

American Solar Energy Society

SOLAR 2008

Including Proceedings of
37th ASES Annual Conference
33rd National Passive Solar Conference
3rd Renewable Energy Policy and Marketing Conference

“Catch the Clean Energy Wave”

May 3-8, 2008
San Diego, California, USA

Volume 1 of 8

Printed from e-media with permission by:

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

ISBN: 978-1-60560-478-7

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

NOTICE

Neither the American Solar Energy Society, Inc., nor any one of the co-sponsors of SOLAR 2008 makes any warranty, express or implied, or accepts legal liability or responsibility for the accuracy, completeness or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately on rights of others. The contents of articles express the opinion of the authors and are not necessarily endorsed by the American Solar Energy Society or by any of the co-sponsors of SOLAR 2008. The American Solar Energy Society does not necessarily condone the politics, political affiliation and opinions of the authors or their sponsors.

Copyright © 2008 by the American Solar Energy Society, Inc.

All rights reserved. Printed in the United States of America. No part of the publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without permission of the publisher, except in the case of brief quotations embodied in critical articles and review or where prior rights are preserved.

LIBRARY OF CONGRESS CATALOGING IN PUBLICATION DATA

Main entry under title: Solar Energy, ASES 2008, Annual Meeting of the American Solar Energy Society, Annual and Passive Proceedings, 2008

1. Solar Energy Congresses

I. Annual Meeting - American Solar Energy Society

II. Series International Solar Energy Society, American Section, Meeting (2008, SAN DIEGO, CALIFORNIA).

Proceedings of the Annual, Passive and Policy and Marketing Conferences, Cleveland, Ohio

American Solar Energy Society

37th American Solar Energy Society Annual Conference
2008

TABLE OF CONTENTS

Volume 1

Architectural Active Solar Energy Reflector Collector Studies	1
<i>J. Goodman</i>	
Experimental Analysis of Personalized Partition Air Sterilization System.....	11
<i>K. Jeong, S. Choi</i>	
A Four Years Performance Study of the 5 kWp Photovoltaic Systems Connected to the Utility Grid of Thailand.....	18
<i>N. Watjanatepin, C. Boonmee</i>	
Decadal Differences in Satellite Derived Solar and Meteorological Parameters	48
<i>W. Chandler</i>	
Computer Simulation of Current Density for pn Silicon Solar Cell with Depletion Layer Forward Voltage Dependence.....	70
<i>F. EL Fitri</i>	
The Field Operation of a Thermally Driven Liquid-Desiccant Air Conditioner	90
<i>J. Miller, A. Lowenstein</i>	
Protecting Solar Water Heating Systems from Freezing, Stagnation & Scalding: Interim Experience from San Diego's Solar Water Heating Pilot Program	117
<i>S. Fralick</i>	
Grounding and Bonding of Large Roof-Mounted Photovoltaic Systems	140
<i>J. Mead</i>	
Improved Electrical Load Match in California by Combining Solar Thermal Power Plants with Wind Farms.....	167
<i>B. Vick, R. Clark</i>	
Satellite Based Assessment of the NSRDB Site Irradiances and Time Series from NASA and SUNY/Albany Algorithms	190
<i>P. Stackhouse</i>	
Towards Reaching Consensus in the Determination of Photovoltaics Capacity Credit.....	224
<i>R. Perez</i>	
Solar Concentrator Options for a Thermochemical Hydrogen Production Process	266
<i>R. Taylor, R. Davenport</i>	
Carousel Trackers with 1-Sun or 3-Sun Modules for Commercial Building Rooftops	294
<i>L. Fraas</i>	
Validation of the Load Collector Ratio (LCR) Method and Solar Load Ratio (SLR) Method for Predicting the Thermal Performance from Five Passive Solar Test Rooms Using Measured Data	319
<i>D. Overbey</i>	
Using Satellite Images to Predict Solar Irradiance for Sub-Tropical South China	373
<i>Z. He, E. Ng</i>	
Real World Testing of Medium Temperature Solar Thermal Collectors.....	399
<i>B. Raichle</i>	

