

A1: Asset Management in Zeiten der Energietransformation

Value Creation through Optimal Thermal Operation of Power Transformers - Future Perspectives.....	1
Alexander Alber (Maschinenfabrik Reinhausen GmbH, Germany)	
Enhanced Condition Monitoring with Wireless Sensor Networks in HVDC Stations.....	7
John H Castellanos and Kevin Schoenleber (Hitachi Energy Research, Germany); Bernhard Deck and Andrew Fairbrother (Hitachi Energy Research, Switzerland); Rahul Gore (Hitachi Energy Research, Sweden); Michael Gratza (TenneT TSO GmbH, Germany); Jochen Jung (TenneT Offshore GmbH, Germany)	
Erzeugung digitaler Zwillinge von Umspannwerken mittels unbemannter Luftfahrzeugsysteme als Bestandteil des Asset Managements.....	13
Philipp Elfers and Sebastian Azer (Jade University of Applied Sciences, Germany); Stephan Mörke and Simon Konzelmann (TenneT TSO GmbH, Germany)	
Determination of Budgets in Asset Management for Maintenance and Renewal Measures based on a Cross-Sectoral Condition Assessment	19
Fabian Göbelsmann (University of Wuppertal, Germany); Roberto Ferrari (Veenker Ingenieurgesellschaft mbH, Germany); Jan Tromnau (EWE NETZ GmbH, Germany); Markus Zdrallek (Bergische Universität Wuppertal, Germany)	

B1: Systemführung des zukünftigen Energiesystems

Alarm Flood Analysis By Distance Measures and Clustering Methods	27
Susanne Schmitt and Georgios Mitrentsis (Hitachi Energy, Germany); Asma Motmem (Universität Heidelberg, Germany)	
Test Scenario Generation for Distribution Grid Control	33
Georgios Mitrentsis and Susanne Schmitt (Hitachi Energy, Germany); Marco Giuntoli (Hitachi Energy Germany AG, Germany); Faiq Ghawash (Hitachi Energy Research, Germany); Milos Subasic (Hitachi Energy, Germany); Zhenyuan Wang (Hitachi Energy Research, USA); Adam Ksiezyk (Hitachi Energy Research, Poland); Iiro Harjunoski (Hitachi Energy, Germany)	
pandaict: a Novel Open-Source Tool for modeling Cyber-Physical Energy Systems	39
Jan Ringelstein, Frank Marten and Mike Vogt (Fraunhofer IEE, Germany); Gourab Banerjee (Fraunhofer IEE & University of Kassel, Germany); Johannes Bao (TU Dortmund, Germany)	

Implementation of a Dynamic Security Assessment - experiences and challenges from a TSO perspective	47
Valeri Franz, Bernhard Fuchs, Stefanie Samaan, Fabio Silva Andrade, Nicolas Schulte, Markus Knittel, Daniel Henschel and Tobias Hennig (Amprion GmbH, Germany)	

C1: Innovative Betriebskonzepte und Geschäftsmodelle

Leveraging Inherent Thermal Cable Reserves for Curative System Operation	55
Carsten Gattermann (Technische Universität Ilmenau, Germany); Adam Kwiatkowski (50Hertz Transmission GmbH, Germany); Steffen Schlegel and Dirk Westermann (Ilmenau University of Technology, Germany)	

Einsatz von kurativer Netzführung zur Erhöhung der Strombelastbarkeit von Freileitungen im Normalbetrieb	63
Lucia Schnee and Markus Miller (University of Stuttgart, Germany); Krzysztof Rudion (Universität Stuttgart, Germany); Philipp Schmid and Mark Heck (Netze BW GmbH, Germany)	

Transferring Curative System Operation Principles to Distribution Systems: Practical Insights into Opportunities and Challenges	70
Kathrin Schaarschmidt (LEW Verteilnetz, Germany); Nils Bornhorst (Universität Kassel, Germany); Andrea Schoen (Fraunhofer IEE & University of Kassel, Germany); Johannes Heid (University of Kassel & Fraunhofer IEE, Germany); Jan Wiemer (Fraunhofer IEE, Germany & University of Kassel, Germany); Maximilian Borning, Sebastian Stermann and Ingo Liere-Netheler (Westnetz GmbH, Germany); Tammo Fleßner (Alterric Deutschland GmbH, Germany); Jonas Derpmann (Amprion GmbH, Germany); Ananya Kuri (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany & Siemens AG, Germany); Mathias Duckheim and Jan Henzgen (Siemens AG, Germany); Stefan Niessen (Siemens AG, TU Darmstadt, Germany); Denis Mende (Fraunhofer IEE & University of Kassel, Germany); Lukas Holicki (WRD Wobben Research and Development GmbH, Germany); Angela Maria Gamba Cardenas and Thomas Fabian (Fraunhofer IEE, Germany)	

Algorithmically Creatable Reliability Block Diagrams for Special Protection Schemes According to the Single-Pass Model for Curative Congestion Management	75
Bartosz Musiol (Bergische Universität Wuppertal, Germany); Christian Thöne (Amprion GmbH, Germany); Markus Zdrallek (Bergische Universität Wuppertal, Germany)	

D1: Leistungselektronik als Schlüsselkomponente im neuen Energiesystem

Untersuchungen zum DC FRT in einem Multi-Terminal Hub-System	81
Ammar Salman (Fraunhofer Institute for Solar Energy Systems ISE, Germany & Fraunhofer, Germany); Robin Grab (Fraunhofer Institute for Solar Energy Systems ISE,	

Germany); Roland Singer and Sönke Rogalla (Fraunhofer-Institut Für Solare Energiesysteme ISE, Germany)

Modulare AC/DC-Umrichterstation als Baustein Fehlertoleranter Mittelspannungs-Gleichstromnetze 88

Thomas Brückner, Sven Marquardt, Ali Sharaf Addin and Florian Zimmert (Universität der Bundeswehr München, Germany)

Hochleistungs-Ladeinfrastruktur für eine ressourceneffiziente Mobilitätswende - Innovative Lösungen mit MS-DC-Netzen in regenerativen LadeHubs..... 94

Christian Schöner, Andreas Hensel, David Derix and Jürgen Thoma (Fraunhofer ISE, Germany); Christian Blaum (Sumida Components and Modules GmbH, Germany); Christoph Drexler, Jonas Pfeiffer and Michael Schmidhuber (SUMIDA Components & Modules GmbH, Germany)

Conceptualizing the protection properties of DC networks: Functional requirements on DC protection systems..... 102

