baum, Sergej; Stadler, Ingo
TH-Köln, Germany

1474 *Performance Evaluations For The Configuration Of IEC 62351 Cybersecurity Profiles In Energy Telecontrol Scenarios*

Todeschini, Mauro G.; Dondossola, Giovanna
RSE S.p.A., Italy

1479 *Development of Photovoltaic Power Generation Output Estimation Method Using Distribution System Sensor Information*

Nagata, Kentaro; Takahashi, Naoyuki; Uemura, Satoshi
Central Research Institute of Electric Power Industry, Japan

1480 *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*

Birkner, Peter (1); Schaldach, Anja (2); Jeromin, Ingo (3); Krontiris, Athanasios (4); Pfeffer, Sophia (5); Neukamp, Till (6)
1: House of Energy e.V., Germany; 2: House of Energy e.V., Germany; 3: Darmstadt University of Applied Sciences, Germany; 4: Darmstadt University of Applied Sciences, Germany; 5: Darmstadt University of Applied Sciences, Germany; 6: Darmstadt University of Applied Sciences, Germany

1495 *Framework For Data Pre-treatment, Clustering, Detection Of Outliers And Critical Operating Points Applied In A Power Utility Voltage Regulator*

Costa, Ricardo (1); Aranda, Jorge (1); Pereira, Paulo (1); Barbosa, Jorge (1); Silva, Eleandro (2); Vianna, Marcelo (3)
1: University of Vale do Rio dos Sinos - UNISINOS, Brazil; 2: Certaja Energia; 3: CEEE Equatorial

1497 *Fault Detection Sensors – E-REDES Case Study*

Raposo, Davide (1); Romão, José (1); Almeida, Pedro (2); Venseth, Terje (3)
1: E-REDES, Portugal; 2: Sicame Group; 3: Nortroll

1506 *Real Time Digital Simulation and IEC 61850 Standard: Interoperability Test Between OPAL-RT and Typhoon HIL Simulators*

Morais, Adriano (1); Cassol, Jhonathan (1); Sartori, Ângelo Felipe (1); Bernardon, Daniel (1); Lima, Diomar (1); Hokama, Wagner (2); Conceição, Julia Beatriz (2); Marchesan, Tiago (1); Carloto, Filipe (3)
1: Universidade Federal de Santa Maria, Brazil; 2: CPFL Energia; 3: Fox IoT

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1: Augsburg University of Applied Sciences, Germany; 2: Technical University of Munich; 3: SWM Infrastruktur GmbH & Co. KG

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Dwivedi, Divyanshi (1,2); Yemula, Pradeep Kumar (2); Pal, Mayukha (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

193 *Causal Network Analysis To Study Evolution Of Distribution System With DER Integration*

Reddy, D. Maneesh (1,2); Dwivedi, Divyanshi (1,3); Yemula, Pradeep Kumar (3); Pal, Mayukha (1,4)
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Hadiwidjaja, Stella (1); Michiorri, Andrea (2)
1: National University of Singapore (NUS); 2: MINES Paris - PSL

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Düsdieker, Saskia; Veith, Katrin; Jenau, Frank
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Enedis, France

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Collins, Mark (1); Jajcanin, Milena (2); Bailey, Kieran (3); Stott, Stephen (3); Macharia, Elizabeth (4)
1: Smarter Grid Solutions, United Kingdom; 2: Schneider Electric, Serbia; 3: Electricity North West Ltd., United Kingdom; 4: Fundamentals Ltd., United Kingdom

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1: EDP Labelec, Portugal; 2: Marinha - Portuguese Navy, Portugal; 3: EDP NEW R&D, Portugal; 4: Smart Energy Lab, Portugal

412 *Integrated Energy Planning With Local Authorities In UK*

Woodruff, Jenny (1); Gowdy, Johnny (2)
1: National Grid Electricity Distribution, United Kingdom; 2: Regen

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1: Esfahan Electricity Power Distribution Company (EEPDC); 2: Sunflower Industrial Research Company (SIRCO)

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Abri, Ahmed Ibrahim (1); P, Dr. Dharmasa P (2)
1: Mazoon Electricity Company, Oman; 2: National University

449 *Improving The Techno-Economic Pattern For Distributed Generation-Based Distribution Networks Via Nature-Inspired Optimization Algorithms*

Sami, Ahmed (1); Othman, ElSaeed (2); Ebrahim, Mohammed (3)
1: Ministry of Electricity and Renewable Energy, Egypt; 2: Faculty of Engineering - Al Azhar University; 3: Faculty of Engineering at Shoubra - Benha University

453 *Comparison of RMS and EMT Models of Inverter-Based Generators regarding Dynamic Frequency Support*

Pfendler, Anna; Hanson, Jutta
Technical University of Darmstadt, Germany

454 *Flexibility Inside: How To Seamlessly Embed Flexibility In Dso Activity*

Dupin, Hubert; Catrinque Martins, Pâmela
Enedis, France

455 *Planning Principles for Hybrid AC/DC Underlay Grids in the Medium-Voltage Level*

Müllender, Maxim (1); Saat, Julian (1); Empen, Lasse (2); Ulbig, Andreas (1)
1: IAEW at RWTH Aachen University, Germany; 2: RWTH Aachen University, Germany

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Costa Nascimento, Priscila; Topel Capriles, Monika
KTH Royal Institute of Technology, Sweden

468 *Power Grid Model: a High-Performance Distribution Grid Calculation Library*

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Carletti, Enrico; Cocchi, Luciano; Amadei, Francesco; Franzone, Giovanni; Rizzati, Jessica; Bolognesi, Massimo; Moschella, Pierpaolo
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475 *Modelling and Validation of Latent Heat Storage Systems for Demand Response Applications*

