



Working in Partnership for a Resilient and Innovative Energy Future

PROGRESS REPORT 2020

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Improving energy, water, and waste efficiency is critical for our buildings, homes, and manufacturing plants. These are the places we live, learn, and work. Enabling American businesses and families to reduce their energy costs without compromising occupant comfort and needs is an enormous opportunity. Enhancing the resilience of our buildings to withstand extreme events and disasters, while at the same time driving great efficiency, is a benefit for occupants and owners alike. Energy-efficient, well-managed facilities provide a pathway for saving money and strengthening our communities.

Through the Better Buildings Initiative, market leaders are working in partnership with the U.S. Department of Energy (DOE) to set aggressive targets, reduce waste, and share successful solutions. Across the economy, DOE works with large and small public and private organizations to quantify what works and share expertise. They also continue to achieve deep energy and cost savings, with the 950+ private and public sector Better Buildings partners collectively saving nearly 1.8 quadrillion British thermal units (Btus) of energy since the start of the program. This amounts to a savings of nearly \$11 billion and 105 million tons of CO₂. Partners also have reduced their water use by more than 8.5 billion gallons.

Together, Better Buildings partners:

- ▶ **Advance innovative new technologies.** New efforts to test technologies, validate their savings potentials, and support others in the process include a Technical Field Validation program, the Integrated Lighting Campaign, and a Buildings-to-Grid Working Group.
- ▶ **Lead by example.** New partnership and leadership opportunities include the Waste Reduction Pilot, the Building Envelope Campaign, and two Accelerators focused on workforce development and efficiency in correctional facilities, with resources and case studies available on the Solution Center.
- ▶ **Fund projects across sectors.** Financial Allies extended \$23 billion in financing, including \$4.2 billion in the past year, across a wide range of sectors and communities. The Financing Navigator and a new focus on finance and resilience are making projects possible at a scale that is reshaping the marketplace.
- ▶ **Support and build the American workforce.** Partners in every sector are increasing the skill sets of new and existing employees through activities such as apprenticeship programs and on-the-job training to fill staffing gaps in the buildings workforce and meet the requirements of technologically evolving equipment.

Better Buildings Solution Center

The Better Buildings Solution Center is a platform for sharing partner solutions, successes and new ideas. This online tool can help any organization easily find proven and cost-effective efficiency solutions by topic, building type, technology, location, or barrier.

There are now more than 2,800 solutions available on the Solution Center, which was visited by more than 100,000 users in 2019. The newest resources, ranging from informational portals with technical guidance to examples of proven approaches taken by program partners, are highlighted throughout the pages of this report, including:

- ▶ On-demand webinars, the Efficiency-Resilience Nexus portal, and a list of most viewed solutions from 2019. [SEE PAGES 15-16](#)
- ▶ Case studies and new resources for water savings and waste reduction. [SEE PAGES 19-20](#)
- ▶ Partner innovations that build on their energy efficiency successes. [SEE PAGES 21-22](#)
- ▶ Sector specific partner solutions. [SEE PAGES 23-43](#)

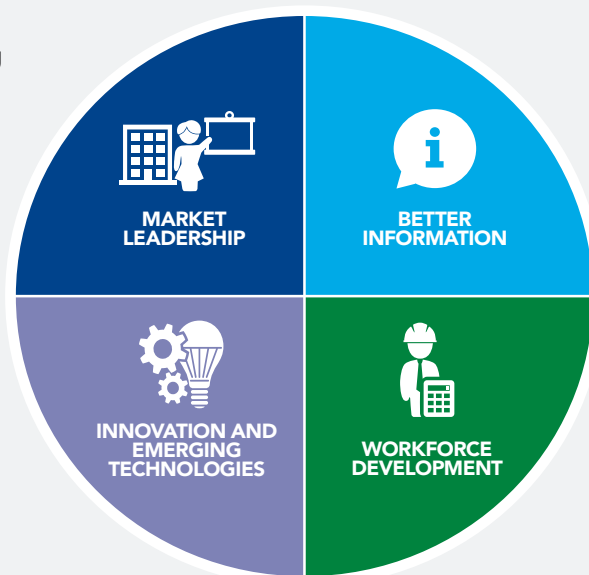
In the coming months and years, DOE will continue to work with market leaders in four key areas included below to ensure a resilient and innovative energy future. As Better Buildings partners explore new strategies and leverage new technologies, DOE will support efforts to eliminate barriers that impede progress. The resulting solutions will increase the flexibility and choice the marketplace needs to keep moving ahead.

“Better Buildings partners continue to exemplify leadership by achieving their goals and sharing innovative approaches to greater energy efficiency. Through investments in advanced technologies and adoption of industry best practices, these organizations are improving the efficiency of operations, saving money, improving occupant comfort, and creating a more resilient and flexible portfolio of buildings and manufacturing plants that are able to face the challenges of today and tomorrow.”



— Dan Brouillette
U.S. Department of Energy Secretary

DOE and its partners are exploring new strategies and solutions in four key areas that are deemed essential to building a more efficient and cost effective energy future. Within these key areas, leading organizations are taking a portfolio-wide approach, leveraging technological advancements, and working collaboratively both within and outside one’s own organization to address barriers that impede progress.



MARKET LEADERSHIP

Market Leadership means showing what's possible, setting aggressive portfolio-wide goals, and adopting cutting-edge technologies.

More than 370 Better Buildings Challenge partners have saved \$5 billion since program inception.

[SEE PAGE 9 FOR MORE](#)

BETTER INFORMATION

Better Information based on proven models supports smarter decisions, which in turn leads to deeper energy and cost savings.

The Better Buildings Solution Center had a 25% increase in users in the past year, and more than 300 new resources were added.

[SEE PAGE 10 FOR MORE](#)

INNOVATION AND EMERGING TECHNOLOGIES

Innovation and Emerging Technologies are key to building a stronger economy utilizing clean energy.

Participants in the Better Buildings Alliance Technology Campaigns reported energy savings of more than \$250 million in the past year.

[SEE PAGE 11 FOR MORE](#)

WORKFORCE DEVELOPMENT

Workforce Development is essential to advance the American job force in step with technological progress.

2,400 workers have participated in In-Plant Trainings since 2011, identifying more than \$50 million in potential energy cost savings.

[SEE PAGE 12 FOR MORE](#)

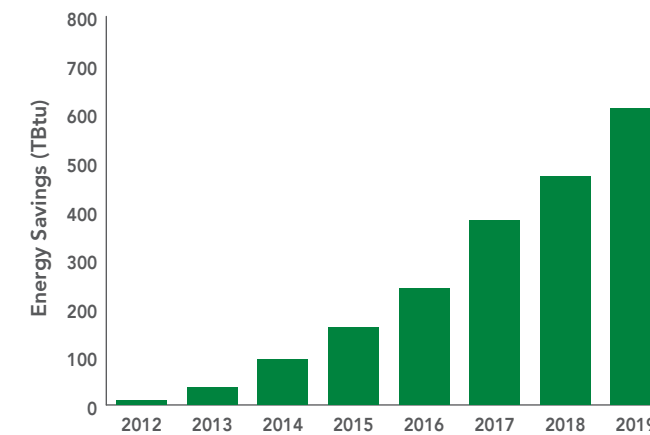
The Better Buildings Initiative is made up of more than 950 organizations. These partners represent market leaders in nearly every sector, from industrial and commercial to public, education, multifamily, residential, and more. The partnership includes 32 of the country's Fortune 100 companies, and 12 of the top 25 U.S. employers.

Better Buildings partners have achieved the following:

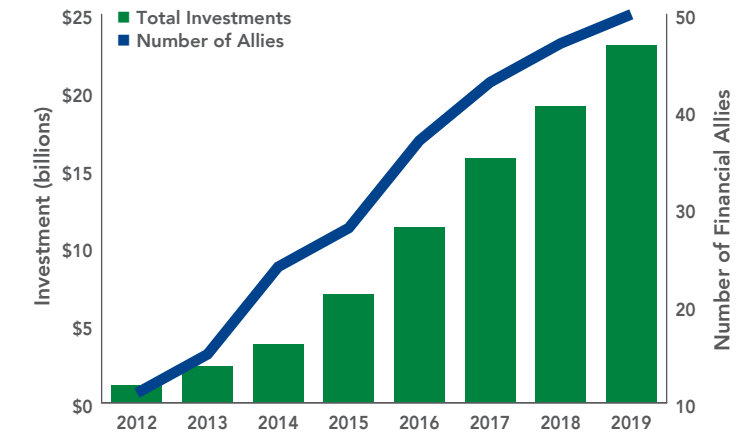
- ▶ More than 370 partners have joined the **Better Buildings Challenge**, and have collectively reported 610 trillion Btus in energy savings and nearly \$5 billion in cost savings to date.
- ▶ Through 2019, Better Buildings Challenge partners have shared energy performance results for more than 40,000 properties, and are saving an average of more than 2% in energy per year.
- ▶ Nearly 20 new partners have joined the Better Buildings Challenge in the past year.
- ▶ Together, more than 230 Challenge and Program-level **Better Plants** partners located in all 50 states have reported 1.3 quadrillion Btus in energy savings and \$6.7 billion in cost savings over the past 10 years.
- ▶ More than 20 new partners have joined Better Plants in the past year.
- ▶ There are more than 275 industrial sector solutions now on the Solution Center.
- ▶ **Financial Allies** extended more than \$23 billion since the start of the program, including more than \$4.2 billion in the past year. Taken together, Allies have now surpassed their commitments by more than \$11 billion.
- ▶ Better Buildings Alliance **Technology Campaign** participants reported energy savings of more than \$250 million in the past year from interior lighting improvements, HVAC rooftop unit replacements and retrofits, and the use of energy management systems.
- ▶ More than 30 partners joined the new **Waste Reduction Pilot** and are helping to determine appropriate metrics, goals, and opportunities to reduce waste in different sectors.
- ▶ More than 400 organizations have joined the Better Buildings **Residential Network**, completing more than 220,000 home energy upgrades to date.
- ▶ Through DOE's **strategic energy management** activities, nearly 50 partners have worked to develop energy management systems that are consistent with ISO 50001.

Partners in the Better Buildings Initiative are modeling leadership within their sectors and making significant impacts within their communities. Challenge partners have saved over 610 trillion Btus of energy since 2012, which is enough energy to power nearly 7 million homes in the U.S. for one year. During that same time period, the more than \$23 billion extended by Financial Allies is directly funding energy efficiency improvements and supporting the energy and buildings workforce.

Better Buildings Challenge Cumulative Energy Savings



Total Investment and Ally Growth by Year



Overall Better Buildings Initiative Results to Date			
Energy Saved (QBtu)	1.76	Partners	950+
Dollars Saved	\$10.7 billion	Square Feet	12.5 billion
Avoided CO ₂ Emissions (tons)	105 million	Industrial Facilities	3,200
Water Savings (gallons)	8.5 billion	Funding Extended by Allies	\$23 billion
Partner Solutions Available Online	2,800+		

Better Buildings Partners by Program					
Better Buildings, Better Plants Challenge	INDUSTRIAL SECTOR	COMMERCIAL SECTOR	PUBLIC SECTOR	MULTIFAMILY SECTOR	FINANCIAL ALLIES
	46 Partners	102 Partners	82 Partners	92 Partners	50 Allies
Better Buildings Alliance		950+ PARTNERS		Better Plants	
175+ Partners				185+ Partners	
Better Communities Alliance			Better Buildings Accelerators		
40+ Partners			220+ Partners		

New Energy Savings Challenge Goal Achievers



35%

NEW Water is an industrial partner located in Green Bay, WI. It committed 34 facilities and has a baseline of 2014.



23%

The **City of Rochester, NY**, committed 4.4 million square feet and has a baseline of 2009.



20%

The **City of Fort Lauderdale, FL**, committed nearly 1.2 million square feet and has a baseline of 2010.



26%

Indianapolis Public Schools, IN, committed over 7 million square feet and has a baseline of 2016.



23%

Corcoran Management is a multifamily partner located in Braintree, MA. It committed 1.1 million square feet and has a baseline of 2014.



20%

Trinity Housing Corporation of Greeley is a multifamily partner located in Greeley, CO. It committed 77,000 square feet and has a baseline of 2011.



25%

University of Utah is a higher education partner located in Salt Lake City, UT. It committed over 10 million square feet and has a baseline of 2008.



22%

Cleveland Clinic Foundation is a healthcare partner located in Cleveland, OH. It committed over 18 million square feet and has a baseline of 2010.



20%

Preservation of Affordable Housing is a multifamily partner located in Boston, MA. It committed 6.9 million square feet and has a baseline of 2012.



25%

Parkway School District, MO, committed over 3 million square feet and has a baseline of 2015.



21%

Michigan State University is a higher education partner located in East Lansing, MI. It committed 20 million square feet and has a baseline of 2010.



2.6% PER YEAR OVER 10 YEARS

Nuveen Real Estate is a commercial partner located in Chicago, IL. It achieved its goal by averaging 2% a year or more over 10 years, having committed 25 million square feet with a baseline of 2008.



24%

Mercy Housing is a multifamily partner located in Denver, Co. It committed 21 million square feet and has a baseline of 2010.



21%

The **City of Margate, FL**, committed over 100,000 square feet and has a baseline of 2011.



2.1% PER YEAR OVER 10 YEARS

USAA Real Estate is a commercial partner located in San Antonio, TX. It achieved its goal by averaging 2% a year or more over 10 years, having committed 12 million square feet with a baseline of 2008.



24%

Loews Hotels & Co is a hospitality partner located in New York, NY. It committed 12.5 million square feet and has a baseline of 2012.



21%

Anne Arundel County Public Schools, MD, committed 13 million square feet and has a baseline of 2013.

New Financial Ally Goal Achievers

Bank of America

\$5 BILLION SECOND GOAL

Bank of America has surpassed a goal of \$5 billion in financing for energy efficiency and/or renewable energy. It is headquartered in Charlotte, NC.



\$40 MILLION

Renew Energy Partners has surpassed a goal of \$40 million in financing for energy efficiency and/or renewable energy. It is headquartered in Boston, MA.



\$25 MILLION

Hawaii Green Infrastructure Authority has surpassed a goal of \$25 million in financing for energy efficiency and/or renewable energy. It is headquartered in Honolulu, HI.

Previous Challenge Goal Achievers

More than **75 Challenge partners** have met one or more of their energy goals, **10 have met a water goal**, and **25 Financial Allies** have met one or more of their financing goals. DOE continues to work with these partners to set new goals, leverage new advanced technologies, and highlight their successes and solutions.



DOE and its partners will continue to find new ways to leverage advanced technologies while collaborating to overcome energy efficiency barriers. See below for some of the topic areas the program will be focused on during the next year.

Grid-Interactive Efficient Buildings

Transforming demand-responsive devices to be fully dispatchable could provide billions of dollars per year in reduced energy costs; increase grid stability and security; and drive economic development, new American jobs, and homegrown technological leadership. In this key focus area, DOE continues to engage with partners through a working group that was formed under the renewables technology team. This group will identify research needs and develop new resources for managing building demand, storage, generation, and load flexibility (shed, shift, shape). Partners are providing data and input on four new field validations of building flexibility technologies.

Field Validation Partnership

This effort helps organizations in different sectors minimize the risks of new technology adoption, while providing pathways to improve the development of new technologies, features, and capabilities. Participants receive assistance from DOE and national laboratory experts who conduct objective measurement and verification of technology performance. DOE, through the Better Buildings Initiative, disseminates objective performance data to derisk technology adoption. The Field Validation Partnership makes it easier for organizations to make better decisions about new technologies to help meet their energy reduction goals.

New Technology Focus Areas

Partners have recently started collaborating through the Better Buildings Alliance on two new technology campaigns:

Integrated Lighting Campaign: Less than 1% of lighting systems in the U.S. are capable of communicating with other building systems to enable additional energy-saving opportunities. The new Integrated Lighting Campaign (ILC) is designed to help facility owners and managers take advantage of the benefits of integrating their lighting with other building systems. The ILC serves as a resource for relevant research on integrated lighting systems and advanced lighting controls, the capabilities they enable, and the benefits observed in both lab environments and in the field.

Building Envelope: Partners from across diverse communities (architects, engineers, construction, and owners/operators) are contributing to an upcoming campaign on envelope efficiency. The campaign will focus on improving comfort and energy performance, and providing resilience and flexibility benefits in new and existing buildings.

