2021 IEEE 5th Conference on **Energy Internet and Energy System Integration (EI2 2021)**

Taiyuan, China 22 – 24 October 2021

Pages 1-743



IEEE Catalog Number: CFP21K59-POD ISBN:

978-1-6654-3426-3

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:
 CFP21K59-POD

 ISBN (Print-On-Demand):
 978-1-6654-3426-3

 ISBN (Online):
 978-1-6654-3425-6

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



Contents

POA-001	Resonance Characteristics and Resonance Suppression Method for Multi-Parallel LCL- Type Inverters	1
POA-002	Coordinated Frequency Control Strategy of PMSGBased Offshore Wind Farm Connected by VSCHVDC System	7
POA-003	Research on Stability Control Strategy of AC/DC Parallel Transmission System Based on the uncertainty analysis of transient shock fault shape	13
POA-004	Model Recognition Based Arc Extinction Time Recognition Strategy for True Bipolar Flexible HVDC Systems	19
POA-005	Research on Protection Method of Medium Voltage DC Distribution Network	25
POA-006	Evaluating Stochastic Flexibility Model of Vehicle Charge Stations in Distribution Network	30
POA-007	Diversified Connection Cascade Planning for Intelligent Medium Voltage Distribution Network in Xiongan New Area under High Reliability Positioning	36
POA-008	Bi-level Planning Model of Urban Diamond-type Distribution Network Considering Load Uncertainty	42
POA-010	Mechanism of the Influence of Inertia Control Scale Factor of Doubly-Fed Induction Generator on System Power Angle Stability	48
POA-011	Collaborative Planning of Distributed Generation and Distribution Network Considering Dynamic Reconstruction of Grid	55
POA-012	Peer-to-Peer Electricity Trading for Prosumers in Distribution Network: A Nash Bargaining Approach	60
POA-013	Planning of Virtual Microgrids by Integrated Partition and DER Allocation	66
POA-014	A Solution of Distribution Network Reconfiguration with Wind Power Using Improved ACO Algorithm	72
POA-015	A DC-collector Topology and its Application for Wave Energy	78
POA-016	Comprehensive evaluation of AC-DC distribution network in photovoltaic-energy storage charging station based on AHP-TOPSIS method	83
POA-017	TransOS-ELM: A Short-term Photovoltaic Power Forecasting Method based on Transferred Knowledge from Similar Days	89
POA-018	An Improved Master-Slave Control Strategy for Medium Voltage DC Distribution System	95
POA-019	Spatial-Temporal Distribution Characteristics of Electric Vehicle Charging Load Considering the Traffic-side Intersection Delay	101
POA-020	Real Time Operation Strategy Of Charging Station Based On Electric Vehicle Schedulable Time	108
POA-021	Integrating Peer-to-Peer Energy Trading of Microgrids into Deregulated Electricity Market by Cascaded Model Predictive Control	114
POA-022	Fault State Operation Analysis for Offshore Wind Farm with Ring-Topology Collector System: An OPF and Topology Optimization Method	119
POA-023	Robust optimal operation of multiple energy systems with high wind power penetration considering thermal inertia of district heating network and carbon emissions	125

POA-024	Efficiency Analysis of AA-CAES Based Energy Hub Considering Combined Cooling, Heating and Power	131
POA-025	Improved sliding mode control for low-voltage ride through of hybrid drive wind turbine	137
POA-026	A Data-driven Robust Planning Method for Integrated Energy System Considering	143
	Uncertainty of Renewable Energy	4.40
POA-027	Cost Optimization of Park Integrated Energy System Considering Combined Demand Response and Multiple Different Operating Scenarios	148
POA-028	Research of Wind Power Generation Characteristics in Southern China Based on Improved Non-parametric Kernel Density Estimation	154
POA-029	Low-carbon Economic Dispatch of Integrated Energy System Considering Hydrogen Mixing in Natural Gas Pipeline	160
POA-030	Standardized modeling of integrated energy system for multi-scenario interaction	165
POA-031	Impacts of VSG Control on Frequency Response in Power Systems with High-Penetration Renewables	171
POA-032	Coordinated Operation of Electricity and Natural Gas Integrated Energy Distribution Systems Considering Combined Electricity-gas Demand Response	177
POA-033	Robust Coordinated Operation of an Integrated Electricity-Heat System With Multi-Energy Microgrids Considering Uncertain Interactive	184
POA-034	Optimal Multi-period Pricing and Operating of Hydrogen Refueling Stations Considering the Coupling of Transportation and Power Systems	190
POA-035	Planning of Integrated Community Energy System Considering Uncertain Carbon Trading Price Based on Information Gap Decision Theory	196
POA-036	Hydrogen-Based Integrated Energy System Planning Considering Temperature-Based Heat Supply and Demand Model	202
POA-037	Tapping the Potential in Air-conditioning Loads at Telecommunication Base Stations: A Semi-Markov Control Method	208
POA-038	Comprehensive Evaluation Index System and Improvement Method for Integrated Energy System	214
POA-039	Research on Reactive Power and Voltage Equalization Control Strategy of Photovoltaic Inverter Cluster	220
POA-040	Extremal-Distribution-Based Cutting Plane Algorithm for Efficiently Solving Two-Stage Distributionally Robust Unit Commitment Problems	225
POA-041	Optimal Configuration of Energy Storage Systems Considering the Risk of Insufficient Flexibility	231
POA-042	A V2G Scheduling Strategy Based on Electric Vehicle Users' Willingness Model	237
POA-043	Economic Dispatch of Low-Carbon Energy Center based on CO2 Electrolysis Technology	244
POA-044	Control Strategy of hybrid Energy Storage in Large-scale Wind Farm	250
POA-045	MIQP Reformulation and Reliable Solution of Stochastic Economic Dispatch	256
POA-046	Dispatch Strategy for the Union of Renewable Energy Generation and Pumped-storage	261
. 5, . 0 10	Hydropower Plant Considering Water Head Effects	201
POA-047	Two-stage optimal dispatch for AC/DC hybrid microgrid based on model predictive control	267
POA-048	Cloud-Cluster Hierarchical Dispatch for Large Scale Demand-Side Distributed Resources	272
POA-049	Optimal Configuration of Isolated Wind / Photovoltaic / Storage DC Microgrid Power Supply based on Improved Multi-Objective Spider Monkey Algorithm	277

POA-051	Optimal Configuration of Comprehensive Power Supply System of Zhongshan Station in Antarctica Considering Low Temperature Characteristics of Batteries	283
POB-001	Stability Analysis and Comparison of DC Power System with Different Droop Control	288
	Methods	
POB-002	A Component Reinforcement Method Based on DAD model for Transmission Systems	294
POB-003	Emergency Control Strategy of Gas-electric Coupling System Based on Dynamic Valve Model	300
POB-004	Research on Grounding Methods of DC Microgrid Based on Power Supply Connectivity and Reliability	305
POB-005	Design and Application of Virtual Stability Control Device Platform	310
POB-006	Design and Development of Power System Configuration Simulation Platform and Its Application in Intelligent Mode Arrangement	315
POB-007	A Substation-based Tri-level Model for Hardening Resource Allocation	320
POB-008	Information Flow Based Cyber-Physical Power System Modeling and Simulation	326
POB-009	Privacy-preserving Voltage Consensus Control for Heterogeneous Energy Storage Systems in Islanded Microgrids Based on Virtual Node Mechanism	331
POB-010	Simulation of Battery Energy Storage in Cyber Physical Systems Using Different Converter Models	337
POB-011	An Efficient Security Scheme for Charging Piles	343
POB-012	Research and Implementation of Real-time Accurate Simulation Platform for Large-scale Stability Control System	349
POB-013	Dynamic Stability Analysis and Improved Control Strategy of DFIG System during LVRT	354
POB-014	Research on the Influence of Phase Locked Loop Nonlinearity on Impedance Measurement for Stability Analysis	359
POB-015	Research on Transient Stability Analysis of Wind-Photovoltaic-Thermal-bundled Power Transmitted System	366
POB-016	Distinction and Conversion Between Frequency Oscillation Mode and Rotor Angle Oscillation Mode	371
POB-017	Impact Evaluation of HVDC System Control on Short-term Voltage Recovery Characteristics of Receiving-end Grid	376
POB-018	DFIG Multi-time Scale Control Characteristics and Simplified Modeling	381
POB-019	Stability Analysis of DFIG Grid-connected Based on Variable Gain Inertia Control	387
POB-020	Research on Multi-peak MPPT of Photovoltaic Array Based on Quantum Genetic Algorithm	392
POB-021	Robust Transmission Expansion Planning Considering Massive N-1 Contingencies with High Proportion of Renewable Energy	397
POB-022	Optimal Configuration of Synchronous Condenser to Suppress High Voltage Tripping of Renewable Energy Generators in DC Sending-End Power System	403
POB-023	Online Assessment Method of Switching Overvoltage Risk Using the Participation-Factor-Based Reduced-Order State-Space Model	409
POB-024	Distributed Optimal Dispatch for Power System Considering Privacy Preservation and	415
	Transient Stability Constraint	
POB-025	Key Influence Factor Analysis Related to the Transient Process of Grid-Connected VSC System	421
POB-026	Frequency Stability Enhancement of Wind Power Penetrated Power System by Switched	426

	Control of Battery Energy Storages	
POB-027	Correlation-based Bad Data Detection of PMU Measurements for Improving Network	431
	Structure with High Penetration of Renewable Energy	
POB-028	EMT Modelling and Overvoltage Analysis of Renewable Energy Generation Grid-connected System	437
POB-029	Robust Offline Deep Reinforcement Learning for Volt-Var Control in Active Distribution Networks	442
POC-001	A Data-Driven Method for Electricity Theft Detection Combing ConvGRU and K-means Clustering	449
POC-002	Single Phase Arc Grounding Fault Line Selection Method for Distribution Network Based on Random Forest Algorithm	455
POC-003	Application and Prospect of Deep Learning in New Energy Power System	461
POC-004	Online Load Data Compression and Reconstruction Based on Segmental Symbolic Aggregate Approximation	466
POC-005	Grid voltage control with new energy, energy storage, and flexible load based on combined model and improved MPC	473
POC-006	Sensitivity Analysis of Influencing Factors of Power Failure in Distribution Network based on Big Data of Distribution Network	479
POC-007	Research on User- Transformer Relationship Based on Improved Dynamic Time Warping Algorithm	485
POC-008	Non-intrusive Electric Vehicle Charging Load Disaggregation based on Independent Component Analysis with Reference	490
POC-009	Efficient Application of CSMA in HPLC Networks for Energy Internet	496
POC-010	Development of Leakage Current Monitoring Senors of MOV for UHV/EHV Series Capacitors	501
POC-011	An Autoencoder-OFDM Power Line Carrier Communication System Based on Deep Learning	508
POC-012	Analysis on the construction and application of intelligent distribution transformer terminal in Hubei Province	514
POC-013	Unit output optimization of integrated energy system based on digital twin and reinforcement learning	519
POC-015	Sectionalizer-Recloser Feeder Automation Approach Based on 5G Communication	525
POD-001	Optimal Dispatch Model considering Flexible Demand Resources and Bidding Uncertainty of Distributed Generation	531
POD-002	Electricity price prediction based on empirical mode decomposition and minimum gated memory network quantile regression	535
POD-004	A Co-optimization Mechanism of Energy and Multiple Ancillary Services with High- Penetration Renewables	542
POD-005	Comprehensive Analysis of Data Value and Its Properties in Electricity and Data Transactions	548
POD-006	An investigation on electricity consuming features for user classification in demand-side management schemes	554
POD-007	Coordinated Optimization of Energy Sharing and Voltage Regulation Service for PV prosumers in the Distribution Network	560

