City of Lancaster

MUNICIPAL CLIMATE ACTION PLAN

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CITY OF LANCASTER
A City Authentic

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Cover photo: onethirtynine photography

LETTER FROM MAYOR DANENE SORACE

Fellow Lancastrians,

It is with great pride that I present to you the City of Lancaster's Municipal Operations Climate Action Plan. This plan is the product of years of hard work on the part of City staff, our City's Climate Action Committee, and our consulting partners at Elevate Energy and the Center for Neighborhood Technology; and this represents a major step forward for our city in committing to a healthier, more economically sustainable, and environmentally conscious future Lancaster.

The City's Climate Action Committee, which has done so much to help lend direction and set goals for this plan, includes 11 partners from several key community stakeholders including LCSWMA, Millersville University, Citizens Climate Lobby's Lancaster Chapter, Lancaster City Housing Authority, The Parking Authority of the City of Lancaster, and the Lancaster County Planning Commission. City staff, the Elevate Energy team, and the Climate Committee have been working hard over the past 9 months to produce the most thoughtful, thorough, and well-polished plan possible. The result of their deliberations and labor is a document detailing adaptation and mitigation strategies that will help guide the City of Lancaster in the 21st century, while continuing to deliver the essential municipal services that our residents depend on every day.

This plan identifies key facets of our municipal services, culture, and infrastructure that will need to be improved upon if we are to properly address the strains that climate change will place on City operations. Major areas for growth and change include the City's management of water, wastewater, energy, waste, stormwater, office culture, potential carbon offset programs, and the municipal vehicle fleet. We have set a number of goals for achieving emissions reductions in the near and long term. The first of these goals is set for 2025 when we are committed to achieving an 80% emissions reduction from 2017 levels and will be drawing **100% of our electricity from renewable sources**.

We here at the City of Lancaster are incredibly proud of this plan and are even more excited by the precedent and foundations it sets for acting on climate issues in the future. Reforming our municipal operations is an essential first step, but it is not enough. In order to confront the climate challenges facing Lancaster City in a truly comprehensive fashion, we will need to take action on a larger scale through the development and implementation of a community climate action plan that considers equitable distribution of services to ensure that those who will be most greatly impacted by the effects of a changing climate are not left behind. I am proud that the time, energy, and strategic thinking put into this plan's development will continue to inform broader climate initiatives and planning efforts in our City moving forward.

This plan goes a long way toward securing our ability to preserve what makes Lancaster so unique, while aiding the City in adjusting to the challenges of our day. These goals and strategies for combating climate change will help us sustain the foundations upon which strong neighborhoods, safe streets, secure incomes, and sound government are built and delivered. The hour is upon us to lead responsibly, providing an example not just for our county, but for the rest of mid-state Pennsylvania as well. The future is full of potential, and I'm excited to see the role that our City will play in shaping it.

Your Mayor,
Danene Sorace

ACKNOWLEDGMENTS

Special thanks are extended to Mayor Danene Sorace for her support of this project and continued commitment to addressing the pressing issue of climate change. A special thanks is also extended to: City of Lancaster Senior Planner Douglas Smith for shepherding this project from its inception; Millersville University's Sustainability Director Chris Steuer and Lancaster County Solid Waste Management Authority's Energy Program Manager Justin Capots for their invaluable time and expertise, which greatly strengthened the technical aspects of this document; and the City of Lancaster's Planning Intern Ben Jennings for his steadfast work on this plan, including community outreach, editing, researching, and writing. The City of Lancaster would also like to acknowledge and express its gratitude for the many other people and organizations who provided support in developing this plan, many of whom will also assist with its implementation.

Prepared By
City of Lancaster Bureau of Planning and Department of Public Works

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Ismael Smith-Wade-El, *Council Member, Lancaster City Council*
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Funding Partners
Partners for Places – a project of the Funders' Network for Smart Growth and Livable Communities
Lancaster County Community Foundation
Lancaster County Solid Waste Management Authority
The Steinman Foundation

Supporting Partners
Urban Sustainability Director's Network
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Michelle Johnsen

Participants gather at community meeting to unveil the City's climate plan.

EXECUTIVE SUMMARY

Lancaster City ranked 14th in the nation among the top 50 cities with biggest increases in heavy downpours from 2005-2014, and seven of the ten hottest days on record since 1914 in Lancaster have occurred in the last 20 years. The impacts of climate change are already being felt in Lancaster through increased precipitation and temperatures. In addition to the direct effects of these conditions, a changing climate will also exacerbate existing conditions such as poor air quality and a propensity for urban flooding. The impacts of climate change challenge municipal operations by putting stress on City facilities and threatening to disrupt the delivery of services to people across Lancaster City.

The City of Lancaster's core mission is to serve its residents, businesses, and environment. Throughout its nearly 300-year history, the City has proven resilient and adaptive to rapid shifts in industry, transportation, and technology, among other changing conditions. As evidenced by Lancaster's adaptive reuse of warehouses and changing farm practices, this flexibility has been a vital asset that will be key to the City's efforts to prepare for the effects of climate change. By adopting and implementing this plan, the City of Lancaster is looking to continue building on this spirit of ingenuity, fostering the development of a healthier and more economically secure future.

Addressing climate change is not a burden, but an opportunity to strengthen the City and its community. With climate impacts projected to increase in coming years, it is imperative that the City of Lancaster identify opportunities to reduce greenhouse gas emissions (mitigation) now, while also taking steps to address both current and anticipated shifts in local climate that Lancaster will not be able to avoid (adaptation). The mitigation strategies within this plan aim to conserve resources and increase prosperity, and the adaptation strategies focus on creating smarter infrastructure.

The City of Lancaster's Municipal Operations Climate Action Plan advances the mitigation and adaptation work the City of Lancaster has been committed to for many years. The Plan details 25 strategies in six key areas to progressively reduce emissions against the City's 2017 baseline (17,012 MT CO2e): Energy; Vehicle Fleet; Water and Wastewater; Stormwater; Waste; and Building a Culture of Sustainability; and Carbon Offsets.

When fully implemented, these strategies will result in carbon neutrality by 2050. A critical component of achieving this goal will require securing carbon offsets and increasing them progressively over the years. By 2025, emissions will be reduced by 79% with 1% in carbon offsets (80% of emissions), and in 2035 emissions will be reduced 80% with 10% in carbon offsets (90% of emissions). In 2050, 81% of emissions will be reduced with 19% in carbon offsets (100% of emissions). In conjunction with these reductions, the City commits to 100% renewable energy sources for all electricity consumption by 2025, meaning all electricity-related emissions will be avoided—this commitment is critical to meeting the ambitious near-term goal in just six short years.

Call to Action

We believe in walking the walk, not just talking the talk. We at the City of Lancaster are eager to further demonstrate our commitment to lessening climate change's impacts, especially on our most vulnerable citizens, while building a stronger economy and community that can continue to be a great place to live, work, and play. Lancaster City's municipal operations make up only about 4% of community-wide emissions, so this municipal plan represents just a first step. Climate science is clear: it is urgent that communities around the world join together and take proactive steps to reduce emissions by at least 80%. The next step will be developing a community-wide climate action and adaptation plan and taking further steps to innovatively, collaboratively, and responsibly reduce greenhouse gas emissions while building a more resilient city.

City of Lancaster
Municipal Climate
Action Plan

INTRODUCTION

INTRODUCTION

Understanding Climate Change

Increased levels of carbon dioxide (CO2) and other GHGs in the earth's atmosphere are warming the Earth and driving changes in our climate. While climate changes over long periods of time due to natural cycles, the recent and rapid changes that have occurred in the industrial era result primarily from human activities that produce GHG emissions, such as fossil fuel combustion and deforestation. As such, we also hold the keys to minimizing the effects of climate change.

Vision Statement

The City of Lancaster equitably implements innovative, collaborative and fiscally responsible strategies to reduce greenhouse gas emissions and build resilience to the impacts of climate change.

Climate Change: Today's landscape of local climate action

The City of Lancaster's Municipal Operations Climate Action Plan will guide the City of Lancaster in reducing its municipal greenhouse gas (GHG) emissions by identifying more efficient means for delivering services to the community, while simultaneously preparing the City for the impacts of a changing climate. This climate action plan includes best practices in climate planning today, addressing both mitigation (reducing GHG emissions) and adaptation (preparing for changes in our climate that are happening or are projected to occur.)

This action plan also addresses the need for broader community action. In fact, the City intends this municipal climate plan to serve as a foundation for community-scale action in the near future. Addressing the challenge before us will take a collaborative, communal effort, and the City of Lancaster is committed to leading that charge, while partnering with individuals, organizations, institutions and businesses across the community.

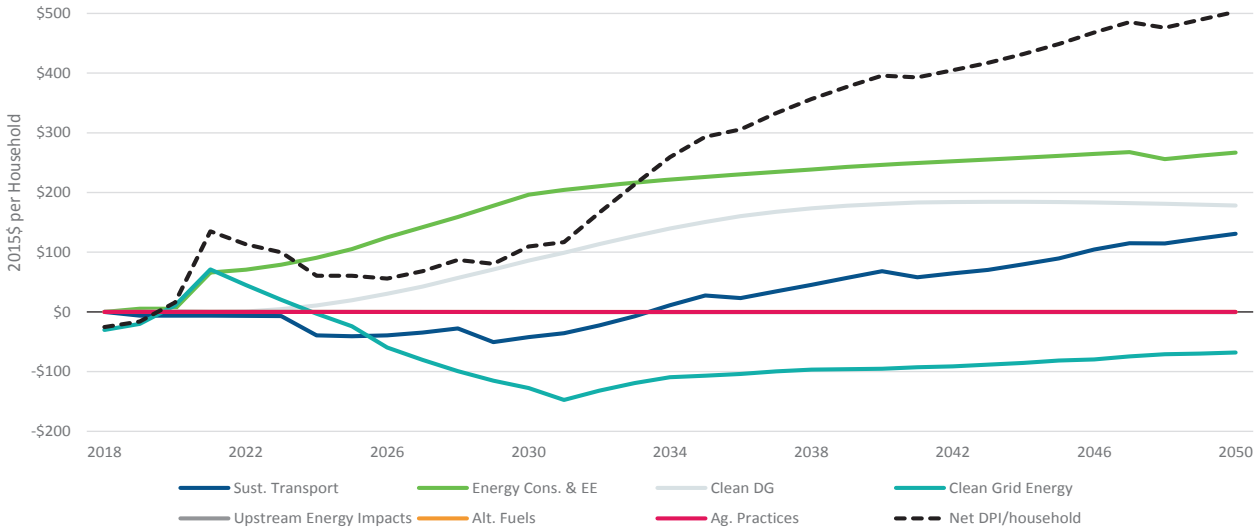
Climate Planning: A Brief History

In 1997, the Kyoto Protocol galvanized worldwide support for localized comprehensive planning on climate change. Since then, communities across the world have worked to develop climate plans to reduce their emissions, and limit their impacts on the environment. The 2007 Global Covenant of Mayors' three-year planning process put equal weight on both mitigation and adaptation—or reducing emissions that are causing climate change while simultaneously preparing for the climate impacts that communities are already experiencing.[1] More recently, the 2015 Paris Climate Accord spurred local municipalities to commit to reducing emissions and address climate hazards and vulnerabilities.[2]

1. Global Covenant of Mayors. (2018, September 13). Global Covenant of Mayors Common Reporting Framework Version 6.1. Retrieved from https://www.globalcovenantofmayors.org/wp-content/uploads/2019/04/FINAL_Data-TWG_Reporting-Framework_website_FINAL-13-Sept-2018_for-translation.pdf
2. United Nations Climate Change. The Paris Agreement. Retrieved from https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

Since the United States' 2017 declaration of intent to pull out of the Paris Climate Accord, the impetus for local action has been greatly amplified.[3] Following that announcement, the City of Lancaster resolved to support the Paris Agreement of the United Nations Framework Convention on Climate Change, joining hundreds of municipalities across the United States by committing to take action.[4] Local initiatives have always played an integral part in shaping climate

Figure 1: Change in disposable personal income and in disposable income per household through 2050



3. World Wildlife Fund. (2018, June 1). US Climate Action Grows Stronger Despite Announcement to Leave Paris Agreement. Retrieved from https://www.worldwildlife.org/stories/us-climate-action-grows-stronger-despite-announcement-to-leave-paris-agreement
4. City of Lancaster. (2017, June 13). Resolution Number 35-2017 A Resolution of the Council of the City of Lancaster Supporting the Purpose of the Paris Agreement of the United Nations Framework Convention on Climate Change and Supporting Lancaster Joining Nearly 250 Cities in the United States in Adopting the Goals of the Agreement in Cooperation with the Mayors National Climate Action Agenda. Retrieved from https://ecode360.com/documents/LA1674/public/368156933.pdf

Climate Change Worsens Existing City Challenges

Climate change is expected to worsen existing conditions in the City of Lancaster such as poor air quality and aging infrastructure, the latter of which must remain functional while being improved to meet today's regulations and tomorrow's climate. These and other challenges the City of Lancaster must address are discussed in the Lancaster Climate Adaptation and Resilience Report.

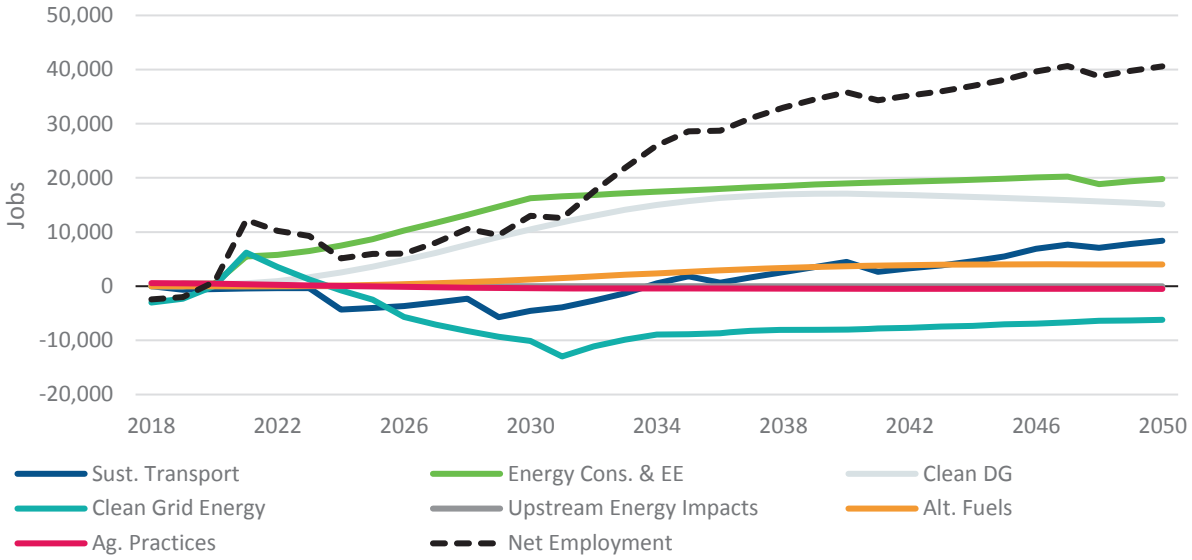
INTRODUCTION, CONTINUED

action and achieving results; and there is no substitute for local knowledge of priorities and needs when forming a plan. Although strong federal programs and policies that support climate efforts are a significant asset, they are not a requirement for communities looking to act now.

Solutions Today with Multiple Benefits

Multilateral agreements on climate action help create partnerships, accountability, and an impetus for local action. They are a sounding board for new ideas and best practices with verifiable data, results, and resources. One important basis for worldwide action is a consensus that we already know the solutions to the climate challenge. While we should advocate for continued and improved technological innovation (and new aspects of strategy development and implementation such as creative mechanisms for finance and new techniques for behavioral alignment may be developed), the tools and information needed to reduce emissions and adapt to our changing climate exist today. Transitioning away from carbon-intensive fossil fuels toward renewable energy. Designing and constructing smarter and more energy efficient buildings. Adopting advanced modes of transportation. Reducing waste within our supply chains while developing products that can be repurposed. Being careful and responsible stewards of the natural capital contained within our lands. The key to successful implementation of these strategies is integrating them into the local context and features of every community.

Figure 2: Number of Annual Jobs Supported Through 2050 by Strategy



The benefits of many climate strategies extend beyond mitigation and adaptation. Commonly, these ancillary benefits include energy and fuel cost savings, maintenance and repair cost savings, job growth, cleaner air, a cleaner environment, and improved health. The 2018 Pennsylvania

Climate Action Plan provides an extensive analysis of the cost-effectiveness of its climate strategies, incorporating program and infrastructure costs, job growth, changes in existing market fuel and energy savings, maintenance costs, and more. The net total results by 2050 include the following:

- Disposable personal income to increase by **$2.35B** annually (amounting to an average of $503 per household per year by 2050) (Figure 1)
- Gross State Product will increase by **$3.76B** annually
- **40,000 net jobs** to be added to the economy (Figure 2.)

The Plan also cites climate-related health risks and impacts that include a rise in heat-related illnesses and mortality, particularly in older populations and those with existing health conditions, increased vector borne diseases (specifically Lyme Disease, West Nile Virus, and Zika Virus), higher rates of respiratory and heart disease as a result of declining air quality conditions, disease related to water pollution, casualties of extreme weather events, and increasing allergens. The State does not quantify the benefits of taking decisive action; however, the Plan notes that climate readiness, increasing public information and knowledge, and improving access to and reliability of services will result in "reduced illness and mortality associated with heat, vector-borne diseases, and waterborne diseases, increased capacity to manage the incidence of vector-borne disease, and protection of vulnerable communities from disproportionate climate impacts. [5]

These and other co-benefits help to create broader consensus and attract additional stakeholders and partnerships in strategy implementation. Each strategy outlined in this plan highlights the multiple benefits anticipated as a result of its full-scale implementation.

Climate Action and the Equitable Distribution of Municipal Services

Climate change in Lancaster affects every resident. Current and projected climate impacts are directly connected to (or affect) the delivery of core municipal operation services as well as a number of neighborhood services. This plan will guide the City in ensuring it is prepared for these impacts and able to meet the needs of people and businesses who rely everyday on successful, uninterrupted delivery of these operations and services. The plan will also better equip the City to identify and address other potential emerging needs that may be specific to particular neighborhoods, building sectors and the people within them. In taking action now, the City can continue its mission to enhance and improve the quality of life in Lancaster City by creating a more equitable and livable place for everyone—block-by-block.

