2022 Asian Conference on **Frontiers of Power and** Energy (ACFPE 2022)

Virtual Conference 21-23 October 2022



IEEE Catalog Number: CFP22CF6-POD ISBN:

978-1-6654-7085-8

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:
 CFP22CF6-POD

 ISBN (Print-On-Demand):
 978-1-6654-7085-8

 ISBN (Online):
 978-1-6654-7084-1

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

Chapter 1: Power Plants and Infrastructure

opology Design and Performance Analysis of a MMC Based Solid-State Transformer Baorong Zhou, Shiyang Li, Junjie Li, Lei Chen, Xuefeng Qiao, and Hongkun Chen	1
Research on Optimal Planning of Distribution Network with Multi-Microgrids Based on he Improved Minimum Spanning Tree Algorithm	7
valuation Index System of Fire Extinguishing Agent Suitable for Transformer Oil Fire Based on Entropy Weight TOPSIS	13
daibin Zhang, Shilei Huang, Jiaqing Zhang, Wen Shi, Fengju Shang, Depeng Kong, Bingqing Li, and Wanru Hong	
ow-Voltage AC-DC Hybrid Distribution Network for Large-Scale Photovoltaic Consumption Space-Time Coordinated Optimization Method	18
i Yue, Fu Yu, Bai Hao, Yuan Zhiyong, He Xiaomeng, and Jin Qinyuan	
Sequence Impedance Modeling and Stability Mechanism Analysis of Three-Phase Grid-Connected Inverter Considering Frequency Coupling	23
lingning Li, Jilong Zhang, Chengxiang Ling, and Jianlong Zou	
Research on Tree Detection under Transmission Line Based on 3D Visualization Thaoqing Jiang, Zhizhou Shang, Feng Guo, and Yupeng Wang	29
Novel Whole-Line Fast Protection Scheme Based on Single-End Line Current for HVDC	34
long Cao and Zhengmao Wang	
he Detection Method of Inter-Turn Short-Circuit Current of In-Phase Coil Compensation axial Permanent Magnet Synchronous Fault-Tolerant Motor	41
Shuqing Tan, Yinru Bai, Xuping Wang, and Pan Liu	
Research on Energy Regulation Strategy of Six-Phase Motor for Multi-Mode Combined	4-
Propulsion System Veibo Li, Zhongtian Zhang, Zhenjie Zou, and Ning Li	41
/irtual Synchronous Generator Modeling Based on Harmonic State Space in DQ Frame (iao Yang, Chengbi Zeng, Xuefeng Wu, Hui Lai, and Hong Miao	52
Primary Frequency Regulation Performance Evaluation of Thermal power Units Based on Frequency Regulation Data Segment Identification using Improved Swinging	
Door Algorithm	57
ault Recovery Strategy for Active Distribution Network Considering Repair Sequence	•
ı nder Extreme Weather Vei He, Xiaolei Liu, Qi Wang, Lunjian Mu, Zhen Qin, and Xia Lei	63
ronno, radoron Ela, qui trang, Eampan ma, Enon qui, ana Ala Eo	

