

2025 29th International Electrical Power Distribution Conference (EPDC 2025)

**Tehran, Islamic Republic of Iran
28-30 October 2025**

IEEE Catalog Number:
ISBN:

CFP2531P-POD
979-8-3315-9685-9



Copyright © 2025, IEEE

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:	CFP2531P-POD
ISBN (Print-On-Demand):	979-8-3315-9685-9
ISBN (Online):	979-8-3315-9684-2

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

New Evaluation of Genetic Algorithm (GA) for Optimized Phasor Measurement Unit (PMU) Allocation in Power Networks and Comparative Performance Analysis with Dynamic Programming (DP) for Cybersecurity Enhancement	1
<i>Mojtaba Sadafi, M. Bagheri Hashkavayi, S. Masoud Barakati, Farhang Padidaran Moghaddam Ali Hassannia</i>	
The Impact of Blockchain and Decentralized Finance (DeFi) on Energy Service Companies (ESCOs)	8
<i>Mehdi Nourinezhad, Yazdan Rezaei, Zeinab Kebriaei</i>	
Power Swing Detection in Distance Protection Schemes Using Impedance Angle Rate Evaluation	12
<i>Elahe Salari, Mehrdad Mahmoudian, Mokhtar Torabi, Hamid Arab</i>	
High Voltage Gain DC-DC Converter for Enhanced Efficiency in Renewable Energy and Electric Vehicle Systems	19
<i>Abbas Seif, Hamid Radmanesh</i>	
Tehran Electrical Network and Energy Observatory, a Platform for Advanced Grid Data Analysis	26
<i>Meisam Nesary Moghadam, Alireza Rezaei, Kambiz Nazerian</i>	
Optimal size of a power system using wind and battery energy storage to mitigate generation in a governmental load	33
<i>Kasra Shafiei, Ali Seifi, Mehrdad Tarafdar Hagh</i>	
Replacement Index: A Techno-Economic Criterion for Replacing Copper Networks with Aerial Bundled Cable in Low-Voltage Distribution Networks	39
<i>Saeed Resali Ahadi, Tahereh Bagherzadeh, Ramin Horri</i>	
The definition of the assessment function for the deterioration mode of insulation level inadequacy due to thermal insulation failure and formation of the Markov model of distribution transformers	46
<i>Alireza Rezaei, Amirreza Yari, Mahmoud Reza Haghifam, Seyyedmostafa Abedi, Ali Akhavein</i>	
Enhancing Electricity Theft Detection: Optimized Model Calibration for Illicit Crypto Mining	52
<i>Milad Khani, Mohammad Pouyani, Mostafa Hoorzad</i>	
Safety Challenges of Utility-Level Battery Energy Storages: A Snapshot from Installations to Operations	59
<i>Pooya Parvizi, Milad Jalilian, Alireza Mohammadi Amidi, Hana Parvizi, Mohammad Reza Zangeneh Mona Faraji Niri</i>	
AI-Based Approach for Cable Theft Evaluation on Electrical Distribution Systems and Safety as Non-Technical Power Loss	65
<i>Ali Khatami</i>	
An Attention-Based Deep Learning Model for Multi-Horizon Prediction of Load, Price, and Wind Power Generation in Smart Grids	71
<i>S. Mozghan Rahmatinia, Seyed-Amin Hosseini-Seno</i>	
Fault Tolerant Control of Synchronous Generator Using a New MPC Controller Approach	80
<i>Alireza Nezamzadeh, Mohammadreza Esmailidehkordi</i>	

