

2025 8th International Conference on Renewable Energy and Power Engineering (REPE 2025)

**Beijing, China
27-29 September 2025**

IEEE Catalog Number:
ISBN:

CFP25REP-POD
979-8-3503-5717-2



Copyright © 2025, IEEE

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:	CFP25REP-POD
ISBN (Print-On-Demand):	979-8-3503-5717-2
ISBN (Online):	979-8-3503-5716-5
ISSN:	2771-702X

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

Active Stable Grid-Connected Control Method of Multi-Unit Parallel in New Energy Station	1
<i>Runze Liu, Hongda Liu, Xuanwen Zhang, Hengxing Lu, Ye Liu, Yun Teng</i>	
Grid Strength Adaptive Transient Voltage Support With Pmsg Wind Turbines	6
<i>Anqi Shen, Minxiao Han, Yifei Guan, Yan Cheng</i>	
Electromagnetic Transient Parameter Prediction of AC/DC System Based on Convolutional Neural Network and Phillips-Haffron Model	12
<i>Yifu Zhang, Song Gao, Haifeng Zhang, Guying Zhuo, Linlin Niu, Feng Wang</i>	
Thermodynamic Evaluation of a Hybrid Single-Flash Geothermal—Solar Thermal Power Plant for Enhanced Thermal Efficiency and Power Generation	16
<i>Carl Belmonte</i>	
SOH Estimation of Lithium Batteries Based on CLSTM-Transformer	24
<i>Ruisi Zhang, En Zhang, Fei Wang, Dingxu Peng, Xiaofeng Zhang, Mingchao Zhu, Yu Cao, Pengsheng Li</i>	
Coordinated Primary Frequency Regulation Control Strategy for Offshore Wind Power-Hydrogen Energy Systems	31
<i>Lulu Zhao, Yunhan Wang, Ying Qiao, Ziqiu Li, Huanjun Chen, Jingjia Liu</i>	
Exploring the Flexibility of Hydrogen Metallurgy for Integration of Renewable Energy	38
<i>Yongsheng Fu, Lin Cheng, Wenbo Shao, Yunting Song</i>	
Review of Intelligent Optimized Dispatch Management Applications in Watersheds	45
<i>Li Fei, Liu Xiaobiao, He Qiang, Li Lin, Liu Liming, Song Wentao, Yang Xiaoyu, Chen Mingsong</i>	
A Low-Carbon Evaluation System for the Entire Life Cycle of UHV Projects	52
<i>Gang Dan, Peidong Li, Huijuan Huo, Xin Qie, Yiting Fu, Yaqi Sun, Zhanning Wei, Yanhui Yang</i>	
Analysis of the Impact of Power Electronic Interfaced Loads on System Dynamic Characteristics	62
<i>Hao Jiang, Yuhang Zhou, Chuan Qin, Jie Yang, Ping Ju</i>	
A Graph-Based Forward-Chaining Expert System for Direct Drive Wind Turbine Monitoring	67
<i>César Tadeu Nasser Medeiros Branco</i>	
Grid-Connected Transient Voltage Control Method for Synchronous Operation of Renewable Energy Station	72
<i>Hongda Liu, Runze Liu, Shihui Bai, Jiacheng Ma, Yifan Chen, Yun Teng</i>	
Hybrid Multi-Terminal DC Transmission System for Large Offshore Wind Farms	77
<i>Xinxin Xu, Jianwu Wang, Huanhuan Jin, Bin Yang, Jun Xiang, Weihao Hao, Gongyi Zhang, Yuebin Wang</i>	
Voltage Active Support Strategy of New Energy Station Considering Multi-Type Unit Coordination	82
<i>Xuanwen Zhang, Ye Liu, Jiacheng Ma, Cheng Qian, Peng Zheng, Zhe Chen</i>	
Study on System Costs with High Shares of New Energy and Power Grid Investment Recovery	87
<i>Yuluo Bu, Xiaoning Ye, Caixia Wang, Zhiyong Shi</i>	