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480 *Assessment Of The Impact Of Future Electrification Scenario On An Urban Distribution Network*

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1: Ricerca sul Sistema Energetico, Italy; 2: Unareti spa; 3: Politecnico di Milano

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PT PLN (Persero), Indonesia

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1: ENEL, Italy; 2: Grispertise, Italy

491 *Connection of a Solar Farm to the 225 kV Grid by Distribution Cable Systems*

Lesur, Frederic (1); Brodaz, Philippe (2)
1: NEXANS, France; 2: EPI, France

496 *Data-driven Assessment of Aggregated EV Charging Potential for Flexibility Procurement*

Nukic, Emir; Ponocko, Jelena
The University of Manchester, United Kingdom

501 *Evaluation Of Dynamic Equivalents Of Active Distribution Networks With Grid Forming Converters In The Context Of System Stability Studies*

Ungerland, Jakob (1); Biener, Wolfgang (1); Lens, Hendrik (2)
1: Fraunhofer Institute for Solar Energy Systems; 2: University of Stuttgart

503 *Sensitivity Of Household Appliances To Supply Voltage*

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1: EDF R&D, France; 2: Enedis, France

506 *New Approach into Material Supply Chain to Boost Industrial Capability*

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Enel Grids, Italy

508 *Optimal Charging Station Disposition*

Vasilj, Josip; Jakus, Damir
University of Split, FESB, Croatia

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510 *Primary Substation Open Standardisation Through Building Information Modelling (BIM) Implementation*

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Enel Grids, Italy

512 *A 2030 Snapshot of Public Smart EV Charging Stations*

Oldfield, Alastair (1); Watkins, Calum (2); MacDonald, Robert (2); Orr, John (1)
1: SP Energy Networks, United Kingdom; 2: Smarter Grid Solutions, United Kingdom

517 *Comprehensive Building Clustering as an Abstraction Method for Planning of Power Distribution Systems*

Röhrig, Paul Maximilian; Körber, Nils; Ulbig, Andreas
IAEW at RWTH Aachen University

520 *Bridging The Gap From Geographical To Electrical Modeling*

Vallet, Sébastien; Vinot, Benoit; Cadoux, Florent
Roseau Technologies, France

521 *Planning Methods For DC Lateral Electrification In Rural Africa*

Richard, Lucas (1,2); Alvarez-Herault, Marie-Cécile (1); Frey, David (1); Raison, Bertrand (1); Saincy, Nicolas (2)
1: G2ELab, France; 2: Nanoé, France

540 *Conceptualization of Flexibility Solutions as an Alternative to Traditional Investment*

Roça, Inês (1); Coelho, Luís (2); Bento, Rui (3)
1: E-Redes, Portugal; 2: E-Redes, Portugal; 3: E-Redes, Portugal

567 *Increase Hosting Capacity through Voltage Control Devices Setting Optimization Technology*

Nam Koong, WON (1); Jung, Won Wook (1); Cho, Sung Min (1); Lee, Hyeong Jin (1); Hwang, Pyeong Ik (2)
1: KEPCO, South Korea; 2: Pusan National University

570 *A Comparative Study of Optimal Planning of Distribution Systems: AC/DC Architecture vs. Conventional Strategies*

Farias de Barros, Heitor (1); Alvarez Hérault, Marie-Cécile (1); Raison, Bertrand (1); Tran, Quoc Tuan (2)
1: Univ. Grenoble Alpes, CNRS, Grenoble INP*, G2Elab, F-38000 Grenoble, France; 2: CEA-INES, Le Bourget du Lac, France

574 *Economic and Technical Benefits of Integrated Power and Gas Grid Planning in Distribution Grids*

Jakob, Joshua (1); Koralewicz, Marlon (1); Kerzel, Marco (1); Zdrallek, Markus (1); Wayas, Louis (2); Köppel, Wolfgang (2); Bauhaus, Bastian (3)
1: University of Wuppertal, Germany; 2: DVGW Research Centre, Germany; 3: SWKiel Netz GmbH, Germany

575 *Decision Support Tool For The Development Of Power Distribution Networks Based On AI Planning*

Castellanos, Sandra (2,1); Alvarez-Herault, Marie-Cecile (1); Lalanda, Philippe (1)
1: Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, 38000 Grenoble, France; 2: Univ. Grenoble Alpes, CNRS, Grenoble INP, LIG, 38000 Grenoble, France

588 *Increasing the Renewables' Hosting Capacity by Topology Optimization of Neighbouring Medium Voltage Grids*

Kharrat, Achraf (1); Weispfenning, Lars (2); Jeromin, Ingo (2); Hanson, Jutta (1)
1: Technical University of Darmstadt, Germany; 2: Darmstadt University of Applied Sciences, Germany

593 *A Novel DSO Approach In Proactively Upgrading The LV Distribution Network For Electrification Of Heat And Transport*

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607 *A Multiconductor Approach To Study Power Flows In Asymmetric And Unbalanced Electric Distribution Networks*

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1: Università Padova; 2: Enel grids srl; 3: e-distribuzione spa

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Shepero, Mahmoud (1); Lingfors, David (1); Widén, Joakim (1); Munkhammar, Joakim (1); Etherden, Nicholas (2)
1: Div. of Civil Engineering and Built Environment, Uppsala University, Sweden; 2: Vattenfall AB

636 *Network Reconfiguration Under a Stochastic Optimisation Framework for Day-Ahead Operation Planning for Future Distribution Networks*

