

# **2020 IEEE Sustainable Power and Energy Conference (iSPEC 2020)**

**Chengdu, China  
23 – 25 November 2020**

**Pages 1-673**



**IEEE Catalog Number: CFP20U88-POD  
ISBN: 978-1-7281-9165-2**

**Copyright © 2020 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:	CFP20U88-POD
ISBN (Print-On-Demand):	978-1-7281-9165-2
ISBN (Online):	978-1-7281-9164-5

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

202006050000001	Photovoltaic Power Forecasting Based on IEWT-Attention-LSTM Model	1
202006100000001	Research on the performance of LLC resonant converter considering the influence of parasitic parameters	9
202006120000002	A Practical Power Prediction and Error Correction Method for Distributed PV based on the Spatial Correlation	14
202006150000031	Composition and Test Method of the Emergency Control System for Battery Storage Power Station on Grid Side	20
202006280000005	Day-ahead Economic Dispatch of Microgrid Based on Multi-agent System Considering Wind Power Generation Uncertainty	25
202006290000001	Fractional Calculus and Its Application in Capacitance Modeling of Power Converter	31
202006290000006	A Method of Comprehensively Assessing Load Power Quality Basing on Combination Weighting of Moment Estimation and Ambiguous Evaluation	36
202006290000026	$\mu$ -Synthesis Robust Control of Variable Speed Wind Turbine Generators for Participating in Microgrid Frequency Regulation	51
202007010000012	Research on Settlement Verification of High-proportion Clean Energy Power Market in Yunnan	57
202007150000001	An Improved Analytical Probabilistic Load Flow Method with GMM Models of Correlated DER Generation	73
202007150000003	A Novel Stochastic Economic Dispatch Method Considering Renewable Energy Correlation and Demand Response	79
202007200000011	Research on Internal Overvoltage and Insulation Coordination of Offshore Wind Power with Flexible and Direct Grid Connection	85
202007300000008	Research on Renewable Energy Absorption Capacity Improvement Technology Considering Cost of Thermal Power Flexibility Retrofit	

.....	91
202007300000010	
Optimal Prediction Intervals of Wind Power Generation Based on FA-ELM	
.....	98
202007300000012	
A Method of Assessing Photovoltaic Hosting Capacity Considering reverse power protection based on power direction in a Spot Network	
.....	104
202007300000041	
Cloud Displacement Vector Calculation in Satellite Images Based on Cloud Pixel Spatial Aggregation and Edge Matching for PV Power Forecasting	
.....	112
202007300000054	
Power Data Recovery Method Based on Time Series Model for Understanding the Operation of HVDC Near-zone Assets	
.....	120
202007300000088	
Selection strategy among categories of evaluation indexes for distribution network operation level based on mutual information	
.....	126
202008080000003	
Automatic Generation of Process Level Secondary Circuit Diagrams in Smart Substation	
.....	132
202008100000008	
Review of Electric Vehicle Charging Demand Forecasting Based on Multi-Source Data	
.....	139
202008120000004	
Congestion Control of HPLC in New Power Distribution and Consumption Services	
.....	147
202008140000002	
Multi-State Probability Prediction of Wind Power based on Deep Learning Model	
.....	155
202008170000013	
Peak Regulation Market Design for End-users in the Presence of Load Aggregators	
.....	161
202008190000007	
CFD Modeling of Hydrodynamics in Circulating Fluid Bed	
.....	167
202008190000052	
Research on Coordinated Control Method of PV and Battery Access Traction Power Supply System Based on RPC	
.....	173
202008190000057	
Forecasting Renewable Energy Generation Scenarios Based on Multi-Agent Diverse GANs	
.....	180

202008190000067	The regulating characteristic analysis for distributed electric heating load in Northern China	187
202008190000068	Modeling of Spatial Distribution Characteristics of High Proportion Renewable Energy Based on Complex Principal Component Analysis	193
202008190000082	Improved Direct Power Control of Doubly Fed Induction Generator Without Phase-Locked Loop	199
202008190000083	Overvoltage Simulation Analysis and Protection Strategy of UPFC Series Transformer	205
202008190000084	Solar energy tracking based on extremum seeking control method	212
202008190000089	Suppression strategy for continuous commutation failure of DC transmission based on synchronous condenser operation of photovoltaic power station	218
202008190000101	Operation Situation Analysis and Improvement Measure Study for Reactive Voltage Control System in Wind Farm	224
202008190000102	Probabilistic Stability Analysis of Power System with Random Delay Based on Series Theory	231
202008190000114	Energy Management of Co-Phase Traction Power Supply System Considering PV and Hybrid Energy Access Based on Information Gap Decision Theory	238
202008190000116	Short-term Forecast for Photovoltaic Generation Based on Improved Restricted Boltzmann Machine Algorithm	245
202008190000147	Adrc Additional Damping for Flexible DC Transmission Control	252
202008190000151	Research on control strategy of new current-type energy-fed AC electronic load	258
202008230000003	Evaluation of distribution network planning with renewable energy	264

202008280000005	Exploration and practice of key technologies for control strategy optimization of large-scale centralized integration renewable energy generation	277
202008280000014	Fault Diagnosis of PEMFC Water Management Subsystem Based on Locality Preserving Projection and Learning Vector Quantization Neural Network	283
202008300000031	Research on Robust Control Strategy for Hybrid Energy Storage of DC Micro-Grid System	289
202008300000136	Truncation Error Analysis of Linear Power Flow Model	301
202008300000144	“Province-City-County” Three-Level Renewable Energy Consumption Computation Methods based on Renewable Energy Cloud Platform.	319
202010160000010	Microgrid Voltage Risk Evaluation Using Distributed Parallel Monte-Carlo Simulation	325
202006250000002	Generation Schedule Considering Branch Security Check under New Energy Access	331
202006280000001	The Research on Black Start Strategy of Distributed Photovoltaic-Battery Energy Storage Systems Based on Cluster Division	337
202006290000027	Single-phase grounding fault line selection method for distribution network with same bus loop based on cluster	343
202006300000017	Parameter Investigation of Magneto-biased High Temperature Superconducting Fault Current Limiter in 10 kV Urban Power Grid	349
202006300000018	Research on Planning of Distributed Photovoltaic Power Supply Connected to Medium Voltage Distribution Network under the Condition of Satisfying Voltage Quality	355
202006300000020	Economic Analysis and Optimal Design for a Grid-connected Microgrid System	363
202007050000002	Hybrid compensation topology for constant currentvoltage charging mode of EV wireless chargers	

