Commercial Building Integration Program

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

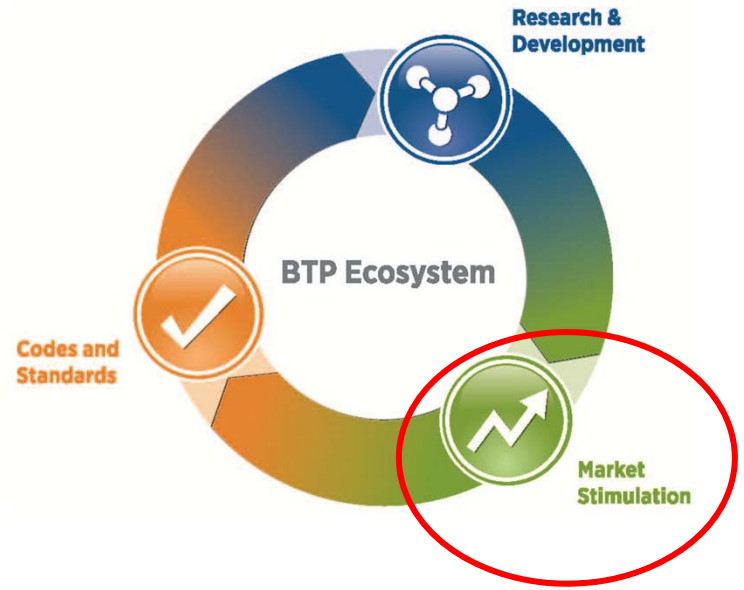
April 2015

Building Technologies Office Program Peer Review

Commercial Buildings Integration Program

CBI Mission: Accelerate voluntary uptake of significant energy performance improvements in existing and new commercial buildings.

CBI Vision: A commercial buildings market where energy performance is a key consideration during construction, operation, renovation, and transactions, and net zero energy ready commercial buildings are common and cost-effective.



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Goals

BTO Goals:

BTO supports the development and deployment of technologies and systems to reduce building energy use by 50 percent.

CBI Program Goals as of end of FY 2014:

	2014	2020	2030
Demonstrate cost effective energy savings over ASHRAE 90.1-2004 code in new buildings	50% energy savings	Zero Energy Ready Building	Zero Energy Ready Building
Demonstrate energy savings at convincing scale for new buildings	X	50% energy savings	Zero Energy Ready Building
Demonstrate cost effective energy savings for existing building retrofits	20% energy savings from prior baseline	20% energy savings from prior baseline	Zero Energy Retrofits
Demonstrate cost effective energy savings at convincing scale for existing building retrofits	X	20% energy savings	50% energy savings

- Convincing scale: impacting square footage of new and existing commercial building types that count for 80% of commercial energy consumption in all climate zones as measured by CBECS 2003

CBI Barriers & Strategies

Key Barriers

- Lack of reliable information on costs and likely impacts of efficiency measures.
- Efficiency investments perceived as too expensive or complicated / risky to access internal or external capital.
- Current real estate, design, construction and building services markets do not appropriately value energy efficiency.
- Inadequate training or experience of building services workforce

Strategies

- Provide reliable information about high impact technologies (HITs) and systems through real world demonstrations and deployment activities.
- Improve interoperability of building energy data tools that help stakeholders understand the value of energy efficiency.
- Provide design and decision support resources for new and existing commercial buildings.
- Prepare the workforce to design, build and operate buildings more efficiently.
- Engage market leaders through partnership programs.
- Support development of new, integrated program models.

CBI Program Methodology

1. Developing and demonstrating **technologies, tools and solutions** to remove barriers to investment and increase understanding of efficiency measures
2. Demonstrating and deploying actionable products through **market partnerships** to drive technologies into the commercial buildings marketplace

CBI MYPP / Funding Priorities

1. Catalyzing High Impact Technologies (HITs)
   - Identification and prioritization of pipeline
   - Bringing technologies to market: Challenges, T2M with ET
   - Building the case: technology demonstrations, specifications, other support materials
   - Accelerating uptake: Campaigns, industry partnerships
   - Handing off to market, Codes, Standards
2. Developing core tools, guides and products
   - Energy data access and analysis: Commercial Building Asset Score, Building Performance Database, SEED, BEDES
   - Open Studio and energy modeling tools
   - Workforce development and training
   - New program models for technology and service delivery
3. Engaging industry stakeholders
   - Better Buildings Challenge
   - Better Buildings Alliance
   - SEE Action
   - Partnerships with federal, state and local government

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CBI Program

Develop | **Demonstrate** | **Deploy**

Market Infrastructure

Develops and deploys solutions and tools that remove market barriers to greater investment in energy efficiency.

