Better Buildings
U.S. DEPARTMENT OF ENERGY

Progress Report 2012

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Better Buildings Progress Report 2012

Executive Summary

Energy efficiency is widely recognized as a cost-effective—but underutilized—strategy for reducing energy costs while increasing energy security, improving our environment, and contributing to the American job market. Potential savings are on the order of $40 billion annually across our nation's commercial buildings, or about 20 percent of projected energy costs. Similar savings are possible across our industrial facilities.[1]

Because these benefits remain unrealized due to a number of identifiable barriers, building owners across diverse market sectors, energy service providers, financial stakeholders, and others called for action from the federal government. Suggested actions included policy dialogues, improved access to information, better financing opportunities, streamlined tax incentives, and technological improvements.

The Administration responded to this call with the **Better Buildings Initiative**—announced by President Obama in 2011. This effort, co-led by former President Clinton and President Obama's Council on Jobs and Competitiveness, is a broad, multi-strategy initiative designed to reduce by 20 percent the energy intensity in the commercial and industrial sectors by 2020 and catalyze revolutionary change in energy use across U.S. buildings.

The Better Buildings Initiative has made tremendous progress in a short time—billions of dollars are being invested, replicable solutions are being shared by market leaders, innovative financing and technological solutions are being deployed, and federal incentive mechanisms are being streamlined. Highlights include:

- **Market Leadership:** More than 110 organizations, representing almost two billion square feet and hundreds of industrial facilities, have taken the Better Buildings Challenge. These leading organizations have each committed to at least a 20 percent improvement in energy intensity by 2020 and are now sharing their successful strategies and results with their peers. Leading financial firms and utilities have committed almost $2 billion in energy efficiency financing through a variety of mechanisms and to help customers improve numerous buildings, also with significant progress.
- **Improved Federal Incentive Mechanisms:** The Department of Energy (DOE), Internal Revenue Service, and Department of Treasury have taken steps to improve the usability of the 179D tax deduction and the more than $3 billion in Qualified Energy Conservation Bonds (QECBs) awarded under the Recovery Act.
- **Federal Government Commitment:** President Obama challenged the federal government to complete $2 billion in federal building upgrades using long-term energy savings to pay for upfront costs, without use of taxpayer money. Federal agencies have now identified over $2 billion in energy upgrade projects and have already awarded over $400 million in construction contracts.

This progress report provides an update of the key strategies the Administration is using to overcome the barriers to energy efficiency, highlights the success of leading organizations in the Better Buildings Challenge, and shares the future plans for the Better Buildings Initiative—providing a framework for meeting the goal of 20 percent savings by 2020.

1 This report is focused on efforts underway in the commercial and industrial sectors. Driving greater energy efficiency in the residential sector is also a goal of the Better Buildings Initiative. The most recent progress report for the Better Buildings Neighborhood program is available at http://www1.eere.energy.gov/buildings/betterbuildings/neighborhoods.

Better Buildings — Goals and Strategies

Better Buildings is a broad, multi-strategy initiative with goals of reducing by 20 percent the energy intensity in the commercial and industrial sectors by 2020, catalyzing revolutionary change in energy use across U.S. buildings, and making a permanent impact on lowering energy bills, reducing pollution, and growing domestic jobs.

Initiated by the Administration, this is a partnership effort implemented by DOE; the Department's goal is to develop new and/or facilitate existing solutions with leaders in the market that build the critical foundation for a robust energy efficiency marketplace.

DOE is currently pursuing strategies within four pillars to catalyze change and accelerate investment in energy efficiency. The strategies reflect broad stakeholder input, are designed to address key barriers, and can and will evolve based on progress and the ongoing stakeholder feedback that DOE routinely seeks so as to improve their effectiveness. The pillars are:

Developing Innovative, Replicable Solutions with Market Leaders: DOE is working with leading organizations across diverse market sectors—public, private, commercial, industrial, financial, and utility—to develop, showcase, and accelerate a broad portfolio of management, financing, and technology solutions. These leaders are providing the how-to's for unlocking savings from energy efficiency, substantiated with the data-based results from their efforts.

Making Energy Efficiency Investment Easier: Better information about building efficiency and savings opportunities and increased access to financing are critical to accelerating energy efficiency investment. DOE is working to facilitate access to standardized, consistent, and low-cost information as well as increased access to existing financial mechanisms. Current efforts include:

- Developing tools to facilitate the assessment of building efficiency in a consistent, standardized, low-cost manner throughout the lifecycle of a building and access to information on opportunities for building improvements;
- Partnering with The Appraisal Foundation to develop guidelines and trainings that help recognize the value of efficiency through appraisal evaluation;
- Developing a consistent taxonomy for building energy efficiency and an associated data repository so that the savings from energy efficiency projects can be analyzed by potential investors and lenders;
- Improving the access to data necessary for building assessments, such as utility bills;
- Streamlining and clarifying existing federal incentive and financing programs to improve the effectiveness of resources such as the 179D tax deduction and QECBs; and
- Improving access to financing through revolving loan funds established through Recovery Act funding to state and local governments.

Developing a Skilled Clean Energy Workforce: A trained and skilled workforce is critical in providing the market-enabling information and services necessary to accelerate investment in energy efficiency. Better Buildings Initiative activities are helping ensure America's current and future practitioners have the right skills to prosper in the clean energy future by identifying key skills areas, developing technical curricula content, and working with training and educational partners to deploy this material to advance the development of a highly skilled workforce.

Federal Leadership by Example: The federal government is modernizing the energy performance of its buildings by using energy performance contracts to invest $2 billion in two years in efficiency at no cost to taxpayers by using long-term energy savings to pay for upfront costs. This strategy builds on a strong foundation of legislation and executive orders that have established a set of energy efficiency, renewable energy, and greenhouse gas reduction targets and focuses on leveraging private-sector services to improve federal buildings in order to meet existing goals.

Major accomplishments to date are highlighted in the timeline and the rest of this report. Moving forward, DOE will evolve these strategies to accelerate investment in energy efficiency. The Department will measure what is working, engage with stakeholders on what does and does not work, and focus on the rapid adoption of successful solutions and the deployment of demonstrated technical, business, and financial solutions. And through the Better Buildings Initiative, DOE will offer an integrated set of solutions from across its clean energy portfolio as well as its work with other federal agencies.

Better Buildings Initiative Timeline

Better Buildings Initiative

President Obama announces the **Better Buildings Initiative**, including the Better Buildings Challenge.

Better Information

DOE signs MOU with The Appraisal Foundation to establish guidelines for appraisers to evaluate the energy performance when conducting commercial and residential building appraisals.

Leadership Challenge

President Obama and Former President Clinton officially launch the **Better Buildings Challenge.**

Workforce

DOE announces the availability of $1.3 million in partnership with the National Institute of Standards and Technology (NIST) to pilot a Building Technology Extension Program for commercial building operations and maintenance.

Federal Government Commitment

Presidential Memorandum issued to upgrade federal buildings at no cost to the taxpayer using long-term energy savings.

2011 FEB JUN DEC 2012

Leadership Challenge

DOE Secretary Chu highlights the **Better Buildings Challenge** at the Clinton Global Initiative America meeting in Chicago; DOE and White House profile inaugural partners.

Better Buildings CHALLENGE U.S. DEPARTMENT OF ENERGY

Engaging Students

First **Better Buildings Case Competition** held at the White House; DOE engages college students to create solutions to real-world problems to be used as models by businesses and other organizations across the marketplace.

