



U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



Data Tools

BPD, SEED & Data Accelerator

BTO Peer Review

April 23, 2014

2:00-3:30

Elena Alschuler

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%
Have used ENERGY STAR to guide energy efficiency upgrade plans

67%
have used ENERGY STAR to justify an energy efficiency project

Utility programs promoting benchmarking can drive similar results:

62%
said that benchmarking strongly influenced them to take energy management actions

84%
made energy efficiency retrofits or operational improvements to their buildings

Audin, Lindsay. "Finding Your Best Energy Opportunity." Building Operating Management. December, 2011.

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



DOE's Vision for Performance-Based Approaches

By making building energy performance clearly traceable:

- **Owners, operators, and product and service providers** can understand the drivers of variations in building performance, identify efficiency investment opportunities, and project the likely savings from investments.
- **Public sector actors** can tailor the design and implementation of energy efficiency programs and policies to be most effective given local market conditions and trends.

Building a Foundation for Private Tools & Activities



③

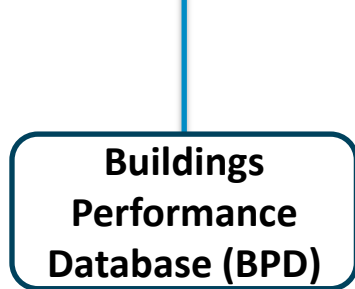
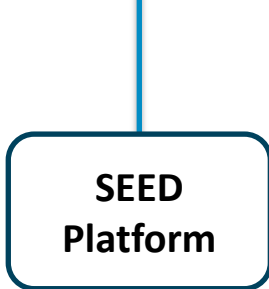
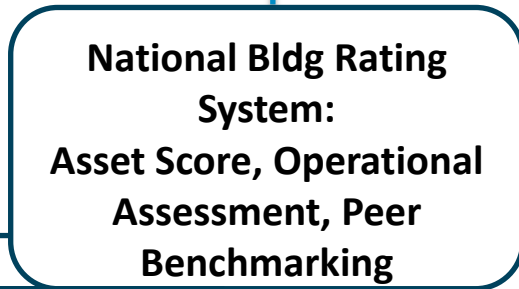
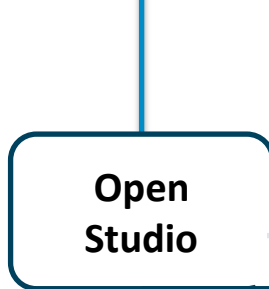
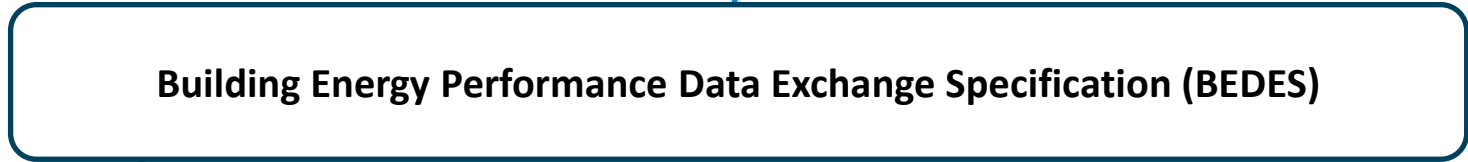
An Ecosystem of Private Tools

