

2012 IEEE Green Technologies Conference

**Tulsa, Oklahoma, USA
19 – 20 April 2012**



**IEEE Catalog Number: CFP12GTC-PRT
ISBN: 978-1-4673-0968-4**

TABLE OF CONTENTS

SESSION: TA1A ENERGY GENERATION AND STORAGE I

Hybrid Renewable Energy System Using DFIG and Multilevel Inverter	1
<i>E. Ahmed, S. Yuvarajan</i>	
Investigation of a Multiple Input Converter for Grid Connected Thermoelectric-Photovoltaic Hybrid System	7
<i>N. Smith, R. McCann</i>	
Enabling Large-Scale PV Integration into the Grid	12
<i>H. Alatrash, R. Amarin, C. Lam</i>	

SESSION: TA1B GREEN NANOTECHNOLOGY I

The Effect of Grain Size and Volume Fraction on Charge Transport in Thermoelectric Nanocomposite of $\text{Bi}_2\text{Te}_3\text{-Sb}_2\text{Te}_3$	18
<i>P. Norouzzadeh, D. Vashaee</i>	
Synthesis and Characterization of 5-(4-(3-trimethoxysilyl)propoxy)phenyl)-1H-tetrazole	21
<i>D. Wang, C. Niu, J. Long, H. Li, M. Song, M. Liu</i>	
Economical $\text{FeSi}_2\text{-SiGe}$ Composites for Thermoelectric Power Generation	25
<i>Y. Liu, Z. Zamanipour, D. Vashaee</i>	

SESSION: TA1C ENERGY USAGE REDUCTION AND CONSERVATION I

Pilot Study of a Plug Load Management System: Preparing for Sustainability Base	30
<i>S. Poll, C. Teubert</i>	
Refrigerant-Free Air Conditioning: Completely Safe, Environmentally-Friendly Cooling	36
<i>P. Frenger</i>	
Computations of Energy Efficiency Potential in Puerto Rico	39
<i>L. Orama, F. Maldonado, O. Ruiz, C. Ortiz, N. Estevez</i>	

SESSION: TA1D GREEN ARCHITECTURE

Thermal Evaluation of Green Roof Systems Containing Bottom Ash Growth Media	43
<i>O. Once, S. Celik, W. Retzlaff, S. Morgan</i>	
Green Data Center Cooling: Achieving 90% Reduction: Airside Economization and Unique Indirect Evaporative Cooling	48
<i>B. Weerts, R. Weaver, D. Gallaher, O. Geet</i>	
Using Semantic Technologies for Energy-efficient Building Planning	54
<i>S. Fenz, T. Neubauer, A. Anjomshoa, U. Pont, A. Mahdavi, A. Tjoa</i>	

SESSION: TP1A ENERGY GENERATION AND STORAGE II

Development Of An Analytical Model To Predict The Performance Of Paddle Wheel In Generating Electricity And Its Validation Using Computational Fluid Dynamics (CFD)	57
<i>Y. Peymani-F, Y. Liu</i>	
Power Quality Analysis of a Sensitive Load using a Phasor Measurement Unit	62
<i>S. Pappu, A. Rahnama, M. Tovar, S. Bayne, B. Little, S. Friend, M. Borhani</i>	
Conceptual Design and Cost Estimate for A Stand-Alone Residential Photovoltaic System	68
<i>K. Lee, K. Malmedal, P. Sen</i>	
MPPT Scheme for Small Scale Photovoltaic Systems using dSPACE	74
<i>A. Mondal, S. Yuvarajan</i>	

SESSION: TP1B GREEN NANOTECHNOLOGY II

Thermal Stability of Lead Sulfide Nanocrystals Synthesized Through Green Chemical Route	77
<i>M. Mozafari, F. Moztaezadeh, D. Vashae, L. Tayebi</i>	
Thermal and Thermoelectric Properties of Nanostructured versus Crystalline SiGe	81
<i>L. Tayebi, Z. Zamanipour, M. Mozafari, P. Norouzzadeh, J. Krasinski, K. Ede, D. Vashae</i>	
Thermoelectric Properties of Mg₂Si Doped with Bi and Al with Conductive Glass Inclusion	85
<i>N. Satyala, J. Krasinski, D. Vashae</i>	
A Method to Measure the Thermal Conductivity of Thermoelectric Nanowires	90
<i>N. Akhter, D. Vashae</i>	

