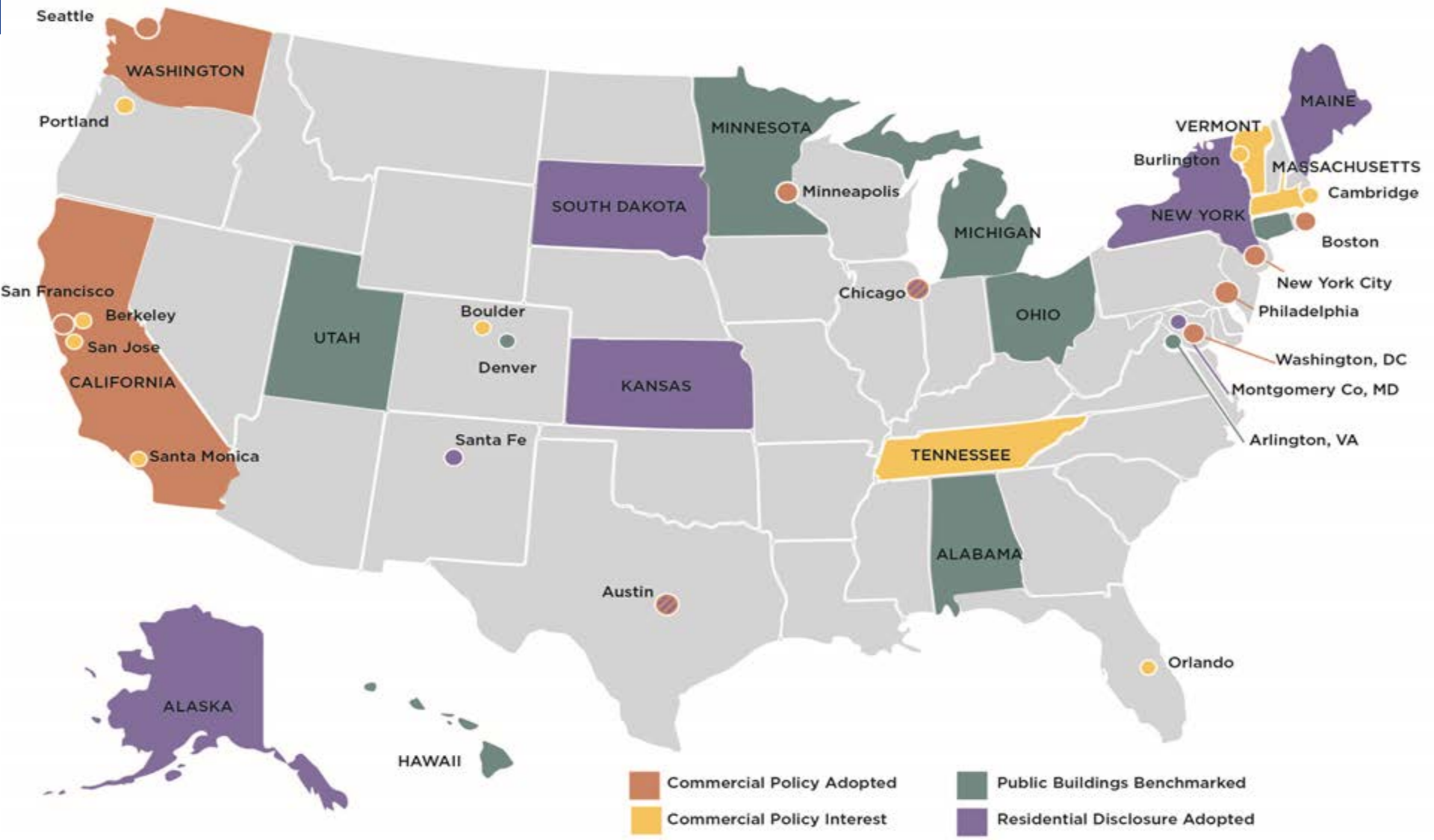
Better Buildings
U.S. DEPARTMENT OF ENERGY

Harnessing the Power of Data from Benchmarking and Disclosure

Alex Dews, Philadelphia, PA
Brendon Slotterback, Minneapolis, MN
Marshall Duer-Balkind, Washington, DC
Constantine Kontokosta, Center for Sustainable Built Environment, New York University

U.S. DEPARTMENT OF ENERGY

U.S. Benchmarking Policy Landscape



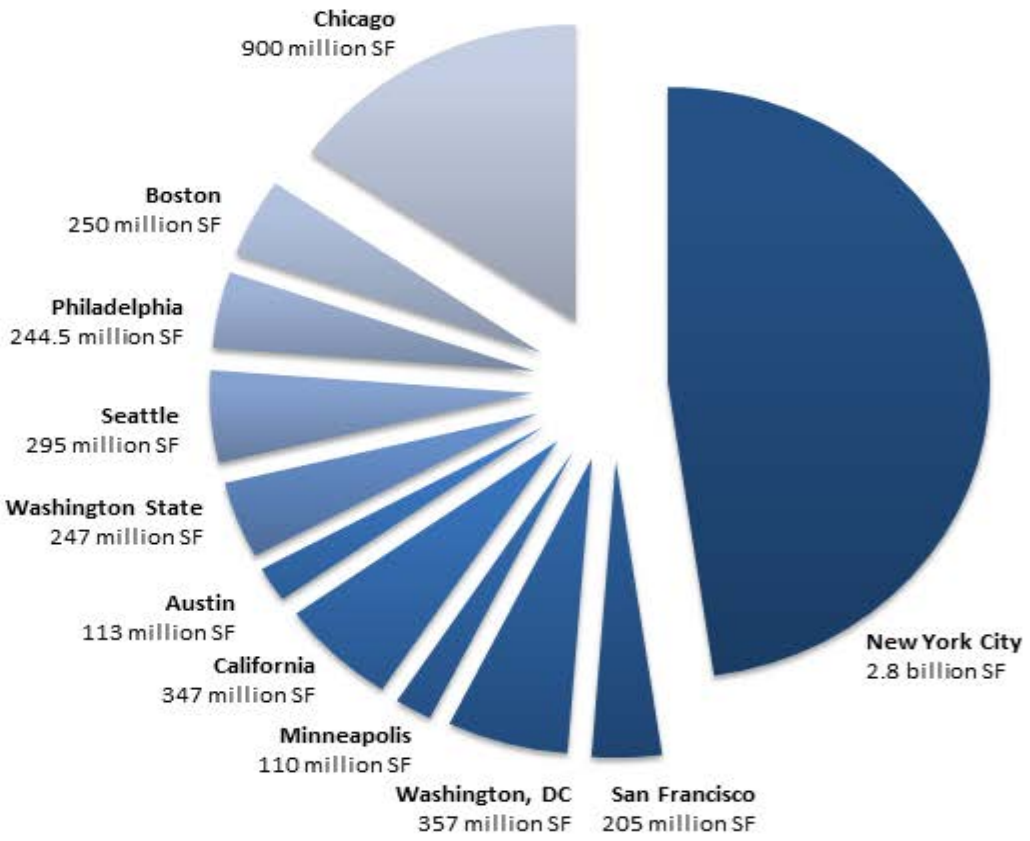
*Map courtesy of BuildingRating.org

Totaling approximately

5.8 billion SF

of floor space in major real estate markets

Building Area (in Square Feet) Covered Annually



Source: IMT

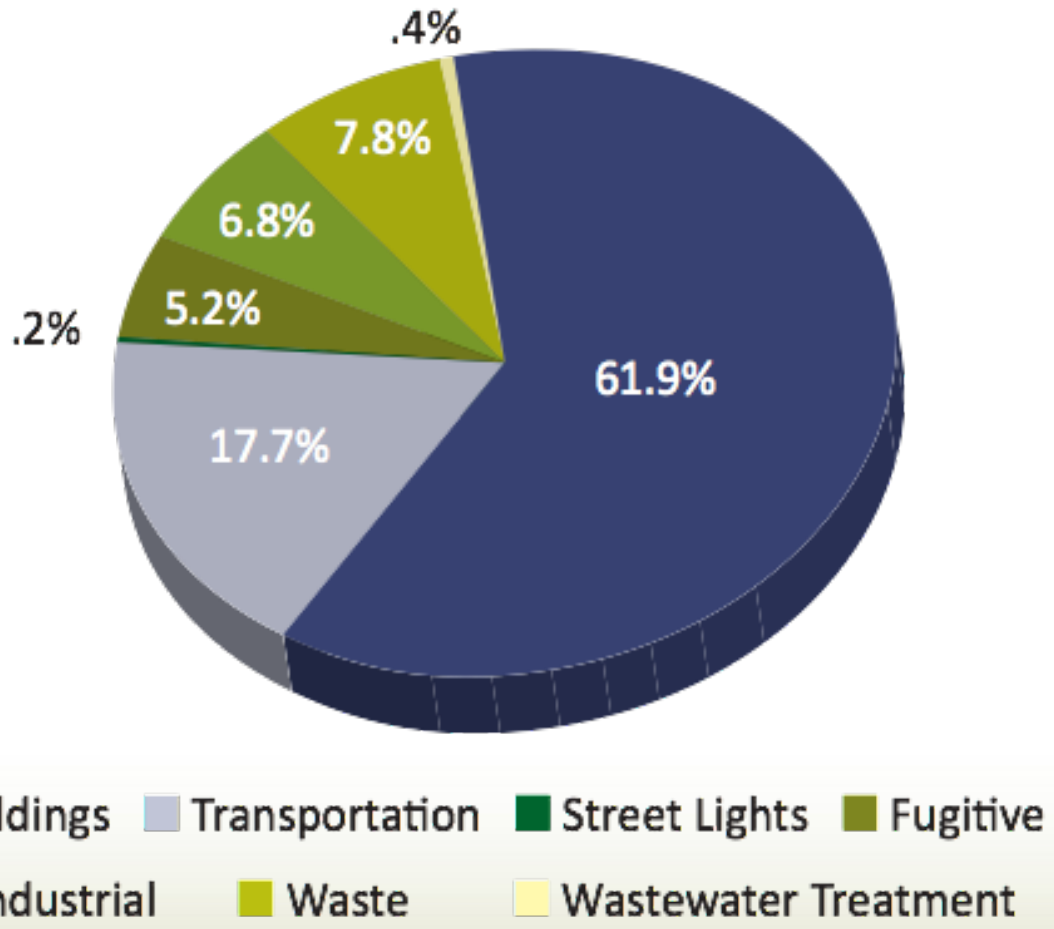
Benchmarking and Disclosure in Philadelphia

Alex Dews, Mayor's Office of Sustainability

Better Buildings Summit, May 2014

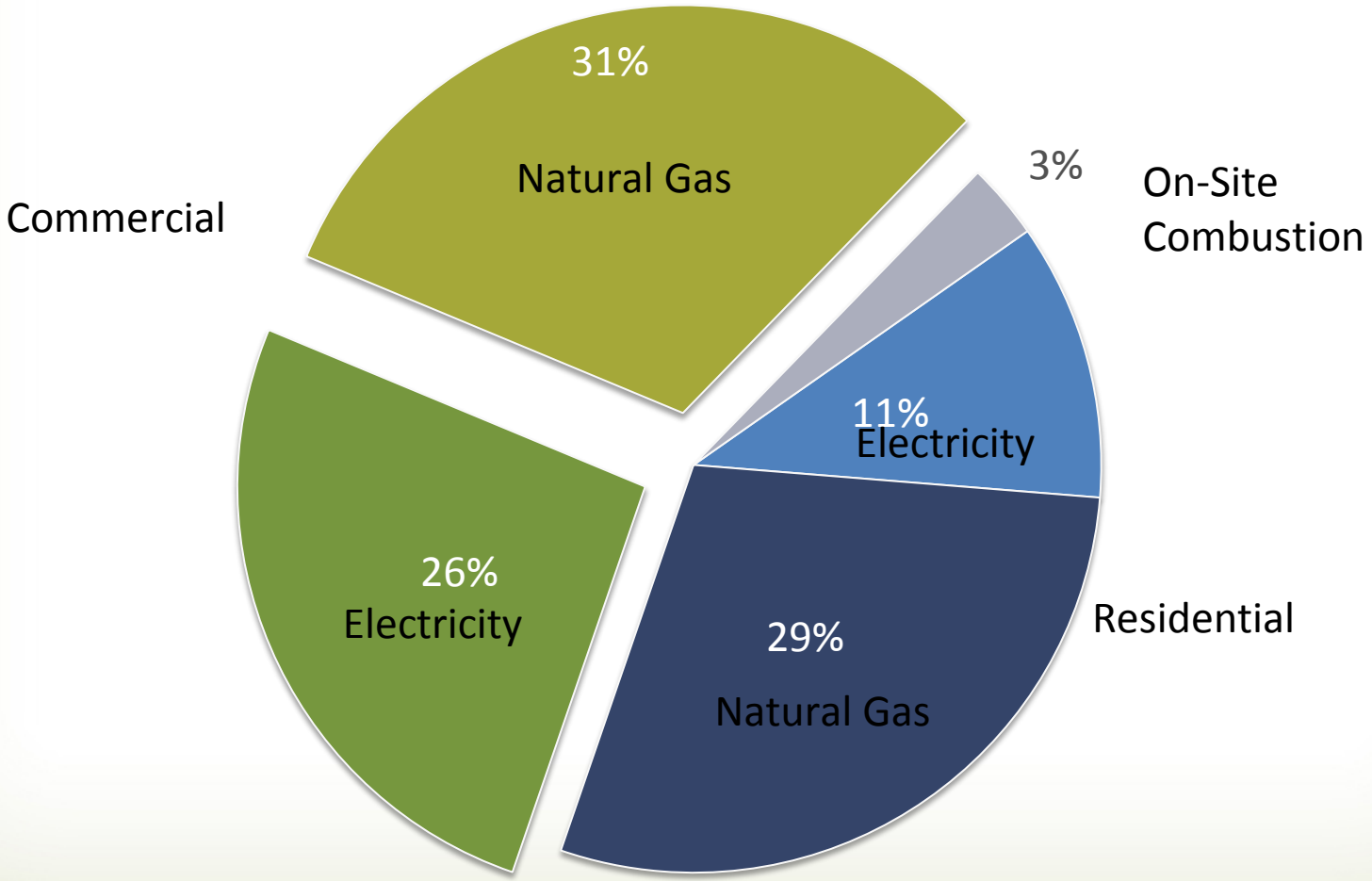
Why Benchmarking?

