



U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy



## Overview

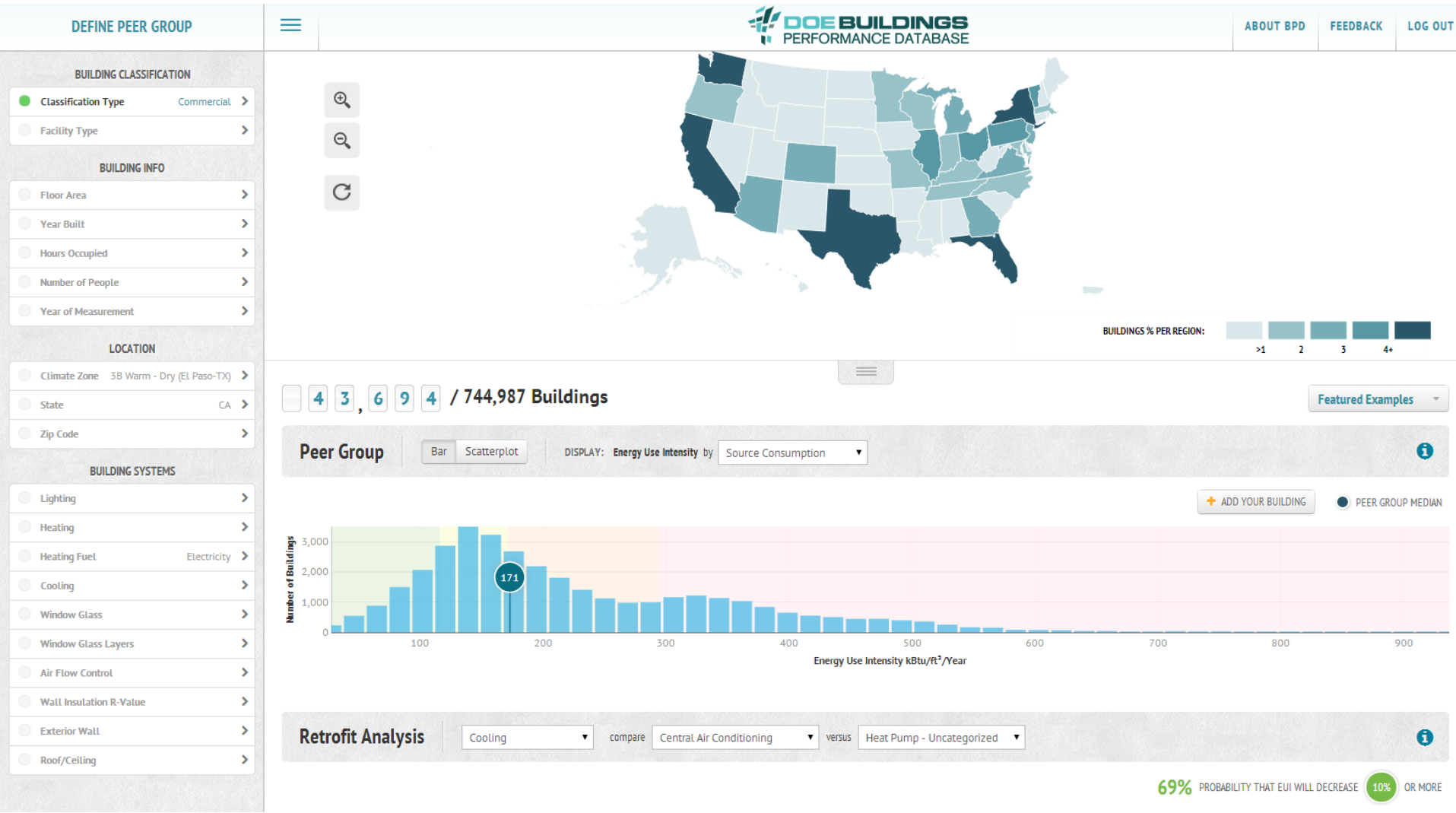


[Buildings.energy.gov/BPD](https://Buildings.energy.gov/BPD)