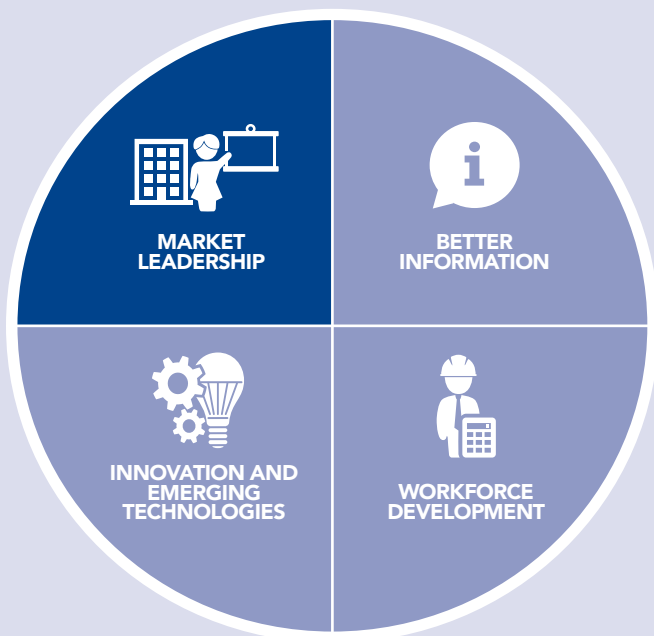


Organizations are demonstrating **MARKET LEADERSHIP** through the Better Buildings Initiative by committing to portfolio-wide energy reductions, transparently sharing their proven solutions to energy, waste, and water challenges, and building strong partnerships to advance common goals. Better Buildings partners represent leaders in nearly every sector of the economy. By embracing cost-effective efficiency strategies, they are enhancing the quality of life for all Americans, improving the factories and offices we work in, the critical buildings like hospitals we rely on, and the educational facilities our children learn in.



Key Partnerships

- ▶ Better Buildings Challenge
- ▶ Better Buildings, Better Plants
- ▶ Better Buildings Alliance
- ▶ Better Buildings Accelerators
- ▶ Better Buildings Residential Network
- ▶ Strategic Energy Management
- ▶ Better Communities Alliance



Recent Highlights

- ▶ More than 30 partners across multiple sectors have joined the Better Buildings, Better Plants **Waste Reduction Pilot** and are working to track progress toward their waste reduction goals.
- ▶ In 2019, the **Green Lease Leaders** cohort grew to represent more than 500 million square feet comprising of a diverse range of buildings from large and small commercial offices to industrial buildings to data centers. Since 2014, the program has recognized green leasing in over 2 billion square feet of space.
- ▶ The Better Plants program is recognizing workers who are advancing ideas and practices that are driving measurable energy savings through the **Individuals Taking Energy Action in Manufacturing (ITEAM)** prize competition. Through the competition, innovative ideas and practices are being disseminated to the benefit of other facilities nationwide.
- ▶ Building on their energy efficiency achievements, more than 45% of Challenge partners have set a **public, enterprise-wide carbon and/or renewable energy goal**, and many others are piloting clean energy projects.

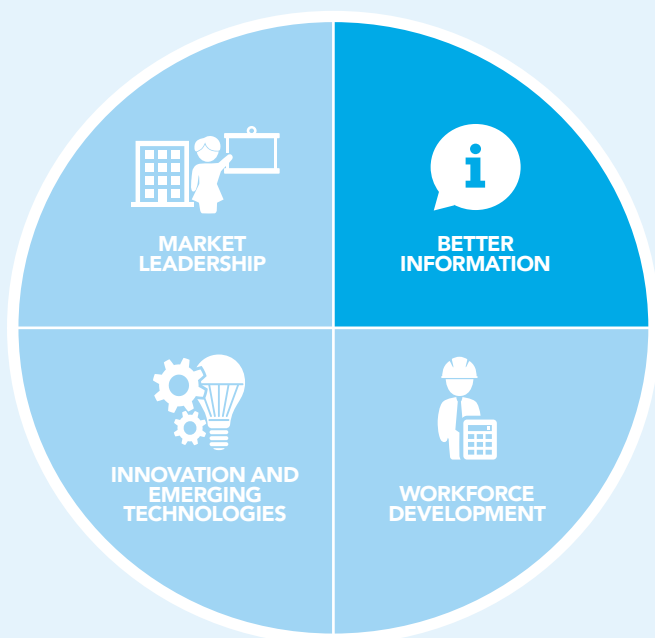
The Better Buildings Solution Center offers a wealth of toolkits, best-practice examples, and online databases to help organizations access **BETTER INFORMATION** supporting energy, water and waste programs. These real-world solutions are proven by program partners to address inefficiencies in their buildings and operations. They are designed to be broadly applicable and replicable, so as to help others in the market make smarter investments for greater efficiency.

The resources found in this report are a small sample of the many available on the Solution Center (see pp. 15-16 for additional details).



Key Partnerships

- ▶ Better Buildings Solution Center
- ▶ Financing Navigator 2.0
- ▶ Home Energy Score



Recent Highlights

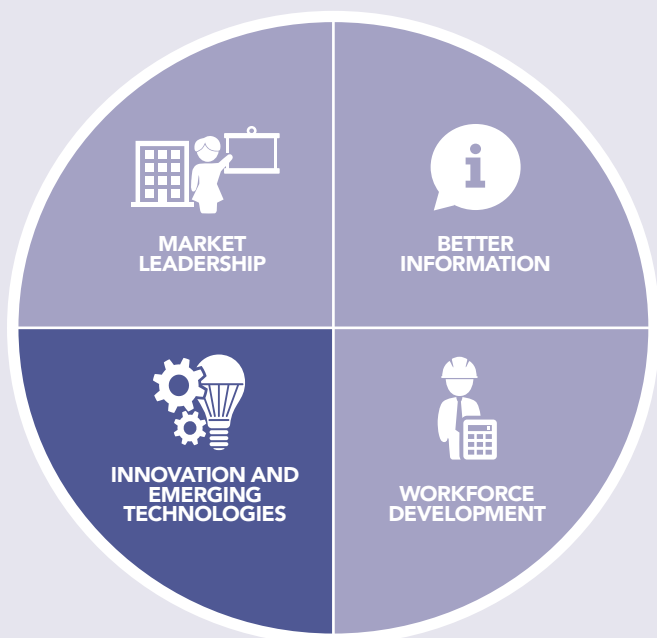
- ▶ More than 100,000 users visited the **Better Buildings Solution Center** in 2019 to take advantage of the more than 2,800 case studies, tools, and resources.
- ▶ More than 2,160 attendees participated in the **2019–2020 Better Buildings Webinar Series**, which featured topics such as green leasing, net zero energy, and using distributed energy technologies; there are also more than **130 on-demand webinars** searchable by sector, barrier, technology, and more.
- ▶ A resource page titled **Financial Performance of High-Performance Buildings** was launched on the Solution Center to drive investment in the marketplace by catalyzing research around the financial performance of energy-efficient buildings—a partnership of DOE, Lawrence Berkeley National Laboratory (LBNL) and Real Estate Research Institute.
- ▶ The **Buildings-to-Grid Working Group** was launched to foster discussions with program partners around demand flexibility; state-of-the-art sensors and controls can reduce site energy consumption by nearly 30% and curtail or temporarily manage peak load by 10% to 20% in commercial buildings.

DOE is committed to the validation and dissemination of **INNOVATIVE AND EMERGING TECHNOLOGIES**, connecting organizations through the Better Buildings Initiative with the latest ideas for improving whole building performance and achieving ultra-low energy buildings. For example, the Better Buildings Technology Teams that are led by experts from DOE's National Labs analyze the latest research and development on energy management systems, renewables, plug and process loads, building envelope, and other high-impact technologies. The market-ready solutions created by these teams are available on the Solution Center.



Key Partnerships

- ▶ Technology Campaigns
- ▶ High-Impact Technology Field Validations
- ▶ Better Buildings Technology Teams



Recent Highlights

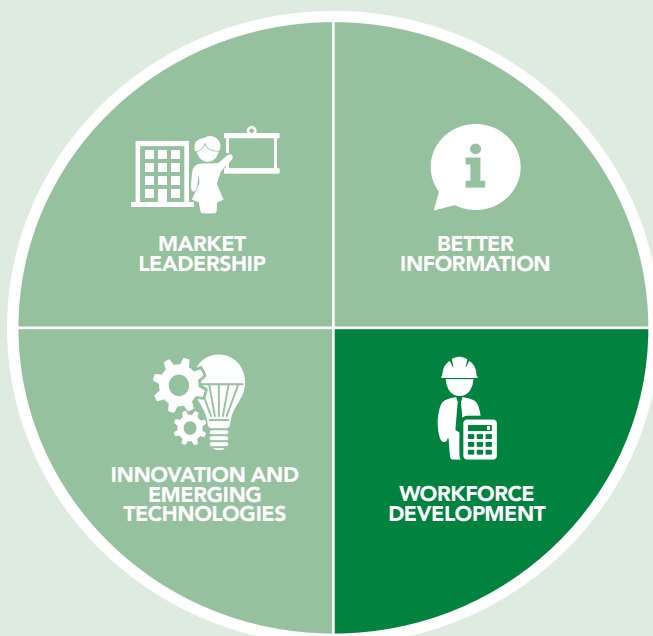
- ▶ Through DOE's **Interior Lighting Campaign**, building owner participants have replaced more than 3.5 million lighting systems, cumulatively saving roughly 800 million kWh of electricity per year (approximately the energy used by 80,000 U.S. homes) and \$85 million in energy costs.
- ▶ Participants in DOE's **Advanced Rooftop Unit (RTU) Campaign** saved nearly \$400 million since 2013 by installing advanced RTUs, reducing their energy use by more than 3 million kWh and helping to drive market transformation toward a greater adoption of this proven technology.
- ▶ The **Smart Energy Analytics Campaign** has supported building owners and operators in their implementation of Energy Management and Information Systems across more than 530 million square feet of floor area. Campaign participants are saving over 2.6 TBtu per year and nearly \$60 million annually.
- ▶ More than 80 partner best practices and other resources on **Zero Energy Ready technologies** are available on the Solution Center, showing how building and home energy use can be offset by renewable energy. More than 4,500 Zero Energy Ready Homes certificates have been awarded.

Reducing energy consumption across the commercial, industrial, and public sectors creates jobs as well as savings. DOE's **WORKFORCE DEVELOPMENT** activities are designed to help overcome common challenges being faced in every sector, as buildings become more advanced and as one generation of seasoned facilities professionals retire and another starts to take the helm. Visit the Solution Center to see how partners are working to increase the skill sets of new and existing employees through activities such as apprenticeship programs and on-the-job trainings.



Key Partnerships

- ▶ Better Buildings Workforce Accelerator
- ▶ Industrial Energy Management Workforce
- ▶ Workforce Guidelines



Recent Highlights

- ▶ The **Better Buildings Workforce Accelerator** launched as a three-year effort to increase the diversity and productivity of today's building energy efficiency workforce through collaboration between national organizations, federal agencies, and regional, state, and local leaders in the building industries.
- ▶ The **Solution Center Workforce landing page** was created to provide access to training tools, materials, and voluntary credentialing guidelines to advance different elements of the Better Buildings Workforce Framework, including:
 - ▶ Access to Better Plants In-Plant Trainings (INPLTs) and DOE's Industrial Assessment Centers (IAC) program.
 - ▶ DOE-recognized certification programs for Building Energy Auditors, Building Commissioning Professionals, and Energy Managers.
 - ▶ Presentations from partners and other experts on workforce issues like building a skilled trades apprenticeship program, and promoting energy efficiency careers among underrepresented groups.

Better Buildings Accelerators are designed to demonstrate specific innovative policies and approaches that speed-up investment in energy efficiency upon successful demonstration. Each Accelerator is a targeted, short-term, partner-focused activity designed to address persistent barriers that stand in the way of efficiency. Seventeen Accelerators have been launched to date, more than half of which have since closed after developing toolkits and case studies and contributing valuable market research. Visit the [Accelerator landing page](#) on the Solution Center to view all of them.

86 Million kWh in Savings

SUSTAINABLE WASTEWATER INFRASTRUCTURE OF THE FUTURE (SWIFt)

Partners achieved 8% energy savings to exceed the Accelerator's 5% short-term savings goal, for a total of **86 million kWh in savings**.

State, regional, and local organizations in SWIFt partner with water resource recovery facilities to achieve 30% energy savings. Partners produce tools and resources to support comprehensive energy efficiency and resource recovery projects in wastewater operations.

103,000 Million Btu in Savings

SMART LABS

Seventeen partners across more than 9 million square feet of laboratory buildings have **saved 103,000 million Btu** and are on track to surpass a 20% energy reduction goal in 10 years.

Best practices are summarized in the Smart Labs Accelerator Toolkit, which is designed to help optimize the performance of laboratories and critical control environments in new or existing facilities.

36% Average Improvement

DATA CENTERS

Average **36% reduction of PUE-1*** across partners, resulting in \$3.9 million in annual cost savings.

Partners have made significant progress toward system metering and associated energy tracking and reduction, while developing best practices for data center configurations and demand management.

*SEE PAGE 40 FOR DEFINITION.

150 Product Offerings

PACKAGED COMBINED HEAT AND POWER (CHP)

More than **150 recognized packaged CHP offerings** are provided by 30 Packagers and 19 Solution Providers.

Partners are evaluating new technologies and validating that installation times and total project costs for packaged CHP systems can be reduced by 20% or more.

BUILDING ENERGY DATA ANALYSIS

Participants are testing a unique building identifier that enables spatial tagging to promote the joining of data sets to improve how building energy data can be used. In the past year, an adoption guide was created with the Institute for Market Transformation.

New Accelerators



WORKFORCE ACCELERATOR

Workforce development is essential to advance the American job force in step with technological progress. Across new construction and retrofit markets for U.S. buildings, workers need clear pathways to increase building efficiency and productivity. By tackling these issues through cross-sector collaboration between national organizations, federal agencies, and regional, state, and local leaders in building industries, the Better Buildings Workforce Accelerator is designed to increase the quantity, quality, diversity, and productivity of today's building energy efficiency workforce.



SUSTAINABLE CORRECTIONS INFRASTRUCTURE PARTNERSHIP (SCIP) ACCELERATOR

SCIP is a three-year initiative accelerating a pathway toward a sustainable corrections infrastructure. While addressing issues like affordability, integration, and storage, SCIP partners will help catalyze energy and water efficiency, and leverage distributed energy resources and workforce development. Doing so will reduce operating and maintenance costs in public correctional facilities while maintaining their security and resilience.

6 Million Square Feet

ZERO ENERGY DISTRICTS

Six district partners representing more than 1,000 acres of development are working to achieve ultra-high energy performance across more than **6 million square feet** of buildings.

Districts are using cost-effective pathways to meet zero energy goals through shared infrastructure, ultra-efficient building design, renewable energy, and innovative business models.

8 Million Students

ZERO ENERGY SCHOOLS

Twenty-three partners across districts, states, and NGOs represent more than **8 million students**.

Participants demonstrate successful strategies for the design and maintenance of zero energy schools. On average, zero energy schools can use between 65% to 80% less energy than conventionally constructed schools.

The Better Buildings Solution Center is the place to find proven and cost-effective energy and water efficiency solutions by topic, building type, sector, technology, location, and barrier. These include showcase projects that demonstrate how partners are reducing energy or water use by 20% or more in buildings and 10% in plants, along with the innovative strategies (known as implementation models) used by partners to overcome common barriers to efficiency. There are also informational portals on key topics like the Efficiency-Resilience Nexus, the Waste Reduction Pilot, the Water Savings Initiative, Workforce Development and more.

On-Demand Better Buildings Webinars

Through Better Buildings webinars, experts discuss a variety of topics from Air Management to Zero Energy. These webinars are helpful resources on key subject areas in energy efficiency, water efficiency, resilience, and more. Below are webinars we have held over previous years. For each webinar you can watch the video recording and follow along with the slide deck.

Webinar Topics

- ▶ Building Envelope
- ▶ Data Centers
- ▶ Energy Data Management
- ▶ Financing
- ▶ Green Leasing
- ▶ Health and Wellness
- ▶ Industrial
- ▶ K-12 Schools
- ▶ Lighting
- ▶ Multifamily
- ▶ Plug and Process Loads
- ▶ Refrigeration
- ▶ Renewables Integration
- ▶ Resilience
- ▶ Smart Labs
- ▶ Space Conditioning
- ▶ Treasure Hunts
- ▶ Water & Wastewater
- ▶ Workforce Development
- ▶ Working with National Labs
- ▶ Zero Energy Buildings



“ I found the Summit to be **extremely valuable**. Topics were relevant, and all participants were open and helpful. First time and not my last. ”

— Summit Attendee

Better Buildings, Better Plants Summit

This annual event for Better Buildings, Better Plants partners and other key stakeholders provides the opportunity for professionals to explore emerging technologies and share innovative strategies in energy and water efficiency. Attendees take part in interactive sessions with industry experts and market leaders as well as multiple opportunities to network with peers. The Summit also serves as a platform to celebrate energy efficiency leadership by recognizing the accomplishments of Better Buildings, Better Plants Goal Achievers.