Higuera, Gregorio; Kazemtabrizi, Behzad; Shahbazi, Mahmoud
Durham University, United Kingdom

651 *Data Driven Photovoltaic Regionalization Approach for Distribution System Operator Supply Areas*

Zehetbauer, Paul (1); Korner, Clemens (1); Wieland, Thomas (2); Brandl, Stephan (3); Ortner, Maximilian (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

657 *Investment Planning For Electrification Of Transport In An Industrial Port*

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1: Smart Innovation Norway; 2: Reiner Lemoine Institut; 3: Borg Havn IKS

663 *Scenario Based Network Planning Example*

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664 *Aspects of Grid Code Verification for Small and Medium Size Hydro Power Plants*

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692 *Decision Support for Matching Flexibility Measures to Flexibility Needs in Power System Planning*

Sandell, Susanne (1); Sæle, Hanne (1); Istad, Maren (1); Blikø, Marianne (2); Abelvik-Engmark, Edda (2)
1: SINTEF Energy Research, Norway; 2: Kongsberg Digital, Norway

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Sebilleau, Dune; Farré, Marjolaine; Moreau, Alain; Genest, Olivier
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N. F Silva, Leonardo (1); R. Abaide, Alzenira (1); P. Sausen, Jordan (1); L. Paixão, Joelson (1); F. Santos, Ilana (2)
1: Federal University of Santa Maria, Brazil; 2: Equatorial Energia

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WSP, Serbia

707 *P2P Trading of RTPV Energy on Blockchain Platform*

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India Smart Grid Forum, India

721 *The Use of Distributed Energy Resources to Mitigate the Negative Imbalance Between Bulk Purchase Versus Distribution Tariffs in South Africa*

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737 *Analysis Of The Renewable Energy Sources Production Simultaneity in Croatia And The Impact On The Network Planning*

Skok, Minea (1); Maricevic, Mario (1); Wagmann, Lahorko (2)
1: EIHP, Croatia; 2: HERA, Croatia

739 *Quantifying Resiliency Benefits of Networked Microgrids using PowerModelsONM.jl*

Fobes, David (1); Bent, Russell (1); Jain, Rishabh (2); Flores-Espino, Francisco (2); Pratt, Annabelle (2); Mahoney, Noah (3); Pinney, David (3); Patel, Trupal (4); Reno, Matt (4)
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746 *Validation of Gaussian Mixture LV Load Models using Measurements*

Ishchenko, Anton (1); Roos, Martijn (2); Suprabhath Nibhanupudi, Sai (1); Willemsen, Colin (1)
1: Phase to Phase B.V., The Netherlands; 2: Enexis B.V., The Netherlands

748 *Method for Analysing Grid Boundary Capacities by Ramp-up of Sector-Coupled Components in Low-Voltage Distribution Grids*

Weiß, Andreas (1,2); Zahler, Jakob (1); Reinhard, Janis (1)
1: Forschungsstelle für Energiewirtschaft e.V.; 2: School of Engineering and Design, Technical University of Munich (TUM)

753 *Smart Recharging Infrastructure for Companies' EV Fleets: Technical Realization and Load Balancing Potential*

Cazzaniga, Andrea; Mauri, Giuseppe; Colzi, Filippo
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755 *Generic Technology Models To Simulate Flexible Operation In Multi-Energy Cellular Energy Systems*

Rasti, Sasan Jacob (1); Flatter, Felix (2); Kramer, Hendrik (3); Schegner, Peter (1); Christoph, Weber (3)
1: TU Dresden, Germany; 2: University of Kaiserslautern-Landau, Germany; 3: University of Duisburg-Essen

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1: EDF R&D, France; 2: CentraleSupélec, IETR, France

764 *Optimisation of A DC Nanogrid For Smartbuildings Energy Supply Based on Environmental and Economic Criteria*

Garron, Colette (1,2,3); Riu, Delphine (2); Chaintreuil, Nicolas (1)
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765 *Low Carbon Customers: Analysis of Loading of Domestic Electric Vehicle and Heat Pump Transformers in Ireland*

Herring, Jack; Ní Reachtagain, Tara; Romo, Francisco; Catanase, Dan; Coughlan, Padraig; Power, Clem
ESB, Ireland

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Li, Jianwei; Cheng, Shuang; Mitchell, Melissa; Li, Furong
University of Bath, United Kingdom

768 *Minimizing The Impacts Of EV Chargers On The Power Grid Thanks To An Optimizing Tool*

Morel, Quentin (1); Soysal, Sena (1); Tisserand, Julie (2)
1: EDF, United States of America; 2: EDF, Paris Saclay

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Azaioud, Hakim (1); Desmet, Jan (2)
1: EELAB/Lemcko Ghent University, Belgium; 2: EELAB/Lemcko Ghent University, Belgium

790 *The Impact of COVID-19 on Electricity Demand in Portugal*

Teixeira, Joana (1); Ferrão, Inês (1); Gonçalves, Sérgio (1); Soares, Anderson (1); Lourenço, Nuno (2); Rua, António (2)
1: E-REDES, Portugal; 2: Banco de Portugal, Portugal

791 *A Finite-Element Based Current Capacity Rating Tool for Power Cables Implemented as SaaS*

Eberg, Espen (1); Strand, Henrik (1); Helleso, Svein M. (1); Solheim, Kristian T. (1); Engebrethsen, Marius (2)
1: SINTEF Energy Research, Norway; 2: REN AS, Norway

794 *Towards Resilient Electricity Distribution Systems in Africa*

Sparavier, Florian (1); Ramstein, Céline (2); Leyder, Sébastien (1)
1: Engie Impact, Belgium; 2: World Bank, USA

