



Milwaukee, Wisconsin USA

Pursuing Ambitious Energy Efficiency for Better Buildings with PACE Financing

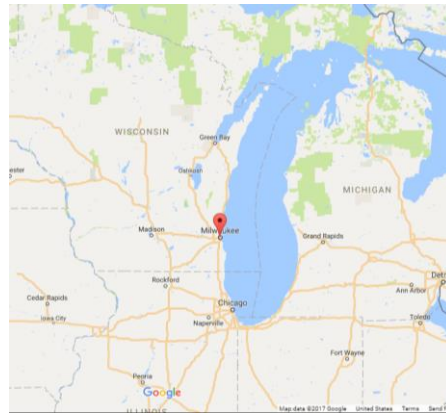
To solidify itself as a low-carbon leader and support economic growth through energy efficiency, the City of Milwaukee has undertaken a comprehensive energy efficiency program for buildings. Building efficiency in the commercial sector provide particular opportunity for the City to curtail greenhouse gas emissions while epitomizing public-private leadership on greenhouse gas emissions reduction. Utilizing a mix of federal funding paired with a financing strategy that incentivizes clean energy upgrades, Milwaukee is on a path to retrofit 200 commercial and industrial buildings with energy-efficient upgrades to meet its goal of 20% building energy reduction over a decade.

Case study

November 2017

Summary

The City of Milwaukee, Wisconsin, is positioning itself to be a world class eco-city by championing the U.S. Department of Energy’s Better Buildings Challenge, which targets 200 buildings citywide for efficiency improvements. So far, 166 buildings have participated in the Challenge with a total of 13 million square feet. A next generation of building efficiency workers have begun to be trained with state of the art technology and the project has made gains to integrate existing DOE tools, including Asset Score and SEED, throughout Milwaukee’s building efficiency delivery system — 23 buildings had been analyzed using DOE tools as of September 2017. Realizing that these city-led innovations created opportunity for peer sharing and technology exchange, Milwaukee was one of the first cities to participate in the Building Efficiency Accelerator (BEA), an initiative led by the World Resources Institute Ross Center for Sustainable Cities.



Population/land area

595,047 / 96.83 sq. mi

Building energy results

111 municipal buildings & 55 commercial buildings and K-12 schools participating
4 million square feet municipal space
23 buildings analyzed

Commercial Building Energy Use in Cities

Commercial buildings consume about 18% of total energy use in the United States and addressing how efficient building systems operate is important for meeting greenhouse gas-reduction targets. Moreover, building efficiency upgrades can



BETTER BUILDINGS CHALLENGE

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offer a number of economic, environmental, and social co-benefits in addition to reduced emissions, including lower heating and cooling bills, improved health outcomes and comfort for building occupants, and foundational support for more resilient energy systems such as solar-plus-storage.

Following the 2008 economic downturn in the U.S., the federal government identified building efficiency as an opportunity to regenerate growth in American cities in a way that can produce quality jobs. The Department of Energy launched the Better Buildings Challenge program in 2011 to create an avenue for stimulus funding toward reduced building energy use — specifically 20% by 2020. With energy efficiency upgrades at its core, the Better Buildings Challenge offers a way for cities to jumpstart their energy efficiency and renewable energy programs alongside economic recovery, particularly in the commercial sectors. The Challenge provides building operators with technical support to install modern lighting, HVAC, and building control technologies — upgrades that can help commercial buildings cut energy use 38% on average, saving \$0.61 per square foot annually.

One city championing the Better Buildings Challenge is Milwaukee, WI, which has targeted 200 buildings citywide for efficiency improvements.

Milwaukee: Smart City USA

Already a leading city on sustainability and energy efficiency, the City of Milwaukee, Wisconsin, is positioning itself to be a world class eco-city. Located on the “fresh coast” shores of Lake Michigan, the City of about 600,000 residents is characterized by the rivers that run through its urban core, its manufacturing industry that includes energy and water technologies, and its food and beverage economy famous for beer production. The City is interested in making its communities sustainable by implementing energy efficiency and renewable energy programs and plans for climate change in terms of both mitigation and adaptation having been impacted by major flood events in 2008 and 2010.



Milwaukee is a City of about 600,000 located on the “fresh coast” of Lake Michigan and is taking on efficiency upgrades for 200 buildings. Photo by Pixabay/12019

In 2013, the City implemented a strategic planning process on sustainability called ReFresh Milwaukee. This sustainability strategic plan focused on key issues facing the city, such as buildings and energy, and outlined efforts that contributed to Milwaukee's Mayor Tom Barrett being recognized by the U.S. Conference of Mayors for his climate action, receiving honorable mention for Climate Protection Awards in 2013 and 2014.

