Sunday, May 13, 2012

Chapter Caucus
5/13/12 8:30am-4:30pm  403

Divisions Caucus
5/13/12 8:30am-4:30pm  404

Energy and Gender Workshop - Registration Required
5/13/2012 9:00am - 5:00pm  404 Chair: Dr. Barbara Farhar
This workshop on Engaging Women in Clean Energy Solutions will identify specific examples of gender-sensitive energy access initiatives and policies that support women’s economic empowerment, improve food security and water management, facilitate a widespread transition to low-emission energy technologies, conserve critical ecosystems, and promote successful adaptation to changing climate conditions.

Key issues will include energy as women’s business, cooking and electrification, methods for women’s inclusion in clean energy solutions, and climate and energy justice. A technical committee, chaired by Dr. Barbara Farhar, Ph.D., Renewable and Sustainable Energy Institute (RASEI), University of Colorado at Boulder (USA), is developing the workshop as well as WREF’s EG section.

WREN Council Meeting - by invitation
5/13/2012 10:00am - 2:00pm  401

Young ISES Meeting
5/13/2012 4:00pm - 5:00pm  401
ASES Professional and Student Chapter Members are invited to attend this meeting

Opening Reception
5/13/12 7:00pm - 10:00pm  Westin Denver Downtown

Monday, May 14, 2012

Speakers Breakfast
5/14/12 7:00am-8:00am  2C

ASES Sustainability Division Meeting (division members only)
5/14/2012 7:00am - 8:00am  1e

ISES SEJ Associate Editors Meeting
5/14/2012 7:00am - 8:30am  1a
Opening Plenary Session
5/14/12 8:15am-10:00am Wells Fargo Theatre  Chair: Chuck Kutscher

Plenary address by: NREL Director, Dan Arvizu.
Welcoming addresses by Conference Chair Chuck Kutscher and Co-Chairs Ali Sayigh (WREN) and Susan Greene (ASES), ASES Chair David Hill, City and County of Denver, Deputy Mayor, Cary Kennedy

Parallel Sessions are Organized by Track Below
10:30am - 11:45am

Advancements in RE Technology

CSP Optical Analysis (Technical)
5/14/2012 10:30am-11:45am 1c Chair: Eric Frazier

Optical Durability of Concentrating Solar Power Solar Reflectors
Cheryl Kennedy, Matthew Gray, Robert Tirawat
NREL, Golden, CO, USA

Service Life Prediction for ReflecTech® Mirror Film
Michael DiGrazia1, Gary Jorgensen2, Randy Gee2, Carl Bingham3
1ReflecTech, Inc., Arvada, CO, USA, 2SkyFuel, Inc., Arvada, CO, USA, 3NREL, Golden, Golden, CO, USA

Comparison of Optical Performance of 3-D Solar Concentrators for Circular and Elliptical Absorber
Imhamed M. Saleh Ali1, Tadhg S O'Donovan1, ksreddy Reddy1, Tapas K Mallick1
1Heriot-Watt University, Edinburgh, UK, 2Heriot-Watt University, Edinburgh, UK, 3Department of Mechanical Engineering, Madras, Chennai, India, 4Heriot-Watt University, Edinburgh, UK

An Analytical Approach Treating Three-Dimensional Geometrical Effects Of Parabolic Trough Collectors
Marco Binotti1, Guangdong Zhu1, Allison Gray1, Giampaolo Manzolini2
1National Renewable Energy Laboratory, Golden, CO, USA, 2Politecnico di Milano, Milano, Italy

Slope Error Measurement Tool For Solar Parabolic Trough Collectors
Kathleen Stynes2, Benjamin Ihas1
1National Renewable Energy Laboratory, Golden, CO, USA, 2University of Colorado, Boulder, CO, USA

Biomass and Liquid Fuels 1 (Technical)
5/14/2012 10:30am-11:45am 2b Chair: Giuliano Premier

Microwave energy potential for large scale biodiesel production
Veera Gnaneswar Gude1, Prafulla Patil1, Shuguang Deng2
1Mississippi State University, Starkville, MS, USA, 2New Mexico State University, Las Cruces, NM, USA

Partial Hydrogenation of Biomass Pyrolysis Oils to Liquid-Fuel Intermediates
Richard French
National Renewable Energy Laboratory, Golden, Colorado, USA

Production of Hydrocarbon Fuels from Biomass by Catalytic Fast Pyrolysis
Kristiina Iisa, Alexander Stanton, Stefan Czernik
National Renewable Energy Laboratory, Golden, CO, USA
Producing Clean Biomass Syngas for Fuel Synthesis: Reforming Catalyst Development and Deployment
Kim Magrini, Matthew Yung, Whitney Jablonski, Yves Parent
NREL, Golden, CO, USA

Sulfur speciation and partitioning during thermochemical conversion of cellulosic biomass to biofuel
Singfoong Cheah¹, Daniel Carpenter¹, Shealyn Malone², Calvin Feik², Matthew Yung¹, Jessica Olstadº
¹National Renewable Energy Laboratory, Golden, CO, USA, ²Overland High School/Institute of Science & Technology, Aurora, CO, USA

Kinetic Systems Biology Analyses of Lipid Accumulation in an Unsequenced Microalga
Michael Guarnieri¹, Ambarish Nag¹, Sharon Smolinski¹, Al Darzins², Michael Seibert², Philip Pienkos²
¹National Renewable Energy Laboratory, Golden, CO, USA, ²DuPont Central Research and Development, Wilmington, DE, USA

The Built Environment

Daylighting (Technical)  1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/14/2012 10:30am-11:45am  1b  Chair: Vicram Sami

Evaluation of the Luminous Environment in Open-plan Offices with Skylights
Gillian Isoardi, Veronica Garcia-Hansen, Michael Hirning
Queensland University of Technology, Brisbane/Queensland, Australia

A Performance Evaluation Method for Roof-Daylighting Systems
Ladan Ghobad³, Wayne Place³, Jianxin Hu⁴
³North Carolina State University, Raleigh, NC, USA, ⁴North Carolina State University, Raleigh, NC, USA

“There Is Great Daylight! But The Lights Are On:” Daylighting Effectiveness And Electric Lighting User Patterns In A Middle School
Erik Bonnett, Carrie Lee, Ian Wolfesteig
University of Oregon, Eugene, OR, USA

Using Coefficient of Utilization as A Performance Indicator for Climate-Based Daylight Modeling by Physical Experiments
Jianxin Hu, Wayne Place, Christoph Konradi
North Carolina State University, Raleigh, NC, USA

Incorporating Sky Luminance Data Measured by EKO Scanner with a Scanning Sky Simulator for Predicting Daylight Quantity in Buildings
Jianxin Hu, Wayne Place, Christoph Konradi
North Carolina State University, Raleigh, NC, USA

A Method for Measurement of Transient Discomfort Glare Conditions and Occupant Shade Control Behavior in the Field Using Low-cost CCD Cameras
Kyle Konis
Portland State University, Portland, USA

Building Design (Ignite)  1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/14/2012 10:30am-11:45am  4b

Zero Energy NAHB Green Home Built By Students
Craig Clark¹, Jeffrey Stevens¹, Dave Kostick¹
¹Alfred State College, Wellsville NY, USA, ²IMT Solar, North Tonawanda, NY, USA

Passive House Design: Town and Country
**Dennis Wedlick**  
Dennis Wedlick Architect LLC, New York, NY, USA  
America’s oldest net zero energy home: Case study lesson for retrofitting the existing housing stock

**Matthew Grocoff**  
Thrive Net Zero Consulting Collaborative / Greenovation TV, Ann Arbor, MI, USA  

**Eric Bonnema, Matt Leach, Shanti Pless**  
NREL, Golden, CO, USA  
Designing Carbon-Neutral Plus-Energy-Buildings With Site Adaptive Heliotropism Cycles

**Thomas Spiegelhalter, Andrew Lee**  
Florida International University, Miami, USA  
A Fundamental Study for Designing a Safe and Eco-friendly Community

**Keisuke Yamamoto, Takuya Kamayama, Tomohiro Suzuki, Jorge Almazan, Haruki Sato**  
Keio University, 3-14-1, Kouhoku-ku, Yokohama, Japan  
Relationships between Subjective and Objective Physical Environmental Factors in Urban Public Spaces

**Xinxin Li¹, Hong Jin¹, Jian Kang², Teng Shao²**  
¹School of Architecture, Harbin Institute of Technology, Harbin, China, ²School of Architecture, University of Sheffield, Sheffield, UK  
Solar Ice Cream: Achieving Net-Zero Through an Integrated Retrofit Approach

**Sara Tepfer, Alison Kwok**  
University of Oregon, Eugene, OR, USA  
Looking Back to the Future

**Edward Cazayoux**  
Environmental Design, Breaux Bridge, LA, USA  
Trees And Solar Power: Coexisting In An Urban Forest Near You

**Daniel Staley**  
DCS Consulting Services, Aurora, Colorado, USA

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**Energy Generation, Distribution, & Transportation**

**Solar Resource Measurements (Technical)**  
5/14/2012 10:30am-11:45am  
3b

Reducing Uncertainty in Bankable Solar Resource and Energy Assessments through On-Site Monitoring - An Update with Additional Case Studies  
**Marie Schnitzer, Christopher Thuman**  
AWS Truepower, Albany, New York, USA

Solar Monitoring, Forecasting, and Variability Assessment at SMUD  
**Obadiah Bartholomy¹, Pramod Krishnani², James Bing³, Thomas Hoff³, Richard Perez⁵, Thomas Vargas⁶**  
¹Sacramento Municipal Utility District, Sacramento, CA, USA, ²Neo Virtus Engineering Inc., Littleton, MA, USA, ³Belectric, Inc, Newark, CA, USA, ⁴Clean Power Research, Napa, CA, USA, ⁵State University of New York, Albany, NY, USA  
Calibration Of Long-Term Global Horizontal Irradiation Estimated By HelioClim-3 Through Short-Term Local Measurement Campaigns: Extending Of The Results To European And African Sites

**Christophe Vernay², Philippe Blanc², Sebastien Pitaval¹**  
¹SOLAIIS, Sophia Antipolis, France, ²MINES ParisTech, Center for Energy and Processes, Sophia Antipolis, France
Can Silicon Detectors be used for Measuring PV Performance?
Manojit Sengupta, Peter Gotseff, Daryl Myers, Thomas Stoffel
NREL, Golden, CO, USA

Calculating A Nation’s “Economic” Solar Potential—A General Methodology And Results For The United States
Richard Keiser
Keiser Analytics, New York, NY, USA

The Opportunities for Renewables in the Transportation Sector (Technical)
5/14/2012 10:30am-11:45am 2a Chair: Laura Vimmerstedt

Personal Transportation One Hundred Percent Solar Powered
Ron Swenson
General Transportation Fund, Santa Cruz, California, USA

Targeting Net Zero Energy At Marine Corps Base Hawaii, Kaneohe Bay
Kari Burman, Alicen Kandt, Lars Lisell, Sam Booth, Andy Walker, Joseph Roberts, Jonathan Falcey
NREL, Golden, CO, USA

The Solar Light Rail
Takaki Kameya¹, Genji Suzuki², Hiroshi Kezuka¹, Hidetoshi Katsuma³
¹Tokyo University of Technology, Tokyo, Japan, ²Tokyo Denki University, Tokyo, Japan, ³Shonan Research Center for Light Rail Transit, Kanagawa, Japan

A study on the feasibility of solar powered railway system for light weight urban transport
Syed Husain Imran Jaffery¹, Hassan Abbas Khan², Mushtaq Khan¹, Sarfraz Ali³
¹National University of Sciences and Technology, Islamabad, Pakistan, ²Lahore University of Management Sciences, Lahore, Pakistan

High Penetration of Renewable Energy in the Transportation Sector: Scenarios, Barriers, and Enablers
Kenneth Bertram², Austin Brown¹, Garvin Heath¹, Trieu Mai¹, Marc Melaina¹, Steven Plotkin², Deena Patel¹, Mark Ruth¹, Travis Simpkins¹, Thomas Stephens², Darlene Steward¹, Laura Vimmerstedt¹, Anant Vyas², Ethan Warner¹
¹National Renewable Energy Laboratory, Denver, Colorado, USA, ²Argonne National Laboratory, Argonne, Illinois, USA

Running the World on Renewables: Alternatives (Forum)
5/14/2012 10:30am - 11:45am 1d Chair: Bill Leighty

FORUM - Running the World on Renewables: Alternatives to Electricity for Transmission, Firming Storage, and Supply Integration for Large-scale, Stranded, Renewable Energy
Bill Leighty
The Leighty Foundation, Juneau, AK, USA

Energy Access

Implications for Renewable Energy on Carbon Reductions (Forum)
5/14/2012 10:30am-11:45am 1e

FORUM - Implications for Renewable Energy on Carbon Reduction Goals
John Nangle
NREL, Golden, CO, USA
Energy and Gender

Energy and Gender Session-1: Sweden, Nicaragua, The Netherlands and India (Technical)
5/14/2012 10:30am-11:45am  
Chair: Dr. Priyadarshini Karve & Dr. Barbara Farhar

Combating Energy Poverty in Africa: Addressing Barriers to Off-grid Rural Electrification
Pushpendra Jain¹, Prem Jain², Philimon Dhafana³
¹University of Botswana, Gaborone, Botswana, ²University of Zambia, Lusaka, Zambia, ³Botswana Power Corporation, Gaborone, Botswana

The Effects of Modern Energy and More Energy-Efficient Technologies Transforming Gender Roles and Relations
Joy Clancy
university of Twente, Enschede, The Netherlands

Gender, Ethnicity and Energy Consumption in Multifamily Houses - Swedish Norms in a Multi-Ethnic Context
Gun Hedlund¹, Karin Perman²
¹Center for Urban and Regional Studies, Örebro, Sweden, ²Dalarna University, Falun, Sweden

Women's Empowerment through Renewable Energy: A Case Study in Nicaragua
Laurie Guevara-Stone
Solar Energy International, Carbondale, CO, USA

Empowerment of Women through an Energy-saving Intervention in the Construction Practices
Shilpa Joshi
Green Build Product(I)Pvt Ltd, Pune/Maharashtra, India

Finance, Policy & Marketing

Navigating Clean Energy Policies (Forum)
5/14/2012 10:30am-11:45am  
FORUM - Navigating Clean Energy Policies: Providing a Public Map to Drive Investment in Renewable Energy
Christie Ulman
US Department of Energy, Washington, DC, USA

Energy - Water Nexus: International Perspective (Forum)
5/14/2012 10:30am-11:45am  
FORUM - Energy – water nexus: An international perspective from developed and developing countries
Veera Gude
Mississippi State University, Starkville, MS, USA

The Role of Renewable Energy in Energy Security (Forum)
5/14/2012 10:30am-11:45am  
FORUM - The Role of Renewable Energy in Energy Security: Opportunities and Obstacles
Jonathan Miller
Governor’s Energy Office, Denver, CO, USA
CRITICAL ANALYSIS OF ON-GOING MEDITERRANEAN SOLAR INITIATIVES
Roberto Vigotti
unknown, unknown, USA

Geothermal Energy Application in Indonesia: Present Status and the Challenges of Its Future Development
Herman Damel Ibrahim
Indonesian National Energy Council, unknown, Indonesia
Waste to Energy at the Greenest Zoo in the World
5/14/2012 10:30am - 11:45am  1a  Chair: Michael Haughey

This presentation will describe Denver Zoo's efforts to become the greenest zoo in the world through systematic planning and creative innovation, including ISO 14001 and on site waste to energy conversion using gasification. Sustainability is fundamental to conservation and a Denver Zoo’s mission, to “secure a better world for animals through human understanding”. Denver Zoo has been an industry leader in sustainable zoo operations for many years, and has now has created several innovations that will have an impact beyond zoos.

Speakers to Include:
George Pond, ASLA, Vice President for Planning & Capital Projects at the Denver Zoo
Study Of The Accelerated Aging Of A Two-layer Material Used In High-Concentration Solar Receivers.

Antoine Boubault¹, Bernard Claudet², Olivier Faugeroux², Gabriel Olalde¹
¹PROMES-CNRS, Font-Romeu-Odeillo-Via, France, ²PROMES-CNRS, Perpignan, France

Biomass and Liquid Fuels 2 (Technical)
5/14/2012 1:15pm-2:30pm  2b  Chair: Veera Gude

Determining The Effects Of Concerted Elimination Reactions In The Pyrolysis Of Lignin Using Model Compounds.
David Robichaud, Jared Clark, Mark Nimlos
National Renewable Energy Laboratory (NREL), Golden, CO, USA

Sustained Photosynthetic Conversion of CO2 to Ethylene in Recombinant Cyanobacterium Synechocystis 6803
Justin Ungerer, Ling Tao, Mark Davis, Maria Ghirardi, Pin-Ching Maness, Jianping Yu
National Renewable Energy Laboratory, Golden, Colorado, USA

Microalgae as biofuels feedstocks: an assessment of the yields and fuel quality
Lieve Laurens, Robert McCormick, Philip Pienkos
National Renewable Energy Laboratory, Golden, CO, USA

Integrated Algae Cultivation for Municipal Wastewater Treatment and Biofuels Production in Industrial Clusters
Viktor Andersson¹, Sarah Broberg², Roman Hackl¹
¹Chalmers University of Technology, Gothenburg, Sweden, ²University of Linkoping, Linkoping, Sweden

Effect of Torrefaction on Energy Yield of Rice Husk at Atmospheric Condition in Air
A.K.M. Sadrul Islam¹, Md. Ahiduzzaman²
¹Islamic University of Technology, Board Bazar, Gazipur, Bangladesh, ²Bangladesh Rice Research Institute, Gazipur, Bangladesh

Renewable fuels - A comparative assessment from economic, energetic and ecological point-of-view up to 2050 in EU-Countries
Amela Ajanovic
Vienna University of Technology, Vienna, Austria

Production and characterization of pyrolysis liquids from sunflower seed as renewable energy source
Adil ABOULKAS¹, Khalifa EL HARFI¹, Mehdi NADIFIYINE², Mbarek BENCHANAA²
¹Laboratoire Interdisciplinaire de Recherche en Sciences et Techniques, Faculté polydisciplinaire de Béni-Mellal, Université Sultan Moulay Slimane, BP 592, 23000, Béni Mellal, Morocco, ²Laboratoire de Recherche sur la Réactivité des Matériaux et l’Optimisation des Procédés «REMATOP», Département de chimie, Faculté des Sciences Semlalia, Université Cadi Ayyad, BP 2390, 40001, Marrakech, Morocco

The Built Environment

Building Design (Technical) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/14/2012 1:15pm-2:30pm  1b  Chair: Liliana Beltran

Peter D’Antonio
PCD Engineering, Longmont, CO, USA

The Outside-In House
Ray Barnes
University of Arizona, Tucson, Arizona, USA

NET ZERO RESIDENTIAL: FEASIBILITY AND MICROCLIMATE RESPONSIVE DESIGN FOR A COLD CLIMATE
Jon Gardzelewski, Anthony Denzer, Gang Tan, Mahdokht Soltaniehha
University of Wyoming, Laramie, Wyoming, USA

Peter D’Antonio
Univ of Colorado, Boulder, USA

Integrated Design to Achieve Zero Net Energy in an Urban Office Building
Robert Peng, Rahman Azari
University of Washington, Seattle, WA, USA

SIMPPLICITY AND INTEGRATION: PASSIVE SOLAR DESIGN AND PASSIVE HOUSE IN INTEGRATED PRACTICE AND EDUCATION
Alfredo Fernandez-Gonzalez, Ulrike Passe, Rod Kruse, Joerg Ruegamer
1Iowa State University, Ames, IA, USA, 2University of Nevada, Las Vegas Nevada, USA, 3University of Utah, Salt Lake City Utah, USA, 4BNIM Architects, Des Moines IA, USA

Planning for Passive Solar Retrofit Potentials For Heating, Cooling And Daylighting In San Luis Obispo County, California
Kenneth Haagard, Rachel Aljilani, Alex Vincent, Chad Worth
1Fellow American Solar Energy Society, California, USA, 2Member International Solar Energy Society, California, USA, 3California Polytechnic State University, California, USA, 4Faculty Cuesta Community College, California, USA

Passive House and Passive Solar: A Comparison of Two Approaches to Low-Energy Heating
Matthew Hogan, Alison Kwok
University of Oregon, Eugene, Oregon, USA

Impact of Cool Materials on Urban Heat Islands and on Buildings Comfort and Energy Consumption
Aldo Fanchiotti, Emiliano Carnielo, Michele Zinzi
1Università degli Studi Roma Tre, Rome, Italy, 2ENEA, Rome, Italy

Building, Shading & Daylight (Ignite) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/14/2012 1:15pm-2:30pm 4c
Chair: Rob Pena

CLIMATIC BASED CONSIDERATION OF DOUBLE SKIN FAÇADE(DSF) SYSTEM- COMPARATIVE ANALYSIS OF ENERGY PERFORMANCE OF A DSF BUILDING IN A MEDITERRANEAN CLIMATE
Mona Azarbayjani
University of North Carolina at Charlotte, Charlotte/NC, USA

Potential of using window films to support protection of the environment in Kurdistan of Iraq
Kamil Yousif, Jundi Yousif, Manaf Mahammed
1Zakho University, Zakho, Iraq, 2Dohuk University, Duhok, Iraq

Validation of Daylighting Model for Inverted V-shape and Dome Type Roof Structures of Mud House Situated at New Delhi, India
Rahul Dev, Vikram Singh, H. N. Singh, G. N. Tiwari
1Centre for Energy studies, Indian Institute of Technology Delhi, New Delhi, Delhi-110016, India, 2Department of Physics, R.S.S. (P.G.) College, Pilkhua, Ghaziabad, U.P.-245304, India

Comparative Evaluation of Side-Daylighting Strategies
Michael Holtz, Zack Rogers
LightLouver LLC, Louisville, Colorado, USA

Heat Load and Solar Gain Prediction for Solid Wall Dwellings Retrofitted with Triple Vacuum Glazing for Selected Window to Wall Area Ratios
Saim Memon, Philip C Eames
Loughborough University, Loughborough, UK
Integrated Towers: High Performance Facades  
Kyoung-Hee Kim\textsuperscript{1}, Seung-Hoon Han\textsuperscript{2}  
\textsuperscript{1}University of North Carolina, Charlotte, NC, USA, \textsuperscript{2}Chonnam National University, Gwangju, Chonnam, Republic of Korea  

A Review Of Daylighting Qualities In Two Assisted Living Facilities In A Hot And Humid Climate.  
Jong Kim, Liliana Beltran, Jialiang Wang  
Texas A&M University, College Station / Texas, USA  

Impact of Shade on HVAC Energy Consumption in Buildings: A Residential Case Study  
Justin Shultz, Lucas Witmer, Jeffrey R. S. Brownson  
The Pennsylvania State University, University Park, PA, USA  

ENVELOPE MATERIALITY: LIGHT AND HEAVY IN WINERIES. THE CASE OF “SANTA ANA” WINERY, IN MENDOZA, ARGENTINA.  
Carolina Ganem\textsuperscript{1}, Helena Coch\textsuperscript{2}  
\textsuperscript{1}INCIHUSA - CONICET, Mendoza, Argentina, \textsuperscript{2}AiEM - ETSAB - UPC, Barcelona, Spain  

A Prototype Daylighted Artificial Sky  
Bruce Haglund, Garrett Lumens, Beau Tanner, Jennifer Mueller, Brad Dunbar, Doran Myrie, Troy Phillips  
University of Idaho, Moscow, ID, USA  

Comparative Performances Of Horizontal And Vertical Shading Devices in Buildings in Muscat Region  
Awni Shaaban, Wael Al-Khudayer  
Sultan Qaboos Univ, Muscat, Muscat, Oman  

Energy Generation, Distribution, & Transportation  

Resource Variability and Modeling (Technical)  
5/14/2012 1:15pm-2:30pm  3b  

Impact of Distributed Generation on PV Variability: A Lanai Case Study  
Manajit Sengupta, Jamie Keller  
NREL, Golden, CO, USA  

The Variability Index: A New and Novel Metric for Quantifying Irradiance and PV Output Variability  
Joshua Stein, Clifford Hansen, Matthew Reno  
Sandia National Laboratories, Albuquerque, NM, USA  

Optimum Fixed Orientations Considering Day-Ahead Market Energy Pricing in California  
Jennifer Luoma, Matthew Love, Jan Kleissl  
University of California San Diego, La Jolla, USA  

GHI Correlations With DHI And DNI And The Effects Of Cloudiness On One-Minute Data  
Frank Vignola  
University of Oregon, Eugene, Oregon, USA  

Development of a Stochastic-Kinematic Cloud Model to Generate High-Frequency Solar Irradiance and Power Data  
Philippe Beaucage, Michael Brower, Jackie Frank, Jeff Freedman  
AWS Truepower, Albany, NY, USA  

A High-Resolution Surface Radiation Dataset from Geostationary Satellites: Methodology and Validation  
Manajit Sengupta\textsuperscript{1}, Aron Habte\textsuperscript{1}, Stephen Wilcox\textsuperscript{1}, Christine Molling\textsuperscript{1}, Andrew Heidinger\textsuperscript{2}  
\textsuperscript{1}NREL, Golden, CO, USA, \textsuperscript{2}University of Wisconsin, Madison, WI, USA, \textsuperscript{3}NOAA, Madison, WI, USA
Biofuels: Planning for a Viable Industry (Forum)
5/14/2012 1:15pm-2:30pm  4d  Chair: Philip Pienkos
FORUM - Algal Biofuels Modeling: Planning for a Viable Industry
Philip Pienkos
National Renewable Energy Laboratory, Golden, CO, USA
Diesel engine fueled with biodiesel obtained from mixed feedstocks
Dilip Kumar Bora, L. M. Das, M K G Babu
Tezpur University, Tezpur, Assam, India

Addressing the Barriers to Successful Small Wind Development (Forum)
5/14/2012 1:15pm-2:30pm  1d
FORUM - Addressing the Barriers to Successful Small Wind Development
Megan Amsler
Small Wind Division Treasurer/Audit Committee Chair and Zoning Working Group Co-Chair; Executive Director of Cape & Islands Self-Reliance Corp., Treasurer of local NESEA chapter, renewable energy inst, North Falmouth, MA, USA

Energy Access

Impacts of Renewable Fuels: Environmental, Social and Economic Sustainability (Forum)
5/14/2012 1:15pm-2:30pm  1e
FORUM - Impacts of Renewable Fuels: Environmental, Social and Economic Sustainability
Jordan Macknick
NREL, Golden, CO, USA

Finance, Policy & Marketing

Opportunities and Challenges in U.S.-China Clean Energy Cooperation (Forum)
5/14/2012 1:15pm-2:30pm  4e
FORUM - Opportunities and Challenges in U.S.-China Clean Energy Cooperation
David M. Kline
NREL, Golden, CO, USA

A Break in the Clouds: Assessing Growth in the Solar Labor Market (Forum)
5/14/2012 1:15pm-2:30pm  3a
FORUM - A Break in the Clouds: Assessing Growth in the Solar Labor Market
Andrea Luecke
The Solar Foundation, Washington, DC, USA

Commercial Market Innovations to Put U.S. Solar on the World Stage (Forum)
5/14/2012 1:15pm-2:30pm  1f
FORUM - Commercial Market Innovations To Put Solar Thermal on the World Stage
Chip Bircher
Utility Solar Water Heating Initiative, De Pere, WI, USA
The last five years have witnessed considerable progress in wave and tidal energy conversion technologies with many large scale deployments occurring at sea. Global programmes encompassing particular announcement by various counties of deployment road maps coupled to financial support mechanisms are now creating the needed environments for commercialisation of the technology. In particular, the recent announcements made by relevant entities of countries such as Canada, China, Korea, USA and the UK. Of a particular note is the announcement by in the UK by the Crown Estate, which owns the seabed, of an ambitious implementation programme to install around 1.6GW of wave and tidal energy technology by 2020 in sites in the Pentland Firth in Scotland. This target alone represents a projected investment of over £4.3 billion and, if successful, has the potential to propel the UK and the implemented technologies associated with the projects onto a higher platform towards achieving a truly global industry. It is important to remember that the developmental routes of many of these technologies began through discussion and debate within the academic and industrial communities. Hence, this forum will report on the latest activities undertaken at a country level and will further enhance the debate and understanding to address the need growth potential and the exploitation of wave and tidal energy resources for sustainable electricity production.
Simulation Of The Process Of Storage And Heat Transference In A Solar Collector With Asphalt Brick Floor
Francisco Risco Franco, German Chumpitaz Ayala, Andres Mendiburu Zevallos
National University Of Santa, Chimbote, Ancash, Peru

EXPERIMENTAL INVESTIGATION AND PERFORMANCE SIMULATION OF HOT AIR GENERATION SYSTEM USING PRODUCER GAS AS FUEL INSTEAD OF LIGHT DIESEL OIL TO DETERMINE THERMAL PERFORMANCE DE-RATING FACTOR (Part I)
A.R. Patel
Indian Institute of Technology Ropar, Ropar, Punjab, India

REMOTE MONITORING OF A SOLAR INSTALLATION FOR HOT WATER PRODUCTION
Fatihah Sahnoun1, Maiouf Belhamel1, Mimoun Zelmat2
1Renewable Energy Development Centre, Bouzareah Alger, Algeria, 2UNIVERSITY M’HAMED BOUGUERA, BOUMERDES, Algeria

Solar Drying of Habanero Chili in Yucatan Mexico
Elizabeth Cortes Rodriguez1, Felipe de Jesus Ojeda Camara1, Claudia A. Ruiz Mercado1, Isaac Pilatowsky Figueroa2
1Universidad Autónoma de Yucatán, Mérida, Yucatán, Mexico, 2Centro de Investigacion en Energía, Universidad Nacional Autónoma de México, Temixco, Morelos, Mexico

ABSORPTION SOLAR REFRIGERATION SYSTEM FOR AIR CONDITIONING IN THE YUCATAN PENINSULA
Elizabeth Cortes Rodriguez1, Claudia A. Ruiz Mercado1, Jose Luis Castilla Carrillo1, Wilfrido Rivera Gomez-Franco1
1Universidad Autonoma de Yucatan, Merida, Mexico, 2Centro de Investigación en Energía, Universidad Nacional Autónoma de México, Morelos, Mexico

Towards Dubai Green City 2020: Baseline assessment and preliminary study
Mohsen M. Aboulnaga
University of Dubai, Dubai, United Arab Emirates

A Knowledge Based Computer-Aided Design Tool for Water Efficient Design of Sustainable Green Open Spaces
Daphna Drori, Edna Shaviv
Faculty of Architecture and Town Planning, Israel Institute of Technology, Haifa, Israel

Green Desalination (Using Solar Energy) at the level of village is the best solution for water sanitation in Egypt.
Mahmoud Hellmy Elshear, Ahmed Onsy
Environmental Institute, Cairo, Egypt

Building Construction without Cement, Sand and Water
Shilpa Joshi1
1Green Build Products(I) Pvt Ltd, Pune/Maharashtra, India, 2Srujan Envitech Solutions Pvt.Ltd, Pune/Maharashtra, India

Assessment of Desalination System Working on Renewable Energy
Esam Jassim
Prince Mohammed University, Al-Khobar, Saudi Arabia
Money comes in many forms, just like energy. Some of these forms support sustainable economic systems and some do not. This presentation will explore the sustainable forms of money and monetary policies and how these are being used to support renewable energy, as well as how such efforts could be expanded.