POD-008	Review and Comparative Study of Energy Routing Algorithms for Energy Internet	567
POD-009	Analysis and Design of a Novel Single-Sided Flux Pad for Dynamic WPT System	573
POD-010	Carbon Trading Based Short Term Production Simulation of Wind Power Integrated System	578
POD-011	Peer-to-Peer Energy Trading Considering Security Constraints in Distribution Networks	584
POE-001	A Novel Load Recognition Strategy Embedded in Power Control Loop for Multi-Port Energy Router	589
POE-002	A Control Strategy for T-Type Three-Level Converter to Suppress Neutral Point Voltage Fluctuation	594
POE-003	A New Power Electronic Transformer for 10kV Distribution Grid Based on Three-phase	600
	Four Arms H-bridge Modular Multilevel Converte	
POE-004	Resonance suppression method for multi-parallel inverters	606
POE-005	A Control Strategy of CLLLC DC Transformers under Unbalanced AC Voltage Conditions in Hybrid Microgrids	611
POE-006	A novel closed-loop control for flexible interconnecting switches	617
POE-007	The decay characteristics based capacity configuration method for user side battery energy storage	621
POE-008	Control method of electric vehicle virtual energy storage participating in power grid peak shaving based on predictive modeling	627
POE-009	An Advanced Control Strategy for Bidirectional Isolated Three Phase AC/DC Dual-Active-Bridge Converter in Hybrid Microgrid	633
POE-010	Joint Control Based on Virtual DC Machine and Predictive Model for Hybrid Energy Storage System	639
POE-011	Estimation of battery state of health based on Random weight PSO-ELM	645
POE-012	Modeling and Optimal Control of Hydrogen Fuel Cell Cogeneration System	649
POE-013	A Thermal Simulation and Prevention Control Framework for Lithium-ion Batteries	655
POE-014	Benefits of Variable Speed Pumped Hydro Storage Technology for Increasing Renewable	660
	Integration in Regional Power Grids	
POE-015	An Innovative Deep Reinforcement Learning Controller for DC/DC DAB Converters Based on Deep Deterministic Policy Gradient	665
POE-016	An Economic Evaluation Method for New Energy Station Configuring with Energy Storage	670
POE-017	Overview and Prospect Analysis of the mechanical elastic energy storage technology	674
POE-018	Wireless Power Transfer in Over-Coupled Region:Analysis on Frequency Splitting and Multi-Mode Frequency Selection Methods	679
POE-019	Comprehensive evaluation of the large-scale charging pile based on the cloud platform	685
POE-020	An Opportunity Cost Based Replacement Strategy for Transformers	691
POE-021	Design of Cold Chain Container Energy Storage and Conversion System Based on Modularization	698
POE-022	Design and Implementation of FPGA based Boost Half Bridge DC-DC Multiphase Converter	704
POF-001	A Bilayer Daily Load Curve Clustering Method Based on Short-Time Cross-Correlation	709
POF-003	Scheduling and Routing of Mobile Charging Vehicles for Unmanned Aerial Vehicles Charging	715
POF-004	Optimal Power Scheduling of Data Centers with Deferrable Computation Requests	721
POF-005	Day-ahead Probabilistic Forecasting of Achievable Incentive-based Demand Response Potential for Load Aggregator	727

POF-006	Net-Zero Carbon Intelligent Energy System based on Multiple Energy Integration	734
POG-001	A Case Study on Integrating Offshore Wind Power to Islanded Offshore Oil and Gas Field	739
POG-003	Simulation study of photovoltaic array MPPT based on improved CS algorithm	744
POG-004	Cooperative Wind Farm Control with Hybrid-Model-Based Deep Deterministic Policy Gradient and Model Selection	750
POG-005	An Improved Differential Protection Strategy of DC Distribution Network with Current Limiting Reactor	756
POG-006	Embedding Data Signals into Power Control Loop of Inverters for Power Line Communication in AC Microgrids	763
POG-007	Analysis of Demand Response Development Situation in China	768
POG-008	Research on FL-SMC of DFIG Grid-Side Converter under Unbalanced Power Grid	772
POG-009	Research on Evaluation Model of Success Degree of Power Grid Infrastructure Project Based on Entropy Weight Method	777
POG-010	Research on Automatic Reclosing Device of Low-Voltage Circuit Breaker	781
POG-011	Optimal Operation of Gas-Electricity Integrated Energy Systems with Demand Response	786
PPA-001	Research on Electromechanical Transient Equivalent Modeling of MMC-HVDC Connected to Passive Network	792
PPA-002	Simplified Calculation and Analysis of Sea Grounding Electrode Temperature Rise	797
PPA-005	Fault Ride-through Control Strategy for Multi-terminal Flexible DC Integration of Wind Farm	803
PPA-006	Discussion on optimization method of new power system planning considering short circuit ratio	809
PPA-007	Research on DC power grid electromechanical transient modeling technology	814
PPA-008	Analysis and Calculation of the Short-circuit current of Xiamen VSC-HVDC project	820
PPA-009	Research on sliding mode control method of nonlinear DC micro-grid active power filter	826
PPA-010	Demand Response Potential Measurement Based on Adjustable Load Scale	831
PPA-011	Influence of Different Factors on Fault Current Under DC Side Fault of Photovoltaic Grid Connected System	835
PPA-012	Calculation of power development scale based on carbon peak constraint and renewable energy consumption weight constraint	839
PPA-013	Analysis and Suppression of 6.5kV SiC MOSFET Turn-on Current Overshoot	843
PPA-014	A mixed model- and data-driven approach for subsynchronous oscillation analysis of VSC-HVDC grid-connected offshore wind farm	848
PPA-015	High Frequency Oscillation Analysis of Flexible DC Transmission System based on Modular Multilevel Converter	854
PPA-016	Multi-terminal DC line fault recovery with fault self-clearing and analysis of converter station online exit strategy	859
PPA-019	Research and Design of Voltage Doubling Rectifier Circuit in High Voltage DC Power Supply	864
PPA-020	A Novel Fault Area Identification Scheme for Inverter Station of HVDC Based on Wavelet Energy Ratio	868
PPA-021	A Novel Bypass MMC Sub-module Topology And Its Capacitor Voltage Balancing Strategy	874
PPA-022	Research on photovoltaic VSG control technology based on generation power reserve	880
PPA-023	Research and Application of Distributed Stability Control Test System	885
PPA-024	Characteristics and high frequency equivalent model of low voltage DC fault arc	891

PPA-025	Influence of Stray Parameters for High-frequency Resonance of MMC-HVDC Systems	896
	Based on Digital-analog Hybrid Simulation	
PPA-026	A Novel Multi-Port Hybrid DC Circuit Breaker for VSC-based DC Grids	900
PPA-027	Low-order Harmonic Suppressing Method of Renewable Energy Integration through VSC-HVDC	906
PPA-028	Effect of foreign matters attached to the switching core of vacuum on load tap changer on oil gap breakdown voltage	912
PPA-029	Suppressing Overvoltage by Synchronous Condenser Based on Multiple Renewable Energy Stations Short Circuit Ratio(MRSCR)	918
PPA-030	Research and Design of Online Monitoring Device for Operating State of GIS Isolating Switch Operating Mechanism	924
PPA-031	Research on the Control Strategy of Phase Modulator Based on Voltage Coordination	929
PPA-032	Influence of Fault Ride-Through Characteristics of Wind Turbines on Transmission Power of Ultra-High Voltage AC/DC Hybrid System	934
PPA-033	Research on Leakage Current Characteristics and Thermal Process of Gradient Valve Plates under High Frequency Voltage Conditions	940
PPA-034	A Simulation Error Analysis Method for HVDC Physical Dynamic Model Parameter Design	945
PPA-035	Fault Location Method of Flexible DC Transmission System Based on End-to-End CNN-LSTM Parallel Network	950
PPA-036	Overvoltage Analysis of AC/DC System Utilizing Two-Time-Scale Separation	955
PPA-037	Research on Voltage Regulation Strategy of Multi-terminal DC Distribution Network	961
PPA-039	Parameters Inversion of Equivalent RLC Fault Circuit for MMC-HVDC Grid Based on BP Neural Network	966
PPA-040	Comparison of Different Parameter Optimization Objectives under DCSCF for MMC-HVDC-Grid	972
PPA-041	Analysis on Fault Current Evolution for MMC-HVDC Grid Considering Fault Current Limiter and Grounding Mode	978
PPA-042	Comparative Analysis and Design of Inductive and Resistive SFCL for HB-MMC-HVDC Under DC Faults	984
PPA-044	Probabilistic Load Flow Calculation for AC/DC Power Grid Based on Polynomial Chaos Approach	988
PPA-045	A Detection System of Gas Concentration Based on Low-Loss Fiber Loop Ring-Down Spectroscopy	993
PPA-047	Photovoltaic Generation Scenario Analysis Considering Irradiation Uncertainty and Output Derating Probability	997
PPA-048	Analysis and Design of an Adjustable impedance of Capacitor Series Inverter in Active Distributed Network	1004
PPA-049	Grounding Characteristic Analysis of MVDC Distribution System Based on Matlab Simulink	1011
PPA-050	Research on Reconfiguration Strategy of Distribution Network Based on Improved Group Search Optimization Algorithm	1016
PPA-051	Influence of Distributed Generation and Demand Response on Security Region for Active Distribution Networks	1022
PPA-052	Energy Efficiency Evaluation of Photovoltaic Power Generation System Based on Analytic Hierarchy Process and Fuzzy Comprehensive Evaluation	1029