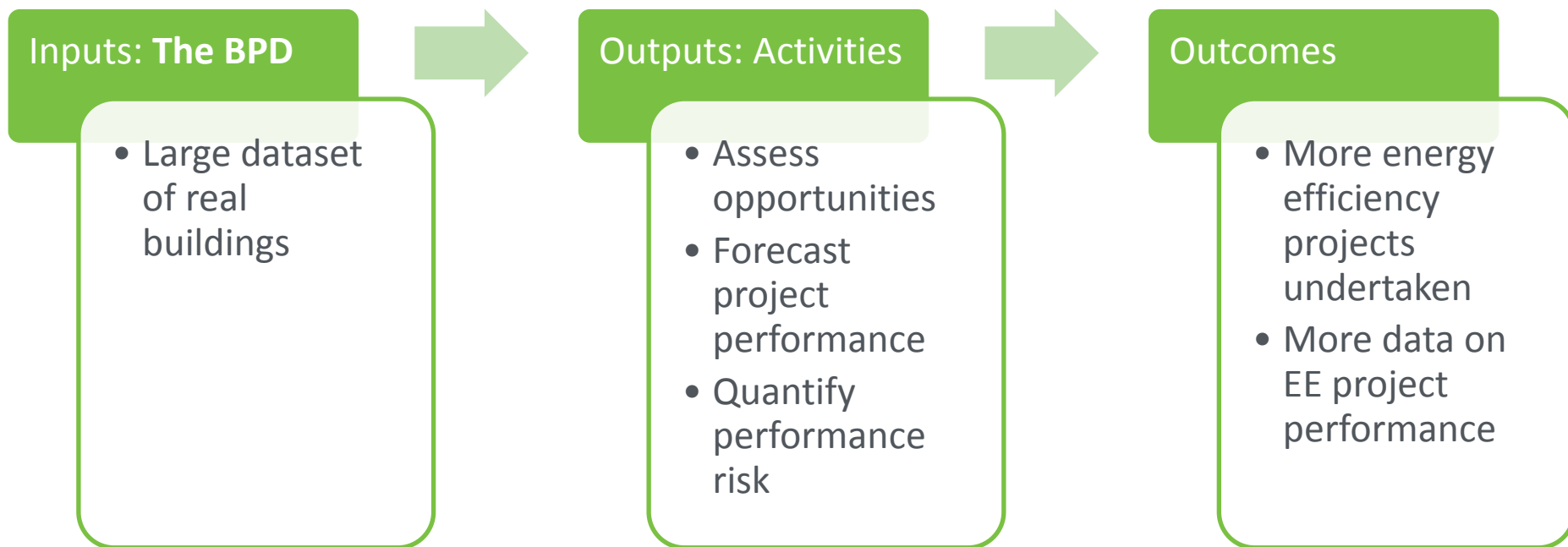
[BuildingsPerformanceDatabase@ee.doe.gov](mailto:BuildingsPerformanceDatabase@ee.doe.gov)

# The 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.



## 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.

# The BPD aggregates data from many other tools

## Data Sources



## Software Tools

*Collect data and conduct diagnostic analysis about individual buildings*



An energy management tool that tracks & assesses energy & water consumption in user's buildings.

### DOE's Building Rating Tools

Includes the Home Energy Score & Commercial Building Energy Asset Score



### Other Tools & Databases

Includes Building Management Tools, Energy Efficiency Program Administration Databases, CBECS and RECS, etc.

## Aggregation Platform

*Combine and analyze data from many sources*



One publicly-accessible database of anonymous, empirical records.

- >740,000 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  
California Commercial End Use Survey  
Pennsylvania Keystone HELP Home Energy Loan Program  
San Diego Gas and Electric  
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  
Virginia Beach City Public Schools  
The City of Phoenix: Energize Phoenix

