DELAWARE COUNTY, PENNSYLVANIA
CLIMATE ACTION PLAN

August 31, 2022

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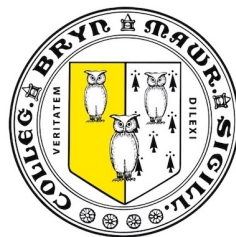
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- Bryn Mawr College
- ICLEI-USA
- Pennsylvania Department of Environmental Protection

Introduction

In the Fall of 2021, Delaware County partnered with the Pennsylvania Department of Environmental Protection, Local Climate Action Program to begin the process of creating a Local Climate Action Plan for Delaware County. Through this program, Delaware County was paired with Bryn Mawr College's Praxis Program to utilize the assistance from local student interns to assist in the development of the plan. The two selected student interns were Saiqian Xiao, a Cities Major and Environmental Studies minor, and Estefania Torres, an Environmental Studies and International Studies double-major.

Throughout the project, the students worked on a variety of tasks, such as creating a greenhouse gas inventory to later be utilized as necessary baseline data tracking the county's climate impact. The end goal of the project was to create a Climate Action Plan identifying GHG baselines for county operations and the surrounding community and identifying potential mitigation efforts to inform the creation of a larger Delaware County Sustainability Plan. The following document synthesizes baseline greenhouse gas emission data with a focus on energy usage, transportation, and solid waste, as well as identifies successful mitigation efforts from around the country. Mitigation Strategies are individual projects that can reduce the community's annual carbon footprint in order to reduce the effects of climate change.

This project was completed in conjunction with the Pennsylvania Department of Environmental Protection's Local Climate Action Program and ICLEI-USA.

About Delaware County

Delaware County is located in southeastern Pennsylvania between the City of Philadelphia, PA and the City of Wilmington, DE. With a rich history of indigenous residents and early colonial settlements, Delaware County has played an important role in America's history over the past 300 years. Consisting of nearly 184 square miles, Delaware County is home to roughly 576,000 residents making it one of the most densely populated counties in Pennsylvania. Delaware County is divided into 49 unique municipalities with the most populous being Upper Darby Township (85,861 based on the 2020 census). The county is home to a diverse population with around 29% of residents identifying as Black, Hispanic, or Asian and a median household income of $76,238. Being in one of only two coastal zones in Pennsylvania, Delaware County has a distinguished industrial corridor, as well as many other commercial and institutional uses throughout the county. Each of these factors make Delaware County a truly unique place to live, work, and play.

Delaware County's Greenhouse Gas Emissions
Methodology

To create a Local Climate Action Plan, Delaware County compiled existing energy, waste, and transportation data to create a Greenhouse Gas inventory both reflecting the emissions generated

from Delaware County operations and the Delaware County community as a whole. The ICLEI-USA framework, along with the ClearPath modeling tool, was used to transfer readily available data into corresponding emissions reports. These reports reflect emissions data in metric tons of CO2e, otherwise known as carbon dioxide equivalents.

Following creation and analysis of the greenhouse gas inventory, a detailed list of initiatives and strategies to reduce emissions were identified. Strategies were compiled from student-led research on other successful GHG reduction programs around the country, as well as feedback from local municipalities through an online survey. These strategies are organized into six focus areas as identified in the planning process for Delaware County's Sustainability Plan: **Energy, Health & Wellness, Waste Management, Transportation, Natural Resources, and Climate Resilience**. The strategies were classified with Levels of Impact (High, Medium, Low) based on the amount of greenhouse gas reductions the action would provide the county. Lastly, common terms and sources were compiled into bulleted lists to assist in further evaluation and vetting of potential GHGs to be discussed throughout the Delaware County Sustainability Plan Subcommittee meetings.

Delaware County Community GHG Emissions

When surveying municipal staff regarding their existing concern for sustainability issues, it was noted that 5 out of 6 felt that their municipalities identified sustainability as high to medium priorities. Through the creation of a Local Climate Action Plan and larger Sustainability Plan, Delaware County hopes to serve as a model and a practice leader for the 49 municipalities within its jurisdiction. As Delaware County embarks to become more efficient within its operations, it is recognized that the county's actions will also serve to improve local greenhouse gas emissions in the community as a whole.

In completing the community-wide GHG inventory, it was found that Delaware County generates over 4.5 million metric tons of CO2e each year. 41% of emissions are generated by commercial energy sources while 38% is generated by transportation and mobile sources and 21% residential energy (Figure 1).

Figure 1: Delaware County Community GHG Emissions (2019)

CO2e By Category

● Residential Energy ● Transportation & Mobile Sources ● Commercial Energy
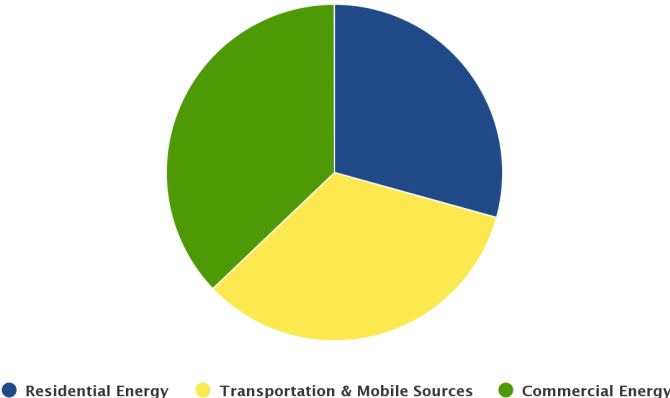
Residential (21%)	1,329,331 metric tons
Commercial (41%)	1,683,678 metric tons
Transportation (38%)	1,522,498 metric tons

**CO2e is calculated by summing the three gases and applies the global warming potential values to CH4 and N2O to express records in terms of CO2 equivalent.

Commercial and Industrial Energy contributes the largest amount of GHGs in Delaware County. Figure 2 breaks the commercial and industrial usage into sectors as defined by PECO. Due to Delaware County's position on the Delaware River, many industrial and commercial businesses call Delaware County home. As such, it is not surprising that the largest contributors to GHG in the county are associated with these large industries. Upon further evaluation, it is notable that large-scale commercial and industrial businesses give off the most GHG, followed by small-scale commercial and industrial business, and followed by general services. It is also notable that neither large nor small-scale commercial and industrial businesses are currently utilizing natural gas as in Delaware County, according to data provided by PECO.

