

Aligning Building Owners and Service Providers

2015 Building Technologies Office Peer Review

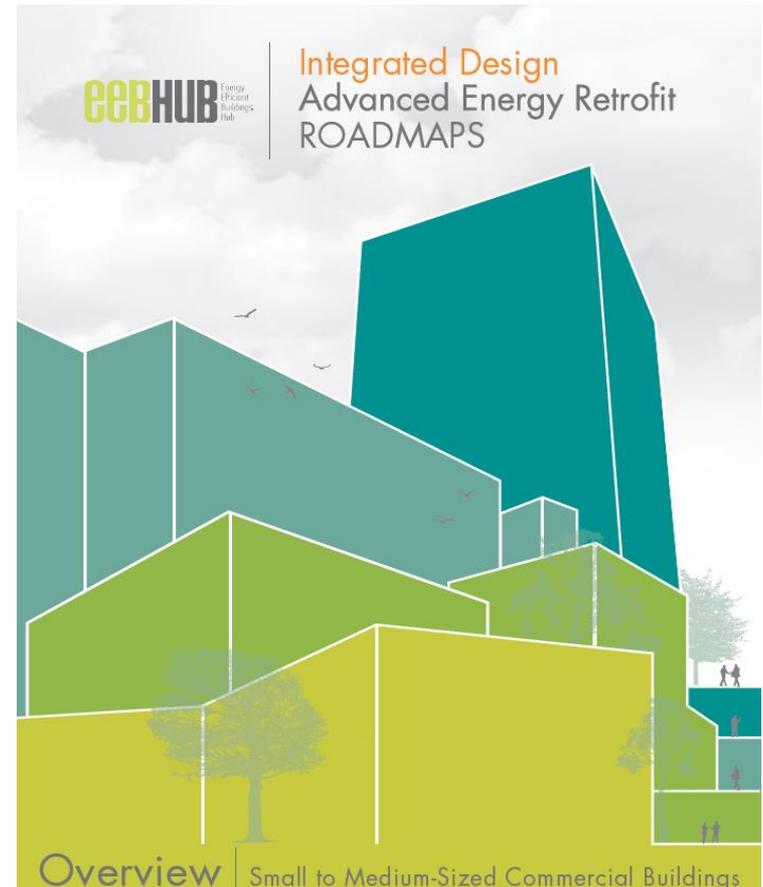
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	LITERATURE REVIEW	FIRST PROTOTYPE	PILOT READY	ROLL-OUT READY	ROLLED-OUT
CONTENT	SURVEY OF RESEARCH FIRST CONCEPTS	FIRST MODEL READY TO BRING TO USERS FOR FEEDBACK	MODEL READY FOR INDEPENDENT USE READY FOR TESTING TROUBLESHOOTING AVAILABLE	VARIETY OF USE CASES TESTED AUTOMATED TROUBLE SHOOTING MARKETING PLAN READY	MARKETING PLAN IMPLEMENTED VERSION IN USE BY MARKETING TARGETS
STAKEHOLDER ENGAGEMENT NETWORKS	IDENTIFY BARRIERS IDENTIFY ORGANIZATIONAL NEEDS FOR PROJECT RECRUIT TESTERS	INFORM SCOPE: EXPAND OR REDUCE DEVELOP FIRST MARKET PARTNERS AND PROCESS FOR FIRST TESTS RECRUIT REVIEWERS	INFORM TESTING PLAN IDENTIFY PRIORITY DESIGN IMPROVE- MENTS RECRUIT TESTERS	IDENTIFY DEBUGGING FOR SCALED USE GENERATE MARKETING PLAN RECRUIT PARTNERS	RECRUIT PARTNERS ENACT MARKETING PLAN



commercialization center
Energizing business for the future.™

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



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Project Summary

Timeline:

Start date: Jan 1, 2012

Planned end date: April 30, 2015

Key Milestones

- 1. Platforms:** Key retrofit value chain groups formed and launched (BP2) 22 content engagements (BP2-BP3); 6 content engagements (BP4)
- 2. CBEI Commercialization Center:** Set-up incubator and program at CBEI (BP3); Commercialization Activity and grow incubator (BP4)
- 3. Business Models:** Draft Business models (BP4: 11/2015)
- 4. Integrated Design Retrofit Roadmaps:** Research existing ID models (BP2); Draft and complete guides (BP3-BP4)

Budget:

Total DOE \$ to date: \$1609K

Total future DOE \$: \$75K

Target Market/Audience:

Building owners, architects, engineers, energy service providers, contractors, manufacturers, startup enterprises in AER market, utility incentive and rebate providers

Key Partners:

CBEI-UPenn	CBEI- University City Science Center
CBEI- DVIRC	
CBEI- BFTP	

Project Goal:

Leverage Consortium relationships with Small and Medium Sized Commercial Buildings (SMSCB) building owners and service providers to develop business models and guides that the market can use to implement 50% or greater energy efficient retrofits; also, provide pathways with the market for testing content so it can be developed according to AER market stakeholder end-uses.

Vision:

By 2030, deep energy retrofits that reduce energy use by 50% in existing SMSCB, which are less than 250,000 sq ft

Mission:

Develop, demonstrate and deploy technology systems and market pathways that permit early progress (20-30% energy use reductions) in Small and Medium Sized Commercial Buildings



Our Goals:

- Enable deep energy retrofits in small to medium sized commercial buildings
- Demonstrate energy efficient systems tailored for SMSCBs in occupied buildings – living labs
- Develop effective market pathways for energy efficiency with utilities and other commercial stakeholders: brokers, finance, service providers.
- Provide analytical tools to link state and local policies with utility efficiency programs



Industry



Economic Development
Organizations



Universities

CBEi
Partners

Purpose and Objectives: Problem Statement

Problem Statement: The SMSCB retrofit industry needs to increase uptake of integrated multi-system approaches to retrofit that offer higher energy efficiency to SMSCB

Platforms: CBEI projects require two-way interactions and communication with key retrofit market stakeholders to create solutions that address market needs

Commercialization Center: CBEI, DOE, and the SMSCB need the benefit of start-up commercialization activities for technologies in the SMSCB AER market

Business Models: SMSCB owners and retrofit providers need viable business models to promote uptake of multi-system whole-building integrated retrofits.

Integrated Design Retrofit Roadmaps: SMSCB owners and service providers need decision-making guidance to implement integrated deep energy efficient retrofits that utilize energy modeling, whole-building design, and measurement and verification

Purpose and Objectives: Target Market and Audience

SMSCBs account for 99% of buildings and 47% of the energy for all commercial buildings

Platforms: The retrofit value chain: building owners, service providers, energy auditors, services, M&V, architects, engineers, energy modelers, utilities, incentive and rebate program managers, sustainability managers, building energy data managers

CBEI Commercialization Center: DOE and Nat'l Lab scientists and program managers, AER tech startups, manufacturers

Business Models: SMSCB building owners and small to medium sized service providers

Integrated Design Retrofit Roadmaps: SMSCB building owners, project managers, designers, engineers, contractors, energy modelers, energy services, and M&V professionals.