Financing

Internal Revenue Service modified the existing energy savings targets for taxpayers **(179D)** claiming a partial tax deduction in order to better align with technological advances in energy-efficient lighting, HVAC, and building envelope products.

Financing

DOE makes **179D tool/ calculator** available. The tool helps taxpayers conduct an initial evaluation of potential energy savings for a given project and streamlines application and compliance process.

Leadership Challenge

First **Better Buildings Challenge Showcase** projects completed and results highlighted nationally.

Leadership Challenge

Better Buildings Challenge: DOE holds a national summit for the public sector; 36 new public organizations join including states, local governments, and school districts.

Federal Government Commitment

Progress on Presidential Memorandum to upgrade federal buildings: DOE and White House announce that federal agencies have identified $2 billion in energy upgrade projects for federal buildings that will use long-term energy savings to pay for project costs.

Workforce

DOE and NIST announce three Centers for Building Operations Excellence to create and deploy programs in California, Pennsylvania, and New York.

Financing

Financial organizations participating in the Better Buildings Challenge have invested almost $400 million in energy efficiency upgrades.

FEB MAR APR JUN AUG OCT DEC SPR SUM 2013

Financing

Department of Treasury issues new tax guidance to make it easier for state and local governments to access more than $2 billion in low-cost financing through **QECBs.**

Leadership Challenge

First **Better Buildings Challenge** Implementation Playbooks available.

Engaging Students

Better Buildings Case Competition.

Leadership Challenge

First year results: **Better Buildings Challenge.**

Manufacturing

President Obama signs an **Executive Order** to accelerate investment in industrial energy efficiency, including combined heat and power (CHP). The order sets a national goal of deploying 40 gigawatts of new, cost-effective CHP over the next decade.

Leadership Challenge

Better Buildings Challenge Partner Meeting: DOE progress report on the Better Buildings Initiative.

Better Information

The Appraisal Foundation issues guidelines for appraisers to evaluate the energy performance when conducting commercial building appraisals.

Developing Innovative, Replicable Solutions with Market Leaders

Despite rising awareness of the availability of energy savings in our commercial and industrial buildings, cost-effective energy efficiency continues to be under-realized, and the energy consumption of the nation's buildings continues to rise. Today, buildings and plants account for close to half of all of the energy used in the United States.

U.S. building owners and operators continue to face stubborn barriers to energy efficiency investment. These barriers, well documented in literature and practice, include:

- **Lack of data-driven results demonstrating the savings from energy efficiency investments**
- **Lack of information on emerging market and technical solutions**
- **Lack of wide recognition of energy efficiency as a viable business practice resulting in an absence of leadership commitment to energy efficiency**

Together, these organizational barriers make energy efficiency difficult to implement for many building owners, contributing to underinvestment in efficiency and underperformance of the nation's buildings. However, leading organizations have been successful in overcoming these barriers, driving energy and cost efficiency through their portfolios and businesses. Through the Better Buildings Initiative, DOE is engaging the market to develop new, and demonstrate existing, technical and business solutions to persistent challenges to energy efficiency.

Challenging and Learning from the Leaders — Better Buildings Challenge

Organizations across the nation have answered the call for demonstrating energy efficiency as a viable business operation; these organizations have committed to organization-wide goals of at least a 20 percent energy improvement by 2020 through the Better Buildings Challenge. In order to help enable energy efficiency, and assist leading organizations to overcome financing and data barriers, the Challenge also includes a network of Financial and Utility Allies.

A cornerstone of the Better Buildings Challenge is a commitment from Partners to share their approaches to overcoming barriers that have consistently plagued their sectors. These models include specific information on the technologies, strategies, processes, and/or services that Partners utilized to achieve their energy savings goals. DOE is working with Partners to document these successful strategies, with the aim of creating replication pathways for adoption by other organizations.

Formally launched by President Obama in December 2011, the Better Buildings Challenge now has more than 110 Partners, representing two billion square feet of building space and more than 300 manufacturing facilities. These Partners represent a broad range of leaders including commercial building owners, schools, universities, hotels, hospitals, retailers, manufacturers, and city and state governments. (Appendix A includes a complete list of Partners and Allies.)

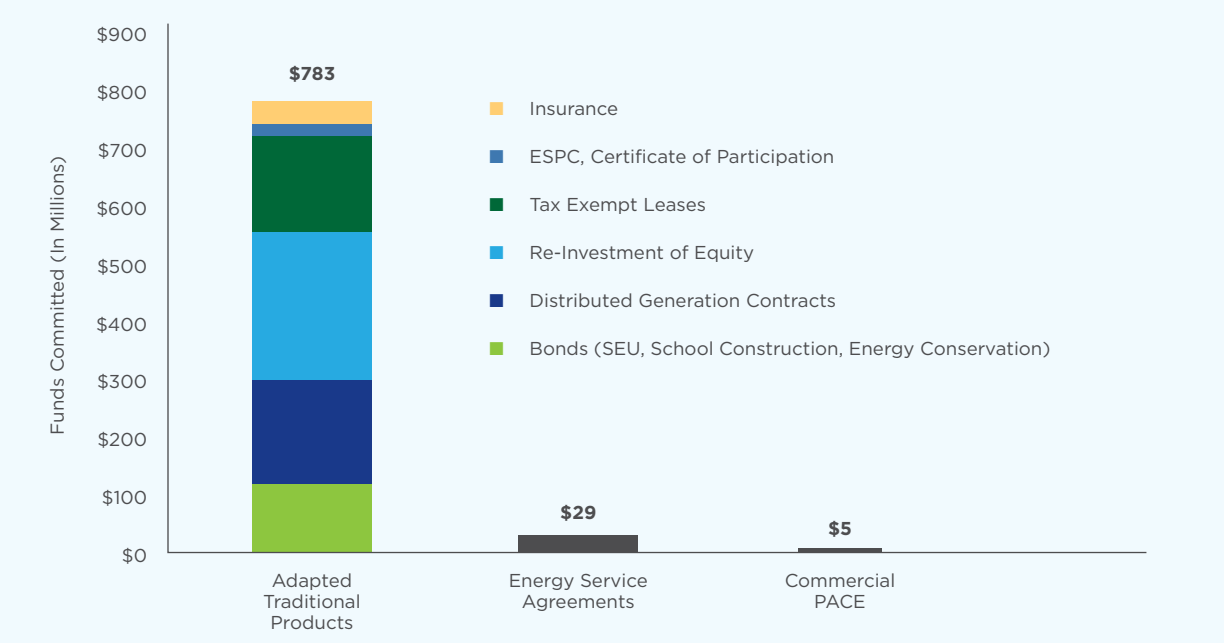
Additional actions in 2012:

- **Financial Allies:** The 14 financial institutions participating in the Better Buildings Challenge have committed almost $2 billion in financing to deliver innovative financing solutions and products for energy efficiency upgrades. To date, Allies have extended more than $800 million in financing for such projects (see Figure 1).

