

# Creating a Cost-Effective and Energy Efficient Kansas City with EPA's ENERGY STAR®

***This case study highlights the work Kansas City has done in partnership with ENERGY STAR over the last several years to improve the energy efficiency of its municipal buildings. Local governments can use these approaches and best practices to drive savings in their buildings and enhance their ability to invest in services for their communities.***

Kansas City is the largest municipality in Missouri and home to 459,787 people.<sup>1</sup> Located in the heart of the Midwest, it encompasses 319 square miles across Jackson, Clay, Cass, and Platte Counties. Famous for unique styles of blues, jazz, and barbeque, the city has a long history of trailblazing. Recently, the city's dedication to energy efficiency and sustainability has set it apart. A dedicated city department, the Office of Environmental Quality, ensures internal environmental responsibility and provides regional leadership on sustainability. Kansas City has incorporated [ENERGY STAR®](#) tools, benchmarking, and the ENERGY STAR energy performance score for buildings into its programs. Combined with numerous community outreach efforts and other municipal policies, these efforts have helped Kansas City become a leader in building sustainable communities.

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<sup>1</sup> Population estimate as of April 1, 2010. [www.census.gov/quickfacts](http://www.census.gov/quickfacts)

## The Climate Protection Plan

Kansas City's commitment to energy efficiency dates back to 2005, when Mayor Kay Barnes signed the U.S. Mayors Climate Protection Agreement.<sup>2</sup> In 2008, the new mayor and city council approved a climate protection plan with 55 strategies for reducing emissions.<sup>3</sup> To implement these strategies, Kansas City obtained a \$4.8 million formula grant and a \$20 million grant from the Department of Energy under the Better Buildings program. Several of the plan's strategies form the basis for current Kansas City programs:

- Require commercial and residential developments receiving city funding to pursue ENERGY STAR certification for their buildings and use [ENERGY STAR labeled products](#).
- Require publicly funded housing projects to comply with [ENERGY STAR for New Homes](#) guidelines.
- Encourage businesses to assess emission-reduction strategies, measure and track their energy usage, and reduce GHG emissions.

The city's Climate Protection Plan includes a goal to reduce greenhouse gas emissions from local government operations 30% below 2000 levels by 2020. The Kansas City government has successfully worked towards this goal. Between 2000 and 2013, Kansas City was able to reduce electricity usage for its municipal operations by 21 percent, even as usage across the community increased by 14 percent. Municipal GHG emissions fell by 25 percent during this period, compared with only 4 percent community-wide.

## City Energy Project

The City Energy Project is a three-year initiative that focuses on improving energy efficiency in large commercial, institutional, and multi-family buildings. Ten cities were competitively selected to work with the Natural Resources Defense Council (NRDC) and the Institute for Market Transformation (IMT) to achieve their goals. Each participating city receives funding allowing one staff member to work full time with city officials to advance local sustainability goals. As a participant, Kansas City has implemented several strategies, including:

- Conducting outreach to promote benchmarking using ENERGY STAR Portfolio Manager®;
- Working with the Central Plains chapter of the U.S. Green Building Council to find local vendors that can benchmark and audit energy use and provide energy efficiency improvements;
- Creating a City Energy Project Advisory Committee (CEPAC) consisting of representatives from local hospitals, schools, the stock of commercial building owners, and construction firms;
- Developing a report on currently available financial incentives (e.g., utility rebates) and technical assistance that is available to support energy efficiency improvements by building owners;<sup>4</sup> and
- Implementing the Mayor James Energy Challenge.

## ENERGY STAR Local Government Tools and Resources

- [ENERGY STAR Partnership](#) allows access to promotional materials and co-branding opportunities for increased recognition.
- [Portfolio Manager®](#) EPA's energy measurement and tracking tool enables strategic energy management and use of key performance indicators at no cost.
- [ENERGY STAR Energy Efficiency Competition Guide](#) helps local governments understand how to plan, implement, and market their own energy efficiency competition.
- [ENERGY STAR certification](#) is available to eligible buildings that score in the top 25 percent in energy efficiency.
- [EPA's National Building Competition](#) is a nationwide competition among commercial buildings to reduce energy and water use.

