Winter 2016 Progress Update

BETTER BUILDINGS ALLIANCE

In 2008, the U.S. Department of Energy (DOE) launched the Better Buildings Alliance to bring together leaders from the nation's commercial building industry to share and advance solutions in energy efficiency. Through the Alliance, building owners, operators, and managers in different market sectors voluntarily work with DOE's network of research and technical experts to develop and deploy innovative, cost-effective, energy-saving solutions that lead to advanced technologies, more profitable businesses, and better buildings. The Alliance advances the Administration's goal to achieve 20% energy savings in U.S. buildings. If achieved, would save the country approximately $80 billion annually on energy bills, reduce greenhouse gas emissions, and create new jobs.[1]

There are now more than 200 companies and organizations in the alliance representing more than 10 billion square feet of real estate. These partners have identified and implemented a variety of energy efficiency solutions and achieved substantial energy savings in their buildings. Upon joining, Alliance partners make an important commitment to participate in Alliance activities that support energy savings in commercial buildings. Partners are encouraged to set energy savings goals, develop innovative energy resources, and adopt advanced cost-effective market and technology strategies. DOE's technical experts engage with these partners to advance their energy savings goals through technology and market solutions activities, to facilitate sharing of best practices and proven strategies among industry peers.

The Alliance has played a foundational role in the Better Buildings Initiative by providing an action network of experts to develop innovative, replicable solutions that transform the way market partners achieve their energy savings goals. In 2015, the Alliance continued its growth, with 12 new partners and 7 new affiliates. The Alliance Technology Solutions Teams introduced 40 industry resources and launched two technology campaigns. The interior lighting campaign has an aggressive goal to upgrade the efficiency of 1 million light troffers, which would achieve savings of close to $60 million.

Better Buildings Initiative 2016 Updates:

- **Better Buildings Alliance** — Winter 2016
  Latest from sector, technology, and market solutions leaders
- **Better Buildings Challenge** — Spring 2016
  Public and private sector leaders share strategies, solutions, and results
- **Better Plants** — Fall 2016
  Leading manufacturers share progress toward ambitious energy savings goals

A 20% reduction in energy consumption would save the country approximately $80 billion annually on energy bills, reduce greenhouse gas emissions, and create new jobs.

Better Buildings Alliance 2015 Snapshot

(Figure 1)

Membership	
Number of Partner Organizations	202
Square Feet Represented	11+ billion
Percent of U.S. Commercial Buildings	13%
New Partners and Affiliates in 2015	19
New Resources Developed	
Business primers, technology and procurement specifications, user guides, rebate resources and case studies	40+



Innovation Solutions Through Teamwork

The Better Buildings Alliance's growing network of partners defines sector priorities and collaborates to implement solutions that address barriers to energy efficiency. The Alliance catalyzes innovation by leveraging partner best practices and expert technical advice. Partners contribute to the development of resources, which help building owners, managers, and operators advance their energy management goals.

Partners work together and with Solutions Teams to advance energy management strategies. Each Solution Team is led by research and technical experts who provide support on overcoming barriers to energy efficiency. The Alliance supports two types of solutions teams. Technology Solutions Teams provide information on cutting-edge technologies and operating procedures, while Market Solutions Teams help address long-standing market barriers to energy efficiency.

Better Buildings Alliance Program Organization

(Figure 2)

SECTORS

- Commercial Real Estate
- Higher Education
- Healthcare
- Hospitality
- Retail, Food Service, and Grocery

SOLUTIONS

Technology Solutions

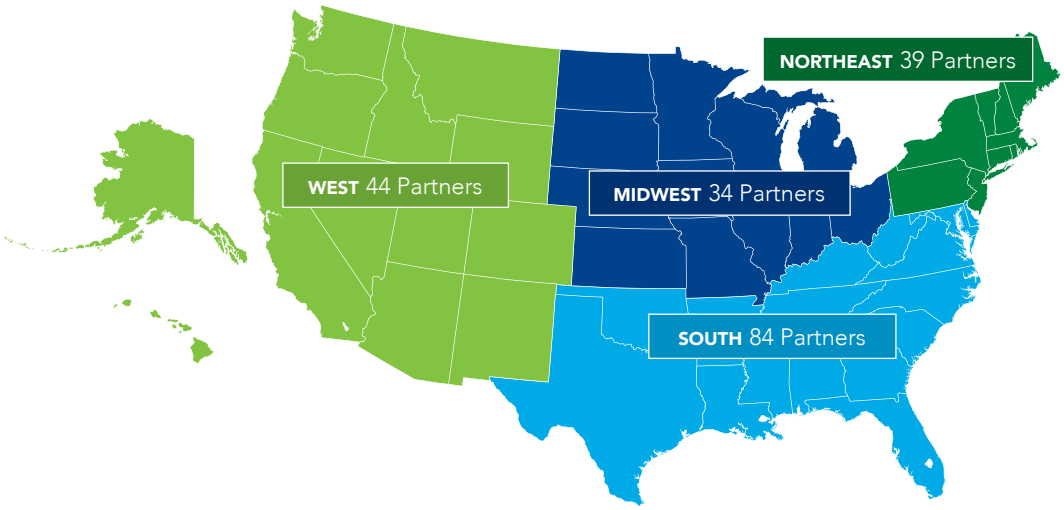
- Energy Management Information Systems (EMIS)
- Lighting and Electrical
- Plug and Process Loads
- Refrigeration
- Renewables Integration
- Space Conditioning

Market Solutions

- Appraisals and Valuation
- Data Access
- Financing
- Leasing and Split Incentive
- Workforce Development

Partner portfolios extend across the U.S., with headquarters located in every region of the country

(Figure 3)



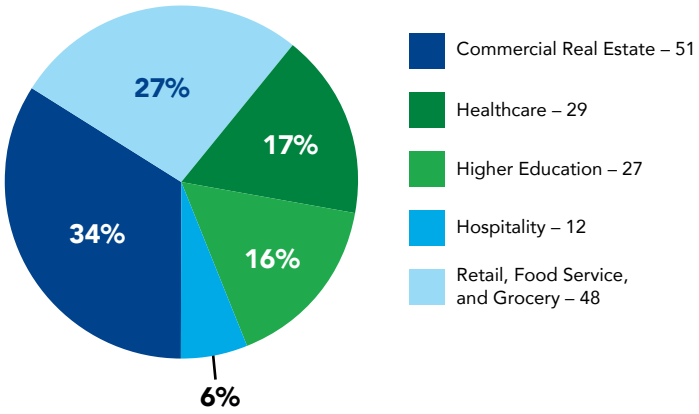
Regions based on U.S. Census Bureau designations.