Better Buildings Challenge: Snapshot

Partners/Allies	Commitments	Progress
Commercial 48 Commercial real estate, healthcare, hospitality, retail, schools, university, state and county government	**2 billion** square feet **300** manufacturing facilities	**53** showcase projects **48** implementation models identified
Industrial 10 Energy-intensive industries to light manufacturing		
Community 37 Municipalities and business		
Financial 14	**$1.7 billion** in financing	**$800 million** extended
Utility 3 Investor-owned and public power	Provide customers with easy access to energy bill data; help customers improve millions of building square feet	Update in spring
Federal Agencies	**$2 billion** in projects	**$400 million** awarded

Figure 1. Financial Allies Have Extended Close to Half the Committed Financing Across a Variety of Mechanisms



- **Utility Allies:** The three utilities play an important role in providing new approaches to helping commercial owners access their energy usage data, understand the efficiency of their buildings, and undertake efficiency upgrades. For example, the Utility Allies will help their commercial customers achieve significant savings (Southern California Edison: 5 percent energy savings across its commercial customer class by 2015; Pacific Gas and Electric: provide multi-measure programs that will reach 30 million square feet of its commercial customers by 2015) and provide them with their energy usage data electronically. In addition, the Los Angeles Department of Water and Power will partner with the regional gas utility to offer combined electric/water/gas programs to customers, a nation-leading first at this scale.

- **Showcase Projects:** Partners have demonstrated concrete action toward their energy reduction commitment through showcase projects. These showcases highlight innovative, aggressive, and realistic strategies for energy savings at the building level. More than 50 showcase projects are underway. Appendix B includes a listing of showcase projects highlighted on the Better Buildings Challenge website.

- **Data-driven Results:** Partners are collecting energy use data, and collaborating with DOE to work through complex collection and analysis issues encountered when tracking portfolio-wide performance data. DOE plans to release results of this first reporting period in spring 2013.

- **Solutions:** Partners are in the initial stages of documenting concrete solutions to some of the most challenging financial, organizational, and process barriers. Collectively, these leaders will demonstrate a number of unique approaches that other organizations can adopt rapidly to accelerate success. Examples of Partner and Ally models are briefly highlighted below. (For additional information on identified models, see Appendix C.)

Better Buildings Challenge Solutions

Better Buildings Challenge Financial Ally: SCIenergy®

Market Barrier:	Building owners limit the outlay of capital for building modernization, and the ownership structure does not provide for a credit-worthy borrower.
SCIenergy's Solution:	A Managed Energy Services Agreement (MESA). A MESA provides capital without adding debt to the real property. A special-purpose project entity, funded by third-party investors managed by SCIenergy, pays for retrofits to lower the cost of the energy bills at the building.
Project:	MESA Contract to Modernize Energy Systems in Lower Manhattan Office Building (First of Its Kind).
Progress to Date:	A fully modernized automation system was installed, including direct digital controls, new high efficiency motors with variable frequency drives on all pumps and fans that move air and water, and a state-of-the-art building management system with overlay systems allowing for real-time monitoring, measurement, and fault detection. The project is expected to result in savings of 24 percent of total energy costs, and to be fully paid off in 10 years.

Better Buildings Challenge Partner: 3M

Market Barrier: Inability to access internal capital for energy efficiency projects.

3M's Solution: 3M established a capital set aside fund dedicated specifically for energy efficiency projects that provided positive returns, but otherwise failed to meet the company's investment criteria.

Outcome: Rapid implementation of energy efficiency projects that would not have occurred otherwise. For each of the past two years, 3M has committed $1 million to the set aside fund for investments in relatively small projects (less than $50,000 in capital costs).

To see details of 3M's solution, visit:
https://www4.eere.energy.gov/challenge/implementation-model/3m.

Better Buildings Challenge Partner: City of Atlanta

Market Barrier: Multiple barriers to engaging the community in deploying energy efficiency, including lack of information, lack of data access and management, and organizational barriers.

Atlanta's Solution: Leveraged a public-private partnership to create a new initiative that provides access to project financing, free building assessments, education and training, and public recognition.

Outcome: Over 30 property owners totaling over 30 million square feet have taken the Atlanta Better Buildings Challenge since its official launch in November 2011. The goal is to reduce energy and water consumption in more than 40 million square feet of buildings by at least 20 percent by 2020 and become one of the country's 10 most sustainable cities.

To see details of Atlanta's solution, visit:
https://www4.eere.energy.gov/challenge/implementation-model/city-of-atlanta.

Better Buildings Challenge Partner: HEI HOTELS & RESORTS

Market Barrier: Lack of centralized information on energy, other key data.

HEI's Solution: Energy management tracking tool, called the Energy Looking Glass Dashboard, that analyzes key variables such as weather normalized utility consumption and hotel occupancy alongside capital and operational energy efficiency initiatives.

Outcome: HEI is now able to recognize areas for improvement and realize savings. Energy Looking Glass Dashboard also facilitates organizational behavior change by encouraging teamwork to meet company goals.

To see details of HEI's solution, visit:
https://www4.eere.energy.gov/challenge/implementation-model/hei-hotels-and-resorts.

Engaging a Broad Community in Solutions

DOE also engages more broadly with industrial, community, and commercial organizations to help them to save energy in their daily operations through the Better Buildings Alliance and the Better Buildings, Better Plants Program. Participants in these programs work with DOE to set energy savings goals, develop energy-saving solutions to both market and technical challenges, and deploy these solutions through their organizations. In return, they are recognized for their accomplishments.

Better Buildings Alliance

Through the Better Buildings Alliance, DOE works in collaboration with commercial building owners to develop both technology and market-related solutions. Dedicated Project Teams focus on replicable and scalable energy efficiency solutions to increase the speed and scale at which efficient technologies and practices are adopted in the market.

The Better Buildings Alliance has grown to include more than 200 members in six sectors: retail, food service, commercial real estate, hospitality, healthcare, and higher education. The Better Buildings Alliance will expand to include the state and local sector in 2013. Members commit to set and share an energy-saving goal, provide updates on progress toward that goal, join one or more Project Teams, and participate in at least one Alliance activity each year.

The Better Buildings Alliance released five new performance specifications for high efficiency building technologies in 2012, doubling the number of energy-saving specifications available. These specifications catalyze innovation and help members procure higher efficiency building technologies. The Alliance also worked in cooperation with association members to kick off the Lighting Energy Efficiency in Parking campaign, a multi-organizational effort to increase adoption of the Better

Spotlight on a Better Buildings Market Solution: Green Lease Library

Building leases lay out how capital expenses and energy costs are divided between tenants and owners. Often, leases are not structured in a way that promotes energy savings. Under many "net" leases, for example, owners must pay for capital improvements, including many energy savings technologies, but tenants reap the benefits of the cost savings from such projects; a problem known as the "split incentive." Green leases promote energy efficiency by equitably aligning the costs and benefits of efficiency investments between building owners and tenants.

To address the issue of split incentives in the commercial real estate sector, the Alliance published two detailed energy-aligned lease case studies in 2012 and launched the Green Lease Library with seven Partner organizations. The Green Lease Library is a one-stop shop to improve access to green leasing resources. This website aggregates and organizes green leasing resources for all audience types, offering guidance, best practices, and toolkits for developing and implementing green leases.

To learn more about the Green Lease Library, visit: http://www.greenleaselibrary.com.

Buildings Alliance LED lighting specifications. In addition to technical solutions, the Alliance has focused on developing market-based solutions, in 2012 focusing on the split incentive barrier through green lease language (see text box on page 10).

Better Buildings, Better Plants Program

Through Better Buildings, Better Plants, industrial companies commit to reducing the energy intensity of their U.S. manufacturing operations by 25 percent over 10 years, establish energy management plans, and report their progress to DOE once a year. The Department works with these companies to establish key energy performance metrics, work through site-specific data collection and analysis, and organize plant-level training events.

The Better Plants Program now includes more than 100 manufacturers, covering more than 1,400 plants, which account for about 5 percent of the total U.S. manufacturing energy footprint. Based on reported data, Partners in the Better Plants Program have saved about 45 trillion BTUs and $240 million cumulatively since the start of the program.