For more information visit [www.energystar.gov/buildings](http://www.energystar.gov/buildings)

<sup>2</sup> <http://www.usmayors.org/climateprotection/agreement.htm>

<sup>3</sup> <http://kcmo.gov/citymanagersoffice/wp-content/uploads/sites/11/2013/11/City-Climate-Protection-Plan.pdf>

<sup>4</sup> <http://kcenergyproject.org/resources>

The Mayor James Energy Challenge is one of the most prominent and well-publicized elements of Kansas City's City Energy Project. In the summer of 2014, Mayor Sly James issued a challenge to building owners and managers to benchmark their energy usage through ENERGY STAR Portfolio Manager. The city continued to lead by example: municipally owned buildings accounted for 67 of the 175 buildings included in the challenge, and the Kansas City Public School District contributed another 40 buildings. Other participants included Hallmark Cards, H&R Block, local universities, many commercial office buildings, and two large hospitals. At least 51 of the buildings participating in 2014 were new to benchmarking. In April 2015, the Mayor launched the 2015 program,

The EPA's ENERGY STAR score is available for 20 different types of facilities. A building's score can range from 1 to 100 and indicates how its performance compares to similar buildings nationwide. Scores of 75 or higher denote top-performing buildings that are eligible for ENERGY STAR certification.

which challenged building owners to improve their ENERGY STAR scores through building upgrades and improvements. This event also recognized Kansas City Power and Light (the local investor-owned electric utility) for providing rebates to building owners for energy efficiency improvements. A 2016 Challenge has already been proposed, in which Kansas City will recognize buildings for achieving a target ENERGY STAR score.

### Kansas City's Energy Data Accelerator Program<sup>5</sup>

Kansas City and the Kansas City Power & Light Company (KCP&L), the local investor-owned electric company, established a partnership with the Department of Energy (DOE) to improve utility data access for building owners and managers. The focus of the Energy Data Accelerator (EDA) project was to overcome market and technological barriers facing commercial building owners, tenants, and utility companies to accessibility of energy consumption data. Particularly, commercial building owners face a market barrier when the owner does not know the utility consumption patterns of their building. This occurs when tenants pay the utility bills and owners are not authorized to access the consumption data from the utility. Owners may also face a technological barrier since large buildings commonly have multiple meters, which can make it difficult for both building owners and utilities to determine which building areas or systems are served by each meter. Further, the billing, physical, and meter addresses for a single building may be different, which causes difficulties when requesting data for a specific building.

During 2014-2015, city and utility staff worked collaboratively with DOE and the U.S. Environmental Protection Agency (EPA) to understand and address the issues associated with energy data access. The participants adopted key policy changes during this time period to overcome the market and technological barriers identified through the EDA program. First, Kansas City adopted the Energy Empowerment Ordinance to facilitate utility data collection from large buildings, beginning with municipal-owned buildings to test the process and lead by example. The policy provides building owners with support to request data from their tenants so that they can better understand utility consumption patterns of their buildings. Second, the Missouri Public Service Commission approved a proposal from KCP&L to aggregate and provide building owners with electricity consumption data in buildings with five or more tenants. Further, KCP&L agreed to research options for transferring data directly to Portfolio Manager. The EDA program guided these local activities by calling attention to these issues, providing technical guidance, including statistical analyses and how-to documents, and offering solutions.

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<sup>5</sup> Energy Data Accelerator page: <http://betterbuildingssolutioncenter.energy.gov/accelerators/energy-data>  
Text provided by JC Martel, Office of City Manager, City of Kansas City, Mo.

## Kansas City's Energy Empowerment Ordinance

To expand the use of benchmarking and encourage energy efficiency, on June 4, 2015, Mayor James and the city council adopted the Energy Empowerment Ordinance<sup>6</sup>, which requires Kansas City building owners to benchmark their energy and water usage with Portfolio Manager and report the results annually to the city.