Figure 2: Commercial & Industrial Energy GHG Emissions (2019)

CO2e By Record
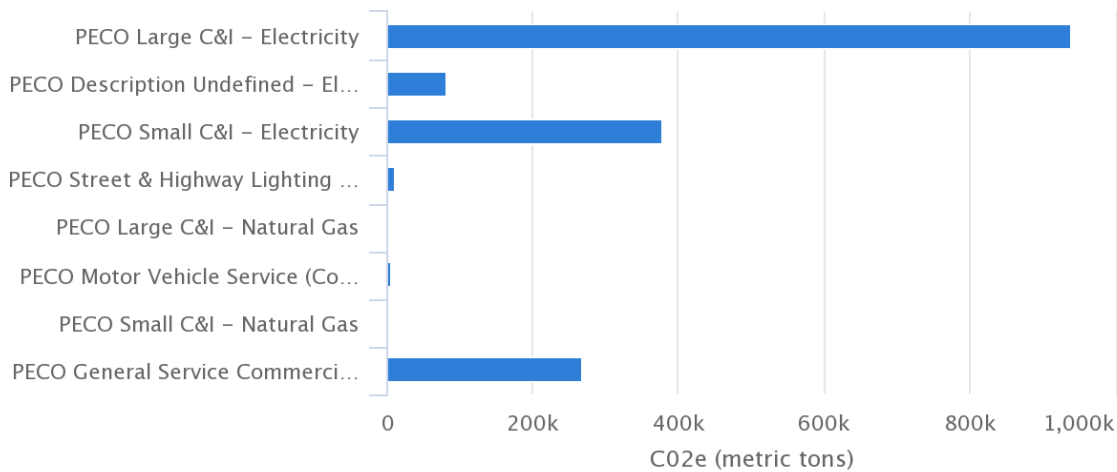
|	
Large C&I Electricity	940,524 metric tons
Undefined Electricity	82,140 metric tons
Small C&I Electricity	377,602 metric tons

Street & Highway Lighting	10,069 metric tons
Large C&I Natural Gas	239.43 metric tons
Motor Vehicle Service	4398.2 metric tons
Small C&I Natural Gas	67.674 metric tons
General Service	268,638 metric tons
Total	*1,683,678 metric tons*

Transportation and Mobile Sources are the second largest contributor of GHG emissions in Delaware County, contributing over 1,522,498 CO2e in 2019. Of the transportation and mobile sources, non-diesel on-road transportation sources contributed 73% of emissions, while diesel on-road transportation sources contributed a mere 17%. As new technology is adopted on a broader scale, it is expected that transportation emissions will go down.

Figure 3: Transportation and Mobile Sources GHG Emissions (2019)

CO2e By Record
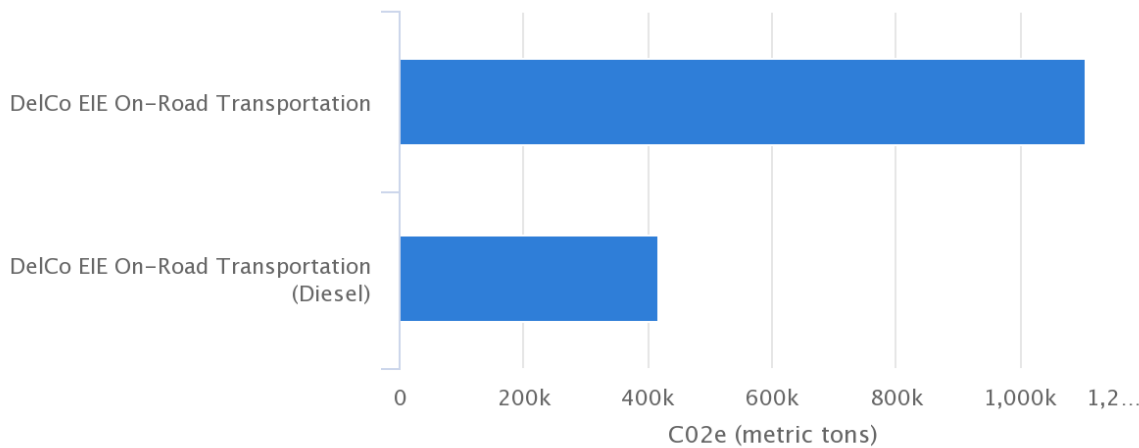
|	
On-Road Transportation	1,105,138 metric tons
On-Road Transportation (Diesel)	417,360 metric tons
Total	*1,522,498 metric tons*

Finally, when evaluating residential energy usage, emissions are broken down into three categories utilizing data from PECO: residential electricity, natural gas, and heating natural gas.

Figure 4 breaks down residential energy emissions in each of these categories. Through this breakdown, it is notable that residential electricity contributed more than 650,000 metric tons of CO2e in 2019, with heating natural gas not far behind with over 558,000 metric tons of CO2e. With nearly 576,000 residents, these figures reflect just under 3 metric tons of residential energy GHG per resident.

Figure 4: Breakdown of Residential Energy Emissions in Delaware County (2019)

CO2e By Record
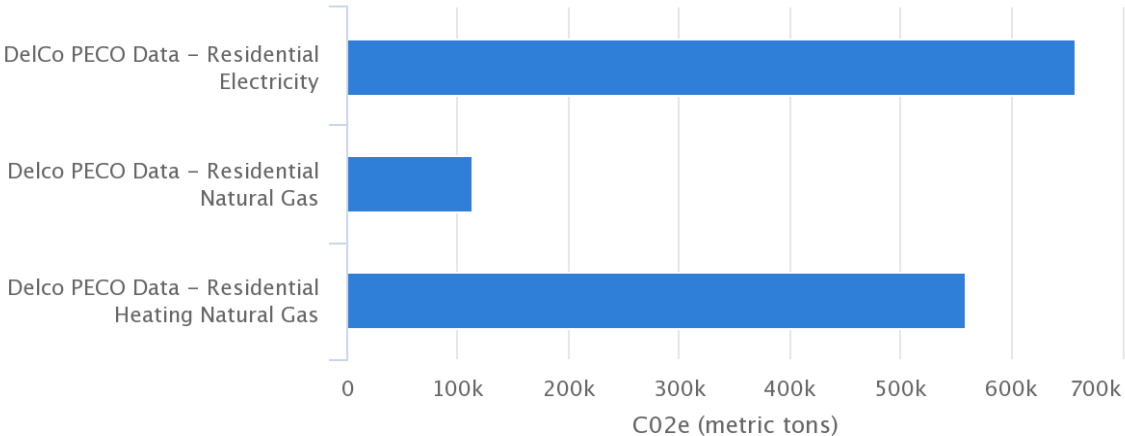
Residential Electricity	657,487 metric tons
Residential Natural Gas	113,166 metric tons
Residential Heating Natural Gas	558,678 metric tons
Total	*1,329,331 metric tons*

