

# **2023 13th Smart Grid Conference (SGC 2023)**

**Tehran, Iran  
5-6 December 2023**



**IEEE Catalog Number: CFP23SGB-POD  
ISBN: 979-8-3503-9607-2**

**Copyright © 2023 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:	CFP23SGB-POD
ISBN (Print-On-Demand):	979-8-3503-9607-2
ISBN (Online):	979-8-3503-9606-5
ISSN:	2572-6935

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

## TABLE OF CONTENTS

<p>An Energy Efficiency Model for Energy Management of a Smart Building Based on System Dynamics Approach .....</p> <p style="padding-left: 20px;"><i>Arash Rajaei, Faezeh Gholipour, Amir Abdollahi, Masoud Rashidinejad</i></p>	1
<p>Optimal Design and Economic Comparison of a Hybrid Energy System in Iran and Switzerland with Sensitivity Analysis .....</p> <p style="padding-left: 20px;"><i>Hossein Kiani, Mahdi Najafi, Hossein Gharibvand, Mohammad Hassan Nazari, Gevork B. Gharehpetian, Seyed Hossein Hosseinian</i></p>	7
<p>A Non-Isolated Bidirectional DC-DC Converter Connected to the T-Type Three Level Converter for Electric Vehicle Battery Charger.....</p> <p style="padding-left: 20px;"><i>Farzad Sedaghati, Seyed Abbas Azimi</i></p>	15
<p>Modeling and Assessment of Water-Energy Nexus Considering Cyber Security in Load Demand.....</p> <p style="padding-left: 20px;"><i>Daryoush Tavangar Rizi, Mohammad Hassan Nazari, Seyed Hossein Hosseinian, Gevork B. Gharehpetian</i></p>	20
<p>Fault Detection and Location in Ring DC Micro-Grid by Radial Basis Function Neural Network and SVM Classifier .....</p> <p style="padding-left: 20px;"><i>Amirhossein Akbari Sharif, Hossein Kazemi Karegar, Saman Esmaeil Beigi</i></p>	26
<p>Two-Stage Energy Management System of Microgrid in the Presence of Cryptocurrency Mining Farms.....</p> <p style="padding-left: 20px;"><i>Payman Rezaei, Masoud Aliakbar Golkar</i></p>	31
<p>A SCOPF Model for Iran's Hourly Power Market, a Requirement to Develop Renewable Power Plants .....</p> <p style="padding-left: 20px;"><i>Abbas Marini, Seyed Mohsen Hashemi, Mehdi Tabarzadi</i></p>	37
<p>Frequency Regulation of an Interconnected Two-Area System Considering Uncertainty .....</p> <p style="padding-left: 20px;"><i>Mohammad Amin Ranjbar, Mohammad Mehdi Amiri, Mohammad Taghi Ameli</i></p>	45
<p>Residential Energy Management of a Grid-Connected Active Building Via Fire-hawk Algorithm .....</p> <p style="padding-left: 20px;"><i>Mohammad Javad Amroony Boushehri, Mohammad Reza Jannati Oskuee, Seyed Ahmad Mousavi</i></p>	54
<p>A Quadratic Step-Up DC-DC Converter with Continuous Current for PV Applications.....</p> <p style="padding-left: 20px;"><i>Ali Sajjadi, Hossein Gholizadeh, Mohsen Hamzeh, Gevork B. Gharehpetian</i></p>	59
<p>A Novel Approach to Predict Unplanned Interruptions in Medium-Voltage Power Distribution Grids Using Data Mining in Tabriz City .....</p> <p style="padding-left: 20px;"><i>Payam Farhadi, Naser Ghorbani</i></p>	63
<p>Smart Grid Protection Against Cyber-Attacks Using PMUs and DC System Model.....</p> <p style="padding-left: 20px;"><i>Zahra Pourahmad, Rahmat-Allah Hooshmand</i></p>	69
<p>Deep Neural Network Based Data-Driven Framework for Combined Economic Emission Dispatch Including Photovoltaic Integration .....</p> <p style="padding-left: 20px;"><i>Younes Ghazagh Jahed, Seyyed Yousef Mousazadeh Mousavi, Saeed Golestan</i></p>	77
<p>Localized Load Reduction Market Development Considering Network Constraints.....</p> <p style="padding-left: 20px;"><i>Mohammad Panahazari, Minoos Mohebbifar, Vahid Nazari Farsani, Mahmoud-Reza Haghifam</i></p>	84