Leading by Example

Well before the development of this plan, the City sought to improve its municipal operations to create lasting environmental benefits for the community. Over the last decade the City has implemented a variety of lighting and HVAC energy efficiency upgrades in municipal buildings, fitted all 122 traffic signals and pedestrian signs with energy efficient LED lights, integrated sustainable development features into the zoning and building codes, adopted a complete streets policy, and put forth a plan to increase sidewalks and the number of street trees, to name a few specific efforts. Since 2015, the City has been measuring GHG emissions. In June 2018, the City of Lancaster achieved recognition for these efforts by being

5. Pennsylvania Department of Environmental Protection. (2018, November 20). Pennsylvania Climate Action Plan. Retrieved from https://www.dep.pa.gov/Business/Energy/OfficeofPollutionPrevention/climatechange/PublishingImages/Pages/CCAC/2018%20PA%20CAP%20Draft%20112018.pdf

INTRODUCTION, CONTINUED

one of the first communities across the country to achieve LEED for Cities Gold certification. LEED is a certification program established by the United States Green Building Council that measures a variety of sustainability characteristics in comparison with other communities.[6]

The City of Lancaster embarked on this planning process as part of a broader mission to lead by example, while serving as a catalyst for broader community action in the near future. The City acknowledges that it is an important partner in reducing emissions and preparing for climate impacts, since it delivers many critical services to the community. However, the City's municipal operations are only approximately 4% of the City's community-wide emissions and leading climate scientists call for an 80% reduction in overall community emissions. The City alone cannot achieve the emissions reductions necessary to limit the worst impacts of climate change. The community must be a partner in that effort.

onethirtynine photography

Lancaster City's vibrant culture.

Many of these strategies can be adjusted to fit residential, business, or community-wide needs. The City of Lancaster's goal of producing a similar community-scale climate action plan in the near future will build from the City's leadership in implementing this municipal operations plan. The community climate action planning process will include analysis of community data, and will deliver a set of actionable strategies for reducing community emissions and equipping people across the City with necessary tools and information.

6. U.S. Green Building Council. (2018, July 19). Lancaster Named LEED Gold City and Recognized for Achieving Sustainability and Resiliency Goals. Retrieved from https://www.usgbc.org/articles/lancaster-named-leed-gold-city-and-recognized-achieving-sustainability-and-resiliency-goals

CITY'S TIMELINE OF CLIMATE ACTION

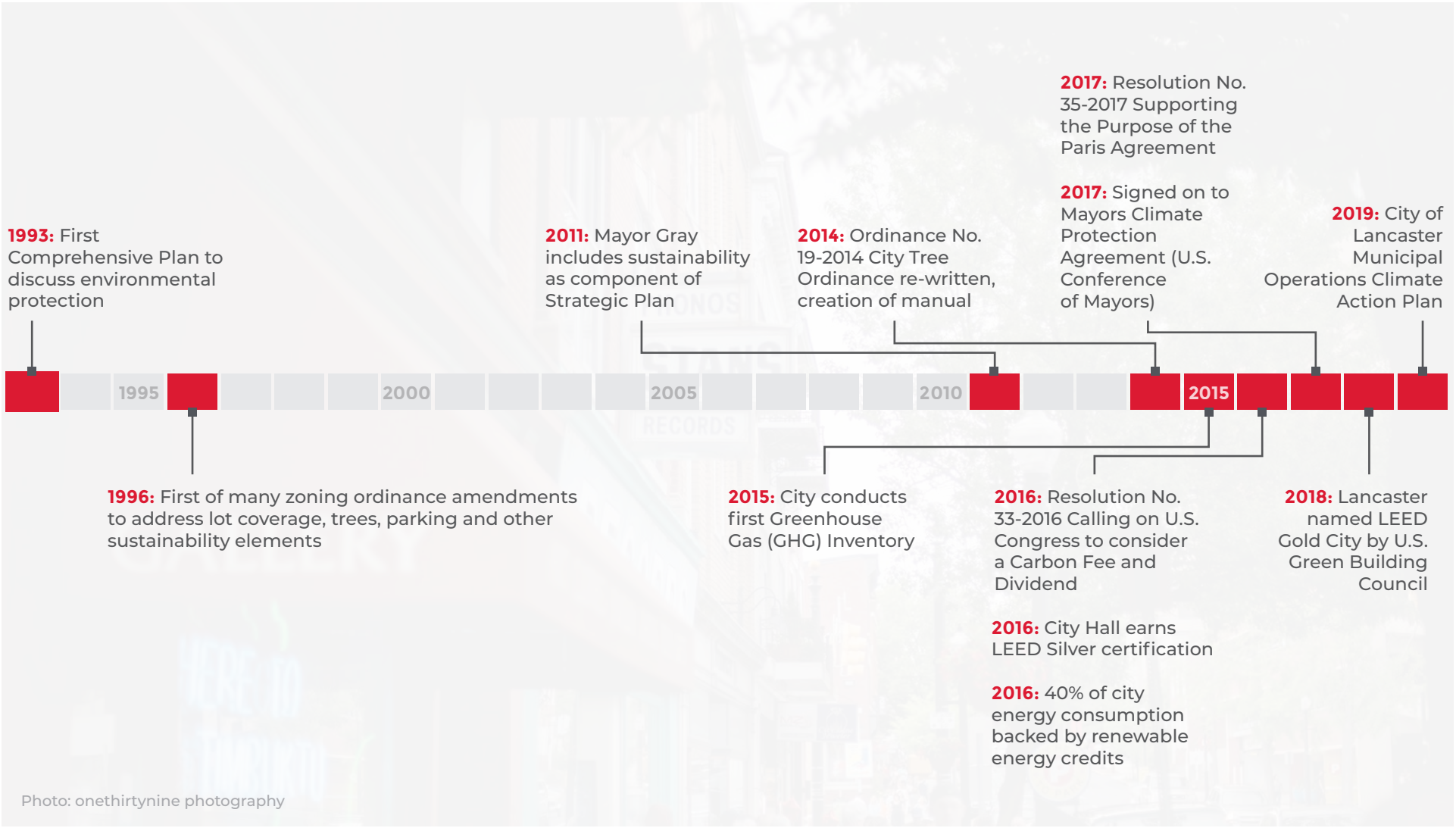


Photo: onethirtynine photography

PURPOSE, GOALS, AND LOCAL CONTEXT

Purpose of this Plan

The primary purpose of this plan is to set forth a vision, a set of goals, and a specific group of strategies for measurably reducing emissions from the City of Lancaster's municipal operations. These strategies will help make the City more resilient to climate impacts, and the plan as a whole will help to galvanize support for broader climate action and establish a precedent for future community-scale planning, all of which are necessary components for Lancaster City to reach an overall goal of carbon neutrality by 2050.

Ben Jennings

Lancaster City Hall .

Vision Statement

The City of Lancaster equitably implements innovative, collaborative and fiscally responsible strategies to reduce greenhouse gas emissions and build resilience to the impacts of climate change.

	Goals	2025	2035	2050
Energy	Transition to renewable energy sources from a mix of on-site or off-site options.	100%	100%	100%
	Reduce municipal energy consumption through energy efficiency improvements.	25%	40%	50%
	All new construction of municipal facilities to be built to highest efficiency standards (IECC), and a percentage of renewable energy sourced, with a progressive goal of carbon neutral/net zero buildings.	Highest efficiency standards	Carbon neutral	Carbon neutral
Vehicle Fleet	Reduce fuel emissions through reduced vehicle miles traveled, when possible, across the municipal fleet.	15% reduction of VMT	20% reduction of VMT	30% reduction of VMT
	Reduce fuel emissions through cleaner fuel technologies, when possible, across the municipal fleet.	10% reduction of VMT	25% reduction of VMT	100% reduction of VMT
Waste	Divert the amount of landfill waste contributed by municipal facilities that cannot be transferred to energy, including construction debris, some organics and wastewater-produced biosolids.	25% diversion of waste to landfill	70% diversion of waste to landfill	Zero waste in municipal facilities
Water	Reduce water consumption on city properties.			
Storm-water	Reduce stormwater entering into the system through conservation, green infrastructure and technology.			
Building Culture of Sustainability	Reduce excess energy and water consumption by City employees.			
	Reduce the emissions impact of City employees travel to and from work.			
	Reduce upstream and downstream emissions by assessing citywide purchasing practices.			
	Establish community-wide connections to municipal climate action, designed to encourage broad-based community support and action.			
Carbon Offsets	Strategically employ carbon offsets to progressively reach carbon neutrality associated with municipal operations.	1% of emissions	10% of emissions	19% of emissions

PURPOSE, GOALS, AND LOCAL CONTEXT, CONTINUED

How to Use this Plan

With municipal operations goals in place, the following set of strategies provide a plan of action for key municipal departments, bureaus and divisions. These strategies have been organized into several categories including energy, vehicle fleet, water & wastewater, stormwater, waste, sustainability culture-building, and carbon offsets. Each strategy includes details outlining its emissions reduction potential and other co-benefits. Specific bureaus will lead the implementation of these strategies in short, mid, and long-term planning ranges. A corresponding implementation matrix includes key metrics meant to aid both the City and interested community members in assessing the success of each strategy. The City commits to reporting on its progress on a regular basis, while continuing to engage the community on climate issues in Lancaster City.

onethirtynine photography

Downtown Lancaster First Friday participants.

This plan is also intended to be incorporated into core municipal functions. The vision, goals, and strategies can be referenced in general budgeting, capital improvement planning, program and policy development, and other planning efforts.

Elements of this plan will be fully integrated into existing operations across many City of Lancaster bureaus and divisions. Bureaus can also reference the list of strategies as they create draft budgets for Council consideration. While this plan provides a helpful overview of many projects, it should be accompanied by additional studies and cost-benefit analysis for successful implementation.

DEVELOPING THE PLAN

The Planning Process

The concept for this plan began taking shape in 2016 when the City pursued grant funding from local and national partners. Letters of support were gathered from numerous potential partners, laying the ground work for a team of steering committee members and community stakeholders. Local funds were secured from the Lancaster County Community Foundation (LCCF), The Steinman Foundation, and Lancaster County Solid Waste Management Authority (LCSWMA), which were used to secure match funding from Partners for Places – a project of the Funders' Network for Smart Growth and Livable Communities.

Plan development began in the fall of 2018 and concluded seven months later in May 2019. Lancaster City Council is anticipated to adopt the full plan in the summer of 2019.

Douglas Smith

First Convening of the City's Climate Committee.

This municipal operations plan is meant to help form approaches that are more closely tailored to the needs and limitations of inward-facing stakeholders; however, external community stakeholders were engaged at various points during its creation. Between November 2018 and May 2019, the Climate Committee met twice as a group, participated in stakeholder interviews and two community meetings, assisted in plan review and development, and engaged in communications with City staff throughout.

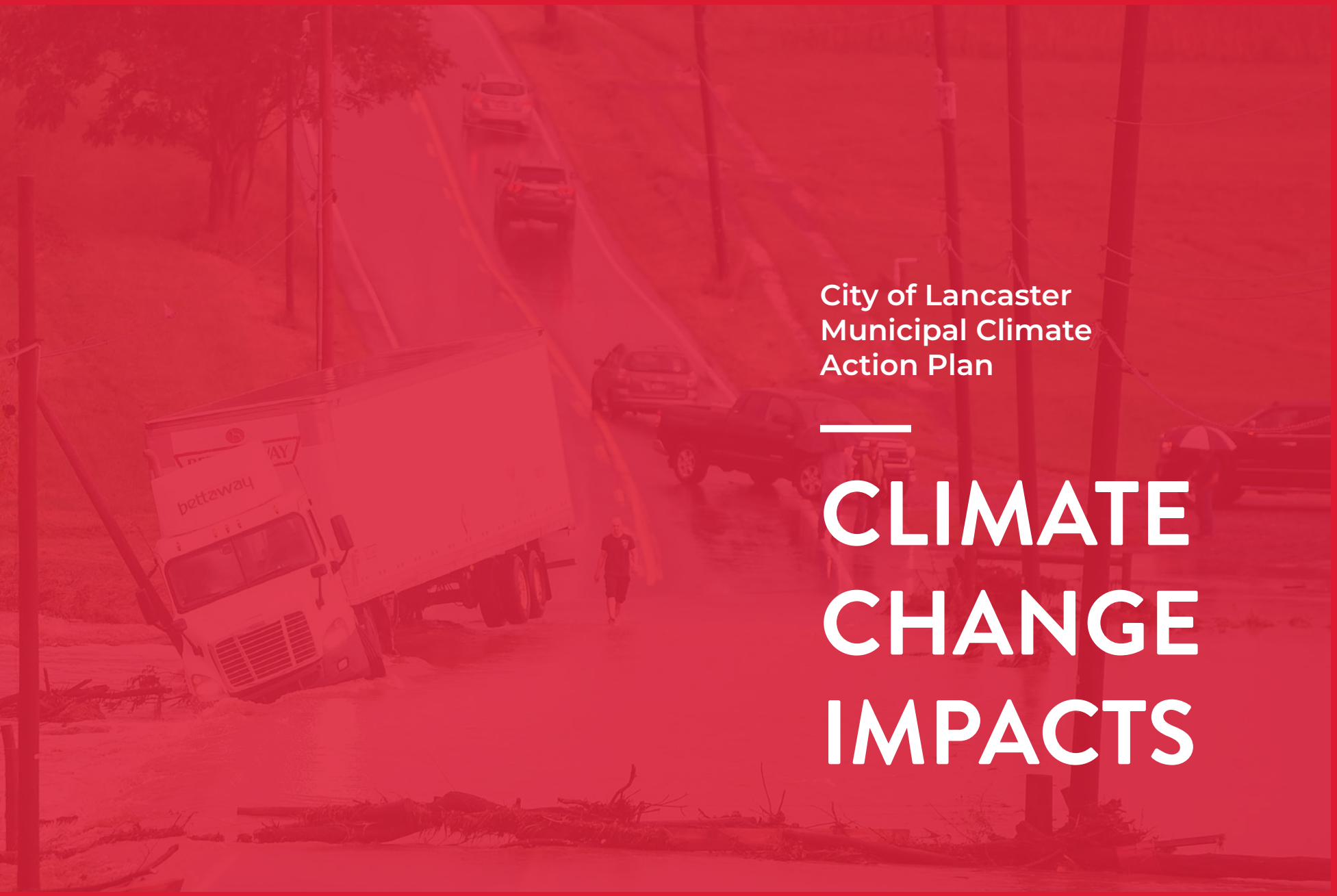
Engagement Activities:
November 2018: Climate Training
December - January: Stakeholder Interviews
January 2019: Committee Meeting
February 2019: Community Stakeholders Meeting
April – May 2019: Independent Interaction/Plan and Strategy Review
May 2019: Community Meeting/Presentation of the Plan
Summer 2019: Plan Adoption by Lancaster City Council Resolution

Plan Development/Technical Activities:
October 2018 – April 2019: Data acquisition and analysis
January 2019 – April 2019: Plan writing

Climate Committee

A group of 16 internal and external stakeholders closely related to all areas of municipal operations topics was organized by Mayor Sorace and key leadership within the Planning Bureau of the Department of Community Planning and Economic Development. The role of the committee was to provide guidance and feedback on climate issues in a two-pronged analysis: identifying climate change's impact on civic infrastructure and the delivery of services and programs, and investigating methods for reducing the impact of City of Lancaster municipal operations on climate change by way of reducing emissions.

Name	Agency	Area(s) of Expertise and Input
Dave Schaffhauser *Facilities Manager (Retired)*	City of Lancaster Facility Management	Energy
Ryan Hunter *Facilities Manager*	City of Lancaster Facility Management	Energy
Larry Cohen *Executive Director*	Lancaster Parking Authority	Transportation; General Climate
Barbara Wilson *Executive Director*	Lancaster City Housing Authority	Housing; Energy; Equity
Justin Capots *Energy Program Manager*	Lancaster County Solid Waste Management Authority	Waste; Energy; General Climate
Chris Steuer *Sustainability Director*	Millersville University	General Climate
Megan Blackmon *Grants Administrator*	City of Lancaster, Administrative Services	General Climate; Equity
Ruth Hocker *Stormwater Program Manager*	City of Lancaster, Bureau of Stormwater and Wastewater Collections	Stormwater; Water; Wastewater; Equity
Robert Bini *Director for Transportation Planning*	Lancaster County Planning Commission	Transportation; Equity
Jerry Miller *Community Activist*	Citizens Climate Lobby – Lancaster Chapter	General Climate; Equity
Paula Jackson *Chief Planner (Retired)*	City of Lancaster, Bureau of Planning	General Climate
Ismael Smith Wade-El *Council Member*	Lancaster City Council	General Climate; Equity
Douglas Smith *Senior Planner (Project Manager)*	City of Lancaster, Bureau of Planning	General Climate; Plan Coordination
Randy Patterson *Director (Retired)*	City of Lancaster Department of Community Planning and Economic Development	General Climate; Plan Coordination
Christopher Delfs *Director*	City of Lancaster Department of Community Planning and Economic Development	General Climate; Plan Coordination
Danene Sorace *Mayor*	City of Lancaster	General Climate; Plan Oversight and Implementation



City of Lancaster
Municipal Climate
Action Plan

CLIMATE CHANGE IMPACTS

CLIMATE CHANGE IMPACTS

Climate Resilience Pays Off

"The political and economic risks posed...will be especially challenging in places where institutions are poorly equipped to manage change. It costs 50% more to rebuild... than to build in a way that can withstand shock".[7] The City commits to proactively integrating climate action within the delivery of municipal services and programs whenever possible.

Studies by thousands of scientists, climatologists and researchers have documented that increasing levels of CO2 and other greenhouse gases (GHGs) in Earth's atmosphere are caused by human activities, specifically fossil fuel combustion, deforestation and changing land use patterns. As a result, people around the world are experiencing climate impacts related to temperature, precipitation, sea level rise, and more. As part of this project, the City developed an Adaptation and Resilience Report (under separate cover) to document historic climate patterns, how those patterns are projected to change, and the ways in which such changes could potentially impact the City's ability to conduct municipal operations and deliver services and programs to people throughout our community.

The full report is vitally important in helping the City of Lancaster adequately plan for the future of municipal operations and service provisions. Much like the City would prepare for a winter weather advisory, it is incumbent upon the City to heed what scientists around the world are telling us – our climate is changing. Lancaster residents, workers and business owners count on the City to provide clean water, protection and emergency services, stormwater removal, social services, and assistance in times of need. To the extent that the City can plan for, budget for, and implement operational solutions related to increasing precipitation and temperatures, it must. The full report includes three sections:

1) **Climate Risk Inventory** – historical climate trends and future projections
2) **Vulnerability Assessment** – examination of key critical assets, services, and people that will be affected by these impacts
3) **Adaptation Strategies** – longer term, community-scale actions aimed at addressing the anticipated impacts of climate change

Temperature: Historic Trends

Over the past 50 years, Lancaster has experienced several changes in climate patterns for both temperature and precipitation. The average annual temperature has increased by approximately 1.2°F (1969-1978 baseline), representing an increase of about 2.4% over the last 50 years. The highest temperature percentage increases were observed in the winter and spring (Table 1).