800 *Autocalibration of a Bottom-up Methodology for Long Term Electricity Consumption Forecasting*

Bellinguer, Kevin (1); Bocquet, Alexis (1); Chevalier, Antoine (2); El Jazouli, Charif (2); Girard, Robin (1)
1: Mines Paris – PSL University; 2: ENEDIS

802 *Optimal Resources Planning Algorithm for a Coordinated Multi-energy System of a District with an Energy Intensive Industry*

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821 *Deployment Of Forecasting Tools In Diverse Demonstration Areas To Improve Energy Scheduling Of Microgrids*

Turk, Ana (1); Sideratos, George (2); Shahare, Kamini (3); Kahraman, Aysegül (1); Paspatis, Alexandros (2); Yang, Guangya (1); Kotsampopoulos, Panos (2)
1: Technical University of Denmark, Denmark; 2: National Technical University of Athens; 3: Visvesvaraya National Institute of Technology

827 *Experiences With Ampacity Rating Calculations For Wind Farm Export Cables*

Strand, Henrik (1); Eberg, Espen (1); Thomsen, Nina Marie (1); Solheim, Kristian Thinn (1); Asklund, Kim Ove (2)
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828 *The Portuguese DAR(Distribution Automation Roadmap) Toward a More Demanding Electricity Grid*

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1: E-REDES, Portugal; 2: INESC Coimbra, Portugal; 3: IPleiria, Portugal

833 *Optimised Approach to Grid Development under Consideration of Digital Solutions*

Schacht, Daniel (1); Schönhofen, Christoph (1); Niewerth, Patrick (1); Bäsmann, Rainer (2)
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835 *A Stochastic Simulation Tool To Evaluate EV Charging Demand Based On Socio-Demographic Indicators*

Cañigueral, Marc; Meléndez, Joaquim
University of Girona, Spain

836 *Data-driven Techniques to Improve the Reliability of Low Voltage Electricity Networks Through Dynamical Evaluation of Non-technical Losses*

Girona-Badia, Marc (1); Mor, Gerard (1); Laguna, Gerard (1); Cipriano, Jordi (1); Luna, Alvaro (2)
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837 *Sizing Of A Power Electronics-Based Voltage Regulating Device To Support The Integration Of Photovoltaics And Electric Vehicles In LV Grids*

Vieira Reinert Frello, Sabine (1); Lavaud, Victor (1); Alvarez-Herault, Marie-Cecile (1); Besanger, Yvon (1); Frey, David (1); Hadjsaid, Nouredine (1,2); Cordonnier, Michel (3); Langlet, Guillaume (3); Bacaud, Leonard (3)
1: University Grenoble Alpes, France; 2: NTU; 3: Enedis

845 *Probabilistic Assessment of Low Voltage Grid Congestion Caused by Flexibility Assets Providing FCR and aFRR*

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846 *FASIT, The Norwegian Reliability Data Collection System – Experiences And Utilitarian Values*

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848 *Estimating Overhead Line Network Outage Risk Caused by Storm Winds and Crown Snow Load Using Open Data*

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860 *Increasing Network Intelligence: Implementing Distributed Local Automation to Reduce Power Interruptions in Distribution Networks*

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1: Sweco Sverige AB; 2: Vattenfall Eldistribution AB, Sweden; 3: Vattenfall AB, Sweden

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1: Odit-e, France; 2: Enel, Spain

874 *System Integration For Enhanced Network Planning And Operation With A Focus On Customer Interaction*

Schaffer, Walter; Groiß, Christoph; Grubinger, David; Hörack, Gerald; Renner, Sandra
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891 *Polygonal Optimisation Of Topologies For LV Network Schematics*

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908 *MV Network Maintenance Planning Decision Support Tool Considering Flexibility Of DER*

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921 *Leveraging Solar Energy Development To Achieve 100% Electrification Ratio In Nusa Tenggara Timur – Indonesia*

Tampubolon, Daniel; Hendriyanto, Albertus; Mari, Bellarminus
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922 *Distribution Asset Thermal Ratings with Evolving Load Profiles*

Peppanen, Jouni; Fernandez Alvarez, Inalvis; Sheridan, Robert
Electric Power Research Institute, United States of America

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Electric Power Research Institute, United States of America

934 *Research On Flexibility Planning Method Of Distribution Network Considering Optimal Configuration Of Power Electronic Devices*

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Beijing Zhizhong Energy Technology Development Co., Ltd, China, People's Republic of

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Laize, Pierre (1,2); Alvarez-Hérault, Marie-Cecile (1); Caire, Raphael (1); Garry, Aurel (2); Caujolle, Mathieu (2)
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959 *Future Of Thermal Plants On Microgrids With High Renewable Share*

Chiodetti, Matthieu (1); Lafont, Thibaut (1); Gevret, Hugo (1); Huet, Clément (2); Mocellin, Pierre (2)
1: EDF R&D, France; 2: EDF SEI, France

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1: Technical University of Munich, Germany; 2: Augsburg University of Applied Science, Germany; 3: SWM Infrasttruktur GmbH & Co. KG, Germany

966 *Integration Of Flexibility Folutions In The Multi-year Planning Of Distribution Grids With Large Amounts Of Renewable Energy Sources: Development Of A Decision-support Tool For The DSO*

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1: EDF R&D, France; 2: Enedis, France

967 *Restructured Active Distribution Network Planning Considering Agents' Investment Budget Uncertainty*

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1: Aalto University, Finland; 2: Sharif University of Technology

975 *Digitized Complex Project Management*

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ENEL GRIDS, Italy

976 *A Surrogate Model of Distribution Networks to support Transmission Network Planning*