Adaptive Multi-Objective Optimization for Real-Time Demand Response in Smart Grids: Enhancing Stability, Efficiency, and Reliability	87
<i>Mohammad Hadi Eskandari Sani, Alireza Norouzpour Shahrbejari, Mehdi Zareian Jahromi</i>	
An Adaptive, Low Computational Cost Traveling Wave-Based Protection Scheme for MV-Distribution Networks Using Modified Frequency Spectrum Hilbert Transform	95
<i>Ehsan Akbari, Milad Samady Shadlu</i>	
Enhancing the Resilience of Electrical and Water Distribution Networks Through Optimal Location and Capacity Assessment and Islanded Operation of Distributed Generation Resources	103
<i>MohamadReza Farhadi, Pezhman Saidi Nezhad, Mehdi ZareKhafri, Ali Karimi</i>	
Advancements in Optical Phase Conductor Technology: A Novel Approach to Integrated Communication	110
<i>Pooya Parvizi, Milad Jalilian, Alireza Mohammadi Amidi, Hana Parvizi, Mohammad Reza Zangeneh</i>	
Fault Location in Distribution Networks Using a Combination of the Impedance-based Method and Smart Meter Data	116
<i>Omar Hosseinbor, Hossein Askarian Abyaneh, Amirreza Yari, Firuzeh Rameshkhah, Habib Allah Ravaghi Ardabili</i>	
Enhancing Industrial Profitability During Power Outages: Economic Evaluation of Energy Solutions and Cryptocurrency Mining	121
<i>Alireza Rouhanian, Ali Akhtari, Mehdi Ghafari, Mohammad Azimpour, Mehdi Salay Naderi, Leyla Daraie</i>	
Enhancing Power Grid Performance with Optimized Energy Storage Systems: A Focus on Voltage Stability, Loss Reduction, and EENS Minimization	128
<i>Alireza Norouzpour Shahrbejari, Mohammad Hadi Eskandari Sani, Mehdi Zareian Jahromi</i>	
Optimal Distribution Network Reconfiguration for Loss Reduction and Peak Load Management with Preservation of Critical Load Points, Considering Distributed Generation, Using Genetic Algorithm	137
<i>Hossein Parsadust, Hossein Lotfi, Mohammad Ebrahim Hajiabadi, Hojjat Parsadust</i>	
Sharif University of Technology Distribution Grid's Restructuring Plan	145
<i>Alireza Alirezaei, Mehdi Vakilian</i>	
Impact of Various Types of Distributed Generation Sources on Distribution Network Protection: Fault Current Characteristics Analysis and Providing a Suitable Protection Plan	150
<i>Yaser Sherej Sharifi, Mohammad Khakroei, Ashkan Mirzaei Rajooni, Reza Sharifi</i>	
Coordinated Demand Response of Electrical and Thermal Loads for Stability Enhancement in Smart Energy Hubs	158
<i>Daryoush Tavangar Rizi, Mohammad Hassan Nazari, Seyed Hossein Hosseinian</i>	
Integration of DGs in DC Microgrids: A Multi-Objective Framework for Cost Reduction and Relay Coordination	163
<i>Abolfazl Hadadi, Mohammad Javad Jalilian, Behrooz Vahidi, Gholam Hossein Riahy Dehkordi</i>	
GIS-Based Predictive Maintenance for Electrical Insulators	170
<i>Ali Jafari, Morteza Kalantari Azad, Ali Montazeri Zanjani, Mohammad Aghaee Fatideh</i>	
A Bi-Level Optimal Operation Strategy for Active Distribution Networks through Interactive Cooperation of DSO and Smart Homes	176
<i>Seyed Alireza Miri, Amir Bagheri</i>	

