U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Benchmarking & Disclosure: DOE Activity

March 3, 2014

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Building Technologies Program
U.S. Department of Energy

Building Owners Use Data to Improve Energy Efficiency

Among facility managers who have used ENERGY STAR for benchmarking:

70%	67%
Have used ENERGY STAR to guide energy efficiency upgrade plans	have used ENERGY STAR to justify an energy efficiency project

Source: Survey of hundreds of facility managers.
Audin, Lindsay. "Finding Your Best Energy Opportunity." Building Operating Management. December, 2011.

Utility programs promoting benchmarking can drive similar results:

62%	84%
said that benchmarking their building's performance strongly influenced them to take energy management actions	of those who benchmarked made energy efficiency retrofits or operational improvements to their buildings

California Statewide Benchmarking Process Evaluation, NMR Group, Inc. April, 2012.

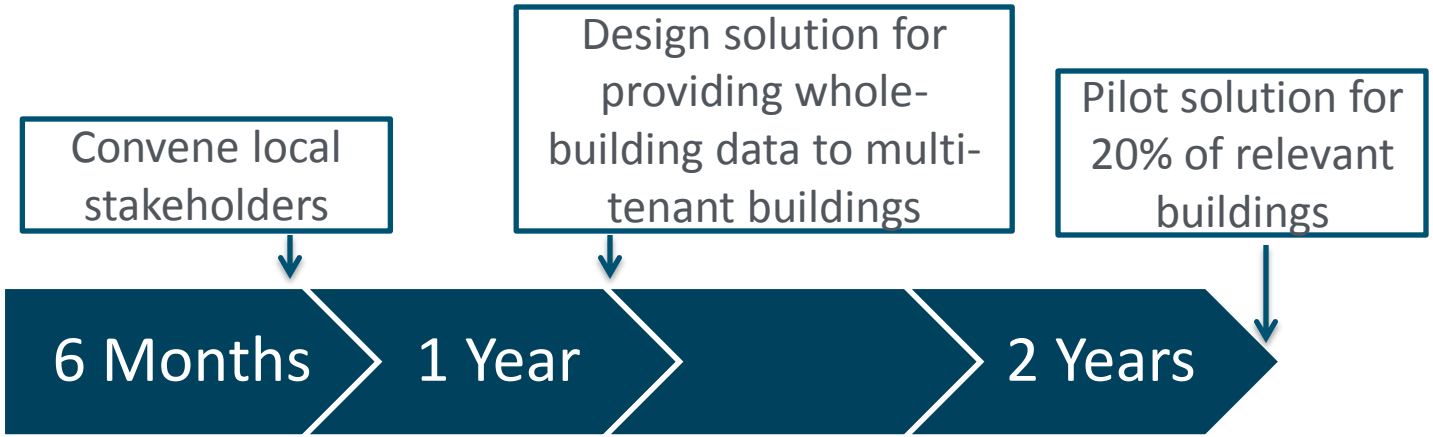
Information about building energy performance can drive improved efficiency. This is a key motivator for building energy data access.

Outline

Step in benchmarking process	DOE Activity
Building owner collects data	• Energy Data Accelerator (for utility data) • Guides for utility regulators • Energy Asset Score
Owner or consultant enters data in benchmarking tool	• Data Quality Assurance Guide
City aggregates and analyzes data from benchmarking tool and city records	• SEED Platform • Data Cleansing and Analysis Guide
City publishes data in a national database	• Buildings Performance Database
City tracks results of benchmarking & disclosure	• Benchmarking & Disclosure Impact Evaluation Guide

DOE Energy Data Accelerator

By the end of two years DOE will accelerate the ability of building owners to gain access to whole-building data by working together with cities and utilities to:



- Demonstrate **low-cost, standardized approaches** for providing energy data for the purpose of whole-building energy performance benchmarking.
- Develop best practice approaches for **reliable and secure** utility aggregation of energy data from multiple accounts to facilitate whole-building benchmarking while **protecting privacy**.
- Demonstrate tools that **streamline the transfer** of utility bill data to benchmarking tools, including standard data formats for ENERGY STAR® Portfolio Manager.

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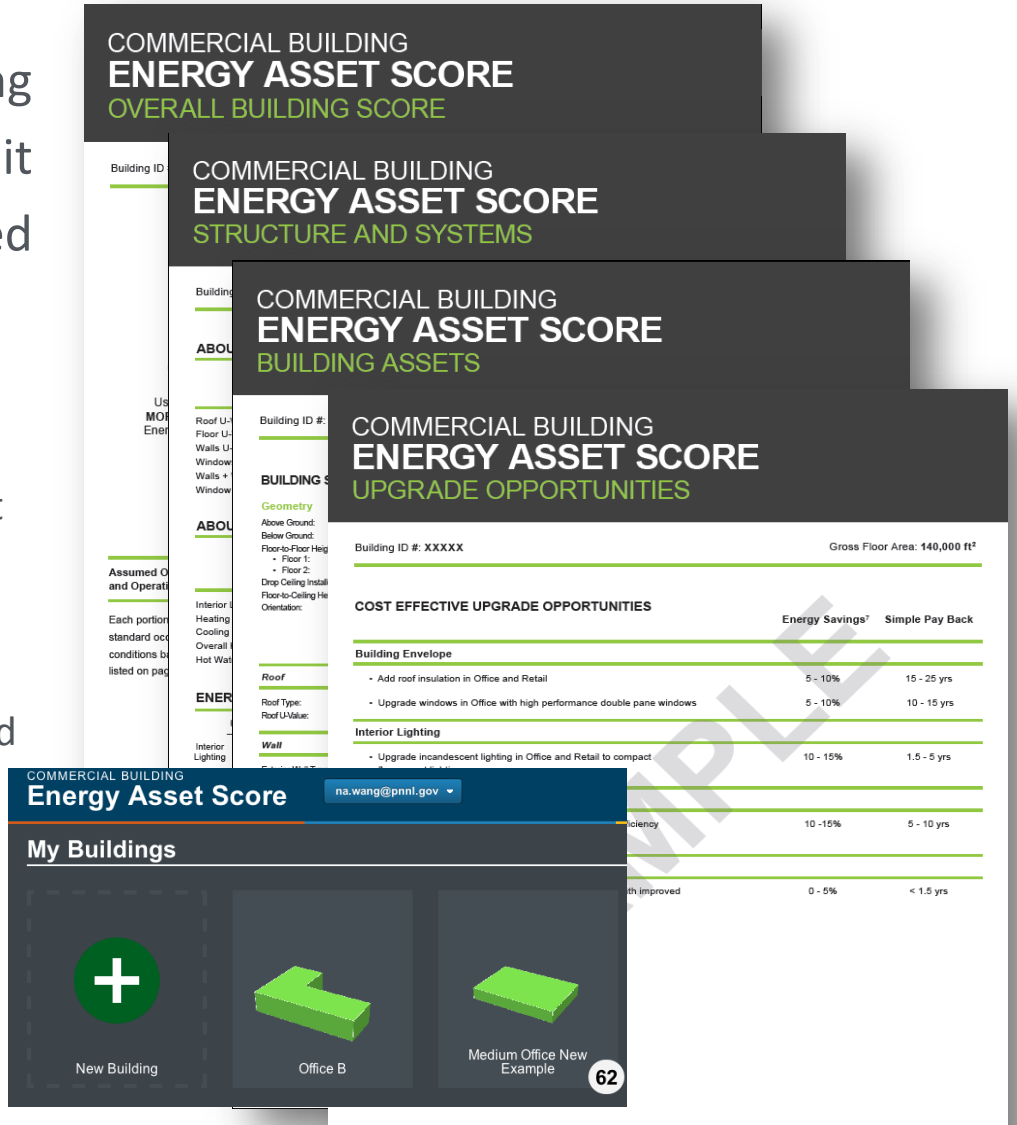
Accelerator partners from across the country…

- Atlanta and Atlanta Gas Light
- Austin and Austin Energy
- Boston and NSTAR/NU
- Cambridge and NSTAR/NU
- Chicago and ComEd
- Chula Vista and San Diego Gas & Electric
- Columbus and AEP Ohio
- District of Columbia and PEPCO
- Houston and Reliant
- Kansas City and Kansas City Power and Light
- Los Angeles and LADWP
- Los Angeles and SoCalGas
- Minneapolis and Xcel
- New York and National Grid
- Philadelphia and PECO
- San Diego and San Diego Gas & Electric
- San Francisco and PG&E
- Santa Monica and Southern California Edison
- Seattle and Puget Sound Energy

Commercial Building Energy Asset Score

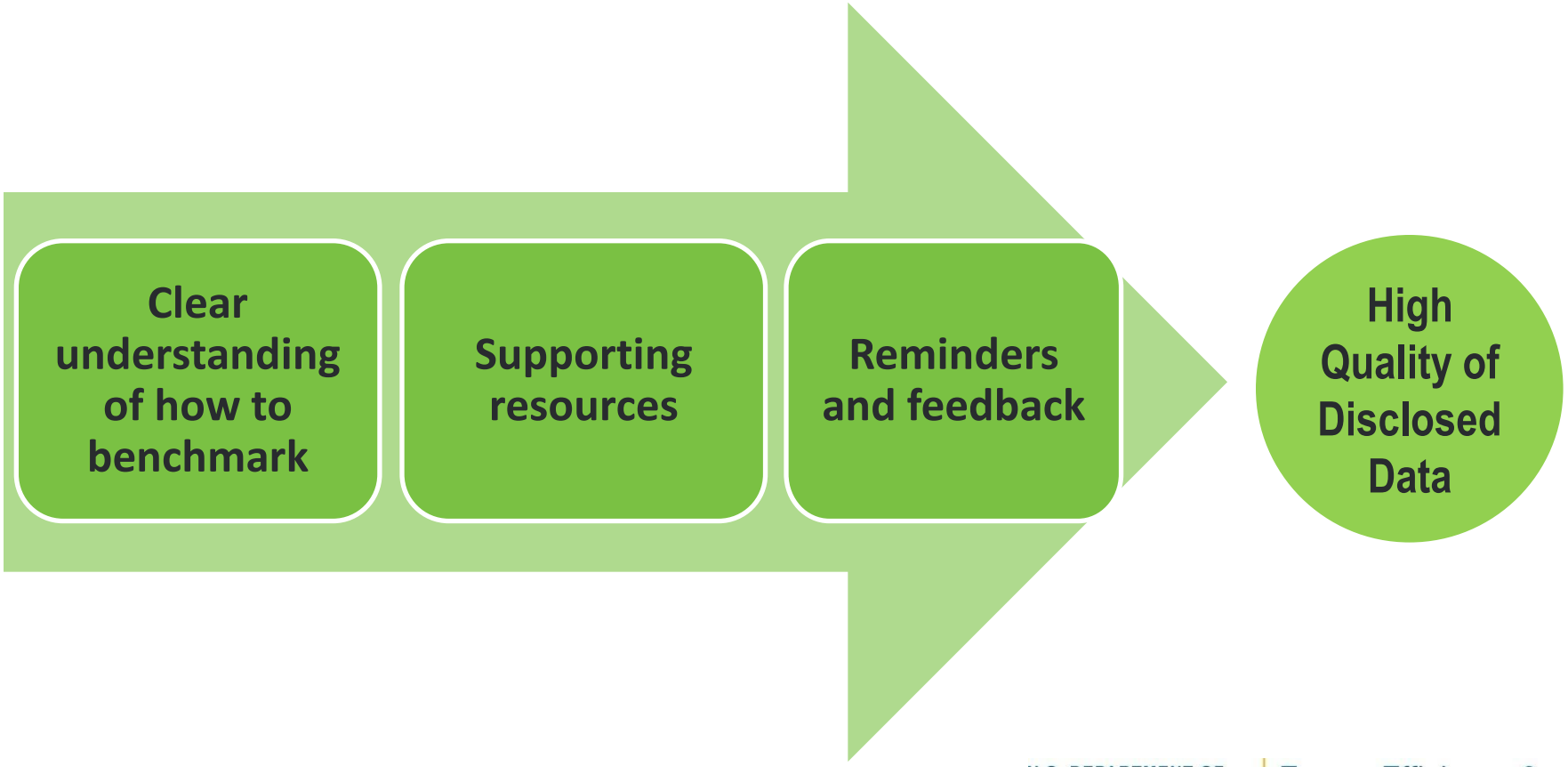
Provides a whole-building score and identifies inefficient systems and potential capital upgrades, based on as-built physical characteristics (independent of operations).

- A good followup to benchmarking
- Similar process to an energy audit
- Standardized inputs, standardized outputs, creates a full energy model for the building
- Results:
  - Whole-building rating of equipment efficiency
  - System-level equipment efficiency ratings
  - Identifies upgrade opportunities and potential savings
- Can be delivered as part of an energy audit



Data Quality Assurance Guide

Goal: Provide guidance on how to improve the accuracy of benchmarking data that owners collect and disclose and improve compliance (which are inextricably linked).



