2022 IEEE Sustainable Power and Energy Conference (iSPEC 2022)

Perth, Australia
4-7 December 2022

IEEE Catalog Number: CFP22U88-POD
ISBN: 978-1-6654-8523-4

Copyright © 2022 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: CFP22U88-POD
ISBN (Print-On-Demand): 978-1-6654-8523-4
ISBN (Online): 978-1-6654-8522-7

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

Feasibility Assessment of Power Supply Options for Seawater Pumping Stations 1
Merid Aboye

Simulation-based FFR Requirement Identification Approach for Battery Energy Storage System 5
Indira Alcaide-Godinez, Feifei Bai and Rafael Castellanos

Local Energy Markets improve Investment Returns of Residential BESS by Arbitrage Opportunities 10
Liaqat Ali, M Imran Azim, Jan Peters, Ehsan Pashajavid, Vivek Bhandari, Anand Menon, Vinod Tiwari and Jemma Green

How P2P Trading Helps an Electricity Retailer Exposed to Volatile Spot Prices: A Case Study 15
Liaqat Ali, Jan Peters, M Imran Azim, Ehsan Pashajavid, Vivek Bhandari, Anand Menon, Vinod Tiwari, Arindam Ghosh and Jemma Green

Dynamic Frequency Analysis of the Jordanian Power System with Significant Penetration of Renewables: Lessons Learnt from the COVID-19 Lockdowns 20
Suad Almattar, Sahban Alnaser and Sereen Althaher

A New Rank-Order Lists Matching Algorithm for Peer-to-Peer Energy Trading 25
Uzma Amin and Cipriyan John

Operating energy storage to reduce Australia's grid emissions 30
Samrudh Anavatti, Marnie Shaw and Louise Bardwell

Deep Learning Control of Transmission System with Battery Storage and Dynamic Line Rating 36
Vadim Avkhimenia, Matheus Gemignani, Petr Musilek and Tim Weis

Overview of Technical Studies Conducted for Facilitating Increased Renewable Penetration on the Island of Ireland 41
Arijit Bagchi, Dusko Nedic, Emma Fagan and Eoin Kennedy

Derivation of a Time-Domain Dynamic Model for a Liquid Air Energy Storage System for Frequency Control Ancillary Services 46
G.A.M. Tirantha Bandara, Sumedha Rajakaruna and Arindam Ghosh

Business Model for Shared Energy Generation with Peer-To-Peer Trading via Blockchain . 51
Beatriz Batista Cardoso, Paula Zenni Lodetti, Maileen Schwarz Simão, Marcos Aurelio Izumida Martins, Luis Gustavo O. B. Ulhoa, Luciano Benvenuti Roncalio, Lucas de Paula A. Pinheiro and Orlando da Silva Santos

Design of DC DC Boost Converter for Solar Photovoltaic Systems Based on Monthly Averaging of Irradiance and Temperature 56
Lt Col Priyal Bhagali and Dr. Rk Thakur

Comparison of techno-economic optimisation models for rural hybrid microgrid design 61
Stuart Bird and Julius Susanto

Assessing of Energy Consumption Balance Index Formed by Various Combinations of Conventional and Renewable Sources 66
Daniela Borissova, Zornitsa Dimitrova and Vasil Dimitrov

Unsupervised, Federated and Privacy-Preserving Detection of Anomalous Electricity Consumption in Real-World Scenarios 71
Joppe W. Bos, Michiel De Vis, Charles Faes, Nicolás González-Deleito, Anna Hristoskova, Sarah Klein and Sreeraj Rajendran

Energy Variation Rate-Based Transient Stability Analysis Method for VDCOL Control of HVDC Transmission System 76
Zeyu Cao, Bingtuan Gao, Xiaolin Liu, Xingang Wang, Zhuan Zhou and Feng Zhang

Hardware Investigation of a New Phase Balancing Topology for Supplying Single-Phase Loads using Three-Phase SEIG 81
Samrat Chakraborty and Rajen Pudur