Sector Groups

There are five diverse sector groups – commercial real estate; healthcare; hospitality; higher education; and retail, food service, and grocery. Each sector group nominates partners to serve on a Steering Committee that ensures Better Buildings Alliance activities are responsive to individual sector needs. Steering Committee Members are thought-leaders among peers. These industry leaders have a unique opportunity to advocate for the needs of colleagues and peers in each sector, and are also noted with distinction on the partnership listing and featured during events and webinars. Steering Committees meet twice a year to discuss priorities, identify technology and market challenges, highlight innovative solutions, and promote opportunities for solution sharing through peer exchanges. Led by a chair, each Committee keeps partners focused on addressing multifaceted needs of their sector.

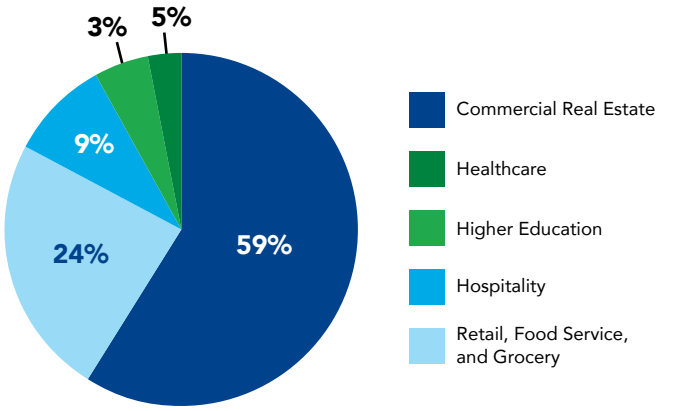
Partners by Sector Group

(Figure 4)



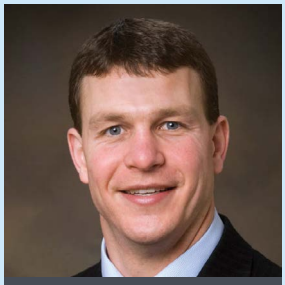
Percent of Floorspace by Sector Group

(Figure 5)



Better Buildings Alliance Steering Committee Chairs, 2014–2016

Eric Duchon
Cushman & Wakefield
COMMERCIAL REAL ESTATE



Corey Zarecki
Gundersen Health System
HEALTHCARE

Susan Corry
University of Maryland
HIGHER EDUCATION

Ray Hobbs
Kelco Management & Development
HOSPITALITY

Chris Magee
MGM Resorts International
HOSPITALITY

Kyle Wilkes
JCPenney
RETAIL, FOOD SERVICE & GROCERY

Each Better Buildings Alliance sector group is represented by a steering committee. The individuals above were elected as Steering Committee Chairs for 2014 to 2016.

Commercial Real Estate

The U.S. Commercial Real Estate (CRE) sector spends more than $32 billion annually on energy.[2] Energy is often a property's largest single controllable operating expense and estimates suggest that benchmarking consumption and implementing cost-effective upgrades can save money and increase asset value.[3] With the CRE sector representing nearly 20% of total commercial building energy use,[4] adopting energy efficiency measures and solutions help companies to drastically cut waste, save energy and money, and protect the environment. For example, at an 8% capitalization rate, reducing energy use by 10% in an office building that spends $400,000 per year on energy would add $500,000 to the asset's value.

The CRE sector group includes 51 partners who own, lease, or manage 6.6 billion square feet of commercial space. In 2015, sector partners attended an ENERGY STAR® webinar on engaging tenants in energy efficiency, provided feedback on the Promoting Solar Photovoltaics (PV) on Leased Buildings Guide, and contributed to Better Buildings Summit presentations on combined heat and power opportunities. The CRE sector has identified next steps, including connecting energy efficiency and building value, identifying and training skilled building engineers, and engaging commercial brokers.

Priorities

- Engaging stakeholders in energy efficiency and sustainability, including tenants and vendors
- Providing guidance for integrating renewables and combined heat and power (CHP) applications

Healthcare

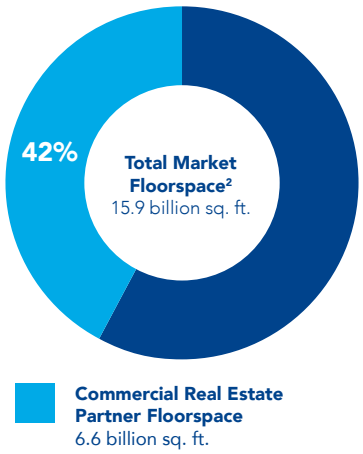
Healthcare facilities are the third most energy-intensive facility type, spending more than $11.5 billion[5] on energy every year.[6, 7] Better Buildings Alliance Healthcare sector partners represent nearly 520 million square feet of space, or 13% of the total market. In 2015, the Better Buildings Alliance expanded its healthcare outreach to include senior care communities and real estate investment trusts recognizing the broad diversity of building types and ownership structures in this broad sector.

Leading healthcare organizations are developing strategic cost reduction programs to improve the environment of care for patients, employees and their communities. Activities in the past year supported and informed the development of those strategic plans, including peer exchanges to share successful strategies for implementing HVAC setbacks, and leveraging efficient lighting technology for improved patient outcomes, safety, and experiences. Partners also shared their experiences successfully engaging CFOs to become advocates for energy efficiency at industry conferences CleanMed 2015 and Healthcare Financial Management Association (HFMA) ANI 2015 by presenting a broader business case for energy efficiency upgrades.

