REQUEST FOR PROPOSALS # 600-11-25

Heating Ventilation Air Conditioning Consulting Services Authority-Wide

Due: July 17, 2025
At 10:00 A.M.

To: Mr. Brandon Havranek
Associate Director of Procurement/ Contracting Officer
Procurement Department
412 Boulevard of the Allies, 6th Floor
Pittsburgh, PA 15219

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH
Request for Proposals #600-11-25
for
Heating Ventilation Air Conditioning Consulting Services Authority-wide

TABLE OF CONTENTS

SECTION I
INTRODUCTION

The Housing Authority of the City of Pittsburgh ("HACP") hereby requests proposals from qualified firms to provide consulting services (hereinafter, "Services"). A more detailed scope of services is provided in Section II of this Request for Proposals ("RFP").

HACP owns and directly manages over 2,500 units of public housing in the City of Pittsburgh consisting of family and elderly housing within approximately 15 communities and amongst various scattered site locations. The selected professionals may be requested to provide services at any HACP community or scattered site.

The HACP desires a HVAC Consultant to explore potential upgrades and design replacement, incorporating renewable energy sources (such as solar), improve energy efficiency, cost reductions, environmental impact reduction, increase climate resilience, reduce greenhouse gas emissions, pursue environmental justice, to assist the HACP to achieve Pittsburgh and Erie 2030 Districts commitment pledge, along with implementing HUD's approach that reduces climate pollution; increase resilience to the impacts of climate change; protect public health; deliver environmental justice; and spur well-paying jobs and economic growth through HUD's ambitious Climate Action Plan first issued in 2021 (with a technical update in 2023) as the successor to its Climate Change Adaptation Plan, issued in 2014, and HUD 2024-2027 Federal Climate Adaptation Plan.

The HACP has existing Ground Sources Heat Pump Geothermal Systems at Arlington Heights (143 Units), Northview Heights (455 Units), and Homewood North (126 Units) communities. The HACP desires have recommendations and designs for the most environmentally friendly solutions for HVAC Geothermal systems.

At other locations throughout the City of Pittsburgh, within its Asset Managed Properties (AMP) portfolio, HACP currently operates a diverse range of heating/cooling systems, including various hydronic boilers, ductless mini-split heat pumps, gas forced air furnaces, and Roof Top Units. To ensure optimal efficiency, effectiveness, and sustainability, these systems require thorough evaluation and potential upgrades designs.

The United States Department of Housing and Urban Development Department ("HUD") provides the funding for the services and therefore all services performed must be in compliance with all rules and regulations of this program, and all other applicable Federal regulations including, but not limited to, Handicap Accessibility (Section 504), Americans with Disabilities Act (ADA), Uniform Federal Accessibility Standards (UFAS), Davis-Bacon wage requirements, Environmental Protection Agency rules and regulations, HUD's Modernization Design Standards, Build America/Buy America Act (BABA)and Federal procurement requirements.

In addition to the Federal laws, rules and regulations, all work must also be performed in compliance with all Commonwealth of Pennsylvania laws and regulations including Pennsylvania Separations Act and Allegheny County and the City of Pittsburgh's requirements.

HACP seeks proposals from qualified professional firms to provide Heating Ventilation Air Conditioning Consulting Services and is contemplating the award of a professional service contract or contracts for **an initial term of two (2) years with three (3), one (1) year extension options, for a total of five (5) years**, whereby HACP will authorize the selected professionals, during a stated time period and for the services HACP requires, to perform the services on an as- needed basis through the use of Task Orders. **Attachment A** – Model Form of Agreement (Form HUD – 51915) is the professional service contract that will be used through this solicitation process.

Any questions regarding this Request for Proposals should be made in writing and directed to:
Mr. Brandon Havranek –
Associate Director of Procurement/Contracting Officer
412 Boulevard of the Allies
6th Floor, Procurement Department
Pittsburgh, PA 15219
412-456-5000 Ext 2890
If submitting questions via email, please send to brandon.havranek@hacp.org.
A complete proposal package may be obtained from the Doing Business section of the HACP website, www.hacp.org.

Following are the key Dates associated with this Request for Proposal

Pre-Submission Conference: **July 2, 2025, at 10:00 A.M.**
Will be held via Zoom meeting:
Pre-Submission Zoom Meeting Link:
https://hacp-org.zoom.us/j/85241391020?pwd=oaXq4FNJsMBVxC74u4WMMP9ZVlp61a.1
Zoom Meeting ID: 852 4139 1020
Zoom Passcode: 130898

One Tap Mobile:
+16469313860,,85241391020#,,,,*130898# US
+19292056099,,85241391020#,,,,*130898# US (New York)

Final Submission
of Written Questions: **July 8, 2025, at 10:00 A.M.**
Mr. Brandon Havranek - Associate Director of Procurement/ Contracting Officer
Housing Authority of the City of Pittsburgh
412 Boulevard of the Allies
6th Floor, Procurement Department
Pittsburgh, PA 15219
412-456-5000 Ext 2890
412-456-5007 Fax
If submitting questions via email, please send to ***brandon.havranek@hacp.org***

Proposals Due: **July 17, 2025, at 10:00 A.M.**
Mr. Brandon Havranek
Associate Director of Procurement
Housing Authority of the City of Pittsburgh
412 Boulevard of the Allies
6th Floor, Procurement Department
Pittsburgh, PA 15219

HACP will also accept online submissions for this Request for Proposals in addition to accepting submissions at our 412 Boulevard of the Allies Building. Offerors may choose either delivery mechanism. For respondents wishing to submit online, please go to the following web address to upload documents:

https://www.dropbox.com/request/Ud8spVx15rYB7CBAUG0r

Please include your name and email address when prompted before submitting and upload all relevant attachments in the same document. Formatting for online submission should be organized in the same manner as if submitting the information via flash drive. The title of the uploaded bid shall be as follows:

[Full Company Name]_RFP #600-11-25_Technical
[Full Company Name]_RFP #600-11-25_Fee Proposal

In the unlikely event your bid is too large to be uploaded as a single file, add: _Part-1, _Part-2… etc. to the end of the file name.
In addition to the electronic submittal above, The Housing Authority of the City of Pittsburgh will **only be accepting physical proposals dropped off in person from 8:00 AM until the closing time of 10:00 A.M. on July 17, 2025,** in the lobby of the One Stop Shop at 412 Boulevard of the Allies, Pittsburgh, PA 15219. Proposals may still be mailed via USPS at which time they will be time and date stamped in the Procurement Department at 412 Boulevard of the Allies, 6th Floor Procurement Department, Pittsburgh, PA 15219. All proposals must be received at the above address no later than **10:00 A.M. July 17, 2025,** regardless of the selected delivery mechanism.

Copies of the RFP documents are not available for in-person pickup. Firms interested in responding may obtain an electronic copy of the Request for Proposals documents free of charge from the Business Opportunities Section of the HACP website, www.hacp.org. Prospective bidders may register as vendors on the website and download the documents free of charge.

SECTION II
SCOPE OF SERVICES

The Housing Authority of the City of Pittsburgh (HACP) is contemplating the award of professional service contract(s) through this solicitation process. The primary objective of this solicitation process is to engage qualified professionals with expertise in both design and contract administration to support HACP's initiatives effectively. The HACP intention is to consider the award of professional service contract(s) through this solicitation process. As part of this Request for Proposal (RFP), additionally design and contract administration services will be integral components. The selected vendor(s) will provide comprehensive design and contract administration services including but not limited to project oversight, compliance management, and quality assurance. It is important to note that while multiple sites are listed, the HACP may not undertake work at all locations.

Each Offeror must review the professional service contract included as Attachment A, the General Conditions for Non-Construction Contracts (HUD 5370-C) Attachment C and Supplemental General Conditions included at Attachment D.

All services performed must follow all applicable Federal regulations including, but not limited to, Handicap Accessibility (Section 504), Americans with Disabilities Act (ADA), Uniform Federal Accessibility Standards (UFAS), Environmental requirements, Davis-Bacon wage requirements, the Build America, Buy America (BABA) Act and Federal procurement requirements. In addition, all services must be performed in compliance with applicable Commonwealth of Pennsylvania laws and regulations including Pennsylvania Separations Act and City of Pittsburgh building code requirements and ordinances.

The vendor(s) shall furnish all labor, material, tools, equipment, transportation and skills necessary to perform all services in the most expeditious and economical manner consistent with the interest of HACP and HUD. NOTE: the HACP may not undertake work at all the sites and possibly include additional sites (not listed) requiring these services. The following HACP Community general background information:

Arlington Heights (AMP-04)
Arlington Heights Family Community is located on the South Side of Pittsburgh. The site consists of 143 one- and two-bedroom apartments distributed across seven 3-story walk-up buildings.

Allegheny Dwellings (AMP-05)
Situated on the North Side of Pittsburgh, Allegheny Dwellings includes 175 one- and two-bedroom apartments within nine 3-story walk-up buildings.

Northview Heights (AMP-09)
Northview Heights is a large family community that is comprised of 450 apartments within 69 buildings. The housing mix includes 68 townhouse-style buildings and one 3-story walk-up, with units ranging from two to five bedrooms.

PA Bidwell (AMP-15)
Located in the Manchester neighborhood, PA Bidwell is a 10-story high-rise apartment building dedicated to senior and disabled residents. It houses 120 one- and two-bedroom units.

Homewood North (AMP-20)
Perched on a hill in Pittsburgh's Homewood neighborhood, Homewood North includes 126 townhouse-style units spread across 19 buildings. Unit sizes include two-, three-, four-, and six-bedroom layouts.

Murray Towers (AMP-31)
Murray Towers is an eight-story high-rise apartment building located in the Squirrel Hill neighborhood. It contains 67 residential units consisting of studio, one-bedroom, and two-bedroom apartments.

Caliguiri Plaza (AMP-41)
Located in the heart of the Allentown Business District, Caliguiri Plaza is an 11-story apartment building with a total of 104 residential units.

Finello Pavilion (AMP-44)
Finello Pavilion is a seven-story high-rise building nestled in the South Oakland area of Pittsburgh. It provides 60 one-bedroom apartments.

Morse Gardens (AMP-45)
Morse Gardens is located on the South Side of Pittsburgh in a repurposed 3-story school building that is listed in the National Register of Historic Places. The site also includes a 4-story addition, with a total of 70 one-bedroom apartments.

Carrick Regency (AMP-46)
Carrick Regency is an eight-story high-rise located in Pittsburgh's Carrick neighborhood. It includes 66 one-bedroom apartments.

Gualtieri Manor (AMP-47)
Situated in the Beechview neighborhood, Gualtieri Manor consists of 31 one-bedroom apartments. The building is a repurposed 3-story school structure with a 5-story addition.

Scattered Sites South (AMP-22)
This portfolio includes single-family homes, duplexes, and multiplexes spread throughout various neighborhoods on the southern side of the City of Pittsburgh. The total unit count is 127.

Scattered Sites North (AMP-39)
Similar to the Scattered Sites South portfolio, this grouping includes 155 single-family, duplex, and multiplex units located throughout various neighborhoods in the northern parts of Pittsburgh.

Mazza Pavilion (AMP-44)
Frank Mazza Pavilion is a newly renovated, non-smoking apartment building located in the Brookline business district. It consists of 30 residential units.

1. **Arlington Heights – 143 Units (AMP-04), Northview Heights – 455 Units (AMP-09), and Homewood North – 126 Units (AMP-20)** communities:
   a. Existing System: Ground Source Geothermal Heat Pump
   b. Tasks:
      i. Assess the performance, efficiency, and environmental impact of the existing ground sourced geothermal heat pump systems.
      ii. Explore potential upgrades or replacements to improve energy efficiency and reduce costs.
      iii. Explore potential solutions to improve heat transferability or supplement heat. This could involve upgrading components of the existing system, optimizing the ground loop design, adding supplemental heating sources (such as electric resistance heaters or a backup boiler), or implementing zoning systems to distribute heat more effectively.
      iv. Investigate the feasibility of incorporating renewable energy sources, such as solar, into the HVAC systems.
      v. Provide recommendations and designs for environmentally friendly solutions to minimize environmental impact.

2. **Allegheny Dwellings – 175 Units (AMP-05)**
   a. Existing Systems: Hydronic Boilers/Fin tube heating
   b. Tasks:
      i. Assess the performance and efficiency of the boiler/fin tube heating systems.
      ii. Explore options for improving energy efficiency and reducing operational costs.
      iii. Evaluate the potential for integrating renewable energy sources, such as solar, to supplement the existing HVAC systems.
      iv. Provide recommendations and designs for environmentally friendly solutions to minimize environmental impact.

3. **Mazza Pavilion – 30 Units (AMP-40), Caliguiri Plaza – 104 Units (AMP-41), Finello Pavilion – 60 Units**

(AMP-44), Morse Gardens – 70 Units (AMP-45), Pietrangelo Carrick Regency – 66 Units (AMP-46), and Gualtieri Manor – 31 Units (AMP-47):

a. Existing System: Vertical Stacked Water Sourced Heat Pump, Fan Coil System,
b. Tasks:
    i. Evaluate the performance and efficiency of the existing vertical stacked water-sourced heat pump systems, including chillers, cooling towers, boilers, and fan coil units.
    ii. Identify potential upgrades or replacements to enhance energy efficiency and reduce environmental impact.
    iii. Assess the feasibility of integrating renewable energy technologies into the existing systems.
    iv. Provide recommendations and designs for environmentally friendly solutions to minimize environmental impact.

4. **PA-Bidwell – 120 Units (AMP-15) and Murray Towers – 70 Units (AMP-31):**
    a. Existing System: Boiler/Fin tube heating with Window Air Conditioning Units
    b. Tasks:
        i. Assess the performance and efficiency of the boiler/fin tube heating systems and window air conditioning units.
        ii. Explore options for improving energy efficiency and reducing operational costs.
        iii. Evaluate the potential for integrating renewable energy sources, such as solar, to supplement the existing HVAC systems.
        iv. Provide recommendations and designs for environmentally friendly solutions to minimize environmental impact.

5. **Scattered Sites Houses:**
    a. Existing Systems: Various Hydronic Boilers and Gas Forced Air Furnaces
    b. Tasks:
        i. Evaluate the performance, efficiency, and condition of the existing boilers and gas forced air furnaces.
        ii. Identify opportunities for energy efficiency improvements and cost reductions.
        iii. Investigate the feasibility of retrofitting or upgrading the HVAC systems with renewable energy technologies.
        iv. Provide recommendations for environmentally friendly solutions tailored to the specific needs of scattered site houses.

Additional Tasks across All Locations:

i. Other possible HACP designated locations, such as Facilities Services Building, Homewood North Family
ii. Investment Center, etc. - which may include Roof Top Units.
iii. Conduct comprehensive assessments of HVAC systems at designated locations.
iv. Evaluate environmental impact and recommend strategies for reduction.
v. Prepare detailed reports outlining findings, recommendations, and proposed solutions.
vi. Present findings and recommendations to HACP, including designs for construction.
vii. Provide project management support during implementation.
viii. Ensure compliance with relevant codes, standards, and regulations.

The HACP has the right to add/remove locations at their sole discretion

Qualifications:
The consultant should possess expertise and demonstrable experience in designing, evaluating and implementing or upgrading geothermal and other heating/cooling systems, preferably with a focus on the most recent advancements in the field.

Geothermal Engineering Expertise:
Advanced knowledge and expertise in geothermal energy systems for at least 5 years.
Experience with the design, installation, and operation of geothermal HVAC systems for at least 5 years.

HVAC Systems Experience:
A comprehensive understanding of the various Heating, Ventilation, and Air Conditioning (HVAC) systems.
Proven experience in assessing and upgrading HVAC systems for efficiency and sustainability.

Renewable Energy Background:
Experience in incorporating renewable energy sources into HVAC systems.
Knowledge of various renewable energy technologies, with a specific focus on geothermal energy.

Project Portfolio:
Successful completion of similar projects involving geothermal HVAC assessments and upgrades.
Provide at least three (3) references from clients with similar project requirements.

Professional Certifications and Licenses:
License to practice engineering in the Commonwealth of Pennsylvania.
Relevant professional certifications, such as Certified Geothermal Designer (CGD), Building Performance Institute (BPI), Certified Renewal Energy Professional (REP), Certified Energy Manager (CEM), LEED certification or other industry-recognized certifications in energy, geothermal and HVAC systems.

Engineering or Environmental Background:
An educational background in engineering, environmental science or a related field.
Advanced degrees or certifications in relevant disciplines.

Regulatory Compliance Knowledge:
Understanding of local, state, and federal regulations related to geothermal and HVAC systems.
Experience navigating permitting processes for renewable energy projects.

Energy Efficiency and Sustainability Focus:
Demonstrate a commitment to energy efficiency and sustainability principles.
Possess knowledge of best practices for minimizing environmental impact in HVAC system upgrades.

Innovative Solutions:
Ability to propose and implement innovative solutions for HVAC system improvements.
Familiarity with emerging trends and technologies in geothermal and HVAC industries.

Communication and Collaboration Skills:
Strong communication skills to effectively convey complex technical information to non- experts.
Ability to collaborate with other stakeholders, including project managers, engineers, and environmental specialists.

Cost Estimation and Budgeting Skills:
Experience in providing accurate cost estimations for geothermal and other HVAC projects.
Ability to work within budget constraints while delivering high-quality solutions.

