

2021 IEEE 4th International Conference on Power and Energy Applications (ICPEA 2021)

**Busan, South Korea
9-11 October 2021**



**IEEE Catalog Number: CFP21T09-POD
ISBN: 978-1-6654-1396-1**

**Copyright © 2021 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:	CFP21T09-POD
ISBN (Print-On-Demand):	978-1-6654-1396-1
ISBN (Online):	978-1-6654-1395-4

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

CURRAN ASSOCIATES INC.
proceedings
.com

2021 IEEE The 4th International Conference on Power and Energy Applications

ICPEA 2021

Table of Contents

Preface.....	vi
Conference Committees.....	vii

Chapter I: Electrical Engineering and Automation

Modeling and Implementation of Multiphase Switched-Capacitor Coupled-Inductor Converter.....	1
<i>Yuen-Haw Chang and En-Ping Jhao</i>	
Analysis of Center of Inertial Frequency in a Power Grid that Includes Distributed Energy Resources Connected via Smart Inverters.....	6
<i>Yuko Hirase, Dai Orihara, Hiroshi Kikusato and Jun Hashimoto</i>	
Application of Oil-immersed Transformer Fault Diagnosis Based on Modified Neural Network Combined with PSO.....	13
<i>Xiongjian Huang, Haojiang Han, Jun Chai, Qing Zhu, Hao Cai and Tao Zhao</i>	
Control Strategy Analysis of a Novel Transformerless Unified Power Quality Controller Based on Ultracapacitor and TRIAC.....	18
<i>Chen Shi, Kun Dong, Jianfeng Zhao, Han Yan and Wei Liu</i>	
Design of a Single Inductor LED Sink Driver Employing a Negative Hybrid Cockcroft-Walton/Dickson Multiplier.....	24
<i>Kei Eguchi, Akira Shibata, Takaaki Ishibashi and Farzin Asadi</i>	
On-line Detection Method of Supraharmonic in Distribution Network Based on Identification of Switching Frequency.....	29
<i>Zhe An, Minxuan Shen, Yaqiong Li, Dandan Feng and Shun Tao</i>	

Chapter II: Electronics and Power Engineering

Power System Operation in the presence of Flexible Prosumers considering System Congestion 33
Mayar Madboly, Amgad El-Deib and Mohamed Elsobki

Analysis of Cell-to-Cell Variation in a Battery Pack after long Service Life Using Parameter Identification 38
Tobias Scholz, Simeon Kremzow-Tennie, Friedbert Pautzke, Heiko Fechtner, Alexander Popp and Benedikt Schmuelling

Battery Management Systems Topologies: Applications 43
Alexander Popp, Heiko Fechtner, Benedikt Schmuelling, Simeon Kremzow-Tennie, Tobias Scholz and Friedbert Pautzke

Supraharmonic Emissions of a bidirectional electric vehicle charging station - a research methodology based on tests at reconstructed distribution grid..... 51
Bernhard Grasel, Jose Baptista, Manfred Tragner, Kurt Leonhartsberger and Gregor Keusch

Controller Chip Design of Coupled-Inductor Cockcroft-Walton-Switched-Capacitor Boost DC-AC Inverter..... 60
Yuen-Haw Chang and Kai-Lin Hsu

Vibration Energy Harvesting Using a MISO Converter Employing Hybrid Cockcroft-Walton/Dickson Multipliers..... 65
Kei Eguchi, Akira Shibata, Takaaki Ishibashi and Farzin Asadi

Control Methods for a Bi-directional DC-DC Converter in Fuel Cell Hybrid Vehicle Applications 69
Hartmut Hinz and Noass Kunstbergs

Drone-based sensing and exploration of overhead electric power lines 76
Steve Mann, Samir Khaki, Jaden Bhimani, Gael Verges and Faraz Sadrzadeh-Afsharazar

Adaptive Power Control of VSC-HVDC as a Corrective Measure..... 82
Alexander Raab, Dominik Frauenknecht, David Riebesel, Gert Mehlmann and Matthias Luther

Chapter III: Electricity Demand and Market Consumption

Comparative Studies on Use of Discrete Wavelet Transform-based Feature Extraction for Peak Load Forecasting Using LSTM 88
Gerard Francesco DG. Apolinario, Ying-Yi Hong, Yih-Der Lee, Jheng-Lun Jiang and She-Szu Wang

Electricity Tariff Simulation on The Largest Electric Power System in Indonesia Using The Time Of Use and Critical Peak Pricing Schemes Based on Revenue Neutrality.....	93
<i>Agus Setiawan, Zainal Arifin, Budi Sudiarto and Iwa Garniwa</i>	
Dimensional and Numerical Analysis of Power Prediction of a Real-Scale Archimedes Spiral Wind Turbine Based on the Experimental Data of Small-Scaled Models.....	99
<i>Abu Hena Md Maruf Morshed, Safwan Shafquat, Israt Zahan Mim, Md. Shahriar Hossain and Md. Shohidul Islam Masum</i>	
Long-Term Load Forecasting Based on Feature fusion and LightGBM	104
<i>Yao Tan, Zhenshan Teng, Chao Zhang, Gao Zuo, Zhiguang Wang and Zhengjia Zhao</i>	
Distributing the Generation of Electricity to Extreme Level	110
<i>Tero Kivimäki, Janne Ruuskanen, David Blazevic, Aki Halme, Turo Salminen, Jukka Vanhala and Paavo Rasilo</i>	
State Estimation in Large, Unbalanced Distribution Systems and its Applications on Network Reconfiguration and Demand Estimation.....	116
<i>Hernán Prieto Schmidt, Milana Lima dos Santos, Gustavo de Gois Himeno, João Carlos Guaraldo, Pedro da Silva Peixoto and José Antonio Jardini</i>	
 <h2>Chapter IV: Energy System and Engineering</h2> 	
Design and Simulation of a Solar PV System for a University Building.....	122
<i>Afshin Balal, Miguel Herrera, Emmanuel Johnson and Tim Dallas</i>	
A MQTT-based Soil Moisture Level Notification System for a Smart Farm.....	126
<i>Jinsuk Baek and Munene W. Kanampiu</i>	
The Influence of Tilt Angle on Output for a Residential 4 kW Solar PV System	131
<i>Afshin Balal and Tim Dallas</i>	
Optimal Deployment Capacity of District Multi-Energy System Considering Cost Evolution.....	135
<i>Yiru Dai and Yipu Zeng</i>	
Demand Side Management and Economic Analysis Using Battery Storage System (BSS) and Solar Energy	141
<i>Afshin Balal and Michael Giesselmann</i>	
Optimal Hybrid Renewable Energy System Design for Generation Cost Reduction and Increased Electrification in Isolated Grid in Indonesia	147
<i>Fauzan Hanif Jufri, Budi Sudiarto and Iwa Garniwa</i>	