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Benchmarking Data Cleansing and Analysis Guide

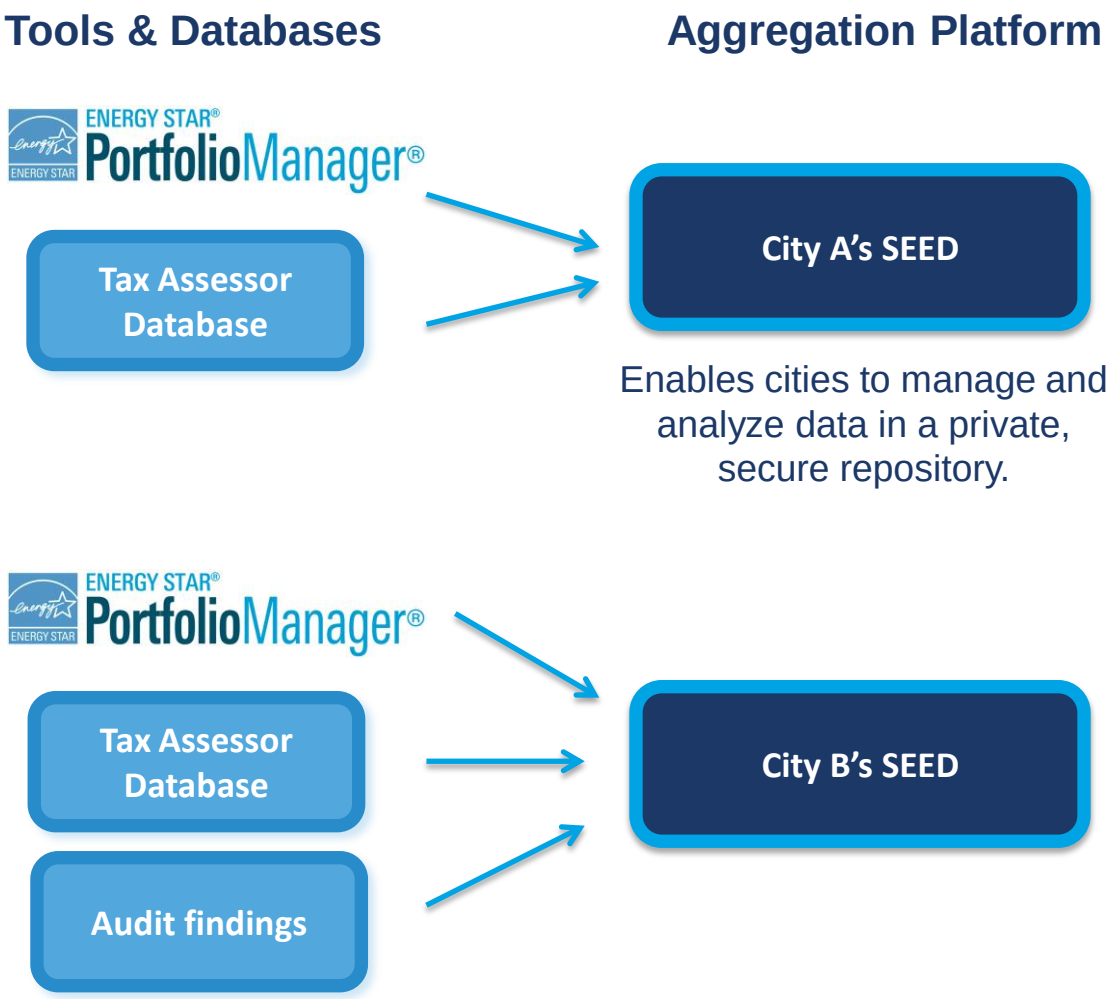
PURPOSE

- Help communities, cities, and other jurisdictions prioritize and conduct analyses of public and/or private building energy benchmarking data
- Encourage a consistent approach to benchmarking data analysis across jurisdictions

SCOPE and VALUE ADDED

- Introduce concepts for benchmarking data analysis
- Describe data collection requirements for analyses
- Describe how to evaluate data integrity and cleanse data
- Outline analysis techniques and associated requirements
- Suggest how to interpret analysis results and identify trends
- Link to available resources

To manage benchmarking programs, Cities combine data about many buildings from a range of tools and sources



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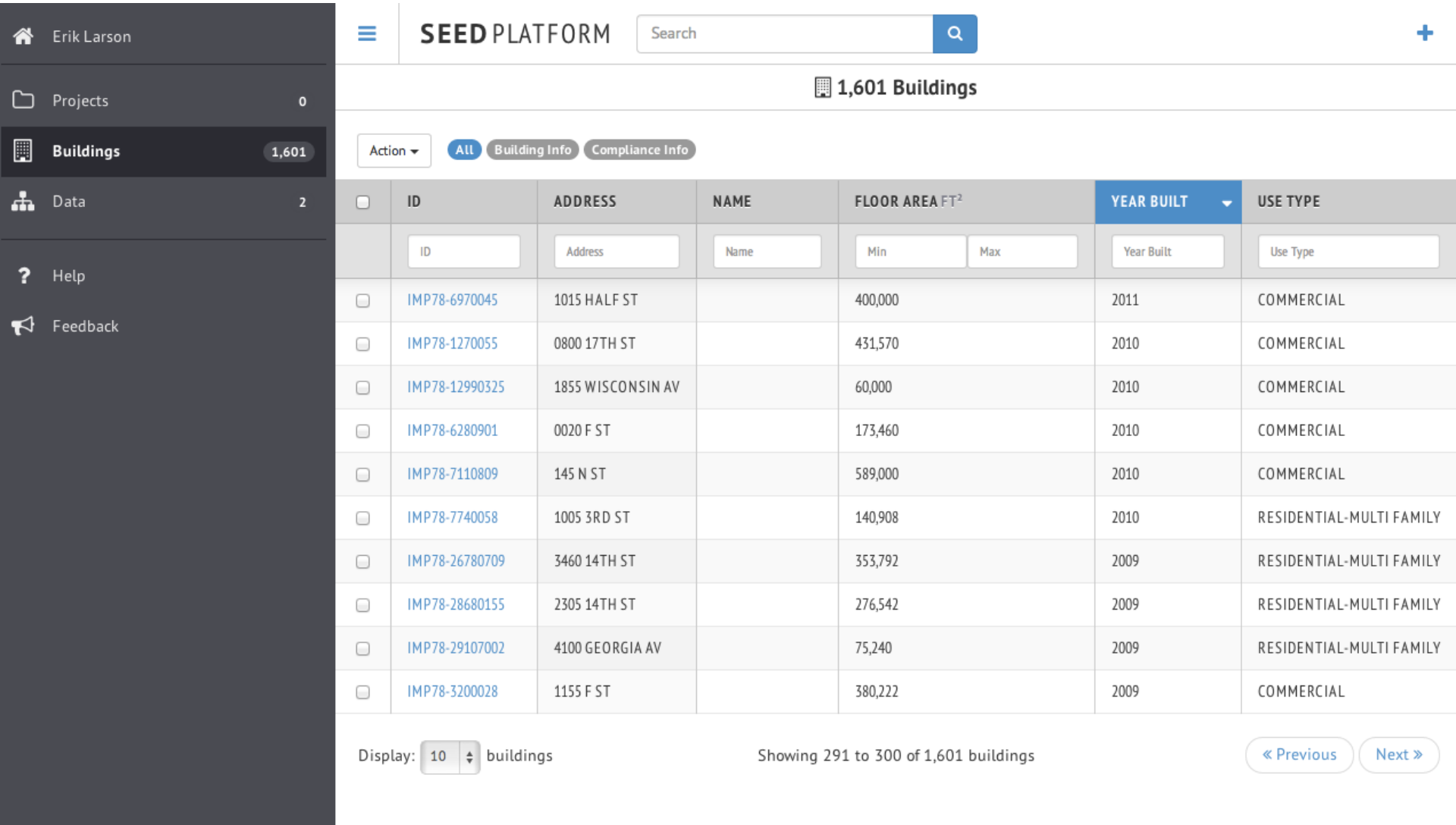
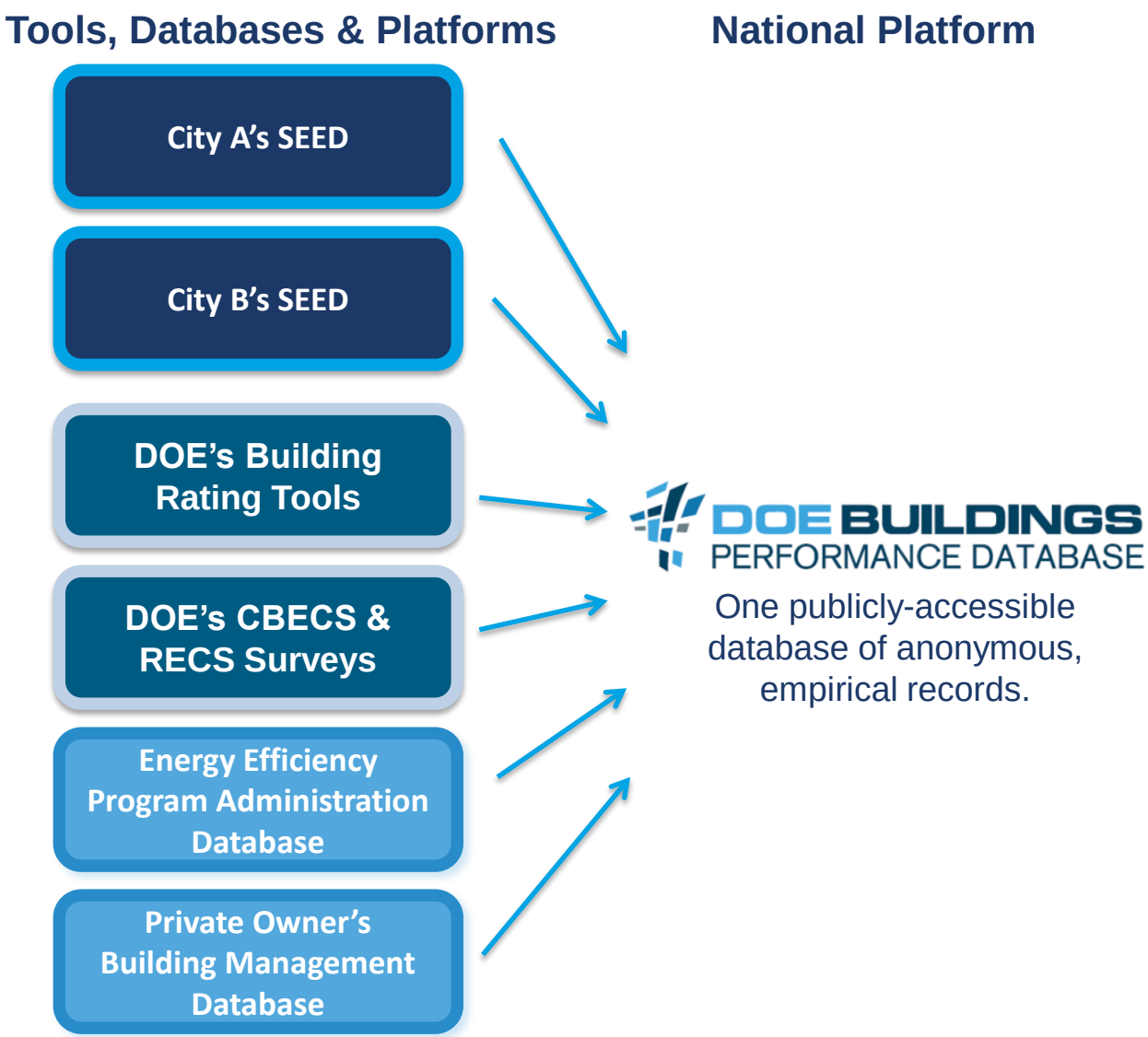
Standard Energy Efficiency Data (SEED) platform

SEED is designed to help State and local governments manage data resulting from building performance reporting programs for private and/or public buildings



Data contributed to the Buildings Performance Database can be accessed in aggregate by the public.