Project Management Experience:
Capability to manage projects from conception to completion.
Familiarity with project management tools and methodologies.

SECTION III
GENERAL REQUIREMENTS & DEFINITIONS

A. General Requirements

An Offeror may be an individual or a business corporation, partnership or a joint venture duly authorized to do business in the City of Pittsburgh, financially sound and able to provide the services being procured by HACP.

If an Offeror has been debarred, suspended or otherwise lawfully precluded from participating in any public procurement activity, such firm shall disclose that information in its offer, which may be sufficient grounds for disqualification. If the selected firm fails to disclose such information, and HACP discovers it thereafter, then HACP may terminate the contract.

Each Offeror must be in good standing with HACP, and any Federal, State or Municipality that has or has had a contracting relationship with the firm. Therefore, if a Federal, State or Municipal entity has terminated any contract with an Offeror for deficiencies or defaults, that Offeror is not eligible to submit a Response to this Solicitation.

The Offeror must also be fully licensed and in good standing to perform professional services in the Commonwealth of Pennsylvania and in the City of Pittsburgh.

B. Definitions

"Good Standing" means the Offeror has performed to the HACP's satisfaction on any of the HACP project and is not suspended, debarred or otherwise lawfully excluded from doing business with any Federal, State or Municipal entity.

C. The Build America, Buy America Act

By receipt of this contract award, it shall be the responsibility of the successful Offeror to agree, certify, and eventually show proof that the work and products provided and installed by the Offeror are in full compliance with the requirements of the Build America, Buy America (BABA) Act. More information can be obtained at the following link: https://www.hudexchange.info/programs/baba/

SECTION IV
CONTENT OF RESPONSE DOCUMENTS

Offerors submitting Proposals should fully read and comprehend the ***Instructions to Offerors Non-Construction*** provided in **Attachment B** and ***General Conditions – Non-Construction*** provided in **Attachment C.** Proposals received without all of the required information may be deemed non-responsive**.** Offerors **choosing to submit physical proposals** must submit one original plus three (3) paper copies of their technical proposal and one (1) electronic copy in a PDF format on a Flash Drive. In a separate sealed envelope submit one (1) original paper, one (1) paper copy and (1) electronic copy in a PDF format of the fee proposal. Proposals must include, in the same order as below and using the forms attached hereto, the following information, exhibits and schedules:

A. General Information:

1. Letter of Interest (Cover letter) including contact name and telephone number.
2. Type of Organization: Corporation, Partnership, Joint Venture or Sole Proprietorship. Names of shareholders, partners, principals and any other persons exercising control over the Firm.
3. Description of the Offeror's Capacity:
    a) Staff resources, office facilities, equipment, etc.
4. Organizational Certifications:
    a) Copies of Certificate of Incorporation, Partnership Agreement, Joint Venture or another organizational document.
    b) Applicable Licenses/Certifications.
    c) A corporate resolution signed by the Secretary of the Corporation and notarized, certifying the name of the individual(s) authorized to sign the offer, the contract and any amendments thereto.

B. Firm's Previous Related Experience:

Describe why Offeror feels its organization is qualified to provide the services requested in this RFP. Describe the types of activities and/or previous undertakings that qualify the Offeror for selection. Include a list of developments or projects in which the Offeror has performed services like those described in this RFP. Such listing shall include at least the following information:

1. Name of the contracting entity.
2. Name, title and a telephone number of a contact person for each identified contracting entity to permit reference checks to be performed. The identified party must be one who has firsthand knowledge regarding the operation of the contracted facility or project and who was involved in managing the contract between the Offeror and the contracting entity.
3. Original and final cost of each project and the amount of any change orders on each project or contract (*if multiple primes were involved on each project*).

C. Offeror's Capacity:

Provide information demonstrating the ability of the Offeror to provide the resources (*staffing, equipment, office facilities and other*) necessary for the timely and efficient implementation of HACP's goals and objectives as described in this solicitation.

1. Provide background information regarding each identified staff member that accurately describe his or her employment history and relevant experience providing services like those describe in this Request for Proposal.
2. Description of the Scope of services for at least three (3) projects on which the staff and/or sub-consultant have provided services like those described in this Request for Proposal.
3. Describe the intended management of the proposed staff to ensure that the services are provided in an efficient manner.

D. Methodology

Project Approach: Provide a brief narrative of the Offeror's approach to the services described in this Request for Proposals. Availability: Describe the availability of the Staff proposed and the turnaround time for each request to be made by the Authority.

E. Certifications and Representations of Offerors:

Each Offeror must complete the Certifications and Representations of Offerors (HUD 5369-C) provided in **Attachment D**.

F. Minority and Women Business Participation:

Provide a written plan that describes ways the Offeror will utilize MBE/WBE businesses to comply with the City of Pittsburgh's established thresholds of 18% Minority-owned Business Enterprise and 7% Woman-owned Business Enterprise participation. Also, complete the table provided in Attachment F and include with your proposal. Proposals must demonstrate how the Offeror intends to meet or exceed these goals.

HACP's MBE and WBE Goals: It is the policy of HACP to ensure that Minority Business Enterprises (MBEs) and Women-owned Businesses (WBEs) are provided maximum opportunity to participate in contracts let by HACP. In accordance with Executive Order 11625, HACP has established a minimum threshold of eighteen percent (18%) of the total dollar amount for MBE utilization in this contract. HACP has established a seven percent (7%) minimum threshold for participation of WBEs, and HACP strongly encourages and affirmatively promotes the use of MBEs and WBEs in all HACP contracts. For these purposes, an MBE is defined as "any legal entity other than a joint venture, organized to engage in commercial transactions, which is at least fifty-one percent (51%) owned and controlled by one or more minority persons." Also, a minority person is defined as a member of a socially or economically disadvantaged minority group, which includes African Americans, Hispanic Americans, Native Americans, and Asian Americans. A WBE/MBE is defined as "any legal entity other than a joint venture, organized to engage in commercial transactions, that is at least fifty-one percent (51%) owned and controlled by a female.

Proposals submitted in response to this solicitation MUST include an MBE/WBE participation plan which, at a minimum, demonstrates "Best Efforts" have been taken to achieve compliance with MBE/WBE goals. HACP's Procurement Policy defines "Best Efforts" in compliance with MBE/WBE goals to mean that the Offeror must certify and document with its bid or proposal that it has contacted in writing at least ten (10) certified MBE/WBE subcontractors to participate in the proposed contract with HACP or lesser number if the Offeror provides documentation that ten (10) certified MBE and ten (10) certified WBE subcontractors could not be identified. Each Offeror shall certify as to the same under penalty of perjury and shall submit the back-up documentation with its bid or proposal. **Any bid or proposal received that does**

not contain such certification and back-up documentation acceptable to HACP may be deemed non-responsive by HACP.
If you have any questions regarding the HACP MBE/WBE policy, **contact Ricardo Wiliams, Vendor Relations Manager**, by email to ricardo.williams@hacp.org or by contacting him at the Procurement Department, Housing Authority of the City of Pittsburgh, 412 Boulevard of Allies, 6th Floor, Pittsburgh, PA 15219, telephone (412) 643-2768.

G. MBE/WBE Letter of Intent:

Complete a Letter of Intent for each MBE/WBE firm contacted. A sample letter is provided in Attachment I.

H. Section 3 Participation:

All section 3 covered contracts shall include the following clause (referred to as the section 3 clause):
The work to be performed under this contract is subject to the requirements of section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

The parties to this contract agree to comply with HUD's regulations in 24 CFR part 75.15 and 75.25, which implement section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 75 regulations.

The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the section 3 preferences, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.

The contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR § 75.9 or §75.19, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR part 75. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR part 75.
The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 75 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR part 75.

Noncompliance with HUD's regulations in 24 CFR part 75 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

After the Section 3 new rule went into effect on November 30, 2020, Tribes and Tribally Designated Housing Entities under the Indian Housing Block Grant and Indian Community Development Block Grant programs are no longer required

comply with Section 3 requirements. The new rule at 24 CFR part 75 provides that contracts, subcontracts, grants, or subgrants subject to Section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 5307(b)) or subject to tribal preference requirements as authorized under 101(k) of the Native American Housing Assistance and Self-Determination Act (25 U.S.C. 4111(k)) must provide preferences in employment, training, and business opportunities to Indians and Indian organizations, and are therefore not subject to the requirements of 24 CFR Part 75.

HACP will aid vendors and Offerors in identifying qualified and eligible Section 3 residents and businesses and has established procedures for monitoring vendor compliance. The Section 3 Program Manual, as may be revised from time to time, contains information on this policy, and the requirements, procedures, forms, and assistance opportunities that have been established to implement this policy.

Below are HACP Section 3 Guidelines as listed in the Program Manual:

RESIDENT HIRING SCALE

TOTAL LABOR DOLLARS USE TOTAL CONTRACT AMOUNT FOR SERVICE CONTRACTS	RESIDENT LABOR AS A % OF TOTAL LABOR A. DOLLARS
Labor dollars $25,000 but less than $100,000	10% of the labor dollars
$100,000, but less than $200,000	9% of the labor dollars
At least $200,000, but less than $300,000	8% of the labor dollars
At least $300,000, but less than $400,000	7% of the labor dollars
t least $400,000, but less than $500,000	6% of the labor dollars
At least $500,000, but less than $1 million	5% of the labor dollars
At least $1 million, but less than $2 million	4% of the labor dollars
At least $2 million, but less than $4 million	3% of the labor dollars
At least $4 million, but less than $7 million	2% of the labor dollars
$7 million or more	½ to 1 % of the labor dollars

*****A copy of HACP's Section 3 Program Manual is available for download at www.HACP.org***

A copy of HUD's Section 3 requirement is provided in **Attachment F**. If you have any questions regarding the Section 3 Requirements or would like to discuss goals and planning for Section 3 requirements. Please contact **Lloyd Wilson Jr., Resident Employment Program Manager / Section 3 Coordinator**, by email at ***Lloyd.wilson@hacp.org*** or by contacting him at:

Housing Authority of the City of Pittsburgh
Bedford Envision Center 2305 Bedford Avenue
Pittsburgh, PA 15219
Telephone (412) 643- 2761

Please complete **Attachment H** and include it in your bid. Proposals must demonstrate how the Offeror intends to meet or exceed the Authority's Section 3 requirements.

Any bid or proposal received from a contractor that does not contain a Section 3 Opportunities Plan or certification and back-up documentation acceptable to HACP may be deemed non-responsive by HACP.

I. Firm Demographics:

- Provide a demographic description of all employees of your firm using the table provided in **Attachment G**.

- **TIN/W-9 Form:**
  - Complete a W-9 Request for Taxpayer Identification Number and Certification, as provided in **Attachment H**.

- **MBE/WBE Letter of Intent:**
  - Complete a Letter of Intent for each MBE/WBE firm contacted. A sample letter is provided in **Attachment I**.

- **Fee Sheet:**
  In a separate, sealed envelope, or in separate file provide the offeror's fee proposal, in the format of **A** including hourly rates only. Please use the job titles as provided on the attached. Do not substitute job titles. Please complete a separate form for any/ all sub consultants.

  Proposed hourly rates should include all overhead and appropriate expenses. Prior to completing the Fee Proposal Form, please review how the job titles/classifications will be weighted as detailed in Section VI (Procurement and Award process)

SECTION V

EVALUATION CRITERIA

The Evaluation Committee will evaluate and will score each proposal that is submitted as a complete response. It is noted that the proposed Fee will be evaluated separately. Responses may receive a maximum score of one hundred (100) points subdivided as follows:

Experience of Offeror: Maximum 40 points

- Demonstrated successful experience and capability of the proposed staff and sub-consultants proposed for this project in providing the specific services described in this Request for Proposals.

Capacity: Maximum 20 points

- Demonstrated ability of the Offeror to provide the resources (staffing, equipment, office facilities and other) necessary for the timely and efficient implementation of HACP's goals and objectives as described in this solicitation.

Proposed Fee: Maximum 15 points

- The proposed rates and level of service are reasonable and appropriate in relation to the services requested.

Methodology: Maximum 20 points

- The Offeror's proposed methodology is reasonable and logical and will ensure that HACP requirements will be met and indicates that the Offeror has a clear understanding of the scope of services required.

MBE/WBE Participation: Maximum 3 points

- Demonstrated experience and commitment of the Offeror to assist the HACP in meeting its requirement and goals related to Minority/Women Business Participants.

Section 3: Maximum 2 points

- Demonstrated commitment to assist the HACP in meeting its requirements and goals related to Section 3.

Deductions:

- Points may be deducted for failure to submit all required documents or for submitting irrelevant or redundant material.

SECTION VI
PROCUREMENT AND AWARD PROCESS

Pursuant to 24 C.F.R. Section 85.36 (d)(3)/ 2 C.F.R. 200.319, Heating Ventilation Air Conditioning Consulting Services are being procured as described in Section II of this solicitation. The following instructions are intended to aid Offerors in the preparation of their Proposals:

A. Pre-Submission Conference:

A pre-submission conference will be held **July 2, 2025, at 10:00 A.M**.

Join Zoom Meeting:

https://hacp-org.zoom.us/j/85241391020?pwd=oaXq4FNJsMBVxC74u4WMMP9ZVlp61a.1

Meeting ID: 852 4139 1020

Passcode: 130898

One Tap Mobile:
+16469313860,,85241391020#,,,,*130898# US
+19292056099,,85241391020#,,,,*130898# US (New York)

Nothing discussed or expressed at the Pre-Submission Conference will change, alter, amend or otherwise modify the terms of this Solicitation unless a subsequent written amendment (addendum) is issued. Verbal responses by HACP's representatives shall not constitute an amendment or change to this Solicitation.

Material issues raised and addressed at the Pre-Submission Conference shall be answered solely through an addendum to this Solicitation. Likewise, the ambiguities and defects of this Solicitation raised at the Pre-Submission Conference shall be corrected by a written amendment only, which, if issued, shall form an integral part hereof.

Although not mandatory, all prospective respondents are strongly encouraged to attend the Pre- Submission Conference. Failure to attend will not excuse the legal contractual duty imposed by this Solicitation and the subsequent contract on each respondent to familiarize itself with the request for proposals.

B. Amendments to Solicitation:

All amendments to this Solicitation shall be sent by certified mail, return receipt requested, electronic mail, and/or by fax, to all potential Offerors who attend the Pre- Submission Conferences and/or receive the solicitation materials. Notwithstanding any information that may be contained in the Solicitation and amendments thereto, Offerors are responsible for obtaining all information required thus enabling them to submit Responses.

C. Submission of Proposals and/or Amendments to Proposals; Deadlines:

Responses may be hand-delivered or sent by certified or registered mail, return receipt requested, to the following address:

Mr. Brandon Havranek
Associate Director of Procurement/ Contracting Officer
Housing Authority of the City of Pittsburgh
412 Boulevard of the Allies
6th Floor, Procurement Department
Pittsburgh, PA 15219

HACP will also accept online submissions for this Request for Proposals in addition to accepting submissions at our 412 Boulevard of the Allies office. For respondents wishing to submit online, please go to the following web address to upload documents:

https://www.dropbox.com/request/Ud8spVx15rYB7CBAUG0r

Please include your name and email address when requested before submitting and upload all relevant attachments in the same document. Formatting for online submission should be organized in the same manner as if submitting the information via flash drive. The title of the uploaded bid shall be as follows:

[Full Company Name]_RFP #600-11-25_Technical
[Full Company Name]_RFP #600-11-25_Fee Proposal

In the unlikely event your bid is too large to be uploaded as a single file, add: _Part-1, _Part-2… etc. to the end of the file name.

In addition to the electronic submittal above, The Housing Authority of the City of Pittsburgh will **only be accepting physical proposals dropped off in person from 8:00 AM until the closing time of 10:00 A.M. on July 17,2025, in** the lobby of the One Stop Shop at 412 Boulevard of the Allies, Pittsburgh, PA 15219. Proposals may still be mailed via USPS at which time they will be time and date stamped in the Procurement Department at 412 Boulevard of the Allies, 6th Floor Procurement Department, Pittsburgh, PA 15219. All proposals must be received at the above address no later than 10:00 A.M. on July 17, 2025, regardless of the selected delivery mechanism.
Each Response will be date-time stamped immediately upon its receipt at HACP to document its timeliness. Any Proposal received after the specified deadline shall be automatically rejected and will be returned unopened except as identified in the Instructions to Offerors attached hereto.

Any amendments to a response must be received before the specified response due date and time established for the delivery of the original Proposal except as identified in the Instructions to Offerors attached hereto.

D. Evaluation and Award Process:

HACP staff will review each Proposal to determine if it is complete and if it is responsive to this Request for Proposals. HACP may allow Offerors to correct minor deficiencies in their Proposals that do not materially affect their Proposal.

All Proposals determined to be complete and responsive will be provided to the HACP Evaluation Committee. HACP's Evaluation Committee will evaluate the Proposals utilizing the criteria established in Section V of this Request for Proposals. **Only firms whose proposals are determined to be responsive and responsible and in the best interest of HACP will be considered for the contract award**.

HACP reserves the right to interview selected Offerors, request additional information from selected Offerors and/or negotiate terms and conditions with selected Offerors.

HACP will perform a responsibility review of the highest-ranked Offeror(s), which shall include reference and financial background checks.