Fabian Benedikt Witt (TU Braunschweig, Germany & elenia - Institut für Hochspannungstechnik und Energiesysteme, Germany); Patrick Vieth (TU Braunschweig, Germany); Melanie Hoffmann (Vattenfall Europe Windkraft GmbH, Germany); Marc René Lotz (Elenia Institute for High Voltage Technology and Power Systems & Technische Universität Braunschweig, Germany); Michael Kurrat (TU Braunschweig, Germany)

E1: Projekte und Anwendungen für eine beschleunigte Energiewende

Heuristic Optimization for Automated Low Voltage Grid Restructuring and Transformer Placement..... 110

Jan Wiemer (Fraunhofer IEE, Germany & University of Kassel, Germany); Julian Dollichon (Fraunhofer Institute for Energy Economics and Energy System Technology, Germany); Alexander Scheidler (Fraunhofer Institut für Energiewirtschaft und Energiesystemtechnik IEE, Germany); Martin Braun (Fraunhofer Institut für Energiewirtschaft und Energiesystemtechnik IEE & Universität Kassel, Germany)

Scenario Development and Grid Expansion Planning: An Innovative Approach for Addressing the New German EnWG 14d Requirements..... 117

Marie Fischer, Ulf Müller, Jan Ulfers and Carsten Pape (Fraunhofer Institut für Energiewirtschaft und Energiesystemtechnik IEE, Germany); David Geiger (Fraunhofer-Institut für Energiewirtschaft und Energiesystemtechnik IEE, Germany); Martin Braun (Fraunhofer Institut für Energiewirtschaft und Energiesystemtechnik IEE & Universität Kassel, Germany)

Effiziente Netzplanung im Zeitalter erneuerbarer Energien: Simulation und Optimierung für Niederspannungsnetze 125

Benny Gottschalk and Carsten Jungandreas (University of Applied Sciences Zwickau, Germany); Tobias Nachtwey and Ronny Kreißl (Stadtwerke Jena Netze GmbH, Germany); Mirko Bodach (Zwickau University of Applied Science, Germany)

Automated Multi-Criteria Planning for the Expansion and Reinforcement of Electrical Grids	132
Hendrik Maschke, Lars-Peter Lauven and Nikola Lukic (Fraunhofer IEE, Germany); Martin Braun (Fraunhofer Institut für Energiewirtschaft und Energiesystemtechnik IEE & Universität Kassel, Germany)	

A2: Asset Management in Zeiten der Energietransformation

Stochastic optimization of energy usage with uncertain input data	138
Alexander Hoppert (Fraunhofer IOSB-AST, Germany); Martin Winkelkotte (Technische Universität Ilmenau, Germany); Steffi Naumann (Fraunhofer IOSB, Germany); Peter Bretschneider (University of Technology Ilmenau, Germany)	
Development of an Identification Method for Locations of grid-serving Flexibilities in a sectoral-coupled Distribution Grid	145
Elisabeth Feldhoff, Christoph Regele and Joachim Kabs (Bayernwerk Netz GmbH, Germany)	
Modellierung von Verteilnetzen der Zukunft: Bedeutung des Netzentwicklungsplans für die Niederspannung	153
Lars Quakernack (Hochschule Bielefeld, Germany); Jens Haubrock (Bielefeld University of Applied Sciences, Germany); Thomas Engelmann (Hochschule Bielefeld - University of Applied Sciences and Arts, Germany)	
Energiewende in Musterhausen: Modellierung der Energieinfrastrukturentwicklung einer Musterkommune	159
Björn Uhlemeyer (BMU Energy Consulting GmbH, Germany); Markus Zdrallek (Bergische Universität Wuppertal, Germany); Friederike Wenderoth (University of Kassel, Germany); Oliver Koch (Bergische Universität Wuppertal, Germany)	

B2: Systemführung des zukünftigen Energiesystems

Subset Simulation as an Advanced Monte Carlo Method for Analyzing the Small Signal Stability of Electric Power Systems Under Consideration of Uncertainties	167
Lukas Wieckhorst (Leibniz University Hannover, Germany); Lutz Hofmann (Leibniz Universität Hannover, Germany)	
Frequency stability analysis for automatic Frequency Restoration Reserve exchange between asynchronous areas via HVDC interconnectors	174
Boyana Georgieva (IFK Universität Stuttgart, Germany); Simon Remppis (TransnetBW GmbH, Germany); Hendrik Lens (Institute of Combustion and Power Plant Technology, University of Stuttgart, Germany)	

Development of Short-Circuit Current Levels in Transmission Grids and Investigation of a Control-Based Reduction of the Short-Circuit Current Contributions from Power Units with Full-Size Converters 180

Marco Harms (TenneT TSO GmbH, Germany); Lucas Reus (Leibniz University Hannover, Germany); Florian Rauscher (Tennet TSO GmbH, Germany); Lutz Hofmann (Leibniz Universität Hannover, Germany)

Enhancing Grid Stability in Low-Inertia, Converter-Dominated Systems: Modular Architecture and Dynamic Assessment Solutions..... 188

Mira Hanna, Nora Philippi and Patrick Gierl (PSI Software SE, Germany); Tobias Pletzer and Stefan Dalhues (PSI Software AG, Germany); Diana Strauss-Mincu, Simon Eberlein and Ali Daoud Abdallah Alshawabkeh (Fraunhofer IEE, Germany); Stephan Ruhe (Fraunhofer IOSB-AST, Germany); Thomas Degner (Fraunhofer IEE, Germany); Markus Mirz (PSI Software SE, Germany); Carsten Heising (Avasition GmbH, Germany); André Kummerow (Advanced System Technology (AST) Branch of Fraunhofer IOSB, Germany)

C2: Innovative Betriebskonzepte und Geschäftsmodelle

Impact of Market-Based and Grid-Friendly Flexibility Behaviors on Grid Utilization and Grid Expansion Planning 194

Florian Hirschmann (University of Kassel, Germany); Lars-Peter Lauven (Dortmund University of Technology & Fraunhofer Institut für Energiewirtschaft und Energiesystemtechnik IEE); Martin Braun (Fraunhofer Institut für Energiewirtschaft und Energiesystemtechnik IEE & Universität Kassel, Germany)

Coordination of Demand-Side Flexibility Resources for Preventive Congestion Management in Distribution Systems 202

Finn Nußbaum, Anna-Lena Steen, Payam Teimourzadeh Baboli and Christian Becker (Hamburg University of Technology, Germany)

Unlocking Flexibility in District Heating Networks by Agent-Based Coupling of Scheduling Optimization and Simulation..... 210