## Private Sector

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



## 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

## 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

## 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,

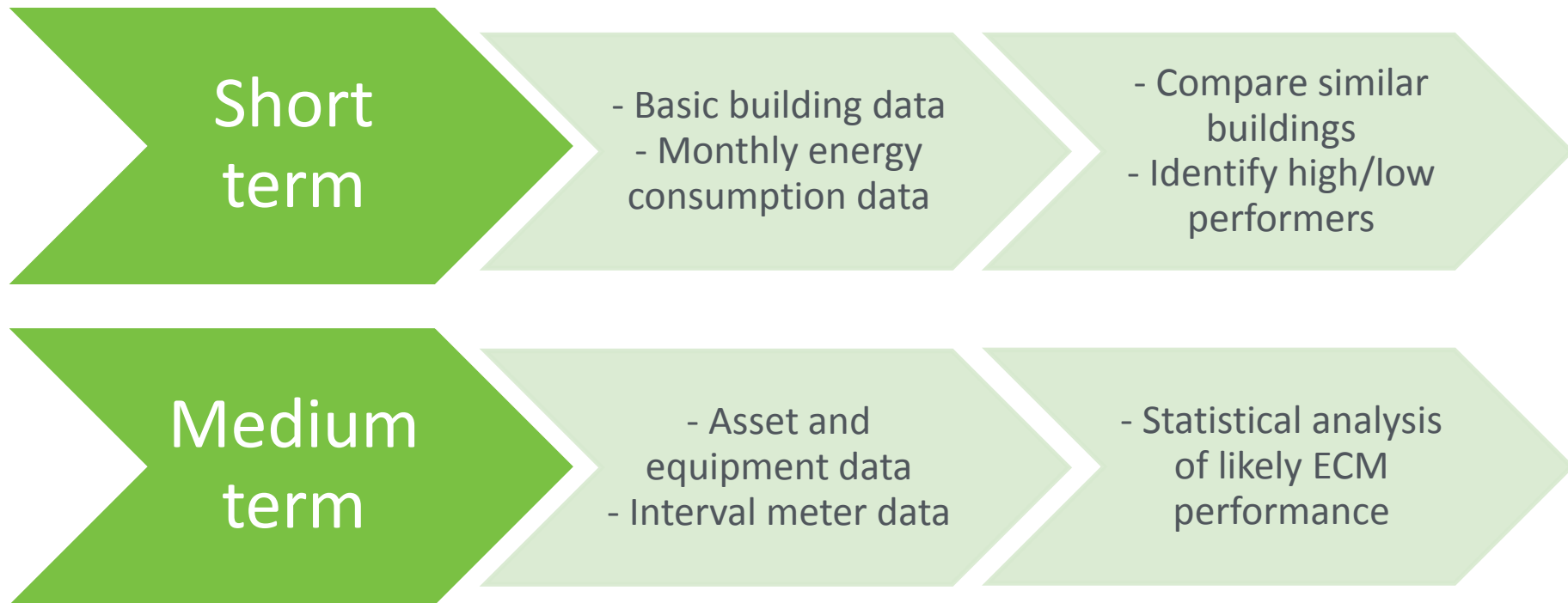
<sup>8</sup>CT

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  
Volunteers of America  
WinnCompanies



- The BPD demonstrates the value of aggregating the kind of data that is commonly collected today.
- As stakeholders begin to collect and contribute richer data, the BPD will support more advanced analysis.



>7,000 users since June 2013 launch

Building  
Owners &  
Managers

Contractors &  
Software  
Developers

Financial  
Institutions

Public  
Agencies

EE Program  
Administrators

Research  
Institutions

- **Use the Peer Group Tool to peruse the BPD, define peer groups, and analyze their performance.**
- **Filter the dataset** based on building type, location, floor area, age, occupancy, and system characteristics such as lighting and HVAC type.
- **Create graphs** of the selected dataset comparing:
  - Energy metrics such as: energy use intensity, source consumption, site consumption, electric consumption, or fuel consumption
  - Building characteristics such as: gross floor area, year built, and hours occupied
  - More variables will become available for analysis as the dataset grows
- **Enter information about a building** to see how it compares to the peer group

