

2022 18th International Conference on the European Energy Market (EEM 2022)

**Ljubljana, Slovenia
13-15 September 2022**

Pages 1-514



**IEEE Catalog Number: CFP2252D-POD
ISBN: 978-1-6654-0897-4**

**Copyright © 2022 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP2252D-POD
ISBN (Print-On-Demand):	978-1-6654-0897-4
ISBN (Online):	978-1-6654-0896-7
ISSN:	2165-4077

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Flexibility Forecasting of Cellular Electric Energy Systems Using Machine Learning Techniques.....	1
<i>Mohammad Zarghami, Jamshid Aghaei, Mohammadali Alipour, Mohammad Reza Salehizadeh</i>	
Influence of Nodal Prices' Determination Process on Bidding Zone Configurations	6
<i>Lukas Hein, Felix Knappstein, Lukas Weber, Albert Moser</i>	
IMAGINE – Market-Based Multi-Period Planning of European Hydrogen and Natural Gas Infrastructure	12
<i>Felix Frischmuth, Richard Schmitz, Philipp Härtel</i>	
The Impacts of the Operating Conditions and Energy Transition in the Regulation of the Electricity Distribution Networks	23
<i>Lauri Virtanen, Osmo Siirto, Samuli Honkapuro</i>	
Comparison Among National Energy Community Policies in Brazil, Germany, Portugal, and Spain	28
<i>Leonarda F. C. Castro, Paulo C. M. Carvalho, J. N. Fidalgo, J. T. Saraiva</i>	
Maximizing Green Hydrogen Production with Power Flow Tracing	34
<i>Ekaterina Dudkina, José Villar, Ricardo Jorge Bessa</i>	
Platform Services Facilitating the Participation of Active Households in the Energy System – A Transaction Cost Perspective.....	40
<i>Sabine Pelka, Dominik Kern, Jan George</i>	
Real-Time Flexibility Market Participation of Thermostatically Controlled Loads.....	46
<i>Joseba Jimeno, Nerea Ruiz, Carlos Madina, Amaia González-Garrido</i>	
Lessons Learnt from Certifying Biofuels for a Future Hydrogen Certification Scheme	52
<i>Matia Riemer</i>	
An Agent Based Model to Simulate Local Electricity Markets, LEM, and Their Interaction with the Wholesale Market, WSM	59
<i>A. F. Santos, J. T. Saraiva</i>	
Short-Term Load Forecast in Power Systems: A Comparison of Different Practical Algorithms	64
<i>Metodija Atanasovski, Mitko Kostov, Goran Veljanovski, Pande Popovski</i>	
Which Support Instruments Can Be Used to Promote Green Hydrogen? - Lessons Learned from Renewable Electricity Support Schemes	69
<i>Lin Zheng, Vasilios Anatolitis, Jenny Winkler</i>	
Modeling of Extreme Weather Events—Towards Resilient Transmission Expansion Planning	76
<i>Maximilian Bernecker, Iegor Riepin, Felix Müsgens</i>	
H2Europe: An Analysis of Long-Term Hydrogen Import-Potentials from the MENA Region.....	83
<i>Eddy Jalbout, Lucien Genge, Felix Muesgens</i>	
The Value of Investments in Network Efficiency in Systems with a Large Integration of Distributed Renewable Generation.....	90
<i>José Nuno Fidalgo, José Pedro Paulos, Pedro Macedo</i>	