HACP will award a contract to the highest-ranked Offeror or Offerors determined to be responsive and responsible and whose offer is in the best interest of HACP.

HACP shall not be responsible for and will not reimburse any Offeror for any cost(s) associated with preparing a proposal.

HACP will evaluate respondents' fee proposals using the Total Hourly Billing Rates for each of the following Job Title/Classifications weighted as shown:

Principal - .05
Professional Engineer - .30
Certified Energy Professional- .15
Engineer in Training / Intern - .15
CADD Operator - .10
Field Engineer / Construction Administrator - .20
Clerical - .05

Respondents must complete the Fee Proposal Form providing rates for each of the specific Job Titles/ Classifications listed above, regardless of the Job Title/Classification used by the respondent firm. Respondents should also provide rates for other Job Titles/Classifications of their firm that may be utilized during the contract term.

A Proposal submitted by an Offeror does not constitute a contract, nor does it confer any rights on the Offeror to the award of a contract. A letter or other notice of Award or of the intent to Award shall not constitute a contract. A contract is not created until all required signatures are affixed to the contract.

Prior to contract execution of any professional service contracts which have a potential value of $50,000.00 and greater, the selected firm may be required to appear before and present a Minority and Woman Owned Business participation plan to the City of Pittsburgh Equal Employment Opportunity Review Commission for approval. Any HACP contracts which have a potential value of $50,000.00 and greater is subject to approval by the HACP Board of Commissioners and the selected firm may be required to appear before the HACP Board of Commissioners.

SECTION VII
ATTACHMENTS

ATTACHMENT A
CONTRACT

U.S. Department of Housing and Urban Development
Office of Public and Indian Housing

OMB Approval No. 2577-0157 (exp. 11/30/2023)

Model Form of Agreement Between Owner and Design Professional

Model Form of Agreement Between Owner and Design Professional

U. S. Department of Housing and Urban Development
Office of Public and Indian Housing

OMB Approval No. 2577-0157
(exp. 3/31/2020)

Table of Contents **Page**

Introduction to Agreement

Agreement
made as of the _____ day of _____ in the year (yyyy) of _____

Between the **Owner** (Name & Address)

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH
412 BOULEVARD OF THE ALLIES, 6TH FLOOR
PITTSBURGH, PA 15219

and the **Design Professional** (Name, Address and Discipline)

For the following **Project** (Include detailed description of Project, Location, Address, Scope and Program Designation)

INDEFINITE QUANTITY
HEATING VENTILATION AIR CONDITIONING CONSULTING SERVICES
AS NEEDED (TASK ORDER)
AUTHORITY-WIDE

The Owner and Design Professional agree as set forth below.
The following documents are in order of precedence:

1. This 11-page Form of Agreement dated _____.
2. The Addenda of this Agreement dated/number _____.
3. HUD Form (5370-C) General Contract Conditions Non-Construction and Supplemental General Conditions.
4. HACP Request for Proposal 600-11-25 including all attachments.
5. Selected Firm's response to the Request for Proposals dated _____.
6. All negotiated modifications to the Selected Firm's response to the Request for Proposals.

Article A: Services

A 1.0 Design Professional's Basic Services

A. 1.1 Areas of Professional's Basic Services. Unless revised in a written addendum or amendment to this Agreement, in plan-ning, designing and administering construction or rehabilitation of the Project, the Design Professional shall provide the Owner with professional services in the following areas:

- Architecture
- Site Planning
- Structural Engineering
- Mechanical Engineering
- Electrical Engineering
- Civil Engineering
- Landscape Architecture
- Cost Estimating
- Construction Contract Administration

A 1.2 Phases and Descriptions of Basic Services.

A. 1.2.1 Schematic Design/Preliminary Study Phase. After receipt of a Notice to Proceed from the Owner, the Design Professional shall prepare and deliver Schematic Design/Preliminary Study Documents. These documents shall consist of a presentation of the complete concept of the Project, including all major elements of the building(s), and site design(s), planned to promote economy both in construction and in administration and to comply with current program and cost limitations. The Design Professional shall revise these documents consistent with the requirements and criteria established by the Owner to secure the Owner's written approval. Additionally, the Design Professional shall make an independent assessment of the accuracy of the information provided by the Owner concerning existing conditions. Documents in this phase shall include:

- Site plan(s)
- Schedule of building types, unit distribution and bedroom count
- Scale plan of all buildings, and typical dwelling units
- Wall sections and elevations
- Outline specifications
- Preliminary construction cost estimates
- Project specific analysis of codes, ordinances and
- regulations Three dimensional line drawings

A. 1.2.2 Design Development Phase. After receipt of written approval of Schematic Design/Preliminary Study Documents, the Design Professional shall prepare and submit to the Owner Design Development Documents. The Design Professional shall revise these documents consistent with the requirements and criteria established by the Owner to secure the Owner's written approval. These documents shall include the following:

- Drawings sufficient to fix and illustrate project scope and character in all essential design elements
- Outline specifications
- Cost estimates and analysis
- Recommendations for phasing of construction
- Site plan(s)
- Landscape plan
- Floor plans
- Elevations, building and wall sections
- Updated three dimensional line drawings
- Engineering drawings

A. 1.2.3 Bidding, Construction and Contract Document Phase. After receipt of the Owner's written approval of Design Develop-ment Documents, the Design Professional shall prepare Construction Documents. After consultation with the Owner and Owner's attorney, if requested by the owner, the Design Professional shall also prepare and assemble all bidding and contract documents. The Design Professional shall revise these Bidding, Construction and Contract documents consistent with the requirements and criteria established by the Owner to secure the Owner's written approval. They shall, include in a detailed, manner all work to be performed; all material; workmanship; finishes and equipment required for the architectural, structural, mechanical, electrical, and site work; survey maps furnished by Owner; and direct reproduction of any logs and subsurface soil investigations. These documents shall include:

- Solicitation for Bids
- Form of Contract
- Special Conditions
- General Conditions
- Technical Specifications
- Plans and drawings
- Updated cost estimates

A. 1.2.4 Bidding and Award Phase. After written approval of Bidding, Construction and Contract Documents from the Owner, the Design Professional shall assist in administering the bidding and award of the Construction Contract. This shall include:

- Responding to inquires
- Drafting and issuing addendum approved by Owner
- Attending prebid conference(s)
- Attending public bid openings
- Reviewing and tabulating bids
- Recommending list of eligible bids
- Recommending award
- Altering drawings and specifications as often as required to award within the Estimated Construction Contract Cost

A. 1.2.5 Construction Phase. After execution of the Construction Contract, the Design Professional shall in a prompt and timely manner administer the Construction Contract and all work re-quired by the Bidding, Construction and Contract Documents. The Design Professional shall endeavor to protect the Owner against defects and deficiencies in the execution and performance of the work. The Design Professional shall:

- Administer the Construction Contract.
- Conduct pre-construction conference and attend dispute resolution conferences and other meetings when requested by the Owner.
- Review and approve contractor's shop drawings and other submittals for conformance to the requirements of the contract documents.
- At the Owner's written request, and as Additional Service, procure testing from qualified parties.
- Monitor the quality and progress of the work and furnish a written field report ☐ weekly, ☐ semi monthly, ☐ monthly, or ☒ Task Order Dependent This service shall be limited to a period amounting to 110% of the construction period as originally established under the construction contract unless construction has been delayed due to the Design professional's failure to properly perform its duties and responsibilities. The Owner may direct additional monitoring but only as Additional Services.
- Require any sub-consultant to provide the services listed in this section where and as applicable and to visit the Project during the time that construction is occurring on the portion of the work related to its discipline and report in writing to the Design Professional.
- Review, approve and submit to Owner the Contractor Requests for Payment.
- Conduct all job meetings and record action in a set of minutes which are to be provided to the Owner.
- Make modifications to Construction Contract Documents to correct errors, clarify intent or to accommodate change orders.
- Make recommendations to Owner for solutions to special problems or changes necessitated by conditions encountered in the course of construction.
- Promptly notify Owner in writing of any defects or deficiencies in the work or of any matter of dispute with the Contractor.
- Negotiate, prepare cost or price analysis for and countersign change orders.
- Prepare written punch list, certificates of completion and other necessary construction close out documents.
- Prepare a set of reproducible record prints of Drawings showing significant changes in the work made during construction, including the locations of underground utilities and appurtenances referenced to permanent surface improvements, based on marked-up prints, drawings and other data furnished by the contractor to the Design Professional.

A. 1.2.6 Post Completion/Warranty Phase. After execution of the Certificate of Completion by the Owner, the Design Professional shall:

- Consult with and make recommendations to Owner during warranties regarding construction, and equipment warranties.
- Perform an inspection of construction work, material, systems and equipment no earlier than nine months and no later than ten months after completion of the construction contract and make a written report to the Owner. At the Owner's request, and by Amendment to the Additional Services section of this contract, conduct additional warranty inspections as Additional Services.
- Advise and assist Owner in construction matters for a period up to eighteen months after completion of the project, but such assistance is not to exceed forty hours of service and one nonwarranty trip away from the place of business of the Design Professional.

A. 1.3 Time of Performance. The Design Professional's sched-ule for preparing, delivering and obtaining Owner's approval for Basic Services shall be as follows:

- Schematic Design/Preliminary Study Documents within __*__ calendar days for the date of the receipt of a Notice to Proceed.
- Design Development Documents within __*__ calendar days from the date of receipt of written approval by the Owner of Schematic Design/Preliminary Study documents.
- Bidding, Construction and Contract Documents within __*__ calendar days from the date of receipt of written approval by the Owner of Design Development Documents.

* To be determined in each Task Order

A. 2.0 Design Professional's Additional Services

A. 2.1 Description of Additional Services. Additional Services are all those services provided by the Design Professional on the Project for the Owner that are not defined as Basic Services in Article A, Section 1.2 or otherwise required to be performed by the Design Professional under this Agreement. They include major revisions in the scope of work of previously approved drawings, specifications and other documents due to causes beyond the control of the Design Professional and not due to any errors, omissions, or failures on the part of the Design Professional to carry out obligations otherwise set out in this Agreement.

A. 2.2 Written Addendum or Contract Amendment. All additional services not already expressly required by this agreement shall be agreed to through either a written addendum or amendment to this Agreement.

Article B: Compensation and Payment B.

1.0 Basic Services

B. 1.1 Fixed Fee for Basic Services. The Owner will pay the Design Professional for Basic Services performed as defined by A.1.2, a Fixed Fee (stipulated sum) of $ *, Per Fee Proposal plus Reimbursable Expenses identified in Article B.2.0. Such

payment shall be compensation for all Basic Services required, performed, or accepted under this Contract.

B. 1.2 Payment Schedule. Progress payments for Basic Services for each phase of work shall be made in proportion to services performed as follows:

Phase	Amount
Schematic Design/Preliminary Study Phase	$ *
Design Development Phase	$ *
Bidding, Construction & Contract Document Phase	$ *
Bidding & Award Phase	$ *
Construction Phase	$ *
Post Completion/ Warranty Phase	$ *
Total Basic Services	$ *

* To be determined in each Task Order

B. 2.0 Reimbursables

B. 2.1 Reimbursable Expenses. The Owner will pay the Design Professional for the Reimbursable Expenses listed below up to a Maximum Amount of $ None 0.00 Reimbursable Expenses are in addition to the Fixed Fee for Basic Services and are for certain actual expenses incurred by the Design Professional in connection with the Project as enumerated below.

B. 2.1.1 Travel Costs. The reasonable expense of travel costs incurred by the Design Professional when requested by Owner to travel to a location that lies outside of a 45 mile radius of either the Project site, Design Professional's office (s), and Owner's office.

B. 2.1.2 Long Distance Telephone Costs. Long distance tele-phone calls and long distance telefax costs.

B. 2.1.3 Delivery Costs. Courier services and overnight delivery costs.

B. 2.1.4 Reproduction Costs. Reproduction and postage costs of required drawings, specifications, Bidding and Contract docu-ments, excluding the cost of reproductions for the Design Profes-sional or Subcontractor's own use.

B. 2.1.5 Additional Reimbursables. The Design Professional and Owner may agree in an addendum or amendment to this Agree-ment to include certain other expenses not enumerated above as Reimbursable Expenses. These Reimbursables shall not be lim-ited by the Maximum Amount agreed to above. A separate Maximum Amount for these Reimbursables shall be established.

B .3.0 Additional Services

B. 3.1 Payment for Additional Services. The Owner will pay the Design Professional only for Additional Services agreed to in an addendum or amendment to this Agreement executed by the Owner and the Design Professional pursuant to A.2. Payment for all such Additional Services shall be in an amount and upon the terms set out in such amendment or addendum and agreed upon by the parties. Each such amendment or addendum shall provide for a fixed price or, where payment for such Additional Services is to be on an hourly basis or other unit pricing method, for a maximum amount; each such amendment or addendum shall also provide for a method of payment, including, at a minimum, whether payment will be made in partial payments or in lump sum and whether it will be based upon percentage of completion or services billed for.

B. 4.0 Invoicing and Payments

B. 4.1 Invoices. All payments shall require a written invoice from the Design Professional. Invoices shall be made no more frequently than on a monthly basis. Payments for Basic Services shall be in proportion to services completed within each phase of work. When requesting such payment, the invoice shall identify the phase and the portion completed. All invoices shall state the Agreement, name and address to which payment shall be made, the services completed and the dates of completion, and whether the invoice requests payment for Basic Services, Reimbursable or Additional Services. Invoices seeking payment for Reimbursable or Additional Services must provide detailed documentation.

B. 4.2 Time of Payment. Upon the Design Professional's proper submission of invoices for work performed or reimbursable expenses, the Owner shall review and, if the work is in conform-ance with the terms of the Agreement, make payment within thirty days of the Owner's receipt of the invoice.

Article C: Responsibilities

C. 1.0 Design Professional's Responsibilities

C. 1.1 Basic Services. The Design Professionals shall provide the Basic Service set out in Article A.1.0.

C. 1.2 Additional Services. When required under this Agreement or agreed to as set out in A.2.0, the Design Professional shall provide Additional Services on the Project.

C. 1.3 General Responsibilities. The Design Professional shall be responsible for the professional quality, technical accuracy, and coordination of all designs, drawings, specifications, and other services, furnished by the Design Professional under this Agreement. The Owner's review, approval, acceptance of, or payment for Design Professional services shall not be construed as a waiver of any rights under this Agreement or of any cause of action for damages caused by Design Professional's negligent performance under this Agreement. Furthermore, this Agree-ment does not restrict or limit any rights or remedies otherwise afforded the Owner or Design Professional by law.

C. 1.4 Designing Within Funding Limitations. The Design Profes-sional shall perform services required under this Contract in such a manner so as to cause an award of a Construction Contract(s) that does not exceed (1) $ * To be determined in each Task Order or (2) an amount to be provided by the Owner in writing to the Design Professional prior to the commencement of Design Professional services. This fixed limit shall be called the Maximum Construction Contract Cost. The amount may be increased by the Owner, but only with written notice to the De--sign Professional. If the increase results in a change to the scope of work, an amendment to this Agreement will be required. The Design Professional and the Owner may mutually agree to decrease the Maximum Construction Contract Cost, but only by signing a written amendment to this Agreement. Should bids for the Construction Con-tract(s) exceed the Maximum Construction Contract Cost, the Owner has the right to require the Design Professsional to perform redesigns,

rebids and other services necessary tocause an award of the Construction Contract within the Maximum Construction Contract Cost without additional compensation or reimbursement.

C. 1.5 Compliance with Laws, Codes, Ordinances and Regulations. The Design Professional shall perform services that conform to all applicable Federal, State and local laws, codes, ordinances and regulations except as modified by any waivers which may be obtained with the approval of the Owner. The Design Professional shall certify that Contract Documents will conform to all applicable laws, codes, ordinances and regulations. The Design Professional shall prepare all construction documents required for approval by all governmental agencies having jurisdiction over the project. The Design professional shall make all changes in the Bidding and Construction Documents necessary to obtain governmental approval without additional compensation or reimbursement, except in the following situations. If subsequent to the date the Owner issues a notice to proceed, revisions are made to applicable codes or non-federal regulations, the Design Professional shall be entitled to additional compensation and reimbursements for any additional cost resulting from such changes. The Design Professional, however, is obligated to notify the Owner of all significant code or regulatory changes within sixty (60) days of their change, and such notification shall be required in order for the Design Professional to be entitled to any additional compensation or reimbursement. Both the owner and design professional are responsible for ensuring that the design and construction comply with any applicable accessibility laws, including the Fair Housing Act (see 24 C.F.R. § 100.205), Sect. 504 of the Rehabilitation Act (Sect. 504), and the Americans with Disabilities Act (ADA). Compliance with Sect. 504 requires adherence to the Uniform Federal Accessibility Standards (See https://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-aba-standards/ufas) and compliance with the ADA requires adherence to the 2010 ADA standards (See https://www.ada.gov/regs2010/2010ADAStandards/2010ADAStandards_prt.pdf).

C. 1.6 Seal. Licensed Design Professionals shall affix their seals and signatures to drawings and specifications produced under this Agreement when required by law .

C. 1.7 Attendance at Conferences. The Design Professional or designated representative shall attend project conferences and meet-i ngs involving matters related to basic services covered under this contract. Attendance at community wide meetings shall be considered an additional service.

