THE CITY OF PHILADELPHIA
OFFICE OF
SUSTAINABILITY

2022 PROGRESS UPDATE

MUNICIPAL ENERGY MASTER PLAN FOR THE BUILT ENVIRONMENT

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ON THE COVER: Auditing a streetlight in Old City for the Philly Streetlighting Improvement Project (Photo credit: Philadelphia Energy Authority)

Letter from the Office of Sustainability

Dear Friends,

During the COVID-19 pandemic, building closures and increased remote work have led to reduced municipal energy consumption. However, this reduction in energy consumption is lower than anticipated due to the implementation of indoor air quality measures such as increased fresh air circulation and filtration required to keep building occupants safe.

At the same time, our municipal greenhouse gas (GHG) emissions have decreased significantly as our local electricity grid supply is cleaner. Much of this reduction can be attributed to the shift from coal burning power plants to natural gas plants. It is important to note that while this reduction in emissions is an improvement over past conditions, it does not meet the City's clean electricity goal. To meet our 2030 goals, the City must accelerate the transition to clean energy through strategic renewable energy purchasing paired with energy use reductions for efficiency projects and programs.

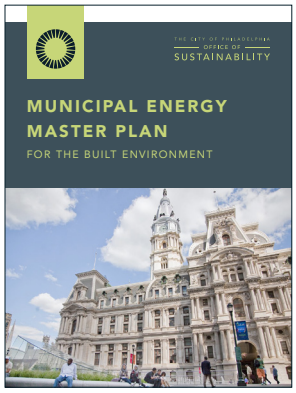
Despite many challenges during the pandemic that stopped or slowed our projects, we completed some key projects that bring us closer to our targets. These projects included a major energy retrofit of the Philadelphia Museum of Art, installation of LED lighting in many facilities, and the LEED Gold certification of Police District 2. We also have begun bringing buildings into compliance with the Building Energy Performance Program, which has helped fine-tune energy performance at our largest facilities.

Furthering our commitments, the City joined the U.S. Department of Energy's Better Climate Challenge, which combines the goals of the Municipal Energy Master Plan and the Municipal Clean Fleet Plan. We know that, to meet these new climate commitments, new initiatives such as electrification of our buildings and increasing the amount of municipal electric vehicle infrastructure will be paramount, but we are more prepared than ever to take on these efforts.

Sincerely,

Philadelphia's Office of Sustainability

Municipal Energy Master Plan Overview and Progress



Released in 2017, the City's first Municipal Energy Master Plan identified two broad strategies to achieving Philadelphia's clean energy goals for municipal buildings:

1. Lower Energy Use in City Operations
2. Clean the City's Energy Supply

The plan outlined eight opportunities that would bring the City closer to cutting carbon emissions, reducing energy waste, and meeting its financial and environmental goals.

The impact of achieving each of the eight opportunity areas is quantified as the following **four long-term goals** for the City's municipal buildings and streetlighting:

Reduce greenhouse gas emissions from the City's built environment 50 percent by 2030.

Reduce the City's built environment energy use 20 percent by 2030.

Generate or purchase 100 percent of all electricity for the City's built environment from renewable resources by 2030.

