

2013 IEEE Conference on Technologies for Sustainability

(Sustech 2013)

**Portland, Oregon, USA
1-2 August 2013**



IEEE Catalog Number: CFP13STS-POD
ISBN: 978-1-4673-4629-0

Program

2013 1st IEEE Conference on Technologies for Sustainability (SusTech)

Alternate Energy I

<i>Optimal Generation Expansion Planning with Integration of Variable Renewables and Bulk Energy Storage Systems</i>	
Zhouxing Hu (Western Electricity Coordinating Council, USA), Ward Jewell (Wichita State University, USA)	1
<i>On the Usage of Storage Systems in the Presence of Ramping Costs and High Penetration of Renewables</i>	
Alberto J. Lamadrid (Lehigh University, USA)	9
<i>Variable Energy Resource Induced Power System Imbalances: Mitigation by Increased System Flexibility, Spinning Reserves and Regulation</i>	
Aramazd Muzhikyan (Masdar Institute, UAE), Amro Farid (Masdar Institute, UAE), Kamal Youcef-Toumi (MIT, USA)	15
<i>Constrained Support Vector Machines for Photovoltaic In-Feed Prediction</i>	
Marcus Hildmann (ETH Zurich, Switzerland), Abhishek Rohatgi (National University of Singapore, Singapore), Göran Andersson (ETH Zürich, Switzerland)	23

Energy Efficiency I

<i>A Long-Term Case Study of Improved Residential Sustainability</i>	
Amy Fuchs Heidner, PE (The Rextor Group PLLC, USA), Dennis Heidner (The Rextor Group PLLC, USA)	29
<i>Hybrid Calibration Methodology for Building Energy Models Coupling Sensor Data and Stochastic Modeling</i>	
Chad Miller (Portland State University, USA), Huafer Hu (Portland State University, USA), Lucas Klesch (AirAdvice Inc., USA)	37
<i>Reliability-Driven Optimum Standby Electric Storage Allocation for Power Distribution Systems</i>	
Salman Kahrobaee (University of Nebraska-Lincoln, USA), Sohrab Asgarpour (University of Nebraska-Lincoln, USA)	44
<i>Information and Communications Technology based Solutions in Achieving Building Energy Efficiency</i>	
Huafer Hu (Portland State University, USA), Geoffrey Jenks (Portland State University, USA), Catherine Huang (Intel Labs, USA), Milan Milenkovic (Intel Corporation, USA), Ulf Hanebutte (Intel Labs, USA)	49
<i>Advancing Industrial Sustainability Through Energy Efficiency Improvements in Motors and Motor-driven Systems</i>	
Baskar Vairamohan (EPRI, USA), Satish Rajagopalan (EPRI, USA), Marek Samotyj (EPRI, USA), Sudeshna Pabi (EPRI, USA)	55

Smart Grid I

<i>Residential Water Heaters as a Grid-Scale Energy Storage Solution Using Model Predictive Control</i>	
Kelcey Lajoie (Oregon State University, USA), Douglas Halamay (Oregon State University, USA), Ted Brekken (OSU, USA)	62
<i>Active Power Control of Photovoltaic Power Systems</i>	
Anderson Hoke (University of Colorado Boulder, USA), Dragan Maksimovic (University of Colorado Boulder, USA)	70

<i>Load Modeling Methodologies for Cascading Outage Simulation Considering Power System Stability</i>	
Jiajia Song (Oregon State University, USA), Eduardo Cotilla-Sanchez (Oregon State University, USA), Ted Brekken (OSU, USA)	78
<i>Smart Grid Distribution Prediction and Control Using Computational Intelligence</i>	
Shawn Chandler (Portland State University, USA), Joshua Hughes (Portland State University, USA)	86
<i>Multi-agent residential demand response based on load forecasting</i>	
Ivana Dusparic (Trinity College Dublin, Ireland), Colin Harris (Trinity College Dublin, Ireland), Andrei Marinescu (Trinity College Dublin, Ireland), Vinnny Cahill (Trinity College Dublin, Ireland), Siobhán Clarke (Trinity College Dublin, Ireland)	90