Susanne Sumi and Jonas Pemsel (Fraunhofer IOSB-AST, Germany); Steffi Naumann (Fraunhofer IOSB, Germany); Silvan Schwebke (Iqony Energies GmbH, Germany)

Proposing an Optimization Model for a techno-economic Evaluation of Energy Storage Systems 218

Andreas Stadler (FENES OTH Regensburg, Germany); Hermann Kraus (OTH Regensburg, Germany); Oliver Brückl (Ostbayerische Technische Hochschule Regensburg, Germany)

D2: Leistungselektronik als Schlüsselkomponente im neuen Energiesystem

Virtual Synchronous Generators and Adaptive Inertia: Frequency Stabilization in Converter-dominated Power Systems.....	224
Alexander Och, Irina Zettl, Alexander Winkens, Mourad Kharrat and Andreas Ulbig (RWTH Aachen University, Germany)	
The Provision of Instantaneous Reserve from MVDC Grids in the Transitioning Power System	230
Julian Richter (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany); Stephan Rupp (Maschinenfabrik Reinhausen & Duale Hochschule Baden-Württemberg, Germany); Sebastian Brüske (Maschinenfabrik Reinhausen, Germany); Ananya Kuri (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany & Siemens AG, Germany); Gert Mehlmann (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany); Matthias Luther (University of Erlangen-Nürnberg, Germany)	
A Comparative Study of P-f Droop Control and Isochronous Control for Grid-Forming Inverters in Isolated Hybrid Power Systems	238
Lucas Reus and Robin Strunk (Leibniz University Hannover, Germany); Marco Alferink and Kai Michels (University of Bremen, Germany); Axel Mertens and Lutz Hofmann (Leibniz Universität Hannover, Germany)	
Inner Grid-Forming Control Loops - Considerations for Physically Meaningful Controls.....	246
Moritz Hildebrandt, Hendrik Westphal, Christian Neumann and Michael Schütt (University of Rostock, Germany); Hans-Günter Eckel (Universität Rostock, Germany)	

E2: Projekte und Anwendungen für eine beschleunigte Energiewende

Evaluation of a Grid State Identification through Cable Distribution Cabinet Measurements in a Real Low-Voltage Grid	254
Eric Dürholt (University of Wuppertal, Germany); Bastian Bauhaus (SWKiel Netz GmbH, Germany); Markus Zdrallek (Bergische Universität Wuppertal, Germany)	
A modular Architecture for Congestion Management using Cross Voltage Level Power Flow Controllers and Energy Hubs	260
Christian H. Nerowski (TU Dortmund University, Germany); Simon Grafenhorst (Karlsruhe Institute of Technology, Germany); Susanne Schmitt (Hitachi Energy, Germany); Martin Lindner (Hitachi Energy Germany AG, Germany); Kevin Förderer (Karlsruhe Institute of Technology, Germany); Christian Rehtanz (TU Dortmund University, Germany); Veit Hagenmeyer (Karlsruhe Institute of Technology, Germany)	

Netzfreundliches Laden in Wohngebieten: Innovative Betriebskonzepte und Flexibilitätsnutzung für eine zukunftsweisende Ladeinfrastruktur 266

Julia Vopava-Wrienz (Montanuniversität Leoben, Austria); Joachim Fabini (TU Wien, Austria); Markus Peyreder (Energienetze Steiermark GmbH, Austria); René Braunstein (Energienetze Steiermark, Austria); Thomas Kienberger (Montanuniversität Leoben, Austria)

Laboratory-Based Testing of Future Use Cases of Intelligent Measurement Systems Using Controller- and Power-Hardware-In-The-Loop..... 273

Thomas Schwierz, Florian Weißberg and Christian Rehtanz (TU Dortmund University, Germany); Georg Kofler (EMH Metering GmbH & Co. KG, Germany); Dominik Hilbrich (Fraunhofer-Institut für Energiewirtschaft und Energiesystemtechnik, Germany)

Poster Session: Asset Management

Analysis of the Grid Impact of a new Sector-Coupled Control Strategy with Power-to-Heat Systems in a Hardware-in-the-Loop Experiment 282

Frank Marten, Lina Wett, Daniel Ackermann, Benjamin Requardt and Colin Jacob Waschner (Fraunhofer IEE, Germany); Lothar Behringer (Stadtwerke Neuburg a. d. Donau, Germany); Anna Cadenbach (Fraunhofer IEE, Germany); Ahmet Bayraktar (ENERPIPE GmbH, Germany)

Entwicklung eines Zielnetzkonzeptes für das Hochspannungsnetz in Bremen 289

Dennis Apelt (Hochschule Bremen, Germany & wesernetz Bremen GmbH, Germany); Thomas Kumm (Hochschule Bremen, Germany); Jan-Christoph Bönke (wesernetz Bremen GmbH, Germany)

The path to data-driven holistic condition monitoring and optimization 295

Matthias Canisius and Leyla Asgarieh (Hitachi Energy Germany AG, Germany); Sourav Adhya (Hitachi Energy, Poland); Michael Gratza (TenneT TSO GmbH, Germany); Jochen Jung (TenneT Offshore GmbH, Germany); Björn Heling (TenneT TSO GmbH, European Union)

Modernization of Legacy Building Management Systems to Meet Future Requirements in Industrial Companies 302

Hannes Peter Wasser, Stephan Balischewski and Andre Pomraenke (Fraunhofer Institute for Factory Operation and Automation IFF, Germany); Marc Richter (Fraunhofer IFF Magdeburg, Germany)

Poster Session: Innovative Betriebskonzepte und Geschäftsmodelle für eine klimaneutrale und nachhaltige Energieversorgung