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984 *SILVERSMITH – Potential*

Stone, Thomas (1); Bower, Andrew (1); Lindmark, Sebastian (1); Hunter, Laurence (2)
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Pisano, Giuditta; Pilo, Fabrizio; Ruggeri, Simona
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1001 *MVDC Distribution System Application Scenarios and Economic Analysis*

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Mehammer, Eirill Bachmann (1); Lakshmanan, Venkatachalam (1); Klemets, Jonatan Ralf Axel (1); Gjørven, Andrè (2); Torsæter, Bendik Nybakk (1)
1: SINTEF Energy Research, Norway; 2: Mellom AS, Norway

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1013 *Impact of Flexibility and User Behaviour on EV Charging Infrastructure Requirements*

Ayyadi, Soumia (1); Sims, Ryan (2)
1: PNDC, University of Strathclyde, Scotland; 2: PNDC, University of Strathclyde, Scotland

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1: E-REDES, Portugal; 2: EDP S.A., Portugal

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CITEA - UPC, Spain

1025 *A New Optimization Method Brings Distribution Grids Performance To The Next Level Thanks To Digital Transformation*

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Schneider Electric, France

1026 *A Study of Mid to Long-term Distribution Planning Based on PV Installation Forecasting*

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Swibki, Taheni (1); Ben salem, Ines (1); Kraiem, Youssef (2); El Amraoui, Lilia (1); Abbes, Dhaker (2)
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1: Maschinenfabrik Reinhausen; 2: Technical University Graz; 3: University of Strathclyde; 4: AIT Austrian Institute of Technology GmbH

1048 *Dimensioning And Sizing Of Microgrids For Ports Under The Assumption Of Optimal Operation*

Klemets, Jonatan Ralf Axel (1); Fjær, Kyrre Kirkbakk (1); Hagen, Jens Eirik (2); Mehammer, Eirill Bachmann (1); Strand, Henrik (1)
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1: Luleå University of Technology, Sweden; 2: Vattenfall R&D, Sweden

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1: AIT Austrian Institute of Technology; 2: Netz Oberösterreich GmbH; 3: KNG Kärnten Netz GmbH; 4: TINETZ Tiroler Netze GmbH

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1076 *Machine Learning-based Identification and Mitigation of Vulnerabilities in Distribution Systems against Natural Hazards*

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Hunter, Lewis; Galloway, Stuart
University of Strathclyde, Glasgow, Scotland

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1133 *Optimal Scheduling of Energy Storage System in Distribution Grids Using Service Stacking*

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1142 *Energy Storage System In Microgrid With High Shares of Distributed Energy Resources - A Case Study On Arholma, Stockholm*

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1: Uppsala University, Sweden; 2: Vattenfall R&D, Sweden; 3: Vattenfall BA Distribution, Sweden

1143 *Study of Low-voltage Distribution Grid Connection Dimensioning Principles Considering Widespread Distributed Generation in Finland*

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1151 *Deterministic and Stochastic Assessment Of Simultaneous EV Charging Hosting Capacity As A Tool For Distribution Network Planning*

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1161 *Impact of EV Regionalisation on Network Reinforcement Requirements*

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1195 *Assessing Connection Requests and Hosting Capacity in LV Networks without Electrical Models: A Model-Free Future*

Bassi, Vincenzo (1); Ochoa, Luis F. (1); Alpcan, Tansu (1); Leckie, Christopher (2)
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1202 *AI Supported Analysis Of Faults Caused By Atmospheric Exposures In Medium and Low Voltage Grids For Evaluation And Development Of Asset Management Strategies*

Storch, Sebastian (1); Uhrig, Martin (2); Finkel, Michael (1)
1: Augsburg University of Applied Sciences, Germany; 2: LEW Verteilnetz GmbH

1220 *Load Shifting and Two-way Chargers – Criteria for Combined Deployment at Gardermoen parking, Norway*

Martinsen, Thomas; Devik, Georg; Nygård, Heidi S; Parray, Tabish; Grøtan, Åshild
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1226 *Local Fault Identification and Location using Collaborative Smart Metering*

Zanghi, Eric (1,2); Guimaraens, Márcio André (3); Maciel, Renan (4); Lima, Rafael Carlos (3)
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1231 *The Benefits Of Smart4RES Predictive Analytics*

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1266 *Load Demand and Grid Integration of Electric Ferries: A Case Study in the Three Major Italian Lakes*

Ceraolo, Massimo (2); Lutzemberger, Giovanni (2); Mauri, Giuseppe (1); Mazzucchelli, Paolo (3); Salamone, Sara (1)
1: RSE S.p.A., Italy; 2: University of Pisa; 3: Gestione Governativa Navigazione Laghi

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1279 *Identification of a Causal Weather-QoS Model for Analysis and Planning of Distribution Networks*

Ambrosetti, Letizia; Perina, Alessandro; Adinolfi, Francesco; Laderchi, Carlo; Licasale, Gabriele; Montone, Alessio
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1288 *Assessment of the DSO's Maximum Allowable Flexibility Procurement Cost*

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1295 *Case Studies of Photovoltaic Generation in Electricity Distribution Network*

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Richaud, Luc (1); Lucas, Chloé (1); Saincy, Nicolas (2); Richard, Lucas (3); Cornelis, Marine (4)
1: Odit-e, France; 2: Nanoé, Madagascar; 3: Nanoé, France; 4: Next Energy Consumer, Italy

1302 *Integrated Physical And Probabilistic Modelling Of Low Voltage Cable Temperatures, Stress Cycles, And Damage*

