

2025 International Conference on Low Carbon and Smart Energy (ICLCSE 2025)

**Guangzhou, China
24-26 October 2025**

IEEE Catalog Number:
ISBN:

CFP251S0-POD
979-8-3315-4879-7



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:	CFP251S0-POD
ISBN (Print-On-Demand):	979-8-3315-4879-7
ISBN (Online):	979-8-3315-4878-0

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

Application and Performance Analysis of MDQN in Microgrid Optimal Scheduling	1
<i>Wei Liu</i>	
Assisted Decision-Making System for Safety Prevention and Control of High-Risk Areas on Distribution Network Side Under Extreme Weather	5
<i>Liu Anjiang, Hao Shuqing, Ma Shuai</i>	
A Drone-Based Visual Method for Wind Turbine Blade Positioning and Inspection	12
<i>Haoqi Liu, Xiaoying Ren, Fei Zhang, Xu Li, Jinming Wang, Siyi Li</i>	
A Multi-Stage Orderly Charging Scheduling Strategy for Electric Vehicles Based on Time-of-Use Pricing	18
<i>Yujie Chen, Jiaqi Li, Jiamin Feng, Yongshi Lu, Jialv Li, Xingyu Zhuang, Lixiao Wang</i>	
A Self-Synchronizing Grid-Forming VSC-HVDC Capable of Quantitatively Measuring the Grid Frequency Utilizing DC Voltage	22
<i>Jingpeng Yue, Zihan Zhang, Haiqing Cai, Wencong Wu, Wei Chen</i>	
A Simulation Study on Grounding Faults in the Metal Shield Layer of High-Voltage Power Cables	28
<i>Zifan Zhang, Xingye Yu, Ming Gao, SiGan Hu, Hanlin Yu</i>	
A VAE-LSTM-Transformer Model for Photovoltaic Power Prediction and Uncertainty Quantification	32
<i>Ruiheng Mai, Nan Ke, Na Shen</i>	
Bidding Strategy of Virtual Power Plant Considering Demand Response in Electricity-Carbon Joint Market	37
<i>Chuchu Xie, Jialin Zhou, Jizhong Zhu, Xin Shen</i>	
Coordinated Scheduling of Electric Vehicles and Renewable Energy in Distribution Systems Based on Proximal Policy Optimization	43
<i>Zhanghuang Zhang, Jieyun Zheng, Ying Shi, Ruochen Chen, Jizhong Zhu, Xiaoning Yang</i>	
Co-optimization for Integrated Electricity and Gas System Based on the Alternating Direction Method of Multipliers	48
<i>Derong Huang, Jizhong Zhu, Haohao Zhu, Qingju Luo</i>	
Design and Development of Photovoltaic Intelligent Lighting System	53
<i>Yuzhe Zhang, Xuanta Li, Jingyuan Guan, Gengyu Wu, Shaotong Li, Kaijie Zhang, Ruijue Feng Zhifeng Chen</i>	
Design of a Meteorological Monitoring Device for Photovoltaic Power Station	58
<i>Yubin Ye, Chengbin Ye, Minghui Xiao, Shijie Ling, Junhao Gong, Jiaxin Wu, Ziheng Wu, Huangshen Luo Jiaquan Xu, Xitao Ling</i>	
Distributed Photovoltaic Grid-Connection Path Optimization and Low-Voltage Switch Control Strategy Based on Balanced Optimization Algorithm Improvement	63
<i>Tong Li, Nan Ke, ZhiFeng Chen, ZhiXin Gao</i>	
Distributed Resource Power Control Under Distribution-Microgrid Coordination	68
<i>Biyan Ma, Zicheng Wu, Jintao Qiu, Dongsheng Liu, Gaoqiang Sun</i>	