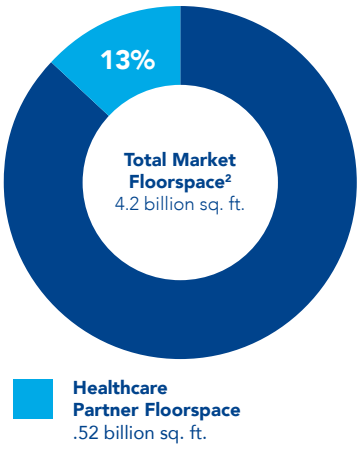
Priorities

- HVAC and air exchange reductions for healthcare
- Lighting for improved environment of care
- Making the business case for energy upgrades beyond energy cost savings

Commercial Real Estate Partners as a Percent of Market Floorspace
(Figure 6)



Healthcare Partners as a Percent of Market Floorspace
(Figure 7)



Higher Education

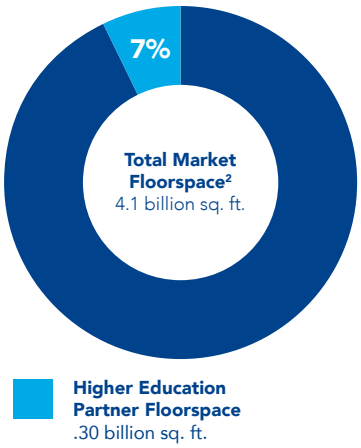
The Higher Education sector spends the equivalent of 225,000 students' tuition on annual energy costs — an estimate of $7.7 billion.[8, 9] The sector spends an even greater sum ($14 billion) on operations and maintenance.[10, 11, 12] Each year, more than 6% of Americans enroll in a higher education facility,[13] and undergraduate enrollment is projected to increase from 17.5 million to 19.6 million students between 2013 and 2024.[14] This sector represents a growing opportunity to equip future professionals with the skills to drive energy efficiency goals.

Higher education partners continue to face a range of challenges to energy efficiency initiatives, including highly-specialized and multiple-use facilities; campus expansion to attract research, faculty and students, and to accommodate associated growth; and recruiting and retaining skilled staff to operate and manage these facilities. Sector activities in the past year aimed at addressing these barriers included a peer exchange call to share successful strategies for attracting top talent, as well as a data benchmarking meeting at the 2015 Better Buildings Summit. The DOE Better Buildings Challenge partners shared their best practices by co-presenting with DOE at five 2015 national conferences: AASHE, APPA, Better Buildings Summit, Smart and Sustainable Campuses, and Greenbuild.

Priorities

- Recruiting and retaining skilled staff
- Enhanced facilities benchmarking
- Addressing facilities expansion

Higher Education Partners as a Percent of Market Floorspace
(Figure 8)



Hospitality

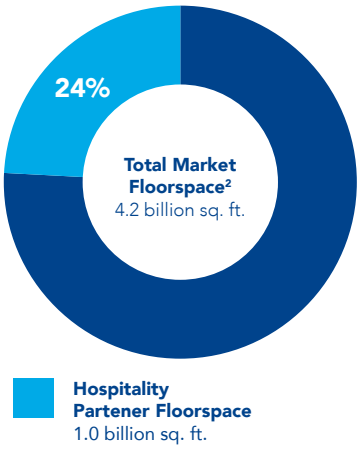
The Hospitality sector includes more than 4.1 billion square feet[15] of floor area nationally, encompassing nearly 5 million guest rooms,[16] and costing more than $7.3 billion[17] annually on energy.[18, 19, 20] If every hospitality property in the US reduced energy cost by 10%, the sector would save $730 million annually. Industry statistics show that a 10% reduction in energy use is equivalent to an increase in revenue per available room (RevPAR) of $0.60 for limited service hotels and more than $2.00 for full-service hotels.[21, 22]

Hospitality partners, one of the Alliance's fastest growing sector groups, became their own sector group in 2015. Partners have focused on strategies including stakeholder engagement and managing vast building performance data, such as HEI Hotels & Resorts and Intercontinental Hotel Group projects, to prioritize potential energy saving opportunities. Partners collaborated with the Renewables Integration Technology Solutions Team in the development, roll-out, and utilization of the On-Site Commercial Solar Photovoltaics (PV) Decision Guide, which serves as a resource to address hospitality-specific barriers to solar PV installation. The inaugural Hospitality Steering Committee identified key priorities in the coming year:

Priorities

- Evaluating EMIS offerings and utilizing building controls
- Financing solar PV at Hospitality properties
- Engaging hotel owners on energy efficiency and benchmarking

Hospitality Partners as a Percent of Market Floorspace
(Figure 9)



Retail, Food Service & Grocery

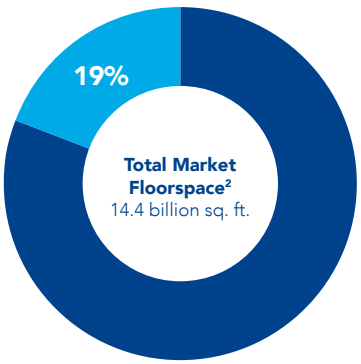
The 48 partners of the Retail, Food Service and Grocery sector of the Better Buildings Alliance cover 2.7 billion square feet of building space, and represent 19% of retail floor space nationwide. Each year, building owners and operators in the retail, food service and grocery sector spend over $41 billion on energy costs.[23] Significantly, 4% of commercial building space is dedicated to food sales and service operations, which spend $15 billion on energy each year. The retail sector comprises almost 13% of commercial building space and supports one in four American jobs.[24] Moreover, the retail sector contributes $2.6 trillion to the nation's economy,[25] and consumes $25 billion of energy every year.[26, 27, 28]

Partners face challenges such as implementing energy efficiency measures while improving customer experience, managing energy and equipment information from large portfolios of buildings, and identifying ways to save energy in high volume quick service commercial kitchens. Sector activities in the past year included co-hosting an Energy Management Information System (EMIS) best-practices webinar with the EMIS technology team, and promoting EMIS resources. In addition, strategies for rooftop unit upgrades were presented to sector members at the 2015 Summit.

Priorities

- Driving retrofits of refrigerated display cases with doors
- Addressing barriers to energy efficiency in leased retail spaces
- Proactive rooftop unit replacement and retrofit strategies

Retail, Food Service & Grocery Partners as a Percent of Market Floorspace
(Figure 10)



Retail, Food Service & Grocery Partner Floorspace
2.7 billion sq. ft.

