

# **2011 IEEE EnergyTech**

**Cleveland, Ohio, USA**  
**25 – 26 May 2011**



**IEEE Catalog Number: CFP1138P-PRT**  
**ISBN: 978-1-4577-0777-3**

# TABLE OF CONTENTS

<b>A Hybrid Topology for Reducing DC Link Voltage Rating in DSTATCOM Applications</b> .....	1
<i>Srinivas Bhaskar Karanki, G. Nagesh, Mahesh K. Mishra, B. Kalyan Kumar</i>	
<b>Maximize User Rewards in Distributed Generation Environments Using Reinforcement Learning</b> .....	7
<i>Bei Li, Siddharth Gangadhar, Samuel Cheng, Pramode K. Verma</i>	
<b>Study on Scale-Free Characteristic on Propagation of Cascading Failures in Power Grid</b> .....	13
<i>Nan Yang, Wenying Liu, Wei Guo</i>	
<b>Fiber Bragg Grating Sensor for Differential Fault Detection in Overhead Power Transmission Lines</b> .....	18
<i>Amin Moghadas, Ronald Barnes, Mehdi Shadaram</i>	
<b>Modeling and Performance Analysis of Microturbine Based Distributed Generation System, “A Review”</b> .....	22
<i>D. N. Gaonkar, Sanjeev Nayak</i>	
<b>Assessment of Voltage Sag in Distribution System Regarding The Uncertainty of Wind Based Distributed Generation</b> .....	28
<i>Bach Quoc Khanh</i>	
<b>Control of a Back-to-Back VSC System from Grid-Connection to Islanded Mode in Microgrids</b> .....	34
<i>Ling Xu, Zhixin Miao, Lingling Fan</i>	
<b>Coordination between DFIG-based Wind Farm and LCC-HVDC Transmission Considering Limiting Factors</b> .....	40
<i>Haiping Yin, Lingling Fan, Zhixin Miao</i>	
<b>Financing Models of Energy Performance Contracting Projects</b> .....	46
<i>Tiancheng Shang, Yuntao Luo, Peihong Liu, Junqing Gao</i>	
<b>Modeling, Analysis, and Validation of a Preliminary Design for a 20 kV Medium Voltage DC Substation</b> .....	51
<i>Gregory F. Reed, Brandon M. Grainger, Matthew J. Korytowski, Emmanuel J. Taylor</i>	
<b>High-Power Switching in Semiconductors - What is Beyond Silicon Thyristor?</b> .....	59
<i>K. Shenai, P. G. Neudeck, M. Dudley, R. F. Davis</i>	
<b>Evaluation of Operating Modes of Micro-Cogeneration Units and a Modification of the Load Profile</b> .....	65
<i>Jan Teuwsen, Lukas Spitalny, Johanna M. A. Myrzik, Christian Rehtanz</i>	
<b>Application of a New IEC Magnetic Field Assessment Methodology to Promote Transformer Substation Sustainable Development</b> .....	71
<i>J. Izagirre, L. Del Río, I. P. Gilbert, J. E. Rodriguez-Seco, J. A. Güemes, A. M. Iralagoitia</i>	
<b>Simulated Demand Response of a Residential Energy Management System</b> .....	77
<i>Curtis Roe, Sakis Meliopoulos, Robert Entriken, Sunil Chhaya</i>	
<b>Efficient Integrated DC-DC Power Converters - Advanced Technologies and New Challenges</b> .....	83
<i>K. Shenai, G. H. Bernstein, J. Wu</i>	
<b>Accelerated Aging with Electrical Overstress and Prognostics for Power MOSFETs</b> .....	89
<i>Sankalita Saha, Jose R. Celaya, Vladislav Vashchenko, Shompa Mahiuddin, Kai F. Goebel</i>	
<b>Transient Stability and Voltage Regulation in Power Systems with Renewable Distributed Energy Resources</b> .....	95
<i>Adirak Kanchanaharuthai, Vira Chankong, Kenneth Loparo</i>	
<b>Appliance of Direct and Indirect Demand Side Management</b> .....	101
<i>Mike Ifland, Nadine Exner, Dirk Westermann</i>	
<b>MPPT Control Strategy for Wind Energy Conversion System Based on RBF Network</b> .....	107
<i>Whei-Min Lin, Chih-Ming Hong, Fu-Sheng Cheng, Kai Hung Lu</i>	
<b>Ride-Through Fault Generalized Control Method for a Wind Turbine Inverter</b> .....	113
<i>Xiangpeng Zheng, Ana Vladan Stankovic</i>	
<b>Estimation of System Reliability Using a Semiparametric Model</b> .....	119
<i>Leon Wu, Timothy Teräsväinen, Gail Kaiser, Roger Anderson, Albert Boulanger, Cynthia Rudin</i>	
<b>General Estimation of Reactive Power Control of DG Sources on Voltages in Distribution Grids</b> .....	125
<i>M. Wolter, L. Hofmann</i>	
<b>Metrics and Benefits Analysis and Challenges for Smart Grid Field Projects</b> .....	131
<i>S. J. Bossart, J. E. Bean</i>	
<b>Initial Observations from Monitoring the In-situ Performance of a Community-Scale Wind Turbine Support Structure</b> .....	136
<i>Michael C. Pollino, Arthur A. Huckelbridge Jr.</i>	