In 2012, DOE held 12 training events at Partners' plants that trained over 250 participants on critical energy management practices. The Department also continues to support Partners' energy management efforts through Superior Energy Performance (SEP), a DOE-developed, ANSI/ANAB-accredited certification program that provides industrial and commercial facilities with a roadmap for achieving continual improvement in energy efficiency while boosting competitiveness.

Better Plants Partners Implement Their Commitment Through Superior Energy Performance

Several Better Plants Partners are also participating in SEP, a DOE-developed, ANSI/ANAB-accredited certification program that provides industrial and commercial facilities with a roadmap for achieving continual improvement in energy efficiency while boosting competitiveness.

- Plants seeking SEP certification adopt the ISO 50001 energy management standard and demonstrate third-party verified energy performance improvement.
- The program, which is in the demonstration phase, also has a workforce development component that certifies experts in energy management systems, who are expected to act as in-house or external consultants to help plants achieve SEP certification.
- To date, 12 plants have been certified to SEP and have improved their energy performance between 6 and 25 percent over a three-year period. Twenty-eight other manufacturing facilities are actively pursuing certification within the demonstration program.

Working with the Next Generation of Leaders — Better Buildings Case Competition

DOE also realizes the power of engaging the nation's brightest students in the effort to solve difficult business and technical problems. The Better Buildings Case Competition draws fresh perspectives and new solutions by engaging collegiate students, while providing the next generation of engineers, entrepreneurs, and policymakers with skills and experience to start careers in clean energy.

Through the Better Buildings Case Competition, DOE challenges university students to develop creative and innovative technical and business solutions for specific problems in industry. Students from university energy clubs across the United States form interdisciplinary teams to tackle tough problems posed by organizations, including Better Buildings Challenge Partners, and present their solutions to a panel of private and public sector judges in a one-day workshop.

The inaugural Better Buildings Case Competition was held in March 2012 on the White House campus. Students from 19 universities traveled from across the country to compete in an all-day workshop. The student teams were challenged to find the best solutions to the energy efficiency challenges presented in real-world case studies for the City of Houston, the District of Columbia, HEI Hotels and Resorts, and Cassidy Turley.

Several of the winning teams were subsequently invited to present their findings to Partner organizations and a number of students found internships, fellowships, and jobs in clean energy through the competition. Winning proposals were selected from:

- Carnegie Mellon University
- Massachusetts Institute of Technology
- Columbia University
- University of Colorado Denver
- University of Southern California
- George Washington University
- University of California, Berkeley

DOE is looking forward to hosting the 2013 Better Buildings Case Competition on March 8 at the White House campus. Students will be asked to find solutions to diverse issues including: determining cost-effective strategies for equipment suppliers, incentivizing tenants to reduce energy consumption, and including natural gas as part of a holistic efficiency solution.

Making Energy Efficiency Investment Easier

Organizations that strongly support energy efficiency and are seeking opportunities to implement projects across their portfolios are still finding roadblocks in the actual implementation. For example, one of the most often cited barriers to energy efficiency is the lack of information. The marketplace—including owners, managers, investors, engineers, and appraisers—needs accessible information to accurately value energy efficiency and identify opportunities for building improvements; however, easy access to quality data still remains a struggle. Other implementation barriers include:

- **Capital constraints to upfront funding**
- **Lack of awareness/information about product/building efficiency and energy consumption**
- **Limited access to quality energy consumption data**
- **Lack of consistent government policy**

Several Better Buildings Initiative efforts focus on developing and improving mechanisms to streamline and simplify activities and reduce the time and cost of energy efficiency implementation.

Improving the Effectiveness of Federal Incentive Programs

Congress established two potentially powerful programs to incentivize the execution of energy efficiency projects through tax reduction. The 179D tax deduction allows commercial building owners to offset some project costs with tax savings, while QECBs allow state and local governments to issue public bonds at subsidized rates. Participants encountered challenges to utilizing these incentives early in both programs' introduction, but by actively engaging stakeholders and working with federal partners, the Administration and DOE have been able to enact changes in regulations and implementation that streamline and enhance both programs.

179D Improvements

During 2012, DOE worked with the Treasury Department and the Internal Revenue Service to modify energy savings targets for taxpayers who claim a partial tax deduction in order to better align with recent technological advances in energy-efficient lighting, HVAC, and building envelope products. The revised language provides greater incentive for taxpayers to upgrade heating and cooling systems by decreasing the threshold for a partial tax deduction from 20 percent to 15 percent energy savings.

DOE also developed a simplified, web-based approach for modeling common energy efficiency upgrade measures in order to streamline the requirements for claiming a deduction and reduce costs for taxpayers. This web-based tool may serve as a substitute in many circumstances to costly modeling requirements that have burdened the application and compliance process. The 179D DOE Calculator can be accessed at: http://apps1.eere.energy.gov/buildings/commercial/179d.

In addition, the Administration continues to work with Congress to redesign the current tax deduction into a more flexible incentive that can optimize investment opportunities for commercial building upgrades.

QECBs in Action

- The City of Philadelphia leveraged $6.25 million in QECBs to finance half of a $12.6 million initiative to upgrade the energy efficiency of four city buildings. $10 million in net savings is expected and the resulting energy reduction is a major step toward achieving the City's goal of reducing government energy consumption by 30 percent by 2015.
- The City of San Diego leveraged a $13.1 million QECB to increase the size of a street lighting upgrade project from 10,000 to 39,000 light replacements. This project is expected to save the City over $2.5 million in avoided energy and maintenance costs annually.
- In many states, QECBs have been utilized primarily to fund energy conservation projects for public entities. However, Massachusetts has facilitated over $10 million of private activity QECB issuances to support three privately-owned renewable energy projects, with more projects in the pipeline.

QECB Clarification

QECBs are a source of low-cost financing for state and local governments that are looking to advance clean energy within their communities with energy efficiency and renewable energy projects and programs. However, state and local officials indicated difficulty in clearly determining the eligibility of certain projects under the original QECB program guidance issued in 2009. As a result, in June 2012, the Department of Treasury and the Internal Revenue Service issued new guidance to make it easier to access the bonds, explaining what constitutes a "green community program," and providing guidance on how to measure and certify the 20 percent energy savings provision for publicly-owned buildings.

Over 120 QECBs totaling more than $730 million have been issued in the last three years, with the majority of those funds going toward energy efficiency projects. Notably, more than a quarter of all projects have been in public schools and higher education facilities. The revised guidance aims to accelerate deployment of additional clean energy projects, allowing organizations to take advantage of the remaining $2.4 billion funds in QECBs.

