



Table of Contents

Impact of Different Daylighting Simulation Results on the Prediction of Total Energy Consumption	1
<i>Ana Paula, Melo; Roberto, Lamberts</i>	
Solar Heat Surplus and Solar Heat Scarcity: The Inclusion of Solar Heat Gain in a Dynamic and Holistic Daylight Analysis	8
<i>Siân, Kleindienst; Marilyne, Andersen</i>	
Real-Time Monitoring of Building Energy Behavior: A Conceptual Framework	24
<i>Alexandre, Nassiopoulos; Frédéric, Bourquin</i>	
Validation of a Low-Energy Whole Building Simulation Model	32
<i>Graziano, Salvalai; Jens, Pfaffert; Dirk, Jacob</i>	
Development of a Calibration Methodology for the Energy Simulation of an Existing Building from 1969	40
<i>Tobias, Leibing; Claudius, Reiser; Oliver, Baumann</i>	
Energy Modeling at Each Design Phase: Strategies to Minimize Design Energy Use	48
<i>Kendra, Tupper; Caroline, Fluhrer</i>	
Analysis of Procedures and Workflow for Conducting Energy Analysis Using Autodesk Revit, gbXML, and Trace700	56
<i>Shariq, Ali</i>	
Modeling Protocol for Early Energy Design Assistance	64
<i>Chris, Baker; Prasad, Vaidya; Alan, D'Souza</i>	
Enumerating a Diverse Set of Building Designs Using Discrete Optimization	77
<i>Elaine T., Hale; Nicholas L., Long</i>	
Using DOE Commercial Reference Buildings for Simulation Studies	85
<i>Kristin, Field; Michael, Deru; Daniel, Studer</i>	
A Building Simulation Sustainability Analysis to Assess Dwellings in a New Cairo Development	94
<i>Wael, Sheta; Steve, Sharples</i>	
The Coupling of ESP-r and GenOpt: A Simple Case Study	102
<i>Leen, Peeters; Michael, Wetter; Alex, Ferguson; William, D'haeseleer</i>	
Multi-Objective Facade Optimization for Daylighting Design Using a Genetic Algorithm	110
<i>Jaime M. L., Gagne; Marilyne, Andersen</i>	
Optimizing Building Energy Simulation Models in the Face of Uncertainty	118
<i>Dirk, Jacob; Sebastian, Burhenne; Anthony R., Florita; Gregor P., Henze</i>	
VisualEPlus: A Chinese Interactive Graphical User Interface (GUI) for EnergyPlus	126
<i>Yiqun, Pan; Qiqiang, Li; Hui, Zhou; Zhizhong, Huang; Zongjian, He; Joe, Huang</i>	
Reconciling Differences in Residential DX Cooling Models in DOE-2 and EnergyPlus	134
<i>Nathanael, Kruijs</i>	
EnergyPlus vs DOE-2: The Effect of Ground Coupling on Heating-Cooling Energy of a Slab-On-Grade House	142
<i>Simge, Andolsun; Charles H., Culp; Jeff, Haberl</i>	
Space Load and System Load Comparison Using Energy Modeling Software	150
<i>Cassie, Waddell; Shruti, Kasrekar</i>	