Buildings account for 62% of GHG emissions in Philadelphia

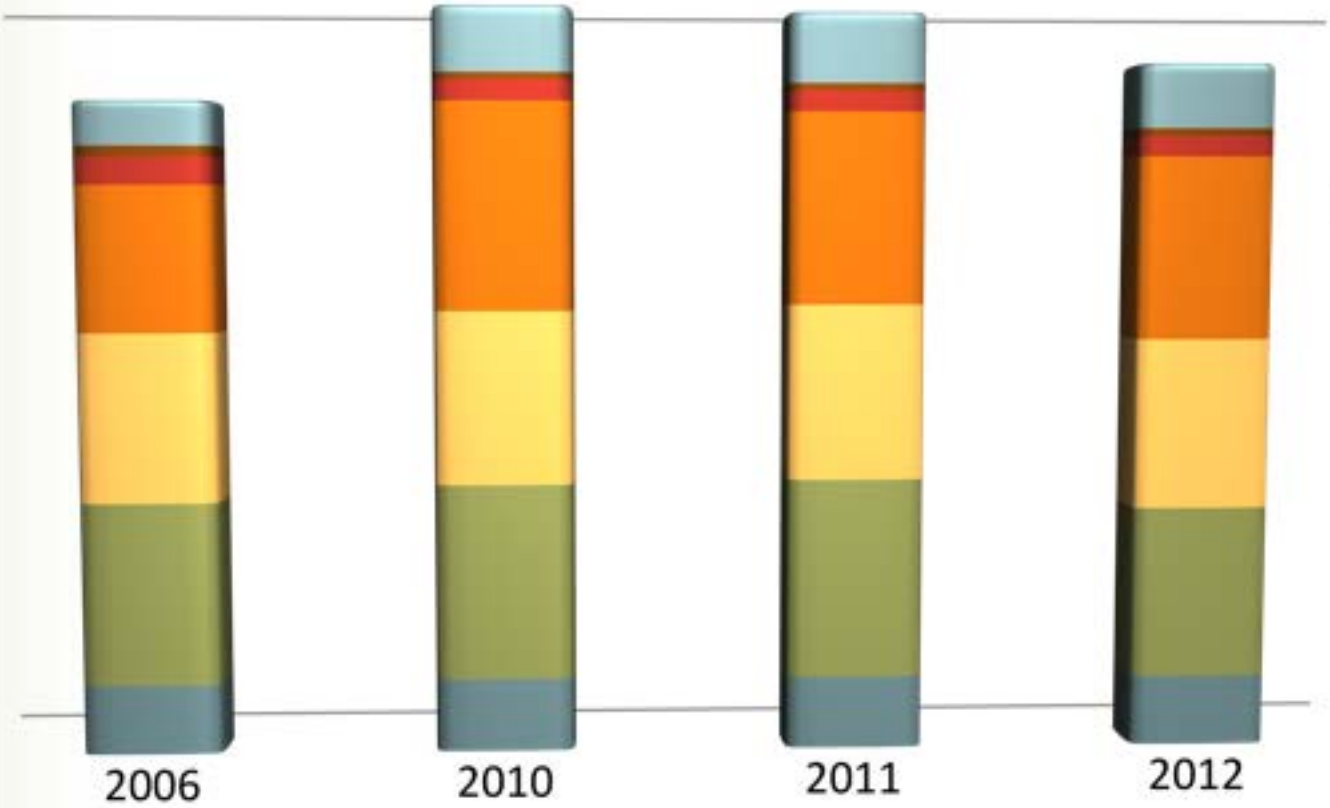


Why Benchmarking?

The commercial sector uses 57% of all building energy



Citywide building energy use has increased 6% since 2006



Commercial natural gas use has increased 25%

Electricity - Residential
Natural Gas - Residential
Electricity - C&I
Natrual Gas - C&I
On-Site Combustion - Residential
On-Site Combustion - C&I
Steam

Benchmarking
Year One Compliance Rate: 86%

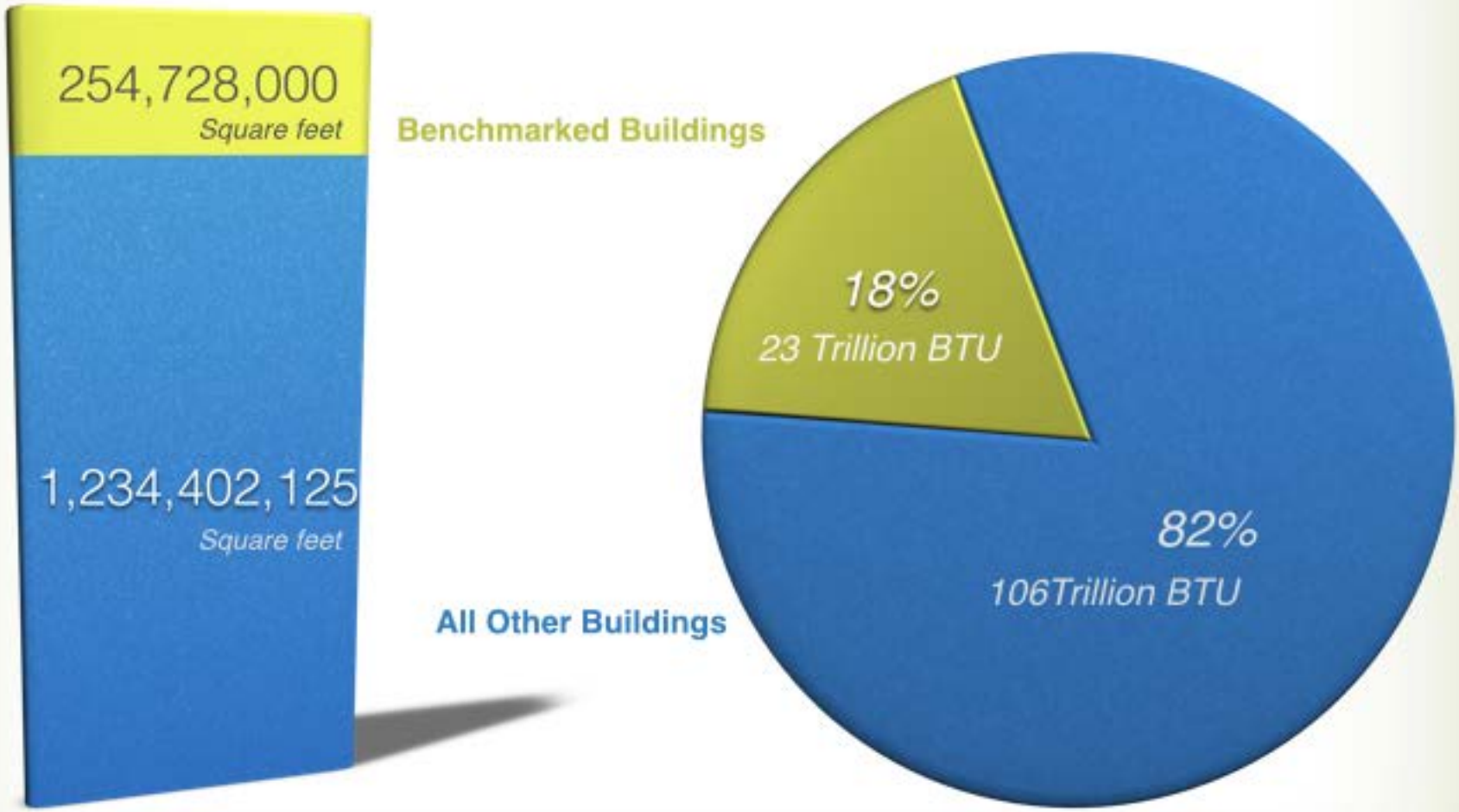
250m
Square ft.
(Non-residential)

Represents
25%
of total Citywide
square footage

64
Average ENERGY STAR Score

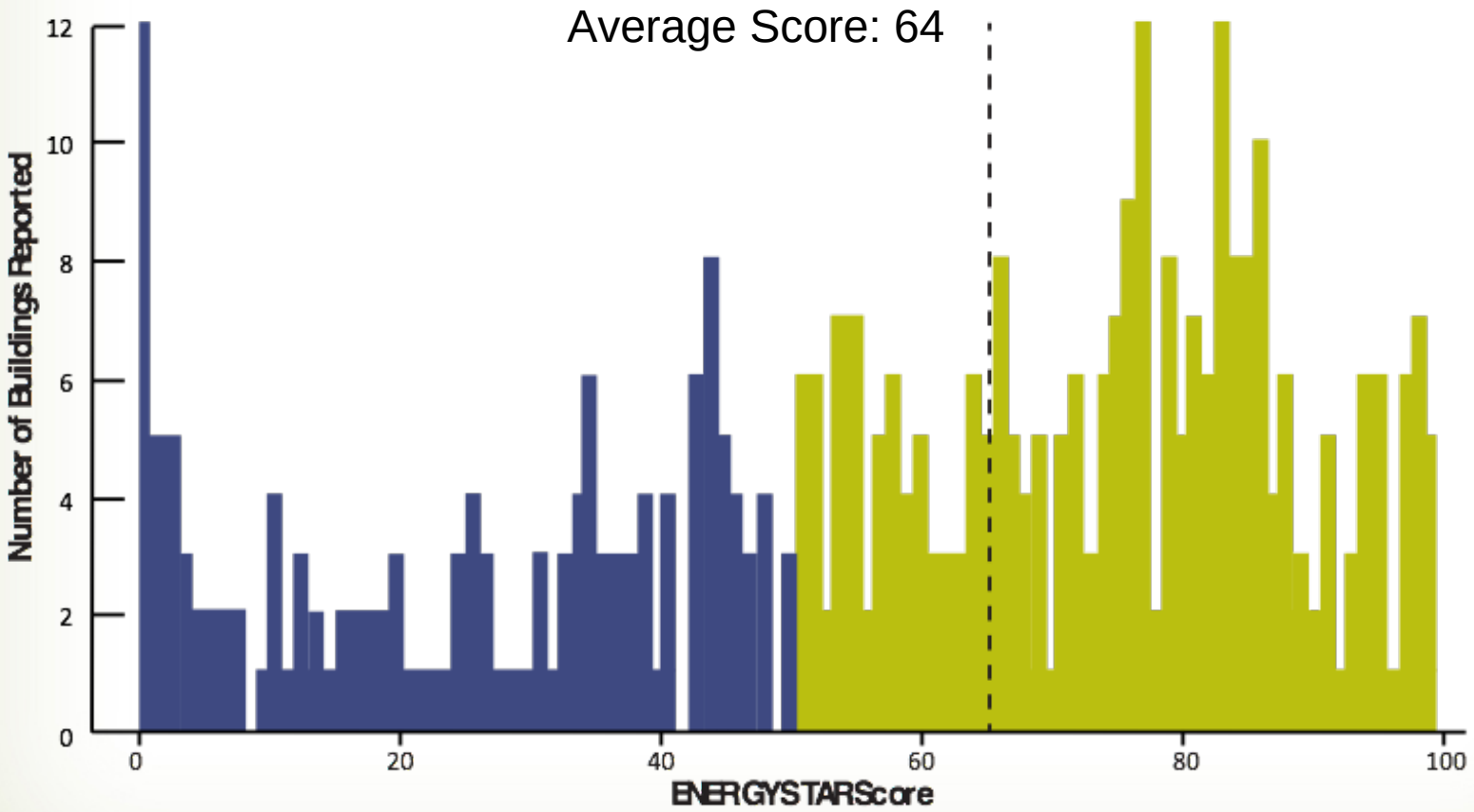
1,700
Buildings

Benchmarking Impact Citywide



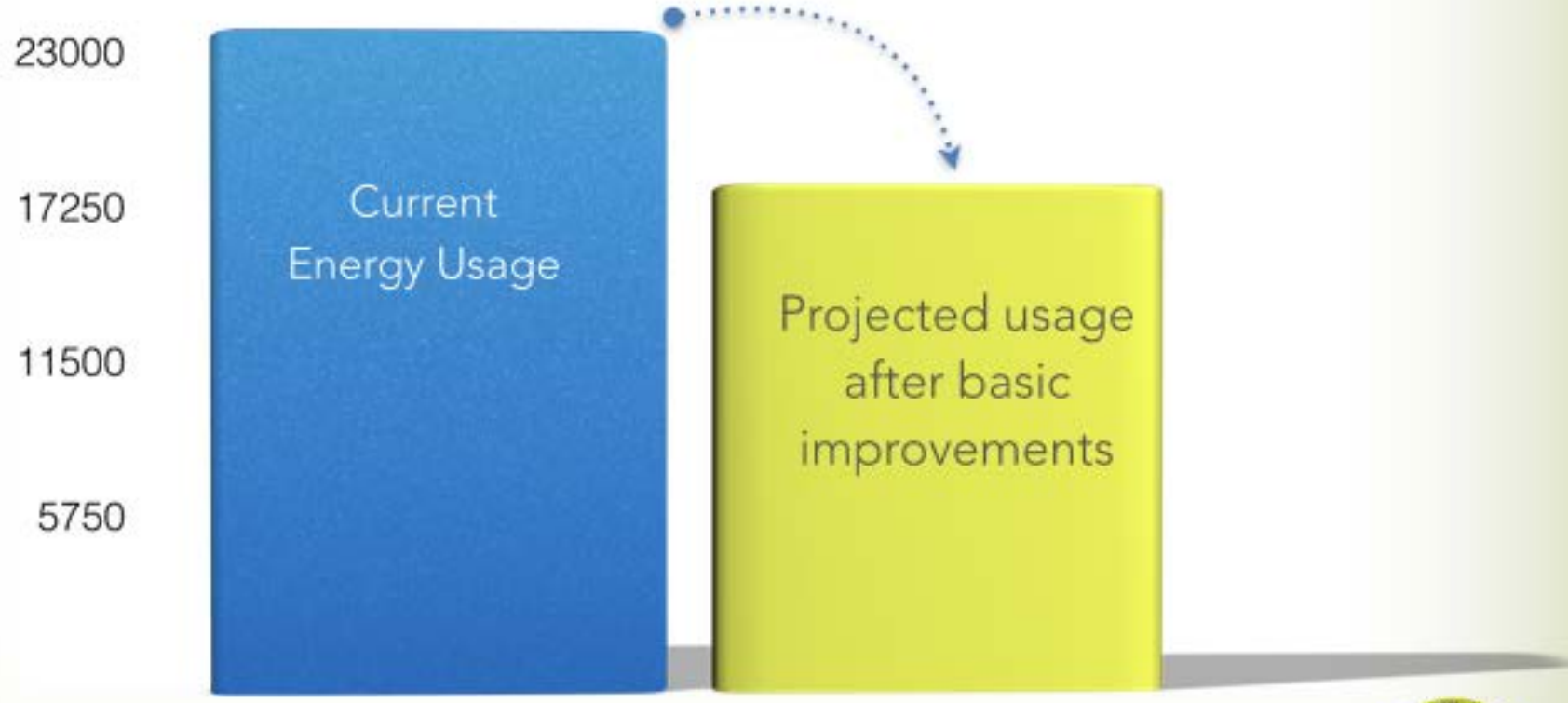
Benchmarked buildings account for
24% *of city square footage, and* ***18%*** *of its energy use*