Leading Energy Savings

In the past year, the following organizations reported year-over-year reductions in energy use intensity, a measure of energy consumed per area, of more than 2%:

Commercial Real Estate

- Duetsche Asset and Wealth Management
- Forest City Enterprises
- Kilroy Realty
- Parmenter Realty Partners
- The JBG Companies
- The Tower Companies

Healthcare

- Cleveland Clinic Foundation
- Gundersen Health System

Hospitality

- Intercontinental Hotel Group

Retail, Food Service & Grocery

- Arby's
- Best Buy
- Kohl's Department Stores
- Macy's
- Walmart
- Whole Foods Market

New Better Buildings Alliance Partners in 2015

In 2015, the Better Buildings Alliance added twelve partners across five sectors, representing nearly 300 million square feet of real estate. These partners strengthen the Alliance through a diversity of industries, experience, and knowledge.

CEFCO Convenience Stores is an independently owned chain of convenience stores based in Temple, TX. With 226 locations across FL, AL, AR, LA, MS, OK and TX, CEFCO is currently ranked as the 37th largest convenience store chain in the USA.

HEI Hotels & Resorts is owner and operator of over 40 upscale and luxury hotels including Marriott, Westin, Hilton, and Hyatt totaling over 11,000 rooms and suites. Recognized as a leader in energy conservation, HEI was awarded the prestigious ENERGY STAR Partner of the Year in Energy Management in 2010, 2011, then Sustained Excellence in 2012, 2013.

Clarion Partners has been a leading U.S. real estate investment manager for 33 years. With $36.8 billion in total assets under management, Clarion Partners offers a broad range of real estate strategies across the risk/return spectrum to its more than 200 domestic and international institutional investors.

Jamestown, LP was established in 1983 as an investment and management company focused on income-producing real estate in the United States. Over the last 32 years, Jamestown has expanded into a national, vertically integrated real estate operator with approximately $9.4 billion of assets under management.

Columbia Association (CA) is a nonprofit public service corporation dedicated to providing the highest level of service and amenities to the 100,000 residents of Columbia, Maryland. Columbia was founded in 1967 by James Rouse who envisioned a city that would respect the land while providing for the growth of the community.

The Luxottica Group is the world's largest eyewear company and ranks #65 in the Forbes ranking of the 100 "Most Innovative Companies" in the world. The company maintains 4 manufacturing and distribution centers, totaling roughly 9 million square feet in the US.

Michigan State University Spartans work every day to advance the common good in uncommon ways. The nation's pioneer land-grant university, MSU is one of the top research universities in the world.

Shari's Café & Pies is the largest family-style chain in the region, with over 4,000 employees, and a lot more satisfied customers. Shari's is open 24 hours a day, 365 days a year and currently has 100 locations in California, Idaho, Nebraska, Oregon, Washington and Wyoming, covering a total of over 390,000 square feet.

Northwestern University is one of the nation's premier research universities, combining innovative teaching and pioneering research in a highly collaborative, multidisciplinary and diverse environment. Northwestern provides students and faculty exceptional opportunities for intellectual, personal and professional growth.

The Tower Companies has maintained a commitment to responsible development and envisions a world where buildings inspire and enrich the lives of their occupants, and create positive social change. The green building leader owns, develops, and manages over 5 million square feet in the Washington, D.C. metropolitan area.

Las Vegas Sands is a leading developer of destination properties that feature premium accommodations, world-class gaming, and entertainment. Sands is committed to environmental responsibility by promoting sustainable development, reducing the impact of operations through their Sands ECO360° sustainability program.

University of Utah Health Care combines excellence in patient care, the latest in medical research, and teaching to provide leading-edge medicine in a caring and personal setting. The system provides care for Utahans and residents of five surrounding states in a referral area encompassing more than 10% of the continental US.

Partners That Committed to the Better Buildings Challenge in 2015

Columbia Association

Saunders Hotel Group

Shari's Café & Pies

New Better Buildings Alliance Affiliates in 2015

Program affiliates are non-profit or trade organizations that represent partners in one or more of the sectors under the Better Buildings Alliance – Commercial Real Estate, Healthcare, Higher Education, Hospitality, and Retail, Food Service & Grocery – and provide unique value to the Alliance. BBA affiliates offer a collective voice in advancing energy efficiency by promoting Better Buildings programs and resources to their membership. The new 2015 affiliates have already demonstrated this value: APPA is planning to offer DOE's building retuning training to its members, Environmental Defense Fund (EDF) is incorporating DOE tools and resources into its Climate Corps program, and The Institute for Market Transformation (IMT) is an organizing partner in the Green Lease Leaders program.

APPA: Leadership in Educational Facilities is a non-profit membership organization comprised of over 15,000 educational facilities professionals from more than 1,300 higher education learning institutions throughout the United States, Canada, and Mexico.

Association for the Advancement of Sustainability in Higher Education (AASHE) provides leadership, knowledge and resources; opportunities for professional development; and a framework for demonstrating the value and competitive edge created by advancing sustainability in higher education.

The Environmental Defense Fund (EDF), a leading international nonprofit organization, creates transformational solutions to the most serious environmental problems. EDF links science, economics, law and innovative private-sector partnerships.

The Institute for Market Transformation (IMT) is a Washington, D.C.-based nonprofit organization promoting energy efficiency, green building, and environmental protection in the United States and abroad. IMT seeks to ignite greater investment energy efficiency in the building sector through activities including technical and market research, policy and program development and deployment, and promotion of best practices and knowledge exchange.

The National Association of College and University Business Officers (NACUBO) represents more than 2,500 colleges, universities, and higher education service providers. NACUBO represents chief business and financial officers through advocacy efforts, community service, and professional development activities.

National Co+op Grocers (NCG) is a business services cooperative for retail food co-ops located throughout the United States. NCG represents 148 food co-ops operating over 200 stores in 38 states with combined annual sales of over $1.8 billion and over 1.5 million consumer-owners.