Application of Battery Storage in Low Voltage Distribution Network for Improving Integration of Distributed Generation	96
<i>Zvonimir Šimic, Danijel Topic, Marina Dubravac, Goran Knežević</i>	
Modelling of Wind Power Plant for Voltage Regulation Simulations	102
<i>Marina Dubravac, Krešimir Fekete, Danijel Topic, Zvonimir Šimic</i>	
What Do We Know About Green Hydrogen Supply Costs?	108
<i>Lucien Genge, Eddy Jalbout, Iegor Riepin, Felix Müsgens</i>	
Assessing the Economic and Environmental Benefits of Residential Demand Response: A Finnish Case Study.....	115
<i>Araavind Sridhar, Samuli Honkapuro, Fredy Ruiz, Salla Annala, Annika Wolff</i>	
Concept and Design of a Real Time Walrasian Local Electricity Market.....	121
<i>João Mello, José Villar, João T. Saraiva</i>	
Optimal Utilization of Stationary Battery Storage and Electric Vehicle in a Prosumer Power System	126
<i>Nemanja Mišljenovic, Goran Knežević, Matej Žnidarec, Danijel Topic</i>	
Increasing Price Granularity in Electricity System Models	132
<i>Carla Mendes, Iain Staffell, Richard Green</i>	
The Growing Use of Electric Vehicles: Impact on Final Energy Consumption.....	138
<i>Raquel Lopes, Fernando Neto, Margarita Robaina</i>	
Integration of Business Climate Resilience on the Transmission Expansion Planning Over the Low-Carbon Energy Transition	145
<i>Luiz Eduardo De Oliveira, João Tomé Saraiva, Julio A. D. Massignan, Phillippe V. Gomes</i>	
Role of Flexibility in Achieving a Decarbonized Nordic Energy System by 2050	151
<i>Ville Siivonen, Samuli Honkapuro, Petr Spodniak, Gerald Aue, Aurélien Peffen, Sylvain Cail</i>	
Stakeholder-Driven Policy Actions for Decarbonization of Finland by 2050	157
<i>Ville Siivonen, Samuli Honkapuro, Petr Spodniak, Gerald Aue, Aurélien Peffen, Sylvain Cail</i>	
Comparing Optimization Strategies in Local Electricity Markets.....	163
<i>Naser Hashemipour, Pedro Crespo Del Granado, Martine Halvorsen Sønju</i>	
Sustainable Transition of Slovenian Power System Until 2050	170
<i>Jan Bohinec, Jan Tršinar, Žiga Žerjav, Lucija Blažej, Tomaž Štokelj, Dejan Paravan</i>	
Effects of Battery Aging on BESS Participation in Frequency Service Markets – Finnish Case Study.....	179
<i>Hosna Khajeh, Chethan Parthasarathy, Hannu Laaksonen</i>	
Techno-Economic Assessment of Deployment of Low-Carbon Heating Technologies: An Agent-Based Approach	185
<i>Jasmine De Riedmatten, Ndaona Chokani, Reza S. Abhari, Marco Pagani, Hubert Klumpner</i>	
Green Hydrogen - Future Production Opportunities from Biogas Plants in Germany	190
<i>Anica Mertins</i>	
Potential Ancillary Service Markets for Future Power Systems.....	196
<i>Hosna Khajeh, Hannu Laaksonen</i>	

Full P2P-Based Residential Energy Community Vs Collective Self-Consumption in Spanish Scenario: Participants Sizing Analysis	202
<i>Nerea Goitia-Zabaleta, Aitor Milo, Haizea Gaztañaga, Elvira Fernandez</i>	
A Comparative Analysis Based on Energy Self-Consumption Regulations in Spain, Romania and Ecuador.....	208
<i>Victor Herrera-Pérez, Aitor Milo, Nerea Goitia-Zabaleta, Paul N. Borza</i>	
Design and Validation of a Predictive Energy Management Strategy for Self-Consumption in Tertiary Buildings.....	214
<i>Ane Feijoo-Arostegui, Nerea Goitia-Zabaleta, Aitor Milo, Haizea Gaztañaga, Laura Oca</i>	
An Assessment of the Diffusion of Private Mini-Grids Operating in Rural Kenya	220
<i>Leticia Tomas Fillol, Samuli Honkapuro, Salla Annala, Antti Pinomaa, Henock Dibaba</i>	
Urban Energy Transition and Heating of Apartment Buildings	226
<i>Juhani Lepistö, Pirjo Heine, Miika Lundell, Pertti Järventausta, Sami Repo</i>	
Estimating the Value of Power Losses Forecast in the Transmission System by Comparing Different Electricity Procurement Strategies.....	231
<i>Ivan Sudic, Tomislav Capuder, Bojan Franc, Matko Mesar</i>	
Decreasing Gas Demand and Now? - Alternative Options for the Utilization of the German Gas Distribution Network.....	236
<i>Stella Oberle, Volkan Isik, Wolfgang Köppel, Jakob Wachsmuth</i>	
Optimal Operation of Hydro-Dominated Power Systems with Environmental Constraints.....	244
<i>Linn Emelie Schäffer, Magnus Korpås, Arild Helseth</i>	
Hybrid AC/DC-OPF ADMM Model for TSO Coordination with Multiple DSOs in Flexibility Market	250
<i>Dmytro Ivanko, Ine Solsvik Vågane, Naser Hashemipour, Irina Oleinikova, Pedro Crespo Del Granado, Hossein Farahmand</i>	
New Method for Evaluating the Value of Flexibility and New Services for DSOs on the LV Network.....	257
<i>Chloe Fournely, Matej Pecjak, Tomi Medved</i>	
Improving Cross-Border Capacity for Near Real-Time Balancing	262
<i>Marie Girod, Efthymios Karangelos, Emily Little, Viktor Terrier, Jean-Yves Bourmaud, Virginie Dussartre, Oualid Jouini, Yannick Perez</i>	
Analysis of the Concepts of Self-Sufficiency of Renewable Energy Sources of the Local Energy Community of Luče, Slovenia.....	268
<i>Chloe Fournely, Nicole Bird, Tomi Medved, Andrej F. Gubina, Edin Lakic, Bojan Stojanovic</i>	
Local Flexibility Need Estimation Based on Distribution Grid Segmentation.....	275
<i>Fábio Retorta, Clara Gouveia, Gil Sampaio, Ricardo Bessa, José Villar</i>	
Electrification of the Hard-to-Abate Sectors: Implication for Net-Zero Power Systems in Europe.....	281
<i>Clément Cabot, Manuel Villavicencio</i>	
Investments and Governance Models for Renewable Energy Communities.....	286
<i>Armando Moreno, José Villar, Clara Sofia Gouveia, João Mello, Rogério Rocha</i>	
Is Electrified Low-Carbon District Heating Able to Manage Electricity Price Shocks?	292
<i>Nima Javanshir, Pauli Hiltunen, Sanna Syri</i>	