PPA-054	Toward the Reactive Power Compensation Optimization in Fujian Power System	1035
PPA-055	Investigate the Use of Electric Vehicles to Improve Resilience for Active Distribution Network System	1041
PPA-056	Research on Optimal Sizing and Location of Substation According to Point Load Forecast Based on BIM	1047
PPA-057	Reactive Power Optimization of Distribution Network Based on Deep Reinforcement Learning and Multi Agent System	1052
PPA-058	Comprehensive Evaluation of Various Linear Programming Solvers for SCED in Power Systems	1058
PPA-059	Active and reactive power coordination optimization method of distribution network based on improved PSO-GA algorithm	1063
PPA-060	Optimized operation of Distribution Network with photovoltaic Power Generation	1070
PPA-061	Power Capacity Planning on Integrated Multi-Energy System of the Industrial Park	1076
PPA-062	Optimal scheduling of price-based demand response in microgrid with classified load change rate	1082
PPA-063	Optimal Planning Method of Renewable power Distribution Network Based on Dynamic Wind and Photovoltaic Power Abandonment	1088
PPA-064	Fault Location Algorithm for Multi-Terminal Transmission Lines of Distribution System Based on Loop-Analysis	1094
PPA-065	A Power Grid Planning Method Considering Dynamic Limit of Renewable Energy Security Constraints	1101
PPA-066	A New Comprehensive Planning Method of Transmission Network with Various Functional Attributes	1106
PPA-068	A New Wind Power System Coordinated and Complementary Control Strategy with Hydrogen Storage System	1112
PPA-069	Hierarchical State Estimation Method for Tree Structure Distribution Network	1117
PPA-070	Fast evaluation method of plug and play access capacity for distributed generation in distribution network	1123
PPA-071	Optimal Operation Scheme of Integrated Energy System With Wind Energy-Solar Energy-Hydrogen Storage	1129
PPA-072	Optimal Robust Energy Management of Microgrid Based on Fuel Cell, Hydrogen Storage Unit and Response load	1134
PPA-073	Application of Power Grid System Based on Hydrogen Energy in Improving Power Quality	1140
PPA-074	Research and demonstration of planning and decision-making tools based on power grid full cost chain	1147
PPA-075	Research on Full Cost Chain Model of Power Grid Development and Operation	1151
PPA-077	Parabolic Rule Variable Filtering Time Constant Demand Response Method Considering SOC State of Wind Power Storage	1157
PPA-078	Resilient distributed voltage control against destabilization attacks in DC microgrids	1163
PPA-079	Optimal configuration of isolated DC microgrid capacity based on CBPIO algorithm	1169
PPA-080	A Power-based Piecewise Probabilistic Harmonic Model of Secondary Residential System	1175
PPA-081	An Adaptive Resilient Control Strategy of Multiple DERs Considering Unreliable Communication in Active Distribution Network	1180
PPA-082	Robust parameters based on VSG & Dirtual inductor design considering power	1185

	decoupling	
PPA-083	Active and reactive power coordination optimization of wind-light-storage and distribution	1191
	network based on improved Gray Wolf algorithm	
PPA-084	A Carbon Emission Flow Analysis Model and Method of Active Distribution System Based	1197
	on Power Flow Tracing	
PPA-085	Research on the optimal regulation strategy of loop closing device based on phase shifting transformer	1203
PPA-086	A Practical Evaluation Method for Power Supply Capacity of Distribution Network	1209
PPA-087	A Novel Pricing Method Based on Robust Optimization with EVA Participation	1215
PPA-088	Research on Optimal Operation of Energy Storage System for Improving Consumption of	1221
11A-000	High Penetration Distributed Generation	1221
PPA-089	Short-term Load Forecasting Based on Kprototypes Clustering and Random Forest	1226
PPA-090	Hierarchical optimization method of distribution network considering coordination and	1231
	interaction of source-network-load	
PPA-091	Distribution network fault location method based on graph theory and deep learning under	1237
	charging load access	
PPA-092	Symmetrical Semidefinite Programming with Bifurcation Phase-Changing SOPs for	1242
	unbalanced Power Distribution Networks	
PPA-093	Large-scale Offshore Wind Farm Electrical Collector System Planning: A Mixed-Integer	1248
	Linear Programming Approach	
PPA-094	A New Coordinated Load Distribution Network Planning Method Considering Demand	1254
	Response	
PPA-095	Optimal Operation Management of Distribution System Based on Electro-Thermal Game	1260
PPA-096	Design and Application of Electrical Analysis and Calculation Module for Integrated Power Grid Planning	1266
PPA-097	Feedback-based Optimal Dispatch for Virtual Power Plants in Active Distribution Networks	1272
PPA-098	Research on Small Signal Stability of Medium Voltage DC Shore Power System	1278
PPA-099	Research on comprehensive index evaluation system of hybrid AC/DC distribution networks	1284
PPA-100	Multistage Optimal Allocation of Gas Turbines in Integrated Electricity and Natural Gas Systems	1291
PPA-101	Optimal Recovery Scheme of Power System Considering Available Resources in Microgrids	1297
PPA-102	TOPSIS Power Quality Comprehensive Assessment Based on a Combination Weighting Method	1303
PPA-103	Load forecasting of 5g base station in urban distribution network	1308
PPA-104	Selection strategy of virtual power plant members considering power grid security and	1314
	economics of virtual power plant	
PPA-105	A new method to compare performance of forecasting models	1320
PPA-106	Arc fault detection method based on high-frequency electromagnetic component	1326
PPA-107	Study on Evaluation of Renewable Energy Accommodation for Receiving Power System	1332
	and Influencing Factors	
PPA-108	An Integrated Energy Distribution System Planning Method with Multiple Energy Storage Systems	1338
PPA-109	Research on Optimal Configuration Method of Devices for Integrated PV Storage and	1344

	Charging Station	
PPA-110	Evaluation System of Distribution Network Admission to Roof Distributed Photovoltaic Based on AHP-EW-TOPSIS	1349
PPA-111	The Multi-stage Substation Coordinated Planning Method Considering the Overall Economy	1353
PPA-112	The Coordinated Planning of Distributed Generation Considering the Electric Price Optimal Strategy	1359
PPA-113	A Method for Optimizing Reactive Power Compensation Configuration Scheme Based on New Energy Low Voltage Ride Through Safety Assessment	1364
PPA-114	A Joint Strategy of Air-Conditioning and Electrolytic Aluminum Participating in Primary Frequency Modulation	1368
PPA-116	A Novel Frequency-RoCoF Islanding Detection Method for Grid-connected Distributed Generation	1374
PPA-117	Robust adaptive dynamic voltage control for distributed photovoltaic considering energy storage	1379
PPA-118	Reliability Classification Standard and Evaluation Method of Distribution Network	1384
PPA-119	Research on Automatic Verification Technology of Information Specification of Relay Protection Device Based on Mature Domestic Storage and Isolated Power Supply	1390
PPA-120	A joint Optimal Dispatch Method for Multi-Integrated Energy Systems Based on The Source-Load Adaptability	1396
PPA-121	Power Flat Management and Coordinated Control Under different operation modes for DC Distribution System Based on Voltage information coding	1404
PPA-122	Voltage Control Strategy of Distributed Photovoltaic Cluster in Distribution Network	1409
PPA-123	A method of physical grid partition division for distribution network based on heuristic algorithm	1414
PPA-125	Three-stage Voltage/Var Control for Distribution Systems with High Permeability Photovoltaic	1419
PPA-126	Voltage Situation Awareness of Active Distribution Network Based on Grey Correlation Analysis	1425
PPA-127	A Predictive Rolling Optimization Method of Load Balancing in Low-voltage Active Distribution Network	1430
PPA-128	Overview of research on distribution network fault prediction based on situation awareness	1436
PPA-129	A Novel Fault Location Method for High Impedance Grounding Fault in Distribution Network	1441
PPA-130	Optimal Configuration of Sectional Switches in Distribution Networks consider Reliability and Economy	1446
PPA-131	Power Distribution System Resilience Investigation: Outfits for Effective Improvement	1451
PPA-133	Treatment Dethod for Series-type and Parallel-Type Compensation Equipment in Voltage Sags	1457
PPA-134	Distributed Robust Optimal Scheduling for Integrated Energy System Considering Source- Load Uncertainty	1462
PPA-135	An Optimal Method of Regional Integrated Energy System Based on Two-stage Robust Model	1468
PPA-136	Security and Energy Supply Valleys Assessment of Regional Integrated Energy System Based on Practical Security Region	1474
PPA-137	Comprehensive Evaluation Strategy of Optimal Operation Mode of Integrated Energy	1479

	System Based on Analytic Hierarchy Process	
PPA-138	Energy Optimal Operation Strategy of Ship Power Station with Multi Energy	1485
PPA-140	Robust Coordinated Dispatch of Integrated Electric-Gas System at the Distribution Level Considering Uncertainty of Wind	1490
PPA-141	Economic optimal scheduling of integrated energy system considering integrated demand response	1496
PPA-142	Research on optimal scheduling of integrated energy storage of photovoltaic building based on improved CDKF method	1502
PPA-143	Research on Purchasing and Selling Energy Strategy of Virtual Power Plant	1507
PPA-144	Subjective-Objective Combination Weighted Integrated Energy System Evaluation System Considering Carbon Trading Market	1513
PPA-145	Stochastic optimal dispatch of Integrated Energy Campus Microgrids considering the Timedelay of Pipelines	1519
PPA-146	Research on Optimal Control of Regional Integrated Energy System Based on Competitive Swarm Optimizer	1525
PPA-147	Research on Hybrid Simultaneous Simulation Method of Multi-energy Coupling System under Multiple time Scale	1531
PPA-148	Expansion Planning of Park-Level Integrated Energy System Based on Dynamic Carbon Trading Model	1537
PPA-149	Research on Interaction of Generalized Demand Side Resources and Energy Interconnection System Based on System Dynamics	1543
PPA-150	Wind farm Planning Considering Output Uncertainty Under Carbon Emission Reduction Target	1550
PPA-151	Day-ahead two-stage stochastic scheduling of integrated energy system considering spatial-temporal correlated scenarios of wind power	1556
PPA-152	Study on Power Control Optimization Technology for Wind Turbines During Power Grid Transient Process	1562
PPA-153	Low-carbon Economic Operation of the CHP System with P2G Heat Recovery and Heat Storage Tanks for Wind Power Consumption	1567
PPA-154	Economic Dispatch Of Virtual Power Plant Contained Wind-Photothermal Considering Integrated Demand Response	1573
PPA-155	Arc Fault Risk Evaluation Based on Image Recognition	1579
PPA-156	Robust State Estimation of Electricity-Gas Integrated Energy System Based on Multi-Time Scale Data Fusion	1584
PPA-157	Machine Learning Based Optimal Energy Flow Calculation for Integrated Electric-Gas Systems	1590
PPA-158	Application of adjacency matrix in probabilistic energy flow calculation method considering coupling failure	1596
PPA-159	Research on Optimal Scheduling of RIES Based on Incentive Integrated Demand Response	1602
PPA-160	Reliability evaluation of the external power supply system of electrified railways considering the access of PV power	1608
PPA-161	Integrated Energy System Station-Network Coordinated Optimal Method for Facility Agricultural Park	1614

