Table of Contents

Guiding Urban Scale Building Integrated Photovoltaic Integration Decisions: Coupled Building Energy Simulation, Life Cycle Assessment and Radiation Simulation. 1
Medioni, Elie Yezioro, Abraham Yelloz, Hilany Jandl, Julius Batten, Rahamim Spatari, Sabrina

Impact and Cost Analysis of Thermal Load Electrification Measures using Automated Urban Building Energy Modeling in Ithaca, NY 11
Dogan, Timur; Kastner, Patrick; Tseng, Hung Ming; Su, Amber Jiayu; Xu, Kewei Curtis

Leveraging ResStock to Improve Utility Decarbonization Program Grid Impact Modelling: Estimating the effect of heat pumps for space and water heating in eastern Oklahoma 19
Zaheer, Hamza; Pudleiner, David B.; Rowland, Kerry R.; Gupta, Pranav

Reference-Building Equivalent Energy Performance Targets for Canada's Housing Energy Code 27
Gilani, Sara; Ferguson, Alex; Azimi, Sara

Evaluating the Feasibility of a Workflow for Following the ASHRAE Standard 90.1 Performance Rating Method Using Building Information Modeling 36
Xu, Weili; Dehwah, Ammar H.A.; Collier, Jessica M; Poplawski, Michael E; Zhang, Jian

Assessing Energy Flexibility Potential via Statistical Analysis of Building Mass Using Rule and Schedule-Based Control 44
Reber, Joscha; Kirschstein, Xenia; Bishara, Nadja

Impact of Lifestyle Changes and Emerging Workplace Trends on Energy Consumption in a Research Building 53
Ingabo, Simeon Nyambaka Le, Anh-Vu Phichetkunbodee, Non Bambang, Christian Kurniawan Lou, Hoi-Lam Le, Minh-Duc Wilbert, Orville Chan, Ying-Chieh

Developing Single Family Prototype Models for California 64
Dabbagh, Mohammad; Athalye, Rahul

An Open-Source Decarbonization Analytics Framework: Designing for Low-Carbon Emission Districts and Communities 76
El Kontar, Rawad Huynh, Cindy Polly, Ben Long, Nicholas Wang, Jing Jin, Xin Rakha, Tarek

Integration Of Hourly Energy Usage And Emission Rates Through Mapping Between Climate Zones And eGrid Region 88
Xie, Yulong Jung, Yun Joon Zhang, Jian Ye, Yunyang Chen, Yan Salcido, Victor Maddox, Douglas Franconi, Ellen Rosenberg, Michael

Façade Greening Strategies: Integrating Life Cycle Assessment and Microclimatic Analysis for Sustainable Urban Planning 100
Lang-Eurisch, Bernadette; Bishara, Nadja

Long-Term Assessment of Commercial Building Energy and Carbon Emissions in the Northwestern Region Under Future Weather Trend 112
Yang, Yizhi; Sui, Jiyuan; Ye, Yunyang; Zuo, Wangda; Jung, Yun Joon; Lei, Xuechen

Drone-based Optimization And Validation Of Numerical Simulations Of Urban Heat Islands 122
Langner, Normen; Brunn, Ansgar; Voellner, David

An Integrated System for Simulating 3D Concrete Printing Process 132
Wu, Chengde; Evans, Pete