An increase in the frequency of warm seasonal anomalies (extremes) was more evident in the summer and fall, and the average annual number

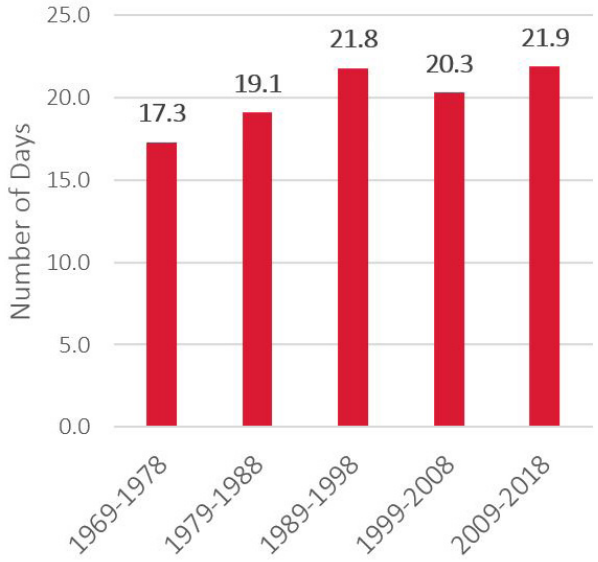
7. Rockefeller Foundation. (2014, December 15). Building Resilience to the Shocks and Stresses of Climate Change. Retrieved from https://www.rockefellerfoundation.org/blog/building-resilience-shocks-stresses/?utm_source=Social%20Media&utm_medium=Twitter&utm_campaign=RF%20Blog

Table 1 Average Annual Temperature by Season and Decade (°F)

Season	1969-1978	1979-1988	1989-1998	1999-2008	2009-2018	Percent Change from Baseline
Winter	31.8	31.3	33.6	32.7	32.9	+3.5%
Spring	51.6	51.6	52.0	52.3	53.2	+3.1%
Summer	73.7	73.2	74.2	74.6	75.1	+1.9%
Fall	33.3	32.6	33	33.7	33.6	+1.1%

Source: National Weather Service Middletown/Harrisburg Local Climatology Reporting Location

Figure 3 Average Annual Number of Extreme Hot Days (Above 90°F) by Decade



Source: National Weather Service Middletown/Harrisburg Local Climatology Reporting Location

CLIMATE CHANGE IMPACTS, CONTINUED

of "extreme hot days" has risen, with days above 90°F having increased by 26.6% against the baseline decade (Figure 3). Additionally, three of the ten warmest annual anomalies on record since 1914 have occurred in the last decade (2009-2018), and seven of them occurred within the past two decades (Table 4).

Temperature Projections for the Future

In this report, the City of Lancaster relied on two "business-as-usual" emissions scenarios, meaning that no actions are taken to reduce greenhouse gas emissions. The two standardized scenarios included one low emissions scenario (LES) and one high emissions scenario (HES). In these projections, average annual temperatures are projected to increase by a range of 4.3-17.1% by the end of the century, with winter and fall yielding the highest projected increases across seasons. As depicted in Table 2, winter average seasonal temperatures within southeastern Pennsylvania are projected to rise by 7.6-14.6%, and by 2.4-12.5% for the fall.

Further, the average annual number of days above 90°F are projected to increase by a sizable 74.2-236.0% (Table 3).

Table 2 Average Annual Temperature by Season Projections (˚F)

Season	2020-2039		2045-2065		2081-2099		End-of-Century % Change from Baseline Years (1961-1999)	
	LES	HES	LES	HES	LES	HES	LES	HES
Winter	34.3	35.0	37.5	38.9	36.9	40.1	+7.6%	+14.6%
Spring	53.4	53.3	54.3	56.0	54.7	59.0	+2.4%	+10.7%
Summer	74.8	75.4	77.1	78.4	77.3	82.2	+3.3%	+9.0%
Fall	57.4	57.8	58.4	60.5	58.8	65.0	+2.4%	+12.5%

Source: Delaware Valley Regional Planning Commission Climate Projections – Chester County

Table 3 Average Annual Number of Extreme Hot Days Projections

Metric	Scenario	2020-2039	2045-2065	2081-2099	End-of-Century % Change from Baseline Years (1961-1999)
Days Above 90˚ F	LES	24.5	42.1	42.6	+74.2%
	HES	27.2	55.6	91.5	+236.0%
Days Above 100˚ F	LES	0.2	0.6	1.6	+597.0%
	HES	0.1	2.2	12.1	+10305.9%

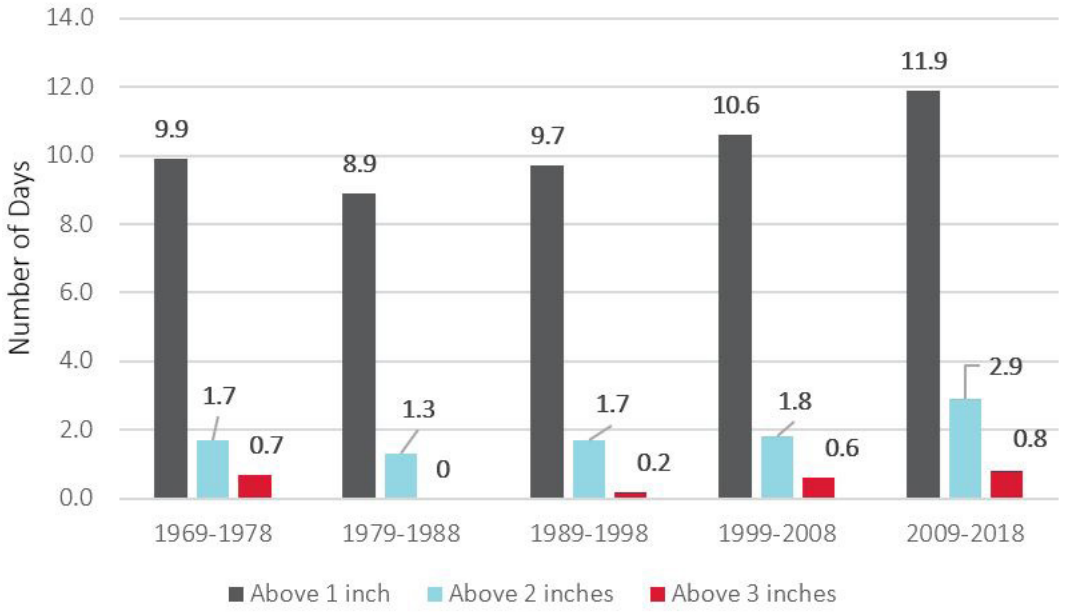
Source: Delaware Valley Regional Planning Commission Climate Projections – Chester County

Table 4 Top 10 Historical Warmest Temperature Annual Anomalies (In Ascending Order)

Year	Avg Temp (˚F) Above Standard Deviation
2016	1.9
2001	2.1
1991	2.2
2002	2.3
2010	2.4
1921	2.5
1999	2.5
2006	2.6
2012	2.6
1998	4.6

Source: Millersville University Weather Information Center

Figure 4 Average Annual Number of Heavy Rainfall Events (Days Above 1, 2, and 3 Inches)



Source: National Weather Service Middletown/Harrisburg Local Climatology Reporting Location

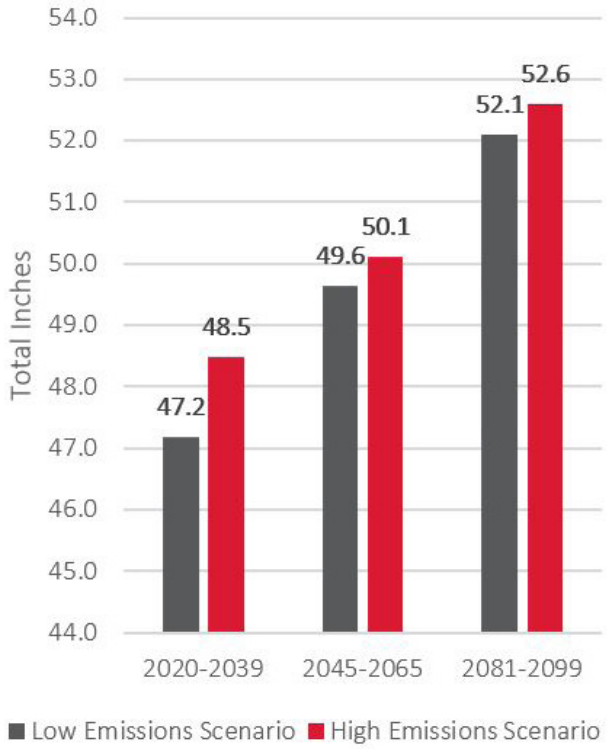
CLIMATE CHANGE IMPACTS, CONTINUED

Precipitation: Historic Trends

Over the past half century, the region around Lancaster has experienced a small decrease in average annual rainfall by decade by approximately 6.1%. However, this is just one metric used to analyze the city's precipitation. When examined seasonally, a rainfall precipitation increase of 11% was noted in fall months, while all other seasons experienced decreases. Despite the overall decrease in average annual precipitation, Lancaster experienced an increase in the frequency of wet season anomalies (extremes) in both summer and fall seasons and in the number of days with 1-inch, 2-inch, and 3-inch heavy rainfall events (Figure 4).

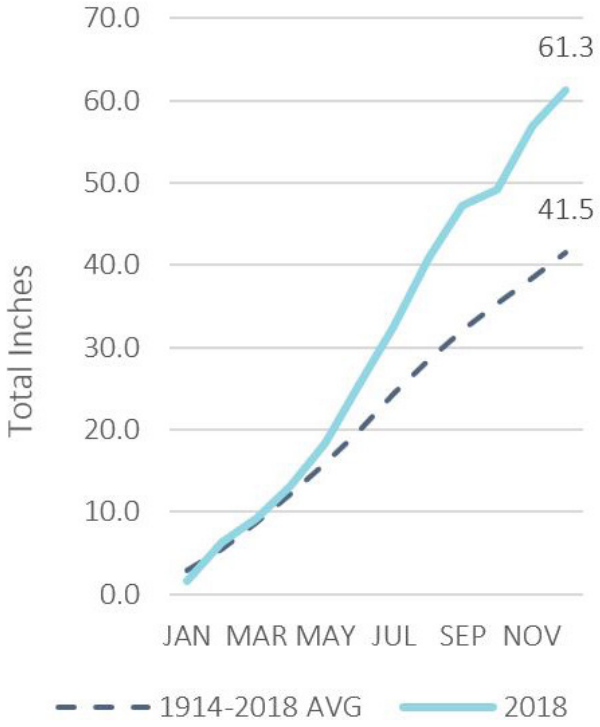
These wet weather anomalies are especially common in the most recent years. The year 2018 was Lancaster City's wettest on record. (Figure 6). Further, a 2015 research report by Climate Central, an independent organization of scientists and journalists, noted that Lancaster City ranked 14th in the nation among the top 50 cities with biggest increases in heavy downpours from 2005-2014 (compared against baseline years 1950-1959).[8]

Figure 5 Average Annual Rainfall Projections



Source: Delaware Valley Regional Plan Commission Climate Projects – Chester County

Figure 6 Cumulative Precipitation Totals (Average vs. 2018)



Source: Millersville University Weather Information Center

8. Climate Central. (2015, May 27). Across U.S., Heaviest Downpours On The Rise. 2015. Retrieved from https://www.climatecentral.org/news/across-us-heaviest-downpours-on-the-rise-18989

Precipitation Projections for the Future

The average annual rainfall in southeastern Pennsylvania is projected to increase to an average of over 50 inches by the end of the century (Figure 5).

Precipitation is a slightly different metric, in that it captures not just rainfall, but any component of the condensation that occurs in the atmosphere. As shown in Table 5, the largest projected increases across the low- and high- emissions scenarios are anticipated to occur in late winter and summer months. While weather events like 1-, 2- and 3-inch rainfall events are not metrics that are projected into the future, it is reasonable to consider that the overall projected increases in total precipitation will likely result in an increase in heavy rainfall events, even in winter months as both precipitation and temperatures are expected to rise.

Lancaster's climate is changing. In many respects, the changes in southeastern Pennsylvania are subtle and not immediately noticeable, except during occurrences of extreme precipitation and temperature anomalies, such as increasingly frequent hot summers or the increasing number of cloudbursts--hyper-localized high-intensity rainfalls that commonly overburden

Table 5 Projected Average Monthly Precipitation by scenario

		2020-2039		2045-2065		2081-2099		
Month	Baseline	LES	HES	LES	HES	LES	HES	Percent
Jan	112.11	74.29	91.22	90.19	98.04	84.39	99.78	-11%
Feb	55.30	70.99	77.48	75.07	100.34	98.91	100.17	81%
Mar	93.92	94.60	104.71	133.65	89.28	113.14	120.68	28%
April	106.93	103.59	101.05	92.57	89.86	97.28	93.62	-12%
May	99.05	112.78	103.30	109.27	109.86	113.12	96.46	-3%
June	96.59	111.21	106.91	111.71	115.69	108.91	114.20	18%
Jul	104.54	119.27	121.45	116.42	107.70	120.07	126.18	21%
Aug.	111.36	108.44	124.89	131.16	121.19	120.98	141.93	27%
Sept.	117.68	118.88	119.82	123.89	110.40	144.35	139.50	19%
Oct.	107.32	104.77	90.84	102.98	120.33	104.81	106.19	-1%
Nov.	106.83	95.54	95.87	95.20	86.16	112.70	103.26	-3%
Dec.	90.40	83.82	93.50	78.01	123.51	104.02	93.56	3%

Source: Delaware Valley Regional Plan Commission Climate Projects – Chester County

CLIMATE CHANGE IMPACTS, CONTINUED

infrastructure. In addition to obvious immediate impacts of increase precipitation and temperature, other expected challenges may lead to increased soil erosion and the creation of a more favorable environment for pathogens and pests that could ultimately threaten our public health. With all of these changes, experts believe that the results of our changing climate will make summers in southeastern Pennsylvania feel more like summers people experience in southeastern Georgia.[9]

The City is anticipating these climate changes as it pertains to municipal operations and the provision of core municipal services for the entire community. It is imperative that the City of Lancaster address this work to be prepared for the "here and now" shown in Lancaster's climate data. Scientists agree that the climate is already changing, and we are certain to face impacts in the coming decades regardless of what actions we take to avoid even worse conditions. Simultaneously, the City will also work to halt greenhouse gas emissions that will further affect our climate by implementing a comprehensive set of emissions-reducing mitigation strategies.

Mark Palczewski

Flash flooding in northern Lancaster County on Route 772 just outside Manheim, PA in August of 2018.

9. Union of Concerned Scientists. (2008). Climate Change Impacts and Solutions for Pennsylvania: How Today's Actions Shape the State's Future. Retrieved from https://www.ucsusa.org/sites/default/files/legacy/assets/documents/global_warming/Exec-Summary_Climate-Change-in-Pennsylvania.pdf

City of Lancaster
Municipal Climate
Action Plan

CITY BASELINE EMISSIONS

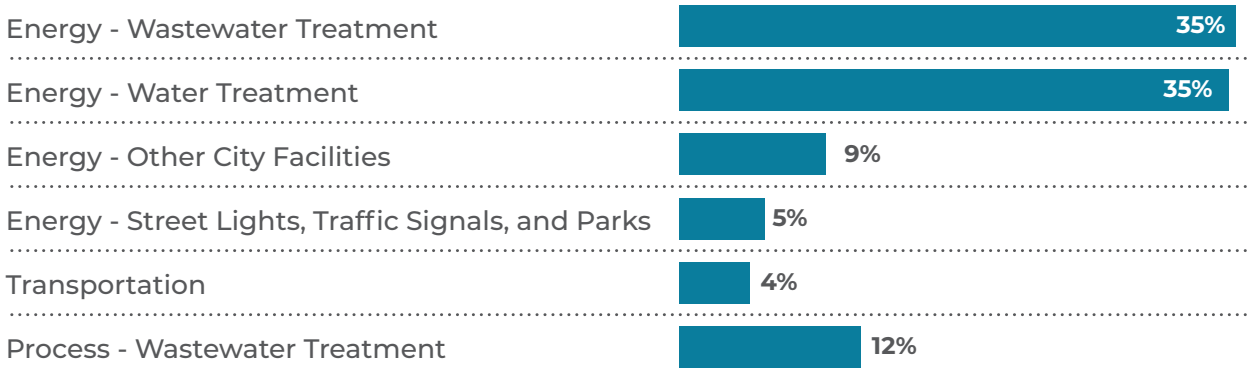
CITY BASELINE EMISSIONS

The City has been tracking emissions across the entire community and those associated with municipal operations since 2015. Municipal operations emissions represent about 4% of total emissions across Lancaster City. In 2017, total emissions associated with municipal operations was 17,012 metric tons of CO2e (MT CO2e) (Figure 7). The year 2017 is the baseline for this plan, meaning this is the starting point from which the City seeks to reduce or "mitigate" its emissions and track its success over time.

What is immediately noticeable is that 84% of the City's emissions derives from energy consumption, which is mostly from electricity and natural gas, but also includes a small amount of fuel oil and propane. In fact, 70% of emissions is attributed solely to the energy required for water and wastewater treatment. These municipal services involve very high energy-intensive processes that are described in more detail in the water/wastewater chapter of this plan. The remaining 14% of energy consumption occurs in other City buildings (9%), and across the city by way of streetlights, traffic signals and within our parks (4%).

Figure 7 City of Lancaster 2017 Baseline Emissions by Sector (17,012 MT CO2e)

The City has been tracking greenhouse gases (GHGs) emitted through municipal operations for several years. This profile helps the City set goals and develop strategies to reduce emissions and adapt to changes in climate while creating a more efficient and resilient municipal operation.



Source: City of Lancaster 2015 Greenhouse Gas Inventory

Michelle Johnsen

Guilbert Brown (Millersville University), Marie Cusick (NPR), Mayor Sorace, and Douglas Smith (City of Lancaster) at the Ware Center in downtown Lancaster.

CITY BASELINE EMISSIONS, CONTINUED

Following energy consumption, another 12% of emissions comes from the nitrous oxide, a byproduct of wastewater treatment. In that process, organic matter decomposes and nitrogen is released in gaseous form, thereby creating GHG emissions.

And finally, use of the City's fleet of vehicles amounts to 4% of the City's emissions. In the delivery of core municipal services, the City owns, maintains and operates over 200 vehicles that include sedans, police cars, firetrucks, sweepers, and backhoes. Though just 4% of emissions, the City is committed to reducing emissions in all aspects of its operations, and particularly those that position the City to lead by example within Lancaster City—because at the community scale, 44% of emissions are associated with transportation.

onethirtynine photography

Downtown Lancaster.

City of Lancaster
Municipal Climate
Action Plan

CLIMATE ACTION IN LANCASTER

CLIMATE ACTION IN LANCASTER

The 30 strategies in this plan position the City of Lancaster to achieve significant reductions, with an emphasis on taking broad, sweeping, but achievable actions in the very short term. By 2025, the City can reduce emissions 79% with 1% carbon offsets (80% of emissions). Continuing on this path, the emissions are incremental in 2035 at 80% with 10% carbon offsets (90%) and 81% by 2050 with 19% carbon offsets (100%). Figures 8 and 9 on page 33 depict the impact of implementing these strategies against a "business as usual" scenario, or in essence, taking no action.

In the business-as-usual scenario, over time a small reduction in emissions is anticipated, as shown in the slight downward progression. This is due to the change in energy sources in which our electricity generation mix is using less coal and deploying more renewables. However, that alone is simply not enough to achieve the significant emissions reductions needed to halt further impacts of climate change.

Many communities have committed beyond this 80% reduction, which for all intents and purposes, is viewed as a minimum in order to avoid the worst effects of climate change. The World Wildlife Federation, a strong climate action advocate, notes that "American cities are already on a path to even stronger action…As first responders to the expensive and growing impacts of climate change,

Michelle Johnsen

Twenty-eight percent of Lancaster City is covered in tree canopy with more than 9,000 street trees inventoried.