PPA-162	An Optimal Reconfiguration Scheme Searching Method with Consideration of Variation Characteristic of Generation and Load	1621
PPA-163	Research on the Acceptability of New Energy under the Constraint of Grid Transient	1625
	Voltage	
PPA-164	Low-Carbon Economic Dispatching of Combined Heat and Power System Considering	1630
	Electric-thermal Integrated Demand Response	
PPA-165	Improved Virtual Synchronous Generator Control for Wind Storage System	1636
PPA-166	Short-term Wind Power Predication Based on Feature Engineering and SOA-SVM	1642
PPA-167	Data Center New Energy System under the "Peak Carbon Dioxide Emissions and Carbon Neutrality" Background and Comprehensive Evaluation Analysis Thereof	1649
PPA-168	Accommodation of Distributed Photovoltaic Energy with Charging Strategy Optimization of Electric Vehicles	1657
PPA-169	Integrated Energy System Day-ahead Dispatch Considering Supply-side and Demand-side Flexibility	1662
PPA-170	Real-time control strategy of hybrid energy storage to smooth out fluctuations in PV industrial parks	1668
PPA-171	Optimal Scheduling of Integrated Electricity and District Cooling Systems with Ice Storage	1674
PPA-172	Optimal Planning of Park Integrated Energy System Considering the Resilience of Distribution Network	1680
PPA-173	Modeling and Simulation of the Grid-Connected Raft-Type Wave Energy Conversion System	1686
PPA-174	Optimal Sizing of Hybrid Energy Storage in Industrial Park Integrated Energy System	1692
PPA-175	Review on Modeling and Optimal Scheduling in Integrated Energy Systems	1698
PPA-177	Analysis of some problems on transient modeling of electrothermal coupling system	1704
PPA-178	Study on design scheme of port shore power system considering economic and environmental benefits	1709
PPA-179	Multi-objective group search optimization of district cooling system considering both economic and efficiency aspects	1714
PPA-180	The Treatment of AC/DC Hybrid Connection in Interregional Power Market Clearance	1720
PPA-181	Study on the Dynamics of Natural Gas System and Linepack Storage in Integrated Energy Systems	1726
PPA-182	A planning method of integrated energy system based on gas turbine installed capacity optimization	1731
PPA-183	Fine Modeling in Thermal System of Integrated Energy System	1738
PPA-184	Optimization Toolbox for Multi-regional Integrated Energy System	1744
PPA-185	Static Stability Analysis of Integrated Electricity and Gas System Considering Voltage and	1750
	Pressure	
PPA-186	Day-ahead Dispatch of Smart Energy Aggregators Based on Regenerative Clean Heating and Demand Response	1755
PPA-187	Congestion Assessment in Electric Vehicle Fast Charging Stations for Coupled Traffic- Power Systems in Smart Cities	1760
PPA-188	Photovoltaic Power Forecasting Based on Similar Day Theory and CEEMDAN-CSO-BP	1765
PPA-189	Optimal Design of Park-Level Integrated Energy System Considering the Cost of Carbon Emissions	1771

PPA-190	Robust Optimization of Reactive Power for Voltage of Power Grids With a High Proportion of Distributed New Energy Access	1777
PPA-191	Fast Power Flow Calculation Method for Electricity Hydrogen Storage Integrated Energy	1783
117(151	Network	1700
PPA-192	Optimal Planning Method for Regenerative Electric Heating System Considering the Supply	1789
	Capability of Distribution Network	1794
PPA-193	Intelligent Fault Diagnosis Method of Power Grid Based on Multi-source feature Fusion	1798
PPA-194	Virtual Synchronous Control of PV-Building System by Utilizing Thermal Inertia	1803
PPA-195	Research on Synergetic Effect of multi-subnet AC/DC Hybrid Microgrid Control Technology	
PPA-197	Average-Value-Based Integrated Induction Machine-Rotor Side Converter System Model in EMTP-type Programs	1809
PPA-198	The PV Inverter Main Circuit Fault Detection Based on Wavelet Packet Energy Analysis Technology	1813
PPA-199	Incremental Distribution Network Source-load-storage Collaborative Planning Method Considering Uncertainty and Multi-agent Game	1819
PPA-200	Random Expected Value Power Supply Reliability Evaluation of Typical Urban Medi-um-	1825
	Voltage Distribution Network Considering the Impact of Integrated Energy Supply	
PPA-201	Energy Optimal Dispatching of Islanded Microgrid Based on Multi-Agent System and Improved Symbiotic Organisms Search	1831
PPA-202	Generator-Grid-Load-Storage Coordinated Optimal Dispatch Considering CO2 Emission in Active Distribution Network	1838
PPA-203	Optimal Models and Methods for Coordinated Planning of Power Networks Based on	1844
	Power Network Full-Cost Chain	1850
PPA-204	A Scheduling Strategy of Vehicle-2-Grid based on Stackelberg Gaming Model	1854
PPA-206	Strategy of Load Source Joint Wind Power Absorption Based on Mode Decomposition	1860
PPA-207	Two-Stage Robust Optimization of Microgrid Based on Adaptive Uncertainty Budget	
PPA-208	A Non-iterative Solution Method for DC Optimal Power Flow Based on Holomorphic Embedding	1865
PPA-209	A Multi-Layer Game Model for Commercial Air-conditioning Load Participating in Peak	1871
	Shaving	1877
PPA-210	Access point and capacity optimization planning method of virtual power plant	1882
PPA-211	Supplementary Planning of DESS in High Proportion of Distributed PV + EV	
PPA-212	Learning Optimization of Power Grid Dispatch Considering Load Aggregator and	1888
	Uncertainty of Both Source and Load	1894
PPA-213	Optimal operation of battery energy storage system in industrial park	
PPA-214	Coordinated charging of electric vehicles in distribution network with high proportion	1899
	distributed photovoltaic	1905
PPA-215	Distributionally robust optimization for internet data center with renewable energy	
PPA-216	Performance Ratio Test and Uncertainty Evaluation of Photovoltaic Power Generation	1911
	System based on Linear Regression	
PPA-217	Virtual Energy Storage Control Method of Electrolytic Aluminum Park Based on Production Data Driven	1917
PPA-218	Study on the Standard Calculation Model of Power Demand Response Incentive Subsidy Based on Master-Slave Game	1923

PPA-219	Scheduling and control of massive electric water heaters based on equivalent energy storage model	1928
PPA-220	Two Stage Symmetrical Fuzzy Modeling and Optimization for the Unit Commitment in Wind Power Systems	1934
PPA-221	Research on Optimal Dispatching of Active Distribution Network Based on Source Network Load Situation	1941
PPA-222	Coordinated Optimization Model of the Wind Power Plant with Hydrogen Storage System and Demand Response	1948
PPA-223	A Green Energy-saving Dispatch Strategy of the Pumped-storage Hydropower Station following Coal-fired Units in Peak Shaving	1955
PPA-224	A Two-stage Maintenance-operation Robust Optimization Model Considering Line Forced Outage	1961
PPA-225	A Stochastic Hydrothermal Dispatching Model of Cascaded Hydropower Systems Considering Renewable Energy Uncertainties	1967
PPA-227	Resilience Lifting Method of Active Distribution Network Considering Charging and Discharging Scheduling of Electric Vehicles	1973
PPA-228	Flexible On-grid and Off-grid Control Strategy of Photovoltaic Energy Storage System Based on VSG Technology	1978
PPA-229	A Two-Step Quadratic-Convex Based Tightening Method for Electricity-Gas System Optimization Considering Current Margins	1986
PPA-230	Research and case analysis on group electricity peak regulation technology of rural guesthouse	1992
PPA-231	Optimal Allocation of Capacity for Standalone Hydro-Photovoltaic-Storage Microgrid	1998
PPA-232	An Improved Strength Pareto Evolutionary Algorithm for Optimization of Residents' Load and Storage	2004
PPA-233	Research on Capacity Configuration of Wind/Solar/Thermal Power and Energy Storage Complementary for UHVDC Transmission System	2010
PPA-234	Microgrid Energy Management using Improved Reinforcement Learning with Quadratic Programming	2015
PPA-235	Energy Storage Requirement of Future Chinese Power System: Multi Scenario Analysis towards 2050	2021
PPA-236	Research on Incentive Subsidy Mechanism of Demand Response Based on System Dynamics	2027
PPA-237	An Improved Model for Hydrogen Production by Alkaline Water Electrolysis	2032
PPA-238	Inertial Response Improvement Method for Bidirectional Power Converter in Hybrid AC/DC Microgrid	2038
PPA-239	Optimal Dispatch for Integrated Energy Microgrid Considering Start-up and Shutdown of Hydrogen Production	2043
PPA-240	Wind Storage Microgrid Energy Management System with Integrated Improved VSG Control	2048
PPA-241	Research on Operation Mode of " Wind-Photovoltaic-Energy Storage-Charging Pile " Smart Microgrid Based on Multi-agent Interaction	2054
PPA-242	Analysis of Adjustable Potential of Sewage Treatment System	2059
PPA-243	Multi-objective optimized charging strategy for electric vehicles based on demand response	2064

PPA-244	Research on trading strategy of virtual power plant with distributed energy aggregation	2070
	based on cooperative game	
PPA-245	Risk-Constrained Day-Ahead Scheduling for Wind Power and Pumped Hydro Storage Based on Information-Gap Decision Theory	2076
PPA-246	· · · · · · · · · · · · · · · · · · ·	2082
	The Subarea Aggregation Model of Fast Charging Electric Vehicles	
PPA-247	Multi-Objective Planning of Thermal-Electric Coupling Micro-Energy System to Promote the Consumption of Renewable Energy	2088
PPA-248	Study on Decision Rule in Stochastic Economic Dispatch Considering Uncertainties of Renewable Energy and Power Load	2093
PPA-249	Capacity optimization for wind/photovoltaic prosumers and shared energy storage operator:A cooperative game approach	2097
PPA-250	State-of-Charge and State-of-Health Estimation Algorithms of Lithium-ion Batteries using SMO	2104
PPA-251	Research of Topology and Test on Charged Melting Ice	2109
PPA-252	Near-zero carbon coordinated control of renewable energy considering environmental costs	2113
PPA-253	Research on Benefit distribution in Coordinated Hydro and Wind Power Generation	2119
PPA-254	Dynamic Dispatch of Hybrid Hydro-PV-PHS Complementary Power Generation System Based on Deep Reinforcement Learning	2125
PPA-255	Optimal operation strategy of energy storage system considering wind uncertainty and power market	2130
PPA-256	Comparison And Analysis of Grid-forming Control Methods of Wind Turbine Converter Under Load Disturbance	2134
PPA-257	Optimized Economic Dispatching Approach for Multiple Flexible Energy Facilities Combined with Coal-fired Power Units in Frequency Regulation Service Based on SDR and Gaussian Randomization	2139
PPA-258	Intelligent Diagnosis Method of Distribution Network Fault for Construction of Digital Twin Coordination System	2145
PPA-259	Ultra-short-term photovoltaic power prediction based on Elman neural network and satellite cloud images	2149
PPA-260	Bi-objective Power-Traffic Pricing Coordination: Incorporating User Choice Stochasticity	2155
PPA-261	A Coordinated Control of Hybrid Energy Storage System for Photovoltaic Power Smoothing	2160
PPA-262	Joint Optimal Dispatching Strategy of Pumped Storage and Thermal Power Units with Large-scale Wind Power Integration	2166
PPA-263	Optimal Planning of Distribution Network Considering Reliability Demand Response	2172
PPA-264	Optimal planning of primary frequency regulation capacity of wind-storage combined systems	2178
PPA-265	An economic optimization method of energy storage based on source-storage collaboration	2184
PPA-266	Research on Technology of ice melting with Load based on Dual SVG Flow Control	2189
PPA-267	A Preliminary Study on the Construction of New Rural Power Grid under the Dual-Carbon Target	2193
PPA-268	Multi-objective Optimization of Distribution Network Based on On-Load-Tap Changer	2197
PPA-269	Advanced Microgrid Energy Management Based on an Improved Acpso Optimization	2202
PPA-270	Interval Optimal Dispatching of IES Considering Dynamic Characteristics of Natural Gas Network	2207