Speakers to Include:
Robert Bows, CRES Board Member, Media and Communications Manager, Public Banking Institute

Parallel Sessions are Organized by Track Below

2:45pm - 4:00pm

Advancements in RE Technology

CSP Applications 2 (Technical)
5/14/2012 2:45pm - 4:00pm  1c  Chair: Allison Gray

Solar Cogeneration A Novel Approach for CSP in Northern Chile
Roberto Roman¹, Felipe Cuevas²
1University of Chile, unknown, Chile, 2ISES, unknown, Germany

Design of a Micro Grooved Receiver Surface for a Solar Powered Stirling Engine Generator
Md. Islam1, Kunwar Singh2
1The Petroleum Institute, Umm Al nar, Abu Dhabi,, United Arab Emirates, 2IIT Kanpur, Kanpur, Uttar Pradesh, India

Advanced Parabolic Trough Concentrator for Grid Parity
David White, Alison Mason
SkyFuel, Arvada, CO, USA

Development of a Solar Technology Acceleration Center (SolarTAC)
Stanley Bull1, Thomas Grant2
1National Renewable Energy Laboratory, Golden, Colorado, USA, 2MRIGlobal, Kansas City, Missouri, USA

Optimized 2-D Solutions for a Low Concentration Linear Non-Imaging Fresnel Concentrator
Brian Raichle, Jamie Russell, Greg Norris, Kevin Howell
Appalachian State University, Boone, NC, USA

Modeling Generation Systems from Using Solar Stirling Engines Parabolic Dishes (Solar/Dish)
Sebastian Mendoza Castellanos1, Reinaldo Guillen Gordin1, Vladimir Melian Cobas1, Electo Eduardo Silva Lora1, Oscar Almazan1
1Federal University of Itajubá, Itajubá - MG, Brazil, 2University of Oriente, Santiago de Cuba, Cuba

Thermal Energy Storage Performance Metrics and Use in Thermal Energy Storage Design
Zhiwen Ma, Greg Glatzmaier, Craig Turchi, Mike Wagner
NREL, Golden, CO, USA

PV & Wind Applications (Ignite)
5/14/2012 2:45pm - 4:00pm 2b  Chair: Greg Glatzmaier

Recent Ocean Energy Development Effort in NREL
Ye Li, Fredrick Driscoll, Robert Thresher
National Renewable Energy Lab, Golden, CO, USA

From Test Cells to Terawatts: Transforming Buildings into Power Plants
Marc Thomas
Dyesol Inc., Toledo, OH, USA

PV Management Systems for large-scale solar arrays
Ray Burgess
Solar Power Technologies, Austin, TX, USA

Techniques For Improving Wind To Power Conversion
Gerry Wiener, Sue Ellen Haupt, Bill Myers, Seth Linden, Julia Pearson, Laura Imbler
National Center for Atmospheric Research, Boulder, CO, USA

Multi-Objective Optimisation of Hybrid Wind Turbine - PV Systems
Azadeh Kamjoo, Alireza Maheri, Ghanim A. Putrus, Arash M. Dizqah
Northumbria University, Newcastle upon Tyne, UK

Cold Storage as an Enabling Technology for Solar and Wind Energy
Paul Denholm, Sean Ong
National Renewable Energy Laboratory, Golden, CO, USA

A Suggestion For The Foundation Type Of Offshore Wind Turbine In The Test Bed On The Basis Of Economic And Constructibility Analysis
moo sung ryu
faust001@kepri.re.kr, moo, USA

Chemical fabrication of dry-type solar cell with using the metal oxide semiconductors
Hiroki Nagai, Tatsuya Suzuki, Chihiro Mochizuki, Ichiro Takano, Tohru Honda, Mitsunobu Sato
The Built Environment

Cooling Buildings (Technical) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/14/2012 2:45pm - 4:00pm 1b Chair: Margot McDonald

Early Results from a Solar Thermal Air Conditioning and Heating System
Eric Buchanan
University of Minnesota, Morris, MN, USA

Comfort Conditions and Cooling Performance of a Wet Roofpond System in the U.S. Southwest.
Alfredo Fernandez-Gonzalez, Iulian Florin Costache
University of Nevada, Las Vegas, Las Vegas, NV, USA

Adaptive Control For Thermal Comfort Based On Predictive Model Of PMV In A Natural Ventilation House
Chou Shen, Joon-Ho Choi
Missouri University of Science and Technology, Rolla, MO, USA

Smart Green Roofs
Pablo La Roche, Eric-Valentin Carbonnier
1California State Polytechnic University, Pomona, Pomona, CA, USA, 2HMC ArchLab, Ontario, CA, USA

Passive use of solar energy in double skin facades for reduction of cooling loads
Anatolijs Borodines, Jurgis Zemitis, Aleksejs Prazuments
Riga Technical University, Riga, Latvia

Full scale experimental Studies of a passive cooling roof In hot arid areas
BENCHEIKH HAMIDA
Laghouat University, LAGHOUAT, Albania

Passive and Active Solar Energy for Net Zero Buildings (Forum) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/14/2012 2:45pm - 4:00pm 4e

FORUM - Passive and Active Solar Energy for Net Zero Energy Buildings
Tom Hootman
RNL, Denver, Colorado, USA

Climate Change

Biochar: An Optimum Approach to Carbon Negativity (Forum)
5/14/2012 2:45pm - 4:00pm 1d

FORUM - Biochar - an optimum approach to carbon negativity?
Ronal Larson
United States Biochar Initiative, Golden, CO, USA
Energy Generation, Distribution, & Transportation

Impacts of Renewable Electricity Generation Technologies: Environmental, Social and Economic Sustainability (Forum)
5/14/2012 2:45pm - 4:00pm  2a

FORUM - Impacts of Renewable Electricity Generation Technologies: Environmental, Social and Economic Sustainability
Garvin Heath
NREL, Golden, CO, USA

Solar Resource Forecasting-I (Technical)
5/14/2012 2:45pm - 4:00pm  4d

Design and Performance of an Optimized Ensemble Solar Generation Forecast System for Grid Systems on the Hawaiian Islands
John Zack, Kenneth Waight, Glenn Van Knowe, Steven Young
AWS Truepower, LLC, Troy , NY, USA

Cloud Advection Schemes for Short-Term Satellite-Based Insolation Forecasts
Steven Miller1, Matthew Rogers2, Andrew Heidinger2, Istvan Laszlo3, Manojit Sengupta4
1Cooperative Institute for Research in the Atmosphere, Fort Collins, CO, USA, 2Cooperative Institute of Meteorological Satellite Studies, Madison, WI, USA, 3NOAA/NESDIS Office of Research and Applications, Camp Springs, MD, USA, 4National Renewable Energy Laboratory, Golden, CO, USA

Validation and Analysis of HRRR Insolation Forecasts using SURFRAD
Matthew Rogers1, Steven Miller1, Cindy Combs1, Manojit Sengupta1, Stan Benjamin1, Curtis Alexander7, Patrick Mathiesen1, Jan Kleissl1
1Cooperative Institute for Research in the Atmosphere, Fort Collins, CO, USA, 2National Renewable Energy Laboratory, Golden, CO, USA, 7NOAA Earth System Research Laboratory, Boulder, CO, USA, 1University of California, San Diego, San Diego, CA, USA

Critical Timeframes of Importance for PV From a Utility Perspective
Obadiah Bartholomy1, Pramod Krishnani2, Yong Cai1, Brad Dommer1
1Sacramento Municipal Utility District, Sacramento, CA, USA, 2Belectric, Inc, Newark, CA, USA

ECMWF Forecast Assessment of Direct Solar Irradiance over Australia
Alberto Troccoli1, Jean-Jacques Morcrette1
1CSIRO, Canberra, Australia, 1ECMWF, Reading, UK

An International Solar Irradiance Data Ingest System For Forecasting Solar Power And Agricultural Crop Yields
James Hall, Jeffrey Hall
JHtech, Divide, CO, USA

Energy Access

ISES Solar Education Exchange (ISEE): Creating Brighter Futures (Forum)
5/14/2012 2:45pm - 4:00pm  1e

FORUM ISES Solar Education Exchange (ISEE) – Creating Brighter Futures: Linking Schools Globally Through Interactive Internet-Based Education
Paulette Middleton, Jennifer McIntosh, Monica Oliphant
Panorama Pathways / ISES, Boulder Colorado, USA
Energy and Gender

Energy and Gender Session (Technical)
5/14/2012 2:45pm - 4:00pm  4c Chair: Shannon Cowlin & Debra Lew

Solar Energy for Improved Rural Livelihoods? The Case of Barefoot Solar Engineers in Chitala, Salima, Malawi.
Leonard Gobede
Department of Energy Affairs, Lilongwe, Malawi

Potential of Efficient Cook Stoves for Biomass Saving and Indoor Air Pollution Mitigation in Pakistan
Khanji Harijan, Mohammad Aslam Uqaili
Mehran University of Engineering & Technology, Jamshoro, Sindh, Pakistan

Introducing The Manufacture Of Solar Ovens And Photovoltaic Modules To A Remote Village In Colombia
Richard Komp¹, Julian Lustig², Hugo Gonzalez⁴, Nimia Lopez⁵, Susan Kinne⁶
¹Maine Solar Energy Association, Jonesport, Maine, USA, ²SOL SA, Barranquilla, Colombia, ³Grupo Fenix, Totogalpa, Nicaragua, ⁴Universidad Nacional de Ingenieria, Managua, Nicaragua

Training Program on “Application of Solar Energy Instrumentation for Income Generation”
Lalita Balakrishnan
All India Women’s Conference, New Delhi, India

Empowerment of Rural Women in India Through Sustainable Energy Use
Gouri Datta
University of Delhi, New Delhi, India

Energy saving in school buildings by actively engaging students in energy saving process
Hamid Abdi
Deakin, Geelong, Australia

A Sunny Future For The Pacific Island Countries
Atul Raturi
University of South Pacific, Suva, Fiji

Effective Solar Technology and Cost Strategies for Accelerated Human Communications in Poor Villages of the World’s Developing Countries
Arun Jhaveri
University of Washington, Seattle, Washington, USA

Empowering Women In Developing Countries Through Energy For Entrepreneurship
Gail Karlsson
ENERGIA International Network on Gender & Sustainable Energy, Leusden, The Netherlands

Finance, Policy & Marketing

Biofuels and Bioenergy (Technical)
5/14/2012 2:45pm - 4:00pm  3a

Issues and Challenges of the Decentralised Bioenergy Industry
Vimal Kumar Eswaral, Prasanthu Dey
Aston University, Birmingham, UK

High Speed Public Policy for Algae-Based Biofuel as a Viable Energy Alternative: Sustainable Collaboration, Technology and Political Will
Nadia Ahmad
University of Denver Sturm College of Law, Denver, CO, USA

Crossing the boundaries between the energy, environment and transport sectors: How and why biofuels can be introduced in a local context

Magdalena Folde
Dept of Thematic studies - Technology and social change, Linköping, Sweden

Biofuels Adoption In Nigeria: Attaining An Equilibrium In The Food, Fuel, Feed And Fibre Objectives

Nelson Abila
University of Vaasa, Vaasa, Finland

Policy for Biomass Utilisation in Energy and Transport Systems – the Case of Biogas in Stockholm, Sweden

Linda Olsson, Linnea Hjalmarsson
Linköping University, Linköping, Sweden

System Approach for the Development of Pricing Policy for Biofuel in Indonesia

Erwin Sadirsan1, Hermanto Siregar2, Dr Eriyatno3, Evita Legowo3
1Indonesian Renewable Energy Society, Jakarta DKI, Indonesia, 2Bogor Agricultur Institute, Bogor, Indonesia, 3Directorate General of Oil and Gas, Jakarta, Indonesia

Finance, Policy & Marketing Potluck (Ignite)
5/14/2012 2:45pm - 4:00pm 3b

Simulating the Financial Effects on Utilities of Demand Destruction

Eric Maurer, Graeme Hoste
Rocky Mountain Institute, Boulder, CO, USA

DECISION-MAKING AND BEHAVIOR CHANGE IN RESIDENTIAL ADOPTERS OF SOLAR PV

Varun Rai1, Kristine McAndrews2
1University of Texas at Austin, Austin, Texas, USA, 2W&T Offshore, Houston, Texas, USA

The Future Renewable Energy Market of the U.S. Southwest: A Renaissance of Regionalism?

David Hurlbut, Joyce McLaren
National Renewable Energy Laboratory, Golden, CO, USA

Incorporating Climate and Air Quality Externalities in the US Electricity System

Kristen Brown, Daven Henze, Jana Milford
University of Colorado Boulder, Boulder, CO, USA

GRID PARITY FOR RESIDENTIAL PHOTOVOLTAICS IN THE UNITED STATES: KEY DRIVERS AND SENSITIVITIES.

Sean Ong, Paul Denholm, Nathan Clark
National Renewable Energy Laboratory, Golden, CO, USA

Common Barriers to Getting Approval from the Utility and How to Address Them

Marc Johnson
New Mexico State, New Mexico, USA

ENERGY DISPATCH SCHEDULE OPTMIZATION IN GRID-CONNECTED, PHOTOVOLTAIC-BATTERY SYSTEMS: A COST-BENEFIT ANALYSIS FOR DEMAND SIDE APPLICATIONS

Anders Nottrott, Jan Kleissl, Byron Washom
University of California, San Diego, La Jolla, CA, USA

Challenges facing project developers and utilities in renewable energy markets.

Chris Hofmann
University of Nevada Reno, Reno, Nevada, USA

An End User Perspective on the Cost of Solar Photovoltaic Energy Systems Installed by Commercial Organizations

Kenton Swift
The University of Montana, Missoula, MT, USA
WREC FORUM

WREC-I (Technical)
5/14/2012 2:45pm - 4:00pm 4a

A Plan For Powering the World For All Purposes With Wind, Water, and Sunlight
Mark Jacobson1, Mark Delucchi2
1Stanford University, Stanford, CA, USA, 2U.C. Davis, Davis, USA

FIT for Future - How a Feed in Tariff (FIT) and SDR’s can boost the renewable energy sector
Stefan Schurig
World Future Council, Hamburg, Germany

THE INTEGRATION OF RENEWABLE ENERGY AND CONVENTIONAL ENERGY SYSTEMS
Stanly R. Bull
NREL, Golden, CO, USA

Economical Evaluation of Electricity Production Through The Renewable Energy in Iran
Mehdi Bariman1, A Kaabi-Nejadian2
1Mazandaran Electric Company, unknown, Iran, 21. Renewable Energy Organization of Iran, unknown, Iran

WREC-II (Technical)
5/14/2012 2:45pm - 4:00pm 4b

Interactive Theatre for Engaging Navajo Women and Student in Solar Energy
Beth Osnes, Angela Hunt
University of Colorado, Boulder, CO, USA

Impacts of Biogas on Women: Experiences from SNV Supported Biogas Programmes in Asia and Africa
Prakash Ghimire
Netherlands Development Organization (SNV), Thimphu, Bhutan

Nexus Carbon for Development - Sustainable And Equitable Energy Access For The Poor
Priyadarshini Karve
Member, Appropriate Rural Technology Institute (ARTI), Pune, Maharashtra, India

FiTs , Starts and Stops
Tony Book
Riomay, Renewable Energy, unknown, UK

WREN

WREN Variegated (Ignite)
5/14/2012 2:45pm - 4:00pm 1f

Chair: Dr. Dorota Chwieduk

HITTITE Direct Stream Generating Parabolic Trough for Power Generation amd Industrial Steam Applications
Oguz Capan
Hitite Solar Enerji, Istanbul, Turkey

Solar Energy as a Clean Source of Electricity
Onu John
Federal Polytechnic Oko, oko,Anambra state, Nigeria

power generation by photovoltaic
AWUZIE CHIOMA
CRES Showcase Colorado

Golden Colorado: 2 Paths Toward Residential Conversion to Net Zero
5/14/2012 2:45pm - 4:00pm

The City of Golden has established a focus on sustainability since 2007, directed by the Community Sustainability Advisory Board plus a fulltime staff member. The City commissioned a study to make existing houses in Golden more energy efficient, even all the way to net zero energy. This study seeks to answer the question: “is it possible to convert a standard house to net zero energy, and if it is possible, what would this entail?”

The result is a pamphlet that takes the reader along two different paths - one making economically justifiable decisions along the way, and the other with a primary eye on ultimately achieving net-zero more aggressively.

Speakers to Include:

Michael D. Haughey, P.E., HBDP, CEM, LEED AP and Peter J. Ewers, AIA, LEED AP
Parallel Sessions are Organized by Track Below
4:15pm - 5:30pm

Advancements in RE Technology

National Lab Concentrating Solar Power Testing Capabilities (Forum)
5/14/2012 4:15pm - 5:30pm
FORUM - National Lab Concentrating Solar Power Testing Capabilities
Chuck Kutscher
NREL, Golden, CO, USA

Radically Reducing the Cost of Solar Water Heaters (Forum)
5/14/2012 4:15pm - 5:30pm
FORUM - Radically Reducing the Cost of Solar Water Heaters
Jay Burch
NREL, Golden, CO, USA

Panels in the Wind: How Wind Studies are Impacting the Solar Industry (Forum)
5/14/2012 4:15pm - 5:30pm
FORUM - Panels in the Wind: How Wind Studies Are Impacting the Solar Industry
David Banks
CPP Wind Engineering, Fort Collins, CO, USA

The Built Environment

Emerging Architecture - ASES Division Forum - AIA Committee on the Environment Award Winners 1.25 AIA-LU/HSW/SD
5/14/2012 4:15pm - 5:30pm
Chair: Alexis Karolidis
COTE Annual Competition

Path to Zero: The Evolution of Ultra Efficient Architecture on the NREL Campus (Forum) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/14/2012 4:15pm - 5:30pm
FORUM - Path to Zero: The Evolution of Ultra Efficient Architecture on the NREL Campus
Ron Judkoff
NREL, Golden, CO, USA

Higher Education and the Solar Revolution (Forum) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/14/2012 4:15pm - 5:30pm
FORUM - Higher Education and the Solar Revolution!
Carol Dollard
Colorado State University, Fort Collins, CO, USA
Automated and Intelligent Solar Shading - The Next Generation (Forum) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/14/2012 4:15pm - 5:30pm 4e
FORUM - Automated & Intelligent Solar Shading - The Next Generation
Rick Morris
C/S Construction Specialities, Missisauga, Ontario, Canada

Energy Generation, Distribution, & Transportation

Solar Forecasting: Needs and Solutions (Forum)
5/14/2012 4:15pm - 5:30pm 3b
FORUM - Solar Forecasting: Needs and Solutions
Carlos Coimbra
University of California, San Diego, La Jolla, CA, USA
FORUM - Solar Forecasting for Integration of Large Amounts of Solar Energy
Melinda Marquis
NOAA Earth System Research Laboratory, Boulder, CO, USA

Opportunities for Hydrogen and Fuel Cells in Transportation (Technical)
5/14/2012 4:15pm - 5:30pm 4d
Chair: Victor Diakov
Hydrogen energy systems analysis in transportation using the macro-system model
Victor Diakov¹, Mark Ruth¹, Timothy Sö¹, Michael Goldsby²
¹NREL, Golden, CO, USA; ²Sandia National Laboratories, Livermore, CA, USA
Present scenario and future market for fuel cell vehicles in India
sandesh k s, b Aprameya swarup
SICE, KArnataka, India
Optimal Power Management of Hydrogen Fuel cell Vehicles
Kary Thanapalan, Fan Zhang, Giuliano Premier, Alan Guwy
University of Glamorgan, Wales, UK
On-board Renewable Hydrogen Production System for Hydrogen Hybrid Vehicles
Kary Thanapalan, Fan Zhang, Giuliano Premier, Alan Guwy, Jon Maddy
University of Glamorgan, Wales, UK

Energy Access

Educating Communities (Forum Highlights)
5/14/2012 4:15pm - 5:30pm 1e
Chair: Dr. Paulette Middleton and Monica Oliphant
Scaling Solar at School
Danielle Murray
San Francisco Department of Environment, San Francisco, CA, USA
The Arizona Solar Challenge: Community Organizing to Build Residential Solar Markets
Antonia Bouchard
Arizona SmartPower, Tempe, AZ, USA
Kilowatts for Education, a new way to think about renewable energy and sustainability projects for educational institutions.
AAron Godwin
Founder, The Renaissance Group, A Conserve First LLC Company, Founder of the Kilowatts for
Energy and Gender

Careers of Empowered Women in Sustainable Energy Science & Technology: WISEST (Forum)
5/14/2012 4:15pm - 5:30pm 4c Chair: Ms. Bobi Garrett & Dr. Barbara Farhar

Many women occupy powerful positions in energy organizations. This Forum features the career trajectories of powerful women and will explore what we can do to attract more women into careers in sustainable energy science and technology.

FORUM - Women in Sustainable Energy Science and Technology (WISEST)
Barbara C. Farhar1, Bobi Garrett2
1University of Colorado Boulder, Boulder, CO, USA, 2NREL, Golden, CO, USA

Finance, Policy & Marketing

Financing International Renewable Energy Projects in the Year of Sustainability for All (Forum)
5/14/2012 4:15pm - 5:30pm 3a

FORUM - Financing International Renewable Energy Projects in the Year of Sustainability for All
Karlynn Cory
NREL, Golden, CO, USA

WREC Forum

WREC-I (Technical)
5/14/2012 4:15pm - 5:30pm 4a

STATUS AND DEVELOPMENT OF WIND ENERGY IN CUBA
Conrado Moreno Figueredo
Centro de Estudio de Tecnologías Energéticas Renovables, Habana, Cuba

SPILLING WIND LEAVES LITTLE ROOM FOR STORAGE
Donald T. SWIFT-HOOK1, David J. MILBORROW2
1Secretary WREN, WOKING, Surrey GU21 4XX, UK, 2Consultant, LEWES, East Sussex BN7 1LR, UK

Viability of Micro Wind Turbines in the Urban Environment
Ghanim Putrus
Northumbria University, Unknown, UK

WREC-II (Technical)
5/14/2012 4:15pm - 5:30pm 4b

Implementation of sustainable energy policy and goals- can networking explain action?
Jenny Palm
, Linköping University, unknown, Sweden
CRES Showcase Colorado

High Altitude, Cold Climate Design Considerations
5/14/2012 4:15pm - 5:30pm 1a   Chair: Michael Haughey

This presentation will be a panel that includes ventilation and thermal envelope issues for "tight" buildings and/or humid occupancies. A project that was part of the Colorado BEST Program, built in Sangre de Cristo, will be used to discuss cold climate and high altitude considerations for PV, RE, and envelopes. In addition, a Colorado-grown company specializing in air mixing as part of a solution to economizer efficiency and coil freeze prevention: The presence of air stratification is a threat to freeze and rupture hydronic coil(s) in Air Handling Units and thus is the reason low-limit freeze stats are used to stop the unit from operating when freezing conditions are present. However repeated “nuisance trips” are undesirable and the most commonly used technique to avoid this problem is having the control system abandon the airside economizer and switch the unit to heating mode. The result is energy being wasted to protect the equipment. Therefore in an effort to be energy conscious, system designers should strongly consider the use of a high-performing air mixing device to eliminate the air stratification and maximize airside economizer.

Speakers to Include:

M. Robert D. Barrett, P.E., Director of Engineering, Blender Products, Inc.
Ross Lindgren, Principal, Hutton Architecture Studio
Paul C. Hutton, AIA, Principal, Hutton Architecture Studio

Concentrating Solar Power Reception - by invitation
5/14/2012 5:45pm - 7:00pm   2c

This reception will be a gathering for the Concentrating Solar Power (CSP) community. After a short welcome and invitation to join the CSP Division, attendees will have a chance to mingle and network. CSP Division members, CSP professionals, CSP advocates, and CSP fans are all encouraged to attend – please email Karen.McInnes@SkyFuel.com to request an invitation.
Sponsored by SkyFuel

SOLARTODAY Reception - invitation only
5/14/2012 5:30pm - 7:00pm
Tuesday, May 15, 2012

Speakers Breakfast
5/15/12 7:00am-8:00am  

ASES CSP Division Meeting (division members only)
5/15/2012 7:00am - 8:00am  

ASES Solar Electric Division Meeting (division members only)
5/15/2012 7:00am - 8:00am  

ASES Sustainable Buildings Division Meeting (division members only)
5/15/2012 7:00am - 8:00am  

ASES Sustainable Transportation Division Meeting (division members only)
5/15/2012 7:00am - 8:00am  

ASES Clean Energy and Water Division Meeting (division members only)
5/15/2012 7:00am - 8:00am  

Morning Plenary Session
5/15/12 8:15am-10:00am  

Exhibit Hall Open
5/15/2012 10:00am - 5:00pm  

ISES Annual General Meeting (AGM)
5/15/2012 12:00pm - 1:00pm  

Parallel Sessions are Organized by Track Below
10:30am - 11:45am  

Advancements in RE Technology

Photovoltaic Materials and Applications (Ignite)
5/15/2012 10:30am - 11:45am  

Chair: Manuel Romero  
Solar Photovoltaic Power Output Data Sets for Grid Integration Studies
Jaclyn Frank, Michael Brower, Michael Barton, Philippe Beaucage
AWS Truepower, Albany, USA
New advancements in PV inverter technology

Paul Bundschuh
Ideal Power Converters, Austin, TX, USA
Pathways To Low-Cost, High-Volume Production Of CIGS Thin-Film PV Modules

Neelkanth G. Dhere
Florida Solar Energy, University of Central Florida, Cocoa, FL 32922-5703, USA
Results from design and outdoor tests of a new PVT-hybrid collector with new receiver design

Stefan Larsson-Mastonstråle1, Henrik Davidsson1, Ricardo Bernardo1
1Lund University, Lund, Sweden, 2Maputo University, Maputo, Mozambique
A Case Study of a Residential Photovoltaic System with Microinverters

Clifford Ho
Sandia National Laboratories, Albuquerque, NM, USA
Modeling, Simulation and Performance Characteristics of Hybrid Powered DC Series Motor via Photovoltaic and DC Shunt Generators

Mohammad Widyan1, Ahmad Harb2
1The Hashemite University, Zarqa 13115, Jordan, 2German Jordanian Universities, Amman 11180, Jordan
Performance Monitoring of MWp Level Crystalline PV Technologies in Indian Climatic Conditions

Rabindra Satpathy, Alka Chauhan
Reliance Industries Ltd - Solar Group, Reliance Corporate Park, Building SC, First floor, India
Electrical and Structural properties of rf sputtered aluminium-doped ZnO thin film at low substrate temperature.

Momoh Musa1, Sanusi Abdullahi1, Kasim U. Isah2
1Usman Danfodiyo University Sokoto, Sokoto, Nigeria, 2Federal University of Technology Minna, Minna, Niger State, Nigeria
Evaluating Multi-axis Sun-tracking Advantages in Spain: a New Point of View

Miguel de Simón-Martín, Cristina Alonso-Tristán, Montserrat Díez-Mediavilla, M. Carmen Rodríguez-Amigo, Teófilo García-Calderón
Burgos University, Burgos, Spain
COMPARISON STUDY OF AIR-BASED PHOTOVOLTAIC/THERMAL (PV/T) COLLECTOR WITH DIFFERENT DESIGNS OF HEAT EXCHANGER

Faridah Hussain1, Mohd Yusof Othman1, Kamaruzzaman Sopian2, Zulkhairi Anuar2, Suhaila Khaireuddin2, Baharuddin Yatim2, Hafizd Ruslan2
1National Metrology Laboratory, SIRIM Berhad, Selangor, Malaysia, 2Solar Energy Research Institute (SERI), Universiti Kebangsaan Malaysia, Selangor, Malaysia
The Autonomous Method of MPPT Control for Photovoltaic Inverters

Weikang Zhang1, Wenxi Zhang2
1Shanghai Center for Photovoltaics, Shanghai, China, 2Shanghai Jiaotong University, Shanghai, China
Growth mechanism and optical properties of Zinc Oxide thin film grown by rf sputtering technique.

Abdullahi Sanusi1, Musa Momoh1, Kasim U. Isah2
1Usman Danfodiyo University Sokoto, Sokoto, Nigeria, 2Federal University Of Technology Minna, Nigeria
The Future of Concentrating Solar Power (Forum)

5/15/2012 10:30am - 11:45am 1c

FORUM - The Future of Concentrating Solar Power
Despite being a mature technology, solar thermal systems can be improved. Four papers address improving collectors, including an evacuated flat plate collector, a direct absorption collector, and a novel integrated CPC collector. Another paper compares flat plate, evacuated tube, and CPC collectors experimentally. Two papers present new concepts on long-term seasonal storage approaches.