An Algorithm for Generating Synthetic Distribution Grids Based on Edrös-Rényi Random Graph Model .....	89
<i>Mohammad Shahraeini</i>	
Detection of Illegal Cryptocurrency Mining Farms in Distribution Systems Using Harmonic State Estimation.....	97
<i>Amir-Saeed Es'Haghi, Ebrahim Afjei, Abbas Marini, Maziar Karimi</i>	
Intelligent Fault Detection and Location Method for DC Micro-Grid by Considering Different Fault and Non-Fault Operation Modes .....	103
<i>Amirhossein Akbari Sharif, Hossein Kazemi Karegar, Saman Esmaeil Beigi</i>	
Application of a Hybrid Deep Model Based on Harmonic Distortion for High-Impedance Fault Detection .....	110
<i>Zeinab Shamaee, Sayed Rasoul Kafimousavi Najafabadi, Rasoul Roustaei</i>	
The Scheduling of Operations in a Competitive Local Energy Market Under Constraints of Flexibility .....	116
<i>M. Reza Sheykha,</i>	
Impact of Distributed Generation on Coordination of Overcurrent Relays by Benders Decomposition Algorithm .....	122
<i>Seyed Akbar Safaei, Naser Khodabakhshi Javinani, Hamed Nafisi</i>	
Power Control and Operation of Fuel-Cell in the Presence of Energy Storage .....	128
<i>Shahab Moradi-Torkashvand, Arina Kharazi, S. Hamed M. M. A. Roudaki, Mehrdad Abedi, S. Hossein H. Sadeghi</i>	
Integrated Battery Energy Storage with Modular Multilevel Converter for Grid-Connected Photovoltaic System: Design and Control.....	136
<i>Ehsan Akbari, Milad Samady Shadlu</i>	
Customers Characterization by Seasonality Detection in Residential Electricity Consumptions Data, Based on High-Day Frequency Identification.....	142
<i>Reza Haghgo, Mohsen Kojury-Naftchali, Alireza Fereidunian</i>	
A Novel 24- Hour Deep Neural Network Based Streamflow Forecasting Method in Data-Scarce Regions.....	148
<i>Parissa Taheri, Sahra Taheri, Masoume Taheri, Gelare Taheri</i>	
Determining Energy Storage Systems Capacity for Preventing Cascading Outages During Primary Control: A Dynamic Study .....	154
<i>Hadi Abbaspour, Siavash Yari, Erfan Asadi, Hamid Khoshkhoo, S. M. Ale Emran</i>	
A Family of Improved Boost Converters with Application of High Intensity Discharge Lightning .....	160
<i>Hossein Gholizadeh, Mohammad Hemati, Mohsen Hamzeh</i>	
Coupled Energy Systems Operation Through MINLP Framework Considering Systems Constraints and Demand Response .....	165
<i>Meysam Feili, Mohammad Taghi Ameli, Miadreza Shafiekhah</i>	
A Cubic Non-Isolated High Step-Up DC-DC Converter Suitable for Distributed Applications .....	173
<i>Hossein Gholizadeh, Ali Sajjadi, Mohsen Hamzeh, Gevork B. Gharehpetian</i>	
Enhancing Smart Grid Security Through Battery Energy Storage Integration: A Security-Constrained Unit Commitment Approach .....	178
<i>Saman Ahmadi, Saleh Irandoust, Turaj Amraee</i>	