Citywide ENERGY STAR Distribution

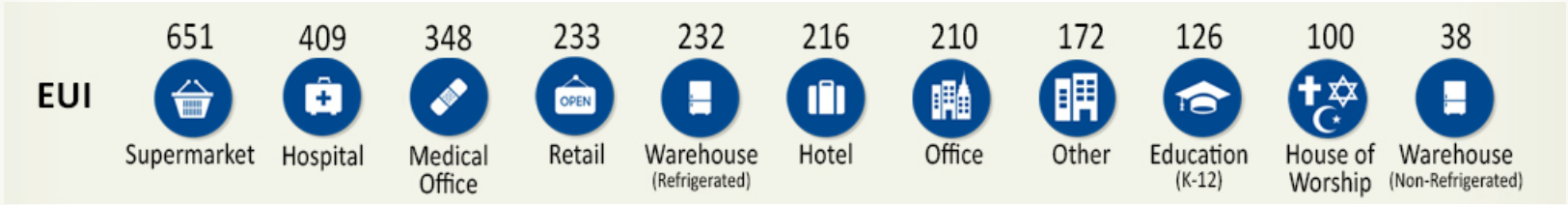


Potential Savings in Benchmarking Portfolio

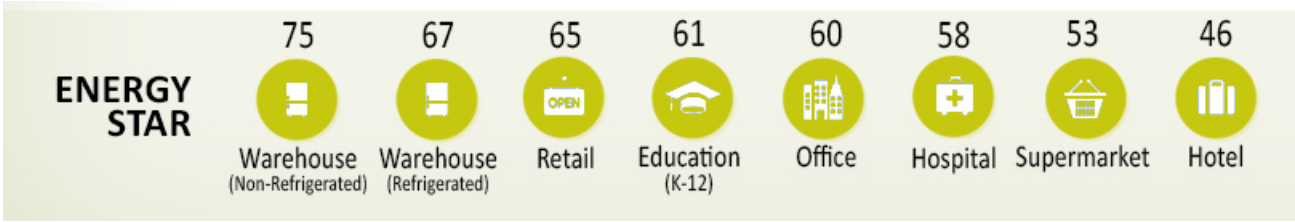
23% energy reduction across 1,700 Buildings
or $100 million in annual savings



Connecting Performance to Financing and Technical Assistance



Sector Summary by Source EUI
(kBtu/per square foot)



Sector Summary by ENERGY STAR
Score (1-100)

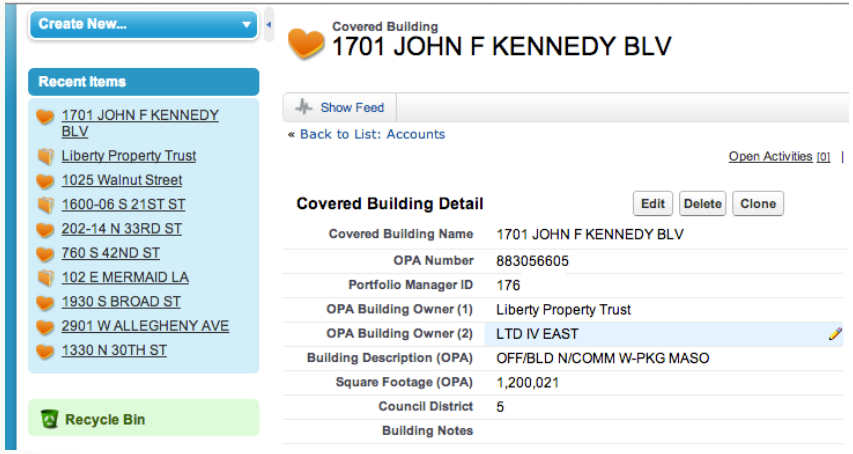
PECO smart ideas®

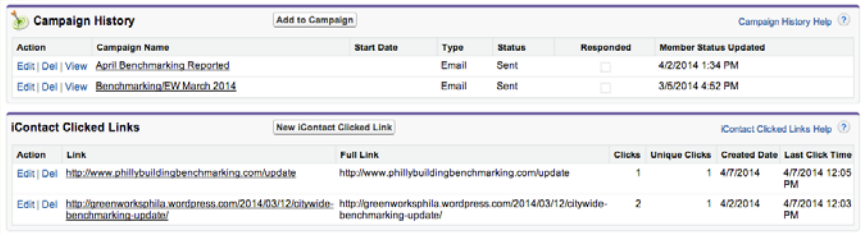
EnergyWorks
ENERGY EFFICIENCY IMPROVEMENTS

PGW energysense

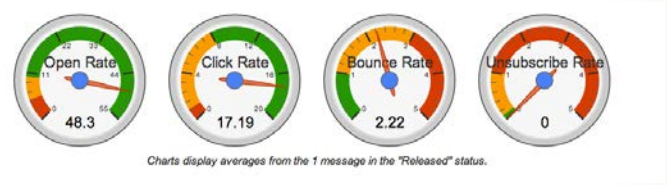
Managing Data and Outreach with CRM

Building Data Tracking





Email Outreach & Marketing



Support from Partner Organizations

LOCAL PARTNERS

BOMA Philadelphia

CBEI CONSORTIUM for BUILDING ENERGY INNOVATION

U.S. Green Building Council Chapter

DELAWARE VALLEY GREEN BUILDING COUNCIL

UTILITY PARTNERS

PECO An Exelon Company

PGW Safe. Reliable. Service.

Philadelphia Water Department

VEOLIA

NATIONAL PARTNERS

United States Environmental Protection Agency

Department of Energy United States of America

CITY ENERGY A JOINT PROJECT of NRDC + IMT

NRDC

IMT INSTITUTE FOR MARKET TRANSFORMATION

Minneapolis Commercial Building Energy Rating & Disclosure Ordinance

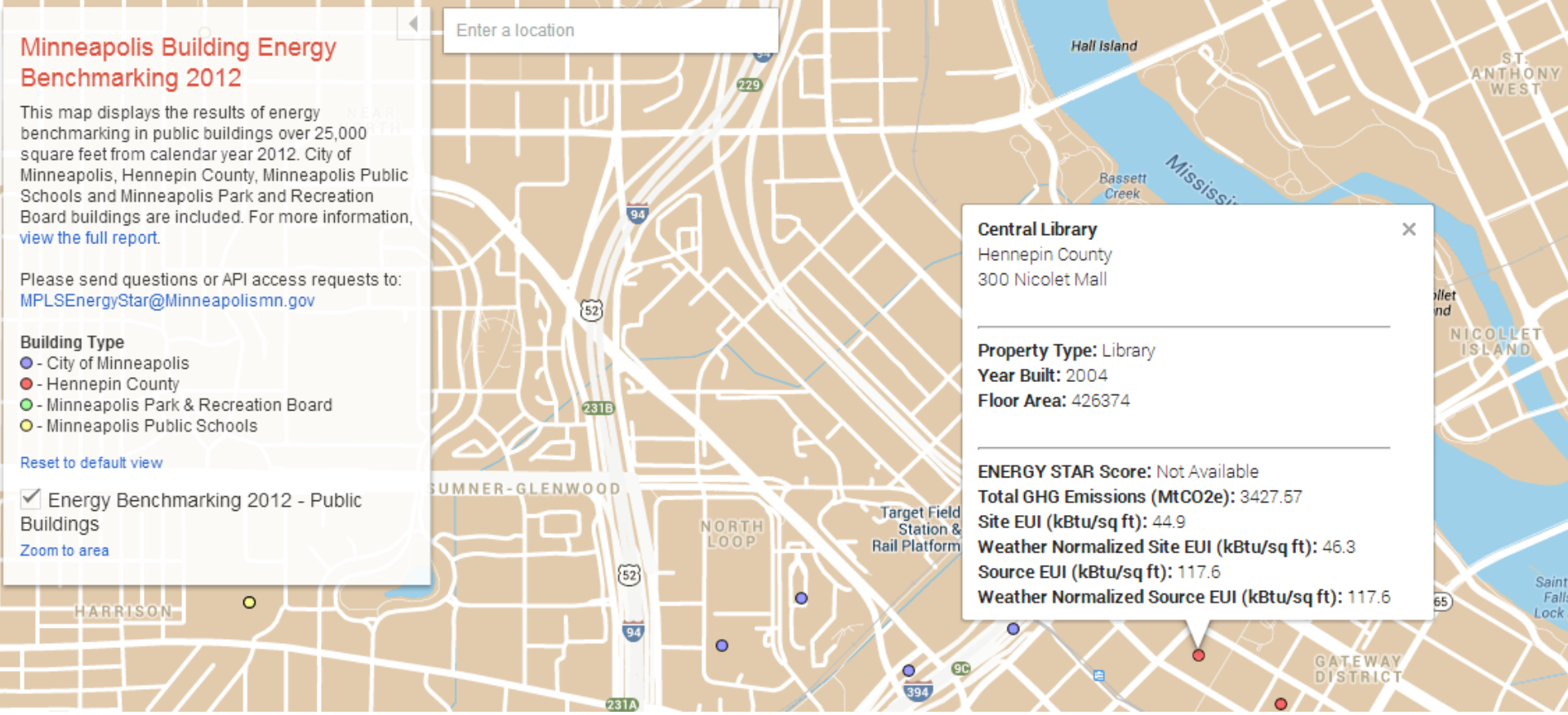
DOE Better Buildings Summit
May 9, 2014

Brendon Slotterback
Sustainability Program Coordinator
City of Minneapolis

What is the Commercial Building Energy Rating & Disclosure Ordinance?

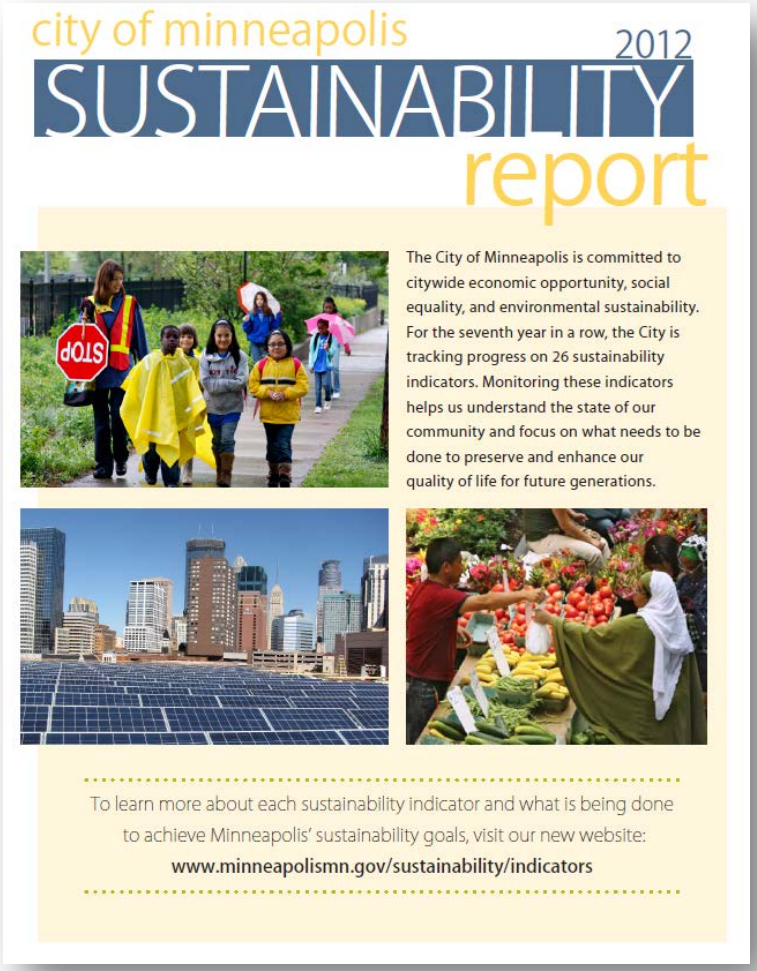
Two parts…

1. Large public and commercial buildings must measure (benchmark) and report to the City energy and water performance annually