Optimierung einer saisonalen Parametrierung des Zusammenspiels aus zwei Betriebsführungsstrategien von stationären Batteriespeichern in Industriestromnetzen.....	308
Malte Schneidewind (Hochschule Bielefeld & DENIOS SE, Germany); Jannis Kreutzer (Hochschule Bielefeld, Germany); Jens Haubrock (Bielefeld University of Applied Sciences and Arts, Germany)	
Thermal energy transmission in Gevensleben - a feasibility study of the sector coupling between wind energy and district heating network	314
Robin Langemann (Technical University Brunswick, Germany & Landwind-Gruppe, Germany); Julia Gottsmann and Ann-Kathrin Dreier (Steinbeis Innovationszentrum energieplus, Germany)	
Multi-Stage Planning of Decarbonized Suburban Heating Supply under Consideration of Prosumer Economics.....	320
Mariem Nouicer (Siemens & TU Darmstadt, Germany); Dominik Husarek (Siemens AG, Germany); Julia Pössinger and Joshua Jakob (Bergische Universität Wuppertal, Germany); Moritz Edinger and Bastian Bauhaus (SWKiel Netz GmbH, Germany); Stefan Niessen (Siemens AG, TU Darmstadt, Germany)	
Non-discriminatory congestion management scheme for consumer curtailment in low voltage distribution grids	328
Laura Fiedler (TUD Dresden University of Technology, Germany & Institute of Electrical Power Systems and High Voltage Engineering, Germany); Peter Schegner (TU Dresden, Germany)	
Reduction of peak loads in the commercial sector based on time-based optimization of power signatures at device level	337
Mathias Herget (University of Applied Sciences Fulda, Germany); Lukas Böhning and Ulf Schwalbe (Hochschule Fulda, Germany)	
Untersuchung der Sensitivität der Netzbelastung bezüglich der Durchdringung dynamischer Stromtarife	345
Hannes Hanse and Ines Hauer (Technische Universität Clausthal, Germany)	
Technical and economical analysis of bidirectional charging considering wear-costs and variable efficiency factors.....	353
Lukas Ebbert, Matthias Klintz and Regine Mallwitz (Technische Universität Braunschweig, Germany); Bernd Engel (TU Braunschweig, Germany)	

Pilot Node Method Applied to Grid-Forming Converter to Supply Instantaneous Reserve from the Distribution Grid	361
Nizam Halawi and Hassan Alhoms (Ilmenau University of Technology, Germany); Franz Linke (Research Fellow, Germany); Steffen Schlegel and Dirk Westermann (Ilmenau University of Technology, Germany)	
Proof of Concept: Grid Parameter Estimation and Optimal Power Flow Applied to a Physical Low-Voltage Grid Model.....	367
Johannes Rolink (University of Applied Sciences Emden/Leer, Germany)	
Reliability-Oriented Routing Metric for OSPF Protocol Applications in Transmission System Operator Use Cases	375
Christian Thöne (Amprion GmbH, Germany); Bartosz Musiol and Markus Zdrallek (Bergische Universität Wuppertal, Germany)	
Possible Contributions of Electrolysis Systems to Grid Stability	381
Sven Schumann (OEM & Siemens Energy, Germany); Marvin Bendig and Fisnik Loku (Siemens Energy, Germany); Sebastian Rehkopf, Markus Glanz and Moritz Bengler (Maschinenfabrik Reinhausen, Germany)	
 Poster Session: Künstliche Intelligenz im Energiesystem	
Methodology for the estimation of the flexibilization potential of household consumers in electrical grids	387
Kyriaki Koutrouveli and Omar Elattar (Technische Hochschule Nürnberg Georg Simon Ohm, Germany); Ivana Mladenovic (Technische Hochschule Nürnberg, Germany); Christiane Dettelbacher (Technische Hochschule Nürnberg Georg Simon Ohm, Germany)	
Use of large language models to classify failure modes in damage notifications from transmission systems	395
Sahar Khaleghian, Thomas Küfner, Maximilian Brüggemann and Zahra Rahmati (TenneT TSO GmbH, Germany)	
Künstliche Intelligenz im Netzbetrieb und in der Netzplanung: Herausforderungen und Lösungsansätze	401
Andreas Kubis (c.con Management Consulting GmbH, Germany); Eric Veith (OFFIS - Institut für Informatik, Germany); Isabell Holtkamp (c.con Management Consulting GmbH, Germany)	
Power Quality State Estimation on base of Neural Networks and Fast Fourier Transform.....	409
Patrick Mack, Marcel Krämer, Markus de Koster and Patrick Lehnen (Technische Hochschule Köln, Germany); Eberhard Waffenschmidt (TH Köln, Germany); Ingo Stadler (Cologne University of Applied Sciences, Germany)	

Poster Session: Leistungselektronik als Schlüsselkomponente im neuen Energiesystem

- Quantifying the Impact of Subperiodic Loads on Impedance Characteristics - An Approach for Selecting Suitable Measurement Methods 418**
 Johannes Schröder, Patrick Möbius, Jonas Josepeit and Detlef Schulz (Helmut-Schmidt-University, Germany); Robert Stiegler (Technische Universität Dresden, Germany); Jan Meyer (TUD Dresden University of Technology, Germany)
- SUREVIVE - Stabilitätsversuche zur Momentanreserve-Erbringung aus Verteilnetz-Anlagen 426**
 Oliver Schillinger (Westnetz GmbH & E.ON SE, Germany); Tilman Wippenbeck and Jana Messmer (Westnetz GmbH, Germany); Volker Schöller and Tobias Holst (Schoenergie GmbH, Germany); Hendrik Lens (Institute of Combustion and Power Plant Technology, University of Stuttgart, Germany); Boyana Georgieva (IFK Universität Stuttgart, Germany); Roland Singer (Fraunhofer-Institut Für Solare Energiesysteme ISE, Germany); Rebekka Denninger (Fraunhofer-Institut für Solare Energiesysteme ISE, Germany)
- Short-Circuit Current Contribution of Power Electronic Converters 429**
 Götz Lipphardt (Hochschule Bochum, Germany); Thomas Hunger (Hochschule Mannheim, Germany)
- Conceptual studies of a smart, self-sufficient energy system utilizing modular multiport converter for connecting green generators via a DC bus 437**
 Luis Sievers (Bonn-Rhein-Sieg UAS, Germany); Daniel Haake (Fraunhofer IEE, Germany); Sebastian Sprunck (Fraunhofer Institute for Energy Economics and Energy Systems Technology, Germany); Lars Lindner (Fraunhofer IEE, Germany); Bikash Sah and Michael Bareev-Rudy (Hochschule Bonn-Rhein-Sieg, Germany); Marco Jung (Bonn-Rhein-Sieg UAS, Germany); Tanja Clees (Hochschule Bonn-Rhein-Sieg, Germany)
- A Modular and Flexible Power System Test Grid for Stability and Protection Analysis of Converter-Dominated Grids 444**
 Johannes Leugner (Siemens AG Germany, Germany); Jonathan Loebel (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany); Kai Trunk and David Da Cruz (Siemens AG Germany, Germany); Christian Scheibe (Siemens, Germany)
- Einsatz von modular aufgebauten, fortschrittlichen Stromflussreglern zur Erhöhung und Flexibilisierung der Leistungsfähigkeit von Hochspannungsnetzen 451**
 Peter Johannes Birkner (House of Energy & Bergische Universität Wuppertal, Germany); Anja Schaldach (House of Energy, Germany); Camillo Banfi (m3 Management Consulting GmbH, Germany); Mark Norton (Smart Wires Inc., Germany); Hedd Roberts (Smart Wires Inc., United Kingdom (Great Britain)); Suresh Kumar Thiyagarajan (Avacon Netz GmbH, Germany)
- Method to define a supply task for research on DC distribution networks 459**
 Milad Rahimipour Behbahani, Filipe Ricardo Gadotti, Steffen Schlegel and Dirk Westermann (Ilmenau University of Technology, Germany)