Optical Performance Modeling And Experimental Validation For A Novel Geometry ICPC Solar Collector
William Duff, Jirachote Daosukho
Colorado State University, Ft. Collins CO, USA

In-field Performance Testing of Flat Plate, Heat Pipe, and CPC Solar Thermal Collectors.
Landon Abernethy, Brian Raichle
Appalachian State University, Boone, NC, USA

Numerical Simulations Of Direct Absorption Of Solar Radiation By A Liquid
Ram Satish Kaluri, Srinivasan Dattarajan, Ganapathisubbu S
Siemens Corporate Research and Technologies, Bangalore, India

Seasonal Storage of Solar Heat – Problems, Pitfall, Benefits and Solutions
Peter D’Antonio
PCD Engineering, Longmont, CO, USA

Long-term solar thermal energy storage using aqueous calcium chloride
Josh Quinell, Jane Davidson
University of Minnesota, Minneapolis, MN, USA

IMPROVEMENT OF THERMAL STRATIFICATION IN A HOT WATER SOLAR STORAGE TANK BY USING A SINTERED BRONZE CONICAL DIFFUSER
Pablo González-Altozano, Luis Hipólito Sanchis, María Gasque, Eugenio García-Mari, Federico Ibáñez, Rosa Penélope Gutiérrez-Colomer
Universitat Politècnica de València, Valencia, Spain

The Built Environment

Building Modeling & Efficiency (Ignite) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/15/2012 10:30am - 11:45am 1b Chair: Dennis Andrejko

Low-grade Solar Heat Capture From Urban Environment For Building Applications
Minjung Maing
Georgia Institute of Technology, Atlanta, GA, USA

A Do-It-Yourself Manual For Solar Swimming Pool Heating And Its Heater, After 39 Years In Operation
Francis de Winter
Francis de Winter & Associates, Soquel, California, USA

Development of a Gas-fired Domestic Heat Pump
Robert Critoph, Steven Metcalf
University of Warwick, Coventry, UK

The Impact of the Shape Factor on Final Energy Use in Residential Buildings in Nordic Climates
Itai Danielski, Morgan Fröling, Anna Joelsson
1Mid Sweden University, Östersund, Sweden, 2Sweco, Umeå, Sweden
Visual Comfort Assessment Based on Perception in Transitional Spaces Between Inside and Outside: A Mediterranean Case Study
Judit López, Carlos Alonso, Isabel Crespo, Rafael Serra, Helena Coch
UPC, Barcelona, Catalonia, Spain

Module Level Power Management Decreases PV Costs and Risks
Levent Gun
Ampt, Fort Collins, CO, USA

Architectural Repercussions Of Environmental Climate Control In The Generation Of Administrative Building Types; Differences Between Model And Technology Chosen.
Cristina Cabello Matud¹, Helena Coch Roura¹, Carlos Alonso Montolio²
¹Universidad de Zaragoza, Zaragoza, Spain, ²Universidad Politecnica de Cataluña, Barcelona, Spain

Model of an energy provision system for the “Sustainable Connected Home”
Luigi Crema¹, Alessandro Bozzioli¹, Alberto Bertaso¹, Federico Casalegno¹, Gaia Scagnetti¹, Alberti Fabrizio¹
¹Fondazione Bruno Kessler, Trento, Italy, ²Massachusetts Institute of Technology, Cambridge, Massachusetts, USA

Unlocking Energy Efficiency in Existing Buildings Using Whole Systems Thinking
Victor Olgyay
Rocky Mountain Institute, Boulder, Colorado, USA

Housing That Merges Sustainability and Affordability (Forum) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/15/2012 10:30am - 11:45am  2a

FORUM - Housing that Merges Sustainability and Affordability
Kevin Yoshida
B+Y Architects, Denver, CO, USA

Energy Generation, Distribution, & Transportation

Renewable Energy Assessment and Generation Poster Session
5/15/2012 10:30am - 11:45am  Exhibit Hall D

High Resolution Solar Measurements at DeSoto: The Deployment Experience
Michael Dooraghi¹, Manojit Sengupta¹, Pete Gotseff¹, Chris Wright¹, Ryan McMorow², Jimmy Paulino¹, Adam Kankiewicz³, Afshin Andreas¹, Barry Mather¹
¹National Renewable Energy Laboratory, Golden, CO, USA, ²Florida Power and Light, Arcadia, FL, USA, ³WindLogics, St. Paul, MN, USA

Study of Solar Energy Potential in Azerbaijan
Fuad Mammadov
Azerbaijan State Oil Academy, Baku, Nasimi region, Azerbaijan

Model To Calculate PV Array Altitude And Azimuth Angles To Maximize Energy And Demand Revenues From Measured Hourly Solar Radiation And Building Use Data
Steve Brunner
Brendle Group, Fort Collins, CO, USA

An Artificial Neural Network Based Approach for Estimating Direct Normal, Diffuse Horizontal and Global Horizontal Irradiances using Satellite Images
Yehia Eissa, Prashanth R. Marpu, Hosni Ghedira, Taha B.M.J. Ouarda, Matteo Chiesa
Masdar Institute, Abu Dhabi, United Arab Emirates

Recalibration of Heliosat-2 Method for Global Horizontal Irradiance Estimation in Dusty and Humid Environments
Yehia Eissa, Hosni Ghedira, Matteo Chiesa, Prashanth R. Marpu, Taha B.M.J. Ouarda
Masdar Institute, Abu Dhabi, United Arab Emirates

Quantifying the Use of Site-Specific Measurements in Place of a Typical Meteorological Year Data Set for Solar Energy Modeling
Christopher Thuman, Marie Schnitzer
AWS Truepower, Albany, New York, USA

Improvement of the Weather Research and Forecasting (WRF) Mesoscale Model for Improved Solar Resource Assessments and Forecasts under clear skies
Jose A. Ruiz-Arias1, Christian A. Gueymard2, Jimy Dudhia3, David Pozo-Vazquez1
1University of Jaen, Jaen, Spain, 2Solar Consulting Services, Colebrook, NH, USA, 3NCAR/MMM, Boulder, CO, USA

Forecasting Solar Power Intermittency using Ground-Based Cloud Imaging
Vijai Thottathil Jayadevan, Jeffrey J. Rodriguez, Vincent P.A. Lonij, Alexander D. Cronin
University of Arizona, Tucson, AZ, USA

Comparing Two Linear Regression Techniques for Long-Term Wind Speed Forecasting
Etenia Ponder, Carole Womeldorf
Ohio University, Athens, OH, USA

Assessment of Wind Energy Resources in Algeria
Mohamed Labadi
University of Sciences and Technology Houari Boumediene USTHB, Algiers, Algiers, Algeria

Wind Properties at Turbine Hub Height: Examples Using Doppler Lidar
Robert Banta1, Yelena Pichugina2, Michael Hardesty2, Alan Brewer2
1NOAA/ESRL, Boulder, Colorado, USA, 2CIRES and NOAA/ESRL, Boulder, Colorado, USA

Cost effective Wave measurements for Ocean energy
Joerg Bendfeld
University of Paderborn, Paderborn /NRW, Germany

Solar resource assessment in coastal NW-Europe
Kristian Nielsen1, Janne Dragsted2, Mikael Scharling1, Simon Furbo2
1Danish Meteorological Institute, Copenhagen, Denmark, 2Department of Civil Engineering, Technical University of Denmark, Kgs. Lyngby, Denmark

Modeled Yearly Energy Yield Of Inverted Metamorphic Multijunction Solar Cells
Daniel Friedman, William McMahon, Jerry Olson, Daryl Myers
National Renewable Energy Laboratory, Golden, CO, USA

Corrections of Satellite-Derived Direct Normal Irradiance Time Series Using Locally-Resolved Atmospheric Aerosol Data
Tomas Cebecauer1, Chris Gueymard2, Marcel Suri1
1GeoModel Solar, Bratislava, Slovakia, 2Solar Consulting Services, Colebrook, NH, USA

Estimating the Effect of Selective Absorber on CSP-Collector Performance
MOHAMED F. EL-REFAIE
CAIRO UNIVERSITY, GIZA, CAIRO, Egypt

Effect of time averaging on estimation of photovoltaic system performance
Clifford Hansen, Joshua Stein, Daniel Riley
Sandia National Laboratories, Albuquerque, NM, USA

Minimising Feed-in Fluctuations of Offshore Wind Farms with Biogas Fired Turbines
Joerg Bendfeld, Martin Tigges
University of Paderborn, Paderborn /NRW, Germany

A Novel Design for Micro Solar Cell Based on Microcantilever-Photoinduced
Mazhar Tayel, Yahya Ragab
Faculty of Engineering, Alexandria University, Alexandria, Egypt

Experimental Solar Chimney Data with Analytical Model Prediction
Mohammad O. Hamdan, Obada Rabbata
The Intersection of Photovoltaics and Electric Vehicles (Forum)
5/15/2012 10:30am - 11:45am  4d

Chair: Cary Hayes, REC Solar
FORUM: The Intersection of Photovoltaics (PV) and Electric Vehicles (EV)
Lee Johnson
Mainstream Energy, San Luis Obispo, CA, USA

Solar Resource Forecasting-II (Technical)
5/15/2012 10:30am - 11:45am  1d

Towards Intra-Hour Solar Forecasting Using Two Sky Imagers At A Large Solar Power Plant
Bryan Urquhart1, Chi Wai Chow1, Andu Nguyen1, Jan Kleissl1, Manajit Sengupta1, David Jeon2, Jim Blatchford3
1University of California, San Diego, La Jolla, CA, USA, 2Sempra Generation, San Diego, CA, USA, 3California Independent System Operator, Folsom, CA, USA

Determination of Forecast Value Considering Energy Pricing in California
Jennifer Luoma, Patrick Mathiesen, Jan Kleissl
University of California San Diego, La Jolla, USA

Short Term DNI Forecasting With Sky Imaging Techniques
Ricardo Marquez1, Carlos Coimbra1
1University of California, Merced, CA, USA, 2University of California, San Diego, CA, USA

Cloud velocity estimation from an array of solar radiation measurements
Juan L. Bosch, Yuehai Zheng, Jan Kleissl
University of California, San Diego, San Diego, CA, USA

Development and testing of a new day-ahead solar power forecasting system
Vincent Larson, Ryan Senkbeil, Brandon Nielsen
Aerisun LLC, Whitefish Bay, WI, USA

Understanding and Addressing Environment, Health, and Safety Risks of PV Manufacturing (Forum)
5/15/2012 10:30am - 11:45am  3b

Patrick Mathiesen1, Jan Kleissl1, Craig Collier2
1University of California - San Diego, La Jolla, CA, USA, 2GL Garrad-Hassan, San Diego, CA, USA
FORUM - Understanding and Addressing Environment, Health, and Safety Risks of PV Manufacturing
Sanjay Baliga
SEMI / PV Group, San Jose, CA, USA

Energy Access

Beyond Solarize (Forum)
5/15/2012 10:30am - 11:45am 1e
FORUM - Beyond Solarize - What We Can Learn from Collective Purchasing and Where We Go Next
Lee L. Rahr
City of Portland, Bureau of Planning & Sustainability, Portland, Oregon, USA

Finance, Policy & Marketing

Securitization as a Means to Improve Renewable Energy Project Finance (Forum)
5/15/2012 10:30am - 11:45am 4e
FORUM - Securitization as a Means to Improve Renewable Energy Project Finance
Michael Mendelsohn
NREL, Golden, CO, USA

Local, National and International Renewable Energy Programs (Forum)
5/15/2012 10:30am - 11:45am 4f
FORUM - Local, National, and International Renewable Energy Programs
Francis de Winter
Francis de Winter & Associates, Soquel, CA, USA

A Panel Discussion Moderated by Juwi Solar with Key Representatives from Major Utilities.
5/15/2012 10:30am - 11:45am 1f
Discussion will focus on what they see as the current trends and future of utility-scale solar.
FORUM-A panel discussion moderated by juwi solar with key representatives from major utilities. Discussion will focus on what they see as the current trends and the future of utility-scale solar.
Megan Day
juwi solar, boulder, USA

WREC Forum

WREC-I WREN Plenary - 1 GBCI General CE Hour
5/15/2012 10:30am - 11:45am 4a
FUTURE PROSPECTS OF RENEWABLE ENERGY IN ICELAND How to get from 82 to 100% renewable proportion
Ingolfur Thorbjornsson, Gudbjorg Hronn Oskarsdottir, Gudmundur Gunnarsson, Geir Gudmundsson, Magnus Gudmundsson, Thorstein Sigfusson
Energy-bio- and Materials Technology at Nordic Innovation, Reykjavik, Iceland

The Challenges of Achieving High Performance When Refurbishing Older Commercial
Buildings - Case Study Comparisons With New and Established Buildings
George Baird
Victoria University of Wellington, Wellington, New Zealand

Comfort Triangles for Improving Thermal Performance of Buildings with Passive Solar Systems
John Martin Evans
University of Buenos Aires, Buenos Aires, Argentina

WREN

WREN-I: Wind Energy Technology (Technical)
5/15/2012 10:30am - 11:45am 4b Chair: Martin Alder

JOENG-KIT:*Renewable Energy Generating From Sea-Waves
Zakir Gaffar Ayoub¹, Arianto Sutanto¹, Eddy Zulkarnaini Gaffar²
¹Bandung Technology, Bandung, Indonesia, ²Research Center for Geotechnology, Indonesian Institute of Sciences, Bandung, Indonesia

Improvement Of Locally Manufactured Wind Turbine Alternators
Nana Oti-Boateng, William Reindorf-Partey, Abeeku Brew-Hammond
The Energy Center, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

VIABILITY OF SMALL WIND TURBINE FOR INTEGRATION INTO URBAN AREAS AIMED AT GENERATING ELECTRICITY
J. Bione Melo Filho, Amanda Ferreira, L. Arturo Malagón
University of Pernambuco, Recife, Pernambuco, Brazil

Design And Benefit Potentials Of Synergistic Current And Offshore Wind (SCOW) Systems
Mithra Sankrithi, Siva Sankrithi
RIC Enterprises, WA, USA

Real Wind Data Collection And Analysis On KNUST Campus
Eric Osei Essandoh
Kwame Nkrumah University of Science and Technology, Kumasi/West Africa, Ghana

Novel Hybrid Observers for a Sensorless MPPT Controller and Its Experiment Verification Using a Wind Turbine Generator Simulator
Ali Mahdi
University of Kerbala, Kerbala, Iraq

CRES Showcase Colorado

Fostering Electric Vehicle Expansion in the Rockies
5/15/2012 10:30am - 11:45am 1a Chair: Lorrie McAllister

Project FEVER (Fostering Electric Vehicle Expansion in the Rockies) is a public/private partnership designed to prepare communities in Colorado for electrified transportation. This panel discussion will provide an overview of the project, objectives and partners. Furthermore, information about the data, projections and forecasts will be shared with attendees. The private sector will be represented by Eaton, a supplier of charging equipment, and Xcel Energy, a local utility in Colorado. Both Eaton and Xcel will provide insight into the electric vehicles present business opportunities that electric vehicles present.

Speakers to Include:
Kathryn Valdez, Xcel Energy
Dave Altman, Eaton Corp.
Natalia Swalnick, Director of Environmental Health, American Lung Association in Colorado
Lauren Quillian, Clean Cities Program Manager

LUNCH
11:45am - 1:15pm

SBSE Annual Meeting
5/15/2012 11:45am - 1:15pm

1b Chair: Ihab Elzeyadi, Ph.D., FEIA, LEED AP

Society of Building Science Educators

Parallel Sessions are Organized by Track Below
1:15pm - 2:30pm

Advancements in RE Technology

Solar Poster Session
5/15/2012 1:15pm - 2:30pm  Exhibit Hall D

Assessment of Light Distribution Patterns in Toplit Offices
Ladan Ghandeharz, Wayne Place
North Carolina State University, Raleigh, NC, USA, 2 North Carolina State University, Raleigh, NC, USA

Design of an innovative internal structure for surface solar air heater’s
Arnaud Colleoni1, Adrien Toutant2, Gabriel Olalde2
1TOTAL - Gas & Power, Paris, France, 2PROMES - CNRS, Odeillo, France

chethan kumar
sjce, mysore, India

Enhanced Heat Transfer Surfaces for Use in the Development of High Performance Solar
Thermal Absorber Plate Development
David Kukukla1, Rick Smith2
1State University of New York College at Buffalo, Buffalo, New York, USA, 2Vipertex, Buffalo,
New York, USA

The Electricity Requirements In Water Heating Systems
José Luis Duomarco
A.I.U., Montevideo, Uruguay

Determination of a solar drying characteristic curve for the microalgae Spirulina (Arthrospira Platensis)
Alfa Oumar DISA, Garba SALIFOU, Jean KOULIDIATI
Université de Ouagadougou, Radiog, Burkina Faso

TRNSYS model for simulation of useful solar energy gain from parabolic trough collectors
systems for Ghardaia, Algeria.
Yettou Fatihab, Gama Amor2, Azoui Boubaker3, Malek Ali2, Larbès Cherifi5
1Applied Research Unit on Renewable Energies, Ghardaia, Algeria, 2Renewables Energies
Developpement Center, Bouzareah, Algeria, Polytechnic National School, El-Harrach, Algeria, Batna University, Batna, Algeria

Cost-effective Pipelines Insulation of Solar Thermal System
Peteris Shipkovs 1, Martinsh Vanags 1, Janis Shipkovs 1, Andrejs Snegirjovs 1, Lana Migla 2
1 Institute of Physical Energetics, Riga, Latvia, 2 Riga Technical University, Riga, Latvia

Novel pellet boiler with Stirling engine for m-CHP domestic application
Luigi Crema, Alberto Bertaso, Alessandro Bazzoli, Fabrizio Alberti
Fondazione Bruno Kessler, Trento, Italy

Evaluation and Simulation of Hybrid Solar Air Conditioning Prototype With TRNSYS 16
DAVID FRANCO, JOSE L. RODRIGUEZ, JOSE R. SANTIAGO, JOSE M. DURAN
UNAM, DGAPA PAPIIT, FES ARAGON, MEXICO, Mexico

Sensitivity Analysis of the Geothermal Heat Pump System Efficiency Based on Variation of Extracted/Rejected Heat Ratio
Tomislav Kurević, Vedrana Kravec, Domagoj Vulin
Faculty of Mining, Geology and Petroleum Engineering, University of Zagreb, Zagreb, Croatia

Increase of efficiency of energy supply at use of solar installations
Olga Shepovalova, Alexey Korolev
The All-Russian Research Institute for Electrification of Agriculture (GNU VIESH), Moscow, Russia

Experimental Investigation of a Natural Circulation System for High Temperature Solar Cooking Applications
Abdulkadir Aman Hassen 1, Demiss Alemu Amibe 1, Jorgen Lovseth 2, Ole Jorgen Nydal 2
1 Addis Ababa University, Addis Ababa Institute of Technology, Addis Ababa, Ethiopia, 2 Norwegian University of Science and Technology, Department of Energy and Process Engineering, Trondheim, Norway

Drinking Water Purification System With Solar Energy
Gustavo Carielo, Chigeru Tiba
Federal University of Pernambuco (UFPE), Recife, Pernambuco/Nordeste, Brazil

Finite Element Modeling of Solar Powered Injera Baking Oven for Indoor Cooking
Abdulkadir Aman Hassen, Demiss Alemu Amibe
Addis Ababa Institute of Technology, Addis Ababa, Ethiopia

Fast pyrolysis of poplar using a captive sample reactor: Effects of inorganic salts on primary pyrolysis products
Calvin Mukarakate 1, Kyle Mino 2, David Robichaud 1, Bryan Donohoe 1, Mi-Kyung Bahng 2, Mark Nimlos 2
1 National Renewable Energy Laboratory, Golden, Colorado, USA, 2 KIOR, Pasadena, Texas, USA

Determining the effects of concerted elimination reactions in the pyrolysis of lignin using model compounds.
David Robichaud, Jared Clark, Mark Nimlos
National Renewable Energy Laboratory, Golden, CO, USA

Biomass in Latvian Energy Balance
Peteris Shipkovs 1, Galina Kashkarova 1, Kristina Lebedeva 1, Martinsh Pankars 2, Ilze Purina 1, Jolanta Sedinša 2
1 Institute of Physical Energetics, Riga, Latvia, 2 Riga Technical University, Riga, Latvia

Microbial Fuel Cell System Identification Using Pseudo-Random Binary Signal
Hitesh C. Boghani 1, Jung Rae Kim 1, Richard M. Dinsdale 2, Alan J. Guwy 2, Giuliano C. Premier 1
1 Sustainable Environment Research Centre (SERC), Faculty of Advanced Technology, University of Glamorgan, Pontypridd, Mid Glamorgan, UK, 2 Sustainable Environment Research Centre (SERC), Faculty of Health, Sports and Science, University of Glamorgan, Pontypridd, Mid Glamorgan, UK

Solar-biogas multipurpose dehydration system
Enrique Majica Castillo 1, Joel Pantoya Enriquez 1, Joel Moreira Acosta 1, Juana Maria Hernandez Jarquin 1, Manuel Alejandro Vazquez 2, Guillermo Ibanez Duharte 1, Joseph Sebastian
Drying and extraction of oils in plants with energetic potential
Reginaldo Ferreira Santos, Augustinho Borsoi, Carlos Henrique Fornasari, Deonir Secco, Samuel Nelson Melegari de Souza
Universidade Estadual do Oeste do Paraná - UNIOESTE, Cascavel, Paraná, Brazil

Molecular Engineering of Carboranylpyrroles: Application of Electronic Structure Calculations to Design Thermally-Resistant Conducting Polymers
Petia Bobadova-Parvanova¹, Joseph Varberg¹, Ethan Harak¹, M. Graca H. Vicente²
¹Rockhurst University, Kansas City MO, USA, ²Louisiana State University, Baton Rouge LA, USA

Photovoltaic Systems 1 (Technical)
5/15/2012 1:15pm - 2:30pm 2b Chair: Neelkanth Dhere

Microinverter Fundamentals: Experiences from the Field
Raghu Belur
Enphase Energy, Petaluma, CA, USA

A New Fuzzy Logic Controller MPPT For Photovoltaic System
OBEIDI née TCHOKETCH KEBIR Gul Filiz, LARBES Chérif, OBEIDI Thameur, HOURIER Mohamed
Laboratoire des Dispositifs de Communication et de Conversion Photovoltaïque, Département d’Electronique, Ecole Nationale Polytechnique, 10, Avenue Hassen Badi, El Harrach Alger 16200, Algeria

In Situ Performance Testing of Bifacial Photovoltaic Panels
Steve Sciara, Brian Raichle
Appalachian State University, Boone, NC, USA

Comparison of Fixed, 1-, and 2-axis Tracking Systems for Small Photovoltaic Systems.
John Robinson, Brian Raichle
Appalachian State University, Boone, NC, USA

Embracing Innovation: Making Module-level Power Management Universally Compatible
John Berdner
Universal Photovoltaic Interface Alliance (UPVI), San Ramon/California, USA

The Effect of Temperature on the Operation of Micro Inverters
Nicholas Carter
Enecsys, Redwood Shores, CA, USA

The Advantages of DC-Coupled Stand-Alone PV Systems
John Ely
Franklin University, Columbus, Ohio, USA

A Solar Potpourri: Water Heating, Space Heating, Space Cooling, and Analysis Tools (Technical)
5/15/2012 1:15pm - 2:30pm 1c Chair: Craig Christensen, NREL

This session combines several topics in low-temperature solar thermal applications. Four papers in this session will address solar space conditioning issues, two on cooling systems and two on heating systems. A paper presents a recently-developed web-based tool to look at glare and flux including shading from the local environs. A paper presents search method when analyzing data for thermal properties. Lastly, a paper presents an approach to solar system control using weather forecasts.

Heat Delivery Performance in Combination Solar Thermal Systems: Strategies for Increasing Delivery Temperature
James Dontje
Gustavus Adolphus College, St Peter, MN, USA

A comparative analysis of solar assisted heat pump systems for space heating
Irina Mitina¹, Vincenzo Sabatelli²
¹All-Russia Research Institute for Electrification of Agriculture (VIESH), Moscow, Russia, ²Italian Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), Trisaia, Italy

Design and construction of a low cost solar chiller, with calorimetric assessment of the adsorbent bed
Laurence Ketteringham, Michael Tierney, Asmidzam Ahamat, Hind Saidani-Scott, Rebecca Selwyn
University of Bristol, Bristol, UK

Thermodynamic Modeling and Simulation Studies of a Double Absorption Open Cycle Hybrid Solar Space-conditioning System
YOGENDER KUMAR YADAV
College of Agricultural Engineering & Technology, CCS Haryana Agricultural University, HISAR/ Haryana, India

Stochastic search methods used for parameter estimation of thermal properties
Rumen Popov¹, Aleksandar Georgiev¹, Ognian Pekov²
¹Technical University of Sofia, Branch Plovdiv, Plovdiv, Bulgaria, ²Geosis Ltd., Plovdiv, Bulgaria

The Use Of PCM For Ameliorating Thermal Performance Of Vehicle Cabin
Chang Ren Chen, Huuan Ming Chou, Nguyen Vu Lan
Kun Shan University, Tainan, Taiwan

Wind Energy Applications (Technical)
5/15/2012 1:15pm - 2:30pm 1d

Type: Wind Energy Applications (Technical)  Chair: Aaron Godwin

The Past and Future Cost of Wind Energy
Eric Lantz¹, Ryan Wiser², Maureen Hand³
¹National Renewable Energy Laboratory, Golden, CO, USA, ²Lawrence Berkeley National Laboratory, Berkeley, CA, USA

Design and wind tunnel testing of a Savonius wind turbine integrated with the omni-direction-guide-vane
Wen Tong Chong, Ahmad Fazizlan, Kok Chen Pan, Sin Chew Poh
Department of Mechanical Engineering, University of Malaya, 50603 Kuala Lumpur, Malaysia

Wind-Powered Ammonia Fuel Production for Remote Islands
Eric Morgan, James Manwell, Jon McGowan
University of Massachusetts, Amherst, Massachusetts, USA

Feature-Based Verification for the High-Resolution NCAR-Xcel WRF-RTFDDA Wind Ramp Forecasts
William Cheng, Yubao Liu, Bill Mahoney, Thomas Warner, Badrinath Nagarajan
NCAR/RL, Boulder, CO, USA

Enhancing The Reliability of Wind Turbines Through Online Multi-Sensor Condition Monitoring
John Steele, Brendan Geels
Colorado School of Mines, Golden, Colorado, USA

International Wind (Forum)
5/15/2012 1:15pm - 2:30pm 3a

Type: International Wind (Forum)  FORUM - Distributed Wind Around The World
Trudy Forsyth
NREL, Golden, CO, USA
The Built Environment

Sustainable Commercial Buildings & Low Energy Architecture in Colorado (Forum) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/15/2012 1:15pm - 2:30pm 1b
FORUM - Sustainable Commercial Buildings & Low Energy Architecture in Colorado
Peter D’Antonio
PCD Engineering, Longmont, CO, USA

Constructing the In-Between: Bridging Gaps in Design, Simulation, and Assessment of High Performance Buildings (Forum) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/15/2012 1:15pm - 2:30pm 2a
FORUM - Constructing the In-Between: Bridging Gaps in Design, Simulation, and Assessment of High Performance Buildings
Ihab Elzeyadi¹, Pablo LaRoche², Craig Briscoe³
¹University of Oregon, Eugene, OR, USA, ²Calpoly Pomona, Los Angeles, CA, USA, ³Glumac Engineering, Portland, OR, USA

Climate Change

Climate Change and Renewable Energy (Technical)
5/15/2012 1:15pm - 2:30pm 1f
Chair: Chuck Kutscher
BIOFUEL-INDUCED GLOBAL LAND USE CHANGE – SOME STRATEGIES FOR MANAGING THE RISK
Helena Chum, Ethan Warner
National Renewable Energy Laboratory, Golden, CO, USA

Hydropower Development in Kerala: Challenges under a Changing Climate
Shadananan Nair
Nansen Environmental Research Centre-India, Kochi, Kerala, India

Energy Demand and Carbon Emission Analysis in the Long Term (-2050) of Beijing, China
Jing Zhang, Ru Guo, Fengting Li
Tongji University, Shanghai, China

Recent Trends And Solar Radiation Outlook For The USA
Jan Remund, Daniel Klauser
Meteotest, Bern, Switzerland

Climate Change And Energy
SIMON GICACI MACHARIA, PETER MWANGI MWANIJK, LUCY N. KARANJA
mkokoteni aid development organization, NAIROBI, Kenya

Energy Generation, Distribution, & Transportation

Variable Generation (Technical)
5/15/2012 1:15pm - 2:30pm 4d
High Temperature Upgrading of Biomass and Methane Using Steam and Concentrated Solar Energy
Aaron Palumbo, Erica Jorgensen, Alan Weimer
University of Colorado at Boulder, Boulder, Colorado, USA
Zachary Norwood, Daniel Kammen
University of California at Berkeley, Berkeley, CA, USA

LARGE-SCALE INTRODUCTION OF NEW RESIDENTIAL DISTRICT-HEATING LOADS TO INCREASE RENEWABLE ELECTRICITY GENERATION IN CHP PLANTS
Magnus Åberg1, Joakim Widén1, Ewa Wäckelgård2, Dag Henning2
1Engineering Sciences, Uppsala, Sweden, 2Optensys Energyanalys, Linköping, Sweden

Power Tower Reference Plant for Cost Modeling with the System Advisor Model (SAM)
Craig Turchi, Michael Wagner
National Renewable Energy Lab, Golden, CO, USA

Off-Shore Wind and Grid-Connected PV: High Penetration Peak Shaving for New York City
Richard Perez1, Jeff Freedman2, Tom Hoff2
1State University of New York at Albany, Albany, New York, USA, 2AWS Truepower, Albany, New York, USA, 3Clean Power Research, Napa, California, USA

Off-Design Configurations For A Hybridized 200MW Coal-Fired Power Plant With Mid-Temperature Solar Heat
Yawen Zhao1, Hui Hong2, Hongguang Jin2
1Institute of Engineering Thermophysics, Chinese Academy of Sciences, Beijing, China, 2Graduate University of the Chinese Academy of Sciences, Beijing, China

Department of Defense creates ‘Distributed Renewable Energy’ model to uplift rural communities in Afghanistan
Kristopher Haag
Department of Defense, Pentagon, Washington, D.C., USA

Resource Assessment Methods (Ignite)
5/15/2012 1:15pm - 2:30pm 3b

Atmospheric Attenuation of Solar Radiation in Central Receiver Systems
Manojit Sengupta, Michael Wagner
NREL, Golden, CO, USA

Lidar measurements for offshore Wind energy research
Yelena Pichugina1, Robert Banta1, Alan Brewer1, Mike Hardesty1
1Cooperative Institute for Research in Environmental Sciences, Boulder, CO, USA, 2Earth System Research Laboratory (ESRL), NOAA, Boulder, CO, USA

PSO/P90 Analysis for Solar Energy Systems Using the System Advisor Model
Aron Dobos, Mike Kasberg, Nate Blair, Paul Gilman
National Renewable Energy Laboratory, Golden, CO, USA

System Advisor Model (SAM) Case Studies Comparing To Real Performance Results
Nate Blair, Aron Dobos, Nicolas Sather
NREL, Golden, CO, USA

Analysis on the Mathematical Modelling of Wind Speed Probability Distribution Function
Suman Sharma1, Jami Hossain2, V V Kishore2
1WindForce Management Services Private Limited, Gurgaon, India, 2TERI University, New Delhi, India

Climate-Regime Cospectrum Analysis: Shortwave Solar Irradiance for Regionally Spaced Locales
Jeff Rayl, George Young, Jeffrey R. S. Browson
The Pennsylvania State University, University Park, PA, USA

Computing Solar Energy Potential of Urban Areas Using Airborne LIDAR and Orthoimagery
Ryan Hippenstiel, Jeffrey R. S. Browson
The Pennsylvania State University, University Park, PA, USA
Analyzing Temporal and Spatial Variations of Direct Normal, Diffuse Horizontal and Global Horizontal Irradiances Estimated from an Artificial Neural Network Based Model

Yehia Eissa, Prashanth R. Marpu, Hosni Ghedira, Taha B.M.J. Ouarda, Matteo Chiesa
Masdar Institute, Abu Dhabi, United Arab Emirates

Evaluation of Procedures to Improve Solar Resource Assessments: Optimum Use of Short-Term Data from a Local Weather Station to Correct Bias in Long-Term Satellite-Derived Solar Radiation Time Series

Chris Gueymard1, William Gustafson2, Gwendalyn Bender2, Andrew Etringer2, Pascal Storck2
1Solar Consulting Services, Colebrook, NH, USA, 23Tier, Seattle, WA, USA

Reanalysis: An Improved Data Set For Simulating Wind Generation?