2. The City discloses results annually after a one year grace period

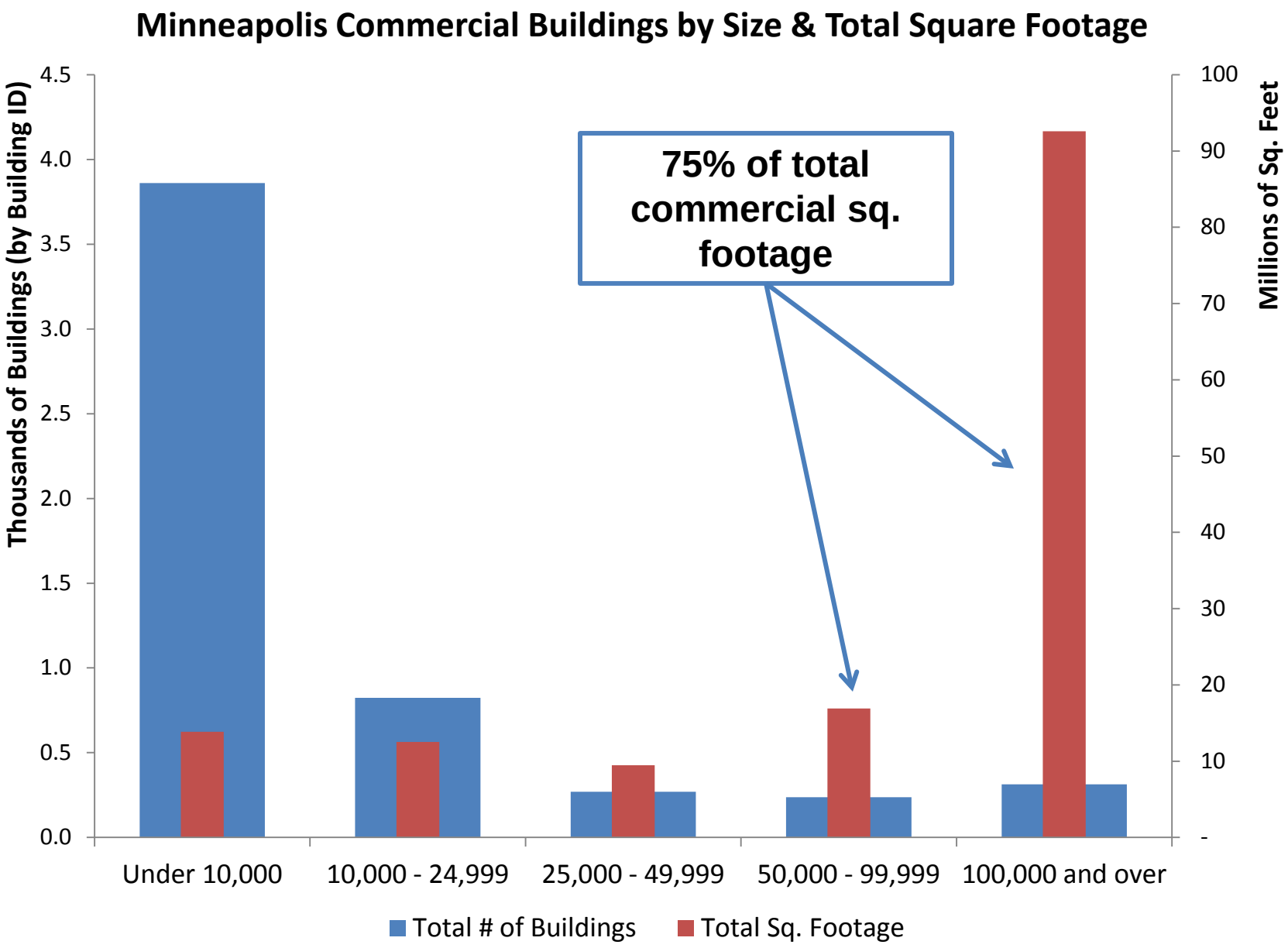
Use market forces, not performance or design mandates, to increase the energy efficiency of existing commercial buildings.



Eco-Focused

Jobs & Economic Vitality

Sustainability Indicators & Targets


Minneapolis Commercial Buildings by Size & Total Square Footage
Thousands of Buildings (by Building ID)
Millions of Sq. Feet
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
100
90
80
70
60
50
40
30
20
10
-
75% of total commercial sq. footage
Under 10,000
10,000 - 24,999
25,000 - 49,999
50,000 - 99,999
100,000 and over
Total # of Buildings
Total Sq. Footage

Reporting timeline

2013 – Public buildings only

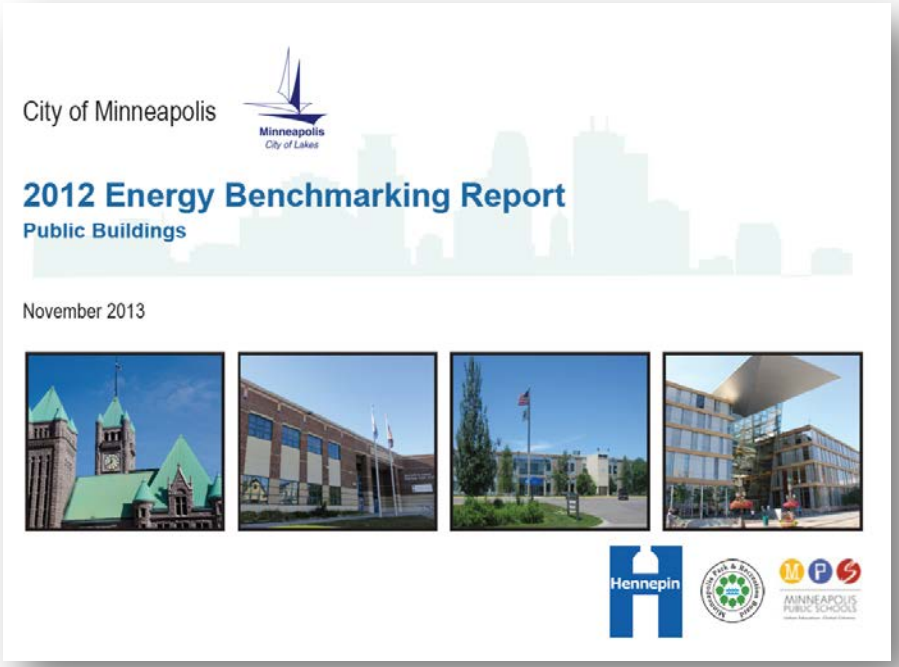
2014– Buildings at or over 100,000 square feet

2015 – Buildings at or over 50,000 square feet

Resources for building owners

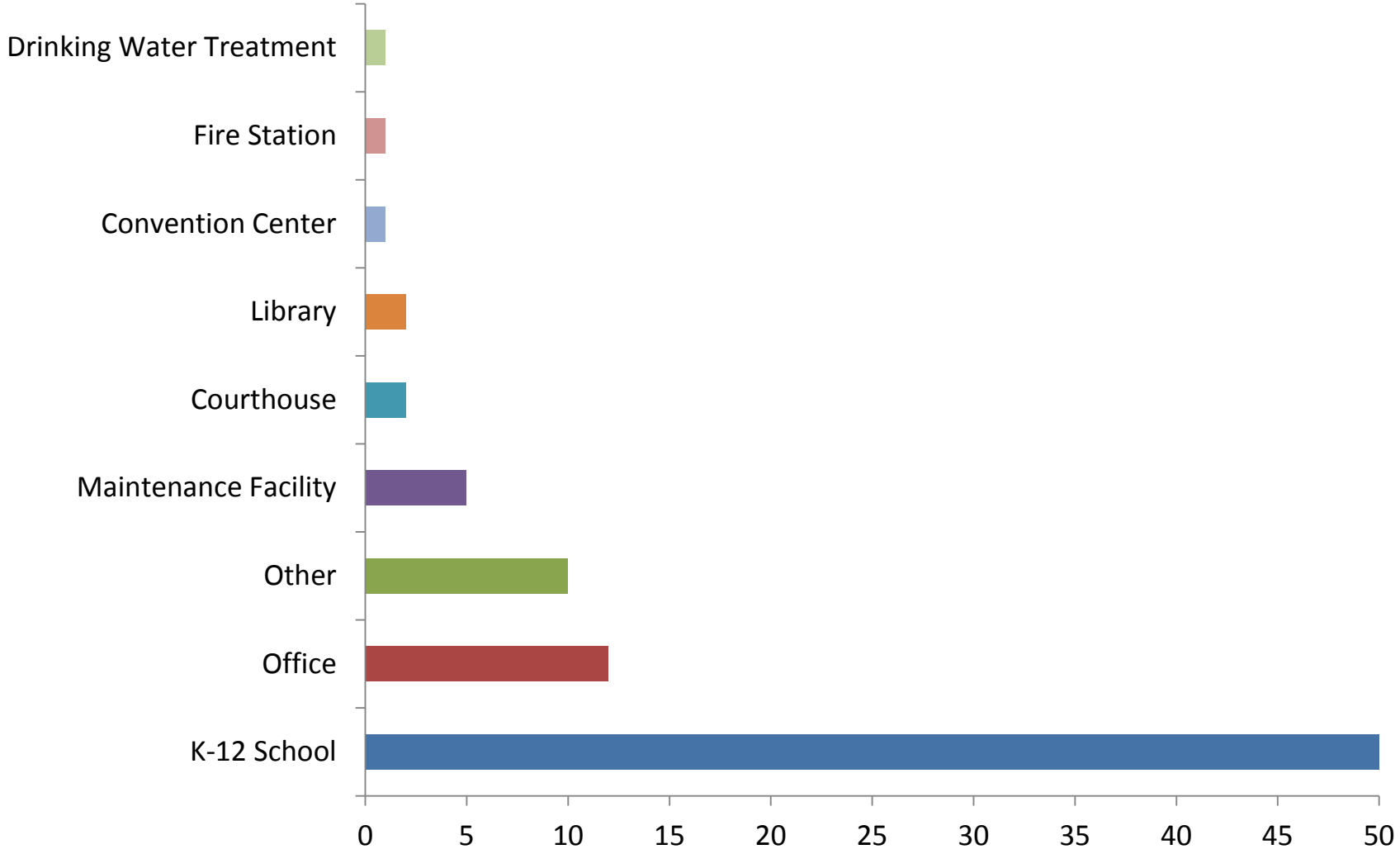
2012 Public building results

- 102 buildings, 21.3 million square feet
- Great cost savings potential: a 10% reduction could save $2.5 m in energy costs.
- 50% of buildings were eligible for ENERGY STAR score
- Median score was 46, average 52
- Scores and energy intensity results vary widely
- Little connection between age and energy use intensity



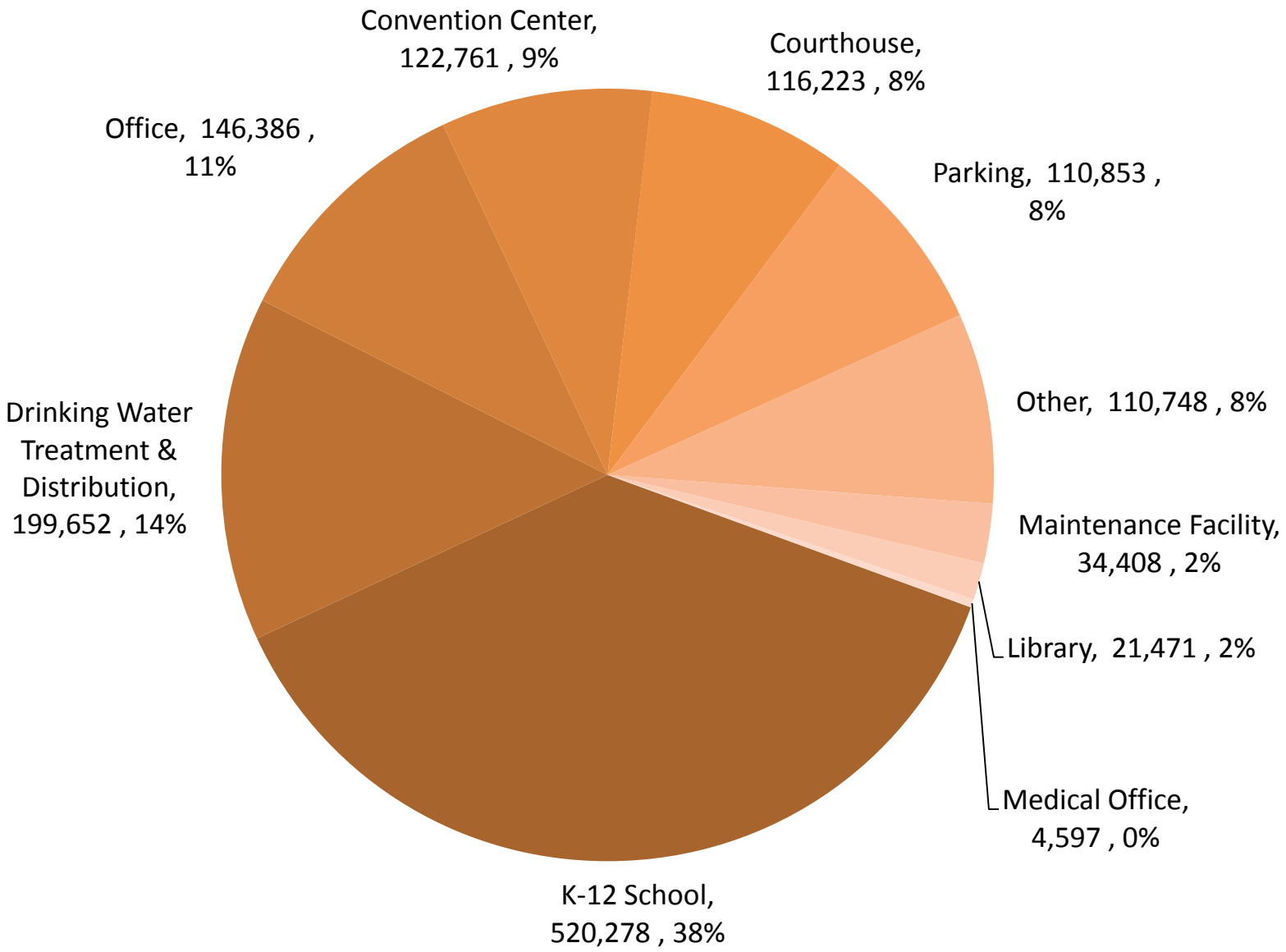
http://minneapolismn.gov/environment/energy/WCMS1P-116916