Alternate Energy II

<i>DC Arc Flash Calculations for Solar Farms</i>	
Eduardo H. Enrique (Stantec Consulting Ltd., Canada), Peter N Haub (Stantec Consulting Ltd., USA), Timothy Bailey (Stantec Consulting Services Inc, USA)	97
<i>Wave Energy Converter Modeling in the Time Domain: A Design Guide</i>	
Bret Bosma (Oregon State University, USA), Ted Brekken (OSU, USA), Tuba Özkan-Haller (Oregon State University, USA), Solomon Yim (Oregon State University, USA)	103
<i>Mobile Elemental Power Plant (MEPP)</i>	
Julanne McCulley (Weber State University, USA)	109
<i>Novel Wireless Performance Monitoring for Small Wind Turbines</i>	
Joshua D Freeman (Amrita University, India), Melvin Sabu (Amrita Vishwa Vidyapeetham University, India), Balakrishnan Shankar (Amrita Vishwa Vidyapeetham, India), Krishnashree Achuthan (Amrita School of Engineering, India)	114
<i>Development of low-profile piezoelectric energy harvester for high load application</i>	
Thorin Purviance (Washington State University Tri-Cities, USA), Spencer Wickler (Washington State University Tri-Cities, USA), Keith Clayson (Washington State University Tri-Cities, USA), Travis Barnes (Washington State University Tri-Cities, USA), Changki Mo (Washington State University Tri-Cities, USA)	120

Quality of Life I

<i>Server Sky - Computation and Power in Orbit</i>	
Keith Lofstrom (Server Sky, USA)	126
<i>Piezoelectric Sensors for Taxiway Airport Traffic Control System</i>	
Chung Leung (Texas A&M University-Kingsville, USA), Wei-Da Hao (Texas A&M University-Kingsville, USA), Claudio Montiel (Texas A&M University at Kingsville, USA)	134
<i>Effects of Salinity and Feed Temperature on Permeate Flux of an Air Gap Membrane Distillation Unit for Sea Water Desalination</i>	
Ifegwu Eziyi (Florida State University, USA), Anjaneyulu Krothapalli (Florida State University, USA), Julián Ramírez (Florida State University, USA), Juan Ordonez (Florida State University, USA), Jose Vargas (Federal University of Parana, Brazil)	142
<i>Our Environmental Handprint -- The Good We Do</i>	
Jon Biemer (Creating Sustainability, USA), Willow Dixon (Creating Sustainability, USA), Natalia A Blackburn (Blackburn Engineering, USA)	146

Smart Grid II

<i>Look-ahead Economic Dispatch of Microgrids with Energy Storage, Using Linear Programming</i> Anderson Hoke (University of Colorado Boulder, USA), Alexander Brissette (University of Colorado, USA), Shawn Chandler (Portland General Electric, USA), Annabelle Pratt (Intel Labs, USA), Dragan Maksimovic (University of Colorado Boulder, USA)	154
<i>A Motor-Generator and Supercapacitor Based System for Micro-Grid Frequency Stabilization</i> Rick Crispo (Oregon State University, USA), Ted Brekken (OSU, USA)	162
<i>Optimal Demand Response Bidding and Pricing Mechanism: Application for a Virtual Power Plant</i> Ashot Mnatsakanyan (Masdar Institute of Science and Technology, UAE), Scott Kennedy (Masdar Institute of Science and Technology, UAE)	167
<i>Characterizing Energy Usage of Chevrolet Volt Versus Speed</i> Dale S.L. Dolan (California Polytechnic State University, USA), Taufik Taufik (California Polytechnic State University, San Luis Obispo, USA), Matthew Ducasse (California Polytechnic State University, USA)	175
<i>The Effect of Demand Side Management on Reliability of Automated Distribution Systems</i> Salman Kahrobaee (University of Nebraska-Lincoln, USA), Sohrab Asgarpour (University of Nebraska-Lincoln, USA)	179

Alternate Energy III

<i>Modeling and simulation of the microalgae derived hydrogen process in compact photobioreactors</i> Jose Vargas (Federal University of Parana, Brazil), David Mitchell (Federal University of Parana, Brazil), Juan Ordonez (Florida State University, USA), Andre Mariano (Federal University of Parana, Brazil), Diego Corrêa (Federal University of Parana, Brazil)	184
<i>Energy harvesting technologies for structural health monitoring application</i> Changki Mo (Washington State University Tri-Cities, USA), Joseph Davidson (Washington State University Tri-Cities, USA)	192