Creating New Avenues for Better Information

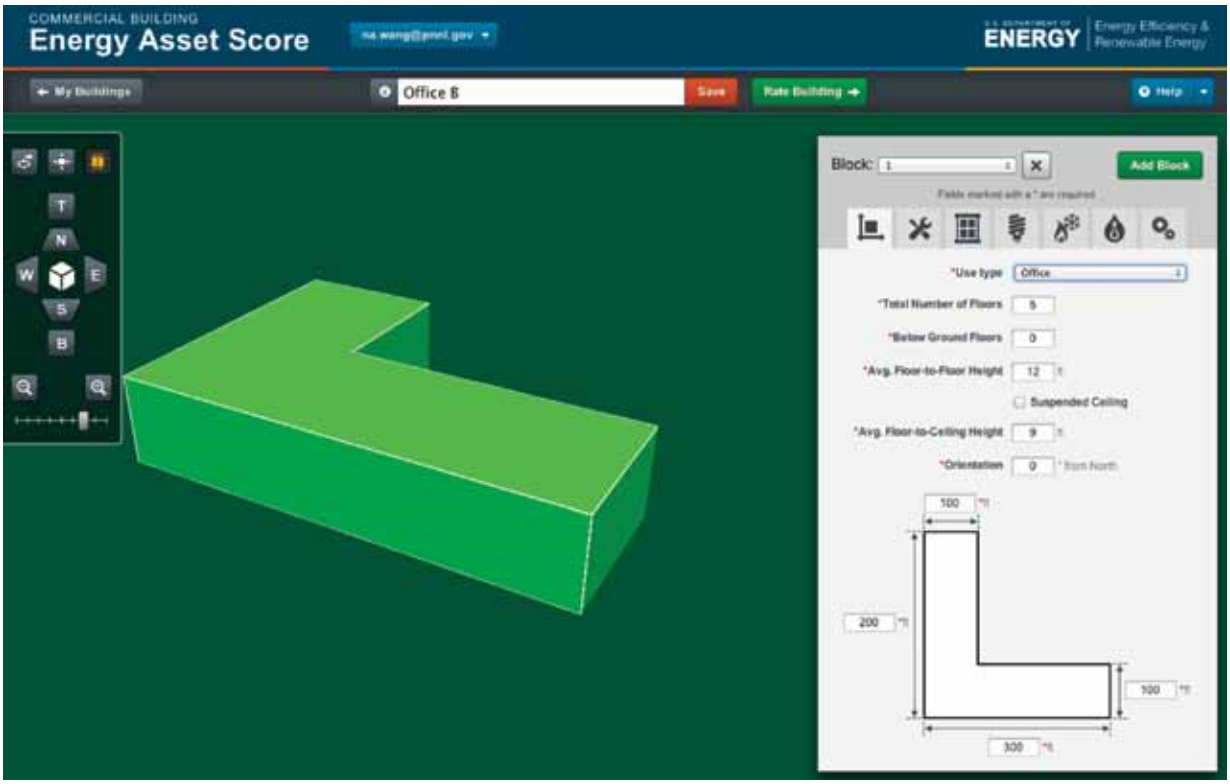
Knowledge about building energy performance and cost enables informed energy efficiency decision making. Information drives strategic development and investment in energy efficiency by enabling informed analysis, predictable results, and consistent valuation. The industry still faces many challenges in acquiring, tracking, and understanding critical building performance information, such as access to data and insufficient tools to connect and compare relevant data throughout the building lifecycle.

With stakeholder input, DOE is working to expand the tools that are available to the market to enable low-cost measurement, management, and analysis of building energy efficiency performance and opportunities for improvement.

Commercial Building Energy Asset Scoring Tool

The Asset Scoring Tool provides a low-cost way to evaluate the as-built energy efficiency of a building, providing the user with (1) a whole-building score, (2) system-level energy efficiency metrics, and (3) identified opportunities for efficiency upgrades. The Asset Scoring Tool is being developed to be a low-cost, easy mechanism for data collection, based on building characteristics including the building envelope, HVAC system, lighting system, service hot water system, and other major energy-using equipment. These system-level efficiency indicators can be used as a quick screen to identify opportunities to make investments in the building systems or equipment in order to cost-effectively improve performance.

Figure 2. Energy Asset Scoring Tool



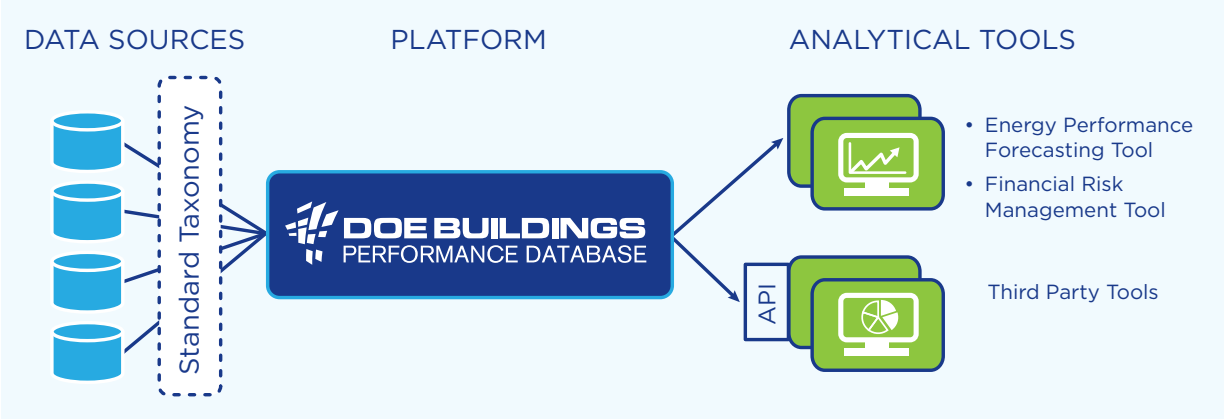
The Asset Score will complement the peer benchmarking information that building owners and managers can get today by using ENERGY STAR® Portfolio Manager. While Portfolio Manager tells a building owner which buildings may be underperforming when compared to similar buildings, the Asset Scoring Tool will help them identify likely causes of the low performance. The Asset Scoring Tool completed an initial pilot in 2012 and is seeking additional users to participate in the pilot testing of an expanded and enhanced version in spring 2013. More information is available at www.buildings.energy.gov/commercial/assetscore.html.

Buildings Performance Database

Today, decision making about the risks and returns of particular energy efficiency projects is hindered by the lack of granular, accurate comparative data. Large sources of performance information are unavailable for public analysis; thus, decisions have to be made based on similar case studies, anecdotal evidence, or experienced guesses. As another resource to the building industry, DOE is developing the Buildings Performance Database, a tool that aggregates actual data about both the physical characteristics and energy consumption of real buildings.

The Buildings Performance Database is a decision-support platform comprised of a database and data analysis tools, which will enable building owners, program managers, engineering firms, and investors to better understand typical building energy usage and to evaluate the energy savings resulting from energy efficiency upgrade measures across similar buildings. The database contains measured rather than modeled data and currently has data for about 50,000 commercial and residential buildings. In early 2013, the database will be publicly available at http://www.buildings.energy.gov/buildingsperformance.

Figure 3. Buildings Performance Database Aggregates Actual Data and Includes Data Analysis Tools



Green Button

Organizations continue to request easier access to their energy usage data in a consumer-friendly and computer-friendly format. Green Button is an industry-led effort that is working to address this request through a common technical standard. Voluntary adoption of a consensus standard by utilities across the nation allows software developers and other entrepreneurs to leverage a sufficiently large market to support the creation of innovative applications that can help consumers make the most of their energy usage information.