Research on Reliability Life Model of Thyristor in HVDC Converter Valve System in High- Altitude Environment70
Qiang Li, Yantao Lou, Chunqiang Su, Ziyi Xu, Binbing Xia, and Feng Wang
Resonance Suppression Strategy of the Multi-Inverter Grid-Connected System Based on Current Given Correction78
Shengqi Zhou, Pengju Sun, Qiang Li, Chen Lan, and Zezhong Xu
Chiedra on the Tanalague and Control Mathed of a Device Comply for Tananagative Field Tant
Study on the Topology and Control Method of a Power Supply for Temperature Field Test of High-Frequency Transformer80
Xinwen Zhang, Bailin Liu, Feng Gao, Dunwen Song, and Xukai Zhu
Application of CSGE-PSPnet Remote Sensing Image Semantic Segmentation Technology
in Transmission and Transformation Engineering Design85
Benliang Li, Keyang Sun, Yao Lang, Lan Guan, Fei Lu, and Yi Zhu
DQ Impedance Modeling and Stability Analysis of Virtual Synchronous Generator
Considering Voltage Current Loop90
Shicong Wang, Chunjuan Jia, Jun Fu, and Chunqiao Jin
Frequency Adaptive Feedforward Odd-Harmonic Repetitive Control for a
Grid-Tied Inverter96
Gong Zhang, Qiangsong Zhao, Bin Wang, and Kaiyue Liu
Active Damping Design of LLCL Grid-Connected Inverter Based on Biquad Filter102
Bin Wang, Yongqiang Ye, Qiangsong Zhao, and Gong Zhang
Outlier Detection of the Power Transformer DGA Fault Data Based on Ensemble Model108
Yanan Liu, Zhang Qian, Huaqiang Li, Lisheng Zhong, Yaohong Zhao, and Yihua Qian
Seepage Characteristics and Stability Analysis of Transmission Line Tower Bank Slope
under the Action of Reservoir Water113
Rongquan Fan, Yifei Jiao, Feng Tian, Wenhui Zeng, and Bin Dong
Transient Stability Analysis of Grid-Forming Converter Based on Virtual
Synchronous Generator118
Zhongming Xiang, Qiulong Ni, Zhenhua Li, Jianping Xu, Sixun Li, Zheren Zhang, and Zheng Xu
Simulation Study on Frost Heave Resistance Characteristics of Transmission Line Tower
Foundation in Peat Season Permafrost Region128
Zhu Feng, Rongquan Fan, Chenji Ren, Dong Bin, Li Tao, Wang Liang, and Keliang Liu
Asymmetric Fault Location of Distribution Network Based on Positive and Negative
Sequence Voltage Ratio130
Hong Xie, Huaying Zhang, Xian Wu, Dehai Zhang, and Wenhai Zhang
Faulty Feeder Selection Based on Adaptive Dictionary Sparse Representation in Isolated
Neutral System137
Gang Sun, Fei Liu, Yunzhi Sun, Chengcheng Gao, Qingbo Wu, Shanqing Wang, Huifen Zhang, and Jingcheng Zhou

A New Differential Protection for Transmission Lines Connecting Renewable Energy Sources to MMC-HVDC Converter Stations Based on Dynamic Time Warping Algorithm Xiang Ren, Tianxiao Huang, Guangming Xin, Xiaofei Wang, Lu Zhang, and Miao Liu	144
AGC Command Allocation Coordinating Frequency Performance and Anti-Vibration of Hydropower Units	151
Yi Xu, Yu Lei, Mingxu Xiang, Wei Liu, Zimeng Huang, Gong He, and Juan Yu	
Identification Method of Transformer Leakage Reactance Based on Recursive Least Squares	158
Qian He, Li Chen, LiangYi Wang, Mengyuan Han, LiJuan Jiang, and ZhongYong Zhao	
Chapter 2: Application of Al in Power System	
A Self-Attention-Embedded Deep Learning Model for Phasor Measurement Unit-Based Post-Fault Transient Stability Prediction	165
Xiaoxuan Han, Yanlin Jin, Ge Wu, Sixin Guo, and Tingjian Liu	
Research on Compressed Air Foam System Performance Diagnosis Combined with Engineering Practice	172
Xianling Fu, Jiaqing Zhang, Jia Xie, Tiantian Tan, Lingxin He, and Yi Guo	172
Fault Location Method Based on Deep Learning in New Power System	178
Power Grid Transient Stability Prediction Method Based on Improved CNN under Big Data Background	183
Jun Zhou, Mukun Li, Liyang Du, and Zihan Xi	
Short-Term Load Forecasting Method Based on Deep Learning under Digital Driving	188
Network Security Protection Based on Deep Learning in Power Grid Information Construction	193
Xiru Mao, Zheng Cheng, and Yu Zhou	
A Method for IoT Device Management and Traffic Scheduling in Distribution Station Area Based on Distributed SDN Architecture	198
Lin Guanqiang, Lei Jinyong, Xu Quan, Wang Xiaoguang, Yu Lei, Li Fukui, and Lin Jingnan	
A Machine Learning Process-Based Training Task Execution Method in the Field of Power Grid Regulation	203
Yingying Lao, Wangyu Dong, Ziyun Chen, Yanru Kong, Jialing Shen, and Hao Li	
Evaluation Method of Distribution Network State Based on IT-II-Fuzzy K-Means Clustering Algorithm for Imbalanced Data under PIOT	211
Ge LI, Xing Ning, Wenlong Gong, Lanhua Zhou, and Wanwan Guo	
Research on Non-Invasive Load Decomposition Algorithm Based on Attention Mechanism of Convolutional Neural Network	216
Jian Sun, Mingkai Li, Pengbo Shi, Qian Li, Jinshan Zhu, Wei Hu, and Qiuting Guo	•