Self-Pressurized, Thermally-Protected Closed Loop Solar Hot Water System	428
<i>Barry L. Butler, Brett L. Butler</i>	
Solar Water Heating Field Monitoring	449
<i>W. Bennett</i>	
A New Family of Solar Metal Sulfate - Ammonia Based Thermochemical Water Splitting Cycles for H₂ Production	463
<i>C. Huang</i>	
Operational Results of Russian-Built Photovoltaic Alternative Energy Powered Lighthouses in Extreme Climates	492
<i>L. Estrada, A. Rosenthal, R. Foster, A. Grigoriev, A. Khoudykin, G. Huaser</i>	
Discharge Experiments in an Initially Stratified Vertical Storage Tank with an Immersed Baffled Heat Exchanger	502
<i>J. Haltiwanger, J. Davidson</i>	
Development of a Novel Small Scale Adsorption Cooling System	521
<i>Y. Gupta, P. Phelan</i>	
Renewable Energy Standards and the Story Behind the Project Delivery and Performance of a One Megawatt PV Array at the Denver Federal Center	556
<i>D. Porter</i>	
Economic Evaluation of Photovoltaic Pumping Systems with V Type Concentrators in Productive Horticultural Chains	582
<i>J. Melo Filho</i>	
Renewable Energy Planning: Multiparametric Cost Optimization	589
<i>A. Walker</i>	
Performance of PV Inverters	628
<i>F. Vignola</i>	
Performance Characteristics of Evacuated Tube Heat Pipe Solar Collectors	651
<i>D. Goodman</i>	
New Optical Modeling and Material Degradation Results in the Long Term Study of a Novel ICPC Solar Collector Installation	682
<i>W. Duff, J. Daosukho</i>	

Volume 2

An Evolutionary Path for Concentrating Thermal Solar Power Technologies: A New Approach for Modeling CSP Power Costs and Potential	714
<i>Y. Zhang</i>	
Versatile Two-Axis Open-Loop Solar Tracker Controller	741
<i>C. Ward</i>	
Preliminary Modeling, Testing and Analysis of a Gas Tankless Water Heater	752
<i>J. Burch</i>	
Passive Cooling with Night Sky Radiation and Heating with Selective Surface Absorbers ...	796
<i>S. Baer</i>	
A Solar Powered Hydrogen Generation and Filling Station	813
<i>M. Campbell</i>	
Scale Formation on Polypropylene and Copper Tubes During Open-Loop Exposure to Mildly Supersaturated Potable Water	819
<i>Z. Wu</i>	
Comprehensive Modeling on the Integral Collection Storage Unit Demonstrated in a Zero Energy House	827
<i>D. Correia</i>	