SESSION: TP1C GREEN INFORMATION TECHNOLOGY

Improved Energy Efficiency for Multithreaded Kernels Through Model-based Autotuning	94
<i>A. Qasem, M. Cade, D. Tamir</i>	
Agent-based Electrical Power Management Model in Consideration of Weather Change	100
<i>N. Mizutani, R. Kanamori, T. Ito</i>	
Energy-Efficient Phase-Aware Scheduling for Heterogeneous Multicore Processors	106
<i>L. Sawalha, R. Barnes</i>	
Practical Energy Saving and Power-Workload Proportionality in a Campus Environment	112
<i>H. Abaci, G. Parr, S. McClean, A. Moore, L. Burness, L. Forgiel</i>	

SESSION: TP1D SMART GRID I

A Hierarchical Control Algorithm for Managing Electrical Energy Storage Systems in Homes Equipped with PV Power Generation	118
<i>Y. Wang, S. Yue, M. Pedram, L. Kerofsky, S. Deshpande</i>	
Laboratory-based Microgrid Setup for Validating Frequency and Voltage Control in Islanded and Grid-Connected Modes	124
<i>S. Bhaskara, M. Rasheduzzaman, B. Chowdhury</i>	
Smart Grid: The Components and Integrating Communication	130
<i>M. Ellis</i>	

SESSION: TP2A ENERGY GENERATION AND STORAGE III

Suitable Wind Energy Conversion System for Bangladesh	136
<i>S. Sohel, M. Uddin, M. Amin</i>	
Thermal Comparison of Reflective and Non-reflective Roofs with Thin-Film Solar Panels	142
<i>G. Irvine, S. Celik</i>	
Reducing Climate Change through CPV Development	145
<i>S. Schreck, S. Latifi</i>	
Hydrokinetic Energy: Overview and it's Renewable Energy Potential for the Gulf of Mexico	148
<i>J. Pastor, Y. Liu</i>	

SESSION: TP2B GREEN NANOTECHNOLOGY III

Anomalous Thermoelectric Behavior of BiSeTe Doped with SiGe:As	151
<i>O. Panachaveettil, R. Vaidyanathan, J. Krasinski, D. Vashae</i>	
Differential Thermal Analysis of Nanostructured Si_{0.80}Ge_{0.20} Thermoelectric Material	155
<i>L. Tayebi, Z. Zamanipour, M. Mozafari, P. Norouzzadeh, K. Ede, J. Krasinski, D. Vashae</i>	
Increase of Boron Precipitation in Nanostructured P-type Silicon Germanium Thermoelectric Alloys	159
<i>Z. Gao, Z. Zamanipour, D. Vashae</i>	
Enhancement of Doping Concentration in P-Type SiGe Thermoelectric Alloy with the Addition of CrSi₂	163
<i>P. Rouhani, Z. Zamanipour, J. Krasinski, D. Vashae, L. Tayebi</i>	

SESSION: TP2C PROTECTION OF THE ENVIRONMENT

Electromagnetic Pollution Index–A Key Attribute of Green Mobile Communications..... 167
P. Venkatapathy, J. Jena, A. Jandhyala

**Seeding of Large Areas with Biological Soil Crust Starter Culture Formulations: Using an Aircraft
Disbursable Granulate to Increase Stability, Fertility and CO₂ Sequestration on a Landscape Scale.....** 171
J. Sears, B. Prithiviraj

Environmentally-Friendly Flaring..... 174
W. Bussman, C. Baukal

SESSION: TP2D SMART GRID II

Reactive Power Considerations in Reliability Analysis of Photovoltaic Systems..... 177
D. Gaikwad, S. Mehraeen