Marek Kubik, David Brayshaw, Phil Coker
Reading University, Reading, UK

A Review of Solar Resource Assessment Initiatives in South Africa: The Case for a National Network

Ewa Zawilska1, Michael J. Brooks2, Adriaan J. Meyer3
1Mangosuthu University of Technology, Durban, KwaZulu-Natal, South Africa, 2University of KwaZulu-Natal, Durban, KwaZulu-Natal, South Africa, 3University of Stellenbosch, Stellenbosch, Western Cape, South Africa

Wind Speed Profile: A new Artificial Neural Network–Power Law Model.

Nawal Cheggaga1, Fatiha Youcef ettoumi1
1university, Blida, Algeria, 2university, Alger, Algeria

Finance, Policy & Marketing

Bankability and Financing (Forum)

5/15/2012 1:15pm - 2:30pm

FORUM - Using Bankability to Increase the Bottom Line
Sunny Rai
Intertek, Arlington Heights, IL, USA

FORUM - Financing and Marketing Clean Energy
Robert Schaefer
AlsoEnergy, Boulder, CO, USA

Innovative Financing for Distributed Generation RE Projects in Colorado (Forum)

5/15/2012 1:15pm - 2:30pm

This Forum will demonstrate the success of an innovative American Recovery Act funded program that supported renewable energy projects in Colorado which would not have obtained project financing without the analysis and technical support. Successful community wind, municipal biomass, small hydro and community solar garden projects will be presented.

Francisco Flores, Renewable Energy Program Manager, Colorado Governor’s Energy Office
Ryan Broshar, SRA International Renewable Energy Financial Analyst
George Wenschhof, Meeker Colorado Rancher with small hydroelectricity running center pivot irrigation
Chris Schaefer, New Centennial Power, 10 MW Wind Project
Link Mueller, City of Fort Collins Waste Water Treatment Facility Utilities Project Manager
State Representative Claire Levy, House District 13 CO (Invited),
Author of HB10-1342, Community Solar Gardens Legislation in Colorado

FORUM - Innovative Financing for Distributed Generation Renewable Energy Projects in Colorado
Joseph McCabe
SRA International, Golden, CO, USA

On the Path to Equilibrium-Lessons Learned for Net Zero Energy Housing in Cold Climates (Forum) 1
GBCI General CE Hour
5/15/2012 1:15pm - 2:30pm 4f
FORUM - On the Path to Equilibrium – Lessons Learned for Net Zero Energy Housing in Cold Climates
Thomas Green
Canada Mortgage and Housing Corporation, Ottawa, Ontario, Canada

U.S. & China: Policy (Technical)
5/15/2012 1:15pm - 2:30pm 1e
Collaboration on Renewable Energy Standards, Testing, and Certification under the U.S.
China Renewable Energy Partnership
William Wallace¹, Lin Wan², Sarah Kurtz¹
¹National Renewable Energy Laboratory, Golden, CO, USA, ²China General Certification Center, Beijing, China

Emerging Conflicts in Renewable Energy Policy and International Trade Law
Joanna Lewis
Georgetown University, Washington, DC, USA
International Technology Transfer And Indigenous Innovation: Evidences From Chinese Photovoltaic Industry
Yongda Yu, Siping Luo
Tsinghua University, Beijing, China

WREC Forum

WREC-I International Forum on Ocean Energy (II)
5/15/2012 1:15pm - 2:30pm 4a Chair: Alain Clement & Mats Leijon
Agenda:
Scottish Marine Energy Aspiration
Cameron Johnstone, Strathclyde University, UK
Swedish Activities in Marine Energy
The last five years have witnessed considerable progress in wave and tidal energy conversion technologies with many large scale deployments occurring at sea. Global programmes encompassing particular announcement by various counties of deployment road maps coupled to financial support mechanisms are now creating the needed environments for commercialisation of the technology. In particular, the recent announcements made by relevant entities of countries such as Canada, China, Korea, USA and the UK. Of a particular note is the announcement by in the UK by the Crown Estate, which owns the sea bed, of an ambitious implementation programme to install around 1.6GW of wave and tidal energy technology by 2020 in sites in the Pentland Firth in Scotland. This target alone represents a projected investment of over £4.3 billion and, if successful, has the potential to propel the UK and the implemented technologies associated with the projects onto a higher platform towards achieving a truly global industry. It is important to remember that the developmental routes of many of these technologies began through discussion and debate within the academic and industrial communities. Hence, this forum will report on the latest activities undertaken at a country level and will further enhance the debate and understanding to address the need growth potential and the exploitation of wave and tidal energy resources for sustainable electricity production.

CRES Showcase Colorado

Local Solutions, Local Plans: the Tale of Three Cities
5/15/2012 1:15pm - 2:30pm  1a

The Tale of 3 Cities: 1. The City and County of Denver has developed a strategy of pairing energy efficiency with renewable energy adoption through the Denver Energy Challenge. Through grant funding and public-private partnerships, the City and County of Denver has structured programs to increase renewable energy development, improve energy efficiency, and reduce utility costs with limited General Fund support. While no one-size-fits-all solution exists, Denver’s programs are scalable and easily replicable by communities of all sizes. 2. Last November, Boulder voters approved municipalizing our electric system if rates & reliability can be protected. Find out more about our quest to move from mostly baseload coal and fossils to mostly renewables. 3. Fort Collins will be the model community for a leading and replicable net Zero Energy District. The mission of FortZED is to transform the downtown area and the main campus of Colorado State University into a net Zero Energy District through conservation, efficiency, renewable sources and smart technologies.

Speakers to Include:

Elizabeth Babcock, Residential Program Administrator,
City and County of Denver, Department of
Environmental Health
Julie Carlton, Energy Outreach Coordinator, City and County of Denver, Department of Environmental Health
Jessica Scott, Solar Program Coordinator, City and County of Denver, Mayor’s Office
Ken Regelson, Founder of EnergyShouldBe.org & Muni101.org
Steve Catanach, Manager, Fort Collins Utilities

Parallel Sessions are Organized by Track Below
2:45pm - 4:00pm

Advancements in RE Technology

Solar Chemistry (Technical)
5/15/2012 2:45pm - 4:00pm  1d  Chair: Carl Bingham

Characterisation Of Solid-Gas Chemical Reactions by Solar Thermogravimetry
Jose Gonzalez-Aguilar1, Elisa Alonso1, Christian Hutter1, Manuel Romero1, Aldo Steinfeld1
1IMDEA Energía, Móstoles, Spain, 2Solar Technology Laboratory, Paul Scherrer Institute, Villigen, Switzerland, 3Dept. of Mechanical and Process Engineering, ETH Zürich, Zürich, Switzerland

Platinum Deposition and Stability by Atomic Layer Deposition on Particle and Carbon Substrates for Electrochemical Devices
Alia Lubers, Troy Gould, Kelly Anderson, Brian Neltner, Alan Weimer
University of Colorado at Boulder, Boulder, CO, USA

Investigation of Novel Ferrite Materials for Energy Applications: Efficient H2 Production and CO2 Separation Using Chemical Looping Hydrogen Production
Victoria Aston, Brian Evanko, Jonathan Scheffe, Alan Izar, Alan Weimer
University of Colorado at Boulder, Boulder, CO, USA

Modeling of a Solar Thermal Reactor for Synthesis Gas Production
Elizabeth Saade Saade1, David Clough1, Alan Weimer1
1University of Colorado, Boulder, CO, USA, 2National Renewable Energy Laboratory, Golden, CO, USA

Further Development of the Isopropanol-Acetone Chemical Heat Engine
Brian Setzler1, William Sheline1, Hany Al-Ansary2, Sheldon Jeter2
1Georgia Institute of Technology, Atlanta, GA, USA, 2King Saud University, Riyadh, Saudi Arabia

Green Hydrogen Production using a Nickel Ferrite Based Hercynite Solar Thermal Water Splitting Cycle
Christopher Muhich, Brian Evanko, Charles Musgrave, Alan Weimer
University of Colorado, Boulder, Colorado, USA

Oxidation Kinetics of the Two Step Solar thermochemical H2O and CO2 Splitting with CeO2
Darwin Arifin1, Anthony McDaniel1, Alan Weimer1
1University of Colorado Boulder, Boulder, CO, USA, 2SANDIA National Labs, Livermore, CA, USA
The Built Environment

Building, Heating & Cooling (Ignite) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/15/2012 2:45pm - 4:00pm 1b  Chair: David Panich

Energy Savings Of A Load-Sharing HVAC System Between A House And An Office Building: Design Options For Optimal Performance
Soolyeon Cho1, Eun Chul Kang2, Euy Joon Lee2
1North Carolina State University, Raleigh, NC, USA, 2Korea Institute of Energy Research, Daejeon, Republic of Korea

System-level Price Responsive Ice Storage Systems
Santiago Naranjo Palacio, Max Zhang, Keenan Valentine, Myra Wong
Cornell University, Ithaca, New York, USA

Applicability, Use and Performance of Natural Ventilation and Daylight in Deep-Plan Urban Buildings: Case Study
David Mwale Ogoli
Judson University, Elgin, IL, USA

Natural ventilation is periodic. Optimizing shaft volumes and varying opening sizes can increase effective time period for natural ventilation.
Abhay Nagory, Peter Simmonds
University of Southern California, Los Angeles, USA

Interrogating the Flow Behavior in a Novel Magnetic Desiccant Ventilation System using Computational Fluid Dynamics (CFD)
Auwal Muktar Dodo, Valente Hernandez-Perez, Jie Zhu, Saffa Riffat
University of Nottingham, Nottingham, Nottinghamshire, UK

Concentrating PV and Thermal energy collection
Alexander Slade
Siroc Pty. Ltd., Broadway, NSW, Australia

Optimal design of a stand alone photovoltaic power supply system for air conditioning application at Samara University in Ethiopia as an alternative to diesel generator
Getachew Bekele, Bizuayehu Bogale
Addis Ababa Institute of Technology, Addis Ababa, Ethiopia

Thi Minh Thu Huynh, Haruki Sato
Keio University, Yokohama, Japan

Development of a Sustainable Cooling and Ventilation System for Hot-Arid Climate Regions
Nasim Karizi1, Rudolf Wienands2
1Arizona State University, Tempe, Arizona, USA, 2Technical University of Munich, Munich, Bavaria, Germany

Low Initial Capital And Operating Costs Industrial Air Conditioning System Design
Anwar El Hadi Abdel-Rahman
Bahri University + Business International & Resource Development, Khartoum, Sudan

Cost Effective Passive Solar For New Home Construction
Steve Kawell
Durango Solar Homes, LLC, Durango, Co., USA
Climate Change

Communicating the Climate Change Crisis (Forum)
5/15/2012 2:45pm - 4:00pm 1f

FORUM - Communicating the Climate Change Crisis
Chuck Kutscher
NREL, Golden, CO, USA

Energy Generation, Distribution, & Transportation

Solar Charged Vehicles: The Future of Driving (Forum)
5/15/2012 2:45pm - 4:00pm 4d

Chair: Christof Demont-Heinrich

This forum will provide an overview of the many unique – and exciting – dimensions of the rooftop/home solar PV + electric vehicle synergy, among them: auto fueling independence, economic savings, and true zero emissions driving.

Cary Hayes, Director of Business Development, REC Solar
Jim Jenal, Founder & CEO, Run On Sun
Christof Demont-Heinrich, Editor, SolarChargedDriving.Com

Grid Interconnection and Performance Testing Procedures for Vehicle-to-Grid (V2G) Power Electronics

William Kramer, Sudipta Chakraborty, Benjamin Kroposki, Andy Hoke, Gregory Martin, Tony Markel
National Renewable Energy Laboratory, Golden, CO, USA

Solar Resource Methods (Technical)
5/15/2012 2:45pm - 4:00pm 1e

Optimising The Temporal Averaging Period Of Point Surface Solar Resource Measurements For Correlation With Areal Satellite Estimates
Ian Grant, Anja Schubert
Bureau of Meteorology, Melbourne, Victoria, Australia

How Typical is Solar Energy? A 6 Year Evaluation of Typical Meteorological Year Data (TMY3)
Matthew Williams, Shawn Kerrigan
Locus Energy, San Francisco, CA, USA

Improving Modeled Solar Irradiance Historical Time Series: What is the Appropriate Monthly Statistics for Aerosol Optical Depth?
Chris Gueymard¹, Manojit Sengupta¹
¹Solar Consulting Services, Colebrook, NH, USA, ²National Renewable Energy Laboratory, Golden, CO, USA

Understanding the Variation in Estimated Long-Term Solar Resource Estimates; Which Data Set Accurately Represents Your Project Site?
Marie Schnitzer, Christopher Thuman
Quantifying the Accuracy of the Use of Measure-Correlate-Predict Methodology for Long-Term Solar Resource Assessments
Christopher Thuman, Marie Schnitzer
AWS Truepower, Albany, New York, USA

Reporting of Irradiance Model Relative Errors
Thomas E. Hoff, Richard Perez, Jan Kleissl, David Renne, Joshua Stein
1Clean Power Research, Napa, California, USA, 2University at Albany, Albany, New York, USA, 3University of California San Diego, San Diego, California, USA, 4NREL, Golden, Colorado, USA, 5Sandia Natl. Labs., Albuquerque, New Mexico, USA

Energy Access

Solar For Everyone (Forum)
5/15/2012 2:45pm - 4:00pm

FORUM - “Solar for Everyone: Community Solar Energy Development.”
Joanna Baker
FLS Energy, Asheville, NC, USA

Finance, Policy & Marketing

High Renewable Energy Penetration Case Studies (Forum)
5/15/2012 2:45pm - 4:00pm

FORUM - High Renewable Energy Penetration Case Studies
Sandra Reategui
NREL, Golden, CO, USA

WREC Forum

WREC-I (Technical)
5/15/2012 2:45pm - 4:00pm

Ultra-Compact Fuel Reformer for Conventional and Renewable Fuels – kW to MW Scale
Saurabh Vilkar
Precision Combustion, North Haven, CT, USA

Development of PEMFC-APU systems for truck application
Per Ekdunge
Powercell Sweden AB, Gothenburg, Sweden

Optimal Power Management of Hydrogen Fuel Cell Vehicles
Kary Thanapalan, Fan Zhang, Giuliano Premier, Alan Guwy
University of Glamorgan, Pontypridd, UK

Development of compact FC- and fuel processor based auxiliary power units using micro-channel reactor technique
Gunther Kolb, Martin O’Connell
Institut für Mikrotechnik Mainz GmbH (IMM), Mainz, Germany

Energy savings technologies integrated with a building structure. Phase Change materials
Dorota Chwieduk
Warsaw University of Technology, Warsaw, Poland
Predicting the Clean Energy and Electric Vehicle Adoption Curve
Craig Shields
2GreenEnergy, unknown, USA

WREC-II (Technical)
5/15/2012 2:45pm - 4:00pm 4b
Enhancing Capacity for Solar Photovoltaics in Rural Nepal
Long Seng To¹, Alex Zahnd², Renate Riek²
¹University of New South Wales, Sydney, Australia, ²Rural Integrated Development Services Nepal, Kathmandu, Nepal
Sustainable Health Care Environments – Designing Energy Efficiency and Healthy Indoor Climate
Fredrik Karlsson
Sweco, Norrköping, Sweden

WREN Special Papers

WREN-IV - Solar Radiation and Associated Topics (Technical)
5/15/2012 2:45pm - 4:00pm 4e
Chair: Prof. John Boland
Energy Efficiency and Renewable Energy - A Path to Sustainability in Buildings
Thom Johnson
Eaton Corporation, Lakewood, CO, USA
POTENTIALS FOR SOLAR IRRADIANCE ESTIMATION FROM TEMPERATURE DATA FOR AKOKA - NIGERIA
Nald Erusiafe¹, Michael Chendo¹, Nsikan Obot¹
¹Department of Physics, Faculty of Science, University of Lagos, Akoka Lagos, Nigeria, ²Federal Polytechnic, Ilaro, Nigeria
A Bayesian Committee Model Approach To Forecasting Global Solar Radiation
Philippe LAURET¹, Auline RODLER², Marc MUSELLI², Maimouna DIAGNE¹, Mathieu DAVID¹, Cyril Voyant²
¹University of La Reunion, Saint Denis, Reunion, ²University of Corsica, Corte, France
SOLAR IRRADIATION FORECASTING: STATE-OF-THE-ART AND PROPOSITION FOR FUTURE DEVELOPMENTS FOR SMALL-SCALE INSULAR GRIDS
Hadjia Maimouna Diagne¹, Mathieu David², Philippe Lauret¹, John Boland²
¹University of La Reunion, Saint-Denis, Reunion, ²University of South Australia, Adelaide, Australia
Comparison of Clear-Sky and Persistence Models for Evaluating Solar Forecasting Skill
Ricardo Marquez¹, Carlos Coimbra³
¹University of California, Merced, CA, USA, ²University of California, San Diego, CA, USA
Energy Impact of Renewable Energy Architectures and Feng Shui
Mohamed Amer Chaaban, Mahmoud Alahmad, Justin Pentelute
University of Nebraska-Lincoln, Omaha, NE, USA
Measuring Irradiance, Temperature and Angle of Incidence Effects on Photovoltaic Modules Using a Sourcemeter-based Test-bed
Michael Buday, Gregory Keoleian
University of Michigan, Ann Arbor, MI, USA
Conformity of Ground Truth with Satellite Derived Data: The Ikorin Experience of Downward Longwave Radiation
Nsikan Obot¹, Micheal Chendo¹, Ese Erusiafe¹, Bamidele Adetunji³
¹Dept of Physics, University of Lagos, Akoka, Lagos State, Nigeria, ²Dept of Physics, University of Lagos, Akoka, Lagos State, Nigeria, ³Dept of Physics, University of Lagos, Akoka, Lagos State,
CRES Showcase Colorado

Keys to Success: The Importance of Colorado Business Incubators in Supporting Innovation and Entrepreneurship
5/15/2012 2:45pm - 4:00pm  1a

Chair: Richard Adams, Manager of the Innovation and Entrepreneurship Center (IEC) within NREL

Innovation and entrepreneurship are the new drivers of the Colorado economy, and business incubators are helping new clean energy, technology and scientific startup companies turn their great ideas into great businesses. These businesses, in turn, create high wage job opportunities for the community and fuel the growth of the industries of the future. This session will explore some of the most successful incubators in Colorado in order to learn what they are doing right, where the challenges are, and discuss insights into the future of business incubation.

Speakers to Include:
Mike Freeman, CEO, Rocky Mountain Innosphere
Stephen Miller, President/CEO of CleanLaunch, Colorado's Clean Tech Incubator
Ric Denton, CEO/President of the Colorado Springs Technology Incubator

Parallel Sessions are Organized by Track Below
4:15pm - 5:30pm

Advancements in RE Technology

PV Stress Testing (Forum)
5/15/2012 4:15pm - 5:30pm  1d

FORUM - Accelerated Stress Testing to predict PV Module Lifetime
John H. Wohlgemuth
NREL, Golden, CO, USA

In Hot Water: Solar Hot Water Issues in Utility Programs (Forum)
5/15/2012 4:15pm - 5:30pm  4d

FORUM - IN HOT WATER - Experiences and Issues - Residential Solar Hot Water and its Implementation -
Daniel Aiello
Arizona Solar Center, Inc., Phoenix, Arizona, USA

The Built Environment

Integration of PV with EE, DR and ES - Tools and Approaches (Forum) 1.25 LU/HSW/SD
5/15/2012 4:15pm - 5:30pm  1b

FORUM - Integration of PV with EE, DR and ES - tools and approaches
Smita Gupta¹, Devan Johnson¹, Craig Christensen¹, Victoria Doyle¹, Rob Hammon⁴, Snuller Price⁵
Energy Generation, Distribution & Transportation

Solar Variability & Forecasting (Ignite)
5/15/2012 4:15pm - 5:30pm 4e

High-Density Solar Measurements at DeSoto: A Step Towards Developing a Better Understanding of PV Variability
Manajit Sengupta1, Adam Kankiewicz2, Michael Dooraghi1, Barry Mather1, Afshin Andreas1, Peter Gotseff1, Jimmy Paulino3, Chris Wright1, Ryan McMorrow1
1NREL, Golden, CO, USA, 2Windlogics, Minneapolis, MN, USA, 3Florida Power and Light, Juno Beach, FL, USA

Predicting Short-Term Variability of High-Penetration PV
Thomas Hoff1, Richard Perez2
1Clean Power Research, Napa, CA, USA, 2State University of New York, Albany, NY, USA

A Simple Cloud Simulator for Investigating the Correlation Scaling Coefficient Used in the Wavelet Variability Model (WVM)
Matthew Love, Jan Kleissl
University of California, San Diego, San Diego, CA, USA

A Comparison of Wind Power and Load Forecasting Error Distributions
Bri-Mathias Hodge, Anthony Florita, Kirsten Orwig, Debra Lew, Michael Milligan
National Renewable Energy Laboratory, Golden, CO, USA

Outputs and error indicators for solar forecasting models
Mathieu David, Hadja Maimouna Diagne, Philippe Laurent
PIMENT - University of La Reunion, Saint-Denis, Reunion

Increasing time resolution of satellite-derived solar irradiance time-series
Hans Georg Beyer1, Richard Meyer2, Kaushal Chhatbar2
1University of Agder, Grimstad, Norway, 2Suntrace GmbH, Hamburg, Germany

Energy Access

Puzzle Pieces (Ignite)
5/15/2012 4:15pm - 5:30pm 1e
Chair: Professor Giuliano C. Premier and Brian Allen

Salvage Value of PV Systems
Joseph McCabe3
1University of Reading, Reading, UK, 2Solarcentury Ltd, London, UK, 3SSE plc, Thatcham, UK

Modeling Distribution System Impacts of Solar Variability and Interconnection Location
Matthew Reno1, Abraham Ellis1, Jimmy Quiroz1, Santiago Grijalva2
1Sandia National Laboratories, Albuquerque, NM, USA, 2Georgia Institute of Technology, Atlanta, GA, USA

Quantiying Long-Timescale Solar Resource Variability
Marc Perez, Vasilis Fthenakis
Columbia University, New York, NY, USA
Ultra-Compact Fuel Reformer for Conventional and Renewable Fuels – kW to MW Scale
Subir Roychoudhury, A. Vilekar
Precision Combustion, Inc., North Haven, USA

Optimum Medium Scale Wind-CAES Configurations for the Electrification of Remote Communities
Achilleas Marcogiannakis, Petros Pasas, Dimitrios Zofirakis, John Kaldellis

Certification for Small Wind Turbine Installers – What’s the Hang Up?
Frank Oteri, Karin Sinclair
NREL, Golden, USA

Technoeconomic Comparison of Strategies for Biomethane Production and Off-Site Utilization
Ali Jalalzadeh-Azar
National Renewable Energy Laboratory, Golden, Colorado, USA

POLYCARBONATE SHEET AS SOLAR COLLECTOR
Vicente Flores, Carlos Alberto Mora
Instituto Tecnologico de Apizaco, Tlaxcala, Mexico

Results and Comparison from the SAM Linear Fresnel Technology Performance Model
Michael Wagner
National Renewable Energy Laboratory, Golden, USA

Off-Grid Solar in Harsh Conditions: Installation Case Study at Mount Everest Basecamp
Sandeep Giri
Gham Power Nepal Private Limited, Kathmandu, Nepal

Technical Evaluation on Eight Overshoot and Undershoot Hydraulic Wheels in Coastal Areas, Mountains and Jungle in Peru as GVEP Project Results 2009 – 2011
Miguel Hadzich, Enrique Mejía, Giacomo Zignago, Sandra Vergara
Pontificia Universidad Católica del Perú, Lima, Limo, Peru

Energy Utilization and Environmental Pollution in Pakistan: Present and Future Perspective
Khanji Harijan, Mohammad Aslam Uqaili, Abdul Haque Tunio
Mehran University of Engineering & Technology, Jamshoro, Sindh, Pakistan

Public-Community Participation in Renewable Energy Projects in India
Prasoom Dwivedi, Alka Dwivedi
University of Petroleum and Energy Studies, Dehradun, Uttarakhand, India

AN ASSESSMENT OF HYBRID DISTRIBUTED GENERATION SYSTEMS IN RURAL ALASKA
Lindsay Willman, Moncef Krarti
University of Colorado, Boulder, CO 80309, USA

Assessing the Public Lighting With Solar Panels in the Sub Saharan Countries in Africa: Yaounde Case Study
Joseph KENFACK, Antoine AMIE ASSOUH, Désiré BIYO'O OLINGA
University of Yaounde I, National Advanced School of Engineering, Yaounde, Cameroon, University of Douala, Douala, Cameroon, Yaounde City Council, Yaounde, Cameroon
Design and Application of Solar Thermal Oven for Industrial Phytosanitary Measures By Forced Hot Air Treatment in India
Sanjib Rout, Abha Bose, Ranjan Pradhan
C. V. Raman College of Engineering, Bhubaneswar, India

Sustainability Analysis of Micro Hydro Projects in Long Bawan, Borneo
Sari Murni, Jonathan Whale, Tania Urmee, John Davis
Murdoch University, Perth, Australia

A Direct Solar Water Heating System for the Health Clinic in the Town of Santa Isabel Cholula, State of Puebla, Mexico.
Roberto Rosas2, Brian Raichle1, Jeff Tiller2
1Appalachian State University, Boone, NC, USA, 2Universidad de las Americas Puebla, Cholula, Puebla, Mexico

Usman Muhammad
Centre for Energy and Environment, Gusau, Zamfara, Nigeria

Tapping The Potential Of Roof Top Solar Panels In Rural India
Anil Kumar Dsouza
SICE, Mysore, Karnataka, India

Assessing Renewable Energy in Palestine
Tareq Abu Hamed2, Hannah Flamm1, Lina Isma'il1
1Arava Institute for Environmental Studies, Hevel Eilot, Israel, 2Dead Sea and Arava Science Center, Hevel Eilot, Israel

Energy and Gender

Showcasing Women in Energy Organizations (Forum)
5/15/2012 4:15pm - 5:30pm 4f Chair: Carol Sue Tombari & Dr. Barbara Farhar
This Forum focuses on organizations involving Women and Energy, such as ENERGIA, WISE, and WOWE, and why they are important.
FORUM - Women in Energy Organizations
Barbara Farhar1, Carol Sue Tombari2
1University of Colorado, Boulder, CO, USA, 2NREL, Ret., Golden, USA

WREC Forum

WREC-I (Technical)
5/15/2012 4:15pm - 5:30pm 4a

E4-Mistra, a research programme for the development of an energy efficient low emission exhaust aftertreatment system for heavy duty vehicles
Jonas Edvardsson1, Heije Westberg1, Jazzer Dawody1, Lennart Andersson1, Miroslawa Mih1, Lars J. Pettersson2, Xanthia Karatzas2, Moa Ziethén Granlund3, Lennart Holmgren3, Hanna Härelin Inge1, Hannes Kannisto4, Fredrik Gunnarsson4, Anders Palmqvist5, Rickard Heijl4, Ma Yi4, Daniel Cederkrantz4, Ronnie Andersson4, Olle Högblom4, Per-Olof Larsson5, Fredrik Andreasson5
1Volvo Group Trucks Technology, Advanced Technology & Research, Gothenburg, Sweden, 2Royal Institute of Technology, Stockholm, Sweden, 3Termo-Gen AB, Lärbro, Sweden, 4Chalmers University of Technology, Gothenburg, Sweden, 5Höganäs AB, Höganäs, Sweden, 6Alfa Laval AB, Lund, Sweden

Design of a software for integrated renewable energy with conventional energy system for rural
areas of Iran

Sanaz Ghazi
Islamis Azad University-Parand branch, Parand, Iran

Environmental and economic analysis of water supply projects: comparative evaluation and prospects
Emilia M. Kondili
Technological Educational Institute of Piraeus, unknown, Greece

WREC-II (Technical)
5/15/2012 4:15pm - 5:30pm 4b

Energy quality management and low energy architecture
Folke Björk
KTH Royal Institute of Technology, Stockholm, Sweden

Passive and Low Energy Architecture - The Israeli Approach Within the Sustainable Building Standard
Edna Shaviv
Israel Institute of Technology, Haifa, Israel

ECOARCHITECTURE FOR SUSTAINABLE DEVELOPMENT
Ruxandra Crutescu1
1PASSIVHAUS BRAGADIRU Ltd, Bragadiru - Ilfov, Romania, 2AMVIC Ltd, Bragadiru - Ilfov, Romania, 3Spiru Haret University – Faculty of Architecture, Bucharest, Romania

WREN

(re)Thinking the Energy Conversation (Forum)
5/15/2012 4:15pm - 5:30pm 4c

FORUM - (re)Thinking the Energy Conversation
Amy Schwab, David Schmaltz
NREL, Golden, CO, USA

CRES Showcase Colorado

Power of the People – Citizen and Non-profit Initiatives in Colorado
5/15/2012 4:15pm - 5:30pm 1a Chair: Alexis Halbert

Colorado has a well-educated and passionate citizenry who, with the help of non-profit leadership, continues to build grassroots momentum for a new energy economy. This session will focus on the work of some of our most committed non-profit organizations and past successes in renewable energy and efficiency measures, including the development of Colorado’s Renewable Energy Portfolio Standard. The session will explore the critical role that non-profits serve for advocacy and education in Colorado.