PVactVal: A Validation Approach for Agent-Based Modeling of Residential Photovoltaic Adoption..... <i>Simon Johanning, Daniel Abitz, Emily Schulte, Fabian Scheller, Thomas Bruckner</i>	297
Hybridization of CEVESÁ MIBEL Market Model Based on Market Outcomes..... <i>André Rodrigues De Oliveira, Vítor Navega, José Villar Collado, João Tomé Saraiva, Alberto Campos</i>	303
Contributions to Tertiary Reserve Requirements Under Operating Conditions and Uncertainties	309
<i>Gioacchino Tricarico, Maria Dicorato, Giuseppe Forte, Francisco Gonzalez-Longatt</i>	
Societal Effects of Large-Scale Energy Storage in the Current and Future Day-Ahead Market: A Belgian Case Study..... <i>Emilia Rocha Ojeda, Lina Silva-Rodriguez, Anibal Sanjab, Madeleine Gibescu, Elena Fumagalli</i>	315
Enhancing the German Transmission Grid Through Dynamic Line Rating..... <i>Philipp Glaum, Fabian Hofmann</i>	323
Development of Energy Communities in Europe..... <i>Hanne Sæle, Andrei Mørch, Amedeo Buonanno, Martina Caliano, Marialaura Di Somma, Christina Papadimitriou</i>	330
Inertia Constants for Individual Power Plants	335
<i>David Kraljic, Blaz Sobocan, Jernej Katanec, Matej Logar, Miha Troha</i>	
Electricity Price Forecasting for Norwegian Day-Ahead Market Using Hybrid AI Models..... <i>Gajanthini Vamathevan, Marthe Fogstad Dynge, Umit Cali</i>	340
Pricing Differentially Private Smart Meter Data in Distribution Networks	346
<i>Mohammad Rayati, Mokhtar Bozorg</i>	
Efficient Solar PV Integration to Data Centers in a Nordic Climate	352
<i>Johannes Hyvönen, Sanna Syri</i>	
Model-Based Approaches to Demand Curtailment Allocation	358
<i>Tamás Borbáth, Dirk Van Hertem</i>	
Local Energy Market Designs to Relieve the Transmission Grid	364
<i>Klemens Schumann, Carlo Schmitt, Andreas Blank, Katharina Kollenda, Albert Moser, Andreas Ulbig</i>	
A Straightforward Methodology to Obtain the Power Coefficients Matrices for Unbalanced Distribution Networks to Be Used in Flexibility Markets	370
<i>Andrés Felipe Cortés Borràs, Maider Santos-Mugica, Amaia González-Garrido, David Martin, Carlos Ojeda</i>	
A Business Case for Flexibility Market Operators Using Algorithms for Improved Market Efficiency	376
<i>Pau Plana Ollé, Bryan Pellerin, Olav Henrik Skonnord, Stig Ødegaard Ottesen</i>	
Blockchain-Based Guarantees of Origin Issuing Platform..... <i>Álvaro Nofuentes, Juan José Hernández, Lucas Pons</i>	381
A Flow-Based Distributed Trading Mechanism in Regional Electricity Market with Energy Hub	385
<i>Lu Wang, Rachid Cherkaoui, Mohammad Rayati, Mokhtar Bozorg</i>	