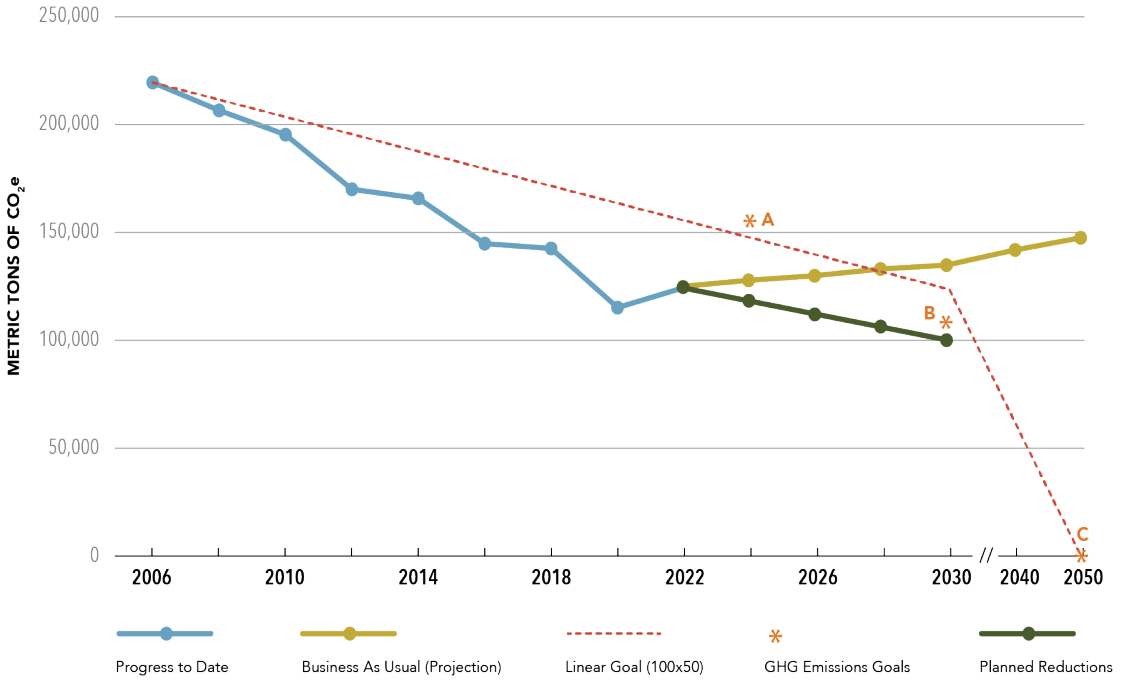
Maintain or reduce the City's built environment cost of energy.

Progress on Goals

The City's preliminary data demonstrates a 44% reduction in greenhouse gas emissions from the 2006 baseline, due in part to a cleaner energy grid. With the Adams Solar power purchase agreement becoming operational by the end of 2023, the proportion of renewable energy will grow significantly. Investing in our building portfolio through a variety of upgrades and low-to-no-cost optimization strategies will continue to lower the City's electricity and heating consumption. In addition, evaluating current building occupant needs as a result of hybrid work schedules will provide significant gains in efficient building use.

	Baseline	2019 Comparison	2021 Progress	2030 Goal	Status
GREENHOUSE GAS EMISSIONS	219,306 MT of CO_2e (2006)	133,527	122,750	109,653	On Track
ELECTRICITY CONSUMPTION	281,324 Weather Normalized MWh (2016)	274,481	268,397	225,059	On Track
PRIMARY HEATING CONSUMPTION	828,532 Weather Normalized MMBTU (2016)	760,556	743,356	662,825	On Track
RENEWABLE ELECTRICITY	6% (FY16)	8%	8%	100%	Needs Improvement
TOTAL COST OF ENERGY	$42.4 Million	$33.4 Million	$33 Million	<$42.4 Million	On Track