As Delaware County undergoes the creation of the Sustainability Plan, these baseline emissions calculations will be utilized to set reduction targets and identify meaningful actions to help influence and educate local municipalities, businesses, and residents to be more energy efficient. Specifically, Commercial and Residential Energy Emissions will be reviewed by the Energy Subcommittee, while Transportation Emissions will be reviewed by the Transportation Subcommittee.
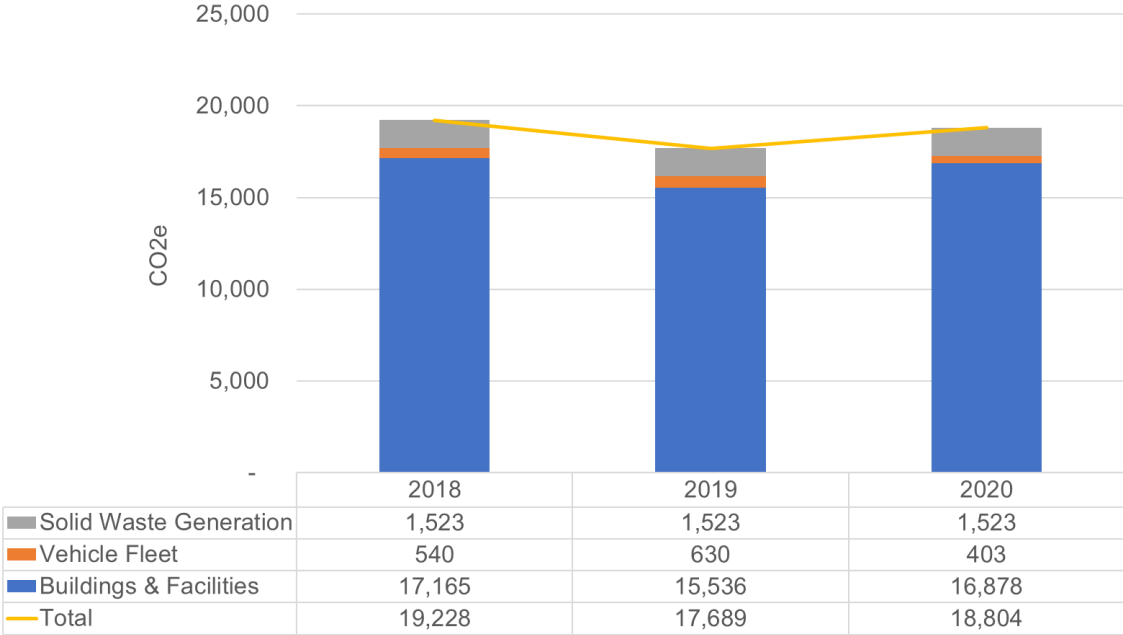
Delaware County Operational GHG Emissions

While Figures 1 through 4 include Delaware County's operational totals within the larger community-scale, it is important for Delaware County to set specific goals within its own operations to serve as a leader in the path to GHG reduction across the county. As an

organization, Delaware County employs over 3,000 people across 62 departments. The County hosts a variety of facilities and functions including George W. Hill Correctional Facility, Fair Acres Geriatric Center, the Delaware County Courthouse Complex, among many others. When evaluating the County's operations, Figure 5 shows that buildings and facilities are by-far the largest contributors to emissions, contributing almost 90% of the total emissions in County operations in 2020. Despite this incredibly high percentage, the County has seen a reduction in GHG emissions as compared to 2019. To better understand these trends, each sector will be evaluated independently.

Figure 5: Operational Greenhouse Gas Inventory by Sector, 2018-2020

	2018	2019	2020
■ Solid Waste Generation	1,523	1,523	1,523
■ Vehicle Fleet	540	630	403
■ Buildings & Facilities	17,165	15,536	16,878
— Total	19,228	17,689	18,804

*Values Measured in Metric Tons CO2e

Energy Usage Across Facilities

When evaluating the energy use across County-owned buildings, the seven largest facilities were considered:

- Fair Acres Campus (Middletown Township)
- George W. Hill Correctional Facility Campus (Concord and Thornbury Townships)
- Delaware County Courthouse Complex (Media Borough)
- Delaware County Emergency Services Training Center (Sharon Hill Borough)
- Delaware County Voting Machine Warehouse (Chester City)
- Delaware County Emergency Services Building/Juvenile Detention Center (Middletown Township)
- Delaware County Community Services Building (Media, PA)

In order to better determine where Delaware County can mitigate GHG emissions, the county must first understand which facilities are producing the largest amount of emissions. To determine the largest GHG emitters, facilities were evaluated for total square footage, overall energy usage, and energy use intensity.

When comparing the seven county facilities by square footage, as shown in Figure 6, the G.W. Hill Correctional Facility is the largest, comprising 35% of the total square footage. Next is the Fair Acres Campus comprising 30%, and finally, the Delaware County Courthouse Complex is third-largest comprising 23%. The three largest facilities in Delaware County comprise 88% of the total square footage.

Figure 6: Delaware County Facilities Compared by Square Footage (Below and Left)

% of Square Feet

30%
23%
6%
2% 4% 1%
35%

■ Fair Acres Campus
■ GW Hill Correctional Facility Campus
■ Courthouse Campus
■ Emergency Services Training Center
■ Voting Machine Warehouse
■ Emergency Services/Juvenile Detention
■ Community Services Bldg.