Speakers to Include:
John Powers, President, Board of Directors, Alliance for Sustainable Colorado
Charlie Montgomery, Energy Organizer, The Colorado Environmental Coalition
Dr. Malcolm Newton, Executive Director, The Denver Institute of Urban Studies and Centre For Urban Research and Environmental Technology
ASES Fellows Reception  
5/15/2012 6:00pm - 7:00pm  

Gala Awards Banquet - ticket required  
5/15/2012 6:00pm - 10:00pm  

Speaker:  
Dennis Dimick, Executive Editor for Environment at National Geographic

Wednesday, May 16, 2012

Speakers Breakfast  
5/16/2012 7:00am - 8:00am  

ASES Resource Applications Division Meeting (division members only)  
5/16/2012 7:00am - 8:00am  

ASES Solar Thermal Division Meeting (division members only)  
5/16/2012 7:00am - 8:00am  

CRES - Electric Avenue  
5/16/2012 7:30am - 5:30pm  

Morning Plenary Session  
5/16/12 8:15am-10:00am  
Wells Fargo Theatre  

Addresses by:  
Secretary Steven Chu, Secretary of Energy, U.S. Department of Energy  
Santiago Seage, CEO of Abengoa Solar

Workshop: Solar Airconditioning Technology and System Design - Registration Required  
5/16/2012 8:00am - 5:00pm  
608  
Chair: Presented by: Dr. Stephen White, CSIRO Energy Technology  
The course will be led by Dr. Stephen White (CSIRO Solar Cooling Research Leader, ausSCIG Chair, International Energy Agency SHC Task 48 subtask leader).

The course is designed as an overview of technical, economic and bigger picture aspects of solar cooling for newcomers to the topic. It will enable participants to identify where solar cooling is applicable and cost effective compared with other alternatives. It will also enable design engineers to confidently specify solar cooling systems through detailed design advice and technical case studies.

Conference Registration Required. Workshop may be added to any single day or full conference registration for an additional charge. If already registered, login and visit "Add Sessions“. Click Here To Register
Workshop: Design, Analyze! Using BEopt (Basic/Intermediate) - Registration Required
5/16/2012 8:00am - Noon 606  Chair: Presented by: Craig Christensen, NREL, Scott Horowitz, NREL, Neal Kruis, NREL

In this hands-on workshop, you will learn basic/intermediate use of the latest version of BEopt™ (Building Energy Optimization), a flexible and powerful front-end for residential building modeling with DOE2-2 or EnergyPlus.

BEopt can be used to identify cost-optimal efficiency and renewable energy packages at various levels of whole-house energy savings along the path to zero net energy (for new construction or retrofit).

Features include: 1) quick inputs (including a quick 3D drawing tool and hundreds of clickable options for efficiency and renewable measures), 2) multiple analysis modes (building designs, parametric sweeps, and cost-based optimizations), and 3) detailed outputs (multi-level, data-rich graphics and an hourly results visualization tool).

See also BEopt Advanced Workshop.

Conference Registration Required. Workshop may be added to any single day or full conference registration for an additional charge. If already registered, login and visit "Add Sessions". Click Here To Register

Exhibit Hall Open
5/16/2012 10:00am - 5:00pm  Exhibit Hall D

Quickmount PV Training - Solar Roofing Best Practices -Commercial
5/16/2012 10:30am-12:00pm  501

Learn about the most common methods of mounting solar PV systems on commercial low slope roofs (flat roofs) with a focus on the design, installation, and maintenance considerations for ballasted mounting systems and penetration based racking systems. This workshop explores important roofing codes and industry best practices key to maintaining roofing warranties and insuring the lowest cost of ownership over the system life. Examine the strengths and weaknesses of commonly used low slope penetration mounts including the new Quick Mount PV Low Slope Mount. This course is eligible for NABCEP Continuing Education Credits (one CEC per hour of training)

Speaker: Jeff Spies

Admirals Bank Training - FHA Financing for Residential Solar
5/16/2012 10:30am-12:00pm  503

Luminate - Engineering Due Diligence and Project Risk Assessment
5/16/2012 10:30am - 12:00pm  502

This presentation will review the engineering due diligence process developers must undertake when seeking capital in the non-recourse project finance marketplace, especially as it relates to the renewable energy sector. An overview of the financing and due diligence process will be provided, including a discussion of the different investor classes and their respective risk tolerances.
Canadian Consulate Training- Tapping into Canada's Financial Advantage and Eco System
5/16/2012 1:15pm - 2:30pm  502

REFUsol Training - Commercial, 3-Phsase Transformerless, String Inverters
5/16/2012 1:15pm - 2:30pm  503

Solectria Utility-Scale Inverter Training
5/16/2012 2:45pm - 4:15pm  501
This customized training includes installation details, string sizing, AC/DC connections, wiring needs, string combiners, data monitoring and options available for each product as well as how to use the inverters in parallel for PV installations ranging from 225 kW thru multi-MW. This training also gives you first hand working knowledge from the experts on the simplicity and ease of installation for Solectria Renewables' commercial/utility-scale inverters. Any installer, designer, site developer, customer or distributor that is interested in training on our large commercial/utility-scale PV inverters & data monitoring products may attend. 2 NABCEP continuing education credits available. SIGN UP before the event (or they can just come during the show): http://events.constantcontact.com/register/event?llr=lxpnklcab&oeidk=a07e5a0tlkeceb68b39

Speakers:
Khaled Basheer, Applications Engineer
John Shaw, Mountain West Regional Sales Manager

RESOL - A Practical Approach To Control Solar Thermal Combisystems
5/16/2012 4:15pm - 5:45pm  502
In this presentation RESOL will share over 30 years' experience in designing control solutions for commonly used in North America modern Solar Thermal Combisystems providing domestic hot water and a portion of the space heating load in homes. RESOL underscores the need for mass market solutions to be simple, reliable, easy to install and economically sustainable. During this session, Mathias will provide a range of in-depth examples of combisystems that can be built and controlled using currently-available RESOL Solar and System Controllers.

Presenter: Mathias Collet, P.Eng., Product Development Manager, RESOL

Parallel Sessions are Organized by Track Below
10:30am - 11:45am
Synthesis, Characterization of New Derivatives of Rhodanine Dyes for Dye-Sensitized Solar Cells (dsscs)

BOUFARES Tahar\textsuperscript{1}, RAHMOUNI Mostapha\textsuperscript{1}, Mir-KASMI Souad\textsuperscript{2}, DJILLALI Karim\textsuperscript{1}

\textsuperscript{1}Laboratory Synthesis and Catalysis LSCT - Ibn Khaldun University of Tiaret, BP 78, Zaaroura 14000 Tiaret, Algeria, \textsuperscript{2}Department of Chemistry, Saad Dahleb University of Blida, Blida, Algeria

A New Method of Developing the Parameters for the Two-Diode Model from Data Sheet Information for the More Accurate Yield Simulation of PV Modules

Bernhard Gatzka, Martin Hofmann
Valentin Software, Berlin, Berlin, Germany

Energy and exergy transfer performances investigation for solar parabolic trough system with heat conducting oil

Lu Jianfeng\textsuperscript{1}, Ding Jing\textsuperscript{1}, Yang Jianping\textsuperscript{2}, Peng Qiang\textsuperscript{2}

\textsuperscript{1}School of engineering, Sun yat-sen university, Guangzhou, China, \textsuperscript{2}School of chemistry and chemical engineering South china university of technology, Guangzhou, China

Improvement And Validation Of A Transient Model To Predict Photovoltaic Module Temperature

Amanda Luketa-Hanlin, Joshua Stein
Sandia National Laboratories, Albuquerque, NM, USA

Cascade Photoconverters on the Basis of the Homogeneous Semiconductor Tunnel Structures

Yuri Arbuzov, Vladimir Evdokimov, Olga Shepovalova
The All-Russian Research Institute for Electrification of Agriculture (GNU VIESH), Moscow, Russia

One Year of Field Studies of Holographic Planar Concentrators at the Tucson Electric Power Solar Test Yard

Adria E. Brooks\textsuperscript{1}, Raymond K. Kostuk\textsuperscript{2}, Vincent P.A. Lonij\textsuperscript{1}, Juan M. Russo\textsuperscript{2}, Deming Zhang\textsuperscript{2}, Shelby Vorndran\textsuperscript{1}, Alexander D. Cronin\textsuperscript{1}

\textsuperscript{1}University of Arizona, Department of Physics, Tucson, AZ, USA, \textsuperscript{2}University of Arizona, Department of Electrical and Computer Engineering, Tucson, AZ, USA

Electronic Transport Studies of Bulk HgCdTe based on an Ensemble Monte Carlo Calculation Including Three-valley Band Structure Model

Mohammed Hichem Tahir, Noredine Maassoume, Benyounesse Bouazza
Abu-Bakr Belkaid University -Tlemcen, Faculty of Technology, Department of Electrical Engineering and Electronics., Tlemcen, Algeria

Design and Implementation of a Solar Array to Feed Linear Induction Motor Based on MATLAB Numerical Simulations

Ali Al Tahir, Marwa Marea
University of Kerbala - Collage of Engineering- Electrical Engineering Department, Kerbala, Al-Mowadaffen/ City Center, Iraq

Enhanced PV Systems for Wide Application

Zhosef Panosyan, Armenak Stepanyan, Sirvard Berberyan, Yeremia Yengibaryan
State Engineering University of Armenia, Yerevan, Armenia

Spectral Distributions of Diffuse and Global Irradiance for Clear and Cloudy Periods

Gina Blackburn\textsuperscript{1}, Frank Vignola\textsuperscript{1}

\textsuperscript{1}University of Oregon, Eugene, OR, USA, \textsuperscript{2}Luminate, LLC, Denver, CO, USA

Empowering Offshore Windfarms by Reliable Measurements

Joerg Bendfeld, Karl Navratil
University of Paderborn, Paderborn /NRW, Germany

Sustainable Wind Energy Harvesting

Jan Jooste

Vaal University of Technology, Vanderbijlpark, South Africa

ANALYZE UNSTEADY FLOW 3D AROUND A BLADE OF A ROTOR OF HORIZONTAL AXIS WIND TURBINE - RUTLAND 503

belkheir noura, ivan dobrev, sofiane khalladi, faouaz massouh, rabah dizene

university of khemis-mila, ain defla, Algeria

Metallic Nano-antenna arrays for light sensing and harvesting of solar energy

Yael Hanein, Amir Boag, Jacob Scheuer, Larry Loev

Tel Aviv University, Tel Aviv, Israel

The Impacts of Grid Connected PV System and Water Heating in a Residential Area on the Distribution Utility’s Active, Reactive and Apparent Power Demands in Brazil

Sergio B. Silva¹, Fabio L. Albuquerque¹, Geraldo G. Caixeta², Adelio J. Moraes²

¹Federal Institute of Tocantins, Palmas, Tocantins, Brazil, ²Federal University of Uberlandia, Uberlandia - Minas Gerais, Brazil

Hybrid Power Plant Design using Solar and Wind Energy

Nimet Citanak, Cetin Gencer

Firat University, Elazig, Turkey

Soft Energy Will Make Light Rail Vehicle Run in the Stricken Area without a Catenary System

Hidetoshi Katsuma¹, Takaki Kameya², Genji Suzuki³, Yoshihiko Harada¹, Hiroshi Asai⁴

¹Shonan Research Center for Light Rail Transit, Kanagawa, Japan, ²Tama Art University, Tokyo, Japan, ³Tokyo Denki University, Tokyo, Japan, ⁴Waseda University, Tokyo, Japan

ECOBAT A BATTERY WHICH GENERATE ELECTRICITY FROM FOOD WASTES

RAKESH BISWAS

graphic era university, dehardun, India

An Economic and GHG Comparison of Hydrogen and Compressed Air for Management of Intermittent Renewable Resources

Darlene Steward

National Renewable Energy Laboratory, Golden, CO, USA

Generalized Optimization of an Arbitrary Reflecting Trough.

Greg Norris, Brian Raichle

Appalachian State University, Boone, NC, USA

Cooling Energy Saving System Using a Water Mist Device on Windows

Kybum Jeong, Sang-Gon Choi

Yuhan College, Bucheon, Gyeonggi, Republic of Korea

Thematic visualization of built environment using microclimatic coupled mapping methodology to support urban neigbourhood Design

AMR ELWAN, CHEBGZHI PENG, MOHAMED FAHMY

Sheffield university, Sheffield, UK

Daylight and energy performance for high-rise office buildings in Shanghai

Rudai Shan

University of Michigan, Ann Arbor, Michigan, USA

MULTIACIMUTAL WINDOW. Possibilities for use as passive air conditioning system in winter in Mendoza.

Gustavo Barea, Alfredo Esteves, Carolina Ganem

INCHUSA - CCT MENDOZA - CONICET, Mendoza, Argentina

Comfort, Energy, and Indoor Air Quality in Passive Houses within the U.S.

Diana Hogard, Mike Beamer, Dave Bisers, Sophia Duluk, Alison Kwok

University of Oregon, Eugene, OR, USA
Investigation on window systems for lighting performance and energy efficiency
Chanjuan Sun¹, Zhiwei Lian², Mojtaba Navvab³
¹University of Michigan, Ann Arbor, MI, USA, ²Shanghai Jiao Tong University, Shanghai, China

Calculating Irradiation For Solar Cadastre: Speed Vs. Accuracy
Daniel Klauser, Jan Remund
Meteotest, Bern, Switzerland

A Comparison of Passive Solar and Mechanically Driven Earth-to-Air Heat Exchangers For Cooling Buildings
Michel Shafik, James Devaney, Bing Chen
University of Nebraska, Lincoln, NE, USA

PASSIVE NATURAL CLIMATE SPACES WITHOUT FACING FACADE ECUADOR THROUGH THE SOLAR RADIANT HEATING PASSIVE SYSTEM.
M. Victoria Mercado, Alfredo Esteves
INCIHUSA CONICET, -Mendoza, Argentina

THERMAL ANALYSIS IN SCHOOL BUILDING STRATEGIES FOR IMPLEMENTATION OF BIOCLIMATIC, TO EXISTING BUILDINGS.
Claudia Cruz
UNIVERSIDAD AUTONOMA DE BAJA CALIFORNIA, Tijuana, Baja California, Mexico

Energy Analysis of Different Toplights For Office Buildings in Austin
Sara Motamedi
University of Texas at Austin, Austin, USA

Monitoring and Mapping Horizontal Global Solar Radiation in Korea
Chang-Yeol Yun, Dok-Ki Jo, Kwang-Deuk Kim, Yong-Heack Kang
Korea Institute of Energy Research, Daejeon, Republic of Korea

Modeling of Radiation Heat Transfer in a Two-Dimensional L-Shaped Enclosure with the Zonal Method
Asma MSADDAK, Rachid MECHI, Habib FARHAT, Rachid SAID
Ionized and reactive Medium Study Unit, Preparatory Institute of Engineering Studies of Monastir, Ibn El Jazzar Street, 5019, Monastir, Tunisia

Improving the well being index, one kitchen at a time.
Sujatha Srinivasan, Mukundan Parthasarathy
Servais Automation Pvt Ltd, Chennai, Tamil Nadu, India

Policies, Programmes and Strategies for Enabling Access to Modern Energy in Sub-Saharan Africa: The Case of Ghana
Stephen Kankam², Emmanuel Boon¹
¹Vrije Universiteit Brussel, Brussel, Belgium, ²Friends of the Nation, Takoradi, Ghana

The Pennsylvania Wind for Schools Program: Providing University Students with Real World Project Experiences through Wind Energy Feasibility Studies
Christian Myers, Susan Stewart
Pennsylvania State University, University Park, PA, USA

Assessment of Sunshine-Based Global Radiation Models Using Data Measured in Riyadh, Saudi Arabia
Zaki Al-Mostafa¹, Abdulrahman Maghrabi², Saad Al-Shehr³
¹National Astronomy Center, King Abdulaziz City For Science and Technology, Riyadh, Saudi Arabia, ²National Center for Mathematics and Physics, King Abdulaziz City For Science and Technology, Riyadh, Saudi Arabia

Determining Typical Buyer Sensitivity for Solar Installation Cost—Energy Savings Benefit
Sarah Miller, Randy Rapp, Matthew Hebdon
Purdue University, West Lafayette, IN, USA

Making solar thermal power generation in India a reality – Overview of technologies, opportunities and challenges
ARUN KUMAR P
Solar hybrid systems include Photovoltaic/Thermal (PV/T), which use the otherwise-wasted thermal energy (50%-80% of incidence), along with the electrical energy. New designs for air-based and liquid-based PV/T systems are presented in two papers, at one sun and modest concentration, respectively. Another paper addresses issues in PV/T with concentrating solar collectors at higher concentrations and in small scale. Two papers present new designs for
solar cooking. Lastly, a paper presents analysis of a PV-driven absorption heat pump.

Performance of a Single Pass Air Base Photovoltaic/Thermal Solar Collector with and without Hexagonal Honeycomb Heat Exchanger

Faridah Hussain1, Mohd Yusof Othman2, Kamazuzzaman Sopian3, Zulkhairi Anuar4, Suhaila Khairuddin5, Baharuddin Yatim5, Hafizd Ruslan5
1National Metrology Laboratory, SIRIM Berhad, Selangor, Malaysia, 2Solar Energy Research Institute (SERI), Universiti Kebangsaan Malaysia, Selangor, Malaysia

An Evacuated PV/Thermal Hybrid Collector with the Tube/XCPC design

Lun Jiang, Roland Winston, Chuanjin Lan, Yanbao Ma, Yong Sin Kim
University of California, Merced, Merced, CA, USA

Micro – Cogeneration from a small scale concentrated solar power for distributed energy applications

Luigi Crema1, Fabrizio Alberti1, Ewa Wackelgard2, Ruben Bartali3, Barbara Rivolta3, Lorenzo Luminari4, Sebastian Hesse5, Drumond Hislop6, Brian Restall7
1Fondazione Bruno Kessler, Trento, Italy, 2Uppsala University, Uppsala, Sweden, 3Politecnico di Milano, Milano, Italy, 4Electronic Machining Srl., Riva del Garda, Trento, Italy, 5Narva Lichtquellen Gmbh + CO, Brand Erbisdorf, Germany, 6Sustainable Engine Systems Ltd., London, UK, 7Ojects in Motion Ltd., Triq il-Minfa, Malta

AN INVESTIGATION AND MODELING OF AN ABSORPTION HEAT TRANSFORMER UTILIZING PHOTOVOLTAIC COLLECTORS

Kiyan Parham1, Mortaza Yari2, Ugur Atikol1
1Eastern Mediterranean University, Gazimagusa TRNC, Turkey, 2University of Mohaghegh Ardabili, Ardabil, Iran

Solar cooking using grill prototype Cooker

shivananda KR
SJCE, mysore, India

Experimental and CFD Analysis of a Solar Based Cooking Unit

Kumaresan Govindaraj, Iniyan Selvarasan, Velraj Ramalingam
Institute for Energy Studies, Anna University, Chennai, Tamilnadu, India

A Better Steam Engine: Testing of the Katrix Rotary Lobe Expander for Distributed Concentrating Solar Combined Heat and Power Systems

Zack Norwood, Daniel Kammen, Duncan Gallaway, Robert Dibble
University of California at Berkeley, Berkeley, CA, USA

PV Performance 2 (Technical)
5/16/2012 10:30am - 11:45am 1c

Outdoor Degradation of I-V Parameters in x-Si PV Modules
Ryan Smith, Dirk Jordan, Sarah Kurtz
National Renewable Energy Laboratory, Golden, CO, USA

Field Performance Measurements of New and Traditional PV technologies
Vincent P.A. Lonij1, Adria E. Brooks1, James Greenberg1, Sean Orsburn1, Gabe Torres2, Alexander D. Cronin1
1University of Arizona, Tucson, AZ, USA, 2Tucson Electric Power, Tucson, AZ, USA

Analysis of Microelectronic Photonic Structure in Three Dimension (AMPS-3D)
Nghia Nguyen
The Pennsylvania State University, University Park, USA

Alleviating Operating Temperature of High Concentration Solar Cell by Active Cooling
Fahad Al-Amri1, Tapas Mallick2
1College of Technology, Dammam, Saudi Arabia, 2Heriot-Watt University, Edinburgh, UK

A Side-by-Side Comparison of Micro and Central Inverters in Shaded and Unshaded Conditions.
The Built Environment

Building Design Tools, General Buildings (Ignite) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/16/2012 10:30am - 11:45am 2b Chair: Alicia Raveto

Reducing Solar Installation Risk and Cost Through New Infrastructure Standards
Juan Suarez
Unirac, Albuquerque, NM, USA

Applying Renewable Energy to Historic Properties
Thomas Keohan1
1National Park Service, Denver, Colorado, USA

Performance Evaluation of an Individual System of Electric Power Generation with Intermittent Sources Feeding Non-linear Illumination Loads
Marcos Galhardo, Wilson Negrao, Edinaldo Pereira, Alex Manito, João Pinho
Grupo de Estudos e Desenvolvimento de Alternativas Energéticas (GEDAE). Instituto de Tecnologia/Universidade Federal do Pará, Belém, Pará, Brazil

Ecocharrettes: Tools for High Performance Buildings
Pablo La Roche1, Eera Babtiwale1
1HMC Architects, Ontario, California, USA, 2California State Polytechnic University Pomona, Pomona, California, USA

Joseph Simon
National Renewable Energy Laboratory, Golden, CO, USA

Green Classroom 2020: Design Strategies to Retrofit K-12 Schools for Carbon Neutrality
Ihab Elzeyadi
University of Oregon, Eugene, OR, USA

Active House Renovation in Albertslund
Peder Veisig Pederen
Cenergia, Herlev, Denmark

Passive green transformation technology study on rural housing in Cold areas
Xinyu Zhang, Hong Jin
Department of Building Technology and Science, School of Architecture, Harbin Institute of Technology, Harbin, Heilongjiang Province, China

Diagnosing, Benchmarking and Transforming the LEED certified FIU-SIPA Building into a Net-Zero-Energy-Building (Net-ZEBs)
Thomas Spiegelhalter, Young Cheol Kang, Nezih Pala, Yimin Yu
Florida International University, Miami, Florida, USA
Teaching Passive Solar Design To Beginning Design Students
Troy Peters
California Polytechnic State University, San Luis Obispo, CA, USA

Climate Change

Climate Change and the Solar Power Industry (Forum)
5/16/2012 10:30am - 11:45am 1d Chair: Laura Hinkelman
FORUM - Climate Change and the Solar Power Industry: Opportunities and Challenges
Laura Hinkelman
University of Washington, Seattle, Washington, USA

Energy Generation, Distribution, & Transportation

Fast Electric Cars, Solar & Renewable Energy 401(k), Implementing Clean Energy Sustainability (Forum)
5/16/2012 10:30am - 11:45am 4d Chair: Ken J. Beitel
FORUM-Fast Electric Cars, Solar & Renewable Energy 401(k): Implementing Clean Energy Sustainability
Ken Beitel
The Renewable Energy Initiative (TREI), Boulder, USA

Solar Generation (Ignite)
5/16/2012 10:30am - 11:45am 3b
Automatic Detection of PV System Configuration
Matthew Williams, Shawn Kerrigan, Alexander Thornton
Locus Energy, San Francisco, CA, USA

The impact of the Dust Storms on Solar Radiation components in central Saudi Arabia
Abdullrahman Maghrabi
King Abdullah City for Science and Technology, Riyadh, Saudi Arabia

Operational Results Of A 180 Wp Solar Home System in The Amazon Region
Wilson Macêdo, Keila Maia, Andréa Nascimento, Marcos Galhardo, João Tavares Pinho
Grupo de Estudos e Desenvolvimento de Alternativas Energéticas/Instituto de Tecnologia/Universidade Federal do Pará, Belém, Pará, Brazil

Evaluation of a Parabolic Trough Collector Performance
Soteris Kalogirou, Gregoris Panayiotou
Cyprus University of Technology, Limassol, Cyprus

Power Output Analysis of Photovoltaic Systems in San Diego County
Mohammad Jamaly, Juan Bosch, Jan Kleissl
University of California San Diego, La Jolla, USA

Fluid Flow and Heat Transfer Analysis in Solar Chimneys using CFD
Ehsan Shams, Hermann Fasel
University of Arizona, Tucson, AZ, USA

Evaluation of Solar Energy Potential for Thin Film and Silicon Technologies
Elizabeth Weatherhead, Matt Parker
1U. of Colorado, Boulder, CO, USA, 2Savannah River National Laboratory, Aiken, SC, USA

Solar Energy Augmentation of Conventional Steam Plants: From System Studies to Reality
Miroslav P. Petrov, Marianne Salomon Popa, Torsten H. Fransson
Grid Integration 1 (Technical)
5/16/2012 10:30am - 11:45am  4c

The effect of large scale transmission limitations on renewable energy load matching for Western U.S.
Victor Diakov¹, Walter Short¹, Braeden Gilchrist²
¹NREL, Golden, CO, USA, ²University of Toledo, Toledo, OH, USA

Rebecca Hott, Ron Santini, Jeffrey R.S. Brownson
The Pennsylvania State University, University Park, PA, USA

Design and Performance of Solar Decathlon 2011 High Penetration Microgrid
Byron Stafford³, Bob Butt¹, Michael Coddington¹, Van Wagner², Barbara Gonzalez², Scott Solomon³, Greg Wiegand³
¹National Renewable Energy Laboratory, Golden, CO, USA, ²Schneider Electric, Palantine, IL, USA, ³Pepco, Washington, DC, USA, ⁴M.C. Dean, Dulles, VA, USA, ⁵MicroPlanet, Woodinville, WA, USA

Comparison of Methods for Long-Term Storage of Solar Energy for Electric Production
Mostafa Shakeri, Maryam Soltanzadeh, R. Eric Berson, M. Keith Sharp
University of Louisville, Louisville, USA

High density thermal energy storage using supercritical fluids
GANI GANAPATHI¹, RICHARD WIRZ²
¹CALIFORNIA INSTITUTE OF TECHNOLOGY/JET PROPULSION LABORATORY, PASADENA, CA, USA, ²UNIVERSITY OF CALIFORNIA, LOS ANGELES, LOS ANGELES, CA, USA

Solar Resources and Forecasting Workshop Highlights (Forum)
5/16/2012 10:30am - 11:45am  1b

FORUM - Solar Resources & Forecasting Workshop Highlights
Steve Wilcox
NREL, Golden, CO, USA

Finance, Policy & Marketing

The Jobs Numbers Question: A Discussion of Critical Context (Forum)
5/16/2012 10:30am - 11:45am  4e

FORUM - The Jobs Numbers Question: A Discussion of Critical Context
Barry Friedman
NREL, Golden, CO, USA
Clean Energy Policies on the State Level: Center for the New Energy Economy (Forum)  
5/16/2012 10:30am - 11:45am  
Forum - Panel Proposal from the Center for the New Energy Economy  
Tom Plant  
Center for the New Energy Economy, Colorado, USA

WREC Forum

WREC-I WREN Plenary  
5/16/2012 10:30am - 11:45am  
Chair: Prof. Don Swift-Hook

RE Deployment and System Integration – key factors for policy makers  
Roberto Vigotti  
IEA, unknown, -

Renewable Energy Trends in Europe  
Arnulf Jäger-Waldau  
European Commission, Joint Research Centre; Renewable Energy Unit, Ispra, Italy

Issues of scale in Microbial Fuel Cells and Bioelectrochemical Systems  
University of Glamorgan, Sustainable Environment Research Centre (SERC), Wales, UK

Feasibility of Renewable energy – policy and technical application in the EU  
Szent Istvan  
Istvan University, Godollo, Hungary

CRES Showcase Colorado

The Dynamic and Collaborative Role of Energy and Industry Associations in Colorado  
5/16/2012 10:30am - 11:45am  
Chair: Carol Tombari

Colorado has a strong presence of professional associations and organizations that represent and support the development of renewable energy and efficiency industries, markets, policies and social networks. In this session we will explore the role these associations and alliances play in moving Colorado’s new energy economy forward and what kind of successes they achieve through collaboration. We will also look at how future collaboration between these organizations can create take our new energy economy to the next level.

