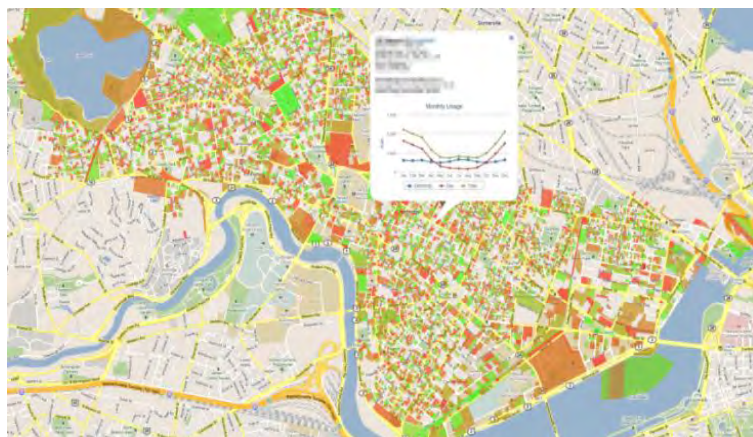


Community Efficiency - An MIT / Cambridge Collaboration

Challenging students to discover, analyze, and articulate strategic approaches to scaling transformative ideas

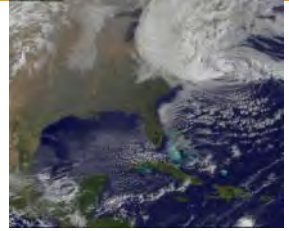


**Harvey Michaels, Lecturer and Director of
MIT Energy Efficiency Strategy Project**

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Society's energy needs can be met in a manner that is *cheaper, cleaner, safer*



We can prove:

- **Energy Efficiency *is a Real* Energy Resource Option:**
 - Buildings consume 70% of all electricity, 50% of all natural gas
 - *50% reduction over 20 years* without sacrificing comfort or function.
 - Efficiency opportunities pay for themselves with energy savings
- **Energy Efficiency *is a Real* Solution for Climate Change**
 - CO2 emissions need to drop 7% per year to sustain a livable Earth (GDP adj.)
 - Efficiency can easily address over half of what we need to do by 2050,
 - It is impossible to accomplish needed carbon reduction *without energy efficiency*.

BUT the path to DEPLOYMENT IS ELUSIVE:

Achieving deep efficiency gains across all homes, buildings, and communities *has proven to be a challenging objective.*

Enabling Transformative Ideas/ Delivering on the Promise of Energy Efficiency



Develop and apply multidisciplinary skills to overcome persistent market barriers to energy efficiency improvements

- Program Design: utility incentives and financing
- Recruitment: community-based marketing
- Treatment: retrofit technology/ comfort
- Transparency: disclosure, benchmarking and GIS mapping



Greening Cities with Energy Efficiency: TODAY: Local Action Moving to the Forefront!

MIT inquiry into Community Energy Innovation - 6 year history:

- **New paradigm: Cities and community organizations as catalysts of energy efficiency in the built environment,**
- **Cases: Utility efficiency program partnerships with cities and towns in Boston, Cambridge, Chicago, Charlotte**
- **Policy: 2008 MA Green Communities Act, ARRA/Renew Boston**
- **Trend: Integrated Resource Planning → Climate Management**



Cambridge MIT/Harvard Sustainability Compact

May 6, 2013



**Working together on new solutions
for community sustainability**

CAMBRIDGE MULTIFAMILY ENERGY INNOVATION PROJECT



Solutions for Multi-Family Housing in Cambridge

Potential Pilot Area:



Central Square Residential
Neighborhood

1044 Buildings

Predominantly
Multifamily

Nearly all buildings are
pre-1950

Predominantly Rental

CAMBRIDGE SOLAR MAP



Solar Tool For Electric Photovoltaics

N/A Poor Good Excellent



15 Tremont St
Cambridge, MA 02139

Overview

Total Roof Area (sqft):	1,479
High PV Potential Area (sqft):	502
System Size(kW):	8
Electricity Output (kWh/y):	11,308

Potential Savings (per year):
\$4,475

Estimates are calculated based on the assumptions available here.