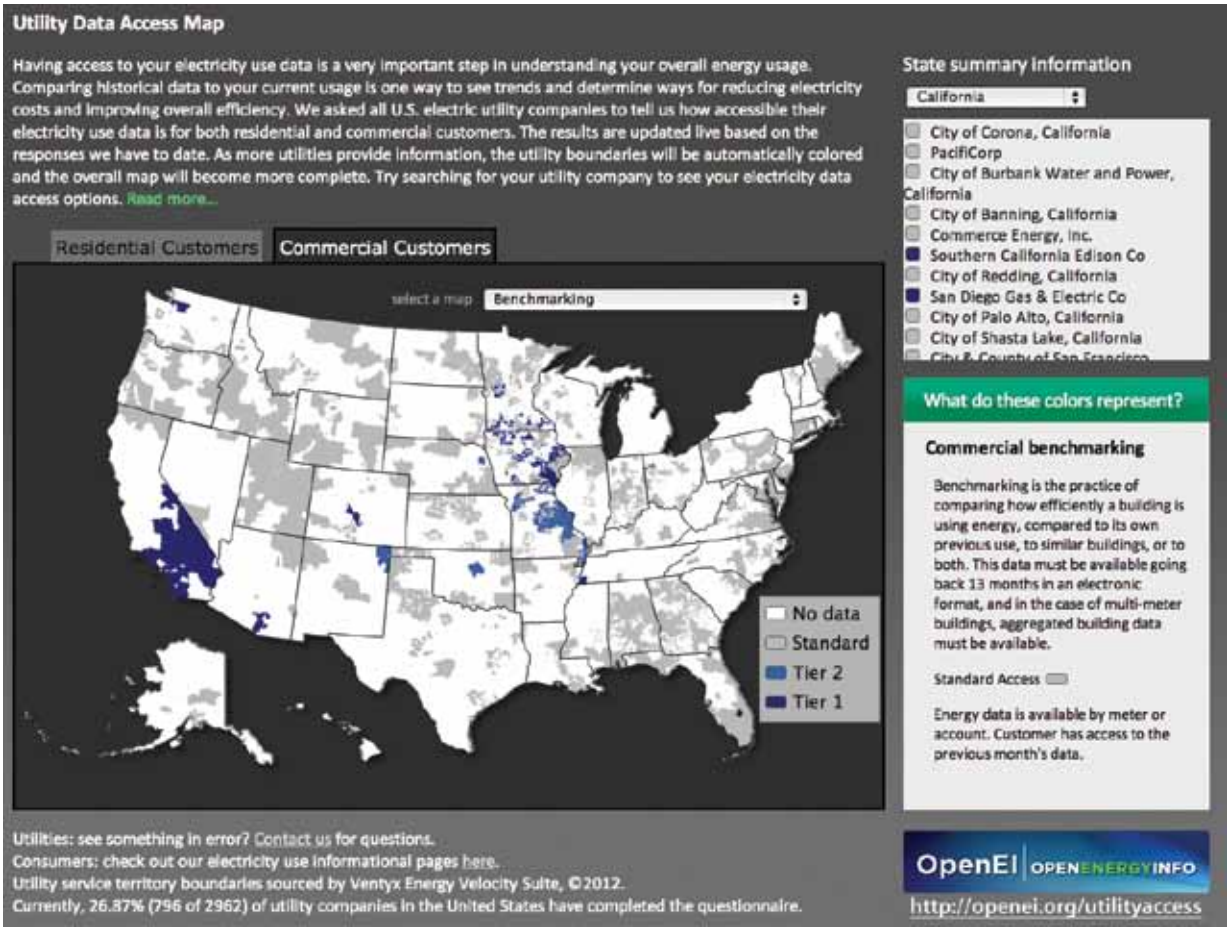
Thirty-two utilities and electric suppliers have committed to enable more than 35 million households and businesses to securely access their own energy information in a standard format. DOE looks forward to engaging with more utilities as they commit to Green Button and to addressing ongoing data issues through the Better Buildings Challenge Utility Ally effort.

DOE also looks forward to engaging data entrepreneurs and others in innovative ways to use this data to build new business solutions through a variety of challenge efforts, such as Apps for Energy (http://appsforenergy.challenge.gov) and Energy Datapaloozas.

Data Access Map

DOE has developed a 50 state map on the data access utilities are providing to their customers—commercial and residential—so that the practices in use across the country can be more readily seen. One purpose for this access to energy bill data is to assist building owners in benchmarking the efficiency of buildings with multiple tenants. Utility practices are color-coded based on whether they offer standard or best practices. DOE will continue to engage utilities in making their practices clear to customers as well as encouraging them to adopt best practices that facilitate building improvements.

Figure 4. DOE Map Summarizes Utilities' Data Access Practices



MOU with The Appraisal Foundation

DOE continues to work with The Appraisal Foundation to develop practical guidelines and professional resources for appraisers so they can have the knowledge base to properly evaluate energy performance when conducting building appraisals.

The appraisal of green buildings has been added to the educational topics required to become a state licensed or state certified real estate appraiser, as well as the continuing education topics required to renew a state credential. State appraiser regulatory agencies must implement this change no later than January 1, 2015. DOE staff members are serving as subject matter experts for the development of all three documents. As this guidance is released, it will become the basis for educational course development by valuation education providers and DOE. Next steps include:

- Guidance on the Valuation of Green Buildings will be issued by the Foundation's Appraisal Practices Board. The first step, establishing the basic competency required to evaluate green/energy-efficient buildings, is underway and is expected to be completed by spring 2013.
- The second step, the guidelines for the valuation of green/energy-efficient residential buildings and the guidelines for the valuation of commercial green/energy-efficient buildings, is expected in spring 2013.
- The Appraisal Foundation and DOE are collaborating with other organizations and discussing methods to develop a national unique building identifier (similar to the VIN number on a vehicle) that would fit with DOE building performance taxonomy efforts. DOE is also working with The Appraisal Foundation to explore the potential to develop appraisal case studies demonstrating the potential value that energy efficiency retrofits add to commercial buildings.

Developing a Skilled Clean Energy Workforce

Advances in building technologies, systems, and techniques demand a workforce with new skills and knowledge. Building operators must manage computerized building and energy systems, maintain integrated renewable systems, and be alert to continuous opportunities to fine-tune their buildings. New methods of design and procurement require different types of project teams, and entire new industries around benchmarking, auditing, and commissioning are appearing. Key barriers in today's workforce include:

- **Lack of trained workforce in the retrofit business**
- **New technologies outpacing staff awareness and education**
- **Lack of energy management approach across facility staff**
- **Lack of certainty around certification programs**

The Better Buildings Initiative activities are helping ensure America's current and future practitioners have the right skills to prosper in the clean energy future by identifying key skills areas, developing critical technical curricula content, and working with training and educational partners to deploy this material to ensure the development of a highly skilled workforce.

Workforce Development Elements

There are a large number of certification programs addressing commercial building jobs, leading to a lack of certainty about what practitioners should be able to do and mistrust in ability to perform. As a result, DOE convened commercial building professionals to develop Job/Task Analyses (JTAs), which analyze the tasks performed by individuals in six common clean energy occupations and identify the knowledge, skills, and abilities required to perform those tasks. This information can be used by industry to develop better training and better workforce certifications. As a next step, DOE is investigating ways it can support private sector workforce certifications based on these JTAs.

Draft JTAs for the following occupations are now available at http://www1.eere.energy.gov/buildings/commercial/workforce.html:

- Commercial Building Energy Auditor
- Commercial Building Energy Modeler
- Commissioning/Retro-Commissioning Authorities
- Energy/Sustainability Manager
- Facility Manager
- Operating Engineer/Building Technician

Training Curricula on Building Re-tuning

DOE has piloted a train-the-trainer approach in an effort to increase the ability of existing and new building operators to perform re-tuning, or light retro-commissioning, on the buildings that they operate. DOE has developed technical content for curricula on re-tuning large (with a building management system [BMS]) and small (without a BMS) buildings and is working with training centers across the country in association with NIST to incorporate these curricula into their educational programs aimed at training and expanding current and incoming building operators. The three centers for Building Operations Excellence are in California, Pennsylvania, and New York. These training curricula provide students with classroom and hands-on experience that enable them to re-tune buildings on a constant basis as needed, ensuring that the building's energy performance does not drift and erode over time.