Speakers to Include:  
Lorrie McAllister, Executive Director of the Colorado Renewable Energy Society  
Neil Lurie, Executive Director of the Colorado Solar Energy Industries Association  
Craig Cox, Executive Director of the Interwest Energy Alliance  
Christine Shapard, Founding Director of the Colorado Clean Tech Industries Association

LUNCH  
5/16/2012 11:45am - 1:15pm
Young ISES - How to get published in a research journal
5/16/2012 12:00pm - 1:00pm  1a

An introduction for Young Scientists and Researchers, presented by Young ISES and Elsevier

Workshop: Design, Analyze, Optimize! Using BEopt (Advanced) - Registration Required
5/16/2012 1:00pm - 5:00pm  606  Chair: Presented by: Craig Christensen, NREL, Scott Horowitz, NREL, Neal Kruis, NREL

In this hands-on workshop, you will learn advanced use of the latest version of BEopt™ (Building Energy Optimization). See summary of features under Basic/Intermediate Workshop listing.

This advanced workshop will build on the Basic Workshop. Participants will learn how to: 1) create/select/save cost data sets, 2) create/modify/save user-defined options for additional energy efficiency and renewable measures, 3) set-up/run optimizations and interpret results, and 4) use the data visualization tool to explore what is happening hour-by-hour in the building.

Requires previous BEopt Basic Workshop or experience using BEopt.

Conference Registration Required. Workshop may be added to any single day or full conference registration for an additional charge. If already registered, login and visit "Add Sessions". Click Here To Register

Women In Solar Energy Luncheon (ticket required)
5/16/2012 11:45pm - 1:15pm  2c

The Women in Solar luncheon will highlight this year’s "Women in Solar" award winner. It will also highlight one of our strong dynamic women moving solar forward in Colorado. There will also be time for networking. All are welcome.

Parallel Sessions are Organized by Track Below
1:15pm - 2:30pm

Advancements in RE Technology

PV Performance 1 (Technical)
5/16/2012 1:15pm - 2:30pm  4c  Chair: Marlene Brown

Dust on Solar Collector Surfaces: A Review of Performance Effects and Mitigation Methods
Lawrence L. Kazmerski¹, Travis Tarver¹, Ali Al-Qaraghuli²
¹National Renewable Energy Laboratory, Golden, CO, USA, ²Arizona State University, Tempe, AZ, USA

Reducing Thin Film PV Manufacturing Costs With Tin-Based Modules
Ramprasad Chandrasekharan, Jeffrey R.S. Brownson
Penn State University, State College, PA, USA

STUDY OF DEGRADATION OF PV MODULES AFTER 20 YEARS OF OUTDOOR EXPOSURE
J. Bione Melo Filho¹, M. C. Alonso-Garcia², Faustino Chenlo²
¹University of Pernambuco - Escola Politécnica, Recife / Pernambuco, Brazil, ²CIEMAT - Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas, Madrid / Madrid, Spain
The Built Environment

Passive House Design: Designs, Builders, Training and Certification (Forum) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/16/2012 1:15pm - 2:30pm 1b
FORUM - Passive House Design: Design, Builders, Training, Certification
Alison Kwok
University of Oregon, Eugene, OR, USA

Building Case Studies (Ignite) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/16/2012 1:15pm - 2:30pm 2b
Chair: John Reynolds
INDOOR TEMPERATURE AND ARCHITECTURAL SHAPE IN APARTMENT BUILDINGS IN HAVANA
Dania Gonzalez Couret
ISPJAE, Havana, Cuba

SUSTAINABLE BUILT ENVIRONMENT IN CUBA
Dania Gonzalez Couret
ISPJAE, Havana, Cuba

On the Map, Off the Grid – Pathways to Net Zero for National Parks in Hawaii
Lars Lisell, Andy Walker, Alicen Kandt
NREL, Golden, CO, USA

Cost Effective International Energy Improvements for Buildings in Mild or Hot Climates
Jeff Tiller1, Li Ming Wu1, Benjamin Sanchez2, Nathan Culver1, Robin Delarm Neri1
1Appalachian State University, Boone, NC, USA, 2Universidad de las Americas Puebla, Cholula, Puebla, Mexico, 3Ching Yun University, Zhongli, Taiwan

Control of solar heat gain to reduce the energy consumption of buildings in Iraq
Kamil Yousif
Zakho University, Zakho, Iraq

A Case Study - Solar Thermal Cooling and Heating System for Creative Arts Building in North Carolina
Bae-Won Koh, Umesh Atre
Innovative Design, Inc., Raleigh, NC, USA

Sustainable Commercial Buildings & Low Energy Architecture in Colorado
Peter D’Antonio
PCD Engineering, Longmont, CO, USA

Techniques To R Reduce The Energy Consumption In Building In Hot Arid Rejoins
Ghanim K. Abdulsada
Building Design Tools (Technical) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/16/2012 1:15pm - 2:30pm  1c  Chair: Victor Olygay

- Evaluating Annual Daylighting Performance through Statistical Analysis and Graphs: The Daylighting Scorecard
  Benjamin Futrell, Dale Brentrup
  University of North Carolina at Charlotte, Charlotte, NC, USA

- An Assessment Tool for Selection of Appropriate Daylighting Solutions for Buildings in Tropical and Subtropical Regions: Validation Using Radiance Simulation
  Veronica Garcia-Hansen, Gillian Isoardi, Michael Hirning, John Bell
  Queensland University of Technology, Brisbane, Queensland, Australia

- Green-Roof Integrated PV Canopies – An Empirical Study and Teaching Tool for Low Income Students in the South Bronx
  Marc Perez, Nathaniel Wight, Christina Ho, Vasilis Fthenakis
  Columbia University, New York, NY, USA

- Towards Zero Net Energy Buildings – Bridging The Gap Between Parametric 3D/4D-BIM Design And The AIA 2030 Challenge
  Thomas Spiegelhalter
  Florida International University, Miami, USA

- Artificial Neural Networks in Short-term Load Forecasting on a University Campus
  David Palchak, Daniel Zimmerle, Sid Suryanarayanan
  Colorado State University, Fort Collins, CO, USA

Climate Change

Tools and Data Products for Climate Change and Renewable Energy (Forum)
5/16/2012 1:15pm - 2:30pm  1d  Chair: John Nangle

FORUM - Tools and data products for climate change and renewable energy
John Nangle
NREL, Golden, CO, USA

Energy Generation, Distribution, & Transportation

Grid Integration-2 (Technical)
5/16/2012 1:15pm - 2:30pm  3b

- Misconceptions about Inverters That Are Hurting the PV Industry, and How to Address Them
  Marc Johnson
  New Mexico State, New Mexico, USA

- Temporary Over-Voltage and Effective Grounding of PV Inverter-Based Distributed Generation
  Marc Johnson
  New Mexico State, New Mexico, USA
Getachew Bekele, Biniam Fanta
Addis Ababa Institute of Technology, Addis Ababa, Ethiopia

A Flexible Markov-Chain Model For Simulating Demand Side Management Strategies With Applications To Distributed Photovoltaics
Joakim Munkhammar, Joakim Widén
Department of Engineering Sciences, Uppsala, Uppland, Sweden

How Smart Energy is Enabling Post-Fukushima Japan to Replace Lost Nuclear with Renewables
Daniel Bihn
Solar Today Magazine, Boulder, CO, USA

Finance, Policy & Marketing

Meaningful Certifications Drive Career Development (Forum)
5/16/2012 1:15pm - 2:30pm 4e

FORUM - Meaningful Certifications Drive Career Development
Tehri Parker
NABCEP, Clifton Park, NY, USA

Market & Cost Trends for Distributed Renewables (Forum)
5/16/2012 1:15pm - 2:30pm 3a

Identify emerging trends in U.S. market share and installed cost of solar PV, solar thermal, and distributed wind generation including differences by region, system size and installation type. Panelists will assess recent market growth and assess the impact of policy support for solar PV, solar thermal and distributed wind generation, including the amount of installed capacity and incentive funding provided by state and by technology. Panelists will compare cost trends and impacts of policy support, and discuss implications for the future of each sector.
Speakers:
Larry Flowers, Deputy Director, Distributed and Community Wind, American Wind Association
Larry Sherwood, President, Sherwood Associates
Andrew Krulewitz, Solar Analyst and PV News Editor, GTM Reasearch | Greentech Media
Andrew Perchlik, Clean Energy Development Fund Director, VT Department of Public Service

FORUM - Market & Cost Trends for Distributed Renewables
Heather Rhoads-Weaver
eFormative Options, Vashon, WA, USA

WREC Forum

WREC-I (Technical)
5/16/2012 1:15pm - 2:30pm 4a

Chair: Prof. Phil Eames
Assessment Of The Resource of Biomethane  
Jerry D. Murphy¹, James Browne¹, Eoin Allen¹, Cathal Gallagher²  
¹University College Cork, Cork, Ireland, ²Bord Gais Energy, Cork, Ireland

Towards 100% Renewable Energy: The Impact of Germany’s Nuclear Phase-out on Renewable Energy Development in Europe  
Rainer Hinrichs-Rahlwes  
BEE - German Renewable Energy Federation, Berlin, Germany

Transport and Refueling Infrastructure Fuel Cells and Hydrogen  
Carlos Navas  
FCH JU, Brussels, USA

CRES Showcase Colorado

Solar Gardens: Cultivating Community Involvement  
5/16/2012 1:15pm - 2:30pm  1a  Chair: Roger Alexander

This session will cover the various considerations that must be taken into account when designing community solar solutions, such as security laws, consumer protection and taxation exposure. The best practices of designing community solar solutions will also be reviewed. Additionally, important items that consumers should consider when partaking in solar gardens will be covered to ensure that consumers adequately protect their investments.

Speakers to Include:
Paul Spencer, President, Clean Energy Collective
Jaclyn Webb, Product Manager, Solar Rewards Community, Xcel Energy

Parallel Sessions are Organized by Track Below
2:45pm - 4:00pm

Advancements in RE Technology

Salt of the Earth Systems: Solar Desalination (Technical)  
5/16/2012 2:45pm - 4:00pm  1d  Chair: Desikan Bharathan

Solar-driven thermal desalination processes have found some application in the past, but further work is needed to resolve issues and optimize designs. Two papers here present improvements to the well-known small-scale “solar still”. A novel small-scale, multi-stage device holds promise of much higher efficiency. Another novel approach allows flexible use of a variety of heat sources. Lastly, a paper shows use of concentrated solar to gather salt (rather than reject it).

Design Concepts For An Innovative Universal Solar Still
Mukilan Suresh¹, Suresh Deivarajan²  
¹Nagoya University, Nagoya, Aichi, Japan, ²Energy & Environment Consultant, Madurai, Tamil Nadu, India

Determining the reliability of passive solar distillation basins and predicting the proper storage volume to meet year-round potable water demand
Noe Santos, Dave James, Aly Said  
University of Nevada, Las Vegas, Las Vegas, Nevada, USA

A Small and Simple Plastic Desalination Device
Junko Tojima, Kosuke Saito, Haruki Sato
Meeting the Dual Goal of Energy Access and Sustainability - CSP Deployment in Developing Countries (Forum)
5/16/2012 2:45pm - 4:00pm 1c Chair: Natalia Kulichenko-Lotz
FORUM - Meeting the Dual Goal of Energy Access and Sustainability - CSP Deployment in Developing Countries.
Natalia Kulichenko-Lotz
WorldBank, Washington, DC, USA

The Built Environment

From Labs to Practice: the Oregon Sustainability Trail (Forum) 1.25 LU/HSW/SD
5/16/2012 2:45pm - 4:00pm 2b Chair: Alison Kwok
FORUM- From Labs to Practice: the Oregon sustainability trail
Alison G. Kwok
University of Oregon, Eugene, Oregon, USA, ASES, Boulder, CO, USA

Energy Generation, Distribution, & Transportation

Competitive Motorsports: Stimulating Demand for Electric Vehicles (Forum)
5/16/2012 2:45pm - 4:00pm 4d Chair: Scotte Elliott
FORUM-Competitive Motorsports: Stimulating Demand for Electric Vehicles
Scotte Elliott
ASES, Boulder, USA

Advances in Renewable Energy Technologies (Technical)
5/16/2012 2:45pm - 4:00pm 3b
Identification of Spatial and Topographic Metrics for Micro Hydropower Applications in Existing Irrigation Infrastructure
Brian Campbell, Dan Zimmerle, Kimberly Catton
Colorado State University, Fort Collins, CO, USA

The design and testing of an exhaust air energy recovery wind-turbine generator
Wen Tong Chong, Ahmad Fazlizan, Sin Chew Poh, Hew Wooi Ping, Sook Yee Yip
Department of Mechanical Engineering, University of Malaya, 50603 Kuala Lumpur, Malaysia, UMPEDAC, Faculty of Engineering, University of Malaya, 50603 Kuala Lumpur, Malaysia

Technical - Economical Evaluation of 1MWe Organic Rankine Cycle Using Eucalyptus Wood from Energy Forests in Brazil
Marcel senaubar Alves, Osvaldo José Venturini, Jose Carlos Escobar Palacio, Electo Eduardo Silva
Arc-fault Protection in PV Installations-Ensuring PV Safety and Bankability (Forum)
5/16/2012 2:45pm - 4:00pm  4c

FORUM - Arc-fault Protection in PV Installations – Ensuring PV safety and bankability.
Jay Johnson
Sandia National Labs, Albuquerque, NM, USA

Energy Access

Islands: Your Renewable Energy Future (Forum)
5/16/2012 2:45pm - 4:00pm  1b

FORUM - Islands and our Renewable Energy Future
Adam Warren
NREL, Golden, CO, -

Finance, Policy & Marketing

Workforce & Jobs (Technical)
5/16/2012 2:45pm - 4:00pm  4e

Colorado’s Solar Thermal Workforce Challenge
Leslie Baer
Energy Intersections, LLC, Denver, CO, USA

Solar Labor Market Analysis and New Jobs and Economic Development Impacts (JEDI) PV Scenario Model
Barry Friedman¹, Philip Jordan², John Carrese³
¹National Renewable Energy Laboratory, Golden, CO, USA, ²Green LMI/BW Research, Boston, Ma, USA, ³San Francisco Bay Area Center of Excellence, San Francisco, Ca, USA

Model Curriculum For Photovoltaic System Installers
Joe Sarubbi, Jerry Ventre
Interstate Renewable Energy Council, Latham, NY, USA

Patrick Phelan, Karen Dada
Arizona State University, Tempe, AZ, USA

Tax Credits & Incentives, Financing (Forum)
5/16/2012 2:45pm - 4:00pm  3a

Randy Lucas¹, Miriam Makhyoun², Ivan Urlaub³
¹Lucas Tax + Energy Consulting and Member, ASES-NC and North Carolina Sustainable Energy Association, Charlotte, NC, USA, ²North Carolina Sustainable Energy Association, Raleigh, NC,
Life After §1603: Solar Development and Financing Absent the §1603 Treasury Grant
Grace Kurdian
Watson, Farley & Williams LLP, New York, NY, USA

WREC Forum

WREC-I (Technical)
5/16/2012 2:45pm - 4:00pm 4a  Chair: Prof. Neelkanth G. Dhere

PENETRATION OF SOLAR PHOTOVOLTAIC INTO NIGERIA’S ENERGY SUPPLY MIX
A.S. Sambo
Energy Commission of Nigeria, Abuja, Nigeria
Testing of PV-modules according IEC standards and beyond - Findings based on certification, quality assurance and field failure analysis -
I. Luck, S. Lehmann
PICON Solar GmbH, Photovoltaik Institute, Berlin, Berlin, Germany
Photovoltaic thermal (PV/T) air collectors' performance analysis
Goh Li Jin
University Kebangsaan Malaysia, Selangor Darul Ehsan, Malaysia
Challenges and perspectives of micro- and nano - structures for Silicon based thin-film photovoltaic
Bernd Rech
Institute Silicon Photovoltaics, Berlin, Germany

WREC-II (Technical)
5/16/2012 2:45pm - 4:00pm 4b  Chair: Prof. Edna Shaviv

Vehicle Charging Behavior and Feedback in a Smart-Grid Environment
Barbara Farhar
University of Colorado at Boulder, Boulder, CO, USA
Renewable Energy Markets in Developing Countries: Experience from Four Solar Home System Programs
Benjamin Sovacool
Vermont Law School, South Royalton, VT, USA
Efficient renewable energy systems using biomass, industrial excess heat, screened waste and waste water for healthy environment
Per Laurell
Gävle Energi, unknown, Sweden
Natural resources and human conflicts: energy and evolution of the security concept
Pastora M. Bello Bugallo, María del Carmen Taboada Gómez, Gustavo Robledo Prieto, Laura Cristóbal Andrade
University of Santiago de Compostela, Santiago de Compostela, Spain
Industrial energetic optimization methodology combining BAT Analysis and Process Simulation
P.M. Bugallo, M.A. Bernal Pampin
University of Santiago de Compostela, Santiago de Compostela, Spain
Predicted Charging and Discharging Effectiveness of a Latent Heat Energy Storage System Linked to a Solar Thermal Collector
Philip Eames
Loughborough University, Loughborough, UK
CRES Showcase Colorado

Going Global – Colorado in International Business and Education
5/16/2012 2:45pm - 4:00pm  1a  Chair: Robert Youngberg

Colorado is rich with businesses and non-profits that work internationally in energy development. This panel will explore the successes of some of Colorado’s organizations with an emphasis on how they navigate the international development world and emerging markets.

Speakers to Include:
Laurie Stone, International Program Manager, Solar Energy International
Alan Campbell, Director, Global Supply Chain, Envirotif
Andrew Romanoff, Senior Advisor, iDE

Parallel Sessions are Organized by Track Below
4:15pm - 5:30pm

Advancements in RE Technology

Solar Heating & Cooling: The Great Installation Debate (Forum)
5/16/2012 4:15pm - 5:30pm  1c

FORUM - Solar Heating and Cooling: the Great Installation Debate
Mark Thornbloom1, Billy Byrom2, Dave Kreutzman3, Tom Lane4, Bob Danielson5, Bob Ramlow6
1Kelelo Engineering / ASES Solar Thermal Division, Cocoa, FL, USA, 2AET - Alternate Energy Technologies LLC, Green Cove Springs, FL, USA, 3Next Generation Energy, Lafayette, CO, USA, 4ECS Solar Energy, Gainesville, FL, USA, 5SunEarth Inc., Fontana, CA, USA, 6Artha Sustainable Living Center LLC, Amherst, WI, USA

CSP-3 International: CSP Around the World (Forum)
5/16/2012 4:15pm - 5:30pm  2b

FORUM - Concentrating Solar Power Around the World
Alison Mason7
1Skyfuel, Inc, Arvada, CO, USA, 2ASES CSP Division, Boulder, CO, USA

The Built Environment

Recent Developments in Solar Cooling and Dehumidification (Forum)
5/16/2012 4:15pm - 5:30pm  1b  Chair: Thomas Henkel

FORUM - Recent Developments Solar Cooling and Dehumidification
Thomas Henkel
Henkel Solar, Inc., Chapel Hill, NC, USA
Energy Generation, Distribution, & Transportation

Strategic Distributed Generated Values from Photovoltaics (Forum)
5/16/2012 4:15pm - 5:30pm 4d

FORUM - STRATEGIC DISTRIBUTED GENERATED VALUES FROM PHOTOVOLTAICS
Marlene Brown
ASES Fellow and Solar Electric Division Chairperson, Albuquerque, NM, USA

What is the future of CPV? (Forum)
5/16/2012 4:15pm - 5:30pm 4c

FORUM - What is the future of CPV?
Bob MacDonald
Skyline Solar, Mountain View, CA, USA

Energy Access

Paths to Progress (Ignite)
5/16/2012 4:15pm - 5:30pm 3b  Chair: Prof. Dr.-Ing. Joao Tavares Pinho, Brian Allen

Environmental and Social Implications of Alternative Energy Supply Chains: Identification of Main Parameters and Examples
CHRISTIANA PAPAPPOSTOLOU1, WOLF FRUH2, EMILIA KONDILI3, JOHN K. KALDELLIS4
1Optimization of Production Systems Lab., Dept. of Mechanical Eng., TECHNOLOGICAL EDUCATIONAL INSTITUTE OF PIRAEUS, ATHENS, Greece, 2School of Engineering and Physical Sciences, Heriot-Watt University, EDINBURG, UK, 3Energy Applications & Environmental Protection Lab, TECHNOLOGICAL EDUCATIONAL INSTITUTE OF PIRAEUS, ATHENS, Greece

Broadening the Appeal of Marginal Abatement Cost Curves: Capturing Both Carbon Mitigation and Development Benefits of Clean Energy Technologies
Shannon Cowlin1, Jaquelin Cochran1, Sadie Cox1, Carolyn Davidson1, Wytze van der Gaast2
1National Renewable Energy Laboratory, Golden, CO, USA, 2JL Network, Groningen, The Netherlands

Bioenergy Industry’s Sustainability Objectives and their Interactions
Vimal Kumar Eswarlal, Prasantha Dey
Aston University, Birmingham, UK

Comparisons of the technical performance, energy consumption, and the potential for using renewable energy for water desalination technologies Ali Al-Qaraghuli and Lawrence L. Kazmerski
Ali Al-Qaraghuli, Lawance Kazmerski
National Renewable Energy Laboratory, Golden, Colorado 80401

Northern Arizona University’s Partnerships with Tribes for Renewable Energy Development
Ann Marie Chischilly, Karin Wadsack, Mehrdad Khatibi, Tom Acker
Northern Arizona University, Flagstaff, AZ, USA

Sustainability Criteria for the Bioenergy Industry
Vimal Kumar Eswarlal, Prasantha Dey
Aston University, Birmingham, UK

Community Renewables: Where Are We Now?
Joseph Wiedman, Erica Schroeder
Interstate Renewable Energy Council, Oakland, CA, USA

Assessing Utility Community Solar Programs
Energy and Gender

Renewables Creating Energy Access for Women in Africa (Forum)
5/16/2012 4:15pm - 5:30pm  1d  Chair: Leslie Baer

In sub-Saharan Africa, 500 million people lack electricity access, with a rural electrification rate of 12%. The lack of access to modern energies cripples the quality of life for women and their families: miles walked carrying fuel and water; toxic indoor air from inefficient cooking fires; lack of food and medicine storage; and inability to pursue education. This forum—creating dialogue between audience and innovators—features three novel applications of renewables, from household PV and RE pumping (Leslie Light, iDE) to lighting, cooking and communications solutions (Doug Vilsack, Elephant Energy) and biofuels agriculture and refining (Alan Propp, Merrick & Company).

Leslie Martel Baer (organizer and moderator), President, Energy Intersections, LLC
Leslie Light, Project Manager, iDE
Alan Propp, Business Development Manager for Renewable Energy, Merrick and Company
Doug Vilsack, Executive Director, Elephant Energy
Outlook and Opportunities: The Growing Solar Demand in the Commercial and Residential Markets (Forum)
5/16/2012 4:15pm - 5:30pm 3a
FORUM - Outlook and Opportunities in the Solar Industry: A Discussion on the Growing Solar Demand in the Commercial and Residential Markets
Jack Calderon
Lincoln International LLC, Chicago, IL, USA

WREC Forum

WREC-I (Technical) 5/16/2012 4:15pm - 5:30pm 4a  Chair: Prof. Thorsteinn I Sigfusson
High enthalpy reservoirs promise profitable operation of geothermal power station in the Pannonian Basin
Lajos Gooz
College of Nyíregyháza, unknown, Hungary
Solar resource assessment and forecasting: Recent achievements, bankability pressures, and current challenges
C.A. Gueymard
Solar Consulting Services, unknown, USA
Taking The Next Step: Driving Renewable Thermal Energy Development In The US
Wilson Rickerson¹, Neil Veilleux¹, Jon Crowe¹, Dwayne Breger², Bram Claeyss², Rob Rizzo², Christie Howe², Andy Brydges²
¹Meister Consultants Group, Boston, MA, USA, ²Massachusetts Department of Energy Resources, Boston, MA, USA, ³Massachusetts Clean Energy Center, Boston, MA, USA

WREC-II (Technical) 5/16/2012 4:15pm - 5:30pm 4b  Chair: Mr. Tony Book
How to reach a global energy balance with only renewable energy sources
Erik Dahlquist
Mälardalen University, Vasteras, Sweden
POST-CONSUMER PLASTIC SOLID WASTE to FEEDSTOCK and/or ENERGY
Anke Brems
Katholieke Universiteit Leuven, Heverlee, Belgium
Biomethane from Biogas for CNG and Gas Grid Injection: New Developments and Technology Rollout
Michael Harasek
Vienna University of Technology, Vienna, Austria
Energy oriented rehabilitation of historic housing
P.M. Bello Bugallo, S. Gonda Casagrande
University of Santiago de Compostela, Santiago de Compostela, Spain

CRES Showcase Colorado

The Power of Collaboration – Colorado’s Clean Energy Cluster Models
5/16/2012 4:15pm - 5:30pm 1a  Chair: Alexis Halbert
University-industry-government collaborations have led to the funding, development,
demonstration and market introduction of cutting edge technologies in the renewable energy and efficiency sectors. This session will explore the winning combination of public and private partnerships in Colorado and why clean energy clusters are leading the way.

Speakers to Include:

David Hiller, Executive Director, Colorado Renewable Energy Collaboratory
Brew Bolin, CEO, Colorado Clean Energy Cluster
Ned Harvey, Chief Operating Officer & Solar Program Director, Rocky Mountain Institute

Thursday, May 17, 2012

Speakers Breakfast
5/17/2012 7:00am - 8:00am  2c

CRES - Electric Avenue
5/17/2012 7:30am - 5:30pm

2012 Colorado Small Hydro Association (COSHA) Workshop
5/17/2012 8:00am - 4:30pm  501/502  Chair: Kurt Johnson, Executive Director, Colorado Small Hydro Association

The 2012 Colorado Small Hydro Association workshop will provide an update on the status of small hydro development in Colorado. Topics covered will include financing, permitting, new technologies, relevant federal and state government programs, utility policy and case studies.

Morning Plenary Session
5/17/2012 8:15am - 10:00am  Wells Fargo Theater

Addresses by Jacques Kimman, Professor of Renewable Energy; Mike Eckhart, Managing Director in the Institutional Clients Group at Citigroup, and others

Workshop: Zero Net Energy Design Workshop - Registration Required
5/17/2012 8:30am - 5:30pm  608  Chair: Presented by: Bruce Haglund, Margot McDonald, Walter T. Grondzik, Alison G. Kwok, Michael Utzinger

Through an intensive series of presentations and an interdisciplinary design charette, participants in this zero net energy design workshop will develop a schematic design for a prototypical office building to the standard set by the Architecture2030 Challenge. Attendees will be provided with resources and guidelines to assist them in developing a design – valuable resources that will help them to address minimizing energy use, carbon emissions, and climate change in their own design practice.

Conference Registration Required. Workshop may be added to any single day or full conference registration for an additional charge. If already registered, login and visit "Add Sessions".  Click Here To Register
Many people understand the general principles of passive solar heating systems, but few have the practical experience and know-how to successfully design and build high-performance passive solar buildings. The Passive Solar Heating workshop provides attendees with the fundamental science and the practical knowledge necessary to successfully design buildings that incorporate any of the various passive solar systems available today. The workshop draws on a number of strategies, resources, and tools developed and/or refined by the presenters to offer attendees a comprehensive view of passive solar heating systems from basic concepts to critical design guidelines to methods of energy performance and economic assessment.

Conference Registration Required. Workshop may be added to any single day or full conference registration for an additional charge. If already registered, login and visit "Add Sessions". Click Here To Register

Exhibit Hall Open
5/17/2012 10:00am - 3:00pm  Exhibit Hall D

Quickmount PV - Solar Roofing Best Practices -Commercial
5/17/2012 10:30am - 12:00pm  503
Learn about the most common methods of mounting solar PV systems on commercial low slope roofs (flat roofs) with a focus on the design, installation, and maintenance considerations for ballasted mounting systems and penetration based racking systems. This workshop explores important roofing codes and industry best practices key to maintaining roofing warranties and insuring the lowest cost of ownership over the system life. Examine the strengths and weaknesses of commonly used low slope penetration mounts including the new Quick Mount PV Low Slope Mount. This course is eligible for NABCEP Continuing Education Credits (one CEC per hour of training)
Speaker: Jeff Spies

Introduction to Growatt
5/17/2012 10:30am - 12:00pm  504
Introduction to Growatt North America's line of residential and small commercial solar PV string inverters. Training will cover topics such as company background, product features and benefits, product comparisons, installation tips, performance monitoring solution, and warranty support, followed by a Q&A.
Speaker: Mike Carnahan
SolarTAC Facility Tour
5/17/2012 1pm

No transportation arrangements provided, click for phone number to RSVP.

Please join us for an exciting trip to Solar Technology Acceleration Center. We are a private, member-based, research and test facility where the solar industry will test, validate, and demonstrate near-market and advanced solar technologies. We will be hosting two tours May 17, 1pm and 3pm. This is a gated facility and is not open to the public. Please call 303-739-7649 to RSVP for one of these tours.

MAGE Industry Training
5/17/2012 2:45pm - 4:15pm 503

SolarTAC Facility Tour
5/17/2012 3pm

No transportation arrangements provided, click for phone number to RSVP.