A Synchronizing Strategy for Seamless Interconnection of an Isolated Microgrid 86
Tamojit Chakraborty, Arpan Malkhandi and Gianmarco Alian

Power System Operation Mode Identification Method Based on Improved Clustering Algorithm 91
Dian Chen, Runzhao Lu, Xi Wang and Yongcan Wang

Risk management for electrifying off-grid island using renewable energy microgrid 96
Mengting Chen, Peiqiang Song, Guipeng Chen, Fengyan Zhang and Xinlin Qing

Design and Application Research of Synchronous Temporary Block Function between Valve Groups on Modular Multilevel Converter Ultra High Voltage Direct Current System 101
Qinlei Chen, Qi Guo, Shuyong Li, Xuehua Lin, Libin Huang, Deyang Chen, Zhijiang Liu, Guanming Zeng and Chao Luo

Hardware in Loop Real-Time Simulation Test Research and Engineering Application of Multi-Terminal Hybrid Ultra High Voltage DC Current Control and Protection System ... 107
Qinlei Chen, Qi Guo, Shuyong Li, Xuehua Lin, Libin Huang, Deyang Chen, Zhijiang Liu, Chao Luo, Guanming Zeng and Yuanhong Lu

Research on The Method for Optimal Location of Charging Stations Based on The Spatial and Temporal Characteristics of Electric Vehicle Charging Demand 113
Shumin Chen, Junda Li and Lingfang Li

Research on GIS corona discharge PRPD pattern based on optical detection 118
Zehao Chen, Lin Shen, Dong Han, Simin Lu and Guoqiang Zhang

Sustainable Electricity Generation in Developing Countries: Case Study in a Sub-Saharan Rural Community 123
Cristian Giovanni Colombo, Michela Longo, Wahiba Yaici, Marco Pasetti and Dario Zaninelli

Optimal operation of virtual energy station based on internal electricity-hydrogen P2P transactions 128
Jianyong Ding, Ciwei Gao, Juan Zuo and Xinhong Wu

A Multi-Stack Vanadium Redox Flow Battery Model Considering Electrolyte Transfer Delay 134
Xiaoling Feng, Yang Li, Fuwen Su, Fei Xue, Binyu Xiong and Hoay Beng Gooi

De-Re-Coupling Scheme-based Model Predictive Control of a Three-phase High-Frequency Link Matrix Converter 139
Tianran Fu, Zhaoyang Yan, Ehsan Pashajavid and Liaqat Ali

Network attack identification method of relay protection device communication system based on FP-Growth algorithm 144
Honghui Gao, Zebing Shi, Fangying Wu, Jiang Yu, Quan Xu, Hongzi He and Zhihua Huang

Extra long distance ultra high voltage direct current 150
Eric Glende and Martin Wolter

Measuring Export Quality Services of Distributed Energy Resources 155
Jaysson Guerrero Orbe and Edward Langham

Nodal Pricing Comparison between DCOPF and ACOPF: Case Studies for the Power Systems in Iceland and Germany 160
Peiyao Guo, Vedran Perić and Zhao Yuan

Review of DC Circuit Breaker Technology 165
Qixin Guo, Jingye Zhang and Teng Chi

Hybridization of WLS and LMR: a Robust Solution for Power System State Estimation .. 170
Ibrahim Habiballah and Dr. Mohammad Shoaib Shahriar

Feasibility Analysis of Implementing Hybrid Powered Electric Vehicle Charging Stations in Sarawak 175
Ahmed Haidar

Research on Residual Power Reconfiguration of Hybrid Energy Storage System Based on Microgrid 181
Liu Haitao, Ma Bingtai, Hao Sipeng, Zhang Kuangyi, Huang Cheng and Lu Heng

Comparison Study of Collaborative Learning Techniques on Residential Short-Term Load Forecasting 186
Yu He, Fengji Luo and Gianluca Ranzi

To Switch or Not to Switch? Rate Plan Selection in the Electricity Retail Market 191
Daxin Huang, Chenye Wu and Nan Gu