- Addresses need for common approaches and metrics to ensure functioning markets for energy efficiency
- Develops model practices, case studies, tools, and guidance
- Works via market outreach team to deploy resources to the market

Organized by major market barriers.

High Impact Technologies & Systems

Supports the acceleration of energy efficient technologies and technical solutions.

- Coordinates with ET, Codes and Standards programs to maximize energy savings
- Uses Better Buildings Alliance work group structure to develop technology-related resources
- Works via market outreach team to conduct demos of technologies
- Works via market outreach team to deploy technical solutions to the market

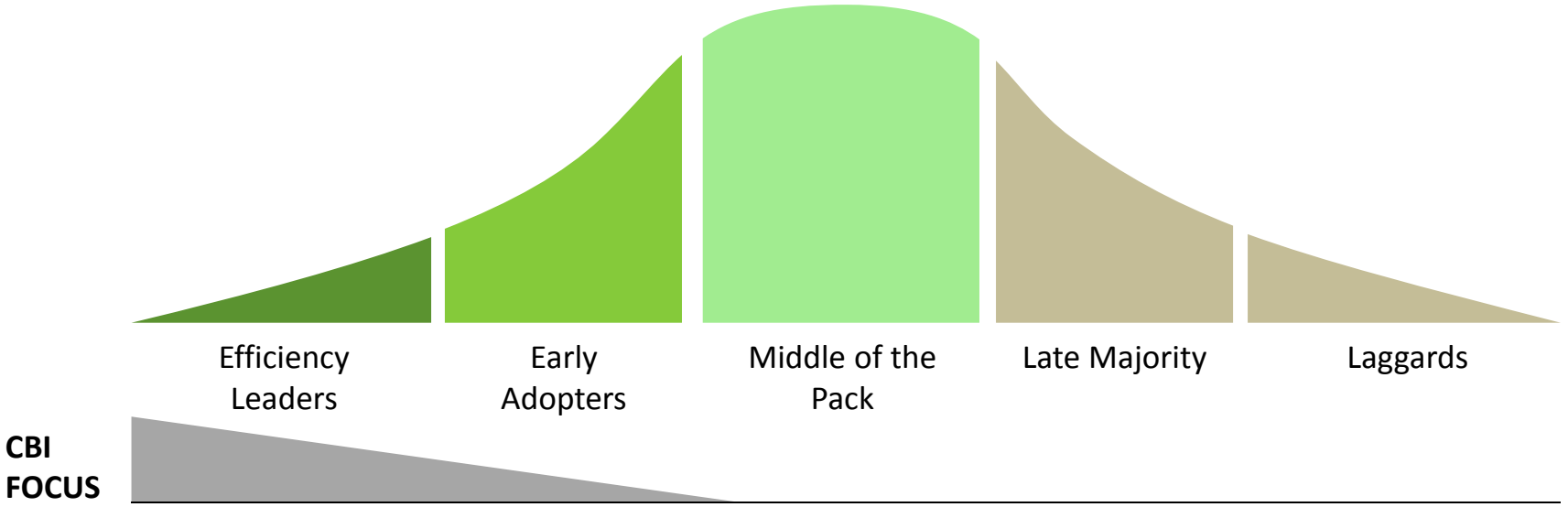
Organized by technology area.

Partnership Programs

Deploys *resources developed by other teams, recruits market partners to participate in activities, tracks & communicates market impact*

Working with: Owners, Managers, Tenants, AECo professionals, Manufacturers, Small business, Utilities, REEOs, Intergovernmental, Other EERE offices, NGOs

Who's our target audience?