Methodology for an Analytical Abstraction and Calibration of Solar Heat Gain 140
Arsano, Alpha Yacob; Dumoulin, Terrance
Uncertainty Propagation in Building Analysis with Truncated Taylor Polynomials 148
Fenrich, Richard Walter
Community Scale Impacts of Sizing Dual Source Cold Climate Heat Pumps 159
Munz, Karlyle Dais; Tabares-Velasco, Paulo Cesar
Streamlining Sustainable Design in Japan: Case Study on Developing ZEBIA - a Tailored ZEB Simulation Tool 168
Ibrahim Idris, Yasin Mohamed Ubbelohde, Susan Nakagawa, Hiroaki Brown, Nathan Iseda, Hajime Philip, Santosh Sakai, Yuuki Santiago, Ibone
Developing Near Optimal Control Sequences for Chiller Plants with Water-side Economizers: A Case Study in a Warm and Marine Climate 178
Faulkner, Cary Alexander; Shi, Chengnan; Ho, Julia; Ildiri, Nasim; Zuo, Wangda
Copper: A Performance Curve Generator for Building Energy Simulation 185
Lerond, Jeremy; Rahman, Aowabin; Zhang, Yiting; Zhang, Jian; Rosenberg, Michael
Equitable Energy Metrics for Integration into Building Performance Standard Tracking Platforms 197
Long, Nicholas Lee Fleming, Katherine Langlois-Romero, Isabel Henze, Gregor Applegate, Sydney
A Comparative Case Study of Heuristic Optimization of an Affordable Housing Development Against a Best Practice Design 209
Best, Robert Edward; Iyengar, Ananth; Lai, Melinda; Tepfer, Sara; Caulkins, Terence
Heuristic Mathematical Optimization of Heat Pumps in Cascade to Reduce Energy Consumption 221
Zabala Urrutia, Laura; Febres Pascual, Jesus; Sterling, Raymond
Autonomous Load Forecast Framework with Dynamic Model Selection 229
Gehbauer, Christoph Deforest, Nicholas Grant, Peter Tragner, Manfred Baptista, José Black, Douglas
Enhancing Chilled Water Plant Efficiency With Real-Time Optimization 241
Yu, Min Gyung Vlachokostas, Alex Devaprasad, Karthikeya Yoder, Tim A. Johnson, Stephanie Salsbury, Timothy I.
Developing a Low-Cost Steam Monitoring and Fault Detection and Diagnostics System Using Modelling and Field Installation 249
Lee, Jongki Mitchell, Alexander Shakeel, Muhammad Umer Calix-Ortiz, Eduardo Mcaninch, Jacklyn Siddiqui, Ashfaq Hussain Ohiku, Hezekiah Tahir, Mustafa Cao, Huy Le, Hoang Ali, Akram Syed Riley, Christopher Stephens, Brent Heidarinejad, Mohammad
Reimagining Photovoltaic and Battery Storage Sizing in Energy Codes: Requirements at the Space Function Level 257
Singer, Joe; Shadd, Eric; Athalye, Rahul; Guglielmetti, Rob
Effects of Urban Morphology on Pedestrian Level Wind Environment and Air Temperature: Using Simulation and Explainable Machine Learning 267
Xue, Cui; Yu, Li; Shen, Pengyuan
ANT: A Multizone Indoor Air Quality (IAQ) and Ventilation Analysis Plug-in for Algorithm Aided Design 278
Shen, Jialei; Dols, W. Stuart; Polidoro, Brian J.

Thermal Comfort Analysis Through Computational Fluid Dynamics-Based Simulation Studies In A Chemotherapy Environment 288
Ongole, Brahma Harshini; Rakha, Tarek
Early Design Thermal Comfort Modeling in Transient Conditions for Warming Hot Climates 298
Su, Amber Jiayu; Brown, Christina Xingyizhen; Mermelstein, Remy; Cerezo Davila, Carlos
Building Operations Emulator: Integrating Interactive Building Energy Simulation into Building Operators Training 307
Kang, SungKu; Velazquez, Jose J.; Kane, Michael B.
Ko'olauloa Community Resilience Hub Design Trade-off Study 317
Mammoli, Andrea Alberto Villa, Daniel Lorenz Eddy, John Azaroff, Illya Kelly-Paddock, Dotty
Building-Grid Interaction Analysis of an All-Electric Office Building with Thermally Activated Building Systems Using Rule Based Control and Dynamic Tariff Signals 329
Kırant-Mitić, Tuğçin; Voss, Karsten
Computationally Efficient and Accurate Modeling of Combined Heat and Power Systems for District Energy Systems 341
He, Zhanwei Anbarasu, Saranya Hinkelman, Kathryn Hu, Jianjun Zuo, Wangda Moftakhari, Ardeshir
Minimizing Operational Carbon Within Whole Life Carbon for New Construction 352
Bacchus, Jamy; Anderson, Caitlin; Mirianhosseinabadi, Sedighehsadat
Development of Regional-Scale Typical Meteorological Years for Canada 364
Beaufort, Manon; Tonellato, Giulio; Kummert, Michaël
Quantifying the Value of Energy Efficiency for Energy Resilience Using Building Simulation 374
Franconi, Ellen; Troop, Luke; Singh, Manan; Lei, Xuechen; Perry, Christopher
RESI: A Power Outage Event And Typical Weather File Generator For Future Resilient Building Design And Operation 386
Jiang, Zixin; Dong, Bing
Inclusive Meteorological Year (IMY) Files: Development Of Localized Weather Files For Disadvantaged Neighborhood Simulations 395
Sherif, Tarek; Katia, Riwayat; Nguyen, Michelle; Ma, Nan; Rakha, Tarek
Can LLMs Understand EEMs? Using Large Language Models To Manage Building Energy Efficiency Measure Data 407
Khanuja, Apoorv; Webb, Amanda L.
Applications in CityLearn Gym Environment for Multi-Objective Control Benchmarking in Grid-Interactive Buildings and Districts 417
Nweye, Kingsley; Nagy, Zoltan
Rapid Building Feature Extraction and Geometry Formulation Using Machine Learning 429
Chowdhury, SoumyaDeep; Grewal, Kuljeet Singh
Advancing Building Energy Modeling with Large Language Models: Exploration and Case Studies 441
Zhang, Liang; Chen, Zhelun; Ford, Vitaly; Xu, Peng
Machine Learning (ML) as a Surrogate Model for Early-stage Heating Demand Optimization 454
Wang, Xinyue; Harrison, Josie; Teigland, Robin; Hollberg, Alexander