C. 2.0 Owner's Responsibilities

C. 2.1 Information. The Owner shall provide information regarding requirements for the project, including a program that shall set forth the Owner's objectives and schedule. The Owner shall also establish and update the Maximum Construction Cost. This shall include the Owner's giving notice of work to be performed by the Owner or others and not included in the Construction Contract for the Project. The Design Professional, however, shall be responsible to ascertain and know federal requirements and limitations placed on the Project.

C. 2.2 Notice of Defects. If the Owner observes or otherwise becomes aware of any fault or defect in the construction of the project or nonconformance with the Construction Contract, the Owner shall give prompt written notice of those faults, defects or nonconfor-mance to the Design Professional.

C.2.3 Contract Officer. The Owner shall designate a Contract Officer authorized to act on its behalf with respect to the design and construction of the Project. The Contract Officer shall examine documents submitted by the Design Professional and shall promptly render decisions pertaining to those documents so as to avoid unreasonably delaying the progress of the Design Professional's work.

C. 2.4 Duties to Furnish. The Owner shall provide the Design Professional the items listed below.

C. 2.4.1 Survey and Property Restrictions. The Owner shall furnish topographic, property line and utility information as and where required. The Owner may at its election require the Design Professional to furnish any of these items as an Additional Service.

C. 2.4.2 Existing Conditions. The Owner shall provide the Design Professional any available "built drawings of buildings or properties, architect surveys, test reports, and any other written information that it may have in its possession and that it might reasonably assume affects the work.

C. 2.4.3 Waivers. The Owner shall provide the Design Professional information it may have obtained on any waivers of local codes, ordinances, or regulations or standards affecting the design of the Project.

C. 2.4.4 Minimum Wage Rates. The Owner shall furnish the Design Professional the schedule of minimum wage rates approved by the U.S. Secretary of Labor for inclusion in the solicitation and Contract Documents.

C. 2.4.5 Tests. When expressly agreed to in writing by both the Owner and the Design Professional, the Owner shall furnish the Design Professional all necessary structural, mechanical, chemical or other laboratory tests, inspections and reports required for the Project.

C. 2.4.6 Contract Terms. The Owner or its legal counsel may provide the Design Professional text to be incorporated into Bidding and Construction Contract Documents.

Article D: Contract Administration

D. 1.0 Prohibition of Assignment. The Design Professional shall not assign, subcontract, or transfer any services, obligations, or interest in this Agreement without the prior written consent of the Owner. Such consent shall not unreasonably be withheld when such assignment is for financing the Design Professional's performance.

D. 1.1 Ownership of Documents. All drawings, specifications, studies and other materials prepared under this contract shall be the property of the Owner and at the termination or completion of the Design Professional's services shall be promptly delivered to the Owner. The Design Professional shall have no claim for further employment or additional compensation as a result of exercise by the Owner of its full rights of ownership. It is understood, however, that the Design Professional does not rep-resent such data to be suitable for re-use on any other project or for any other purpose. If the Owner re-uses the subject data without the Design Professional's written verification, such re-use will be at the sole risk of the Owner without liability to the Design Professional.

D. 1.2 Substitutions.

A. The Design Professional shall identify in writing principals and professional level employees and shall not substitute or replace principals or professional level employees without the prior approval of the Owner which shall not unreasonably be withheld.

B. The Design Professional's personnel identified below are considered to be essential to the work effort. Prior to diverting or substituting any of the specified individuals, the Design Professional shall notify the Owner reasonably in advance and shall submit justification, including proposed substitutions, in sufficient detail to permit evaluation of the impact on the contract. No diversion or substitution of such key personnel shall be made by the Design professional without the prior written consent of the Owner.

As stated in Proposal.

D. 1.3 Suspension. The Owner may give written notice to the Design Professional to suspend work on the project or any part thereof. The Owner shall not be obligated to consider a claim for additional compensation if the Design Professional is given written notice to resume work within 120 calendar days. If notice to resume work is not given within 120 calendar days, the Design Professional shall be entitled to an equitable adjustment in compensation.

D. 1.4 Subcontracts. The Design Professional will cause all applicable provisions of this Agreement to be inserted in all its subcontracts.

D. 1.5 Disputes. In the event of a dispute arising under this Agreement, the Design Professional shall notify the Owner promptly in writing and submit its claim in a timely manner. The Owner shall respond to the claim in writing in a timely manner. The Design Professional shall proceed with its work hereunder in compliance with the instructions of the Owner, but such compliance shall not be a waiver of the Design Professional's rights to make such a claim. Any dispute not resolved by this procedure may be determined by a court of competent jurisdiction or by consent of the Owner and Design Professional by other dispute resolution methods.

D. 1.6 Termination. The Owner may terminate this Agreement for the Owner's convenience or for failure of the Design Professional to fulfill contract obligations. The Owner shall terminate by delivering to the Design Professional a Notice of Termination specifying the reason therefore and the effective date of termination. Upon receipt of such notice, the Design Professional shall immediately discontinue all services affected and deliver to the Owner all information, reports, papers, and other materials accumulated or generated in performing this contract whether completed or in process. If the termination is for convenience of the Owner, the Owner shall be liable only for payment for accepted services rendered before the effective date of termination.

D. 1.7 Insurance. The Design professional shall carry Commercial or Comprehensive General Liability Insurance, Professional Liability Insurance (for a period extending two years past the date of completion of construction), and other insurance as are re-quired by law, all in minimum amounts as set forth below. The Design Professional shall furnish the Owner certificates of insurance and they shall state that a thirty day notice of prior cancellation or change will be provided to the Owner. Additionally, the Owner shall be an additional insured on all Commercial or Comprehensive General liability policies.

Insurance	Limits or Amount
Worker's Compensation:	Statutory Amount
Comprehensive General Liability:	
(a) Bodily Injury:	$100,000 each person, $300,000 each occurrence
(b) Property Damage:	$500,000 each occurrence
Professional Liability Insurance:	$1,000,000 each occurrence

D. 1.8 Retention of Rights. Neither the Owner's review, approval or acceptance of, nor payment for, the services required under this contract shall be construed to operate as a waiver of any rights under this contract or of any cause of action arising out of the performance of this contract, and the Design Professional shall be and remain liable to the Owner in accordance with the applicable law for all damages to the Owner caused by the Design professional 's negligent performance of any of the services furnished under this contract.

Article E: Additional Requirements

E. 1.0 Contract Provisions Required by Federal Law or Owner Contract with the U.S. Department of Housing and Urban Development (HUD).

E. 1.1 Contract Adjustments. Notwithstanding any other term or condition of this Agreement, any settlement or equitable adjust-ment due to termination, suspension or delays by the Owner shall be negotiated based on the cost principles stated at 48 CFR Subpart 31.2 and conform to the Contract pricing provisions of 2 CFR 200.

E. 1.2 Additional Services. The Owner shall perform a cost or price analysis as required by 2 CFR 200 prior to the issuance of a contract modification/amendment for Additional Services. Such Additional Services shall be within the general scope of services covered by this Agreement. The Design Profes-sional shall provide supporting cost information in sufficient detail to permit the Owner to perform the required cost or price analysis.

E. 1.3 Restrictive Drawings and Specifications. In accordance with 2 CFR 200 and contract agreements between the Owner and HUD, the Design Professional shall not require the use of materials, products, or services that unduly restrict competition.

E. 1.4 Design Certification. Where the Owner is required by federal regulations to provide HUD a Design Professional certification regarding the design of the Projects (24 CFR 905), the Design Professional shall provide such a certification to the Owner.

E. 1.5 Retention and Inspection of Records. Pursuant to 2 CFR 200, access shall be given by the Design Professional to the Owner, HUD, the Comptroller General of the United States, or any of their duly authorized representatives, to any books, documents, papers, and records of the Design Professional which are directly pertinent to that specific Contract for the purpose of making an audit, examination, excerpts, and transcrip-tions. All required records shall be retained for three years after the Owner or Design Professional and other subgrantees make final payments and all other pending matters are closed.

E. 1.6 Copyrights and Rights in Data. HUD has no regulations pertaining to copyrights or rights in data as provided in 2 CFR 200. HUD requirements, Article 45 of the General Conditions to the Contract for Construction (form HUD-5370) requires that contractors pay all royalties and license fees. All drawings and specifications prepared by the Design Professional pursuant to this contract will identify any applicable patents to enable the general contractor to fulfil the requirements of the construction contract.

E. 1.7 Conflicts of Interest. Based in part on federal regulations (2 CFR 200 and Contract agreement between the Owner and HUD, no employee, officer, or agent of the Owner (HUD grantee) shall participate in selection, or in the award or admin-istration of a contract supported by Federal funds if a conflict of interest, real or apparent, would be involved.

Such a conflict would arise when:

(i) The employee, officer or agent,

(ii) Any member of his or her immediate family,

(iii) His or her partner, or

(iv) An organization that employs, or is about to employ, any of the above, has a financial or other interest in the firm selected for award. The grantee's or subgrantee's officers, employees or agents will neither solicit nor accept gratuities, favors or anything of monetary value from Contractors, or parties to sub-agree-ments. Grantees and subgrantees may set minimum rules where the financial interest is not substantial or the gift is an unsolicited item of nominal intrinsic value. To the extent permitted by State or local law or regulations, such standards or conduct will provide for penalties, sanctions, or other disciplinary actions for viola-tions of such standards by the grantee's and subgrantee's officers, employees, or agents or by Contractors or their agents. The awarding agency may in regulation provide additional prohibi-tions relative to real, apparent, or potential conflicts of interest.

Neither the Owner nor any of its contractors or their subcontrac-tors shall enter into any Contract, subcontract, or agreement, in connection with any Project or any property included or planned to be included in any Project, in which any member, officer, or employee of the Owner, or any member of the governing body of the locality in which the Project is situated, or any member of the governing body of the locality in which the Owner was activated, or in any other public official of such locality or localities who exercises any responsibilities or functions with respect to the Project during his/her tenure or for one year thereafter has any interest, direct or indirect. If any such present or former member, officer, or employee of the Owner, or any such governing body member or such other public official of such locality or localities involuntarily acquires or had acquired prior to the beginning of his/her tenure any such interest, and if such interest is immedi-ately disclosed to the Owner and such disclosure is entered upon the minutes of the Owner, the Owner, with the prior approval of the Government, may waive the prohibition contained in this subsection: Provided, That any such present member, officer, or employee of the Owner shall not participate in any action by the Owner relating to such contract, subcontract, or arrangement.

No member, officer, or employee of the Owner, no member of the governing body of the locality in which the project is situated, no member of the governing body of the locality in which the Owner was activated, and no other public official of such locality or localities who exercises any functions or responsibilities with respect to the project, during his/her tenure or for one year thereafter, shall have any interest, direct or indirect, in this contract or the proceeds thereof.

E. 1.8 Disputes. In part because of HUD regulations (2 CFR 200, this Design Professional Agreement, unless it is a small purchase contract, has administrative, contractual, or legal remedies for instances where the Design Professional violates or breaches Agreement terms, and provide for such sanctions and penalties as may be appropriate.

E. 1.9 Termination. In part because of HUD regulations (2 CFR 200), this Design Professional Agreement, unless it is for an amount of $10,000 or less, has requirements regarding termi-nation by the Owner when for cause or convenience. These include the manner by which the termination will be effected and basis for settlement.

E. 1.10 Interest of Members of Congress. Because of Contract agreement between the Owner and HUD, no member of or delegate to the Congress of the United States of America or Resident Commissioner shall be admitted to any share or part of this Contract or to any benefit to arise from it.

E. 1.11 Limitation of Payments to Influence Certain Federal Transaction. The Limitation on Use of Appropriated Funds to Influence Certain Federal Contracting and Financial Transac-tions Act, Section 1352 of Title 31 U.S.C., provides in part that no appropriated funds may be expended by recipient of a federal contract, grant, loan, or cooperative agreement to pay any person, including the Design Professional, for influencing or attempting to influence an officer or employee of Congress in connection with any of the following covered Federal actions: the awarding of any federal contract, the making of any Federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amend-ment, or modification of any federal contract, grant, loan, or cooperative agreement.

E. 1.12 Employment, Training, and Contracting Opportunities for Low-Income Persons, Section 3 of the Housing and Urban Development Act of 1968.

A. The work to be performed under this contract is subject to the requirements of section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particu-larly persons who are recipients of HUD assistance for housing.

B. The parties to this contract agree to comply with HUD's regulations in 24 CFR part 135, which implement section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 135 regulations.

C. The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collec-tive bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employ-ment positions can see the notice. The notice shall describe the section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.

D. The contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR part 135. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR part 135.

E. The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 135 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR part 135.

F. Noncompliance with HUD's regulations in 24 CFR part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

G. Reserved.

H. Reserved.

E. 1.13 Reserved.

E. 1.14 Clean Air and Water. (Applicable to contracts in excess of $150,000). Because of 2 CFR 200) and Federal law, the Design Professional shall comply with applicable standards, orders, or requirements issued under section 306 of the Clean Air Act (42 U.S.C. § 1857h-4 transferred to 42 USC § 7607, section 508 of the Clean Water Act (33 U.S.C. § 1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR part 15), on all contracts, subcontracts, and subgrants of amounts in excess of $150,000.

E. 1.15 Energy Efficiency. Pursuant to Federal regulations (2 CFR 200) and Federal law, except when working on an Indian housing authority Project on an Indian reservation, the Design Professional shall comply with the mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Pub. L. 94-163 codified at 42 U.S.C.A. § 6321 et. seq.).

E. 1.16 Prevailing Wages. In accordance with Section 12 of the U.S. Housing Act of 1937 (42 U.S.C. 1437j) the Design Professional shall pay not less than the wages prevailing in the locality, as determined by or adopted (subsequent to a determination under applicable State or local law) by the Secretary of HUD, to all architects, technical engineers, draftsmen, and technicians.

E. 1.17 Non-applicability of Fair Housing Requirements in Indian Housing Authority Contracts. Pursuant to 24 § CFR Part 1, title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d-2000d-4), which prohibits discrimination on the basis of race, color or national origin in federally assisted programs, and the Fair Housing Act (42 U.S.C. 3601-3620), which prohibits discrimination based on race, color, religion, sex, national origin, disability, or familial status in the sale or rental of housing do not apply to Indian Housing Authorities established by exercise of a Tribe's powers of self-government. Pursuant to 24 CFR § 1000.12, other civil rights statutes do apply to I ndian Housing Authorities such as, Section 504, the Indian Civil Rights Act, and the Age Discrimination Act. (29 USC 794; 25 USC 1301.1303; and 42 USC 6101-6107 respectively).

E. 1.18Prohibition Against Liens. The Design professional is Prohibited from placing a lien on the Owner's property. This prohibition shall be placed in all design professional subcontracts.

Article F: Other Owner Requirements (if any)
(Continue on additional pages as necessary)

This Agreement is entered into as of the day and year first written above.

Owner	Design Professional
Housing Authority of the City of Pittsburgh	
(Housing Authority)	(Firm)
(Signature)	(Signature)
James D. Harris	
(Print Name)	(Print Name)
Chief Contracting Officer	
(Print Title)	(Print Title)

Addendum (If any)
(Additional Services and other modifications)

This is an Addendum to a Standard Form of Agreement between Owner and Design Professional signed and dated the _____ day of _____ in the year (yyyy) of _____ between the Owner _____ and Design Professional _____ on Project _____ The parties to that Agreement agree to modify the Agreement by the above delineated Additional Services and modifications.

This Addendum is dated this _____ day of _____ in the year (yyyy) of _____

Owner	Design Professional
_____	_____
(Housing Authority)	(Firm)
_____	_____
(Signature)	(Signature)
_____	_____
(Print Name)	(Print Name)
_____	_____
(Print Title)	(Print Title)

EXHIBITS TO
Model Form of Agreement (HUD 51915)

Compliance with Law. Offeror shall comply with all Federal, State and Local laws, regulations ordinances and codes relating to the operation and activities of Authority and all Services performed pursuant to this Agreement, including, but not limited to completing the following items which shall be attached as exhibits:

(a) Non-Debarment Certificate (Exhibit C)

(b) Certification re: Lobbying (Exhibit D)

(c) Disclosure of lobbying activity (Exhibit E)

(d) Conflict of Interest (Exhibit F)

EXHIBIT C

CERTIFICATION OF PROPOSER
REGARDING DEBARMENT SUSPENSION AND OTHER RESPONSIBILITY MATTERS

(Proposer)_____certifies to the best of its knowledge and belief, that it and its principals:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from covered transactions by any Federal department or agency.

2. Have not within a three year period preceding this bid been convicted of or had civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain or performing a public (Federal, State or Local) transaction or contract under a public transaction: violation of Federal or State antitrust statutes or commission of embezzlement, thief, forgery, bribery, falsification or destruction of records, making false statements or receiving stolen property;

3. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or Local) with commission of any of the offenses enumerated in paragraph (2) of this certification: and

4. Have not within a three-year period preceding this bid had one or more public transactions (Federal, State or Local) terminated for cause or default.

   If the Proposer is unable to certify any of the statements in this certification, the Proposer shall attach an explanation to this certification.