PPA-271	Two-stage Robust Optimal Dispatch of AC/DC Hybrid Microgrid Considering the Influence of Converter	2214
PPB-003	Research and Realization of Management System of Generator Set Frequency Regulation Capability Based on Parallel Control Platform	2221
PPB-004	Large-scale Security Constrained Unit Commitment Optimization Method Based on Multiple	2226
	Strategy Combination of Model Dimension Reduction	
PPB-005	Resonance Stability Analysis based on Impedance Network for Large-Scale Wind Power	2231
	Bases Considering Frequency Coupling Characteristic	
PPB-006	Calculation, Measurement and Engineering Application of Loop Closing Current in Power Grid	2237
PPB-007	Industry Electricity Demand Forecast by Integrating Multiple Correlation Analysis Methods	2242
PPB-008	Comprehensive evaluation method of power grid operation considering index correlation	2248
PPB-009	Research on Modeling of Heating Substations Based on LSTM	2254
PPB-010	Using mobile hydrogen trucks to improve energy supply system resilience	2258
PPB-011	A Fault Diagnosis Method for Single Phase Break in Distribution Network Based on Multi- Voltage-Level Information Fusion	2264
PPB-013	A Robust Distribution State Estimation Algorithm for Weakly Looped Distribution Network	2269
PPB-014	A stability verification method for initial paths in the early stage of black-start progress	2273
PPB-015	Dynamic phasor estimation method considering false data injection attack	2279
PPB-016	Research on influencing factors of air-conditioning electricity demand flexibility for nearly zero energy commercial buildings	2285
PPB-018	Short-Circuit Current Calculation Method for Power System with Renewable Energy Source and HVDC System	2291
PPB-019	A Novel Capacitance Determination Method of Metal Oxide Arrester Blocks when Excited by VFTO	2297
PPB-020	Power Grid Fault Diagnosis based on Support Vector Machine	2301
PPB-021	Analysis of the Impact from the Parameters on the Flow Calculation for the District Heating System	2308
PPB-022	Short Circuit Calculation Method of Power System with Renewable Energy sources and Experimental Verification	2313
PPB-023	The optimal energy flow of combined heat and power systems considering users' comfort	2318
PPB-024	Identification of cascading fault sequences in AC/DC hybrid power system	2322
PPB-025	Gas Pipe Leak Detection Based on Circuit-analog Tide Calculation	2327
PPB-027	Security Margin Assessment for Electricity Spot Market Clearing based on Active Power Steady-state Security Distance	2332
PPB-028	Power System Modal Identification Based on Prony Levenberg Marquardt	2337
PPB-029	Modeling and Analysis of Electromagnetic Defense for Resilient Power Grid Against	2342
11 0 020	Abnormal Damage	2012
PPB-030	Identification of the Transmission Sections for Power System based on the Breaking Power Flow and Cut Set Filtering	2348
PPB-031	Research on Short-term Power Load Forecasting in Distribution Station Area and	2353
	Adjustable Load Participating in Demand-side Cluster Control	
PPB-032	Game-Theoretic Model for Optimal Cyber-Attack Defensive Decision-Making in Cyber- Physical Power Systems	2359

PPB-034	An Authentication Scheme for Smart Charging of Electric Vehicles	2365
PPB-035	A Dynamic Simulation Framework for Integrated Energy System	2370
PPB-036	Square-root Extend Kalman Filter-based Detection of False Data Injection Attack in Smart Grids	2376
PPB-037	Detection of False Data Injection Attack in Smart Grid via Sliding-Mode Interval Observer	2382
PPB-038	Study on Self-Monitoring Scheme of the Accuracy Deviation for the Merging Unit	2388
PPB-039	Game Theoretical Dynamic Cybersecurity Defense Strategy for Electrical Cyber Physical Systems	2392
PPB-040	Fault-tolerant design of power edge computing processor based on full-hardware dual-core lockstep	2398
PPB-041	Analysis of Cyber Attacks on Wind Power Generation Systems in Damping Inter-area Oscillations of Power Systems	2404
PPB-042	Design of Adaptive Power Distribution Protocol Conversion System based on MQTT Cloud Edge Interaction	2410
PPB-043	Destination-driven EV Fast Charging Station Capacity Configuration	2417
PPB-044	A Cyber Risk Assessment and Detection Method for Power Systems Against Data Integrity Attack on Load Frequency Control	2423
PPB-045	An Active Defense Mechanism for Cyber-Physical Power Systems Against Data Integrity Attack on ADMM-Based Economic Dispatch	2428
PPB-046	Information-Flow-Based Cyber-Physical Testbed for Power System Considering Cyber Contingency	2433
PPB-047	A security protocol for smart meters	2438
PPB-048	Step Size Adjustment Method of Digital-analog Hybrid Simulation for Complex Active Distribution Network	2443
PPB-050	Electromagnetic Protection Optimization of the Intelligent Electronic Devices Based on the Passive EMI Filter Design	2448
PPB-051	A Vulnerability Identification Method of Power System Based on Infomap Community Discovery Algorithm	2454
PPB-052	Optimal Attack Strategy of Power Grid based on Double Q-learning Algorithm	2460
PPB-053	Improved LSTM Memory Recursive Neural Network Precise Compensation and Prediction for Phase Selective Switching Device	2466
PPB-054	Real-Time Recursive Correction State Estimation Utilizing Only SCADA Measurements	2473
PPB-055	A Directional Protection Scheme for Collector Lines of DFIG-Based Wind Farm Using	2478
PPB-056	Positive-Sequence Equivalent Impedance Comparison Analytical Stochastic Power Flow for Power Systems with High Penetration of Renewable Energy	2484
PPB-057	Comparative Analysis of Reserve Configuration of Power System with Storage Considering the Uncertainty of New Energy	2490
PPB-058	Principle and Implementation of Networked Protection in Active Distribution Networks	2496
PPB-059	Research on Autonomous Operation Control of Microgrid Based on Deep Reinforcement Learning	2503
PPB-060	Frequency Emergency Control for Large-scale Disconnection of Renewable Energy	2508
PPB-061	Research on the Development and Testing Technology of Domestic Chip Relay Protection Devices	2513

PPB-062	Research on Risk-Based Planning of Power Grid Considering the Access of New Energy	2518
PPB-063	A frequency control technology based on improved virtual synchronous generator	2525
PPB-065	DC Emergency Power Support Applied into Frequency Corrective Control	2531
PPB-066	Analysis of Power Chip Failure in Busbar Protection	2537
PPB-067	The Discussion on the Replacement Strategy of Overrunning Protection In Smart Substation	2542
PPB-068	Power Grid Nodal Vulnerability Analysis Combining Topology and State Information	2546
PPB-069	Research on the coupling performance of voltage and frequency for the power grid with highly penetrated photovoltaics generation	2552
PPB-071	Probabilistic Transient Analysis of Power System based on Nonlinear Auto-regressive Model	2556
PPB-073	Research on Suppression Strategies of Wind Farm Subsynchronous Oscillation	2561
PPB-074	Repetitive Control for Current Harmonic Suppression of PMSG-Based Wind Turbines	2566
PPB-075	Composite Power System Reliability Evaluation Considering Space-time Characteristics of Wind Farm	2571
PPB-077	Primary frequency regulation method for thermal power units based on multi-scale morphological filter	2577
PPB-078	Power Flow Correction Strategy Based on Improved Comprehensive Sensitivity Index	2583
PPB-079	Research and Application of Helicopter-based Wildfire Monitoring Technology for Transmission Lines	2590
PPB-080	Model Parameter Identification of Wind Farm's Primary Frequency Control based on Actual Power Response Characteristic	2596
PPB-081	Active Optimization Arc Suppression Method Based on Cascaded H-Bridge Converter for Distribution Networks	2602
PPB-082	Design and Simulation Analysis of Grid-connection of Superconducting Generator	2608
PPB-083	Analysis of Reactive Power Coordinated Control of Large Wind Farm	2614
PPB-084	Improved Atom Search Optimizer of Offshore Wind Power for Fault Ride-through Capability Enhancement	2618
PPB-085	Research on Control Strategy of SSSC to Suppress Wind Power Subsynchronous Oscillation	2624
PPB-086	Evaluation Method of Wind Turbine Group Classification Based on Calinski Harabasz	2630
PPB-088	Artificial Short-circuit Test and Result Analysis of Ximeng UHV AC/DC transmission project	2636
PPB-089	Requirement of Generalized Modeling Technology and Parameter Identification for Wind Turbines	2643
PPB-090	Analysis of Static Stability of Virtual Synchronous Converter Based on Line Impedance Characteristics	2648
PPB-091	Research on Dynamic coordination mechanism of DFIG based on inertia response	2654
PPB-092	Frequency regulation strategy of wind farm based on frequency deviation regulation of parallel network	2660
PPB-093	General secondary equipment simulation drive system	2665
PPB-094	Neutral Current Suppression for a Common mode decoupling Three-phase Transformerless Converter	2669
PPB-095	Multi-Functional Coordination Control for Bidirectional Interlinking Converters in Islanded Hybrid AC/DC Microgrid Cluster	2673

PPB-096	Investigation on distributed coordinated control method of DFIGs participating in power system frequency regulation	2679
PPB-097	Short-term Wind Speed forecasting Based on Weighted Spatial Correlation and Improved GWO-GBRT algorithm	2685
PPB-098	The Method of Circuit Breaker Interrupting Capacity Verification Considering Breaking	2691
	Sequences	
PPB-099	An Interharmonic Suppression Control Scheme in PV System Based on DC-Link Voltage Perturbation Reduction	2695
PPB-100	Low Frequency Oscillation Damping Strategy for Virtual Synchronous Generator Based on	2701
DDD 404	Port Energy Function	0700
PPB-101	Reliability Assessment of Wind Farm with Wind Turbine Gearbox Fatigue	2706
PPB-102	Parameter Optimization Strategy of Energy Storage-Based Virtual Synchronous Generator Considering Inertial and Damping Coordination	2712
PPB-103	Test and Assessment of Grid Forming Wind Turbine based on Controller Hardware-in-the- Loop	2718
PPB-104	Research on Modeling and Simulation of Direct Drive Wind Turbine Based on ADPSS/ ETSDAC	2724
PPB-105	Transient Stability Analysis for Grid-tied Virtual Synchronous Generator Based on T-S Fuzzy Modeling and LMI Approach	2730
PPB-106	Deep Reinforcement Learning-Based Fast Prediction of Strategies for Security Control	2737
PPB-107	Evaluation of Voltage Support Strength of Receiving Power Grid Considering Wind Power Injection	2743
PPB-108	Electricity market clearing model considering uncertainty of wind power	2748
PPB-109	Research on Alarm Information Oriented Fault Event Classification Method	2753
PPB-110	Study on Wind Power Accommodation Method Based on Controllable Electric Heating	2759
PPB-111	Probabilistic Production Simulation Method for Frequency Response Capacity Planning	2764
PPB-112	Extension Controller for Wind Turbine Pitch System	2771
PPB-113	Indirect Power Control of Doubly-fed Induction Generator	2775
PPB-114	Evaluation method of system dominant instability form based on fuzzy evaluation function	2781
PPB-115	Research on Transient Power Characteristics of PMSG at Fault Clearing Time Considering Dynamic of Phase Locked Loop	2787
PPB-116	Research on Detection Method of High-Impedance Grounding Fault for the Grounding Transformer	2793
PPB-117	Research on Unit Removal Method under Islanding Operation of Small Hydropower Microgrid	2797
PPB-118	Stochastic Optimal Dispatch of Virtual Power Plants Considering Cyber Coupling	2803
PPB-119	Research on Emergency Power Support Strategy for Multi-HVDC Transmission Network	2808
11 110	Based on Power Trajectory Sensitivity	2000
PPB-120	Correlation Analysis of Wind and Photovoltaic Power Based on Bayesian Theory	2814
PPB-121	Reactive Power Optimization in Distribution Networks with High Penetration of Renewable	2819
	energy Based on Second-order Cone Programming	2010
PPB-122	A Multi-Agent Deep Reinforcement Learning Based Multi-Timescale Voltage Control For Distribution System	2825
PPB-123	Simulation on Anti-islanding Protection of Distributed PV Inverter Based on RT-LAB and	2831

