COMMUNITY ENERGY BY DESIGN
A SIMULATION-BASED DESIGN WORKFLOW USING MEASURED DATA CLUSTERING TO CALIBRATE URBAN BUILDING ENERGY MODELS

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2018 EPB SYMPOSIUM ON URBAN SYSTEMS DESIGN // TOKYO - JAPAN
PERFORMATIVE PRAXIS LAB
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OUR AIM IS TO INFLUENCE ARCHITECTURE, URBAN DESIGN AND PLANNING PRACTICES THROUGH BASIC AND APPLIED RESEARCH, AND DEVELOPING SUSTAINABLE DESIGN WORKFLOWS AND METRICS.
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MOBILITY AND OUTDOOR COMFORT  ENERGY AND DAYLIGHTING  AERIAL ANALYTICS
MOBILITY AND OUTDOOR COMFORT

July 4 @ 9:00 A.M.

July 4 @ 12:00 P.M.

July 4 @ 15:00 P.M.
a) Successful infiltration detection.
PERFORMATIVE PRAXIS LAB

Our aim is to influence architecture, urban design and planning practices through basic and applied research, and developing sustainable design workflows and metrics.

Mobility and Outdoor Comfort  Energy and Daylighting  Aerial Analytics
Percentage urban and location of urban agglomerations with at least 500,000 inhabitants, 2014
COMMUNITY ENERGY: TECHNICAL AND SOCIAL CHALLENGES AND INTEGRATIVE SOLUTIONS

PI: Dr. Jason Dedrick, Co-PI: Dr. Beas Kriemeyer
COMMUNITY ENERGY: TECHNICAL AND SOCIAL CHALLENGES AND INTEGRATIVE SOLUTIONS

PI: Dr. Jason Dedrick, Co-PI: Dr. Bess Kriitemeyer

MUELLER, AUSTIN, TX
700-Acre Mixed-Use Development

- 6,000 New Homes (25% affordable)
- 4.2M sq. ft. Office / Commercial
- 750,000 sq. ft. Retail
- 140 acres of parks & greenways
- 13 miles of bike & hike paths
- 15,000 new trees to be planted

All development to be LEED-certified - or - earn 3-Star Rating from Austin Energy Green Building Program

- 40% Developed Land (~12.4 million sq. ft.)
- 60% Undeveloped Land (~18.7 million sq. ft.)
COMMUNITY ENERGY: TECHNICAL AND SOCIAL CHALLENGES AND INTEGRATIVE SOLUTIONS

PI: Dr. Jason Dedrick, Co-PI: Dr. Bess Kriemeyer

Simulation

Visualization

Analysis

Community Energy

Model Calibration

Visualization

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MUELLER, AUSTIN, TX
700-Acre Mixed-Use Development

1,000 feet

Sponsors

NSF
SYRACUSEcoe
center of excellence
SYRACUSE ARCHITECTURE
PECAN STREET
THE iSCHOOL

Partners
COMMUNITY ENERGY: TECHNICAL AND SOCIAL CHALLENGES AND INTEGRATIVE SOLUTIONS

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Community Benefits

- $$$ Cost Savings
- Community Resource Sharing and Identity

Environmental Benefits

- CO2 Reductions

Utility Benefits

- $$$ Cost Savings
- Peak Load Reduction
- Improved Reliability

Real-Time Energy Data Dashboard

Opportunity for load shifting

Shared use of stored solar energy
Research Question:

How can informed urban design decisions use measured data clustering to calibrate UBEMs to support urban design in terms of form, building systems configurations, as well as influencing user behavior aspects in the built environment?
EL KONTAR, R., AND RAKHA, T., (2016) "PROFILING OCCUPANCY PATTERNS IN COMMUNITY-SCALE RESIDENTIAL BUILDINGS USING OPERATIONAL ENERGY USE DATA CLUSTERING,"
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