Lithium Battery Energy Storage Packaging: Innovative Precise Sorting Technique	183
<i>Amirhossein Rahimian Zarif, Yasser Mafinejad</i>	
Optimal Sizing and Location of DG Units Using Meta-heuristic Algorithm to Find The Best Combinations Renewable Energy Technology in Terms of system Costs	189
<i>Milad Farhadi, Fatemeh Panahi, Amir Mohammad Sharifi, Seyed Hessamedin Sadeghi</i>	
Optimal Energy Management in a Microgrid with Renewable Sources, Fuel Cell, Electric Vehicles, and Demand Response Programs for Operational Cost Reduction	196
<i>Milad Farhadi, Mohammad Reza Fatehi, Amir Mohammad Sharifi, Fatemeh Panahi Mohammad-amin Mohseni</i>	
A Novel Non-Isolated High Step-Up DC-DC Boost Converter with an Optimized Structure by Using Two Coupled Inductors for DC Microgrid Applications	201
<i>Abdullah Abdollahpour, Amirreza Bahadori, Mohsen Zolfkhani, Seyed Hossein Hosseini</i>	
Practical Test of Restricted Earth Fault (REF) Relay	207
<i>Nader Jalali Marand, Hasan Abniki, Hossein Askarian Abyaneh</i>	
Optimal Management of a Multi-Carrier Energy System Considering Demand Response and Consumption Pattern Optimization: A Case Study of the Abarj-Fars Station Grid	213
<i>Mohammad Reza Masoudi, Mostafa Karimi, Mahdieh Golnary</i>	
Differential Privacy-Based Deep Reinforcement Learning for Secure and Cost-Efficient Energy Optimization	221
<i>Younes Ghazagh Jahed, Nasrin Tirgarian, Seyyed Ali Sadat Tavana</i>	
Long-Term Yearly Peak Load Forecasting, Using Artificial Intelligence, Time Series Analysis, and Trend Curve Techniques	227
<i>Hossein Aliyan, Seyed Hamid Khalkhali, Mohsen Taghizadeh Kejani</i>	
ANN-Driven Energy Loss Quantification in Modern Distribution Grids: An Intelligent Framework for Grid Efficiency Evaluation	235
<i>Saeed Moharrami, Hamed Asadpour, Hamid Heidary, Meysam Ansari</i>	
Detection of Unauthorized Electricity Consumption with a Novel Analytical Approach	241
<i>Akbar Bayat, Ali Abdali, Vahid Babaei, Amir Reza Zargham, Mohammad Aghaee-Fatideh, Samira Rahimi</i>	
Damping Enhancement Strategy in Microgrids Using High-Pass Filter-Based Virtual Synchronous Generator	246
<i>Shahram Akhtari, Mohammadali Narooie Dehchil, Ali Akhtari</i>	
Asset governance framework in electricity distribution system	253
<i>Amirhossein Yousefi Joobeni, Mahdi Naghavi, Reza Dashti</i>	
Cloud-Based Energy Management for Single Consumers: Integrating IoT, Demand Response, and Renewable Energy for Enhanced Energy Efficiency	265
<i>Malihe Hariri, Hamid Reza Abrishami, Vahid Baghishani</i>	
Enhancing Power System Flexibility and Reducing Traditional Generations through Integrated Renewable Energy and Demand Response Strategies	274
<i>Kasra Shafiei, Ali Seifi, Mehrdad Tarafdar</i>	