Kinetics of the Decomposition of Cu_2OCl_2 (Melanothallite): The High Temperature Step in the Copper Chloride Thermochemical Water Splitting Cycle	836
<i>R. Rennels</i>	
Modeling a High Concentration Photovoltaic System	859
<i>A. Sahm</i>	
Chhaya 2.0 - Using a Dynamic Balance Point to Extend the Passive Season	868
<i>V. Sami</i>	
Should Electric Storage Water Heaters be the Preferred Backup for Solar Water Heating Systems in Zero Energy Homes?	896
<i>E. Lee</i>	
A Low-Cost Power Meter For Solar Hot Water Systems	922
<i>B. Butler</i>	
Performance Assessment of 2 MW of Photovoltaic Projects Operating in the City and County of San Francisco	942
<i>L. Mitchell</i>	
Solar Water Distillation by a Simple and Low-Cost Humidification-Dehumidification Method	968
<i>N. Mitten, H. Ingley</i>	
Solar Electric and Human Pedal Powered Zero Emission Vehicle	999
<i>D. Robinson</i>	
Development of an Updated Typical Meteorological Year Data Set for the United States	1026
<i>S. Wilcox, W. Marion</i>	
Modeling Photovoltaic and Concentrating Solar Power Trough Performance, Cost and Financing with Solar Advisor Model	1051
<i>N. Blair</i>	
Cal Poly Sustainable Power for Electrical Resources (SuPER) Project	1077
<i>J. Harris, A. Shaban</i>	
Establishing a Consistent Calibration Record for Eppley PSPs	1116
<i>L. Riihimaki, F. Vignola</i>	
Microoptical Film for Low Cost Solar Concentrators	1138
<i>N. Walker</i>	
Solar Powered Personal Rapid Transit (PRT): Electric Vehicles without Batteries or Congestion	1180
<i>R. Baertsch</i>	
A Western Hemisphere Solar Data Set for Rapid Resource Assessment	1202
<i>B. Walter, B. Nijssen</i>	
Solar Water Desalination System for Coastal Villages	1235
<i>J. Goswami, H. Ingley</i>	
Performance Improvement of a CO_2 Combined Cooling, Heating, and Power Cycle Using Solar Thermal Collectors	1240
<i>G. Diaz</i>	
Numerical Investigation of Influences of an Aerowindow on the Performance of Solid Particle Receivers	1257
<i>T. Tan</i>	
Estimating the Solar Access of Typical Residential Rooftops: A Case Study in San Jose, CA	1271
<i>R. Levinson</i>	
Spatial and Temporal Interactions of Solar and Wind Resources in the Next Generation Utility	1321
<i>B. Palmintier, L. Hansen</i>	

California Self-Generation Incentive Program - Measured 2006 PV Performance	1355
<i>G. Simons</i>	
A Lightweight Concentrating Solar Dish Design Utilizing a Stretched Membrane Reflector	1383
<i>D. Simmers</i>	

Volume 3

Passive Cooling of Building Integrated Photovoltaics	1426
<i>G. Mittelman</i>	
From Global Horizontal to Global Tilted Irradiance: How Accurate are Solar Energy Engineering Predictions in Practice?	1434
<i>C. Gueymard</i>	
Mendocino Wine Company - Leading Green Winery	1457
<i>Tom Thornhill</i>	
Sierra Nevada Brewery	1485
<i>Cheri Chastain</i>	
The Greening of a Law Firm	1507
<i>Bruce Lyburn</i>	
Solar Workforce Development: Jobs & Training Trends	1528
<i>Jane Weissman</i>	
Environmental and Sustainable Energy Workforce Development Opportunities	1556
<i>Todd Trammell</i>	
Federal Support of Solar Workforce Development - Solar America Initiative	1575
<i>Katie Bolcar</i>	
Skytherm Project	1594
<i>Harold Hay</i>	
Large Scale Passive & Low Energy Buildings	1613
<i>Bruce Haglund</i>	
The Foundation Comes Before the Wall and the Watchtowers: Passive First	1628
<i>Marc Schiler</i>	
Empowerment for the 21st Century - Busting the Barriers	1703
<i>Irene M. Stillings</i>	
How I Got "Here"	1720
<i>Elaine Hebert</i>	
Unlocking Solar Incentive Program Data with Fleet-Wide Analysis, Simulation and Reporting	1758
<i>Jeff Ressler</i>	
The Wealth of Networks	1767
<i>Scott Cronk</i>	
The Many Faces of DSIRE	1782
<i>Susan Gouchoe</i>	
Solar Mapping	1801
<i>Steph Stoppenhagen</i>	
State Solar Policy	1821
<i>Adam Browning</i>	
Profile of a Local Solar Incentive Program	1835
<i>David Hochschild</i>	