.....	369
202007070000006	
Research on Low Voltage Ride Through Technology of Wind Farm	
.....	376
202007150000004	
A Data Synchronization Method for Relay Protection in Active Distribution Network	
.....	383
202007300000006	
Research on Development and Upgrade of Distribution Network Planning Technology	
.....	389
202007300000021	
Practical Flexibility Analysis on Europe Power System with High Penetration of Variable Renewable Energy	
.....	395
202007300000027	
Study on the Configuration of Clean Energy Substitution for APU in Green Airport	
.....	403
202007300000028	
Low-Complexity Model Predictive Rotor Current Control of DFIG under Unbalanced Grid Condition	
.....	409
202007300000031	
Transmission Expansion Planning Coordinated with Distribution Networks Considering High Renewable Energy Penetration	
.....	415
202007300000034	
Distribution Network Expansion Planning with the Presence of Interactive Trading among Multiple Market Participants	
.....	423
202007300000044	
Coordinated Control Strategy of Distributed Network Voltage Considering Operation State	
.....	429
202007300000049	
Rapid Evaluation Technology of Grid Planning Scheme for Power Systems with High Proportion Renewable Energy Based on Plant Commitment	
.....	441
202007300000052	
Analysis of Peak Regulation Strategy with Considering Renewable Energy Injection and Power from Outside	
.....	448
202007300000060	
Capacity configuration ratio optimization method of power system with high permeability of wind and photovoltaic power generation	
.....	454
202007300000061	
Regional Multi-Energy System Planning with Considering the Correlation between New Energies' Output	
.....	460

202007300000062	
Cooperative Planning for IoT-Based Aggregation of Electric Vehicle Fast-Charging Stations and Distributed Generations	466
202007300000095	
Energy Storage Sizing Based on Asymmetric Copula for Wind Farm to be Black-Start Source	479
202008050000006	
Coordinated Planning of Renewable Energy and Grid Expansion Based on Scenario Trees	485
202008060000007	
Research on typical power supply mode of DC distribution and consumption system	491
202008070000005	
THE ACTIVE DISTRIBUTION NETWORK AND DG PLANNING CONSIDERING DR UNDER DYNAMIC ELECTRICITY PRICE STRATEGY	497
202008130000002	
Distributionally Robust Economic Dispatch Considering the Uncertainty and Correlation of Wind Farm Outputs	503
202008150000004	
Partitioning Active Distribution Networks by Using Spectral Clustering	510
202008180000022	
Design of flood control and safety management system for dams operated by China Three Gorges Corporation	516
202008190000006	
Continuous Commutation Failure Suppression for Multi-Infeed UHVDC System Using Grid-Side Energy Storage	522
202008190000015	
Planning of 500 kV substation considering interconnection structure of 220 kV Substation	528
202008190000016	
A Distributionally robust optimization model based on data mining for energy management of distribution network with renewable energy	535
202008190000017	
The Optimized Configuration of Four-terminal Soft Open Point of Active Distribution Network Considering the Influence of Power Supply Capacity	541
202008190000023	
Coordinated Frequency Regulation using Wind Turbine and Battery Energy Storage	547
202008190000024	



An ESS-Based Approach for Mitigation of REGs Temporary Overvoltage Caused by UHVDC Commutation Failure .....	553
202008190000036	
Study on the Accommodation Ability and Development Demand with High Proportion Renewable Energy Integrated into Grid in China .....	559
202008190000042	
Research on Optimal Decision-Making of Power Grid Flexible Reserve under New Situation .....	565
202008190000051	
Multi-Source Trans-Provincial Coordinative Optimal Technology Considering Trans-provincial Transaction Costs .....	572
202008190000062	
Coordinated peak regulation control strategy of BESS and thermal power units in high proportion new energy power system .....	579
202008190000064	
Review on Reserve Configuration for Large-Scale Renewable Energy Integration .....	585
202008190000072	
A Method for Microgrid Partitioning Based on Integration of Main Network and Microgrid .....	592
202008190000121	
Calculation Method of Optimal Operation Efficiency of Medium Voltage Distribution Line Considering Economy and Reliability .....	604
202008190000128	
Multi Energy Coordinative Optimization Technology and Application for Northwest China Power Grid .....	610
202008300000036	
Heat Transfer Performance of Heat Pipe with Hydrophilic Inner Wall .....	616
202008300000049	
Research on Capacity Planning of Renewable Energy Grid Integration Based on Effective Short Circuit Ratio .....	622
202008300000096	
A Coordinated Primary Frequency Control Method for DFIG-based Wind Farm .....	628
202008300000102	
Design of real-time transmission scheme of wide-frequency measurement data in power electronics dominated power system .....	634
202008300000150	