10. World Wildlife Fund. (2015, August 6). Biggest US Cities Setting Unprecedented Emissions Reductions Goals to Fight Climate Change. Retrieved from https://www.worldwildlife.org/press-releases/biggest-us-cities-setting-unprecedented-emissions-reductions-goals-to-fight-climate-change

The Numbers

In 2018, the International Panel on Climate Change (IPCC) confirmed that human (or anthropogenic) activities are estimated to have caused approximately 1.0°C (between .8° and 1.2°) of global warming beyond what is natural occurring. IPCC notes that "Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate" and that impacts and associated risks with that increase will "depend on the rate, peak and duration of warming." The report further notes that the impacts are larger if we globally exceed and stay above 1.5°C, and that all efforts should be to reduce anthropogenic global warming—the sooner, the better. [11] Similarly, other organizations have called for large scale emission reductions to prevent rising temperatures that are causing catastrophic damage to our world. As early as 2007, the Union of Concerned Scientists urged for an 80% reduction in U.S. emissions from 2000 levels to stabilize emissions and prevent continued climate impacts. Communities began to follow suit in several climate agreement commitments at that time.[12] The City realizes that the efforts of this plan are only a first step in reaching the commitments it agreed to in reducing community-wide emissions by 80%. The City's efforts are crucial, however, in establishing the need for and ability to meet these goals.

Figure 8 Metric Tons CO2e Emitted After Action

The successful implementation of strategies in this plan will result in the City reducing emissions due to municipal operations by 79% in 2025, 80% by 2035, and 81% by 2050, as showing in Figure 9. (There is some incremental reduction of "business as usual" emissions over time, which is due to the continued and increasing availability of cleaner energy sources).

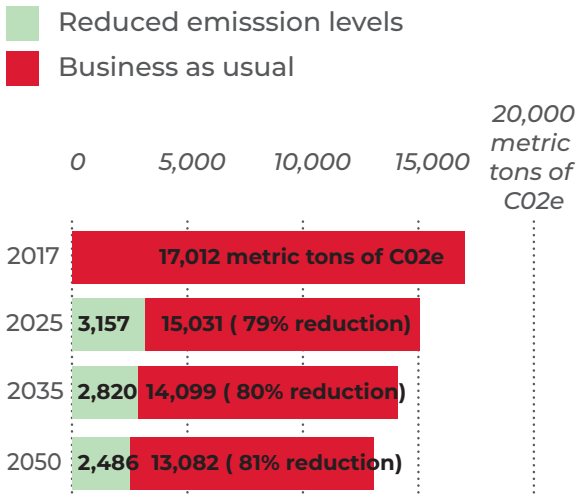
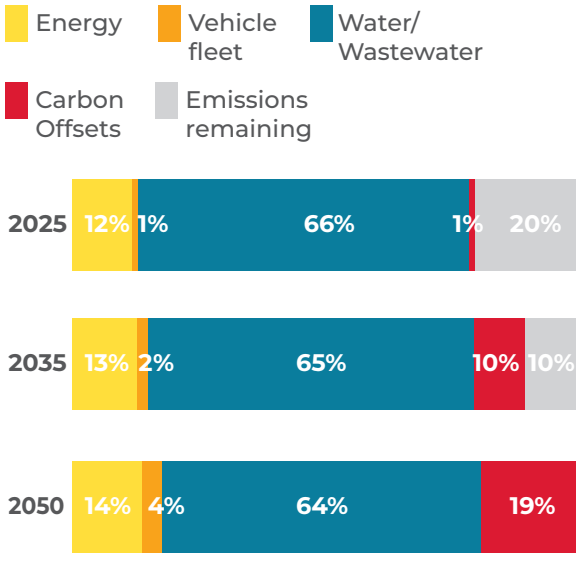


Figure 9 Overall Emissions Reductions as a Result of Action

The City will employ a carbon offset program in which it further sequesters emissions by 1% (2025), 10% (2035) and 19% (2050), resulting in total emissions reductions of 80% by 2025, 90% by 2035, and allowing the City to achieve carbon neutrality by 2050.



11. International Panel on Climate Change. (2018). Summary for Policymakers: Global Warming of 1.5°C. Retrieved from https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf
12. Union of Concerned Scientists. (2007). A Target for U.S. Emissions Reductions. Retrieved from https://www.ucsusa.org/sites/default/files/legacy/assets/documents/global_warming/emissions-target-fact-sheet.pdf

CLIMATE ACTION IN LANCASTER, CONTINUED

it makes sense that mayors are way ahead on this challenge.... It is encouraging that city leaders understand that Paris is an all-hands-on-deck moment and are ready to do their part."[10]
To that end, the City of Lancaster commits to exceed an 80% reduction of emissions in its municipal operations and will aim for carbon neutrality by 2050 by using carbon offsets. As noted above, the City will come close to an 80% reduction rather quickly—within six years—as it transitions to 100% renewable energy sources for municipal operations.

The City is committed to seeking out firsthand ways to further reduce its emissions that will derive from any remaining natural gas consumption and the nitrous oxide emitted during wastewater treatment, but these efforts will take time and careful analyses. In the interim, the City will secure carbon offsets as a means to definitively reach 80% emissions reduction in 2025 (1% offsets), 90% reduction (10% offsets in 2035), and reaching a goal of carbon neutrality by 2050 (19% offsets).

Carbon offsets are measurable GHG emissions reductions that are generated by other sources than one's own.[13] For example, in the Lancaster this might include the continued planting of trees that absorb carbon dioxide (CO2) in or near Lancaster City, improving energy efficiency to reduce emissions within Lancaster City or County (but beyond the City's portfolio of buildings), or adopting no-till practices in the nearby agriculture areas of Lancaster County. Standardized protocols dictate how carbon offsets are monitored and verified for GHG accounting. City of Lancaster is committed to using carbon offsets that have an impact on reducing emissions locally to the benefit of people in and near Lancaster City.

The table starting on page 36 depicts a summary of the strategies within this plan that upon implementation, and in combination with carefully selected carbon offsets, will position the City to achieve its 2025, 2035 and 2050 emissions reduction goals.

13. World Resources Institute. (2010, August). Bottom Line on Offsets. Retrieved from https://www.wri.org/publication/bottom-line-offsets

What is the difference between carbon offsets and renewable energy credits (RECs)?

The City of Lancaster currently purchases renewable energy credits, or RECs. Employing RECs allows the City to essentially convey its use of non-renewable electricity by assuring that for a certain amount of non-renewable MWh of electricity used, that same amount is also generated somewhere else as renewable energy. RECs are considered "indirect emissions reductions" and result in lower emissions reduction calculations. But the true emissions reductions experienced do not necessarily—and more often than not, do not occur near Lancaster. The City of Lancaster can also only employ RECs to reduce electricity-related GHG emissions. GHGs from other sources, such as the City's fleet vehicles, can only be offset using carbon offsets, not RECs.

Table 6

Differences between Offsets & RECs	Offsets	RECs
Unit of Measure	Metric tons of CO2 or CO2 Equivalent	Megawatt hours (MWh)
Source	Projects that avoid/reduce GHG emissions to the atmosphere	Renewable electricity generators
Purpose	Represent GHG emissions reductions	Convey use of renewable electricity generation and support renewable electricity development
Reporting	Reduce or "offset" organization's emissions, as a net adjustment	Can lower an organization's scope 2 emissions from purchased electricity
Consumer Environmental Claims	Can claim to have reduced or avoided GHG emissions outside their organization's operations	Can claim to use renewable electricity from a low or zero emissions source
Additionality Test Requirements	Required and tested for additionality to ensure that it is beyond business as usual.	Not required for a renewable energy usage claim or to report use of zero-emissions power.

Summary of Strategies

Some strategies have specific GHG emission reductions, while others do not. The CO2e annual emission savings noted here are those the city anticipates achieving by 2050. Some strategies do not have specific emission reductions but still impact the City's ability to achieve the goals set forth.

Strategy	Title	Lead Agency	Implementation Time Range	GHG Reduction	Impact
Energy, Chapter 5					
5.1	Reducing Energy Consumption in Municipal Buildings Through Energy Efficiency	Facilities Mgmt and Engineering	Short to Long	406 MT CO2e	
5.2	Accessing Renewable Energy Through On-Site And Off-Site Generation	Facilities Mgmt and Engineering	Mid to Long	940	
5.3	Exploring Electrification of Buildings	Facilities Mgmt	Long	166	
5.4	Improving Energy Habits Among Building Occupants	Facilities Mgmt, Communications, and Green Team	Short	95	
5.5	Improving Streetlight Efficiency	Operations and Engineering	Mid to Long	224	
5.6	Establishing Efficiency and Renewable Energy Requirements for All Future Construction Of Municipal Buildings	Engineering	Short	35	
Transportation, Chapter 6					
6.1	Conduct a Fleet Analysis	Operations	Short	n/a	
6.2	Increase Number of Lower Carbon Vehicles	Operations	Short to Mid	282	
6.3	Expand Employee Bike Share	Operations plus TBD partners	Short	109*	*
6.4	Employee Transportation Demand Management	Green Team and Communications	Short		

* Expanding bike share and employee transportation demand management were calculated together as a reduction in overall vehicle miles traveled

Strategy	Title	Lead Agency	Implementation Time Range	GHG Reduction	Impact
Water & Wastewater, Chapter 7**					
7.1	Implementation of Energy Efficiency Strategies at Water and Wastewater Facilities	Water and Wastewater	Short to Long	2,393	
7.2	Combined Heat and Power/Renewable Energy Feasibility Study at Wastewater Plant	Facilities Mgmt and Water and Wastewater	Mid	5,944	
7.3	Conduct Water Audits in All Facilities	Water	Short	n/a	
7.4	Retrofitting Facilities with Water-Efficient Features	Water	Mid	n/a	
7.5	Reducing Water Consumption Through Improved Landscape Management	Facilities Mgmt	Short to Mid	n/a	
7.6	Establishing a Water Reclamation and Reuse Program	Wastewater and Water	Mid	n/a	
7.7	Expand the Use of Wastewater Biosolids	Wastewater; partner LCSWMA	Mid	n/a	
Stormwater, Chapter 8					
8.1	Continue to Implement Green Infrastructure Improvements to Ease Flooding in Key Areas	Stormwater	Short to Mid	n/a	

** Emissions for water/wastewater were calculated specific to operations. Reducing water consumption and the need for wastewater treatment is a viable means of reducing energy consumption too, but it was not calculated for the municipal operations plan.

Summary of Strategies

Some strategies have specific GHG emission reductions, while others do not. The CO2e annual emission savings noted here are those the city anticipates achieving by 2050. Some strategies do not have specific emission reductions but still impact the City's ability to achieve the goals set forth.

Strategy	Title	Lead Agency	Implementation Time Range	GHG Reduction	Impact
Waste, Chapter 9* **					
9.1	Conduct Waste Analysis for Municipal Buildings	Facilities Mgmt, Solid Waste and Recycling, and Operations	Short	n/a	
9.2	Implement Food Composting in Municipal Buildings	Solid Waste and Recycling	Short	n/a	
9.3	Adaptive Reuse of City Buildings and Construction Recycling	Solid Waste and Recycling and Facilities Mgmt	Mid	n/a	
9.4	Reduce Employee Waste	Solid Waste and Recycling	Short	n/a	
9.5	Reuse Office Equipment	Facilities Mgmt and Solid Waste and Recycling	Short	n/a	
Culture of Sustainability, Chapter 10					
10.1	Dedicate Staff to Lead City Climate Action	Admin Services	Short	n/a	
10.2	Establish a Green Team	Mayor's Office and Climate Committee	Short	n/a	
10.3	Develop a Green Meetings Policy	Green Team	Short	n/a	
10.4	Integrate Climate/Sustainability into Municipal Processes	Mayor/Council, Green Team, and Admin Services	Mid to Long	n/a	
10.5	Implement Climate-sensitive Purchasing Guidelines	Admin Services and Green Team	Short to Mid	n/a	
Carbon Offsets, Chapter 11					
11.1	Identifying Responsibility Internally	Mayor's Office	Short to Mid	n/a	
11.2	Establishing Financing and Pilot Programs	Mayor's Office	Short	n/a	

*** Emissions were not calculated because the City has no data on waste generated within municipal facilities. Furthermore, most waste is processed at LCSWMA's waste-to-energy transfer station and does not reach a landfill destination.

City of Lancaster
Municipal Climate
Action Plan

ENERGY

ENERGY

The City of Lancaster's energy consumption for municipal operations is comprised mostly of electricity and natural gas usage in its facilities. The majority of the City's emissions profile (70%) is associated with the energy required to treat and pump water within the City's water and wastewater operations, as is discussed in the water and wastewater section of this plan. The remainder of municipal operations energy consumption occurs across the City's facilities, representing 14% of the City's total emissions profile. This includes lighting, heating and cooling, and plug load from the use of computers, printers, monitors, overhead screens, and more. This means that some of the best opportunities to reduce municipal operations-related emissions are tied to overall reductions in the City's energy consumption, and a lessened reliance on fossil fuel-sourced energy. Aside from strengthening efforts aimed at reducing emissions, the strategies in this section will also help to reduce energy costs, increase energy independence, and enhance the comfort of City employees at their place of work.

Over the past decade, the City has worked to implement energy efficiency improvements across its buildings and lighting. Some of these improvements include efficient indoor lighting upgrades, new LED exit signs in City buildings, several HVAC replacements, retrofitted traffic lights, and significant improvements made to the police station as part of the Energy Efficiency and Conservation Block Grant funds, by way of the 2009 American Recovery and Reinvestment Act (ARRA). The City's energy data shows that this work resulted in an 8.15% drop in electricity consumption between 2015 and 2017.

Nonetheless, more will need to be done if the City is to meet the emissions goals laid out in this plan, and opportunities for improvement exist everywhere across the City's building portfolio. Former Facilities Management Director Dave Schaffhauser (who retired in 2019) acknowledged mounting challenges, including the complications of maintenance for an aging building stock, the amount of energy required for 24-hour facility operations at buildings like the police station, energy-intensive water and wastewater operations, and the energy habits and behaviors of people working inside the buildings.

The six strategies in this chapter detail opportunities the City can act upon now and in the future to reduce emissions associated with energy consumption. These strategies employ a multidimensional approach to solving issues of energy usage, seeking creative and comprehensive reforms that will help to both increase energy efficiency and minimize the use of fossil fuels in municipal operations.

Keeping Track of Energy Consumption

Facilities Management tracks the City's energy consumption through Facility Dude's Utility Trac, an online energy management program. This comprehensive approach to energy management allows officials to log energy consumption and costs monthly, examine consumption trends over time, and identify potential areas of concern and improvement.

Douglas Smith

Lancaster City Hall's green roof.

Ben Jennings

Lancaster City Hall .

Efficiency at City Hall

City Hall was built in 1892 and served as Lancaster's first post office until 1932. Renovations over the years, including major work completed in 2013, have resulted in City Hall now being one of the top energy performers in the City's building portfolio. The City of Lancaster was recognized for this work by the United States Green Building Council (USGBC) in 2016 when it was granted LEED Silver certification. USGBC LEED ratings are designed to score buildings based upon elements of sustainable design and process incorporated in a given structure.

ACTIONS

5.1

Reducing Energy Consumption in Municipal Buildings Through Energy Efficiency

Lead Agencies:
Facilities Management and Department of Engineering

Timeline:
Short to long-term (varied)

The City of Lancaster is committed to reducing energy consumption associated with municipal operations from 2017 levels by 25% in 2025, 40% in 2035, and 50% by 2050. Costs associated with the City's energy use are considerable, and energy use is the biggest contributor to the City's emissions profile when considering the full impact of water and wastewater operations. It stands to reason that an integral element of reducing municipal operations emissions is to ensure that we use energy as efficiently as possible. Efforts to reduce energy consumption must be collaborative and tactical in their implementation. Energy assessments, also referred to as energy audits, help to provide a better understanding of energy performance in each building and the opportunities for reducing consumption. These assessments will be paired with energy recommendations that are tailored to each building based upon its characteristics and specifications. Once energy assessments have been conducted for all City buildings, a comprehensive strategy will be formed to deliver the most impactful and practical changes that support the City in reaching its goals.

No-cost or low-cost strategies such as mandating auto-hibernation settings on computers, and upgrades to lighting, insulation and air-sealing provide short-term benefits with very quick payback periods. In the mid-term and long-term, higher cost measures may include the installation of efficient HVAC equipment for heating and air conditioning, particularly for larger buildings or buildings in constant use such as the police station and fire houses. Incentives and additional support may be available through the local utility companies, which could potentially help to expedite the project timelines and reduce payback periods.

5.2

Accessing Renewable Energy Through On-Site and Off-Site Generation

Lead Agencies:
Facilities Management and Department of Engineering

Timeline:
Mid to long-term

The City commits to transitioning to 100% renewable energy resources from a mix of on-site and off-site options for all electricity use by 2025. Investments made in sourcing energy from renewable sources will aid the City's efforts and mission in a multitude of ways, both reducing emissions associated with municipal operations and supporting the growth of a broader economy of sustainability.

The City will consider strategies that incorporate both on-site and off-site renewable energy options. On-site renewable energy options consist of various systems that fit fully within the footprint of a building and surrounding lot lines, such as rooftop solar panels or wind turbines. Off-site generation is characterized by tapping into sources not within an immediate location, such as rooftop solar from another building, a nearby community solar array, or even a Power Purchase Agreement (PPA) with a local renewable energy supplier, such as the Lancaster County Solid Waste Management Authority's Waste-to-Energy facility through a partnership. The City will also consider energy storage through high-capacity batteries, which will allow the City to further expand the distribution of renewable energy based on energy demand.[14] Any remaining energy consumption will be mitigated through carbon offsets and a limited purchase of renewable energy credits. The City of Lancaster will carefully assess all opportunities for utilizing both on-site and off-site renewable energy systems by initiating a renewable energy feasibility study. This effort will establish the best ways for integrating on-site renewable energy systems on City properties, identify best practices, and seek out ideal public and private partners from whom off-site renewable energy can be sourced. See page 41 for information on community solar as a possibility for off-site renewable energy options.

5.3

Exploring Electrification of Buildings

Lead Agencies:
Facilities Management

Timeline:
Long-term

The City will explore opportunities to heat buildings using electricity as it transitions to using more renewable electricity. This process is known as thermal decarbonization; wherein, the City will aim to reduce natural gas use in buildings in favor of sourcing carbon-free electricity for heating purposes. Reasons for considering thermal decarbonization abound. Some benefits the City would enjoy through the adoption of such a strategy include the negation of environmental issues related to fracking practices, the opportunity to associate with a wave of positive public sentiment surrounding such initiatives, as well as securing insulation from the market volatility of natural gas prices. One way or another, the City will commit to methods for reducing its reliance on natural gas, supporting and taking advantage of the ever-expanding green energy market.