Minimal DC Voltage Output Control for Auxiliary MMC in Series-Connected Hybrid Diode Rectifier Integrating Offshore Wind Farm	93
<i>Xinqun Chen, Lei Zhang, Guowei Song, Yuebin Wang, Jianwu Wang, Weihao Hao, Yang Huang, Zhou Yu Qiang Song</i>	
Model-Based Fault Detection in a Water Driven Parabolic Trough Collector	98
<i>Pedro J. Zufiria, Ángela Castillo, Alberto Portal, Luis J. Yebra</i>	
A Digital Twin Technology as a Fault Identification and Diagnostic Tool for PV Mini Grids: A Systematic Review	103
<i>Gilede Kassahun Berisha, N. Lebsework Lemma, W. Mengesha Mamo, Frehiwot Woldehanna Phil. Steffen Kersten, Worke Woldeesemyat</i>	
Fault Ride-Through Strategy Based on Coordinated Control of Wind Turbines and Mmc-Hvdc	111
<i>Xuegen Lin, Dingfei Que, Yu Shen, Zixuan Zhang</i>	
Health State Identification Method of High Voltage Power Grid Circuit Breaker Based on Adaptive Adversarial Transfer Network	117
<i>Shimin Liang, Guopeng Zhang, Runxing Zhou, Shihui Bai, Luyuan Gao, Gang Zhang</i>	
A Quantitative Assessment Method for Transformer Overheating Fault Severity Based on Weighted Carbon-Hydrogen Ratio of Characteristic Gases	122
<i>Xinxi Yu, Lin Du, Zhengyu Chen, Pintao Wei, Zhen Zhong</i>	
Dynamic Modeling for PV Arrays Based on Power-Law Model	128
<i>Jingjing Wei, Quan Yang, Xingshuo Li</i>	
An Enhanced Fault Ride-Through Strategy for GFM Converters Using Active Power Curtailment and Reactive Power Anti-Windup Control	133
<i>Weihong Zao, Ziming Zhu, Zhen Liu, Yu Duan, Xing Ma, Jian Ma</i>	
Electromagnetic Field Modelling and Validation of Cylindrical Permanent Magnets in Traction Motors for Railway Applications	138
<i>Hao Lin, Xin Wei, Yuge Han, Haipeng Geng, Leiming Song</i>	
DDPG-Based Optimization of Frequency Regulation Control Parameters for Offshore DFIG Wind Turbines	143
<i>Xin Wu, Xiao Ji, Chenyu Wu, Ying Zhang, Linjun Shi, Chao Kong, Qiqi Miu</i>	
Optimal Frequency Governing for Full-Scale Variable-Speed Pumped Storage Units	149
<i>Zheng Qi, Sihan Zhang</i>	
Decision-Aware CNN-LSTM for Real-Time Wind Turbine Blade Icing and Efficiency Prediction	154
<i>Jiaxin Han, Yao Li, Wen Lin, Jingxian Wang, Lian Chen, Qingguang Yu</i>	
Electromagnetic Design and Analysis of Permanent Magnet Motors Based on Function-Driven Method	159
<i>Hao Lin, Yuge Han, Xin Wei, Haipeng Geng, Leiming Song</i>	
Wideband Oscillation Parameter Identification in Converter-Dominated Power Systems	164
<i>Min Cheng, Run Huang, Chen Wu, Yixuan Chen, Shanxue Gao</i>	
Identification of Transformer DC Bias Voiceprint Based on Mel-scale and Gammatone Filter Bank Energies and Recursive Feature Elimination	169
<i>Chenguang Wang, Yaozhong Zhang, Xianfeng Zhou, Ziheng Yu, Guangyu Fan, Zhenting Sun</i>	

Design of Power Control Strategy for Three-Level Neutral Point Clamped Converter Considering Day and Night Operation Modes	175
<i>Andrey Chepiga, Mark Gainullin, Gleb Gusev, Dmitrii Lapkin</i>	
Modeling and Analysis of Grid-Forming Converter Integration for Enhancing Grid Strength	181
<i>Libin Yang, Zhengxi Li, Tingxiang Liu, Junxiong Ma, Xiaofei Sun, Pengyin Liu</i>	
A Multi-Level Safety Risk Prevention and Control for Power System Laboratories	187
<i>Li Xue, Ningning Ma</i>	
High-Frequency Oscillation Stability Analysis of Flexible Dc Transmission System Based on Frequency Impedance Model	192
<i>Run Huang, Min Cheng, Chen Wu, Yixuan Chen, Shanxue Gao</i>	
Electrical Simulation Experiment and Verification Analysis of Escalators Considering the Impact of Power Quality	198
<i>Yutong Wu, Bo Yang, Bin Zhao, Chen Wang, Chongchong Xu, Jiawen Huang</i>	
An Exploration of a Mechanism for Resident Users to Participate in Demand Response Services Based on Cooperative Game Theory	206
<i>Wenbo Tang, Tingyu Jiang, Ping Ju</i>	
Research on Load Forecasting Optimization Method Based on Interpretable Spatio-Temporal Graph Network	212
<i>Cheng Qian, Peng Zheng, Ziyang Xin, Gong Chen, Hongda Liu, Yun Teng</i>	
Load Forecasting in Islanded Microgrids Using VMD-CNN-BiGRU	217
<i>Jianpeng Guo</i>	
Data-Driven Deep Learning Framework for Fault Identification Method According to Customer Power Supply Reliability in Distribution Network	222
<i>Weihua Zuo, Qingguang Yu, Xin Yao, Ding Liu, Min Guo, Xiaoyu Che</i>	
Two-Level Topology Identification Method Based on Main and Distribution Networks for Regional Anti-Islanding Protection	227
<i>Shuangfeng Chen, Bing Hu, Dong Chen, Hua Zhang, Dong Yang, Changsong Qin, Cong Li, Hao Liu</i>	
Design and Parameter Optimization of Boundary Elements for Single-Ended Whole-Line High Speed Protection in Distribution Networks	235
<i>Pengfei Liu, Guobing Song, Jifei Yan, Zhongxue Chang, Zhihua Zhang, Jian Liu</i>	
Evaluating the Impact of Electrolyzers on Distribution Network	241
<i>Yunhan Wang</i>	
Reactive Power Optimization Strategy for Medium and Low-Voltage Distribution Networks Based on the ADMM Algorithm	249
<i>Binwu Zhang, Yahui Zhu, Bo Yu, Quanyuan Li, Huchang Li, Guowei Li</i>	
Exploration and Practice of Emergency Management System for Power Grid Dispatching	254
<i>Zheng Chen, Shaoqing Xi, Shangqiu Shi, Haixing Cheng, Guannan Wang, Guangzheng Xing, Licheng Sha</i>	
Physics-Informed Hybrid KNN-MLP for Enhanced Wind Power Forecasting	259
<i>Yingjun Shen, Kaixi Song, Lingyao Wang, Huiyang Jiang, Taiwei Shi, Zhe Song</i>	