Purpose and Objectives: Impact

Project	Near Term Impact	Mid-term Impact	Long Term Impact
Stakeholder Engagement Platforms	<ul style="list-style-type: none"> • 2M+ SF of buildings for Asset Scoring Tool • 200+ people for in-person and virtual engagements at CBEI • 1 International Award, 1 Conference presentation 	<ul style="list-style-type: none"> • Serve as national convener on SMSCB retrofit programs, policies, and technical approaches. • Effective, interactive engagements to address barriers to CBEI program work 	<ul style="list-style-type: none"> • Develop thought-leader status on SMSCB program, policy, and technical approaches through annual engagements.
CBEI Commercialization Center	<ul style="list-style-type: none"> • 3 AER businesses launched • 1 DOE technology business plan developed 	<ul style="list-style-type: none"> • Support the formation of new companies offering AER related products and services. • Serve as a convening venue for presentation of CBEI proposed business models 	<ul style="list-style-type: none"> • A market facing portal for the technology transfer of CBEI work products. • Attract local, national, and international AER firms to the CBEI
SMSCB Business Models	<ul style="list-style-type: none"> • Project discontinued 	N/A	N/A
Integrated Design AER Roadmaps	<ul style="list-style-type: none"> • 26,000+ downloads of first model of Roadmaps out. • 3 journal articles, 3 Conference Presentations,, 2 Conference Papers 	<ul style="list-style-type: none"> • Adaptation of IDRR content for online web platform • Develop business plan • Develop commercialization relationships • Develop partnerships to pilot IDRRs 	<ul style="list-style-type: none"> • Commercialize through AEC Software provider

Approach

Develop SMSCB AER business models in tandem with retrofit market industries and end-users

Stakeholder Engagement Platforms:

- Develop annual engagement plan and host in-person and virtual engagements
- Develop engagement materials- all email and web content related to the events

Commercialization Center:

- ID top 5 of 10 technology candidates with external review board
- Administer business/commercialization plan competition

Business Models: (discontinued 11/2015)

- Stakeholder interviews- 10 building owners and 10 AER service providers
- Draft business models from interview information

Integrated Design Retrofit Roadmaps:

- Testing the 3-part IDRR materials with the Retrofit Demonstration projects private sector clients
- Develop final versions of the paper-based Retrofit Roadmap materials for market sharing at end of April, 2015

Key Issues

Integrated system AER business models combine precedents drawn from multiple, sometimes elusive, sources in the existing market

Stakeholder Engagement Platforms:

- Researchers need feedback from end-users to shape content to fill market needs
- Packaged content is required for engaged stakeholders

Commercialization Center:

- Limited AER startups looking for office space
- Business mentoring is needed

SMSCB Business Models: (discontinued 11/2015)

- Difficult to identify building owners for the business model interviewing and AER process
- Very few successfully completed AERs that could service as business models

Integrated Design Retrofit Roadmaps:

- Several definitions of Integrated Design in the market place
- Lack of project management resources for SMSCB energy retrofits for lite to comprehensive projects

Distinctive Characteristics

Projects develop new capacities in the AER markets to promote deeper multi-system approaches for energy efficient retrofits

Stakeholder Engagement Platforms:

- Retrofit value chain approach to stakeholder engagement- integrate building owners and service providers through engagements
- Professional facilitative approach in active work sessions

Commercialization Center:

- Only incubator dedicated to AER business models and commercialization

SMSCB Business Models: (discontinued 11/2015)

- Promote increased integration between single-system service providers
- Tailored to regional retrofit market building owner, auditor, and contractor businesses

Integrated Design Retrofit Roadmaps:

- Design a resource for project management, not system-specific measures
- 4 scales tailored to retrofits, not new construction

Progress and Accomplishments: Lessons Learned

Difficulty exists in creating project milestones which are based on the adoption of new business models in the AER market

Stakeholder Engagement Platforms

- Difficult to measure changed practices after engagements

Commercialization Center:

- Limited AER startups are looking for new space

SMSCB Business Models: (discontinued 11/2015)

- Difficult to identify and interview building owners in the very small commercial building segment

Integrated Design Retrofit Roadmaps:

- The retrofit roadmaps were designed to be validated through the process of the CBEI retrofit demonstration projects, which were discontinued in the conceptual design phase

Progress and Accomplishments: Accomplishments

Stakeholder Engagement Platforms:

- Supported our work in gaining commitments for the 2 M SF of commercial office space for the DOE Asset Scoring Tool
- Supported 2 webinars: Certificate of Proficiency in Benchmarking for approximately (80 registered/35 attendees)
- Developing Solutions to Commercial Benchmarking and Transparency Challenges (80 attendees and executive summary forthcoming)