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MODERN DEVELOPMENT STUDIO, LLC



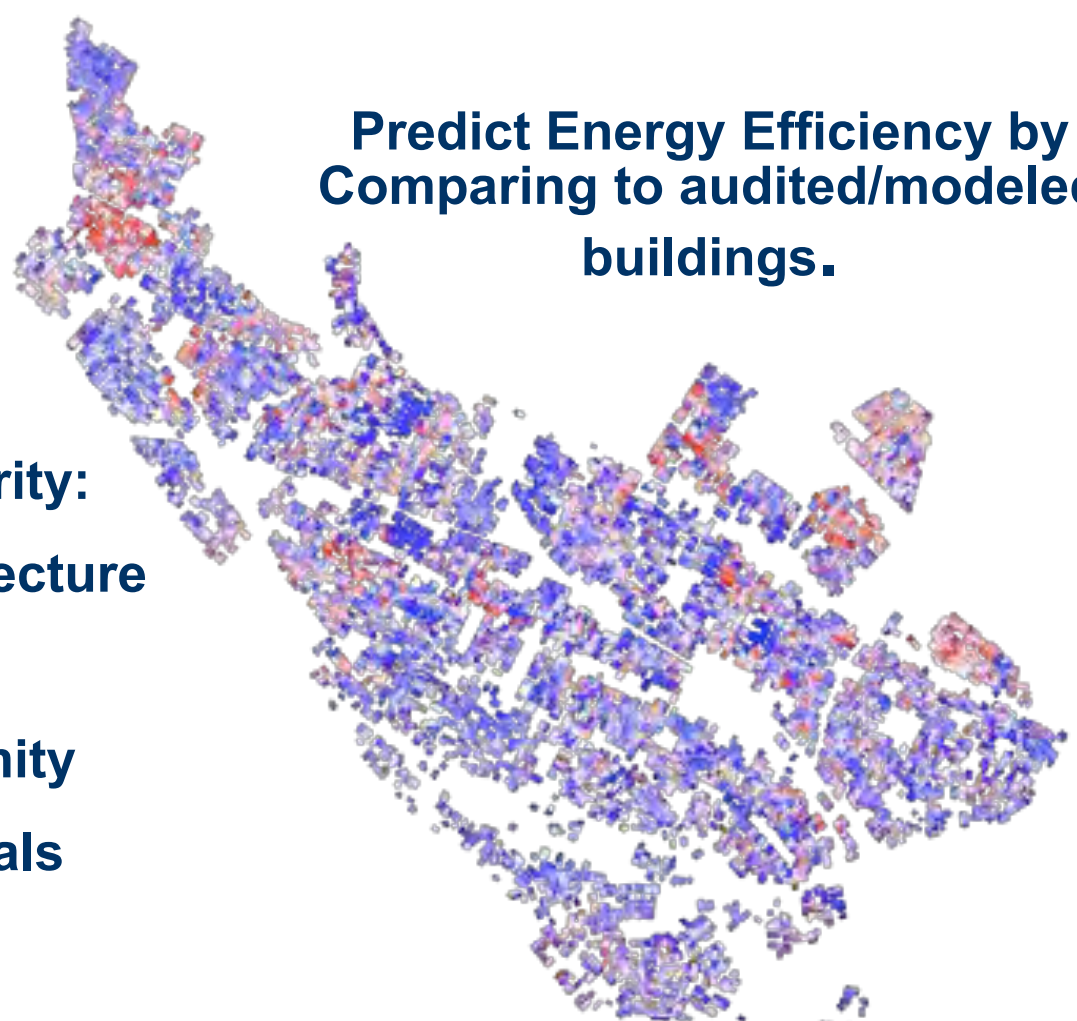
MIT Field Intelligence Lab Energy Informatics:

High Res IR Imaging, Quantitative Energy Auditing



**Predict Energy Efficiency by
Comparing to audited/modeled
buildings.**

- Similarity:
- Architecture
- Age
- Proximity
- Materials
- Size



CONTROL TECHNOLOGY

•Answer:



• A Cambridge Multifamily Thermostat



Urban Multifamily Design elements

Program Design: utility incentives and financing

- Solarize Model – single vendor, fixed time, simplified
- Landlord-tenant expense and financing.

Recruitment: community-based marketing

- Community vendor selection
- Scoring and relationships

Treatment: retrofit technology and transparency/disclosure

- Manageable set – responding to conditions on the ground
- Disclosure, benchmarking and GIS mapping

ENERGY SCORE MAP

•INFORMATION LAYERS

•Average monthly electricity and gas (usage and dollars)