McFadzean, Gordon (1); Finley, James (2); Edwards, Gruffudd (1); Tawn, Rosemary (1); Hodgins, Zoe (2); Lee, Nicole (2); Taylor, Megan (2); Ingham, Ben (3)
1: TNEI Services Ltd, United Kingdom; 2: Frazer-Nash Consultancy, United Kingdom; 3: Electricity Northwest Ltd, United Kingdom

1303 *Increasing the Resiliency of Distribution Systems with Probabilistic Planning*

Soma, Gian Giuseppe; Celli, Gianni; Pilo, Fabrizio; Pisano, Giuditta
University of Cagliari, Italy

1305 *Enhancing Load Profiles and Network Topology Records using Smart Meter Data*

Urquhart, Andrew (1); Woodruff, Jenny (2); Psarra, Iro (3); Al-Hariri, Nadim (3); Thomson, Murray (1)
1: Loughborough University, United Kingdom; 2: National Grid Electricity Distribution; 3: CGI

1329 *Predicting Local Effects of Energy Transition Through Development of a Network Observation Tool*

Vandeburie, Julien; Wehenkel, Thomas; Gerard, Simon
RESA, Belgium

1345 *IANOS Project: Integrated Solutions to Decarbonise and Improve the Resilience of Electrical Power and Energy Systems in Geographical Islands*

Ruano Rodrigues, Eduardo (1); Carvalho, Ana (1); Martins, Carlos (2); Patrão, Carlos (3)
1: EDP; 2: EDA; 3: Cleanwatts

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Prata, Ricardo (1); Podlogar, Martin (2); Davoudi, Masoud (3); Almer, Friedrich (4); Odilon, Faivre (5); Ranchere, Anne-Soizic (6)
1: E-REDES, Portugal; 2: Elektro Ljubljana, Slovenia; 3: PG&E, USA; 4: Omicron, Austria; 5: Enedis, France; 6: Nexans, France

1363 *Optimal sizing and location of Battery storage system services for Distribution Network in Egypt*

Abo Salem, Ahmed (1); Beshr, Eman H (2); Abdelsalam, Ibrahim (3)
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1364 *Active Control of MV-LV power systems highly penetrated by non-dispatchable Distributed Energy Sources (DERs)*

Rojas Delgado, Brenda (1); Alonso, Mónica (2); Temiz, Irina (1); Amarís, Hortensia (2)
1: Uppsala University, Sweden; 2: Universidad Carlos III de Madrid

1380 *Application of Probabilistic Load Flow Methodologies for Capacity Assessment: A South African Case Study*

de Bruyn, Johannes; Dalton, Amaris; Bekker, Bernard
Stellebosch University, South Africa

1391 *Contributions to Energy Management of Single-Phase AC Microgrids Used in Isolated Communities*

Bissiriou, Aziz Oloroun-Shola; Ribeiro, Ricardo L. of A.; Rocha, Thiago de O. A.; de Oliveira, Gabriel P.
Universidade Federal do Rio Grande do Norte, Brazil

1393 *Forward Feedback Effects of Distributed Flexibility Resources on Hosting Capacity Assessment*

Mousavi, Milad (1); Alvarez, Manuel (1); Zhong, Jin (2)
1: Luleå University of Technology, Sweden; 2: The University of Hong Kong

1405 *Systematic Application of Series Compensation in Distribution Networks with Control and Protection*

Veiga Claudio, Cíntia (1); F. Rissi, Guilherme (1); E. C. Figueiredo, Carlos (1); M. Duarte, Luis (2); Clodoaldo de Jesus, Nelson (2); Souza de Jesus, Willian (2); Ahn, Seun (3); Suzuki, Massayuki (3); Teixeira Duarte, Mateus (4); R. Garcia, Flávio (5); R. Almeida, Patrick (5)
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1406 *Integrated Method for Distribution Grid Expansion Planning Considering Operational Strategies of Residential Technologies*

Böttcher, Luis (1); Schumann, Klemens (1); Ulbig, Andreas (1,2)
1: IAEW at RWTH Aachen University, Germany; 2: Fraunhofer Center Digital Energy

1411 *Assessment of Potential Electrolyzer Locations Regarding Their Impact on Redispatch Demand and Hydrogen Network Operation*

Kisse, Jolando Marius
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1413 *Optimal Planning of University Campus Microgrid with High Penetration of Renewable Energy and Storage: UCCS Campus Case Study*

Masaud, Tarek; Michon, David; Nwaulu, Emmanuel
University of Colorado at Colorado Springs, United States of America

1416 *Smart Grid-Evolvability: Towards Technical Debt-Management in Smart Grids*

Schütz, Johann (1); Marx Gómez, Jorge (2)
1: OFFIS, Germany; 2: Carl von Ossietzky - Universität Oldenburg

1417 *Dynamic Current Ratings of Underground Cables for an Optimized Planning of High Voltage Distribution Grids*

Miller, Markus (1); Rudion, Krzysztof (1); Nägele, Haiko (2); Großhans, André (2)
1: University of Stuttgart, Germany; 2: Netze BW GmbH, Germany

1421 *The Role Of Digitalization In Planning And Operation Of Microgrids In Emerging Countries*

Dimovski, Aleksandar (1); Ragaini, Enrico (2); Barbieri, Jacopo (3); Albertini, Lorenzo M. F. (1); Aghahadi, Morteza (1); Mauri, Marco (1); Merlo, Marco (1)
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1425 *Distribution Planning Model Requirements for Smart Community Integration*

McGranaghan, Mark (1); Ravi Sahaya, Treisa (2); Peppanen, Jouni (3); McCormack, Eoin (1)
1: EPRI Europe, Ireland; 2: University College Dublin, Ireland; 3: EPRI, USA