Determination of the optimal proportion of renewable energy based on the total social cost .....	640
202009170000001	
Research on Online Modeling Technology of Wind Farm in Online Stability Analysis .....	646
202006150000001	
Study on Control Technologies Scheme of Wind Farm Transient Active Support .....	657
202006200000001	
Reliability Evaluation Modeling of Multi-Port Power Electronic Transformer Based on Cascaded H-Bridge .....	662
202006230000003	
Comparison of Low Frequency Oscillation Characteristic Differences between VSG and SG .....	668
202006230000011	
Influence Analysis of Thermal States on Dynamic Frequency Response for Power Systems with High Renewables .....	674
202006260000001	
Research on AGC Control System Optimization of Ultra Supercritical Unit .....	681
202006260000002	
Study on the safety of primary frequency regulation for thermal power unit .....	687
202006290000022	
FLC Dead band Optimization for HVDC System Stability Enhancement .....	692
202006300000029	
State Evaluation of Superconducting Current Limiters Based on Fuzzy Layered Method .....	699
202006300000038	
Power System Inertia Estimation Method Based on Energy Conservation .....	705
202007010000004	
Research on the Substitution Ability of Battery Energy Storage system for Thermal Power Units in Frequency Regulation .....	712
202007010000017	
Suppressing Subsynchronous Oscillation in Wind-Thermal-Bundled Power System via Flexible Excitation System .....	719
202007010000022	
Research on DC Assembled Switch and Its Control Strategy to Improve Reliability of AC-to-DC Distribution System .....	726
202007010000024	

Comprehensive Small-Signal Modeling and Stability Analysis of Medium-Voltage ACDC Distribution Networks Based on the Master-Slave Control Strategy .....	732
202007030000002	
Analysis of the Influence on Distributed Renewable Energy Penetration Rate on the Current Protection .....	738
202007090000001	
Common evaluation and classification method of electric insulating oil and battery research on its application .....	764
202007170000001	
Study on Control Sequence Coordination Method Between Security and Stability Control System and HVDC Pole Control System .....	769
202007170000002	
An Optimized Strategy of Switching Crowbar Improve LVRT of DFIG Based on RTDS .....	775
202007200000010	
Generating Large-Scale Electromagnetic Transient Simulation Model on CloudPSS Using PSASP Projects .....	781
202007300000029	
Frequency-Coupling Restrained Control of PV Inverter Tied into Weak AC Grid .....	793
202007300000069	
Online Evaluation Technology of Switching Overvoltage on No-Load Transmission Lines During Power Grid Restoration .....	800
202007300000078	
Modified T-Source Circuit Breaker for Bidirectional Operation in MVDC .....	813
202007300000084	
Parameters Setting for Primary Frequency Regulation of Wind Power in High-Proportion Clean Energy System .....	819
202007300000086	
Dynamic Transient Power Sharing in Grid-Connected DC Microgrid .....	826
202008030000001	
Analysis on DC Voltage Balance Control Between Three Phases for STATCOM .....	840
202008100000003	
Optimization strategy of DSOGI-PLL precision under harmonic interference conditions .....	852
202008100000007	
Comparison of Two Typical High-voltage Magnetically Controlled Reactor Body Structures and Electromagnetic Transient Modeling Method	

.....	858
20200810000009	
A Mathematical Analysis of Y-matrix Modulation_ The Natural Self-Voltage Balancing Capability of Modular Multilevel Converter Under Arbitrary Level Number	
.....	864
202008110000012	
A Fast Blocking Method of Bus Protection when CT Disconnected Based on Braking Current and Zero Sequence Current	
.....	871
202008170000016	
Research status and prospects of coal-fired power plant flue gas mercury removal technology	
.....	883
202008180000004	
Research on Regional Power Grid Voltage Control Technology Based on Reactive Power Support Capability of Controllable Power sources	
.....	889
202008180000012	
Resilience Assessment Using Simulation System of Distribution Network under Extreme Weather	
.....	895
202008180000014	
Noise analysis and SNR optimization design of fiber optical current transformers	
.....	903
202008180000015	
Research on External Characteristics for PMSG Wind Turbine Systems Under Symmetrical Fault	
.....	910
202008180000016	
Improved Firing Angle Control for Mitigating Continuous Commutation Failure of HVDC System	
.....	916
202008180000017	
A Reactive Power Coordination Control Scheme for Hybrid Multi-Infeed HVDC System	
.....	922
202008190000001	
Research on Adaptive Virtual Inertia Compensation and Fast Frequency Response Strategy for New Energy Stations	
.....	928
202008190000012	
A Fast Evaluation Algorithm on Frequency Stability for Power System with High-penetration Renewable Energy Considering Security Control Measures	
.....	934
202008190000049	
Review on Transient Voltage Stability of Power System	
.....	940
202008190000070	
Rotor Angle Stability with Different Penetration Levels of Wind Generation in the Sending Grid	

.....	948
202008190000085	
Frequency Support of Wind Power Considering Grouping Control and Orderly Recovery	
.....	955
202008190000092	
Impact of PV Characteristics on Voltage Dynamics of PET-based Microgrid	
.....	961
202008190000105	
Study on Operation Characteristics of Offshore Wind Farm Integrated to Weak AC Systems via VSC-HVDC	
.....	968
202008190000123	
The best power supply capability evaluation of the active distribution system considering the interruption cost	
.....	975
202008190000127	
Study on DC side harmonic performance of VSC HVDC	
.....	982
202008190000136	
Reliability Research Strategy of All-domesticized Chip Relay Protection Device	
.....	990
202008230000006	
Analysis on Instability Mechanism of Angle-Voltage Interaction Considering Dynamic Characteristic of Photovoltaic Generators	
.....	1004
202008260000010	
Research on the Strategy for Series-Connected Transformer Magnetic Saturation and Magnetizing Inrush Current Suppression in Dynamic Voltage Restorers	
.....	1012
202008260000020	
Sequence Impedance Modeling of DFIG Wind Farm via LCC-HVDC Transmission	
.....	1018
202008260000024	
Study on Fault Deduction and Operation Mode Optimization of VSC HVDC Power Grid	
.....	1024
202008300000048	
Fault Ride Through Technology of Wind Power Transmission System and Its Research Scheme	
.....	1031
202008300000115	
Investigation on The Fracture Mechanism of 42CrMoA steel Tower Bolts employed in Wind Power Station	
.....	1044
202008300000134	
Typical Influence of Wind Power Capacity Expansion on the Transient Angle Stability and Feasible Explanations	
.....	1052
202008300000140	
Research on the MPPT Control Simulation of Wind and Photovoltaic Complementary Power Generation System	