Learn more at:

betterbuildingsolutioncenter.energy.gov/summit

New on the Solution Center

▶ **Wastewater Energy Management Toolkit:**

A resource Toolkit to support best practices and innovative approaches successfully used by water resource recovery facilities to establish and implement energy management and planning.

▶ **Residential Energy Efficiency for Local Governments:**

A resource guide for local governments with analytical tools and model programs for a wide range of communities and demographic regions.

▶ **Finance and Resilience Initiative:**

An initiative bringing together partners, Financial Allies and experts in finance, insurance, and other fields to help building owners mitigate resilience risk.



Most Viewed Solutions in the Past Year



1. **Commercial Energy Financing Primer:** An introduction to critical issues in energy finance for commercial buildings with case studies, market data, and other resources; part of the Better Buildings Financing Navigator.



2. **K-12 Lighting Toolkit:** Providing sector-specific technical implementation details, case studies, specifications, and other best practices for reducing energy use up to 50% through more efficient lighting in schools.



3. **Clean Energy for Low-Income Communities (CELICA) Toolkit:** A collection of tools, resources, and models for developing low-income energy efficiency and renewable energy programs that can reduce the energy burden for low-income communities.



4. **Energy Savings Performance Contracting (ESPC) Toolkit:** A set of resources drawing on ESPC best practices and innovative approaches to help state and local organizations successfully establish and implement performance contracting.

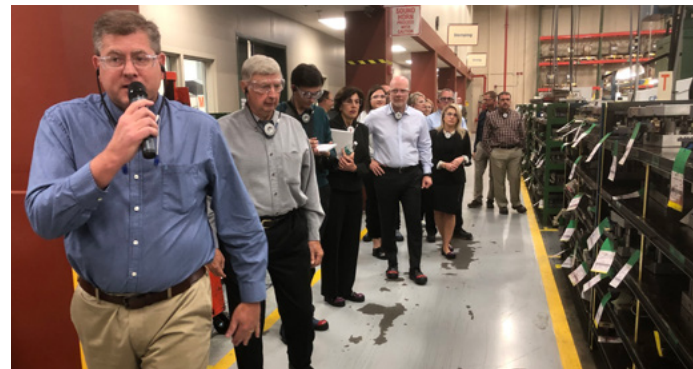


5. **High-Efficiency Rooftop Unit (RTU) Replacement Toolkit:** Resources to help HVAC contractors and service companies work with their customers to evaluate and manage their inventory of RTUs and make the business case for high-efficiency replacements.

Recognizing Leaders

TE Connectivity

TE Connectivity's plant in Lickdale, PA, manufactures electrical connectors and contacts used primarily in household appliances. It is saving nearly 10 billion Btus and more than \$200,000 per year in compressed air energy costs.



University of Virginia (UVA)

UVA's Clark Hall has achieved 65% annual energy savings since 2014 after installing a 2+ megawatt solar system covering 280,000 square feet of roof space, making extensive LED lighting updates, and upgrading pneumatic HVAC controls.



MetLife Investment Management

MetLife is saving more than \$500,000 annually at its District Center in Washington, D.C., which is a first of its kind "smart" commercial office building with capability for smart tenant solutions, such as apps for personal control of lighting, HVAC, access control, and more.



Gundersen Health

Gundersen coupled low-energy design standards with renewable energy solutions, including 40 geothermal wells and rooftop solar photovoltaic, at its 35,000-square-foot Sparta Medical Clinic in Wisconsin, which opened in 2017.



Chesapeake College

Chesapeake College has reduced its energy intensity by 43% since 2011, saving more than \$250,000 annually. It reached its Challenge goal eight years ahead of schedule, and is committed to achieving carbon neutrality in campus operations by 2025.



University of Maryland Medical Center (UMMC)

UMMC hosted an Energy Treasure Hunt led by the American Society for Health Care Engineering (ASHE). Participants explored UMMC's mechanical room, roof, lab offices, operating rooms, and other key locations.



Partners in the Headlines

MetLife recognized for energy efficiency leadership



"MetLife Investment Management's 910,000-square-foot building in Washington, DC is a Better Buildings showcase project and saves 31% annually on energy costs."

Atlanta sees 20% reduction in water and energy consumption, officials say



Atlanta. News. Now.

"Since [2011], the city has saved 1.3 billion gallons of water, created 654 jobs and added \$51.63 million to the regional economy, according to a news release. The city has also saved enough energy to power 150,000 homes for a year."

Lebanon County plant spearheads energy savings initiative



"The 254,000-square-foot facility is one of six TE Connectivity plants in Pennsylvania and employs more than 500 people. Company officials said savings initiatives have cut annual energy costs from \$2.2 million to \$2 million—a cost savings of \$223,000 a year."

Wendy's saved 377,000 gallons of diesel last year



"We expanded the number of restaurants that reduced the number of deliveries each week in order to create efficiencies that ultimately mean fewer trips, fewer miles, and less fuel."

Shorenstein: BOMA San Francisco members on the move



"New and modernized elevators, creative re-use of reclaimed materials... indoor LED lighting retrofit, retrofitted chiller, updated HVAC system, energy-efficient appliances, and new LED lighting throughout the parking garage... Shorenstein committed to reducing its portfolio's energy intensity by 40%."

Engage with Better Buildings

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The efficient use of water results in lower operating costs, a more reliable water supply, and improved water quality. Additionally, because energy is required to transport and treat water, saving water also saves energy. Through 2019, partners have saved a total of 8.5 billion gallons, which is enough water to fill nearly 13,000 Olympic-sized swimming pools. There are also now more than 160 water efficiency resources available on the Better Buildings Solution Center.



Partners with Greatest Water Savings

Savings Since Baseline Year

Staples*	34%
Poudre School District, CO*	32%
Anthem, Inc.*	27%
University of Nebraska Medical Center	21%
Foundation Communities	20%
DWS	20%
State of North Carolina	14%

*Water goal achiever

New on the Solution Center

- ▶ **Industrial Water Efficiency Page.** Tips and resources to help industrial organizations reduce water consumption are available, along with a way to receive direct technical assistance from an expert at the Lawrence Berkeley National Laboratory.
- ▶ **Healthcare Water Efficiency and Program Management Toolkit.** Guidance on how healthcare facilities can achieve significant operating cost and energy savings without jeopardizing water quality and maintaining control of infection.

SOLUTION CENTER CASE STUDY

DaVita

[Top-User Water Efficiency/Management Program](#)

HEALTHCARE SECTOR

DaVita provides kidney care to patients and set a goal to reduce water use by 30% per dialysis treatment, a typically water-intensive process. The company's Top 150 Water Users program was created to identify opportunities across the company to save water, resulting in 645 million gallons saved since 2013. Program highlights include:

- ▶ Continuously evaluating data quality to identify opportunities to control costs, address leaks, and perform preventative maintenance.
- ▶ Increasing the reporting of leaks by encouraging a "see something, say something" culture.

SOLUTION CENTER CASE STUDY

Nissan North America

[Chilled Water System Upgrades and Dashboard](#)

INDUSTRIAL SECTOR

Nissan identified that the chilled water system at its Canton, MS, vehicle assembly plant accounted for 15% of the plant's total electrical consumption. The company reduced energy use of the system by 35%, with a return on its \$700,000 investment in under two years. Program highlights include:

- ▶ Upgrading 10 chillers with a total cooling capacity of 25,000 tons.
- ▶ Installing an online, real-time dashboard platform to monitor the four main areas of the system, with data streamed to a live monitor on the manufacturing floor.

Annually, the U.S. generates 2.7 billion tons¹ of industrial solid waste and more than 260 million tons² of municipal solid waste. By reducing waste, organizations may also save energy. Manufacturers, companies, schools, and governments across the country can strengthen their competitiveness and sustainability by setting and realizing robust waste reduction goals. There are currently more than 30 participants in the Better Buildings, Better Plants Waste Reduction Pilot.



Pilot Waste Data Findings to Date

- ▶ Nearly half of all commercial sector pilot partners have a diversion rate of 50% or more.
- ▶ Partners diverted 1.9 million tons from landfill, enough to fill more than 135 thousand trash trucks.
- ▶ Partners often use outreach and education to increase diversion rates and reduce contamination in bins.
- ▶ Some partners are working with a third party to recover energy, and one partner was able to recover around 125,000 MMBtus from waste solvents last year.

SOLUTION CENTER CASE STUDY

Bristol-Myers Squibb (BMS)

Waste Reduction Strategy

INDUSTRIAL SECTOR

BMS developed a waste management program based on the principles of green chemistry to remove waste in product streams and reuse materials wherever possible. Program highlights include:

- ▶ Inactivating on-site biohazardous waste.
- ▶ Engaging suppliers to use less Styrofoam and recycle packaging, pallets, and containers.
- ▶ Using recyclable packaging, product inserts, and shipping containers.
- ▶ Achieving zero waste to landfill with 35 waste streams.
- ▶ Building a zero waste biologics drug-substance manufacturing facility.
- ▶ Achieving a 66% reduction in product mass intensity.

Setting a Waste Goal

Organizations are setting a variety of waste goals:

- ▶ **Diversion Rate.** A goal to increase the percentage of total waste diverted from landfills through reuse, recycling and composting, or other diversion methods.
- ▶ **Absolute Reduction in Landfill Waste.** A goal to decrease the total weight (in pounds or percentage of total) of landfill waste.
- ▶ **Waste Intensity Reduction.** A goal to decrease the total weight of waste generated, adjusted to reflect an organization's scale, in terms of gross floor area, production volume, sales, or other metrics.

SOLUTION CENTER CASE STUDY

Shorenstein Properties

Waste Training and Audits

COMMERCIAL REAL ESTATE SECTOR

Shorenstein Properties is working toward a goal of increasing waste diversion 20% by 2025, over a 2016 baseline. Program highlights include:

- ▶ Developing the "Recycling @ Shorenstein: Online Education" portal to encourage employees and tenants to recycle.
- ▶ Providing a waste audit guide to inform teams on best practices and guidelines.
- ▶ Implementing a waste policy with provisions for composting and recycling, janitorial training, waste diversion reporting, annual waste audits, and guidance on e-waste and construction/demolition waste.

The Better Buildings Initiative has more than 900 partners that represent virtually every sector of the American economy. These organizations are characterized by a willingness to publicly announce their sustainability goals, leverage data to make more informed decisions, employ both cutting-edge technologies and sensible low-cost measures, and share their results and strategies with the marketplace.

Organizations continue to engage with the program in new ways. Within the Better Buildings Challenge many partners that met their original energy and water reduction goals are following up with new or extended goals. Within the Better Plants program, industrial organizations are leveraging new tools and trainings to overcome barriers and identify opportunities in their plants.

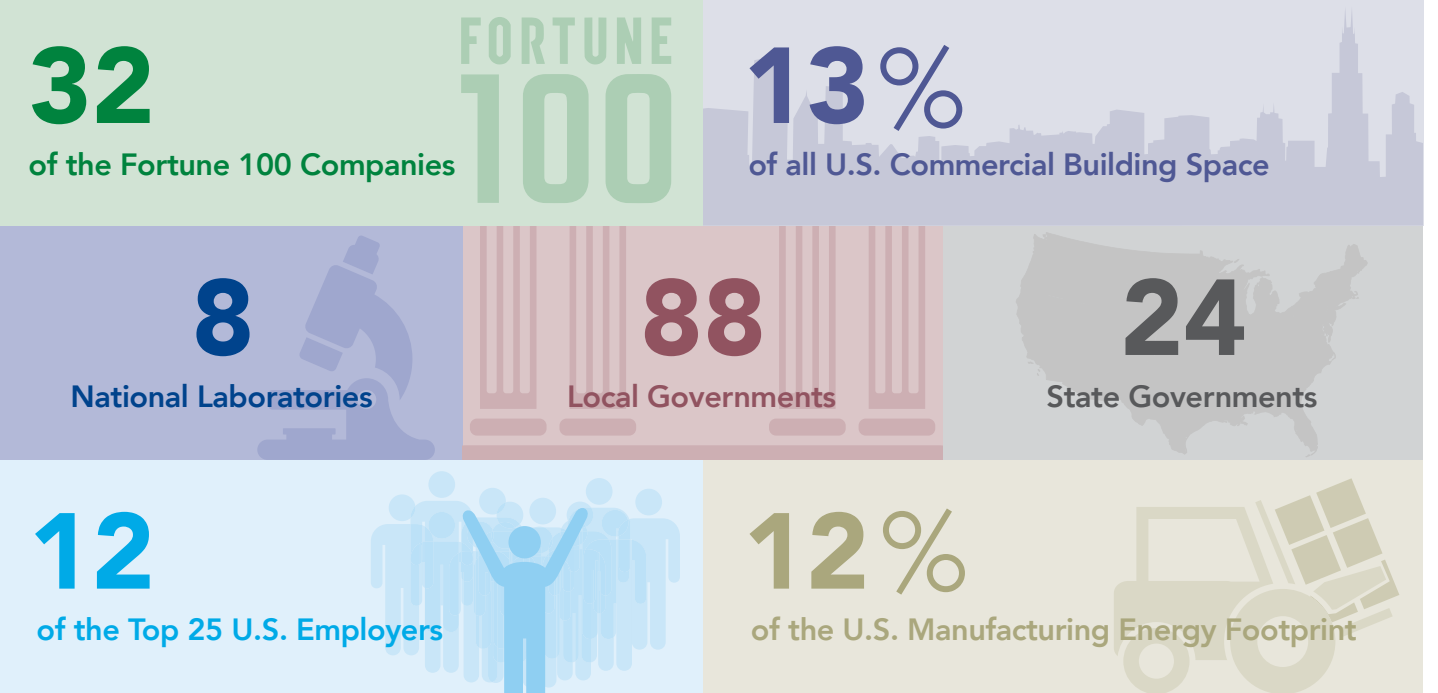
The Sector Spotlights in the pages ahead provide a window into the many ways partners are not just increasing their energy savings, but also integrating their energy strategies with water and waste reduction efforts. The whole-building, portfolio-wide approach taken by Better Buildings Initiative partners is a model for other organizations within the United States and beyond.

Across sectors, an efficiency-first strategy is typically the most cost-effective way to manage building energy usage; however, partners are also now complementing energy efficiency with renewable energy. They are also setting aggressive carbon-reduction goals to drive change within their organizations. Among Better Buildings Challenge partners, for example, more than 45% have public enterprise-wide carbon and/or renewable energy goals, and many other partners without public goals are piloting significant clean energy projects.

The key drivers for the increasing adoption of clean energy measures as reported by partners are:

- ▶ Accessing preferential loans
- ▶ Achieving deeper cost savings
- ▶ Investor, taxpayer, and customer feedback
- ▶ Resilience and energy security (risk management)
- ▶ Responding to existing and anticipated state and local energy policies
- ▶ Social impact responsibilities and executive leadership (organizational culture)
- ▶ Utility incentives and partnerships

Better Buildings Partners Are



New on the Solution Center: Partners Innovating Beyond Energy Efficiency

SOLUTION CENTER CASE STUDY

Gundersen Health

[Integrating Renewables with Energy Efficiency](#)

HEALTHCARE SECTOR

Gundersen Health is pioneering on-site solar by leveraging grants, green revolving funds, and other financing opportunities to pair its energy efficiency savings with renewables. At its 35,000-square-foot Sparta Clinic, this approach has paid for mechanical rooms with geothermal pumps, rooftop solar PV, double pane windows, spray foam insulation, and 40 geothermal wells to heat and cool the building more efficiently. The building's on-site and off-site solar capacity generates enough renewable energy to offset the building's consumption, making Sparta Clinic an energy-independent facility.

SOLUTION CENTER CASE STUDY

National Housing Trust (NHT)

[Financing On-Site Solar](#)

MULTIFAMILY SECTOR

Multifamily housing partners led by **National Housing Trust (NHT)** are using an innovative financing model for affordable housing providers to develop solar projects. Owners establish separate solar companies to own and operate solar installations on their properties, allowing them to develop multiple sites at one time and reap utility savings directly. **Denver Housing Authority, LINC Housing, Bridge Housing, Jonathan Rose Companies, and Silver Street Group** have partnered with NHT to develop 8.4 MW of solar PV. In Washington, DC, NHT used this approach to install 10 PV and six solar thermal systems across five of its properties.