Second Nature

Second Nature builds a sustainable and positive global future through leadership networks in higher education. Second Nature's Climate Leadership Commitments is based on the idea that bold commitments to climate action and resilience by higher education leaders yield big changes at their institutions, and beyond.

Technology Solutions Teams

There is tremendous opportunity to reduce commercial and industrial building energy use through currently available, cost-effective technologies. A 20% reduction in commercial and industrial energy use would save nearly 6 quadrillion BTUs and $40 billion annually. In turn, this capital could be reinvested into growing businesses and creating jobs. The Better Buildings Alliance Technology Solutions Teams help commercial building owners realize these opportunities by providing objective guidance on where to focus time and resources.

Lighting & Electrical: This year marked the launch of the outstanding Interior Lighting Campaign at the Better Buildings Summit, in partnership with Building Owners and Managers Association (BOMA), Illuminating Engineering Society (IES), General Services Administration (GSA), and International Facility Management Association (IFMA). The launch was followed by a webinar to promote the campaign. The campaign quickly exceeded its original goal of upgrading 100,000 troffer lights, thus the organizing partners decided to increase the goal by a factor of 10 to 1 million troffers. The Lighting Energy Efficiency in Parking (LEEP) Campaign continued its success in 2015, and recognized 18 organizations at the BOMA Every Building Conference for leading the way in efficient outdoor lighting. Participating organizations have committed to install efficient lighting for over 470 million square feet of parking space. Parking lighting has extraordinary potential for energy savings; participating organizations have cut energy use in their retrofitted parking facilities by an average of 60%. In 2016, LEEP leadership will transition to the Green Parking Council, a founding organizing partner of the campaign. Learn more at: eere.energy.gov/betterbuildingsalliance/lighting.

Energy Management & Information Systems (EMIS): In 2015, the EMIS Team provided targeted guidance on the planning, procurement and implementation of EMIS technologies leading to energy and cost savings. The team released reports including the EMIS Specification and Procurement Support Materials and a Primer on Organizational Use of EMIS. In addition, the team hosted EMIS product overview webinars with vendors and learning sessions that covered EMIS-based automated measurement and verification. Partners from the public sector shared EMIS pilot programs. An upcoming effort to develop packaged sector-specific EMIS is being conducted by Lawrence Berkeley National Laboratory (LBNL) under DOE's Center for Buildings Energy Research and Development (CBERD) program. Learn more at: eere.energy.gov/betterbuildingsalliance/EMIS.

Food Service: The Food Service Team successfully completed the Demand-Controlled Kitchen Ventilation (DCKV) Guidance and a summary of Advanced Controls for Walk-In Coolers and Freezers (WICF). The team is working with industry partners to finalize an Online Food Service Resource Catalog that will be a central resource for energy efficiency technology information for the sector. In 2016, the work of the Food Service technology team will transition to the Retail, Food Service and Grocery Team. Learn more at: eere.energy.gov/betterbuildingsalliance/foodservice.

Refrigeration: The Refrigeration Team finalized a case study on the first supermarket installation of a transcritical carbon dioxide booster refrigeration system at a Hannaford Supermarket, and is currently evaluating data to develop another case study on alternative refrigerants with Whole Foods Market. Additionally, working groups were established to target three leading member priorities: utility incentive programs, performance metrics, and refrigeration business model adjustments. Learn more at: eere.energy.gov/betterbuildingsalliance/refrigeration.

Plug & Process Loads: The team published a number of documents related to Advanced Power Strips (APSs), including a Technical Specification for APSs, a graphic describing how to use an APSs in an office setting, and a list of utility incentives for purchasing APSs. As part of the promotion of the Technical Specification for APSs, the team hosted a webinar on how to leverage the specification for commercial buildings. The team also published two reports highlighting results of three technology demonstrations on efficiency innovations for plug-in commercial washers: Ozone Based Laundry Systems and Commercial Washer Wastewater Recycling Technology. Learn more at: eere.energy.gov/betterbuildingsalliance/plugloads.

Laboratories: The team co-hosted a webinar called "The Elephant in the Room: Addressing Plug Loads in Laboratories" with sector partners. In an effort to simplify the available resources for partners focused on energy efficiency in labs, the Better Buildings Alliance and finalized a memorandum of understanding with the International Institute for Sustainable Laboratories (I2SL). Learn more at: eere.energy.gov/betterbuildingsalliance/labs.

Renewables Integration: This year the team focused on solar photovoltaic (PV) solutions for the Healthcare, Hospitality and Commercial Real Estate sectors. For each sector, the team created mini-guides, assembled case studies, and hosted peer exchange calls with sector partners. The team also coordinated with DOE's SunShot team to publish a Request for Information to learn more about challenges to solar PV adoption. To continue with PV guidance, in 2016, the team will focus on PV implementation in the commercial real estate sector and provide guidance on energy storage systems related to renewable power. Learn more at: https://www4.eere.energy.gov/alliance/activities/technology-solutions-teams/renewables-integration.

Space Conditioning: The Advanced Rooftop Unit (RTU) Campaign (ARC), co-organized by ASHRAE and the Retail Industry Leaders Association (RILA), announced the first award winners for leadership and excellence in commercial building RTU efficiency. The winners' combined estimated energy savings total over 100,000,000 kWh and $10 Million per year. Savings strategies include replacement of older units with high-efficiency units, adding advanced controls through retrofits, and enhanced quality management. New resources produced by the team include case studies with Target, Walgreens, and JCPenney, a business case for proactive RTU replacement, an RTU technology demonstration with Publix, and a webinar highlighting RTU best practices. In the future, the Space Conditioning team will focus on resources to improve fan efficiency and best practices for retail ventilation. Learn more at: eere.energy.gov/betterbuildingsalliance/spaceconditioning.

Technology Team Spotlight

In 2015, the Interior Lighting Campaign established a new goal: To upgrade the efficiency of 1 million light troffers, which will achieve savings of close to 60 million kWh, the equivalent of the annual electricity use in 5,500 homes.