A Smart Grid Intelligent Control Framework..... 183
M. Yilmaz, N. Dhansri

**Adaptive Admission Control for a Smart Grid FiWi Communications Network facing Power
Blackouts during a DDoS Attack.....** 186
M. Levesque, M. Maier, Y. Desai, G. Joos

Uncertainty Modeling and Stochastic Control Design for Smart Grid with Distributed Renewables..... 189
D. Li, S. Jayaweera, C. Abdallah

SESSION: FA POSTER SESSION

Synthesis of Organic Chromophores for Dye-Sensitized Solar Cells (DSSCs)..... 192
T. Boufares, M. Rahmouni, S. Mir-Kasmi, K. Djillali

Biomass Torrefaction: Improving the Fuel Properties of Biomass..... 193
E. Wyble, P. Aucoin

Expedient Wind Energy Potential In Louisiana..... 194
J. Honegger, Y. Liu

Energy Assessments: Improving Manufacturing Efficiency..... 195
K. Guiberteau

Life Cycle Management of Turbine Driven Auxiliary Feedwater Pumps in Nuclear Power Plants..... 196
S. Raghavan, B. Chowdhury

Edible Organic Semiconductors..... 197
P. Frenger

Sustainable Transparency: Sustainable Design and Performance Verification of an Integrated Tower..... 198
K. Kim, S. Han

**How Haiti Can Securitize Reliable Domestic Energy Production, Commodity Exports, And Socio-
Economic Progress From Sugarcane And Its Biomass Residuals.....** 199
M. Muia

**Life Cycle Analysis for Algae Biofuels - Using Local Situations to Factor in the Cost/Benefit of High-
End Products Along with Nutrient Remediation and CO₂ Sequestration.....** 200
J. Korstad, J. Moore

Second Life Hybrid Vehicle Batteries Used In Solar Backup..... 201
C. Davis, B. Schultz

SESSION: FPA ENGINEERING GENERATION AND STORAGE VI

**Prioritization of Renewable Energy Resources to Participation of Private Sector Investment (Case
study : Iran).....** 202
A. Aslani, M. Naaranoja, E. Antina, F. Aslani

Comparison of Methods Used for Forecasting Solar Radiation..... 205
R. Sudirman, K. Ashenayi, M. Golbaba

Thermal Energy Storage- Btu's in the Land of kWh's..... 208
B. Silvetti

An Improved Optimal Control Design for Wind Energy Systems..... 211
A. Fekih

SESSION: FPB GREEN NANOTECHNOLOGY IV

Enhancement in Thermoelectric Power Factor of SiGe-CrSi₂ Composite Alloy	216
<i>Z. Zamanipour, D. Vashaee</i>	
Enhancement of Thermoelectric Efficiency of MnSi_{1.75} with the Addition of Externally Processed Nanostructured MnSi	219
<i>X. Shi, Z. Zamanipour, K. Ede, J. Krasinski, D. Vashaee</i>	
Cost Effective Synthesis of Bulk Thermoelectric Higher Manganese Silicide for Waste Heat Recovery and Environmental Protection	222
<i>X. Shi, Z. Zamanipour, A. Dehkordi, K. Ede, J. Krasinski, D. Vashaee</i>	
Economical Preparation of Nanostructured Bulk (Bi_xSb_{1-x})₂Te₃ Thermoelectrics	225
<i>A. Dehkordi, Z. Zamanipour, X. Shi, D. Vashaee</i>	

ADDITIONAL PAPERS

Switched Reluctance Propulsion for Electric Motorboat Applications	228
<i>R. McCann, M. Bell</i>	
Energy Harvesting for Large Truck Stabilization Using Switched Reluctance Regenerative Braking	231
<i>R. McCann, R. Purupati, A. Bhavnani</i>	
Effect of Redcedar Oil During Biological Conversion of Eastern Redcedar to Ethanol	237
<i>E. Lam</i>	
Author Index	