Privacy Leakage in GAN Enabled Load Profile Synthesis 196
Jiaqi Huang and Chenye Wu

Adverse Impacts of Unregulated Electric Vehicle Charging on Distribution Networks: A review 201
Nathan Hynes and Ehsan Pashajavid

Demand Side Management in China: Market, Policies, and Future 207
Javad Jazaeri

Research on Black Start of High-Proportion Renewable Energy System Based on Solar-Storage Generation System 211
Wanyu Ji

Low-carbon economic optimal dispatch strategy of integrated energy system considering electric-heat flexible load and carbon trading 217
Xin Jiang, Qian Ai, Yun Chen and Jiayu Wang

Expanded Hydrogen and Ammonia Power Generation for Hydrogen Storage with Unit Commitment 222
Rena Jimbo, Nobuyuki Yamaguchi and Yusuke Manabe

Analysis of Renewable Energy and Development Path of New Power System under China's "Dual-Carbon" Situation 227
Haishan Ke, Huawei He, Yue Zhou and Zhaotuo Li

ABCD Parameters in Series-Series Compensation Wireless Power Transfer System 231
Dowon Kim

Comparison of Wired and Wireless Mode of Digital Protection Scheme based on PRP Topology 236
Shantanu Kumar, Ahmed Abu-Siada, Narottam Das and Syed Islam

Dynamic Simulation of Electric-gas Integrated Energy System with Variable Wind Power 241
Jiaxiang Li, Zheng Yan, Xiaoyuan Xu and Pengfei Han

Optimal Configuration and Economic-environmental Analysis of Floating Photovoltaic: An Empirical Case Study in Singapore 246
Yingqi Liang, Can Berk Saner, Hong Quan Jacky Siew, Han Ho Lionel Lee, Vanmathi Porhcisaliyan, Xin Wei Tan and Xiaotian Li

Short-Term Load Forecasting with Temporal Fusion Transformers for Power Distribution Networks 251
Huanyue Liao and Krishnanand Kaippilly Radhakrishnan

A Digital Twin Approach for Fault Diagnosis in Unmanned Ships Integrated Power System 256
Qi Liu, Xingang Yang, Lei Su, Ruihao Sun, Moduo Yu and Wentao Huang

An Improved Active Section Splitting Method for Multi-Machine Power Systems Based on Multilayer Graph Segmentation Algorithm 261
Yang Liu, Li Li, Yinguo Yang, Shuangxi Wu, Zhen Yu, Yu Zhu, Ruizhe Zhang and Jun Liu

Distributed Inter-Regional Dispatching Method Based on Alternating Direction Method of Multipliers 266
Qian Ma, Liang Zhang, Xiuli Wang, Ziqiang Wang, He Huang and Peng Li

A Model-Based Approach for Voltage and State-of-Charge Estimation of Lithium-ion Batteries 271
Seyed Madani

Solar PV rebound effect on regional demand 276
Nariman Mahdavi

Are Consumers with Low Serving Costs Necessarily Carbon Friendly? 281
Gaoyang Mou, Jiaqi Huang and Chenye Wu

A Design of Distributed Secondary Control for Stability Improvement in High-Capacity Inverter Testing of Islanded AC Microgrid 286
Khang Nguyen, Mario Palendeng, Behrooz Bahrani and Suresh Thennadil

Green development approach of chemical water treatment process in thermal power plant . 291
Xin Nie and Anjar Praditya Wicaksono

Power Quality Improvement of a Solar Powered Bidirectional Smart Grid and Electric Vehicle Integration System 296
Nikitha Paidimukkala, Narottam Das and Syed Islam

On the Sustainable Charging of Electric Vehicles in the Presence of Distributed Photovoltaic Generation 302
Marco Pasetti, Michela Longo, Stefano Rinaldi, Paolo Ferrari, Emiliano Sisinni and Alessandra Flammini