Commercialization Center:

- Selected 5 technologies with the highest probability of commercialization success
- Launched business model competition through iStart for 5 technologies

SMSCB Business Models: (discontinued 11/2015)

- 20 AER Service Providers and Building Owner interviews on AER business models completed

Integrated Design Retrofit Roadmaps:

- Validated the Partial Retrofit Roadmap and Reference manual with focus groups
- Over 26,000 downloads of the overview brochure from CBEI website in BP4

Progress and Accomplishments: Market Impact

Stakeholder Engagement Platforms:

- 6 engagements completed with over 200 market actors engaged in-person and online
- Supported development of 2 educational products and 2 technical resources this program year
- Supported the preparation of several pieces of online content.
- 1 conference presentation

Commercialization Center:

- Providing a capacity to CBEI to offer technology business planning and commercialization

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Integrated Design Retrofit Roadmaps:

- Publication of Overview Brochure through CBEI: 26,000+ downloads
- Tested the Roadmaps on 4 external demonstration projects
- Education through content development of over 60 AER industry stakeholder firms
- 3 Conference papers, 6 conference presentations

• ID AER Roadmap Overview

- Introduction
- Scale of Retrofit Quiz

• ID AER Roadmap Reference Manual

- Expanded Content
- Tools and Resources

PROJECT TEAM GUIDE: LITE
Details the implementation of an ID process (Checklists and Guidelines) for a scope that includes the Purchase, Installation and Commissioning of a minimum of one building system and the existing building commissioning of a least one existing system.

PROJECT TEAM GUIDE: PARTIAL
Details the implementation of an ID process (Checklists and Guidelines) for a scope that includes the Purchase, Installation and Commissioning of a minimum of two building systems and one building envelope component.

PROJECT TEAM GUIDE: SUBSTANTIAL
Details the implementation of an ID process (Checklists and Guidelines) for a project scope that includes the Purchase, Installation and Commissioning of most building systems and building envelope components.

PROJECT TEAM GUIDE: COMPREHENSIVE
Details the implementation of an ID process for a project scope that includes the Purchase, Installation and Commissioning of all building systems and building envelope components through the use of customized process protocols and benchmarks.

Progress and Accomplishments: Awards and Recognition

- International Association of Facilitators Silver Impact Award for the Stakeholder Engagement Platforms Project 2024



Project Integration and Collaboration

Stakeholder Engagement Platforms:

- BOMA Intl, BOMA in certain cities AIA, IFMA, GBCs, ASHRAE
- regional and national retrofit service provider firms to arrange focus groups and publicize CBEI stakeholder events
- CBEI network of 4000+ AER stakeholders

CBEI Commercialization Center:

- CleanTech Open
- 17 DOE Nat'l Labs
- Navigator Network of incubators for startups
- iStart networking site for aspiring entrepreneurs

SMSCB Business Models:

- 20 AER Service Providers and Building Owners

Integrated Design Retrofit Roadmaps:

- 25 professionals from regional and national AEC firms; 15 building owner, development, and/or finance organizations; 20 manufacturers and suppliers.
- Southface (Advanced Commercial Buildings Initiative)
- Architecture 2030 (2030 districts)
- Preservation Green Lab (America Saves!)

Project Integration and Collaboration: Partners, Subcontractors, Collaborators

Stakeholder Engagement Platforms:

- Fulcrum Connection, LLC provides facilitation support for large scale convenings

CBEI Commercialization Center:

- CleanTech Open, Navigator program partners who also incubate startups (6)
- Wharton Small Business Development Center
- Expert panel to select leading technology for commercialization
- iStart for web-launched business model competition

SMSCB Business Models:

- Delaware Valley Green Building Council

Integrated Design Retrofit Roadmaps:

- Maskar Design: Developed Overview Brochure

Project Integration and Collaboration: Communications

Stakeholder Engagement Platforms:

- BP2-BP3 20+ workshops to review CBEI content with market actors, 1 launch event, 1000+ stakeholders engaged
- BP4 1 large scale workshop (80+), 2 small-scale focus groups (10), 2 webinars (35)

CBEI Commercialization Center:

- 8 presentations on CBEI Commercialization Center to regional and national audiences in conferences and business seminars

SMSCB Business Models:

- Focused interviews with 20 AER Service Providers and Building Owners

Integrated Design Retrofit Roadmaps:

- 16 Integrated Design Retrofit Demonstration Project meetings at 4 regional sites
- 4 focus groups along the project development path

Next Steps and Future Plans

Stakeholder Engagement Platforms:

- Capability will be folded into 2 BP5 projects and cease to be an independent market engagement project at CBEI

CBEI Commercialization Center:

- Maintain active incubator
- Increase market introduction work

Integrated Design Retrofit Roadmaps:

- Project will publish guides Integrated Design Retrofit Roadmaps in April of 2015
- Project will pursue integration of content on web-based platform through other avenues after BP4 concludes

REFERENCE SLIDES

Project Budget

Project Budget: BP4: 873.5K

Variances: Business Models project discontinued in 11/2014. ~90K spent

Cost to Date: BP3-BP4: 1,766K multiyear effort

Additional Funding: BP5: 163K

Budget History

CBEI BP3 (past)
2/1/2013 – 4/30/2014

CBEI BP4 (current)
5/1/2014 – 4/30/2015

CBEI BP5 (planned)
5/1/2015 – 4/30/2016

	CBEI BP3 (past) 2/1/2013 – 4/30/2014		CBEI BP4 (current) 5/1/2014 – 4/30/2015		CBEI BP5 (planned) 5/1/2015 – 4/30/2016	
	DOE	Cost-share	DOE	Cost-share	DOE	Cost-share
Platforms	\$328K	\$0K	\$250K	\$0K	\$0K	\$0K
Comm. Cen.	\$270K	\$69K	\$175K	\$88K	\$75K	\$88K
Bus. Models			\$181K	\$0K	\$0K	\$0K
IDRR	\$225K	\$0K	\$180K	\$0K	\$0K	\$0K

CBEI – Consortium for Building Energy Innovation (formerly EEB Hub)

BP – Budget Period



Energy Efficiency &
Renewable Energy

Project Plan and Schedule

- Platforms project began in earnest in FY2012
- Planned completion date of Platforms and IDRR is BP4
- CBEI Commercialization Center’s planned completion date is 30 April 2016

Project Schedule												
Project Start: 1 Feb 2012	Completed Work											
Projected End: 30 April 2016	Active Task (in progress work)											
	◆ Milestone/Deliverable (Originally Planned)											
	◆ Milestone/Deliverable (Actual)											
	BP3 (2013-14)				BP4 (2014-15)				CBEI BP5 (2015-16)			
Task	Q1 (Feb-Apr)	Q2 (May-Jul)	Q3 (Aug-Oct)	Q4 (Nov-Apr)	Q1 (May-Jul)	Q2 (Aug-Oct)	Q3 (Nov-Jan)	Q4 (Feb-Apr)	Q1 (May-Jul)	Q2 (Aug-Oct)	Q3 (Nov-Jan)	Q4 (Feb-Apr)
Past Work												
Platforms: Maintain at least 5 Platforms and host 12 engagements				◆								
CBEI Commercialization Center: Create On-Site Incubator				◆								
Integrated Design Retrofit Roadmaps: Create draft version of Partial Retrofit Roadmap				◆								
Current/Future Work												
Platforms: Complete 6 stakeholder engagements								◆				
CBEI Commercialization Center: Maintain on-site startup incubator												◆
SMSCB Business Models							◆					
Integrated Design Retrofit Roadmaps: Complete the Partial Team Guides (4) Lite-Comprehensive									◆			