Building the Future: Three Centers for Building Operations Excellence

DOE and NIST announced three centers for Building Operations Excellence to create and deploy programs in June 2012. Cohorts are expected to begin receiving instruction by the first quarter of 2013. The three initial centers offering these trainings are:

- The Corporation for Manufacturing Excellence in California, partnering with Laney College and the International Union of Operating Engineers Local 39.
- Delaware Valley Industrial Resource Center in Pennsylvania, partnering with Pennsylvania State University, Pennsylvania College of Technology, and Drexel University.
- New York State Department of Economic Development in New York, partnering with City University of New York and Rochester Institute of Technology.

Federal Leadership by Example

In December 2011, President Obama signed a Presidential Memorandum directing all federal agencies to maximize existing authorities to utilize performance-based contracting for undertaking energy retrofits on federal buildings, and to enter into a minimum of $2 billion in performance-based contracts over the next two years.

Performance-based contracting is an innovative approach to financing building upgrade projects that uses long-term energy savings to pay for upfront costs, resulting in no cost to taxpayers. The approach leverages Energy Savings Performance Contracts (ESPC) wherein Energy Service Companies (ESCO) and utility companies conduct energy upgrades of federal buildings and guarantee savings from the improvements.

DOE has assisted federal agencies in identifying the potential for energy improvement across buildings, as well as simplifying the process for implementing energy performance contracts. Activities include developing and promoting a streamlined procurement and reporting process with standard templates, providing training on critical elements of energy management, and developing a new pilot effort for smaller buildings called ENABLE.

Progress to date includes:

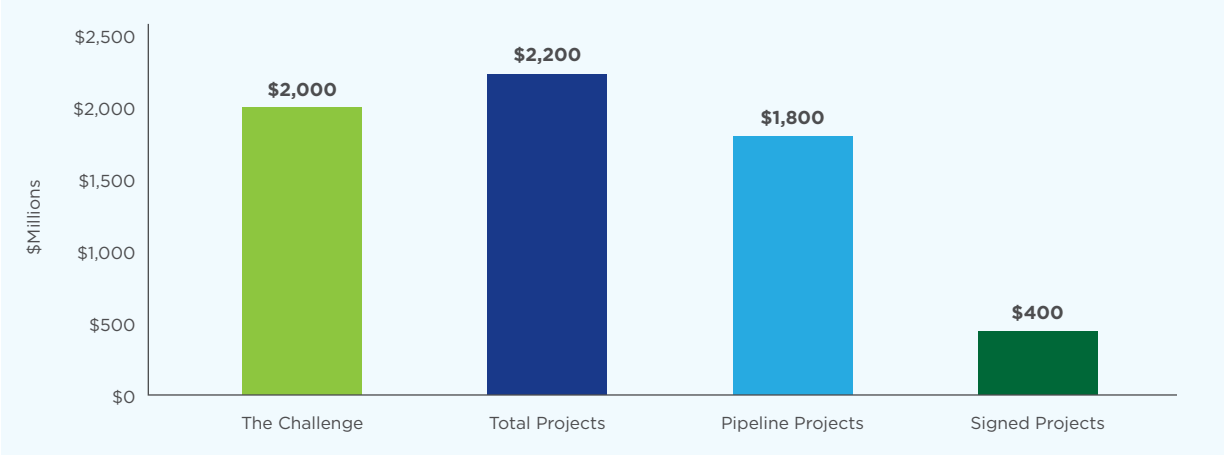
- Federal agencies have now identified a pipeline of over $2 billion in energy efficiency projects to be implemented by December 31, 2013 for federal buildings that will use energy savings to pay for project implementation costs.
- Over $2.1 billion has already had a Notice of Opportunity issued—the first step of the procurement process, with only $123 million yet to be issued—putting the federal government on track to meeting the goal.
- More than $400 million in projects have already been awarded, which will also help agencies meet the Government's energy intensity reduction goal of a 30 percent improvement from 2003 through 2015.

Small Changes Add Up to a Big Difference Through ESPC ENABLE

Federal agencies are also stepping up to implement projects at their small facilities through DOE Federal Energy Management Program's (FEMP) newest project funding offering.

- ESPC ENABLE offers small facilities an opportunity to upgrade lighting, water, and simple HVAC controls through standard tools, templates, and a streamlined procurement process.
- Extensive marketing and outreach was also conducted via on-line and in-person events throughout the year. More than 1,500 federal decision makers and potential service providers were reached through these events resulting in more targeted efforts with specific agencies.
- As a result, the number of service providers has more than doubled in the last six months, providing agency customers a more diversified ESCO pool in terms of service area and small business designation.

Figure 5. President's Performance Contracting Challenge Investment (as of 11/15/12)



Appendix A. Better Buildings Challenge Participant List

Better Buildings Challenge

Corporate Partners:

Ascension Health
Best Buy
CBRE
Cleveland Clinic Foundation
Forest City Enterprises
Green Sports Alliance
HEI Hotels & Resorts
IHG (InterContinental Hotels Group)
Jones Lang LaSalle
Kohl's Department Stores
Lend Lease
The PNC Financial Services Group
Prologis
RREEF Real Estate
Shorenstein Properties LLC
Staples
Starbucks Coffee Company
SUPERVALU
TIAA-CREF
TRANSWESTERN
USAA Real Estate Company
Walgreens Co.
Wyndham Worldwide

State and Municipal Partners:

County of Arlington, VA
City of Arvada, CO
City of Atlanta, GA
City of Beaverton, OR
City of Chicago, IL
City of Cleveland, OH
City of Columbia, MO
District of Columbia
State of Delaware
City of Denver, CO
Town of East Hartford, CT
City of El Paso, TX
City of Fort Worth, TX
City of Gillette, WY
Hall County, GA
City of Hillsboro, OR
City of Houston, TX
Town of Huntington, NY
State of Iowa, Department of Administrative Services
Kauai County, HI
Kitsap County, WA
City of Knoxville, TN
City of Los Angeles, CA
State of Maryland
Commonwealth of Massachusetts
City of Medford, MA
City of Milwaukee, WI
State of Minnesota
New Castle County, DE
State of North Carolina
Town of North Smithfield, RI
City of Omaha, NE
City of Pittsburgh, PA
Placer County, CA
State of Rhode Island and Providence Plantations
City of Roanoke, VA
City of Rochester, NY
City of Sacramento, CA
City of Santa Fe, NM
City of Seattle, WA
Sonoma County, CA
Spokane County, WA
Thurston County, WA
City of Toledo, OH
City of West Palm Beach, FL
Will County, IL
City of Worcester, MA

Education Partners:

Allegheny College
Camas School District, WA
Delaware State University
District of Columbia Public Schools
Douglas County School District, NV
Dysart Unified School District No. 89, AZ
Fort Atkinson School District, WI
Houston Independent School District, TX
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

Industrial Partners:

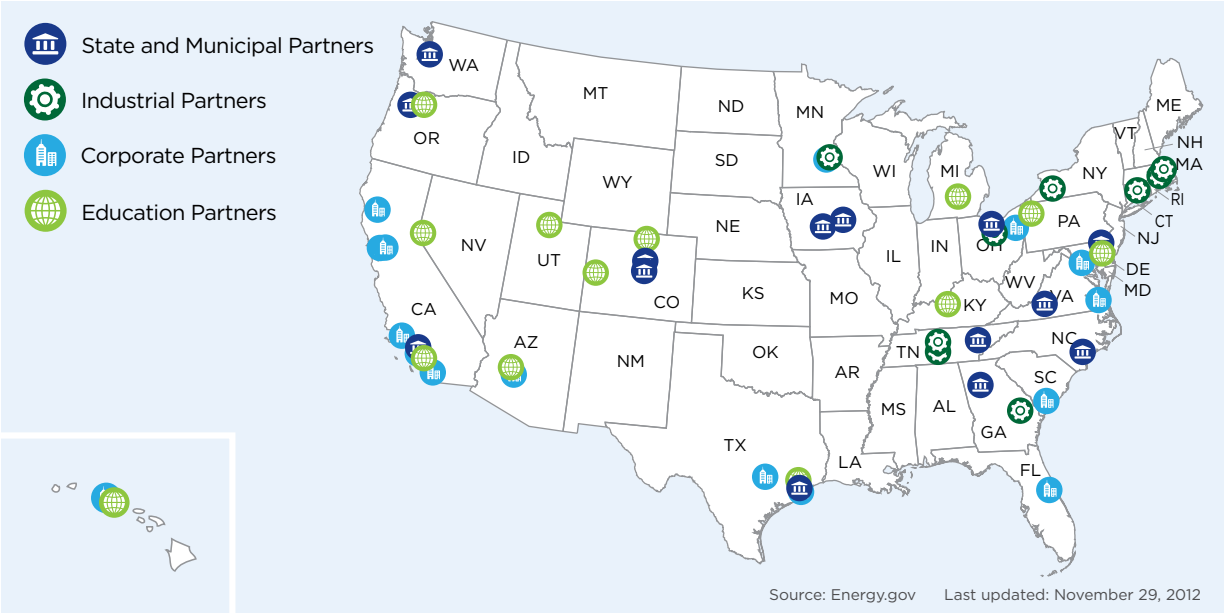
3M
Alcoa
Briggs and Stratton
Cummins Inc.
GE
Legrand
Nissan North America Inc.
Saint-Gobain Corporation
Schneider Electric
The J.R. Simplot Company

Financial and Utility Allies:

Abundant Power
AFL-CIO
Blue Hill Partners LLC
Citi
Clean Fund
Energi Inc.
GE Capital
Green Campus Partners
Greenwood Energy
Los Angeles Department of Water and Power
Metrus Energy
Pacific Gas and Electric Company
Renewable Funding
Samas Capital
SClenergy
Southern California Edison
Ygrene Energy Fund

Appendix B. Better Buildings Challenge Showcase Projects

U.S. Map with Showcase Projects



List of Showcase Projects Highlighted on the Better Buildings Challenge Website (as of 12/5/12)

Corporate Partners:

Forest City Enterprises
South Bay Galleria – Energy Reduction Project
Redondo Beach, CA

HEI Hotels & Resorts
San Diego Marriott La Jolla
La Jolla, CA

Staples
Staples Orlando Fulfillment Center #4895
Orlando, FL

SUPERVALU
Albertsons Carpinteria Remodel and Expansion
Carpinteria, CA

TIAA-CREF
811 Barton Springs Road
Austin, TX

TRANSWESTERN
Pennzoil Place
Houston, TX

State and Municipal Partners:

Atlanta, GA
Boisfeuillet Jones - Atlanta Civic Center
Atlanta, GA

Cleveland, OH
Fire Station 1
Cleveland, OH

Knoxville, TN
Knoxville Conference and Exhibition Center
Knoxville, TN

Roanoke, VA
Roanoke Civic Center
Roanoke, VA

Seattle, WA (2030 District)
EMP Museum
Seattle, WA

State of Delaware Department of Natural Resources and Environmental Control
Carvel State Office Building
Wilmington, DE

Education Partners:

Allegheny College
Richard J. Cook Center for Environmental Science
Meadville, PA

Douglas County School District, NV
Gardnerville Elementary School
Gardnerville, NV

Michigan State University
Anthony Hall – Advancing Energy Efficiency
East Lansing, MI

Portland Public Schools
Benson Polytechnic High School
Portland, OR

Poudre School District, CO
Poudre High School Infrastructure Replacement
Fort Collins, CO

University of California, Irvine
Smart Labs Initiative/Natural Sciences II
Irvine, CA

Industrial Partners:

Legrand
Legrand/Wiremold Headquarters Building
West Hartford, CT

Appendix C. Better Buildings Challenge Solutions

Implementation Models Address Key Market Barriers in Commercial, Financial, Industrial, and Public Sectors

Market Barrier	Commercial			Financial Ally		Industrial		Public			
	Owners/Developers	Property Mgmt.	Occupiers	Owner Occupied	Tenant Occupied	Energy Intensive	Non-Energy Intensive	Higher Ed.	School District	Local Gov't	State
Knowledge/Information											
Lack of credible information about savings options	●	●				●	●	●		●	●
Data Access and Management											
Lack of access to consistent and transparent building performance data	●	●					●	●	●	●	●
Lack of centralized information for data analysis and display	●	●	●					●		●	●
Inability to accurately measure energy consumption and verify savings	●	●					●				
Financing											
First cost bias	●					●	●				
Insufficient access to capital (internal funding)	●			●		●	●	●	●	●	●
Insufficient access to capital (external funding)	●							●		●	●
High transaction costs for small-scale projects					●					●	●
Absence of third-party financing products	●			●							
Trained Professionals											
Lack of qualified workforce	●	●	●				●			●	●
Market/Organizational											
Lack of full organizational buy-in (e.g., aligned employee and stakeholder incentives)	●	●	●				●	●	●	●	●
Inherent barriers in real estate (e.g., split incentive)	●		●		●						
Energy is not viewed as a core business element and management priority	●		●			●	●	●	●	●	●
Internal organizational barriers to implementation/perceptions of organizational risks (e.g., disrupting business operations)				●		●	●		●		●

List of Solutions Highlighted on the Better Buildings Challenge Website (as of 12/5/12)

3M, Capital Set Aside Fund

Addresses the problem of having limited access to internal capital for energy efficiency projects by establishing a capital set aside fund dedicated specifically for energy efficiency projects.

Atlanta, GA, Public-Private Partnerships

Engages the local community in reducing energy and water consumption by providing access to project financing, free building assessments, education and training, and public recognition.

District of Columbia, Community Engagement

Utilizes a community-wide planning initiative, legislation, and public-private partnerships to engage the local community in achieving the City's energy reduction goals.

HEI Hotels and Resorts, Energy Looking Glass Dashboard

Overcomes the barrier of lacking centralized energy information by implementing an energy management tracking tool that can recognize areas for improvement and realize savings.

Pittsburgh, PA, Green Initiatives Trust Fund

Addresses the lack of a sustainable funding source to apply to energy efficiency projects by establishing a set aside fund for these projects that is continually replenished by savings, allowing additional projects to be implemented.

SCIenergy, Managed Energy Services Agreement

Provides capital without adding debt to the real property, helping building owners that are limited in the outlay of capital for building modernization.

TIAA-CREF, Data Update and Certification Scorecard

Addresses a lack of visibility into the energy and water usage of the third-party-managed assets by adding sustainability metrics to the existing property governance scorecard, part of a formal performance assessment of third-party property managers.

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