Design of Hybrid Power System Stabilizer for Dynamic Stability Improvement using Cultural Algorithm 307
Jasmeen Patel, Narottam Das and Syed Islam

Dynamic equivalent modeling of wind farm considering HVRT characteristic 313
Yanhui Qin, Baoyu Zhai, Qi Yang, Zian Li, Zhichao Yang and Bingtuan Gao

Pump Fault Detection Method for Vanadium Redox Flow Batteries Without Flow Rate Sensors 318
Ziyi Qin, Yang Li, Jinrui Tang, Shaofeng Zhang, Changjun Xie and Binyu Xiong

A Review on Hydrogen Storage Techniques and Their Applications in Novel Initiatives in Australia 323
Ziad Ragab and Sumedha Rajakaruna

Advanced Dynamic Virtual Power Plants with Electric Vehicle Integration 328
Adithya Ravikumar, Sara Deilami and Foad Taghizadeh

A Novel Sequence to Sequence based CNN-LSTM Model for Long Term Load Forecasting 334
Osaka Rubasinghe, Xinan Zhang, Tat Kei Chau, Tyrone Fernando and Herbert Ho Ching Iu

Assessing energy flexibility in non-energy-intensive manufacturing companies 339
Julia Schulz, Magdalena Paul, Stefan Roth, Valerie Scharmer, Lukas Bank and Michael F. Zaeh

Optimal Scheduled Control Operation of Battery Energy Storage System using Model-Free Reinforcement Learning 344
Alaa Selim

A Power Supply Reliability Optimization Strategy of Shipboard Integrated Power System Equipped with Medical Load and Energy Storage System 349
Keguang Shen and Wentao Huang

Analysis of the Impact of Variable Renewable Energy on Power Flow in Bulk Grid Power System 354
Yuichi Shimura, Motoshi Maekawa, Kazuaki Iwamura, Yosuke Nakanishi, Ryotaro Minami, Noboru Hattori and Junichi Fukushima

A model-based assessment of sustainable grid interconnection: A case study for micro hydro based minigrid in Nepal 359
Ravi Raj Shrestha, Binay Paudyal, Prasant Basnet, Hitendra Dev Shakya, Jiwan Kumar Mallik and Neha Joshi

Multisectoral sustainable development impacts survey from the application of the SDGs-IAE Framework: A case study 364
Maileen Simão, Letícia Dagnese, Euler Ribeiro, Marcos Aurélio Martins, Vivien Green and Kleber Tomaz

HIGH GAIN BOOST CONVERTER WITH RIPPLE FREE INPUT CURRENT FOR SOLAR POWER INTEGRATION IN DC MICROGRID 369
Kumar Abhishek Singh and Dr Kalpana Chaudhary

Optimizing BTM of HV Battery Pack for Automotive Application Using Electro-Thermal Simulation 375
Naveen Sn and Seeta Gunti

Hierarchical Optimization Method for Ship Navigation in Multiple Emission Control Areas 380
Ruihao Sun, Moduo Yu, Wentao Huang, Xinsheng Zhang and Heng Song

An Inclusive Model for a Practical Low-Voltage Feeder with Explicit Multi-Grounded Neutral Wire 385
Ching Hong Tam, Frederik Geth and Mithulananthan Nadarajah

Portable IoT Solution for HRES Integration 390
Mario Augusto Trape, Ali Hellany, Syed Shah, Mahmood Nagrial and Jamal Rizk

Is eLMP Harder to Predict than LMP? 393
Haojun Wang, Wenqian Jiang and Chenye Wu

Optimization strategy for multi-area DC dispatching control considering frequency constraints 398
Kaifeng Wang, Lin Ye, Busheng Zhang, Yifei Jin, Yongning Zhao and Wei Chen

Resilience Assessment and Enhancement Strategies of Transmission System under Extreme Ice Disaster 403
Wei Wang, Song Gao, Hanshuai Zhang, Dexin Li and Linbo Fu

