2021 12th International Renewable Engineering Conference (IREC 2021)

Amman, Jordan 14 – 15 April 2021



IEEE Catalog Number: CF. ISBN: 978

CFP21Z67-POD 978-1-6654-4701-0

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:
 CFP21Z67-POD

 ISBN (Print-On-Demand):
 978-1-6654-4701-0

 ISBN (Online):
 978-1-6654-2548-3

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

E-mail: curran@proceedings.com Web: www.proceedings.com



TABLE OF CONTENTS

<u>Title</u>	Page
Cover Page	I
IREC Backup Program	II
1 IREC 2021 Detailed Program	III
2 Committee	X
2.1 Organizing Committee	X
2.2 Technical Program Committee	XII
Table of Contents	XIV
An Experimental Comparison of Bifacial and Monofacial PV Modules	1
Parametric Investigation of Nano-Fluids Utilization in Parabolic Trough Collector	9
Temperature Swing Across Silica Aerogel Glazing System Under Jordanian	14
Climate	
Potential of using Off-grid PV/Wind/Diesel Battery Hybrid Energy System in	19
Jordan	
Developing an Energy Benchmark for Residential Buildings in Jordan	26
Wind Turbine Runaway Safety System	31
Effect of modulation index on the performance of the three phase modular	38
multi-level converters	
DESIGNING A MICROGRID FOR A REAL GRID TIED PV SYSTEM	44
On-Road Vehicular Emissions Case of Palestine	55
Reactive lift-type Spherical Turbine Design for the Disi-Station Pipes in Jordan	61
-Study Case	
A Linear Programming Based Load Scheduling System Considering Dynamic	67
Pricing and Renewable Energy	
Gradual Faults Diagnosis by a Novel Impedance Characterization Method	72
Evaluating Grid Connected Photovoltaic System Performance And Estimating	78
The Produced Electric Power	
Wind Power assistant to weak grid with special load: A case study of High	82
power induction furnace	
A modified Active Frequency Drift Method for Islanding Detection	88
Adaptive Fuzzy Control of Three-Phase Grid Connected Inverter	94

<u>Title</u>	Page
A Community-Based Building-to-Building Strategy for Multi-Objective	100
Energy Management of Residential Microgrids	
Sizing PV System in a Household for Charging an Electric Vehicle with	106
Considering the Driving Profile and Geographical location	
Strategy of Integrating Buildings with Smart Systems	113
Harmonization between Renewable Energy and Cloud Computing towards	118
Green Computing A Case Study: Data Center at The University Of Jordan	
Estimation of Power Produced by PV Generator Using Weather Data	123
Risk Assessment of Solar Energy Projects in Lebanon using the Reference	128
Ideal Method	
Energy evaluation for the co-generation of cold and hot water system	135
Radial Junction Silicon Nanowire Solar Mini-Modules Grown on FTO/Glass	139
Substrates	
Status of energy in Syria - Study on how to meet the energy shortage by means	145
of renewable resources	
An Average Current Control Method in Multiphase Interleaved Bidirectional	151
DC/DC Converter Connected on DC Microgrids	
POLYCARBONATE BLADED HIGHWAY WIND TURBINE: A CASE	157
STUDY	
Coordination between offshore and onshore Voltage Source Converter for	162
Doubly Fed Induction Generator wind farm	
Improving the Stability of Smart Grids by Using Flexible Alternating Current	165
Transmission Systems (FACTS)	
Comparison between T-cell and half-bridge cell submodule based modular	168
multilevel converters for use in smart transformer	
Analysis and Simulation of Maximum Power Point Tracking Based on	174
Gradient Ascent Method	
Optimal Load Management of Smart Homes considering PVs and Comfort of	179
Residents	
Low Frequency Oscillation Analysis for Dynamic Performance of Power	185
Systems	
The Dynamic Behavior of Large Scale Safawi PV plant integrated to the	191
National Transmission Grid of Jordan, Particularly 132 Kv Busbar	