Holistic design and optimization framework for power electronic systems with special consideration of limited data bases 464

Sven Fießer (University of Applied Science Fulda & Technical University of Ilmenau, Germany); Ulf Schwalbe (Hochschule Fulda, Germany)

Control zone balance control for power grid operation with voltage angle-based control 471

Hassan Alhomsy (Ilmenau University of Technology, Germany); Franz Linke (Research Fellow, Germany); Steffen Schlegel and Dirk Westermann (Ilmenau University of Technology, Germany)

Poster Session: Projekte und Anwendungen

AMYGO: Automated Modular Energy Grid Optimization 477

Yannic Harms (Fraunhofer IEE, Germany); Denis Mende (Fraunhofer IEE & University of Kassel, Germany); Lothar Löwer (Fraunhofer IEE, Germany); Steffen Meinecke and Nicolai Damm (Universität Kassel, Germany); David Sebastian Stock (Fraunhofer IEE, Germany)

Entwicklung eines Monitoringsystems zur Zustandsbewertung von Niederspannungskabeln basierend auf Breitband-Powerline-Kommunikation..... 485

Thorsten Klauke-Queder (Universität Duisburg-Essen, Germany & Fakultät für Ingenieurwissenschaften (IngWi), Germany); Michael Kreisköther (AMPERIAS GMBH, Germany); Johannes Hampel (iAd GmbH, Germany); Amirali Mahjoob (RWTH, Germany & IAEW, Germany)

Digital Twin of Hydrogen Storage Infrastructure for Long-Term Energy Storage..... 492

Lukas Böhning (Hochschule Fulda, Germany); Sven Fießer (University of Applied Science Fulda & Technical University of Ilmenau, Germany); Mathias Herget (University of Applied Sciences Fulda, Germany); Patrick Stock and Ulf Schwalbe (Hochschule Fulda, Germany)

Vernetzte Reallabore mit intelligenter Entscheidungsunterstützung zur energieoptimierten Flexibilisierung durch Sektorenkopplung 500

Melina Gurcke (Hochschule Bielefeld, Germany); Jens Haubrock (Bielefeld University of Applied Sciences, Germany); Laura Kockhans, Leif Donar Brandhorst and Sebastian Bamberg (Hochschule Bielefeld - University of Applied Sciences and Arts, Germany); Henning Rahlf and Paul Hahn (Paderborn University, Germany); Julia Eberharter (Horizonte Group Technik, Germany); Arne Lazar and Robin Kreipe (Westfalen Weser Netz GmbH, Germany); Angelika Maier (Energie Impuls OWL, Germany); Peter Westerbarkey (Westaflexwerk GmbH, Germany)

Transparent and flexible energy system analysis: The method of the point cloud..... 507

Fabian Roos, Richard Eckerle, Martin Sauter and Thomas Weyh (Universität der Bundeswehr München, Germany); Dennis Helmut (University of the Bundeswehr Munich, Germany)

Kosteneffiziente Energieversorgung durch PV-Inselsysteme: ein Ansatz zur Elektrifizierung ländlicher Gebiete in Afrika.....	517
Madani Drave, Fabian Roos, Richard Eckerle and Thomas Weyh (Universität der Bundeswehr München, Germany); Dennis Helmut (University of the Bundeswehr Munich, Germany); Anton Lesnicar (Lehrbeauftragter, Germany)	

Poster Session: Systemführung des zukünftigen Energiesystems

Why the Implementation of a Smart Metering Infrastructure in Germany should lead us to a Closed Internet of Energy Architecture?.....	526
Manuel Wickert and Jonathan Bergstraesser (Fraunhofer IEE, Germany)	

Durations of missing zero crossings of fault current contributions from shunt reactors	534
Constantin Balzer (Hitachi Energy Germany AG, Germany & PowerConsulting, Germany); Tobias Rodler (TenneT TSO GmbH, Germany)	

IT Security Aspects of Integrating the German Balancing Reserve into the Smart Metering Infrastructure.....	540
Fabio Stoll, Joachim Gerlach, Jessica Roevekamp and Benjamin Pottkamp (Hochschule Albstadt-Sigmaringen, Germany)	

Systematischer Vergleich der Glättungseffekte von Lastprofilen	547
Christoph Stegner (ZAE Bayern, Germany)	

Digitaler Produktpass 4.0: Enabler des Energiesystems der Zukunft - Digitaler Zwilling und Datenmodelle für automatisierte Anmelde- und Betriebsprozesse	555
Johannes Stein (VDE, Germany); Christian Diedrich (Otto-von-Guericke-Universität Magdeburg, Germany); Thomas Duerr (Siemens AG & Siemens Ag France, Germany)	

Interoperability in Energy Systems: Identifying Challenges and Innovations in Metering Operations and Data Sharing in Germany	564
Hela Cuzic, Jonathan Bergstraesser and Volker Berkhout (Fraunhofer IEE, Germany)	

OpenEnergyTwin - Open, Interoperable and User-Centered Platform for Sustainable Energy Systems	572
Michael Brand, Jan-Henrik Bruhn and Nils Huxoll (OFFIS - Institute for Information Technology, Germany); Sebastian Lehnhoff (University of Oldenburg & OFFIS - Institute for Information Technology, Germany); Florian Schmidtke, Nikolaus Wirtz and Michael Andres (Fraunhofer FIT, Germany); Armin Fatemi, Antigona Selimaj and Andreas Ulbig (RWTH Aachen University, Germany)	