   (Proposer)_____ **CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF THE CONTENTS OF THE STATEMENTS SUBMITTED ON OR WITH THIS CERTIFICATION AND UNDERSTANDS THAT THE PROVISIONS OF 31 U.S.C. SECTIONS 3801 ET SEO. ARE APPLICABLE THERETO.**

_____
Signature and Title of Authorized Official

EXHIBIT D

CERTIFICATION REGARDING LOBBYING

I, _____, _____
Hereby Certify on *(Name and Title of Authorized Official)*

Behalf of _____ that
(Subcontractor)

1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency. A Member of Congress, and officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan or cooperative agreement.

2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL "Disclosure Form to Report Lobbying", in accordance with its instructions.

3) The undersigned shall require that the language of this certification be included in the award documents for all sub awards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all sub recipients shall certify and disclose accordingly.

   This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

_____, _____
Signature *Title of Authorized Official*

EXHIBIT E

Disclosure of Lobbying Activities

Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352

Public Reporting Burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, researching existing data sources, gathering and maintaining the date needed and completing and reviewing the collection of information. Please do not return your completed form to the Office of Management and Budget sent it to the address provided by the sponsoring agency.

1. Type of Federal Action:	2. Status of Federal Action:	3. Report Type:
____a. contract ____b. grant ____c. cooperative agreement ____d. loan ____e. loan guarantee ____f. loan insurance	____a. bid/offer/application ____b. initial award ____c. post-award	____a. initial filing ____b. material change For Material Change Only year_____quarter_____ date of last report_____

4. Name and Address of Reporting Entity: ____Prime____Subawardee Tier_____,if known: Congressional District, if known:	5. If reporting entity in No. 4 if Subawardee,enter name and address of Prime. Congressional District, if known:
6. Federal Department/Agency:	6. Federal Program Name/Description: CFDA Number, if applicable:
8. Federal Action Number, if known:	9. Award Amount, if known: $
10a. Name and Address of Lobbying Registrant (If individual, last name, first name, MI):	b. Individuals performing services (Include address if different from No. 10a) (last name, first name, MI):

I. Information requested through this form is authorized by Sec 319, Pub L. 101-121, 103 Stat. 750, as amended by Sec. 10: Pub. L. 104-65, Stat 700 (31 U.S.C. 1352). This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the above when this transaction was made entered into. This disclosure is required pursuant to 31 U.SA.C. 1352. This information will be reported to the Congress semiannually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.	Signature_____ Print Name_____ Title:_____ Telephone No.:_____ Date: _____

Federal Use Only

Authorized for Local Reproduction
Standard Form LLL (1/96)

EXHIBIT F

CONFLICTS OF INTEREST

_____("Contractor") certifies that:

1. No employee, officer, or agent of the Housing Authority of the City of Pittsburgh ("HACP") participated in the selection, or in the award or administration of the Contractor's Agreement with HACP, which would involve a conflict of interest, real or apparent. A conflict would arise when (i) a HACP employee, officer or agent, (ii) any member of his or her immediate family, (iii) his or her parents (iv) his or her business associates or (v) an organization that employs, or is about to employ, any of the foregoing, receives a payment from the Contractor or any affiliate thereof, or has a financial or other interest in the Contractor or the Contractor's Agreement with HACP.

2. Contractor shall not enter into any contract, subcontract or agreement with any officer, agent or employee of HACP during his or her tenure nor for one year thereafter shall any officer, agent or employee of HACP have any interest, direct or indirect, in the Contract Agreement, including the proceeds thereof.

CONTRACTOR

Date: _____ By: _____

Name: _____

Title: _____

ATTACHMENT B

INSTRUCTIONS TO OFFERORS NON-CONSTRUCTION

Instructions to Offerors Non-Construction

U.S. Department of Housing and Urban Development
Office of Public and Indian Housing

- 03291

1. Preparation of Offers

(a) Offerors are expected to examine the statement of work, the proposed contract terms and conditions, and all instructions. Failure to do so will be at the offeror's risk.

(b) Each offeror shall furnish the information required by the solicitation. The offeror shall sign the offer and print or type its name on the cover sheet and each continuation sheet on which it makes an entry. Erasures or other changes must be initialed by the person signing the offer. Offers signed by an agent shall be accompanied by evidence of that agent's authority, unless that evidence has been previously furnished to the HA.

(c) Offers for services other than those specified will not be considered.

2. Submission of Offers

(a) Offers and modifications thereof shall be submitted in sealed envelopes or packages (1) addressed to the office specified in the solicitation, and (2) showing the time specified for receipt, the solicitation number, and the name and address of the offeror.

(b) Telegraphic offers will not be considered unless authorized by the solicitation; however, offers may be modified by written or telegraphic notice.

(c) Facsimile offers, modifications or withdrawals will not be considered unless authorized by the solicitation.

3. Amendments to Solicitations

(a) If this solicitation is amended, then all terms and conditions which are not modified remain unchanged.

(b) Offerors shall acknowledge receipt of any amendments to this solicitation by

(1) signing and returning the amendment;
(2) identifying the amendment number and date in the space provided for this purpose on the form for submitting an offer,
(3) letter or telegram, or
(4) facsimile, if facsimile offers are authorized in the solicitation. The HA/HUD must receive the acknowledgment by the time specified for receipt of offers.

4. Explanation to Prospective Offerors

Any prospective offeror desiring an explanation or interpretation of the solicitation, statement of work, etc., must request it in writing soon enough to allow a reply to reach all prospective offerors before the submission of their offers. Oral explanations or instructions given before the award of the contract will not be binding. Any information given to a prospective offeror concerning a solicitation will be furnished promptly to all other prospective offerors as an amendment of the solicitation, if that information is necessary in submitting offers or if the lack of it would be prejudicial to any other prospective offerors.

5. Responsibility of Prospective Contractor

(a) The HA shall award a contract only to a responsible prospective contractor who is able to perform successfully under the terms and conditions of the proposed contract. To be determined responsible, a prospective contractor must -

(1) Have adequate financial resources to perform the contract, or the ability to obtain them;
(2) Have a satisfactory performance record;
(3) Have a satisfactory record of integrity and business ethics;
(4) Have a satisfactory record of compliance with public policy (e.g., Equal Employment Opportunity); and
(5) Not have been suspended, debarred, or otherwise determined to be ineligible for award of contracts by the Department of Housing and Urban Development or any other agency of the U.S. Government. Current lists of ineligible contractors are available for inspection at the HA/HUD.

(b) Before an offer is considered for award, the offeror may be requested by the HA to submit a statement or other documentation regarding any of the foregoing requirements. Failure by the offeror to provide such additional information may render the offeror ineligible for award.

6. Late Submissions, Modifications, and Withdrawal of Offers

(a) Any offer received at the place designated in the solicitation after the exact time specified for receipt will not be considered unless it is received before award is made and it -

(1) Was sent by registered or certified mail not later than the fifth calendar day before the date specified for receipt of offers (e.g., an offer submitted in response to a solicitation requiring receipt of offers by the 20th of the month must have been mailed by the 15th);
(2) Was sent by mail, or if authorized by the solicitation, was sent by telegram or via facsimile, and it is determined by the HA/HUD that the late receipt was due solely to mishandling by the HA/HUD after receipt at the HA;
(3) Was sent by U.S. Postal Service Express Mail Next Day Service - Post Office to Addressee, not later than 5:00 p.m. at the place of mailing two working days prior to the date specified for receipt of proposals. The term "working days" excludes weekends and U.S. Federal holidays; or
(4) Is the only offer received.

(b) Any modification of an offer, except a modification resulting from the HA's request for "best and final" offer (if this solicitation is a request for proposals), is subject to the same conditions as in subparagraphs (a)(1), (2), and (3) of this provision.

(c) A modification resulting from the HA's request for "best and final" offer received after the time and date specified in the request will not be considered unless received before award and the late receipt is due solely to mishandling by the HA after receipt at the HA.

(d) The only acceptable evidence to establish the date of mailing of a late offer, modification, or withdrawal sent either by registered or certified mail is the U.S. or Canadian Postal Service postmark both on the envelope or wrapper and on the original receipt from the U.S. or Canadian Postal Service. Both postmarks must show a legible date or the offer, modification, or withdrawal shall be processed as if mailed late. "Postmark" means a printed, stamped, or otherwise placed impression (exclusive of a postage meter machine impression) that is readily identifiable without further action as having been supplied and affixed by employees of the U.S. or Canadian Postal Service on the date of mailing. Therefore, offerors should request the postal clerk to place a hand cancellation bull's-eye postmark on both the receipt and the envelope or wrapper.

(e) The only acceptable evidence to establish the time of receipt at the HA is the time/date stamp of HA on the offer wrapper or other documentary evidence of receipt maintained by the HA.

(f) The only acceptable evidence to establish the date of mailing of a late offer, modification, or withdrawal sent by Express Mail Next Day Service-Post Office to Addressee is the date entered by the post office receiving clerk on the "Express Mail Next Day Service-Post Office to Addressee" label and the postmark on both the envelope or wrapper and on the original receipt from the U.S. Postal Service. "Postmark" has the same meaning as defined in paragraph (c) of this provision, excluding postmarks of the Canadian Postal Service. Therefore, offerors should request the postal clerk to place a legible hand cancellation bull's eye postmark on both the receipt and the envelope or wrapper.

(g) Notwithstanding paragraph (a) of this provision, a late modification of an otherwise successful offer that makes its terms more favorable to the HA will be considered at any time it is received and may be accepted.

(h) If this solicitation is a request for proposals, proposals may be withdrawn by written notice, or if authorized by this solicitation, by telegram (including mailgram) or facsimile machine transmission received at any time before award. Proposals may be withdrawn in person by a offeror or its authorized representative if the identity of the person requesting withdrawal is established and the person signs a receipt for the offer before award. If this solicitation is an invitation for bids, bids may be withdrawn at any time prior to bid opening.

7. Contract Award

(a) The HA will award a contract resulting from this solicitation to the responsible offeror whose offer conforming to the solicitation will be most advantageous to the HA, cost or price and other factors, specified elsewhere in this solicitation, considered.

(b) The HA may
(1) reject any or all offers if such action is in the HA's interest,
(2) accept other than the lowest offer,
(3) waive informalities and minor irregularities in offers received, and (4) award more than one contract for all or part of the requirements stated.

(c) If this solicitation is a request for proposals, the HA may award a contract on the basis of initial offers received, without discussions. Therefore, each initial offer should contain the offeror's best terms from a cost or price and technical standpoint.

(d) A written award or acceptance of offer mailed or otherwise furnished to the successful offeror within the time for acceptance specified in the offer shall result in a binding contract without further action by either party. If this solicitation is a request for proposals, before the offer's specified expiration time, the HA may accept an offer, whether or not there are negotiations after its receipt, unless a written notice of withdrawal is received before award. Negotiations conducted after receipt of an offer do not constitute a rejection or counteroffer by the HA.

(e) Neither financial data submitted with an offer, nor representations concerning facilities or financing, will form a part of the resulting contract.

8. Service of Protest

Any protest against the award of a contract pursuant to this solicitation shall be served on the HA by obtaining written and dated acknowledgment of receipt from the HA at the address shown on the cover of this solicitation. The determination of the HA with regard to such protest or to proceed to award notwithstanding such protest shall be final unless appealed by the protestor.

9. Offer Submission

Offers shall be submitted as follows and shall be enclosed in a sealed envelope and addressed to the office specified in the solicitation. The proposal shall show **the hour and date specified in the solicitation for receipt, the solicitation number, and the name and address of the offeror, on the face of the envelope.**

It is very important that the offer be properly identified on the face of the envelope as set forth above in order to insure that the date and time of receipt is stamped on the face of the offer envelope. Receiving procedures are: date and time stamp those envelopes identified as proposals and deliver them immediately to the appropriate contracting official, and only date stamp those envelopes which do not contain identification of the contents and deliver them to the appropriate procuring activity only through the routine mail delivery procedure.

[Describe bid or proposal preparation instructions here:]

ATTACHMENT C

GENERAL CONDITIONS FOR NONCONSTRUCTION CONTRACTS

General Conditions for Non-Construction Contracts

Section I — (With or without Maintenance Work)

U.S. Department of Housing and Urban Development
Office of Public and Indian Housing
Office of Labor Relations
OMB Approval No. 2577-0157 (exp. 1/31/2027)

Applicability. This form HUD-5370-C has 2 Sections. These Sections must be inserted into non-construction contracts as described below:

1) **Non-construction contracts** *(without* maintenance) **greater than $250,000 - use Section I;**
2) **Maintenance contracts** (including nonroutine maintenance as defined at 24 CFR 905.100) **greater than $2,000 but not more than $250,000 - use Section II;** and
3) **Maintenance contracts** (including nonroutine maintenance), **greater than $250,000 — use Sections I and II.**

Section I - Clauses for All Non-Construction Contracts greater than $250,000

1. Definitions

The following definitions are applicable to this contract:

(a) "Authority or Housing Authority (HA)" means the Housing Authority.
(b) "Contract" means the contract entered into between the Authority and the Contractor. It includes the contract form, the Certifications and Representations, these contract clauses, and the scope of work. It includes all formal changes to any of those documents by addendum, Change Order, or other modification.
(c) "Contractor" means the person or other entity entering into the contract with the Authority to perform all of the work required under the contract.
(d) "Day" means calendar days, unless otherwise stated.
(e) "HUD" means the Secretary of Housing and Urban development, his delegates, successors, and assigns, and the officers and employees of the United States Department of Housing and Urban Development acting for and on behalf of the Secretary.

2. Changes

(a) The HA may at any time, by written order, and without notice to the sureties, if any, make changes within the general scope of this contract in the services to be performed or supplies to be delivered.
(b) If any such change causes an increase or decrease in the hourly rate, the not-to-exceed amount of the contract, or the time required for performance of any part of the work under this contract, whether or not changed by the order, or otherwise affects the conditions of this contract, the HA shall make an equitable adjustment in the not-to-exceed amount, the hourly rate, the delivery schedule, or other affected terms, and shall modify the contract accordingly.
(c) The Contractor must assert its right to an equitable adjustment under this clause within 30 days from the date of receipt of the written order. However, if the HA decides that the facts justify it, the HA may receive and act upon a proposal submitted before final payment of the contract.
(d) Failure to agree to any adjustment shall be a dispute under clause Disputes, herein. However, nothing in this clause shall excuse the Contractor from proceeding with the contract as changed.
(e) No services for which an additional cost or fee will be charged by the Contractor shall be furnished without the prior written consent of the HA.

3. Termination for Convenience and Default

(a) The HA may terminate this contract in whole, or from time to time in part, for the HA's convenience or the failure of the Contractor to fulfill the contract obligations (default). The HA shall terminate by delivering to the Contractor a written Notice of Termination specifying the nature, extent, and effective date of the termination. Upon receipt of the notice, the Contractor shall: (i) immediately discontinue all services affected (unless the notice directs otherwise); and (ii) deliver to the HA all information, reports, papers, and other materials accumulated or generated in performing this contract, whether completed or in process.
(b) If the termination is for the convenience of the HA, the HA shall be liable only for payment for services rendered before the effective date of the termination.
(c) If the termination is due to the failure of the Contractor to fulfill its obligations under the contract (default), the HA may (i) require the Contractor to deliver to it, in the manner and to the extent directed by the HA, any work as described in subparagraph (a)(ii) above, and compensation be determined in accordance with the Changes clause, paragraph 2, above; (ii) take over the work and prosecute the same to completion by contract or otherwise, and the Contractor shall be liable for any additional cost incurred by the HA; (iii) withhold any payments to the Contractor, for the purpose of off-set or partial payment, as the case may be, of amounts owed to the HA by the Contractor.
(d) If, after termination for failure to fulfill contract obligations (default), it is determined that the Contractor had not failed, the termination shall be deemed to have been effected for the convenience of the HA, and the Contractor shall been titled to payment as described in paragraph (b) above.
(e) Any disputes with regard to this clause are expressly made subject to the terms of clause titled Disputes herein.

4. Examination and Retention of Contractor's Records

(a) The HA, HUD, or Comptroller General of the United States, or any of their duly authorized representatives shall, until 3 years after final payment under this contract, have access to and the right to examine any of the Contractor's directly pertinent books, documents, papers, or other records involving transactions related to this contract for the purpose of making audit, examination, excerpts, and transcriptions.

(b) The Contractor agrees to include in first-tier subcontracts under this contract a clause substantially the same as paragraph (a) above. "Subcontract," as used in this clause, excludes purchase orders not exceeding $10,000.
(c) The periods of access and examination in paragraphs (a) and (b) above for records relating to:
(i) appeals under the clause titled Disputes;
(ii) litigation or settlement of claims arising from the performance of this contract; or,
(iii) costs and expenses of this contract to which the HA, HUD, or Comptroller General or any of their duly authorized representatives has taken exception shall continue until disposition of such appeals, litigation, claims, or exceptions.

5. Rights in Data (Ownership and Proprietary Interest)

The HA shall have exclusive ownership of, all proprietary interest in, and the right to full and exclusive possession of all information, materials and documents discovered or produced by Contractor pursuant to the terms of this Contract, including but not limited to reports, memoranda or letters concerning the research and reporting tasks of this Contract.

6. Energy Efficiency

The contractor shall comply with all mandatory standards and policies relating to energy efficiency which are contained in the energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Pub.L. 94-163) for the State in which the work under this contract is performed.