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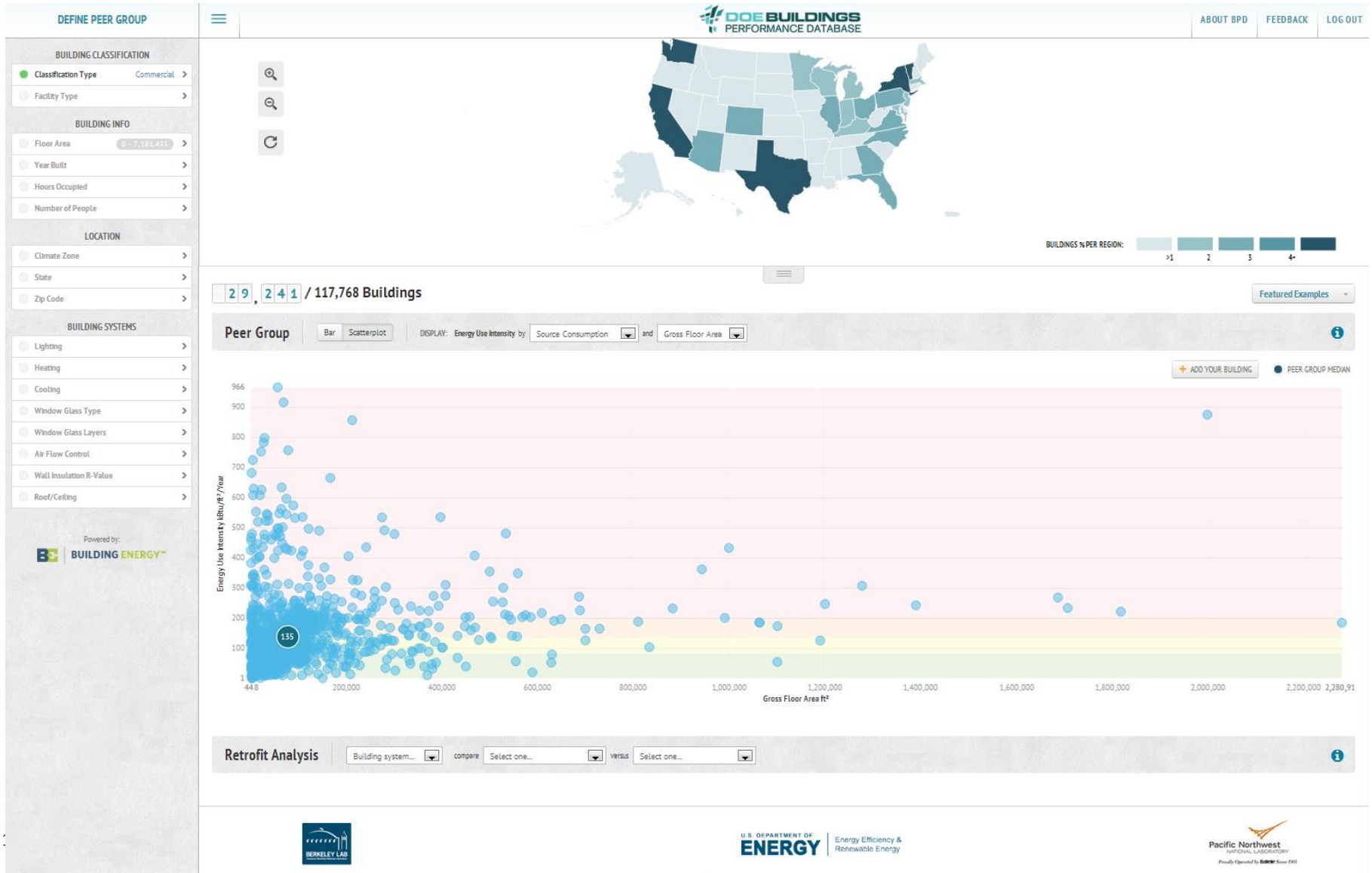
The Buildings Performance Database (BPD)

The BPD enables users to statistically analyze trends in the energy performance and physical & operational characteristics of real commercial and residential buildings.



Benchmarking & Disclosure Impact Evaluation

Create an impact evaluation handbook that facilitates evaluations that are:

- **Defensible -** developed and reviewed by experts in evaluation
- **Consistent –** uses recognized methods for evaluating B&D policies (to allow comparisons of policies and policy components).

Handbook examines benchmarking & disclosure with three different lenses:

Gross energy savings estimate:

How much energy was saved over time?

Net energy savings estimate:

How much of the savings was due to the benchmarking?

Non-energy impacts estimate:

What are the economic and greenhouse gas impacts?

Discussion

- What is missing that DOE could do to help?
- Which of these areas are you most interested in discussing today?

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SEED Platform

Overview

SEED PLATFORM

Search

Getting Started

The Standard Energy Efficiency Data (SEED) platform is a software tool that provides a standardized format for collecting, storing and analyzing building energy performance information about large portfolios. Upload your buildings list to get started.

Upload your Data

Getting Started Guide

What's New in R2

Upload your data

Get started using SEED by uploading your buildings list (city tax assessor data) and then your EPA Portfolio Manager data. Make sure these files are each in .csv format. The SEED platform will help you map and clean your data in the process of loading.

Download Sample Data

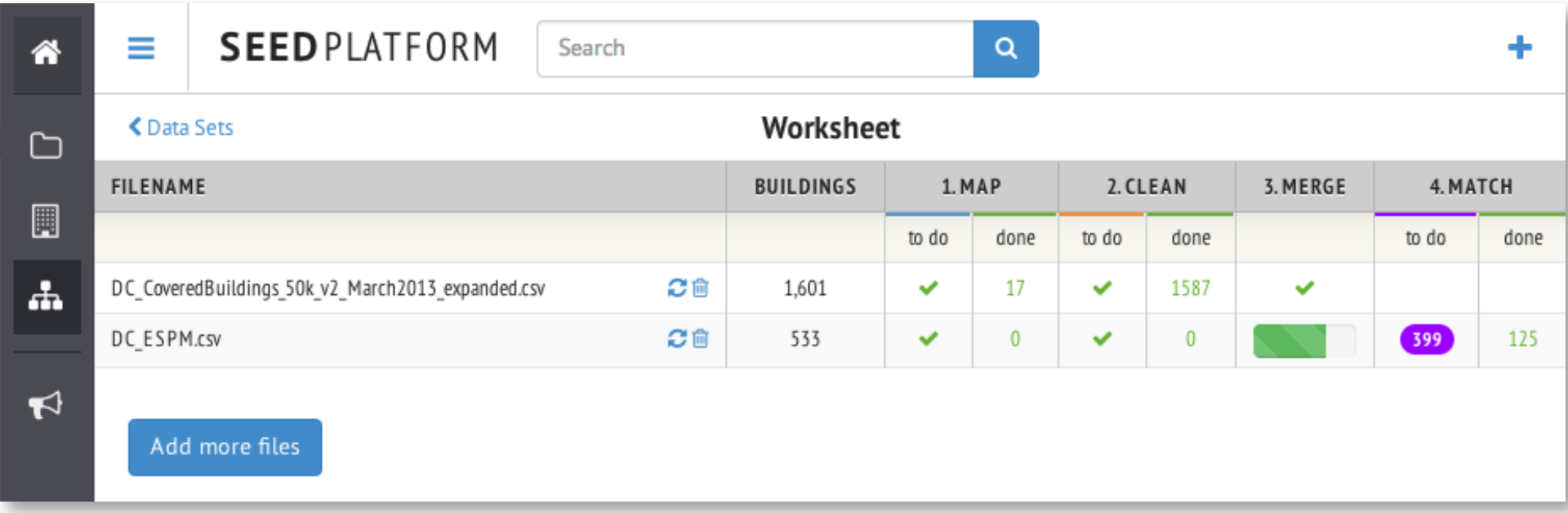
Match your data

Match-up your buildings list with the Portfolio Manager dataset to tie records together. SEED will help you by auto-matching high confidence pairings and then provide you with tools to match the rest of your dataset.

Manage compliance

You are ready to start managing the compliance of individual buildings to your data disclosure requirements! Use SEED's flexible, easy-to-use labeling system and project groupings to track the status of data submission, review, and compliance.

Upload Data



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Map your Buildings List into SEED (BEDES format)

SEED PLATFORM

Search

Worksheet

Mapping (EBR-Phase1-10.02....)

No columns are mapped to source_facility_id.

FIELD MAPPINGS					SOURCE DATA				
	IMPORT	TABLE	FIELD	← CONFIDENCE →	SPREADSHEET HEADER	ROW 1	ROW 2	ROW 3	ROW 4
1	☑	AssessedBuilding	✓	Unmapped	Source Facility ID	1	2	3	4
2	☑			Unmapped	BUILDING NAME	MAYFLOWER PARK HOTEL	PARAMOUNT HOTEL	WESTIN HOTEL	WESTIN HO
3	☑			Unmapped	BUILDING ADDRESS	405 OLIVE WAY	724 PINE ST	1900 5TH AVE	1900 5TH A
4	☑			Unmapped	GROSS FLOOR AREA (SF)	88434	103566	377813	419900

- address_city
- address_city_state
- address_line_1
- address_line_2
- address_number_from
- address_number_to
- address_state
- address_street_name
- address_street_type
- block
- boro
- borough
- building_count
- gross_floor_area
- name
- owner_name
- postal_code
- property_type
- source_facility_id
- use_description
- ward
- year_built

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Match your Buildings List to Portfolio Manager data

SEEDPLATFORM

Search

Worksheet

Matching (DC_ESPM.csv)

Filter matching by: All | 473 to do | 51 done Confidence: 111 high | 323 medium | 90 low

Data From: DC_ESPM.Csv						Existing Buildings			
YEAR BUILT	ADDRESS	NAME	BUILDING ID	MATCH	CONFIDENCE	ID	NAME	ADDRESS	YEAR BUILT
Year Built	Address	Name	ID						
1990	1301 K Street Nw	One Franklin Square	1953 (0248-0830)	☑	med	02480830		1301 K ST NW	1990
1987	555 13th Street N.W Suite 100 West	Columbia Square	2214 (0290-0861)	☐	low	2999304	DC0321ZZ - JUDICIARY CENTER	555 4TH STREET, NW	
1964	1101 17th Street N.W.	1101 17th Street	5829 (0183 0857)	☑	med	02470092		1101 14TH ST NW	1981
1969	1776 K Street NW	1776 K Street NW	6768 (0126 0057)	☑	high	01260057		1776 K ST NW	1969
1997	2121 Pennsylvania Ave., NW	International Finance Corporation	11064 (0074-0049)	☐	med	00740049		2121 PENNSYLVANIA AV NW	1997
1985	1001 Pennsylvania Ave, NW	1001 Pennsylvania Ave	12407 (0348-0832)	☐	med	03480832		1001 - 0429 PENNSYLVANIA AV NW	1987
1975	2101 L St NW	2101 L St NW	13149 (0072 0076)	☑	high	00720076		2101 L ST NW	1978
1978	1875 Eye Street, NW	International Square	16591 ()	☐					
1988	700 14th Street, NW	CNBB	16714 ()	☐					
2000	1201 F Street NW	1201 F Street	16807 ()	☐	high	02890832		1201 F ST NW	2000

Display: 10 buildings Showing 1 to 10 of 524 buildings « Previous Next »

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See all information for a building, and pick the source for the "master" record

SEEDPLATFORM

Search

Buildings

1201 15TH ST

Building Information

FIELD	MASTER	PORTFOLIO MANAGER DATA	ASSESSOR DATA
ID	IMP1-02130017	19680	02130017
Block #			
Name	NATIONAL ASSOC OF HOME BUILDERS OF U S	The National Housing Center Corporation	NATIONAL ASSOC OF HOME BUILDERS OF U S
Street Address	1201 15TH ST map	1201 15th Street, NW	1201 15TH ST
County			2
City, State	Washington, DC	Washington, District of Columbia (D.C.)	Washington, DC
Zip Code	20005	20005	20005
Year Built	1973	2001	1973
Use Type		Office	COMMERCIAL
Use Description			Commercial-Office-Large

Compliance Projects That Include This Building

PROJECT	SUBMITTAL TYPE	YEAR ENDING	DEADLINE	STATUS	CHANGED ON	CHANGED BY
There are no complaince projects for this building						

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Create Projects, such as “2013 Compliance”

SEED PLATFORM

Search

Building Actions

Edit Columns

ID	ADDRESS 1	CITY	STATE	POSTAL CODE	FLOOR AREA FT²
1034332	1550 M St. NW	Washington		20036	84,886
1229780	1300 L Street, NW	Washington		20005	78,549
3412660	2101 MARTIN LUTHER KING JR AVEN	Washington		20002	75,660
3412676	2100 MARTIN LUTHER KING JR AVEN	Washington		20020	81,610
3485321	2030 F Street, NW	Washington		20006	71,400
3499931	2117 E. St. NW, Washington D.C. 20036	Washington D.C.		20036	99,000
100004	1200 Foster St NW	Atlanta		30318	67,269
100014	96 Poplar St NW	Atlanta		303032120	86,627
100017	929-933 NE Euclid Ave	Atlanta		30307	87,271
100037	149 Peachtree Cir	Atlanta		30309	64,703

Display: 10 buildings

Showing 1 to 10 of 898 buildings

« Previous Next »

Create a New Project

Project Name: Project Name

☑ Add compliance information.

Compliance Information

Submittal Type:

Year Ending Date: --------- ----

Choose the year ending month for report period.

Reporting Deadline: mm/dd/yyyy

Cancel | Create Project

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Create labels and use them to manage activities, or move/copy them over to other projects

SEEDPLATFORM

Search

Projects

DC Benchmarking 2014 (18 Buildings)

Project Actions

TYPE OF SUBMITTAL: Benchmarking **YEAR ENDING:** 12/19/2014 **DEADLINE:** 12/29/2014

Edit Columns

ID	STATUS	ADDRESS 1	NAME	YEAR BUILT	CITY	POSTAL CODE	FLOOR AREA FT²
1034332	Compliant	1550 M St. NW	American Chemical Society - 1550 Building	1987	Washington	20036	84,886
1229780	Non-Compliant	1300 L Street, NW	1300 L Street	1986	Washington	20005	78,549
1419693	Need info	1800 K Street, NW	1800 K Street	1969	Washington	20006	224,864
1423975	Exempt	1666 K St NW	1666 K St NW	1971	Washington	20006	416,062
1431050	Compliant	1707 L Street, NW	1707 L Street	1960	Washington	20036	109,926
1431261	Compliant	1828 L Street Street, NW	1828 L Street Associates	1965	Washington	20036	332,928
1486998	Compliant	1220 L Street, NW	1220 L Street	1983	Washington	20005	365,115
1495502	Compliant	1620 I St, NW	1620 Eye, LLC	1971	Washington	20006	154,338
1496039	Compliant	2021 K St, NW	2021 K Street, NW	1972	Washington	20006	220,871
1567527	Compliant	1310 G Street, NW	1310 G Street	1991	Washington	20005	179,336

Display: 10 buildings

Showing 1 to 10 of 18 buildings

« Previous Next »

SEED V1 (April) & V1.1 (Summer)

Basic Navigation & Usability

- Audit trail, comments and annotations
- Improved error reporting & documentation
- User can view records over time and can multiple values for given data point (e.g., square footage)
- User can edit/save building records at the individual data field level
- User can view a status/dashboard page

Uploading/Mapping/Matching

- Import data using the new Energy Star Portfolio Manager API
- Ability to add new data fields and define their format

Compliance Management

- Compare selected records to peer group in the Buildings Performance Database
- User can view which records do and do not meet a minimum set of compliance checks, including PM record completeness

Data QA / Export Data

- One-click export to Buildings Performance Database
- Export through API or in excel/ csv

Architecture

- API for publishing data and plug-in framework for software extensions
- Open Source platform

Discussion

In the short to medium term, what is the best role for DOE vs. SEED users vs. the private sector?