Despite these efforts, Milwaukee's aging commercial buildings are a growing concern for citizens of the city and are increasingly seen as an impediment to improving local quality of life. Aging structures, the foreclosure crisis, and state law restricting green building practices are all issues that were identified in the City's 2014 sustainability annual report. The City of Milwaukee is committed to rehabilitating and repurposing aging structures, as well as encouraging and investing in energy efficiency improvements in existing buildings.

Engaging with Commercial Buildings through Better Buildings Challenge

Milwaukee's built environment must be planned for one of the widest weather and temperature fluctuations in the country. To achieve this in the buildings sector, the City relies on strong energy efficiency measures as a first consideration, backed by a Wisconsin law that prioritizes efficiency over new power plant generation where feasible. Four core programs led the City's building efficiency efforts to utilize energy efficiency as an economic and job engine: the Me2 program for residential efficiency, the Me3 manufacturing technical assistance program (which is currently being phased out and the City is partnering with the Industrial Assessment center at UWM to provide a similar service), the Milwaukee Shines program to incentivize solar energy, and the national Better Buildings Challenge Initiative highlighted in this case study for its support of commercial buildings.

Knowing that these city-led innovations created opportunity for peer sharing and technology exchange, the City of Milwaukee was one of the first cities to participate in the Building Efficiency Accelerator (BEA), an initiative led by the World Resources Institute Ross Center for Sustainable Cities. As part of the commitment to the BEA — which called for implementing one energy efficiency policy and an associated project — the City became a partner to the U.S. Department of Energy Better Buildings Challenge in 2012, pledging to reduce the energy use of the City's building portfolio 20% by 2020.



“It's not an investment to pay your energy bill. It is an investment to invest in energy efficiency, because when you lower that bill, you're achieving savings for your business and your customers.” —Mayor Tom Barrett

Photo by Wikimedia commons/Steve Glynn

How Does PACE Work?

Property-Assessed Clean Energy financing, or PACE, is a financing model to encourage energy efficiency improvements and clean energy generation for public and private buildings. Recognizing that energy upgrades require considerable upfront costs, the PACE model allows for improvements to be implemented in the near term but paid off over time, typically as a special surcharge on the property tax bill. Projects are designed so that annual energy savings pay for the special charge, providing a net-positive cash flow. The model is particularly attractive because the PACE financing may not be treated as traditional debt, but experience benefits immediately and the financing transfers with the property, not the owner. PACE must be approved at the state level (currently, PACE has been approved in 33 states, with active programs operating in 19) and typically implemented at the City or County level.

In 2015, the City expanded its Challenge and developed a comprehensive buildings energy efficiency program. Realizing that an easy-to-navigate customer experience was essential, the Milwaukee Better Buildings Challenge created a customer “charter” that tailored an individualized program path based on the goals of each building owner involved. In response to the success of the Better Buildings Challenge for municipal buildings, the City took steps to engage the private sector through a set of bundled energy services. The expansion to commercial buildings is called Better Buildings Challenge- Milwaukee or the “enhanced Better Buildings Challenge.” and was funded by a \$750,000 federal grant with a matching cost share with the aim to cut energy use in municipal and downtown commercial buildings. The City seeks to enlist 200 buildings over three years to join the Challenge. The customized charter approach led to several key successes early on in the Better Buildings Challenge, including for five buildings in the Milwaukee Public Schools system, two of the largest buildings in the Milwaukee County system, and saving 12% annual energy use and \$47,000 in the historic Central Library building.

In exchange to joining the enhanced Better Buildings Challenge, the City provided a number of bundled services to Class B and C commercial building owners. Bundled service offerings included:

Benchmarking. Building managers cannot track their progress to meet energy reduction goals without first establishing a baseline of energy use. Benchmarking is, therefore, essential to track energy use over time to compare current and future building performance to past performance. Milwaukee’s Better Building Challenge uses EPA’s Portfolio Manager tool, allowing commercial building owners to visualize their energy use, track use over time to single out abnormalities, compare buildings across the city, and allow the City to recognize efficiency success.

Energy assessments. For a limited time during the Better Buildings Challenge, the U.S. Department of Energy funded building energy audits for Class B and C offices, commercial spaces with small square footage, and K-12 school buildings, recognizing that the initial step to decrease baseline energy load is calculating current load for lighting, appliances and equipment.

PACE financing. Property Assessed Clean Energy financing, or PACE, allowed for private capital to fund

upfront energy and water improvements that will be paid through a voluntary municipal service charge paid back over time as part of a building's property tax payments. PACE was offered to any commercial properties free of liens or other restrictions (more on PACE below).

Incentives. A variety of federal and state tax incentives were made available to commercial entities in order to improve initial investments in energy improvements. A feature of the Better Buildings Challenge was match-making between businesses and an adviser to navigate the various incentives available for energy projects, improving cost-effectiveness, sometimes by developing custom incentive for complex projects.