PROJECTED GREENHOUSE GAS EMISSIONS FOR THE CITY OF PHILADELPHIA'S BUILT ENVIRONMENT



A United States' Paris Climate Accord goal of 28% reduction by 2024

B City's built environment goal of 50% reduction by 2030

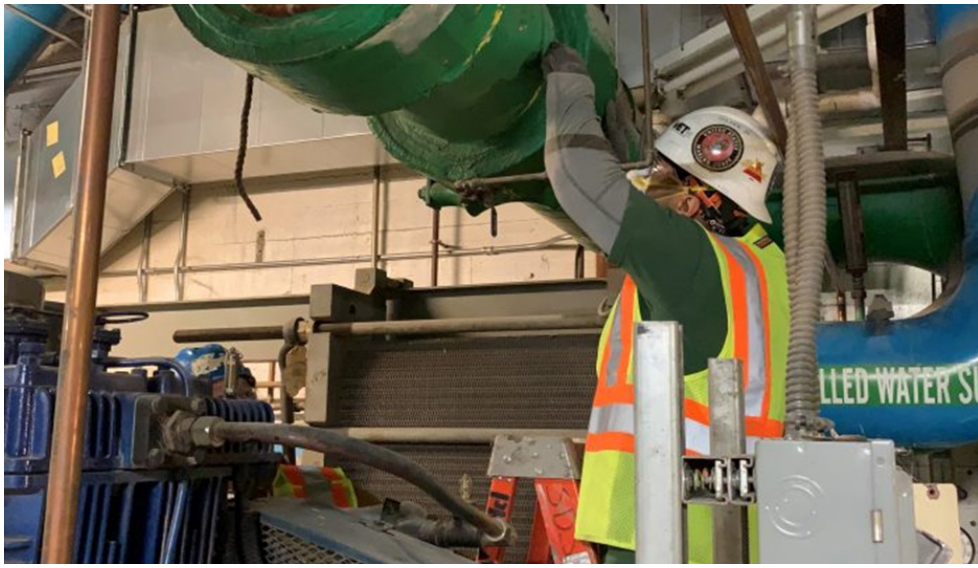
C Citywide goal of zero greenhouse gas emissions by 2050 (100x50)

STRATEGY 1: Lower Energy Use

OPPORTUNITY: IMPROVE OPERATIONAL PRACTICES

Progress: Energy Performance Contracting at the Philadelphia Museum of Art

The Philadelphia Museum of Art (PMA), a popular cultural attraction and one of the City's largest energy users, completed a major retrofit in early 2021, bringing the months-long $11.4 million project to a close. The private-public partnership between the City and PMA, the Philadelphia Energy Authority and Johnson Controls Inc. produced a multifaceted transformation that will lower the museum's carbon emissions by 2,400 MT of CO_2e, water use by 1.2 million gallons, steam use by 16,000 MMBTU, and will save enough electricity to power 437 average U.S. households for a year. The subsequent energy savings in Year One exceeded expectations by more than 50% and saved the PMA close to $1.2 million.



Construction team member installing new chiller at the Philadelphia Museum of Art

To achieve these major savings, the project team replaced more than 10,000 lights with LEDs, installed a new chilled water system, and upgraded the heating system, among other improvements. The project also created 191 jobs throughout its course, with women- and minority-owned businesses performing more than 40% of the work.

Kevin from Emergent Energy Solutions showing newly installed controls at the Justice Juanita Kidd Stout Center for Criminal Justice

Progress: An Update on the Building Energy Performance Program and the Building Monitoring Program

After Mayor Kenney signed the Building Energy Performance Policy into law, the Building Energy Performance Program (BEPP) kicked off in 2021, with the first round of covered buildings receiving a one-year deadline extension due to pandemic-related delays. The City has since obtained BEPP compliance for seven out of more than 30 eligible municipal buildings.

The Building Monitoring Program equips municipal buildings with building automation systems (BASs) that connect and control mechanical and electrical systems, making it easier to track and optimize energy use. Having BASs in place enabled City Hall, the Municipal Services Building, and the One Parkway Building, all buildings part of the monitoring program, to achieve BEPP compliance through the Active Optimization pathway. Recently installed controls will allow the Justice Juanita Kidd Stout Center for Criminal Justice to be able to work toward the Active Optimization pathway as well.

Follow along with the City's progress toward BEPP compliance on the Dashboard at https://bit.ly/philamunienergyuse.

OPPORTUNITY: LED STREETLIGHTING

Progress: Trial Installations for the Philly Streetlight Improvement Project Begin

The Philly Streetlight Improvement Project (PSIP) will improve lighting infrastructure across Philadelphia by converting approximately 120,000 streetlights into longer lasting, energy efficient LED lights with lighting controls. The project will connect new and existing LED streetlights to a centralized management system, making it possible to adjust lights, monitor outages remotely, and improve response times. Upgrading lighting citywide can improve public safety and reduce traffic crashes, lower carbon emissions and electricity use, and save enough on utility costs and operations to make this project budget neutral.