Experimental and Numerical Comparison of Heat Transfer in a Naturally Ventilated Roof Cavity	160
<i>Adrien, Brun; Etienne, Wurtz; Daniel, Quenard</i>	
Beyond Arrows: CFD Modeling of a New, Naturally Ventilated Double-Skin Facade Configuration in a Chicago High Rise Office Building	170
<i>Mona, Azarbayjani; Jim, Anderson</i>	
A Comparison of Window Modeling Methods in EnergyPlus 4.0	177
<i>Peter, Lyons; Justin, Wong; Mahabir, Bhandari</i>	
A New Model for Calculating the Convective and Radiant Impact of Radiators and Baseboards in EnergyPlus	185
<i>Daeho, Kang; Richard K., Strand</i>	
Dynamic Modeling of Mechanical Draft Counter-Flow Wet Cooling Tower with Modelica	193
<i>Xiao, Li; Yaoyu, Li; John E., Seem</i>	
Modeling of the Single Coil, Twin Fan Air-Conditioning System in EnergyPlus	201
<i>Clayton, Miller; Chandra, Sekhar</i>	
Towards the Application of Distributed Simulation in Whole Building Heat, Air and Moisture Performance Engineering	207
<i>M., Mirsadeghi; D., Cóstola; B., Blocken; J. L. M., Hensen</i>	
Heat Flow Modeling of HVAC Systems for Fault Detection and Diagnosis	215
<i>Gerhard, Zimmermann; Yan, Lu; George, Lo</i>	
Thermodynamics of the Microclimate: Effects of External Elements on Internal Heat Gains	223
<i>Anupam, Jain; Aran, Osborne</i>	
Optimizing the Effect of Vegetation for Pedestrian Thermal Comfort and Urban Heat Island Mitigation in a Hot Arid Urban Environment	230
<i>Akram, Rosheidat; Harvey, Bryan</i>	
Quantification of Available Solar Irradiation on Rooftops Using Orthograph and LiDAR Data	238
<i>Chanikarn, Yimprayoon; Mojtaba, Navvab</i>	
Thermal Behavior of Urban Canyons Using Numerical Modeling, CFD Simulation and GIS Mapping	244
<i>Rafael Silva, Brandão; Marcia Peinado, Alucci</i>	
Customizing the Behavior of Interacting Occupants Using Personas	252
<i>Rhys, Goldstein; Alex, Tessier; Azam, Khan</i>	
Window Opening Behavior in a Naturally Ventilated School	260
<i>Spencer, Dutton; Li, Shao</i>	
Agent-Based Modeling and Simulation of Individual Building Occupants	269
<i>Gerhard, Zimmermann</i>	
Going Beyond a RESNET Certification for Code-Compliant Simulations: A Comparison of Detailed Results of Three RESNET-Certified, Code-Compliant Residential Simulation Programs	277
<i>Zi, Liu Hyojin, Kim Mini, Malhotra Jaya, Mukhopadhyay Juan-Carlos, Baltazar</i>	
<i>Jeff, Haberl Charles, Culp Bahman, Yazdani Cynthia, Montgomery</i>	
Simulating Building Energy Performance of Single-Family Detached Residences Designed for Off-Grid, Off-Pipe Operation	285
<i>Mini, Malhotra; Jeff, Haberl</i>	

What Does It Take for the Residential Building Sector to Reach Net-Zero Energy?	293
<i>Kevin, Otto; Russell, Taylor; Rohini, Brahme; William, Sisson</i>	
On the Use of Integrated Daylighting and Energy Simulations to Drive the Design of a Large Net-Zero Energy Office Building	301
<i>Rob, Guglielmetti; Shanti, Pless; Paul A., Torcellini</i>	
Integrating Advanced Daylight Analysis into Building Energy Analysis	310
<i>John, An; Sam, Mason</i>	
Animated Building Performance Simulation (ABPS): Linking Rhinoceros/Grasshopper with Radiance/Daysim	321
<i>Kera, Lagios; Jeff, Niemasz; Christoph F., Reinhart</i>	
Tool for Generating Realistic Residential Hot Water Event Schedules	328
<i>Robert, Hendron; Jay, Burch; Greg, Barker</i>	
Implementation of a Model for a Wind Turbine System in EnergyPlus	336
<i>Daeho, Kang; Richard K., Strand</i>	
Integrating Solar Thermal and Photovoltaic Systems in Whole Building Energy Simulation	344
<i>Soolyeon, Cho; Jeff S., Haberl</i>	
Energy Efficiency Code in Brazil: Experiences in the First Public Building Labeled in Brasilia	352
<i>Cláudia Naves David, Amorim Milena Sampaio, Cintra Caio Frederico, e Silva Júlia, Teixeira Fernandes Larissa Olivier, Sudbrack</i>	
Modeling Energy Demand for Heating at a City Scale	358
<i>Aneta, Strzalka; Ursula, Eicker; Volker, Coors; Jürgen, Schumacher</i>	
Estimating Material Usage of Road Infrastructure in US Cities	365
<i>David, Quinn; John E., Fernández</i>	
Proactive Energy Management for Next-Generation Building Systems	377
<i>Victor M., Zavala Jianhui, Wang Sven, Leyffer Emil M., Constantinescu Mihai, Anitescu Guenter, Conzelmann</i>	
Dynamic Modeling and Consistent Initialization of System of Differential-Algebraic Equations for Centrifugal Chillers	386
<i>Pengfei, Li; Yaoyu, Li; John E., Seem</i>	
Comparison of Building Load Performance Between First Principle Based Shading Algorithm and Implementable Shading Control Algorithm	394
<i>Rui, Zhang; Khee Poh, Lam</i>	
Dynamic Radiance: Predicting Annual Daylighting with Variable Fenestration Optics Using BSDFs	402
<i>Mudit, Saxena; Greg, Ward; Timothy, Perry; Lisa, Heschong; Randall, Higa</i>	
The Daylighting Dashboard - A Simulation-Based Analysis for Daylit Spaces	410
<i>Christoph F., Reinhart; Jan, Wienold</i>	
Uncertainty Analysis in Building Simulation with Monte Carlo Techniques	419
<i>Sebastian, Burhenne; Dirk, Jacob; Gregor P., Henze</i>	
Using Statistical Methods to Investigate the Mapping from Initial Values to the Multiple Steady States in Complex Building Simulation Problems	427
<i>Jinchao, Yuan; Leon R., Glicksman</i>	
Decomposing Building System Data for Model Validation and Analysis Using the Koopman Operator	434
<i>Bryan, Eisenhower; Tobias, Maile; Martin, Fischer; Igor Mezić</i>	