% of Energy Use

57%
18%
21%

■ Fair Acres Campus
■ GW Hill Correctional Facility Campus
■ Courthouse Campus
■ Emergency Services Training Center
■ Voting Machine Warehouse
■ Emergency Services/Juvenile Detention
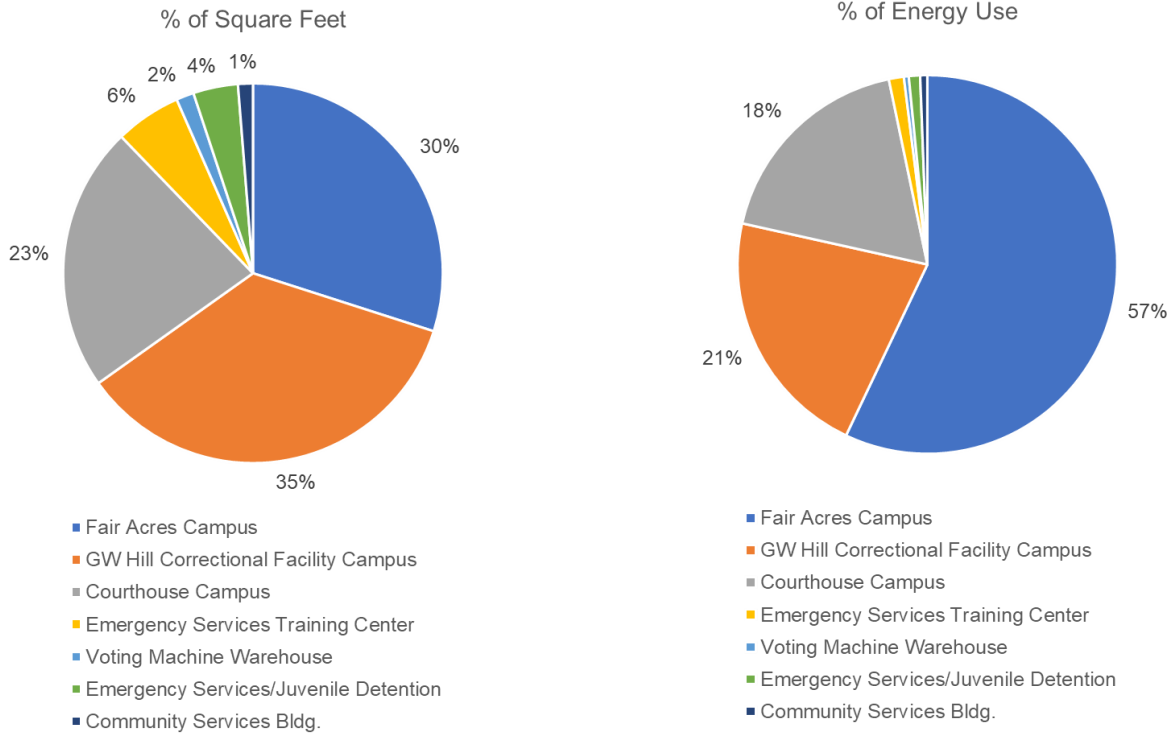■ Community Services Bldg.

Figure 7: Delaware County Facilities Compared by Energy Usage (Above and Right)

Despite containing the second largest square footage, Figure 7 shows the Fair Acres Campus as the largest energy user among the evaluated facilities, utilizing 57% of the total energy. The G.W. Hill Correctional Facility was the second largest energy user, utilizing 21%, and the Delaware County Courthouse Complex, was the third largest, utilizing 18%. Some potential explanations for the large energy use at Fair Acres may be due to its 24/7 operational schedule, as well as the requirement of special care equipment for each resident. The G.W. Hill Correctional Facility

mirrors Fair Acres in serving a 24/7 need; however, it is expected that less equipment is required for the housing of incarcerated individuals.

To complete the comparative analysis of Delaware County facilities, EUI, or Energy Use Intensity for each facility was evaluated. The energy use intensity was calculated using the ClearPath tool and each facility's square footage. Knowing the EUI is helpful because the figure can be used both as a baseline that can be tracked over time, as well as to compare an individual building performance to national figures of buildings similar in size and use, and thereby gauge how well it is performing. Figure 8 evaluates the calculated EUI for 2019 and 2020, and compares these figures to the National Median.

Figure 8: EUI Comparison of County Owned Facilities

Property Name	Baseline Site EUI (kBtu/ft²) 2019	Current Site EUI (kBtu/ft²) 2020	Site EUI (kBtu/ft²) Change	Current Site EUI Difference from National Median by property type ("lower" is better)
Fair Acres Campus	207.7	211.4	-3.7	208 % higher
GW Hill Correctional Facility Campus	67.5	88.8	21.3	1% higher
Courthouse Campus	91.5	100.1	8.6	123% higher
Emergency Services Training Center	25.2	22.7	-2.5	70% lower
Voting Machine Warehouse	30.5	22.4	-8.1	38% lower
Emergency Services & Juvenile Detention	28	18.6	-9.4	84% lower
Community Services Bldg.	60.3	58	-2.3	38% lower

When comparing 2019 and 2020, the total EUI for Delaware County increased by 8 kBtu/sq. ft. The George W. Hill Correctional Facility Campus has an EUI roughly on par with the National Median for similar facilities, while the Emergency Services Training Center, Voting Machine Warehouse, Juvenile Detention Center, and Community Services Building all performed better than the National Median. The fact that the EUIs for the Fair Acres Campus and the Courthouse Campus are significantly higher than the National Median indicate that these are prime targets for energy efficiency interventions. As the County moves to set specific targets in its Sustainability Plan, the improvement of EUI across all County buildings would serve to meet both GHG reduction goals and overall energy efficiency goals.

Delaware County Fleet
Delaware County has over 320 vehicles in its fleet, serving a variety of needs such as transporting cargo, such as mail or equipment, transporting incarcerated individuals, investigating crimes, performing park maintenance, transporting employees to site visits,

meetings, and conferences, among many other uses. When evaluating the county fleet, vehicles fall into three main categories: passenger vehicles, light trucks, and heavy trucks. When considering alternatives for the county fleet, it is important to understand the fleet's current composition. Figure 9 shows the percentage of vehicles in each category, while Figure 10 shows the fleet's breakdown by fuel type.
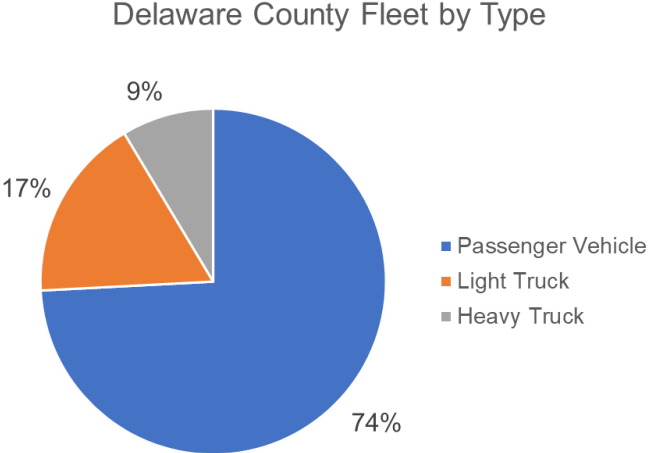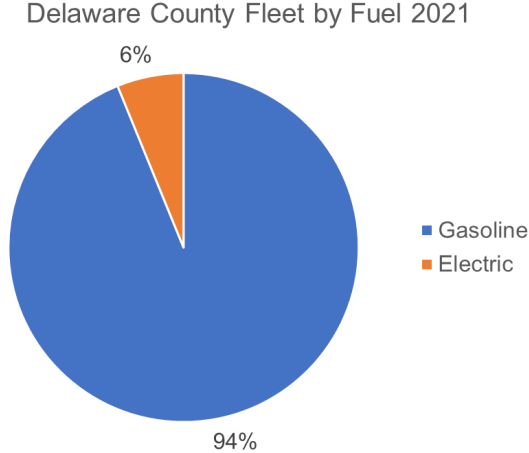
Figure 9: Delaware County Fleet Characterization (2021)