Wind Farm Station Output Prediction Method Based on Improved Ensemble Learning	264
<i>Baobao Jin, Guopeng Zhang, Jiaqing Sun, Ziyi Hu, Ziyang Xin, Libin Ren</i>	
A Practical Equivalent Method for Wind Farms Considering LVRT Active Power Recovery Characteristics	269
<i>Jialong Wu, Xijian Dong, Feng Xue, Kui Deng, Wei Zhao, Feng Li</i>	
A High-Efficiency Mesoscale Wind Farm Simulation Tool and Comparative Study	275
<i>Zhiyuan Qiu, Yingning Qiu, Yanhui Feng</i>	
Coordinated Operation Method of Optical Storage Based on Improved Deep Neural Network	280
<i>Yuwen Liu, Zirui Wang, Yankang Wu, Luyuan Gao, Jian Liu, Hualiang Zhang</i>	
Adaptive Battery Control in PV Systems using Deep Learning and Swarm Intelligence Algorithms	285
<i>Rahman Nafeez, Akhtyamov Roman Rinatovich, Siddikur Rahman, Maidul Islam, Viacheslav Vavilov Jai Govind Singh</i>	
Multi-Energy Storage Optimal Configuration Method for New Energy Power System	291
<i>Hengxing Lu, Haihan Li, Zirui Wang, Yankang Wu, Runze Liu, Qiuhaio Zhang</i>	
Enhancing Thermal Efficiency of a Single-Slope Solar Still with Submerged Ferrite Magnets: Experimental Investigation	296
<i>Naouar Elmgari, Younes Chhiti, Charafeddine Jama, Ahmed Chebak</i>	
Collaborative Optimization Based on Wind-Solarstorage System Scheduling Method	302
<i>Haihan Li, Hengxing Lu, Ziyi Hu, Yifan Chen, Xuanwen Zhang, Tieyan Zhang</i>	
Sustainable Water Access in Iraq's Arid Areas Through PV Pumping Systems: PVSyst Simulation and Analysis	307
<i>Raghad Adeeb Othman, Omar Sharaf Al-Deen Al-Yozbaky</i>	
Reserve Capacity Optimization Method of Micro-Energy System Based on Deep Reinforcement Learning	313
<i>Pei Li, Xingqiao Ren, Luyuan Gao, Ziyang Xin, Haihan Li, Chuanyue Sun</i>	
Phase Change Material Integration for Passive Thermal Regulation in Liquid Metal Batteries	318
<i>Lei Fan, Xingjie Wu, Xin Yang, Bo Li, Min Zhou, Kai Jiang</i>	
Energy-Based Methods for Tracing Low-Frequency Oscillations in Power Systems: A Review	323
<i>Zhang Dong, Chen Genjun, Zhang Xiao, Zheng Chuanjian, Xu Xiaoliang</i>	
Study on Step Response of Electric Field Force During Charging of DC-Link Capacitor	328
<i>Zuo Qianglin, Deng Guangzhao, Lei Qiaoshu</i>	
Grid Support Control of Hybrid DC Transmission System Based on GFM-FBMMC-LCC for Offshore Wind Farms	334
<i>Ruoning Tian, Ning Wang, Xiaorong Xie, Huibo Lou, Yue Dai, Xiaojing Wang, Wanglin Sun</i>	
Enhanced-Reliability ANPC Three-Level Inverter for Large-Scale Photovoltaic Systems	339
<i>Qiannuo Zheng, Yanhui Feng, Yingning Qiu</i>	
Simulation of the Impact of Green Power on Energy Transition: A Case Study of Carbon Peaking Pilot Cities	345
<i>Dafei Jiang, Qiao Meng, Xiuyan Yin, Jing Zhao, Ziming Liu</i>	

