

# **2023 6th International Conference on Energy Conservation and Efficiency (ICECE 2023)**

**Lahore, Pakistan  
15-16 March 2023**



**IEEE Catalog Number: CFP23N58-POD  
ISBN: 979-8-3503-3220-9**

**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:	CFP23N58-POD
ISBN (Print-On-Demand):	979-8-3503-3220-9
ISBN (Online):	979-8-3503-3219-3
ISSN:	2767-9810

**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

<b>Air Quality of Karachi and Lahore: How does the energy industry of Pakistan affect it? .....</b>	<b>12</b>
<i>Muzammil Tariq</i>	
<b>Smart Energy Conservation in Data Centers Using Machine Learning Based Software-Defined Networking .....</b>	<b>16</b>
<i>Haseeb Aslam and Dr Saima Munawar</i>	
<b>Optimal Dispatch of Distributed Generators in Multiple Microgrids Using Hybrid PSO-GWO. ....</b>	<b>26</b>
<i>Usman Hassan and Aftab Ahmad</i>	
<b>Health_monitoring and Power Quality Analysis of Induction Motors at Tube Well Sites of WASA Lahore .....</b>	<b>32</b>
<i>Umair Liaqat, Muhammad Sohaib, Tauseef Tauqeer, Hamza Shaukat, Rehan Hafiz and Usman Younis</i>	
<b>Determination of Thermal Properties of Eutectic Phase change materials (EPCM) using the T-history method.....</b>	<b>38</b>
<i>Salman Khan, Muhammad Ali Kamran, Massab Junaid and Rizwan Mehmood Gul.</i>	
<b>Multi-agent and Reinforcement Learning Schemes for Demand Response Estimation in Distributed Microgrids .....</b>	<b>44</b>
<i>Muhammad Ikram, Salman Ahmed, Safdar Nawaz Khan Marwat and Muhammad Nasir.</i>	
<b>Analysis and Design of the Subnominal Operation of Voltage-Source Parallel Resonant Class E Frequency Multiplier .....</b>	<b>50</b>
<i>Tian Li, Mingyu Li, Zhijiang Dai, Jingzhou Pang, Weimin Shi and Hailin Cao.</i>	
<b>Structural Optimization of Interuniversity Campus with System Analysis of the Territorial Dispersion of Residential and Educational Facilities.....</b>	<b>55</b>
<i>Ekaterina Prokshits, Pavel Moskalev, Olga Sotnikova, Iana Zolotukhina, Dmitrii Vasenin and Nikita Savvin.</i>	
<b>A Case Study on Robust Power/Energy Balancing Driven Cost Optimization for Sizing Energy Storage, Power Generators and Consumers .....</b>	<b>61</b>
<i>Saheer Javaid, Mineo Kaneko and Yasuo Tan.</i>	
<b>Deep Learning-based Predictive Modeling of Building Energy Usage.....</b>	<b>67</b>
<i>Faizan Hamayat, Zeeshan Akram and Syed Zubair.</i>	
<b>Design of Weather Monitoring System for Intermittent Power Generation using Blynk Platform .....</b>	<b>73</b>
<i>Syafii Syafii, Thoriq Kurnia Agung and Aulia Aulia.</i>	
<b>Improved Power Quality of Distribution Grid by integrating DVR with Super Twisting Sliding Mode Control .....</b>	<b>78</b>
<i>Ijaz Ahmad, Amjad Ullah Khattak and Mian Farhan Ullah.</i>	
<b>Non-intrusive Status Prediction of Residential Appliances using Supervised Learning Techniques.....</b>	<b>84</b>
<i>Muhammad Zaigham Abbas, Intisar Ali Sajjad, Rehan Liaqat, Tanveer Khursheed, Muhammad Awais and Muhammad Saqib Javed.</i>	
<b>Eco Gym: Electricity Generation from Manual Treadmill .....</b>	<b>90</b>
<i>Yusra Aftab, Muhammad Moiz Ghauri, Hamza Rashad, Ali Ahmad and Aashir Waleed.</i>	

<b>Assessment of Passive Design Based Energy Efficiency Improvement Opportunities Through Energy Audit of Residential Units .....</b>	<b>95</b>
<i>Farrukh Arif, Faiza Saeed and Nida Azhar.</i>	
<b>Green Retrofitting of Educational Building for Enhancing the Building's Performance .....</b>	<b>99</b>
<i>Huda Riaz, Norheen Amina, Rafia Asif, Habiba Mohsin, Amna Ehsan and Hira Ishtiaq.</i>	
<b>Sustainable Strategy to Develop Organic Bio refinery Model.....</b>	<b>105</b>
<i>Tayyab Qureshi, Muhammad Farooq, Hamid Siddiqi, Waqas Nazir Awan and Farooq Mustafa Joyia.</i>	
<b>Qualitative risk evaluation of occupational health and safety measures of under-construction Indus Highway N-55: A Case Study.....</b>	<b>108</b>
<i>Adil Khan, Muhammad Shakeel, Majid Khan, Nasir Sohail, Muhammad Shahab and Muhammad Wasil.</i>	
<b>Multiobjective Optimal Power Flow (MO-OPF) using Hybrid Harris Hawk-Particle Swarm Optimization Algorithm Hy(HHO-PSO) .....</b>	<b>116</b>
<i>Rafae Ashfaq and Intisar Ali Sajjad.</i>	
<b>NUMERICAL ANALYSIS OF PYROLYSIS OF PLASTIC USING OXY-HYDROGEN GAS PRODUCED BY ELECTROLYSIS OF SOLAR ENERGY.....</b>	<b>122</b>
<i>Muhammad Hamza, Ahmad Ali, Saqlain Abbas, Faiza Bibi, Komal Afzal, Zulkanain Abbas and Hamid Ashraf.</i>	
<b>Design, Fabrication and Performance enhancement of photovoltaic thermal collector by using different heat transfer fluids .....</b>	<b>127</b>
<i>Faisal Umer, Syed Abdur Rehman, Abdul Haseeb, Adeel Waqas and Hassan Nazir.</i>	
<b>Investigating the macroscopic spray characteristics of Mustard biodiesel in a control volume chamber. ....</b>	<b>132</b>
<i>Muteeb Ul Haq, Ali Turab Jafry and Hammas Ullah.</i>	
<b>Electric Vehicle Readiness in Sabah: Overview of Market Forecast and Adoption Challenges.....</b>	<b>135</b>
<i>Myjessie Songkin and Nick Hornie Kasim.</i>	
<b>A Controller Hardware in Loop Framework for Microgrid Control Applications .....</b>	<b>141</b>
<i>Muhammad Anique Aslam, Syed Abdul Rahman Kashif, Muhammad Adeel, Muhammad Usman Shahid, Mudassar Iqbal and Muhammad Awais Riaz.</i>	
<b>Erosion of pipe bends for multiphase flow: A Review .....</b>	<b>146</b>
<i>Muhammad Abdullah, Muhammad Rehan Khan, Uzair Khaleeq Uz Zaman, Bilal Anjum, Muhammad Ali Khan and Abdur Rehman Mazhar.</i>	
<b>Dielectric-Metal Nanostructures for Enhanced Scattering and Absorption in Solar Cells .....</b>	<b>152</b>
<i>Saba Latif, Mehboob Alam and Yehia Massoud.</i>	
<b>Author Index .....</b>	<b>158</b>