Please join us for an exciting trip to Solar Technology Acceleration Center. We are a private, member-based, research and test facility where the solar industry will test, validate, and demonstrate near-market and advanced solar technologies. We will be hosting two tours May 17, 1pm and 3pm. This is a gated facility and is not open to the public. Please call 303-739-7649 to RSVP for one of these tours.

Parallel Sessions are Organized by Track Below
10:30am - 11:45am

Advancements in RE Technology

5/17/2012 10:30am - 11:45am 1c Chair: Jim Huggins

Modeling of solar water heaters (SWH) is essential for many applications. Two papers discuss upcoming changes in modeling and hot water draw assumptions in generating ratings for SWH, affecting the posted ratings for certified systems. Optimization of a passively-pumped SWH is illustrated, proceeding from a first-principles model of the system. Testing always must compliment modeling. Two papers focus on testing, including measurement methods for sky infrared fluxes, and experimental results on testing different heat exchangers.

Comparative Performance Analysis of Solar Heat Exchangers for Solar Hot Water Systems
Jayanta Deb Mondol, Mervyn Smyth, Aggelos Zacharopoulos
University of Ulster, Jordanstown, UK

A Realistic Hot Water Draw Specification for Rating Solar Water Heaters
Jay Burch1, Jeff Thornton2
1National Renewable Energy Laboratory, Golden, CO, USA, 2Thermal Energy System Specialists, Inc, Madison, WI, USA

Geyser Pump Solar Water Heater System Modeling Design Optimization
Qi Zhang, Susan Stewart, Jeffrey R. S. Brownson, Lucas Witmer
Assessment of smart domestic solar heating systems control using meteorological forecasts – a preliminary study under Brazilian conditions.

Manfred Kratzenberg, Hans Beyer
Laboratorio de Energia Solar, Federal University of Santa Catarina, Florianopolis, Brazil

Revisions to the SRCC Rating Process for Solar Water Heaters
Jay Burch¹, Jeff Thornton¹, Jim Huggins², Steven Long²
¹National Renewable Energy Laboratory, Golden, CO, USA, ²Solar Rating and Certification Corporation, Cocoa Beach, FL, USA, ³Thermal Energy System Specialists, Inc., Madison, WI, USA

Hydro, Ocean, and Storage Applications (Technical)
5/17/2012 10:30am - 11:45am 1d Chair: AbuBakr Bahaj & Arthur Williams

Design of an Axial Flow Pico-Hydro Turbine Runner for Application in Rural Cameroon
Bryan Ho-Yan, William Lubitz
University of Guelph, Guelph, Ontario, Canada

Long Term Wave Energy Resource Characterisation at the Atlantic Marine Energy Test Site
Brendan Cahill, Tony Lewis
Hydraulics & Maritime Research Centre, University College Cork, Cork, Ireland

Preparation and Properties of Carbonate Molten Salt for Solar Thermal Power Plant
Jing Ding, Qiang Peng, Xiaoli Yang, Xiaolan Wei, Jianfeng Lu, Jianping Yang
¹Sun Yat-sen University, Guangzhou, China, ³South China University of Technology, Guangzhou, China

Revolving Iceboats Power (RIP) System for Arctic and Frozen Lake Applications
Mithra Sankrithi, Aarti Sankrithi
RIC Enterprises, WA, USA

Overview of molten salt storage systems and material development for solar thermal power plants
Thomas Bauer¹, Doerte Laing², Nils Breidenbach², Markus Eck², Nicole Pfleger²
¹German Aerospace Center (DLR), Institute of Technical Thermodynamics, Cologne, Germany, ²German Aerospace Center (DLR), Institute of Technical Thermodynamics, Stuttgart, Germany

Development of a Structured Concrete Thermocline Thermal Energy Storage System
Bradley Brown, Matt Strasser, Paneer Selvam
University of Arkansas, Fayetteville, AR, USA

Solar Tac (Forum)
5/17/2012 10:30am - 11:45am 4c

FORUM - The Solar Technology Acceleration Center (SolarTAC) – Current Status, Future Plans and Opportunities
Timothy J. Wendelin
NREL, Golden, CO, USA

The Built Environment

Solar Buildings (Technical) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/17/2012 10:30am - 11:45am 1b Chair: Polly Cooper

GSA’s Green Proving Ground: Identifying, Testing and Evaluating Innovative Technologies
Alicen Kandt¹, Kevin Powell¹
Comparative Study of Indigenous Architectural knowledge and practices of sustainability
S.Majid Mofidi¹, Mahsa Ghazi-Jahani²
¹University of Science & Technology, School of Architecture and Urban Development, Teharn, Iran, ²Islamic Azad University, Science and Research Branch, Department of Art and Architecture, Teharn, Iran

Steve Stevens
AT&T Bell Labs (Retired), Golden, Colorado, USA

Site Metrics for Green Schools: The Impact of Site Planning and Transportation Credits of LEED™ and non LEED™ Rated K-12 Schools on Building Performance and Student Health
Ihab Elzeyadi
University of Oregon, Eugene, USA

George Lof: Denver’s Solar Pioneer
Anthony Denzer
University of Wyoming, Laramie, WY, USA

Green Classroom 2020: Design Strategies to Retrofit K-12 Schools for Carbon Neutrality
Ihab Elzeyadi
University of Oregon, Eugene, OR, USA

Seasonal Storage of Solar Heat-Problems, Pitfalls, Benefits & Solutions (Forum) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/17/2012 10:30am - 11:45am 1f
FORUM - Seasonal Storage of Solar Heat – Problems, Pitfalls, Benefit and Solutions
Peter D’Antonio
PCD Engineering, Longmont, CO, USA

Energy Generation, Distribution, & Transportation

Resource Applications (Technical)
5/17/2012 10:30am - 11:45am 4d

Probabilistic Power Predictions based on the Analog Ensemble
Luca Delle Monache1, F. Anthony Eckel2, Jesper Nissen3, Sue Ellen Haupt1, Daran Rife1, Badrinath Nagarajan1, Keith Searight2
1National Center for Atmospheric Research, Boulder, CO, USA, 2National Weather Service Office of Science and Technology, Silver Spring, MD, USA, 3Vestas Technology R&D, Aarhus N, Denmark

A Consensus Wind forecasting System
William Myers, Seth Linden, Gerry Wiener, Sue Haupt
National Center for Atmospheric Research, Boulder, CO, USA

Incorporating uncertainty and risk in biomass resource analysis for biomass power and biofuels
Tim Rooney, Edward Gray
Antares Group, Inc., Denver, CO, USA

Clean Energy Ministerial Global Atlas for Solar and Wind Energy
Carsten Hoyer-Klick1, Nicolas Fichaux2, Jake Badger3, Ivan Moya Mallafre4, Marcel Sur2
1German Aerospace Center, Stuttgart, Germany, 2IRENA, Abu Dhabi, United Arab Emirates, 3Technical University of Denmark (DTU), Roskilde, Denmark, 4Cener, Sarriguren, Spain, 5Geomodel Solar, Bratislava, Slovakia
Micro-scale Numerical Weather Prediction and Its Application for an Offshore Wind Farm in South Korea
Yubao Liu, Seung-Woo Lee, Young-Jean Choi, Will Y.Y. Cheng, Yuewei Liu, Wanli Wu, Linlin Pan, Boem-Keun Seo, Jae-Young Byon, Song-Lak Kang
1 National Center for Atmospheric Research, Boulder, CO, USA, 2 Korea Meteorological Administration, Seoul, Republic of Korea, 3 Texas Tech University, TX, USA
Towards a High Resolution Long-term Solar Resource Database: Applying the SUNY model to ISCCP B1U data stream
Richard Perez, James Schlemmer, Karl Jr. Hemker, Paul Stackhouse, Stephen Cox, Colleen Mikovitz
1 University at Albany, Albany, New York, USA, 2 NASA Langley Research Center, Hampton, Virginia, USA, 3 SSAI, Hampton, Virginia, USA

Energy Access

Are We Sustainable? (Ignite) 1 GBCI General CE Hour
5/17/2012 10:30am - 11:45am 2b Chair: Professor Giuliano C Premier, Brian Allen
Decentralization, Development and Sustainability – If Solar is Peace, is Sprawl War?
John Hoag
John Hoag, John Hoag, USA
Hispanics and their Solar Energy Adoption Patterns
Mary Beth McCabe, Ramon Corona, Richard Weaver
National University, La Jolla, California, USA
Approaches for Planning and Implementing Sustainable Energy Growth in a Complex World
Neil Snyder, Amy Schwab
National Renewable Energy Laboratory, Golden, CO, USA
Solar Access, Politics and Policy
Richard Heinemeyer
American Institute of Architects, Washington, DC, USA
Solar for All: Powering the Millennium Development Goals
Robert Freling
Yale University, New Haven, CT, USA
Strategies for Industry Sustainability
Salvador Ávila Filho, José Rafael Nascimento Lopes, Carlos Roberto Oliveira de Souza
1 UFBA - PEI - TECNOLOGIA LIMPAS TECLIM, Salvador, Brazil, 2 SENAI BA, Salvador, Brazil
Brightparks™: The Fusion of Solar Power and Usable Public Space
Brandon Colvin
Arizona State University, Tempe, AZ, USA
The Burning Sun
Kofi Ntiforo
Kwame Nkrumah University of Science and Technology, Kumasi, Ghana, Kumasi, Ashanti Region, Ghana
Solar Within The Renewable Space: Why It Is More Effective Than It Looks Like
Giovanni Lendi
Sedna Power Plants US, Cherry Hill, NJ, USA
Finance, Policy & Marketing

Simplify, Integrate & Standardize—How to design successful products for the residential PV market which have mass-market potential (Forum)
5/17/2012 10:30am - 11:45am 2a
FORUM-Simplify, integrate & standardize – How to design successful products for the residential PV market which have mass-market potential
Wolfgang Schlichting
Wolf Research LLC, Miami, USA

International Voluntary Renewable Energy Markets (Forum)
5/17/2012 10:30am - 11:45am 4e
FORUM - International Voluntary Renewable Energy Markets
Jenny Heeter
NREL, Golden, CO, USA

WREC Forum

WREC-I WREN Plenary
5/17/2012 10:30am - 11:45am 4a Chair: Mr. Bill Watts
Sweating to be Cool with Solar: Progress toward a vibrant solar airconditioning industry
Stephen White1, Daniel Mugnier2, Daniel Rowe1
1CSIRO Energy Technology, Newcastle, Australia, 2TECSOL, Perpignan, France
Renewable Energies and Passive Design for a Sustainable Airport
Silvia de Schiller
University of Buenos Aires, Buenos Aires, Argentina
Fabrication Issues, Reliability And Long Term Durability Of CIGS Thin Film PV Modules: A Review
Neelkanth Dhere, Shirish Pethe
Florida Solar Energy Center, University of Central Florida, Cocoa, FL 32922-5703, USA
The Road Towards Energy Neutral Cities
Jacques T N Kimman
Zuyd University, Heerlen, The Netherlands
Global Trends in Renewable Energy Markets and Finance
Michael Eckhart
Citigroup, Inc., New York, New York, USA
SCALING UP THE UPTAKE OF RENEWABLE ENERGY
Mohamed El-Ashry
UN Foundation, unknown, USA

WREN

WREN - Dust and Solar Collectors: A Showstopper? (Forum)
5/17/2012 10:30am - 11:45am 1e Chair: Scott Huffman, NREL
Forum Details:
Simon Bräuniger, MASDAR, Abu Dhabi “Living the Dust Problem in Masdar, the World’s Sustainable City”

David Kissell, LOTUS LEAF, Minneapolis, Minnesota “New Coating Approaches to Dust Alleviation”

Daniel Chen, 3M, St. Paul, Minnesota “Commercial Dust Mitigation: Current Products and Future Expectations”

Steve Risser, BATTELLE, Columbus, Ohio “Dust: Issues and R&D Approaches”

Cheryl Kennedy, NREL, Golden, Colorado “Soiling Research Efforts for Concentrating Technologies”

FORUM - Dust and Solar Collectors: A Showstopper?

Lawrence L. Kazmerski
NREL, Golden, CO, USA

WREN-V (Technical)
5/17/2012 10:30am - 11:45am 4b

EXERGO–ECONOMIC ANALYSIS OF PERFORMANCE OF A HOT AIR GENERATION SYSTEM USING PRODUCER GAS AS FUEL INSTEAD OF LIGHT DIESEL OIL TO DETERMINE THERMO–ECONOMIC DERATING FACTOR (Part II)

Patel A. R.
Indian Institute of Technology Ropar, Roopnagar, Punjab, India

Beyond Smart Grid: Alternatives for Transmission and Low-cost Firming Storage of Stranded Renewables as Hydrogen and Ammonia Fuels via Underground Pipelines

William Leighty1, John Holbrook2
1The Leighty Foundation, Juneau, AK, USA, 2AmmPower LLC, Richland, WA, USA

Jatropha Bio-Diesel Production Technologies

Ebtisam Heikal1, Salah Khalil1, Ismaiel Abdou1
Egyptian Petroleum Research Institute, Cairo, Egypt

Market-Based Indian Grid Integration Study Options

Blaise Stoltenberg1, Kara Clark1, S.K. Negi2
1National Renewable Energy Laboratory, Golden, CO, USA, 2Gujarat Energy Transmission Corporation LTD, Vadodara, Gujarat, India

Evaluate the Performance of Micro CHP based Renewable Energy from Livestock Waste in a typical farm in Iran

Mostafa Kamalinasab1, Fatemeh TeymouriHamzehkolaee2, Sourena Sattari3
1Islamic Azad University, Tehran, Iran, 2Iran’s power ministry, Tehran, Iran, 3Energy Faculty of Engineering, Sharif University of Technology, Tehran, Iran

Research on Traffic Noise Environment of Urban Residential Area Based on the Genetic Algorithm

Wu Hupeng1, Kang Jian2, Jin Hong1
1Harbin Institute of Technology, Harbin, China, 2University of Sheffield, Sheffield, UK

Variability of global sunshine in Guadeloupe

Maina ANDRE1, Ted SOUBDHAN2, Jean-Louis BERNARD2
1University of french West Indies, Pointe-à-pitre, Guadeloupe

Super Solar Synergy: Solar(i)zed Architecture @ System - Of - Systems Infrastructure {
Solarized Urbanism = Solarized Functions @ Architectural Forms}

RAYMOND GECAS
iSOLAR1, FL, USA
New advancements in PV inverter technology  
*Rachel Ramsey*

unknown, unknown, USA

Space Solar Power technology  
*Chandrakala T N, Aprameya Swarup*

Sri Jayachamarajendra College of Engineering, Mysore, India

Optimization of Fuzzy Logic Controller MPPT in Photovoltaic System With Genetic Algorithms  
*OBEIDI Thameur, LARBES Chérif, OBEIDI née TCHOKETCH KEBIR Gui Filiz, HOURIER Mohamed*

Laboratoire des Dispositifs de Communication et de Conversion Photovoltaïque, Département d’Electronique, Ecole Nationale Polytechnique, 10, Avenue Hassen Badi, Algeria

ANALYSIS OF FLAT PLATE PHOTOVOLTAIC- THERMAL (PVT) MODELS  
*Jose Bilbao, Alistair Sproul*

University of New South Wales, Sydney, Australia

GROWTH AND ELECTRICAL CHARACTERISATION OF NANOSTRUCTURED CuAlS2 THIN FILMS BY TWO STAGE VACUUM THERMAL EVAPORATION TECHNIQUE.  
*A.U Moreh*, *Musa Momoh*, *H.N Yahya*, *Kasimu Isa*

1Usman Danfodiyo University Sokoto, Sokoto, Nigeria, 2Sokoto Energy Research Centre, Sokoto, Nigeria, 3Federal University of Technology, Minna, Nigeria

Distribution Area Automation and Protection Systems for Distribution Generation Integration – Need & Requirements  
*Jayaprakash Ponraj*

IBM, Bangalore, Karnataka, India

STRUCTURAL CHARACTERISATION OF NANOSTRUCTURED CuAlS2 THIN FILMS GROWN BY TWO STAGE VACUUM THERMAL EVAPORATION TECHNIQUE.  
*Musa Momoh*, *A.U Moreh*, *H.N Yahya*

1Usman Danfodiyo University Sokoto, Sokoto, Nigeria, 2Sokoto Energy Research Centre, Sokoto, Nigeria

Solar PV Back Up-Alternative To Petrol Generators  
*Matthew Matimbwi*

TAREA, Dar es Salaam, Tanzania

Fully-inorganic Quantum-dots Based Solar Cell Study  
*Guifu Zou*

Soochow University, Suzhou, China

Holt-Winters Forecasting for Output Power and Efficiency of a Solar Photovoltaic System  
*Yan Su, Lai-Cheong Chan, Lei Chen*

University of Macau, Macau, China

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**CRES Showcase Colorado**

**Colorado – The Right Climate for Business**

5/17/2012 10:30am - 11:45am  1a  Chair: Alexis Halbert

Colorado continues to fuel growth and innovation, create jobs, and is a global competitor in attracting clean technology companies and business opportunities. This session will discuss why Colorado is home to some of the most successful renewable energy companies in the country and will explore ways to further attract and retain businesses.
Speakers to Include:

Dan Fesenmeier, Account Manager, Renewable Power Generation Sales, GE Energy
Michael Rucker, CEO, Juwi Wind
Craig Cox, Executive Director of the Interwest Energy Alliance
Tom Georgis, VP Development, Solar Reserve
TJ Deora, Director, Colorado Governor’s Energy Office

LUNCH
11:45am - 1:15pm

Parallel Sessions are Organized by Track Below
1:15pm - 2:30pm

The Built Environment

Shading: A Major Solar Strategy (Forum) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/17/2012 1:15pm - 2:30pm 4c

FORUM - Shading: A Major Solar Strategy
Norbert Lechner
Auburn University, Auburn, AL, USA

Building Integrated Photovoltaics (Technical) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/17/2012 1:15pm - 2:30pm 1b

Chair: Ken Haggard

Sustainable Buildings & Low Energy Architecture-JinkoSolar Installation at The Dependable Companies Headquarters
Isabelle Christensen
Jinko Solar, San Francisco, CA, USA

Building-Integrated Photovoltaics (BIPV) in the Residential Sector: An Analysis of Installed Rooftop Prices
Ted James, Alan Goodrich, Michael Woodhouse, Robert Margolis, Sean Ong
National Renewable Energy Laboratory, Golden, CO, USA

Feasibility of Renewable Energy Based Distributed Generation in Yanbu, Saudi Arabia
Alaa Alaidroos, Long He, Moncef Krarti
University of Colorado, Boulder, CO 80309, USA

Impact of Distributed Solar Generation in Low Energy Housing on the Electrical Grid
Wasim Saman, David Whaley, Lachlan Mudge
University of South Australia, Adelaide, South Australia, Australia

Direct Current to Direct Current – A Bridge to Zero Net Energy
Karl Johnson¹, Elaine Hebert²
¹Calif. Institute for Energy & Environment, California, USA, ²Retired, Calif. Energy Commission, California, USA

Building Integrated Photovoltaic (BIPV) Lifecycle Cost Evaluation
Ryan Smith, Steffan Lofgren
University of Utah, Salt Lake City, UT, USA
Building Monitoring (Technical) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD  
5/17/2012 1:15pm - 2:30pm  1f  
Chair: Harvey Bryan

Paul Stackhouse1, William Chandler2, Taiping Zhang2, James Hoefl2, David Westberg2, Urban Zeigler3, Gregory Leng2, Robert Charles4, Nathalie Melocha5, Kevin Bourque5, Farah Sheriff5, Thomas Anderson3, Julien Poirier3  
1NASA Langley Research Center, Hampton, VA, USA, 2SSAI, Hampton, VA, USA, 3NRCan-CanmetEnergy, Varennes, Quebec, Canada

Comparative Life-cycle Analysis Of Energy-Efficiency Measures At TVA’s Chattanooga Office Complex: Phase II Results & Final Design  
UMESH ATRE1, MICHAEL NICKLAS1, DAVID ZIMMERMAN1  
1INNOVATIVE DESIGN INC, RALEIGH, NC, USA, 2TENNESSEE VALLEY AUTHORITY, CHATTANOOGA, TN, USA

Reaching toward Net Zero: Results from a PVT Powered Residence in the Pacific Northwest  
Doug Boleyn  
Energy Trust of Oregon, Portland, OR, USA

FORUM - Making Homes Smarter – Using Real-Time Energy Data and Analysis to Decrease Energy Use  
Kerri Devine, Catherine Joseph  
Duke Smart Home Program, Durham, NC, USA

Sunspace Thermal Dynamics in the Pacific Northwest: A Field and Modeling Study  
Alexandra R. Rempel1, Alan W. Rempel1, Ken N. Gates2, Katharine V. Cashman1, Barbara Shaw1, Catherine J. Page2  
1University of Oregon, Eugene, OR, USA, 2Ken Gates Construction, Eugene, OR, USA, 3Barbara Shaw Management, Eugene, OR, USA

Energy Generation, Distribution, & Transportation

Advancements in Grid Integration of Wind and Solar Power in the Western Interconnect (Forum)  
5/17/2012 1:15pm - 2:30pm  4d

FORUM - Advancements in Grid Integration of Wind and Solar Power in the Western Interconnect  
Brian Keith Parsons  
NREL, Golden, CO, USA

Technologies Working Together (Ignite)  
5/17/2012 1:15pm - 2:30pm  2b

Analysis of geothermal energy potential in Latvia  
Anatolijs Borodinecs, Yelena Pshenichnaya, Jurgs Zmitis, Andris Kreslins  
RIGA TECHNICAL UNIVERSITY, Riga, Latvia

Hybrid System Design with AC Mini Grid for Power Backup against Blackouts  
Sandeep Giri  
Gham Power Nepal Private Limited, Kathmandu, Nepal

Grid-Connected PV Application In The Amazon Region: A Case Of Study Of A 3.3 kWp System  
Wilson Negrão Macêdo1, Renato Luz Cavalcante3, Marcos Galhardo1, Edinaldo José da Silva Pereira1, João Tavares Pinho1, Wilson Braga Júnior2  
1Instituto de Tecnologia/Universidade Federal do Pará, Belém, Pará, Brazil, 2Grupo de Estudos e Desenvolvimento de Alternativas Energéticas, Instituto de Tecnologia/Universidade Federal do
Pará, Belém, Pará, Brazil

A clean energy future and the impacts on electricity generation within Australia
Craig Froome, John Foster, Liam Wagner
The University of Queensland, Brisbane, Queensland, Australia

Offshore Wind Power: A Case for a Fully HVDC Transmission System
Mohammad Mohammad
Converteam UK - GE Energy, Rugby, Warwickshire, England, UK

Uncovering the potential of domestic demand side management to maximise the diffusion of renewable energy
Daniel Saker, Maria Vahdati, Stephen Millward, Emmanuel Essah
University of Reading, Reading, UK, SSE plc, Reading, UK

Harmonics Issues that Limit Solar Photovoltaic Generation on Distribution Circuits
Ketut Dartawon, Ricardo Austria, Le Hui, Mark Suehiro
Pterra Consulting, Albany, NY, USA, Maui Electric Company, Kahului, HI, USA

Future In Grid Management “Smart Grid”
KUNWAR PAL SINGH, HARMAN SINGH
GURU NANAK DEV ENGINEERING COLLEGE, LUDHIANA, PUNJAB, India

Variability in the Florida Current: Implications for Power Generation
Howard Hanson, James vanZwieten, Alana Smentek-Duerr
Florida Atlantic University, Boca Raton, FL, USA

A novel technique for extraction of geothermal energy from abandoned oil wells
Seyed Ali Ghoreishi-Madiseh, Ferri P. Hassani, Mohammed J. Al-Khawaja
McGill University, Montreal, Quebec, Canada, Qatar University, Doha, Qatar

EXERGO–ECONOMIC ANALYSIS OF PERFORMANCE OF A HOT AIR GENERATION SYSTEM USING PRODUCER GAS AS FUEL INSTEAD OF LIGHT DIESEL OIL TO DETERMINE THERMO–ECONOMIC DE–RATING FACTOR
A.R. Patel
Indian Institute of Technology, Punjab, India

DECENTRALISED OFF-GRID ELECTRICITY GENERATION IN INDIA USING INTERMEDIATE PYROLYSIS OF RESIDUE STRAWS
S. Sagi, A. Hornung, A. Apfelbacher, A. Patel, H. Singh
Aston University, Birmingham, UK, Indian Institute of Technology, Rupnagar, Punjab, India

The Value of Geographic Diversity of Wind and Solar – a Stochastic Geometry Approach
Victor Diakov
NREL, Golden, CO, USA

Dimensioning of a Tidal Stream Power Plant: Power Peaks vs. Installation Cost
Gregorio Iglesias, Marcos Sanchez, Rodrigo Carballe, Simon Neil
University of Santiago de Compostela, Santiago de Compostela, Spain, Bangor University, Menai Bridge, UK

INDIA’S BIOMASS POWER SECTOR
Deepthi .H.L, Apremayaswarup .B
SICE, MYSORE, India

Current Productivity Potential of Microalgae Biofuel with a Critical Evaluation of Resource Demand for Scale-up
Jason Quinn, Lenneke DeWinter, Kimberly Catton, Thomas Bradley
Colorado State University, Fort Collins, CO, USA, Wageningen University, Wageningen, Netherlands, UK

Panels in the Wind: How Wind Studies Are Impacting the Solar Industry
David Banks
University of Toronto, Toronto, Ontario, Canada, Colorado State University, Fort Collins, Colorado, USA, American Society of Civil Engineers (ASCE), Atlanta, USA
A SUPER HYBRID OCEAN ENERGY SYSTEM
Amith Mysore Chandra kant, aprameya swarup
sjce,mysore, karnataka, India

BIOFUELS
ASHWINI MODI, B Aprameya Swarup
SRI JAYACHAMARAJENDRA COLLEGE OF ENGINEERING, MYSORE, India

WIND SPEED AND ENERGY AT DIFFERENT HEIGHTS ON THE LATVIAN COAST OF THE BALTIC SEA
Valerijs Bezrukovs, Vladislavs Bezrukovs
Ventspils University College, Ventspils, Latvia

Diesel engine fueled with biodiesel obtained from mixed Feedstocks
Dilip Kumar Bora, L. M. Das, M K G Babu
Tezpur University, Tezpur, Assam, India

AC Micro Inverters for PV Technology Shoot-Off (Forum)
5/17/2012 1:15pm - 2:30pm

In this forum, companies providing AC Micro Inverter technologies for photovoltaic systems will compare and contrast their solutions side by side. The solar community needs educational exposure to the various features and benefits of these new AC Micro Inverter technologies. This Forum will introduce multiple solution providers to the audience with a structured approach of presenting consistent comparisons.

Raghu Belur, VP Marketing, Enphase
Juergen Krehnke, COO/President/GM of SMA America
Craig Lawrence, VP of Marketing at Solar Bridge

FORUM - AC Micro Inverters for PV Technology Shoot-Off
Marlene Brown
ASES Fellow and Solar Electric Division Chairperson, Albuquerque, NM, USA

Energy Access

The Food System Lifecycle: Opportunities for Energy Reduction and Capture (Forum)
5/17/2012 1:15pm - 2:30pm

FORUM - The Food System Lifecycle: Opportunities for Energy Reduction and Capture
Tekla Taylor
Women In Sustainable Energy (WISE), Lakewood, Colorado, USA

Finance, Policy & Marketing

Utility Rates for PV (Technical)
5/17/2012 1:15pm - 2:30pm

The Distributed Energy Future Impacts on the Utility Business Model and Implications for the Solar Industry
Ryan Matley, Virginia Lacy, James Newcomb
Rocky Mountain Institute, Boulder, Colorado, USA

How Utility Demand Charges Prevent the Adoption of Onsite Solar Power Generation
Lou Villaire, Mac Lewis
The Colorado Renewable Energy Collaboratory is a successful public-private research collaboration that can be replicated around the world. The Collaboratory has attracted large and small industry members (including seven Global 500 companies), industry sponsored research and several large U.S. Department of Energy research awards. To date, the Collaboratory has attracted $35 Million in private and federal funding to the four Colorado-based institutions over the past four years. The Collaboratory’s agreements and contracts are in the public domain, and this successful collaborative model can be duplicated.