	Smart TTU device	
PPB-124	Modeling and control of photovoltaic hydrogen production system adapting to power	2835
	fluctuations	
PPB-125	Multi element aggregation control strategy of wind-photovoltaic- storage-electric vehicle based on virtual power plant	2841
PPB-126	An adaptive virtual inertia control strategy on voltage regulation of DC microgrid	2848
PPB-127	A robust short-term wind power forecasting algorithm based on LSTM-XGBoost Model	2854
PPB-129	Deep Reinforcement Learning Based Preventive Maintenance for Wind Turbines	2860
PPB-131	Power Oscillation Characteristics of Large Power Systems under Random Disturbances	2866
PPB-132	Research of additional loss in 10kV distribution network under complex power quality disturbances	2871
PPB-133	Dynamic Stability Analysis of Sub-synchronous Oscillation Mode of Phase Locked Loop	2877
PPB-134	Intelligent Optimization of Reactive Voltage for Power Grid With New Energy Based on Deep Reinforcement Learning	2883
PPB-137	A Fault Ride-through Method of Paralleled Synchronous and Virtual Synchronous Generators in Islanded Microgrids	2890
PPB-138	Short-term thermal load probabilistic forecasting considering electrical-thermal coupling characteristics	2896
PPB-139	Research on Location and Capacity Planing of Data Centers Under New Energy Access	2901
PPB-140	Conditional Mutual Information Based Interpretable Key Feature Selection Method for Power System Security Analysis	2907
PPB-141	Decoupling Method of Short Line Based on Characteristic Line And its Simulation Analysis	2912
PPB-142	Forced Oscillation Suppression Method of Renewable Energy High-Infiltration Power System Based on Kuramoto-like Model	2918
PPB-143	Research on Voltage Stability of HVDC Receiving-end System Based on Power Limit Trajectory	2924
PPB-144	Research on the Influence of Wind-Fire Bundling on Power Angle Stability of Sending End System	2930
PPB-145	Analysis of Dynamic Characteristics of Doubly-Fed Induction Generator Under Different Drivetrain Vibration Suppression Strategies	2936
PPB-146	The Optimal Design of the Second-Order Generalized Integrator Phase-Locked Loop Under Power Voltage Distortion Conditions	2942
PPB-147	Optimal Allocation of FACTS Devices Using Improved Differential Harmonic Search Algorithm	2948
PPB-149	Evaluation of Synchronous Generators Reactive Power Output During Transient Process	2953
PPB-150	Preliminary Analysis on Configuration Scheme of Power Sources in Future Power System of China	2959
PPB-151	High-performance Full Electromagnetic Transient Simulation System of Fujian Power Grid and its Application	2964
PPB-152	Effect of DFIG Under Droop Control on Center Migration of Out-of-Step Oscillation	2970
PPB-153	Research on Harmonic Dynamic Interaction Analysis and Suppression Methods of Microgrid	2975
PPB-154	Network-Constrained AC Unit Commitment Based on Linear Approximation Techniques	2980
PPC-001	An Attention-based CNN-GRU Model for Resident Load Short-term Forecast	2986

PPC-002	Strong Wind Data Augmentation Based on F-DBSCAN and C-SMOTE for Wind Power Forecasting	2992
PPC-003	Short-term load forecasting method based on artificial intelligence highway neural network	2999
PPC-004	A Short-term load forecasting method of distribution network based on improved AlexNet-GRU deep learning network	3004
PPC-005	A Novel Method for Residents Indoor-outdoor Detection Based on Power Consumption	3011
	Data	
PPC-006	A method for predicting reactive voltage of photovoltaic transmission system based on double-RF	3015
PPC-007	Object Detection Method based on Improved SSD Algorithm for Smart Grid	3020
PPC-008	Exploring the impact of COVID-19 on travel behavior based on EV charging big data	3025
PPC-009	Industry Community and Core Industry Detection Base on Electricity Consumption Data	3031
PPC-010	Fuzzy C-Means Clustering Algorithm for Non-Intrusive Load Identification Considering the Difference in Information Expression of the Features	3036
PPC-011	Graph Convolution Network Considering Edge Node Feature Aggregation	3043
PPC-012	Small signal stability assessment of power system based on SaDE-ELM algorithm	3049
PPC-014	Incorporating Knowledge Distillation Into Non-intrusive Load Monitoring for Hardware Systems Deployment	3054
PPC-015	Nd-Net: Exploring Non-Defective Features for More Robust Inspection of Power Transmission Line Defect	3059
PPC-016	Research on Estimation of Regional Housing Vacancy Rate Based on Electricity Big Data	3064
PPC-017	Research on Detection Methods of Foreign Objects and Component Defects in Transmission Lines Based on Deep Learning	3070
PPC-018	A Load Forecasting Method of Electric Vehicles Charging Station Group Based on GAN-RF Model	3076
PPC-019	Cluster analysis of the electricity consumption of student dormitories in institutions of higher education located in the Hot Summer and Cold Winter region in China	3080
PPC-020	Power Grid Reactive Voltage Control Method Based on Improved Reinforcement Learning	3085
PPC-021	Bitcoin Mining Recognition Based on Community Detection with Electricity Consumption Data	3091
PPC-022	Wind power prediction based on CNN-LSTM	3097
PPC-023	Transient Stability Self-Adaptive Assessment Based on Sample Enhancement of DCGAN	3103
PPC-024	A Data-Driven Based Energy Consumption Modeling for Heterogeneous Servers in Data Centers	3109
PPC-025	Distribution network reconfiguration method considering random access of electric vehicles in cloud environment	3115
PPC-026	Short-term power load forecasting based on self-adaptation random forest	3121
PPC-027	An Online Power System Static Security Assessment Method Based on Convolutional Neural Network	3127
PPC-028	A Data Augmentation Method for Distributed Photovoltaic Electricity Theft Using	3132
1 1 0-020	Wasserstein Generative Adversarial Network	0102
PPC-029	An Ensemble Method for Aggregated Baseline Load Estimation: From Probabilistic Perspective	3138
PPC-030	Power Grid Fault Diagnosis Based on Random Forest	3143

PPC-031	A Tilt Angle Measurement Method of Power Tower Using UAV LiDAR Point Cloud	3149
PPC-032	Renewable Scenario Generation Based on Improved Generative Adversarial Networks	3155
PPC-033	Modeling method of dew-point temperature prediction in industrial workshop based on machine learning	3160
PPC-034	Non-intrusive television recognition based on harmonic current characteristics	3166
PPC-036	Appliance power pattern mining via motif discovery in unsupervised NILM	3172
PPC-037	A Survey: New Generation Artificial Intelligence and Its Application in Power System Dispatching and Operation	3178
PPC-038	Direct Thermal Load Control in Active Distribution Networks Based on Deep Reinforcement Learning	3184
PPC-039	Time-Frequency Memory Recurrent Neural Networks Empowered Incipient Fault Detection in Power Distribution System	3190
PPC-040	Model-Based and Data-Driven Contingency Filtering for Real-Time Corrective Security-Constrained Economic Dispatch	3195
PPC-041	Transmission Line Fault Location Based On the Stacked Sparse Auto-Encoder Deep Neural Network	3201
PPC-042	A Novel Fault Diagnosis Method for High Voltage Circuit Breaker Based on Density Peak Clustering	3207
PPC-043	Feature Recognition Technology of Substation Inspection Image	3213
PPC-044	Short-term Load Forecasting Based on Modified Locally Linear Embedding Using Multiple Weights	3219
PPC-045	Load Disaggregation based on Sequence-to-point Network with Unsupervised Pre-training	3224
PPC-046	Data-Driven Power Flow Calculation Based on Deep Learning	3230
PPC-047	Data-Driven-Based Aggregate ACLs External Modeling and Load Tracking Control Strategy	3235
PPC-048	VarASV: Enabling Pitch-variable Automatic Speaker Verification via Multi-task Learning	3240
PPC-049	ISCP-Data: a Vehicle-to-grid Dataset for Commercial Center and Its Machine Learning Application	3246
PPC-051	Electricity Consumption Forecasting using Extreme Learning Machine with the Generalized Maximum Correntropy	3251
PPC-052	Information Extraction Method of Power Grid Operation Mode based on Double Layer Labeling Model	3256
PPC-053	Short-term electricity consumption forecasting based on long short-term memory network	3262
PPC-054	A Transformer Vibration Amplitude Prediction Method via Fusion of Multi-Signals	3268
PPC-055	Process Mining for Wind Turbine Maintenance Process Analysis: A Case Study	3274
PPC-056	A Temporal Convolutional Neural Network with Attention Mechanism for Industrial Non-intrusive Load Monitoring	3279
PPC-057	Intelligent Fault Diagnosis Approach for PV Arrays Based on Sparrow Search Algorithm Optimized Kernel Extreme Learning Machine	3285
PPC-058	Superpixels Segmentation and Low-rank Matrix Recovery for Thermal Fault Diagnosis of Power Equipments	3292
PPC-059	Design of Micro-service Architecture for Lightweight Dispatching and Control System	3296
PPC-060	Non-intrusive Inverter Air Conditioner Identification Using General Knowledge	3302
PPC-061	Industry Kinetic Energy Index Prediction via Stacked Transformer	3307
PPC-062	Short-time Passenger Flow Forecast of Urban Rail Transit Based on the CEEMDAN-	3312