Economic Implications of DSO-TSO Coordination Schemes at a System Level and for Market Actors in Case of Flexibility or Traditional Grid-Based Solution.....	391
<i>Carlos Madina, Amaia González-Garrido, Ines Gomez-Arriola</i>	
Electrofuels from Excess Renewable Electricity: Costs, Emissions, Carbon Use.....	397
<i>Markus Millinger, Philip Tafarte, Matthias Jordan, Kathleen Meisel, Daniela Thrän</i>	
The Impact of RES Integration on Balancing Markets.....	403
<i>Mano Farrokhseresh, Frank Nobel</i>	
Extended Social Welfare Decomposition for Multi-Energy Systems	409
<i>Tim Felling, Philipp Fortenbacher</i>	
Added Value of Providing Transmission Grid Congestion Management Via Bidirectionally Chargeable Electric Vehicles.....	416
<i>Timo Kern, Christian Wendlinger</i>	
Identifying the Determinants of Efficient System Operation Through an International Review of Wholesale Electricity Markets.....	425
<i>Thomas Brouhard, Martin Hennebel, Marc Petit, Cyril Gisbert</i>	
Monitoring and Mitigation of Market Manipulation in Redispatch Markets	431
<i>Johannes Klöters, Christoph Neumann, Lukas Hein, Albert Moser</i>	
Evaluating Transmission Network Development Alternatives Through Combined Benefit Analysis	440
<i>Massimo La Scala, Maria Dicorato, Giuseppe Forte, Corrado Gadaleta, Chiara Giordano, Michela Migliori, Davide Monno, Enrico Maria Carlini</i>	
Comparing Congestion Income Distribution Methods in Case of Flow-Based and ATC-Based Network Representation	446
<i>Dániel Divényi, Ádám Tran, Zoltán Jakab, Ádám Sleisz, Péter Sorés</i>	
The Impact of the Coal-Gas Relative Price on the CO ₂ Marginal Abatement Effect of Renewable Electricity in the US	452
<i>Félix Michelet</i>	
Market Failures in Local Flexibility Market Proposals for Distribution Network Congestion Management	457
<i>Roman Hennig, Simon H. Tindemans, Laurens De Vries</i>	
An Overview of Local Electricity Market Designs	463
<i>Jovana Forcan, Miodrag Forcan</i>	
The Demand Response Potential of a Hydrogen-Based Iron and Steel Plant.....	469
<i>Annika Boldrini, Derck Koolen, Wina Crijs-Graus, Machteld Van Den Broek</i>	
Identification of Barriers and Investment Determinants for Hydrogen Infrastructure: Development of New Business Models	475
<i>Andrei Morsch, Sarah Schmidt, Pedro Crespo Del Granado</i>	
Combining High Shares of Renewable Energy with Nuclear Power Generation on the Belgian Energy System.....	481
<i>Joannes Laveyne, Lieven Vandervelde</i>	
Ex-Post Electricity Allocation for Energy Communities.....	487
<i>Bernadette Fina</i>	