.....	1058
202008300000146	
Studying the SVC Control Strategy of the Ali Interconnection Project	
.....	1064
202006270000001	
Subsidizing stranded costs in high-renewable electricity markets_ A case study	
.....	1070
202007240000003	
Mid-long term contract energy decomposition algorithm considering uncertainty of wind power	
.....	1075
202007250000001	
Investment Efficiency and Cost Analysis of New Renewable Energy Source	
.....	1082
202007250000002	
Risk Control in Electricity Market Based on Margin Requirement	
.....	1088
202007300000032	
Co-optimization Model of Energy and Auxiliary Service Market Considering Opportunity Cost	
.....	1094
202007300000033	
Evaluation of Generators' Market Power By Combination Empowerment and Trapezoidal Cloud Model	
.....	1100
202007300000053	
A Method for Identifying HVDC Near-zone Assets of Southwest Regional Power Grid Based on Flow Contribution	
.....	1107
202007300000065	
An evaluation method of power market operation efficiency based on Grey Relational Analysis of entropy weight method	
.....	1114
202008110000008	
Research on the Development Status and Trend of Peak Load Regulation and Frequency Modulation Power Auxiliary Service Market in China	
.....	1121
202008160000006	
Dynamic Bidding Strategy for Electricity Retailers Considering Multi-type Demand Response	
.....	1127
202008190000022	
Joint Cleaning Model of Energy and Auxiliary Service Market Considering Wind Power Cost	
.....	1133
202008190000039	
Research on Renewable Energy Accommodation Power Market Mechanism in Energy Internet Environment	
.....	1140
202008190000063	

Research on Function and Morphology of Future Power System with High Renewable Energy Penetration and its Evolution Driving Force .....	1147
202008300000143	
Research and Application of Related Settlement Method Considering Price Stabilization in Yunnan Power Market .....	1153
202006290000014	
Optimal energy flow calculation of electricity-heat integrated energy system with heat pump .....	1159
202007070000001	
Operation Model and Transaction Mode of Regional Integrated Energy System Based on Virtual Power Plant Mode .....	1166
202007070000003	
Optimizing Operation of Integrated Energy System in Parks Considering Various Forms of Energy Storage .....	1173
202007280000006	
A cascade utilization method of multi-grade energy based on thermal coupling analysis .....	1179
202007300000004	
Multi-objective optimization analysis of a combined heat and power system based on useful work of different qualities of heat energy utilization .....	1185
202008100000006	
Economic Optimal Operation of the Combined Cooling, Heating and Power Microgrid with Compressed Air Energy Storage .....	1191
202008140000011	
The Efficiency and Economic Feasibility Study on Wind-Hydrogen System .....	1198
202008180000019	
Exploiting Flexibility of Heating Network for Integrated Energy System Considering Temperature Gradient and Fatigue Life .....	1204
202008190000008	
ADMM-Based Distributed Optimal Dispatch of Integrated Energy System Considering Uncertainties of Source and Load .....	1222
202008190000034	
Resilience-based Hardening Approach for Integrated Power and Natural Gas Systems .....	1228
202008190000098	
Reliability Modeling and Assessment for Integrated Energy System_ A Review of the Research Status and Future Prospects	

.....	1234
202008190000109	
Optimization of waste heat efficient utilization technology of regional integrated energy system	
.....	1242
202008190000133	
Techno-economic Optimization of ORC for Gas Engine Waste Heat Recovery	
.....	1248
202008240000006	
Linearized Modeling of Integrated Electricity and District Heating Systems with VF-VT Strategy Based on McCormick Envelopes	
.....	1254
202008280000019	
Robust Optimal Power Flow Model of Electricity-Gas Integrated Energy System Considering the Uncertainty of Roof Photovoltaic	
.....	1261
202006030000003	
Joint Economic Dispatch of Integrated Electricity-Gas Energy System and Double-track Freight Railway Network.	
.....	1269
202006130000001	
Study on Stray Current and Potential Distribution of Metro under Complex Geological Conditions	
.....	1275
202006180000002	
Study on the Large Power Shortage Island Self-healing Method of Smart Distribution Network Based on Status of Protection	
.....	1281
202006220000001	
The Research on Protection Operation Characteristics of Different Phase Two-point Grounding Fault from Allopatry in Small Current Grounding System	
.....	1287
202008120000011	
A Novel Backup Protection Scheme for LCC-VSC Based on Current Integral	
.....	1298
202008180000023	
A Method to Prevent and Control the Interruption Exception of Sampling in Merging Unit	
.....	1304
202008190000055	
Short-term economic environmental dispatch of hydrothermal power system based on predictive search NSGA-II	
.....	1310
202008190000091	
Engineering design of step-up transformer for inverter type high voltage DC power supply	
.....	1326
202008190000118	
Solid Nitrogen Cryogenic Thermal Storage in the Terminations for Resilient Helium Gas Cooled HTS Cables Utilized in DC Power Distribution Network	