The city will phase in the benchmarking and reporting requirements over a three-year period:

- All municipal buildings of at least 10,000 square feet must comply no later than May 1, 2016, and each May 1 thereafter.
- All non-municipal buildings (institutional, commercial, industrial, and multi-family residential) of at least 100,000 square feet must comply no later than May 1, 2017, and each May 1 thereafter.
- All non-municipal buildings of at least 50,000 square feet must comply no later than May 1, 2018, and each May 1 thereafter.

The city plans to report benchmarking results for municipal buildings 10,000 square feet or larger by May 1, 2016, and will pursue ENERGY STAR certification for any eligible buildings.

When fully implemented, the ordinance will apply to 1,500 large buildings. The covered multi-family buildings represent approximately 3 percent of the multi-family residential buildings in the city, but approximately two-thirds of the multi-family floor space. The ordinance does not require any building owner to make energy efficiency improvements or take any action to reduce energy use. However, in many other U.S. cities that have adopted similar benchmarking requirements<sup>7</sup>, affected building owners have used the benchmarking information to reduce energy use in their buildings.

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<sup>6</sup> <http://kcenergyproject.org/benchmarking/>

<sup>7</sup> List of U.S. cities that have adopted benchmarking requirements: <https://www.energystar.gov/buildings/program-administrators/state-and-local-governments/policies>

## PACE Financing

For building owners who decide to make energy efficiency improvements, Kansas City has affiliated with two statewide PACE (property-assessed clean energy) districts—the Missouri Clean Energy District (MCED) and the Show Me PACE Clean Energy Development Board—to provide access to capital for energy efficiency and renewable energy projects. MCED has made two PACE loans to building owners in Kansas City. In 2014, MCED loaned \$571,430 to the Wornall Plaza Condominium to improve its lighting, domestic water, building envelope, energy management, and heating, ventilation, and air conditioning systems. In 2016, MCED made a loan of \$1,648,802 to the Plaza Corporate Center for upgrades to the building's chiller, boiler, control system, and fan, and repairs to reduce air infiltration. PACE loans can provide full financing—including the costs of energy audits required to support the loan applications—to local commercial building owners. These loans can be amortized over extended time periods (up to 20 years), such that the resulting annual cost savings on utility bills equal or exceed the annual loan repayments (made as special property tax assessments).

## Kansas City's Enterprise Sustainability Platform and Portfolio Manager

In 2010, the city installed a software program that monitors energy consumption in municipal buildings. The Enterprise Sustainability Platform (ESP) was developed in partnership with Talisen Technologies and provides real-time information from thermostats, fan speeds, outside air sensors, gauges, pumps, and utility sub-meters. The system can adjust connected equipment and software to eliminate energy usage spikes and diagnose problems. ESP consolidates data from these various sources to provide a single snapshot that the Facility Services Division in Kansas City uses to analyze data and minimize both costs and cycle-time. Among the successes since the installation of the ESP have been the city's reduction of electricity consumption at one of its parking garages, saving over \$48,000 a year, as well as the city's reduction of electricity consumption at the Health Department by 27%, saving \$101,976 a year.<sup>8</sup>

In conjunction with ESP, Kansas City uses [Portfolio Manager](#) to monitor and track energy consumption. These systems are fully integrated, meaning that when data are updated in ESP, they are automatically updated in Portfolio Manager. In Portfolio Manager, users can evaluate building energy consumption and see change over time. The use of Portfolio Manager has brought a greater overall awareness of energy benchmarking to the city and provided a basis for the creation of an energy manager position in the Office of Environmental Quality. Kansas City has several examples of building upgrades that demonstrate the value of benchmarking in Portfolio Manager:

**City Hall** is a 76-year-old, 29-story building at the heart of Kansas City's municipal operations. The city began tracking steam consumption for the building using Portfolio Manager, and the data helped make the case for investment in real-time monitoring and demand management for steam consumption. Monitoring and demand management have led to \$150,000 in annual savings and allow the city energy manager to track steam consumption against steam cost and work orders. City Hall achieved ENERGY STAR certification in 2012 with an ENERGY STAR score of 92. In 2016, the City plans to update City Hall's ENERGY STAR certification.