Simulation of a Last-Minute Flexibility Market for Renewable Power Schedule Deviations in Northern Germany	491
<i>Martin Grasenack, Lucas Jürgens, Hans Schäfers, Pedro Girón, Kaspar Knorr, Mike Vogt</i>	
Industrial Grid Fees Vs. Demand Response: A Case Study of a Multi-Use Battery in a German Chemical Plant	497
<i>Markus Fleschutz, Andre Leippi, Markus Bohlauer, Marco Braun, Michael D. Murphy</i>	
Utilization of Electric Vehicle Fleets in Industrial Demand Response Considering Vehicle-to-Grid Benefits and Battery Degradation.....	503
<i>Andre Leippi, Markus Fleschutz, Kevin Davis, Michael D. Murphy</i>	
Analysis and Modeling of DFIG-Based Wind Turbines with Variable Frequency Regulation Capability	509
<i>Tahaguas A. Woldu, Martin Wolter</i>	
The “Syste(M)arket” – Introduction of an Integrated and Modular Market Design for the Needs of the Future Energy System	515
<i>Peter Lopion, Tim Felling, Alexander Heckmann, Henrike Janissen, Nils Lügger, Andreas Maaz, Andre Peters, Constanze Roos, Miriam Sander, Frederik Paul Sapp</i>	
Measuring the Impact of Environmental Constraints on Hydropower Flexibility	520
<i>Siri Mathisen, Birger Mo, Arild Helseth, Johan Bladh, Jonas Funkquist</i>	
Possibilities for Increasing the Transmission Capacity of Overhead Lines in Real Meteorological Conditions	526
<i>Dusan Vucic</i>	
A Holistic Functional Analysis of a Flexibility Aggregator in a Dynamic Market Environment	532
<i>Leila Luttenberger Maric, Hrvoje Keko, Nikola Banovic, Donata Boric, Stjepan Sucic</i>	
Analysis of Battery Energy Storage Systems Participation in Multi-Services Electricity Markets.....	538
<i>João Carlos Agrela, Igor Rezende, Tiago Soares</i>	
How to Design Carbon Contracts for Difference - A Systematic Literature Review and Evaluation of Design Proposals.....	544
<i>Anabel Rilling, Vasilios Anatolitis, Lin Zheng</i>	
Influence of an Inter-TSO Cooperation on the Redispatch Demand in Europe	552
<i>Lukas Weber, Louis Gilles, Albert Moser</i>	
Electric Water Heaters Contributing to the Primary Frequency Regulation Markets—Finnish Case	558
<i>Pekka Manner, Samuli Honkapuro</i>	
Interconnection of Norway to European Balancing Platforms Using Hierarchical Balancing	563
<i>Anthony Papavasiliou, Gerard Doorman, Mette Bjørndal, Yves Langer, Guillaume Leclercq, Pierre Crucifix</i>	
Hybrid Versus Radial Offshore Wind Connections: Power Grid Investments in the North Sea.....	570
<i>E. Sævareid, G. Durakovic, B. Knudsen, J. Straus, A. Tomsgard</i>	
Detection of Consumers with Electric Heating Devices and Temperature Normalization of Their Electric Energy Consumption.....	575
<i>Teja Melink, Lev Prislan, Anja Ilic</i>	

How to Determine Bottom-Up Model-Derived Marginal CO ₂ Abatement Cost Curves with High Temporal, Sectoral, and Techno-Economic Resolution?	580
<i>Steffi Misconel, Hannes Hobbie, Dominik Möst, Matteo Giacomo Prina, Wolfram Sparber</i>	
Grid Tariffs for Peak Demand Reduction: Is There a Price Signal Conflict with Electricity Spot Prices?	586
<i>Sigurd Bjarghov, Matthias Hofmann</i>	
The New Redispatch and the Impact on Energy Management in Districts	592
<i>Frank Salm, Matthias Oettmeier, Patrick Rönsch</i>	
Exploring the Trade-Off Between Long-Term Storage Deployment and Transmission Expansion in the Power Sector.....	596
<i>Maren Ihlemann, Kenneth Bruninx, Erik Delarue</i>	
CO ₂ - And Cost-Optimal Multi-Energy System Modelling Considering the Provision of Operating Reserve	601
<i>Elisabeth Feldhoff, Steffen Schlegel, Dirk Westermann, Steffi Naumann, Peter Bretschneider</i>	
AI Agents Assessing Flexibility: The Value of Demand Side Management in Times of High Energy Prices.....	607
<i>Alexander Dreher, Lisa Marie Martmann, Malte Lehna, Cyriana Roelofs, Jonathan Bergsträßer, Christoph Scholz, Wolfgang Slaby, Heike Wetzel</i>	
The Impact of Degradation on the Investment and Operation of a Community Battery for Multiple Services	616
<i>Kjersti Berg, Sigurd Bjarghov, Rubi Rana, Hossein Farahmand</i>	
Analysis of the European Day-Ahead Electricity Market Coupling Mechanism: Discussion, Modeling, and Simulation	624
<i>Ângelo Casaleiro, Nuno Pinho Da Silva, Nuno Souza E Silva, Ricardo Cartaxo, Ricardo Pastor, Wei Yang, Bin Han, Hui Cui</i>	
Wind Farm-Based Green Hydrogen: A Virtual Power Plant Case Study.....	632
<i>Ramin Ahmadi Kordkheili, Mahdi Pourakbari-Kasmaei, Matti Lehtonen, Reza Ahmadi Kordkheili</i>	
Performance Comparison of Integrated Formulations for European Electricity Market Clearing	639
<i>Ádám Sleisz, Dániel Divényi, Péter Sorés, Dávid Raisz</i>	
A Note on a Revenue Adequate Pricing Scheme that Minimizes Make-Whole Payments	645
<i>Mehdi Madani, Anthony Papavasiliou</i>	
Decarbonization of the Heating Sector in Hamburg Grid Constraints, Efficiency and Costs of Green Hydrogen Vs. Heat Pumps	651
<i>Felix Röben, Nina Kicherer, Lucas Jürgens, Simon Decher, Hans Schäfers, Jens-Eric Von Düsterlho</i>	
Double-Reservoir Deep Echo State Network Architecture for Short-Term Electricity Demand Forecasting	657
<i>Nabangshu Sinha, Carlo Lucheroni</i>	
Sensitivity Analysis of Resulting KPIs in Cost- and Emission-Minimal Energy Supply Scenarios of Rural Communities.....	663
<i>Jonas Pemsel, Julius Russmann, Sebastian Flemming</i>	