Use of Building Simulation Software TAS to Investigate the Dynamic Thermal Performance of a School Building with Installation of a Monodraught Natural Ventilation and Cooling System	442
<i>Naghman, Khan; Yuehong, Su; Saffa B., Riffat; Nick, Hopper</i>	
Toward Zero Energy Buildings: Optimized for Energy Use and Cost	452
<i>Carrie, Brown; Leon, Glicksman; Matthew, Lehar</i>	
Development of a Dedicated Outdoor Air System Module for a Whole Building Annual Simulation Program	458
<i>Young Tae, Chae; Richard K., Strand</i>	
Influence of Supply Air Temperature on Underfloor Air Distribution (UFAD) System Energy Performance	466
<i>Tom, Webster Kwang Ho, Lee Fred, Bauman Stefano, Schiavon Tyler, Hoyt</i>	
<i>Jingjuan, Feng Allan, Daly</i>	
Model-Based Thermal Load Estimation of Buildings	474
<i>Zheng, O'Neill; Satish, Narayanan; Rohini, Brahme</i>	
Analysis of the Energy Savings Potential in K-5 Schools in Hot and Humid Climates: Application of High Performance Measures and Renewable Energy Systems	482
<i>Piljae, Im; Jeff S., Haberl</i>	
An Introduction to the CFD Capabilities in CONTAM 3.0	490
<i>Liangzhu (Leon), Wang; W. Stuart, Dols; Qingyan, Chen</i>	
Robust Eddy Viscosity Turbulence Modeling with Elliptic Relaxation for External Building Flow Analysis	497
<i>Mirza, Popovac</i>	
CFD Simulation Enhances the Optimization of a Data Center's Expansion Process	506
<i>Gang, Tan; Kevin S., Venerable</i>	
Performance-Based Incentive Program for New Buildings: Report from the Field	514
<i>Maria, Karpman; Mike, Karpman; Shelley, Beaulieu; Tom, Rooney; Dan, Cogan</i>	
Pushing the Limits of Simulation Complexity: A Building Energy Performance Simulation Exhibition Center in the U.A.E.	523
<i>Marcus, Jones; Stephan, Ledinger</i>	
Is Real-Time Pricing Right for Solar PV?	531
<i>Jeffrey, Perlman; Andrew, McNamara; Da-Wei, Huang; Lindsay, Audin</i>	
Improvements on the Fast Fluid Dynamic Model for Indoor Airflow Simulation	539
<i>Wangda, Zuo; Qingyan, Chen</i>	
Methodology for Quantifying the Performance Implications of Intelligent Shade Control in Existing Buildings in an Urban Context	816
<i>William, O'Brien; Konstantinos, Kapsis; Andreas, Athienitis; Ted, Kesik</i>	