.....	1339
202008190000132	
An improved test bench for phase-leg based on IEGT 3L-NPC inverter	
.....	1349
202008220000001	
A protection scheme on Hybrid DC transmission system based on information fingerprint	
.....	1355
202008110000007	
The Heat Dissipation and Thermal Control Technology of Battery Pack in Energy Storage System	
.....	1361
202008260000022	
Research on Influence of Tidal Geoelectric Field on Geomagnetically Induced Current Calculation of Power Grid	
.....	1367
202006150000032	
Modeling and Simulation of Unstable High Resistance Grounding Fault based on RTDS	
.....	1373
202006290000023	
Optimal Sizing of Photovoltaic and Battery Energy Storage of Electric Vehicle Charging Station Based on Two-part Electricity Pricing	
.....	1379
202006300000015	
Modeling and Performance Analysis for Communication Network in Smart Power Distribution System	
.....	1385
202007200000001	
Study on steady-state power flow optimization of cold-heat-electricity integrated energy system	
.....	1391
202007240000004	
Research on Energy Management of Integrated Energy Systems Considering Multi agent	
.....	1397
202007240000007	
Robust optimal scheduling of integrated energy systems based on hybrid energy storage and multiple time scales	
.....	1404
202007280000002	
Creating Multi-timescale Digital Twin Models for Regional Multiple Energy Systems on CloudPSS	
.....	1412
202007300000013	
Modeling and Control of Wind Storage Microgrid in Grid-connected and Off-grid Mode	
.....	1419
202007300000023	
Performance Analysis of Advanced Adiabatic Compressed Air Energy Storage System with Constant-volume and Adiabatic Gas storage Model under Multi-cycle Operation	
.....	1425
202007300000035	

A Medium and Long Term Load Characteristic Index Forecasting Method Considering Load Influencing Factors .....	1431
202008190000009	
Mixed-Integer Linear Programming Model and Constraints Reduction Methods for Security-Constrained Unit Commitment .....	1437
202008190000048	
A Decoupling Control Strategy to Feedwater System of The Gas-steam Combined Cycle units .....	1450
202008190000086	
Optimal Strategy of RIES Based on Bilateral Stackelberg Game .....	1456
202008190000100	
Techno-economic Analyses of Steam Differential Pressure Power Generation in Integrated Energy System .....	1462
202008190000107	
Research on optimization operation strategy of building-type distributed energy system based on Epsilon .....	1469
202008190000117	
Modelling of Renewable-energy-base Heat and Power System and Regulation Method Study .....	1476
202008190000122	
Security Assessment of Interdependent Electricity-Gas Networks .....	1484
202008190000130	
Day-ahead optimal dispatch of active distribution network with micro-energy grid considering demand response .....	1491
202008190000131	
Robust Planning Method for Integrated Energy Systems with the Consideration of multiple energy uncertainties .....	1499
202008190000137	
Multi-objective Optimal Operation of District Integrated Energy System .....	1505
202008190000139	
Multi-Time Scale Energy Management Strategy of Micro Energy Grid Based on Model Predictive Control .....	1511
202008190000140	
The key technology for optimal scheduling and control of wind-photovoltaic-storage multi-energy complementary system .....	1517
202008240000009	
Multi-time Scale Optimal Dispatching of Electro-thermal System Considering ElectricThermal Energy Storage and Flexible Load .....	1523

202008280000008	Robust Optimization of Integrated Energy System Considering Multiple Thermal Inertia and Wind Power Uncertainty	1529
202008300000093	Efficient Integration and Comprehensive Utilization of Renewable Energy Hydrogen Energy Based on DC Energy Routing	1537
202006300000008	The Design and Implementation of ID Generator for Power Internet of Things	1544
202007200000009	Digital Twin Modeling and Simulation of Distributed and Centralized Integrated Energy System on CloudPSS-IESLab	1550
202007240000006	Centralized Trading Pricing Strategy for Regional Integrated Energy System	1556
202008050000003	Application of Regional Integrated Energy Management and Service Management System	1568
202008180000020	Electromagnetic characteristics analysis of High Temperature Superconductor stack with magnetic substrate	1574
202008190000135	Multi-Regional Integrated Energy Service Business Model Based on Cost-Benefit Analysis	1580
202007060000004	A Novel High-Precision Method Based on Adaptive Unscented Particle Filter for BeiDouGPS Disciplined Crystal Oscillator	1587
202007080000006	Qualitative Knowledge Graph Model Construction Method of Transformer Maintenance	1593
202007280000001	Selection method of smart grid operation index based on maximum relevance and minimum redundancy	1599
202008140000023	Development of Evaluation Module for Relay Protection Competition of Intelligent Substation	1629
202008170000002	Research and Exploration of a Dual-path Security Check Mechanism for Remote Operation	1635
202008180000001		

Assessment and Quantify the Impact of Different Data Flow Control Methods on Digital Substation Communication Network	1641
202008190000035	
The Application of Blockchain for the Management of Engineering Projects in Power System	1648
202008190000078	
A Synchrophasor Estimation of Power Systems Considering Three-phase Amplitude Imbalance	1655
202008190000134	
Multi-level display for digital power grid based on homeomorphic transformation and hierarchical graph model	1661
202006230000001	
Research on Integrated Model and Interactive Influence of Energy Internet Cyber Physical System	1667
202007300000087	
Cellular Automata Based Cyber Risk Conduction Mechanism of Cyber Physical Power Systems	1672
202008180000005	
Data Adjustment Method for Cyber-Physical Systems Based on Unscented Particle Filter	1678
202008190000019	
A Resilience Enhancement Scheme of Cyber-Physical Power System for Extreme Natural Disasters	1684
202008190000029	
A Pilot Protection Scheme of Hybrid DC Line based on Mann-Kendall Test	1690
202008190000033	
Reliability evaluation of security and stability control device based on Monte Carlo and Fault Tree method	1697
202008190000110	
Comprehensive evaluation on Intelligent Substation Operation based on Cyber and Physical System model with variable weight	1703
202007010000011	
Study of Modeling of Dynamic Components in STEPS	1710
202007280000003	
The Intelligent Energy System Based on Internet of Things Helps Rural Electrification	1716
202007300000005	
Design of the Secondary Security Measure Skill Evaluation System for Smart Substations	1724
202007300000043	