A Digital Twin Implementation of a Low Voltage Residential Area.....	579
Timo Wagner (Friedrich-Alexander Universität Erlangen- Nürnberg, Germany); Florian Zier, Andreas Bammes and Gert Mehlmann (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany); Matthias Luther (University of Erlangen-Nürnberg, Germany)	
Assessing the impact of cyber-physical incidents on optimal power flow results in distribution systems.....	586
Eric Tönges and Max Wiegand (University of Kassel, Germany); Johannes Heid (University of Kassel & Fraunhofer IEE, Germany)	
A Sensitivity-based Congestion Management Method for Low Voltage Grids.....	593
Lorenz Dallinger (University of Kassel, Germany); Johannes Heid (University of Kassel & Fraunhofer IEE, Germany); Eric Tönges (University of Kassel, Germany)	
Impact of Real Grid Conditions on AC Charging Behavior of Electric Vehicles	600
Jakob Vellinger, Georg Kerber and Simon Schramm (Hochschule München, Germany)	
Möglichkeiten durch Remote Attestation in regionalen Energienetzen	607
Andreas Wark, Torsten Sowa, Carl-Heinz Genzel and Michael Kreisköther (amperias GmbH, Germany)	

Extra Poster Session: Innovative Betriebskonzepte und Geschäftsmodelle

Extra Poster Session: Systemführung des zukünftigen Energiesystems

A3: Künstliche Intelligenz im Energiesystem

Machine Learning Pipelines for Intelligent Alarm Management in Power Systems.....	613
Georgios Mitrentsis and Susanne Schmitt (Hitachi Energy, Germany); Jhelum Chakravorty and David Marino (Hitachi Energy, Canada); Antony Hilliard (Hitachi Energy Research, Canada)	
Automated detection and localization of measurement and time anomalies in IEC 60870-5-104 SCADA records.....	619
André Kummerow (Advanced System Technology (AST) Branch of Fraunhofer IOSB, Germany); Stephan Ruhe and Dennis Rösch (Fraunhofer IOSB-AST, Germany)	
Probabilistic fault localization via artificial neural networks in MV distribution grids.	627
Kurt T Brendlinger (Fraunhofer IEE & Technische Hochschule Lübeck, Germany); Gourab Banerjee (Fraunhofer IEE & University of Kassel, Germany); Roman Bolgarny (Fraunhofer IEE & University of Kassel, Germany); Gerrit Fröhlich and Zhenqi Wang (Avacon Netz GmbH, Germany); Marco Pau (Fraunhofer IEE, Germany)	

B3: Systemführung des zukünftigen Energiesystems

Frequency stability analysis under the influence of decentralized energy resources in a cellular energy system	634
Ailen Maria del Lujan Kreizer, Julius Frerk and Markus Zdrallek (Bergische Universität Wuppertal, Germany); Felix A Flatter and Christian Trossen (University of Kaiserslautern, Germany)	
Data-driven Congestion Forecast at Distribution Grid Level.....	643
Annika Schurtz, Jonas Eickmann and Sebastian Dierkes (Westnetz GmbH, Germany); Marc Linders (Westenergie AG, Germany)	
Grid Congestion Detection through Grid State Identification based on Real-Time Measurements in Low-Voltage Grids	649
Martin Asman, Eric Dürholt, Kevin Kotthaus and Markus Zdrallek (University of Wuppertal, Germany)	
Voltage Constraint Limitations of the Feasible Operation Region for Ancillary Service Provision between Different Voltage Levels.....	657
Manuel Wingenfelder and Lars Stark (Leibniz University Hannover, Germany); Lutz Hofmann (Leibniz Universität Hannover, Germany); Clara Schwind (Leibniz University Hannover, Germany)	

C3: Innovative Betriebskonzepte und Geschäftsmodelle

Examination of Dynamic Line Rating Deviations in Day-Ahead Congestion Forecast ..	664
Tom Sennewald, Matthias Abel and Mark Thiele (TenneT TSO GmbH, Germany)	
Redispatch in Hochspannungsnetzen von Windausbauregionen unter Ausnutzung vorgehaltener Sicherheitsreserven.....	670
Tom Kulms (RWTH Aachen, Germany & Trianel GmbH, Germany); Andreas Ulbig (RWTH Aachen University, Germany)	
Bewertung der Treibhausgasemissionen durch den Betrieb von Wärmepumpen unter Berücksichtigung zeitvariabler Faktoren	676
Danny Günther, Jeannette Wapler, Neels Vesely and Jakob Moll (Fraunhofer-Institut für Solare Energiesysteme ISE, Germany)	
GreEner Tech: Sustainable Technology for Medium Voltage Switchgear Systems	684
Samuel Rader (ABB Corporate Research Germany, Germany); Nils Wilm Rosebrock (Technical University Braunschweig, Germany); Timo Meyer (Technische Universität Braunschweig, Germany); Michael Kurrat (TU Braunschweig, Germany); Nada Sahlab (ABB Corporate Research Center Germany, Germany); Prerna Juhlin (ABB Corporate Research Germany, Germany); Manuel Bickel, Christian Buschbeck and Konrad Schoch (Wuppertal Institut für Klima, Umwelt, Energie gGmbH, Germany); Matthias Quast	

and Hannes Geist (Universität Freiburg, Germany); Frank Balle (Universität Braunschweig, Germany); Kai Yu (RWTH Aachen University, Germany)

D3: Projekte und Anwendungen

Commissioning and Reliable Operation of Inter Array Cables in Offshore

Windfarms: Testing and Monitoring 692

Uwe Kaltenborn, Ondrej Musil, Olaf Schacht, Christoph Steiner and Dan Keller (HIGHVOLT Prüftechnik Dresden GmbH, Germany)

Entwicklung einer Methodik zur Berechnung und Bewertung der

Beeinflussung von HGÜ-Kabel auf parallele Infrastrukturen 698

Mohammad Nazemi and Robert Dommerque (Amprion GmbH, Germany); Christian Rückert (Berufsgenossenschaft ETEM, Germany)

Sector Coupling in the District: Selected Implementation Projects

for Future Renewable Energy Supply 705

Lina Wett, Tarek Anwarzai and Anna Cadenbach (Fraunhofer IEE, Germany)

Automatisierte Einteilung von Stadtquartieren zur Optimierung der

Wärmeplanung: Eine Methodik basierend auf Energetischen Stadtraumtypen 710

Julia Pössinger and Joshua Jakob (Bergische Universität Wuppertal, Germany); Bastian Bauhaus (SWKiel Netz GmbH, Germany); Markus Zdrallek (Bergische Universität Wuppertal, Germany); Moritz Edinger (SWKiel Netz GmbH, Germany)

Extra Poster Session: E3 - Leistungselektronik als Schlüsselkomponente im neuen Energiesystem - Laborinfrastruktur