Segment	Description	Deployment Strategy
Leaders / Adopters	Organizations willing to set and communicate efficiency goals, adopt new technologies, and test solutions early for competitive advantage. Tend to influence their peers and the market.	Directly work BBC and BBA members to prime the market, document and test market-changing solutions. Expand BBA to new high-priority market segments as time and resources allow.
Middle-of-the-pack	Organizations that are not willing to be early adopters but follow the lead of their peers or competitors once a practice or solution is proven	Provide access to tools and solutions for them that turn them from opposed to neutral by enabling them to comply/adopt at lowest cost.
Late Majority / Laggards	Don't change habits, practices or technologies until they have to.	Served by other programs (utility, etc.) Moved by regulations (Codes & Standards)

CBI Focus Areas: High Impact Technology (HIT) Catalyst

Demonstrating and deploying information about products that are currently market-viable but underutilized and that can cost-effectively save energy, including:

- Improvements in the efficiency of key building equipment & systems;
- Whole-building performance in both new and existing buildings that use significantly less energy than current standard practice.

Market needs

- Objective, third-party information about tech performance and risks
- Case Studies that highlight strategies and priorities for building decision makers that "look like them"

Current project areas

- Priority Focus Areas and related Market Transformation Activities: Innovation Challenges, Performance Specs and Adoption Campaigns
- Emerging technology graduates: demonstration and deployment

New

- Cross-agency alignment of technology demonstration programs
- Tech-to-market Bridge with ET

Projects

- HIT List: troffers + controls, EMIS packages, refrigeration case retrofits and controls, fans/blowers and window attachments
- Submeter Challenge
- Technology Demonstrations
- Better Buildings Technology Support
- RTU Suite
- "Getting beyond widgets"

CBI Focus Areas: Market Infrastructure

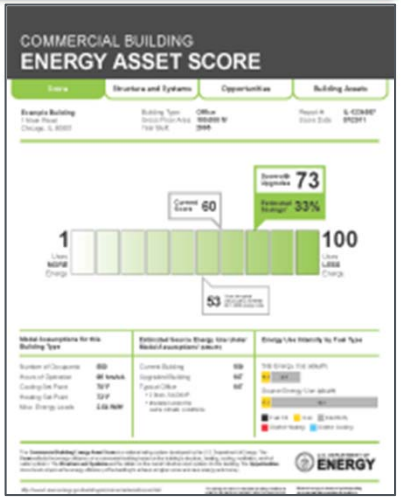
Market needs:

- A low-cost way to use data to measure and assess whole building energy performance, that can support performance-based design, markets, and policies
- Interoperable data systems that facilitates consistent measurement and analysis of energy performance in buildings

CBI Activities on Building Energy Performance Data:

- Building assessment tools: easy-to-use tools for assessing energy performance that support performance-based decision making, policy and transactions
- Measurement and Verification: standardized, transparent low-cost, high-quality approaches for assessing savings from energy efficiency measures and programs
- Data access and analytics: streamlined customer access to data in standardized formats that support energy performance-aware transactions and building management
- Data utilization: mechanisms that allow energy performance to be incorporated into valuation at key real estate transaction points so that building owners can monetize their investments in energy efficiency

DOE BUILDINGS PERFORMANCE DATABASE



Projects

- Building Energy Asset Score
- Building Energy Data Exchange Specification (BEDES)
- Standard Energy Efficiency Data (SEED) platform
- Building Performance Database (BPD)
- Energy Data Accelerator

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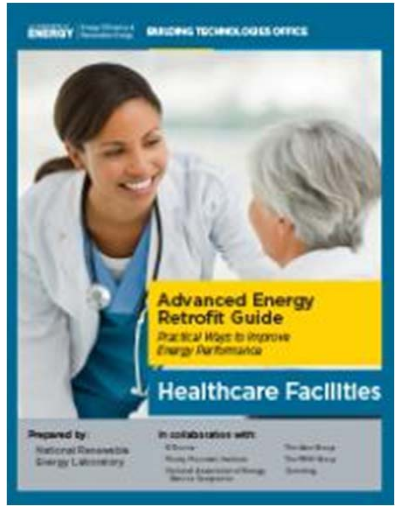
CBI Focus Areas: Market Infrastructure

CBI activities to improve the process of delivering efficiency: Decision support tools that incorporate energy performance into organizational culture and real estate transaction points.