FNP-BPNN Integrated Model for Power System Frequency Nadir Prediction 408
Xiangxu Wang, Qili Ding, Zhengwen Li, Hui Zeng, Nan Zou, Zhongbo Wang and Weidong Li

Modeling Energy Creation with a Lagging Charge and a Quasi-Sinusoidal Variance in Capacitance 413
Andrew Ward

Voltage control of offshore wind farm considering reactive ability of electrochemical energy storage 418
Haitao Wu, Jian Yu, Jun Liu, Rui Mei, Xiangmei Ji and Hong Wang

Analysis of Kuramoto models for AC microgrids based on droop control 423
Qing Xu, Shitao Wang, Jiayi Liu, Huihui Song and Yanbin Qu

Peak Power Estimation Method of Vanadium Redox Flow Battery for Solar-Battery Powered Electric Vehicle Charging Stations 428
Fei Xue, Yang Li, Jinrui Tang, Xiaoling Feng, Danhong Zhang and Binyu Xiong

Effects of various accelerated corrosion conditions on corrosion behavior of galvanized steel in marine atmospheric environment 433
Xunping Yan, Yun Cong, Gencheng Wang and Zhengpeng Zhang

Optimal reactive power allocation method for an offshore wind farm based on novel power operation region of PMSG 438
Zhichao Yang, Bingtuan Gao and Zeyu Cao

Novel voltage stability index based Synchronous condenser capacity configuration strategy of sending system integrated renewable energies 443
Li Yanhe, Zhang Zhen, Fang Jinyuan, Cao Zeyu and Gao Bingtuan

A Data-Driven Vulnerability Analysis of Electricity Markets Under International Tension . 448
Jianing Yi, Chenye Wu and Jiasheng Zhang

Autonomous Distrubuted Frequency Control for the Management of Energy Storage Systems in Microgrid 453
Naoto Yorino, Kazuya Amimoto, Yutaka Sasaki, Yoshifumi Zoka, Hiromu Inami and Shoya Ogawa

Low Voltage Ride Through Method for Wind Turbines Based on Cooperative Control Strategy of Multiple Reactive Power Sources 458
Baoyu Zhai, Guanchu Chen, Shakenbieke Alimaiibieke, Shuchao Liang, Zeyu Cao and Bingtuan Gao

An Adaptive Load Frequency Control Based on Sliding Mode Control and Disturbance Observer 464
Boming Zhang, Tat Kei Chau, Herbert Iu and Paul McCormick

Spatial-Temporal Attention Based Interpretable Deep Framework for FDIA Detection in Smart Grid 469
Wangjun Zhang, Chao Deng, Xiangjing Su, Liangzhao Nie and Yi Wu

A Pilot VSC-HVDC Line Protection Scheme Based on Similarity of Time-Frequency Matrix of Initial Current Traveling Wave 475
Yunqi Zhang, Congbo Wang, Yue Yu, Guosheng Yang and Hong Cao

Modal and harmonic response analysis of submarine cable under multiple working conditions 480
Zhenpeng Zhang, Naiyi Li, Li Liu, Te Li and Yun Cong

A Graph-based Deep Reinforcement Learning Framework for Autonomous Power Dispatch on Power Systems with Changing Topologies 486
Yu Zhao, Jun Liu, Xiaoming Liu, Keyu Yuan, Kezheng Ren and Mengqin Yang

A Peer-to-Peer Energy Trading System Considering Participants' Social Relationships and Multi-class Preferences 491
Zehua Zhao, Fengji Luo, Jiajia Yang and Gianluca Ranzi

Cogging Torque Modelling and Suppression for FSPM in EV application 496
Jiawei Zhou and Ming Cheng

Design and application for Transformer District Smart Fusion Terminal under the background of Energy Internet 502
Enguo Zhu, Yan Liu, Kuixi Chen and Dixing Li

Short-Term Load Forecasting using Long Short Term Memory Optimized by Genetic Algorithm 507
Muhammad Zulfiqar, Muhammad Babar Rasheed and Maria D.R-Moreno