SOLUTION CENTER CASE STUDY

Chesapeake College

[On-Campus Solar Energy and Storage](#)

HIGHER EDUCATION SECTOR

Chesapeake College generates over 50% of its energy needs from renewable sources after installing a 1.8 MW ground-mount and carport-based PV installation coupled with 1 MW battery backup. The school began exploring renewable energy sources in 2011 by installing a 50 kW wind turbine on campus. It followed this up with a power purchase agreement, closely coordinated with the local utility, which allowed for its solar project while also supporting a new real-time weather monitoring and PV control test project desired by the utility. It has reduced annual energy costs by 40%, which is the equivalent of 60 full-time tuitions per year.

SOLUTION CENTER CASE STUDY

Worcester, MA

[Solar Array to Save Nearly \\$70 Million](#)

LOCAL GOVERNMENT SECTOR

Worcester, MA, installed and began operating the largest municipally-owned solar array in New England in the summer of 2017. The 8.1 MW solar array includes 28,600 solar panels covering 25 acres of a former landfill (equivalent to 19 football fields), and is expected to save \$69 million over 30 years. The Greenwood Street Solar Farm is one part of a broader effort to meet the city's greenhouse gas reduction targets through a 20-year energy savings performance contract that is expected to cumulatively save the city nearly \$100 million and reduce emissions by more than 480 million pounds over the life of the contract.

U.S. industry consumes more than 30% of the nation's energy—equivalent to the eighth-largest economy in the world in terms of GDP.³ It is no surprise that more and more industrial organizations are pursuing new and novel solutions to improve energy performance to cut costs and improve competitiveness. While Better Plants started with just 32 partners, it has since grown to encompass more than 230 program and Challenge partners, all striving for ambitious energy efficiency goals. In the past year, Better Plants supported partners by addressing the following priorities:

- ▶ A water efficiency-focused In-Plant Training is now available to Better Plants partners, after first piloting the content with ArcelorMittal, Owens Corning, and Saint-Gobain Corporation. The training teaches participants how to calculate the true cost of water and audit their facilities to look for water savings opportunities. It also features the DOE's Plant Water Profiler software platform that enables employees to generate water balances in industrial facilities.
- ▶ A Field Validation Pilot is launching to help partners evaluate emerging technologies under real-world conditions and bridge the "valleys of death" between the lab and marketplace.
- ▶ Twenty industrial partners have now joined the Better Buildings, Better Plants Waste Reduction Pilot to share solutions and work together to set, track, and meet ambitious waste reduction goals.

Better Plants program partners have consistently set a high standard for the rest of industry in recent years by going above and beyond their 25% energy intensity reduction goals. Navistar, for example, reported a cumulative reduction of 27% in 2019, Owens Corning a 31% reduction in 2018, Bradken a 33% reduction in 2017, and Daikin Applied Americas a 35% reduction in 2016.

BETTER INFORMATION

Better Plants launched an Online Learning Series to connect industrial partners with another way to train workers on energy management. Initial webinars included topics such as Compressed Air Systems and Water Efficiency, and explored Federal Government resources like the Manufacturing Extension Partnership and the Agriculture Department's Rural Development Programs.



235
UNIQUE SECTOR PARTNERS

46
CHALLENGE PARTNERS

189
BETTER PLANTS PARTNERS

3,200 FACILITIES

\$6.7 BILLION SAVED SINCE 2009

Challenge Partners with Greatest Energy Savings

2019 Reported Savings Toward Initial Goal Since Baseline Year

NEW Water*	35%
Celanese Corporation*	28%
C. F. Martin & Co., Inc. (Martin Guitar)*	27%
J.R. Simplot - Food Group*	24%
Ford Motor Company	23%
Orange Water and Sewer Authority	18%
United Technologies Corporation (UTC)*~	16%
Lennox International~	15%
Eastman Chemical Company	13%

*Goal achiever ~ Previously met Program Level goal

Challenge Partners That Met the 25% Goal and Re-pledged

Savings Since Baseline Year

Volvo Group North America	23%
HARBEC	22%
Bentley Mills	18%
Legrand	11%

Leadership in Action

- ▶ **Lineage Logistics** reduced the cost of refrigeration per pallet of goods by 39% at its Mira Loma, California, facility through upgraded warehouse infrastructure and novel AI software, receiving multiple patents related to the technology and a 2019 Better Practice award. 
- ▶ **Volvo Group North America** replaced 13 existing grinding machines at its Hagerstown, MD, facility with three new Computer Numerically-Controlled (CNC) grinding machines. These provide around a 55% reduction in electricity consumption and a 35% increase in the production rate. 
- ▶ An **ArcelorMittal** integrated steel manufacturing plant in Cleveland, Ohio, re-attested to 50001 Ready and was able to assess water and energy performance improvements during an In-Plant training pilot. 
- ▶ **TE Connectivity** has conducted more than 100 energy treasure hunts—saving the Challenge partner hundreds of thousands of dollars—after first being exposed to the concept through a Better Plants In-Plant Training on Energy Treasure Hunts. 
- ▶ **Saint-Gobain Corporation** held a contest across 19 of its U.S. facilities to fix compressed air leaks, saving \$2.5 million in annual energy costs and winning a 2019 Better Practice award. The contest was partly inspired by fellow Challenge partner **Legrand**, which held its third annual Energy Marathon this past year that reduced energy consumption by 14% at 26 participating U.S. sites. 
- ▶ **Agropur** reduced annual system energy use by 40%, or \$157,000 a year, through a comprehensive refrigeration upgrade project at its Le Sueur, Minnesota, facility, winning a 2019 Better Project award. Additional savings were achieved through the realization that the plant could operate with fewer ammonia compressors. 
- ▶ **Tyson Foods** hosted its first In-Plant Training which identified more than \$265,000 in annual energy cost savings opportunities across its facility's ammonia refrigeration system, hydraulic system, and compressed air system. Around 80% of the opportunities have an immediate payback, with the average payback achieved in just over half a year. 

U.S. commercial office space makes up nearly 16 billion square feet of floorspace,⁴ meaning that energy efficiency upgrades can bring big savings for both tenants and landlords when done in a cost-effective way. Commercial real estate (CRE) partners continue to reduce energy and water consumption while factoring in resilience and risk. By utilizing the latest innovative technologies and partner resources, building portfolios have continued to improve, and efficiency champions have been recognized. In the past year, the CRE sector helped address the following barriers:

- ▶ Building technology is changing rapidly, and the CRE sector took note in order to keep up with innovations that yield large energy savings. To connect partners more closely with emerging technologies, the sector has been actively promoting new building technologies, validation opportunities, and research results along with solutions on topics such as [advanced energy management information system \(EMIS\) implementation](#), optimization and demand response, and [creative solutions for on-site solar installations](#).
- ▶ For organizations looking to begin their energy efficiency journey, it can be difficult to know how or where to start. The CRE sector recognized this barrier and leveraged the Better Buildings Solution Center to highlight existing resources in a [dynamic suite of basic, actionable steps](#) aimed at these building owners and operators.
- ▶ Mitigating [resilience risk](#) at the asset and portfolio level continues to be a priority for CRE partners. The sector built on earlier resilience efforts by highlighting partner efforts on climate risk assessments and resilience best practices.

WORKFORCE DEVELOPMENT

CBRE's workforce development program provides training and career development for building technicians looking to advance their careers. By partnering experienced with entry-level techs, CBRE's program is helping to close a skills gap as more experienced techs retire. CBRE's program also includes a sustainability track to focus on the latest sustainability and energy efficiency building technologies.



75
UNIQUE SECTOR PARTNERS

23
CHALLENGE PARTNERS

53
ALLIANCE PARTNERS

6.6 BILLION SQUARE FEET

\$289 MILLION SAVED SINCE 2011

Challenge Partners with Greatest Energy Savings

Savings Toward Initial Goal Since Baseline Year

The Hartford Financial Services Group, Inc.*	38%
Lendlease*	36%
The Tower Companies*	23%
Columbia Association*	23%
Shorenstein Properties, LLC*	16%
Nuveen Real Estate*	15%
CommonWealth Partners	15%
Anthem*	14%
PNC Financial Services Group	14%
JBG Smith	14%
Highwoods Properties	12%
LBA Realty	12%
USAA Real Estate*	11%

*Goal achiever

Leadership in Action

- ▶ **Jamestown** developed an EMIS [checklist](#) to improve portfolio energy performance, in partnership with the Smart Energy Analytics Campaign, resulting in a first-year site-level savings average of 4% with five properties achieving savings from 16% to 21%.
- ▶ **MetLife Investment Management's District Center** achieved more than 30% energy savings through a package of energy upgrades and a unique smart building architecture.
- ▶ Several commercial real estate partners achieved significant savings by implementing high-efficiency lighting systems and were among those recognized by the Interior Lighting Campaign in 2019, including:
 - ▶ **CBRE** saved 2.9 million kWh at a single site
 - ▶ **Columbia Association** saved 50,000 kWh of energy annually via retrofits
 - ▶ **United States General Services Administration (GSA)** saved 85,000 kWh annually



- ▶ **Shorenstein** reduced chiller operation and garage lighting energy consumption by 40% after carrying out HVAC and LED lighting upgrades at the historic [Market Square](#) in San Francisco.
- ▶ **The Tower Companies** purchased and installed a 122-kW rooftop solar PV system atop a [multifamily high-rise](#) that reduced almost 10% of the overall building demand.
- ▶ **WashREIT** achieved \$30,000 in estimated savings in 2019 by optimizing its [energy intelligence software \(EIS\)](#) to allow properties to more actively anticipate and avoid peak loads at critical times as a way to reduce capacity charge costs while minimizing impact on operations.
- ▶ **DWS** implemented a Climate Risk and Resiliency Pilot to assess properties at risk of impact from climate change, with a goal to identify strategies and improvements that would protect occupants, equipment, and the physical asset. A checklist was created that references recent city-level climate action plans, flood maps, and historic climate-related events.





32
UNIQUE
SECTOR
PARTNERS

9
CHALLENGE
PARTNERS

23
ALLIANCE
PARTNERS

490 MILLION SQUARE FEET

\$240 MILLION SAVED SINCE 2011

**Challenge Partners with
Greatest Energy Savings**

Savings Toward Initial Goal Since Baseline Year

UW Health*	22%
Cleveland Clinic Foundation*	22%
NewYork-Presbyterian Hospital	14%
University of Maryland Medical Center	14%
University of Pittsburgh Medical Center	13%

*Goal achiever

Healthcare facilities use nearly 10% of the energy consumed by the commercial sector⁵ despite representing less than 5% of commercial floorspace.⁴ As one of the fastest growing sectors,⁶ healthcare organizations are prioritizing energy efficiency and advanced technologies that generate energy savings and can improve environments of care for patients and conditions for the critical employees that serve our communities. Throughout the past year, sector partners have engaged in the following areas:

- ▶ The opportunity for improving energy efficiency in healthcare is evolving as the model of care is changing from large in-patient facilities to typically smaller out-patient facilities. Partners are using peer exchange to share best practice solutions for energy resilience planning—drawing connections between resiliency, energy efficiency, and zero energy.
- ▶ Zero energy operating status is now possible through advancements in building technologies and a growing demand for highly efficient structures. Partners are integrating renewables, microgrids, and other new technology with energy efficiency to achieve a zero energy result.

Leadership in Action

- ▶ **Cleveland Clinic** reduced energy consumption by 22% from a 2010 baseline, meeting its Challenge goal, after implementing several high-impact energy reduction measures, including LED retrofits, optimized air exchange rates in operating rooms, and employee engagement initiatives. 
- ▶ **Gundersen Health System's** new Tomah Clinic is using 50% less energy than the average clinic. The facility features a rooftop solar array, LED lighting throughout the building with manual dimming and occupancy sensors, and 90 geothermal wells among other energy-efficient features, along with a 435 kWh battery for emergency power. 
- ▶ **University of Nebraska Medical Center** created a public dashboard displaying its strategies and progress toward achieving several sustainability goals, including the installation of nearly 1,500 solar panels that can provide 500 kW of power to the Medical Center. 
- ▶ **University of Maryland Medical Center** partnered with **American Society for Health Care Engineering (ASHE)** to hold an Energy to Care Treasure Hunt, which engaged senior leadership and identified low-cost energy-saving opportunities estimated to reduce energy annually by 11%. 

- ▶ **Welltower** launched a guide for senior housing efficiency and excellence, providing its senior housing operating partners with ideas for no- and low-cost measures to reduce utility costs, enhance the comfort of residents and staff, and create a culture of sustainability. 



15
UNIQUE
SECTOR
PARTNERS

6
CHALLENGE
PARTNERS

9
ALLIANCE
PARTNERS

1 BILLION SQUARE FEET

\$184 MILLION SAVED SINCE 2011

**Challenge Partners with
Greatest Energy Savings**

Savings Toward Initial Goal Since Baseline Year

Loews Hotels & Co*	24%
MGM Resorts International	15%

*Goal achiever

With 24-hour 365-day operations, hotels are one of the highest energy and water consumers per square foot. Across America’s 47,000 hotels, it is estimated that the average guest room incurs nearly \$2,200 in energy costs annually.⁷ By investing in and prioritizing energy efficiency, hoteliers can improve guest comfort and satisfaction, realize cost savings, and meet internal sustainability goals. Throughout the past year, sector partners have engaged in the following areas:

- ▶ Large hospitality brands are setting ambitious corporate sustainability goals, but it can be challenging to access energy data across portfolios with varying ownership. Some Better Buildings partners have developed internal certification programs to help properties make continual improvements.
- ▶ Further engagement around energy efficiency with franchisee owners and operators can drive savings and help achieve broader sustainability goals. Better Buildings collaborated with Affiliate partner **Asian American Hotel Owners Association** to highlight how organizations can save money by leveraging low to no-cost energy efficiency upgrades. Working alongside partners, a new guide was also created to help hoteliers identify Key Energy Resources and Tools for Hospitality.

Leadership in Action

- ▶ **Loews Hotels & Co** reduced energy consumption by 24% from a 2012 baseline, by prioritizing energy efficiency in its long-term capital infrastructure plans, upgrading to LED lighting, and using a scorecard to measure building performance.
- ▶ **MGM Resorts International** is in the process of building a 640-acre, 100 MW solar array in Nevada’s Dry Lake solar energy zone. Energy from this project will provide 90% of the daytime power needed at MGM Resorts’ 12 Las Vegas Strip destinations.
- ▶ **Hilton** has the largest ISO-certified portfolio in the world, with every property certified in Energy Management, Environmental Management, and Quality Management. Its award-winning comprehensive environmental and social impact reporting program, Lightstay, became the first hotel brand to achieve “Recognized Standard” status from the Global Sustainable Tourism Council in 2019.
- ▶ **Marriott** established an internal Measurement and Verification (M&V) process for assessing new energy-saving technologies, products, and services allowing its engineering and sustainability team to prioritize new technologies based on validated energy-saving potential and verified typical returns.



The retail sector of today is not the same as it was 10 years ago. Extensive growth in e-commerce is driving retailers to adapt their facilities and operations in order to meet the needs of modern consumers. Global e-retail sales amounted to \$2.8 trillion in 2018 and are projected to reach up to \$4.8 trillion by 2021.⁹ As retail, food service, and grocery (RFSG) companies evolve with the aim to maintain and grow their customer base, they continue to seek advanced technologies to improve energy and water efficiency within their next generation of RFSG buildings.

In the past year, Better Buildings partners helped address the following barriers:

- ▶ Organizations face a growing need for more granular energy data that can help them make targeted performance investments and improvements at their facilities. A Submetering Resources for Commercial Buildings list was developed that provides information on correctly sizing submeters for current and future needs, managing and analyzing collected data, and using submeter data to target investments and building improvements for greater energy efficiency.
- ▶ Companies often lack internal support and effective communications strategies to convey the value of energy efficiency within their organizations. Leading RFSG partners are implementing sustainable operating practices through participation in efforts like the Grocery Stewardship Certification program, which targets low-cost operational improvements and engages employees in energy efficiency, water conservation, and waste reduction efforts.

INNOVATION AND EMERGING TECHNOLOGIES

Target is a recognized leader in developing innovative energy efficiency improvements in retail store design and operation. The company has installed 2 million LED light fixtures in 1,800+ stores and plans to include smart LED lighting technology in all new construction in the future, which collectively will reduce energy use by an average of 470 million kWh per year for a 10% annual energy savings. The smart lighting upgrades use indoor positioning technology and sync with the company's Target Circle™ mobile phone app to enhance their customers' experience.