Green Jobs, Federal ITC, and the Importance of Long-Term Policies	1845
<i>David Kopans</i>	
State Solar Policy	1860
<i>David Felix</i>	
Attracting Solar Home Buyers	1868
<i>Claudia Chandler</i>	
Growing the Small Wind Workforce for Today's Economy	1908
<i>Megan Amsler</i>	
Cape Cod Community College Small Wind Technology Certificate Program	1917
<i>Richard Lawrence</i>	
Small Wind Training at Appalachian State	1955
<i>Brent Summerville</i>	
Wind Power Education & Training at Lakeshore Technical College (LTC)	1978
<i>Jenny Heinzen</i>	
Renewable Electricity 24/7 – Exploring Solar and Other Renewable Sources of Electricity Production	1991
<i>John Reynolds</i>	
Development and Utilization of Geothermal Resources	1998
<i>John W. Lund</i>	
Thermal Storage Strategies for Concentrating Solar Power Plants: Assessment from a Developer's Point of View	2053
<i>Rainer Aringhoff</i>	
Wave Energy Opportunities and Developments	2068
<i>David Eveland</i>	
Solar Water Heating - Installation Issues	2111
<i>Alison Mason, Mark Thornbloom</i>	
Solar Thermal Hardware Certification	2119
<i>Les Nelson</i>	

Volume 4

Photovoltaic Testing and Certification at Arizona State University Photovoltaic Testing Laboratory	2130
<i>G. Tamizh-Mani</i>	
Small Wind Turbine Certification	2144
<i>Larry Sherwood</i>	
Testing Small Wind Turbines at the NREL's National Wind Technology Center	2156
<i>Karin Sinclair</i>	
Credentialing Programs for Practitioners & Training	2170
<i>Jane Weissman</i>	
Xcel Energy Solar Strategy	2192
<i>Frank Prager</i>	
Concentrating Solar Power Forum Concentrating Photovoltaics	2204
<i>Sarah Kurtz</i>	
CSP Project Development and Policies	2215
<i>Dr. David W. Kearney Dr. Fred Morse</i>	
CSP Overview	2228
<i>Thomas Mancini</i>	

City of Santa Monica’s Community Energy Independence Initiative	2240
<i>Susan Munves</i>	
San Francisco's Environmental Program	2273
<i>Cal Broomhead</i>	
SolarCity	2288
<i>Brady Radovich</i>	
Lighting the Atrium: A Case Study of Electric Lighting	2296
<i>Emily Hoyt & Taylor Mikosz</i>	
Instrumentation and Visualization: A Comparative Assessment of Thermal, Luminous, and User-Interface Performance	2310
<i>Rhonda Lowe, Lindsey Frizzell</i>	
Monterey Building Energy Audit	2343
<i>Michael Bejrowski & Nicholas Arnold</i>	
Why Is It So COLD In Here?	2369
<i>Britni Jessup</i>	
Solar Rights and Solar Access Laws: An Overview	2383
<i>Colleen Kettles</i>	
California’s Solar Access Laws	2402
<i>Scott Anders</i>	
Federal Solar Access	2429
<i>Scott Hennessy</i>	
Solar Thermal Solutions In Natural Gas Efficiency Programs	2438
<i>Tina Halfpenny</i>	
Solar Thermal = Electricity = Natural Gas	2457
<i>Les Nelson</i>	
San Diego Solar Water Heating Pilot Program	2466
<i>Andrew McAllister</i>	
Solar Water Heating in California	2490
<i>Nick Chaset</i>	
Discovering the Distribution Capacity Value of Solar	2501
<i>Joe Bourg</i>	
Utility-Scale Solar Adoption in Florida	2511
<i>Jeff Curry</i>	
Distribution Capacity Value of PV	2519
<i>Richard Perez</i>	
Discovering the Distribution-Capacity Value of Solar - A Distribution Engineer’s Perspective	2567
<i>Joe Frani</i>	
Re-Energizing Community College Technical Education Programs	2582
<i>Greg Newhouse</i>	
The Photovoltaic Installer Instructional Program	2593
<i>Brian Hurd</i>	
Energy Training for Recognized Industry Certifications	2644
<i>Tom Chatagnier</i>	
Good Jobs in the Green Economy	2654
<i>Carla Din</i>	
Butte College: A National Leader in Sustainability in Community Colleges	2673
<i>Michael Miller</i>	