- Design and construction: platforms to accelerate the use of energy modeling, energy performance-based design, high-performance operations, and deeper energy retrofits
- Leasing and tenant fit-out: tools that align building owner and tenant incentives to improve energy efficiency
- Operations and energy management: a robust culture of organization-wide energy management
- Successful financing and business models: easier, cheaper and more transparent best practices that show results

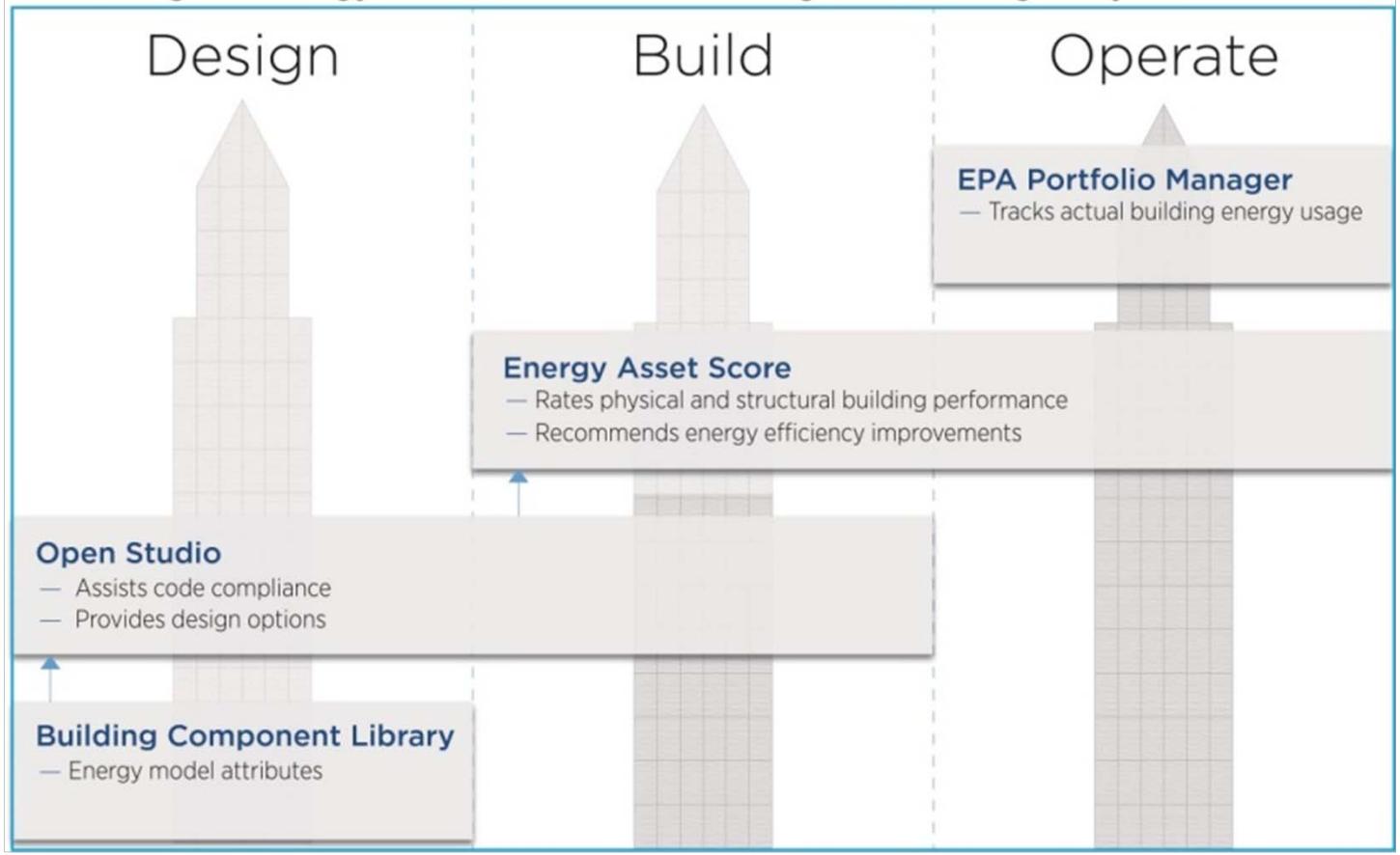


Projects

- Open Studio software suite for Energy Plus
- Advanced Energy Design / Retrofit Guides
- ISO 50001: Conformant Energy Management Systems
- Small Building Energy Management
- BEM Library
- Financing Turnkey Energy Efficiency Solutions
- Better Buildings Challenge models