Energy Management and Cost Optimization via the Integration of Renewable Energy in Multi-Energy Systems	280
<i>Kasra Shafiei, Ali Seifi, Mehrdad Tarafdar Hagh</i>	
A Hybrid Approach to Microgrid Energy Optimization: Integrating Renewable Energy Sources with Demand-Side Management	286
<i>Kasra Shafiei, Ali Seifi, Mehrdad Tarafdar Hagh</i>	
Maximizing the Efficiency of Energy Storage and Renewable Energy Source Integration in Power-Intensive Industrial Microgrids	292
<i>Kasra Shafiei, Ali Seifi, Mehrdad Tarafdar Hagh</i>	
Energy-aware Workflow Scheduling in Cloud Computing: DVFS-enabled under Deadline Constraint	298
<i>Negin Shafinezhad, Hamid Abrishami, Maryam Mahmoudi, Vahid Baghishani</i>	
Stochastic Energy Management of Multi-Carrier Energy Systems Integrated with electrical and thermal Demand Response Programs and Renewable Energy Sources Under System Uncertainties	304
<i>Hossein Kiani, Seyed Hossein Hosseini, Amir Khorsandi</i>	
Optimal Stochastic Scheduling of Virtual Power Plant with Distributed Energy Resources and Demand Side Management for Supplying Electrical and Thermal Loads in Distribution Network	310
<i>Hossein Kiani, Mohammad Hassan Nazari, Seyed Hossein Hosseini</i>	
Optimal Planning of Energy Hubs for Electrical Distribution Networks with Renewable Integration and Storage Systems: Analysis of Battery Degradation Costs and System Uncertainties	316
<i>Hossein Kiani, Mohammad Hassan Nazari, Seyed Hossein Hosseini</i>	
Optimizing Flexibility and Economic Benefits in Distribution Networks through Prosumers on the basis of Peer-to-Peer Energy Trading	322
<i>Hossein Kiani, Mohammad Hassan Nazari, Seyed Hossein Hosseini</i>	
Augmented Reality and Virtual Reality, an Innovative and Interactive Tool in Technical Training in the Electrical Industry: Case Study "Implementing Cable Termination" in Great Tehran Electric Power Distribution Company	328
<i>Ali Mighi, Kourosh Apornak</i>	
Robust Load Management Modeling for Outage Management and Energy Imbalance Reduction in Distribution Networks Based on Technical and Economic Indicators Considering Solar Energy	333
<i>Kourosh Apornak, Ali Mighi</i>	
Optimized Cyber-Attack Detection and Localization in Smart Grids via Autoencoder-Based Deep Transfer Learning	339
<i>Amirreza Taherinia, Mahsan Tavakoli Kakhki, Turaj Amraee</i>	
Evaluation of Reliability for Integrating Renewable Energy Sources and Battery Backup Systems in Seaport Power Grid	346
<i>Mehrdad Mahmoudian, Hossein Ardakani Movaghti, Rololah Akbari, Seyed Milad Hosseini Kavkani</i>	
A Sensitivity-Driven Optimization Framework for EV Parking Planning in Distribution Networks: A Holistic Approach to Grid Performance Enhancement	355
<i>Mohsen Naservand, Abolfazl Pirayesh Neghab</i>	
Techno-Economic Framework to Analyze Hot Line Operation Efficiency in the Electricity Distribution Network	361
<i>Mohsen Kojury-Naftchali, Mohammad Shams Talooki, Esmaeel Nabavi</i>	