Clean energy technical support. Building owners, property managers, and contractors were given insights into trends in energy-efficient equipment and technologies as part of the Challenge. The Midwest Energy Research Consortium (M-WERC) and Milwaukee's Environmental Collaboration Office partnered to develop a technology page that building stakeholders could use to make the best product choices on building upgrades. The City is one of the first in the country to implement the U.S. Department of Energy's Asset Score — a rating tool for assessing the physical and structural energy efficiency of commercial buildings that enables comparison between buildings — and is also using the Standard Energy Efficiency Data (SEED) platform to track energy efficiency data in a standardized format.

Like the success of Better Buildings Challenge-Milwaukee, these bundled service offerings are the result of the crucial role, public-private partnerships played in accelerating Challenge outcomes. The Challenge gained momentum quickly from the City's role as home base for a robust network of businesses that focuses on energy efficiency, such as the company Johnson Controls which specializes in state-of-the-art, efficient HVAC controls and building management systems. Finally, M-WERC's headquarters in Milwaukee offered the opportunity for the City to benefit from cutting-edge energy innovation close to home — in addition to the synergy that has evolved from the university network's ability to link its research to companies in the region.

PACE in Action: \$1.7m in PACE Financing Helps Restore Historic Building

Citywide, eight projects funded through property assessment financing are projected to generate more than over \$1 million in savings on energy bills. Financing partner PACE Equity of Milwaukee has invested \$12 million in the various projects, including downtown historic landmark the Mackie Building.

The Mackie Building was built 136 years ago to house Milwaukee's grain trading hub, and the building is still often referred to as "the Grain Exchange." The site also functioned as the original home of the Milwaukee Chamber of Commerce.



Photo by Wikimedia commons/James Steakley

Results

So far, 111 municipal buildings have participated in the Better Buildings Challenge-Milwaukee with a total of 4 million square feet. An additional 55 commercial buildings and K-12 schools, totaling 9 million square feet, also participated.

In terms of technology delivery, a number of gains have been made: A website was built to enable building owners to navigate energy project progress and a database of state and U.S. energy efficiency technologies compiled. A next generation of building efficiency workers have begun to be trained with state of the art technology and the project has made gains to integrate existing DOE tools, including Asset Score and SEED, throughout Milwaukee's building efficiency delivery system — 23 buildings had been analyzed using DOE tools as of September 2017. Data transparency has been increased through benchmarking using Portfolio Manager.

Despite the gains, progress slowed when a new Wisconsin state law was adopted that impedes municipalities' ability to improve or enhance commercial building codes with energy efficiency standards. The City created a document called "[Eco Design Guidelines](#)" to assist building owners in going beyond code.

Budget and Finance

City of Milwaukee matched a \$280,000 Department of Energy grant to launch the Better Buildings Challenge in 2016, expanding the program for the 2017 fiscal year with an additional, matched \$465,000 grant agreed to at the outset of the project.

Today, the building is used to host banquets and events within the grain exchange trading floor and as office space.

The Mackie Building's \$13.7 million redevelopment included \$1.7 million in energy-related upgrades — including replacing elevators, introducing low-flow plumbing systems, and improved hot water systems — that are being financed over time as an assessment on property tax bills. The building's HVAC system is being upgraded from steam to an efficient variable refrigerant flow (VRF) system, which both heats and cools while requiring no ductwork, thereby preserving the building's interior in order to meet historic guidelines. All told, identified utility and operational changes are expected to result in energy savings of 64,000 kWh per year and a total cost savings of \$2.2 million over time.



Photo by Wikimedia commons/James Steakley

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Creative financing beyond the project's \$1.5-million municipal budget was needed to reach the 200-building goal set by the Challenge, so the City utilized its PACE program, implemented a few years before the enhanced BBC, as an innovative financing tool that could engage private financing to drive energy efficiency in commercial buildings. Under PACE, as improvements are made to a building, such as more efficient heating and cooling or better lighting structures, costs are paid over time through a property tax adjustment. Eight approved PACE projects have received a total \$13,139,017 in PACE financing to garner total annual energy cost savings of \$1,088,781.

Building Efficiency Accelerator Supports Milwaukee as a world class eco-City

City of Milwaukee utilized a peer-networking platform that addresses energy efficiency in buildings called the Building Efficiency Accelerator (BEA). The BEA encourages cities to accelerate efforts to become energy efficient through public-private partnerships to implement building efficiency projects and policies on the local level. The BEA has eight strategies that local governments can implement to increase energy efficiency in buildings, such as incentives and finance, local governments leading by example, and municipal engagement with building owners, managers, and occupants.

The City participates in the BEA to show leadership and building global relationships around sustainability.

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