Enhancing Short-Term Load Forecasting with Multi-Head Attention and Hybrid Encoder-Predictor Architecture	73
<i>He Gan, Ke Nan</i>	
Fault Module Localization and Type Identification in Multilevel Power Grid Simulator	78
<i>Zhidong Wang, Yuhan Wang, Weinan Chen, Mengfang Li, Jinyue Su, Bingchen Li, Jiehui Li, Ruiyu Feng</i>	
Home Energy Management System Based on Proximal Policy Optimization	83
<i>Jizhong Zhu, Kaixin Lin, Le Zhang</i>	
Improvement and Strengthening Method for Local Structure of UHV Converter Oil Tank for Defence Against High-Energy Arc Faults	89
<i>Zongliang Zhang, Yikun Zhao, Ke Wang, Jiantao Sun, Jiaxi Li, Shuqi Zhang, Peng Li</i>	
Influence of Inclination Angle on the Thermal Performance of a Self-Powered Gravity Heat Pipe with Wireless Temperature Measurement	95
<i>Liyao Chen, Chengdai Chen, Tao Lin, Fengqin Han</i>	
Informer-Based Long-Horizon Power Load Forecasting: An Empirical Study on the SG-HL Dataset	100
<i>Ziming Zeng, Zhesong Lei, Jiaqi Li, Menghan Hu</i>	
Investigation of Heat Transfer in Gravity Heat Pipes Applied to Coal Yard Cooling	105
<i>Bohan Wen, Tao Lin, Chengdai Chen, Haotian Cai, Fengqin Han</i>	
Multidimensional Analysis of Current Applications of PV-ESS-EV Microgrid Systems	109
<i>Lijuan Sun, Haoyuan Peng, Lihuan Guo, Zhuoru Lin</i>	
Multi-Objective Optimization of Autonomous Operation for Microgrids	113
<i>Zicheng Wu, Biyan Ma</i>	
Multi-Sample Screw Detection in Photovoltaic Panels Based on Binocular Vision and Deep Learning	117
<i>Xingbang Liao, Zicheng Wu, Junying Zeng, Guobin Wei, Chengbin Ye, Mingzhi He, Mingxiang Huang, Jiehui Li, Zhaoyang You</i>	
Multi-Time Scale Robust Scheduling for New Electricity System With Offshore Wind Power	121
<i>Jianhe Li, Jizhong Zhu, Shenglin Li, Hanjiang Don, Xin Shen</i>	
Prediction Study of Coal Pile Temperature Based on Closed Coal Yard	126
<i>Zhong Qian Luo, Tao Lin, Han Lin, Yu Hao Feng, Jun Jie Chen, Honghua Chen</i>	
PV Module Handling and Installation Car Based on Visual Recognition	129
<i>Qihang Liu, Chengbin Ye, Guobin Wei, Yongpei Tang, Peimei Xie, Mengyao Ou, Yunxiao Jin, Yongshi Lu, Bixing Xiao, Rong Dai</i>	
Reliability Analysis of Grid Simulator Inverter Topology	133
<i>Junwei Zou, Zhidong Wang, Jiehui Li, Jiafeng Zeng, Mengyao Ou</i>	
Research on Adaptive Control for Voltage Over-Limit in Distribution Networks with High Proportion of Residential Photovoltaics	138
<i>Zicheng Wu, Ziwei Xu, Mingxiang Huang, Jiehui Li, Huaye Huang, Qihang Liu, Mengyao Ou</i>	
Research on a Fast Protection Algorithm for Distribution Networks Using Short Data Windows Based on the Least Squares Method	142
<i>Gengyu Wu, Yinlian Ji, Kaijie Zhang, Siyi Li, Bin Su, Ruijue Feng, Zhifeng Chen</i>	