②

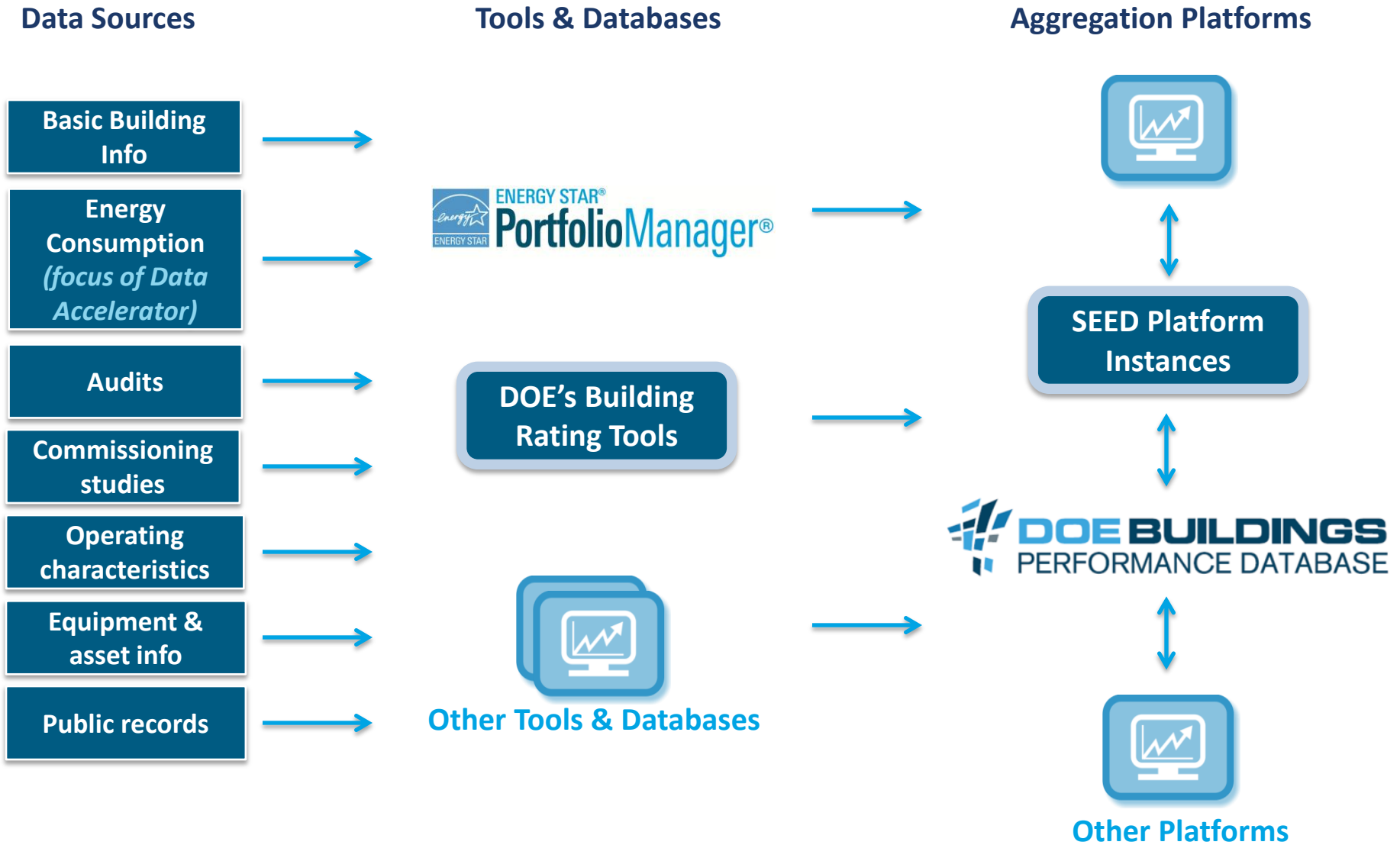
A Common Data Taxonomy

①

A Linked Set of Metrics and Platforms

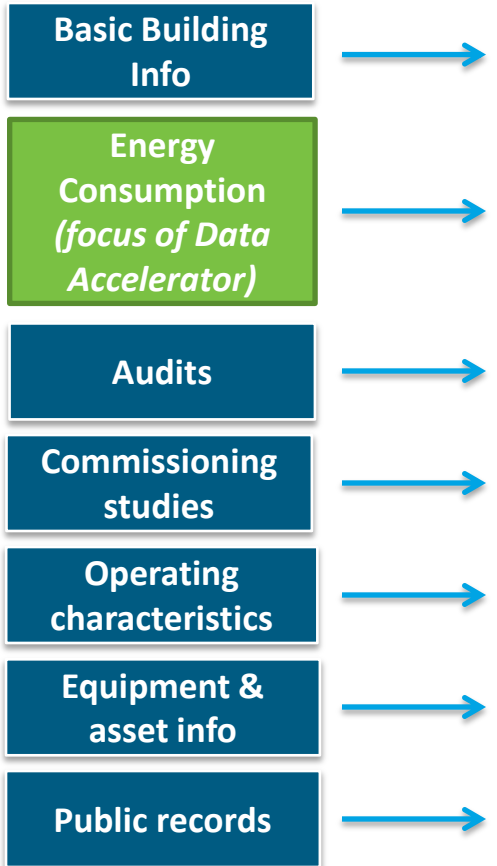


Supporting Interoperability at Different Scales