Delaware County Fleet by Type

- Passenger Vehicle
- Light Truck
- Heavy Truck

9%
17%
74%

Figure 10: Delaware County Fleet by Fuel Type (2021)

Delaware County Fleet by Fuel 2021

- Gasoline
- Electric

6%
94%

When evaluating Figures 9 and 10, it can be evaluated that the county fleet is currently composed primarily of gasoline-fueled passenger vehicles. As of 2021, the county had 15 electric vehicles. To date, as of August 2022, the County has since received additional grant funding through the PA DEP's Alternative Fuel Incentive Program to add an additional 69 electric vehicles to the fleet. As the county continues to prioritize the electrification of the fleet, GHG emissions should go down. It is recommended that the Sustainability Plan set a specific

target for the conversion of the county fleet to electric vehicles to ensure that progress toward an electrified fleet continues to gain momentum.

Solid Waste and Other Inventory Constraints

In the creation of the GHG inventory, there were several constraints in the compilation for baseline data. First, detailed figures for waste collection from county facilities were not specified by facility or in total; therefore, standardized estimates for waste generation were utilized. The county is currently seeking to combat this problem in the future by drafting an RFP for waste management services that would require measurement of trash, recycling, and other diversion strategies in all county facilities. In the creation of the Mitigation Strategies Plan, all identified initiatives were not reflected in ClearPath to generate GHG reduction impacts, as the online program limited the type of projects that could be captured. Finally, in the identification of potential mitigation strategies not all opportunities were fully vetted for necessary infrastructure availability or jurisdictional control. These barriers are expected to be vetted during the Sustainability Subcommittee meeting process.

Plan Implementation

Delaware County is currently in the process of drafting its first-ever Sustainability Plan. The Delaware County Sustainability Plan is designed to identify implementable actions for the County to green its operations and make Delaware County a more sustainable place to live, work, and play. The plan identifies six focus areas, including Climate Resiliency, Energy, Health and Wellness, Natural Resources, Transportation, and Zero Waste. Subcommittees composed of industry experts, government staff, and local residents will convene on each topic area, tasked with identifying meaningful targets and action items to help further Delaware County's goals.

This Local Climate Action Plan will serve as a primary guiding document for the Sustainability Plan. Specifically, figures from the greenhouse gas inventory in energy, solid waste, and vehicles will serve as baselines to measure progress and success of action items in the energy, zero waste, and transportation sections. Additionally, the Mitigation Strategies Plan component of the LCAP will start conversations regarding strategy and assist in the overall creation of implementable action plans. This work was necessary in the creation of Delaware County Sustainability Plan as it lays the framework for the reduction of the County's annual carbon footprint leading to a more efficient and healthy operation.

The implementation of the plan will be overseen by the Delaware County Office of Sustainability and the Delaware County Sustainability Commissions. The Delaware County Sustainability Commission is a group that meets monthly to coordinate sustainability efforts, discuss projects and programs, and provide direction regarding sustainability policy and recommended practices for the county.

Overview of Strategies

Below, is an infographic that serves to demonstrate the impact of each of the mitigation strategies that will be discussed in the document. It specifies which category (Energy, Health & Wellness, Waste Management, Transportation, Natural Resources, and Climate Resilience) the strategy will serve and the level of impact it will have in regards to Greenhouse Gas emissions. Additionally, if the category has been measured through our data management program (ClearPath), there will be an inclusion of the estimates of the potential Greenhouse Gas Reductions. The number corresponds to the Mitigation Strategies listed below.

Number	Category	Strategy	Level of Impact	Potential GHG Reduction
1-1		Convert to Green Energy Sources: Develop regional partnership to develop a renewable energy site to source county's energy	High	N/A
1-2a		Convert to green energy sources: Install solar energy for residential buildings	Medium	Grid Electricity Energy Reduced (MMBtu / Year) = -7370
1-2b		Convert to green energy sources: Install solar energy for commercial and industrial buildings	High	Grid Electricity Energy Reduced (MMBtu / Year) = -736992
1-3		Convert to Green Energy Sources: Wind energy	High	N/A
1-4		Convert to Green Energy Sources: Geothermal energy	High	N/A
1-5		Convert to Green Energy Sources: RNG energy	Medium	N/A
1-6		Supply financial and technical support for sustainable residential energy audits and retrofits	Medium	N/
1-7		Educate and promote appliance recycling and proper disposal across the community	Medium	N/A
1-8		Install Low Income Weatherization Programs	Medium	One Year Emissions Savings (MTCO2e) = -9269.9
2-1		Address chemicals of concern	Low	N/A
2-2		Increase the accessibility to nutritious, whole foods	Low	N/A
3-1		Electric school buses initiative	Medium	N/A

3-2	🚚	Sustainable county fleet project	Medium	N/A
3-3	🚚	Promote electric vehicles in the community-scale	High	Change to Gasoline VMT* = -2.3377 x10^9
3-4	🚚	Improve the county's bicycle network	Medium	VMT* reduced = -5.8321 x10^6
3-5	🚚	Install carpooling programs	Low	N/A
4-1	♻️	Offer accessible recycling services in local communities	Low	N/A
4-2	♻️	Offer accessible composting services in local communities	Low	N/A
5-1	🌍	Transition the county into a green economy	Low	N/A
5-2	🌍	Implement green building standards to county-funded infrastructures	Low	N/A
5-3	🌍	Educate residents to be more prepared to combat extreme weather events	Low	N/A
5-4	🌍	Encourage people to buy locally to support Delaware County's economy	Low	N/A
6-1	🌳	Preserve and increase the amount of trees in the community	Low	N/A
6-2	🌳	Engage with community stakeholders to promote the preservation of natural resources	Low	N/A

💡 Energy	🧍 Health and Wellness	🚌 Transportation
♻️ Waste and Resource Management	🌍 Climate Resiliency	🌳 Natural Resources

(1) Mitigation Strategies | Energy

1. <u>Convert to Green Energy Sources</u>: develop regional partnership to develop a renewable energy site to source county's energy
   a. [Powering Our Future: A Clean Energy Vision for Philadelphia](#) (DRAFT PDF)
      i. *Greenworks* and City-Issued Draft of a inside look into Philadelphia's current energy system and how to move into a clean and "just energy future"

b. [Clean Energy Vision Plan | City of Philadelphia](#) (PDF)
    i. This is the result of feedback that was received in order to create concrete climate action goals for Philadelphia.