Fault Diagnosis of High Voltage Circuit Breaker using Random Forest and PSO-KELM	221
Research on Condition Assessment and Fault Diagnosis of Power Transformers Hanfeng Wang, Qiannan Xue, Shiqi Kang, Peng Zhang, Che Xu, and Chenguang Yan	226
Chapter 3: Energy Analysis and Planning	
Research on the Information Interaction Evaluation Model for Serving Power Market Transactions	232
Jing Yang, Wei Wang, Lei Li, Weihua Weng, Tao Yu, and Yijun Huang	
Operation Optimization and Analysis of Office Building Integrated Energy System Considering Comprehensive Demand Response of Heat and Electricity	237
A Technical Design for Smart-Grid to Realize both Low Voltage Ride through and Anti-Islanding Protection	242
Optimal Allocation of Distributed Energy Storage Systems in Weak Grid: A Case Study of Ali, Tibet	247
Chao Liu, Annie Lin, Boqi Zhang, Weikang Kong, Miao Zhu, and Shuli Wen	
Impact of Different Auction Mechanisms in the Carbon Emission Auction Market on the Electricity Market	252
Qiang Wang, Daoqiang Li, Wei Wang, Kai Yuan, Xuepan Tang, and Tianran Li	
Low Carbon Economic Scheduling of Wind Power System Including Environmental Premium and Carbon Cost	258
Heng Zhao, Yuyan Yang, Song Qing, Tong Zhang, Jie Peng, Yongchen Jiang, and Jichun Liu	
Design of Multi-Time-Standard Electric Heating Market Transaction Mechanism Based on Blockchain	265
Gang Liu, Baoju Li, Dongmei Yang, Yong Sun, Jiyue Fu, and Chang Liu	200
Research on Voltage Coordination Recovery Strategy of Multi-Outfeed and Multi-Infeed UHVDC Transmission System with Similar Path	271
Probability Density Forecast of Day-Ahead Electricity Price Based on EEMD-QRDCC	277
Demand Response Dynamic Pricing and Economic Scheduling Considering Energy Consumption Characteristics	282
A Copeland-Method-Based Weakness Identification for the Components in Transmission Systems under Natural Disasters	287