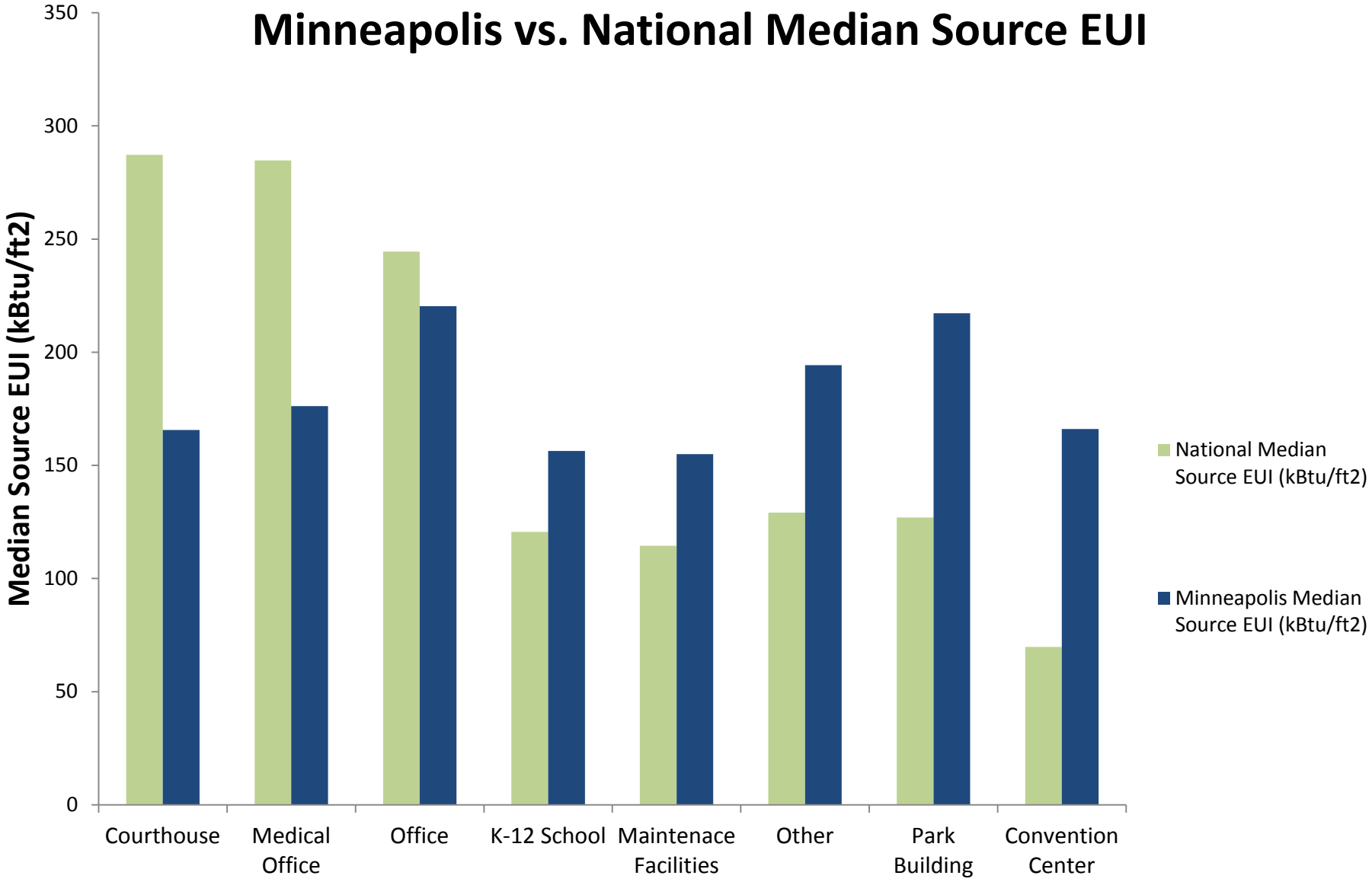
Benchmarked Public Buildings by Type



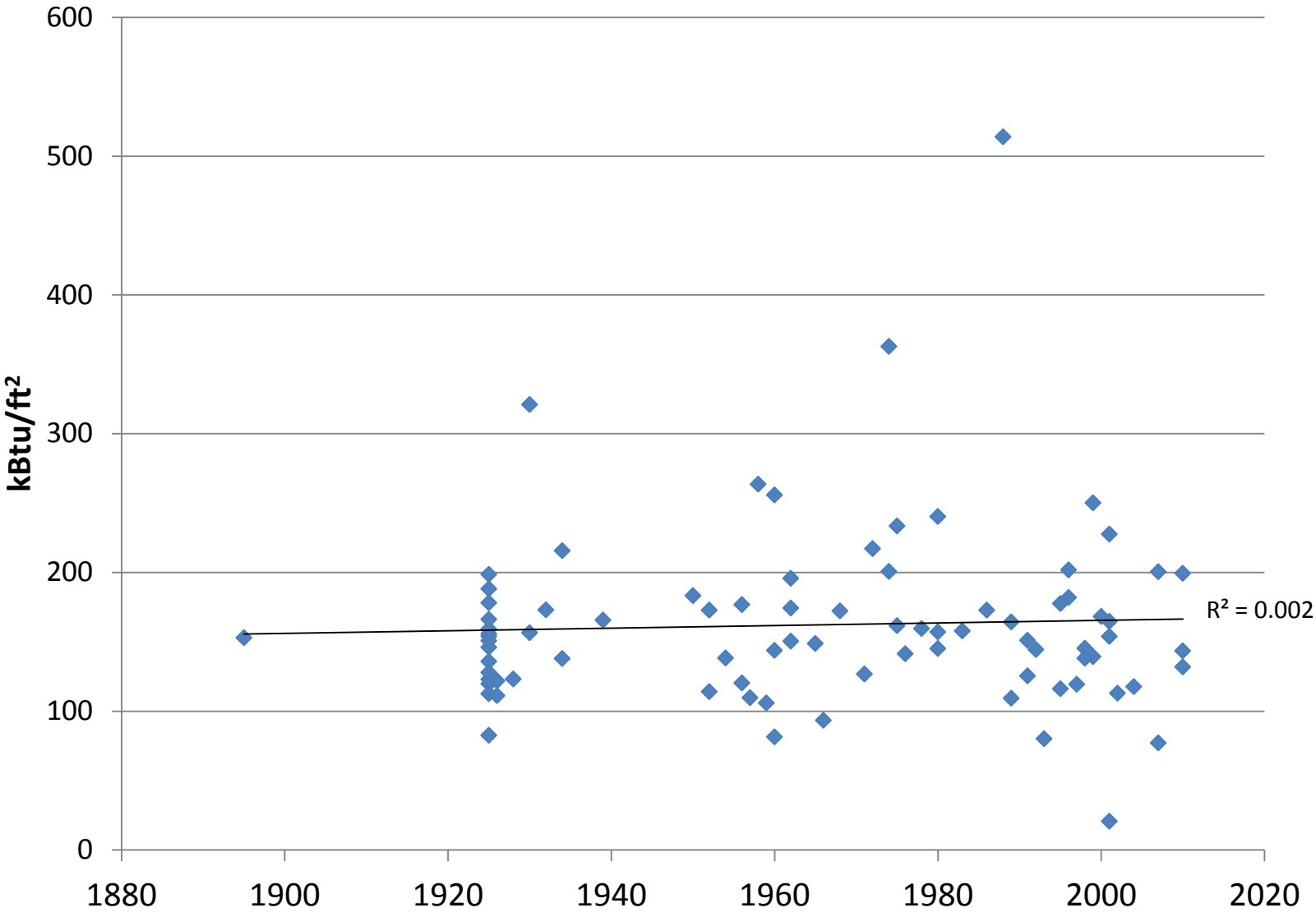
Benchmarked Energy Use by Building Type

mmbtu



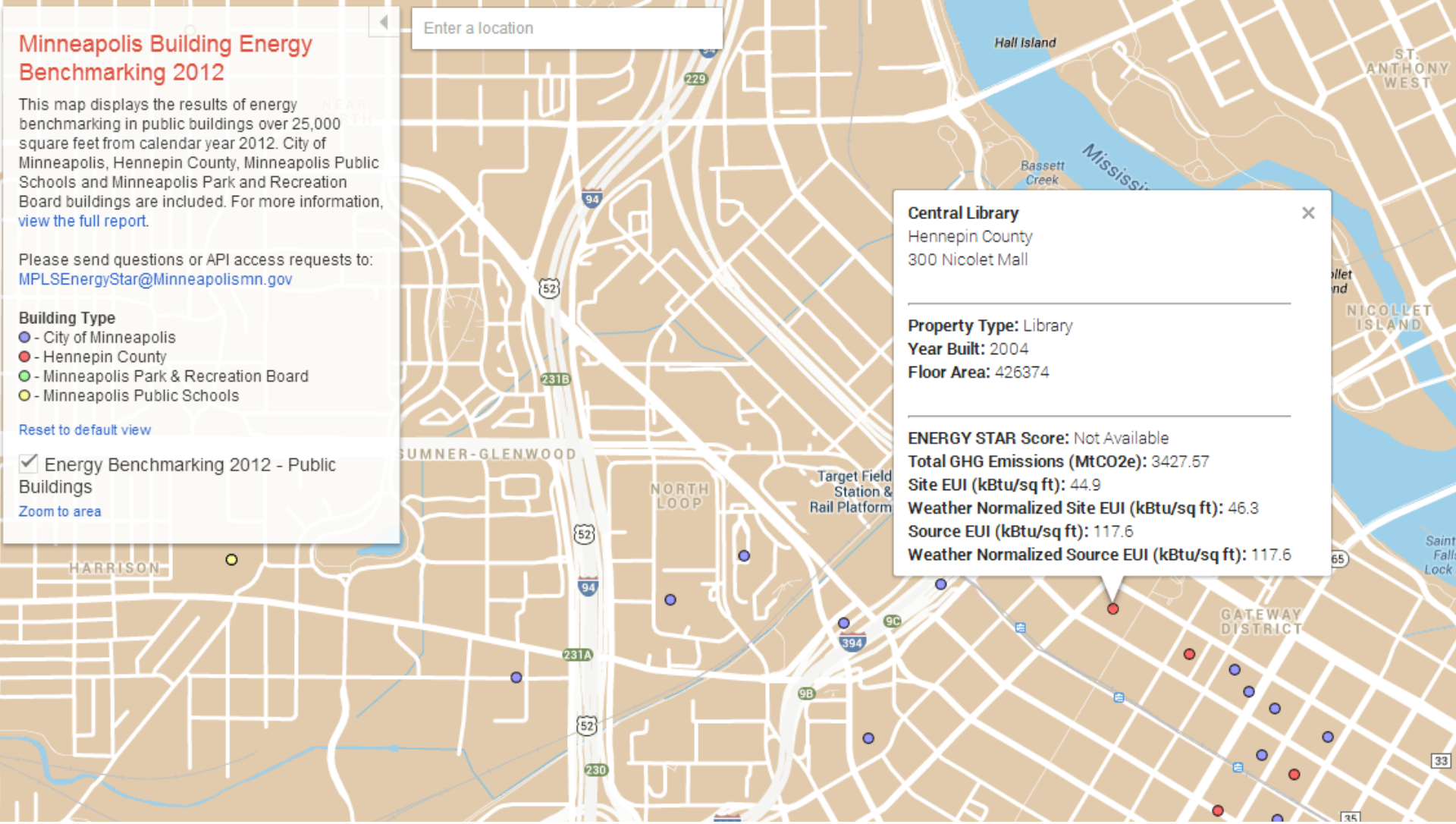

Minneapolis vs. National Median Source EUI
Median Source EUI (kBtu/ft2)
350
300
250
200
150
100
50
0
Courthouse
Medical Office
Office
K-12 School
Maintenace Facilities
Other
Park Building
Convention Center
National Median Source EUI (kBtu/ft2)
Minneapolis Median Source EUI (kBtu/ft2)

Source EUI by Year Built



Motivating action

Energy use data is transparent and is changing conversations…



Energy use data is transparent and is changing conversations…

SEATTLE ENERGY BENCHMARKING & REPORTING

SEATTLE OFFICE BUILDING

ENERGY PERFORMANCE PROFILE

<BUILDING_NAME>

Address: <BUILDING_ADDRESS>

Year Built: <YEAR_BUILT> Gross Floor Area: <GROSS_FLOOR_AREA>

Seattle Building ID: <DPD_BUILDING_ID>

Compare Your Building to Others in Seattle

Your building's annual energy use per square foot or **Energy Use Intensity (EUI)** can be compared to the other 400 Seattle office buildings that reported 2012 energy performance as required by law.

Your building's 2012 EUI
<EUI> kBtu/sf

LOWEST USE	MEDIUM-LOW	MEDIUM-HIGH	HIGHEST USE
42 or less	43-60	61-80	81 or more

Full report and other building type comparisons at **www.seattle.gov/energybenchmarking**.

EUI = Total Annual Energy Use (kBtu) ÷ Total Square Feet (sf)

Compare Your Building to Others in the U.S.

If available, your building's ENERGY STAR® score shows how its energy use compares to other U.S. buildings on a scale of 1 (least efficient) to 100 (most efficient). Buildings scoring 75 or more may be eligible to earn ENERGY STAR certification. Unlike EUI, the ENERGY STAR score takes into account the number of workers, operating hours, computers and other factors. Learn more at www.energystar.gov.