<u>Title</u>	Page
Optimal sizing of Decentralized Biogas Plants in the West Bank	197
The use of voltage envelope and voltage dependent loads to increase the	201
penetration of renewables	
Future Energy Mix Mapping for Jordan using Multi Criteria Decision Analysis	207
Design, Performance and Economic Analysis of Solar PV System: A Case	212
study size 148.8 kWp for Al-Tafila Center for Care and Rehabilitation (Jordan)	
Optimal Location of Distributed Generation and its Impacts on Voltage	218
Stability	
An integration platform for optimised design and real-time control of smart	224
local energy systems	
Maximum PV Penetration Level integrated to the National Transmission Grid	230
of Jordan, Particularly 132 KvBusbar	
Solving Ecological Problem of Pyrolysis Carbon Black (PCB)	233
Axiomatic design of smart local energy systems	237
Maximum Power Point Tracking Technique Using Combined Incremental	243
Conductance and Owl Search Algorithm	
Study of DC Short Circuit Fault & Protection of VSC-HVDC Based Off-Shore	249
DFIG Wind Farm	
Effect Of Floating Azolla Cover On The Evaporation Of Open Waters In	254
Jordan	
A new design method of PSS for power system including DFIG-based wind	257
turbines	
An approach to modelling a Smart Local Energy System demonstrator project	263
Power Generation and Water Treatment Using Sediment Microbial Fuel Cells	269
(SMFCs)	
Smart Hubs 1 – A Demonstration of Electric Vehicle's Lithium – Ion Battery	275
Charging Characteristic and Efficient Demand Side Energy Management with	
Solar Photovoltaic System.	
Hierarchical test strategy and sizing considerations for retired lithium-ion	281
batteries from electric vehicles	
Smart Distribution System using Fuzzy Logic Control	287
A Deep Review and Analysis of Artificial Neural Network Use in Power	292
Application with Further Recommendation and Future Direction	

<u>Title</u>	Page
Solar water heater sizing and economic evaluation for local hospital	297
Performance Comparison for Sun-Tracking Mechanism Photovoltaic (PV) and	303
Concentrated Photovoltaic (CPV) Solar Panels with Fixed System PV Panels	
in Jordan	
Sustainable energy retrofitting for residential buildings in Palestine, a	311
simulation based approach	
A Multi-Objective Scheduling Technique for Home Energy Management	316
System	
Optimal Energy Management Strategy in A GridTied System with PV, Wind,	322
and ESS Considering Environmental Aspect	
A Novel Multi-agent Mechanism for Managing Electrical Power Smart Grids	328
Model Predictive Current Control with Duty Ratio Optimization for Three	334
Phase Grid-Tie Micro Inverter Based on Runge Kutta Approximation	
Hybrid renewable energy system for a remote area in UAE	341
Biofuels Policy and Future in Jordan	347
Energy Savings and Optimum Insulation Thickness in External Walls in	355
Palestinian Buildings	
Study of CUBESAT systems for IoT	360
A Review Study on "5G NR Slicing Enhancing IoT & Smart Grid	363
Communication"	
Hybrid Power System for Jordanian Houses to Reduce the Electrical Bill in	367
Efficient Way	
Investigation of the Palestinian overall heat transfer coefficient and comparison	374
with International Building Codes	
Reactive Power Management and Protection Coordination of Distribution	379
Network with High Solar Photovoltaic Penetration	
Numerical Simulation of Lithium-ion battery aging mechanisms and charging-	385
discharging cycle	
ANALYTICAL HIERARCHY PROCESS-BASED DECISION MAKING	391
FOR EVALUATING THE USE OF PYROLYTIC CARBON BLACK AS AN	
ALTERNATIVE SOURCE OF HEATING IN REFUGEE CAMPS IN	
JORDAN	

<u>Title</u>	Page
Performance Analysis of Successive Evaporation Condensation Solar Still	395
(SECSS) Desalination Unit with Heat Recovery	
Design and Performance Evaluation of Large Field of Flat Plate Solar	401
Collectors Network for Industrial Application	
Utilization of Desulfurized Diesel in Domestic Boiler	408
Transfer Learning Approach for Occupancy Prediction in Smart Buildings	414
Distributed Solar PV System for Industrial Applications in Palestine	420
Chi-Squared Test to Investigate the Causes and Effects of Overcrowding In Emergency Department	425
Thermal energy storage using Dead Sea brine	429
An Intelligent Demand Side Management Algorithm for Smart buildings	434
Collaborative Microgrids: Design and Dynamic Analysis using Multiagent Fuzzy-Logic System	440
Photovoltaic Panel Efficiency Improvement by using Direct Water Passive Cooling with Clay Pot	447
An economic study of the life cycle of solar energy projects in Tartous Governorate ((Model: matn alssahil station)	451
Study the effect of some bacteria treatment on fertilizer specifications resulted from organic waste	455
A retrofitting of commercial rediential building into a green building concept: A case study in Jordan	458