Optimal Placement, Phase Connection, and Sizing of Distributed Generation in an Unbalanced Three-Phase Microgrid for Network Performance Enhancement	371
<i>Mohsen Naservand, Abolfazl Pirayesh Neghab</i>	
Optimal Sizing, Placement, and Quantity of Energy Storage Systems for Resilience Enhancement in Distribution Networks During Storm Condition	377
<i>Mohsen Naservand, Abolfazl Pirayesh Neghab</i>	
Optimal Placement and Coordination of Protective Devices in Distribution Networks Considering Protection Coordination Constraints	383
<i>Hossein Ramezani, Mohammad Ebrahim Hajiabadi, Hossein Lotfi, Hossein Parsadust, Vahid Baghishani</i>	
Adaptive Protection Scheme for Radial Microgrids Considering Generation Contingency	390
<i>Abdolreza Gholipour, Mahdi Akhbari, Mohammad Bayat Bidkorpe, Farzaneh Gholipour</i>	
Modeling, Design and Control of a Power Factor Correction Converter for a Switch-Mode Power Supply to Electric Power Quality Improvement	400
<i>Mohammad-Sadegh Karbasforooshan</i>	
System-Wide Temporal Characterization of Technical Loss Time-Series Patterns and Energy Loss Factor Behavior: A High-Resolution Empirical Study of Macro-Scale Power Distribution Networks	406
<i>Saeed Moharrami, Hamed Asadpour, Mehrdad Samadi, Marjaneh Mohammadjafari</i>	
Hybrid Solar-Biogas System for Efficient Energy Management in Electric Vehicle Charging Station	410
<i>Seyed Ali Alenabi, Amirreza Olyaei Farshbafian, Amirhosein Mansouri, Hamed Karimi, Alireza Siadatan</i>	
Optimal Sizing and Siting of Solar Power Plants in the Distribution Network of Qazvin Province	416
<i>Seyed Hamid Rafiei, Hamid Norozi, Yadollah Kordlou</i>	
Analysis and Comparison of MVDC and MVAC Distribution Grid with the Aim of Localization and Optimum Decision-Making	422
<i>Hossein Aliyan, Mohsen Taghizadeh Kejani, Seyed Hamid Khalkhali</i>	
Enhancing Smart Grid Resilience Against Cyberattacks: A Combined Approach Using CHP Units and Demand Response Programs	431
<i>Kamran Taghizad-Tavana, Mohsen Ghanbari-Ghalehjoughi, Mehrdad Tarafdar-Hagh Hossein Shahinzadeh, Hamed Nafisi, Hossein Askarian-Abyaneh</i>	
Mitigating Negative Energy Pricing through Cryptocurrency Mining as a High Flexible Load	437
<i>Omidreza Heydaritafreshi, Mehran Hajiaghapour-Moghimi, Ehsan Hajipour, Mahmud Fotuhi-Firuzabad</i>	
Optimization of Power Distribution and Energy Consumption Management in Distribution Networks Using Time-Based Dynamic Load Response Programming	444
<i>Mohsen Naservand, Abolfazl Pirayesh Neghab</i>	
Multi-Agent Multi-Objective based Operation of Smart Distribution Network	450
<i>Mohammad-Reza Jannati-Oskuee, Masoumeh Karimi, Mohammad Javad Amroony Boushehri</i>	
A new method based on chatbots to increase satisfaction in the electricity distribution Customer relationship management systems	456
<i>Reyhane Taghizadeh Khankook, Hamid Reza Abrishami, Mojtaba Banifakhr, Vahid Baghishani</i>	
Bi-Level Distribution Network Expansion Planning Considering Topological and Electrical Resilience	462
<i>Masoumeh Karimi, Mohammad-Reza Jannati-Oskuee, Mojtaba Totonchi Sotobadi</i>	