7. Disputes

(a) All disputes arising under or relating to this contract, *except for disputes arising under clauses contained in Section 111, Labor Standards Provisions,* including any claims for damages for the alleged breach there of which are not disposed of by agreement, shall be resolved under this clause.
(b) All claims by the Contractor shall be made in writing and submitted to the HA. A claim by the HA against the Contractor shall be subject to a written decision by the HA.
(c) The HA shall, with reasonable promptness, but in no event in no more than 60 days, render a decision concerning any claim hereunder. Unless the Contractor, within 30 days after receipt of the HA's decision, shall notify the HA in writing that it takes exception to such decision, the decision shall be final and conclusive.
(d) Provided the Contractor has (i) given the notice within the time stated in paragraph (c) above, and (ii) excepted its claim relating to such decision from the final release, and (iii) brought suit against the HA not later than one year after receipt of final payment, or if final payment has not been made, not later than one year after the Contractor has had a reasonable time to respond to a written request by the HA that it submit a final voucher and release, whichever is earlier, then the HA's decision shall not be final or conclusive, but the dispute shall be determined on the merits by a court of competent jurisdiction.
(e) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under the contract, and comply with any decision of the HA.

8. Contract Termination; Debarment

A breach of these Contract clauses may be grounds for termination of the Contract and for debarment or denial of participation in HUD programs as a Contractor and a subcontractor as provided in 24 CFR Part 24.

9. Assignment of Contract

The Contractor shall not assign or transfer any interest in this contract; except that claims for monies due or to become due from the HA under the contract may be assigned to a bank, trust company, or other financial institution. If the Contractor is a partnership, this contract shall inure to the benefit of the surviving or remaining member(s) of such partnership approved by the HA.

10. Certificate and Release

Prior to final payment under this contract, or prior to settlement upon termination of this contract, and as a condition precedent thereto, the Contractor shall execute and deliver to the HA a certificate and release, in a form acceptable to the HA, of all claims against the HA by the Contractor under and by virtue of this contract, other than such claims, if any, as may be specifically excepted by the Contractor in stated amounts set forth therein.

11. Organizational Conflicts of Interest

(a) The Contractor warrants that to the best of its knowledge and belief and except as otherwise disclosed, it does not have any organizational conflict of interest which is defined as a situation in which the nature of work under this contract and a contractor's organizational, financial, contractual or other interests are such that:
(i) Award of the contract may result in an unfair competitive advantage; or
( ) The Contractor's objectivity in performing the contract work may be impaired.
(b) The Contractor agrees that if after award it discovers an organizational conflict of interest with respect to this contract or any task/delivery order under the contract, he or she shall make an immediate and full disclosure in writing to the Contracting Officer which shall include a description of the action which the Contractor has taken or intends to take to eliminate or neutralize the conflict. The HA may, however, terminate the contract or task/delivery order for the convenience of the HA if it would be in the best interest of the HA.
(c) In the event the Contractor was aware of an organizational conflict of interest before the award of this contract and intentionally did not disclose the conflict to the Contracting Officer, the HA may terminate the contract for default.
(d) The terms of this clause shall be included in all subcontracts and consulting agreements wherein the work to be performed is similar to the service provided by the prime Contractor. The Contractor shall include in such subcontracts and consulting agreements any necessary provisions to eliminate or neutralize conflicts of interest.

12. Inspection and Acceptance

(a) The HA has the right to review, require correction, if necessary, and accept the work products produced by the Contractor. Such review(s) shall be carried out within 30 days so as to not impede the work of the Contractor. Any

product of work shall be deemed accepted as submitted if the HA does not issue written comments and/or required corrections within 30 days from the date of receipt of such product from the Contractor.

(b) The Contractor shall make any required corrections promptly at no additional charge and return a revised copy of the product to the HA within 7 days of notification or a later date if extended by the HA.

(c) Failure by the Contractor to proceed with reasonable promptness to make necessary corrections shall be a default. If the Contractor's submission of corrected work remains unacceptable, the HA may terminate this contract (or the task order involved) or reduce the contract price or cost to reflect the reduced value of services received.

13. Interest of Members of Congress

No member of or delegate to the Congress of the United States of America or Resident Commissioner shall be admitted to any share or part of this contract or to any benefit to arise there from, but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

14. Interest of Members, Officers, or Employees and Former Members, Officers, or Employees

No member, officer, or employee of the HA, no member of the governing body of the locality in which the project is situated, no member of the governing body in which the HA was activated, and no other pubic official of such locality or localities who exercises any functions or responsibilities with respect to the project, shall, during his or her tenure, or for one year thereafter, have any interest, direct or indirect, in this contract or the proceeds thereof.

15. Limitation on Payments to Influence Certain Federal Transactions

(a) Definitions. As used in this clause:

"Agency", as defined in 5 U.S.C. 552(f), includes Federal executive departments and agencies as well as independent regulatory commissions and Government corporations, as defined in 31 U.S.C. 9101(1).

"Covered Federal Action" means any of the following Federal actions:

(i) The awarding of any Federal contract;
(ii) The making of any Federal grant;
(iii) The making of any Federal loan;
(iv) The entering into of any cooperative agreement; and,
(v) The extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

Covered Federal action does not include receiving from an agency a commitment providing for the United States to insure or guarantee a loan.

"Indian tribe" and "tribal organization" have the meaning provided in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B). Alaskan Natives are included under the definitions of Indian tribes in that Act.

"Influencing or attempting to influence" means making, with the intent to influence, any communication to or appearance before an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any covered Federal action.

"Local government" means a unit of government in a State and, if chartered, established, or otherwise recognized by a State for the performance of a governmental duty, including a local public authority, a special district, an intrastate district, a council of governments, a sponsor group representative organization, and any other instrumentality of a local government

"Officer or employee of an agency' includes the following individuals who are employed by an agency:

(i) An individual who is appointed to a position in the Government under title 5, U.S.C., including a position under a temporary appointment;
(ii) A member of the uniformed services as defined in section 202, title 18, U.S.C.;
(iii) A special Government employee as defined in section 202, title 18, U.S.C.; and,
(iv) An individual who is a member of a Federal advisory committee, as defined by the Federal Advisory Committee Act, title 5, appendix 2.

"Person" means an individual, corporation, company, association, authority, firm, partnership, society, State, and local government, regardless of whether such entity is operated for profit or not for profit. This term excludes an Indian tribe, tribal organization, or other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Recipient" includes all contractors, subcontractors at any tier, and subgrantees at any tier of the recipient of funds received in connection with a Federal contract, grant, loan, or cooperative agreement. The term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Regularly employed means, with respect to an officer or employee of a person requesting or receiving a Federal contract, grant, loan, or cooperative agreement, an officer or employee who is employed by such person for at least 130 working days within one year immediately preceding the date of the submission that initiates agency consideration of such person for receipt of such contract, grant, loan, or cooperative agreement. An officer or employee who is employed by such person for less than 130 working days within one year immediately preceding the date of submission that initiates agency consideration of such person shall be considered to be regularly employed as soon as he or she is employed by such person for 130 working days.

"State" means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, a territory or possession of the United States, an agency or instrumentality of a State, and a multi-State, regional, or interstate entity having governmental duties and powers.

(b) Prohibition.

(i) Section 1352 of title 31, U.S.C. provides in part that no appropriated funds may be expended by the recipient of a Federal contract, grant, loan, or cooperative agreement to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(v) The prohibition does not apply as follows:

(1) Agency and legislative liaison by Own Employees.

(a) The prohibition on the use of appropriated funds, in paragraph (i) of this section, does not apply in the case of a payment of reasonable compensation made to an officer or employee of a person requesting or receiving a Federal contract, grant, loan, or cooperative agreement, if the payment is for agency and legislative activities not directly related to a covered Federal action.

(b) For purposes of paragraph (b)(i)(1)(a) of this clause, providing any information specifically requested by an agency or Congress is permitted at any time.

(c) The following agency and legislative liaison activities are permitted at any time only where they are not related to a specific solicitation for any covered Federal action:

(1) Discussing with an agency (including individual demonstrations) the qualities and characteristics of the person's products or services, conditions or terms of sale, and service capabilities; and,

(2) Technical discussions and other activities regarding the application or adaptation of the person's products or services for an agency's use.

(d) The following agency and legislative liaison activities are permitted where they are prior to formal solicitation of any covered Federal action:

(1) Providing any information not specifically requested but necessary for an agency to make an informed decision about initiation of a covered Federal action;

(2) Technical discussions regarding the preparation of an unsolicited proposal prior to its official submission; and

(3) Capability presentations by persons seeking awards from an agency pursuant to the provisions of the Small Business Act, as amended by Public Law 95-507 and other subsequent amendments.

(e) Only those activities expressly authorized by subdivision (b)(ii)(1)(a) of this clause are permitted under this clause.

(2) Professional and technical services.

(a) The prohibition on the use of appropriated funds, in subparagraph (b)(i) of this clause, does not apply in the case of-

(i) A payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action, if payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action.

(i) Any reasonable payment to a person, other than an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action if the payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action. Persons other than officers or employees of a person requesting or receiving a covered Federal action include consultants and trade associations.

(b) For purposes of subdivision (b)(ii)(2)(a) of clause, "professional and technical services" shall be limited to advice and analysis directly applying any professional or technical discipline.

(c) Requirements imposed by or pursuant to law as a condition for receiving a covered Federal award include those required by law or regulation, or reasonably expected to be required by law or regulation, and any other requirements in the actual award documents.

(d) Only those services expressly authorized by subdivisions (b)(ii)(2)(a)(i) and (ii) of this section are permitted under this clause.

(iii) Selling activities by independent sales representatives.

(c) The prohibition on the use of appropriated funds, in subparagraph (b)(i) of this clause, does not apply to the following selling activities before an agency by independent sales representatives, provided such activities are prior to formal solicitation by an agency and are specifically limited to the merits of the matter:

(i) Discussing with an agency (including individual demonstration) the qualities and characteristics of the person's products or services, conditions or terms of sale, and service capabilities; and

(ii) Technical discussions and other activities regarding the application or adaptation of the person's products or services for an agency's use.

(d) Agreement. In accepting any contract, grant, cooperative agreement, or loan resulting from this solicitation, the person submitting the offer agrees not to make any payment prohibited by this clause.

(e) Penalties. Any person who makes an expenditure prohibited under paragraph (b) of this clause shall be subject to civil penalties as provided for by 31 U.S.C. 1352. An imposition of a civil penalty does not prevent the Government from seeking any other remedy that may be applicable.

(f) Cost Allowability. Nothing in this clause is to be interpreted to make allowable or reasonable any costs which would be unallowable or unreasonable in accordance with Part 31 of the Federal Acquisition Regulation (FAR), or OMB Circulars dealing with cost allowability for recipients of assistance agreements. Conversely, costs made specifically unallowable by the requirements in this clause will not be made allowable under any of the provisions of FAR Part 31 or the relevant OMB Circulars.

16. Equal Employment Opportunity

During the performance of this contract, the Contractor/Seller agrees as follows:

(a)The [contractor/seller] will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, disability, or national origin. The [contractor/seller] will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, sexual orientation, gender identity, disability, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The [contractor/seller] agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

(b)The [contractor/seller] will, in all solicitations or advertisements for employees placed by or on behalf of the [contractor/seller], state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, disability, or national origin.

(c)The [contractor/seller] will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the [contractor/seller]'s legal duty to furnish information.

(d)The [contractor/seller] will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice to be provided by the agency contracting officer, advising the labor union or workers' representative of the [contractor/seller] 's commitments under section 202 of Executive Order 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(e)The [contractor/seller] will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

f)The [contractor/seller] will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(g)In the event of the [contractor/seller]'s non-compliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be canceled, terminated or suspended in whole or in part and the [contractor/seller] may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(g)In the event of the [contractor/seller]'s non-compliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be canceled, terminated or suspended in whole or in part and the [contractor/seller] may be declared ineligible for further Government contracts in acc ordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(h) The [contractor/seller] will include the provisions of paragraphs (a) through (h) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each sub[contractor/seller] or vendor. The [contractor/seller] will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event the [contractor/seller] becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the [contractor/seller] may request the United States to enter into such litigation to protect the interests of the United States.

17. Equal Opportunity for Workers with Disabilities

1.The [contractor/seller] will not discriminate against any employee or applicant for employment because of physical or mental disability in regard to any position for which the employee or applicant for employment is qualified. The [contractor/seller] agrees to take affirmative action to employ and advance in employment individuals with disabilities, and to treat qualified individuals without discrimination on the basis of their physical or mental disability in all employment practices, including the following:

i.Recruitment, advertising, and job application procedures;

ii.Hiring, upgrading, promotion, award of tenure, demotion, transfer, layoff, termination, right of return from layoff and rehiring;

iii.Rates of pay or any other form of compensation and changes in compensation;

iv.Job assignments, job classifications, organizational structures, position descriptions, lines of progression, and seniority lists;

v.Leaves of absence, sick leave, or any other leave;

vi.Fringe benefits available by virtue of employment, whether or not administered by the [contractor/seller];

vii.Selection and financial support for training, including apprenticeship, professional meetings, conferences, and other related activities, and selection for leaves of absence to pursue training;

viii.Activities sponsored by the [contractor/seller] including social or recreational programs; and

ix.Any other term, condition, or privilege of employment.

2.The [contractor/seller] agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the act.

3.In the event of the [contractor/seller] noncompliance with the requirements of this clause, actions for noncompliance may be taken in accordance with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the act.

4.The [contractor/seller] agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Director, Office of Federal Contract Compliance Programs, provided by or through the contracting officer. Such notices shall state the rights of applicants and employees as well as the [contractor/seller] 's obligation under the law to take affirmative action to employ and advance in employment qualified employees and applicants with disabilities.

The [contractor/seller] must ensure that applicants or employees with disabilities are provided the notice in a form that is accessible and understandable to the individual applicant or employee (e.g., providing Brail or large print versions of the notice, or posting a copy of the notice at a lower height for easy viewing by a person using a wheelchair). With respect to employees who do not work at a physical location of the [contractor/seller] , a [contractor/seller] will satisfy its posting obligations by posting such notices in an electronic format, provided that the [contractor/seller] provides computers, or access to computers, that can access the electronic posting to such employees, or the [contractor/seller] has actual know ledge that such employees otherwise are able to access the electronically posted notices. Electronic notices for employees must be post ed in a conspicuous location and format on the company's intranet or sent by electronic mail to employees. An electronic posting must be used by the [contractor/seller] to notify job applicants of their rights if the [contractor/seller] utilizes an electronic application process. Such electronic applicant notice must be conspicuously stored with, or as part of, the electronic application.

5.The [contractor/seller] will notify each labor organization or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the [contractor/ seller] is bound by the terms of section 503 of the Rehabilitation Act of 1973, as amended, and is committed to take affirmative action to employ and advance in employment, and shall not discriminate against, individuals with physical or mental disabilities.

6.The [contractor/seller] will include the provisions of this clause in every subcontract or purchase order in excess of $ 10,000, unless exempted by the rules, regulations, or orders of the Secretary issued pursuant to section 503 of the act, as amended, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the Director, Office of Federal Contract Compliance Programs may direct to enforce such provisions, including action for noncompliance.

7.The [contractor/seller] must, in all solicitations or advertisements for employees placed by or on behalf of the [contractor/seller], state that all qualified applicants will receive consideration for employment and will not be discriminated against on the basis of disability.

18. Dissemination or Disclosure of Information

No information or material shall be disseminated or disclosed to the general public, the news media, or any person or organization without prior express written approval by the HA.

19. Contractor's Status

It is understood that the Contractor is an independent contractor and is not to be considered an employee of the HA, or assume any right, privilege or duties of an employee, and shall save harmless the HA and its employees from claims suits, actions and costs of every description resulting from the Contractor's activities on behalf of the HA in connection with this Agreement.

20. Other Contractors

HA may undertake or award other contracts for additional work at or near the site(s) of the work under this contract. The contractor shall fully cooperate with the other contractors and with HA and HUD employees and shall carefully adapt scheduling and performing the work under this contract to accommodate the additional work, heeding any direction that may be provided by the Contracting Officer. The contractor shall not commit or permit any act that will interfere with the performance of work by any other contractor or HA employee.

21. Liens

The Contractor is prohibited from placing a lien on HA's property. This prohibition shall apply to all subcontractors.

22. Training and Employment Opportunities for Residents in the Project Area (Section 3, HUD Act of 1968;
24 CFR 135)

(a) The work to be performed under this contract is subject to the requirements of section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

(b) The parties to this contract agree to comply with HUD's regulations in 24 CFR Part 75, which implement section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the Part 75 regulations.

(c) The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the section 3 prioritization requirements, and shall state the minimum percentages of labor hour requirements established in the Benchmark Notice (FR-6085-N-04)..

(d) The contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR Part 75, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR Part 75. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR Part 75.

(e) Noncompliance with HUD's regulations in 24 CFR Part 75 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts

(f) Contracts, subcontracts, grants, or subgrants subject to Section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 5307(b)) or subject to tribal preference requirements as authorized under 101(k) of the Native American Housing Assistance and Self-Determination Act (25 U.S.C. 4111(k)) must provide preferences in employment, training, and business opportunities to Indians and Indian organizations, and are therefore not subject to the requirements of 24 CFR Part 75.