Innovative Power Hardware-in-the-Loop Testing Methods for Advanced

Grid-Forming Inverters using Rapid Control Prototyping 717

Jonas Steffen, Tobias Erckrath, Matthias Klee, Fabian Schnabel and Daniel Stracke (Fraunhofer IEE, Germany); Marco Jung (Bonn-Rhein-Sieg UAS, Germany)

Extension of Standardized Tests to Validate the Behavior of DER2G on

the Example of Bidirectional Charging Stations in Germany 723

Derk Gonschor (Bonn-Rhein-Sieg UAS, Germany); Ron Brandl (Fraunhofer IEE & European Distributed Energy Resources Laboratories e.V., Germany); Philipp Schmitz (Hochschule Bonn-Rhein-Sieg, Germany); Marco Jung (Bonn-Rhein-Sieg UAS, Germany)

Rationalisierbarer Anschlussprozess von Offshore-Windparks: Ein Ansatz

mit Hardware-in-the-Loop-Simulation 730

Florian Hans, Torben Jersch and Gesa Quistorf (Fraunhofer Institute for Wind Energy Systems, Germany)

Validierung neuer Betriebsverfahren und Sicherstellung der Interoperabilität in lokalen Energienetzen - die „Sandbox-Ortsnetze“ 737

Ron Brandl (Fraunhofer IEE & European Distributed Energy Resources Laboratories e.V., Germany); Thomas Degner, Norbert Henze and Axel Seibel (Fraunhofer IEE, Germany); Marco Jung (Fraunhofer Institute for Energy Economics and Energy System Technology, Germany); Philipp Strauß, Martin Franke and Tobias Erckrath (Fraunhofer IEE, Germany)

Asset Management

Extra Poster Session: Leistungselektronik als Schlüsselkomponente im neuen Energiesystem

A4: Künstliche Intelligenz im Energiesystem

PROTECT: Application example for a transparent cyber-attack detection and simulation system in an industrial energy supplier environment 746

André Kummerow (Advanced System Technology (AST) Branch of Fraunhofer IOSB, Germany); Michael Sihle (eoda GmbH, Kassel, Germany); Stefan Fitzenreiter (EAM-Netz GmbH, Kassel, Germany); Martin Schneider (eoda GmbH, Kassel, Germany); Paul Bachmann and Jörg Lässig (Hochschule Zittau-Görlitz, Germany); Dennis Rösch (Fraunhofer IOSB-AST, Germany)

Skalierbare KI zur kontinuierlichen Verbesserung von Energieprognosen 754

Raphael Riege, Lukas Koppenhagen and Tim Nöbel (Fraunhofer IEE, Germany)

AI-based consumption forecast to reduce energy costs for the operation of charging infrastructure in retail 762

Kolja Eger (Hamburg University of Applied Sciences, Germany); Nick Krüger (HAW Hamburg, Germany); Nils Heinrich (Envidatec GmbH, Germany)

B4: Systemführung des zukünftigen Energiesystems

Kleinteilige Flexibilitäten: Schnittstellen und Koordinationsansätze für einen ergänzenden, marktbasierten Redispatch..... 769

Peter Müller (c.con Management Consulting GmbH, Germany); Isa Ryspaeva and Melih Kurt (TenneT TSO GmbH, European Union)

Real-Time Flexibility Allocation among Distributed Energy Resources: A Digital Twin-Driven Dynamic Optimization Approach.....	775
Béla Wiegel, Tizian Schug, Payam Teimourzadeh Baboli and Christian Becker (Hamburg University of Technology, Germany)	

Konzept eines probabilistischen digitalen Zwillings für die Überwachung und Steuerung von Niederspannungsnetzen	783
Angellina Ebenezer Anitha, Katrin Handel and Jens Haubrock (Bielefeld University of Applied Sciences and Arts, Germany); Paul Bauer and Claudia Benesch (TU Wien, Austria); Fernando Lezama (Polytechnic of Porto & GECAD, Portugal); Pedro Faria (Polytechnic Institute of Porto, Portugal); Filipe Doria (Polytechnic of Porto & GECAD, Portugal); Zita Vale (Polytechnic Institute of Porto, Portugal); Daniel Hauer (Siemens, Austria); Stephan Cejka (Siemens AG Österreich, Austria); Franz Zeilinger (Siemens Austria AG, Austria)	

DEER- Verifiable yet Privacy Preserving Data Exchange for Decentralizing Redispatch	790
Marc Fabian Körner (FIM Forschungsinstitut für Informationsmanagement, Germany & Fraunhofer FIT WI, Germany); Jens Strüker and Leo Schick (Fraunhofer FIT, Germany); Marvin Ehaus and Matthias Babel (Fraunhofer FIT WI, Germany)	

C4: Innovative Betriebskonzepte und Geschäftsmodelle

How to recycle power electronics - a step towards circularity	797
Paula Burfeind (Clausthal University of Technology, Germany); Daiyi Hu (TU Braunschweig, Germany); Regine Mallwitz (Technische Universität Braunschweig, Germany); Christine Minke (Clausthal University of Technology, Germany)	

HB-MMC Converter Loss Minimization by Applying a Flexible Volt-age Security Margin using On-Load-Tap-Changers.....	804
Johannes Kayser (Technical University of Ilmenau, Germany); Steffen Schlegel and Dirk Westermann (Ilmenau University of Technology, Germany); Daniel Vahle and Volker Staudt (Ruhr University Bochum, Germany)	

Efficiency Optimization and Modelling of the Additional No-Load Losses of Low-Voltage Induction Motors Using Soft Magnetic Slot Closing Material	810
Florian Kirchner (Innomotics GmbH, Germany); Andreas Kremser (Technische Hochschule Nürnberg, Germany)	

Impact of harmonics on the electrical power supply system in an energetic, economic and ecological perspective.....	818
Benjamin Jacobsen (University of Technology Chemnitz, Germany)	

D4: Innovationen in Betriebsmitteln und Technologien für eine klimaneutrale und nachhaltige Energieversorgung

Resource Requirements and Sustainability of Electric Drivetrains in

Mobility Applications 826

Daiyi Hu (TU Braunschweig, Germany); Regine Mallwitz, Jan Hoffmann and Markus Henke (Technische Universität Braunschweig, Germany); Paul Ohnesorge (Open Hybrid LabFactory, Germany); Niklas Langmaack (Technische Universität Braunschweig, Germany)

Comparison of topology planning between AC and DC based distribution systems 834

Steffen Schlegel and Dirk Westermann (Ilmenau University of Technology, Germany)

Einfache Lastfluss-Steuerung in Mittelspannungs- und Niederspannungsnetzen 841

Lothar Fickert (Technische Universität Graz, Austria); Ziqian Zhang (Graz University of Technology, China); Robert Schürhuber (Graz University of Technology, Austria)