# Peer Group Tool

## Homes in Florida

### Florida Homes

#### Building Count by Source kBtu/SF/yr

DEFINE PEER GROUP

BUILDING CLASSIFICATION

Classification Type

Residential

Facility Type

BUILDING INFO

Floor Area

64 - 6,356,822

Year Built

Hours Occupied

Number of People

Year of Measurement

LOCATION

Climate Zone

State

FL

Zip Code

BUILDING SYSTEMS

Lighting

Heating

Heating Fuel

Cooling

Window Glass

Window Glass Layers

Air Flow Control

Wall Insulation R-Value

Exterior Wall

Roof/Ceiling

DOE BUILDINGS  
PERFORMANCE DATABASE

ABOUT BPD

FEEDBACK

LOG OUT

29,479 / 744,987 Buildings

Featured Examples

Peer Group

Bar

Scatterplot

DISPLAY: Energy Use Intensity by Source Consumption

Number of Buildings

Energy Use Intensity kBtu/ft²/Year

ADD YOUR BUILDING

PEER GROUP MEDIAN

80

Retrofit Analysis

Building system... compare Select one... versus Select one...

# Peer Group Tool

## Washington DC Benchmarking Data

Office Buildings <1M SF, built since 1900  
Source Consumption by Gross SF

*Note: Does not yet  
include Federally  
owned buildings*

3 4 5 / 744,987 Buildings

Featured Examples

Peer Group

Bar

Scatterplot

DISPLAY: Energy Use Intensity by

Source Consumption

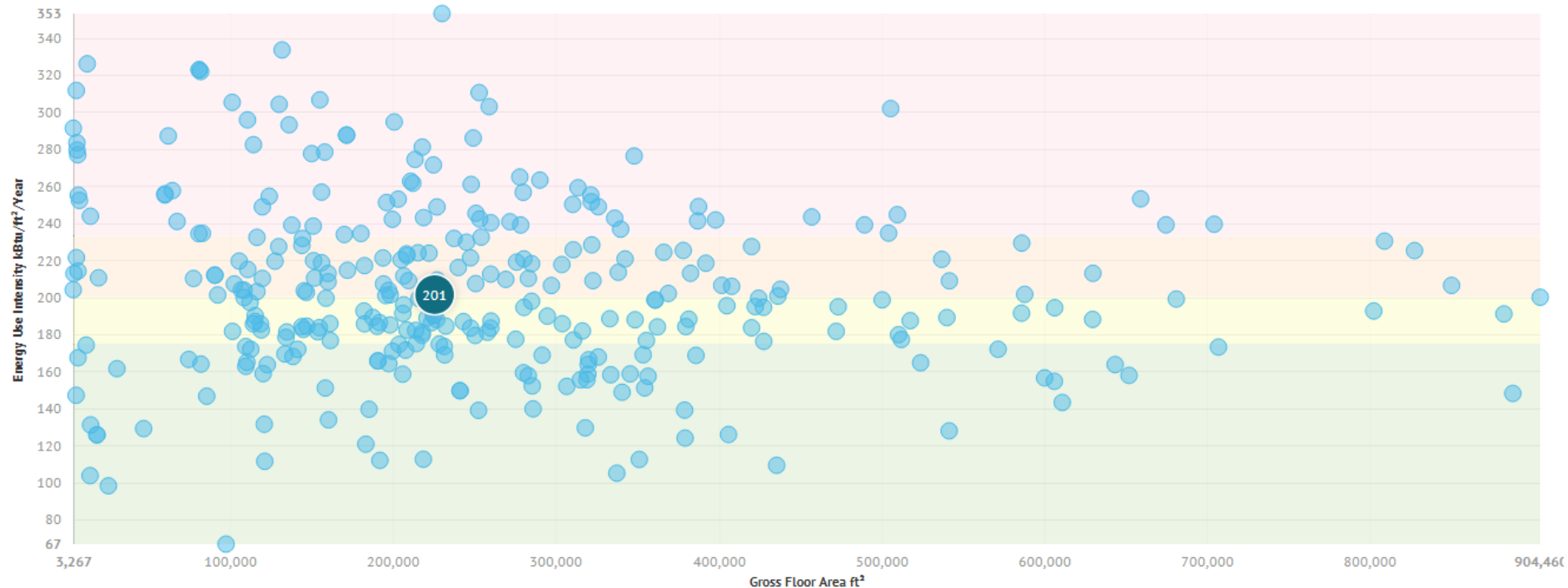
and