Research and Application of Immersive Virtual Reality System Based on 3D Geographic Information System .....	1730
202008040000006	
Key Technologies Research and Equipment Development of Smart Substation Automation System .....	1736
202008040000015	
Research on Service-Oriented Substation Wide-Area Operation and Maintenance System and Its Application .....	1742
202008170000005	
Target Architecture of Distribution Network Monitoring System towards Energy Revolution and Digitization .....	1748
202008170000008	
Fault Current Calculation of MMC-HVDC With Varying Capacitance Equivalents .....	1754
202008180000007	
Deformation Simulation Analysis of Aluminum Strands of Conductor .....	1760
202008180000008	
Research on Verification Test of Tension Stringing for UHV Transmission Line Project .....	1766
202008190000094	
Analysis of the Influence of Voltage Recovery Process on Line Selection Device When Single-phase Grounding Fault Is Removed .....	1772
202008190000144	
Analysis and Algorithm Optimization of The Malfunction of Capacitor Overvoltage Protection .....	1778
202007080000007	
An Analysis of Factors Influencing the Demand for Smart Energy in Yunnan Province Based on Pearson Correlation Coefficient .....	1785
202007080000008	
Investigation and Analysis of the Present Situation of Smart Energy in Yunnan Province .....	1792
202007270000001	
Agent-based simulation analysis of the interaction effects between electricity market and carbon market .....	1798
202008190000025	
Theoretical Research Based on the Application of Safety Information Management in Power Construction Site .....	1804
202008190000054	
Mesosopic Analysis of Market-Based Electricity Price Fluctuation Modes .....	1810
202008190000060	

Design Scheme of Multifunctional Electric Energy Meter Based on Distributed Sampling Method .....	1817
202008190000069	
Research on Comprehensive Service System and Typical Application Scenarios of Urban Smart Energy System .....	1824
202008190000112	
Research on the Operation Management Mode of Intelligent Hydroelectric Power Plant .....	1831
202006170000002	
Coupled Thermal-Electromagnetic Simulation of Magnetic Controlled Reactor Using Finite Element Method .....	1837
202006290000018	
Optimization of High Back-pressure Unit and Cogeneration Unit to Improve Peaking Load Performance .....	1843
202006290000020	
Improving Peaking Load Performance by Unit Absorption Heat Pumps Optimization .....	1848
202007070000002	
Distributed Energy Sharing Service Model Based on the Aggregation of Idle Equipment .....	1853
202007080000002	
Peak and Valley Periods Partitioning Based on Improved K-medoids Algorithm .....	1860
202007270000004	
An Accurate Fault-Location Method for Distribution Network with Distributed Generators Based on Multi-Terminal Traveling Wave .....	1867
202007300000036	
Islanding Detecting Method Based on Harmonic Voltage Fluctuation Characteristic for Photovoltaic Grid-connected System .....	1874
202007300000039	
Power System Frequency Regulation with Fuel Cell Using Dynamic Power Flow .....	1880
202008170000010	
Location Evaluation of Multi-station Integration Based on AHP-Entropy Weight Method .....	1887
202008180000010	
Research on Energy Availability and Economy Coupling of Distributed Energy Supply System in Data Center .....	1893
202008190000028	
Optimal Pulse Width Modulated STATCOMs in Photovoltaic Power Plants .....	1899
202008190000031	

Voltage stability analysis method of distributed photovoltaic integration based on improved V-Q sensitivity .....	1907
202008190000040	
A Novel On-Site Short-Circuit Test Method Improving The Stability And Reliability Of The Distribution Network .....	1914
202008190000047	
Voltage Estimation of Distribution Network Based on Mean Impedance Method .....	1921
202008190000113	
Dynamic Island Partition Strategy for Active Distribution System with Controllable Load Participation .....	1927
202008260000031	
Convexity Analysis and Linear Approximation of Voltage Magnitude - Power Injection Mapping for Distribution Systems with Unknown Parameters .....	1939
202008300000132	
DC-Side Decoupling Method of DC-link Capacitor Reduction for Single Phase PWM Rectifier .....	1945
202008300000137	
A Cleaning Method for Outliers in Raw Wind Data Based on the Edge Detection and Variable-point Variance .....	1951
202006150000006	
Implementation of a Two-stage Single-phase Three-wire Power Conversion System .....	1958
202006300000021	
Research on Quench Detection Criterion of HTS SMES Magnet .....	1963
202007020000003	
Energy storage technology and its typical application in new energy grid connection system .....	1969
202007300000022	
PLL-free active synchronous grid-connected control strategy of distributed energy storage .....	1975
202007300000064	
Data-based Energy Storage System Configuration and Operation Considering Degradation Cost .....	1981
202007300000092	
Research on Simulation Modeling and experimental technology of large capacity distributed energy storage .....	1989
202008140000022	
A Battery Experiment Design for Electrical Engineering Course Extension Education .....	2002
202008190000038	
Distributed Cooperative Control Based on PI Consensus Algorithm for Energy Storage Units in Microgrids	