ENERGY STAR

Your Building's ENERGY STAR Score: **<ES_SCORE>**

Seattle Median ENERGY STAR Score for Offices: 75

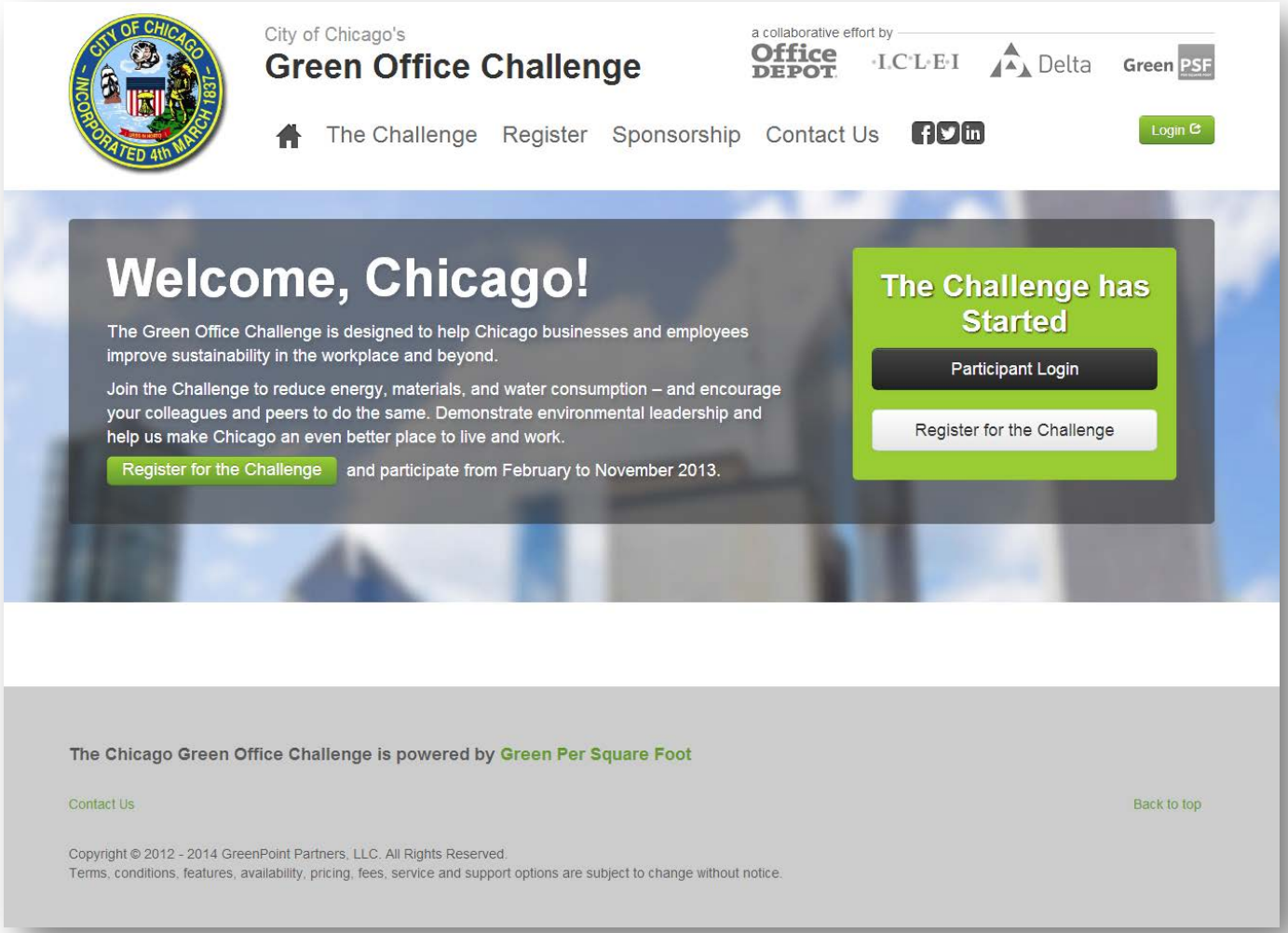
A higher ENERGY STAR score indicates a more efficient building.

The information in this report is self-reported and subject to verification. The City is sending this report to the building owner and the person that reported the building.

www.seattle.gov/EnergyBenchmarking

Energy use data is transparent and is changing conversations…

Connecting building owners with resources



Engaging tenants

Important recent developments

DOE Data Accelerator

Better Buildings Initiative

Customer Energy Usage Data (CEUD)

Public Utilities Commission Workgroup

Reporting deadline for buildings 100,000 square feet and over: **June 1, 2014**

Benchmarking workshops:

April 24th and May 6th

City's website:
http://minneapolismn.gov/energybenchmarking

CEE website:
http://buildingdisclosure-mpls.mncee.org/

Brendon Slotterback - 612-673-2349 - brendon.slotterback@minneapolismn.gov

SUSTAIN ABILITY

DC

Putting Data to Work: *Transforming Building Performance in the District of Columbia*

Marshall Duer-Balkind

Energy Administration
District Department of the Environment
Government of the District of Columbia

Better Buildings Summit
Washington, DC

May 9, 2013

Why Benchmarking?

Sustainable DC

Overall Vision:

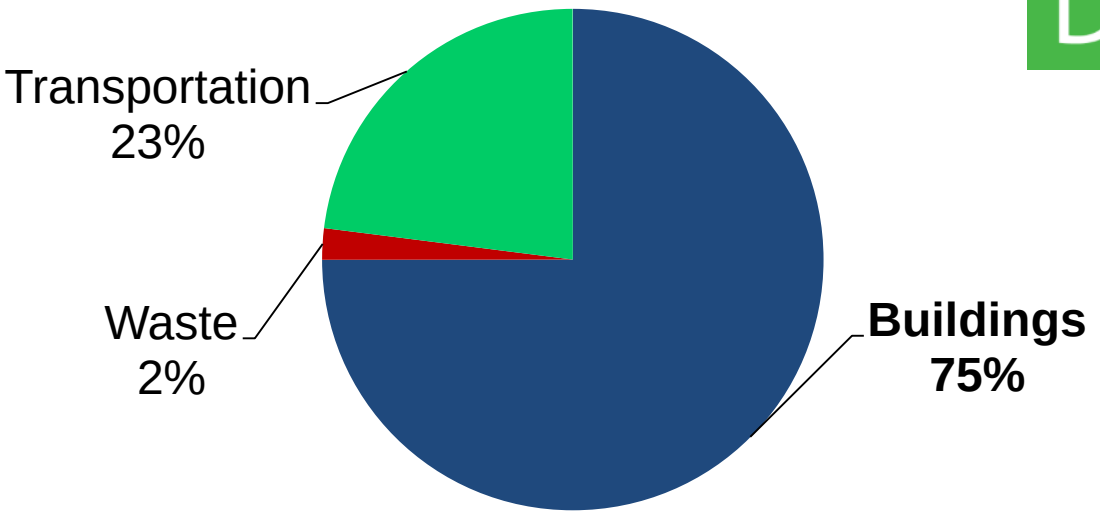
In just one generation—20 years—the District of Columbia will be the healthiest, greenest, and most livable city in the United States.

Energy Target:

By 2032, **cut citywide energy use by 50%** and increase use of renewable power to 50%

Why Benchmark?

Buildings are DC's largest source of Greenhouse Gas Emissions:



Source: DC 2011 GHG Inventory

Utilities are the largest non-fixed expense for DC building owners.

32% - Utilities
22% - Repairs/Maintenance
21% - Admin
5% - Security
1% - Grounds

Source: BOMA, 2010

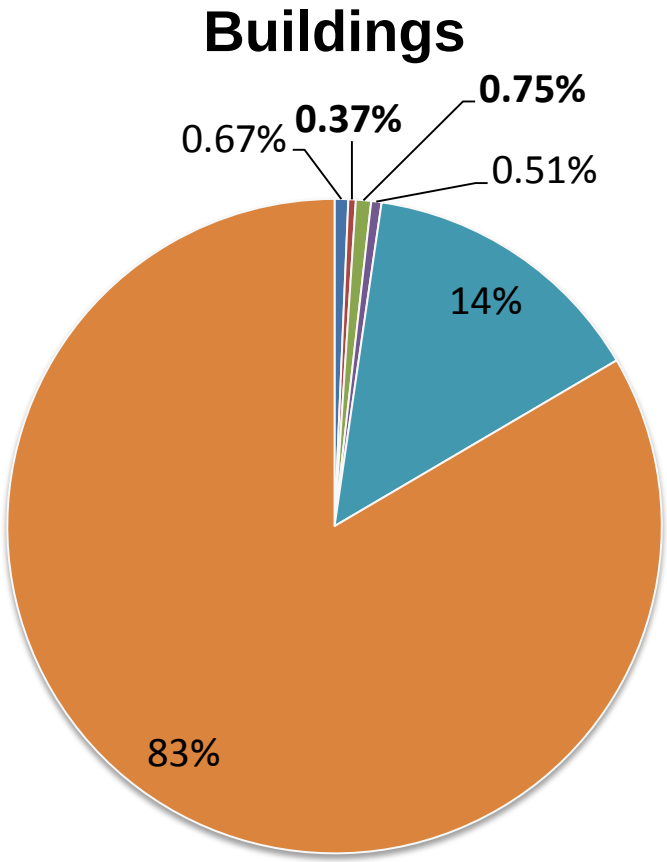
DC Benchmarking Law

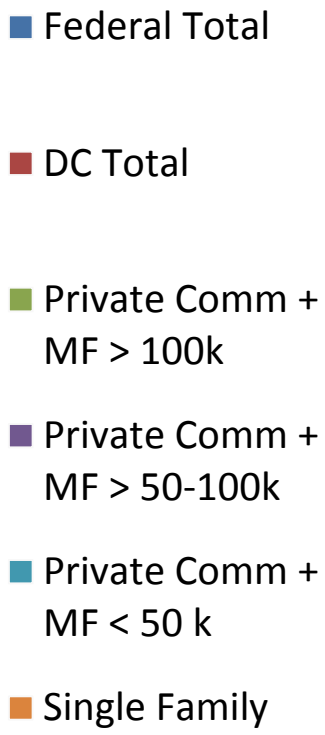
Green Building Act of 2006
Clean and Affordable Energy Act of 2008
(D.C. Official Code § 6-1451.03(c), 20 DCMR 3513)

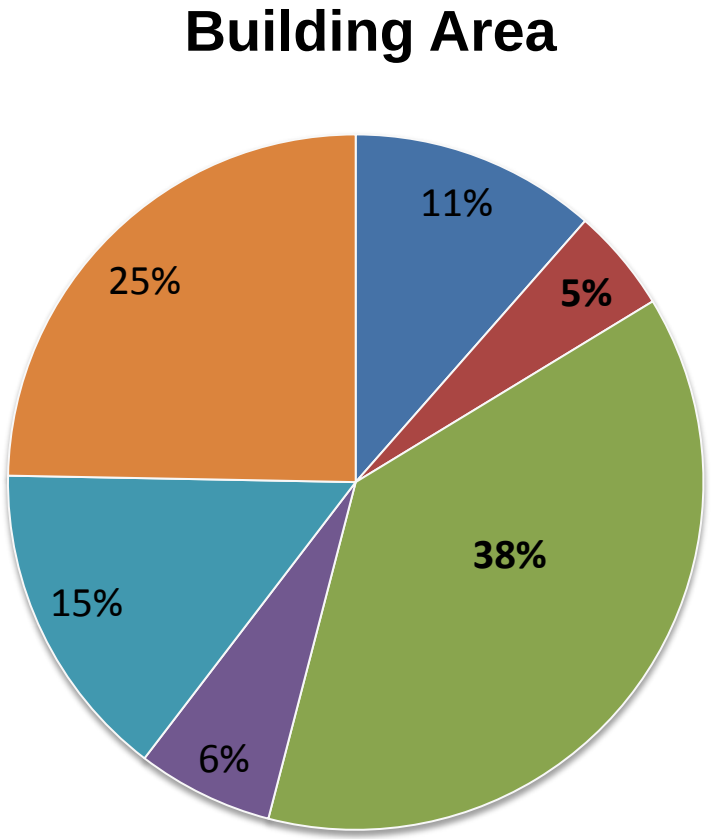
- **ENERGY STAR Portfolio Manager** benchmarking & public reporting
  - DC Government Buildings >10,000 sq. ft.
  - Private Buildings >50,000 sq. ft., **each April 1**
- **ENERGY STAR Target Finder** modeling for new buildings >50,000 sq. ft.

Building Stock: Effective Scale

2000 buildings, 357 million sq. ft. = 1.6% of the Buildings; 49% of the area







128 thousand buildings

730 million gross square feet

Utility Data

Problem: Owners often can't access tenant data

- Partial Solution: DDOE requires non-residential tenants to provide their landlord access to data
- Doesn't address residential; cumbersome

Solution: Aggregated whole-building consumption data + Direct upload to Portfolio Manager

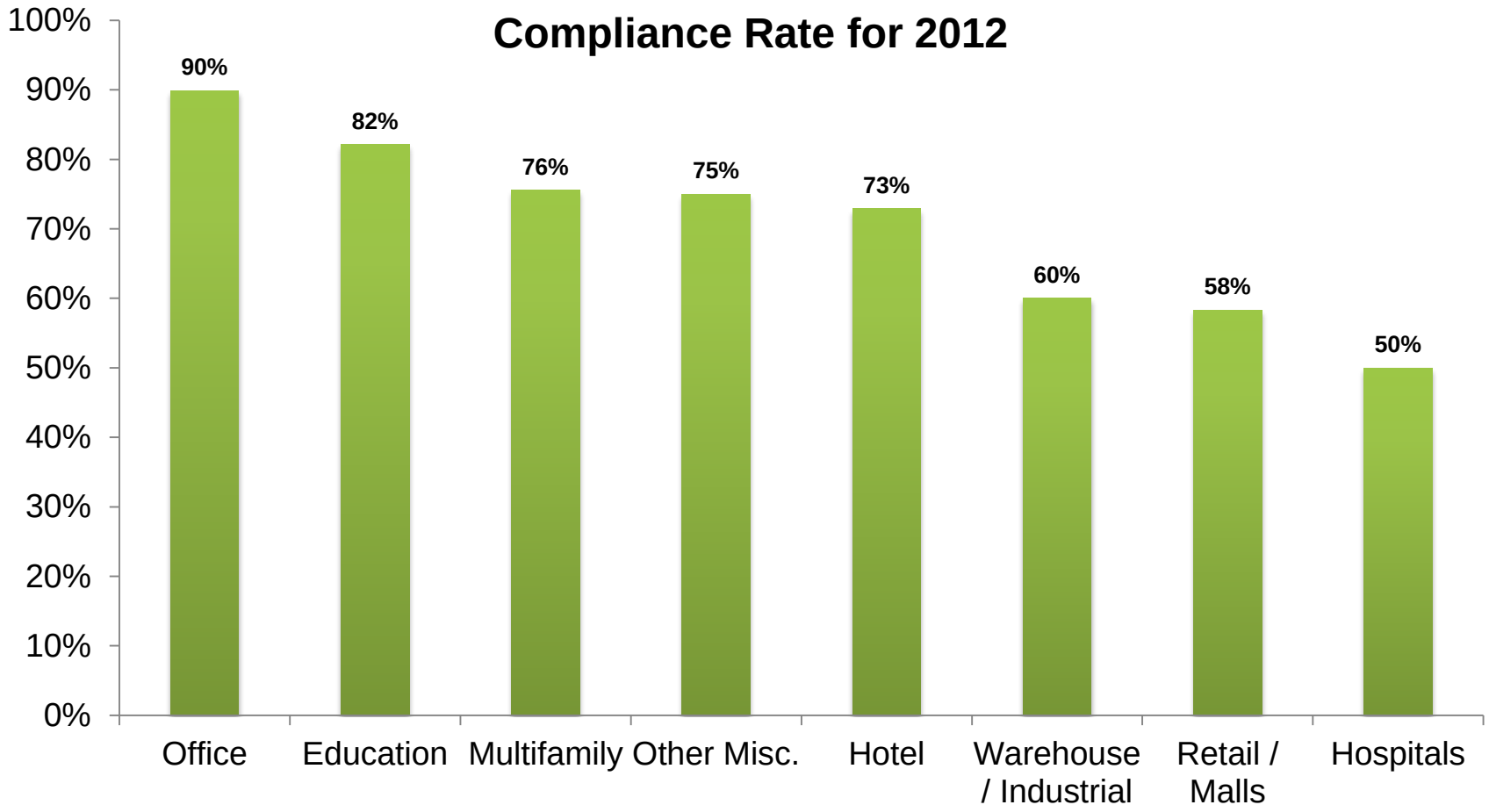
- Aggregate Data Available from Pepco for 5+ accounts
- Pepco expects automated upload by Summer 2014
- US DOE Energy Data Accelerator