Today's Agenda

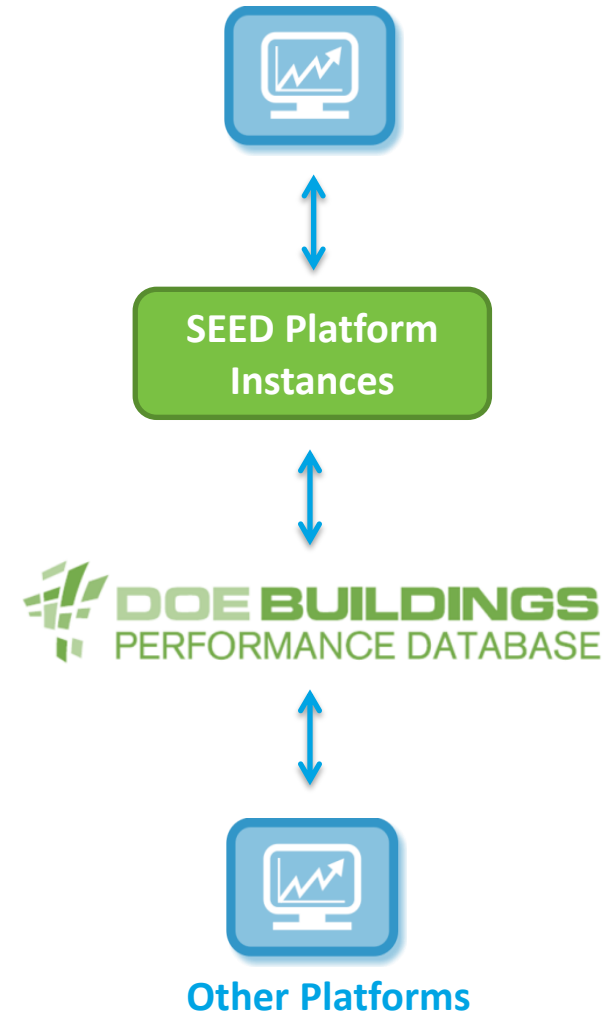
Data Sources



Tools & Databases

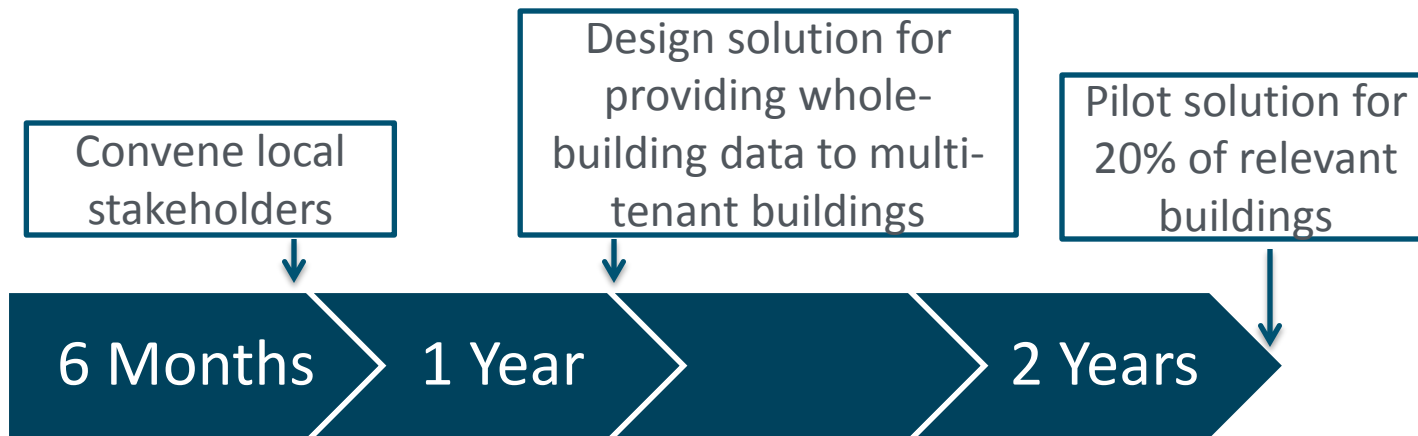


Aggregation Platforms



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.