14. Union of Concerned Scientists. (2015, February 20). How Energy Storage Works. Retrieved from https://www.ucsusa.org/clean-energy/how-energy-storage-works

ACTIONS

5.4

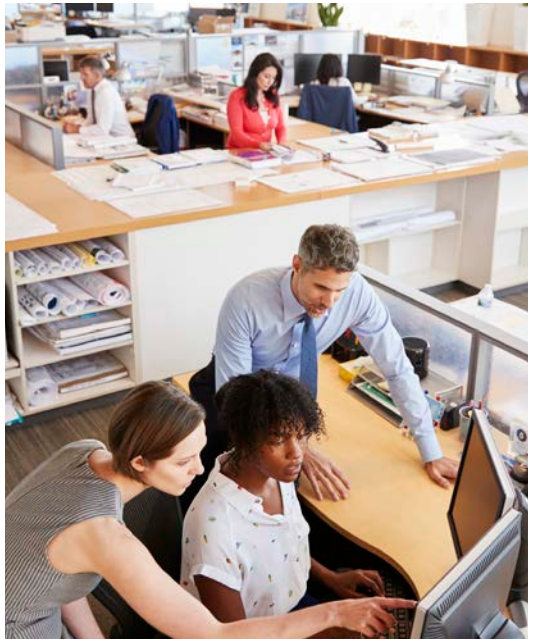
Improving Energy Habits Among Building Occupants

Lead Agencies:
Facilities Management, Communications, and Green Team

Timeline:
Short-term

In addition to ensuring that both the outer structures and internal systems of City buildings use energy efficiently, the City also commits to fostering and instituting an energy-conscious work-culture by working with employees to establish the individual's role in reducing consumption. Behavior change is typically achieved through the integration of shared goals, equitable outcomes, and progress-oriented language, which can be adopted by municipal government and its employees. Municipal decision makers who are willing and motivated to act on energy efficiency should, and (in addition to their internally aimed efforts) they should also share their enthusiasm for efficiency measures and the associated cost savings with community stakeholders. Engagement may include activities such as stakeholder meetings, the establishment of advisory or ad hoc committees, press releases, and targeted information releases (e.g. newsletter, internal email bulletin).

A coordinated effort to consistently provide information, prompt stakeholder participation, and elicit feedback from stakeholders is pivotal to the long-term success of energy efficiency strategies in Lancaster.



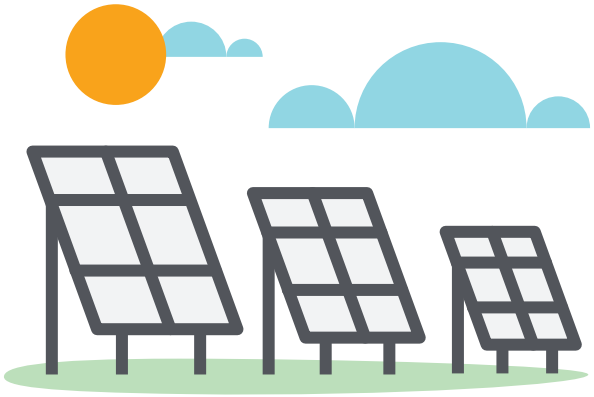
iStock Photo

Workplace habits impact energy consumption.

What is Community Solar?

Community solar is a solar photovoltaic (PV) installation that can provide both solar energy and financial benefits to community members through a voluntary program. Various approaches to community solar have been deployed across the country allowing individuals, businesses, and anyone with an electricity bill to benefit from the solar power generated by a community solar installation. In fact, cities that have led the charge by becoming early leaders in community solar are now commonly sharing the benefits that access to solar energy provides with other community partners, creating an inviting space for businesses, institutions, residents, and future investors.

Business and ownership models vary based on local and state policies, utility structures, and other market related issues. One constant, however, is that in any model participation is voluntary. Participants typically receive a commensurate credit applied to their electricity bill. As a result, subscribers may see reduced electricity rates for as long as 25 years. In February 2019, bipartisan-led and supported H.B. 531 was introduced into Pennsylvania state legislature for consideration, which would make community solar a viable opportunity across the commonwealth.[15]



1. Solar panels are installed in a sunny location somewhere in the community.

2. Anyone with an electricity bill can subscribe to this a community solar array and start accessing solar energy for their home.

3. Each subscriber is credited with the electricity created by their share of the solar array right on their electric bill, regardless of where they live.

15. Solar United Neighbors. "Support for Pennsylvania community solar bill grows." March 8, 2019. Website article accessed on April 23, 2019. https://www.solarunitedneighbors.org/news/support-for-pennsylvania-community-solar-bill-grows/

ACTIONS

5.5

Improving Streetlight Efficiency

Lead Agencies:
Bureau of Operations and Department of Engineering (Utility Project Management)

Timeline:
Mid to long-term

The operation of both City-owned and utility-owned streetlights represented about 5.5% of the City's emissions profile in 2017. Typical streetlights use high pressure sodium lighting which effectively illuminates our roadways and sidewalks. Installing energy efficient lighting such as light-emitting diode technology (LEDs) would result in significant energy savings ranging from 50% to 75% of the current kilowatt hours.

The City is currently working to secure ownership of the approximately 5,000 utility-owned streetlights in Lancaster. Once the City gains ownership of these streetlights, an analysis of what types of lighting replacement and installation strategies are most sensible will be conducted. Given the expenses associated with this endeavor, the City of Lancaster will work with PPL Electric Utilities to obtain the financial incentives outlined in Act 129 Phase III, which includes provisions for streetlight installation.

Act 129

Act 129 is Pennsylvania state law enacted in 2008 that requires major electric utilities to reduce energy use within their service territories based on efficiency goals established by the Pennsylvania Utilities Commission. In order to meet these goals, utilities have implemented a variety of programs and incentives for customers across all building sectors. In the first seven years, "Act 129 delivered $6.4 billion in benefits to all customer classes." Source: Keystone Energy Efficiency Alliance (KEEA). https://keealliance.org/act-129/

5.6

Establishing Efficiency and Renewable Energy Requirements for All Future Construction of Municipal Buildings

Lead Agencies:
Bureau of Engineering

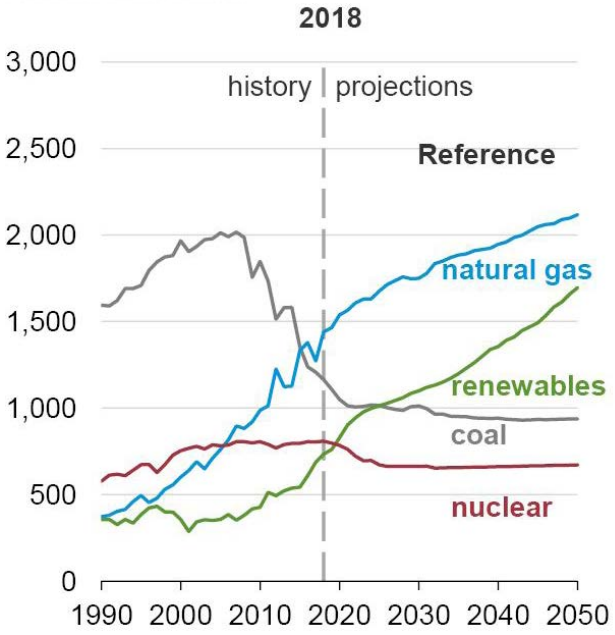
Timeline:
Short-term

The City of Lancaster will occasionally find it necessary to build new structures, complete major renovations in older buildings, or renovate a newly acquired building being added to the City's portfolio. The addition of new buildings will result in increased energy consumption. Requiring high energy efficiency standards and renewable energy requirements for all future municipal buildings and renovation plans will ease the transition of public utilities and services into new structures when needed. Implementing these energy-related improvements at the time of construction or renovation is a more financially prudent process than the addition of such systems post construction.

Electricity Generation is Getting Cleaner

The electric generation fuel mix nationwide and in the PJM market from which Lancaster draws its electricity is characterized both by a significant decline in coal and an increase in cleaner fuel sources, such as natural gas and renewable solar energy.

Figure 10 Electricity generation from selected fuels
In billion kilowatthours



Source: U.S. Energy information Administration, Annual Energy Outlook 2019

COMMUNITY CONNECTIONS

As the City moves forward on implementing its energy strategies, there are some outward-facing energy strategies that are rooted in community action, but will require municipal involvement up-front. Prior to the development of a community-scale climate action plan in the near future, the City of Lancaster will investigate these opportunities:

- Consider implementing C-PACE (Commercial Property Assessed Clean Energy) in Lancaster to provide often-needed up-front financing for commercial buildings.
- Utilize Local Economic Revitalization Tax Abatement (LERTA) as a financing tool for energy efficiency and renewable energy improvements.
- Establish a mandatory energy/water benchmarking program for larger buildings in the City.
- Consider identifying a public/private partnership to implement a community solar project that benefits low income households and small businesses.
- Investigate programs like Solarize Philly that aim to help homeowners install on-site solar on their homes, to determine their applicability in Lancaster.
- Partner with utilities and local organizations to expand the reach of existing Act 129 efficiency programs among vulnerable populations and small businesses.
- Research the potential emissions savings and viability of developing a residential air-source heat pump/solar water heating program with local contractors.
- Analyze opportunities for improved energy codes and related enforcement.
- Allow energy efficiency improvements as part of any HOME loan, Community Development Block Grant funds, etc.
- Hire local community organizations/organizers to conduct a community climate education campaign.
- Hire woman-owned and minority-owned businesses for energy efficiency work.

Douglas Smith

Solar panel installation at Rachel's Creperie.

City of Lancaster
Municipal Climate
Action Plan

VEHICLE FLEET

VEHICLE FLEET

The City of Lancaster currently owns a fleet of just over 200 vehicles purposed for conducting municipal operations. To better understand the climate impact of its fleet, the City completed a greenhouse gas inventory in 2018 of its vehicle fleet emissions between 2015 and 2017. In 2017, the total emissions associated with the fleets operations was 751 MT of CO2. To put this in perspective, city employees (593) currently use 219 vehicles, which results in an average of 1.26 MT CO2 per employee.

The City's fleet in 2017 was comprised of several different fuel type vehicles including gasoline powered vehicles (75%), diesel fuel vehicles (16%), and a handful of compressed natural gas (CNG) and bi-fuel vehicles. The fleet includes many special purpose vehicles, such as dump trucks, police cars, street sweepers, and construction machinery like backhoes for which GHG reduction strategies must consider performance as well as emissions.

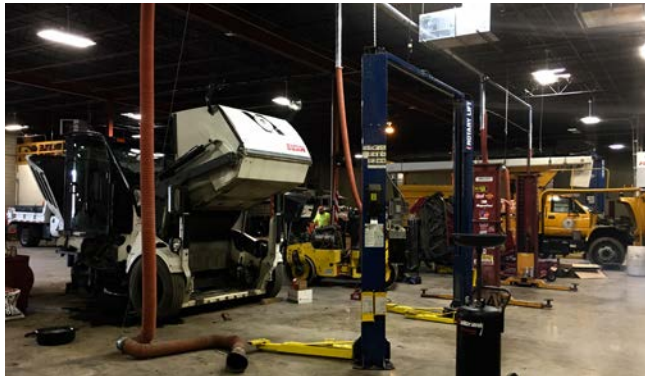
Emissions from City-operated vehicles are estimated based on vehicle miles traveled (VMT) as measured by monthly odometer readings. Each year the City purchases between 6 and 12 vehicles. Vehicles are budgeted for and requested by specific departments and purchased by the Fleet Manager. Vehicles are maintained at the City Garage, and repairs are tracked within the Motor Vehicle Bureau. The overall efficiency of the fleet has improved slightly from 15.7 miles per gallon (mpg) in 2015 to just over 16 miles per gallon in 2017. Emissions associated with personal vehicles owned by City employees were not factored into the 2018 emissions inventory, but will be accounted for in

Ben Jennings

The City's current fleet includes over 200 vehicles.

a future community-scale emissions inventory. Emissions associated with airline travel for business trips as well as the sourcing and refinement of fuel used by the City are elements of the City's environmental footprint that are important to consider; however, due to the City's limited power in influencing the reduction of such emissions associated with these upstream activities and processes, strategies for managing such emissions are not included in this plan.

The four strategies in this section are designed to help the City reduce the emissions of its fleet by limiting the number of miles traveled annually by City vehicles and purchasing low-carbon vehicles.



There are a variety of vehicles for different municipal functions.

Ben Jennings

ACTIONS

6.1

Conduct a Fleet Analysis

Lead Agencies:
Bureau of Operations and Motor Vehicles Section

Timeline:
Short-term

While fleet related emissions make up a relatively small portion of the City's total emissions profile, it is one of many strategies that help meet the aggressive mitigation goals outlined in this plan. Decarbonizing the fleet is also an important demonstration project for the community because of the high visibility of the City fleet.

An understanding of how and when City vehicles are needed and utilized is essential to identifying the best opportunities for improving the fleet in ways that will both enhance its utility and reduce its contribution to overall City emissions.

Trip logs and GPS-based tools can be used to determine how often vehicles are used, the purposes of the trips they go on, and the lengths of those trips. Running an idling analysis can also help identify opportunities for user efficiency. These results can be combined with existing data on VMT, hours of use, and fuel usage by vehicle and department, to create usage metrics, understand usage patterns and identify opportunities for increasing fleet-efficiency

Carsharing Pool

City of Stamford (CT) In tracking its fleet, the City of Stamford, Connecticut realized that many vehicles were underutilized. By implementing a carsharing pool, the City projects it will save over $1 million dollars in the next five years.[16]

16. AgileFleet. (2018, July 11). City of Stamford Fleet Projects 5-year cost savings of more than $1-million via car sharing, cost avoidance. Retrieved from http://blog.agilefleet.com/company-feed/city-of-stamford-fleet-projects-5-year-cost-savings-of-more-than-1-million-via-car-sharing-and-cost-avoidance

6.2

Increase Number of Lower Carbon Vehicles

Lead Agencies:
Bureau of Operations and Motor Vehicles Section

Timeline:
Short to mid-term

The purchase of alternative fuel vehicles would provide a clear path to reducing City fleet emissions. The City of Lancaster currently uses over 200 vehicles in its municipal operations, only 15 of which would be capable of converting to traditional cleaner technologies. The City will investigate additional emerging technologies such as the conversion of vehicles with gas-to-hybrid systems, when appropriate. This option may especially work well with vehicles that have many expected years of service before fleet retirement/replacement. The City is committed to incrementally increasing the percentage of its fleet that is capable of utilizing cleaner fuel technologies: converting 10% of the fleet to cleaner-fuel technology vehicles by 2025, 25% of the fleet by 2035, and 100% of the fleet by 2050.

There are several different alternative fuel-type vehicles on the market today. The City will determine which of these alternative fuel-type vehicles best suit the needs of the bureaus and departments that they are intended to serve. The technology for alternative fuel-type vehicles is advancing rapidly, so considerations regarding the practicality of purchasing new vehicles that could be rendered obsolete not long after purchase will be made.

Types of Low-Carbon Alternative Fuel Vehicles Today

Vehicle Type	Benefits	Limitations
Electric	• Zero tailpipe emissions • Significant advances in range and charge times	• Electricity-sourced, so only as clean as its energy source • Requires charging/ down time • Limited range
CNG	• Lower carbon compared to gasoline or diesel	• Lifecycle emissions are only about 15% lower, might not help City reach its goals
Biofuels	• GHGs emitted are biogenic, rather than anthropogenic	• Still has other tailpipe air pollutants
Hybrid	• Increases fuel efficiency	• Limited carbon savings

ACTIONS

6.3

Expand Employee Bike Share

Lead Agencies:
City of Lancaster Green Team and Bureau of Operations;
Partners: *To be determined*

Timeline:
Short-term

Reducing single occupancy automobile travel is one of the key strategies to reduce vehicle fleet emissions. Making City-owned bicycles available to employees gives them a zero emissions option for short to mid-length trips. Lancaster's compact build and increasing number of bike-friendly roadways make it an ideal urban setting for short-commute bicycling, something that City employees should be motivated to take full advantage of.

Rather than having employees keep a bike at work for occasional use, the City will encourage and incentivize the use of an in-house bicycle fleet for use by employees. The City already has several bikes that are available to employees, but they have not been widely used. The City will evaluate whether it makes more sense to expand its own fleet or to partner with a pre-established bike sharing organization. Such a partnership could include other stakeholder institutions across Lancaster.

bikeit Lancaster

Bike It Lancaster

Bike It Lancaster is a bike share program that is available in Lancaster now. It maintains a fleet of bikes and six docking stations for use by the hour or through annual membership.

6.4

Employee Transportation Demand Management

Lead Agencies:
City of Lancaster Green Team;
Partners:
Communications Department

Timeline:
Short-term

Reducing the need for travel is an important way to reduce vehicle fleet emissions. As online meeting technology improves, it should be used more often as a substitute for traveling to meet in person. This would help to reduce automobile trips, increase the productivity of employees doing work from home, and even eliminate air travel in some circumstances. During extreme weather events, a video meeting setup might also prove superior by facilitating communication between disparate meeting partners.

If remote meeting technology is to function as a valid replacement for in-person meetings, the meeting services and associated technology must be high quality and easy to use. The City will evaluate its existing meeting related technology and equipment to better assess the necessity of potential upgrades and service improvements.

The City will also consider a variety of incentive programs that could further motivate employees, such as perks for replacing an in-person meeting that would have required travel with an online meeting, preferred parking for carpoolers and electric vehicles, or a parking cash-out program that financially rewards employees who don't use City parking spaces.

COMMUNITY CONNECTIONS

The City of Lancaster can positively impact the transportation emissions of the community through its policies and programs. Strategies to address community transportation GHG's will be addressed in a community climate action and adaptation plan. As Lancaster explores community-scale transportation strategies, it should work to improve equity and access to public transportation services in Lancaster. Public transit is an essential tool for providing equitable transportation access for low income residents, seniors, youth, and those with disabilities. Delivering the benefits of these strategies to those who need them most and ensuring that funds put towards these strategies go on to cultivate new jobs and investment opportunities for disadvantaged populations is of great importance to the City and its strategic plan. Below are potential community transportation strategies for consideration:

- Continue to implement adopted "complete streets" policy that increases access to multimodal transportation and creates safe, welcoming environments to encourage zero-carbon transportation through walking and biking.
- Implement the strategies identified in the 2018 Lancaster Active Transportation Plan, the 2015 Downtown Walkability Analysis and the City of Lancaster Economic Development Strategic Plan.
- Conduct alternative fuel/autonomous vehicle/ shared vehicle readiness study and identify the potential impacts of these markets in Lancaster.
- Evaluate new mobility options (e.g. rideshare/ transportation network companies, carshare, bikeshare, scooters, etc.) and their impacts around the community.
- Assess Lancaster's infrastructure readiness for alternative fuel vehicle.
- Support the Chamber of Commerce's initiative to connect people with Northern jobs via carpools, van pools, employer transportation programs, and more. Commuter Services of Pennsylvania is a useful tool to coordinate commuter alternatives across different employers and throughout the region.
- Assess alignment of parking policies with Lancaster's climate goals.
- Support and expand existing public transit services and infrastructure, which might include improved bus stop facilities, bus rapid transit lines, and riding incentives. Public transit is an essential tool for providing equitable transportation access for low-income residents, seniors, youth, and those with disabilities.
- Encourage transit-oriented development and location-efficient land uses.