Research on Closed-Loop Testing Methods for Grid-Forming Energy Storage Converters	351
<i>Qiaoming Shi, Jie Tian, Lin Tu, Yushu Hong, Gang Li, Yu Lu, Zixuan Wang, Hongde Liu</i>	
Research on Black Start and Multi Micro Source Coordinated Control Strategy Under Island Operating Conditions Based on Grid-Forming Control	359
<i>Qian Li, Jia Zhong, Yanan Jing, Jianing Li</i>	
Research on Development and Application Trends of Renewable Energy Hydrogen Production Technology	365
<i>Cao Yuchen, Ye Xiaoning, Bu Yuluo, Shi Zhiyong</i>	
Comparative Energy Analysis of Technical Pathways for Offshore-to-Onshore Hydrogen Transportation	370
<i>Mengyun Wu, Hewen Zhou, Haiyang Lin, Qie Sun</i>	
Engine Utilization of Post-Consumer Plastic Oil Blended with Oxygenated Additives	375
<i>Somkiat Maithomklang, Anupap Pumpuang, Niti Klinkaew, Ekarong Sukjit</i>	
The Joint Optimization Model for Grid-Connected Wind-PV-Storage Hydrogen Production System	379
<i>Dong Zhang, Peiyu You, Chenxi Liu</i>	
Research on U.S. Renewable Energy Consumption Prediction Based on Multi-Branch Deep Learning Architecture	384
<i>Zi Li, Yeyubei Zhang, Yunchong Liu</i>	
Electricity Consumption Behavior Prediction Method Based on Feature Fusion and Ensemble Learning	389
<i>Xiancheng Zhong, Xuanwen Zhang, Yifan Chen, Jian Liu, Runze Liu, Feng Li</i>	
Integrated Planning of Data Centers and Coupled Electricity-Water Systems with Renewable Energy for Low-Carbon Goals	394
<i>Yuan Wang, Bo Zeng, Jiayu Wang, Ziyang Liu</i>	
The Optimization Selection of the Generator Condenser Modification in High Proportion Renewable Energy System	399
<i>Tao Wang, Zican Tao, Yu Wang, Li Wang, Li Zhang, Long He, Guanqun Sun, Defu Cai</i>	
A Semi-Supervised Deep Learning Framework for Day-Ahead Photovoltaic Power Forecasting	405
<i>Xing Luo, Xu Zhu, Yuanqi Cheng, Zhi Jin</i>	
Collaborative Optimization of Wind-Solar-Storage Integrated System Based on NSGA-III and Bi-Level Optimization Model	410
<i>Peng Zheng, Cheng Qian, Haihan Li, Hengxing Lu, Ziyang Xin, Zhe Wang</i>	
Research on the Quantitative Method of the Environmental Value of Green Electric Power	415
<i>Zhiyong Shi, Si Wu, Caixia Wang, Xiaoning Ye, Shuowei Li, Yuluo Bu</i>	
Electric-Thermal Collaborative Optimization Scheduling Strategy Based on Artificial Intelligence Algorithm	420
<i>Dawei Zhao, Xingqiao Ren, Gong Chen, Yankang Wu, Luyuan Gao, Wei Yu</i>	
Personalized Energy Conservation Incentive Strategy for Residential Consumers: Combining Reinforcement Learning-Based Clustering with Dynamic Time Warping and Convolutional Neural Network	425
<i>XianPing Lin, YanQin Wang, KeGang Cui, XueCai Wang, HaiNing Zhang, Xin He</i>	

Research on Artificial Intelligence Autonomous Control Systems for Nuclear Power Plants	433
<i>Jinxiao Yuan, Shuang Lin, Shaohua Wang, Sui Fan</i>	
Millimeter Wave Non-Destructive Testing of XLPE Insulation Structures for Electrical Equipment	439
<i>Ya Guo, Nuannuan Cheng, Xiaona Wang, Junyi Wang, Zexing Li</i>	
Research on Multi-Modal Fusion-Based Anti-Error System for Nuclear Power Plants	445
<i>Jinxiao Yuan, Shuang Lin, Lei Song, Sui Fan</i>	
Design of a Miniaturized Limiter for Power Sensor Auxiliary Port	450
<i>Wang Jiaying, Wang Cong, Su Han, Yu Chengkun</i>	
Research on Intelligent Control Strategy for BIPV System Based on TD3-LSTM	455
<i>Rao Fu, Dongjie Xia, Guofeng Xia, Quan Zhang</i>	