Following the 2021 launch, the project is now well underway with the completion of trial installations in ten residential blocks and five driveways. The exciting trial installations kicked off the stakeholder engagement period for the multi-year, citywide project.

Learn more and follow along with the progress at phillystreetlightimprovement.com.

Trial installations of new LED streetlights on the 2300 block of N. Carlisle St. in Philadelphia

OPPORTUNITY: CAPITAL AND REBUILD PROJECTS

Progress: Updated LEED Ordinance and the 2nd Police District Office

The City continues to push for higher standards for municipal buildings. In 2021, City Council unanimously passed an update to the 2009 Energy Efficiency and Environmental Design in Construction of Buildings ordinance, requiring that all new municipal construction and renovation projects achieve a LEED Gold certification. The ordinance, which goes into effect in Fiscal Year 2024 (beginning in July of 2023), improves upon the previous LEED Silver standard. Eight municipal buildings have earned a LEED certification since the ordinance's inception.

To cultivate a greater understanding and application of LEED in future municipal projects, the Energy Office organized a LEED Green Associate and LEED Accredited Professional training for City employees and plans to continue holding trainings in the future.

In 2021, the 2nd Police District Office became the third municipal building to achieve a LEED Gold certification after the mid-century bank building completed major interior and exterior renovations. The new headquarters feature low-emitting materials to improve indoor air quality, a highly efficient HVAC system, and a white rooftop to counteract the urban heat island effect.

The newly renovated 2nd Police District office achieved a LEED Gold certification in 2021, becoming the City's third building to do so.
(Photo credit: Todd Woodward/SMP Architects)

OPPORTUNITY: GREENWORKS SUSTAINABILITY FUND

Established in 2010, the Greenworks Sustainability Fund (GSF) continues to support a variety of energy efficiency and sustainability-based projects that serve to lower the City's carbon footprint. In 2021, the African American Museum of Philadelphia (AAMP) received GSF funding to improve its energy efficiency and create a more comfortable indoor space for all occupants.

New LED lighting throughout the African American Museum of Philadelphia not only lowers energy costs, but also creates a brighter, warmer space.

The museum's new building automation system (BAS) makes managing electrical and mechanical building systems—including the heating, ventilation and air conditioning (HVAC), and lighting and security systems—more efficient and will save the museum close to $7,000 each year. New air conditioning and HVAC ceiling diffusers enable staff to adjust for unique temperature and humidity requirements for preserving its art collection. The renovated glazed windows improve insulation and filter out UV rays that are harmful to both people and the art.

Through PECO's Direct Install program, the museum also replaced lighting systems throughout the auditorium and administrative offices with efficient and durable light-emitting diodes (LEDs).

"The lighting update is a tremendous difference from what it used to be; even the staff have noticed how bright the administrative floor is."
- Facility Manager Kirk Dorset

"It's a big difference throughout the museum," adds Dorset. "Also, with the auditorium—the new LED lights that we put in—you get a nice warm feeling of the auditorium."

OPPORTUNITY: STAFF ENGAGEMENT

Progress: LEED Training

The 2021 update to the Energy Efficiency and Environmental Design in Construction of Buildings ordinance sparked new efforts to engage staff across disciplines to master sustainable building principles and apply them to their work on major renovations and new constructions. In 2022, the Energy Office partnered with Green Building United to train City employees working on capital projects across nine departments to earn LEED Green Associate and/or LEED Accredited Professional credentials.

Progress: Natural Gas Emergency Communication System

In late 2021, the Energy Office partnered with the Office of Emergency Management to set up a two-way emergency communications system in case of a natural gas emergency event. Using the Everbridge platform, teams can easily launch text and email alerts to building managers about switching over to secondary heating sources, to provide status updates during an event, and receive instant feedback using polls.