ENERGY STAR Portfolio Manager

Tracks building energy and water consumption, and provides a weather normalized EUI and a whole building score, based on actual energy performance.

The screenshot displays the ENERGY STAR Portfolio Manager interface for a property named "Example Office". The interface is divided into several sections:

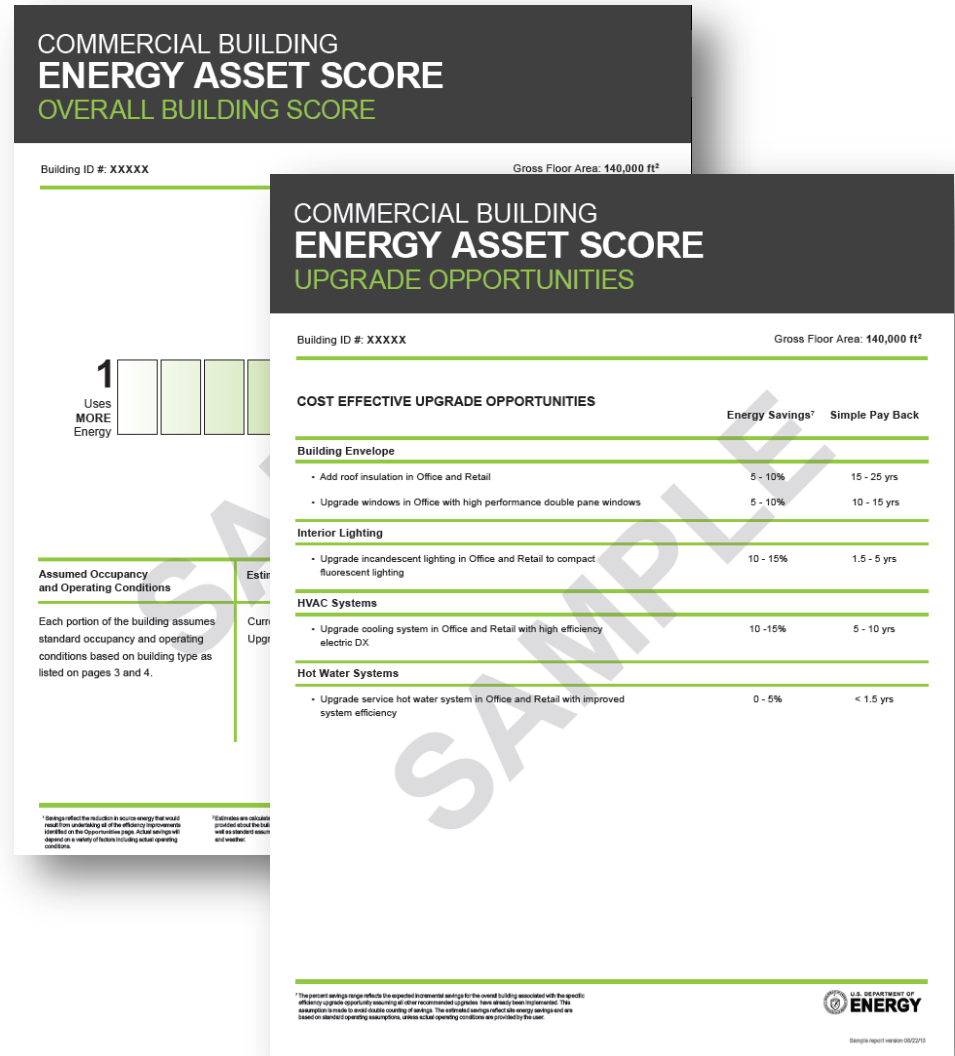
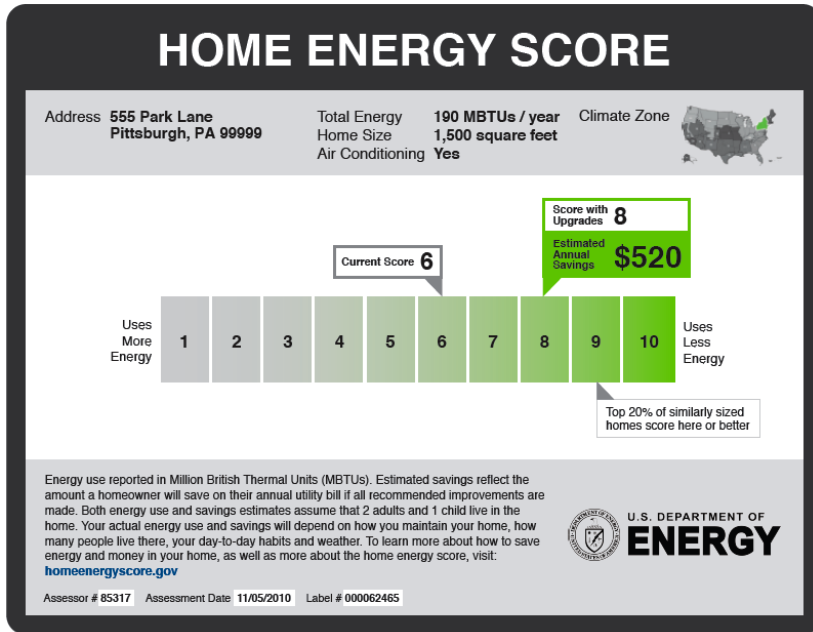
- Header:** "MyPortfolio" with tabs for "Sharing", "Planning", "Reporting", and "Recognition".
- Property Information:**
 - Address: 1100 Lee Hwy, Fairfax, VA 22031 | [Map It](#) EXISTING
 - Portfolio Manager Property ID: 5000074 | Primarily: [Office](#)
 - Year Built: 1987 EXISTING
- Weather-Normalized Source EUI:**
 - Current EUI: [N/A](#)
 - Baseline EUI: [N/A](#)
- Summary Tab:**
 - Basic Information:** Construction Status: EXISTING; Federal Property: Empty; [Service & Product Finder](#); [Edit](#) button.
 - Unique Identifiers (IDs):** Portfolio Manager ID: 5000074; Standard ID's: None; Custom ID's: None.
- Properties Overview:**
 - Properties (5): [Add a Property](#)
 - Notifications (0): You have no new notifications.
 - My Properties (5): Filter by: View All Properties (5); [Create Group](#) | [Manage Groups](#)
 - Property List:
 - Federal Building
 - Higher Campus
 - Hill Store
 - Insurance Office
 - Sunnyside Elementary
- Source EUI Trend:** Line graph showing Source EUI from 2002 to 2012. Values range from approximately 200 to 800.
- Total GHG Emissions Trend:** Line graph showing Total GHG Emissions from 2002 to 2012. Values range from approximately 10k to 35k.
- This Property's Overall Use:**
 - View as Diagram: Add Another Type of Use
 - Table:

Name	Function	Gross Floor Area	Action
Vacant Space	Office	10000	I want to...
Building Use	Office	100000	Correct Mistakes
 - Tip: To add multiple uses and buildings to this property, you can use the uploader to create a [spreadsheet template](#) to upload.
- Gross Floor Area Comparison:**
 - Legend: Use Total GFA (dark blue), Property GFA (light green)
 - Bar chart showing Property GFA at 100,000 and Total GFA at 110,000.
 - Warning: The total of the [Gross Floor Area](#) for your uses does not equal the Gross Floor Area for your property. [Learn more](#).
 - Tip: Keeping Use Details & Basic Information Up to Date: If your property has more than one building, it is important that you keep your use details updated at both the property and building levels so that your ENERGY STAR score and other metrics are accurate. [Learn more about keeping use details up to date.](#)

If you're a pro, you may want to [upload and/or update multiple properties](#) at once using an Excel spreadsheet. This can be done to create new properties, add use details, create meters and add meter consumption data.

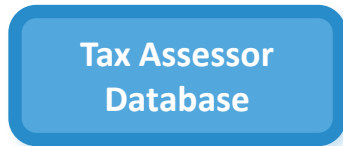
Commercial Asset Score & Home Energy Score

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



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

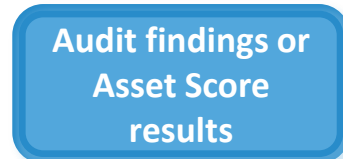
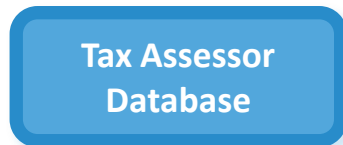
Tools & Databases



Aggregation Platform



Enables cities to manage and analyze data in a private, secure repository.



Standard Energy Efficiency Data (SEED) platform

- V1 designed to help cities manage data resulting from building performance reporting programs for private and/or public buildings.
- Potential for a wide range of other uses by public entities, efficiency programs, etc.

The screenshot displays the SEED PLATFORM interface. On the left is a dark sidebar with navigation options: Erik Larson (home), Projects (0), Buildings (1,601), Data (2), Help, and Feedback. The main header includes a hamburger menu, the text 'SEED PLATFORM', a search bar, and a plus sign. Below the header, it shows '1,601 Buildings' and filter tabs for 'All', 'Building Info', and 'Compliance Info'. The main content is a table with columns: ID, ADDRESS, NAME, FLOOR AREA FT², YEAR BUILT, and USE TYPE. The table lists 10 buildings with their respective IDs, addresses, names, floor areas (with min/max values), years built, and use types. At the bottom, there is a pagination control showing 'Display: 10 buildings' and 'Showing 291 to 300 of 1,601 buildings', along with 'Previous' and 'Next' navigation buttons.

	ID	ADDRESS	NAME	FLOOR AREA FT ²		YEAR BUILT	USE TYPE
	ID	Address	Name	Min	Max	Year Built	Use Type
<input type="checkbox"/>	IMP78-6970045	1015 HALF ST		400,000		2011	COMMERCIAL
<input type="checkbox"/>	IMP78-1270055	0800 17TH ST		431,570		2010	COMMERCIAL
<input type="checkbox"/>	IMP78-12990325	1855 WISCONSIN AV		60,000		2010	COMMERCIAL
<input type="checkbox"/>	IMP78-6280901	0020 F ST		173,460		2010	COMMERCIAL
<input type="checkbox"/>	IMP78-7110809	145 N ST		589,000		2010	COMMERCIAL
<input type="checkbox"/>	IMP78-7740058	1005 3RD ST		140,908		2010	RESIDENTIAL-MULTI FAMILY
<input type="checkbox"/>	IMP78-26780709	3460 14TH ST		353,792		2009	RESIDENTIAL-MULTI FAMILY
<input type="checkbox"/>	IMP78-28680155	2305 14TH ST		276,542		2009	RESIDENTIAL-MULTI FAMILY
<input type="checkbox"/>	IMP78-29107002	4100 GEORGIA AV		75,240		2009	RESIDENTIAL-MULTI FAMILY
<input type="checkbox"/>	IMP78-3200028	1155 F ST		380,222		2009	COMMERCIAL