City of Lancaster
Municipal Climate
Action Plan

WATER AND WASTEWATER

WATER AND WASTEWATER

Providing clean and safe drinking water and treating wastewater can be especially energy intensive. For drinking water, energy is used by the City to channel water from the Conestoga River and the Susquehanna River to the treatment plant, which treats the source water to reach drinking water quality standards and pumps the treated water to customers. For wastewater, energy is used to channel wastewater from the sewer system to the treatment plant where it is treated to reach water quality standards and returned to the Conestoga River. In 2017, 82% of emissions associated with municipal operations were related to water and wastewater treatment.

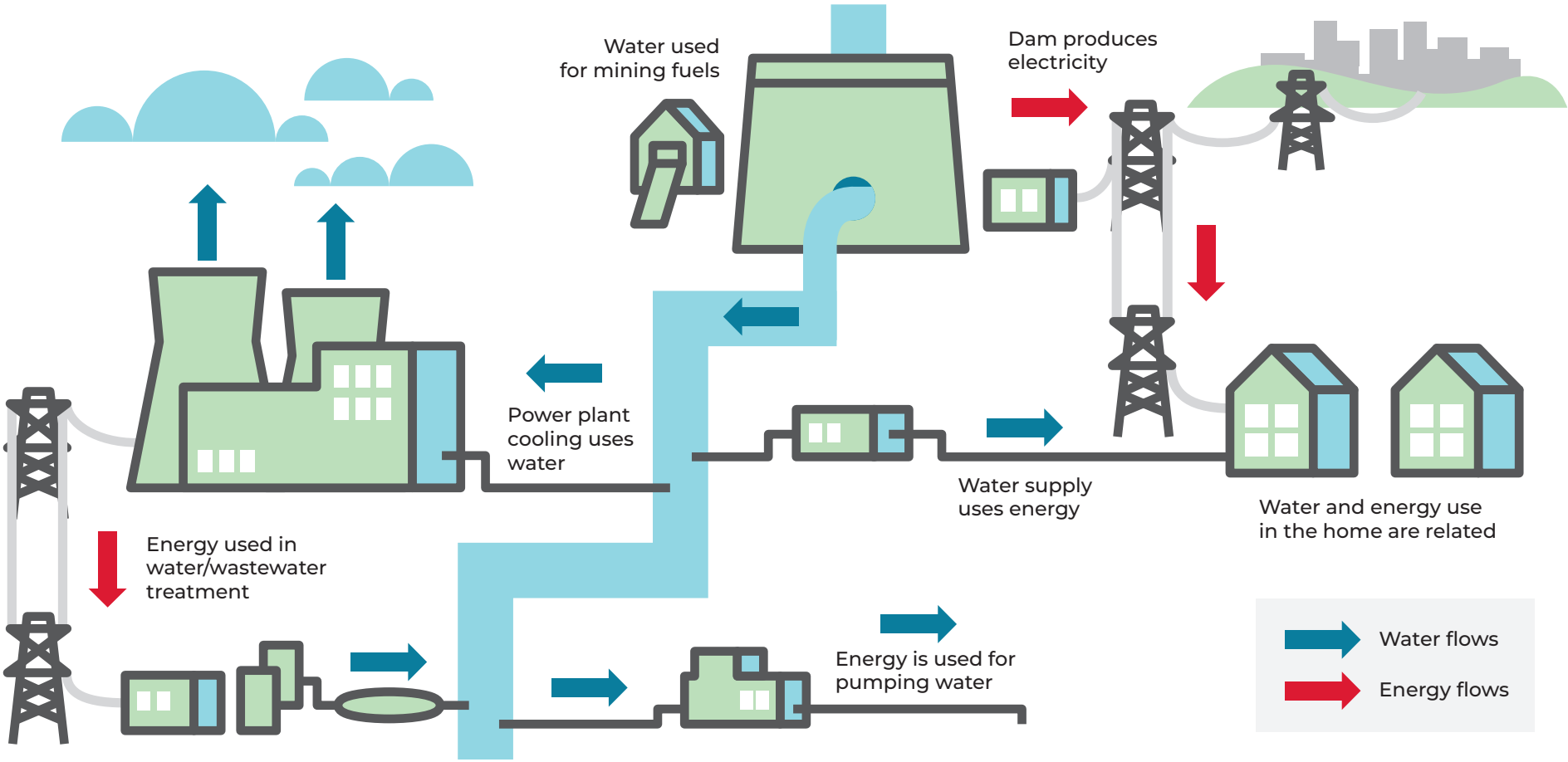
The seven strategies in this section focus on two areas: water and wastewater facilities, as well as water and wastewater activities across the municipal buildings portfolio.

iStock Photo

Clean drinking water requires a significant amount of energy consumption.

Energy Demands on Water Resources

The water-energy nexus is a phrase used to describe the interconnected relationship that energy and water have. As shown in this diagram, a significant amount of energy is required to extract, distribute, and treat water. Conversely, water is also used in both energy production and generation.



ACTIONS

7.1

Implementation of Energy Efficiency Strategies at Water and Wastewater Facilities

Lead Agencies:
Bureau of Wastewater and Bureau of Water

Timeline:
Short to long-term (multiple and varied)

The City of Lancaster's operation of water and wastewater treatment facilities represents 82% of its total emissions profile. Twelve percent is connected to emissions within wastewater processes, while 70% is attributed to the energy required in water and wastewater operations—extracting, treating, pumping, and treating again before returning the water back to the river—not to mention general building energy consumption, such as lighting and HVAC systems. This is typical for municipalities that process water since water and wastewater treatment are highly energy intensive processes. Both water and wastewater operations are regulated to meet established national and state standards for the safety and protection of people, and must do so 24 hours a day, every day, without fail. Opportunities for saving money and reducing energy usage at these 24-hour facilities abound and can be realized through the adoption of several water and wastewater strategies.

- Leak detection across the entire system *(Applicable to water only)*
- Aeration efficiency *(Applicable to wastewater only)*
- Lighting Efficiency *(Applicable to both)*
- HVAC Efficiency *(Applicable to both)*
- Pumping Efficiency *(Applicable to both)*
- Efficient Controls *(Applicable to both)*

7.2

Combined Heat and Power/Renewable Energy Feasibility Study at Wastewater Plant

Lead Agencies:
Facilities Management, Bureaus of Water, and Wastewater

Timeline:
Mid-term

During the process of wastewater treatment, the installation of anerobic digesters produces a steady flow of methane gas. When this gas is captured it can be used to produce both electricity and thermal energy, also referred to as “combined heat and power” or CHP. A CHP system can replace a portion or sometimes all of the electricity and heating needs of a treatment plant. On-site renewable energy (e.g. solar) is another option that can be installed separately or in a hybrid system along with CHP. High-capacity batteries can further expand this system by capturing excess energy generation for later use instead of a diesel generator. In order to determine whether this is a viable option for the Lancaster Advanced Wastewater Treatment Plant (WWTP), the City will conduct a feasibility study to analyze opportunities for installing renewable energy systems, identify the energy savings potential of putting such systems in place, and gauge both the financial incentives and costs associated with installation.

7.3

Conduct Water Audits in All Facilities

Lead Agencies:
Facilities Management and Bureau of Water

Timeline:
Short-term

As described above, water use in municipal buildings results in energy-intensive treatment processes. A water audit is a tool that is used to identify loss and waste due to leaking or inefficient pipes, fixtures, and equipment. The City will establish policies governing water audits and performance targets for municipal buildings and implement a water audit and benchmarking program for its facilities.

A water audit begins with a review of water bills from the previous two years to establish a baseline of typical water consumption. This baseline is used as a benchmark for comparison to similar building types and can help to identify unexplained spikes in water consumption that may indicate a leak. Facilities are then physically inspected to locate leaks and determine the performance of water-using systems, including those related to sanitation, maintenance, mechanical systems, building processes and irrigation. Once potential water-saving measures are identified, the cost and savings of implementation can be estimated. Facility procedures including maintenance and procurement practices are also typically evaluated.

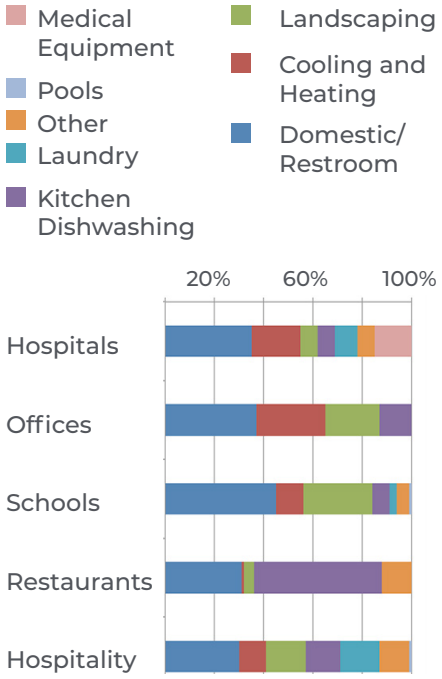
At the conclusion of these activities, Facilities Management will create a water efficiency action plan, benchmark its progress, and report its progress publicly.

ACTIONS

7.4

Retrofitting Facilities with Water-Efficient Features

Typical Water Use in Commercial and Institutional Buildings



Sources U.S. Environmental Protection Agency, WaterSense

Lead Agencies:
Bureau of Water

Timeline:
Mid-term

The installation of water-efficient fixtures reduces the demand for potable water, thereby also reducing the need for production and distribution, which saves the City money. The City will retrofit municipal buildings with water-efficient certified products when renovating or constructing facilities. The U.S. Environmental Protection Agency's WaterSense program certifies building fixtures that use at least twenty percent less water than conventional counterparts. Water-saving measures could also include water reclamation and rainwater harvesting for non-potable uses (see Stormwater and Wastewater sections). Facility managers should align water efficiency retrofit activities with the priorities identified in the facility's water-efficiency action plan.

look for WaterSense Meets EPA Criteria

USEPA

7.5

Reducing Water Consumption Through Improved Landscape Management

Lead Agencies:
Facilities Management

Timeline:
Short to mid-term

Well-managed landscapes will reduce the amount of treated water used for non-potable purposes such as irrigation. For instance, xeriscaping is a practice that utilizes plants that can survive without, or with very little, supplemental watering after vegetation is established (i.e., capable of producing new growth). Stormwater systems can also be designed to direct water towards trees and other vegetation, reducing the need for watering. The City will identify and prioritize opportunities to reduce its water consumption through improved landscape management at municipal buildings, public parks, and open spaces, and do so in partnership with other institutions and businesses.

USEPA

Water efficient landscaping outside a building.

The City may also own vacant land that could be allowed to return to forest, reducing the costs associated with mowing and turf management. To date, the City has planted nearly 600 trees on city-owned land in the floodplain in an effort to improve water quality in the Conestoga River and to establish more wildlife habitat. In areas where turf is necessary, such as athletic fields, commonly used bluegrass turf can be replaced with turfgrass types that use less water like buffalo grass or blue grama grass.

ACTIONS

7.6

Establishing a Water Reclamation and Reuse Program

Lead Agencies:
Facilities Management, Bureau of Wastewater, and Bureau of Water

Timeline:
Mid-term

The amount of wastewater treated can be reduced by installing water reclamation and reuse systems, which capture, treat, and reuse water within buildings. Water reclamation and reuse systems can also enhance the resiliency of critical facilities that must remain operational during water service disruption by providing a redundant water supply. Reclaimed water is typically used in non-potable applications such as irrigation, toilet flushing, cooling tower make-up, and vehicle maintenance.

Reclaimed water can be sourced from captured condensate and harvested rainwater. A condensate capturing system harvests the condensation that forms on outdoor mechanical equipment during hot, humid weather and redirects it to a central storage tank for reuse. Rainwater harvesting strategies capture and store stormwater (see Stormwater and Drinking Water sections). Graywater, another source of reclaimed water, is lightly contaminated water generated by bathroom sinks, showers and laundry; it does not include wastewater from toilets or kitchens. A graywater reuse system retrofits the building's plumbing system to collect, treat, and redistribute graywater within the same building.

The City's wastewater treatment plant employs a comprehensive asset management program for long-range project planning. The water reclamation and reuse program should be in-step with, and incorporated into, updates to the plan.

7.7

Expand the Use of Wastewater Biosolids

Lead Agencies:
Bureau of Wastewater
Partner: LCSWMA

Timeline:
Mid-term

Biosolids are organic materials rich in nutrients, such as phosphorous, that are produced during the wastewater treatment process. Traditionally, biosolids are disposed of and sent to landfills where they release greenhouse gases as they decompose. Alternatively, biosolids can be treated and applied to land to improve soil properties, add nutrients (replacing commercial chemical fertilizers), and become a "carbon sink" by increasing total soil carbon.

The City of Lancaster's Wastewater Treatment Plant (WWTP) currently landfills biosolids or spreads them on farm fields growing animal feed, depending on the weather and nutrient loads for farms. The biosolids are a useful fertilizer for farmers, and the product of this process is high-quality compost that can be used for the City's landscaping projects, tree planting, and other community purposes. The material can also be used as fuel in a biodigester, which could produce energy for the WWTP. The City will explore options for expanding the use of biosolids on land owned by the City and partner organizations within the community and study the feasibility of producing energy for the WWTP.

City of Lancaster, Stormwater Bureau

A green roof at the City of Lancaster's wastewater treatment facility.

COMMUNITY CONNECTIONS

Some of the water and wastewater strategies that the City would like to see implemented are rooted in community action but will require municipal involvement to be initiated. Prior to the development of a community-scale climate action plan in the near future, the City of Lancaster will continue or begin to investigate these opportunities:

- Examine existing building code and policies to identify any barriers to implementing alternative water and wastewater systems.
- Continue to partner with local organizations to support and promote community-focused water management programs, such as "such as "Save It! Your Water. Your Money. Your City." and incorporate new information from water audits systemwide leak detection, xeriscaping and other things as they are developed.
- Develop and implement a water efficiency audit and retrofit program for drinking water customers that prioritizes low-income households, non-profit organizations, and customers with high water usage.
- Update municipal codes to require certified water efficient building fixtures in all new construction and major renovations.
- Adopt a water conservation ordinance to address indoor and landscape water use in the residential, commercial, institutional and industrial sectors.
- Adopt a water benchmarking ordinance for the multifamily, commercial, institutional, and industrial sectors.
- Develop financing tools that benefit both water and wastewater infrastructure in the community, such as Commercial Property Assessed Clean Energy (C-PACE) and Local Economic Revitalization Tax Abatement (LERTA).

onethirtynine photography

Reusable bags celebrating Lancaster.

City of Lancaster
Municipal Climate
Action Plan

STORMWATER

STORMWATER

iStock Photo

A cloudburst is a large amount of precipitation in a very short timeframe that is hyper localized. Cloudbursts often overwhelm infrastructure and result in localized flooding.

Lancaster's climate is changing, and projections indicate that the number of intense storms and overall precipitation will continue to increase. Between 2005 and 2015, Lancaster was ranked 14th among the top 50 cities with biggest increases in heavy downpours.[17] The City of Lancaster recognizes the challenge of stormwater removal, noting the City's stormwater infrastructure is over 100 years old and was designed to overflow wastewater into the Conestoga River during intense rain events.[18]

Lancaster has both a combined sewer system (CSS) and a municipal separate storm sewer system (MS4) (see maps). While the CSS collects both sewage and stormwater and conveys flows to a wastewater treatment plant (WWTP), the MS4 collects only stormwater runoff and discharges flows directly to receiving streams.

The CSS is designed to overflow into the Conestoga River when it is unable to convey all flows to the WWTP; when this happens it is called a combined sewer overflow (CSO) event. "Urban flooding" can occur when rain events overwhelm the ability of local drainage systems to drain stormwater. To reduce the risk of urban flooding and CSO events, the City will work to reduce flows entering drainage systems by protecting existing vegetation and adding green infrastructure that manages stormwater on site.

The City of Lancaster is not new to this concept of stormwater-focused green infrastructure. Many City-led strategies from the 2011 and now the updated 2019 green infrastructure plan have already been implemented, while a host of regulatory ordinances have been amended to improve drainage and increase trees and plants through planting initiatives. The City authored a series of technical guides to assist developers and design professionals, including the Green Infrastructure Design Manual, Green Infrastructure Operations and Maintenance Manual, and Green Infrastructure Monitoring Manual.

This plan section includes one strategy with a series of action steps:

17. EcoWatch. (2015, June 2). 50 Cities With Biggest Increases in Heavy Downpours. Retrieved from https://www.ecowatch.com/50-cities-with-biggest-increases-in-heavy-downpours-1882045870.html
18. R. Hocker, personal communication/stakeholder interview, December 19, 2018.

Combined Sewer Overflow and MS4 Areas

MS4 drainage areas

Combined Sewer Overflow Basins

Engleside

North

Stevens Avenue

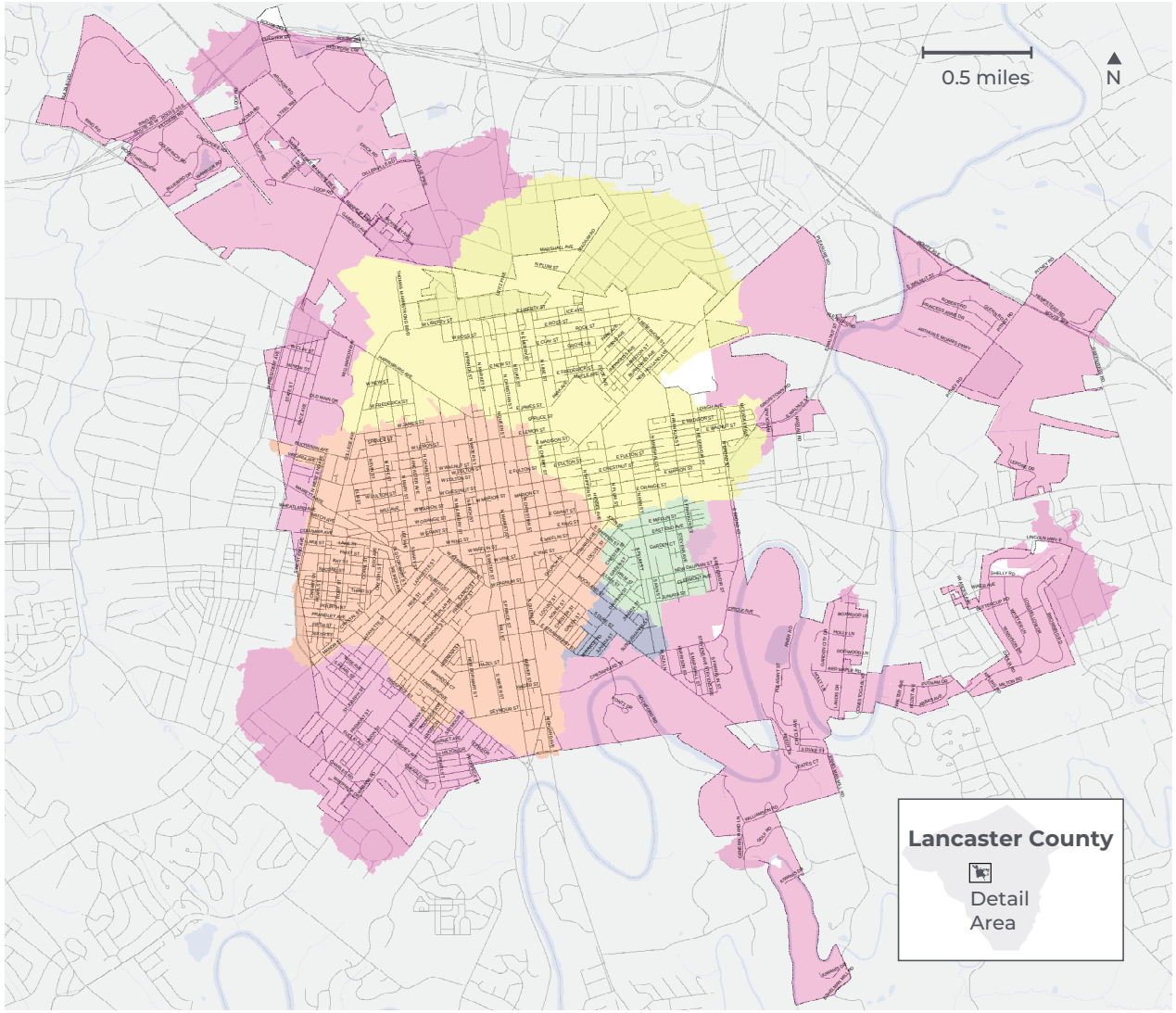
Susquehanna

Streets

City of Lancaster

Surrounding townships

Rivers, lakes, streams



Source: Lancaster County GIS, Copyright© 2014. This map is intended for general reference use only. It is not a legall recorded plan, survey, or engineering schematic and should not be used as such. For a complete disclaimer see www.co.lancaster.pa.us/gisdisclaimer
Prepared by City of Lancaster Dept. of Public Works - Apr. 2019

ACTIONS

8.1

Continue to Implement Green Infrastructure Improvements to Ease Flooding in Key Areas

Green infrastructure will reduce flooding in key areas and provide other benefits to public health, environmental quality, and economic savings. An analysis of Lancaster's Green Infrastructure Plan estimated that the recommended improvements in the CSS area would provide energy, air quality, and climate-related benefits valued at $2.8 Million annually; reduce gray infrastructure capital costs by $120 Million; and reduce wastewater operational costs by over $600,000 annually (USEPA, February 2014, "The Economic Benefits of Green Infrastructure: A Case Study of Lancaster, PA). Implementing the plan across the entire city would provide energy, air, and climate benefits valued at $4.2 Million annually.