74
UNIQUE SECTOR PARTNERS

34
CHALLENGE PARTNERS

40
ALLIANCE PARTNERS

2.7 BILLION SQUARE FEET

\$2.2 BILLION SAVED SINCE 2011

Challenge Partners with Greatest Energy Savings

Savings Toward Initial Goal Since Baseline Year

Sprint*	35%
Havertys*	33%
Best Buy*	31%
Kohl's Department Stores*	27%
Whole Foods Market	18%
Wen-GAP, LLC	17%
Walgreens Co.	16%
Promar Corporation	16%
Life Time Fitness	15%
Hamra Enterprises	15%
Staples	15%
Wendium of Florida, Inc.*	15%
Carlisle, LLC	14%
Nike, Inc.	13%
Walmart	12%
Briad Wenco, LLC	11%
The Wendy's Company	10%

*Goal achiever

Leadership in Action

- ▶ After surpassing its original Challenge energy goal, **Kohl's Department Stores** extended its commitment to a 30% energy reduction across its portfolio by 2025.
- ▶ **The Wendy's Company** and two of its franchisees, **Carlisle, LLC** and **Wendium of Florida, Inc.**, joined the Water Challenge by committing to a 20% reduction in water use by 2029.
- ▶ The **Retail Industry Leaders Association (RILA)** developed an innovative platform, the Retail Advisor for Energy Management, that offers benchmarking and reporting support for retailers and provides tailored guidance for evaluating energy management programs.
- ▶ **Havertys** completed multiple LED lighting projects at its Eastern Distribution Center in Braselton, GA, that reduced energy use by 29%, saving \$50,000 a year in energy costs and significantly decreasing maintenance costs.
- ▶ **Walgreens** installed optimized lighting solutions across its building portfolio to save the retailer 54 million kWh annually, receiving recognition from the Interior Lighting Campaign.

KOHL'S



HAVERTYS



- ▶ **Whole Foods Market** completed 24 lighting projects at new construction properties that will reduce energy use by 2.2 million kWh each year.
- ▶ **Hannaford** underwent a deep energy retrofit at its Brandon, VT, store to reduce energy use by 56% at the supermarket, saving \$135,000 annually in energy costs.
- ▶ RFSG partners continued pursuing high-efficiency rooftop unit (RTU) improvements that earned recognition from the Advanced RTU Campaign:
 - ▶ **McDonald's** replaced more than 70% of RTUs at its company-owned restaurants from 2013 to 2018.
 - ▶ **H&M** installed 540 RTUs and controls, resulting in more than 4 million kWh annual energy savings.
 - ▶ **Walgreens** installed more than 4,300 RTUs with high-efficiency units and controls, resulting in more than 39 million kWh annual energy savings.
 - ▶ **Target** installed more than 17,500 RTUs from 2013-2019 that are reducing annual energy use by 12 million kWh.



K-12 school districts spend nearly \$8 billion annually on energy costs, the second largest expense after teacher salaries.⁹ Aging facilities combined with limited school budgets result in deferred maintenance of facilities with an estimated \$270 billion needed for infrastructure repairs.¹⁰ Rural schools also face unique obstacles, such as serving remote populations or lacking a local workforce to maintain or upgrade equipment. Despite these challenges, Better Buildings K-12 partners are demonstrating leadership in energy efficiency by developing resources and replicable models that improve occupant comfort, lower energy bills, and create healthy learning environments for students.

In the past year, the Better Buildings K-12 schools sector focused on the following issues:

- ▶ Attracting, retaining, and training a highly-skilled, energy management workforce remains a key priority for school districts. The [Rural K-12 School Workforce Development and Training](#) resource provides building operators with actionable steps to improve energy efficiency knowledge and create cost-effective and efficient learning environments for students.
- ▶ On average, zero energy schools can use between 65% to 80% less energy than conventionally constructed schools. [A Guide to Zero Energy and Zero Energy Ready K-12 Schools](#) outlines eight steps to creating a zero energy school—emphasizing the importance of incorporating energy efficiency into the planning, design, construction, and operations process.
- ▶ Distributed energy resources can support renewable energy goals, provide energy and cost savings, and supply backup power to school districts when operating as emergency shelters. To help districts assess and prioritize investment options, [How Distributed Energy Resources Can Improve Resilience in Public Buildings](#) presents three case studies, featuring a K-12 school district, along with a step-by-step guide and key considerations for decision-makers.

"Energy conservation initiatives in our schools and offices support our efforts to find new ways to use resources responsibly, while allowing us to remain true to the core mission: educating students. Our performance in the Better Buildings Challenge provides another positive indicator AACPS is making significant strides in the district's strategic plan."

— Lisa Seaman-Crawford

Director of Facilities, Anne Arundel County Public Schools



36
UNIQUE SECTOR PARTNERS

29
CHALLENGE PARTNERS

11
ACCELERATOR PARTNERS

230 MILLION SQUARE FEET

\$46 MILLION SAVED SINCE 2011

Challenge Partners with Greatest Energy Savings

Savings Toward Initial Goal Since Baseline Year

Indianapolis Public Schools, IN*	26%
Parkway School District, MO*	25%
Anne Arundel County Public Schools, MD*	21%
Poudre School District, CO*	20%
River Trails School District 26, IL*	20%
Fairfax County Public Schools, VA	18%
Manchester School District, NH	15%
Aurora Public Schools, CO	14%
Pasadena Independent School District, TX	14%
Fort Worth Independent School District, TX	14%

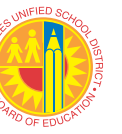
*Goal achiever

Leadership in Action

- ▶ **Bullitt County Public Schools, KY**, developed a district-wide energy plan to identify and implement cost-saving measures in response to rising energy costs and aging buildings in need of HVAC and lighting upgrades, saving the district over \$7 million cumulatively in energy and operational costs in the past 12 years.
- ▶ **Dysart Unified School District, River Trails School District 26, and San Francisco Unified School District** presented at the 2019 Green Schools Conference and shared success stories on how to create innovative programs and policies to engage students, staff, and the greater community with district-wide, eco-efficiency efforts.
- ▶ **Indianapolis Public Schools, IN**, expects to save nearly 28% through a retrofit of Brandes Elementary School by establishing new setpoints for heating and cooling, adding additional zones to the building automation system and optimizing controls throughout the facility. The district was also recognized as a goal achiever this year, reducing cumulative energy consumption by 26% in 2019.



- ▶ **San Francisco Unified School District, CA**, is expected to achieve more than 60% energy savings and nearly 35% cost savings at Charles Drew Elementary School through upcoming project renovations including upgrades to the lighting, boilers, and building envelope.
- ▶ **Forth Independent School District, TX, Montville Public Schools, CT, and Pasadena Independent School District, TX**, joined the Better Buildings Challenge in 2019, committing a combined 24 million square feet of building space.
- ▶ **Los Angeles Unified School District (LAUSD), CA**, achieved nearly 30% energy savings and more than \$225,000 cost savings annually at the Santee Education Complex. LAUSD's Heroes for Zeros program encourages behavioral changes which contribute to cumulative energy reductions of 5%, and 10% reduction of annual water consumption.
- ▶ **Parkway School District, MO**, completed the Parkway West High School retro-commissioning and HVAC improvement project, achieving more than 27% annual energy savings and nearly \$100,000 annual cost savings. Parkway achieved a cumulative energy reduction of 25% in 2019, six years ahead of the district's goal.





54
UNIQUE
SECTOR
PARTNERS

23
CHALLENGE
PARTNERS

31
ALLIANCE
PARTNERS

380 MILLION SQUARE FEET

\$171 MILLION SAVED SINCE 2011

**Challenge Partners with
Greatest Energy Savings**

Savings Toward Initial Goal Since Baseline Year





Chesapeake College*	43%
University of California, Irvine*	31%
University of Utah*	25%
Towson University*	24%
Morehouse College	22%
Allegheny College	19%
Sewanee: The University of the South	17%
Northwestern University	16%

*Goal achiever

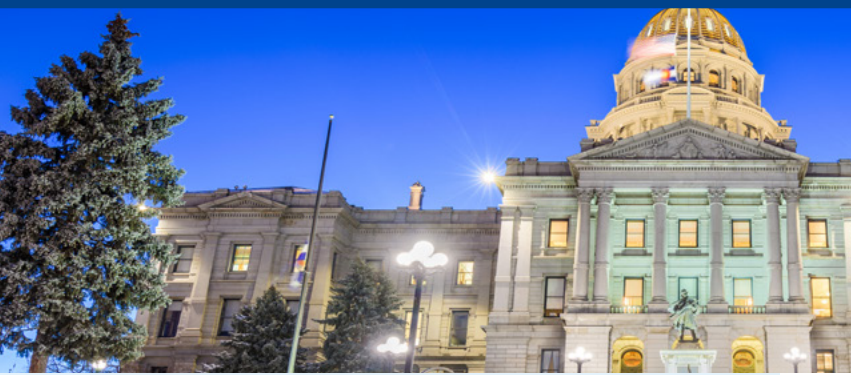
Colleges and universities spend \$6 billion annually on energy, which is more than they spend on computers and textbooks combined.¹⁰ The boom in campus space growth has continued despite enrollment stabilizing or even declining in some cases, leaving many offices with fewer tuition dollars supporting more building space. School energy offices are addressing this by collaborating with students to improve campus energy performance, and investing in comprehensive technical and behavioral programs for energy-intensive laboratories. In addition the education sector is the fastest growth sector for zero energy buildings in new construction. In the past year, the Better Buildings higher education sector developed resources to address these challenges:

- ▶ The Higher Education Energy Planning: Review and Summary was compiled to synthesize 45 campus energy, climate, and sustainability master plans including best practices, common pitfalls, and innovative new ideas.

Leadership in Action

- ▶ **Washington College** completed its zero energy laboratory, one of the first of its kind featuring ground-source HVAC, heat recovery wheel, 82 kW roof-mounted solar array and 46 kWh battery to attain 105% net positive energy use, meeting rigorous Living Building Challenge criteria. 
- ▶ **Washington University in St. Louis** created a 3-credit interdisciplinary course on renewable energy that partnered with the City of St. Louis to pursue SolSmart Gold designation and to develop an on-site solar strategy for city-owned buildings. 
- ▶ **Northwestern University** realized 24% savings following lighting and HVAC upgrades to the Tarry Research and Education Building. 
- ▶ **Towson University** achieved 35% savings at its Residence Tower by installing a high-performance building envelope, premium efficiency LED lighting with automated controls, water cooled variable refrigerant flow system and dedicated outside-air system to optimize environmental conditions while maximizing efficiency. 
- ▶ **Macalester College** students helped build an energy information system (EIS) covering 1.3 million square feet across 26 buildings. 

- ▶ Collaborated with International Institute for Sustainable Laboratories (I2SL) to improve laboratory benchmarking practices via the new Laboratory Benchmarking Tool.



24
UNIQUE
SECTOR
PARTNERS

6
CHALLENGE
PARTNERS

25
ACCELERATOR
PARTNERS

260 MILLION SQUARE FEET

\$283 MILLION SAVED SINCE 2011

**Challenge Partners with
Greatest Energy Savings**

Savings Toward Initial Goal Since Baseline Year

State of Maryland*	25%
State of North Carolina*	17%
State of Minnesota	14%
Commonwealth of Massachusetts	14%

*Goal achiever

Utility spending by states totaled nearly \$8 billion in 2018.¹¹ Conserving energy in their buildings enables states to shift funds spent on utilities to other public priorities and demonstrate good stewardship of taxpayer dollars. These state efforts are paying off, with more than 27 million MWh saved in 2019, enough to power more than 2.6 million homes for a year.¹² State governments continue to implement Lead By Example initiatives that are improving the efficiency of state-owned buildings, and focus on underserved sectors including water resource recovery and correctional facilities. Over the past year, the Better Buildings state government sector developed the following materials:

- ▶ Compiled the Wastewater Energy Management Toolkit to highlight the tools and resources resulting from the Sustainable Wastewater Infrastructure of the Future (SWIFt) Accelerator to establish energy management and planning in water resource recovery facilities.
- ▶ Launched the Sustainable Corrections Infrastructure Partnership (SCIP) Accelerator, helping state and federal agencies achieve a sustainable corrections infrastructure through solutions that reduce operating and maintenance costs while maintaining sector priorities of security and resilience.

Leadership in Action

- ▶ The **State of Maryland** achieved more than 20% energy savings and \$12,000 cost savings through lighting, HVAC, and building envelope upgrades to the Historic Western Railway Train Station, which today serves as the headquarters for the Canal Place Preservation and Development Authority.
- ▶ The **Commonwealth of Massachusetts** installed more than 950 utility meters covering 420 buildings, including state hospitals, prisons, universities, community colleges, courts, and office buildings, receiving recognition from the Smart Energy Analytics campaign.
- ▶ In December 2019, the **State of New Mexico** launched a \$32 million ESPC project across more than 30 Santa Fe buildings totaling 1.7 million square feet of space. The project—which includes the state’s first battery storage system, electric vehicles and charging stations in addition to solar at 19 sites—is expected to yield annual energy savings of \$1.1 million.
- ▶ The **Delaware** Division of Health and Social Services announced a \$3.7 million ESPC project for energy efficiency improvements across eight buildings that is projected to yield \$7.3 million in savings over 20 years of funding from a bridge loan by the Delaware Sustainable Energy Utility.



Local government buildings alone consume 2 quadrillion Btus each year⁴ and have the potential to save \$3.7 billion annually through a 20% improvement. Better Buildings local government partners are leading by example, reducing energy in their facilities, passing innovative policies that target new and existing buildings, increasing renewable energy adoption, and building resilience throughout their communities.

In the past year, local governments have taken action in the following areas:

- ▶ Local governments continue leading the way, improving the energy efficiency of their facilities through operational improvements and targeted investments. Better Buildings partners have collectively saved \$461 million and 48 trillion Btus since 2011. To support data-driven energy management in the public sector, DOE developed the Energy Data Management Guide.
- ▶ Local governments are passing innovative policies to maximize energy efficiency and reduce emissions in private buildings. Twelve Better Buildings partners require that building owners meet energy performance requirements or standards, covering nearly 6 billion square feet. These requirements build on the more than 30 local governments that have established benchmarking and transparency ordinances nationwide.
- ▶ Local governments are increasing renewable energy adoption through methods like community solar. Thirty-four Better Buildings partners have committed to 100% clean energy and many are expanding access to renewable energy to low-income populations with a higher energy burden. To help make community solar accessible and affordable to every U.S. household by 2025, DOE recently launched the National Community Solar Partnership.
- ▶ Local governments are installing microgrids and investing in distributed energy resources (DERs) to increase the resilience of municipal operations, particularly critical facilities, while ensuring their communities can respond and recover from grid outages. DOE published a step-by-step guide that introduces the benefits of integrating energy efficiency with DERs to achieve resilience benefits.



75
UNIQUE SECTOR PARTNERS

47
CHALLENGE PARTNERS

44
COMMUNITIES ALLIANCE PARTNERS

16
ACCELERATOR PARTNERS

420 MILLION SQUARE FEET

\$461 MILLION SAVED SINCE 2011

Challenge Partners with Greatest Energy Savings

Savings Toward Initial Goal Since Baseline Year

Roanoke, VA*	25%
Chattanooga, TN*	25%
Rochester, NY*	23%
Margate, FL*	21%
Fort Lauderdale, FL*	20%
Arlington County, VA	18%
Seattle, WA	18%
Boston, MA	17%
Cook County, IL	17%
Placer County, CA	16%






*Goal achiever

"Five years ago city government set a goal to reduce our carbon footprint through a Better Buildings Challenge and we went to work. Often it's the simple things, like putting in controls so our lights automatically turn off at 6pm; other times it's intensive capital investment like renovating the Chattanooga Public Library..."

— Mayor Andy Berke
Chattanooga, TN

Leadership in Action

- ▶ **Boston, MA**, launched an executive order requiring new municipal buildings to meet a zero net carbon standard. These buildings will be energy efficient and meet energy needs through a mix of on- and off-site renewables. 
- ▶ **Denver, CO**, saved commercial building owners and tenants 1.6% on average annually in avoided energy costs since 2016, thanks to a combination of its benchmarking and disclosure and Green Buildings ordinances that allowed for flexible compliance options toward improving energy performance. 
- ▶ **Hillsboro, OR**, worked with DOE to leverage the Renewable Energy Integration & Optimization Lite (REopt Lite) tool and the Distributed Energy Resources Customer Adoption Model (DER-CAM) tool to identify eight sites that could rely on CHP, solar PV, and storage technologies to power critical services in the event of a grid outage. 
- ▶ **Los Angeles, CA**, increased its Better Buildings Challenge commitment by 400%, committing to a 22% energy reduction across 150 million square feet by 2025, making it the largest local government commitment and fourth-largest partner commitment overall. 