<b>Speed Sensor Less Direct Torque Controlled Induction Motor Drive With Constant Switching Frequency Operation.....</b>	140
<i>Abhijit Choudhury, Kishore Chatterjee</i>	
<b>Smart Grid Communication and Co-Simulation .....</b>	146
<i>Vincenzo Liberatore, Ahmad Al-Hammouri</i>	
<b>Power System Economic Dispatch with Spatio-temporal Wind Forecasts .....</b>	151
<i>Le Xie, Yingzhong Gu, Xinxin Zhu, Marc G. Genton</i>	
<b>Thermal Stability Testing of Fischer-Tropsch Fuel and Various Blends With Jet A, as well as Aromatic Blend Additives .....</b>	157
<i>J. Klettlinger, R. Rich, C. Yen, A. Surgenor</i>	
<b>Optimization of Cantilever Beam Parameters in Flutter for PiezoElectric Power Harvest .....</b>	163
<i>A. V. Balakrishnan, O. S. Alvarez-Salazar</i>	
<b>Alternative Fuel Research in Fischer-Tropsch Synthesis .....</b>	166
<i>Angela D. Surgenor, Jennifer L. Klettlinger, Chia H. Yen, Leah M. Nakley</i>	
<b>A Novel Technique To Enhance Wind Power Generation In Moderate Wind Speed .....</b>	173
<i>J. A. Al-Nouman, S. J. Ranade</i>	
<b>PEV Charging Impact on Residential Distribution Transformer Life.....</b>	179
<i>Q. Gong, S. Midlam-Mohler, V. Marano, G. Rizzoni</i>	
<b>Modeling of Power Generation Pollutant Emissions Based on Locational Marginal Prices for Sustainable Water Delivery .....</b>	185
<i>Timothy H. Carter, Caisheng Wang, Stephen S. Miller, Shawn P. McElmurry, Carol J. Miller, Ian A. Hutt</i>	
<b>Combined Studies of Power Electronics and Communication Networks for the Smart Grid.....</b>	191
<i>L. C. Herrera, F. Guo, R. Murawski, E. Ekici, J. Wang</i>	
<b>Solar Radiation Durability of Materials Components and Systems for Low Concentration Photovoltaic Systems .....</b>	196
<i>Roger H. French, Myles P. Murray, Wei-Chun Lin, Kara A. Shell, Scott A. Brown, Mark A. Schuetz, Robert J. Davis</i>	
<b>Multi-time-scale Modeling and Analysis of Energy Storage in Power System Operations .....</b>	201
<i>Le Xie, Anupam A. Thatte, Yingzhong Gu</i>	
<b>A Cost-effective High Intensity Concentrated Photovoltaic System.....</b>	207
<i>Bernard Sater, Mico Perales, Jon Jackson, Sagar Gadkari, Terry Zahuranec</i>	
<b>Energy Economic Analysis of PV based Charging Station at Workplace Parking Garage .....</b>	213
<i>Pinak Tulpule, Vincenzo Marano, Stephen Yurkovichy, Giorgio Rizzoni</i>	
<b>Smart DC Micro-grid for Efficient Utilization of Distributed Renewable Energy.....</b>	219
<i>K. Shenai, K. Shah</i>	
<b>Impact of Harmonic Current on Energy Meter Calibration .....</b>	225
<i>Shannon Edwards, Dave Bobick, Steven Weinzierl</i>	
<b>MEMS Fabricated Optical Sensor for Measurement of Skin Friction.....</b>	231
<i>Daniel J. Sullivan, John F. Kline, Maria Salamon</i>	
<b>A Novel Approach to Airborne Wind Energy: Design and Modeling.....</b>	237
<i>Nicholas White, Nicholas Tierno, Mario Garcia-Sanz</i>	
<b>Control of Flywheel Energy Storage Systems for Wind Farm Power Fluctuation Mitigation.....</b>	243
<i>Tipakorn Greigarn, Mario Garcia-Sanz</i>	
<b>Analysis of a Stirling-Cycle Power Converter for Domestic Combined Heat and Power .....</b>	249
<i>D. J. Buckmaster, W. S. Newman</i>	
<b>Improving HVAC System Performance Using Smart Meters .....</b>	255
<i>M. N. Sinha, R. W. Cox</i>	
<b>Integrated Energy Systems with Multi-Objective.....</b>	261
<i>Shaya Sheikh, Behnam Malakooti</i>	
<b>750kW AC-link Power Converter for Renewable Generation and Energy Storage Applications.....</b>	266
<i>Erik Limpaecher, Greg Deffley, Frank Hoffmann, Wei Zhou</i>	
<b>Power System Optimization Using Energy Storage.....</b>	272
<i>John R. Miller, David M. Ryan</i>	
<b>Motoring Performance of a Conical Pole-Pair Separated Bearingless Electric Machine.....</b>	277
<i>Peter Kascak, Ralph Jansen, Timothy Dever, Aleksandr Nagorny, Kenneth Loparo</i>	
<b>A General Mathematical Framework for Power System Security and Control.....</b>	283
<i>Richard M. Kolacinski, Adirak Kanchanharuthai</i>	
<b>Author Index</b>	