Opportunities for DERs in Ancillary Services Markets: Analysis and Deployment Strategies in a National Framework.....	672
<i>Matteo Spiller, Giuliano Rancilio, Filippo Bovera, Marco Merlo</i>	
Global Gas Market Implications of Methane Emission Reduction Policies.....	678
<i>Ruud Egging-Bratseth, Franziska Holz, Kristina Mohlin, Huong Nguyen, Daniel Zavala-Araiza, Carolyn Fischer</i>	
Optimization of Customer Flexibility Within Implicit Demand Side Management Programs.....	685
<i>Katerina Bilbiloska, Aleksandra Krkoleva Mateska, Petar Krstevski</i>	
Assessment of the Potential of Local Solar Generation for Providing Ship Shore Power in the Norwegian Harbour Port of Borg	691
<i>Farhan Farrukh, Ciara Dunks, Martha Hoffmann, Per Olav Dypvik</i>	
Energy Transition of the Heating Sector in Lower Austria	697
<i>Nicolás Pardo García, Demet Suna</i>	
When Markets Don't Deliver: Bilateral Hedging by Means of PPAs in Managing Intertemporal Price Risks in Power Generation Investments	702
<i>Saara Hollmén, Fabian Levihn, Gustav Martinsson</i>	
Impact of Home- and Destination Charging on the Geographical and Temporal Distribution of Electric Vehicle Charging Load	708
<i>Aurora Flataker, Olav Kåre Malmin, Odd A. Hjelkrem, Rubi Rana, Magnus Korpås, Bendik N. Torsæter</i>	
Modeling the Dispatch of Electrolyzers Using Agent-Based Electricity Market Simulation.....	714
<i>Florian Zimmermann, Emil Kraft, Wolf Fichtner</i>	
LEMMAS: A Secured and Trusted Local Energy Market Simulation System	724
<i>Rui Andrade, João Vitorino, Sinan Wannous, Eva Maia, Isabel Praça</i>	
Integration of Offshore Wind Power at Sørlige Nordsjø II	729
<i>Vegard Viken Kallset, Stefan Jaehnert</i>	
State of the Art Price Forward Curve Calculation for Power and Gas Markets	735
<i>David Grgic, Victor Francisco Guada Escalona, Juš Pogacar, Jan Bohinec, Ludvik Bartelj, Gašper Rugelj</i>	
Optimal Integration of Non-Dispatchable RES in OSMOSE FlexEnergy Market.....	740
<i>Andrea Bello, Alessio Franzinelli, Francesco Colaone, Nicola Di Marco, Edoardo Gino Macchi, Andrea Gobbi, Federico Bellamoli</i>	
Electricity Trading in Local Sector-Coupled Energy Communities	746
<i>Natapon Wanapinit, Max Tutte, Jessica Thomsen</i>	
Cross-Border Trading Model for a Risk-Averse VPP in the Continuous Intraday Electricity Market.....	752
<i>Priyanka Shinde, Iasonas Kouveliotis-Lysikatos, Mikael Amelin</i>	
Heat Pumps Associated with Thermal Energy Storages to Improve Network Utilization and Flexibility: The Case of Chrysa Xanthi, Greece	758
<i>Matej Pecjak, Jernej Zupancic, Edin Lalic, Andrej F. Gubina, Estelle Mayer</i>	