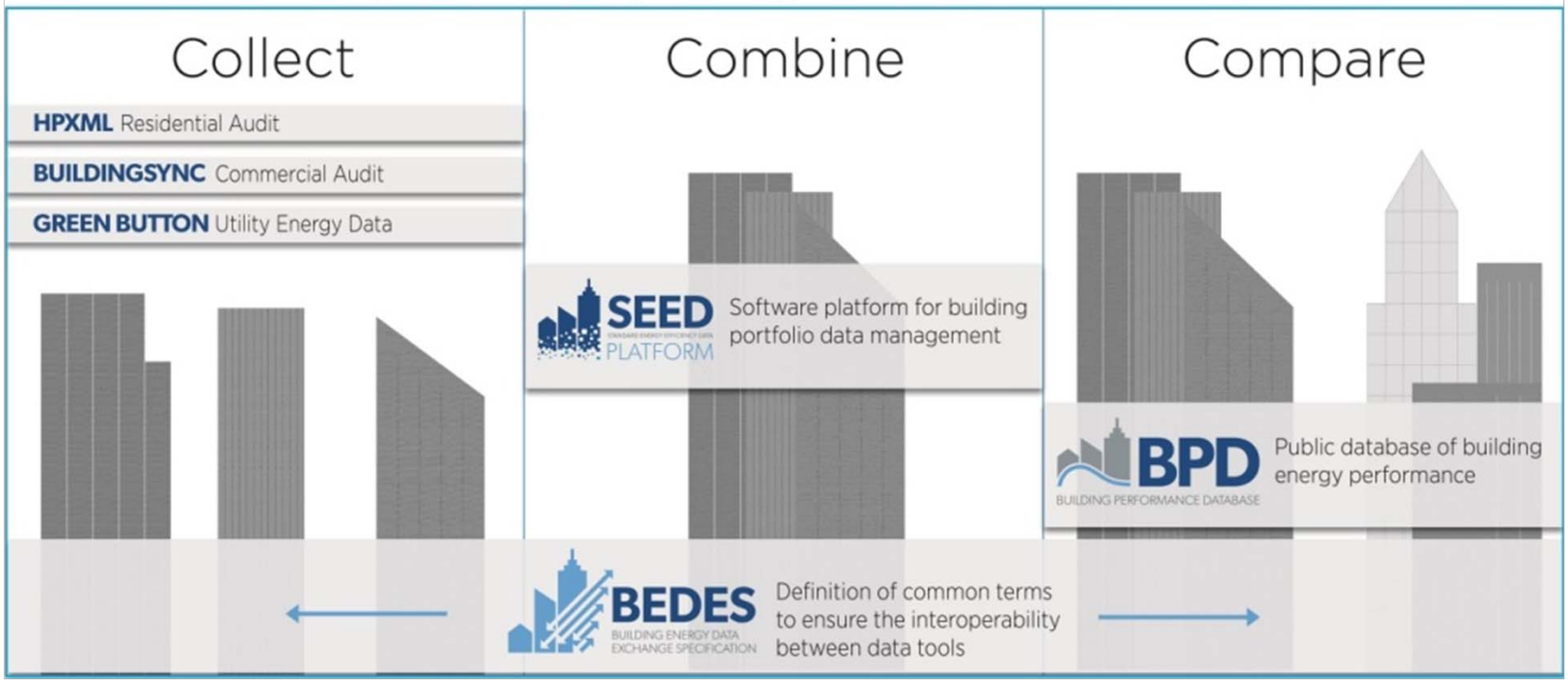
Building Lifecycle

Goal: Integrate energy-related information throughout building lifecycle



Industry Level

Goal: Increase availability and consistency of energy-related information



CBI Focus Areas: Partnerships, Market Outreach and Engagement

- Better Buildings Challenge
  - 20% energy efficiency improvement over 10 years; Partners commit to public goal with annual reporting
  - CBI manages commercial real estate, retail, restaurant, healthcare, lodging, and higher education partners
- Better Buildings Alliance
  - Nearly 200 members representing 10 billion square feet of commercial space working with DOE and its national labs to save energy
  - Participants take part in energy saving technology campaigns, demonstrations, and projects
- State and Local Energy Efficiency Action (SEEAction)
  - CBI oversees existing buildings working group
  - Helping identify best practices and overcome barriers to energy efficiency
- Partnerships with Grantees, Regional and National Energy Efficiency Program Sponsors

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DOE Commercial Building Integration projects and grants:

Tuesday	Wednesday	Thursday
11:15-11:30: Workforce Overview (McLean)	8:45-9:00 Commercial Technology Demonstration/ Deployment Overview (Potomac)	9:00-11:00 High Impact Technology Catalyst Review
1:30-1:45, Small Commercial Buildings Overview (Great Falls)	9:00-10:00 PNNL and LBNL: RCx Sensors Suitcase (Great Falls)	
1:45-2:15, BlocPower: Crowdsourced Microfinance for Energy Efficiency in Underserved Communities (Great Falls)	10:00-10:30 PNNL: VOLTTRON Commercialization (Great Falls)	
2:15-2:45 Ecology Action: Small Market Advanced Retrofit Transformation Program (Great Falls)	11:00-11:15 Market Engagement Overview (Potomac)	