A Techno-Economic Based Two-Stage Approach for Congestion Management in Distribution Network Considering High DG Penetration.....	185
<i>Elaheh Kadivar, Alireza Hatami</i>	
A New Market-Based Framework for Increasing Responsive Loads in Distribution Systems .....	194
<i>Mohammad Panahazari, Mino Mohebbifar, Vahid Nazari Farsani, Mahmoud-Reza Haghifam</i>	
An Innovative Method for Converting Solar Thermal Energy into Electrical Power.....	200
<i>Arya Gholipour Hanizi, Amir A. Ghavifekr</i>	
Evaluating the Impact of the Demand Response Program on the Economic Operation of Energy Hubs in Terms of Electricity and Heat Demand .....	206
<i>Daryoush Tavangar Rizi, Mohammad Hassan Nazari, Seyed Hossein Hosseini, Gevork B. Gharehpetian</i>	
A New Method Based on Symbolic Regression to Detect the Probability of False Data Injection Attacks on PV Generation .....	213
<i>Amir Mohammad Moradpour, Mohammad Hossein Alizadeh, Hamed Delkhosh</i>	
Intelligent Expansion Planning of the Electricity and Gas Distribution Networks with the Presence of Distributed Generation and Energy Storage.....	220
<i>Mahdi Tabarzadi, Pouria Maghouli</i>	
The Role of Microelectronics for Smart Cities, Smart Grids and Industry 5.0: Challenges, Solutions, and Opportunities .....	228
<i>Amirhosein Asilian, Hossein Shahinzadeh, S. Mohammadali Zanjani, Gevork B. Gharehpetian, Almoataz Y. Abdelaziz, Sudeep Tanwar</i>	
Optimal Operation of Smart Grids in the Presence of Photovoltaic Units .....	240
<i>Siamak Bahari, Mohammad Javad Amroony Boushehri, Saeed Sharifi</i>	
Predicting the Number of Voltage Sags Using the SARFI Index Considering System Uncertainties .....	245
<i>Sina Shakeri, Javad Khajouei, Saeid Esmaeili, Miadreza Shafie-Khah</i>	
Assessing Potential of Renewable Energy Sources in Iran Through Practical and Analytical Data.....	251
<i>Seyed Mohsen Hashemi, Behnam Alizadeh, Mohammadreza Sheibani, Farhad Fallahi</i>	
A Distributed Control Strategy Based on Fuzzy Logic Method for SoC Balancing in Inverter-Based AC Microgrids.....	259
<i>Amir Reza Malekpour, Hossein Askarian Abyaneh, Amir Abolfazl Suratgar</i>	
A Novel Approach for Frequency Control in Smart Grids Utilizing Thermal Equipment for Emergency Situations.....	263
<i>Sajad Golshaeian, Hossein Kiani, Mohammad Hassan Nazari, Seyed Hossein Hosseini, Gevork B. Gharehpetian</i>	
Investigation of Low-Temperature Ethylene Production of Transformer Oil Using IEC 60296-2020 Method .....	270
<i>Nima Ajodani-Zanjani, Hossein Karami, Arash R. Khoshrou, Gevork B. Gharehpetian</i>	
Visibility of Power Distribution Network Using Neural Network .....	274
<i>Abolfazl Hadavi, Karim Roshan Milani, Mehrdad Tarafdar Hagh</i>	
Deep Reinforcement Learning Based Network Reconfiguration .....	278
<i>Mohammad Hossein Alizadeh, Mohsen Parsa Moghaddam, Maryam Imani</i>	

Short-Term Wind Speed Prediction Using GMDH Neural Networks: Binalood Wind Farm Case Study.....	284
<i>Mehdi Farhadkhani</i>	
Experimental Analysis of Dust Accumulation on the Panels of a Microgrid-Connected Photovoltaic System in an Arid Climate.....	288
<i>Mohammad Nazififard, Nazanin Torabi</i>	
Implementation of System Identification Models to Predict Demand Response Potential in Smart Grids.....	293
<i>Fatemeh Sheibani, Mojgan Mollahassani Pour, Hengameh Keshavarz, Mohammad Raeisi</i>	
Model Predictive Control of Hybrid Energy Storage System of Amirkabir DC Microgrid .....	299
<i>Serge Yeghyazarian Tabrizi, M. S. Mahdavi, Amir Khorsandi, G. B. Gharehpetian</i>	
Decentralized Robust Fixed-Time Secondary Voltage Control of AC Microgrids.....	305
<i>Naser Padar, Amin Fathollahzadeh, Mohammad Javad Mirzaei</i>	
Harmonic Distortion Optimization of Multilevel H-Bridge Inverter with Delta-Connected.....	311
<i>Ehsan Chaharmahali, Maryam Sepehrinour, Hamed Karimi, Alireza Siadatan</i>	
Comparing Actual Measurement and PVsyst Simulation Results for Energy Generation of Microgrid-Connected PV Systems .....	316
<i>Mohammad Nazififard, Hamed Hashemi-Dezaki, Kia Nazififard</i>	
A Reliability-Based Strategy for Active Distribution Network Expansion Planning .....	322
<i>Seyed Peiman Mirhoseini, Seyed Mohsen Hashemi, Behnam Alizadeh, Mahdi Tabarzadi, Farhad Fallahi</i>	

**Author Index**