Addressing Market Issues in Electrical Power Systems with Large Shares of Variable Renewable Energy	764
<i>Magnus Korpås, Hannele Holttinen, Niina Helistö, Robin Girard, Matti Koivisto, Bethany Frew, Jan Dobschinski, J. Charles Smith, Til Kristian Vrana, Damian Flynn, Antje Orths, Lennart Söder</i>	
Schedule Peer-to-Peer Transactions of an Energy Community Using Particle Swarm.....	772
<i>Miguel Vieira, Ricardo Faia, Tiago Pinto, Zita Vale</i>	
Advanced Clearing Model in Prosumer Centric Local Flexibility Market.....	778
<i>Rui Carvalho, Ricardo Faia, Gabriel Santos, Tiago Pinto, Zita Vale</i>	
Residential Users as Flexibility Providers: A Techno-Economic Analysis.....	784
<i>Davide Falabretti, Francesco Gulotta, Dario Siface</i>	
Quantifying the Opportunity Cost of Land Use Restrictions and Their Impact on the Energy Transition - A Case Study for Germany's Onshore Wind Power.....	790
<i>Philip Tafarte, Charlotte Geiger, Paul Lehmann</i>	
Decarbonization of the Metal Industry in Hamburg – Demand, Efficiency and Costs of Green Hydrogen.....	796
<i>Carsten Schütte, Nicolas Neubauer, Felix Röben, Marc Hölling, Luisa Genz, Torben Edens, Hans-Christian Henne, Klaus Schweininger</i>	
Energy Transition Changing Land Use – Estimating Large-Scale PV and Power-to-X Potential of Present Peat Production Areas.....	804
<i>Otto Räisänen, Julius Vilppo, Jouni Haapaniemi, Antti Supponen, Hannu Karjunen, Sami Repo, Jukka Lassila</i>	
The Impact of Variable Renewables' Heterogeneity on Their Market Values in the Iberian Wholesale Electricity Market	810
<i>Silke Johanndeiter</i>	
Pitfalls of Power Systems Modelling Metrics	816
<i>Rogier Hans Wuijts, William Zappa, Marjan Van Den Akker, Machteld Van Den Broek</i>	
Discrete Events Based Simulated Trading and Research System.....	827
<i>Zejian Feng, Shouzhen Zhu, Xiaomin Bai</i>	
Bidding in Local Electricity Markets Considering Low Voltage Grid Constraints	833
<i>Fernando Lezama, Ricardo Faia, Zita Vale</i>	
Lagrangian Relaxation of Large-Scale Congestion Management Using Extended Subgradient Methods	839
<i>Andreas Blank, Carlo Schmitt, Jonas Mehlem, Albert Moser</i>	
Establishing Low-Carbon Hydrogen Trade Relations - Where to Go and Who to Partner With?	845
<i>Johannes Brauer, Johannes Trüby, Manuel Villavicencio</i>	
Blockchain-Based Local Electricity Market Solution	851
<i>Gabriel Santos, Ricardo Faia, Helder Pereira, Tiago Pinto, Zita Vale</i>	
Auctions Vs. Feed-In Premium: Support Policies for Onshore Wind Power in Germany	858
<i>Philip Tafarte, Jan-Niklas Meier, Paul Lehmann</i>	
Robust Planning of a European Electricity System Under Climate Uncertainty	864
<i>Leonie Sara Plaga, Valentin Bertsch</i>	