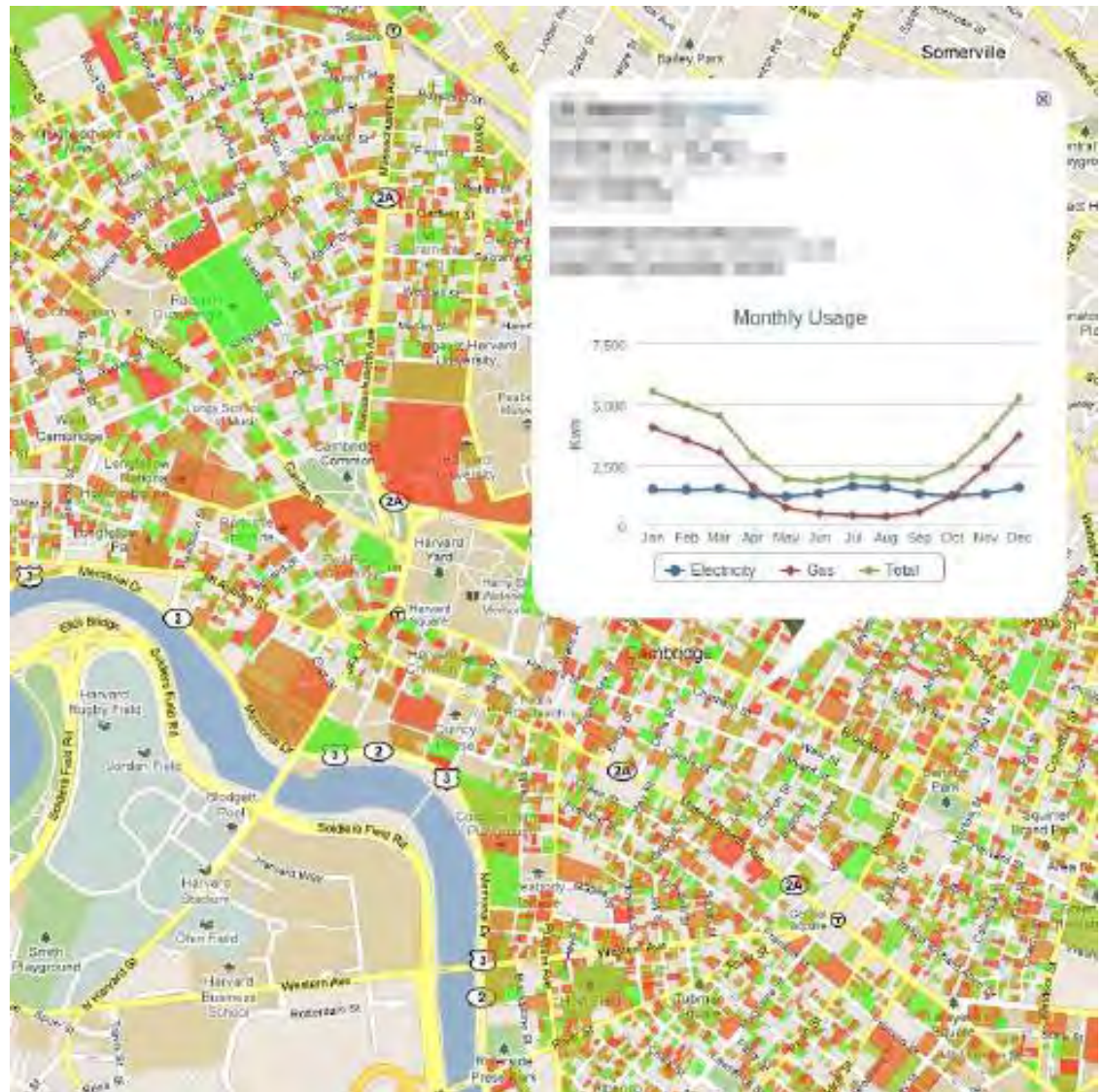
•Heat fuel type

•Benchmark or efficiency potential score

•Recommended upgrades

•Available rebates

•Potential savings



MIT EE Strategy and Systems: achieve *all of the efficiency we need* to preserve our climate.

➤ **New Opportunities:**

- **Energy Productivity – reduce friction: carbon benefit funding, addressing worldwide deficiency, integrating financing/big data.**
- **Energy Systems Integration: Optimizing building and EV energy management to accommodate intermittent solar/wind.**
- **Community-scale Systems: collective intelligence, goal-setting, social networks.**

➤ **Developments:**

- **Dramatically accelerate energy efficiency with big data, financing “no money down”, social networks**
- **Integrate climate value into efficiency funding stream.**
- **Innovate on both sides of meter to integrate renewables**

More generally, how do we *Enable Transformative Ideas*?

➤ Plan Development

- *Judicial examination, and distillation of broad experience - Strategy/Innovation*

➤ Leadership

- *Enthusiasm, Vision, Access, Action,*

➤ Expertise

- *Integration of Science, Economics, Equity, Local Values;*

➤ Marketing

- *Making it easy, reducing time and risks*

➤ Social Marketing

- *Collective rewards, individual recognition by groups*

➤ Governance

- *Ownership, Consensus-building, Metrics/Evaluation*



Its not just about efficiency