Simplifying Modeling for Building and District Energy Systems with Large Language Models 466
Mostafavi, Saman; Maxwell, John T.; Zhenirovskyy, Maksym; Matei, Ion
Machine Learning for Determining Building Type 475
Chowdhury, Shovan Li, Fengqi Stubbings, Avery New, Joshua Garg, Ankur Bacabac, Kevin Correa, Santiago
A Comparative Analysis of Different Weather Datasets for Future-proofing Building Performance Analysis 486
Azimi, Mitra; Baltazar, Juan Carlos
A Decision-Support Framework for Community Building Energy Modeling in Developing Nations, Leveraging Satellite Imagery and Machine Learning Techniques 501
Bansal, Daksh; Ramalingam Rethnam, Omprakash; Thomas, Albert
Addressing the Need for Microclimate Considerations in DOE Reference Building Prototypes for Urban Energy Simulation with a Focus on The Urban Shadow Effects 511
Ghiasi, Sedigheh; Passe, Ulrike; Thompson, Janette R
Advancing Building Energy Modeling: An Open-Source Bayesian Calibration Framework for Non-Residential Buildings 518
Fülep, Katalin Julianna; Chen, Siling; Brandt, Stefan; Streblow, Rita
An Evaluation of Embodied Carbon Emissions of Building Materials in Jordanian Dwellings 529
Alasmar, Reham; Schwartz, Yair; Burman, Esfandiar
Analysis of Factors Influencing Residents' Perceptions Regarding Potential Increases in Electricity Prices in Residential Buildings 541
Bambang, Christian Kurniawan Le, Anh-Vu Hoi-Lam, Lou Le, Minh-Duc
Phichetkunbodee, Non Wilbert, Orville Ingabo, Simeon Nyambaka Ying-Chieh, Chan
Augmenting Thermal Mass Performance without Added Carbon Footprint: Surface Area Modulation of Structural Slabs in Naturally Ventilated Buildings 551
Wang, Zherui; Zhang, Xiang; Peng, Xiaoxiao; Vasanthakumar, Saeran; Aviv, Dorit
Building Information Modeling-Based Building Energy Modeling: Assessment of Workflows and Tools 562
Farid Mohajer, Mahsa; Aksamija, Ajla
Convex Partition Zoner: A New Algorithm for Automated Thermal Zoning 576
Xiang, Jialiang; Dang, Quoc; Davila, Carlos Cerezo; Samuelson, Holly
Development of a Prototype Energy Modeling Framework for Residential Buildings in Rural Alaska 588
Guillante, Patricia Kiesling, Christiana Cooper, Janie Gioppo, Zachary Cetin, Kristen Poleacovschi, Cristina
Development of a Reinforcement Learning-Based Solar Decomposition Model for Predictive Control Using Limited Measurement Data 598
Jeon, Byung-Ki; Kim, Deuk-Woo
Development of a Simulation Testbed for Validating Optimal Thermal Energy Storage Operation Algorithms in Energy-Efficient Buildings 607
Devaprasad, Karthikeya; Yu, Min Gyung; Huang, Bowen; Ma, Xu
Dynamic Thermal Comfort-based Temperature Setpoint Controls 619
Al Jebaei, Hussein; Aryal, Ashrant