- ▶ **Orlando, FL**, partnered with the Orlando Utilities Commission Community Solar Farm to offset the energy consumption of 19 city buildings. With the addition of a more than 220 MW installation, the city is working to provide access to community solar via subscriptions on par with market rates to help alleviate the energy burden for low- and moderate-income residents in the city. 
- ▶ **Philadelphia, PA**, approved a bill requiring non-residential commercial buildings over 50,000 square feet to either perform regular building tune-ups to improve energy efficiency or demonstrate high performance. Once implemented, the policy is projected to reduce energy use in participating buildings by 5% to 20% annually. **New York City** and the **District of Columbia** also recently passed building performance standards. 


- ▶ **Seattle, WA**, completed the city's Building Tune-Up Accelerator Program with more than 100 mid-size building participants covering nearly 7 million square feet, and is projected to reduce energy use by 12% per year. View the report the city developed in partnership with DOE to learn more. 

More than one in six American households live in multifamily apartments or condominiums.¹³ While new multifamily buildings are being built across the country, most of the multifamily building stock is decades older, with much of it not updated to meet current energy performance standards. Moreover, affordability restrictions are set to expire on more than 250,000 multifamily units across the country over the next five years¹⁴ and the supply of unsubsidized affordable rental housing continues to decline. Energy efficiency upgrades present an excellent opportunity to slow these trends and preserve housing affordability while improving resident health and comfort.¹⁵

State and utility energy retrofit programs in some states offer significant potential to improve the efficiency of multifamily buildings and save both building owners and tenants money. Evidence shows such programs can cost-effectively reduce energy consumption by 30% for natural gas and 15% for electricity.¹⁶ Municipal green building codes and ordinances are also helping to drive energy efficiency and renewable energy advances in the multifamily sector. Better Buildings Challenge multifamily partners in San Francisco, CA,¹⁷ and Cambridge, MA,¹⁸ are now required to meet city green building requirements for newly constructed buildings tied to the LEED rating system.

As solar photovoltaic installations continue to climb, a recent report by the National Renewable Energy Laboratory shows that nearly half of all U.S. residential rooftop solar potential is on the homes of low-to-moderate income (LMI) households, representing 320 GW of potential solar capacity. The majority of this potential—60%—exists in renter-occupied and multifamily buildings.¹⁹ Better Buildings Challenge multifamily partners are leading the way: nearly half have installed or are planning solar PV projects on their properties.

THE U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD) WORKS WITH DOE TO SUPPORT MULTIFAMILY SECTOR PARTNERS, PROVIDING INCENTIVES AND TECHNICAL ASSISTANCE FOR UTILITY BENCHMARKING AND PLANNING PORTFOLIO-WIDE INVESTMENTS IN ENERGY AND WATER EFFICIENCY.



121
UNIQUE SECTOR PARTNERS

92
CHALLENGE PARTNERS

29
ACCELERATOR PARTNERS

650 MILLION SQUARE FEET (675 THOUSAND HOUSING UNITS)

\$136 MILLION SAVED SINCE 2009

7 OUT OF THE 10 LARGEST PUBLIC HOUSING AUTHORITIES

Challenge Partners with Greatest Energy Savings

Savings Toward Initial Goal Since Baseline Year

Mercy Housing*	24%
Corcoran Management*	23%
Trinity Housing Corporation of Greeley, CO*	20%
Preservation of Affordable Housing*	20%
Caritas Communities, Inc.	18%
Jonathan Rose Companies	16%
Utica Municipal Housing Authority	16%
The Community Builders, Inc.	16%
Manhattan Housing Authority	16%
Wesley Housing Corporation	15%
Cascap, Inc.	14%
The Housing Authority of the City and County of Denver	13%
Housing Authority of San Buenaventura, CA	13%
Washington, DC, Housing Authority	12%
Danville Development	12%
Foundation Communities	11%

*Goal achiever
Does not include prior year multifamily goal achievers.

Leadership in Action

► **Tenderloin Neighborhood Development Corporation** committed to power more than 40 affordable housing sites across seven neighborhoods in San Francisco with 100% renewable electricity, providing clean power to 5,000+ local residents.



► **Preservation of Affordable Housing** predicts annual cost savings of at least \$480,000 from 27 projects completed in 2019. The company tapped into more than \$2.3 million in incentives to finance the work, including new heating and domestic hot water systems, smart heating controls, solar thermal installations, low-flow water fixtures, and lighting upgrades.



► **San Buenaventura Housing Authority** completed construction of Westview Village Phase I, its \$60 million LEED for HOMES Platinum and LEED-Neighborhood Development certified property. This Rental Assistance Demonstration (RAD) property provides more than 130 units of affordable housing to low-income families.



► **Denver Housing Authority's** 2 MW community solar garden won the grand prize in the Department of Energy's Solar in Your Community Challenge. The project benefits more than 760 low-income households, saving them approximately 20% on their energy bills, or nearly \$3 million in savings.



► **Rockford Housing Authority** is implementing a 2 MW community solar project with projected savings of \$10,000 per year. The project will bring utility bill savings to over 600 low-income families in Rockford, IL, as well as jobs and economic development to the environmental justice community.



► **National Housing Preservation Foundation** installed 955 KW solar systems across its portfolio that will save an estimated 1,200 MWh per year. The projects were financed via a Community Solar Investor program and Low-Income Housing Tax Credit proceeds.



► **Satellite Affordable Housing Associate's Lakeside Senior Apartments** won a 2019 COTE® Top Ten award from the American Institute of Architects for sustainable design excellence. The LEED platinum-certified building features high-density wall insulation, roof insulation, high-performance windows, and takes advantage of heat recovery and solar energy to reduce loads and offer multiplying benefits to its low-income residents.



► **Codman Square Neighborhood Development Corporation** has received an \$800,000 grant from the Boston Medical Center (BMC) to rehabilitate 59 housing units for health and energy efficiency upgrades. Codman is one of nine properties receiving healthy housing investments from BMC, totaling \$6.5 million for some of Boston's poorest neighborhoods.





133,600 HOME ENERGY SCORES CONDUCTED SINCE 2012

102,000+ HOMES UPGRADED IN 2019 BY HOME PERFORMANCE WITH ENERGY STAR® SPONSORS

More than 400 Better Buildings Residential Network members, including partners in DOE’s Home Performance with ENERGY STAR® (HPwES) program, are working together to make it easier for the residential sector to invest in energy efficiency. Nearly 40 local HPwES Sponsors and 1,300 Participating Contractors made a significant impact during 2018 by completing 85,000+ Home Upgrades, including 41,000+ Income-Qualified and 10,000+ multifamily upgrades. These HPwES Sponsors continue to connect consumers with trained, qualified contractors that can reduce household energy costs and improve the comfort of their homes. Since 2002, HPwES Sponsors have served 775,000 total households with an average of \$500 in savings per home.

The 4,000 participants in Better Buildings Residential Network regular peer exchange calls continue to explore innovative ideas for improving the energy efficiency of homes. The network has also helped highlight the shared benefits of health and building energy efficiency by serving on the Technical Advisory Committee for the American Council for an Energy-Efficient Economy’s (ACEEE) second annual Health, Energy, and Environment Conference and by participating in ACEEE’s Bridging Health and Energy Efficiency Working Group.

MARKET LEADERSHIP

Focus on Energy is Wisconsin utilities’ statewide energy efficiency and renewable resource program. This HPwES Sponsor completed 1,600 HPwES projects, and launched a Home Energy Challenge with the City of La Crosse and local employers. Nearly 800 Wisconsin realtors promoted energy efficiency resources through the organization’s Focus on Energy Ambassador Initiative. It has also contributed to Wisconsin Department of Public Instruction’s Career Pathways resources and engaged with technical schools on workforce development efforts.

New Tools and Resources

- ▶ The Home Improvement Expert™ (HIE) tool, launched by DOE in partnership with Building America researchers and DOE’s national labs, helps homeowners optimize energy savings and improve performance when making home improvements. HIE fact sheets and checklists compile best practices from industry leaders and national laboratories for 21 different home improvements related to energy efficiency, providing resources that homeowners can apply to vendor contracts to ensure quality installation of home improvements.
- ▶ The Virtual Tour of Zero portal showcases highly efficient homes that are capable of offsetting annual energy consumption with renewable energy systems.
- ▶ The Florida Solar Energy Center published Keep Safe: A Guide to Resilient Housing Design and Construction in Island Communities to provide easily accessible information on resilient housing design and construction that can be used by renters, homeowners, designers, and contractors.
- ▶ DOE’s Advanced Building Construction (ABC) Initiative is fostering a new era of construction productivity for affordable high-performance buildings by coordinating research activities, sharing reports, and driving greater market adoption of ABC technologies, such as novel envelope panels, integrated HVAC/hot water/ventilation systems, and digital scanning and translation technologies.
- ▶ The Low-Income Energy Affordability Data (LEAD) tool helps improve the understanding of low-income and moderate-income household energy characteristics. It was developed through the Clean Energy for Low Income Communities Accelerator, through which \$355 million was allocated by partners to support access to clean energy for 155,000 low-income homes.



30
UNIQUE
SECTOR
PARTNERS

9
CHALLENGE
PARTNERS

21
ACCELERATOR
PARTNERS

331 MEGAWATTS OF ELECTRICITY DEMAND

\$23 MILLION SAVED SINCE 2011

The demand for computation and data centers continues to surge, driven by the use of applications such as artificial intelligence, Internet of things, autonomous vehicles, virtual reality, etc. Although most enterprise and institutional data centers have the opportunity to save 20% to 40% or more of their energy consumption, small- to medium-sized data centers remain an area of opportunity for energy efficiency reductions. Better Buildings data center partners are improving efficiency by pursuing liquid cooling, consolidating data center infrastructure, and upgrading to high-efficiency uninterruptible power supply systems and energy management systems.

Throughout the past year, the data center sector has helped advance the following priorities:

- ▶ Demonstrating new technologies, a number of partners are moving away from traditional air cooling and using liquid cooling. Ensuring optimal cooling for a data center is a top priority for operators as it lowers operational expenditures and optimizes computing performance. Some partners are making the transition to rear door heat exchangers, while others are going all the way to direct coupled warm liquid cooling, eliminating the need for compressor based cooling.
- ▶ Allocating capital and getting buy-in for energy efficiency projects with a long return on investment remains a challenge. Working with Lawrence Berkeley National Laboratory's Center of Expertise for Energy Efficiency in Data Centers, Better Building partners provided input on how organizations can make the business case for improving the energy efficiency of their data centers.

POWER USAGE EFFECTIVENESS (PUE) IS THE INDUSTRY STANDARD METRIC USED TO MEASURE THE ENERGY EFFICIENCY OF DATA CENTERS. PUE IS CALCULATED BY DIVIDING THE AMOUNT OF POWER ENTERING THE DATA CENTER BY THE POWER USED TO RUN THE COMPUTER INFRASTRUCTURE WITHIN IT.

Leadership in Action

- ▶ **Digital Realty** achieved a nearly 40% reduction in infrastructure energy (PUE-1) at its Bedford, MA, data center through upgrades to all constant volume computer room air handling (CRAH) units, aging air-cooled chiller equipment, and lighting. It also earned ENERGY STAR certification at nearly 30 data centers, representing 70% of the company's U.S. stabilized and managed portfolio.²⁰

- ▶ **Iron Mountain's** data centers have been powered by 100% renewable energy since 2016, achieved by responsibly sourcing power via both retail supply agreements and virtual power purchase agreements. Iron Mountain developed a Green Power Pass program to provide customers with an annual certification of attestation, allowing them to take credit for green energy consumed within the data centers.
 
- ▶ **Sabey** partnered with Big Bend Community College's Data Center training program to develop the new curriculum for the Mission Critical Operations pilot program, which is preparing students for entry-level facility manager positions.
 
- ▶ **Oak Ridge National Laboratory** realized a 25% reduction in PUE-1 after performing a building-wide retrofit to the 9,400-square-foot data center housing Summit, a high-performance computing machine. Summit's updated data center features an innovative warm-water cooling system, 480V racks to prevent excess electrical transmission losses, and upgraded LED lighting.
 

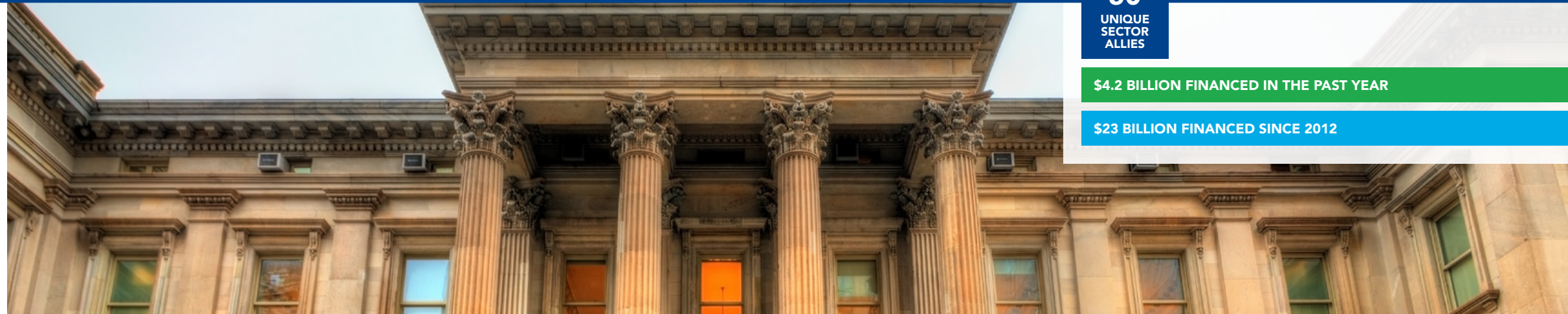
50
UNIQUE
SECTOR
ALLIES

\$4.2 BILLION FINANCED IN THE PAST YEAR

\$23 BILLION FINANCED SINCE 2012

Estimates by the American Council for an Energy-Efficient Economy state that the total amount of efficiency investments in the United States are on the order of \$60 to \$115 billion per year,²¹ with the majority of that investment occurring in buildings. Upfront costs can be a primary barrier to implementing energy upgrades. Better Buildings Financial Allies are helping organizations overcome financial barriers by offering a range of traditional and innovative financing options, freeing up organizations to focus on their core missions. In the past year, the Financial Allies helped address the following barriers:

- ▶ Growing concerns about the financial impact of resilience are having a ripple effect through the real estate industry, and many building owners are seeking guidance on how to best manage increasing resilience risk. DOE established the Finance and Resilience Initiative to foster clarity, collaboration, and guidance on the intersection of finance and resilience.
- ▶ Commercial property assessed clean energy (CPACE) is a financing mechanism that has seen tremendous growth over the past few years, yet many building owners are unaware of some of the benefits that CPACE offers. The CPACE for New Construction Toolkit was launched to summarize how CPACE can be used to implement energy, water, and resilience improvements in new construction and major redevelopment projects.
- ▶ There is a wide array of financing options available for energy upgrades, and many building owners struggle to fully understand the landscape and nuances of those options. The Better Buildings Financing Navigator, an online tool that helps public and private sector organizations find financing solutions for energy efficiency and renewable energy projects, was expanded to include more information on green bonds.



Financial Allies with Most Capital Invested in 2019
Contributions Toward Goal Since Baseline Year

Bank of America*	\$2.25B
Enterprise Community Partners*	\$481M
AFL-CIO*	\$454M
Connecticut Green Bank*	\$232M
Bostonia Partners	\$186M
Renew Financial*	\$158M
Redaptive*	\$151M
Greenworks Lending*	\$83M
Renew Energy Partners*	\$45M
PACE Equity*	\$37M
Hawaiian Green Infrastructure Authority*	\$28M
Metrus Energy*	\$20M

*Goal achiever

On the Solution Center: Financing Navigator



Leadership in Action

- ▶ **Citizen Energy** implemented lighting upgrades at several multifamily properties using an efficiency-as-a-service model, resulting in over 20% savings for each owner. 
- ▶ Three new Financial Allies joined the program last year, committing a total of \$180,000 million in financing for energy efficiency and renewable energy projects.
- ▶ **Lever Real Estate Capital** provided \$4.6 million in PACE financing for various energy conservation measures as part of the redevelopment of the historic Blackstone Hotel in Omaha, NE. 
- ▶ **Hannon Armstrong** financed an \$85 million project at Parris Island Marine Base that will save \$6 million in annual energy costs and improve facility resilience. 
- ▶ **Bank of America** and **Citi** issued green bonds with an aggregate total of over \$7 billion to support organizational efforts to improve energy and sustainability.  
- ▶ Cumulative commercial PACE investment in the U.S. eclipsed \$1 billion in 2019, with the more than 20 Financial Allies that offer PACE contributing more than \$570 million to this total.