Alameda County’s Hits LEED Gold at its Juvenile Justice Center	2700
<i>Matt Muniz</i>	
Living Roofs	2726
<i>Brian L. Swanson</i>	
Ohlone College Newark Center for Health Sciences and Technology Project	2735
<i>Narinder Bansal</i>	
EcoArts: Science/Arts/Sustainability	2768
<i>Marda Kirn</i>	
Activating Solar Communities	2814
<i>Gwen Rose</i>	

Volume 5

The Emerging Smart Grid - Update, Challenges, and Opportunities	2838
<i>Scott Anders</i>	
Xcel Energy’s Smart Grid	2859
<i>Dan James</i>	
The Bright Promise of Thin-Film Photovoltaics	2870
<i>Peggy Hock</i>	
Scalable, Low-Cost, High Efficiency CIGS Manufacturing	2889
<i>BJ Stanbery</i>	
Unique Applications Incorporating Flexible Thin Film	2904
<i>Arthur Rudin</i>	
The Benefits of 5.7m2	2928
<i>Teresa Trowbridge</i>	
Why LEED for Homes is the Way It Is (Especially With Respect to Solar)	2949
<i>Ann Edminster</i>	
EE + Passive Solar + PVT Solar (PV w/ Solar Thermal Integrated)	2966
<i>Bruce Baccei</i>	
Solar Design Solutions in LEED®	2996
<i>Bion D. Howard</i>	
Making Installations Easier - Zoning for Small Wind Turbines	3019
<i>Jim Green</i>	
PRB-1 - A National Zoning Preemption for Amateur Radio Operators	3030
<i>Thomas Diskin</i>	
Permitting Small Wind in Massachusetts	3043
<i>Megan Amsler</i>	
Orienting the Neighborhood: Let the Sun Shine In	3058
<i>Craig Christensen</i>	
Chula Vista Research Project (CVRP)	3092
<i>Doug Newman</i>	
Solar Energy Enters into UN Climate Change Negotiations	3116
<i>Ron Swenson</i>	
Renewable Energy and the UNFCC	3125
<i>Chuck Kutscher</i>	
Payment for Ecosystem Services (PES): A Multilateral Policy Framework for Climate Change Adaptation and Mitigation	3140
<i>Allan Baer</i>	

An Immediate, Off-the-Shelf Solution to Energy and Climate	3152
<i>Ken Zweibel</i>	
Converting Transportation Networks into Solar Collectors	3169
<i>Bill James</i>	
State Solar Policy Initiatives: Recent Development & Lessons Learned	3183
<i>Mark Sinclair</i>	
Solar Energy – Transforming the New York State Power Market	3195
<i>Vicki Colello</i>	
Renewables Portfolio Standards: An Opportunity for Expanding State Solar Markets	3210
<i>Ryan Wiser</i>	
An Update on the Status of Renewable Energy Forecasting	3232
<i>Bart Nijssen</i>	
Operational Renewable Energy Forecasting	3236
<i>Eric Gritmit</i>	
Solar Resource Forecasting	3259
<i>David Renné</i>	
Solar Forecast Evaluation in the IEA Task 36	3265
<i>Richard Perez</i>	
Ground Truth Verification of Resource Forecasts	3290
<i>James Bing</i>	
Climate Change: Ethics, Politics and Energy Behavior Forum	3309
<i>Rev. Robert Walker, Andrea Cook, Lesley McAllister, Barry Butler, Barbara Farhar</i>	
Eden’s Covenant: A Judeo-Christian Environmental Ethic	3322
<i>Robert H. Walker</i>	
Changing Public Opinion on Climate Change	3345
<i>Andrea Cook</i>	
Climate Change & Human Rights	3362
<i>Lesley K. McAllister</i>	
Your Life, Your Planet, Your Choice	3379
<i>Barry Butler</i>	
Renewable Energy - for the World	3398
<i>Ambassador Reno Harnish</i>	
The MASDAR Initiative	3444
<i>Bradley D. Collins</i>	
Regional Production of Mustard Oil for Biofuel	3462
<i>Ken Kimes</i>	
Financial Solutions and Opportunities	3479
<i>John Whisman</i>	
Food Without Pollution	3492
<i>Steve Heckerth</i>	
U.S. Photovoltaic Markets: PV Policies Leading the Way	3512
<i>Susan Gouchoe</i>	