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

Tools, Databases & Platforms

City A's SEED

City B's SEED

DOE's Building Rating Tools

DOE's CBECS & RECS Surveys

Energy Efficiency Program Administration Database

Private Owner's Building Management Database

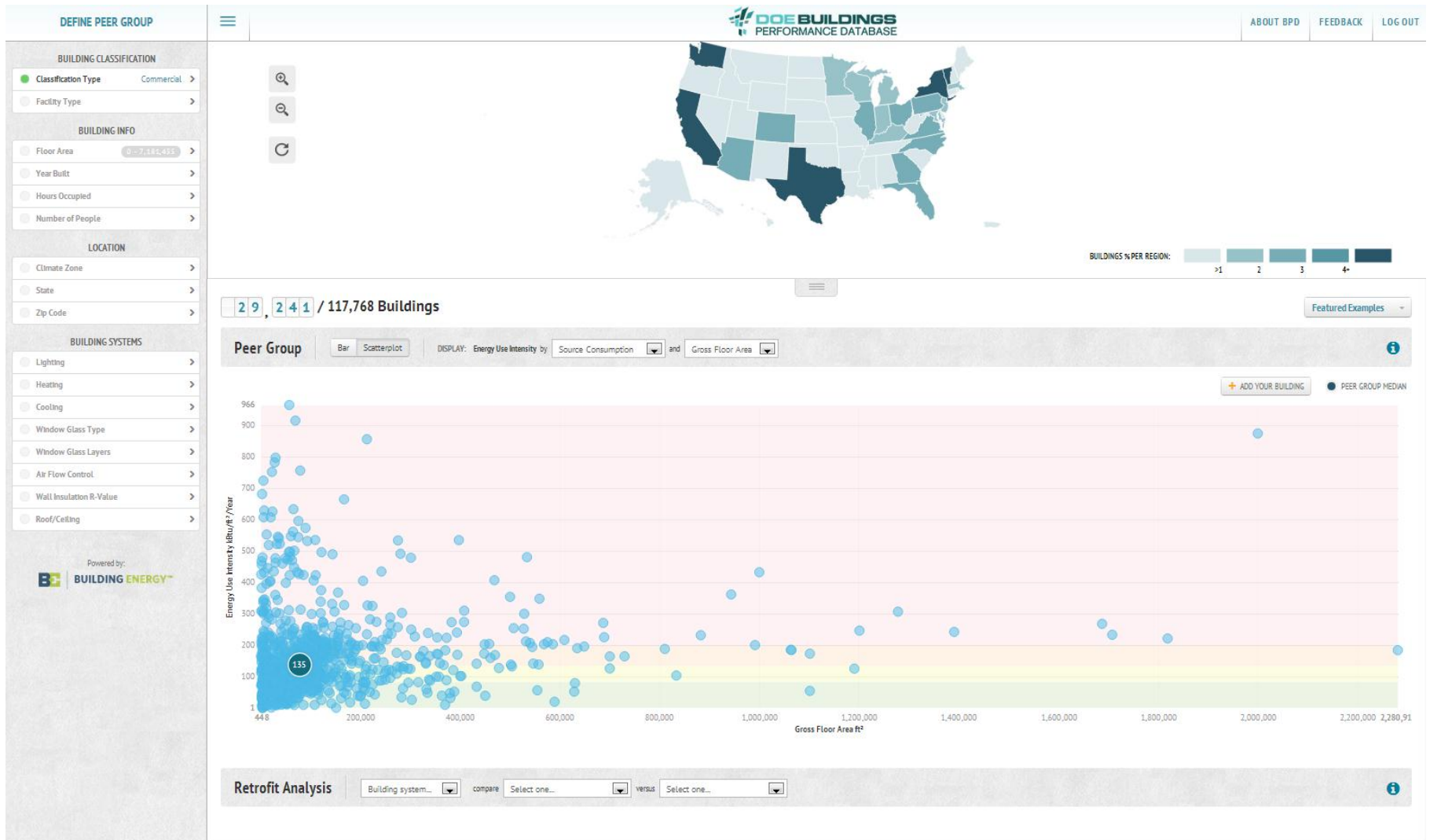
National Platform



One publicly-accessible database of anonymous, empirical records.

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.



A common data format makes it easier to exchange and combine data among all the tools, databases and platforms



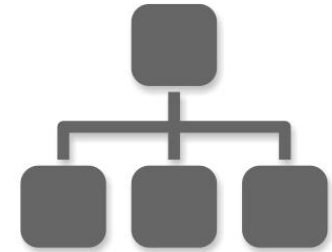
The Building Energy Data Exchange Specification



Residential,
commercial and
multifamily
sectors



Activity areas,
equipment and
operational characteristics,
energy consumption,
energy conservation
measures and costs



Project, building,
campus or
program-level
information



BEDES establishes
data fields,
definitions,
units of measure,
and file formats



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International Data Activities