GENeSYS-MOD Turkey: Quantitative Scenarios for Low Carbon Futures of the Turkish Energy System	872
<i>Irem Sultan Hastürk, Emre Çelebi, Ahmet Deniz Yücekaya, Gökhan Kirkil</i>	
Power Network Planning with Flexibility Under Long-Term Renewable Capacity and Location Uncertainties.....	878
<i>Adrienne De Bazelaire, Olivier Massol, Kutluhan Pak, Yannick Perez, Vincent Rious</i>	
Modelling the Economic Feasibility of Distributed Flexibility Assets in the Dutch Electricity Markets.....	884
<i>Samuel De Weerd, Madeleine Gibescu, Maarten De Leeuw, Johan Van Haperen, Bouke Siebenga</i>	
Technical Solutions and Business Prospects for the Participation of Small PV Systems in the Balancing Energy Market.....	892
<i>Christoph Kondzialka, Manuela McCulloch, Jonas Dierenbach, Rouven Taubmann, Dietmar Graeber, Gerd Heilscher, Kay Wiedemann, Falko Ebe</i>	
Protect Consumers and Retain Flexibility: Fixed Price Contracts with Fixed Volume.....	898
<i>Gerard Doorman</i>	
Renewable Energy Generation, Electric Vehicles, Storage Technologies, and Hydrogen for Mobility – Contribution to the 2030 Portuguese Energy and Climate Targets.....	904
<i>André Lopes, Jorge Sousa, Cristina Camus, João Lagarto</i>	
Financial Performance of the Solar PV Projects Approved Under the 2020 Portuguese Auction	911
<i>Hélio Marques, Jorge Sousa, Cristina Camus, João Lagarto</i>	
Modelling Prices in Hydro Dominated Electricity Markets	917
<i>Elis Nycander, Lennart Söder</i>	
Defossilisation of the Industrial Sector - A Techno-Economic Bottom-Up Approach to Determining CO ₂ Abatement Costs.....	923
<i>Hendrik Scharf, Ole Sauerbrey, Dominik Möst</i>	
Flexibility Markets in the EU: Emerging Approaches and New Options for Market Design	935
<i>Chloé Fournely, Matej Pecjak, Tamara Smolej, Andreas Türk, Camilla Neumann</i>	
Organizing the Flexible Energy Market for Bridging Smart Energy Communities	942
<i>Gregor Cerne, Matija Arh, Laurynas Šikšnys, Lukas Albert, Kokos Isidoros, Christos Patsonakis, Charalampos Savvaidis, Konstantinos Votis</i>	
Indicators for Assessing the Necessity of Power System Flexibility: A Systematic Review and Literature Meta-Analysis.....	947
<i>Rajon Bhuiyan, Jan Weissflog, Michael Schoepf, Gilbert Fridgen</i>	
A Frequency-Domain Analysis of Electricity Market Prices for Multi-Timescale Flexibility of Power-to-X Facilities.....	954
<i>Nicolas Fatras, Zheng Ma, Bo Nørregaard Jørgensen</i>	
Optimal Coordination of Phase-Shifting Transformers in Curative Congestion Management	960
<i>Jonas Mehlem, Christian Gerdon, Jonas Rinner, Sirkka Porada, Andreas Blank, Albert Moser</i>	
An Overview of Market Design Considerations to Stimulate the Participation of VRE in Balancing Service Markets - With German Perspectives	966
<i>Claire Lambriex, Riley Van Ryswyk, Albert Moser</i>	

Statistical Analysis of Two Different Intraday Market Designs: The German and Iberic Intra-Day Market	973
<i>Andrea Alberizzi, Alessandro Zani, Paolo Di Barba, Miloš Pantos</i>	
Analysis of Nodal Price Interactions in Real-Scale Integrated Electricity-Gas-Heating Systems.....	979
<i>Lukas Löhr, Christian Fester, Lukas Hein, Albert Moser</i>	
Evaluating Modelling Approaches for State-Dependent Environmental Constraints in Medium-Term Hydropower Scheduling	986
<i>Sofie Aandahl Børresen, Linn Emelie Schäffer</i>	
The Influence on Day-Ahead Trading Volumes by Including Power Flow Equations in the Planning Algorithm for Short-Term Hydropower in Congested Areas	992
<i>Marius Eriksen, Mathias Espeland Trondal</i>	
Hydrogen Storage System Allocation in a Distribution Grid Considering Congestion Problem	998
<i>Sajjad Fattaheian-Dehkordi, Mehdi Tavakkoli, Mahmud Fotuhi-Firuzabad, Ali Abbaspour, Mina Habibi, Matti Lehtonen</i>	
Energy Procurement Strategy for Retail Customers Utilizing Standard Momentum Indicators	1003
<i>Gregor Gostincar, Gregor Lekan, Gašper Artac, Jan Jeriha</i>	
Green Energy Transformation of Kolektor - A Work in Progress.....	1008
<i>Dejan Brozovic, Aleksander Grobin, Gašper Artac, Edin Lakic</i>	
Simultaneous Detection and Classification of Dust and Soil on Solar PhotoVoltaic Arrays Connected to a Large-Scale Industry: A Case Study.....	1015
<i>Krishna Sandeep Ayyagari, Yuvraj Munian, Devasena Inupakutika, B Koti Reddy., Reynaldo Gonzalez, Miltiadis Alamaniotis</i>	
An Electricity Market Categorization Based on Morphological Analysis for Smart Grid Development	1021
<i>Rebeca Ramirez Acosta, Sebastian Lehnhoff, Jorge Marx Gomez</i>	
Modelling of Flexibility Options in a Low Voltage Distribution System	1028
<i>Jasmin Pfleger, Tomi Medved, Jernej Zupancic, Andrej F. Gubina, Edin Lakic</i>	

Author Index