When choosing where to add green infrastructure improvements, it is important to focus on benefits to low-income areas, flood-prone areas, and areas where flooding creates additional challenges (such as intersections). It is also important to incorporate strategies that provide direct benefit to existing residents and help maintain neighborhood affordability.[19] Housing strategies, although outside the scope of this plan, should also be considered at the inception of neighborhood-scale green infrastructure projects.

The City will continue these actions as it implements green infrastructure citywide:

- Review all planned municipal construction projects for opportunities to add green infrastructure.
- Install green infrastructure on municipal property and public right-of-ways.
- Partner with other institutions and organizations.

The City will consider these action steps as it continues to implement green infrastructure citywide:

- Map hyperlocal locations of urban flooding and high need.
- Work with the State Climatologist to identify future climate adaptation needs.
- Update the Streetscape Design Guidelines, capital improvement plan (CIP), and other City design guidelines and ordinances to define areas of urban flooding and further prioritize green infrastructure installation.
- Incorporate community benefits like local hiring and job training.
- Develop financing tools that benefit both green infrastructure and green building in the community, such as Commercial Property Assessed Clean Energy (C-PACE) and Local Economic Revitalization Tax Abatement (LERTA).

19. Dale, A. & Newman, L. (2009). Sustainable development for some: green urban development and affordability. Local Environment: The International Journal of Justice and Sustainability, 14:7, 669-681. https://www.tandfonline.com/doi/abs/10.1080/13549830903089283

City of Lancaster
Municipal Climate
Action Plan

WASTE

WASTE

The City of Lancaster's approach to handling waste and recycling operations is twofold: providing strategies for managing waste generated at municipal buildings, and coordinating solid waste removal services that serve nearly 18,000 residential and commercial customers across the community. The City is not involved in landfill operations through its oversight and implementation of these strategies; however, the City does coordinate with Lancaster County Solid Waste Management Authority (LCSWMA) sites for processing waste and recycling, and the City contracts with a private hauler for residential solid waste and recycling. LCSWMA sites that are used to service the City include its landfill, recycling center, and the Lancaster Waste-to-Energy (WTE) facility.

The WTE facility plays a unique role in the City of Lancaster's goal to reduce emissions. Built in 1991, the state-of-the-art facility reduces the volume of waste that goes to landfill by 90 percent—thereby eliminating all the landfill-related emissions associated with that waste. Burned waste is both converted into electricity that is that is sold back to the grid and is also used to fully power operations at the WTE facility. Traditional climate and sustainability plans tend to focus on a bevy of strategies aimed at reducing landfill waste through recycling, reusing certain items, and reducing overall consumption. The Lancaster WTE facility lessens the need to rely heavily on these strategies, since much of the waste originally destined for landfill is converted into renewable energy.

LCSWMA

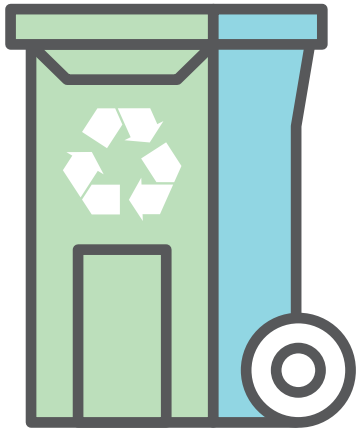
Lancaster County Solid Waste Management Authority's Waste-to-Energy facility.

As such, the strategies in this section focus on municipal operations waste that remains designated for landfill, as well as the behaviors and habits of municipal employees that create solid waste. This approach carries with it benefits that go beyond emissions reduction and reaches toward broader sustainability goals and environmental awareness among City employees.

Four Step Process of The Lancaster County Solid Waste Management Authority

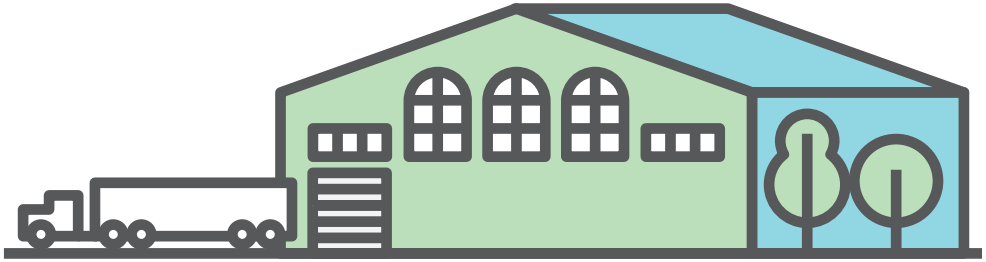
1: Minimize Volume and Toxicity of Waste

The first step minimizes the volume and toxicity of waste. This includes curbside and drop-off recycling programs, which recovers materials to be transformed into other products. Additionally, convenient and safe disposal at the Household Hazardous Waste Facility protects the environment by keeping these items out of the waste stream.



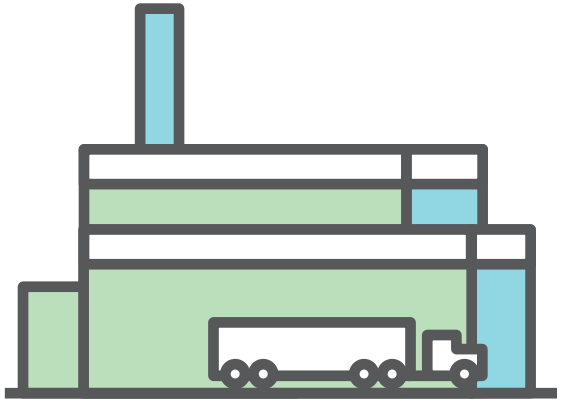
2: Waste Consolidation and Transfer

This step focuses on waste consolidation and transfer. After local haulers deliver trash to the Transfer Station Complex, our trucks transfer the waste for final processing and disposal. This means less collection trucks on the road and cleaner air.



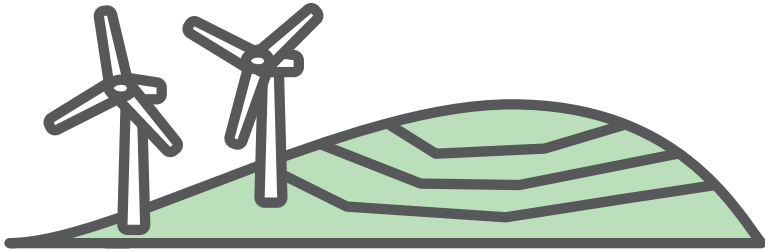
3: Waste Combustion and Energy Recovery

The next step involves extracting resources from the waste by combusting the post-recycled material at the Lancaster Waste-to-Energy Facility and the Susquehanna Resource Management Complex. This not only saves landfill space, but creates electricity too. In fact, LCSWMA powers the equivalent of 45,000 area homes with trash.



4: Minimal Landfilling

The final step, for the small percentage of waste that cannot be recycled or converted into energy, is disposing at the state-of the-art, environmentally sound Frey Farm Landfill.



ACTIONS

9.1

Conduct Waste Analysis for Municipal Buildings

Lead Agencies:
Facilities Management, Bureau of Solid Waste and Recycling, and Bureau of Operations

Timeline:
Short-term

The average office worker creates over four pounds of waste each day that is typically thrown out in the trash, but much of that can be recycled or composted. A high percentage of recyclables are often contaminated by other waste and rendered unrecyclable. As much as 30% of daily office waste is related to food consumption, which can also produce potent GHGs if poorly managed.[20] By conducting a thorough waste analysis, the City will identify the composition of its waste stream, gain a better understanding of the habits of employees, be able to better implement new office practices and procedures, and more easily identify potential procurement improvements that reduce the employee waste stream.

20. RoadRunner Recycling. (2019, June 11). The Facts: Office Workers and their Waste Generation. Retrieved from https://www.roadrunnerwm.com/blog/office-worker-waste-generation

9.2

Implement Food Composting in Municipal Buildings

Lead Agencies:
Bureau of Solid Waste and Recycling

Timeline:
Short-term

Food waste makes up 20-30% of the general office building waste generated nationally each day.[21] Food waste is organic material, and while it is usually disposed of with other refuse, it can be reused and repurposed in beneficial ways. Composting harnesses the natural decomposition of organic material, that, when combined with certain bulking agents, creates a rich soil-like material commonly referred to as "compost." For City purposes, compost is utilized for grounds maintenance, landscaping, and gardening. This nutrient-rich organic compost reduces the need for chemical treatments, pesticides, and fertilizers, which in turn promotes soil conservation and protects groundwater quality. By targeting the removal of organic waste from the waste stream in the interest of converting it into compost, the City is working to capture these benefits and set a positive example for the community at large. As another alternative, fats, oils, and greases can also be disposed of in an anaerobic digester with biosolids.

Ben Jennings

20-30% of the waste created by the average office worker is generated from food consumption. The rise in single use packaging like wrappers, coffee cups, and water bottles greatly contributes to this number.[22.]

21. RoadRunner Recycling. (2019, June 11). The Facts: Office Workers and their Waste Generation. Retrieved from https://www.roadrunnerwm.com/blog/office-worker-waste-generation
22. RoadRunner Recycling. (2019, June 11). The Facts: Office Workers and their Waste Generation. Retrieved from https://www.roadrunnerwm.com/blog/office-worker-waste-generation

ACTIONS

9.3

Adaptive Reuse of City Buildings and Construction Recycling

Lead Agencies:
Bureau of Solid Waste and Recycling and Facilities Management

Timeline:
Mid-term

Occasionally, the City will find itself in a situation where municipal buildings are either no longer in use or cannot continue to serve in their current capacity, but can and should be adapted for reuse by the City, local businesses, or other members of the community. For example, the City's recycling center was formerly Firehouse #4, and the original City Hall was sold to a private owner, who in turn sold a portion of that site to present-day Passenger Coffee & Tea Showroom. Present-day City Hall functioned as the Lancaster Post Office from 1892 through 1932. Adaptive reuse of buildings should always be considered as the first alternative unless safety hazards or other issues are present. Vacant or underutilized buildings can negatively impact the perceived character of a neighborhood. Furthermore, demolishing buildings can create a significant amount of waste that, if not deliberately recycled, will be sent to the landfill.

The City will develop a policy to address these matters that commits to the following:

1. Whenever transitioning a municipally-owned building to another use, whether it be internal or external, the City will ensure that the new building use is suitable to the location and neighborhood for which it is situated in.
2. When demolition of a municipal building is necessary, the City will seek to recycle all construction materials to the extent that it is possible.

Each of these processes will involve an aspect of community development and engagement. Working with community partners to ensure buildings are reused in the most effective and useful ways and that practical uses for recyclable building materials are found is important to the health and growth of communities within Lancaster.

About Construction/ Demolition Debris

Construction debris totals nearly 160 million tons nationally each year. In the U.S. construction debris includes demolition waste (48%), renovation waste (44%), and new construction waste (8%). In Lancaster, construction and debris waste must be sorted to remove combustible wood from other debris like cement and plaster, the latter of which is sent to landfill. The Lancaster County Solid Waste Management Authority reports that construction debris has increased 67%, between 2015 and 2018.[23]

23. J. Capots, personal communication, May 22, 2019.

9.4

Reduce Employee Waste

Lead Agencies:
Facilities Management and Bureau of Solid Waste and Recycling

Timeline:
Short-term

Waste generated by employees can amount to a significant total each year in municipal buildings. A waste stream analysis conducted by Facilities Management in partnership with the Bureau of Solid Waste and Recycling will provide specific numbers and guidance on areas for improvement, but in the interim simple procedures and workplace policies can help to alter employee habits and deliver positive results in employee waste reduction. For example, reducing the size of waste receptacles while increasing the size of recycling receptacles serves as a visual cue. Establishing printing rules, procedures, and signage, while also setting printers to automatically print double-sided, may reduce the amount of paper used daily.

9.5

Reuse Office Equipment

Lead Agencies:
Facilities Management and Bureau of Solid Waste and Recycling

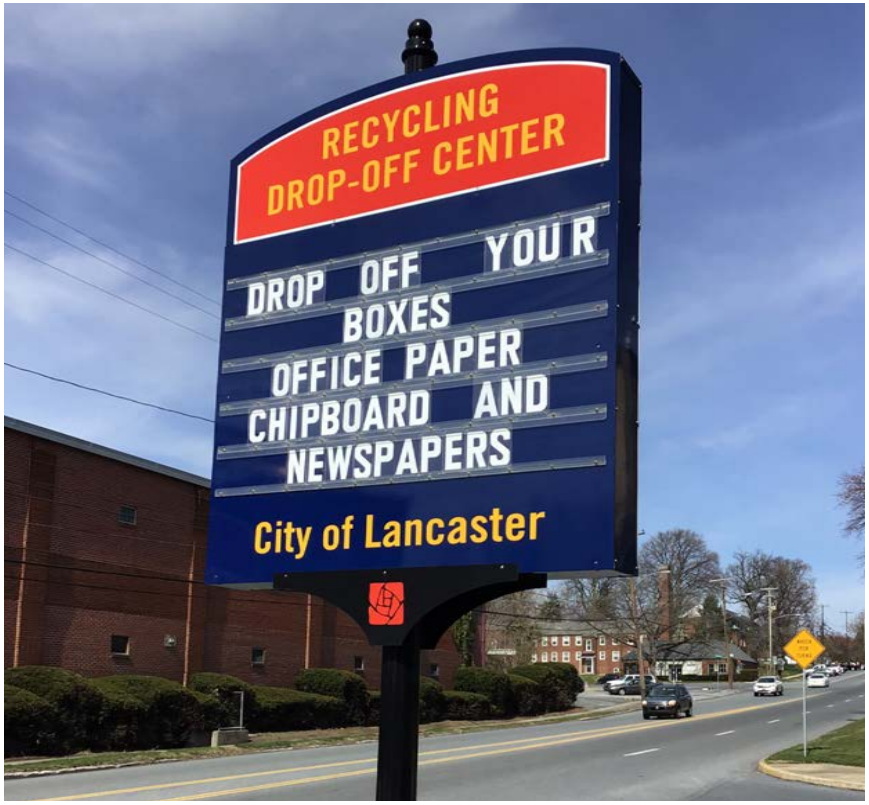
Timeline:
Short-term

Equipment turnover provides another opportunity to reduce the amount of waste generated by the City. As a means for cost savings, IT equipment is often inventoried to maintain a selection of computers, monitors, keyboards, and related items that are no longer used by their original employees and can be made available for immediate use by others. Similarly, keeping an inventory of office equipment will help to reduce municipal building-generated waste. This may range in scale from small office supply materials and desk lighting to larger ticket items like desks, conference room tables, and chairs. Items that are no longer needed by one office can be tracked and stored in a central depository. This depository would be referenced when making new purchases to ensure that the requested items for purchase don't overlap with city items already being held in storage. There are also opportunities to further recycle similar items that no longer serve the needs of employees and could instead be donated to others within the community such as afterschool programs, senior centers, or small businesses. The City commits to and will establish a process for bettering using office equipment both internally and externally and will coordinate efforts with the existing auction program before putting them into the waste disposal circulation.

COMMUNITY CONNECTIONS

As the City moves forward on implementing these waste strategies, there are obvious connections to the wider Lancaster City community. There are some outward-facing waste strategies that are rooted in community-scale emissions and community action but require municipal involvement to be initiated. Prior to the development of a community-scale climate action plan in the near future, the City of Lancaster will investigate these opportunities:

- Develop a community-scale construction and demolition waste recycling program.
- Consider the potential for a food composting program and its environmental benefits.
- Conduct feasibility analyses to determine how best to implement single-hauler recycling for businesses and assess case-specific business needs.
- Implement the collection of household hazardous waste materials for employees at municipal buildings (e.g., batteries, bulbs, medication).
- Work with local business partners and the Lancaster County Solid Waste Management Authority to discuss a waste audit program that targets partnerships with specific business associations and targeted building and business types.



Mike Devaney

Lancaster City's Recycling Drop-off Center.

City of Lancaster
Municipal Climate
Action Plan

CULTURE OF SUSTAINABILITY

CULTURE OF SUSTAINABILITY

Radical reductions in carbon emissions at the local level are necessary to halt climate change and prevent the most severe consequences. The City of Lancaster's choice to reduce greenhouse gas (GHG) emissions is an affirmation of a commitment to provide essential and equitable distribution of core municipal services, while at the same time reducing its environmental footprint and preparing for a changing climate. The strategies outlined in this plan reduce emissions, improve best practice standards and guidelines, and encourage sustainability from a municipal operations standpoint.

Successfully carrying out the strategies outlined in this plan will require committed and steadfast leadership, technologically sound operations that rely on existing best practices in addressing climate change, and a culture of awareness among municipal staff. If the City is to meet its goals, new understandings pertaining to how the City and its employees conduct operational activities must be adopted by City staff and key stakeholders. In essence, the City of Lancaster is committing to changing the way we do business. We know that changing our behaviors at a municipal level and creating a culture of sustainability can be challenging. We also know that it can jumpstart Lancaster's climate action transformation, making the city a healthier, safer, and better place to live and work. The intention is to lead by example, demonstrating that this shift in norms will lead to tangible benefits.

The City can also incorporate community benefits when implementing the strategies of this plan and those of larger community-scale action in the future. By establishing requirements for local hiring, harnessing workforce development opportunities, and targeting the use of local materials and products, Lancaster City and nearby communities can experience the economic benefits associated with a new climate economy.

There are five strategies in this section that aim to build and integrate the culture of sustainability needed to shepherd the City through the implementation of this plan over both the short and long term. The City of Lancaster will dedicate staff to lead this work, establish a green team, develop a green meetings policy, integrate sustainability into municipal processes, and implement climate sensitive purchasing policies. These actions will help to further reduce emissions, foster awareness, and hopefully create a ripple effect of sustainable behaviors, serving as a foundation for a future community-scale climate action plan.

City of Lancaster

Lancaster residents are familiar with recycling procedures.

Douglas Smith

City Hall green roof.

ACTIONS

10.1

Dedicate Staff to Lead City Climate Action

Lead *Agencies*:
Department of Administrative Resources and Bureau of Human Resources

Timeline:
Short-term

The City commits to dedicating a staff person to lead the implementation of the City of Lancaster's Municipal Operations Climate Action Plan. The 25 strategies of the plan involve many lead agencies and both internal and external partners. Though responsibilities rest with the identified implementation partners, a lead staff person will provide essential leadership and overall implementation of the plan by: 1) working to integrate the climate plan with other municipal plans and work; 2) coordinating communications across departments, bureaus and divisions; 3) providing assistance to implementation partners when needed; 4) identifying gaps and needs that impede specific strategy implementation; 5) obtaining data and tracking individual strategy metrics; 6) measuring overall progress on climate goals; and 7) establishing internal and external progress report mechanisms and outreach.

10.2

Establish a Green Team

Lead Agencies:
City of Lancaster Climate Committee and the Mayor's Office

Timeline:
Short-term

While each strategy in this plan has an assigned (proposed) lead agency and a corresponding list of potential partners, a Green Team will provide the general plan oversight and leadership needed to ensure its momentum and oversee its implementation. Green Team members will serve as "champions" for the plan across the entire City and will work to engage City employees and identify "captains" to help with plan implementation within each City department and bureau. The Green Team will also be responsible for tracking all strategies through a series of metrics that will help gauge success and locate areas for improvement. The currently appointed members of the City's Climate Committee are ideal candidates for initially filling out the ranks of the new Green Team, as the transition from planning to implementation presents an opportunity to further expand the committee's expertise. Members of the Green Team will be draw from Lancaster's talented municipal staff and climate-conscious community.

ACTIONS

10.3

Develop a Green Meetings Policy

Lead Agencies:
City of Lancaster Green Team.

Timeline:
Short-term

The concept of “green meetings” has grown in popularity as organizations and institutions have begun to embrace sustainability. In the workplace, most people conduct business with established meetings, processes and daily habits. In some instances, these common practices include “unsustainable” behaviors that are not congruent with the City of Lancaster’s new climate vision. Establishing a green meetings policy will help create workplace habits that eliminate or reduce excessive waste by, for example, eliminating printed agendas, emailing digital meeting materials, and avoiding the use of single-use food service materials. Other elements of a green meetings policy could prioritize goals to support local businesses when utilizing vendors, and promote downtown Lancaster’s walkability to encourage meeting invitees to forgo driving when possible. These green meeting strategies along with other eco-conscious meeting tactics can quickly be made habitual and commonplace if the City of Lancaster works to establish a policy.

10.4

Integrate Climate/Sustainability into Municipal Processes

Lead Agencies:
Mayor's Office and City Council.
Partners: City of Lancaster Green Team, City of Lancaster Department of Administrative Services, and various City Commissions

Timeline:
Mid to long-term

Cities standing at the vanguard of international climate action are furthering their efforts to fully achieve the reductions needed to address climate change by integrating climate-conscious public policy into standard municipal processes. For example, the City of Oslo (Norway) employs a climate-centered budget that outlines not only monetary goals but also includes an annual GHG emissions cap. The budget is not considered balanced and will not be approved if the reduction in community-wide emissions is not in sync with the reductions required by the climate plan. Furthermore, each city department is responsible for meeting their own climate targets while adhering to the approved budget through use of strategies detailed in the climate plan.

The City of Lancaster will consider this approach and others as it works to meet the climate goals outlined in this plan. Bold top-down policies emanating from leadership at City Hall are essential to realizing the goals of this municipal operations plan, and they are even more critical in helping to lay the foundations from which a strong and effective community scale climate action plan will be forged in the future. Methods for embedding aspects of climate awareness within various processes such as budgeting, capital improvement planning, purchasing, hiring and onboarding, and employee trainings will be considered.

ACTIONS

10.5

Implement Climate-sensitive Purchasing Guidelines

Lead Agencies:
Department of Administrative Services and City of Lancaster Green Team.

Timeline:
Short to mid-term

Green Purchasing or "Environmentally Preferable Purchasing" is a set of rules aimed at creating "a reduced negative effect or increased positive effect on human health and the environment, when compared with competing products that serve the same purpose."[24] Establishing these procurement practices will help ensure that future purchases don't work to unintentionally set back the important climate work the City is undertaking. At minimum, the City's purchasing guidelines will include rules for energy efficient office equipment such as printers, monitors, copiers, and other items, and will mandate the use of post-consumer recycled content paper. The City commits to employing similar language and requirements within its contracts and vendor agreements as a means for furthering its mission and demonstrating leadership within the community.

24. National Association of State Procurement Officials. NASPO Green Purchasing Guide. Retrieved from https://www.naspo.org/green/index.html

City of Lancaster
Municipal Climate
Action Plan

CARBON OFFSETS

CARBON OFFSETS

If the City of Lancaster is to be successful in its endeavor to reach carbon neutrality, taking measures to support and invest in carbon offset programming both locally and regionally will be an essential component of the City's efforts. Carbon offset programs are gaining popularity amongst municipalities and city governments around the globe and are helping them achieve their climate goals through the support of programs outside the scope of their municipal operations.

Each carbon offset program should be distinctly attuned to the community it's meant to serve, although all such programs focus on the sequestration, emissions reduction, and containment or storage of GHGs.[25] These programs are often designed to aid local governments by making up for whatever carbon reductions cannot be eliminated through mitigation efforts by partnering with outside institutions to achieve verifiable community GHG reductions.

The diversity of land use and industry within Lancaster County provides a wide range of potential opportunities locally, that, through proper investment and partnerships, could go a long way toward securing the carbon offset needs of the City. Strategies relevant to Lancaster include coordination with local farmers to improve farming practices, supporting tree planting programs, the promotion of anaerobic digestion facilities, supporting landfill methane capture, and more.

Douglas Smith

Tree planting in Lancaster helps reduce emissions.

25. U.S. Environmental Protection Agency. (February 2018).Offsets and RECs: What's the Difference? Retrieved from https://www.epa.gov/sites/production/files/2018-03/documents/gpp_guide_recs_offsets.pdf

Figure 11 Metric Tons CO2e Emitted After Action

The successful implementation of strategies in this plan will result in the City reducing emissions due to municipal operations by 79% in 2025, 80% by 2035, and 81% by 2050, as showing in Figure 9. (There is some incremental reduction of "business as usual" emissions over time, which is due to the continued and increasing availability of cleaner energy sources).

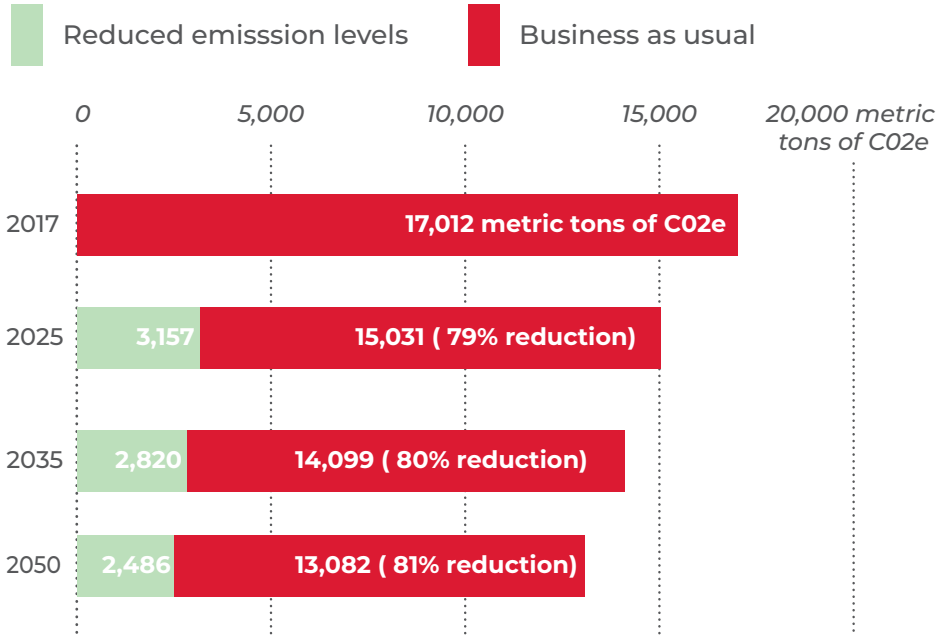
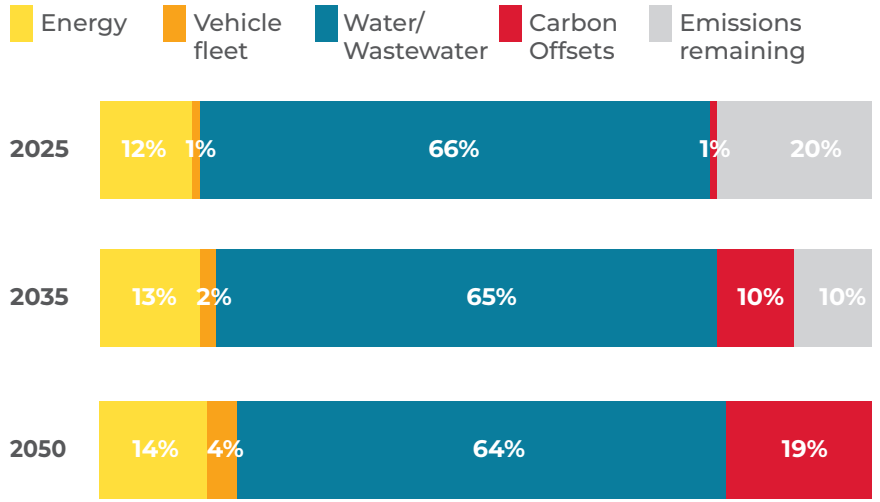


Figure 12 Overall Emissions Reductions as a Result of Action

The City will employ a carbon offset program in which it further sequesters emissions by 1% (2025), 10% (2035) and 19% (2050), resulting in total emissions reductions of 80% by 2025, 90% by 2035, and allowing the City to achieve carbon neutrality by 2050.



ACTIONS

11.1

Identifying Responsibility Internally

Lead Agencies:
Mayor's Office

Timeline:
Short to mid-term

A crucial aspect of establishing a successful carbon offset program is maintaining sufficient project oversight that ensures the program and its partners are continuing to administer best practice and deliver the desired offsets. Depending on what kinds of offset strategies the City and community partners determine to be the most effective and sensible to pursue, different departments, bureaus, and personnel should be asked to take responsibility for managing certain aspects of the offset programs. It is also possible that many of the duties associated with general upkeep of the program could be outsourced to a relevant local authority or third party that has a relevant mission, aims, and expertise.

11.2

Establishing Financing and Pilot Programs

Lead Agencies: :
Mayor's Office and Department of Administrative Services

Timeline:
Short to mid-term

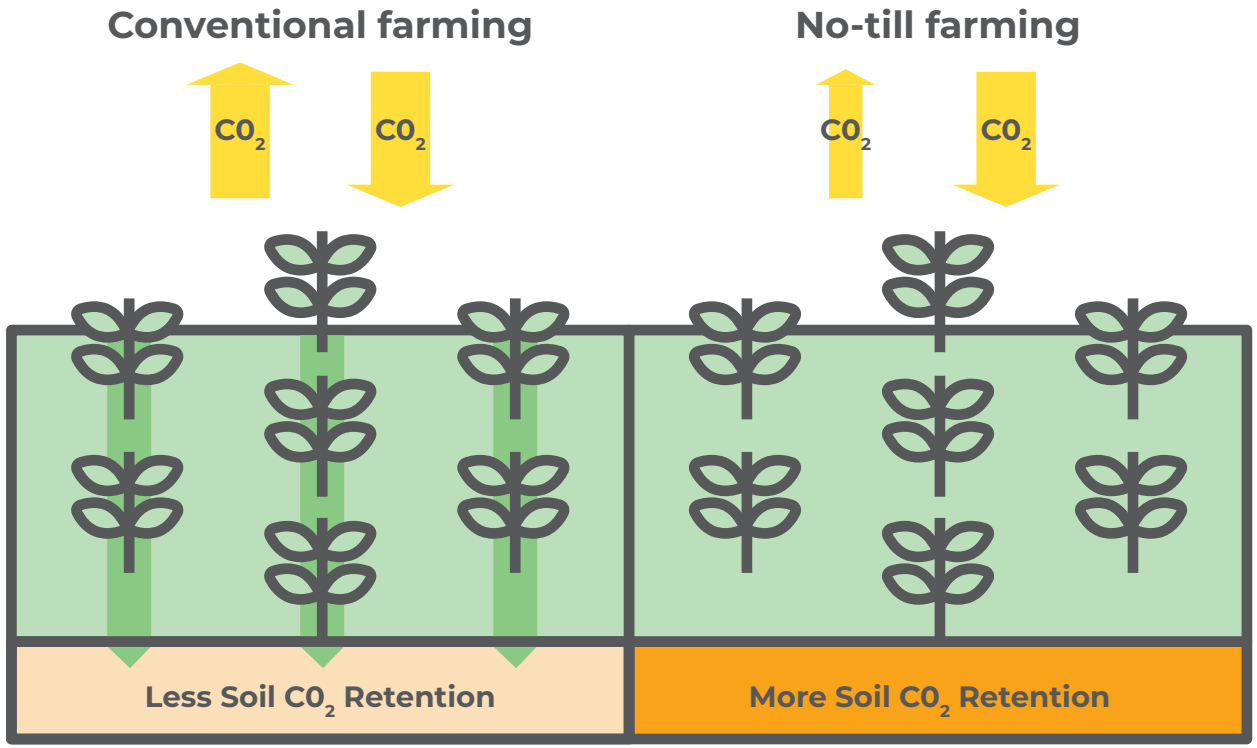
Early pilot programs will be fundamental to the success of the City's carbon offset programs. Showing future partners that joining the carbon offset program is economically sensible and sustainable from a business standpoint is key. In addition to the verifiable accounts of success coming out of the pilot program, locating and securing additional funding that might facilitate potential partners entry into the full-scale program would help in establishing a larger partner network. Funding for the carbon offset program could be sourced from third parties by way of grants, a fee system, or future federal and state level legislation.

COMMUNITY CONNECTIONS

By nature, many of the strategies for securing the carbon offsets the City needs are outward facing as the program is inherently tied to the larger community and communal initiatives. The City's primary role in developing its carbon offset program is oversight and promotion of the strategies outlined below.

- Coordination with Lancaster County farmers to help promote cropland carbon sequestration practices (such as no/low till farming, agroforestry, improved nitrogen fertilizer management, and more).
- Promoting anaerobic digestion for farms (credits bought by City will help pay for installation costs) and other relevant local businesses.
- Purchasing energy from Lancaster County businesses and households that install renewable energy infrastructure.
- Supporting urban forestry efforts within Lancaster City and other forestry initiatives throughout the County and other places in the state.

Figure 13 The Benefits of No-till Farming



The US Department of Energy notes that no-till agriculture results in capturing carbon in the soil instead of releasing harmful emissions into the air. No-till efforts also protect against soil erosion.

City of Lancaster
Municipal Climate
Action Plan

WHAT'S NEXT?

WHAT'S NEXT?

Implementation and Strategy Monitoring

Implementation of the strategies in this plan will fall under the supervision of various City departments, bureaus and divisions, while designated staff and the Green Team (strategies 10.1 and 10.2) will provide general plan oversight, guidance, and track overall plan success in reaching the intended emissions targets established for 2025, 2035, and 2050. A supplemental implementation matrix tracking tool for this Plan highlights key department-level ownership, a selection of metrics that can used to track various performance indicators for each strategy, the proposed frequency for gathering data, and sources from which to retrieve the data.

Monitoring the progress of each strategy is an important step in plan implementation, and doing so will help determine if the City of Lancaster is on track to reduce its emissions associated with municipal operations. In the cumulative, this detailed evaluation helps determine whether or not the collection of strategies represents the right mix to meet established goals. In addition, consistent monitoring of individual strategies by tracking specific predetermined metrics or "success factors" will assist implementers in identifying areas where modifications may need to be made in order to stay on track to reach specific strategy targets and overall climate goals.

Sam Interrante

Lancaster City Council. Left-to-right: Pete Soto, Chris Ballentine, Janet Diaz, Ismael Smith-Wade-El, Faith Craig, John Graupera, and Council President James Reichenbach.

Reporting and Plan Updates

This Plan is only a first step in the journey to effectively reduce emissions and plan for our changing climate and represents a comprehensive set of municipal operations strategies to be implemented between now and the year 2050. To that end, the Plan is seen as a "living document" and will be regularly revised to incorporate changes in circumstances, technological advances, and especially new state and federal policies. Plan updates also provide an opportunity to evaluate successes, implement course corrections, and if needed, to rebalance efforts between strategies and reprioritize resources.

The City will track its progress on an annual basis. The tracking tool serves as a foundation for sharing this information, and reports can provide other pertinent details for each strategy as City leadership deems necessary. At minimum, a report on plan progress should occur every year between now and 2025 and every two to three years thereafter. An ideal time to develop a plan update or revisions to specific strategies may be during the development of a community-wide Lancaster City Climate Action Plan and minimally during each of the target years: 2025, 2035, and 2050.

Next Steps

Immediate next steps for this plan will include formal adoption by City Council and the initial stages of implementation and oversight by assigned and designated City Staff, which will also include identifying the first budget items connected to some of the crucial, shorter term strategies. The Climate Committee that helped usher this plan during its development will transition into the City's team charged with implementation oversight and monitoring, while departments, bureaus, and divisions will take ownership of specific strategies.

In the next few years, City leadership and the Green Team will also work to identify the appropriate timing for a broader, community-wide Lancaster City Climate Action Plan. This plan will build from the foundation laid in addressing municipal operations and will identify how the entire community can take part in reducing emissions and preparing for inevitable effects of climate change in Lancaster City.

The City of Lancaster welcomes input and ongoing participation from Lancaster individuals, businesses, and organizations as we chart new territory with the adoption of the City of Lancaster Municipal Operations Climate Action Plan, the early stages of implementation, and broader community climate action in the near future.

CITY OF LANCASTER
A City Authentic

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