Findings

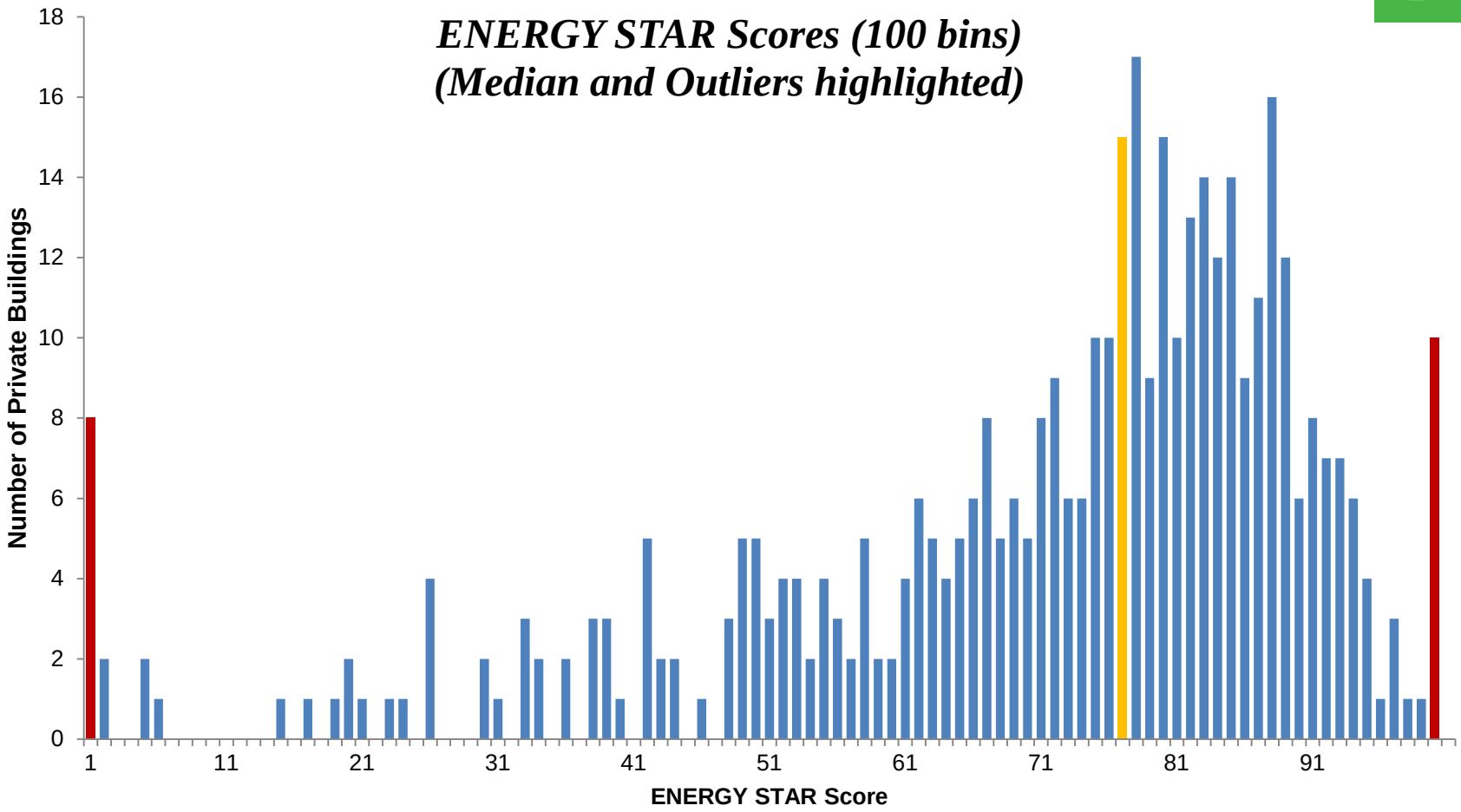
Compliance Rate:

2012: 83%

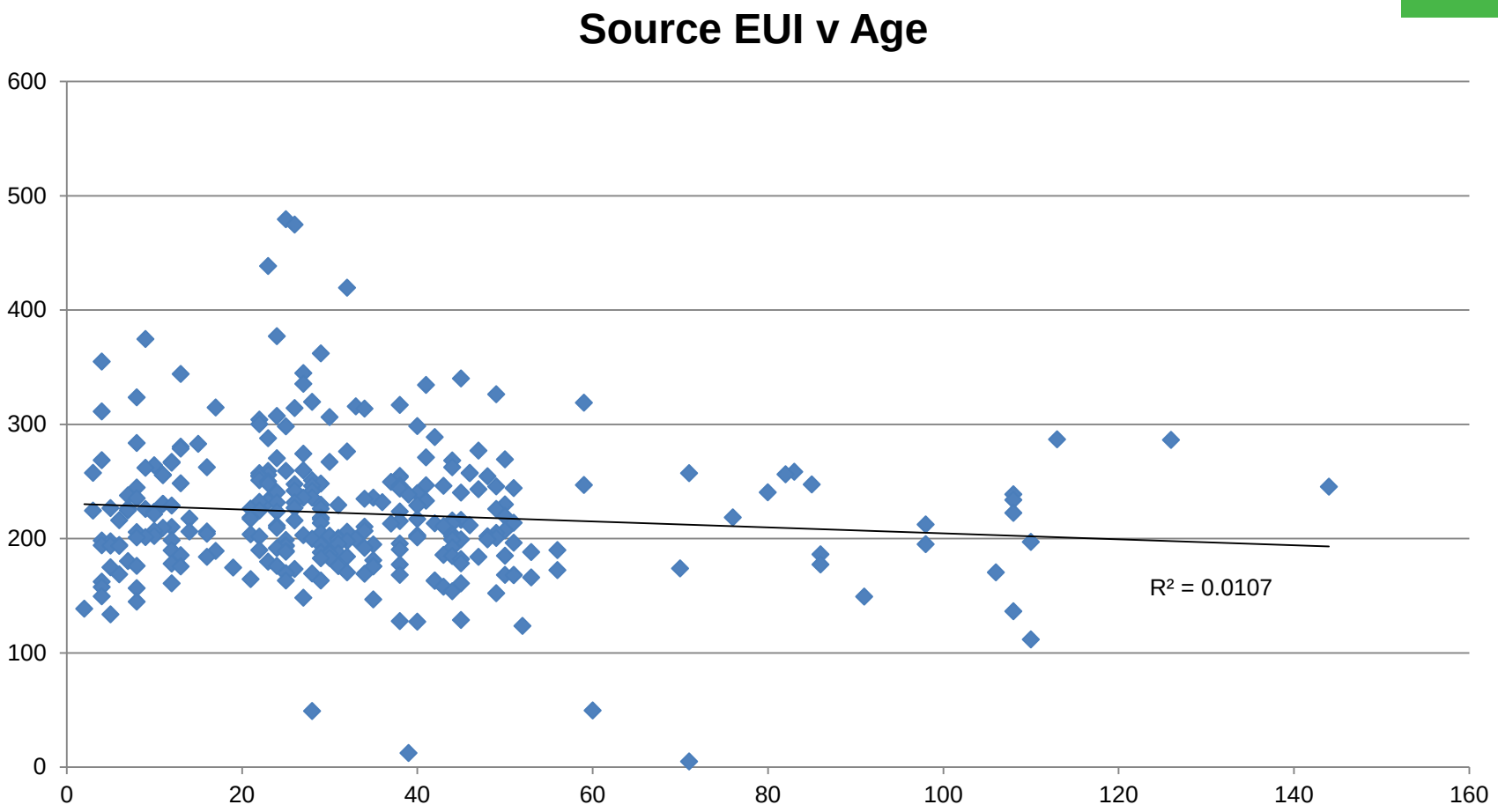
2013: 58%



ENERGY STAR® Scores (2012)



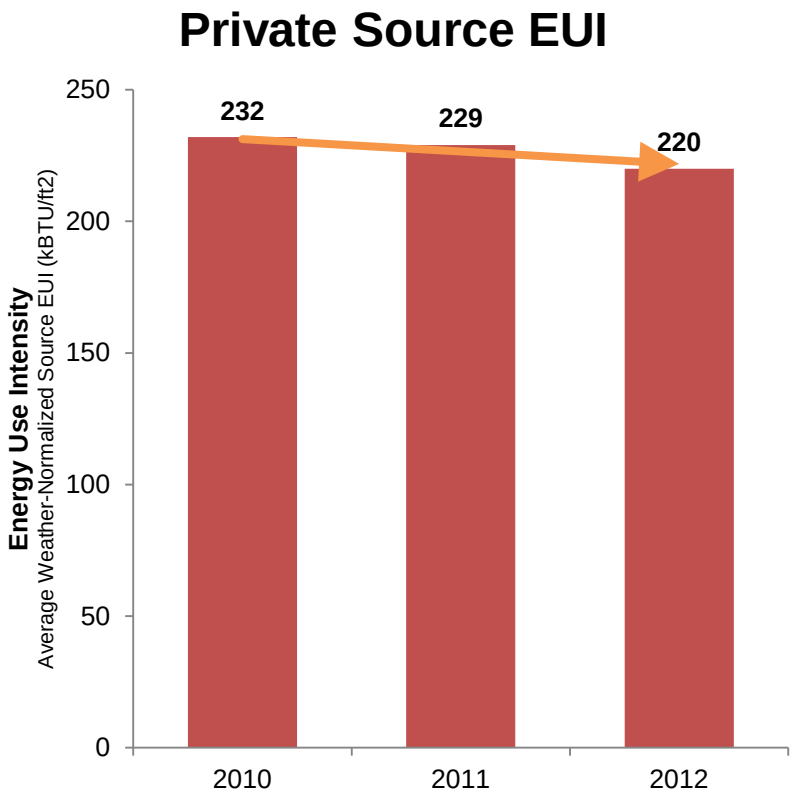
Age Doesn't Matter

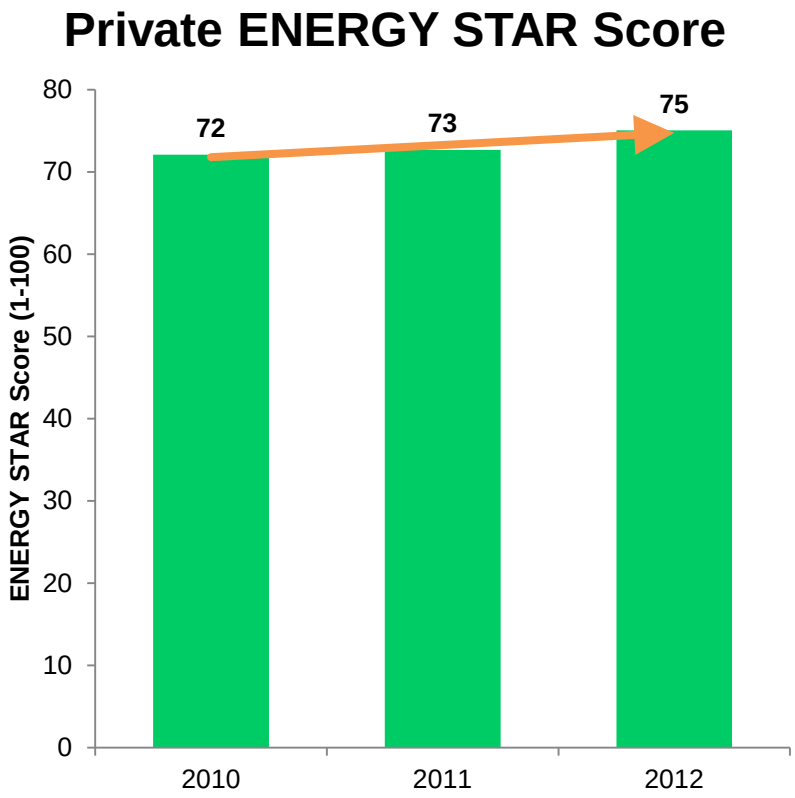


Energy Savings

DC Government & Private Buildings, 2010-2012:

6% Energy Savings

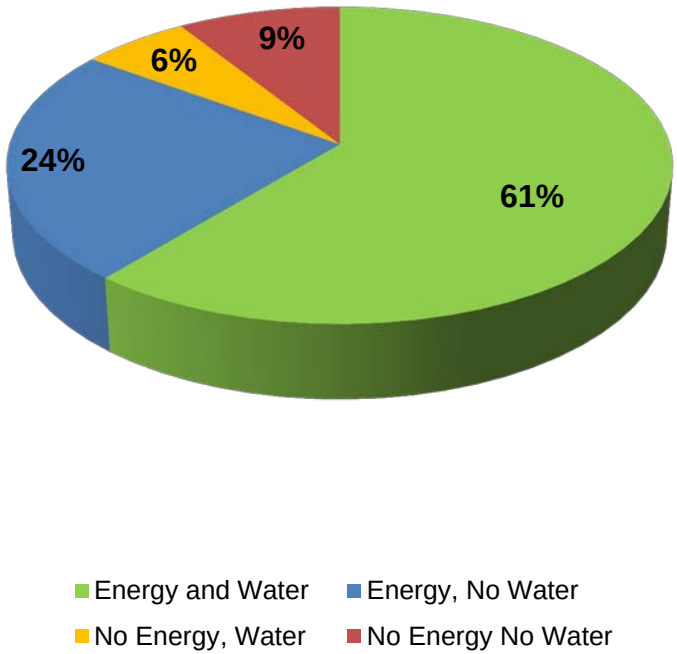




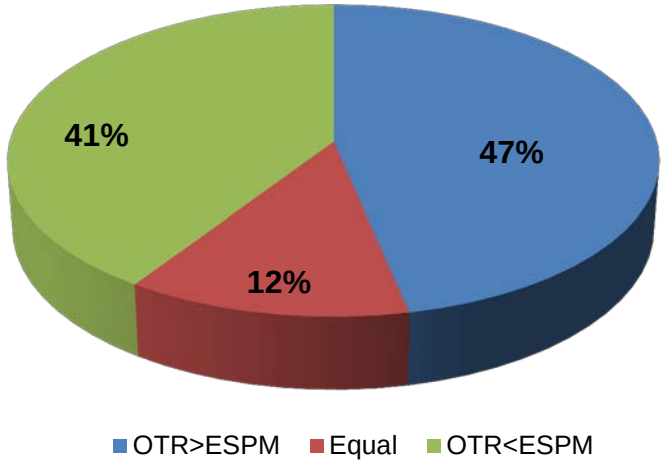
Source: DC Benchmarking Reports from rated buildings with 3 years of data

Missing Data

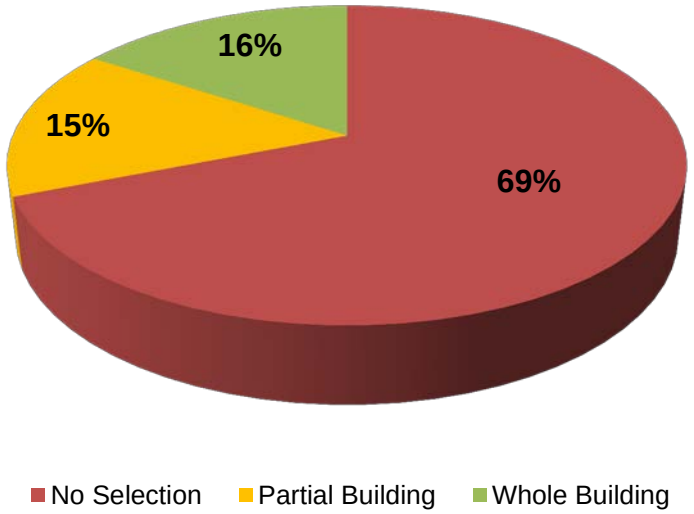
Missing Utility Data (2012)



Floor Area Discrepancy (2012)



Multifamily Meter Configuration (2012)

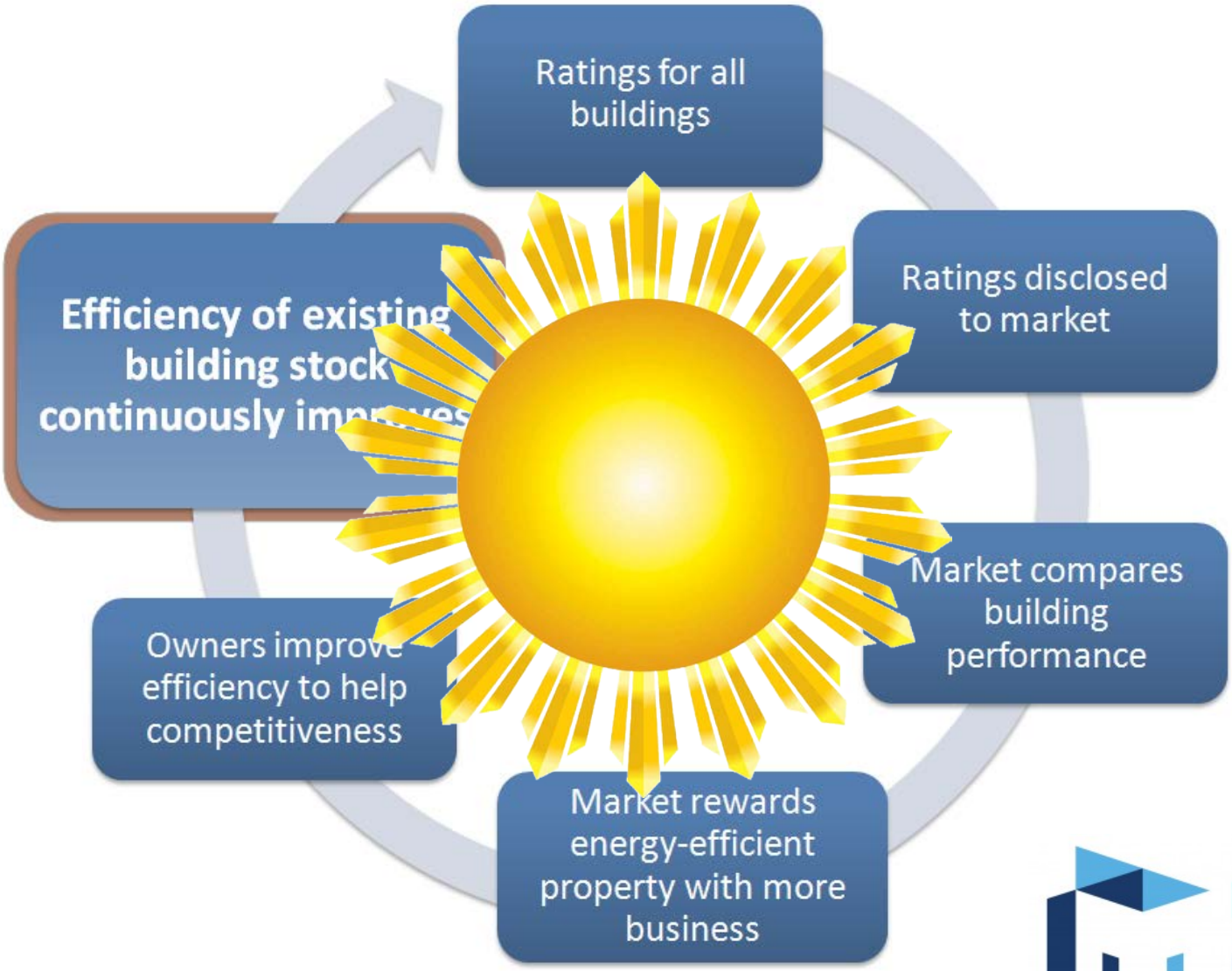


Putting the Data to Work

Data Uses

1. Help Owners and Managers understand their energy use and compare to peers
2. Help policymakers with analysis, planning program design
3. Drive Market Transformation

Why Transparency?

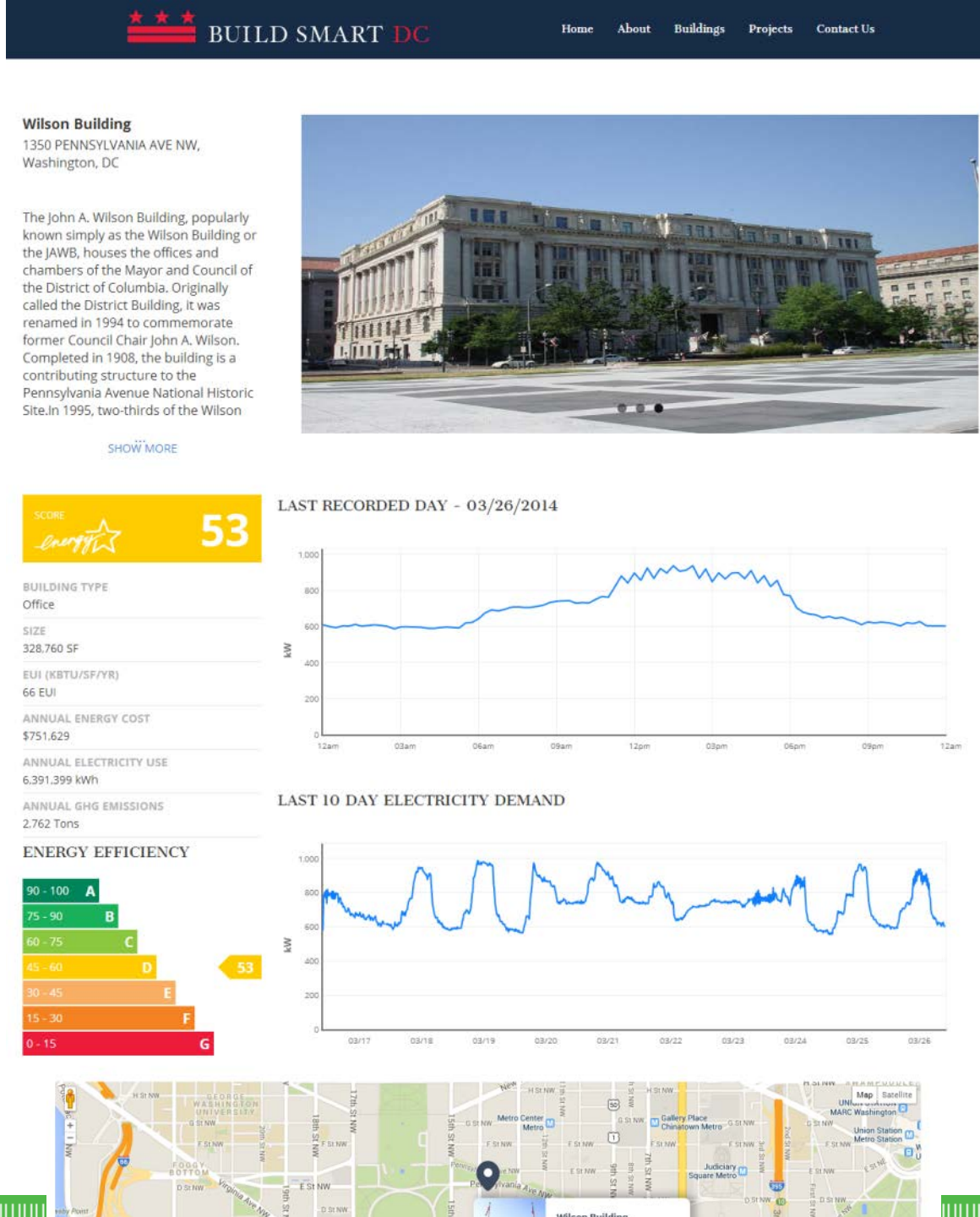


SUSTAIN ABILITY DC

IMT INSTITUTE FOR MARKET TRANSFORMATION

Public Building Transparency

- District government benchmarked close to 400 buildings
- ***BuildSmartDC.com***
- ENERGY STAR Score for 125+ buildings
- Interval Data for select facilities
- **Game Change Initiative: 20% in 20 months!**



Private Building Transparency

- Benchmark results are disclosed publicly online
- DC is second city to publish this data
- 490 buildings in initial release set
- Will be in BuildSmartDC and other mapping tools
- Data fields in public database currently include:

Address	Year Built
Space Type(s)	Gross Building Area
Energy Performance Rating (1-100)	Energy Use Intensity (EUI)
Electricity Use	*Natural Gas Use*
Water Use	*Other Fuel Use*
Optional Narrative Information	CO_2 Emissions

Data Reliability

- Data Quality and Reliability is a big outstanding question!
- Reliability is more than just cleaning = **“Can you trust the data?”**
- Our Hypothesis: Most errors are accidental
- DDOE has put out an grant for intense data quality reliability analysis and confidence indexing; could direct enforcement actions and/or technical assistance

Improving Performance

DC Sustainable Energy Utility (DC SEU)

- Energy efficiency 'utility' under contract to DDOE

DC SEU Benchmarking Help Center: FREE Technical assistance via email, phone, & in-person training:

- benchmarking@dcseu.com | 202-525-7036
- Assisted 70% of buildings that reported in 2013

DC SEU is using data to:

- Proactively engage with customers
- Identify sector-specific needs
- Target limited resources effectively

Building on Existing Law

Aggregate Benchmarking Data Access

- Utilities provide aggregate data for 5+ meters
- Requires direct monthly automated upload to ENERGY STAR Portfolio Manager

Benchmarking Data Transfer Improvement

- Seller of building covered by benchmarking law must provide buyer with all data needed for benchmarking; buyer benchmarks for that year

Building Energy Performance Standards

- DDOE Directed by Mayor to finish plan in 2014

Thank You!

SUSTAIN ABILITY DC

Marshall Duer-Balkind

marshall.duer-balkind@dc.gov

(202) 671-3042

http://ddoe.dc.gov/energybenchmarking

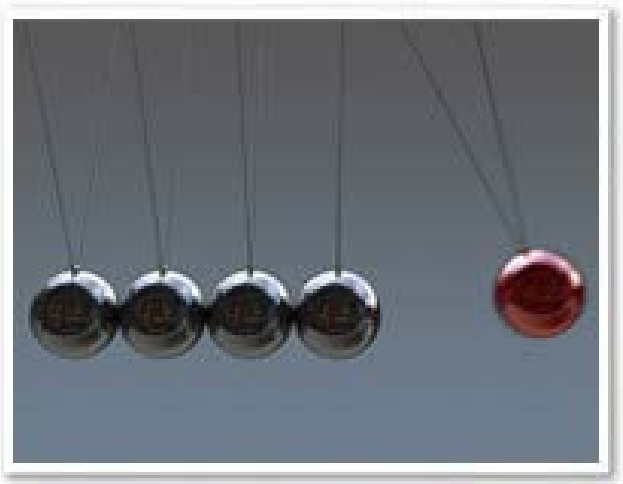
Twitter: @BenchmarkDC

DISTRICT DEPARTMENT OF THE ENVIRONMENT

green forward

DOE Resources – Impact Evaluation Handbook

- Publishing an Impact Evaluation Handbook for benchmarking and disclosure
- Addresses short, mid, and long term consumption, environmental, and economic impacts
- Contains all information needed for independent third parties to conduct
- Uses data already available
- Available Fall 2014



DOE Resources – (SEED)
Standard Energy Efficiency Data Platform

- Help state and local governments manage data resulting from benchmarking programs
- To manage benchmarking programs, cities combine data about many buildings from a range of tools and sources
- Can also be used by other efficiency programs and building owners