Research on a Voltage Sag Sensitivity Testing Method Based on Binary Search and Small-Angle Delay Construction	147
<i>Xiangkai Zhang, Zhifeng Chen, Yichen Sun, Qinming Hu, Gengyu Wu, Ruijue Feng, Yinlian Ji, Zifeng Liao</i>	
Research on Electricity Load Forecasting Model Based on Feature Adaptive VMD-LSTM	151
<i>Chuying Zhong, Zifan Zhang, Hanlin Yu, Xingye Yu, Chuchu Zeng, Xinyu Zhu, Wenzi Cao</i>	
Research on Electric Vehicle Charging Pile Planning Based on Deep Reinforcement Learning	156
<i>Wei Liu</i>	
Research on Graded Reclosing Strategy of Distribution Network Based on Island Inertia Characteristics	160
<i>Yinlian Ji, Gengyu Wu, Xiangkai Zhang, Yuzhe Zhang, Bin Su, Zhifeng Chen, Jiating Zhou</i>	
Research on High-Resistance Ground Fault Protection Based on the Ratio of Power Frequency Variation of Phase Currents	165
<i>Zhifeng Chen, Yinlian Ji, Zhixin Gao, Yingming Zeng, Kaitao Zheng, Xinyi Chen, Ruijue Feng</i>	
Research on Intelligent Detection and AI Prediction Device for the Risk of Loosening and Falling off Bolts of Photovoltaic Modules	170
<i>Cai Wenrong, Xu Ziwei, Xu JiaQuan, Lin XiTao, Ye YuBin, Ye Chengbin</i>	
Research on Intelligent Supervision and Legal Adaptation of Construction Contract Performance Based on Blockchain and BIM	174
<i>Liu Jinkang</i>	
Research on Inverse Time Relay Protection Settings Adapted to Changes in Distribution Network Structure	182
<i>Xingye Yu, Zifan Zhang, Hanlin Yu, Chuying Zhong, Xinyu Zhu, Wenzi Cao, Zhidong Wang</i>	
Research on the Impact of Non-Uniform Temperature Distribution Inside Large Power Transformers on Insulation Margin	185
<i>Tao Zhu, Li Ma, Ke Wang, Xiaolin Zhao, Zuoxian Wang, Huiwen He, Ruoxi Wang</i>	
Research on the Optimization Strategy of Park Integrated Energy System with Flexible Load Participation	191
<i>Xu Ziwei, Huang Huaye, Zhou Jiating, Wang Zhidong, Guo Taojing, Zhang Zichang, Guo Lin</i>	
Research on the Reliability of Multi-Terminal DC Wind Power in Offshore DC Collection Systems	196
<i>Mengyao Ou, Jiafeng Zeng, Liping Zeng, Zhirong Yuan, Huaye Huang, Ziwei Xu, Jiehui Li, Ruiyu Feng</i>	
Robust Optimal Scheduling of Park Integrated Energy System Considering Carbon Trading	201
<i>Jizhong Zhu, Meiyun Gao, Yanjiang Li</i>	
Robust Scheduling for Integrated Electricity and Gas Systems Considering Wind Power Uncertainty	207
<i>Xiluo Wang, Haohao Zhu, Jizhong Zhu, Xiaoning Yang, Xin Shen</i>	
Short-Term Real-Time Electricity Price Prediction Method Based on TCN-LSTM	213
<i>Yong Liu, Yuwang Miao, Jie Zheng, Hanjiang Dong, Jizhong Zhu, Ziyu Chen</i>	
Simulation on a Hybrid Thermoelectric-Liquid Cooling Thermal Management System for 58Ah Power Lithium Iron Phosphate Batteries	219
<i>Changxing Lu, Tao Lin, Fengqin Han</i>	
Small-Sample Rotor Fault Data Augmentation via Diffusion Generative Adversarial Network	223
<i>Yue Chen, Chao Shen</i>	

Study on Smooth Transition Performance of PMSM MTPA Control and WFC Based on Single Current Loop	227
<i>Lina Luo, XiangYu Yang, Zhidong Wang, Zifan Zhang</i>	
Study on the Impact of Thermoelectric Cooling Configuration on the Thermal Management Performance of Power Batteries	231
<i>LinFeng Zhong, Tao Lin, Chengdai Chen, Weijun Liao, Fengqin Han</i>	
Study on the Influence of Ambient Temperature on the Thermal Management Performance of Thermoelectrically Cooled Batteries	235
<i>Tao Lin, Weijun Liao, Chengdai Chen, Fengqin Han</i>	
Suppression Strategy for Second-Order Frequency Ripple Current of Battery Clusters in High-Voltage Transformer-Less Energy Storage System	239
<i>Dangsheng Zhou, Chang Liu, Xu Cai, Qiang Chen, Xiao Huang</i>	
Toxicity Evaluation Device of Cable Trench Mixture Based on Catboost Algorithm	245
<i>Liao Xingbang, Luo Huangshen, Xu Ziwei, Lin ShiJie, Zeng JunYing, Ye Chengbin</i>	
Unit Commitment for Integrated Electricity and Heat Systems Considering Full Temperature Dynamics	249
<i>Yutong Wen, Haohao Zhu, Jizhong Zhu, Xin Shen</i>	
Weekly Energy Use Optimization Method for Zero-Carbon Buildings Considering Energy Independence	255
<i>Jie Shen, Kun Yu, Xingying Chen, Dong Wang, Yuntian Zheng, Le Bu</i>	
X-Ray Non-Destructive Testing Robot for Tension and Compression Joints Adapted to Different Wire Spacing	260
<i>Jiehui Li, Zhaoyang You, Huaye Huang, Chengbin Ye, Zhidong Wang, Lingpeng Kong, Zicheng Wu Mingxiang Huang</i>	
YOLO-Based Packaging Air Leakage Method on K210 Platform	264
<i>ShiJie Lin, Qi Zeng, JunYing Zeng, MengYao Ou, KeYi Huang, SiQi Zhang, ZhongQian Luo, XinBang Liao</i>	