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.
**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:

<table>
<thead>
<tr>
<th>Demonstrate cost effective energy savings over ASHRAE 90.1-2004 code in new buildings</th>
<th>2014</th>
<th>2020</th>
<th>2030</th>
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</thead>
<tbody>
<tr>
<td>50% energy savings</td>
<td>Zero Energy Ready Building</td>
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<th>Demonstrate energy savings at convincing scale for new buildings</th>
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<tr>
<th>Demonstrate cost effective energy savings for existing building retrofits</th>
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<th>2030</th>
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<tbody>
<tr>
<td>20% energy savings from prior baseline</td>
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<td>Zero Energy Retrofits</td>
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- 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

Develop
Where there is an appropriate federal role

Demonstrate
Work with market partners to test, refine and measure

Deploy
Work with market partners to hand off – exit strategy!

Data, Metrics and Tools
Technology Demonstration
New Construction/Major Renovation /Codes
Workforce: Training and Certification
Energy Management

Better Buildings Challenge
Better Buildings Alliance
Industry Partners
Intergovernmental
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

U.S. Department of Energy
Energy Efficiency & Renewable Energy
CBI Program

**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, AEC professionals, Manufacturers, Small business, Utilities, REEOs, Intergovernmental, Other EERE offices, NGOs
### Who’s our target audience?

<table>
<thead>
<tr>
<th>Segment</th>
<th>Description</th>
<th>Deployment Strategy</th>
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<tbody>
<tr>
<td>Leaders / Adopters</td>
<td>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.</td>
<td>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.</td>
</tr>
<tr>
<td>Middle-of-the-pack</td>
<td>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</td>
<td>Provide access to tools and solutions for them that turn them from opposed to neutral by enabling them to comply/adopt at lowest cost.</td>
</tr>
<tr>
<td>Late Majority / Laggards</td>
<td>Don’t change habits, practices or technologies until they have to.</td>
<td>Served by other programs (utility, etc.) Moved by regulations (Codes &amp; Standards)</td>
</tr>
</tbody>
</table>

**CBI FOCUS**

- Efficiency Leaders
- Early Adopters
- Middle of the Pack
- Late Majority
- Laggards
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

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

- **Design**
  - Open Studio
    - Assists code compliance
    - Provides design options
  - Building Component Library
    - Energy model attributes

- **Build**

- **Operate**
  - EPA Portfolio Manager
    - Tracks actual building energy usage
  - Energy Asset Score
    - Rates physical and structural building performance
    - Recommends energy efficiency improvements
Industry Level

Goal: Increase availability and consistency of energy-related information

Collect
- HXML Residential Audit
- BUILDINGSYNC Commercial Audit
- GREEN BUTTON Utility Energy Data

Combine
- SEED PLATFORM Software platform for building portfolio data management

Compare
- BPD Public database of building energy performance
- BEDES Definition of common terms to ensure the interoperability between data tools
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**
DOE Commercial Building Integration projects and grants:

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

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