Strategy 2: Clean Energy Supply

OPPORTUNITY: PURCHASING CLEAN ENERGY

Progress: Power Purchase Agreement for Solar Energy

The City is moving forward with plans to purchase renewable energy generated by the Adams Solar project in a major step towards the 2030 goal to power 100% of electricity using purchased or generated renewable energy. Through a Power Purchase Agreement (PPA) between the Philadelphia Energy Authority and renewable energy project developer Energix Renewables, the Adams Solar project is set to be completed by the end of 2023 and begin providing the City with 22% of the electricity needed for all municipal buildings. We anticipate that at least 40% of the project work is completed by minority-, women- and disabled person-owned businesses. The project broke ground in December 2022.

Grading in progress at the Adams Solar project

Progress: Helping Low- and Moderate-Income Households Go Solar

In an agreement with the Philadelphia Energy Authority (PEA), the City has committed to purchasing solar renewable energy credits (SRECs) generated through local programs that help low- and moderate-income (LMI) households install solar panels. The PEA and its green bank affiliate, the Philadelphia Green Capital Corp., manage multiple programs that provide Philadelphians with grants and group-buying discounts to make rooftop solar projects more accessible and affordable, bringing some relief to households experiencing energy insecurity, energy burden, and climate change impacts at disproportionately higher rates. All proceeds from the City's purchase—estimated to be up to 2,000 SRECs, worth up to $100,000—will go towards installing more solar rooftops and creating a revolving source of funding for affordable solar projects around the city. Furthermore, purchasing local SRECs and supporting citywide solar projects have the added benefit of enhancing the city's clean energy economy by generating taxpayer revenue and creating local jobs in the rapidly growing field of solar installers.

A rooftop solar installation in process at a Solarize Philly event (Photo credit: Jared Piper)

What's Next

Municipal Clean Fleet Plan: Installing a Level 3 Fast Charging Pilot for Electric Vehicles

Procuring electric vehicles (EVs) instead of fossil fuel-consuming vehicles, while building the proper infrastructure to charge and operate EVs, are both major pillars of the 2021 Municipal Clean Fleet Plan. Using funding from the Operations Transformation Fund, the Office of Sustainability is working with the Department of Fleet Services and the Office of Innovation and Technology to pilot a level 3 EV fast charger to be installed at a municipal fleet shop. The team plans to have this installed by summer of 2023.

Building Energy Performance Program (BEPP)

The City is pursuing BEPP compliance for more than 30 large municipal buildings through a combination of tune-ups and high-performance pathways. As of fall 2022, seven large buildings have achieved compliance.

Building Monitoring Program and Expansion

More than 20 municipal buildings use centralized building automation systems (BASs) to manage various major equipment including HVAC, lighting, and security systems. The Building Monitoring Program closely tracks and optimizes energy use in these buildings by using BASs to identify opportunities to boost energy efficiency, improve indoor comfort, and lower utility costs. Currently, four buildings are part of this program.

Office Space Optimization

An important part of lowering building energy consumption and realizing operational cost savings is the smart utilization of space. The Office of Sustainability, in partnership with the Department of Public Property and the Office of Innovation and Technology, is engaging in a cross-departmental space optimization effort. The outcome of this effort will lead to an updated office policy appropriate for current hybrid work options and storage space needs.

Better Climate Challenge

The City joined the U.S. Department of Energy's Better Climate Challenge in 2022, committing to reduce greenhouse gas emissions by at least 50% and lower energy intensity by 25% by 2023 (baseline 2017). To achieve this, the Energy Office plans to develop additional renewable energy projects, invest in capital projects to improve energy efficiency, and institute a clean fleet procurement policy.

State and Federal Funding Opportunities for Energy Saving Projects

Partnering with the Department of Public Property, the Philadelphia Energy Authority and others, the Office of Sustainability is preparing a request for proposal for another Pennsylvania Guaranteed Energy Savings Act project across multiple municipal buildings. The team will also be looking to leverage the federal Bipartisan Infrastructure Law and Inflation Reduction Act when possible.

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