Volume 6

U.S. Photovoltaic Markets – Risks and Opportunities to 2012	3541
<i>Travis Bradford</i>	

State PV Markets Follow Policy	3578
<i>Larry Sherwood</i>	
Overview of Energy Efficiency and Solar in Schools	3592
<i>Natalie Osborne</i>	
San Diego City Schools Solar Story	3604
<i>J. William Naish</i>	
Bringing Solar into the Classroom – Teacher Training Tools	3628
<i>Barry Scott</i>	
Advancing Renewable Tariffs - The Wisconsin Experience	3667
<i>Michael Vickerman</i>	
Building Clean Energy Businesses in New York	3684
<i>V. Colello</i>	
Is PAYS® the Answer to Financing Solar Water Heating Systems?	3699
<i>W. Bollmeier</i>	
Florida’s Alternative Energy Banner Center for Solar Energy Education and Training	3717
<i>D. Block, S. Schleith</i>	
Solar Energy Education with Service-Learning: Case Study of a Freshman Engineering Course	3737
<i>U. Bhattacharjee</i>	
San Diego Smart Energy 2020 – 50% Greenhouse Gas Reduction by 2020	3769
<i>B. Powers</i>	
Assessing the Strategic Value of Solar Water Heating to Electric Utilities	3775
<i>J. Bourg</i>	
Alternative Energy Engineering Technology: The First Graduates	3795
<i>R. Welch</i>	
Analysis of Duke Energy's "Save-a-Watt" Proposal for Utility Energy Efficiency	3800
<i>R. Day, I. Urlaub</i>	
Options for Selling Solar Distributed Generation to an Interconnected Utility in California	3805
<i>K. Fox</i>	
Solar San Diego - The Impact of Binomial Rate Structures on Real PV-Systems	3819
<i>O. Van Geet, E. Brown</i>	
Kindling a Market Transformation for Energy Efficiency + Solar	3845
<i>B. Baccei, R. Hammon</i>	
Building the Solar Array at California State University, Fresno	3869
<i>F. Nader</i>	
The Development of Interconnection Standards in Six States in 2007-2008	3874
<i>J. Keyes</i>	
"Grid Parity" is a Red Herring	3889
<i>A. Black</i>	
A Certification Model for Solar Salespeople	3910
<i>A. Black</i>	
Solar Market Transition in New Jersey: Promise and Progress Toward Sustained Growth	3923
<i>D. Hill, L. Barth</i>	
Combined Solar PV and Earth Space Monitoring Technology for Educational and Research Purposes	3958
<i>I. Tyukhov</i>	

Using Digital Media to Visualize and Teach Renewable Energy Systems	3982
<i>C. Atchison</i>	
Barriers and Breakthroughs for Multi-Tenant Developments	4026
<i>C. Carmichael</i>	
PV Workforce Development and the Market for Customer-Sited PV	4062
<i>M. McRae</i>	
PV Energy: Cost vs. Price in the Marketplace	4098
<i>J. Bing</i>	
Solar Teaching Facility Developed to Train for NABCEP Certification	4124
<i>D. Thayer</i>	
The Future Grid-Tied PV Business Models: What Will Happen When PV Penetration on the Distribution Grid is Significant?	4154
<i>S. Graham</i>	
The Youth Energy Solutions (YES) Summit	4176
<i>S. Schleith, P. Hall</i>	
Indoor Temperature Predictions in a Passive Solar Building in an Arid Environment	4198
<i>B. Givoni</i>	
A Software Tool for Climate Analysis, CLIMA	4229
<i>L. Rodriguez</i>	