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Opas, Mikael; Baranauskas, Marius; Rauma, Kalle
VTT Technical Research Centre of Finland, Finland

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Fürst, Kristoffer; Chen, Peiyuan
Chalmers University of Technology

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NMBU, Norway

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1: Enel Grids; 2: Enel Grids, Italy

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BKW Energie AG, Switzerland

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1: Universidade Federal de Santa Maria, Brazil; 2: Universidade Regional Integrada do Alto Uruguai e das Missões - URI campus Santo Ângelo, Brazil

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FEDERAL UNIVERSITY OF SANTA MARIA, Brazil

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1: D.I.E.E.I. - University of Catania, Italy; 2: Consorzio Cometa, Italy; 3: A.P.S.E.M.A. - University of Catania

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1: kepco, South Korea; 2: Hanbat University, South Korea

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1: e-distribuzione, Italy; 2: University of Rome La Sapienza, Italy

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1: Onlim Gmbh, Austria; 2: Wiener Netze GmbH, Austria

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National Grid, United Kingdom

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1: Fraunhofer Center Digital Energy, Aachen, Germany; 2: IAEW at RWTH Aachen University

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1: University of Florence, Italy; 2: TU Wien, Austria

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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

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1: LUT University, Finland; 2: Polytechnic University of Milan, Milan, Italy; 3: Pohjois-Karjalan Sähkö

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1: Vattenfall AB, Sweden; 2: Vattenfall Eldistribution AB, Sweden

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EDF, France

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ENGIE IMPACT - BRUXELLES, Belgium

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1: University of Zagreb Faculty of Electrical Engineering and Computing, Croatia; 2: Grid ONE

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1: Helmut Schmidt University / University of the Federal Armed Forces Hamburg; 2: University of Duisburg-Essen; 3: PSI GridConnect GmbH

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1: IST, Portugal; 2: INESC-ID, Portugal; 3: Smart Energy Lab

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1: ENEL, Italy; 2: e-distribuzione, Italy; 3: CESI, Italy

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1: ITI/LARSyS, Portugal; 2: IN+/LARSyS, Portugal; 3: INESC-ID, Portugal

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1: National Grid; 2: Frazer-Nash Consultancy

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1: E-REDES, Portugal; 2: INESC TEC, Portugal; 3: ENGIE Impact, Belgium; 4: NODES, Norway; 5: N-SIDE, Belgium; 6: Centrica, Belgium

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1: entellgenio GmbH, Germany; 2: Vattenfall Eldistribution AB, Sweden

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Tehran Power Distribution Company, Iran

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1: Elenia Oy; 2: Elenia Verkko Oyj, Finland

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1: Aristotle University of Thessaloniki, Greece; 2: Independent Power Transmission Operator (IPTO)

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1: Hamid haghjoo, Iran; 2: Marzeh zareh zadeh ,Iran; 3: Mehdi ashkpour motlagh

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1: i-DE, Redes Eléctricas Inteligentes, Spain; 2: IIT- Universidad Pontificia Comillas, Spain

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1: Austrian Power Grid, Austria; 2: TU Graz, Austria

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1: University of Wuppertal, Germany; 2: WSW Energie & Wasser AG

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1: KEDC Company; 2: Østfold University College, Norway; 3: IFE, Institute for Energy Technology

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1: National Grid, United Kingdom; 2: Frontier Economics, United Kingdom

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Institute of Power Transmission and High Voltage Technology, University of Stuttgart, Germany

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Green Power Denmark, Denmark

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1: Enedis, France; 2: LMD - Laboratoire de Météorologie Dynamique, France

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1: ABB, Czech Republic; 2: Brno University of Technology, Czech Republic

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1: Capgemini; 2: E-Redes

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1: Eindhoven University of Technology, Eindhoven, The Netherlands; 2: University of Twente, Enschede, The Netherlands

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ESB Networks, Ireland

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1: VITO; 2: NODES AS; 3: MITNETZ STROM; 4: Centrica Business Solutions; 5: KU Leuven/EnergyVille; 6: INESC TEC; 7: N-SIDE

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1: Helen Electricity Network Ltd, Finland; 2: LUT University

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Scottish Power Energy Networks, United Kingdom

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TNEI Services, United Kingdom

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1: SmartCom, Slovenia; 2: Elektro Celje, Slovenia

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Stedin, The Netherlands

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1: ENERGA-OPERATOR SA, Poland; 2: Polskie Sieci Elektroenergetyczne SA, Poland; 3: Narodowe Centrum Badań Jądrowych; 4: Transition Technologies-Systems Sp. z o.o.

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SP Energy Networks, United Kingdom

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1: SINTEF Energi AS, Norway; 2: Lede AS, Norway

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University of Ljubljana, Faculty of Electrical Engineering, Slovenia

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1: University of Oviedo supported by Phoenix Contact, Spain; 2: Norwegian University of Science and Technology, Norway

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1: G2ELAB, France; 2: ENEDIS, France

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1: Smart Innovation Norway; 2: UiT Campus Narvik

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1: VTT Technical Research Centre of Finland, Finland; 2: MSc Electronics, Finland; 3: THT Control, Finland; 4: Caruna, Finland

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Yoon, DeukSeon (1); Kim, Kyunghoon (2); Lee, Junho (3)
1: KEPCO ES, South Korea; 2: KEPCO ES, South Korea; 3: KEPCO ES, South Korea

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Geth, Frederik (1); Vanin, Marta (2); Van Hertem, Dirk (2)
1: GridQube, Australia; 2: KU Leuven and Energyville, Belgium