"The Financial Allies program provides meaningful thought leadership, helping organizations understand complex options while connecting their needs to the capital to fund projects. Bank of America's participation directly aligns with our commitment to environmental sustainability."

— Geoff Culm

Managing Director – Energy Services and Government Leasing, Bank of America

The U.S. Federal Government is the largest energy consumer in the nation. In fiscal year 2018, the government used nearly 900 trillion Btu of site-delivered energy in buildings and mobility operations costing a total of \$16.6 billion, with spending for buildings representing \$6.2 billion of the total.²² In order to support federal agency missions and maintain the efficient operation of government buildings, the Federal Energy Management Program (FEMP) offers guidance and tools to optimize building performance and facilitates peer exchange to help implement replicable, cost-effective, and resilient projects. Highlights from the past year include:

- ▶ FEMP hosted the **2019 Energy Exchange** in Denver, Colorado, attended by more than 2,500 stakeholders from the larger federal energy- and water-management community.
- ▶ During FY2019, the Federal Government invested a **record of nearly \$820 million** to strengthen energy and water infrastructure using DOE's indefinite-delivery, indefinite-quantity (IDIQ) energy savings performance contract.
- ▶ FEMP launched **50001 Ready cohorts for federal sites** to provide training on how to implement DOE's 50001 Ready program.

New Tools and Resources

- ▶ A [suite of cybersecurity tools](#) using the National Institute of Standards and Technology (NIST) Cybersecurity Framework was created to enhance the cybersecurity posture of federal facilities.
- ▶ The [REopt Lite tool](#)—which allows users to evaluate distributed energy resources for economic viability, optimal dispatch strategy, and sustainment of critical loads during a grid outage—[continues to be enhanced](#) to address user priorities. REopt Lite now has expanded resilience capabilities to enable users to optimally size new diesel generation and better understand the benefits and trade-offs of resilience.
- ▶ The [Energy Savings Performance Contract \(ESPC\) Project Development Resource Guide](#) outlines the available resources that project facilitators and federal project executives use in delivering ESPC project development services and laying out product documentation requirements.

FEMP by the Numbers

\$1.8 billion	Total Federal Investment in Facilities Infrastructure Energy Efficiency Government-Wide in FY2018
6 trillion Btus per year	Estimated Annual Energy Savings from FY2018 Investment
\$150 million	Estimated Annual Energy Cost Savings from FY2018 Investment
\$820 million	Efficiency Investment Awarded in FY2019 Under FEMP-Managed Performance Contracts (DOE IDIQ)

Leadership in Action

- ▶ A number of federal sites were recognized for attaining DOE's 50001 Ready recognition, including the **Tennessee Valley Authority's** Magnolia Combined Cycle Power Plant, **Oak Ridge National Laboratory**, and **National Renewable Energy Laboratory**.
- ▶ **The U.S. Navy** is implementing a nearly \$350 million ESPC project with guaranteed cost savings of more than \$830 million to address resilience, reliability, and efficiency at Naval Station Guantanamo Bay with the installation of a new power plant, microgrid, battery energy storage system, and solar photovoltaics.
- ▶ FEMP completed Retuning Challenge pilots with the **U.S. Army, Department of Veterans Affairs, General Services Administration, and National Aeronautics and Space Administration**; site retuning can typically reduce energy usage up to 20% through properly configured and maintained building systems.
- ▶ The **Drug Enforcement Administration (DEA)** and the **National Institute of Standards and Technology (NIST)** both completed their first year of energy savings performance contract energy sales agreements (ESPC ESAs). The DEA project includes a 2.5 MW solar PV system, which is expected to save more than \$300,000 in energy annually, while NIST installed a 5 MW ground-mounted PV system, which will realize more than \$3.5 million in energy savings over the life of the contract.

COMMERCIAL

Abbott Northwestern Hospital
 AKSAN United Fortune, Inc.*
American Family Insurance
Anthem, Inc.*
 Army & Air Force Exchange Service
Ascension*
 AtSite
 Baptist Memorial Hospital Desoto
 Beaumont Health System
 Belk, Inc.
 Berkshire Residential Investment
Best Buy*
 BJ's Wholesale Club, Inc.
 Bon Secours St. Francis Health System
 Boston Market
 Briad Wenco*
 Brixmor Property Group
 Broward Health North
 Calhoun Management*
 Carlisle Corporation*
 Catholic Health Initiatives
 CBRE
 CC Frost Properties, Ltd.
 CEFCO Stores
 CentraCare Health
 Chipotle Mexican Grill
CKE Restaurants Holdings, Inc.*
 Clarion Partners
Cleveland Clinic*
 Coffee & Bagel Brands
 Colliers International
Columbia Association*
 CommonWealth Partners*
 Community Services Agency & Development Corporation
 Costco Wholesale Corporation

*Cotti Foods Corporation**
 Cox Enterprises
 Crate & Barrel
 Cushman and Wakefield
 Dacra Development
 DaVita
 Delight Restaurant Group*
 Denver West
 Dunkin' Brands
DWS*
 Equity One Inc.
 First Potomac Realty Trust
 Food Lion
 Forest City Realty Trust
 Gables Residential
 Glenborough
 Guam Memorial Hospital Authority
 Gundersen Health System
 H&M
 Hackensack Meridian Health*
 Hamra Enterprises*
 Hannaford
 Harris Teeter
The Hartford Financial Services Group, Inc.*
Havertys*
*Hawaiian Airlines**
 HAZA Foods
 HealthSouth
*Highwoods Properties**
 Hilton*
 Hines
 The Home Depot
 Hoover Foods*
 Hospital Corporation of America
Hudson Pacific Properties
 Hyatt Hotels Corporation
 IBM

IHG (InterContinental Hotels Group)
 Inova Health System
 JAE Restaurant Group*
 Jamestown*
 JBG Smith*
 JC Penney
 Jones Lang LaSalle
 Kaiser Permanente
 Kessinger/Hunter & Co.
 The Kessler Collection
 Kilroy Realty*
 Kimco Realty Corporation
Kohl's Department Stores*
 Lamey-Wellehan Shoes
 LaSalle Investment Management
Las Vegas Sands Corporation*
 LBA Realty*
 Legacy Health
Lendlease*
 Liberty Property Trust
 Life Time Fitness*
 Lincoln Harris
 Living City Block
Loews Hotels & Co*
 Lowe's
*Lush Cosmetics**
 Luxottica North America
Macy's*
 The Malcolm Bryant Corp.
 Marriott International

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Mayo Clinic
McDonald's Corp.
MC Realty
Mesa Lane Partners, LLC
MetLife Investment Advisors*
MGM Resorts International*
Montefiore Medical Center*
Mountain West Wendy's*
Neema Hospitality
Newmark Grubb Knight Frank
NewYork-Presbyterian Hospital*
Nike*
North Shore-Long Island
Jewish Health System
**Nuveen Real Estate
(formerly TH Real Estate)**
Oregon Health & Science University
Panda Restaurant Group, Inc.
Parkway Properties*
Parmenter Realty Partners*
Petco
PetSmart
PNC Financial Services Group*
Primary Aim, LLC*
Principal Real Estate Investors
Prologis*
Promar Corporation
Providence Health & Services
Prudential Financial, Inc.
Publix
Red Robin Gourmet Burgers
Regency Centers
Regions Bank
REI
Related Companies
Retail Properties of America
Ryan Companies US, Inc.
Safeway

Saunders Hotel Group*
Sears
Shari's Cafe & Pies*
Sharpe Properties Group, LLC
*Sheetz Inc.**
Shorenstein Properties LLC*
Siemens
Southwestern Vermont Health Care
Sprint*
Staples*
Starbucks Coffee Company*
Stream Realty Partners, L.P.
Studley
Summa Health System
Suncoast Credit Union*
SUPERVALU
Tar Heel Capital*
Target
TH Real Estate (TIAA)*
Tishman Speyer
The Tower Companies*
Transwestern
U.S. Navy CNIC Facilities
and Acquisitions
U.S. Space and Rocket Center
Ultra Beauty
USAA Real Estate*
University of California, Irvine Health
University of Maryland
Medical Center*
University of Nebraska
Medical Center*
University of Pittsburgh Medical Center
(UPMC)*
University of South Alabama
Medical Center
University of Utah Health Care
UW Health*
Vornado

Walgreens Co.*
Walmart*
The Walt Disney Co.
Washington REIT*
Wawa
Weis Markets
Welltower
Wen-GAP, LLC
Wend-Rockies Inc.*
Wendium of Florida, Inc.*
The Wendy's Company*
WenMarr Management
Company, LLC*
Westchester Medical Center
The Westfield Group
Whole Foods Market*
Wyndham Destinations*
Wyndham Hotels and Resorts
Yum! Brands

DATA CENTERS

CenturyLink, Inc.*
Digital Realty Trust*
eBay Inc.*
Intel*
Intuit*
Iron Mountain Data Centers*
Sabey Data Center Properties*
Virtustream
Waste Management

EDUCATION

Adams 12 - Five Star Schools, CO
Alachua County Public Schools, FL*
Albuquerque Public Schools, NM*
Alexandria City Public Schools, VA*
Allegheny College*
Amity School District, CT

**Anne Arundel County
Public Schools, MD***

Arizona State University
Arlington County School District, VA
Aurora Public Schools, CO*
Bard College*
Boulder Valley School District, CO

Bullitt County Public Schools, KY*

Camas School District, WA*

*Catholic University of America**
Carleton College
Case Western Reserve University

Chesapeake College*

Clark Atlanta University
Colorado School of Mines
Community College of Allegheny County*
Cornell University
Delaware State University*
Douglas County School District, CO
Douglas County School District, NV*
Duke University
Dysart Unified School District 89, AZ*
Emory University
Evergreen Public Schools, WA*
Fairfax County Public Schools, VA*
Florida A&M*
*Fort Worth Independent School District, TX**
Georgia Institute of Technology
Grand Valley State University
Hackensack University Medical Center*
Hermosa Beach City School District, CA
Hillsboro School District, OR*
Horry County Schools, SC

Houston Independent School District, TX*

Indiana University

Indianapolis Public Schools, IN*

Kansas City Public Schools, MO*
Los Angeles Unified School District, CA*
Loyola University
Madison City Schools, AL*
Manchester School District, NH*
Massachusetts Institute of Technology
Mesa County Valley School District, CO*

Michigan State University*

*Montville Public Schools, CT**
*Morehouse College**
Northwestern University*
*Pace University**

Parkway School District, MO*

*Pasadena Independent School District, TX**
Penn State University*
Portland Public School District, OR*
Portland State University

Poudre School District, CO*

Ramapo College

River Trails School District 26, IL*

San Francisco Unified School District*
San Mateo Community College District
School District of Philadelphia, PA
Sewanee: The University of the South*
Stanford University
Stevens Institute of Technology*

Towson University*

Tulane University
Tulsa Public Schools, OK*
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 Illinois, Chicago
University of Maryland
University of Massachusetts Medical School
University of Miami
University of Minnesota
University of New Hampshire
University of South Carolina
*University of Tulsa**
University of Utah*
University of Virginia*
University of Wisconsin
*Washington College**
Washington University in St. Louis*
Washtenaw Community College
Xenia Community Schools, OH*

FEDERAL

Argonne National Laboratory
Defense Health Agency
Environmental Molecular Sciences Laboratory
Lawrence Berkeley National Laboratory
Lawrence Livermore National Laboratory

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Los Alamos National Laboratory
 National Energy Research
 Scientific Computing Center
 National Renewable
 Energy Laboratory
 Oak Ridge National Laboratory
 Pacific Northwest National Laboratory
 U.S. Department of Agriculture -
 Edward T. Schafer Agricultural
 Research Center
 U.S. Department of Defense - Defense
 Information Systems Agency
 U.S. Department of Veterans Affairs
 U.S. Environmental
 Protection Agency
 U.S. General Services Administration -
 Federal Drug Administration Bothell
 Laboratory
 U.S. National Aeronautics
 and Space Administration -
 Armstrong Flight Research Center
 U.S. National Aeronautics
 and Space Administration -
 Jet Propulsion Laboratory
 U.S. Social Security Administration
 Veterans Health Administration

FINANCIAL ALLIES

Abundant Power Group*

Advantage Energy Capital
 Partners, LLC*

AFL-CIO Housing Investment Trust*

All American Investment Group*

Allumia*

Alturus*

Bank of America*

BioStar Renewables*

Blue Hill Partners LLC*

BlueFlame Energy Finance*

Bostonia Partners LLC*

Byline Financial Group*

California Housing Partnership*

CBJ Energy*

Centrica Business Solutions*

Citi*

*Citizen Energy**

CleanFund LLC*

Commercial Power Partners, LLC*

Community Investment Corporation*

Connecticut Green Bank*

EDF Renewable Energy*

Energi*

*Enhanced Capital**

Enterprise Community Partners*

Flywheel*

Greenworks Lending*

Hannon Armstrong*

The Hartford Steam Boiler Inspection
 and Insurance Co.*

Hawaii Green

Infrastructure Authority*

Lever Energy Capital*

LISC*

Low Income Investment Fund*

Metrus Energy*

New York City Energy Efficiency Corporation*

Onsite Utility Services Capital*

PACE Equity*

Petros PACE Finance LLC*

Redaptive*

Renew Energy Partners*

Renew Financial*

Samas Capital*

Skyview Ventures*

Sol Systems*

Southeast Capital & Finance*

Sparkfund*

Structured Finance Associates, LLC*

Triple Bottom Line (TBL) Foundation*

Urban Ingenuity*

Ygrene Energy Fund*

INDUSTRIAL

3M*

AbbVie Inc.

Agropur

Alcoa*

Alexandria Renew Enterprises*

Alumalloy Metalcastings

Amcor

American Mitsuba

ArcelorMittal USA

Armstrong Flooring, Inc.

Asama Coldwater Manufacturing

AstraZeneca

AT&T

Autoliv

Avon Lake Regional Water

Ball Corporation

BD*

Bendix Commercial Vehicle Systems

Bentley Mills*

Bosch Rexroth

BPM, Inc. (Badger Paper Mills, Inc.)

Bradken

Bridgestone Americas, Inc.

Briggs & Stratton*

Bristol-Myers Squibb*

Buck Company

Bucks County Water & Sewer Authority*

California Portland Cement Company
 (d.b.a. CalPortland)

Campbell Soup

Cardington Yutaka Technologies*

Carlton Forge Works
 Cascade Engineering
 Technologies, Inc.

Celanese International Corporation*

**C. F. Martin & Co., Inc.
 (Martin Guitar)***

Chapco Inc.
 Charter Steel
 Chippewa Valley Ethanol Company
 Citrus World, Inc. (formerly Florida's
 Natural Growers)
 City of Charleston, SC,
 Water System
 City of Grand Rapids Water Resource
 Reclamation Facility*
 City of Phoenix Water
 Services Department
 City of Roseville, Environmental Utilities
 Department

Clearwater Engineering
 Coilplus Inc.

Comau Inc.

Commercial Metals Company
Commercial Vehicle Group
 Co-Operative Industries
 Aerospace & Defense

Cooper Standard

Cummins, Inc.*

Custom Glass Solutions

Daikin Applied Americas, Inc.

Darigold*
 Delta Diablo
 Denison Industries
 Des Moines Water Works*
 Deschutes Brewery
 Didion Milling
 Dixline Corporation
 Donsco Inc.
 Dow Chemical

DSM North America
 Durable Products
 Durex Inc.
 Earth2O (d.b.a. The Sweetwater
 Company Inc.)

East Penn Manufacturing Co.

Eastman Chemical Company*

Eaton Electric

Eck Industries
 Electrolux*

Encina Wastewater Authority*

Estée Lauder

**Expera Specialty Solutions
 (Thilmany Mill)**

Fiat Chrysler Automobiles
 Flambeau River Papers
 Flowers Foods
 FMC Corporation
 Ford Motor Company*
*Fort Wayne City Utilities - City of
 Fort Wayne*

GB Manufacturing

General Aluminum Manufacturing
 Company

**General Dynamics Ordnance
 and Tactical Systems**

General Electric*

General Mills*

General Motors*

General Stamping & Metalworks
 GKN Aerospace Services Structures
 Golden Renewable Energy, LLC
 Goodyear Tire & Rubber Company
 Graham Packaging

**Graphic Packaging
 International, Inc.**

HARBEC*

Harley-Davidson Motor Company
 Harrison Steel Castings Co.