.....	2008
202008190000056	
A Hybrid Optimization Method for Distribution System Expansion Planning with Lithium-ion Battery Energy Storage Systems	
.....	2015
202008190000058	
Research on Hybrid Energy Storage System with High Power Density and High Energy Density	
.....	2022
202008190000093	
A Novel Virtualization Intelligent Power Supply with Large Capacity Energy Storage	
.....	2028
202008290000001	
Economic Feasibility Analysis of User-Side Battery Energy Storage Based on Three Electricity Price Policies	
.....	2034
202008290000029	
Planning Method and Principles of the Cloud Energy Storage Applied in the Power Grid	
.....	2040
202008300000116	
Research on Lithium-ion Battery Safety Risk Assessment Based on Measured Information	
.....	2047
202008300000123	
Research and Development of Large Capacity Battery Energy Storage Bidirectional Converter	
.....	2053
202006200000002	
Development of Economic Model Predictive Control for Permanent Magnet Synchronous Motor	
.....	2059
202006290000025	
Optimization of Heterogeneous Resources Combination using Virtual Power Plant based on Modern Portfolio Theory	
.....	2065
202006300000033	
Virtual Power Plant Platforms and Their Applications in Practice_ a Brief Review	
.....	2071
202007240000002	
Architecture and Key Technology of Intelligent Energy Service System Based on Industrial Internet	
.....	2077
202007260000001	
Production scheduling problem under peak power constraint	
.....	2083
202007290000008	
Optimal Mechanism Design for Incentive-Based Demand Response Based on Stackelberg Game	
.....	2089
202007300000055	
Investment Benefit Evaluation Model of New Electric Vehicle Charging Station in Old Town	



.....	2097
202007300000056	
Research on Optimal Scheduling of Electric Vehicles Considering Wind Power	
.....	2104
202007300000067	
Queueing Theory-Based Optimal Decision-Making Model of Battery Energy Storage-Assisted Fast Charging Station Participating in Emergency Demand Response	
.....	2110
202007300000076	
Technology research of demand side resources participating in dispatching control in energy Internet	
.....	2116
202007300000085	
Robust Dispatch with Demand Response under Decision-dependent Uncertainty	
.....	2122
202007300000090	
Development Pathway and Practices for Integration of Electric Vehicles and Internet of Energy	
.....	2128
202007300000096	
A Review of Decision-Making Strategies of Profit-Seeking Demand Response Aggregators	
.....	2135
202007300000099	
Non-intrusive Extraction and Forecasting of Residential Electric Vehicle Charging Load	
.....	2141
202008090000007	
Utility Decision-Making for Spinning Reserve Portfolios Considering Uncertainties from Both Generation and Demand Sides	
.....	2147
202008130000015	
Combination Decision Model in Long Time Scale considering Coordinated Charging and Distribution Transformer Extension	
.....	2160
202008160000002	
Data-driven Method Based Electric Vehicle Owner Identification	
.....	2166
202008170000015	
Power load forecasting of LSSVM based on real-time price and chaotic characteristic of loads	
.....	2172
202008190000030	
Analysis on Peak Clipping Effect of Distribution Network Based on Incentive Demand Response Participated by Electric Vehicles	
.....	2179
202008190000032	
Two-stage Electric Vehicle Charging Strategy for Reducing both Charging Cost and Transformer Aging	
.....	2187

202008190000095	Research on the evaluation index system of the quality basic ability of intelligent energy meter industry	2193
202008190000111	Optimization Control for Orderly Charge and Discharge Control Strategy of Electric Vehicles Based on Reliable Index of Charging	2200
202008190000150	Charging Guiding Strategy for PET Based on Q Learning Algorithm	2206
202008250000006	Research and Development of Flexible Load Aggregator Energy Management and Simulation System	2213
202006230000006	A Microgrid Capacity Optimization Method Considering Carbon Emission Cost	2219
202007010000023	Control Strategy of DC nanogrid Based on hierarchical bus voltage control and droop control	2237
202007050000004	Research on the Influence of Microgrid to Distribution Network Protection and Improvement Measures	2243
202007300000058	Optimal Scheduling Strategy with Multi-time Scales for PV-Storage Based Charging Station	2249
202008050000010	Optimal Scheduling Strategy of Microgrid Participating in Upper Power Grid Based on Flexibility of Distributed Power	2256
202008190000075	Study on Tunneling Magnetoresistance Based Symmetrical Air-Gap Current Sensor for Medium-Voltage DC Systems	2262
202008190000081	Reserve-energy joint optimal scheduling based on Conditional Value-at-Risk for Islanded Microgrids	2269
202008230000004	Real-time Optimal Operation of Microgrid with Power-to-hydrogen	2275
202008300000135	Improvement Method of Supply Capacity for Distribution Network Considering Certain Components N-1	2281
202007290000001	Analysis of Fuel Flow and Pollution Flow Based on The Energy Tracing Results of Power Grid Source-flow	

.....	2287
202008090000006	
The Adaptive Model of Demand-Side Electricity Market Based on the Blockchain	
.....	2294
202008300000117	
Applications of NILM in the Optimization Management of Intelligent Home Energy Management System	
.....	2300
202005250000003	
Big data analysis of unburned carbon in fly ash for the optimization in a coal-fired power plant	
.....	2306
202006040000003	
Study on the operating condition division and multi-objective optimization of thermal power units based on Apache Spark	
.....	2312
202006060000001	
TDV-LSTM _ A New Methodology for Series Arc Fault Detection in Low Power AC Systems	
.....	2319
202006090000002	
A New Method to Evaluate and Predict the Load Capacity of Transformer in Energy Internet with Data Mining Algorithm	
.....	2325
202006230000007	
Power System Disturbance Identification with Missing PMU Data	
.....	2330
202006280000002	
A method of electromagnetic vibration power generation based on washing machine	
.....	2342
202006300000025	
Multi-objective transmission network expansion planning based on Reinforcement Learning	
.....	2348
202006300000036	
Design and Realization of Data Application Architecture oriented to the Requirements of Distribution Network	
.....	2354
202007010000002	
Critical Clearing Time Prediction of Power System Fault Based on Machine Learning	
.....	2360
202007010000008	
Research and application of predictive control based on deep learning modeling	
.....	2366
202007010000021	
Power Metering Wiring Evaluation System Based on Machine Vision Technology	
.....	2372
202007170000004	
Scenario Analysis and Anomaly Detection of Locational Marginal Price in Electricity Market	