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Maki, Kari (1); Aro, Matti (1); Agwan, Utkarsha (2); Das, Hari Prasanna (2); Lin, Yu-Wen (2); Spanos, Costas (2)
1: VTT Technical Research Centre of Finland, Finland; 2: University of California Berkeley, USA

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1: Aalto University, Finland; 2: Sharif University of Technology; 3: North China Electric Power University; 4: Geologian tutkimuskeskus

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Graham, Shauna; Pollock, Jonathan; Clarke, Anne
NIE Networks, United Kingdom

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1: enel grids, Italy; 2: enel grids, Spain; 3: enel grids, Colombia; 4: enel, Italy

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McSweeney, Liam (1); Haben, Stephen (2); Young, Samuel (2)
1: National Grid Electricity Distribution, United Kingdom; 2: Energy Systems Catapult

990 *FLEX - Winter Trial Of Flexibility Services In Northern Ireland*

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1: EA Technology, United Kingdom; 2: Northern Ireland Electricity Networks, United Kingdom

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1: E.ON Hungary, Hungary; 2: Budapest University of Technology and Economics, Hungary

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Jones, Lewis; McSweeney, Liam
National Grid Electricity Distribution, United Kingdom

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De Moliner, Anne; Cauchois, Pierre
Enedis, France

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National Grid Electricity Distribution, United Kingdom

1051 *Grid-Friendly Renewable Energy Communities Using Operating Envelopes Provided by DSOs*

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Schaefer, Edmund (1,2); Desta, Yohannes (1); Goselink, Erik (1); Hoogsteen, Gerwin (2); Hurink, Johann (2); van Leeuwen, Richard (2)
1: Saxion University of Applied Sciences, University of Twente, The Netherlands; 2: University of Twente, the Netherlands

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1: National Technical University of Athens, Greece; 2: University of Western Macedonia, Greece

1062 *Development Possibilities of Distribution Network Service Charges of Low-Voltage Customers – Apartment Houses as Energy Communities*

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Thorvaldsen, Kasper Emil; Kiel, Erlend; Sæle, Hanne
Sintef Energy Research, Norway

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1080 *Technical Impacts of the Deployment of Renewable Energy Communities on Electricity Distribution Grids*

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Weiss, Xavier (1); Nordström, Lars (1); Berlin, Arne (2)
1: KTH Royal Institute of Technology, Sweden; 2: Vattenfall Eldistribution AB

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1099 *Review of Emerging Advanced Smart Charging Flexibility Business Models*

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1107 *Empowering Consumers with 100 % Green Power Solution*

Bakre, Sharad; Khan, Salman
The Tata Power Company Limited, India

1110 *Multi-Criteria Criticality Indexing Method of Power Transformers Based on a Bi-Level Analytic Hierarchy Process*

Zou, Yunyang (1); Yan, Ziming (1); Cho, Sungin (2); Xu, Yan (1)
1: Nanyang Technological University, Singapore; 2: SP PowerGrid Ltd (SPPG)

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Nunes Reis, Lindemberg; Vieira, Samuel; Malheiros Nunes, Lucas
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1121 *Automated Development of the Software Model of the Distribution Network Based on Field Collected Data and GIS Coordinates*

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1: DMCC Engineering, Ukraine; 2: DMCC Europe, France; 3: ENERGO-PRO Georgia, Georgia

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1: Enedis, France; 2: EDF R&D, France

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Elektro Ljubljana, Slovenia

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Dept. of Electrical and Electronic Engineering, Chungnam National University

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Vanhanen, Tuomas (1,2); Järventausta, Pertti (1)
1: Tampere University, Finland; 2: City of Tampere, Finland

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Rossi Ashton, Sam
Western Power Distribution, United Kingdom

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1: FGH e.V., Germany; 2: RWTH Aachen University, Germany

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1: University of Wuppertal, Germany; 2: Yncoris GmbH & Co. KG, Germany

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Melone, Joseph (1); Wyatt, David (2); Bhagavathy, Priya (1); Coffele, Federico (1)
1: PNDC - University of Strathclyde, United Kingdom; 2: Energy Systems Catapult, United Kingdom

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1: E-REDES, Portugal; 2: ENEDIS, France

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1: University of Belgrade; 2: VF Holding doo, Serbia

1247 *Climate Analysis to Prevent Risk to Distribution Network Assets*

Dodds, Charlie; Miller, Susan; Bebbington, Malcolm; Jones, Matthew; Cupples, David; Campbell, Alexandra
SP Energy Networks, United Kingdom

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1394 *A Review on Local Flexibility Market Advancement: Practices in Nordic Countries*

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1: Luleå University of Technology, Sweden; 2: The University of Hong Kong

1400 *Standardization ISO55000 & PAS55*

Valbuena, Ivan; Morales, Carolina
Enel Colombia, Colombia

1404 *Method for the Assessment of Structural Parameters for Distribution Grid Cost Drivers*

Böttcher, Luis; Braun, Simon; Selimaj, Antigona; Ulbig, Andreas
IAEW at RWTH Aachen University, Germany

1430 *Industrialization And Automation Of AI-based Services Modernizing Low Voltage Network Through The BD4OPEM Platform*

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1: Clausthal University of Technology, Germany; 2: Xi'an Jiaotong University, China

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Chrysanthopoulos, Nikolaos; Papadaskalopoulos, Dimitrios; Strbac, Goran
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1498 *Proactive Complaint Management witch ClientID*

Raposo, Davide (1); Graça, Inês (1); Silva, Cristiana (1); Preto, Isabel (2)
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