Gross Floor Area



+ ADD YOUR BUILDING

● PEER GROUP MEDIAN



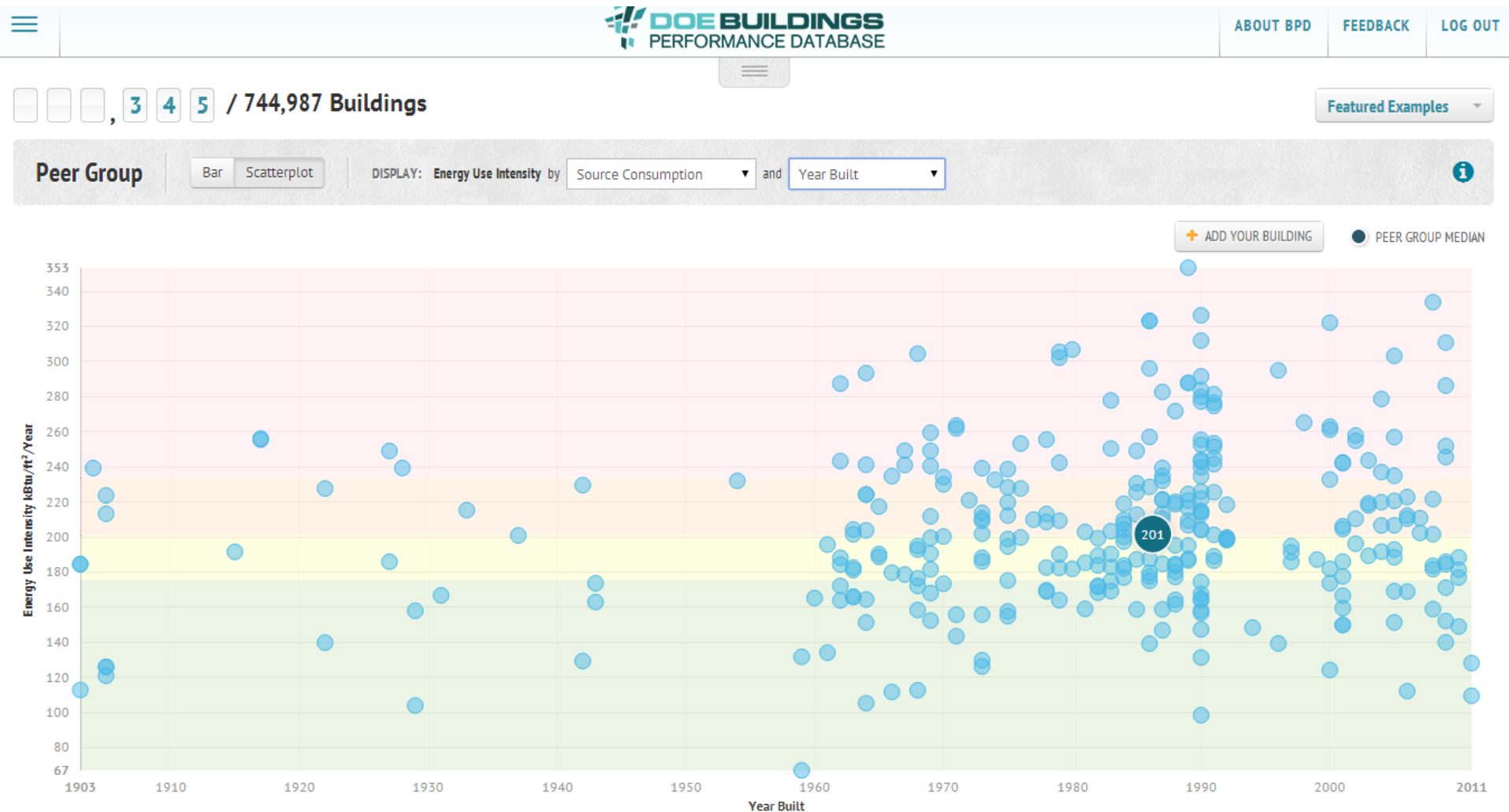
# Peer Group Tool

## Washington DC Benchmarking Data

### Office Buildings <1M SF, built since 1900

#### Source Consumption by Year Built

*Note: Does not yet include Federally owned buildings*





- The Tool allows users to analyze the savings potential of specific energy efficiency measures for a peer group of buildings.
- Results provide **forecasted energy savings** for individual measures
  - The graph shows the probability of achieving different levels of energy savings.
- Methodology:
  - The bar chart shows the **distribution of likely energy savings, based on one-to-one comparisons of buildings that have one technology to peers that have a different technology.** The horizontal axis shows the percent change in energy use, while the vertical axis shows the percentage of the one-to-one comparisons that resulted in that level of energy savings.
  - Note that the savings estimates currently exclude interactive effects between technologies. Moreover, it does not take into account the relative impact of other building characteristics that may be correlated. As the data in the BPD becomes more robust, users will be able to control for these variables.