[Kansas City Missouri City Hall](#)

<sup>8</sup> <https://www.talisenintl.com/wp-content/uploads/2015/07/Kansas-City.pdf>

**Kansas City Missouri (KCMO) Health Facility**, which houses both the Public Health Clinic and City Employee Health Clinic, was constructed in 1996 and first benchmarked in 2009, achieving an ENERGY STAR score of 7. After receiving such a surprisingly low score, the facility became a major energy conservation project for the city. Performance monitoring in Portfolio Manager helped designate the facility as a candidate for capital investment. The building then received lighting upgrades and converted from a dual-duct, constant volume system to a variable-air volume system, resulting in significant energy use and cost reductions. Today the Health Facility has an ENERGY STAR score of 63.



*Kansas City Health Care Trust Employee Clinic*

Health Facility 67,326	Electricity (kWh)	Steam (Mlbs)	Chilled Water (Ton Hours)	Total Energy (MMBtu)	Total Cost
2010	4,218,240	0	0	14,393	\$ 314,703.00
2011	3,759,200	0	0	12,829	\$ 298,671.00
2012	2,569,600	0	0	8,770	\$ 248,115.00
2013	2,632,870	0	0	8,986	\$ 267,417.00
2014	2,540,160	0	0	8,670	\$ 252,306.00
<b>% Change (14/10)</b>	<b>-39.78%</b>	<b>N/A</b>	<b>N/A</b>	<b>-39.76%</b>	<b>-19.83%</b>
<b>% Change (14/13)</b>	<b>-3.52%</b>	<b>N/A</b>	<b>N/A</b>	<b>-3.52%</b>	<b>-5.65%</b>

*KCMO Health Facility's energy use 2010-2014*

Other benefits of both Portfolio Manager and ESP include the graphing and comparison tools. ESP allows users to compare and rank buildings by factors such as energy cost per square foot. The data can be filtered by department and utility type and can show the comparative performance of any monitored building. Portfolio Manager provides a variety of graphing options, including comparisons against baseline years and graphics of building portfolio performance segmented by property type. An additional useful function of Portfolio Manager is the generation of weather-normalized data. Portfolio Manager can return weather normalized energy use intensity (EUI) values that show what a building's EUI would've been under normal climate conditions for its zip code. This is an ideal metric for measuring a building's changes in performance over time. The number of heating or cooling degree days, which are also available as metrics in Portfolio Manager reporting, can drastically affect energy consumption and can explain usage and cost spikes that occur despite energy efficiency efforts.

### Future Plans

Kansas City has a number of plans in the works to further increase energy efficiency including:

- Sub-metering individual tenant spaces and systems to better manage resources and identify sources of usage spikes;
- Advocating for the automation of utility cost and consumption data availability through initiatives that make data at the meter level available to consumers;
- Encouraging installation of kiosks in city buildings to provide real-time information to employees and visitors on building energy usage; and
- Utilizing ENERGY STAR tools to encourage energy efficient behavior in office space and housing.

## Lessons Learned

Kansas City has worked hard to make energy efficiency a priority throughout the city. Several key takeaways from the city’s process can assist other cities in becoming more energy efficient.

- **Garner the support of leadership.** From Mayor Barnes signing the Climate Protection Agreement to Mayor James’ Energy Challenge, energy efficiency has been prioritized by the leadership in Kansas City. This high-level support has increased awareness of the need to reduce energy consumption in Kansas City.
- **Develop a plan.** The city’s climate protection plan has provided a path forward, laying out goals and strategies to achieve them. Involving key stakeholders in the process of developing the plan has ensured the support of both elected officials and community members.
- **Develop partnerships.** Kansas City’s successes have hinged on a top-down commitment to collaborating with key community organizations, such as Kansas City Power and Light, the Greater Kansas City Chamber of Commerce, Mid-America Regional Council, and Bridging the Gap.
- **Gather data.** Portfolio Manager and ESP allow Kansas City to conduct analysis and make adjustments to control energy usage. The data have justified several high return-on-investment capital expenditures and contributed to reduced costs and consumption in municipal operations.



For more information on Kansas City’s sustainability efforts, please visit the [Office of Environmental Quality’s website](#).