Volume 7

Innovative Household Solar System Produces a Positive Net Energy Cost	4237
<i>S. Dent</i>	
The Effect of the Optical Properties of Roofs and Walls on the Thermal and Energy Performance of Residential Buildings	4266
<i>A. Fanchiotti</i>	
Cruise Control: Thermal Comfort in Commerical Office Space	4291
<i>K. Jeans</i>	
Performance Prediction of Different Glazing Systems and Impact on Human Thermal Comfort - Analysis of Two Climatic Zones in the Indian Subcontinent	4313
<i>R. Jha</i>	
Effects of Window Size in Daylighting and Energy Performance in Buildings	4345
<i>J. Melendo</i>	
An Exploration of Glazing Systems for Low Cost, High Performance Housing in Tijuana, Mexico	4375
<i>A. Jeerage</i>	
The Potential Application of Natural Fiber Reinforced Bio-Polymer (NFRBP) Composites in Architecture	4403
<i>J. Cleveland</i>	
Glass Dominated Buildings in Hot and Arid Climate: An Energy Analysis Model of a 'Climatologically Sealed' Building in Tucson, Arizona	4465
<i>A. Chatterjee</i>	
EMS-Post-Occupancy Monitoring and Building Energy Performance Certificate Implementation for the USC-School of Architecture	4474
<i>T. Spiegelhalter</i>	
Creating a Sustainable Infrastructure and Zero-Fossil-Energy-Operated Buildings for Catalina Island in Southern California	4481
<i>T. Spiegelhalter</i>	

Design and Thermal Performance of a Solar House with BIPV/T System, Thermal Storage and Passive Solar Heating	4506
<i>Y. Chen</i>	
The P.R.I.M.E. Evaluation System: A Student Developed Eco Analysis Tool	4539
<i>J. Epp</i>	
Development of a Multiple Film Based Daylight Control System	4576
<i>V. Garg</i>	
Roddy / Bale Green Roof Study	4602
<i>A. Kwok</i>	
Caught on the Rise: A Study of the Economic & Energy Waste Created by Escalators	4609
<i>S. Oaks</i>	
Posturbanism: An Empirical Analysis of Urban Multi-Nodal Model for Northeast Ohio	4614
<i>A. Sharag-Eldin</i>	
Validated Evaluation on Building Energy Conservation Features in a Zero Energy House	4620
<i>L. Zhu</i>	
Ruffled Pages	4644
<i>S. Landry</i>	
Real Energy Saving Performance of Thermal Mass Walls Demonstrated in a Zero Energy House	4668
<i>L. Zhu</i>	
Demand Side Management for Metal Buildings	4693
<i>P. Hartman</i>	
Learning from the Solar Decathlon: High Performance Building Design, Operation and Evaluation	4720
<i>R. Peña</i>	
This Is Not a Toy	4783
<i>E. Meier</i>	
A Post-Occupancy of Occupancy at IslandWood	4836
<i>A. Kwok</i>	
Retrofitting a University Building: Apply Two Building Energy Performance Analysis Tools to Assist Sustainable Implementation Strategies for Watt Hall	4844
<i>S. Lin</i>	
Laboratories 2030: Implications of the 2030 Challenge for the Research Building Sector	4860
<i>J. Nicolow, V. Sami</i>	
The Blue Ridge Parkway Visitor Centre: Correlating Building Simulation with Measured Performance in Passive Solar Design	4897
<i>V. Sami</i>	

Volume 8

A Comparison of Computational Fluid Dynamic Simulations and Actual Performance of a Classroom Achieving 100% Cooling Through Night Ventilation of Mass	4932
<i>G. Brown</i>	
Beth David Synagogue, a High Performance Public Green Building In San Luis Obispo, California	4963
<i>K. Haggard</i>	