.....	2378
202007230000003	
Stacking-based estimation of maximal transient voltage drop with unified fault location representation	
.....	2391
202007300000007	
Short-term load forecasting of multi-layer LSTM neural network considering temperature fuzzification	
.....	2398
202007300000030	
High-performance Machine Learning in Enabling Large-scale Load Analysis Considering Class Imbalance and Frequency Domain Characteristics	
.....	2411
202007300000042	
An Operation Reliability Analysis Method Of Distribution Networks Based On Data And Physical Fusion Models	
.....	2417
202007300000068	
An Improved Support Vector Machine Method for Transient Stability Assessment in Bulk Power Grid	
.....	2423
202007300000070	
Analysis of Frequent Tube Burst of High Temperature Reheater in 600 MW Unit	
.....	2429
202007300000075	
Location representation of single-position fault for power system transient stability intelligent assessment	
.....	2435
202007300000079	
Research on intelligent construction technology of transmission line stringing based on line length accurately laying	
.....	2442
202007300000098	
Decision Tree Based Subsynchronous Oscillation Detection and Alarm Method Using Phasor Measurement Units	
.....	2448
202008110000005	
Intelligent Recognition of Corona Discharges by Visible Images	
.....	2460
202008110000006	
High performance load pattern identification in the scenario of high proportion data missing	
.....	2467
202008170000017	
A Self-Constructed CNN Classifier for Keyhole Detection and Location	
.....	2479
202008180000021	
Temperature Recognition for Normal Temperature Metal Based on The Statistical Features of Visible Image and K-nearest Neighbor Algorithm	
.....	2485
202008190000013	

Reduction of Commutation Failure Frequency in HVDC Transmission Systems by means of an Improved Solid-State Fault Current Limiter .....	2493
202008190000014	
An Improved Statistical Algorithm for Topology Identification and Parameter Estimation of Low-voltage Distribution Grids .....	2500
202008190000018	
Steady-state power quality comprehensive evaluation of grid-connected photovoltaic system based on Bayes discriminant analysis .....	2506
202008190000027	
A Fault Diagnosis Method of Active Distribution Network Based on Fault Search Table and Data Mining Technology .....	2512
202008190000066	
Research on Fault Intelligent Identification and Control System of Large ACDC Hybrid Grid .....	N/A
202008190000076	
Small Magnitude PMU Bad Data Detection Based on Data Mining Technology .....	2526
202008190000079	
Improving correlation-based consumer phase identification for incomplete data .....	2533
202008190000080	
Low-voltage station area topology recognition method based on weighted least squares method .....	2539
202008190000104	
Study on Conductor Creep Characteristics and Test Model of UHVDC Transmission Line .....	2545
202008190000115	
Distribution power system state estimation based on Gaussian mixture model-Neural network .....	2552
202008190000125	
State of Health Estimation of LiFePO <sub>4</sub> Battery based on Probability Density Function .....	2558
202008190000126	
Short-Term Load Forecasting Method for Low Voltage Users Based on Deep Belief Neural Network .....	2564
202008190000129	
Research on Power System State Estimation Technology Considering Data Filling Technology .....	2570
202008190000138	
LightGBM-Based Prediction of Remaining Useful Life for Electric Vehicle Battery under Driving Conditions	

.....	2577
202008240000012	
Variable Input Structure User Load Forecasting Method Based on User Load State Identification	
.....	2583
202008240000013	
High-Precision User Load Forecasting Based On Wavelet Denoising	
.....	2590
202008250000008	
The Multi-Agent Competition Analysis in Day-ahead Electricity Market Considering Demand Side Bidding	
.....	2597
202008300000120	
Key Features Analysis of Transient Stability and its Application in Dynamic Security Assessment	
.....	2603
202008300000125	
Frequency Stability Control Method of ACDC Power System Based on Convolutional Neural Network	
.....	2609
202008300000148	
Cluster Recognition and Early Warning Modeling for Rotating Stall of Gas Turbine	
.....	2616
202007300000091	
Block-chain based Energy Tracing Method for Electric Vehicles Charging	
.....	2622
202007300000097	
Study on Electric Vehicle Sharing and Leasing Business Model for Group Users based on Blockchain	
.....	2628
202008190000106	
Research on Integrated Energy Trading Mechanism Based on Blockchain Smart Contract Technology	
.....	2634
202006280000003	
Vulnerability Assessment of WAMS Communication System in the Energy Internet Based on Attack Tree Model	
.....	2640
202007150000002	
A 5G communication based adaptive current differential protection for distribution networks	
.....	2646
202008190000002	
Research on the Integrated Space-Air-Ground Communication Network Based on Network Slicing and its Key Technologies	
.....	2652
202008190000053	
Research on the Total Solution for Relay Protection of the Wise Substation Based on Comprehensive Perception	
.....	2658
202008190000119	
Research on Differential Protection and Power Recover Technology of Distribution Network Based on 5G	
.....	2664

202007300000045	
Research on a New Generation of Intelligent Fusion Terminal and Its Intelligent Test System	
.....	2670
202007300000080	
Design of Wireless Intelligent Monitoring System for Inner Suspension Inner Backstay Derrick for Tower Erection in Sections	
.....	2676
202008150000005	
Design of Spatial DC Total Electric Field Measurement System Based on Edge-Cloud Collaboration	
.....	2683
202008190000108	
Research on Edge Computing-oriented Storm Edge Node Scheduling Optimization Strategy	
.....	2689
202008230000007	
Real-time Energy Management of Large-scale Data Centers_ A Model Predictive Control Approach	
.....	2695
202006300000023	
Key Technologies of Large Power Grid Security and Stability Intelligent Sand Table Deduction	
.....	2702