23. Procurement of Recovered Materials

(a) In accordance with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, the Contractor shall procure items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR Part 247 that contain the highest percentage of recovered

materials practicable consistent with maintaining a satisfactory level of competition. The Contractor shall procure items designated in the EPA guidelines that contain the highest percentage of recovered materials practicable unless the Contractor determines that such items: (1) are not reasonably available in a reasonable period of time; (2) fail to meet reasonable performance standards, which shall be determined on the basis of the guidelines of the National Institute of Standards and Technology, if applicable to the item; or (3) are only available at an unreasonable price.

(b) Paragraph (a) of this clause shall apply to items purchased under this contract where: (1) the Contractor purchases in excess of $10,000 of the item under this contract; or (2) during the preceding Federal fiscal year, the Contractor: (i) purchased any amount of the items for use under a contract that was funded with Federal appropriations and was with a Federal agency or a State agency or agency of a political subdivision of a State; and (ii) purchased a total of in excess of $10,000 of the item both under and outside that contract

ATTACHMENT C.1

SUPPLEMENTAL GENERAL CONDITIONS

To the extent that there is a conflict between the terms of the General Conditions and the terms of the Supplemental General Conditions, the terms of the Supplemental General Conditions shall govern to the extent of such conflict.

If HUD 5370 applies:

Section 31(e) of the General Conditions shall be deleted in its entirety and replaced by the following:

31(e). Forum. The Contracting Officer's decision shall be final unless, within thirty (30) days of receipt of the Contracting Officer's decision, the Contractor files a suit in a court of competent jurisdiction.

If HUD 5370-EZ applies:

Section 3(d) of the General Conditions shall be deleted in its entirety and replaced by the following:

3(d). Forum. The Contracting Officer's decision shall be final unless, within thirty (30) days of receipt of the Contracting Officer's decision, the Contractor files a suit in a court of competent jurisdiction.

If HUD 5370-C applies:

Section 1 Item 7(d) of the General Conditions shall be deleted in its entirety and replaced by the following:

Section 1 Item 7(d). Forum. The Contracting Officer's decision shall be final unless, within thirty (30) days of receipt of the Contracting Officer's decision, the Contractor files a suit in a court of competent jurisdiction.

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

Date: _____ **Signature**: _____
Contracting Officer

_____
Vendor Name (Insert vendor company name above)

Date: _____ **Signature:** _____

Title: _____

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

Request for Proposals

Heating Ventilation Air Conditioning Consulting Services Authority-wide

ATTACHMENT D

Certifications and Representations of Offerors (HUD 5369-C)

Certifications and Representations of Offerors
Non-Construction Contract

U.S. Department of Housing and Urban Development
Office of Public and Indian Housing

Public reporting burden for this collection of information is estimated to average 5 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

This form includes clauses required by OMB's common rule on bidding/offering procedures, implemented by HUD in 24 CFR 85.36, and those requirements set forth in Executive Order 11625 for small, minority, women-owned businesses, and certifications for independent price determination, and conflict of interest. The form is required for nonconstruction contracts awarded by Housing Agencies (HAs). The form is used by bidders/offerors to certify to the HA's Contracting Officer for contract compliance. If the form were not used, HAs would be unable to enforce their contracts. Responses to the collection of information are required to obtain a benefit or to retain a benefit. The information requested does not lend itself to confidentiality.

1. Contingent Fee Representation and Agreement

(a) The bidder/offeror represents and certifies as part of its bid/ offer that, except for full-time bona fide employees working solely for the bidder/offeror, the bidder/offeror:

(1) ☐ has, ☐ has not employed or retained any person or company to solicit or obtain this contract; and

(2) ☐ has, ☐ has not paid or agreed to pay to any person or company employed or retained to solicit or obtain this contract any commission, percentage, brokerage, or other fee contingent upon or resulting from the award of this contract.

(b) If the answer to either (a)(1) or (a) (2) above is affirmative, the bidder/offeror shall make an immediate and full written disclosure to the PHA Contracting Officer.

(c) Any misrepresentation by the bidder/offeror shall give the PHA the right to (1) terminate the resultant contract; (2) at its discretion, to deduct from contract payments the amount of any commission, percentage, brokerage, or other contingent fee; or (3) take other remedy pursuant to the contract.

2. Small, Minority, Women-Owned Business Concern Representation

The bidder/offeror represents and certifies as part of its bid/ offer that it:

(a) ☐ is, ☐ is not a small business concern. "Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding, and qualified as a small business under the criteria and size standards in 13 CFR 121.

(b) ☐ is, ☐ is not a women-owned small business concern. "Women-owned," as used in this provision, means a small business that is at least 51 percent owned by a woman or women who are U.S. citizens and who also control and operate the business.

(c) ☐ is, ☐ is not a minority enterprise which, pursuant to Executive Order 11625, is defined as a business which is at least 51 percent owned by one or more minority group members or, in the case of a publicly owned business, at least 51 percent of its voting stock is owned by one or more minority group members, and whose management and daily operations are controlled by one or more such individuals.

For the purpose of this definition, minority group members are:

(Check the block applicable to you)

☐ Black Americans
☐ Asian Pacific Americans
☐ Hispanic Americans
☐ Asian Indian Americans
☐ Native Americans
☐ Hasidic Jewish Americans

3. Certificate of Independent Price Determination

(a) The bidder/offeror certifies that—

(1) The prices in this bid/offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other bidder/offeror or competitor relating to (i) those prices, (ii) the intention to submit a bid/offer, or (iii) the methods or factors used to calculate the prices offered;

(2) The prices in this bid/offer have not been and will not be knowingly disclosed by the bidder/offeror, directly or indirectly, to any other bidder/offeror or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the bidder/offeror to induce any other concern to submit or not to submit a bid/offer for the purpose of restricting competition.

(b) Each signature on the bid/offer is considered to be a certification by the signatory that the signatory:

(1) Is the person in the bidder/offeror's organization responsible for determining the prices being offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(l) through (a)(3) above; or

(2) (i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(l) through (a)(3) above (insert full name of person(s) in the bidder/offeror's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the bidder/offeror's organization);

(ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(l) through (a)(3) above; and

(iii) As an agent, has not personally participated, and will not participate in any action contrary to subparagraphs (a)(l) through (a)(3) above.

(c) If the bidder/offeror deletes or modifies subparagraph (a)2 above, the bidder/offeror must furnish with its bid/offer a signed statement setting forth in detail the circumstances of the disclosure.

4. Organizational Conflicts of Interest Certification

(a) The Contractor warrants that to the best of its knowledge and belief and except as otherwise disclosed, it does not have any organizational conflict of interest which is defined as a situation in which the nature of work under a proposed contract and a prospective contractor's organizational, financial, contractual or other interest are such that:

(i) Award of the contract may result in an unfair competitive advantage;

(ii) The Contractor's objectivity in performing the contract work may be impaired; or

(iii) That the Contractor has disclosed all relevant information and requested the HA to make a determination with respect to this Contract.

(b) The Contractor agrees that if after award he or she discovers an organizational conflict of interest with respect to this contract, he or she shall make an immediate and full disclosure in writing to the HA which shall include a description of the action which the Contractor has taken or intends to eliminate or neutralize the conflict. The HA may, however, terminate the Contract for the convenience of HA if it would be in the best interest of HA.

(c) In the event the Contractor was aware of an organizational conflict of interest before the award of this Contract and intentionally did not disclose the conflict to the HA, the HA may terminate the Contract for default.

(d) The Contractor shall require a disclosure or representation from subcontractors and consultants who may be in a position to influence the advice or assistance rendered to the HA and shall include any necessary provisions to eliminate or neutralize conflicts of interest in consultant agreements or subcontracts involving performance or work under this Contract.

5. Authorized Negotiators (RFPs only)

The offeror represents that the following persons are authorized to negotiate on its behalf with the PHA in connection with this request for proposals: (list names, titles, and telephone numbers of the authorized negotiators):

6. Conflict of Interest

In the absence of any actual or apparent conflict, the offeror, by submission of a proposal, hereby warrants that to the best of its knowledge and belief, no actual or apparent conflict of interest exists with regard to my possible performance of this procurement, as described in the clause in this solicitation titled "Organizational Conflict of Interest."

7. Offeror's Signature

The offeror hereby certifies that the information contained in these certifications and representations is accurate, complete, and current.

Signature & Date:

Typed or Printed Name:

Title:

ATTACHMENT E

MBE PARTICIPATION PLAN

I. SMALL BUSINESS PARTICIPATION
Is the Bidder a Small Business as defined by the size and standards in 13 CFR 121?

Yes _____ No _____

II. MINORITY BUSINESS PARTICIPATION
Is the Bidder classified as a Minority Business Enterprise?

Yes _____ No _____

If "No", are any Subcontractors classified as Minority Business enterprise?

If "Yes", please fill in the following chart:

Consultant Firm(s) MBE	**$ Value Contract**	**% of Fee**

WBE PARTICIPATION PLAN

III. WOMEN-OWNED BUSINESS PARTICIPATION
Is the Bidder classified as a Woman-Owned Business Enterprise?

Yes _____ No _____

If "No", are any Subcontractors classified as Woman-Owned Business Enterprise?

Yes _____ No _____

If "Yes", please fill in the following chart:

Consultant Firm(s) WBE	**$ Value Contract**	**% of Fee**

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

Request for Proposals

Heating Ventilation Air Conditioning Consulting Services Authority-wide

ATTACHMENT F

Section 3 Clause/Opportunities Plan and Related Data

All section 3 covered contracts shall include the following clause (referred to as the section 3 clause):

A. The work to be performed under this contract is subject to the requirements of section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

B. The parties to this contract agree to comply with HUD's regulations in 24 CFR part 75.15 and 75.25, which implement section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 75 regulations.

C. The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.

D. The contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR § 75.9 or §75.19, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR part 75. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR part 75.

E. The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 75 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR part 75.

F. Noncompliance with HUD's regulations in 24 CFR part 75 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

G. After the Section 3 new rule went into effect on November 30, 2020, Tribes and Tribally Designated Housing Entities under the Indian Housing Block Grant and Indian Community Development Block Grant programs are no longer required comply with Section 3 requirements. The new rule at 24 CFR part 75 provides that contracts, subcontracts, grants, or subgrants subject to Section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 5307(b)) or subject to tribal preference requirements as authorized under 101(k) of the Native American Housing Assistance and Self-Determination Act (25 U.S.C. 4111(k)) must provide preferences in employment, training, and business opportunities to Indians and Indian organizations, and are therefore not subject to the requirements of 24 CFR Part 75.

SECTION 3 OPPORTUNITIES PLAN

Business Opportunities and Employment Training for Housing Authority of the City of Pittsburgh Low Income Public Housing Residents (LIPH) and Area Residents of Low and Very Low-Income Status (ARLIS)

PRIME CONTRACTORS NAME: _____

SPECIFICATION OF REFP/IFB/RFQ NUMBER: _____

SPECIFICATION OF REFP/IFB/RFQ TITLE: _____

The Contractor hereby agrees to comply with all the provisions of Section 3 as set forth in 2 CFR 200 et seq. and the HACP Section 3 Policy and Program requirements. The Contractor hereby submits this document to identify employment opportunities for HACP residents (LIPH) and **Area Residents of Low and Very Low-Income** Status (ARLIS) during the term of the contract between the Contractor and the HACP.

The preference of HACP is to ensure that as many HACP residents as possible are employed. In an effort to further that requirement, HACP has created a preference tier structure as outlined in the HACP Section 3 Policy and Program Manual which can be reviewed by visiting the "Vendor Services" section of www.hacp.org. Contractors are required to comply with Section 3 by first considering Tier I - Hiring. If the Contractor cannot meet its Section 3 requirement in Tier I and needs to move to Tier II or Tier III, that Contractor must document this inability to comply with the preference and the need to move to a lower tier. (Such inability **must** be documented for moves within tiers). The Contractor agrees to meet its Section 3 requirement following the Preferential Tier Structure as indicated by the selection below (check one or more tiers below):

[ ] Tier I - HIRING

The Contractor affirms that the jobs identified shall be for meaningful employment that may or may not be related to the scope of services covered under Contract/Purchase Order #_____. The Contractor has committed to employ _____ resident(s) in order to comply with its Section 3 requirements. A prime contractor may satisfy the HACP Resident Hiring Requirements through his/her subcontractors. **Contact the HACP Resident Employment Program for resident referrals at 412-643-2761, Ext 2761.**

When Tier I is selected, the Contractor shall complete the following table as instructed below:

(1) Indicate each job title for all phases of this contract
(2) The number of positions that will be needed in each category
(3) How many of those positions are currently filled
(4) The number currently filled by low and very low-income HACP residents
(5) The number currently filled by City of Pittsburgh neighborhood area residents
(6) How many positions need to be filled

Indicate your requirement for the number of positions you intend to fill with:

(7) Low income HACP Residents (LIPH) and/or
(8) Low and very low-income City of Pittsburgh Neighborhood Area Residents (ARLIS)

SECTION 3 OPPORTUNITIES PLAN

Section 3 Labor Utilization Assessment and Plan							
SPEC or RFP TITLE:				SPEC or RFP NUMBER:			
JOB TITLE (1)	NUMBER OF POSITIONS					HIRING REQUIREMENT	
	# NEEDED (2)	CURRENTLY FILLED			TO BE FILLED (6)	LIPH (7)	ARLIS (8)
		TOTAL (3)	LIPH (4)	ARLIS (5)			

LIPH – HACP low-income public housing resident
ARLIS – Area Residents of low / Very Low-Income Status – (Area is the Pittsburgh metropolitan area)

In the event the value of Section 3 resident hiring is less than the amount identified in the Resident Hiring Scale, vendors must contribute to the HACP Education Fund an amount not less than the difference between the value of Section 3 hiring and the amount identified in the Resident Hiring Scale, which funds shall be used to provide other economic opportunities.

Therefore, if it is anticipated that any position listed above shall be for less than the full term of the contract period, you must indicate on the lines below, the anticipated term for each position:

_____

_____

SECTION 3 OPPORTUNITIES PLAN

[ ] Tier II – CONTRACTING

The contractor has identified _____ HACP resident-owned business(es) or _____ Section 3 business(es) which is/are 51 percent or more owned by low-or very low-income persons or Over 75 percent of the labor hours performed for the business over the prior three-month period are performed by Section 3 workers. This will satisfy the contractor's Section 3 requirement covered under Contract/Purchase Order # _____.

In a one (1) page letter on your firm's letterhead:

1) Indicate the requirements, expressed in terms of percentage, of planned contracting dollars for the use of Section 3 business concerns as subcontractors.

2) A statement of the total dollar amount to be contracted, total dollar amount to be contracted to Section 3 business concerns for building trades and total dollar amount to be contracted to Section 3 business concerns for other than building trades work (maintenance, repair, modernization, and development).

3) A description of the method used to develop the requirements above and the efforts to be undertaken by the contractor to meet those requirements.

[ ] Tier III - OTHER ECONOMIC OPPORTUNITIES

Firms may provide other economic opportunities to train and employ Section 3 residents or make a direct cash contribution to the HACP Education Fund. HACP has established the following minimum threshold requirements for provision of training or contribution to the HACP fund that provides other economic opportunities:

a) Contractor incurs the cost of providing skilled training for residents in an amount commensurate with the sliding scale set forth in the Resident Hiring Scale; or,

b) Contractor makes a contribution to the HACP Education Fund at Clean Slate E3 to provide assistance to residents to obtain training. The level of contribution would be commensurate with the sliding scale set forth in the Resident Hiring Scale. Contractor shall provide, in a letter on firm letterhead:

1) Indication of the skilled training to be provided, the number of persons to be trained, the training provider, the cost of training, and the trainee recruitment plan; or,
2) Provide the amount of planned contribution to be made in relation to percentage of the contract labor hour's costs. (Contribution checks should be made payable to: **Clean Slate E3 Education Fund and mailed to Clean Slate E3, C/O Housing Authority of the City of Pittsburgh, Finance Department, 412 Boulevard of the Allies, 7th Floor, Pittsburgh, PA 15219.**

[ ] Tier IV – No New Hire Opportunity

If awarded this contract, the contractor will be able to fulfill the requirements of the IFB/RFP/RFQ with the existing work force. No new hires will be employed as a result of this award. If this position changes and hiring opportunities become necessary, the HACP Resident Employment Program will be notified.

SECTION 3 OPPORTUNITIES PLAN

By signing below, the Contractor hereby agrees to comply with the selected Section 3 requirements indicated above. To the extent that the completion of this form is contingent upon future information, for example price negotiations, request for specific services, etc., the undersigned hereby affirms and agrees to fully adhere to the spirit and intent of the HACP Section 3 Policy.

Furthermore, the undersigned acknowledges and affirms responsibility for completion and submission of this form as part of the response documentation for this Invitation for Bid or Request for Proposal. Failure to submit this form may jeopardize the responsiveness of your submission.

Company: _____

Name: _____

Title: _____

Signature: _____ Date: _____

Witness Name: _____

Witness Signature: _____ Date: _____

PLACE HOLDER FOR
ROSTER OF CURRENT EMPLOYEES

Pursuant to Housing Authority of the City of Pittsburgh Section 3 Program Manual, Part I, Section A - Section 3 Policy Statement (in part):

"HACP shall examine and consider a contractor's potential for success in providing employment and business opportunities to those covered under Section 3 prior to acting on any proposed contract award. In response to any RFP, RFQ or IFB HACP will require submission of the Section 3 Opportunities Plan and roster of current employees, and certification that the bidder will comply with the requirements of Section 3."