The City of San Diego's Sustainable Building Expedite Program	4998
<i>S. Whitley</i>	
Searching for the Optimal Mix of Solar and Efficiency in Zero Net Energy Buildings	5016
<i>S. Horowitz</i>	
Demand Side Management Programs and Renewable Energy Generation to Avert the Installation of New Coal-Fired Power Plants	5045
<i>A. Fernandez-Gonzalez</i>	
Rapid Contour Crafting to Create More Sustainable Housing	5051
<i>L. Haymond, D. Noble</i>	
Greenfoot: A Tool For Estimating the Carbon and Ecological Footprints of Buildings	5058
<i>V. Olgay</i>	
The Carriage House: Evaluating Renewable Resource Integration for Net Zero Residential Energy and Water in a Cold Climate	5063
<i>M. Yoklic</i>	
Building America Homes: A Blueprint for the 2030 Challenge	5092
<i>A. Neugebauer, R. Kerr</i>	
An Introduction of Possible Composite Structures of a Building Envelope for the Climate of New Delhi, India, Based on Optimum U-Value Derivations	5104
<i>N. Bhowal</i>	
North v. South: The Impact of Orientation in Daylighting School Classrooms	5116
<i>J. Theodorson</i>	
Feedback Systems in High Efficiency Solar Homes: Fostering Energy-Efficient Occupants	5122
<i>R. Kerr</i>	
Evaluating Total Daylight Window Energy Performance Early in the Design Process and the Visualization of the Resultant Luminous Environment	5143
<i>B. Futrell</i>	
Heating and Cooling Performance of a Roofpond-Direct Gain Test Cell	5176
<i>A. Fernandez-Gonzalez, D. Overbey</i>	
Aesthetic Implications at the 2007 Solar Decathlon	5182
<i>D. Douglass, M. Schiler</i>	
Climatic Alignment of Architectural Design Strategies Through an Analysis of Native Plants in Southern California	5210
<i>A. Lee, T. Spiegelhalter</i>	
The Process of Defining a Sustainable Aesthetic	5250
<i>D. Douglass, M. Schiler</i>	
The Influence of Landscaping Materials on Urban Heat Islands	5291
<i>M. Tural</i>	
Implementing the 2010 Imperative in a Beginning Architectural Design Studio	5309
<i>T. Peters</i>	
Passive Solar: Thermal Comfort Through Shade and Thermal Mass	5341
<i>C. Gavina</i>	
Campus Sustainability Vision and Plan	5354
<i>J. Stuart</i>	
Passive Solar Architecture for Non-Architectural Masters Students	5386
<i>R. Berkowitz</i>	

Using ENVI-MET Simulation as a Tool to Optimize Downtown Phoenix’s Urban Form for Pedestrian Comfort	5398
<i>A. Rosheidat</i>	
A Comparison of LEED and Green Globes Using Dual Certified Buildings	5433
<i>H. Bryan</i>	
Equilibrium™ - Demonstrating a Vision for Sustainable Housing in Canada	5455
<i>T. Green</i>	
Performance Evaluation of Double Skin Façade for Office Building	5508
<i>R. Sonal, M. Herman</i>	
Getting to Carbon Neutrality in Buildings	5536
<i>H. Bryan</i>	
Impacts of Array Configuration on Land Use Requirements for Large-Scale Photovoltaic Deployment in The United States	5570
<i>P. Denholm, R. Margolis</i>	
A Method for Analysis of Lighting Environments Using High Dynamic Range Imaging	5574
<i>S. Bhave</i>	
Daylight (re)Visualizations for Spatial (re)Configurations: Tracking Illuminance Levels in the Life of an Early 20th Century Residential Apartment	5601
<i>G. Thomson</i>	
An Indo-American Venture: Building an Energy Efficient House in Kerala, India with the Center of Science and Technology for Rural Development (COSTFORD) Using Indigenous Knowledge and Appropriate Technology, Part I	5623
<i>M. Kindred</i>	

Author Index