Optimization of Wind Permanent Magnet Generator for Maximum Wind Energy Extraction Based on Genetic Algorithm	468
<i>Mohammad Rajabi-Sebdani</i>	
Flexibility Valuation: Determining the Flexibility Activation Threshold for Peak Load Management	474
<i>Saeed Kafshdouzzadeh, Paniz MohsenNia, Ehsan Shahi, Mahdi Nozarian, Alireza Fereidunian</i>	
Citizen-driven Energy Action Contributing to Integrate Nano-Storages into Energy Communities	483
<i>Behzad Gholami Soltanahmadi, Ehsan Shahi, Mahdi Nozarian, Alireza Fereidunian</i>	
Uncertainty Management in Distribution Networks: A Comprehensive Review of Advanced Sampling Methods for Renewable Energy Integration	491
<i>Reza Khalili, Mohammadreza Bakhtiari, Mohadese Dejahagah, Hassan Sam Daliri, Reza Gharibi Hamed Nafisi</i>	
Microgrids and Resilience: A Comprehensive Review of Research Approaches and Optimization Strategies	499
<i>Reza Khalili, Hassan Sam Daliri, Reza Gharibi, Mohammadreza Bakhtiari, Hamed Nafisi Hossein Askarian Abyaneh</i>	
Resiliency Improvement of Smart Distribution Network by Island Microgrids Forming	507
<i>Mehdi Mozaffari Honuomarvar, Mahdi Rahimi, Mohammadreza Mazidi, Alireza Rahimi</i>	
Smart Grid Resilience: The Key Role of Machine Learning in Crisis Management	512
<i>Kamran Taghizad-Tavana, Mohsen Ghanbari-Ghalehjoughi, Mehrdad Tarafdar-Hagh Hossein Shahinzadeh, Hamed Nafisi, Hossein Askarian-Abyaneh</i>	
A Comprehensive Framework for Enhancing Distribution systems Resilience Through EV Integration	519
<i>Mohammad Mandegari-Meybodi, Ali Pasban-Gajan, AmirSaeed Es'haghi, Mahmud Fotuhi-Firuzabad Meoin Moeini-Aghaie</i>	
Comprehensive Analysis of Control Strategies and Rotor Angle Stability in Hybrid Wind Energy Systems Connected to Conventional Grids	527
<i>Aliyu Sabo, Dauda Dahiru, Noor Izzri Abdul Wahab, Hossein Shahinzadeh, Hamed Nafisi Mohammad Mohsen Hayati, Mehdi Abapour</i>	
A Novel High-Gain DC-DC Converter for Fuel-Cell Electric Vehicle	535
<i>Farzad Mohammadzadeh Shahir, Amir Mohamad Mohamadi</i>	
Optimal Incentive-Based Demand Response Model for Peak Load Reduction Considering Aggregator Profit Maximization	540
<i>Hossein Shahinzadeh, Shohreh Azani, Saiedeh Mehrabani-Najafabadi, Ersan Kabalci Almoataz Y. Abdelaziz, Gevork B. Gharehpetian</i>	
Health index based distribution transformers condition monitoring system	545
<i>Kambiz Nazerian, Habib Allah Ravaghi Ardabili, Amirreza Yari, Javad Khoshnodi, Avesta Jafari M.R. Haghifam</i>	
A New Optimization Model for Reducing Outage Duration via Service Group Allocation in Electricity Distribution	551
<i>Amirpouya Hosseini, Amirreza Yari, Habib Allah Ravaghi Ardabili, Reza Dashti</i>	
Insulation Puncture Fault Detection Based on Statistical Indicators	555
<i>Farhad Shabihi, Amir Hosein Salemi, Sajad Bagheri, Ali Tofighi, Hassan Feshki Farahani</i>	

Carbon Footprint Assessment of Influential Factors in Electricity Consumption in Tehran Province via the STIRPAT Model	560
<i>Rashin Ilka, Alireza Noorpoor, Saeed Nazari Kudahi, Rahil Ilka</i>	
Advanced AI-Based Data Analytics for Effective Peak Load Management at Major University Campuses in Tehran	566
<i>Kambiz Nazerian, Habib Allah Ravaghi Ardabili, Abdolhossein Esmaeilzadeh, Pouya Ramezanzadeh Reza Zamani, Alireza Mansoori, Mohsen Parsa Moghaddam</i>	
A Novel Approach to Distribution Network Modeling with Limited Online Data	571
<i>Akbar Bayat, Ali Abdali, Abbas Rabiee</i>	
Thermal Analysis of New Generation of Distribution Transformers: Experimental Validation	575
<i>Ali Abdali, Akbar Bayat, Kazem Mazlumi, Abbas Rabiee</i>	
Presenting the business model of intelligent electricity distribution networks for developing countries	579
<i>Fatemeh Hashemi, Ali Komasi</i>	
Coordinated Integration of Solar PV Systems and Electric Vehicles Charging Stations: An Optimization Framework for Enhanced Distribution System Power Quality	583
<i>Payam Rezaei, Alireza Jalilian</i>	
Robust Classification of Power Quality Disturbances in Electric Power Distribution Networks Using Domain-Adversarial Neural Networks	588
<i>Amir Hossein Koohestani, Alireza Jalilian</i>	
Calculation Of Carbon Footprint Caused by Electricity Consumption Based on Economic Growth and Population Increase in Southern Provinces of Iran with STIRPAT Model	593
<i>Rashin Ilka, Mehran Khalesi, Habiballah Ravaghi Ardabili</i>	
An Analysis of Game Theoretic Methodologies for Reliability Enhancement in Electrical Distribution Systems	600
<i>Mohammad Rahim Mohammadi, Habib Rajabi Mashhadi</i>	