	BLSTM Model	
PPC-064	A Machine Learning Based Sameness Recognition Method for Power System Management Information	3318
PPC-065	Frequency Regulation Parameter Identification of Wind Farm AGC System Based on Data Driven Technology	3323
PPC-066	Power Generation Efficiency Prediction Methods of Photovoltaic Panel under Dust Based on Convolutional Neural Network	3329
PPC-067	Path Planning of Electric Power Inspection Robot Based on Improved Lion Swarm Algorithm	3335
PPC-068	Study on the Prediction of Consumer Electricity Consumption Based on Hybrid Model	3340
PPC-069	Online matching method of wind farm unit-level data	3347
PPC-070	Typical Load Analysis and Forecast of a Provincial Power Grid in Mid-Southern China	3352
PPC-072	A Nonlinear White-Box SM4 Implementation Applied to Edge IoT Agents	3358
PPC-073	Performance Detection and Analysis of Built-in UHF Sensors for UHV GIS Equipment	3364
PPC-075	Research on Online Status Evaluation Technology for Main Equipment of Power Transmission and Transformation Based on Digital Twin	3368
PPC-076	Partial Discharge in Cable Heads: Causes and Preventive Measures for a gas insulation ring-network cabinet	3374
PPC-077	Research on perception layer architecture in differentiated application scenarios for power loT:evidence from Hunan Province	3380
PPC-078	Reseach on Optimization of RFID Indoor Positioning Algorithm Based on RSSI	3386
PPC-079	Design of Deterministic Transmission Framework for Distributed Power System Based on Digital Twin	3391
PPC-080	A Novel Mobility Management Scheme for UAV Inspection in 5G-empowered Smart Grid	3396
PPC-081	Digital Twin Based BESS State Estimation and Operating Opimization	3402
PPC-082	Defending 5G IoT Terminals in Electrical PowerCommunication and Information System Against Cyber Threats	3406
PPC-083	Design and Implementation of Internet of Things System Based on Customer Electricity Behavior Analysis	3411
PPC-084	Post Disturbance Review System based on Multi-Source Information	3416
PPC-085	Technical Requirements for Autonomous Point Cloud Collection and Autonomous Inspection of Unmanned Aerial Vehicle	3421
PPC-086	Non-uniform Quantisation Current Differential Protection Algorithm Applied On Power Specific Integrated Circuit	3425
PPC-087	An Edge Gateway Communication Load Balancing Method considering Service Timing Logic in Distribution Area	3431
PPC-088	Single-phase grounding fault line selection in un-effectual grounding systems based on low-voltage measurements	3437
PPC-089	A Novel Substation Networking Methodoloy with Visulization and Supervision Support	3443

Modelling in Integrated Energy Trading System Under an Incentive-Compatible Market

Analysis and Decision-making of Excess Renewable Energy Consumption Trading between

Research on Investment Management of Residential Power Supply Project

Electricity Retailers Based on Evolutionary Game

PPD-002

PPD-003

PPD-004

Mechanism

3448

3454

3460

PPD-005	Customized Pricing Strategy of Residential Consumers in Retailers for Demand Response	3466
PPD-006	Energy Storage System Value Analysis and Value Recovery Mechanism Research	3471
PPD-007	A Multi-Participant Dynamic Game Model in Electricity Market Under Renewable Portfolio	3477
	Standard and Green Certificates Trading	
PPD-008	An Analytical Long-Run Incremental Cost Pricing Model for Stochastic Power Flow	3483
PPD-009	Revenues Allocation Model and Evaluation Method for Joint Transaction of Wind-Thermal	3488
	Power Generation Rights Based on Cooperative Game	
PPD-010	Pricing method in retail electricity market considering the fatigue life of wind turbine gearbox	3494
PPD-011	Insurance Pricing in Electricity Retail Market Based On Reliability Analysis	3500
PPD-012	Price Determination Method in Electricity Retail Market considering the Voltage-Related	3506
	Distribution Network Reliability	
PPD-013	A Power-Quality-Based Pricing Method Considering Resonance in Electricity Retail Market	3512
PPD-014	Trading Interval Optimization Based on the Pricing Strategy of Adjustable Load	3518
PPD-015	The Evaluation Index System and Method of Electricity Spot Market Based on SCP Theory	3523
PPD-016	Simulation Analysis of Imbalance Settlement Cost in Real-time Balancing Market Based on ABM Model	3528
PPD-017	Two Stage Deep Peak Regulation Ancillary Service Market Clearing Model Considering Virtual Power Plant	3534
PPD-018	Real-time Incentive-based Demand Response for a Virtual Power Plant: a Rolling-window	3539
	Multistage Stochastic Programming Approach	
PPD-019	On the Convergence to Nash Equilibrium in Retail Electricity Markets	3545
PPD-021	Research on transaction and settlement mechanism of new energy resources participating	3552
	in Yunnan power market	
PPD-022	The Future of GB Electricity Supply: Carbon Neutral Impact on Electricity Wholesale Price	3558
PPD-023	Reliable Electricity Pricing Method of Distribution Network Considering Outage Loss Increment and Differentiated Demand	3564
PPD-024	Dynamic Time-of-use Discharging Price Strategy of Electric Vehicle Participating in	3570
110 024	Electricity Market Concerning Users Risk Appetite	0070
PPD-025	Spot Trading Scheme for Realizing Self-balanced Operation in Electrical Power Distribution	3575
	Networks	
PPD-026	Investment Evaluation Index System for Pilot Projects of Incremental Distribution Network	3580
PPD-027	A Peer-To-Peer Energy Sharing Framework for Prosumers Considering Network	3586
DDD 000	Constraints and Social Preferences	0500
PPD-028	"Energy Red Packet" Incentive-based Bidding Mechanism and Its Benefit Sharing in the	3592
DDD 000	Transactive Energy Market	0500
PPD-029	Transaction Mechanism of New Energy in Electricity Market	3598
PPD-030	TIME SERIES UPDATING FORECASTING METHOD OF ENERGY CONSUMPTION	3604
DDD 004	BASED ON VMD-LSTM	0040
PPD-031	A Hierarchical Optimization Model for Shared Energy Storage and Multiple PV Prosumers:	3610
DDD 222	A Heuristic Algorithm and Stackelberg Game Method	0045
PPD-032	Coordinated Energy Management of Networked Microgrids in the Distribution Market	3615
PPD-033	Research on Transaction and Market Mechanism in Micro-grid Considering Matching Degree between Supply and Demand	3621
PPD-034	Simulation Analysis of the Hydro and Thermal Electricity Replacement Trading Model	3627

	Between Yunnan and Guizhou Provinces Based on Prophet	
PPD-035	Optimal scheduling of integrated energy systems considering the resource trading among	3634
	users	
PPD-036	Cooperative Operation for Rooftop Photovoltaic Distributed Generation and Residential Buildings	3639
PPD-037	Optimal Scheduling Strategy of Demand Response Aggregators Considering Customers' Complicated Response Characteristic	3645
PPD-038	Day-Ahead Market Trading Model of Pumped-Hydro-Solar Hybrid System Considering Contract Decomposition	3651
PPD-039	Optimization model of short-term positive deviation electricity assessment of power selling companies considering incentive demand response	3656
PPD-040	A Novel V2V Charging Mechanism based on Bargain Model within the Scheme of Internet of Smart Charging Points	3662
PPD-041	A credit management mechanism for peer-to-peer electricity trading in blockchain environment	3668
PPD-042	Research on the application of block chain in promoting the consumption of renewable energy	3673
PPD-043	Research on Distributed Power Trading Based on Blockchain Technology	3679
PPE-002	A Reconfigurable Hybrid AC/DC Microgrid Clustering Architecture with Decentralized Control for Coordinated Operation	3685
PPE-005	Research on Double Active Clamping Single Staged Backward AC-AC Converter	3692
PPE-006	Experimental study on the effectiveness of water mist containing surfactant on extinguishing transformer oil fire	3698
PPE-007	Bidirectional Buck/Boost Converter Based on SiC MOSFET	3704
PPE-008	Flexible control strategy for AC/DC bus interface Converter in hybrid microgrid	3709
PPE-009	Blockchain Based Secure Decentralized Energy Management System for Interconnected Vehicular Power Electronic Transformer Microgrids	3714
PPE-010	Research on Isolation Scheme of A Distribution Power Network With MVDC-Flexible Interconnection Based on MMC	3720
PPE-011	Active Equalization Circuit and Control Design of Series Battery Pack Based on Single Inductance	3725
PPE-012	Molecular dynamics simulation on high temperature pyrolysis of transformer insulating oil under thermal stress	3730
PPE-013	Consistency Evaluation of Retired Power Battery based on the Analytic Hierarchy Process Method	3735
PPE-014	Research on AC and High Frequency Breakdown Characteristics of Oil-paper Insulation of 220 kV Current Transformers	3740
PPE-015	Research on Deterioration Mechanism of Oil-paper Insulation of 220 kV Current Transformer	3744
PPE-016	Research on fault detection method of LiFePO4 battery based on two dimensional residuals	3750
PPE-017	The Effect of Salt Fog on Electric Joint Compound used in Southeast Coastal	3754
PPE-018	Research on Economy of Electrochemical Energy Storage System under Peak-Valley Price Difference and Whole Value Mode	3758
PPE-019	Electrochemical energy storage technology and its application analysis	3764

PPE-020	Planning Model for Electric Vehicle Charging Station Considering Battery Capacity	3768
PPE-021	Harmonic Modeling and Analysis of STATCOM Considering Frequency Coupling	3772
PPE-022	Optimal configuration of energy storage system of multi-station fusion model considering renewable energy consumption	3778
PPE-023	Fire suppression and cooling effect of perfluorohexanone on thermal runaway of lithium-ion batteries with large capacity	3783
PPE-024	High-frequency Isolated and Large Capacity Power Conversion System Based on SiC MOSFET	3789
PPE-025	Development of Temperature Rise Simulation APP for Three-phase Common Enclosure GIS/GIL	3795
PPE-026	Research on zero sequence circulating current suppression of parallel inverter system with common AC and DC bus	3800
PPE-027	Influence and Suppression Control Strategy of DC Voltage Ripple on Single-Phase Backto-Back Three-level Converter	3805
PPE-028	Optimal Energy Storage Allocation and Benefit Analysis for Electricity Retailers	3810
PPE-029	Influence of Humidity on Partial Discharge Characteristics of Cable Buffer Layer under Different Electric Fields	3816
PPE-030	A calculation method of energy storage allocation in Shanxi Power Grid Based on abandoned power	3821
PPE-031	Capacity and Power Allocation Strategy of Energy Storage Participating in Grid Peak Shaving	3826
PPE-032	Insulation Breakdown Failure Analysis of a 500kV Power Transformer in Lightning Impulse Test	3831
PPE-033	A Voltage Vector Superposition Based Control Strategy for High Voltage Capacitor Ageing Test Used Multilevel Cascaded Converter Fed with Single DC Source	3836
PPE-034	Research on Optimization Technology of turn to turn protection Considering Saturation of high voltage bus shunt reactor	3842
PPE-035	Current Regulation of Grid-Forming Converters	3848
PPE-036	Energy Internet: A Novel Green Roadmap for Meeting the Global Energy Demand	3855
PPE-037	Design of Basic Control Strategy for Energy Storage Type MMC	3861
PPE-038	Layout scheme of energy storage stations for multi-application requirements	3866
PPE-039	Research on Temperature Rise of $\pm 800 \text{kV VSC-DC}$ Wall Bushing Superposed By DC and AC Loads	3872
PPE-040	Problems and Technology Development Trends of Hydrogen Production from Renewable Energy Power Electrolysis	3879
PPE-041	Fast Tracking Phase-Locked Loop Based on Complex Vector Form and Phase Difference Interval Judgment	3883
PPE-042	Design and Analysis of Universal Clamps for UHV Transmission Lines	3888
PPE-045	Analysis on Self-heating Process of Battery Modules in Energy Storage Station Based on Equivalent Circuit Model	3894
PPE-046	Implementation of Constant Current or Constant Voltage Output Based on Switching Circuit for Battery Charging Applications	3900
PPF-001	Research on Medium and Long term Unit Commitment of Wind Power Consumption Considering Carbon Reduction	3905