High Impact Technology (HIT) Catalyst

In order to help businesses prioritize opportunities, the Department of Energy releases its annual High Impact Technology (HIT) list. These market-ready technologies are estimated to have the greatest potential to reduce U.S. building energy consumption. Where applicable, the Better Buildings Alliance Technology Solutions teams work to support adoption of HIT list technologies in the market. Alliance partners develop technology procurement specifications and case studies, participate in technology campaigns, and demonstrate promising technologies in their buildings.

In 2015, DOE worked with Better Buildings partners to conduct technology demonstrations of LED downlights, underutilized micro-combined heat and power (CHP), modular HVAC load reduction with smart scrubbers, and commercial refrigeration fan applications. Host sites receive recognition and DOE-supported third party measurement and verification of demonstration savings. See the Technology Demonstration Hub for a full listing of current demonstration opportunities.

2015 High Impact Technology (HIT) List

Technology	Summary
LED Troffers with Controls	High-efficiency LED technology, in combination with advanced controls, creates the opportunity for whole building energy reductions. Advanced controls allow lighting to adjust automatically to match environmental or usage conditions, avoiding waste.
Packages of Building Management and Information Systems and Whole Building Diagnostics	Cross-system building information and control strategies, which rely on the data collected through building energy information, management and diagnostic systems, make it possible to realize tremendous energy savings. However, these systems can be expensive to install and manage, and users often have difficulty channeling the resulting data into a meaningful strategy to improve energy efficiency. Packages of Building Management and Information System solutions will address confusion in the marketplace and reduce current system complexities resulting in cost-effective, simplified and standardized solutions for more efficient whole building energy performance.
Shadings and Awnings	Window attachments can play an important role in the reduction of building loads and glare control without increasing energy use. They are widely adopted in other parts of the world, but not in the United States. The AERC and other key stakeholders will also assess barriers to the use of shading systems in the U.S. and develop resources to overcome them. These resources may include training, sources of real building energy savings/operation data, and details on system-level savings.
Refrigeration Controls & Display Case Retrofits	Replacing and retrofitting aging refrigeration systems would lead to significant greenhouse gas and energy-use reductions. This 2-pronged approach will include collaboration with Energy Efficiency Programs to drive further adoption of open case retrofits, as well as convening refrigeration technology stakeholders to develop a metric for highly efficient non-packaged refrigeration systems.
Commercial Fans and Blowers	Fan energy performance can vary based on design and selection of fan products and components. Guidance and information to support proper sizing, selection and the application of high efficiency fan components for new and retrofit applications will improve fan energy performance at very low cost across multiple building systems and building sectors.

Market Solutions Teams

Market barriers, such as financing and access to data, can hinder implementation of energy efficiency. The Better Buildings Alliance Market Solutions Teams collaborate with members and stakeholders to:

- Identify non-technical, market-based barriers to energy efficiency
- Develop resources to help Alliance partners deploy proven solutions in their portfolios

Based on partner feedback on market needs, current activities are focused on the following topics:

Leasing and the Split Incentive

In collaboration with the Institute for Market Transformation and a steering committee of more than 20 industry practitioners, the Green Lease Leaders program was created to acknowledge landlords and tenants using the commercial lease to create sustainable tenant/landlord relationships. The program now represents more than 800 million square feet of commercial floor space, and in 2015, for the first time, five commercial brokers were recognized for their efforts. In 2016, the Leasing & Split Incentive team will continue to align financial and energy incentives for landlords/tenants through the Green Lease Leaders.

Workforce Development

The Better Buildings Workforce Initiative provides resources to equip the commercial building workforce with the knowledge and qualifications to improve energy performance. Industry practitioners and the National Institute of Building Sciences worked closely with the Workforce Initiative to develop guidance, including voluntary national guidelines to streamline and improve the credentials for energy professionals. During 2015, DOE released four Job Task Analyses and Schemes: Energy Manager, Energy Auditor, Building Operator, and Commissioning Professional. A recognition program for certification bodies was introduced and the corresponding Better Buildings Workforce Guidance (BBWG) was made available. In late 2015, the Certified Energy Manager certification from the Association of Energy Engineers became the first BBWG recognized certification program. Building owners and managers can use these guidelines when hiring or procuring services in these four job areas by requesting that individuals hold credentials that are recognized by DOE as aligned with the Better Buildings Workforce Guidelines.

DOE has developed the Building Re-tuning Training program for buildings with and without building automation systems (BAS). Re-tuning training provides facility staff with the knowledge and skills to cost-effectively improve the efficiency of operations. This program has been tested and will be delivered by BOMA (Building Owners and Managers Association) International and APPA: Leadership in Educational Facilities. BOMA and APPA are expected to begin delivering this training in regions across the country. Work is currently underway to create a webinar-style training program for buildings with BAS. Additionally, DOE published case studies on successful building re-tuning efforts. Check with national partners APPA and BOMA to schedule a training.

Better Buildings
U.S. DEPARTMENT OF ENERGY
RECOGNIZED PROGRAM
MEETS U.S. DEPARTMENT OF ENERGY GUIDELINES

In late 2015, the Certified Energy Manager certification from the Association of Energy Engineers became the first Better Buildings Workforce Guidance recognized certification program.

Valuing Energy Efficiency

In order to prioritize actions, DOE held conversations with key industry stakeholders and analyzed existing research on market barriers to investment energy efficiency. Based on this work, DOE has developed a market intervention strategy to ensure that energy efficiency attributes are fully and properly considered in the building valuation process. DOE developed a training program for commercial appraisers; this program includes information on DOE's Buildings Performance Database, Building Energy Asset Score, and the U.S. Environmental Protection Agency's ENERGY STAR Portfolio Manager®, and is currently being piloted in select markets. DOE also supported the Appraisal Foundation in publishing a guidance document for commercial appraisers entitled "Valuation of Green Buildings: Background and Core Competency" with input from BBA members. In 2016, DOE will facilitate greater data availability and research showing the link between efficiency and value, and will pilot activities that help building owners, lenders, and appraisers account for energy-related variables in real estate transactions, including appraisal, underwriting, acquisitions and dispositions.

Data Access

Through the Better Buildings Energy Data Accelerator, the Data Access Team continued to successfully engage with local governments and utilities to overcome technical and policy barriers to whole-building energy disclosure. These partnerships revealed key challenges to the successful provision of whole-building energy data access, as well as best practices that are being shared across jurisdictions.