Wind Turbine Abnormal Data Cleaning Method Considering Multi-Scene Parameter Adaptation	202
Yu Wang, Yangfan Zhang, Hui Liu, Linlin Wu, Weixin Yang, and Kai Liang	292
Research on Carbon Emission Measurement Method Based on Carbon Emission Reduction of Power Grid Supply Chain	. 298
Yuan Zhang, Shu Xia, and Fan Yang	
Low-Carbon Operation Method Based on Model Predictive Control for Photovoltaic- Diesel Microgrid	.303
Abdullziz Hamad Alotaibi	
Green Evaluation Design and Application Research of Power Grid Suppliers under the Carbon Peaking and Carbon Neutrality Goals	308
Multi-Objective Monthly Generation Scheduling Considering the Supply Constraints of Adjustable Energy	313
Unbalanced Power Flow Calculation in Active Distribution Networks Based on Improved Sequence Components	318
Xinzhi Guo, Yong Guo, Yihao Sun, Jie Ma, Zhengbo Li, and Peng Chen	
Mechanism Analysis of Power Fluctuation of Wind Power AC Transmission Channel Caused by DC Commutation Failure	. 323
Yang Yan, Cai Wantong, Zou Shixian, Peng Bo, and Xu Wei	
Opportunity Cost Analysis of Renewable Energy Participation in AGC Frequency Regulation	330
Zhenyi Wang, Hua Ye, Bin Hu, Tianrui Xu, Ming Qu, Xinran He, and Tao Ding	
Optimization Clearing Model of Regional Integrated Electricity Market Transaction in the Dual Track System of Planning and Market	. 335
Jianhua Li, Haoting Qin, Yunxia Wu, Su Zhang, Hao Fu, Tianzhi Li, and Yue Hu	
Optimal Scheduling of Power Consumption on the user Side with Natural Gas Differential Pressure Generation	. 340
Qi Mei, Fuping Wang, Qiang Zhang, Shu Shi, Yi Luo, and Hanzheng Xie	
Design of Inter Provincial Pumped Storage Trading Market in Yangtze River Delta Region of China	. 346
Min Wu, Xiaogang Li, Xinhang Shen, and Bin Zou	
A PCA-Based Evaluation Method for Distribution Network Engineering Contractors	. 351
A Data-Analysis Evaluation Method for the Distribution Network Engineering Contractor Jian Lin, Weiwei Hong, Yiwei Chen, Zhenxi Huang, Yifu Lin, Chenjing Zhou, Feixiong Chen, and Zhenguo Shao	. 356

Regional Distributed Photovoltaic Short Term Power Prediction Method Based on Cluster Analysis and Stacking Ensemble Learning	
Junhang Wu, Zhiyuan Tang, Yi Gao, Lianbin Wei, Jin Zhou, Fujia Han, and Junyong Liu	
Comprehensive Assessment System and Method of Distribution Network Engineering Projects	366
Jiafeng Zhan, Xuhua Wu, Weiju Chen, Xiaomin Liu, Gangping Cai, Dujian Yang, Yuhan Xie, Feixiong Chen, and Zhenguo Shao	
Transmission Grid Performance Evaluation Based on Combinatorial Game Theory under Dual Carbon Targets	371
Zheyi Ji, Xuesong Xu, Deyu Zhang, Tianhao Du, Muzi Li, and Junfeng Hu	
Optimal Scheduling Strategy of Park Microgrid Based on Blockchain Technology Xi Wang, Wei Wang, Xuna Liu, Yang Liu, Linyan Zhao, Yipeng Chen, and Huaqiang Li	376
Return Power Optimization Strategy of DAB Converter Based on Model Predictive Control	382
Xinwen Zhang, Canlong Wang, Feng Gao, Dunwen Song, and Xukai Zhu	502
Research on the Development Path of New Power System Based on SWOT-PEST Analysis	387
Ke Xu, Weiting Xu, Chang Liu, Yang Liu, Fulin Yang, Meiqi Sheng, and Minqi Cao	
Effective Electric Vehicles Navigation Strategy Considering the Uncertainty of the Charging Load	394
Xun Li, Mengge Shi, Jiashuo Hu, Shan He, Dazhong Zou, and Youwei Jia	
Research on Analysis and Application of Lightning Current Model in Power System and Protection Improvement Method	399
Shaoming Zheng, Rui Chen, Yimin Liu, Siqi Zhang, Dan Liu, and Tianxiao Huang	
STGCN-Based Capacity Estimation of Regional Interruptible Loads with Privacy Preservation	404
Jiahua Hu, Dairui Li, Yang Xu, Weiwei Zhang, Junjie Li, and Zhiyi Li	
The Interline Power Flow Devices Location Selection Method Based on Novel Indexes Zheng Li, Yuqiao Jia, Dajiang Wang, Jingbo Zhao, Ke Xu, and Bing Xie	409
A Review of Supervision Measures in the US Ancillary Service Markets and Suggestions for China	414
Pengyu Di, Yue Zhao, Guobing Wu, Sijie Liu, Qiuna Cai, Xinyu Meng, Pengcheng Zha, and Yuguo Chen	
Research on the Calculation Method of New Energy Generation Market-Oriented Proportion for Electricity Marketization in China	419
Zheng Zhao, Chen Lv, Chenhui Tang, and Menghua Fan	
Design of the Comprehensive Power Grid Simulation Platform Based on Integrated Main and Distribution Network	424
Jinvuan Wu. Li Zhang. Bin Zhao. Tingting Wang. Huarong Han. and Xiaoiun Liao	