Evaluating the Effects of Physical Parameters of Shanashir on Thermal Comfort based on UTCI Index, a Case Study 626
Fani, Mahya; Mehdizadeh Saradj, Fatemeh; Sharp, Nina
Hygrothermal Behavior of 3D Concrete Printed Wall Assemblies 637
Ghaderi, Ehsan; Evans, Pete; Doyle, Shelby; Senske, Nick; Wu, Chengde
Optimizing Operational Costs in Combined Heat and Power Integrated District Heating Systems: A Reinforcement Learning Approach 649
Anbarasu, Saranya Ambadkar, Tanmay Adhikari, Rosina Hinkelman, Kathryn He, Zhanwei Zuo, Wangda Moftakhari, Ardeshir
Performance Investigation of Different PV Technologies on Pneumatically Actuated Adaptive Façade at a Demonstrator Building in Freiburg, Germany 661
Moser, Stephan Gonzalez, Edith A. Ridder, Matthias Born, Larissa Körner, Axel Gresser, Götz T. Knippers, Jan Weitlaner, Robert
Reinforcement Learning to Enhance Optimal Operation of Resilient Community Energy Systems 668
Li, Zhuorui; Han, Xu; Wang, Jing; Zuo, Wangda
Unveiling the Role of Deployment in the Performance of ASHRAE Guideline 36 679
Huang, Sen; Yoon, Yeobeom; Im, Piljae; Zandi, Helia; Lian, Jamie
What Density for Net Zero Energy?: A Simulation-based Multi-objective Optimization of High-rise Residential Precincts in a Tropical Climate 686
Govindarajan, Praveen; Ortner, F. Peter
Physics-Informed Hybrid Modeling Approach for Room Temperature Prediction Using an RC Model and Siamese Neural Network 698
Park, Chul-Hong; Cho, Seongkwon; Song, Tae Yong; Heo, Seon-Young; Park, Cheol-Soo
Development of a Mixed-Integer Nonlinear Model Predictive Controller for 5th Generation District Heating and Cooling Networks 705
Hermans, Louis; Boydens, Wim; Helsen, Lieve
Modelica-based Modeling and Simulation of an HVAC System Integrated with Direct Air Capture of CO2 715
Xu, Youmin; Han, Xu; Cao, Xiangkun
Data-Driven Occupant-Thermostat Override Models for Winter Heating in Quebec 725
Kaspar, Kathryn Elaine; Ouf, Mohamed M.; Eicker, Ursula
Developing a Novel Modeling Framework for Residential Home's Occupant Behaviors in Support of Building-to-Grid Integration Research 735
Kim, Ryunhee Luna; Ye, Yunyang; Huang, Sen; Xie, Yulong; Wang, Jing
Simulation Driven Rating of Smart Thermostats 746
Benne, Kyle; Thomas, Jermy; Ling, Jiazhen; Blum, David; Roth, Amir
A Parameter-based Transfer Learning Approach for Predicting Occupancy in Institutional Buildings 758
Doma, Aya; Amara, Fatima; Ouf, Mohamed
Impact of Occupant Behavior on Indoor Thermal Comfort and Ventilation Patterns in Social Housing of Mumbai, India: Observation from Experiments and Household Surveys 768
Gupta, Vallary; Sarkar, Ahana; Jana, Arnab
Model Predictive Control for a Multi-modal Nocturnal Radiative Cooling System 778
Koch, Manuel; Sawant, Parantapa; Eismann, Ralph; Jones, Colin N.

Assessing the Impact of Variable Air Volume Box Damper Stuck Faults Using a Building Automation System and Building Energy Simulation Model 790
Jung, Sungkyun; Yoon, Yeoboem; Im, Piljae
Local vs. Integrated Control Strategies for Heat Pump and PV Systems 800
Mun, Jeeye; Cho, Seongkwon; Park, Cheol-Soo
Assessment of Simulation Models when Considering Energy Efficiency in a Real-World District Cooling System Condenser Loop 809
Huylo, Michael; Moftakhari, Ardeshir; Novoselac, Atila
Adaptive Fault Detection and Diagnosis Based on Growing Gaussian Mixture Regressions for Passive Chilled Beams System 818
Dahal, Sujit; Wang, Liping; Braun, James E.
Decomposition of Dynamic Window Views Using Semantic Segmentation 830
Ingabo, Simeon Nyambaka; Chan, Ying-Chieh
Thermal Comfort Evaluation During Demand Response Using Computational Fluid Dynamics (CFD) 838
Lee, Hyeonjun; Ahn, Hyeunguk; Rim, Donghyun
Sustainability through Optimal Design of Buildings for Natural Ventilation using Updated Comfort and Occupancy Models 849
Chung, Jihoon; Shahmansouri, Nastaran; Goldstein, Rhys; Stoddart, James; Locke, John