# Retrofit Analysis Tool

## California Big Box Retail: Cooling Retrofit

CA Retail Buildings >50,000 SF

Compare Packaged Direct Expansion to Air Source Heat Pump

5 4 0 / 744,987 Buildings

Featured Examples

Peer Group

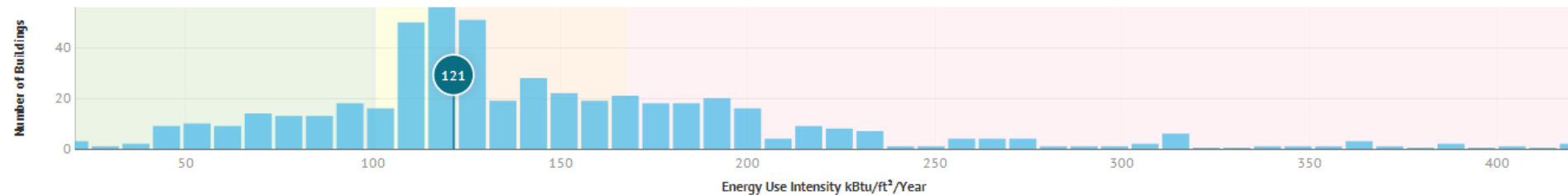
Bar   Scatterplot

DISPLAY: Energy Use Intensity by Source Consumption



+ ADD YOUR BUILDING

PEER GROUP MEDIAN



Retrofit Analysis

Cooling

compare

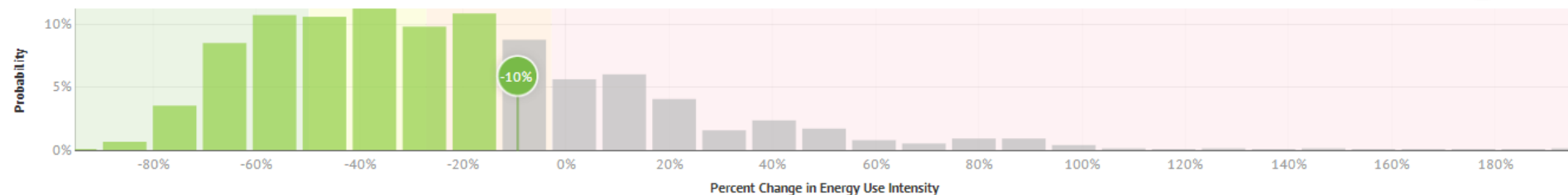
Packaged Direct Expansion

versus

Heat Pump - Air Source



66% PROBABILITY THAT EUI WILL DECREASE 10% OR MORE



# Retrofit Analysis Tool

## California Office Buildings: Heating Retrofit

### Office Buildings

Compare Packaged Hot Water Boiler to Air Source Heat Pump



2,240 / 744,987 Buildings

Featured Examples

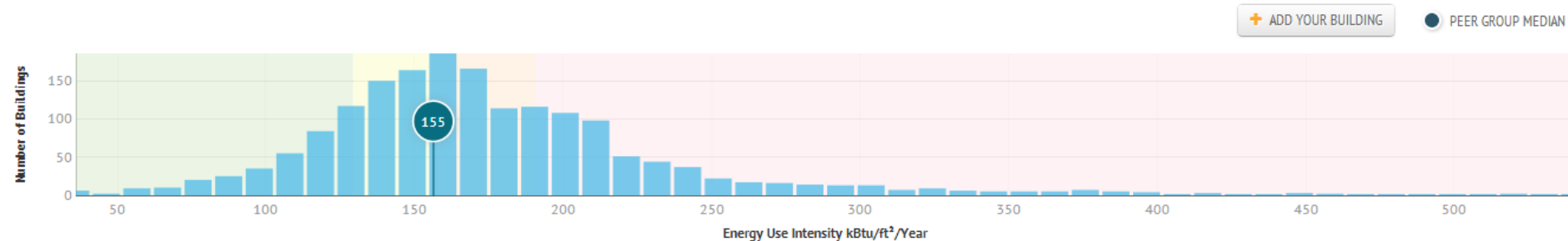
#### Peer Group

Bar

Scatterplot

DISPLAY: Energy Use Intensity by

Source Consumption



#### Retrofit Analysis

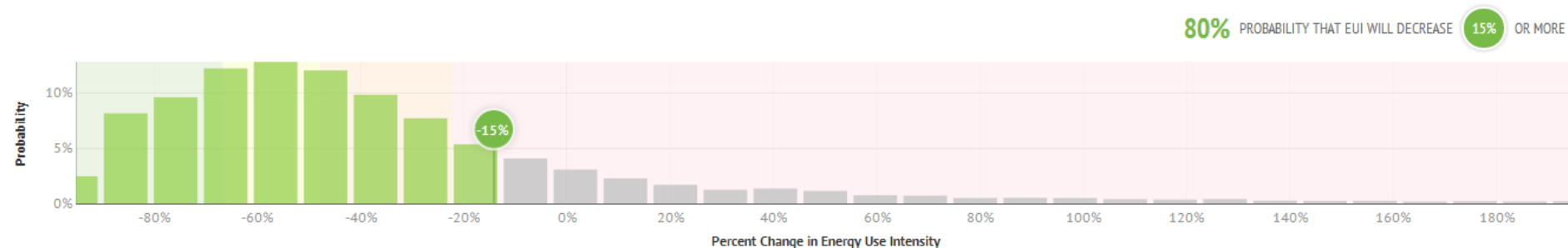
Heating

compare

Boiler - Hot Water

versus

Heat Pump - Air Source



## Assess opportunities

- Identify high or low performing buildings, and identify improvements that will likely have a significant savings impact

## Understand performance risk

- Analyze the range of likely returns from an investment

## Evaluate investment performance

- Compare efficiency project performance to similar projects

## Assess opportunities

- Identify high or low performing buildings, and identify improvements that will likely have a significant savings impact

## Understand performance risk

- Analyze the range of likely returns from an investment

## Evaluate investment performance

- Compare efficiency project performance to similar projects

## Influence local real estate markets

- Enable public access to general statistical information about buildings, without sharing building-level information

Help participants assess opportunities

- Help building owners, managers, and contractors identify improvements that will likely have a significant savings impact

Target program design

- Identify buildings and efficiency measures with the greatest savings potential

Support M&V

- Optimize M&V requirements based on measured savings uncertainty and persistence



## Assess opportunities

- Identify high or low performing buildings, and identify improvements that will likely have a significant savings impact

## Increase confidence in returns

- Analyze actual building performance (as opposed to modeled or predicted performance)