What are the tradeoffs between co-funded open source development and private sector offerings?

DOE-Supported	Co-funded by Cities *or* Private Offerings
• Core data management functionality • Maintain interoperability with Federal tools • Plug-in support and read/write API • Help documentation, trainings and support for end users and API users • Open source code curation • Sharing and collaboration platform? • ***Others?***	• Data collection (user interface for owners to submit data) • Advanced statistical analysis and visualization • Integration with other city databases and business processes, such as fine-tracking system and CRM • Public interface for disclosed data, with any associated functionalities • Database hosting/ SEED as a managed service • ***Others?***

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DOE BUILDINGS PERFORMANCE DATABASE

Overview

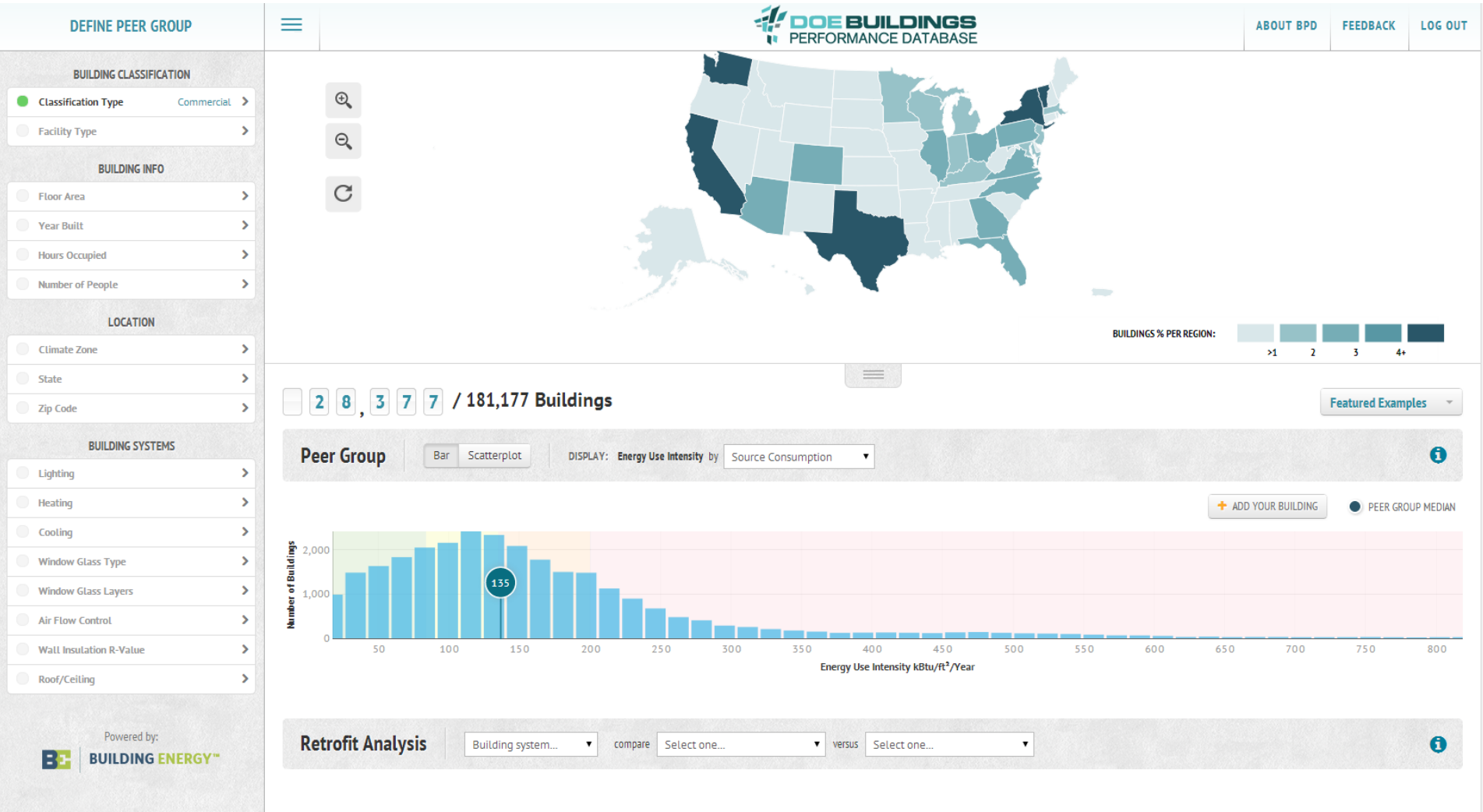
January 2014

Buildings.energy.gov/BPD

BuildingsPerformanceDatabase@ee.doe.gov

Buildings Performance Database

- The BPD statistically analyzes trends in the energy performance and physical & operational characteristics of real commercial and residential buildings.



BPD unlocks the power of building energy performance data.

DOE BUILDINGS PERFORMANCE DATABASE

Inputs: The BPD

- Large dataset of real buildings

Outputs: Activities

- Assess opportunities
- Forecast project performance
- Quantify performance risk

Outcomes

- More energy efficiency projects undertaken
- More data on EE project performance

Design Principles

- The BPD contains *actual data* on existing buildings - not modeled data or anecdotal evidence.
- The BPD enables statistical analysis without revealing information about individual buildings.
- The BPD cleanses and validates data from many sources and translates it into a standard format.
- In addition to the BPD's analysis tools, third parties will be able to create applications using the database.

Current Data Sources for the BPD

- >180,000 buildings, from both public and private contributors.
- More datasets are being added regularly. There is no upper limit for the number of buildings the BPD can hold.

Public Sector

U.S. Energy Information Administration
U.S. General Services Administration
U.S. Environmental Protection Agency
U.S. Office of Housing and Urban Development
New York City Dept. of Citywide Administrative Services
New York Power Authority
Pennsylvania Keystone HELP Home Energy Loan Program
San Francisco Department of the Environment
State of California Public Utilities Commission
State of California Energy Commission
Seattle, Washington
University of Arizona
University of Dayton
District Department of the Environment: Washington, DC
Vermont Energy Investment Corporation

Private Sector

Brandywine Realty Trust
Connexion Asset Group
CNT Energy
Kohl's
Liberty Property Trust
Lucid Design Group
Prudential
Related
Tishman Speyer
Transwestern
USAA
And other private building owners

Better Buildings Challenge Data Sources*

DOE BUILDINGS PERFORMANCE DATABASE

Corporate

Ascension Health
Best Buy
Cleveland Clinic Foundation
Forest City Enterprises
HEI Hotels & Resorts
IHG (InterContinental Hotels Group)
Jones Lang LaSalle
Kohl's Department Stores
Lend Lease
Macy's
New York Presbyterian Hospital
Parmenter Realty Partners
Prologis
RREEF Real Estate
Shorenstein Properties LLC
Sprint
Staples
Starbucks Coffee Company
The PNC Financial Services Group
The Tower Companies
TIAA-CREF
Transwestern
University of Pittsburgh Medical Center
USAA Real Estate Company
Walgreens Co.
Wyndham Worldwide

Community

Arlington County, VA
Arvada, CO
Atlanta, GA
Beaverton, OR
Boston, MA
Chicago, IL
Clark County, NV
Cleveland, OH
Columbia, MO
Denver, CO
District of Columbia
Forth Worth, TX
Hillsboro, OR
Houston, TX
Huntington, NY
Los Angeles, CA
Milwaukee, WI
Omaha, NE
Placer County, CA
Roanoke, VA
Sacramento, CA
Seattle, WA
Toledo, OH
West Palm Beach, FL
Will County, IL

***Will be live this week**

Better Buildings Challenge Data Sources*

DOE BUILDINGS PERFORMANCE DATABASE

State and Municipal

Commonwealth of Massachusetts
El Paso, TX
Gillette, WY
Hall County, GA
Kauai, HI
Kitsap County, WA
Knoxville, TN
Margate, FL
Medford, MA
Pittsburgh, PA
Rochester, NY
Santa Fe, NM
Spokane County, WA
State of Delaware
State of Iowa
State of Maryland
State of Minnesota
State of North Carolina
State of Rhode Island
Thurston County, WA
Worcester, MA

Education

Alachua County Public Schools
Allegheny College
Camas School District, WA
Delaware State University
Douglas County School District, NV
Dysart Unified School District No. 89, AZ
Fort Atkinson School District, WI
Houston Independent School District, TX
Indian River Central School District, NY
Kentucky Community and Technical College System
Mesa County Valley School District 51, CO
Michigan State University
Portland Public Schools, OR
Poudre School District, CO
University of California, Irvine
University of Hawaii at Manoa
University of Utah
University of Virginia

***Will be live this week**

Better Buildings Challenge Data Sources*

DOE BUILDINGS PERFORMANCE DATABASE

Multifamily Residential

ACTION-Housing, Inc.
Aeon
BRIDGE Housing Corporation
Campus Crest Communities
Columbia Residential
Community Housing Partners
Corcoran Management
Denver Housing Authority
EAH Housing, Inc.
East Bay Asian Local Development Corporation
Eden Housing
Forest City Enterprises
Green Coast Enterprises
Hispanic Housing Development Corporation
Homes for America
Housing Authority of City of Atlanta, GA
Housing Authority of City of Baltimore, MD
Housing Authority of City of Bristol, CT
Housing Authority of City of Buenaventura, CA
Housing Authority of City of Freeport, IL
Housing Authority of City of Helena, MT
Housing Authority of City of Palatka, FL
Housing Authority of City of Philadelphia, PA
Housing Authority of City of Tampa, FL
Housing Authority of Knox County, IN
Housing Partnership Equity Trust
Jersey City, NJ Housing Authority
LINC Housing Corporation
McCormack Baron Salazar
Mercy Housing, Inc.
Multi-Family Mission Ministries
National Church Residences
National Housing Trust
NHP Foundation
Preservation of Affordable Housing
REACH CDC
Retirement Housing Foundation
Rural Ulster Preservation Company
Satellite Affordable Housing Associates
Tenderloin Neighborhood Development Corporation
The Community Builders, Inc.
The Economic Development Authority of the City of Mankato, MN
The Evangelical Lutheran Good Samaritan Society
The Tower Companies
TIAA-CREF
Tonti Properties
Trinity Management
Village of Hempstead Housing Authority