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

Request for Proposals

Heating Ventilation Air Conditioning Consulting Services Authority-wide

ATTACHMENT G

Firm Demographics Form

ATTACHMENT G - Firm Demographics																	
		Male								Female							
	All employees	White American	African American	Hispanic American	Asia American	Hasidic Jew American	Other American Minority	Foreign	Total Males	White American	African American	Hispanic American	Asia American	Hasidic Jew American	Other American Minority	Foreign	**Total # of American Minorities**
Partner																	
Associate																	
Professional																	
Secretarial																	
Clerical																	
Other																	
Total																	

Explain all other American Minority: _____

_____

_____

Be certain that the numbers in this table are accurate and add up correctly.

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

Request for Proposals

Heating Ventilation Air Conditioning Consulting Services Authority-wide

ATTACHMENT H

Request for Taxpayer Identification Number and Certification *(IRS W9)*

Form **W-9**
(Rev. March 2024)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Go to *www.irs.gov/FormW9* for instructions and the latest information.

Give form to the requester. Do not send to the IRS.

Before you begin. For guidance related to the purpose of Form W-9, see *Purpose of Form*, below.

Print or type. See ***Specific Instructions*** on page 3.

1 Name of entity/individual. An entry is required. (For a sole proprietor or disregarded entity, enter the owner's name on line 1, and enter the business/disregarded entity's name on line 2.)

2 Business name/disregarded entity name, if different from above.

3a Check the appropriate box for federal tax classification of the entity/individual whose name is entered on line 1. Check only **one** of the following seven boxes.

☐ Individual/sole proprietor ☐ C corporation ☐ S corporation ☐ Partnership ☐ Trust/estate

☐ LLC. Enter the tax classification (C = C corporation, S = S corporation, P = Partnership) . . . . .

Note: Check the "LLC" box above and, in the entry space, enter the appropriate code (C, S, or P) for the tax classification of the LLC, unless it is a disregarded entity. A disregarded entity should instead check the appropriate box for the tax classification of its owner.

☐ Other (see instructions)

3b If on line 3a you checked "Partnership" or "Trust/estate," or checked "LLC" and entered "P" as its tax classification, and you are providing this form to a partnership, trust, or estate in which you have an ownership interest, check this box if you have any foreign partners, owners, or beneficiaries. See instructions . . . . . ☐

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):

Exempt payee code (if any)

Exemption from Foreign Account Tax Compliance Act (FATCA) reporting code (if any)

(Applies to accounts maintained outside the United States.)

5 Address (number, street, and apt. or suite no.). See instructions.

Requester's name and address (optional)

6 City, state, and ZIP code

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN*, later.

Note: If the account is in more than one name, see the instructions for line 1. See also *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number

			–		–				

or

Employer identification number

		–							

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and, generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here	**Signature of U.S. person**	**Date**

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to *www.irs.gov/FormW9*.

What's New

Line 3a has been modified to clarify how a disregarded entity completes this line. An LLC that is a disregarded entity should check the appropriate box for the tax classification of its owner. Otherwise, it should check the "LLC" box and enter its appropriate tax classification.

New line 3b has been added to this form. A flow-through entity is required to complete this line to indicate that it has direct or indirect foreign partners, owners, or beneficiaries when it provides the Form W-9 to another flow-through entity in which it has an ownership interest. This change is intended to provide a flow-through entity with information regarding the status of its indirect foreign partners, owners, or beneficiaries, so that it can satisfy any applicable reporting requirements. For example, a partnership that has any indirect foreign partners may be required to complete Schedules K-2 and K-3. See the Partnership Instructions for Schedules K-2 and K-3 (Form 1065).

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS is giving you this form because they

must obtain your correct taxpayer identification number (TIN), which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

• Form 1099-INT (interest earned or paid).

• Form 1099-DIV (dividends, including those from stocks or mutual funds).

• Form 1099-MISC (various types of income, prizes, awards, or gross proceeds).

• Form 1099-NEC (nonemployee compensation).

• Form 1099-B (stock or mutual fund sales and certain other transactions by brokers).

• Form 1099-S (proceeds from real estate transactions).

• Form 1099-K (merchant card and third-party network transactions).

• Form 1098 (home mortgage interest), 1098-E (student loan interest), and 1098-T (tuition).

• Form 1099-C (canceled debt).

• Form 1099-A (acquisition or abandonment of secured property).

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

Caution: If you don't return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See *What is backup withholding*, later.

By signing the filled-out form, you:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued);

2. Certify that you are not subject to backup withholding; or

3. Claim exemption from backup withholding if you are a U.S. exempt payee; and

4. Certify to your non-foreign status for purposes of withholding under chapter 3 or 4 of the Code (if applicable); and

5. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting is correct. See *What Is FATCA Reporting*, later, for further information.

Note: If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

• An individual who is a U.S. citizen or U.S. resident alien;

• A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States;

• An estate (other than a foreign estate); or

• A domestic trust (as defined in Regulations section 301.7701-7).

Establishing U.S. status for purposes of chapter 3 and chapter 4 withholding. Payments made to foreign persons, including certain distributions, allocations of income, or transfers of sales proceeds, may be subject to withholding under chapter 3 or chapter 4 of the Code (sections 1441–1474). Under those rules, if a Form W-9 or other certification of non-foreign status has not been received, a withholding agent, transferee, or partnership (payor) generally applies presumption rules that may require the payor to withhold applicable tax from the recipient, owner, transferor, or partner (payee). See Pub. 515, Withholding of Tax on Nonresident Aliens and Foreign Entities.

The following persons must provide Form W-9 to the payor for purposes of establishing its non-foreign status.

• In the case of a disregarded entity with a U.S. owner, the U.S. owner of the disregarded entity and not the disregarded entity.

• In the case of a grantor trust with a U.S. grantor or other U.S. owner, generally, the U.S. grantor or other U.S. owner of the grantor trust and not the grantor trust.

• In the case of a U.S. trust (other than a grantor trust), the U.S. trust and not the beneficiaries of the trust.

See Pub. 515 for more information on providing a Form W-9 or a certification of non-foreign status to avoid withholding.

Foreign person. If you are a foreign person or the U.S. branch of a foreign bank that has elected to be treated as a U.S. person (under Regulations section 1.1441-1(b)(2)(iv) or other applicable section for chapter 3 or 4 purposes), do not use Form W-9. Instead, use the appropriate Form W-8 or Form 8233 (see Pub. 515). If you are a qualified foreign pension fund under Regulations section 1.897(l)-1(d), or a partnership that is wholly owned by qualified foreign pension funds, that is treated as a non-foreign person for purposes of section 1445 withholding, do not use Form W-9. Instead, use Form W-8EXP (or other certification of non-foreign status).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a saving clause. Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items.

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.

2. The treaty article addressing the income.

3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.

4. The type and amount of income that qualifies for the exemption from tax.

5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if their stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first Protocol) and is relying on this exception to claim an exemption from tax on their scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity, give the requester the appropriate completed Form W-8 or Form 8233.

Backup Withholding

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 24% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include, but are not limited to, interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third-party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester;

2. You do not certify your TIN when required (see the instructions for Part II for details);

3. The IRS tells the requester that you furnished an incorrect TIN;

4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only); or

5. You do not certify to the requester that you are not subject to backup withholding, as described in item 4 under "*By signing the filled-out form*" above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See *Exempt payee code*, later, and the separate Instructions for the Requester of Form W-9 for more information.

See also *Establishing U.S. status for purposes of chapter 3 and chapter 4 withholding*, earlier.

What Is FATCA Reporting?

The Foreign Account Tax Compliance Act (FATCA) requires a participating foreign financial institution to report all U.S. account holders that are specified U.S. persons. Certain payees are exempt from FATCA reporting. See *Exemption from FATCA reporting code*, later, and the Instructions for the Requester of Form W-9 for more information.

Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you are no longer tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account, for example, if the grantor of a grantor trust dies.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of $50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a $500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Line 1

You must enter one of the following on this line; **do not** leave this line blank. The name should match the name on your tax return.

If this Form W-9 is for a joint account (other than an account maintained by a foreign financial institution (FFI)), list first, and then circle, the name of the person or entity whose number you entered in Part I of Form W-9. If you are providing Form W-9 to an FFI to document a joint account, each holder of the account that is a U.S. person must provide a Form W-9.

• **Individual.** Generally, enter the name shown on your tax return. If you have changed your last name without informing the Social Security Administration (SSA) of the name change, enter your first name, the last name as shown on your social security card, and your new last name.

Note for ITIN applicant: Enter your individual name as it was entered on your Form W-7 application, line 1a. This should also be the same as the name you entered on the Form 1040 you filed with your application.

• **Sole proprietor.** Enter your individual name as shown on your Form 1040 on line 1. Enter your business, trade, or "doing business as" (DBA) name on line 2.

• **Partnership, C corporation, S corporation, or LLC, other than a disregarded entity.** Enter the entity's name as shown on the entity's tax return on line 1 and any business, trade, or DBA name on line 2.

• **Other entities.** Enter your name as shown on required U.S. federal tax documents on line 1. This name should match the name shown on the charter or other legal document creating the entity. Enter any business, trade, or DBA name on line 2.

• **Disregarded entity.** In general, a business entity that has a single owner, including an LLC, and is not a corporation, is disregarded as an entity separate from its owner (a disregarded entity). See Regulations section 301.7701-2(c)(2). A disregarded entity should check the appropriate box for the tax classification of its owner. Enter the owner's name on line 1. The name of the owner entered on line 1 should never be a disregarded entity. The name on line 1 should be the name shown on the income tax return on which the income should be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a single owner that is a U.S. person, the U.S. owner's name is required to be provided on line 1. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on line 2. If the owner of the disregarded entity is a foreign person, the owner must complete an appropriate Form W-8 instead of a Form W-9. This is the case even if the foreign person has a U.S. TIN.

Line 2

If you have a business name, trade name, DBA name, or disregarded entity name, enter it on line 2.

Line 3a

Check the appropriate box on line 3a for the U.S. federal tax classification of the person whose name is entered on line 1. Check only one box on line 3a.

IF the entity/individual on line 1 is a(n) . . .	THEN check the box for . . .
• Corporation	Corporation.
• Individual or • Sole proprietorship	Individual/sole proprietor.
• LLC classified as a partnership for U.S. federal tax purposes or • LLC that has filed Form 8832 or 2553 electing to be taxed as a corporation	Limited liability company and enter the appropriate tax classification: P = Partnership, C = C corporation, or S = S corporation.
• Partnership	Partnership.
• Trust/estate	Trust/estate.

Line 3b

Check this box if you are a partnership (including an LLC classified as a partnership for U.S. federal tax purposes), trust, or estate that has any foreign partners, owners, or beneficiaries, and you are providing this form to a partnership, trust, or estate, in which you have an ownership interest. You must check the box on line 3b if you receive a Form W-8 (or documentary evidence) from any partner, owner, or beneficiary establishing foreign status or if you receive a Form W-9 from any partner, owner, or beneficiary that has checked the box on line 3b.

Note: A partnership that provides a Form W-9 and checks box 3b may be required to complete Schedules K-2 and K-3 (Form 1065). For more information, see the Partnership Instructions for Schedules K-2 and K-3 (Form 1065).

If you are required to complete line 3b but fail to do so, you may not receive the information necessary to file a correct information return with the IRS or furnish a correct payee statement to your partners or beneficiaries. See, for example, sections 6698, 6722, and 6724 for penalties that may apply.

Line 4 Exemptions

If you are exempt from backup withholding and/or FATCA reporting, enter in the appropriate space on line 4 any code(s) that may apply to you.

Exempt payee code.

• Generally, individuals (including sole proprietors) are not exempt from backup withholding.

• Except as provided below, corporations are exempt from backup withholding for certain payments, including interest and dividends.

• Corporations are not exempt from backup withholding for payments made in settlement of payment card or third-party network transactions.

• Corporations are not exempt from backup withholding with respect to attorneys' fees or gross proceeds paid to attorneys, and corporations that provide medical or health care services are not exempt with respect to payments reportable on Form 1099-MISC.

The following codes identify payees that are exempt from backup withholding. Enter the appropriate code in the space on line 4.

1—An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2).

2—The United States or any of its agencies or instrumentalities.

3—A state, the District of Columbia, a U.S. commonwealth or territory, or any of their political subdivisions or instrumentalities.

4—A foreign government or any of its political subdivisions, agencies, or instrumentalities.

5—A corporation.

6—A dealer in securities or commodities required to register in the United States, the District of Columbia, or a U.S. commonwealth or territory.

7—A futures commission merchant registered with the Commodity Futures Trading Commission.

8—A real estate investment trust.

9—An entity registered at all times during the tax year under the Investment Company Act of 1940.

10—A common trust fund operated by a bank under section 584(a).

11—A financial institution as defined under section 581.

12—A middleman known in the investment community as a nominee or custodian.

13—A trust exempt from tax under section 664 or described in section 4947.

The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 13.

IF the payment is for . . .	THEN the payment is exempt for . . .
• Interest and dividend payments	All exempt payees except for 7.
• Broker transactions	Exempt payees 1 through 4 and 6 through 11 and all C corporations. S corporations must not enter an exempt payee code because they are exempt only for sales of noncovered securities acquired prior to 2012.
• Barter exchange transactions and patronage dividends	Exempt payees 1 through 4.
• Payments over $600 required to be reported and direct sales over $5,000[1]	Generally, exempt payees 1 through 5.[2]
• Payments made in settlement of payment card or third-party network transactions	Exempt payees 1 through 4.

[1] See Form 1099-MISC, Miscellaneous Information, and its instructions.

[2] However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney reportable under section 6045(f), and payments for services paid by a federal executive agency.

Exemption from FATCA reporting code. The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements. A requester may indicate that a code is not required by providing you with a Form W-9 with "Not Applicable" (or any similar indication) entered on the line for a FATCA exemption code.

A—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37).

B—The United States or any of its agencies or instrumentalities.

C—A state, the District of Columbia, a U.S. commonwealth or territory, or any of their political subdivisions or instrumentalities.

D—A corporation the stock of which is regularly traded on one or more established securities markets, as described in Regulations section 1.1472-1(c)(1)(i).

E—A corporation that is a member of the same expanded affiliated group as a corporation described in Regulations section 1.1472-1(c)(1)(i).

F—A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state.

G—A real estate investment trust.

H—A regulated investment company as defined in section 851 or an entity registered at all times during the tax year under the Investment Company Act of 1940.

I—A common trust fund as defined in section 584(a).

J—A bank as defined in section 581.

K—A broker.

L—A trust exempt from tax under section 664 or described in section 4947(a)(1).

M—A tax-exempt trust under a section 403(b) plan or section 457(g) plan.

Note: You may wish to consult with the financial institution requesting this form to determine whether the FATCA code and/or exempt payee code should be completed.

Line 5

Enter your address (number, street, and apartment or suite number). This is where the requester of this Form W-9 will mail your information returns. If this address differs from the one the requester already has on file, enter "NEW" at the top. If a new address is provided, there is still a chance the old address will be used until the payor changes your address in their records.

Line 6

Enter your city, state, and ZIP code.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have, and are not eligible to get, an SSN, your TIN is your IRS ITIN. Enter it in the entry space for the Social security number. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN.

If you are a single-member LLC that is disregarded as an entity separate from its owner, enter the owner's SSN (or EIN, if the owner has one). If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note: See *What Name and Number To Give the Requester*, later, for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local SSA office or get this form online at *www.SSA.gov*. You may also get this form by calling 800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at *www.irs.gov/EIN*. Go to *www.irs.gov/Forms* to view, download, or print Form W-7 and/or Form SS-4. Or, you can go to *www.irs.gov/OrderForms* to place an order and have Form W-7 and/or Form SS-4 mailed to you within 15 business days.

If you are asked to complete Form W-9 but do not have a TIN, apply for a TIN and enter "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, you will generally have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note: Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon. See also *Establishing U.S. status for purposes of chapter 3 and chapter 4 withholding*, earlier, for when you may instead be subject to withholding under chapter 3 or 4 of the Code.

Caution: A disregarded U.S. entity that has a foreign owner must use the appropriate Form W-8.

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if item 1, 4, or 5 below indicates otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on line 1 must sign. Exempt payees, see *Exempt payee code*, earlier.

Signature requirements. Complete the certification as indicated in items 1 through 5 below.

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third-party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), ABLE accounts (under section 529A), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account) other than an account maintained by an FFI	The actual owner of the account or, if combined funds, the first individual on the account[1]
3. Two or more U.S. persons (joint account maintained by an FFI)	Each holder of the account
4. Custodial account of a minor (Uniform Gift to Minors Act)	The minor[2]
5. a. The usual revocable savings trust (grantor is also trustee)	The grantor-trustee[1]
b. So-called trust account that is not a legal or valid trust under state law	The actual owner[1]
6. Sole proprietorship or disregarded entity owned by an individual	The owner[3]
7. Grantor trust filing under Optional Filing Method 1 (see Regulations section 1.671-4(b)(2)(i)(A))**	The grantor*
8. Disregarded entity not owned by an individual	The owner
9. A valid trust, estate, or pension trust	Legal entity[4]
10. Corporation or LLC electing corporate status on Form 8832 or Form 2553	The corporation
11. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
12. Partnership or multi-member LLC	The partnership
13. A broker or registered nominee	The broker or nominee
14. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity
15. