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Building Energy Benchmarking

An Overview of City and Utility Programs

Andrea Krukowski
Institute for Market Transformation

NECPUC | Stowe, VT |
June 17, 2014

Institute for Market Transformation

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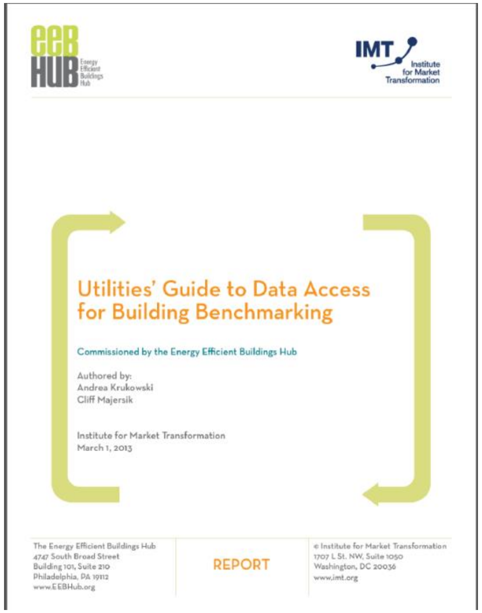
- National best practices center for design, adoption, and implementation of building energy performance policies in cities
- Policy advisor to state and local governments, federal agencies, the Administration, and industry groups
- One of founding members of Data Access and Transparency Alliance (DATA)



eeB HUB Energy Efficient Buildings Hub

IMT Institute for Market Transformation

Utilities' Guide to Data Access for Building Benchmarking

Commissioned by the Energy Efficient Buildings Hub

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Institute for Market Transformation
March 1, 2013

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REPORT

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DATA Data Access and Transparency Alliance

BOMA International

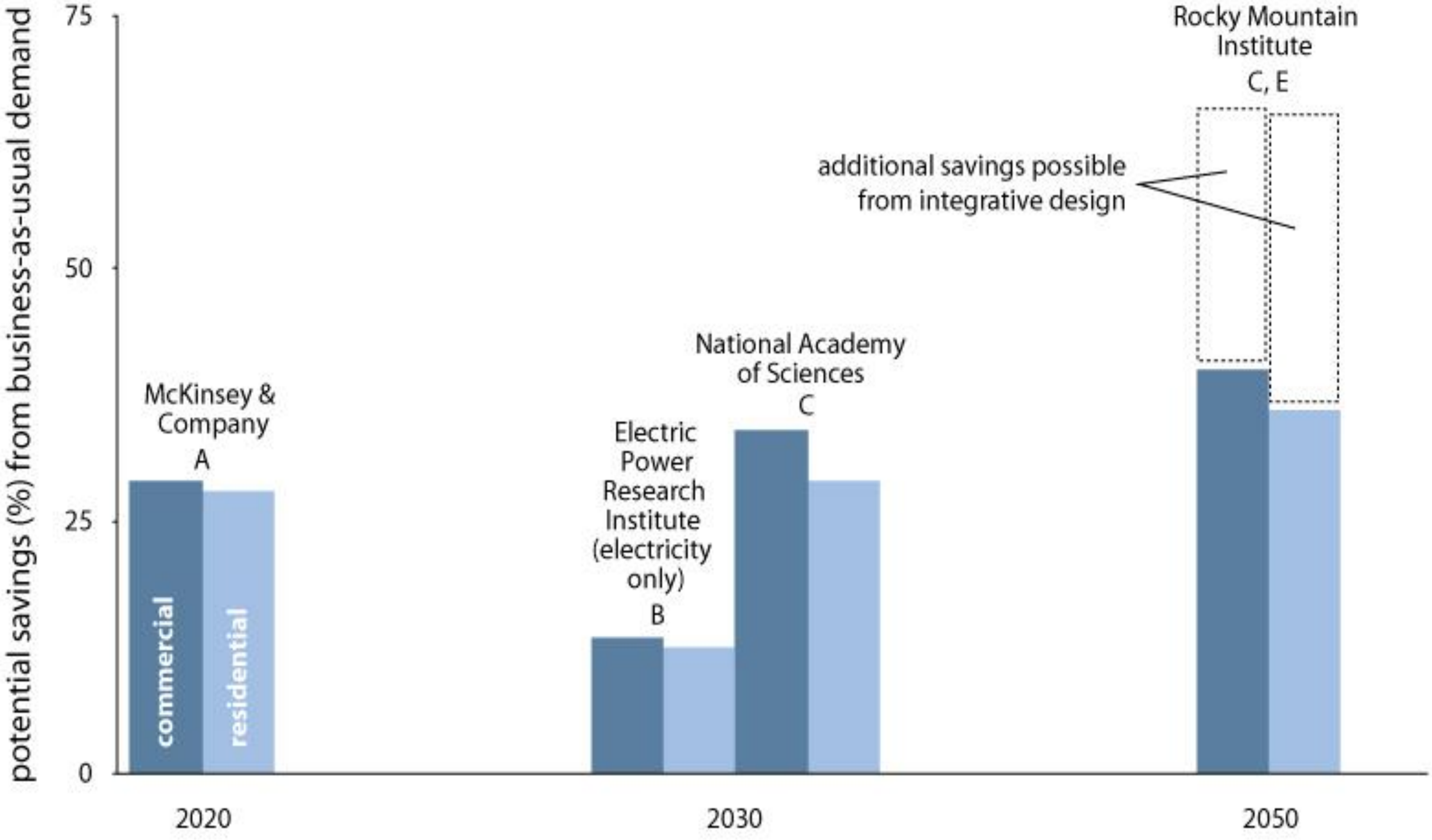
The Real Estate Roundtable

Enterprise℠

U.S. Green Building Council

NRDC
The Earth's Best Defense

Potential Savings in U.S. Building Sector by Study



Lettered sources in chart are detailed below.

Rocky Mountain Institute © 2011. For more information see www.RMI.org/ReinventingFire.


Based on standard U.S. Government tests
ENERGYGUIDE
Refrigerator-Freezer
With Automatic Defrost
With Top-Mounted Freezer
Without Through-The-Door-Ice Service
Capacity: 20.8 Cubic Feet
Sears, Roebuck and Co.
Model(s) 6818*99*, 7818*99*, 6918*99*, 7918*99*, 6018*99*, 7016*99*, 6017*99*, 7017*99*
Compare the Energy Use of this Refrigerator with Others Before You Buy.
This Model Uses
601 kWh/year
Energy use (kWh/year) range of all similar models
Uses Least Energy
Uses Most Energy
Refrigerators using more energy cost more to operate.
This model's estimated yearly operating cost is:

You can’t manage what you don’t measure

Nutrition Facts

Serving Size 1 cup (228g)
Servings per Container 2

Amount Per Serving

Calories 280 **Calories from Fat** 120

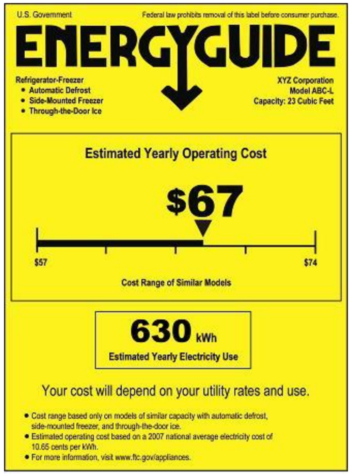
	% Daily Value*
Total Fat 13g	20%
Saturated Fat 5g	25%
Trans Fat 2g	
Cholesterol 2mg	10%
Sodium 660mg	28%
Total Carbohydrate 31g	10%
Dietary Fiber 3g	0%
Sugars 5g	
Protein 5g	

Vitamin A 4% • Vitamin C 2%
Calcium 15% • Iron 4%

*Percent Daily Values are based on a 2,000-calorie diet. Your daily values may be higher or lower depending on your calorie needs.

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4



U.S. Government Federal law prohibits removal of this label before consumer purchase.

ENERGYGUIDE

Refrigerator-Freezer
- **Automatic Defrost**
- **Side-Mounted Freezer**
- **Through-the-Door Ice**

XYZ Corporation
Model ABC-L
Capacity: 23 Cubic Feet

Estimated Yearly Operating Cost

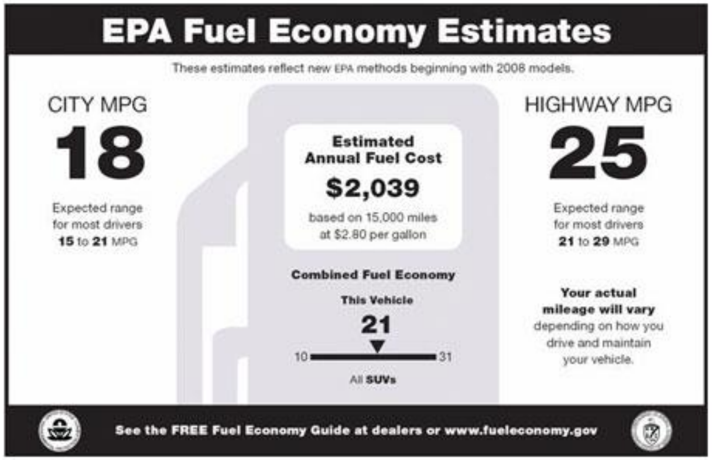
$67

Cost Range of Similar Models

630 kWh
Estimated Yearly Electricity Use

Your cost will depend on your utility rates and use.

- Cost range based only on models of similar capacity with automatic defrost, side-mounted freezer, and through-the-door ice.
- Estimated operating cost based on a 2007 national average electricity cost of 10.65 cents per kWh.
- For more information, visit www.ftc.gov/appliances.



EPA Fuel Economy Estimates

These estimates reflect new EPA methods beginning with 2008 models.

CITY MPG
18
Expected range for most drivers
15 to **21** MPG

Estimated Annual Fuel Cost
$2,039
based on 15,000 miles at $2.80 per gallon

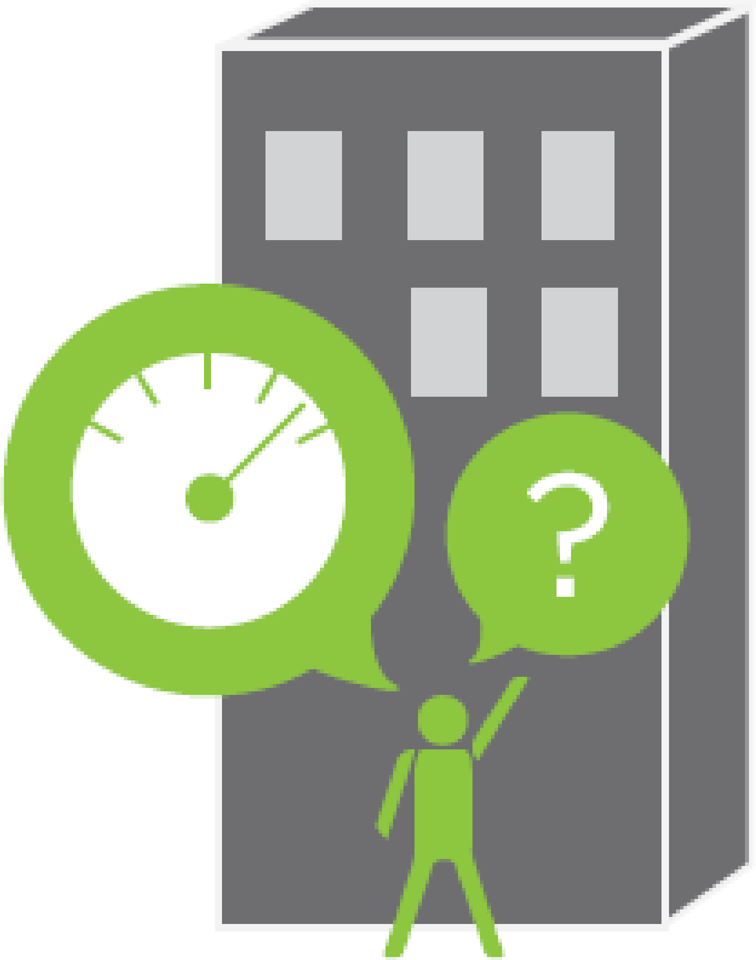
Combined Fuel Economy
This Vehicle
21

HIGHWAY MPG
25
Expected range for most drivers
21 to **29** MPG

Your actual mileage will vary depending on how you drive and maintain your vehicle.

See the FREE Fuel Economy Guide at dealers or www.fueleconomy.gov

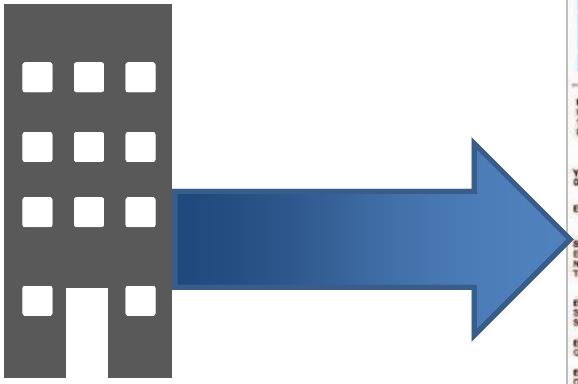
Building owners often can’t get energy data for their buildings



Barriers:

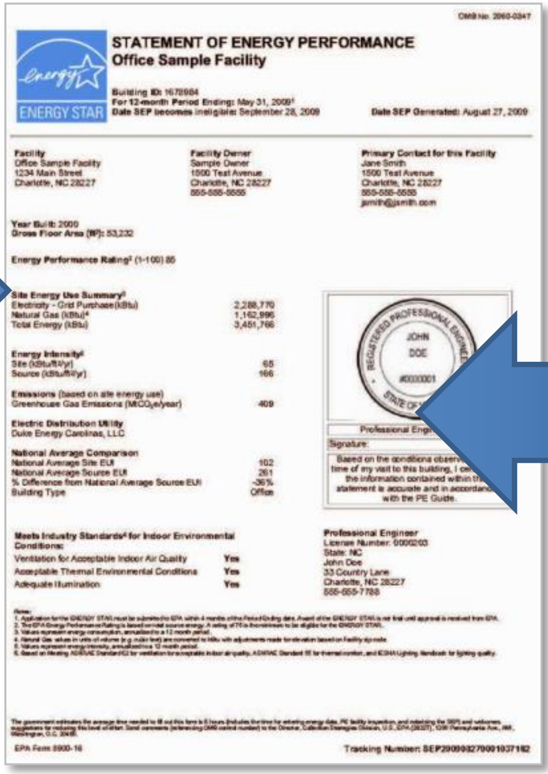
- Separately-metered tenants
- Lack of clear procedures
- Utility policies and state privacy laws
- Lack of standardization

Benchmarking Data Needs



Building Owners

- Building physical characteristics
- Building operating characteristics



OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Office Sample Facility

Building ID: 1678984
For 12-month Period Ending: May 31, 2009[1]
Date SEP becomes ineligible: September 28, 2009
Date SEP Generated: August 27, 2009

Facility
Office Sample Facility
1234 Main Street
Charlotte, NC 28227

Facility Owner
Sample Owner
1500 Test Avenue
Charlotte, NC 28227
555-555-5555

Primary Contact for this Facility
Jane Smith
1500 Test Avenue
Charlotte, NC 28227
555-555-5555
jsmith@jsmith.com

Year Built: 2000
Gross Floor Area (ft²): 53,232

Energy Performance Rating[2] (1-100) 85

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	2,288,770
Natural Gas (kBtu)[4]	1,162,996
Total Energy (kBtu)	3,451,766
Energy Intensity[5]	
Site (kBtu/ft²/yr)	65
Source (kBtu/ft²/yr)	166
Emissions (based on site energy use)	
Greenhouse Gas Emissions (MtCO$_2$e/year)	409
Electric Distribution Utility	
Duke Energy Carolinas, LLC	
National Average Comparison	
National Average Site EUI	102
National Average Source EUI	261
% Difference from National Average Source EUI	-36%
Building Type	Office

JOHN DOE #000001

Professional Engi

Signature:

Based on the conditions observ
time of my visit to this building, I ce
the information contained within th
statement is accurate and in accordan
with the PE Guide.

Meets Industry Standards[6] for Indoor Environmental Conditions:

Ventilation for Acceptable Indoor Air Quality	**Yes**
Acceptable Thermal Environmental Conditions	**Yes**
Adequate Illumination	**Yes**

Professional Engineer
License Number: 0000203
State: NC
John Doe
33 Country Lane
Charlotte, NC 28227
555-555-7788

EPA Form 5900-16

Tracking Number: SEP200908270001037182

Utilities

- Building energy consumption

Current Practices

Utility Company (State)	Aggregate Whole-building Data	Automated Upload to Portfolio Manager
Austin Energy (Texas)	✓	-
Avista (Washington)	✓	✓
California IOUs	-	✓
Commonwealth Edison (Illinois)	✓	✓
Consolidated Edison (New York)	✓	-
National Grid	✓	-
NSTAR	✓	TBD
PECO (Pennsylvania)	✓	✓
Pepco (District of Columbia)	✓	2014
Puget Sound Energy (Washington)	✓	✓
Seattle City Light (Washington)	✓	✓

Utility Data Access Programs

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WASHINGTON
Avista Utilities
Puget Sound Energy
Seattle City Light
Seattle Steam

CALIFORNIA
Pacific Gas & Electric
Sacramento Municipal Utility District
Southern California Edison
Southern California Gas Company
San Diego Gas and Electric

ILLINOIS
ComEd

AUSTIN
Austin Energy

PHILADELPHIA
PECO
Veolia Energy

WASHINGTON, DC
Pepco

BOSTON
National Grid
NSTAR
Veolia Energy

CONNECTICUT

NEW YORK CITY
ConEd
National Grid
Department of
Environmental
Protection

🟦 Mandate requiring utilities to provide energy consumption data for ENERGY STAR Portfolio Manager

Benchmarking Policy Landscape

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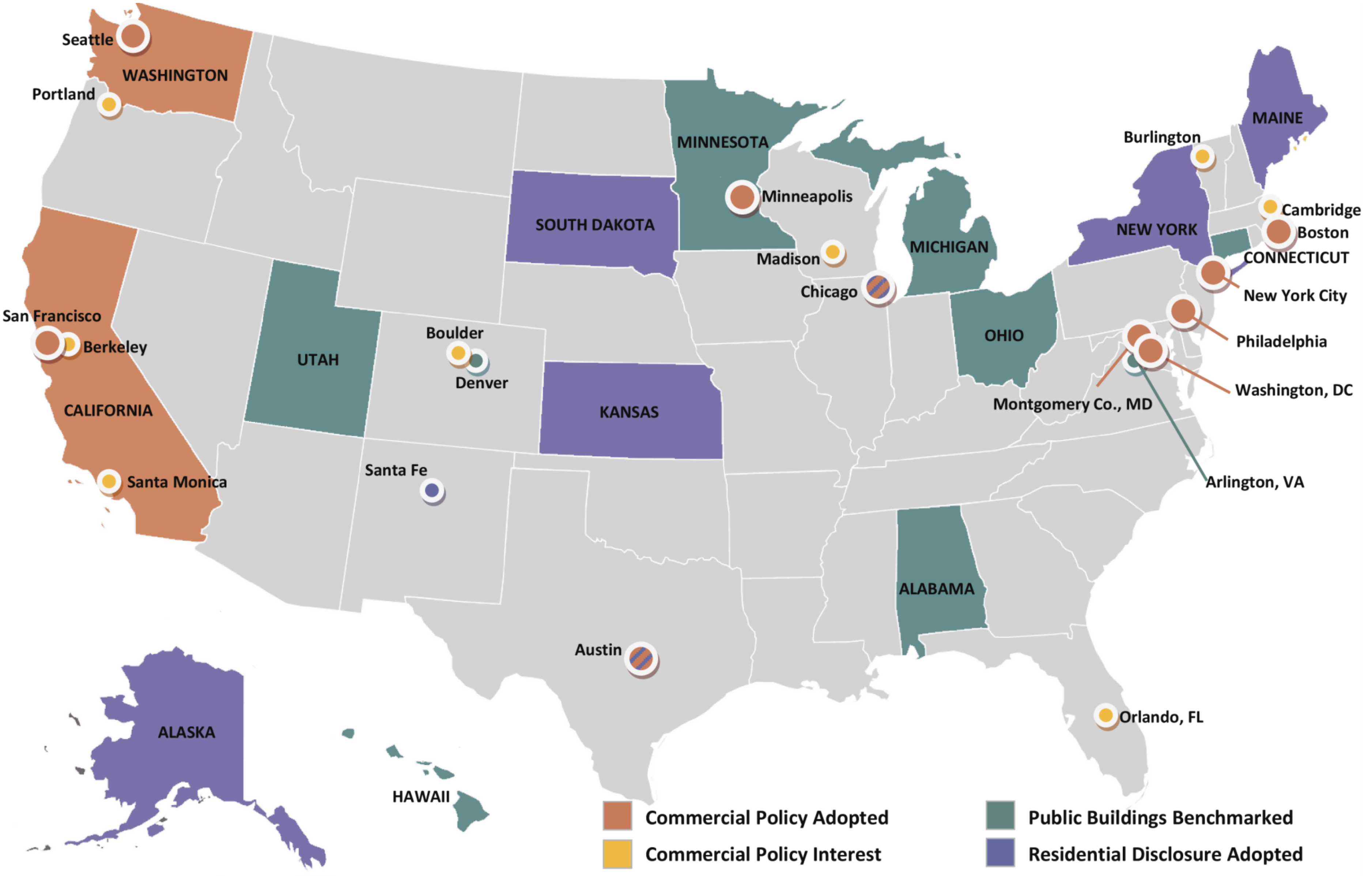
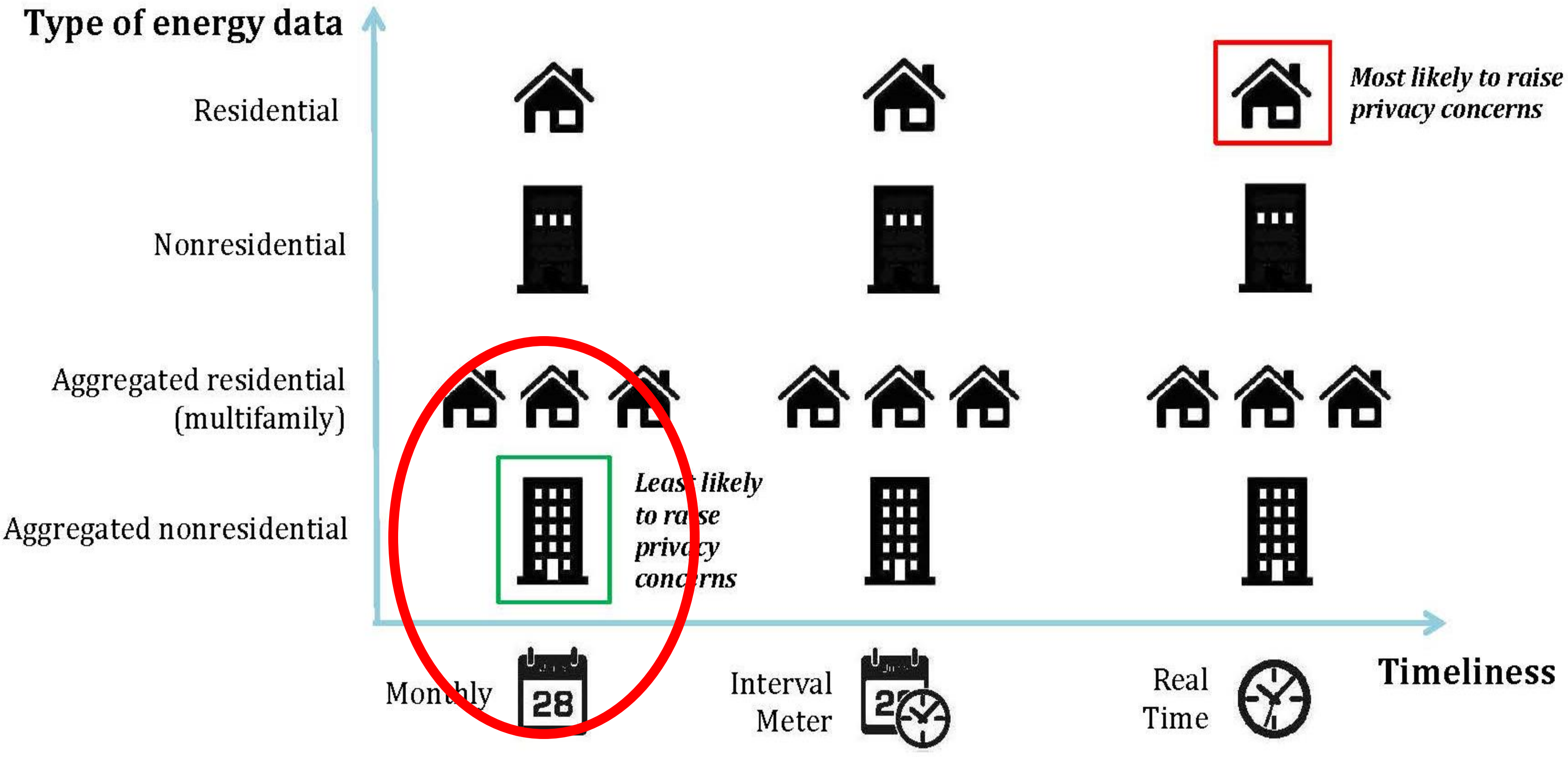


Utility Meter Data Sensitivity



Type of energy data

Residential

Nonresidential

Aggregated residential (multifamily)

Aggregated nonresidential

Most likely to raise privacy concerns

Least likely to raise privacy concerns

Monthly

Interval Meter

Real Time

Timeliness

Current Practices

Utility Company (State) OR Public Utility Commission (PUC)	**Account Aggregation Threshold** Number of accounts / maximum percentage of total energy usage one account can contribute
Avista (Washington)	2
Consolidated Edison (New York)	2
Seattle City Light (Washington)	2
Clark Public Utilities	2
Commonwealth Edison (Illinois)	4
National Grid (Massachusetts)	4
NSTAR (Massachusetts)	4
Austin Energy (Texas)	4/80*
Puget Sound Energy (Washington)	5
Pepco (District of Columbia)	5

* Does not apply to multifamily buildings

Utilities Benefit by Supporting Benchmarking

- Customer service
- A gateway to other energy efficiency programs
- Insight into building loads to improve marketing and targeting for energy efficiency programs and inform infrastructure planning
- Data to analyze energy efficiency programs and validate savings

Report for the California Public Utility Commission:

Utility-led benchmarking programs yielding substantial energy savings

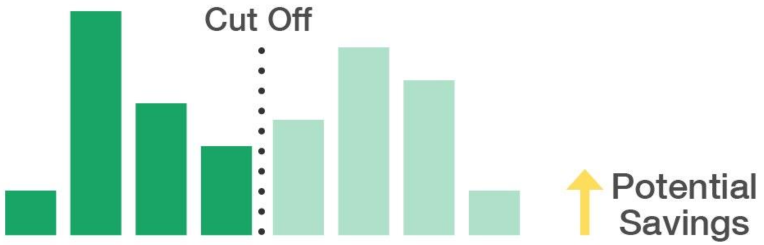
April 2012

Of those who benchmarked:

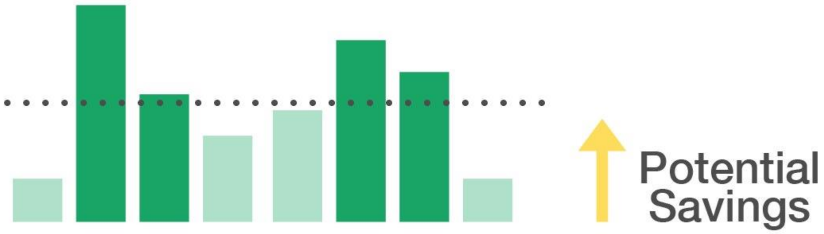
- 62% took energy management actions
- 84% planned or implemented energy efficiency improvements
- 81% link improvements to utility efficiency programs
- 82% said utility training had been sufficient to benchmark buildings on their own

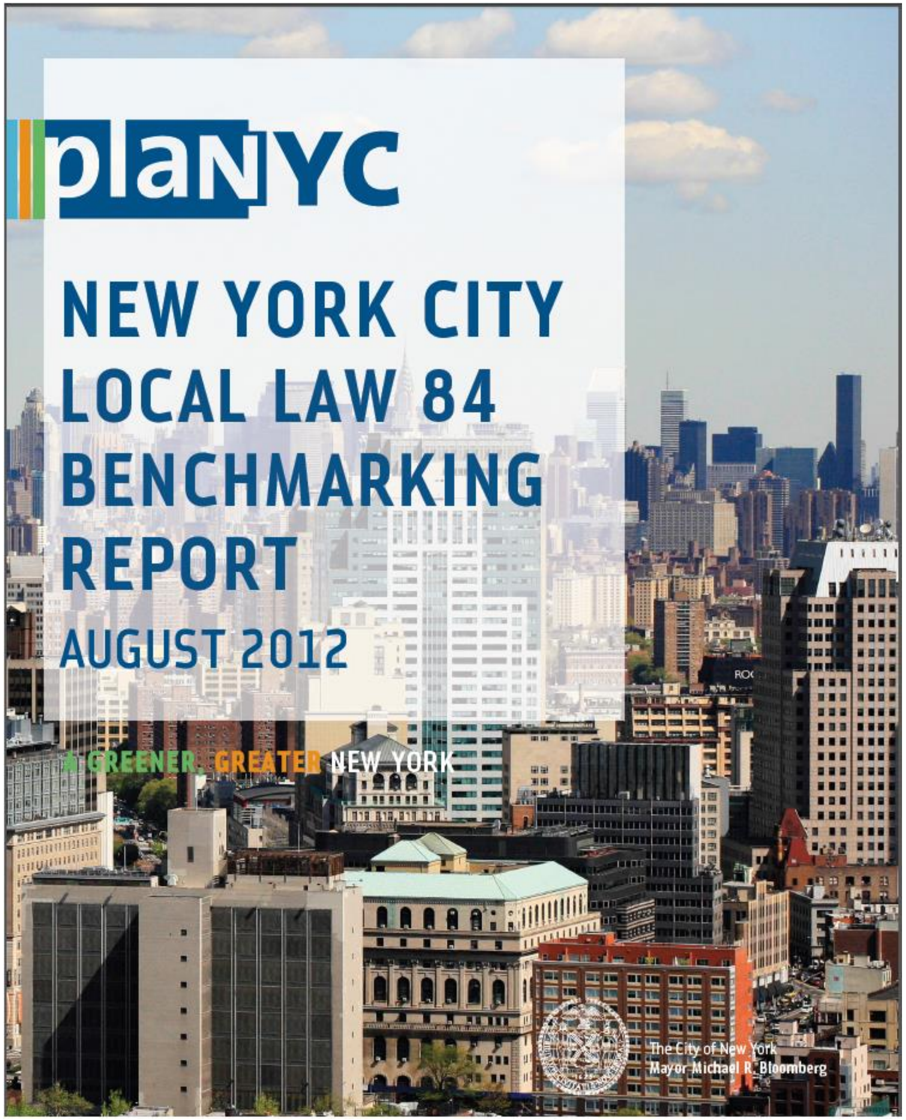
Fund True Opportunities

Typical Funding Program



LEAN Approach





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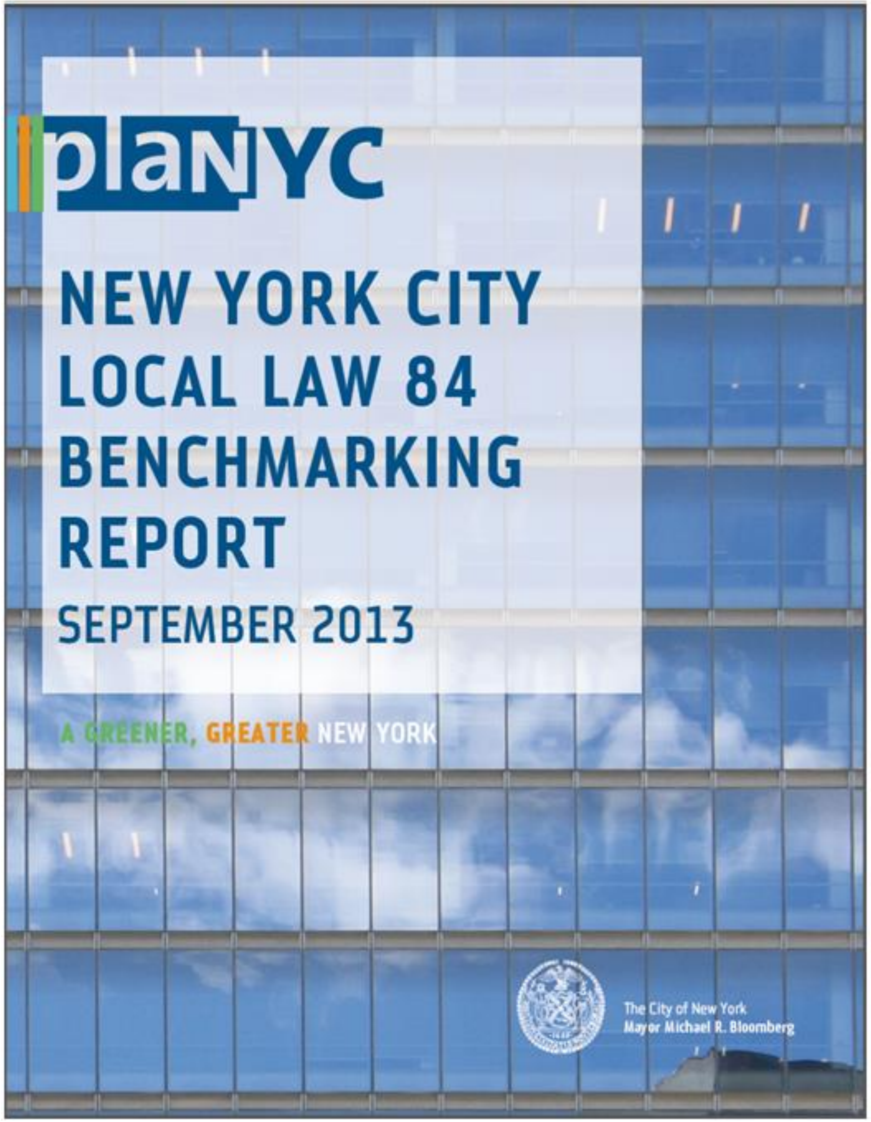
NEW YORK CITY
LOCAL LAW 84
BENCHMARKING
REPORT
AUGUST 2012

A GREENER, GREATER NEW YORK

The City of New York
Mayor Michael R. Bloomberg



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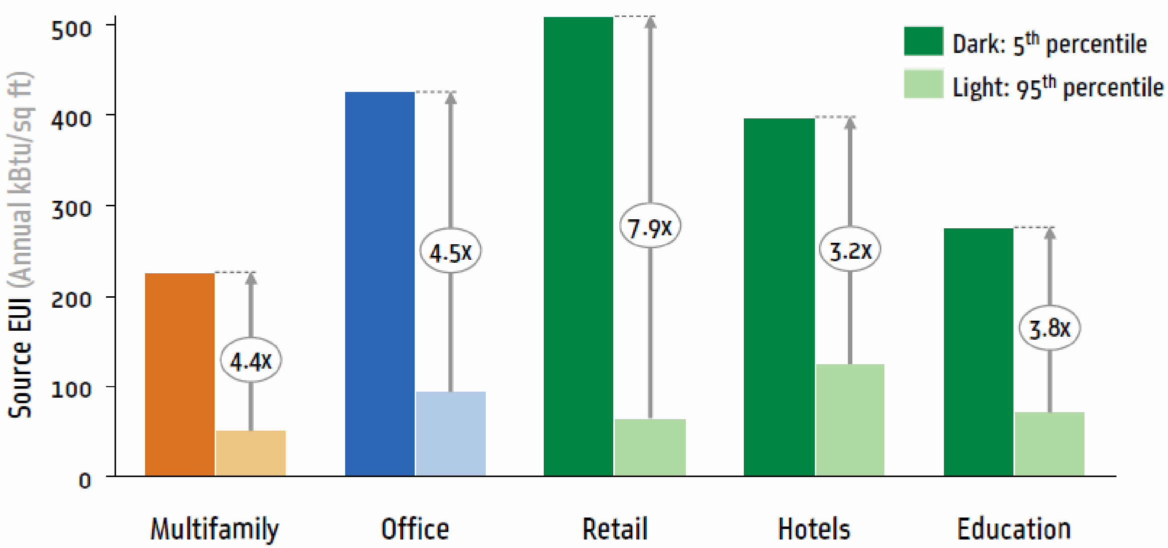
NEW YORK CITY
LOCAL LAW 84
BENCHMARKING
REPORT
SEPTEMBER 2013

A GREENER, GREATER NEW YORK

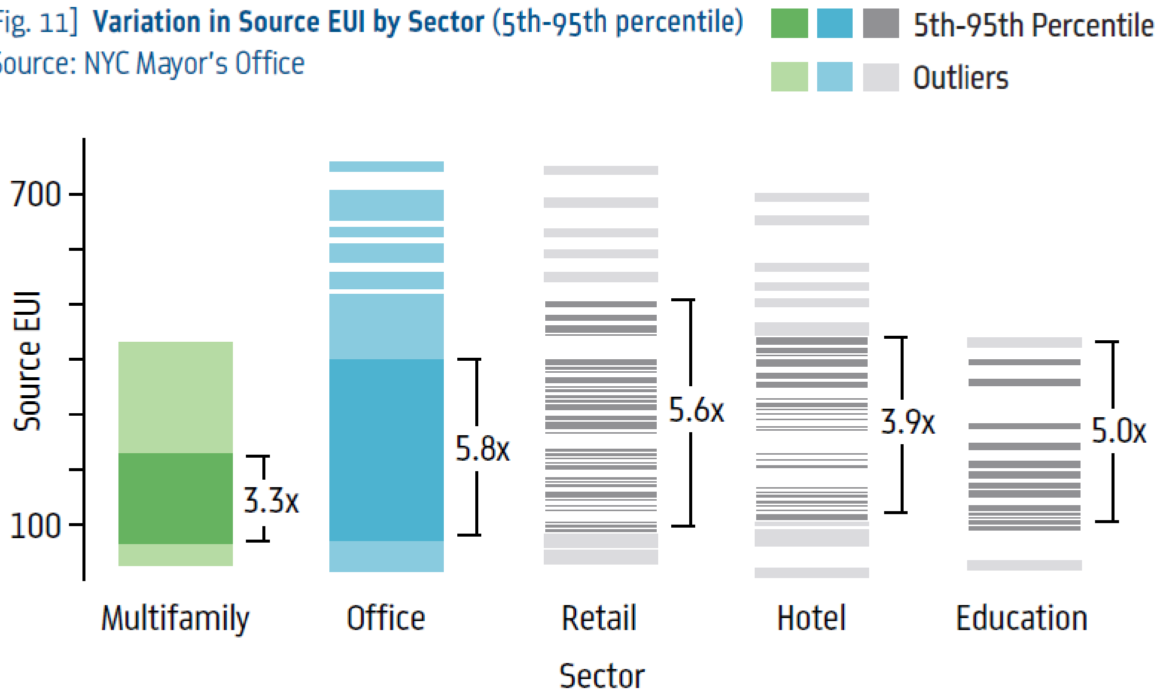
The City of New York
Mayor Michael R. Bloomberg

Early Findings from Energy Benchmarking in New York



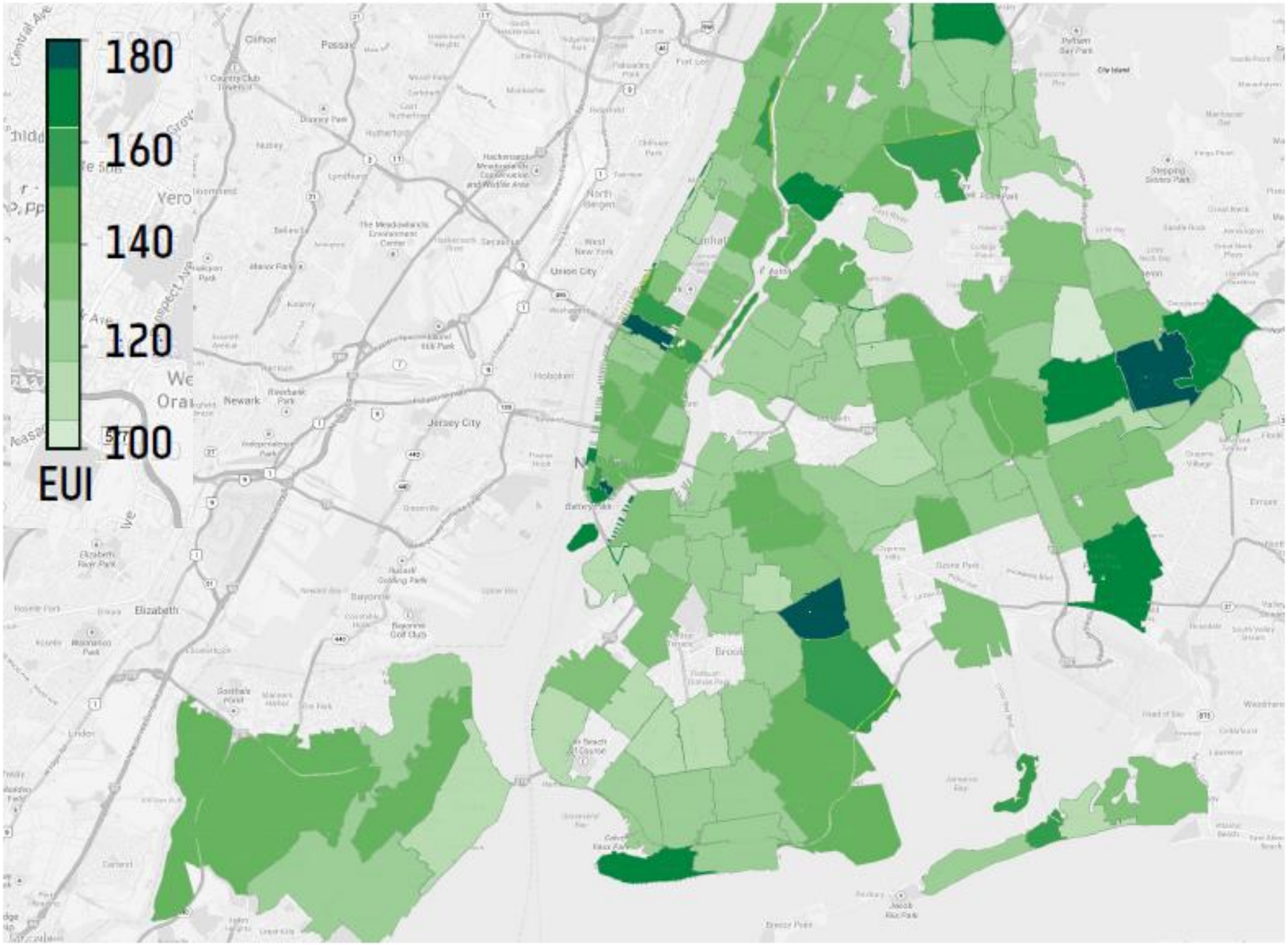
2012: Within the multifamily sector, the poorest performing buildings **use 4 times the energy** of the highest performing buildings.