Chapter 4: Energy and Power Control

Online Monitoring of Capacitor of Submodule in M3C Converter	429
D-Q Small-Signal Impedance Analysis of Improved Virtual Synchronous Generators for Low-Frequency Transmission System	434
Jing Wu, Yuchao Shi, Haitao Zhang, Zhibin Ye, Chenchen Li, and Guofeng Xu	
Analysis and Improvement of Synchronous Frequency Resonance Caused by Imbalance DC Components	443
Yujie Gu, Jianbo Yi, Zhenyuan Zhang, and Qi Huang	
Research on Quantitative Risk Assessment and Prevention and Control Measure of Subsynchronous Oscillation	449
Song He, Feng Luo, Yingjie Chen, Naishuang Li, and Weilun Ni	
Transient High-Frequency Impedance Pilot Protection for Urban Flexible DC Distribution Network Xiao Zhang and Xinyan Fang	456
A Digital Load Forecasting Method Based on Digital Twin and Improved GRUYu Gu, Fandi Wang, Mukun Li, Lu Zhang, and Wenlong Gong	462
Research on Power Optimal Control Strategy of Marine Diesel-Storage	467
VSG Transient Power Angle Stabilization Strategy Considering Current Limiting	472
Research and Application of Low-Voltage Flexible Interconnection Technology of Distribution Network	478
Wu Di, Wang Wei, Wang Shaoqu, Yu Zhuofei, Sun Houtao, and Hong Dan	
Grounding Operation Analysis of Low Voltage Direct Current Supply and Utilization System	484
Shukang Zhao, Yuanyuan Sun, Kaiqi Sun, Shulin Yin, Chunyi Tian, and Xingqi Wu	404
Inertia Control and Dynamic Performance Optimization of Interlinking Converter Based	400
on Parameter Adaptation	489
The Coordinated Planning of Distributed Generation and Distribution Network Considering DG Control Models	494
Panlong Jin, Zongchuan Zhou, Xue Feng, and Zhiyuan Wang	
A Novel Power Synchronization Strategy and an Overall Control Architecture for Star-Connected Cascaded H-Bridge STATCOMs	500
Kai Hu, Guoliang Zhao, Chaobo Dai, Hongyang Yu, Zhichang Yang, and Xiaoge Liu	
Classification and Identification of Voltage Sag Sensitive Consumers Based on Multivariate Features	506
Yutao Qiu, Lei Zhang, Hongfei Mao, and Yu Xiao	