DOE is working with Accelerator participants to develop an "Energy Data Access Toolkit" The resource highlights key takeaways from the experience of the Accelerator partners, including guidance on policy, technical, and stakeholder engagement topics. The toolkit serves as a roadmap for other city and utility partners to overcome market barriers to energy data access, and facilitates continued development of data access solutions across the country after the formal conclusion of the Accelerator in December 2015.

New Resources and Key Outcomes from the Energy Data Accelerator

Key Resources:

- Energy Data Accelerator Toolkit
- Briefing Book on Whole-Building Aggregated Data
  - Summary and Talking Points on the PNNL Study on Data Aggregation and Privacy
  - Stakeholder Engagement Guide
  - Technical Best Practices Guide
  - The Value to Utilities of Providing Energy Data Access to Commercial Customers
- Webinars on the PNNL Study, as well as technical topics such as meter-to-building mapping
- Full-day workshop as part of the Better Buildings Summit

Key Outcomes:

- Rocky Mountain Power launches its Energy Data Access and Benchmarking Solution, featuring whole-building data aggregation and the use of Portfolio Manager web services
- Xcel Energy launches its Energy Benchmarking Program, which features meter-to-building mapping, whole-building data aggregation, and Portfolio Manager web services

Achieving Savings Through Alliance Activities

University of California, Berkeley

In 2010, University of California, Berkeley identified a key barrier to campus energy reduction: the school's biggest energy consumers – students, faculty, and most staff – were disconnected from the effects of their behaviors because energy usage and costs were centrally managed. The new Energy Management Initiative (EMI) solves this issue by targeting building occupants and allocating energy cost responsibility to individual campus departments. Cost allocation was phased in over two years so that any department that saw savings in year one could claim those savings, while any department that saw increases would have those covered by the university. Departments then assumed full cost responsibility in year two. The energy office helped develop intuitive energy dashboards and buildings surveys to assist technical outreach, and the university leveraged research partnerships with Lawrence Berkeley National Labs, Pacific Northwest National Labs and others to perform energy audits, implement HVAC control sequences, and perform measurement and verification. Over the first two years of the program, the initiative has saved over 18 million kWh and $4.4 million.

Hannaford

Hannaford partnered with the Better Buildings Alliance to demonstrate the performance of a transcritical carbon dioxide booster refrigeration system at its Turner, ME location. Working with the Refrigeration Technology Team, Hannaford evaluated performance by comparing the store's energy use over time to that of a supermarket with a similar layout and refrigeration needs but using conventional hydrofluorocarbon (HFC) refrigerant. The results showed that energy use for the transcritical carbon dioxide system was of a comparable magnitude to that of the conventional system, while the transcritical system also reduced the direct environmental impact of refrigeration leakage, recharge, and disposal by 15% due to the substantially lower global warming potential of carbon dioxide, and had lower operating costs. The study suggests that transcritical carbon dioxide booster refrigeration systems can be a viable alternative to conventional systems in some cases, especially in cooler climates. For more information, see the Case Study: Transcritical Carbon Dioxide Supermarket Refrigeration Systems.

CKE Restaurants

CKE Restaurants, Inc. owns, operates and franchises some of the most popular brands in the quick-service restaurant industry, including the Carl's Jr.®, Hardee's®, Green Burrito® and Red Burrito® restaurant brands. CKE Restaurants joined the Interior Lighting Campaign (ILC) in late 2015 and is in the process of upgrading troffer lighting in its restaurant system from T8 fluorescent lamps to LED lighting. As a member of the ILC, the company announced its intention to implement these upgrades in more than 190 restaurants by February 2016. The annual energy savings of upgrading the troffer lighting in these 190 stores will be 3 million kWh, equivalent to the annual energy usage of more than 275 homes. As a result, CKE Restaurants will save more than $300,000 annually. CKE Restaurant operators are also providing positive feedback on the new LED lighting brightness and quality. The company plans to produce a design manual for its franchisees to assist them in making similar upgrades.

APPA

In early 2015, APPA joined the Better Buildings Alliance as a program affiliate. A leading non-profit membership organization, APPA provides professional development, research, publications, credentialing, standards, facilities performance and evaluation services to over 1,300 higher education institutions and 15,000 educational facilities professionals. As established market leaders, they were a prime candidate to carry on the work of the Building Retuning Training program developed through Pacific Northwest National Laboratory and U.S. DOE. In under a year, APPA has adopted the curriculum and partnered with universities to lead two trainings, with more planned. Michigan State University also co-presented with DOE at the APPA Annual Meeting on Alliance resources available to colleges and universities. APPA also presented with Better Buildings partners, University of Virginia and Anne Arundel County Public Schools, on building strong energy teams in the education sector at Greenbuild 2015.

MGM Resorts International

As a further commitment of MGM Resorts International's partnership with DOE, MGM Resorts became the first hospitality partner to join the Interior Lighting Campaign. MGM is no stranger to supporting and advancing DOE's efforts in commercial lighting, as MGM Resorts is also part of the Lighting Energy Efficiency in Parking (LEEP) campaign and participates extensively within the Lighting & Electrical Technical Team. After a highly successful LED lighting retrofit of a 61 acre parking lot at MGM Grand Detroit that reduced the parking garage's annual energy use by 80% and supported the entire property in achieving a 12% energy reduction, MGM Resorts looked to expand its lighting projects. Starting in 2016, MGM Resorts is kicking off a two year lighting project that will upgrade more than 1 million light fixtures with an estimated ROI of just two years. Upgrades will begin with installations of all new LED troffers with sensors for back-of-house with lights, followed by upgrades to lighting in guest-facing spaces, casinos, and convention center space in later 2016. MGM will finish with lighting upgrades for exterior spaces and landscaping. Chris Magee, Director of Sustainable Facilities Development at MGM Resorts and the Hospitality Steering Committee co-chair, shared that the lighting specifications developed by the Better Buildings Lighting and Electrical subcommittee were a key resource and were included in RFPs for this project work.