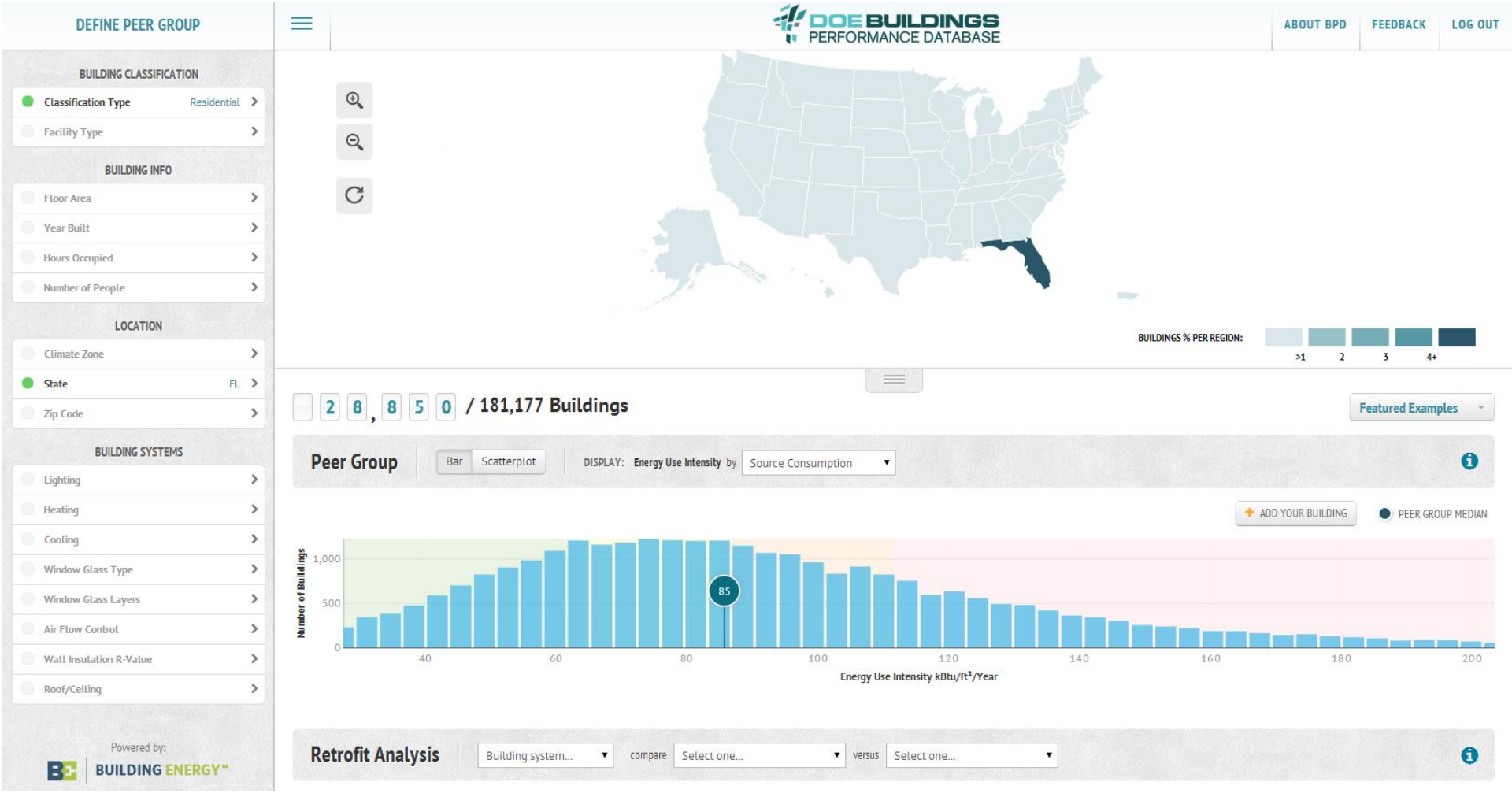
*Will be live this week

Peer Group Tool
Homes in Florida

DOE BUILDINGS PERFORMANCE DATABASE

Florida Homes

Building Count by Source kBtu/SF/yr

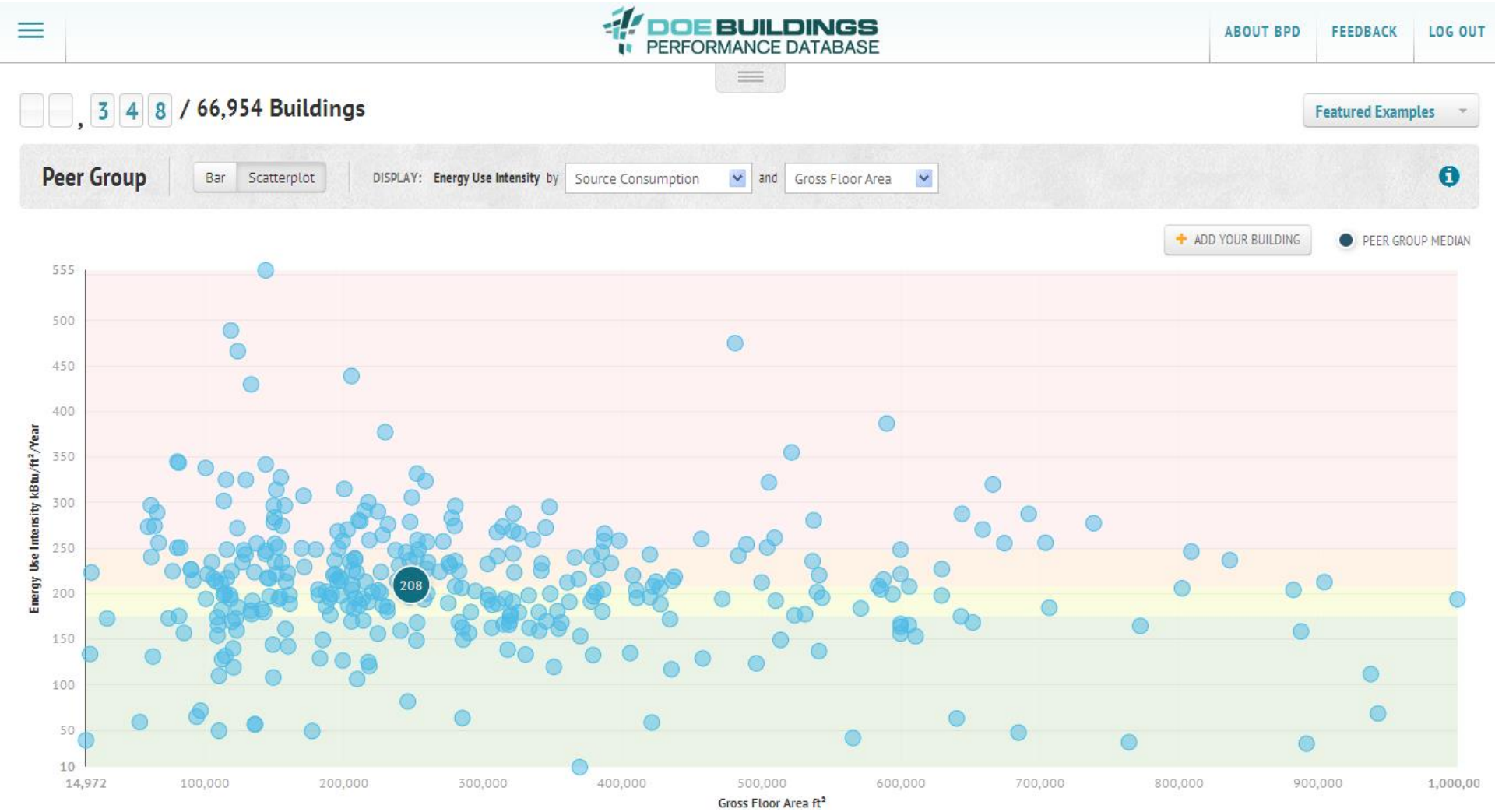


Peer Group Tool
Washington DC Benchmarking Data

DOE BUILDINGS PERFORMANCE DATABASE

Office Buildings <1M SF, built since 1900

Source Consumption by Gross SF

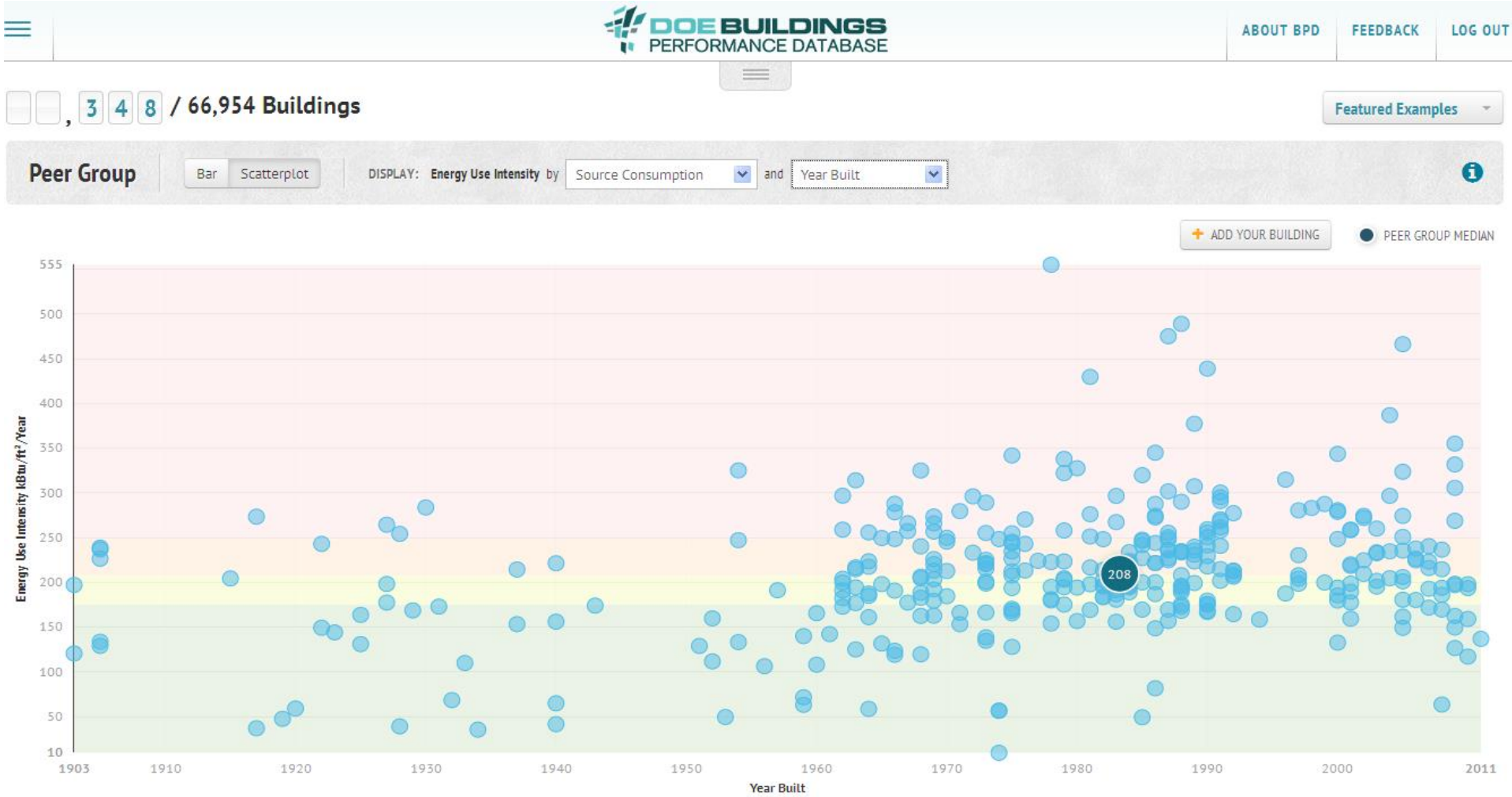


Peer Group Tool
Washington DC Benchmarking Data

DOE BUILDINGS PERFORMANCE DATABASE

Office Buildings <1M SF, built since 1900

Source Consumption by Year Built

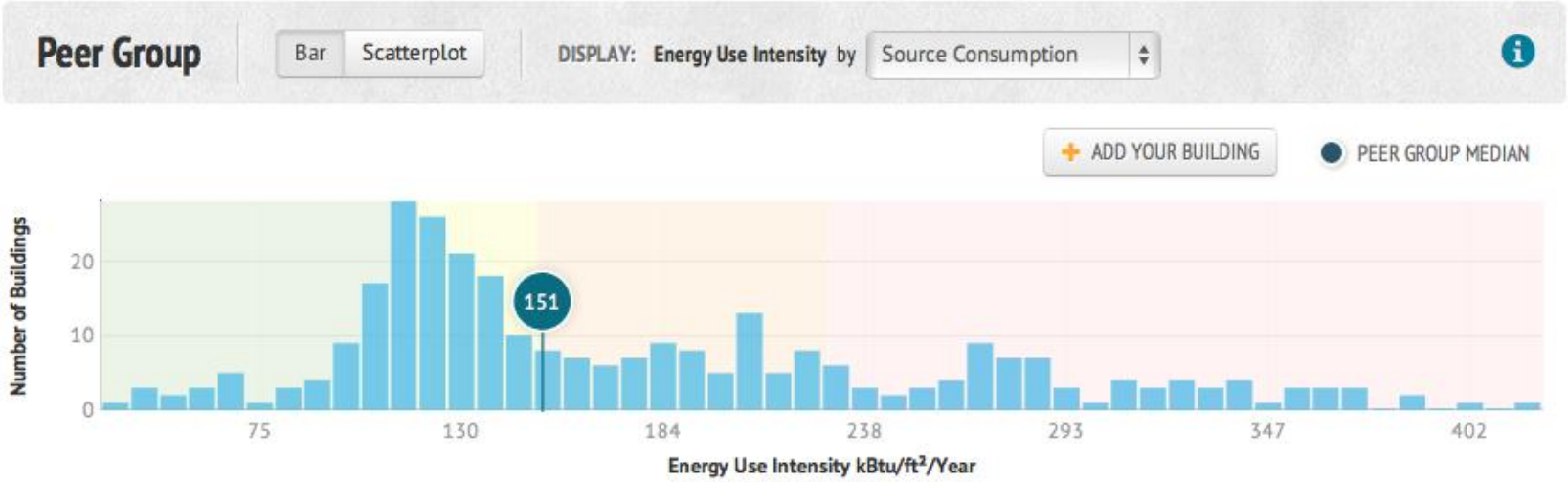


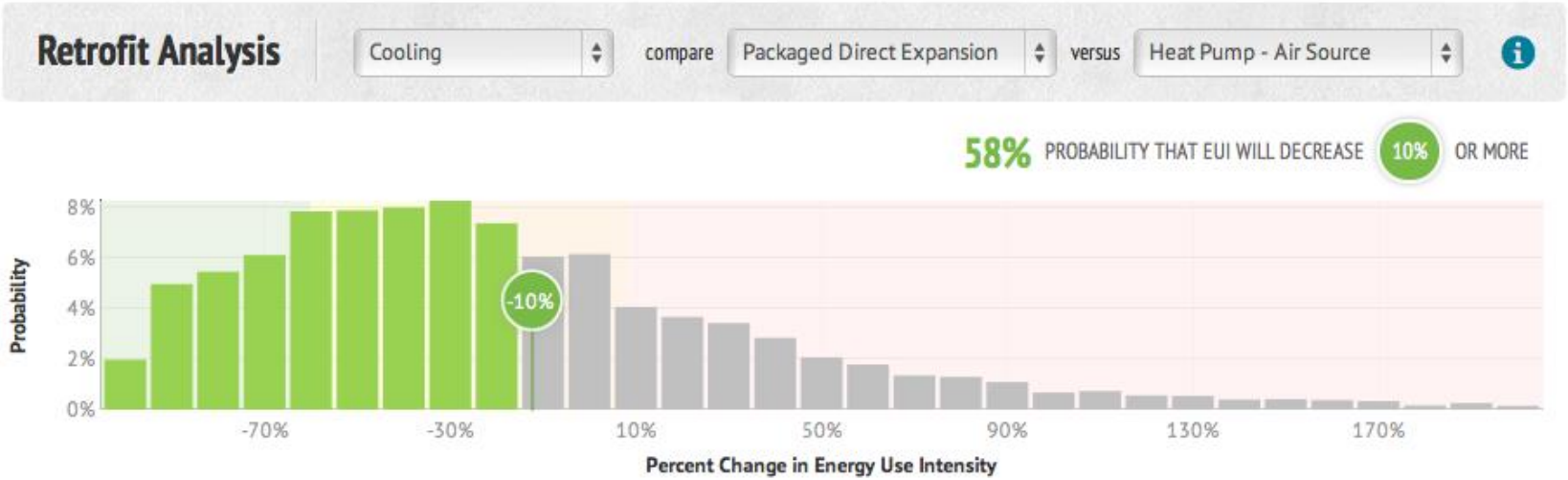
Note: Does not yet include Federally owned buildings