E4: efzn-Leitprojekt SiNED

Converter-Dominated Grids: Control and Protection Concepts for

Ancillary Services of the Future 844

Julian Beyrodt (German Aerospace Center, Germany); Marc René Lotz (Elenia Institute for High Voltage Technology and Power Systems & Technische Universität Braunschweig, Germany)

Beitrag zu Systemdienstleistungen durch Prosumer-Haushalte mit

Steuerungsmechanismen und innovativen Konzepten 852

Carsten Wegkamp, Cornelius Biedermann and Bernd Engel (Technische Universität Braunschweig, Germany)

Effect of the Quantity and Penetration of Energy Resources on the

Incentivization of Grid-Beneficial Behavior in Prosumer Households 860

Jens Sager (Carl von Ossietzky Universität Oldenburg, Germany); Carsten Wegkamp (TU Braunschweig, Germany); Astrid Nieße (Universität Oldenburg, Germany); Bernd Engel (TU Braunschweig, Germany)

Extra Poster Session: Künstliche Intelligenz im Energiesystem

Extra Poster Session: Projekte und Anwendungen

A5: Künstliche Intelligenz im Energiesystem

Predicting the Oil Quality of Power Transformers using Machine Learning 866

Silas Aaron Selzer and Niklas Bäcker (University of Wuppertal, Germany); Markus Zdrallek (Bergische Universität Wuppertal, Germany); Korbinian Maurer and Karlheinz Lindl (Maschinenfabrik Reinhausen GmbH, Germany)

Graph Neural Networks for Grid Control: Prospects in AI-assisted Transmission Grid Operation 874

Clara Holzhüter (Fraunhofer IEE Kassel, Germany & University of Kassel, Germany); Pawel Lytaev (Universität Kassel, Germany); Marcel Dipp (Fraunhofer IEE, Universität Kassel, Germany); Mohamed Hassouna (Fraunhofer IEE Kassel & University of Kassel, Germany); Kurt T Brendlinger (Fraunhofer IEE & Technische Hochschule Lübeck, Germany); Jan Viebahn (TenneT TSO BV, The Netherlands); Wiktor Gegelman (Tennet TSO GmbH, Germany); Christian Merz (50 Hertz Transmission GmbH, Germany)

Entwicklung und Implementierung eines Expertensystems für die Netzanalyse von Stromversorgungssystemen 882

Bodo Appel and Lothar Horn (Sachverständigenbüro Bodo Appel GmbH, Germany)

Realizing Digital Twins of Assets and Grids with the help of AI - Lessons learned from an OEM perspective 890

Erhard Aumann (Siemens, Germany); Mathias Duckheim and Wiebke Fröhner (Siemens AG, Germany); Thomas Werner (SIEMENS AG, Germany)

B5: Systemführung des zukünftigen Energiesystems

Mehr Effizienz für die Energiewende: Wie PlanOps in der Planung und im Betrieb der Netze zum Umdenken bewegt 897

Philipp Erlinghagen (envelio GmbH, Germany & VDE FNN, Germany); Robin Fabis and Simon Koopmann (envelio GmbH, Germany)

Auswirkungen der Netzorientierten Steuerung nach § 14a EnWG auf die Wärmebedarfsdeckung von Wohngebäuden 902

Julian Urbansky (Fraunhofer UMSICHT, Germany); Robin Sattler (Universität Stuttgart, Germany); Anne Hagemeier (Fraunhofer UMSICHT, Germany)

Technisches Netzbetreiberportal - Prozessoptimierende Kommunikationsplattform zum Datenaustausch zwischen Verteilnetzbetreibern	909
Luca Splittgerber, Sebastian Dierkes and Sebastian Sengen (Westnetz GmbH, Germany)	

Implications of the Data Governance Act and Data Act as implementation of the European Data Strategy on the Energy Sector	914
Volker Berkhout (Fraunhofer IEE, Germany); Marian Klobasa, Nicholas Martin and Murat Karaboga (Fraunhofer ISI, Germany); Jonathan Bergstraesser (Fraunhofer IEE, Germany); Junsong Du (RWTH Aachen University, Germany); Rita Streblow (RWTH University of Aachen, Germany); Lukas von der Heide, Timm Hülsewig and Manuel Wickert (Fraunhofer IEE, Germany); Marijke Welisch (Fraunhofer CINES, Germany)	

C5: Innovative Betriebskonzepte und Geschäftsmodelle

MARWELOUS - Fokussierung möglicher Herausforderungen für die Schutzkonzepte bei Ausbringung netzbildender Wechselrichter ins Verteilnetz ...	921
Tilman Wippenbeck and Jonas Meyer (Westnetz GmbH, Germany); Stefan Eichner (Fraunhofer ISE, Germany); Roland Singer (Fraunhofer-Institut Für Solare Energiesysteme ISE, Germany); Steffen Godow (E.DIS Netz GmbH, Germany); Thomas Greiter and Markus Schlump (LEW-Verteilnetz GmbH, Germany); Thomas Blume (Schleswig-Holstein Netz AG, Germany); Tim Pfüller, Rolf Dubberke, Daniel Backes and Leon Grebe (Syna GmbH, Germany); Marc Linders (Westenergie AG, Germany)	

Probabilistic switch state identification based on scarce grid measurements	927
Luiza Voss De Gregorio (TU Darmstadt & Siemens AG, Germany); Paul Stursberg and Michael Metzger (Siemens AG, Germany); Stefan Niessen (Siemens AG, TU Darmstadt, Germany); Philipp Hofbauer and Simon Erhard (Allgäu Netz, Germany)	

Risikobewertung des Strombilanzkreismodells im Vergleich zu diversen Stromeinkaufsmodellen der Vollstromversorgung	934
Patrick Selzam (Fraunhofer IEE, Germany)	

Investigation of the influences of the multi-use operation of battery energy storage systems to maximize the yield of PV-coupled industrial consumers	942
Steffen Kortmann (RWTH Aachen University & Fraunhofer FIT, Germany); Mario Mirkes (RWTH Aachen University, Germany); Lucas Jonas (Enable Energy, Germany); Andreas Ulbig (RWTH Aachen University, Germany)	

E5: efzn-Leitprojekt SiNED

Aggregation of flexibility potentials from active distribution grids and subsequent usage in overlaying grid operational management	949
Neelotpal Majumdar and Lutz Hofmann (Leibniz Universität Hannover, Germany)	