The BPD statistically analyzes trends in the energy performance and physical & operational characteristics of real commercial and residential buildings.
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**
- Basic Building Info
- Energy Consumption
- Audits
- Commissioning studies
- Operating characteristics
- Equipment & asset info
- Public records

**Software Tools**
Collect data and conduct diagnostic analysis about individual buildings

- **PortfolioManager®**
  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*
Better Buildings Challenge Data Sources

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, 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.

**Short term**
- Basic building data
- Monthly energy consumption data
- Compare similar buildings
- Identify high/low performers

**Medium term**
- Asset and equipment data
- Interval meter data
- Statistical analysis of likely ECM performance
>7,000 users since June 2013 launch

- Building Owners & Managers
- Contractors & Software Developers
- Financial Institutions
- Public Agencies
- EE Program Administrators
- Research Institutions
Peer Group Tool

• 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
Florida Homes
Building Count by Source kBTU/SF/yr
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
Note: Does not yet include Federally owned buildings
Retrofit Analysis Tool

• 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

Peer Group: Bar Scatterplot
DISPLAY: Energy Use Intensity by Source Consumption

Energy Use Intensity: kBTU/ft^2/Year

Retrofit Analysis: Cooling [compare Packaged Direct Expansion] versus [Heat Pump - Air Source]

66% probability that EUI will decrease 10% or more
Office Buildings

Compare Packaged Hot Water Boiler to Air Source Heat Pump
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
### Value – Government Agencies

<table>
<thead>
<tr>
<th>Assessment Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
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<td>• Identify high or low performing buildings, and identify improvements that will likely have a significant savings impact</td>
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<td>Evaluate investment performance</td>
<td>• Compare efficiency project performance to similar projects</td>
</tr>
<tr>
<td>Influence local real estate markets</td>
<td>• Enable public access to general statistical information about buildings, without sharing building-level information</td>
</tr>
</tbody>
</table>
## Value – Energy Efficiency Programs

<table>
<thead>
<tr>
<th>Help participants assess opportunities</th>
<th>• Help building owners, managers, and contractors identify improvements that will likely have a significant savings impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target program design</td>
<td>• Identify buildings and efficiency measures with the greatest savings potential</td>
</tr>
<tr>
<td>Support M&amp;V</td>
<td>• Optimize M&amp;V requirements based on measured savings uncertainty and persistence</td>
</tr>
</tbody>
</table>
## Value – Financial Institutions

<table>
<thead>
<tr>
<th>Assess opportunities</th>
<th>• Identify high or low performing buildings, and identify improvements that will likely have a significant savings impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase confidence in returns</td>
<td>• Analyze actual building performance (as opposed to modeled or predicted performance)</td>
</tr>
<tr>
<td>Conduct performance risk analysis</td>
<td>• Quantitatively distinguish between expected returns and performance risk</td>
</tr>
<tr>
<td>Support portfolio-level investment strategy</td>
<td>• Diversify risk by investing in a range of buildings and measures</td>
</tr>
</tbody>
</table>
Check out the BPD: Buildings.energy.gov/BPD

Contact Us

- At: BuildingsPerformanceDatabase@ee.doe.gov

Identify Data

- The BPD staff can help you identify datasets that contain the minimum and optional fields.

Transfer Data

- You can share your Portfolio Manager account, or transfer files via an FTP site or email.
- The BPD accepts all electronic file formats including .csv, .xls and .accdb.
- Include the words “PROPRIETARY DATA” in the file name or email body.

Cleanse Data

- The BPD team will reformat, cleanse and anonymize your data before entering it into the BPD.
- You may request a cleansed copy of your own dataset.

Access The BPD

- The BPD team will let you know when your data has been uploaded!
- BPD data is stored under stringent privacy and security protocols.

Contact:

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
BPD Data Privacy and Security

- 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.