PPF-002	A Hybrid Simulation Study of the Herding Behavior Effects in the China National Carbon Market	3911
PPF-003	Study on the Economic Optimization of Park Integrated Energy System with Electricity-	3918
DDE 004	Heat-Cooling-Gas under Carbon Trading	0004
PPF-004	Strategic Bidding of Emission-Constrained Generation Companies with Incomplete	3924
DDE 005	Information in Day-Ahead Electricity Markets	3930
PPF-005	Two-stage Bidding Strategy of Virtual Power Plant in Electricity and Carbon Emissions Trading Markets	3930
PPF-006	Multi-objective charging scheduling model for electric vehicles considering urgent demand under different charging modes	3936
PPF-007	Electric vehicle user portrait considering market response potential	3941
PPF-008	Distributed Demand Response of the Integrated Energy System in an Industrial Park	3947
PPF-009	Matching Analysis of Synergic Development of the Energy Internet Industry System	3953
PPF-010	Research on Investment and Operation Mode of Multi-station Integration Data Center Station	3960
PPF-011	Market Participation of Virtual Power Plant with Renewable Generation and Waste Treatment under Incentive and Loss Mechanism	3965
PPF-012	Evaluation of New Energy Accommodation Capability Based on Renewable Energy Power Prediction under "Double Carbon" Goal	3970
PPF-013	Hybrid Experimental Learning on Trading Behavior Analysis in Electricity Markets	3975
PPF-014	Supply-demand Interactive Equilibrium Model of Multiple Multi-energy Parks Based on Aggregative Game Mechanism	3981
PPF-015	Community Charging Stations Planning under Shared Energy Storage Mode: A Stackelberg Game approach	3987
PPF-016	Model Construction and Construction Key Issues for Energy Internet Ecosystem	3993
PPF-017	Carbon-oriented Local Integrated Energy System Multi-energy Coupling Market Design	3998
PPF-018	A photovoltaic array state evaluation method based on combined weight and MCMC	4004
PPF-019	Research on Risk Assessment of China's PV-Storage Charging and Exchanging Power	4011
	Station Under the Environment of Energy Internet	
PPF-020	Research on Operation Mode of Integrated Energy Service System Adapting to Multi-station Integration	4017
PPF-021	Chance-constrained Optimal Power-water Flow Considering Load Uncertainties	4023
PPF-022	Coal-rock interface recognition method based on GAF-deep learning	4029
PPF-023	Optimal Scheduling of Load Aggregators Participating in Demand Response Market under Low-carbon Power System	4034
PPF-024	Forms, Key Supporting Technologies and Business Models of the Integrated Energy Service Station	4041
PPG-001	A Study on Hydraulic Balance Optimization of District Heating System Based on Data-	4046
	Mechanism Fused Model	
PPG-002	Research on the implementation path of Hebei Energy Internet	4051
PPG-003	A Path Analysis of Electric Heating Technology Based on Entropy Weight Method	4057
PPG-004	Energy Consumption Forecast of Building Models in College Town——A Case study in China	4061
PPG-007	An Analytical Model of Heating Networks for Dynamic Simulation in Integrated Energy	4066

	Systems	
PPG-008	Review of the Application of Urban Multi-Source Big Data in Power System in China	4072
PPG-009	Tie-line Feasible Region Characterization Method for Nonlinear Regional Power System	4077
PPG-010	Distribution Network Fault Location Based on Time Reversal Considering Hybrid Power	4082
	Network and Load	
PPG-011	Improved Voltage Compensation Method for Zero Sequence Directional Protection of	4088
	Double-Circuit Transmission Lines in Open-Phase Operation	
PPG-012	Application of volume detection based on machine vision in coal and gangue separation	4094
PPG-013	Modeling of Electric - thermal Multi - energy System and Coupling Method under Different	4099
	Time Scales	
PPG-014	Location optimization of electric vehicle time sharing rental network for electric power	4105
	company exclusive	
PPG-015	Study on Simple Field Test Method for Thyristor Control Performance of SVC	4111
PPG-017	Aggregation Effect on Particle Motion and Electric field	4155
PPG-018	Study on Design Scheme of Overhead Transmission Line in Bauxite Landfill	4119
PPG-019	Theoretical Study on Group Pile of Anti-liquefaction Micro-steel Pipe	4124
PPG-020	Electricity demand and carbon emission forecast of China's civil vehicles under the	4129
	background of electrification	
PPG-021	Simulation Investigation of Airflow Distribution in Data Center using the Field Synergy	4134
	Principle	
PPG-022	Research on a New Method of Industrial Park Load Forecasting Based on Typical User	4140
	Load Characteristics	
PPG-024	Design of additional damping control for power system with high proportion hydropower	4145
	units based on H-infinity robust control theory	
PPG-025	Research on the Road Map of Fujian Province\'s Carbon Peak	4150
PPG-026	Modeling Carbon Capture Plants (CCP) as Responsive Demands	4154
PPG-027	Research of Teaching Experiment Platform for Flexible AC/DC Transmission System	4161
PPG-028	Freight Train Speed Tracking Based on Optimal Preview Control	4167
PPG-029	Study on Coupling Technology of Hydrogen Production by Electrolytic Energy of Volatility	4174
PPG-030	Graph Based Storage and Analysis of Secondary Circuits in Smart Substation	4181
PPG-031	Analysis on Potential of Small Hydropower Increasing Power Generation in Mengdong	4187
	River Basin	
PPG-032	An Assessment Method of Carbon Emission Reduction Additionality in Grid Dispatching	4193
	Model	
PPG-033	Integrated demand response based on user comfort and consumer psychology	4199
PPG-034	Evaluation of the Performance of Energy Storage System Participating in Grid Frequency	4205
	Regulation	
PPG-035	Dynamic Evolution Mechanism of High-end Chemical Industry Based on System Dynamics	4210
PPG-036	State of Charge Balancing Control for Battery System Based on the Reconfigurable	4215
	Converter	
PPG-037	Multi-timescale optimal scheduling of integrated energy systems based on wind/light to	4221
	hydrogen	
PPG-038	A Review: Comprehensive Effectiveness of Electric Vehicles in Market	4227
PPG-039	A Probability Measure Model for the Adaptability of Distribution Network Planning	4234

	Considering Multiple Scenarios	
PPG-040	Intrinsic Parameter Estimation of Railway Traction Power System Based on Impedance	4240
	Measurement	
PPG-041	Optimization of Charging and Discharging of Electric Vehicles Considering Residents' Travel Habits	4247
PPG-042	Multi-objective Optimal Control of DFIG for Unbalanced Grid Voltage	4253
PPG-044	An analysis method for the influence of governors and PSSs on low-frequency oscillation	4259
PPG-045	Simulation analysis of electromagnetic protection for live operation robot control box	4264
PPG-046	Research on Energy Management Strategy of Hybrid Energy Storage System for Electric Ship	4272
PPG-047	Research on Optimization Method of Cleaning Parameters of Insulator Dry Ice Cleaning Robot	4278
PPG-048	Performance Test and Analysis of National Secret algorithm SM2 in Power data Protection	4284
PPG-049	Research on Fault Diagnosis Method of Power Transformer Based on Graph Neural Network	4289
PPG-050	Wind Area Distribution Map Plotting of Power Grid Based on Meteorological Data Fusion	4295
PPG-051	Idle and Max Power Forecasting for Linear Server Power Consumption Model using Random Forests	4300
PPG-052	Single Phase Grounding Fault Location Method based on the Change of the Zero Sequence Current along with Compensation Degree	4305
PPG-053	Research on Four Ground Wires Design Scheme for Tower of 220kV Double-Circuit Transmission Line	4311
PPG-054	Capacity Configuration and Control Strategy of EV Charging Station with Integrated Wind Power and Energy Storage Based on SSA	4316
PPG-055	COMBINATION RESULT OF TWO MPPT TECHNIQUES (FUZZY LOGIC AND PERTURB AND OBSERVE METHOD): COMPARISON WITH THE CONVENTIONAL PERTURB AND OBSERVE METHOD	4323
PPG-056	Research on the Distribution Efficiency of Green Certificates in China Based on DEA Model	4328
PPG-057	The One Network Oprerating Platform For E-vehicle Based on Blockchain	4333
PPG-058	Smart Substation Configuration File Management and Verification Technology and System	4337
PPG-059	Research on Power Use Inspection Management System for High Risk Industry Users under the "Dual Carbon" Target	4342
PPG-060	Research on electricity consumption behavior of coal to power equipment based on random forest method	4347
PPG-061	Joint optimal operation of cascade hydropower stations in Yandu River Basin in dry season under the background of dual carbon target	4352
PPG-062	Experimental Verification of Energy Conversion Efficiency of Doubly Fed Wind Turbine	4357
PPG-063	Research on control strategy of grid connected interface converter for optical storage microgrid	4362
PPG-064	Comparison of DC Fault Current Suppression by Current-limiting Control Algorithms for Double Terminal Half-bridge MMC-HVDC System	4367
PPG-065	Experimental Research on New Circuit Breaker based on True Type Test Platform of 10kV Distribution Network	4373
PPG-066	An Emergency control method of AC/DC hybrid power system considering the risk of DC	4377

	commutation failure under AC fault	
PPG-067	Study on melting ice current characteristics under low temperature and high wind speed	4382
PPG-068	Optimal Configuration of Off-Grid Microgrid Considering the Uncertainty of Photovoltaic Power Generation	4386
PPG-069	Long-term Energy Consumption Forecasting for Data Center Industry in China	4392
PPG-070	Optimization allocation strategy of distributed generation in grid-connected microgrid based on economic dispatch	4398
PPG-071	Optimal Configuration of Grid-connected Microgrid Considering Real-time Electricity Price	4404
PPG-073	Multi - objective Planning of Distributed Generation With Coordination of Economics and Reliability	4411
PPG-074	Research on automatic cache of PCBA board based on welding machine	4416
PPG-075	Research on Creep and Shrinkage Characteristics of Bidirectional Geogrid in Transmission Line Engineering	4420
PPG-076	A Fast Fault Simulation Method of Distribution Network with Distributed Geration Based on Neural Petri Net	4424
PPG-077	Multi-Objective Optimal Dispatching Algorithm for Park Integrated Energy System Considering Starkberg Game and Energy Cascade Utilization	4429
PPG-080	Identification Method of Load Model Static Characteristic Coefficients Based on Disturbance Data	e 4434
PPG-082	Summary of Cost Management Analysis of Power Grid Enterprises Based on Transmission and Distribution Price Reform	4440
PPG-084	Investigation on Differentiated Transformation Strategy of Coal to Electricity based on Big Data Statistical Analysis	4444
Author Index	x 44	148-4497