Harva Company
 Haynes International
 HNI Corporation/Allsteel
 Honda
 Huntsman Corporation
 Imerys Carbonates North America

Ingersoll Rand*

Ingevity

Intel
 International Paper Company
 Intertape Polymer Group
 Intralox LLC
 Ithaca Area Water Wastewater
 Treatment Agency*

JBT Corporation

Jedco, Inc.

Johnson Controls*

Johnson & Johnson

Johnson Matthey

J.R. Simplot*
 Kent County Levy Court
 Kenworth Truck Company

Kingspan Insulated Panels, Inc.

Krage Manufacturing
 KYB Americas Corporation

Lafarge-Holcim*

Land O'Lakes
 Leggett & Platt, Incorporated

Legrand*

Lennox International*

Lineage Logistics

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Lockheed Martin

L'Oréal*

Los Angeles Bureau of Sanitation

Los Angeles Department of
Water and Power*

Lynam Industries Inc.

Magnetic Metals Corp.

MAHLE Engine Components USA

Manitowoc Grey Iron Foundry

Mannington Mills

Marquis Energy

Marquis Energy Wisconsin

Massachusetts Water
Resources Authority

MB Aerospace East Granby

McCain Foods USA, Inc.

McWane, Inc.*

MEKRA Lang

Metal Industries, Inc.

Miami-Dade Water &
Sewer Department

Michels Corporation

Mitsubishi Electric Automotive America

Mohawk Industries

Mulgrew Aircraft Components, Inc.

Narragansett Bay Commission

Navistar International Corporation

Neenah Foundry

**NEW Water (Green Bay
Metropolitan Sewerage District)***

Newman Technology

ND Paper Inc.

Nissan North America*

Novati Technologies

Novelis

NSK Americas

NYC DEP - Bureau of
Wastewater Treatment

Occidental Chemical Corporation

O'Fallon Casting

OFD Foods

OMNOVA Solutions Inc.

Orange Water and Sewer Authority*

Oshkosh Corporation

Osram Sylvania**Owens Corning**

Ozinga Bros.

Pactiv

Paperworks Industries

Parker Hannifin

Patrick Cudahy**Patriot Foundry & Castings**

PepsiCo

Pharmavite*

Philadelphia Water Department

Pima County Regional Wastewater
Reclamation Department

Plastics Engineering
Company (Plenco)

PPC Broadband

PPG

Procter & Gamble

Quad/Graphics, Inc.

Raytheon

Research Electro-Optics

Richmond Industries Inc.

Roche Diagnostics Operations

Rowley Spring and Stamping

Saint-Gobain Corporation*

Saputo Dairy Foods

Savage Precision Fabrication

Schneider Electric*

Sears Manufacturing Company

Selmet, Inc.

Shape Corporation

Shaw Industries

Sheboygan Regional Wastewater

Treatment Facility

Sherwin Williams

Silgan Closures

Silgan Containers

Silgan Plastic Food Containers

Solberg Manufacturing Inc.*

Sony DADC

Spirax Sarco, Inc.

Stanley Spring and Stamping

Steelcase, Inc.

St. Petersburg Water
Resources Department

Sugar Creek Packing Co.

SunOpta, Inc.

TE Connectivity*

Tenaris

Texas Instruments

Texas Nameplate Co.

Textron, Inc.

ThyssenKrupp Elevators

TitanX Engine Cooling, Inc.

**Toyota Motor Engineering
& Manufacturing North
America, Inc.***

TPC Group LLC

Tri-State Plastics, Inc.

Tyson Foods

United Mechanical and Metal
Fabricators (U-MEC)

United Technologies Corporation*

Valmont Industries

Vanguard Space Technologies

Vermeer

Verso Corporation**Victor Valley Wastewater
Reclamation Authority***

Vitro Architectural Glass

Volvo Group North America*

W. L. Gore and Associates

Waupaca Foundry
 Weber Metals Inc.
 Western Lake Superior
 Sanitary District
 Westrock
Weyerhaeuser
 Whirlpool Corporation
 Xerox*
 Zimmer Biomet

MULTIFAMILY

2LifeCommunities*
 ACTION-Housing Inc.*
 Aeon*
 AHEAD, Inc.*
 Atlanta Housing Authority*
 Beacon Communities*
 Boston Housing Authority*
 The Boston Land Company*
 Bozzuto Management Company*
 BRIDGE Housing Corporation*
Cambridge, MA, Housing Authority*
 Capitol Hill Housing*
 Caritas Communities, Inc.*
 Cascap, Inc.*
 Century Housing*
 The City of Hickory Public
 Housing Authority*
 Cleveland Housing Authority*
 Codman Square Neighborhood
 Development Corporation*
 CommonBond Communities*
 The Community Builders, Inc.*
 Community Housing Partners*
 Consecra Housing Network*
Corcoran Management*
 Cuyahoga Metropolitan
 Housing Authority*

Danville Development*
 EAH Housing, Inc.*
 East Bay Asian Local
 Development Corporation*
 The Economic Development Authority
 of the City of Mankato, MN*
 Eden Housing*
 The Evangelical Lutheran
 Good Samaritan Society*
 Fort Wayne Housing Authority*
 Foundation Communities*
 FS Energy*
 Gary Housing Authority*
 Gateway Management
 Services, LLC*
 Green Coast Enterprises*
 High Desert Housing*
 Homes for America*
 Housing Authority of Baltimore City*
 Housing Authority of the City of
 Bristol, CT*
 The Housing Authority of the City and
 County of Denver*
 Housing Authority of the City of
 Helena, MT*
 Housing Authority of the City of
 Palatka, FL*
 Housing Authority of the City of
 Philadelphia, PA*
 Housing Authority of the City of
 San Buenaventura, CA*
 Housing Authority of
 Knox County, IN*
 Houston Housing Authority*
 Jamaica Plain Neighborhood
 Development Corporation*
**Jersey City, NJ,
 Housing Authority***

**Jewish Community Housing
 for the Elderly***

Jonathan Rose Companies*
Keene Housing*
 Kier Property Management*
 King County Housing Authority*
 Korman Residential Properties, Inc.*
 LINC Housing Corporation*
 Lucas Metropolitan
 Housing Authority*
 Manhattan Housing Authority*
 McCormack Baron Salazar*

Mercy Housing, Inc.*

Michigan City Housing Authority*
 Minneapolis Public
 Housing Authority*
 National Church Residences*
 New Bedford Housing Authority*
 New York City Housing Authority*
 NewLife Homes*
 NHP Foundation*
 NHT/Enterprise Preservation
 Corporation*
 Peabody Properties, Inc.*
 Presby's Inspired Life*

Preservation of Affordable Housing*

Puerto Rico Public Housing
 Administration*
 REACH CDC*
 The Renaissance Collaborative*
 Retirement Housing Foundation*
 Rockford Housing Authority*

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Rural Ulster Preservation Company*
San Antonio Housing Authority*
Satellite Affordable Housing
Associates*
Schochet Companies*
The Silver Street Group
and Housing Management
Resources, Inc.*
Stewards of Affordable Housing
for the Future
Tampa Housing Authority*
**Tenderloin Neighborhood
Development Corporation***
**Trinity Housing Corporation
of Greeley, CO***
Trinity Management*
Truth or Consequences
Housing Authority*
Utica Municipal Housing Authority*
Village of Hempstead
Housing Authority*
Vistula Management Company*
Volunteers of America
Washington, DC,
Housing Authority*
Wesley Housing Corporation*
Windsor Locks Housing Authority*
WinnCompanies*
Wishrock Investment Group*
Yolo County, CA, Housing Authority*

STATE & LOCAL

Alabama

Albany, NY
*Alexandria, VA**
Anchorage, AK
Arlington County, VA*
Arvada, CO*

Atlanta, GA*

Austin, TX
Beaverton, OR*
Boston, MA*
Boulder, CO
Boulder County, CO
Broward County, FL
California
Cambridge, MA
Chattanooga, TN*
Chicago, IL*
Chula Vista, CA*
Cincinnati, OH
Clark County, NV*
Cleveland, OH*
Colorado
Columbia, MO*
Columbus, OH
Commonwealth of Pennsylvania
Connecticut
Cook County, IL*
Dearborn, MI
Deerfield Beach, FL
Delaware*
**Delaware Valley Regional
Planning Commission**
Denver, CO*
Des Moines, IA
Detroit, MI
District of Columbia*
Dubuque, IA
El Paso, TX*
Evanston, IL
Flint, MI
Florida
Fort Lauderdale, FL*
Fort Worth, TX*

The Fresno Energy
Performance District
Gary, IN
Gillette, WY*
Greater Lawrence Sanitary District
Hall County, GA*
Hawaii
Hawkeye Area Community
Action Agency
Hillsboro, OR*
Hoboken, NJ
Holland, MI
Houston, TX*
Huntington, NY*
Huntington Beach, CA
Illinois
Indiana
Iowa
Kansas
Kansas City, MO
Kauai County, HI*
King County, WA*
Knoxville, TN*
Knoxville Utilities Board
Little Rock, AR
Local Government Commission
Los Angeles, CA*
Los Angeles County, CA
*Manchester, NH**
Margate, FL*
Maryland*
Massachusetts*
Medford, MA*
Miami-Dade County, FL
Michigan
Milwaukee, WI*
Minneapolis, MN

Minnesota*

Missouri

Montana

Montgomery County, MD

Montpelier, VT

Nevada

New Hampshire

New Orleans, LA

New York, NY

Newark, NJ

North Carolina*

North Dakota

**Northeast Ohio Regional
Sewer District**

Oakland, CA

Oklahoma

Oregon

Orlando, FL*

Perry, IA

Philadelphia, PA*

Phoenix, AZ

Pittsburgh, PA*

Placer County, CA*

Portland, ME

Portland, OR

Racine, WI

Reno, NV*

Rhode Island*

Richmond, VA

Roanoke, VA*

Rochester, NY*

Saint Paul, MN

Salt Lake City, UT*

San Diego, CA*

San Francisco, CA

Santa Fe, NM*

Santa Monica, CA

Seattle, WA*

Sonoma County, CA

South Carolina

Southeast Michigan
Regional Energy Office

Southern California
Regional Energy Network

St. Petersburg, FL

Takoma Park, MD

Tallahassee, FL

Tennessee

Texas

Thurston County, WA*

Toledo, OH*

Utah

Virgin Islands Energy Office

Virginia

Washington

Washington State Transportation
Improvement Board

West Palm Beach, FL*

West Virginia

Will County, IL*

Wisconsin

Worcester, MA*

UTILITY

AEP Ohio

Arizona Public Service

Atlanta Gas Light

Austin Energy

Baltimore Gas & Electric

Bonneville Power Administration

California Energy Commission

Commonwealth Edison

Consolidated Edison

Efficiency Vermont

Eversource

Focus on Energy

Kansas City Power & Light

Long Island Power Authority

National Grid

Nicor Gas

NSTAR/Northeastern

One Gas

Orlando Utilities Commission

Pacific Gas and Electric Company

PECO

Pennsylvania PUC

Peoples Natural Gas

Pepco

Philadelphia Gas Works

PSEG Long Island

Puget Sound Energy

Questar Gas

Reliant/NRG

Rocky Mountain Power

San Diego Gas & Electric

Southern California Edison

Southern California Gas

TECO

Xcel Energy

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PROGRAM AFFILIATES

2G Energy Inc.

Aegis Energy Services

Alliance to Save Energy

American Council for an
Energy-Efficient Economy

American Hotel & Lodging Association

American Institute of Architects

American Planning Association

American Society for
Healthcare Engineering

American Society for Heating,
Refrigerating, and Air-Conditioning
Engineers

APPA - Leadership in
Educational Facilities

Appraisal Institute

Arup

Asian American Hotel
Owners Association

Association for Learning Environments

Association for the Advancement of
Sustainability in Higher Education

Association of Energy Affordability

Biomass Thermal Energy Council

BlocPower

Build It Green

Building Owners and Managers
Association International

Building Performance Institute

The Bullitt Foundation

C40

California Regional Multiple
Listing Service

California Street Light Association

Capstone Turbine Corporation

Caterpillar Inc.

Center for REALTOR® Technology

City Zenith

Clean Energy States Alliance

Commercial Real Estate Data Alliance

Community Action Partnership
of Oregon

Community Action Program
of Evansville and
Vanderburgh Counties

Connex

Consortium for Building
Energy Innovation

CoreLogic

Couleecap Inc.

Council of Multiple Listing Services

Denver National Western Center

DTE Energy

Earth Advantage

EcoDistricts

Ecolibrium3

Edison Electric Institute

EEtility

Elevate Energy

Emerald Cities Collaborative

Energize Connecticut

The Energy Coalition

Energy Efficiency for All/NRDC

Energy Foundation

Energy Outreach Colorado

Enhabit

Environmental Defense Fund

Ford Twin Cities Assembly Plant
Redevelopment Project

Franklin Energy Services LLC

Garfield Clean Energy Collaborative

GE Distributed Power

GEM Energy LLC

Global Cool Cities Alliance

Google

Governing Institute

Green Building Alliance

Green Button Alliance

Green Parking Council

Green Sports Alliance

GRID Alternatives

Groundswell

Hatch

Health Care Without Harm

Highland West Energy

Home Innovation Research Labs

Home Performance Coalition

Homes.com

ICLEI

Illuminating Engineering Society
of North America

Institute for Market Transformation

Institute for Sustainable Communities

International City/County Management
Association

International District
Energy Association

International Facility
Management Association

IRES MLS

Kraft Power Corporation

Kresge Foundation

MacAllister Power Systems

Martin Energy Group

Metropolitan Regional
Information Systems

Mid-America Regional Council

Midwest Energy Efficiency Alliance

Midwest Real Estate Data

NACUBO

NAIOP (Commercial Real Estate
Development Association)

National Apartment Association

National Association of Convenience Stores	Renewable Energy Transition Initiative
National Association of Counties	Retail Industry Leaders Association
National Association of Real Estate Investment Trusts	Rocky Mountain Institute
National Association of REALTORS®	Roof Coatings Manufacturers Association
National Association of Regional Councils	Second Nature
National Association of State Energy Officials	Slipstream
National Co-op Grocers	Smart Cities Council
National Energy Education Development Project	Smart Energy Decisions
National League of Cities	The Solar Foundation
National Multifamily Housing Council	Spire Inc.
NeighborWorks of Western Vermont	STAR Communities
New Buildings Institute	Sterling & Wilson Cogen Solutions, LLC
New Jersey Clean Energy Program (TRC Solutions)	Stewart and Stevenson Power Product LLC, Atlantic Division
North American Sustainable Refrigeration Council	Sun Valley EcoDistrict
Northeast Energy Efficiency Partnerships	Surdna Foundation
Northeast-Western Energy Systems	Sustainability Roundtable Inc.
NYSERDA	Sustainable Endowments Institute
Opportunity Council	Telecommunication Industry Association
Pearl National Certification	Tennessee Valley Authority
Pension Real Estate Association	Thermal Energy Corporation
Philips Lighting	U.S. Green Building Council
PicketFence.com	Unified Foodservice Purchasing Co-op, LLC
Posigen	Unison Energy, LLC
Practice Greenhealth	United Illuminating
Public Technology Institute	Urban Land Institute
The Real Estate Round Table	Urban Sustainability Directors Network
Real Estate Standards Organization	Vermont Energy Investment Corporation
Realtors Property Resource, LLC	Vizient Vote Solar
Regional MLS	Water Environment Federation
	Western New York Manufacturing ZNE District

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- 1 U.S. Department of Energy (DOE). 2015. *Quadrennial Technology Review: An Assessment of Energy Technologies and Research Opportunities*, page 207. <https://www.energy.gov/sites/prod/files/2017/03/f34/qtr-2015-chapter6.pdf>
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- 6 U.S. Bureau of Labor Statistics (BLS). 2020. *Occupational Outlook Handbook, Healthcare Occupations*. <https://www.bls.gov/ooh/healthcare/home.htm>
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- 11 American Council for an Energy Efficient Economy (ACEEE). 2019. *State Energy Efficiency Scorecard*, page 1. <https://aceee.org/sites/default/files/publications/researchreports/u1908.pdf>
- 12 American Council for an Energy Efficient Economy (ACEEE). 2019. *State Energy Efficiency Scorecard*, page vi. <https://aceee.org/sites/default/files/publications/researchreports/u1908.pdf>
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