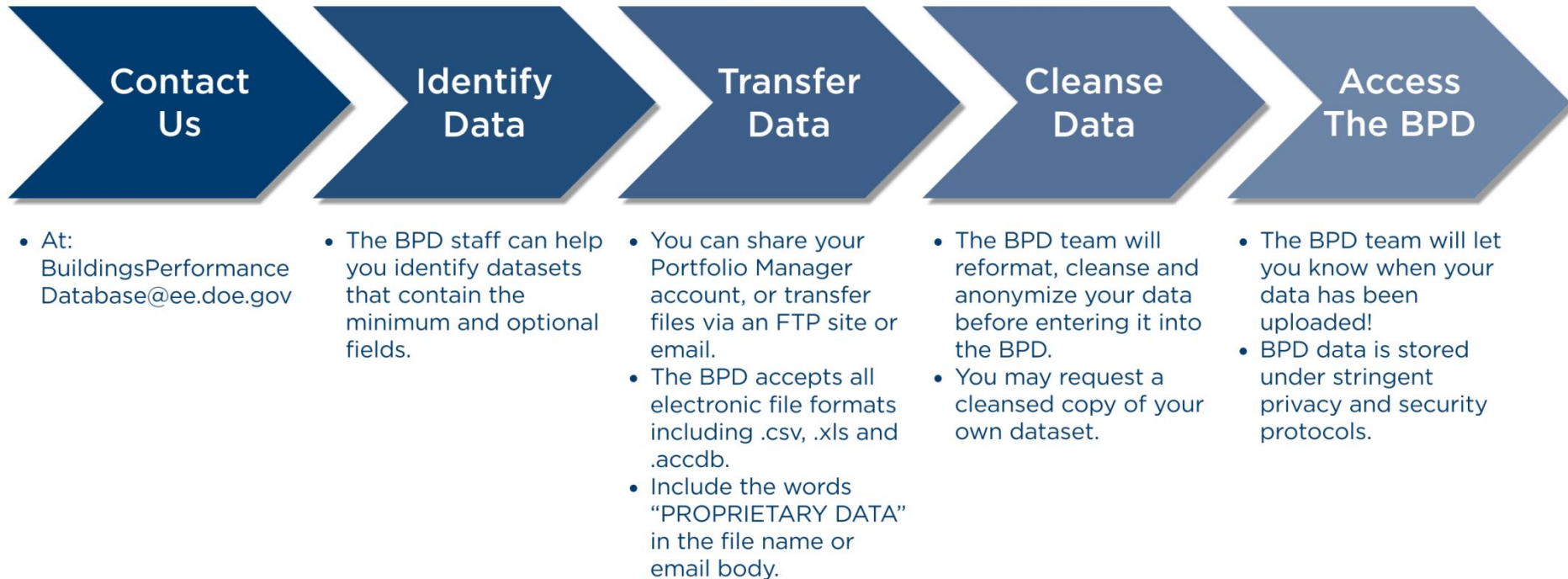
## Conduct performance risk analysis

- Quantitatively distinguish between expected returns and performance risk

## Support portfolio-level investment strategy

- Diversify risk by investing in a range of buildings and measures

## Check out the BPD: [Buildings.energy.gov/BPD](https://buildings.energy.gov/BPD)



**Contact:**

**[BuildingsPerformanceDatabase@ee.doe.gov](mailto:BuildingsPerformanceDatabase@ee.doe.gov)**

# BPD is seeking datasets that include:

- **Required Fields**

- ✓ *Basic Building Characteristics*

- ☐ City, State, Zip Code
- ☐ Usage type (office, retail, home)
- ☐ Building floor area
- ☐ Year completed
- ☐ Electricity/fuel use for at least one year

- **Optional Fields**

- ✓ *Detailed Building Characteristics*

**Operational information (Portfolio Manager data),**  
such as:

- ☐ Types of activities and associated floor area
- ☐ Operating hours
- ☐ Number of occupants

**Equipment & Asset information,** such as:

- ☐ Lighting type and controls
- ☐ Air distribution configuration, controls, etc
- ☐ Heating and cooling equipment types & efficiencies
- ☐ Hot water equipment type & efficiency
- ☐ Wall, roof and window characteristics

- **The BPD has clear use restrictions, and stringent privacy and security policies:**
  - Data can only be analyzed in aggregate through the BPD interface. The BPD analyses will never allow identification of specific buildings.
  - All the records contained in the Database are anonymous. All personally identifiable information, such as name, street address, etc. of buildings or individuals are removed from the records prior to entry.
  - Individual building records will not be released publicly. Any data that is properly marked as “proprietary data” is protected by law from release under the Freedom of Information Act.
  - The Database’s security policies align with DOE policies and Information Security best-practices. The BPD employs Secure Sockets Layer (SSL) certificates with 2048-bit RSA encryption.
  - *DOE can provide a standard confidentiality statement to attach when providing your data for the BPD.*