Introduction about Anti Misoperation Software of the Remote Control Soft-Clamp for the Smart Substation51
Wang Xuecheng, Wang Xiaoming, Wang Liang, Liu Jiangtao, Ran Qingyu, Wang Lei, Xue Yaqi, and Ma Lei
Coordinated Preventive-Corrective Control for Power System Transient Stability Enhancement Based on Machine Learning-Assisted Optimization51
Yunyang Xu, Kangkang Wang, Wei Wei, Xi Wang, Junyong Liu, and Kangwen Li
Research on Scheduling of Hybrid AC/DC Distribution Network Considering V2G528 Bin Che, Chuan He, Baosheng Chen, Yuliang Qing, and Qiang Ji
A Harmonic Source Localization Method Based on Critical Admittance Screening with Adjusted Coefficient of Determination53
Qingshen Xu, Yuanyuan Sun, Shulin Yin, Ruize Sun, Qianqian Li, Demin Qi, and Bowen Li
Research on Classification and Coding Technology of Substation Engineering Model Based on 3D Design53
Jianqin Li, Junhui Hu, Jingnan Shi, and Hui Wang
Research on Controlled Series Complementary and PSS Coordinated Damping Control Method54
Lei Ming, Song Yang, Li Fei, Li Shicun, Wang Shilong, Qin Xiankun, Luo Yihui, and Liang Chengning
Sliding-Mode Control with Two-Stage Photovoltaic Off-Grid and Grid-Connected Inverters 54 Haiwei Liu, Wenxi Zhen, Baixu Chen, Weicheng Shen, Kaisong Dong, and Xiping Ma
Chapter 5: Energy Conversion, Generation and Storage
Optimal Configuration of Energy Storage Considering the Heterogeneous Flexible Loads55 Zhicheng Ma, Qiang Zhou, Dingmei Wang, Ruixiao Zhang, and Lijuan Liu
A MSTUKF-Based Technique for SOC Estimation of Li-Ion Batteries for Electric Vehicles 55° Bingxin Wu and Feiyan Qin
Optimal Configuration of Energy Storage Power Station Considering Voltage Sag562 Ying Li, Hui Peng, Fan Yang, and Shaowei Liang
Operation Optimization of Rural Areas' Energy System Considering its Characteristics in New Era
Wang Chao, Zhuang Lisheng, Pan Lin, Gong Weishuai, and He Siqiang
An Assessment Method for the Contribution of Electrochemical Energy Storage to the FM Auxiliary Service Market57
Jiali Xiong, Ďawei Chen, Zhicheng Li, Weijun Zhang, Qiang Cai, Liyu Dai, and Wujie Chao
A Method for Low-Carbon Dispatch of PEDF (Photovoltaic, Energy Storage, Direct Current and Flexibility) Microgrid Considering Indirect Carbon Emissions

Distributed Energy Storage Planning Method Considering the Comprehensive Value of Energy Storage	585
Jun Wei, Shengyong Ye, Xuna Liu, Ting Li, Xinting Yang, Liyang Liu, Chuan Long, and Yifan Pan	
Distribution Network PV Acceptance Capacity Assessment Considering Balance of Flexibility Supply and Demand	592
Xinting Yang, Chuan Long, Yongsheng Ye, Ting Li, Liyang Liu, Jun Wei, Xuna Liu, and Haoyang Bai	
Study on the Influence of Distributed Photovoltaic on Distance Protection of Collecting Line	600
Xuekai Hu, Qian Zhang, Lei Wang, Qi Zhang, Shaobo Yang, and Zhuoran Wang	
Cloud Energy Storage Service Mechanism considering Power Transaction	606
Day-Ahead Optimal Economic Dispatch Based on Cloud Energy Storage System Haiyan Wang, Wei Wang, Fang Liu, Xinting Yang, Liyang Liu, and Yinjiang Li	613
Collaborative Optimization of Park Integrated Energy System Based on Shared Energy Storage	619
Zhichao Ren, Ruiguang Ma, Chuan Long, Bo Chen, Xuehai Lv, Huaqiang Li, and Luyao Gao	
Energy Storage System Configuration Evaluation and Optimization Model for Distribution Network	625
Chuan Long, Shengyong Ye, Ting Li, Liyang Liu, Xuna Liu, Jun Wei, Xinting Yang, and Hanyang Chen	
Security Impact of Energy Storage Frequency Modulation System on Power System and its Control Strategy	631
Jingfeng Ou, Yajun Zou, and Wei Wang	
Allowable Capacity Analysis of Distributed Renewable Energy Resources in Active Distribution Network	636
Xiaobing Liang, Yue Yang, Ranran An, Zhulu Zhang, Shuai Liu, and Haoran Guo	
Capacity Auction Mechanism Considering Flexiblility Constraints and Battery Energy Storage	643
Wenjin Jiang, Xiazhe Tu, Qiaomei Liu, Zhenyu Huang, and Gao Qiu	
The Coordinated Planning of "Source-Load-Storage" Active Distribution Network under Low-Carbon Economy	648
Panlong Jin, Zongchuan Zhou, Xue Feng, and Zhiyuan Wang	
Dual-Parameter Adaptive Control Strategy of Inertia and Damping for Energy Storage Converters	654
Jun Wang, Wujie Chao, Liyu Dai, Xue Han, and Zhibin Ling	
Research on Power Limiting Strategy of PV Power Generation Based on MPPT and Power Loop	664
Qian Weijie, Zhang Zhongfeng, Li Jiapeng, Wang Jianhua, and Hu Binhui	00 1