CBRE

CBRE developed and launched an innovative sustainability training platform for its more than 2,900 U.S. brokerage professionals. CBRE recognized the importance of brokers to the commercial real estate transaction and the increasing availability of green and sustainable buildings. The platform includes a broker training video and a resource center that helps brokers understand and communicate the sustainable features of commercial properties helping to connect sustainability conscious tenants with high performing space that meets their needs. In May 2015, two CBRE brokers were among the first five brokers ever recognized by the Green Lease Leaders program for their role in facilitating sustainable tenant-landlord relationships.

Better Buildings Alliance Partners

Commercial Real Estate

AtSite
Bank of America
CBRE*
CC Frost Properties, Ltd.
Clarion Partners
Colliers*
Columbia Association
Community Services Agency & Development Corporation
Cox Enterprises
Cushman and Wakefield*
Dacra Development
Denver West
Deutsche Asset & Wealth Management
Equity One Inc.
First Potomac Realty Trust
Forest City Enterprises
General Services Administration*
Glenborough
Hines
IBM
Jamestown
Jones Lang LaSalle*
Kessinger Hunter & Co
Kilroy Realty
Kimco Realty Corporation*
Liberty Property Trust*
Living City Block
MC Realty
Mesa Lane Partners, LLC
Newmark Knight Frank
Parmenter Realty Partners
PNC Financial Services Group
Principal Real Estate Investors*
Prologis
Prudential Financial, Inc.
Regency Centers
Related Companies
Retail Properties of America
Ryan Companies US, Inc.
Sharpe Properties Group, LLC*
Stream Realty Partners, L.P.
Studley
The JBG Companies
The Malcolm Bryant Corp.*
The Tower Companies
The Westfield Group
Tishman Speyer
Transwestern
U.S. Navy CNIC Facilities and Acquisitions
USAA Real Estate Company
Vornado

Retail, Food Service & Grocery

Arby's Restaurant Group
Army & Air Force Exchange Service
Belk, Inc.
Best Buy
BJ's Wholesale Club, Inc.
Boston Market
CEFCO Stores
Chipotle Mexican Grill
CKE Restaurants Holdings, LLC*
Costco Wholesale Corporation
Crate & Barrel
Dunkin' Brands
Einstein Noah Restaurant Group, Inc.
Floorquest
Food Lion
Ford Motor Company
Fresh & Easy
Hannaford
Harris Teeter
JC Penney*
Kohl's Department Stores
Lamey-Wellehan Shoes
Lowe's
Luxottica North America
Macy's
McDonald's Corp.
Panda Restaurant Group, Inc.
Petco
PetSmart
Publix
Red Robin Gourmet Burgers
REI
Safeway
Sears
Shari's Cafe & Pies
Staples*
Starbucks Coffee Company
SUPERVALU
Target
The Home Depot*
Ulta Inc.
Walgreens Co.
Walmart*
Wawa*
Weis Markets
Wendy's*
Whole Foods Market*
Yum! Brands*

Healthcare

Ascension Health
Beaumont Health System*
Bon Secours Health System
Broward Health North
Catholic Health Initiatives (CHI)
CentraCare Health
Cleveland Clinic Foundation*
Defense Health Agency (DHA)
Department of Veterans Affairs (VA)
Gundersen Health System*
HealthSouth
Hospital Corporation of America (HCA)
Inova Health System
Kaiser Permanente
Legacy Health*
Lincoln Harris

Mayo Clinic

New York-Presbyterian Hospital

North Shore-Long Island Jewish Health System

Providence Health & Services

Southwestern Vermont Health Care

Summa Health System

University of Maryland Medical Center*

University of Pittsburgh Medical Center*

University of South Alabama Medical Center

University of Utah Healthcare

Veterans Health Administration

Welltower

Westchester Medical Center

Higher Education

Arizona State University

Clark Atlanta University

Cornell University

Duke University

Emory University*

Grand Valley State University

Loyola University

Massachusetts Institute of Technology (MIT)

Michigan State University

Northwestern University

Portland State University

San Mateo Community College District

Stanford University*

Tulane University

University of California, Berkeley*

University of California, Davis

University of California, Irvine

University of California, Merced

University of Colorado Boulder*

University of Hawaii at Manoa

University of Maryland*

University of Massachusetts Medical School

University of Miami*

University of South Carolina

University of Utah*

University of Wisconsin*

Washtenaw Community College

Hospitality

HEI Hotels & Resorts*

Hilton Worldwide

Hyatt Hotels Corporation

IHG (InterContinental Hotels Group)

Kelco Management & Development

Las Vegas Sands Corp.

Marriott International

MGM Resorts International*

Saunders Hotel Group

The Kessler Collection

The Walt Disney Co.

Wyndham Worldwide*

Affiliates

American Hotel & Lodging Association

American Institute of Architects (AIA)

American Society for Healthcare Engineering (ASHE)

American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)

APPA - Leadership in Educational Facilities

Association for the Advancement of Sustainability in Higher Education (AASHE)

Biomass Thermal Energy Council (BTEC)

Building Owners and Managers Association International (BOMA)

Consortium for Building Energy Innovation (CBEI)

Environmental Defense Fund (EDF)

Green Building Alliance

Green Parking Council

Green Sports Alliance

Health Care Without Harm

Illuminating Engineering Society of North America (IES)

Institute for Market Transformation (IMT)

International Council of Shopping Centers (ICSC)

International Facility Management Association (IFMA)

National Association of College and University Business Officers (NACUBO)

NAIOP (Commercial Real Estate Development Association)

National Association of Convenience Stores (NACS)

National Association of Real Estate Investment Trusts (NAREIT)

National Co-op Grocers

National Multifamily Housing Council (NMHC)

Practice Greenhealth

Professional Retail Store Maintenance Association (PRSM)

Retail Industry Leaders Association (RILA)

Second Nature

Seventhwave

Sustainability Roundtable Inc.

Sustainable Endowments Institute

The Bullitt Foundation

The Real Estate Round Table

Unified Foodservice Purchasing Co-op, LLC

VHA Inc.

Key

Partners in **bold** have taken the Better Buildings Challenge.

Asterisk (*) indicates 2014-2016 sector steering committee representative.

Endnotes

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