Poster Session

<i>Wind Power Ramping in BPA Area</i> James Mullen (Washington State University - Tri-Cities, USA), Mohamed Osman (Washington State University-Tri-Cities, USA)	196
<i>WSN Based Tracking for a Concentrating Solar Thermal Energy System</i> Joshua D Freeman (Amrita University, India), Jibin Varghese (Amrita Vishwavidyapeetham, India), Divya Pullarkatt (Amrita Vishwa Vidyapeetham, India)	203
<i>Battery Recharging and Testing Swap Stations</i> Russell Ellis (Portland State University, USA), Caitlin Fackrell (Portland State University, USA), Thatcher Gordon (Portland State University, USA), Phil Lamb (Portland State University, USA), James Morris (Portland State University, USA), Charlie Kawasaki (BETTERY, Inc., USA)	208
<i>Communication(s) and Technology in Spectrum Implementation with Body Earth</i> John Vinson (Bonneville Power Administration Retired, USA)	212
<i>Investigating the Effects of 802.11n Interference on Home Area Networks</i> Daniel Ihlenfeldt (Southern California Edison, USA), Clint Powell (SCE, USA), Afshin Amini (SCE, USA)	218
<i>Integrating heterogeneous distributed energy resources to manage intermittent power at low cost</i> Shahin Abdollahy (University of New Mexico, USA), Olga Lavrova (University of New Mexico, USA), Nicholas Heine (University of New Mexico, USA), Svetlana V. Poroseva (University of New Mexico, USA), Andrea Mammoli (the University of New Mexico, USA)	223

<i>Supercapacitor Energy Storage Systems for Voltage and Power Flow Stabilization</i>	
Arne Bostrom (OSU, USA), Annette von Jouanne (Oregon State University, USA), Ted Brekken (OSU, USA), Alex Yokochi (OSU, USA)	230
<i>Low-cost solar micro-forecasts for PV smoothing</i>	
Andrea Mammoli (University of New Mexico, USA), Anthony Menicucci (University of New Mexico, USA), Thomas Caudell (University of New Mexico, USA), Abraham Ellis (Sandia National Laboratories, USA), Steve Willard (Public Service Company of New Mexico, USA), John Simmins (Electric Power Research Institute, USA)	238
<i>Low-Cost Cloud-Based Design of Smart Rural Energy Device in Microgrid: Perspective India (An Energy-On-Demand Service for Rural India)</i>	
Mukundhan Srinivasan (Alpha College of Engineering, India), Vineeth Vijayaraghavan (Solarillion Foundation, India), Sabarigirish Vijayakumar (TCS Pvt Ltd, India), Ramesh Rajesh (Solarillion Foundation, India)	244
<i>Variable Energy Resource Induced Power System Imbalances: A Generalized Assessment Approach</i>	
Aramazd Muzhikyan (Masdar Institute, UAE), Amro Farid (Masdar Institute, UAE), Kamal Youcef-Toumi (MIT, USA)	250
<i>X-View: The Reichmuth Framework II</i>	
Terry Egnor (Energy Resource Management, USA), Howard Reichmuth (Energy Resource Management, USA)	258
<i>Study on the Effect of Solar Irradiance Intermittency Mitigation on Electric Vehicle Battery Lifetime</i>	
Alexander Brissette (University of Colorado, USA), Anderson Hoke (University of Colorado Boulder, USA), Joshua Traube (University of Colorado, USA), Fenglong Lu (University of Colorado, USA), Dragan Maksimovic (University of Colorado Boulder, USA)	262
<i>Current Total Harmonic Distortion Calculation of Interior Permanent Magnet Synchronous Traction Motors for HEV/BEV Applications</i>	
Leon Jin (Oregon State University, USA)	268

Quality of Life II

<i>Novel nanomaterials for water desalination technology</i>	
David Cohen-Tanugi (MIT, USA), Shreya Dave (MIT, USA), Ronan McGovern (MIT, USA), John H Lienhard, V (MIT, USA), Jeffrey Grossman (MIT, USA)	272