[Fig. 11] **Variation in Source EUI by Sector** (5th-95th percentile)
Source: NYC Mayor's Office



2013: **Energy use varies by a factor of about three for multifamily buildings**
(5th-95th percentile)

Early Findings from Energy Benchmarking in New York



[Fig. 23] **Geographic Distribution of Median Multifamily EUI**
Source: New York University

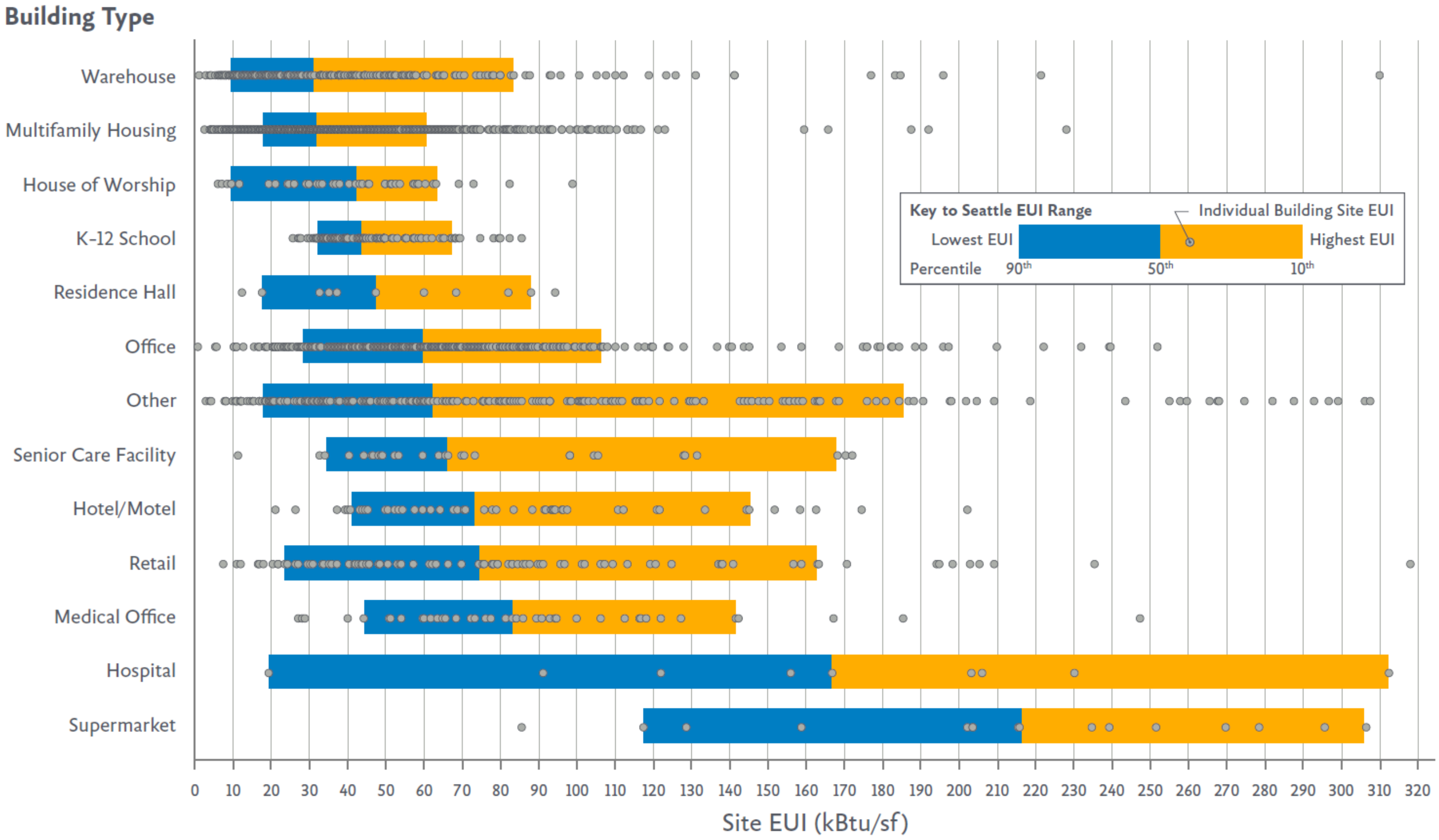
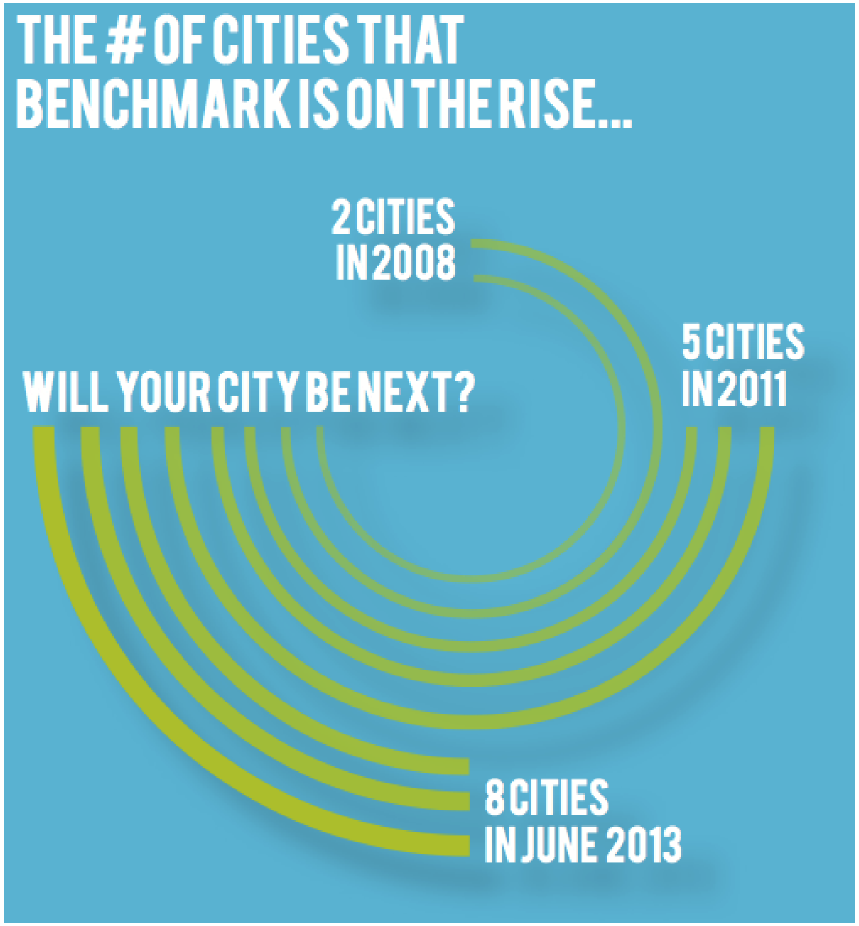


Figure 11: **2012 EUI Performance Range and Distributions by Building Type**

Momentum is building…



- July 2011: NARUC resolution
- November 2013: NASUCA resolution
- DOE Voluntary Code of Conduct
- Better Buildings Energy Data Accelerator
- PUCs currently considering issue of data aggregation
- More utilities funding efforts through energy efficiency portfolios

That enforce branding

Thank you! Questions?

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