US-China CERC & US-India CBERD

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4:00-5:00

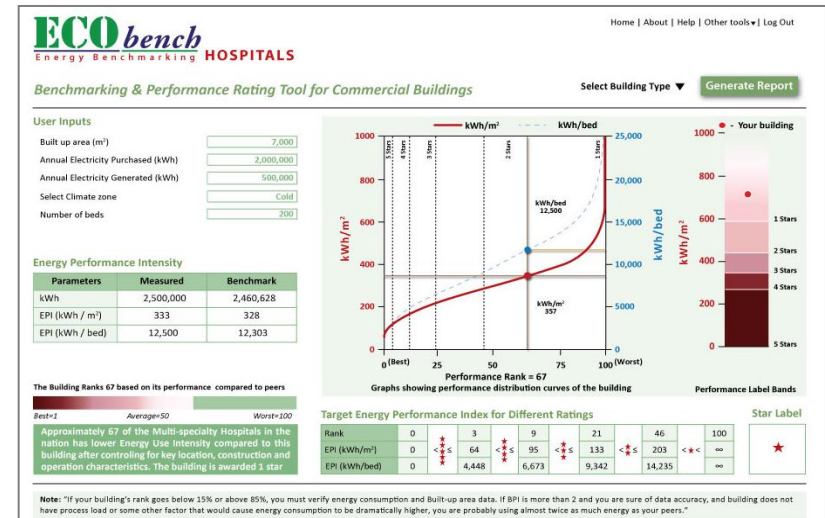
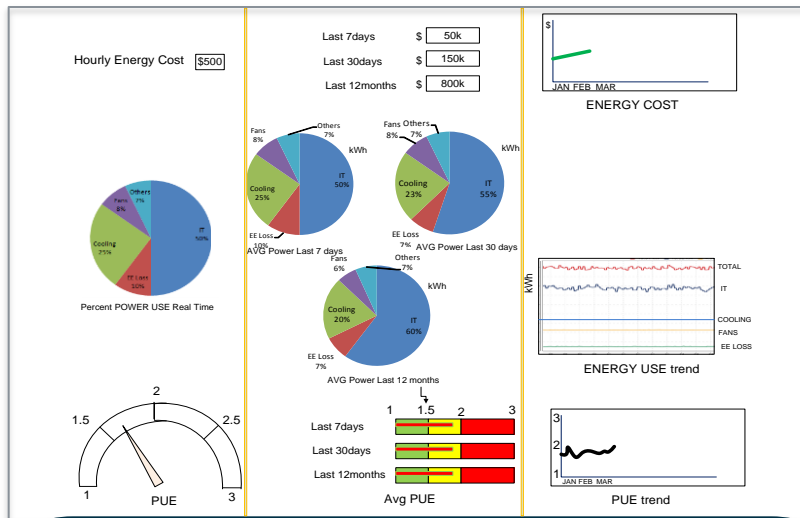
Rich Karney
Building Technologies Program
U.S. Department of Energy

US-China CERC: Research on low-energy building O&M

Project Goals (by December 2015):

- A piloted building energy database, benchmarking system, and policy framework for public buildings in China.
- US building technology and solution providers trained on use of benchmarking system to sell energy services (through US-China ECP platform).
- China incorporate benchmarking into 13th Five Year Plan activities.
- Research findings to US DOE on China's real-time energy monitoring; innovations in building energy performance codes, standards, and policies; and the development of the energy quota standard.

US-India CBERD Monitoring and Benchmarking



Monitoring

- **EIS Market Intelligence:** Market segmentation; technical, usability and cost requirements for EIS solutions
- **R&D:** Sample specification and selection guides; cost-benefit framework for packaged EIS
- **Deployment:** Implement in 5-10 demonstration sites

Benchmarking

- **Market Intelligence:** Analysis of current state of the art, goals, use cases and gaps
- **R&D:** Develop new techniques/ algorithms for asset, operation and system level benchmarking.; Prototype next-gen database design, algorithms and tools
- **Deployment:** Training workshops; technical assistance to potentially Energy Star, India's BEE Benchmarking program etc