Retrofit Analysis Tool
California Big Box Retail: Cooling Retrofit

CA Retail Buildings >50,000 SF; N = 320

Compare Packaged Direct Expansion *to* Air Source Heat Pump

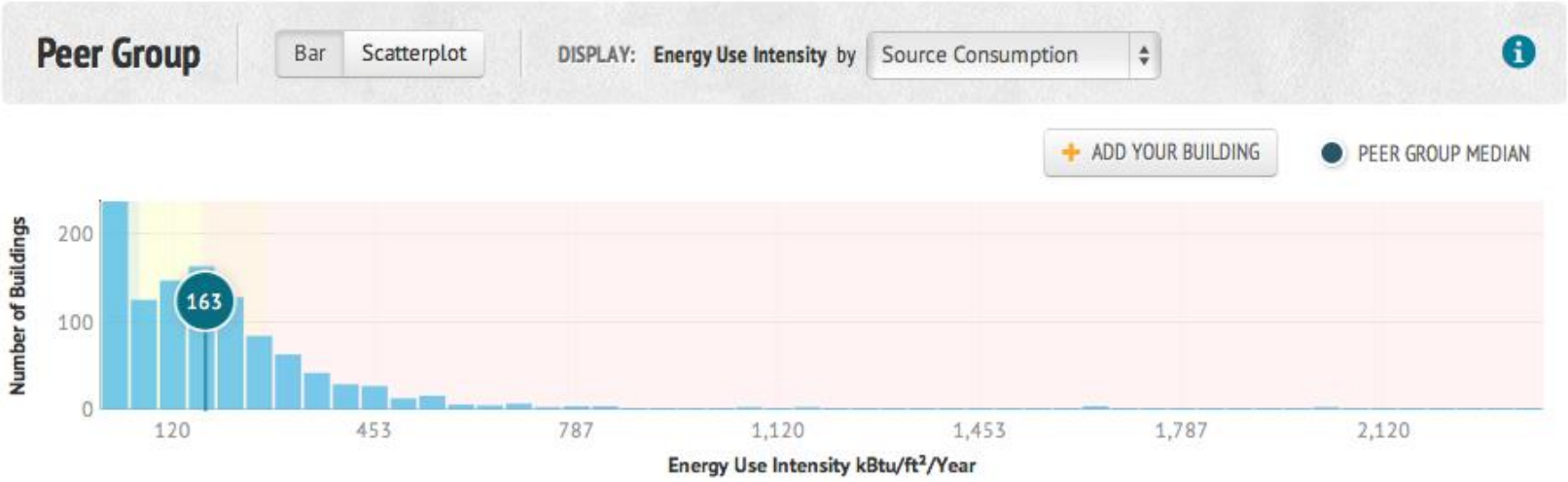


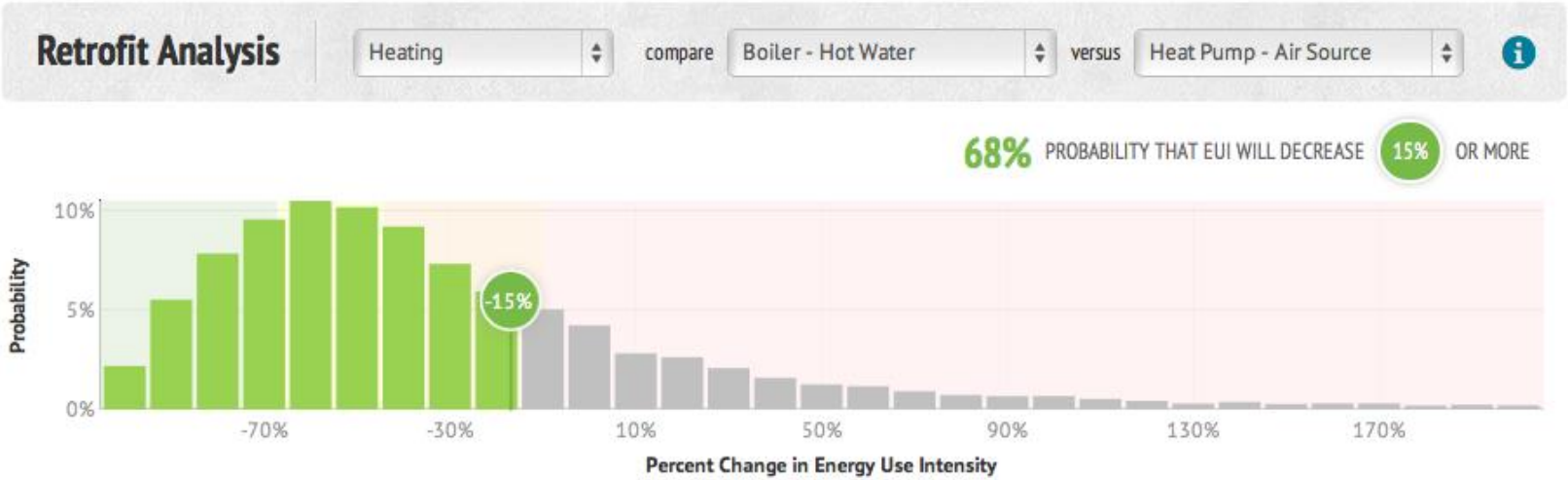


Retrofit Analysis Tool
California Office Buildings: Heating Retrofit

Office Buildings; N = 2,022

Compare Packaged Hot Water Boiler *to* Air Source Heat Pump





Discussion: Is this value proposition correct?

DOE BUILDINGS PERFORMANCE DATABASE

Influence local real estate markets	• Enable public access to general statistical information about buildings, without sharing building-level information
Assess opportunities	• Identify high or low performing buildings, and identify improvements that will likely have a significant savings impact
Evaluate and assess projects in public buildings	• Analyze the range of likely returns from an investment • Compare efficiency project performance to similar projects
Inform policy design for private buildings	• Tailor programs and policies to local real estate market conditions and efficiency opportunities

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Discussion

Who needs to do what in order to achieve the BPD's full value?

DOE	Cities	Other Partners

• Manage central database, including cleansing and validating data
• Unlock more fields/filters
• Provide public access through user interface and API
• *Other?*
	• Drive data collection, including asset info
	• Contribute to the BPD
	• Support and collaborate with other partners
	• *Other?*
		• Software developers & researchers create new functionalities:
		  • See records compared against BPD
		  • Create localized peer comparisons
		• Local real estate listings incorporate data
		• Incentive programs contribute data and collaborate on program design
		• *Other?*

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A GUIDE TO BENCHMARKING DATA CLEANSING AND ANALYSIS

Mona Khalil

Weatherization and Intergovernmental Program

EERE

Mona.Khalil@ee.doe.gov

City Leadership

- Collaboration between DOE/NREL/LBNL and 3 Cities: New York, San Francisco, Washington DC
- Cities provide lessons learned, guidance, data, review
- Community Benchmarking data opens up a new world of opportunities for strategic energy planning

DISTRICT DEPARTMENT OF THE ENVIRONMENT

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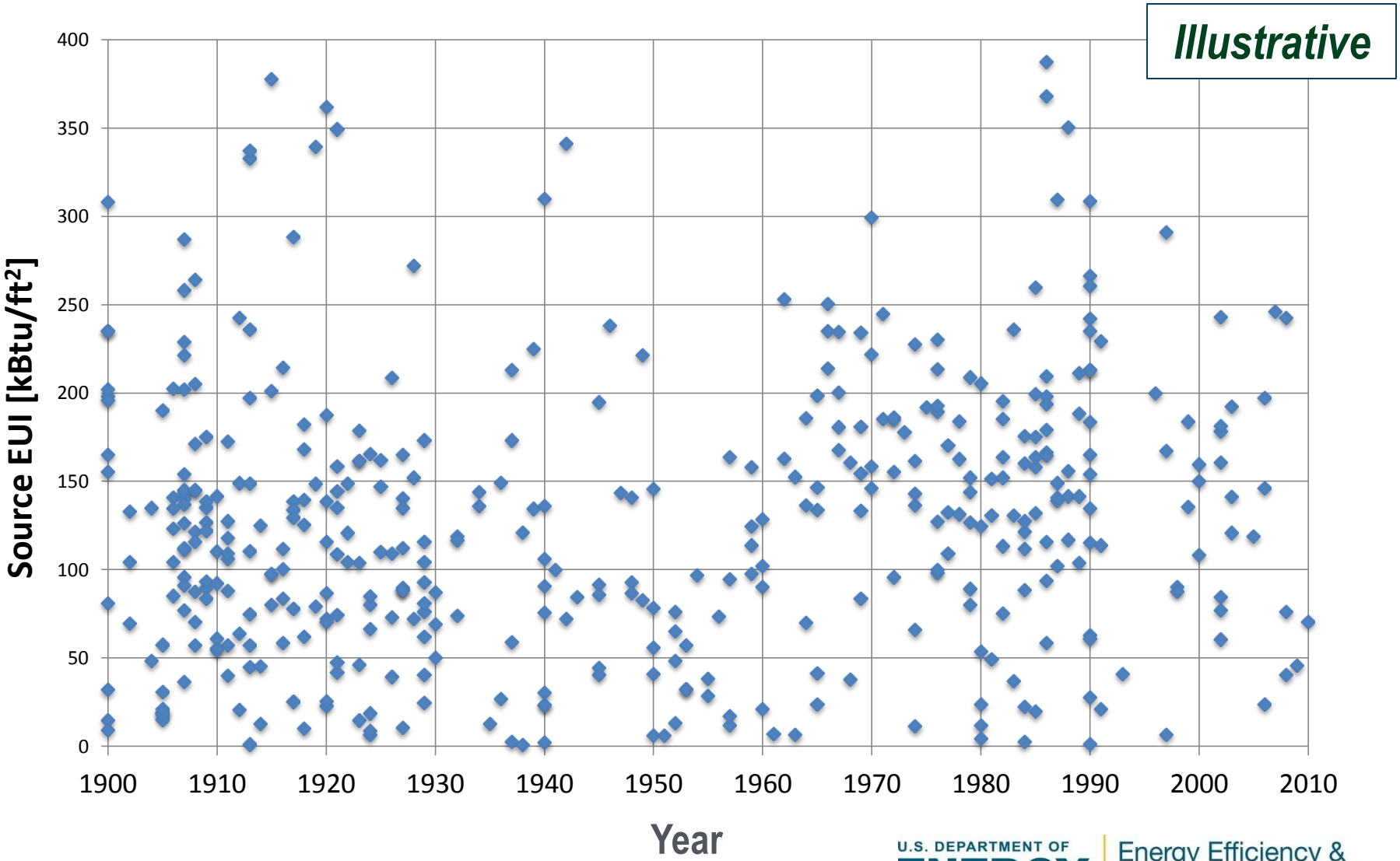
Data, finally!



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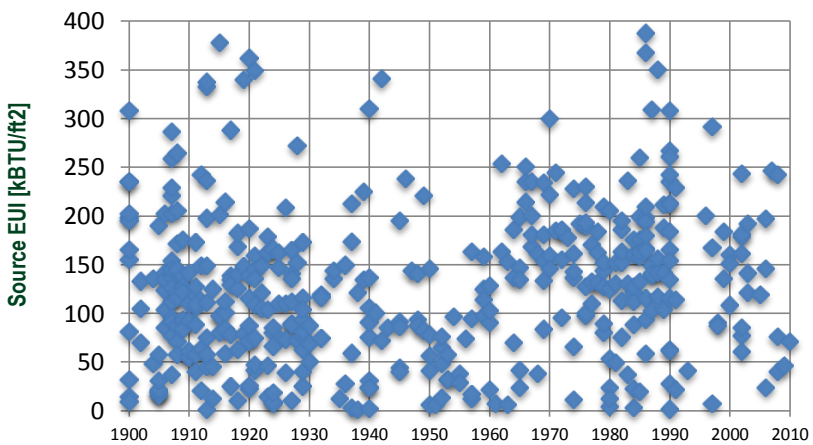
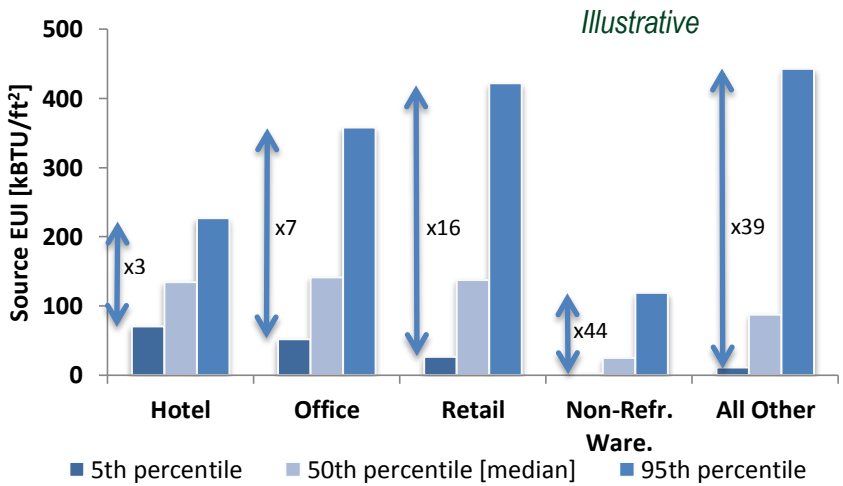
Purpose of the Guide

- Help communities, cities, and other jurisdictions prioritize and conduct analyses of public and/or private building energy benchmarking data
- Incorporate lessons learned from your data sets and experience with community-wide benchmarking
- Encourage a consistent approach to data cleansing and analysis across jurisdictions





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Part 1. Benchmarking Data Cleansing

- Data cleansing for accuracy and to remove erroneous or suspect entries
  - LBNL is developing a data cleansing and validation protocol for the BPD
- Incorporate lessons learned and considerations
  - Methodology for data cleansing
  - Types of common data errors, and examples of dataset-specific errors
  - Additional data needs and opportunities for improvement

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Part 2. Benchmarking Data Analysis

Main topics covered:

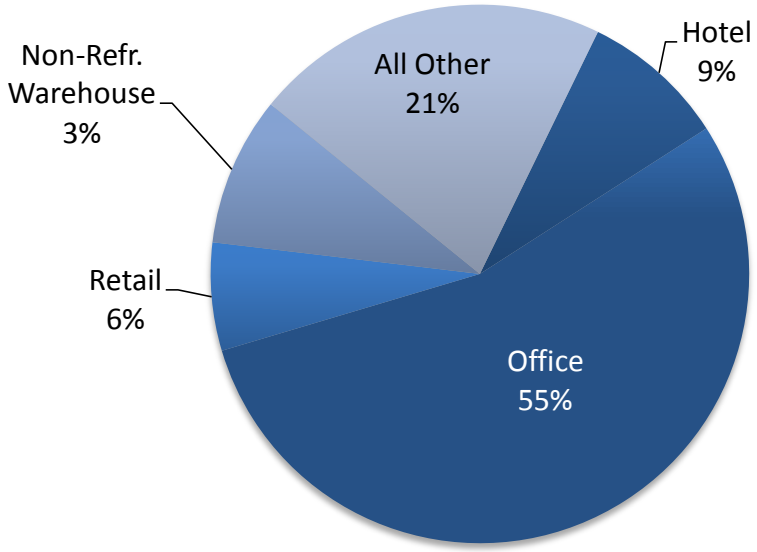
1. Understanding the Building Stock
2. Understanding the Basic Energy Performance Profile
3. Gaining Insights into Energy Trends
4. Determining Savings Potential

Level of Analysis

Main topics covered:

1. **Understanding the Building Stock**
2. Understanding the Basic Energy Performance Profile
3. Gaining Insights into Energy Trends
4. Determining Savings Potential

Illustrative



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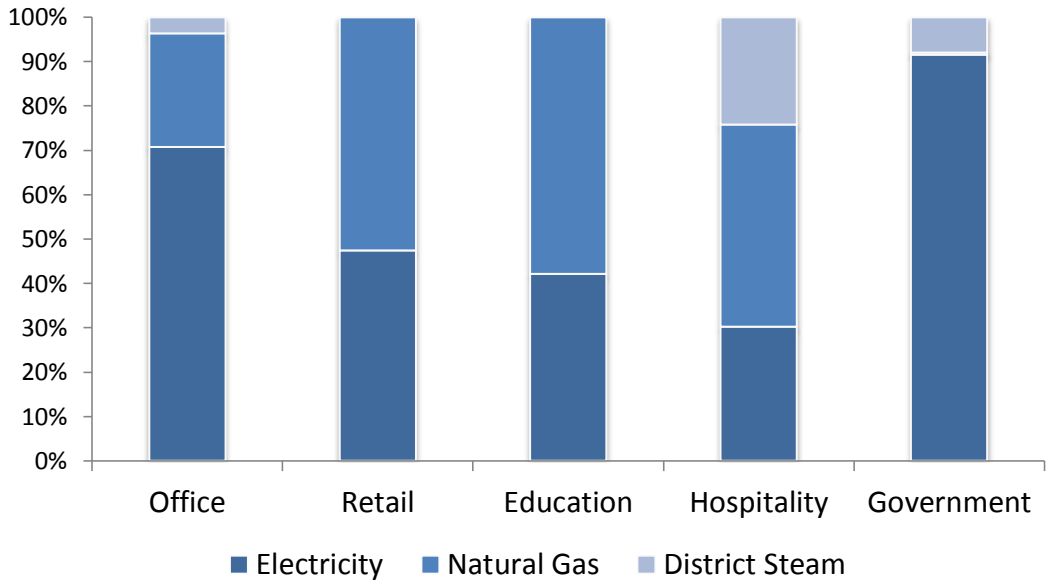

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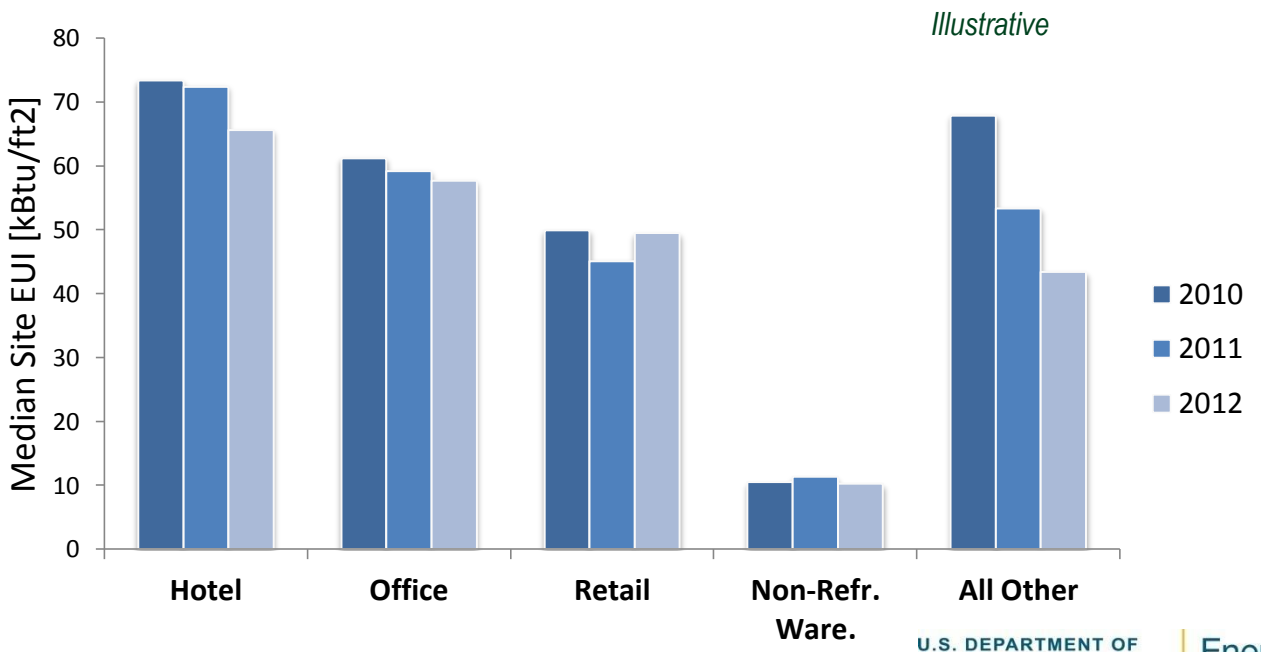

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Level of Analysis

Main topics covered:

1. Understanding the Building Stock
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4. **Determining Savings Potential**

Illustrative

Calculating Estimated Savings Potential by Quartile

	Site EUI Range [kBtu/ft^2]	Total Site Energy [GBtu/yr]	Savings Proportion	Savings Estimate [GBtu/yr]
1st quartile (top 25% performers)	0.2–31.3	210	0%	0
2nd quartile	31.3–57.1	1,320	10%	132
3rd quartile	57.1–84.1	2,651	20%	530
4th quartile (poorest 25% performers)	84.1–1,667	2,960	30%	888
Total			**22%**	**1,550**

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DISCUSSION

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FEEDBACK WELCOME:

- How is this guide most needed?
- Is there a critical analysis topic missing?
- What level of detail and guidance is helpful?

THOUGHTS ON DATA QUALITY

- Improving self-reported data quality

THOUGHTS ON DATA ANALYSIS

- Changes in composition of portfolio over time
- Inconsistent methodology across data providers and across jurisdictions
- Large variations within same building types
- Making the best use of this data

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Benchmarking and Disclosure:

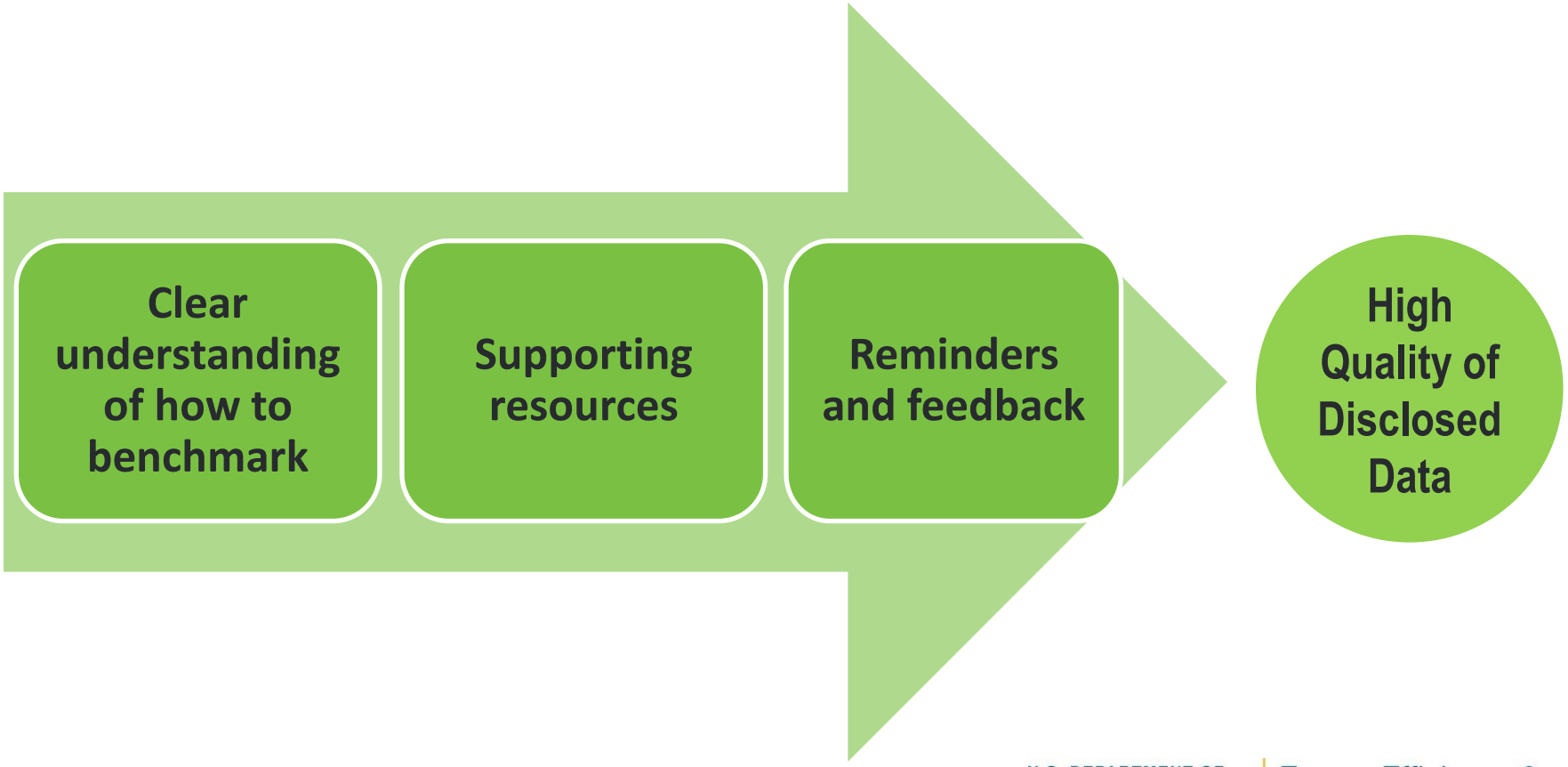
Data Quality Assurance and Impact Evaluation

March 3, 2014

Cody Taylor
Building Technologies Program
U.S. Department of Energy

Data Quality Assurance Guide

Goal: Provide guidance on how to improve the accuracy of benchmarking data that owners collect and disclose and improve compliance (which are inextricably linked).



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Data Quality Assurance Guide

What can be done to improve compliance and data quality?