Dana C. Christensen, Ph.D., Deputy Laboratory Director for Science and Technology, National Renewable Energy Laboratory

William H. Farland, Ph.D., Vice President for Research, Colorado State University

John M. Poate, Ph.D., Vice President for Research and Technology Transfer, Colorado school of Mines

Stein Sture, Ph.D., Vice Chancellor for Research, University of Colorado Boulder

Jennifer Schofield, M.B.A., Agreements Lead, National Renewable Energy Laboratory

FORUM - Tearing Down Silos – A Model for Collaborative Public/Private Research in Renewable Energy

David Hiller

Colorado Renewable Energy Collaboratory, Golden, CO, USA

Finance & Policy Potluck 1 (Ignite)

5/17/2012 1:15pm - 2:30pm  3a

Successfully Streamlining Low-Impact Hydropower Permitting: Colorado’s Model For The Entire Country

Ryan Broshar

SRA International, Golden, CO, USA

OpenEI – An Open Energy Data and Information Exchange for International Audiences
Debbie Brodt-Giles  
National Renewable Energy Laboratory, Golden, Colorado, USA

Optimum Operation of Bulk Energy Storage Systems in Contemporary Spot Electricity Markets  
Dimitrios Zafirakis, Konstantinos Chalvatzis  
University of East Anglia, Norwich Business School, Norwich, UK

The Role of Government Grants and Incentives in Financing Solar Research, Development, Commercialization and Deployment  
Ron Flavin  
Nova Southeastern University, Fort Lauderdale, FL, USA

POLICY BUILDING BLOCKS: HELPING POLICYMAKERS DETERMINE POLICY STAGING FOR THE DEVELOPMENT OF DISTRIBUTED PV MARKETS  
Elizabeth Doris  
National Renewable Energy Laboratory, Golden, USA

Promotion systems for electricity generation from renewable energy sources revisited  
Reinhard Haas  
Vienna University of Technology, Vienna, Austria

Where are the eco-innovators? Analysis of the knowledge flows between successive generations of green technology innovations  
Daniel Johnson, Kristina Lybecker, Jeffrey Moore  
Colorado College, Colorado Springs, CO, USA

WREC Forum

WREC-I WREN Plenary  
5/17/2012 1:15pm - 2:30pm 4a

Review of PV performance ratio development  
W.G.J.H.M. Van Sark¹, N.H. Reich², B. Müller², A. Armbruster², K. Kiefer², Ch. Reise²  
¹Copernicus Institute, Utrecht University, Utrecht, The Netherlands, ²Fraunhofer Institute for Solar Energy Systems ISE, Freiburg, Germany

Abstract 0965 from Ali Sayigh  
London, UK

OFFSHORE WIND POWER CONTRIBUTION IN ACHIEVING GLOBAL RENEWABLE ENERGY TARGETS: CURRENT STATUS AND FUTURE PROSPECTS  
JK Kaldellis  
Lab of Soft Energy Applications & Environmental Protection, Athens, Greece

Building energy efficiency and assessment in China  
Boizhan Li  
Chongqing University, Chongqing, China

CRES Showcase Colorado

A Solar Thermal Roadmap  
5/17/2012 1:15pm - 2:30pm 1a  Chair: Lorrie McAllister, Executive Director, Colorado Renewable Energy Society

Colorado is strategically poised to seize national leadership in the solar thermal industry. The state is optimal for solar thermal heating performance, is home to a cluster of cleantech and solar innovators, it has deep technical expertise in the field; and its citizens strongly support the development of clean energy.

Speakers to Include:
Parallel Sessions are Organized by Track Below
2:45pm - 4:00pm

Advancements in RE Technology

Technology (Ignite)
5/17/2012 2:30pm - 4:00pm 2b

ECM Controlled (Speed Controlled Pump) and Intelligent Sensor Solution for Cost Effective BTU Meter Solutions
Lars Mejsner, Dale Drury
Grundfos Pump Corp, Olathe, KS, USA

Energy and exergy transfer performances investigation for solar parabolic trough system with heat conducting oil
LU Jianfeng1, Ding Jing2, Yang Jianping2, Wang Kang1
1Sun Yat-sen University, Guangzhou, China, 2South China University of Technology, Guangzhou, China

Converting Waste Heat To Useful POWER
PRAMOD KUMAR, B APRAMEYA SWARUP
SJCE, MYSORE,KARNATAKA, India

Installation Effect by Solar Heater System using Solar Radiation Forecasting
Basvaraj Yalasangi, Appramayya Swarup
Sri Jayachamarajendra College of Engineering, Mysore, India

Solar Steam Irrigation
Santosh Kumar, Aprameya Swarup
Sri Jayachamarajendra College of Engineering, Mysore, India

An Integrated Sustainable Food Production and Renewable Energy System with Solar & Biomass CHP
Ratnalee Patil1, Gary Bailey1, Umesh Atre1, Mike Nicklas0
1Innovative Design, Inc., Raleigh, NC, USA, 0GrowGreen Power, Inc., Raleigh, NC, USA

Application of Solar Energy in rural area for Mitigation of GHG Emission
kiran kumar
SJCE, mysore, India

Solar Industrial Process Heat
Muralikrishna K, Aprameya Swarup
Sri Jayachamarajendra College of Engineering, Mysore, India

Operation Proposal and Efficiency Analysis of Direct-Fired Absorption Chillers Biogas Produced in the Brewery
Yingjian Li, Qi Qiu, Changkun LIU
College of Chemistry & Chemical Engineering, Shenzhen University, Shenzhen city, China

An Improved Model for Solar Parabolic Trough Using Green House Effect
Khairul Anam
Islamic University of Technology, Dhaka, Bangladesh

Annual Performance of an Innovative, Cost-Reducing Parabolic Trough Concentrator
David White, Alison Mason
SkyFuel, Arvada, CO, USA

INVERTERS TOPOLOGIES AND CONTROL STRUCTURE FOR GRID CONNECTED PHOTOVOLTAIC SYSTEMS
L. Hassaine1, E. Olías2
1Centre de Developpment des Energies Renouvelables, Algiers, Algeria, 2Universidad Carlos III Madrid, Madrid, Spain

SOLAR COOKER USING WASTE MATERIALS
Chethan Kumar C D, Aprameya Swarup
SJC, mysore, mysore, India

HYDROGEN FUEL CELLS
Sandesh K S, Apprampayya Swaroop
Sri Jayachamarajendra College of Engineering, Mysore, India

Modeling Optimization of a Fixed, Arbitrary V-Trough Concentrator.
Jenni Brito1, Erick Bandala2, Brian Raichle1
1Appalachian State University, Boone, NC, USA, 2Universidad de las Americas Puebla, Cholula, Puebla, Mexico

Aerial Solar Thermography and the Condition Monitoring of Photovoltaic Systems
Harley Denio
Oregon Infrared, Aloha, Oregon, USA

Scope of Solar Energy in Rural Sector
Mamatha J, B Aprameya Swarup
Sri Jayachamarajendra Institute of Technology, Mysore, India

Comparative Study of the Temperature Sensitivity for N- and P-Doped Silicon Resistors
Ali Boukabache1, Pierre Pons2, F. Kerrou3, Mohamed Hocine4
1CNRS ; LAAS ; 7 avenue du colonel Roche, F-31077, Toulouse Cedex 4, France, France, 2Université de Toulouse ; UPS, INSA, ISAE ; UT1, UTM, LAAS ; F-31077, Toulouse, France, 3Université Mentouri, Route d’Ain-El-Bey, 25000, Constantine, Algérie, Algeria, 4Ecole Normale Supérieure, Kouba,, Alger, Algérie, Algeria

Solar Pump
Santosh Kumar, Aprameya Swarup
Sri Jayachamarajendra College of Engineering, Mysore, India

New Era of Solar power in Mysore
Roshvihkar B S, Aprameya Swarup
Sri Jayachamarajendra College of Engineering, Mysore, India

An Engineering Approach To Solar PV And Critical Best Practices Protocols
Thomas Ball
Association of Energy Engineers, California, USA

Indian Solar Cities Programme: An Overview of Major Activities and Accomplishments
Alicen Kandt, Shannon Cowlin
NREL, Golden, CO, USA

Integrated Resources Planning: Western São Paulo State case study
Paulo Roberto Carneiro, José Aquiles Baesso Grimoni, Miguel Edgar Morales Udaeta, Luiz Claudio Ribeiro Galvão
São Paulo University, São Paulo, SP, Brazil

TECHNO ECONOMIC STUDY OF SOLAR THERMAL POWER PLANT FOR CENTRALIZED ELECTRICITY GENERATION IN ALGERIA
Mohamed Abbas1, Boussad Boumeddane2, Noureddine Said2, Nachida Merzouk1
1Unité de développement des équipements solaire (UDES), Route Nationale N° 11, B.P 365, Bou Ismail, 42415, Tipaza, Algeria, 2Département de mécanique, Université Saad Dahleb, Route de Soumâa, Blida, Algeria, 3Centre de développement des énergies renouvelables (CDER), Route de
Some Don’t Like it Hot: Solar Cooling (Technical)

Solar cooling is necessary for solar thermal system to address high fractions of building space conditioning loads and to efficiently use solar equipment in the summer when heat demand is low. One paper presents results for a traditional double-effect absorption chiller, but driven by non-tracking CPC collectors with evacuated tube receivers. Two papers investigate the use of solar-driven ejectors as compressors in cooling cycles. Modeling and testing of a latent cooling (dehumidification) device using liquid desiccants regenerated with waste heat from a PV/T system is presented. Another paper presents an alternative geothermal sink for waste heat from a solar-driven absorption chiller. Lastly, a paper considers non-solar sources for building cooling, including night-sky radiation and shallow geothermal resources.

Non-tracking Solar Cooling with 6.5 RT Double-effect Absorption Chiller
Heather Poiry, Kevin Balkosky, Roland Winston, Lun Jiang
University of California, Merced, Merced, CA, USA

Ammonia generation with flat-plate solar collector for absorption cooling system
Reinaldo J. Guillen Gordin1, Maria I. Fernandez Parra1, Electo E. Silva Lora1, Osvaldo J. Venturini2
1University of Oriente, Stgo de Cuba, Cuba, 2University of Itajubá, Itajubá, Brazil

An Ejector Refrigeration Cycle For Utilizing Solar Thermal Energy
Yusuke Saito1, Tatsuya Ito1, Takahiro Fukushima1, Sarin Chan1, Akiko Matsuoka1, Haruki Sato1
1Department of System Design Engineering, Keio University, Yokohama-City, Kanagawa
Prefecture, Japan, 2Department of Mechanical Engineering, Keio University, Yokohama-City, Kanagawa Prefecture, Japan, 3Industrial and Mechanical Engineering Department, Institute of Technology of Cambodia, Phnom Penh, Cambodia

Combined Ejector-Absorption Solar Cooling System
Ranj Sirwan, Kamaruzzaman Sopian, Yusoff Ali
National University Malaysia (UKM), Bangi, Selangor, Malaysia

Modeling and Testing of a Liquid Desiccant Dehumidification System Regenerated with Solar Thermal Energy from a PV/T System
Michael Hatt1, Tim Merrigan2, Michael Brandemuehl2
1University of Colorado, Boulder, CO, USA, 2National Renewable Energy Laboratory, Golden, CO, USA

Integration of shallow geothermal energy in the construction: Analisis of the solar-assisted air-conditioning system installed in the southern Spain.
FRANCISCO JAVIER BATLLES GARRIDO1, SABINA ROSIEK1
1Department of Applied Physics UNIVERSITY OF ALMERIA, ALMERIA, Spain, 2CIESOL, Joint Centre University of Almeria-CIEMAT, ALMERIA, Spain

SPACE COOLING POTENTIALS FOR AMBIENT SOURCES WITH THERMAL ENERGY STORAGE
Keith Sharp, Brian Robinson
University of Louisville, Louisville, KY, USA

The Built Environment

Building Analysis (Technical)1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/17/2012 2:45pm - 4:00pm 1b Chair: Don Aitken
Thermal Comfort Simulations for Disaster-Relief Housing for Haiti
Juintow Lin
California State Polytechnic University, Pomona, Pomona, USA

From Static to Kinetic: A Review of Acclimated Kinetic Building Envelopes
Jialiang (Julian) Wang, Liliana O. Beltrán, Jonghoon Kim
Department of Architecture, Texas A&M University, College Station, USA

Development and Validation of a Thermal Network Model to Predict Indoor Operative Temperatures in Dry Roofpond Buildings.
Afzal Hossain1, Alfredo Fernandez-Gonzalez2
1University of Nevada, Las Vegas, Las Vegas, NV, USA, 2Arizona State University, Tempe, AZ, USA

Analysis of the Impact of Urban Heat Island on Building Energy Consumption
Sandeep Doodhabalalopus, Harvey Bryan
Arizona State University, Tempe, Arizona, USA

Building-Energy Research at the National Renewable Energy Laboratory (NREL) (Forum) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/17/2012 2:45pm - 4:00pm 1f
FORUM - Building-Energy Research at the National Renewable Energy Laboratory (NREL)
Ron Judkoff
NREL, Golden, CO, USA
In order to integrate wind and solar energy effectively into the global energy grid it is important to have accurate knowledge of the amount of power that will be produced at various wind and solar farms over the short term time horizon. Here wind and cloud forecasting play a key role and accurate forecasts of winds and cloud coverage are essential. This forum will focus on the latest techniques and problem areas in wind forecasting in relation to renewable energy production.

John Zack, Principal / Director of Forecasting, AWS TruePower

Sue Ellen Haupt, Director, Weather Systems & Assessment Program, NCAR

Adam Kankiewicz, Senior Atmospheric Research Scientist, WindLogics

Julie Lundquist, Assistant Professor of the Department of Atmospheric and Oceanic Sciences, University of Colorado. Joint Appointe, National Renewable Energy Laboratory

Jeff Lerner, Director of Forecasting 3Tier

FORUM - Weather Prediction and Renewable Energy

Gerry Wiener
National Center for Atmospheric Research, Boulder, CO, USA

Energy Information Tools & Maps: Making Informed Decisions Using Energy Data (Forum)

Debbie Brodt-Giles
NREL, Golden, CO, USA

DC-to-DC Converter / Optimizer PV Technology Shoot-Off (Forum)

Marlene Brown
ASES Fellow and Solar Electric Division Chairsperson, Albuquerque, NM, USA
Energy Access

Accessing Renewable Futures (Forum Highlights)
5/17/2012 2:45pm - 4:00pm  1e  Chair: Prof. Dr.-Ing. Joao Tavares Pinho, Dr. Paulette Middleton

FORUM - Solar PV Projects' Hidden Dangers: How to Harness the Sun's Energy without Getting Burned.
John Hanebrink
Mareer Harbert, P.A., Orlando, FL, USA

FORUM - Solutions and paradigm shifts to expedite the environmental permitting of renewable energy projects
Sarah Busche
NREL, Golden, CO, USA

FORUM - Enabling Renewables with Energy Efficiency
Scott Elliott
Vermont Energy Investment Corporation, Columbus, Ohio, USA

Byron Woertz
Western Electricity Coordinating Council (WECC), Salt Lake City, UT, USA

Finance, Policy & Marketing

Finance & Policy Potluck 2 (Ignite) 1 GBCI General CE Hour
5/17/2012 2:45pm - 4:00pm  3a

The Green Proving Ground RE Checklist
James Harris
National Renewable Energy Laboratory, Golden, CO, USA

RESA Reporting in Colorado: Big Data with Many Stakeholders
Leslie Baer
Energy Intersections, LLC, Denver, CO, USA

PV Project Due Diligence for Ontario, Canada Climates
Ryan Grant², Kurt Lyell¹, John Hoffner¹, Jack Whittier¹, Sheck Wing "Michael" Mak³, Richard Campell¹, Timothy Stanton¹, Edwina Lui¹, Rod Jackson¹, Scott Stibrich¹
¹CH2M HILL, Denver, Colorado, USA, ²TransCanada, Calgary, Alberta, Canada, ³CH2M HILL, Toronto, Ontario, Canada, ⁴CH2M HILL, Austin, Texas, USA

The Potential of Photovoltaic Systems in Canada
Anis Haque, Raied Hasan
Department of Electrical and Computer Engineering, University of Calgary, Calgary, Canada

The Actual Value of Solar Electricity (Photovoltaics) in Urban Settings: Real-time Pricing, SRECs, and Tax Credits
Lucas Witmer, Mesude Bayrakci, Babatunde Idrisu, Jeffrey R. S. Brownson, Seth Blumsack
The Pennsylvania State University, University Park, PA, USA

Net-Zero Carbon Manufacturing at Net-Zero Cost
Dustin Pohlman, Jeremy Smith, Kelly Kissock
University of Dayton, Dayton, OH, USA

INTEGRATION THROUGH INNOVATION. THE ITALIAN ROADMAP FOR BIPV SYSTEMS.
Pierluigi De Berardinis, Pierluigi Fecondo
University of L'Aquila, Department of Architecture and Urbanism, L'Aquila, Italy
Potentials of polygeneration in district heating systems
Nguyen Le Truong, Leif Gustavsson
Linnaeus University, Växjö, Sweden

ADVENT OF RESIDENTIAL SOLAR PV FINANCING: OPPORTUNITIES AND CHALLENGES FOR THE US INSTALLATION INDUSTRY AND EMERGING TRENDS
Deep Chakraborty
Centrosolar America, CA, USA

Solar Renewable Energy Credits (SRECs) Price Forecast - A Linear Optimization Approach
Dawei Zhou, Daniel Bradley
Navigant, Inc., Westbury, NY, USA

Policy, Branding, & Real-Time Pricing (Ignite)
5/17/2012 2:45pm - 4:00pm 4e

Forum - Real-Time Pricing for Solar Power
Lou Villaire
Colorado Mesa University, Grand Junction, CO, USA

FORUM - Internet Marketing and Solar Energy Brand Promotion
Angela Fisher
Solar Planet, Boulder, CO, USA

FORUM - The Clean Energy Solutions Center, a Network for Policy Assistance
Sandra Reategui
NREL, Golden, CO, USA

WREC Forum

WREC-I (technical)
5/17/2012 2:45pm - 4:00pm 4a Chair: Prof. G. Premier

Decentralized Integrated Organic Waste Management For Urban Areas In The Developing World
Priyadarshini Karve
Director, Samuchit Enviro Tech Pvt Ltd, Pune, Maharashtra, India

Hydrogen Enriched Biogas Production from Low Grade Biomass
R.M. Dinsdale
University of Glamorgan, Pontypridd, UK

WREC-II (Technical)
5/17/2012 2:45pm - 4:00pm 4b Chair: Dr. Sanaz Ghazi

Combination of Taguchi method and artificial intelligence techniques for the optimal design of flat-plate collectors
Soteris A. Kalogirou
Cyprus University of Technology, Limassol, Cyprus

ADVANCES IN SOLAR ASSISTED DRYING SYSTEMS FOR MARINE AND AGRICULTURAL PRODUCTS
Kamaruzzaman Sopian, Mohd Yusof Othman, Saleem Zaidi
Universiti Kebangsaan Malaysia, Selangor, Malaysia

Influence of control modes of a grid-connected PV system on power flow in the host grid
Ali Hamzeh
Damascus University / Society of Syrian Engineers, Damascus, Syria

Climate Statistics for Energy Meteorology
John Boland
CRES Showcase Colorado

Recharge Colorado: Energy Central
5/17/2012 2:45pm - 4:00pm  
Chair: Jeffrey Nathanson, CEO Recharge Colorado,
A panel presentation on Energy Efficiency and Renewable Energy Development in Colorado through the eyes of Utility practitioners.
Speakers to Include:
Jeffrey Nathanson, CEO Recharge Colorado
Gretchen Stanford, Customer Relations Manager, Loveland Utilities
Ann Seymour, Colorado Springs Utilities (CSU) - Water Conservation Manager
Brad Zaporski, Marketing and Member Services Manager, San Miguel Power Association (SMPA)

Parallel Sessions are Organized by Track Below
4:15pm - 5:30pm

Advancements in RE Technology

From Minimizing Risk to Maximizing Performance: Flat Panel PV Resource Assessment Best Practices (Forum)
5/17/2012 4:15pm - 5:30pm  
FORUM - From Minimizing Risk to Maximizing Performance: Flat Panel PV Resource Assessment Best Practices  
Marie Schnitzer, Robert Dolce, Justin Robinson  
Draker Labs/ASES RAD Chair, Burlington, VT, USA

Eco-friendly Ocean Thermal Energy Conversion (OTEC) Systems (Forum)
5/17/2012 4:15pm - 5:30pm  
FORUM - Eco-friendly Ocean Thermal Energy Conversion (OTEC) systems  
Desikan Bharathan  
National Renewable Energy Laboratory, Golden, CO, USA

Keys to Successful Solar Water Heating Programs (Forum)
5/17/2012 4:15pm - 5:30pm  
FORUM - Keys to Successful Solar Water Heating Programs  
Chip Bircher  
Utility Solar Water Heating Initiative, De Pere, WI, USA

Quantum Dots, Nanoscience and the Future of Photovoltaics (Forum)
5/17/2012 4:15pm - 5:30pm
The audience will get an up-to-the-minute report from leading researchers on novel approaches for harvesting and converting solar photons into electrical energy with efficiencies above the theoretical limits of current technologies, while using materials and architectures fabricated through inexpensive, scalable chemical methods.

Mathew C. Beard, Ph.D., Senior Scientist, National Renewable Energy Laboratory
Craig Taylor, Ph.D., Professor, Colorado School of Mines
David Jonas, Ph.D., Professor, University of Colorado Boulder
C. Michael Elliott, Ph.D., Professor, Colorado State University

FORUM - Quantum Dots, Nanoscience and the Future of Photovoltaics
David Hiller
Colorado Renewable Energy Collaboratory, Golden, CO, USA

The Built Environment

Real Stories from Real Buildings (Forum) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/17/2012 4:15pm - 5:30pm 1b
FORUM - REAL STORIES FROM REAL BUILDINGS
Troy Peters
Society of Building Science Educators, San Luis Obsipo, CA, USA

Bioclimatic Architecture/Daylighting (Ignite) 1 GBCI General CE Hour, 1.25 AIA-LU/HSW/SD
5/17/2012 4:15pm - 5:30pm 2b
Chair: Bill Beckman

Energy and economic optimization of bioclimatic building in Tlemcen site (North Africa)
Mohammed El Amine Boukli Hacene, Nasr Eddine Chabane Sari
Abou Bekr Belkaid University of Tlemcen, Tlemcen, Algeria

To build with the climate: reflection on the Tools of architectures and construction materials - Case of the town of Tlemcen (North of Africa)
Mohammed El Amine Boukli Hacene, Nasr Eddine Chabane Sari
Abou Bekr Belkaid University of Tlemcen, Tlemcen, Algeria

Elimination of Waste Active and Standby Power for Homes by Using a Low-cost Wireless Electricity Switch
Hamid Abdi
CISR, Geelong, Australia

ColorfulnessReflectivity in Daylit Spaces: How color reflectivity affects experience and performance
Esther Hagenlocher
University of Oregon, Eugene, OR, USA

Energetically independent buildings of the resort-improving and educational-recreational complex in ecological settlement "GENOM"
Dmitriy Strebkov, Olga Shepovalova, Ilya Dunichkin
1National Research University Moscow State University of Civil Engineering (MGSU), Moscow,
Russia, The All-Russian Research Institute for Electrification of Agriculture (GNU VIEWS), Moscow, Russia

Luminances and Vision Related to Daylighting
Alexis Aguilar, Urtza Uriarte, Antoni Isalgue, Helena Coch, Rafael Serra
UPC, Barcelona, Catalonia, Spain

Design Strategy of Energy-efficient Public Buildings in Chill Region of China
Hong Jin, Beichen Zhao
1Harbin Institute of Technology, Harbin, China, 2Lianmeijiahe Thermal Energy Technology Co., Ltd., Harbin, China

Testing And Analysis Of Low Carbon Rural Housing Indoor Thermal Environment In Severe Cold Region Of China
wei ling, hong jin
School of Architecture, Harbin Institute of Technology, Harbin, China

Kenell Touryan, Areg Gharabegian, Artak Hambarian
1American University of Armenia, Yerevan, Armenia, 2Parsons, Pasadena, CA, USA

Sustainable concept in Guizhou traditiona architectural environment
Mao Lin qing, Kang Jian, Jin Hong, Liu Da ping
1School of Architecture in Harbin Institute of Technology, Harbin, No. 66 of Xi Da straight Street, China, 2School of Architecture in University of Sheffield, Sheffield S10 2TN, UK

Energy Generation, Distribution & Transportation

The Future of Renewable Integration Studies (Forum)
5/17/2012 4:15pm - 5:30pm 4d
FORUM - The future of renewable integration studies
Gregory Brinkman
NREL, Golden, CO, USA

Energy Access

Renewable Electricity Futures: Exploration of up to 80% Renewable Penetration in the U.S. (Forum)
5/17/2012 4:15pm - 5:30pm 1e
FORUM - Renewable Electricity Futures: Exploration of up to 80% Renewable Penetration in the United States
Trieu Mai
NREL, Golden, CO, USA

Energy and Gender

Opportunities for Women in U.S. Renewable Industries (Forum)
5/17/2012 4:15pm - 5:30pm 3b
FORUM - The opportunities for women in U.S. renewables and what we’ll need to get them there.
Leslie Baer
Women In Sustainable Energy, Denver, CO, USA
Finance, Policy & Marketing

Grid Integration & Utility (Technical)
5/17/2012 4:15pm - 5:30pm  2a

National Utility Rate Database
Sean Ong, Ryan McKeel
National Renewable Energy Laboratory, Golden, Colorado, USA

Integrating Variable Renewable Energy Sources into the Grid: Lessons from Large Studies
Lori Bird, Michael Milligan
National Renewale Energy Laboratory, Golden, CO, USA

Complementary generation patterns – diversification through portfolio approach aiming towards large-scale wind and solar integration
Valerie Speth1
1Universität St Gallen, St Gallen, Switzerland, 2juwi R&D GmbH Co KG, Wörrstadt, Germany

Examining the Advantages of Extending Department of Buildings Approval to Systems Using IEC-Certified c-Si Modules
Marc Perez1, Vasilis Fthenakis1, Anthony Pereira2
1Columbia University, New York, NY, USA, 2altPOWER, Inc., New York, NY, USA

The Potential Impact of Increased Renewable Energy Penetrations on Electricity Bill Savings from Residential Photovoltaic Systems
Naïm Darghouth, Galen Barbose, Ryan Wiser
Lawrence Berkeley National Laboratory, Berkeley, CA, USA

Standards, Permitting and Codes (Technical)  1 GBCI General CE Hour
5/17/2012 4:15pm - 5:30pm  4e

Benchmarking Non-Hardware Balance of System Costs for PV Systems in the United States Using a Bottom-Up Approach
Kristen Ardani1, Galen Barbose2, Robert Margolis1, David Feldman1, Sean Ong2
1National Renewable Energy Laboratory, Washington DC, USA, 2Lawrence Berkeley National Laboratory, Berkeley, CA, USA

Harmonization of Global Codes and Standards
John Jordon, Robin Kobren
Dunmore Corp., Bristol, PA, USA

Structural Design & Permitting for Solar Rooftop Installations
Stephen Dwyer
Sandia National Laboratory, Albuquerque, NM, USA

5/17/2012 4:15pm - 5:30pm  3a

Robert Westby
NREL, Golden, CO, USA

WREC Forum

WREC-I (Technical)
5/17/2012 4:15pm - 5:30pm  4a  Chair: Prof. Rolf Hanitsch
The ideal city (sustainable): visions
Federico M. Butera
Milan Polytechnic, unknown, Italy

ECBCS Annex 51 - Energy Efficient Communities: Case Studies and Strategic Guidance for Urban Decision makers
Bahram Moshfegh
Linkoping University, Linkoping, Sweden

Thermal Comfort Effectiveness of Chilled Ceiling/ Displacement Ventilation Aided with Personalized Evaporative Cooler in Transient Environments
W. Chakroun, N. Ghaddar
1 American University of Beirut, Beirut, Lebanon; 2 Kuwait University, Safat, Kuwait

An analysis of the benefits and drawbacks of exposed thermal mass in modern, well-insulated buildings
Hareth Pochee, George Dawson, Pete Burgon, Tom Bentham
Max Fordham LLP, London, UK

WREN

WREN: Saudi Arabia (Forum)
5/17/2012 4:15pm - 5:30pm 4b
FORUM - Enabling deployment of renewable energy in the Kingdom of Saudi Arabia.
Maher Alodan
King Abdullah City for Atomic and Renewable Energy, Riyadh, Olaya street, Saudi Arabia

CRES Showcase Colorado

Trends in Clean Energy Policies to Drive a New Energy Economy
5/17/2012 4:15pm - 5:30pm 1a  Chair: Former Governor Bill Ritter

In Colorado, Governor Ritter demonstrated policy can drive investment and market expansion. In the four years Ritter served as Governor, he signed 57 different clean energy bills and saw record investment in the state from the clean energy sector. Vestas established their North American manufacturing headquarters along with other industry leaders like SMA, Siemens, RES Americas, Primestar, Abound and Ascent Solar to name a few. During his term as Governor, he raised the state's RPS from 10% to a nation leading 30% and renewable installations went from 225MW to over 1,800MW.

Speakers to Include:
Bill Ritter, Jr., Former Colorado Governor, now Director of the Center for the New Energy Economy at Colorado State University
Malcolm Woolf, Executive Director, Maryland Energy Administration

Friday, May 18, 2012

SOLD OUT - Tour of the National Renewable Energy Laboratory (NREL), Golden, CO - ticket required (SOLD OUT)
5/18/2012 9:00am - Noon

(Board bus at the Colorado Convention Center at 8:30 a.m., return to the Colorado Convention Center at 12:30 p.m.)
NREL is the U.S. Department of Energy’s (DOE) primary national laboratory for renewable energy and energy efficiency research and development. This tour features NREL’s South Table Mountain research campus. Tour stops will include the ultra-high efficient Research Support Facility, the Science & Technology Facility and Integrated Biorefinery Research Facility.

Transportation will be provided; registration is required by April 27 and space is limited to 40 participants. US citizens must show government-issued photo identification (such as a driver’s license) upon arrival. Foreign nationals (including Canadian citizens, permanent resident aliens and resident aliens) must complete a foreign national data card by April 19 and show their passport and visa upon arrival. Contact Sarah Barba at sarah.barba@nrel.gov for additional registration requirements relating to the foreign national data card. This will be a walking tour so participants are urged to wear comfortable walking shoes and to dress for the weather.

SOLD OUT - Tour of NREL's National Wind Technology Center, Boulder, CO - ticket required  
5/18/2012 2:00pm - 4:00pm

(Board bus at the Colorado Convention Center at 1:30 p.m., return to the Colorado Convention Center at 4:30 p.m.)

WREF attendees have a special opportunity to visit the Department of Energy’s National Wind Technology Center (NWTC) in Boulder, Colorado, on Friday, May 18. The NWTC is part of NREL. It is the nation’s premier wind energy research facility providing technical support critical to the development of advanced wind and water energy systems. Its location provides highly variable wind patterns ideal for testing.

Transportation will be provided; registration is required by April 27 and space is limited to 40 participants. US citizens must show government-issued photo identification (such as a driver’s license) upon arrival. Foreign nationals (including Canadian citizens, permanent resident aliens and resident aliens) must complete a foreign national data card by April 19 and show their passport and visa upon arrival. Contact Sarah Barba at sarah.barba@nrel.gov for additional registration requirements relating to the foreign national data card.