2. <u>Solar Energy</u>
    a. Definition: Solar Energy is the generation of electricity using the energy transmitted through the sun. This energy source can be harnessed directly or indirectly, such as to create thermal or electrical energy. This is one of the cleanest and most abundant renewable energy sources available.
    b. Local Government Actions (Philadelphia)
        i. Connect local communities to financial resources available to make the transition to solar energy smoother
        ii. Provide financial incentives for installation of solar panels
        iii. Provide or partner with an educational organization to teach communities about the benefits of solar energy
        iv. Promote Solar Energy Projects to other local ordinances
    c. Resources
        i. [Philadelphia Solar Rebate](#) (a program that encourages property owners to install solar panels through a one-time rebate payment from the city)
        ii. [Solarize Philly](#) (a citiwide program dedicated to make the conversion into solar easy and affordable)

3. <u>Wind Energy</u>
    a. Definition: This action defines the process through which wind is used to generate electricity or mechanical power. Oftentimes, wind energy is transformed into electrical energy through wind turbines. The wind turbines convert the kinetic energy that is created by air in motion into electrical energy that can be used to power communities.
    b. Local Government Actions (Philadelphia)
        i. Encourage homeowners or communities to establish their own wind energy sources
        ii. Provide financial incentives for installation of local wind energy
        iii. Connect local communities to financial resources available to make the transition to solar energy smoother
        iv. Provide or partner with an educational organization to teach communities about the benefits of wind energy
        v. Promote Wind Energy Projects to other local ordinances
    c. Resources
        i. [PA: Department of Environmental Protection on Wind Energy](#)
        ii. [Community Wind Energy Planning](#) (information on how to grow community wind energy projects)

4. <u>Geothermal energy</u>

a. Definition: This energy source utilizes the ground as a source for heat or cooling in buildings. This system transfers the heat or cold to or from the ground to to generate electricity or cool and heat buildings.

b. Local Government Actions (Philadelphia)
   i. Provide financial incentives for geothermal energy projects
   ii. Provide resources and contacts on organizations who are well-versed in geothermal systems for local communities
   iii. Connect with local organizations to provide geothermal systems for local communities
   iv. Educate local communities on geothermal energy and its benefits

c. Resources
   i. [What is Geothermal Energy and Why It Matters](#)
   ii. [Can Philadelphia tap into its Geothermal Resources?](#)
   iii. [Incentives in Moving Towards Geothermal Energy](#)
   iv. [Policy Overview for Local Geothermal Electricity Development](#)
   v. [Homeowners Energy Efficiency Loan Program](#)

5. RNG Energy

a. Definition: Known as biomethane, it is natural gas that is produced by the decomposition of organic matter under anaerobic (oxygen-free) conditions. Oftentimes the gas is captured and purified to remove other components (water, CO2, hydrogen sulfide); however, this energy source can also be manufactured using electricity, carbon dioxide and hydrogen (potentially, becoming entirely climate-neutral if electricity sources do not use greenhouse gas sources).

b. Local Government Actions (Philadelphia)
   i. Provide financial incentives for RNG projects
   ii. Provide resources and contacts on organizations who are well-versed in geothermal systems for local communities
   iii. Educate local communities on RNG energy sources and its benefits
   iv. Enable policies that improve waste management policies

c. Resources
   i. [What is RNG & Why it Matters](#)
   ii. [RNG Pilot Project (Philadelphia Works) Rejected in Philadelphia (August 2021)](#)
   iii. [RNG: Guidance for State Policy](#)

6. Residential Energy Audits

a. Definition: Creating inspection and analysis surveys that determine the energy conservation of a building. These efforts are inclusive of all-communities, as it does not withhold sustainable means to reduce energy for low-income communities.

b. Local Government Actions

   i. Connect with local energy conservation non-profit organizations

   ii. Connect with local energy partners/companies to support efforts

   iii. Provide funding and incentives to encourage community members to participate

  c. Resources

   i. [Energy Efficiency Sponsors & Other Information](#)

7. <u>Appliance Recycling</u>

  a. Definition: Educate and promote appliance recycling and proper disposal action throughout the community.

  b. Local Government Actions

   i. Provide financial / tax incentives for community members with approved appliances

   ii. Provide potential funding and technology programs to support efforts

   iii. Release annual reports to demonstrate the effectiveness and improvements in local communities

   iv. Connect community members to recycling programs and ensure that they are accessible

  c. Resources

   i. [An example of a city of this in action today](#) (Austin, Texas)

8. <u>Low Income Weatherization Programs</u>

  a. Definition: Weatherization is the practice of protecting a building from the elements (wind, precipitation, sunlight) and modifying the building to reduce energy consumption and optimize energy efficiency. Low income weatherization programs would guarantee grants and aid to low-income households that are improving their home's energy efficiency.

  b. Local Government Actions

   i. Provide financial / tax incentives for community members for weatherizing their homes

   ii. Connect low-income communities to weatherization programs

   iii. Educate community members on resources available for weatherization programs

   iv. Create or institute a weatherization program that will support efforts for local communities

   v. Create local weatherization improvement reports to demonstrate the effectiveness of programs

  c. Resources

   i. [Residential Weatherization and Direct Install Programs](#)

   ii. [Weatherization Assistance Programs](#)

   iii. [Pennsylvania Weatherization Programs](#)

9. [Other recommendations Provided by the EPA](#)

1. Building codes and appliance standards
2. Building / labeling disclosure
3. Financial Incentives
4. Lead by example / non-residential programs
5. Residential Retrofit Programs
6. Include Educational Institutions in conversations for green energy initiatives

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(2) Mitigation Strategies | Health & Wellness

1. Address chemicals of concern
    a. Definition: ensuring that the local community is aware of any and all potential hazards to ensure that there are informed decisions instilled to address these health concerns
    b. Local Government Actions
        i. Surveying the local community of pollutants
        ii. Finding mitigation strategies for set pollutants / hazardous chemicals and reducing their exposure to local communities
        iii. Building / labeling disclosure for the public
        iv. Working with local industry leaders to ensure that reductions can be made and addressed
    c. Resources
        i. [Harvard's Local Efforts](#)
2. Increase the accessibility to nutritious, whole foods
    a. Definition: This action is to ensure that all community members have access to locally grown, nutritious, whole food
    b. Local Government Actions
        i. Surveying local communities for Food Desserts, Lack of Grocery Stores, etc.
        ii. Community Gardens
        iii. Initiating a [Food Purchasing Program](#)
        iv. Educating the general public on importance of food
        v. Transportation of the Food – 100 mile food challenge Bryn Mawr Project
        vi. Reducing Food Waste
    c. Resources
        i. [Health and Wellness Practices Initiated at Harvard University](#)
        ii. [EAT-Lancet Commission and Food Awareness](#)
        iii. [Why is Food Important?](#)
        iv. [Food Purchasing Program](#)

(3) Mitigation Strategies | Transportation

1. Electric school buses initiative
    a. Definition: reducing the diesel emission by switching the school bus fleet to electric vehicles based on local financial capacity or grant availability
    b. Local Government Actions
        i. Conducting survey and research to track the carbon emission of the transportation for the school districts of Delaware County
        ii. Establishing the reduction goal of switching the school buses from diesel to electric, purchasing electric school buses, and installing electric vehicle charging stations
    c. Resources
        i. [The Yellow School Bus Industry White Paper](#) (National School Transportation Association, 2013)
        ii. The Diesel Emissions Reduction Act ([DERA](#)) Program
            1. School District of Philadelphia has initiated [a project](#) to install electric school buses
            2. An electric school bus replacing a diesel school bus is the equivalent of removing [23 tons](#) of greenhouse gasses per year
        iii. [Alliance for Electric School Buses](#)
2. Sustainable county fleet project
    a. Definition: Creating a project that will increase the percentage of electric vehicles among the county's fleet and installing infrastructures to support this action
    b. Local Government Actions
        i. Defining a [low-GHG emitting vehicle](#) and [minimizing](#) vehicle miles traveled
        ii. Evaluating the current carbon emission inventory of county fleet and developing a plan for Electric Vehicle Installation
    c. Resources
        i. [King County: Feasibility of Achieving Carbon-neutral Fleet](#)
            1. Conclusion: transiting to all-electric buses is only effective means to achieve zero-emission
            2. Next step: collaborating with the bus manufacturing industry, power providers, local communities and others to ensure the safety, financial and service accessibility of e-fleets
            3. Goals

        a. Reducing the GHG emission of government operations by 50% by 2030

        b. Increasing the percentage of alternative fuels in County fleets 10% by 2025

        c. Ensure all electricity supplied for government operations is carbon neutral by 2025

    ii. [Guide/Factsheet: greening county fleet](#)

    iii. [Quantifying Transit' Impact on GHG Emissions and Energy Use](#)

    iv. CA' s [Community Readiness Guidebook](#)

3. <u>Promote electric vehicles in the community-scale</u>
   a. Definition: encouraging the [use](#) of battery and plug-in hybrid cars, sport utility vehicles (SUVs), and light trucks across Delaware County
   b. Local Government Actions
      i. Strategically deploying [publicly accessible chargers](#)
      ii. [Informing](#) consumers information on fuel economy and advanced technology cars
   c. Resources
      i. [Guiding Principles](#) for Utility Programs to Accelerate Transportation Electrification
      ii. [Zero-Emission Vehicle Program](#)
      iii. Safer, Affordable Fuel-Efficient ([SAFE](#)) Vehicle Rule
      iv. [Low Carbon Fuel Standard](#)
      v. [Current Electric Vehicle Charging Stations in Delaware County](#)

4. <u>Improve the county's bicycle network</u>
   a. Definition: building the infrastructure of the bicycle network as a crucial part of the county's transportation system
   b. Local Government Actions
      i. [Bike Montco: The Bicycle Plan for Montgomery County](#) (August 2018)
         1. To support *bicycling* as a daily transportation option
            a. Expand the bicycle network to connect important destinations, trails, urban centers, and transportation hubs
            b. E.g. increase the amount of covered bicycle parking at rail stations
            c. E.g. install suburban Bicycle Share Programs (E.g. Philly Indego Bike Share)
   c. Resources
      i. [PennDOT Connects Initiative](#)
      ii. [SEPTA's Cycle-Transit Plan](#) (April 2015)
      iii. [Delaware County Bicycle Plan](#)

5. <u>Install carpooling programs</u>

a. Definition: creating initiatives to motivate and empower community residents to share rides during the routine commuting and casual driving

b. Local Government Actions
   i. Building a website to install an online carpool matching program
   ii. Conducting surveys and directly coordinating carpooling within the community
   iii. Creating referral-discount incentives to motivate more ridesharing

c. Resources
   i. Ride Sharing Programs, USDOT
   ii. Car and Van Pooling, PennDOT
   iii. Share-A-Ride program by DVRPC
   iv. Share the Ride NC
   v. Ridesharing Options Analysis and Practitioners' Toolkit

6. Other transportation strategies
   a. Vision Zero Philadelphia (2017 PDF)
   b. Philadelphia's Strategic Transportation Plan (October 2018 PDF)

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(4) Mitigation Strategies | Waste Management

1. Offer accessible recycling services in local communities
   a. If community does not have access to a recycling program, this is one approach to ensure that citizens still have access to recycling initiatives
   b. Local Government Actions
      i. If transportation is a potential concern, surveying the local community to initiate a recycling program
      ii. Ensure that program is affordable
      iii. Providing incentives to encourage community members to take action
   c. Resources
      i. Other International Recycling Initiatives

2. Offer accessible composting services in local communities
   a. If community does not have access to a composting program, this is one approach to ensure that citizens still have access to sustainable initiatives
   b. Local Government Actions
      i. If transportation is a potential concern, surveying the local community to initiate a composting program (conveniency)
      ii. Ensure that program is affordable
      iii. Providing incentives to encourage community members to take action
      iv. Encourage small composting efforts by providing workshops

          v.   Working with local composting organizations to ensure that composting program is connected to local agriculture / energy creating efforts

3. <u>More suggestions for GHG emission reduction</u>
   a. Composting local agriculture / for renewable energy
   b. Landfill gas reusable
      i. Covanta Extends [Partnership](#) with Delaware County Solid Waste Authority for Sustainable Waste Disposal
4. [Other Waste Management Efforts as Suggested by the EPA](#)

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(5) Mitigation Strategies | Climate Resilience

1. <u>Transit the county into a green economy</u>
   a. Definition: [transiting](#) the current economy to "low carbon, resource efficient and socially inclusive"
   b. Local Government Actions
      i. Creating [people-centered prosperity](#) by prioritizing investment and access to the sustainable natural systems, infrastructure, knowledge and education
      ii. Educating the [life-cycle](#) concept to the community and promoting the green products from the consumer end
      iii. Recognizing the limitation of [natural capital](#) and nurturing the natural values through the decision-making process
   c. Resources
      i. [Green Economy Coalition](#)
      ii. [Ten Conditions for a Transition towards a Green Economy](#)
      iii. [US Green Economy Report](#)
2. <u>Implement green building standards to county-funded infrastructures</u>
   a. Definition: developing green building ordinances or choosing one [model code](#) and implementing them to the county-funded buildings, properties, and infrastructures
   b. Local Government Actions
      i. Initiating a [Sustainable Design and Green Building Team](#) to define green building ordinances, identify the scope of implementation, and develop the stakeholder engagement and communication plan
      ii. Developing [incentives](#) to promote the construction of green-certified buildings
   c. Resources
      i. [Comparison](#) of Green Building Standards
      ii. [LEED](#) rating system
      iii. The Center for [Green Schools](#)
      iv. PA [High Performance Building Program](#)

     v.   Green Building [Toolkit](#) for Local Governments
3. <u>Educate residents to be more prepared to combat extreme weather events</u>
   a. Definition: identifying the most possible natural hazards in the community and educating residents of ways to be prepared, evacuate, and stay safe
   b. Local Government Actions
      i. [Publicizing](#) the types of disasters that are likely in the county and the local emergency, evacuation, and shelter plans for each specific disaster
      ii. Encouraging more sign-ups of the community's [alter system](#)
      iii. Identifying the most vulnerable neighborhoods and allocating budgets to buy residents the coverage of [flood insurance](#) and emergency preparedness [kit](#)
   c. Resources
      i. National Flood [Insurance](#) Program
      ii. Flood Safety Social Media [Toolkit](#)
      iii. Severe Storm and Flood [Recovery Assistance](#)
      iv. [Report](#): State Flood Resilience and Adaptation Planning
      v. Iowa Flood Mitigation [Board](#)
4. <u>Encourage people to buy locally to support Delaware County's economy</u>
   a. Definition: helping the public to identify local businesses and providing incentives for buying locally
   b. Local Government Actions
      i. Building the guiding website and displaying more local farmer's market, restaurants, and visiting sites to the public
      ii. Installing programs to establish connections between local residents and local farms to realize the direct-to-consumer network
   c. Resources
      i. Organization: [Shop Local USA](#)
      ii. [Local Food Supply China Initiative](#) in Southwestern PA
      iii. Local Food Promotion [Program](#)
      iv. Local Foods, Local Places [Toolkit](#)
      v. [Guide](#) to Finding Local Food during Pandemic

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(6) Mitigation Strategies | Natural Resources

1. <u>Preserve and increase the amount of vegetation and trees</u>
   a. Definition: preserving the existing vegetation, minimizing the potential removal, and installing more green capitals across the county
   b. Local Government Actions
      i. [Milwaukie Community CAP](#) (pp. 61-62)

1. Increasing *tree canopy* to 40% by 2040 and developing a tree planting program focused on shielding low income neighborhoods from heat
   ii. [MONTCO 2040: A SHARED VISION](#) (January 2015)
      1. Installing *green roof*: to increase the vegetation and meanwhile to manage the stormwater
      2. Reinvigorating the *tree canopy* in communities: preserve current trees while planting more trees in priority areas to manage the stormwater; adopt ordinances to ensure all processes
   c. Resources
      i. [NRCS Conservation Programs](#)
      ii. [USDA](#), Farmers and You: Conserving Our Natural Resources
      iii. Challenges to [Green Roof](#) Construction
      iv. Estimating the Environmental Effects of Green Roofs: A Case Study in [Kansas City](#), Missouri (US EPA, 2018)
2. <u>Engage with community stakeholders to promote the preservation of natural resources</u>
   a. Definition: Increasing the [education and outreach](#) of local municipalities and environmental organizations to promote the adaptation and application of natural resources programs
   b. Local Government Actions
      i. Conducting a [stakeholder analysis](#) to understand their relatedness to the county's concerns and produce a target list to do advocacy with and take actions with
      ii. Continuing the engagement with local environmental organizations and municipalities to build connections and seek opportunities to begin the advocacy partnership
   c. Resources
      i. Greener Parks for Health Advocacy [Toolkit](#)
      ii. [Search Engine](#): Environmental Groups in PA
      iii. WWF's [Guidance](#) on how to advocate for a more enabling environment for civil society in your context

Glossary of Terms

Climate Change: This global phenomenon defines a change in regional climate patterns that is attributed to the increased levels of greenhouse gas emissions. These long-term shifts in climate create shifts in global temperatures and weather patterns.

ClearPath: ClearPath is a Greenhouse Gas emissions software from ICLEI-USA that was provided to the students as a tool for local government climate action planning.

Climate Neutral: Establishing a net zero carbon footprint that refers to balancing a measured amount of carbon released with an equivalent amount or offset–buying enough carbon credits to make up the difference of carbon emissions.

Greenhouse Gas Inventory: A developmental data inventory that defines the measured greenhouse gas emissions for a specified location, in this case: Delaware County.

Greenhouse Gas(es) (GHG): These are a series of different gasses that can be found in the Earth's atmosphere, such as carbon dioxide, methane, nitrous oxide, and ozone. They are especially crucial in terms of understanding climate action planning as they absorb infrared radiation. Due to the ability to trap in heat, the more that these gasses are emitted into Earth's atmosphere, the more the Earth will continue to warm.

ICLEI-USA: Local Governments for Sustainability is a global network working with more than 2500 local and regional governments committed to sustainable urban developments. The organization provides technical assistance, tools, and network to advance in sustainable climate action planning.

Local Climate Action Program: This program works in conjunction with local organizations in Pennsylvania to lead in mitigating climate change action in the local communities. The program is officially run by the DEP Energy Programs Office and funded by the State Energy Program of the U.S. Department of Energy.

Mitigation Strategies: An project or action that can be implemented to eliminate the risk of generating a hazardous situation, or prevent it from happening. These are often created in advance to lessen the effects and prepare for threats that can be posed by environmental factors.

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