2:45-3:15 LBNL: Architecture 2030 District Toolkit (Great Falls)	1:30-1:45 Modeling Overview (McLean)	
4:00-4:30, Southface Energy Institute: Advanced Commercial Buildings Initiative (Great Falls)	2:30-3:00 NREL: DOE Technology Performance Exchange (Potomac)	
4:00-4:30 LBNL: Getting Beyond Widgets (Potomac)		
4:30-5:00, National Trust for Historic Preservation: America Saves! Energizing Main Street's Small Businesses (Great Falls)		
4:30-5:00 LBNL: High Performance Active Perimeter Building Systems (Potomac)		

Penn State Consortium for Building Energy Innovation projects:

Tuesday	Wednesday
11:30-12:00 CBEI: Career Pathways for the Energy Retrofit Workforce (McLean)	9:00-9:30 CBEI: Lessons Learned from Integrated Retrofits in Small and Medium Sized Commercial Buildings (Potomac)
12:00-12:30 CBEI: Building Retuning Training (McLean)	9:30-10:00 CBEI: Demonstrating On-Bill Financing to Encourage Deep Retrofits (Potomac)
1:30-2:00 CBEI: Broker Training - Placing Value on Energy Retrofits(McLean)	10:00-10:30 CBEI: Using DOE Tools (Potomac)
2:30-3:00 CBEI: Improving Code Compliance with Change of Occupancy Retrofits (Presidential)	11:15-11:45 CBEI: Improving Benchmarking Data Quality (Potomac)
4:15-4:45 CBEI: Packaged Masonry Wall Retrofit Solution for Small and Medium Sized Commercial Buildings (Presidential)	11:45-12:15 CBEI: Benchmarking Analytics Tools (Potomac)
	12:00-12:30 CBEI: HVAC Packages for Small and Medium Sized Commercial Buildings (McLean)
	1:30-2:00 CBEI: Stakeholder Engagement Support for the Better Buildings Energy Data Accelerator (Potomac)
	2:00-2:30 CBEI: Aligning Owners and Service Providers (Potomac)
	2:45-3:15 CBEI: Enhancing OpenStudio for Airflow and Daylight Modeling (McLean)
	4:00-4:30 CBEI: Collaborative Approaches for Integrated Energy Retrofits (McLean)

CBEI CONSORTIUM for BUILDING ENERGY INNOVATION