

Proceedings of the International Conference on Smart Grid and Clean Energy Technologies

(ICSGCE 2011)

Energy Procedia Volume 12

**Chengdu, China
27-30 September 2011**

Volume 1 of 2

Editors:

Qi Huang

Jason Z. Kang

**ISBN: 978-1-62748-413-8
ISSN: 1876-6102**

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2011) by Elsevier B.V.
All rights reserved.

Printed by Curran Associates, Inc. (2013)

For permission requests, please contact Elsevier B.V.
at the address below.

Elsevier B.V.
Radarweg 29
Amsterdam 1043 NX
The Netherlands

Phone: +31 20 485 3911
Fax: +31 20 485 2457

<http://www.elsevierpublishingsolutions.com/contact.asp>

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com



Contents

Editorial to the First International Conference on Smart Grid and Clean Energy Technologies (ICSGCE 2011) Q. Huang, J.Z. Kang	1
Message from the Organizing Committee of the first International Conference on Smart Grid and Clean Energy Technologies (ICSGCE 2011) D. Sutanto	2
Power Distribution System Planning for Smart Grid Applications using ANN Y.S. Qudaih, Y. Mitani	3
Investment Evaluation System Development based on Unified Information Platform for Future Smart Grid H. Chen, K. Feng, Q. Zhang, Z. Zhao, L. Zhang, J. Li, K. Wu	10
An Evolutive and Multilingual CIM Ontology Management System L. Wang, A. Hosokawa, H. Murayama	18
Terrestrial-Satellite Hybrid Backbone Communication Network for Smart Power Grid C. Deng, X. Xiao, Z. Fu, G. Liu, H. Yang, J. Liu	27
Beidou Time Synchronization Receiver for Smart Grid S. Ye	37
Q-Learning Approach for Hierarchical AGC Scheme of Interconnected Power Grids B. Zhou, K.W. Chan, T. Yu	43
The Feasible Analysis of Business Operation Model for Power Fiber to the Home S. Li, N. Song, G. Li	53
Multi-Agent-based Cloud Architecture of Smart Grid X. Jin, Z. He, Z. Liu	60
Costs and Benefits of Smart Grids and Accumulation in Czech Distribution System M. Adamec, P. Pavlatka, O. Stary	67
Dynamic Residential Demand Response and Distributed Generation Management in Smart Microgrid with Hierarchical Agents B. Jiang, Y. Fei	76
TFP Electricity Consumption Efficiency and Influencing Factor Analysis based on DEA Method T. Shu, X. Zhong, S. Zhang	91
Smart Grid Facing the New Challenge: The Management of Electric Vehicle Charging Loads C. Zhang, Q. Huang, J. Tian, L. Chen, Y. Cao, R. Zhang	98
An Improved Non-Intrusive Load Monitoring Method for Recognition of Electric Vehicle Battery Charging Load P. Zhang, C. Zhou, B.G. Stewart, D.M. Hepburn, W. Zhou, J. Yu	104
Research on Technologies in Smart Substation H. Li, L. Wang	113
Smart Home Renewable Energy Management System A.R. Al-Ali, A. El-Hag, M. Bahadiri, M. Harbaji, Y.A. El Haj	120
Research on China's Power Sector Carbon Emissions Trading Mechanism F. Zhang, Y. Guo, X. Chen	127
Demand Side Response to Mitigate Electrical Peak Demand in Eastern and Southern Australia M. Marwan, F. Kamel	133
Energy Conservation Potential in SMEs of Thailand M. Prukvilailert, P. Wangskarn	143
Evaluation the Designated Government Buildings Promotion in Thailand P. Wangskarn, M. Prukvilailert	149
Study of SEA Indicators System of Urban Green Electricity Power based on Fuzzy AHP and DPSIR Model C. Cheng, Y.-H. Zhou, K.-W. Yue, J. Yang, Z.-Y. He, N. Liang	155
Calculation of the Critical Value Price of Distributed Generation Considering Transmission Loss Cost L. Lei, B. Hai, W. Ling	163
Smart Grid Fault Detection using Locally Optimum Unknown or Estimated Direction Hypothesis Test Q. He, R.S. Blum	170
Application of a Load Forecasting Model based on Improved Grey Neural Network in the Smart Grid N. Tang, D.-J. Zhang	180
Performance Testing on GOOSE and MSV Transmission in One Network J. Li, Q. Huang, F.-k. Hu, S. Jing	185
A Monitoring System Design in Transmission Lines based on Wireless Sensor Networks Y. Yang, G. Xie, X. Xu, Y. Jiang	192
A Dynamic Load Control Scheme for Smart Grid Systems C.-xu Liu, Q.-A. Zeng, Y. Liu	200

Survey on Microgrid Control Strategies	
W. Huang, M. Lu, L. Zhang	206
Clean Energy Grid-Connected Technology based on Smart Grid	
L. Peng, G.-S. Yan	213
Review of Smart Grid Comprehensive Assessment Systems	
Q. Sun, X. Ge, L. Liu, X. Xu, Y. Zhang, R. Niu, Y. Zeng	219
A Novel Ranging Method based on RSSI	
H. Wang, J. Wan, R. Liu	230
A Fast and Robust Load Flow Method for Distribution Systems with Distributed Generations	
H. Sun, D. Nikovski, T. Ohno, T. Takano, Y. Kojima	236
Comparison Study of Two Meta-Heuristic Algorithms with Their Applications to Distributed Generation Planning	
R. Shi, C. Cui, K. Su, Z. Zain	245
Multi-Objective Service Restoration for Blackout of Distribution System with Distributed Generators based on Multi-Agent GA	
L. Zhang, L. Sun	253
Coordination Return of Protective Devices in Distribution Systems in Presence of Distributed Generation	
B. Abdi, M. Abroshan, M.H. Aslinezhad, A. Alimardani	263
Distribution Network Reconfiguration based on Simulated Annealing Immune Algorithm	
J. Chen, F. Zhang, Y. Zhang	271
Reliability Assessment of Distribution Networks with Distributed Generations using Monte Carlo Method	
X. Zhang, Z. Bie, G. Li	478
Equilibrium of Distribution Network Facilities: Problem Formulation and Application	
W. Wei, S. Fang, Z. Ma	287
Improving Grid Transmission Capacity and Voltage Quality in Low-Voltage Grids with a High Proportion of Distributed Power Plants	
P. Esslinger, R. Witzmann	294
The Decoupled Control Research of UPQC	
Z. Liang, B. Lu, T. Bai, S. Wang, K. Liu, S.F. Yin, J. Zhang	303
Study of New Vibration Suppression Devices for Application to EHV Transmission Line Groundwires	
S. Liu, N. Sun, Q. Yin, Y. Qi, D. Cao, L. Zhang	313
Temperature Distribution and Pressure Response of GIS on Partially Overheated State	
S. Fan, J. Li, C. Hu, P. He, H. Nie, D. Gan	320
Power Grid and Alternating Current Distribution Research of Renewable Energy Generate Electric Power's Village System	
D. Xi, L. Hu, X. Li	328
75V Space-Efficiency Trench Power MOSFET	
L. Yu, Q. Feng	335
High Permittivity Dielectric LDMOS for Improved Performance	
J. Li, P. Li	341
A Novel Grid-Connected Converter with Active Power Filtering Function	
C. He, X. Xie, H. Yan, C. Xie, G. Chen	348
The Device Parameters Simulation of Electrical Fast Transient Generator	
Z. Wu, D. Qi	355
The Study of Fast Optimal Generator Shedding based on Predictor-Corrector Method	
B. Wang, Z. Wang	361
Simulation and Control Strategy of a Micro-Turbine Generation System for Grid Connected and Islanding Operations	
X. Guo, H. Guo	368
Construction of System Restoration Strategy with PMU Measurements	
Y. Hou, S. Liu, Z. Qin	377
Short-Term Load Forecasting based on Gaussian Wavelet SVM	
Y. Zheng, L. Zhu, X. Zou	387
The Investigation on the Lifetime Prediction Model of IGBT Module	
B. Liu, D. Liu, Y. Tang, M. Chen	394
Theoretical Research on Ferroresonance in Neutral Grounded Power System	
F. Liu, M. Li, P. Liu, Y. Cao, H. Zeng	403
Infrared Electric Image Thresholding using Two-Dimensional Fuzzy Renyi Entropy	
S. Fan, S. Yang, P. He, H. Nie	411
Online Partial Discharge Detection and Location System Using Wireless Sensor Network	
X. He, G. Xie, Y. Jiang	420
Power Fiber to the Home Opens Up a New Approach of Integration of Three Networks	
G. Nan, S. Zhang, Y. Lin, G. Zhang	429
Research of Control Strategy of STATCOM in AC/DC Hybrid Power System	
L. Ding, Y. Miao	437
Research of Coordinated Control Strategy for Multi-UHVDC in AC/DC Hybrid Power Grid	
S. Liu, L. Ding, Y. Miao	443
Effect of Oxygen Partial Pressure on the Optical Property of Amorphous Titanium Oxide Thin Films	
Y. Ju, L. Li, Z. Wu, Y. Jiang	450
Process Effects on Heat-Sensitive Properties of Sputtered TiO _x Thin Film	
L. Li, Z. Wu, Y. Ju, C. Chen	456
Recent Development of Grid-Connected PV Systems in China	
H. Wu, Y. Hou	462

Energy Management of Stand-alone Hybrid PV System C. Wang, W. Chen, S. Shao, Z. Chen, B. Zhu, H. Li	471
Local Weather Effect on the Town Island PV System W.W.T. Fok, T.K. Cheng, P.W.T. Pong, C.C. Ngan, R. Ho	480
Solar Irradiance Short-Term Prediction Model based on BP Neural Network Z. Wang, F. Wang, S. Su	488
Mitigation of Voltage Unbalance in Low Voltage Distribution Network with High Level of Photovoltaic System K.H. Chua, J. Wong, Y.S. Lim, P. Taylor, E. Morris, S. Morris	495
Growth of Diameter-Controlled ZnO Nanorod Arrays by Hydrothermal Technique for Polymer Solar Cell Application Z. Yuan, J. Yu, Y. Jiang	502
Improvement in Open-Circuit Voltage for Organic Solar Cells based on Subphthalocyanines and C60 J. Huang, J. Yu, Y. Qi, Y. Jiang	508
Effect of Molybdenum Oxide Anode Buffer Layer on the Performance of Inverted Small Molecular Organic Solar Cells Y. Zang, J. Huang, H. Li, J. Yu, Y. Jiang	513
Organic Solar Cells using Tin (II) Phthalocyanine as Donor Material C. Du, J. Yu, J. Huang, Y. Jiang	519
Effect of Ultrathin Magnesium Layer on the Performance of Organic Light-Emitting Diodes W. Wang, H. Zeng, Q. Li, S. Yu	525
Thermal Model based Power-Generated Prediction by using Meteorological Data in BIPV System C.Y. Huang, H.J. Chen, C.C. Chan, C.P. Chou, C.M. Chiang	531
Maximum Power Point Tracking of Photovoltaic Generation based on the Type 2 Fuzzy Logic Control Method A. Gheibi, S.M.A. Mohammadi, M. Maghfoori	538
Numerical Study on a Novel Photovoltaic/Thermal Heat Pump System H. Chen, P. Wei	547
Analysis of Computation Model of Particle Deposition on Transmittance for Photovoltaic Panels J. Zang, Y. Wang	554
Photovoltaic based Dynamic Voltage Restorer with Outage Handling Capability using PI Controller M. Ramasamy, S. Thangavel	560
Integrated Solar Controller for Solar Powered Off-Grid Lighting System Z. Yi He, H. Chen	570
Accelerated Aging Tests on PV Grounding Connections E. Wang, K.-H. Yen, C. Wang, L. Ji, T. Zgonena	578
Small Scale PV Monitoring System Software Design M. Anwari, M.M. Dom, M.I.M. Rashid	586
The Indoor Thermal Research of the HCRI-BIPV Smart Window H.-J. Chen, C.-M. Shu, C.-M. Chiang, S.-K. Lee	593
An Overview: The Development of Prediction Technology of Wind and Photovoltaic Power Generation Z.W. Zheng, Y.Y. Chen, M.M. Huo, B. Zhao	601
Self-Assembled of Conducting Polymeric Nanoparticles and its Application for OLED Hole Injection Layer W. Junfeng, J. Yadong, Y. Yajie, Y. Junsheng, X. Jianhua	609
Spectral Response of Metal-Semiconductor-Metal Photodetector based on Black Silicon S. Yuanjie, J. Yadong, W. Zhiming, Z. Guodong	615
Influence of Doping Concentrations in White Organic Light-Emitting Diodes based on Phosphorescent Iridium Complexes X. Lei, J. Yu, Y. Jiang	620
Volatile Organic Compound Colorimetric Array based on Zinc Porphyrin and Metalloporphyrin Derivatives L. Jing, X. Jianhua, X. Shuang	625
Effects of Oxygen Flow on the Infrared Switching Properties of Vanadium Oxide Thin Films W. Yao, W. Zhiming, L. Zhenfei, W. Tao, J. Yadong	632
Modeling of Electric Power Transformer using Complex-Valued Neural Networks Y.S. Chistyakov, E.V. Kholodova, A.S. Minin, H.-G. Zimmermann, A. Knoll	638
Study on a New Transformer Main Protection Scheme X. Wang, Z. Wang	648
Winding Considerations on the High Frequency Transformers B. Abdi, A.A. Nasiri, M.H. Aslinezhad, M. Abroshan	656
Transformer Fault Diagnosis based on Feature Selection and Parameter Optimization H. Han, W. Hou-Jun, D. xiucheng	662
A Novel Method of Transformer Fault Diagnosis based on Extension Theory and Information Fusion in Wireless Sensor Networks K. Shao	669
Effect of Transformer's Parameters on Harmonic Generation B. Abdi, A.H. Ranjbar, V. Farabi, M.S. Yazdanparast	679
Research and Design of Portable Fault Recorder based on FPGA C. Qiong, W. Zhao-Hui	686
Application of Synthetic Relative Measuring Method in On-Line Monitoring for Capacitive Equipment G. Qing, Q. Lijun, H. Cuijuan, W. Ying	693
Optimal Excitation Controller Design of Synchronous Generator based on DSP X. Li, L. Zhang	703
A Fast Self-Adaptive Algorithm for the Enhancement of Infrared Electric Image S. Fan, S. Yang, P. He, H. Nie	711

Design of Intelligent Inductive Security System based on Wireless Sensor Network X. Cai, A. Hu, R. Liu	718
Comparative CO ₂ -Sensing Characteristic Studies of PEI and PEI/Starch Thin Film Sensors B. Sun, G. Xie, Y. Jiang, X. Li	726
Tabu Search Algorithm Optimized ANN Model for Wind Power Prediction with NWP S. Han, J. Li, Y. Liu	733
Studies on Sensor-Less Hysteretic Multi-Scalar Control of Doubly Fed Machine for Wind Power Generators Y. Zhang, Z. Wang, Z. Bie, J. Chen	741
Affect Analysis of Power Grid Energy Quality for Coastal Wind Power Access S. Chen, N. Gao, H. Shen, Y. Quan, C. Wang, L. Zhu, J. Liu	752
Review of Evaluation Criteria and Main Methods of Wind Power Forecasting X. Zhao, S. Wang, T. Li	761
A Review of Wind Power Forecasting Models X. Wang, P. Guo, X. Huang	770
Optimization of Fuel Consumption in Micro-Turbines A. Alimardani, H. Keshkar, B. Abdi	779
Optimization of Rotor Speed Variations in Microturbines H. Keshkar, A. Alimardani, B. Abdi	789
The Requirements and Technical Analysis of Low Voltage Ride Through for the Doubly-Fed Induction Wind Turbines C.-guang Niu, G.-qi Liu	799
Designing Pitch Controller for Large Wind Turbines via LMI Techniques H. M. Hassan, W.A. Farag, M. Shawkey, A.L. ElShafei	808
Reliability Assessment of Interconnected Generation Systems based on Hourly Wind Speed Probability Model W.-H. Shi, J. Chen	819
A Gaussian RBF Network based Wind Speed Estimation Algorithm for Maximum Power Point Tracking L. Tian, Q. Lu, W.-z. Wang	828
Measurement of Wind Speed and Direction with Ultrasonic Sensor using FPGA K. Xie, K. Wang	837
Optimal Power Control Model of Direct Driven PMSG C.-L. Dang, L. Zhang, M.-X. Zhou	844
Comfort-Constrained Distributed Heat Pump Management S. Parkinson, D. Wang, C. Crawford, N. Djilali	849
Orthogonal Experiment Optimum Design in the Power of the Rotor on Straight-Bladed VAWT S. Tang, Y. Xu, G. Zhu, W. Fang	856
Visibility and Potential of Solar Energy on Horizontal Surface at Kuwait Area F.Q. Al-Enezi, J.K. Sykulski, N.A. Ahmed	862
A New Method of Producing Bio-Energy by using Sugar-Beets G.-Q. Zhou, G.-F. Zhang, D.-M. Qi	873
Potential of Advanced Coal and Gas Combustion Technologies in GHG Emission Reduction in Developing Countries from Technical, Environmental and Economic Perspective S.L. Koh, Y.S. Lim, S. Morris	878
Method Study on Reducing the City Gas Winter Summer Peak Valley Dissimilarity J. Han, Z. Yang	886
Study on Combustion Parameters of Liquefied Petroleum Gas Engine G. Lu, L. Li	897
A Study on the Thermal Performance of Vertical U-Tube Ground Heat Exchangers Z. Zheng, W. Wang, C. Ji	906
Use of Wastes in Construction Industries as an Energy Saving Approach Md. R. Karima, M.F.M. Zain, M. Jamil, F.C. Lai, Md. N. Islam	915
Vortex Patterns of the Flow in a Curved Duct X. Wu, S. Lai, K. Yamamoto, S. Yanase	920
Electricity Generation by the Tidal Barrages A. Etemadi, Y. Emami, O. AsefAfshar, A. Emdadi	928
Electricity Generation by the Ocean Thermal Energy A. Etemadi, A. Emdadi, O. AsefAfshar, Y. Emami	936
Review of Methods used for Microalgal Lipid-Content Analysis Y. Han, Q. Wen, Z. Chen, P. Li	944
Optimized Fuzzy Control Algorithm in Integration of Energy Storage in Distribution Grids A. Darvishi, A. Alimardani, B. Abdi	951
Optimization and Analysis of Distributed Energy System with Energy Storage Device H. Yun, W. Li	958
Comparison of Sliding Mode and PI Control of a Hybrid Energy Storage System in a Microgrid Application A. Etxeberria, I. Vechiu, H. Camblong, J.-M. Vinassa	966
Mitigation of Wind Power Fluctuation by Combined use of Energy Storages with Different Response Characteristics G. Wu, Y. Yoshida, T. Minakawa	975
The Study and Exploration of a New Generation of Photovoltaic Energy Storage System H. Jin, L. Qin, C. Hao, L. Wang, F. Jiao	986
Application of Fuzzy Wavelet Transform to Smooth Wind/PV Hybrid Power System Output with Battery Energy Storage System X. Li, Y. Li, X. Han, D. Hui	994

A Simple Analog BLDC Drive Control for Electro-Mechanical Energy Storage System	
B. Abdi, M.M. Teymoori, H. Gholamrezaei, A.A. Nasiri	1002
Design and Realization of Microgrid Composing of Photovoltaic and Energy Storage System	
J. Wang, X. Li, H. Yang, S. Kong	1008
PV Fluctuation Balancing using Hydrogen Storage – a Smoothing Method for Integration of PV Generation into the Utility Grid	
S.G. Tesfahunegn, Ø. Ulleberg, P.J.S. Vie, T.M. Undeland	1015
Theoretical Analysis of Rotating Hollow Cylinder’s Vibrations	
L. Yazdanparast, B. Abdi, A.H. Ranjbar, S.M.M. Mirtalaei	1023
Grid Support with Variable Speed Wind Energy System and Battery Storage for Power Quality	
S.W. Mohod, S.M. Hatwar, M.V. Aware	1032
Numerical Simulation of Internal Melt Ice-on-Coil Thermal Storage System	
Z.-H. Zheng, C. Ji, W.-X. Wang	1042
Energy Conversion Stage Design of Solar Water Pump in a Nanofiltration System	
C. Jin, B. Wang, D. Jiang, W. Jiang	1049
A Study of “Pump Type” Matrix Converter with High Voltage Transfer Ratio	
H. Wan, J. Huang, Y. Pan	1057
Research on Producing Low-Power Low-Voltage DC Power Supply with High-Voltage Power Bus	
Y.-H. Liu	1068
Control Strategy for Domestic Water Heaters during Peak Periods and its Impact on the Demand for Electricity	
A. Moreau	1074
Application of Analytic Hierarchy Process in the Planning of Energy Supply Network for Electric Vehicles	
B. Li, X. Chang	1083
Series-Parallel Resonant High Frequency Inverter for Stand-alone Hybrid PV/Wind Power System	
P. Kong, J. Zhao, Y. Xing	1090