Data Exchange via Web Services	• Allow utilities to directly provide energy use data into owners benchmarking profiles.
Complimentary Policies	• Audit and commissioning policies which force more diligent collection of building energy use data, which can be used to assess benchmarking data.
Compliance Checklist	• List of items that a owner needs to satisfy in order to comply with the ordinance
Directory of Professionals	• List of professionals in the jurisdiction who can be hired to benchmark properties for owners
Live Training Sessions	• Conduct live sessions to guide individuals how to benchmark their property. This is often targeted at users who need extra assistance
Help / Call Center	• Phone number that an owner can dial in order to ask questions regarding benchmarking their property.
Marketing Campaign	• Active efforts to promote and raise awareness regarding the policy. Can include webinars, social media, and others
Feedback to Benchmarkers	• Provide individualized feedback to benchmarkers, identifying areas where their data differed widely from the mean.

Data Quality Assurance Guide

DOE will be sharing the guide with jurisdictions shorty and ask all for review, primarily regarding your own current quality assurance measures.

		Quality Assurance Measures											Compliance Statistics		
	Jurisdiction	Web Service Data Exchange	Complimentary Energy Audit Policy	Data Extrapolation	Compliance Checklist	How-to-Guide	Directory of Professionals	Training Sessions	Call/Help Center	Informational Web page	Marketing Campaign	Benchmarking the Benchmarkers	Maximum Annual Fine for Non-Compliance	Years of Compliance	Compliance Rate in Most Recent Year [1]
Cities	Austin							✓		✓			$500	3	tbd
	Boston	✓						✓		✓			$3,000	1	tbd
	Chicago		✓					✓	✓	✓			$100	1	tbd
	DC							✓	✓	✓	✓		$100 / day	1	80%
	Minneapolis							✓		✓			$1,000	1	tbd
	New York City			✓				✓	✓	✓	✓	✓	$2,000	3	75%
	Philadelphia									✓	✓		tbd	1	61%
	San Francisco	✓	✓					✓		✓		✓	$2,500	3	tbd
	Seattle	✓			✓	✓	✓	✓	✓	✓	✓		$4,000	3	93%
States	Washington	✓								✓				1	
	California	✓						✓	✓	✓	✓			4	

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For each QA measure, we will provide:

QA Measure Description

Training workshops are designed to help users become more familiar with the energy performance ordinance and ENERGY STAR Portfolio Manager tool. They are hands-on workshops that are generally free to the public. The workshops decrease the likelihood of human error in the benchmarking process by making sure the building managers have hands on experience and are familiar with the benchmarking tool.

Example With Results

Philadelphia holds targeted training sessions for distinct market segments in need of additional guidance. In the past, the city has worked directly with owners of and representatives from religious buildings and educational buildings, among others. These sessions are held regularly and the city caps the attendees at around 10 people so that specific needs are able to be more easily addressed. This personal touch has been an effective method of building the benchmarking capabilities in smaller buildings, ones where the burden of benchmarking is typically handled by an office manager, who another person not in an energy management role.

Resources to Help You Pursue the Measure:

- Curriculum from EPA's Portfolio Manager training sessions
- PG&E's energy education classes
- Etc
- Etc
- Etc

Data Quality Assurance – Next Steps

- How can we improve this guide?
- Are there any QA measures we are missing?
- What other resources do you need to ensure successful collection of quality data?

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Benchmarking & Disclosure Impact Evaluation

Create an impact evaluation handbook that facilitates evaluations that are:

- **Defensible -** developed and reviewed by experts in evaluation
- **Consistent –** uses recognized methods for evaluating B&D policies (to allow comparisons of policies and policy components).

Handbook examines benchmarking & disclosure with three different lenses:

Gross energy savings estimate:

How much energy was saved over time?

Net energy savings estimate:

How much of the savings was due to the benchmarking?

Non-energy impacts estimate:

What are the economic and greenhouse gas impacts?

B&D Impact Evaluation

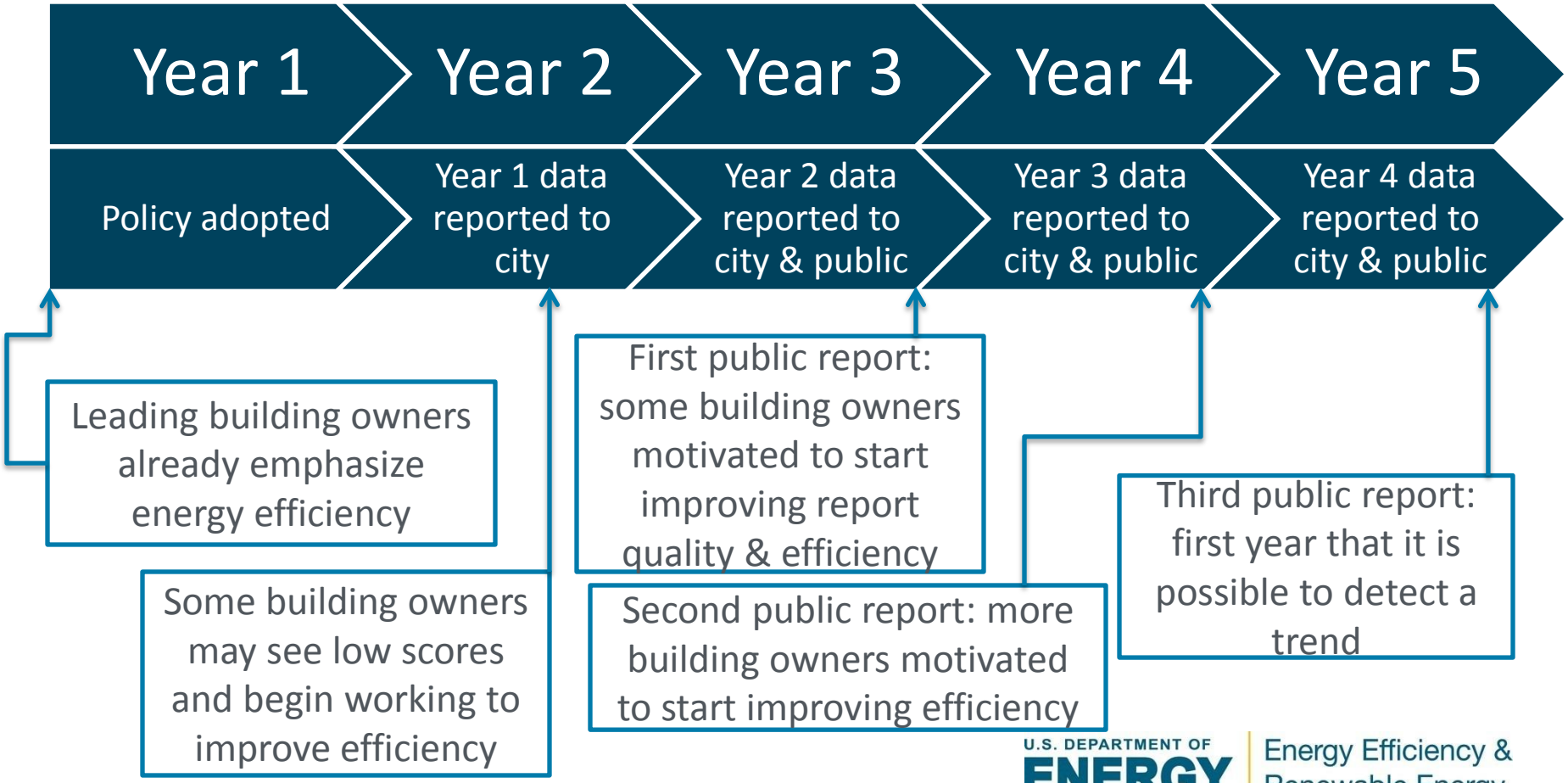
	Gross energy savings estimate	Net energy savings estimate	Non-energy impacts estimate
Existing Evidence	• 7% savings for buildings in ESPM 2011-2012 [1] • 3pt gain in ESPM Score Year 1 to Year 2 [2]	• No known research yet on net energy savings	• Existing research[3] on value focuses on high-performing buildings: • 5-16% rental rate premium • 0-31% sales price premium • 0-6% occupancy premium • Positive effects to high-performing buildings may be accompanied w/ negative affects to low-performing buildings
DOE to Provide	• Method to calculate gross energy savings estimate from ESPM report.	• Attribution analysis combining leading industry methods • Method that includes input and reviews from key stakeholders.	• Method to estimate changes in GHG emissions of building stock • Method to estimate affect on long term jobs

[1] Benchmarking and Energy Savings, EPA 2012 link
[2] NYC LL84 Benchmarking Report, PlaNYC 2013 link
[3] Various Sources from Benchmarking & Disclosure, Lessons Learned, Boston Green Ribbon Commission 2012 link

B&D Impact Evaluation

True impacts of B&D policies will not be known for years. However, the policies start to reshape the market as soon as they are established and evaluation efforts should begin at this point as well.

Typical example:



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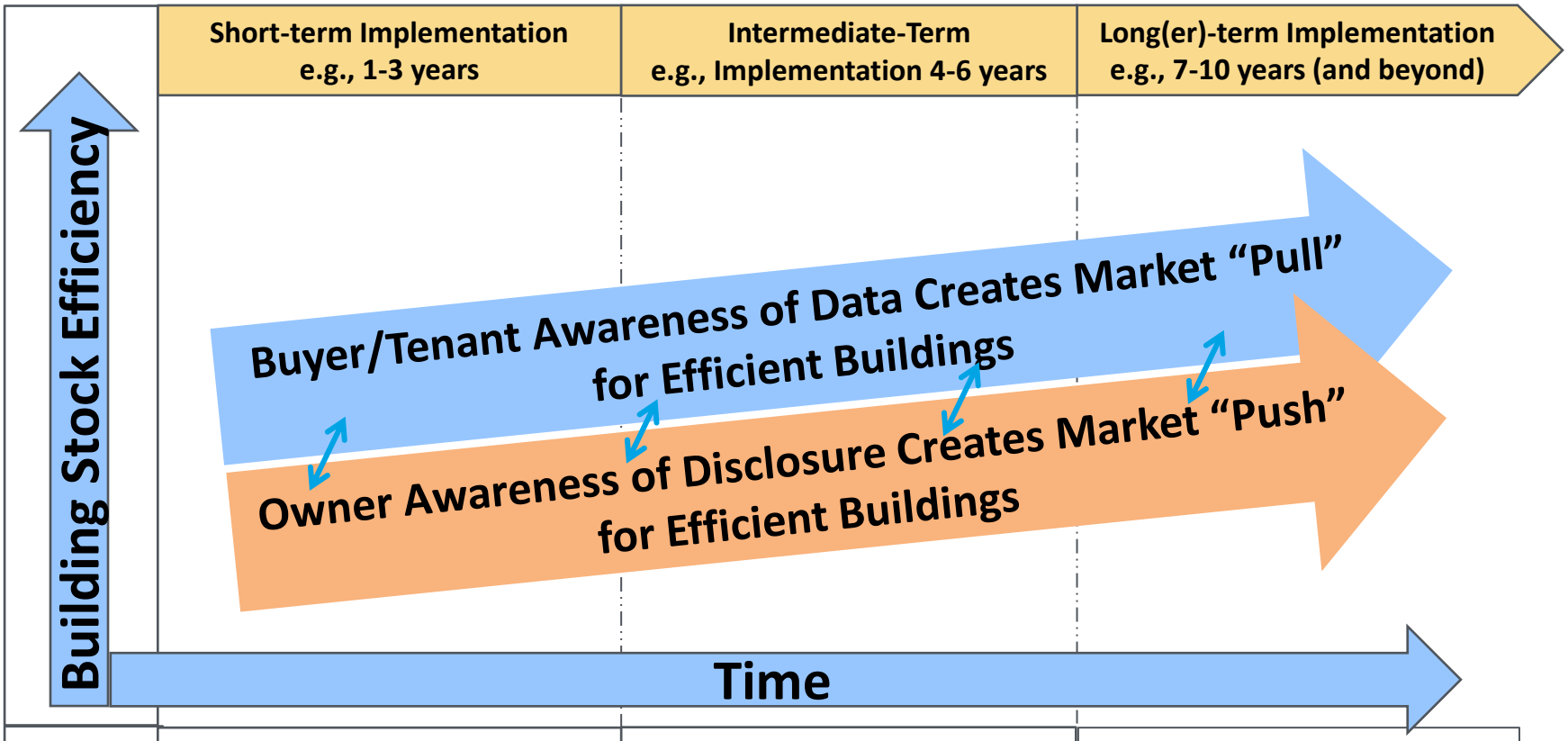
B&D Impact Evaluation



Expected Market Status	* Tenants and owners are able to access/become aware of relative energy efficiency status of buildings. * Savvy tenants begin to request efficiency information when making purchase choices * Innovative owners use efficiency to position their buildings for better tenant retention, rental rate, etc	* Owners begin to pursue no-cost, operational measures, to increase efficiency * Savvy tenants use energy efficiency information when making purchase choices in lease negotiations * Innovative owners invest in energy efficient retrofits to improve customer comfort and reduce costs	* Innovative owners recognize that energy efficiency improvements create lasting value in their properties * Premiums are paid for high-efficiency buildings and lower efficiency buildings are associated with lower rents, higher vacancy * Information transparency has allowed the market to operate efficiently by incorporating energy into decision-making and valuation

How you can help

- Provide feedback on assessment methods
- Establish baselines for future assessments.
- Conduct trial impact assessments, if only internally – the more assessment data we collect, that better we can adjust.

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