Modeling and Simulation of Hybrid Pumped Storage Power Station	666
Optimal Siting and Sizing for Distributed Energy Storage System in Active Distribution Networks for Peak Load Management	671
Zhongqi Cai, Kun Yang, Yanxun Gu, Sirong Pan, Sashuang Sun, Hanzheng Xie, and Peilin Li	
Projection Method of Energy Storage System in Power Spot Market for Renewable Accommodation	677
Dong Peng, Yawei Xue, Hongyang Liu, Haoran Zhao, Xiaorui Hu, Ziyan Jiang, and Shu Wang	
Research on Green and Low-Carbon of Electrical BWFRP Pipe	683
The Participation of Independent Energy Storages in Electricity Markets: A Suvey and Perspectives of Jiangxi Province	688
Zhonghua Xie, Ning Zhu, Haoyong Chen, Qin Le, Jianguang Li, and Hongjun Qin	
Coordinated Planning of Source-Grid-Load-Storage Power System to Promote Large-Scale Renewable Energy Consumption	694
Study on Operation and Capacity Optimization of Distributed PV System with Battery in Steel Plant	700
Flicker Source Location and Responsibility Division Method Considering Flicker Power Fluctuation Characteristics	705
Chapter 6: Integrated Energy Systems	
Day-Ahead Generation Schedule of Wind-Thermal-Storage System Considering Prediction Error	710
Research on Comprehensive Evaluation Method of Multi-Energy FlowLiu Jinhui and Pei Xuliang	715
Flexibility Evaluation Index System and Calculation Method of Active Distribution Network with High Proportion of Renewable Energy Zhijie Liu, Shouzhen Zhu, Peng Zhang, and Zhenhai Zhang	720
Multidimensional Benefit Evaluation of RSOFC Integrated Energy Station Considering Electro-Thermal-Hydrogen Coupling	725
MPPT and Energy Storage Control of a Hybrid PV Array and Heat Pump System: An Experimental Research	731

Author Index	760
Considering the Low-Carbon Transformation of Thermal Power	754
Coordinated Planning and Profit Distribution of Wind, Solar and Thermal Power	
Qiyun Cheng, Taiping Yuan, Xianzhe Liang, Zhichen Hu, and Kai Ye	
Cascading Failure Model of Integrated Electricity-Gas System Considering Multiple Driving Factors	748
Demand Model of Single Energy and Integrated Energy for User Pei Su, Huitao Niu, Lidong Wang, Hongyan Zhang, Han Fu, and Peiyi Zhang	743
Considering Wind Power and Photovoltaic Uncertainty	736
Day-Ahead Operation Optimization Model of User-Side Cloud Energy Storage	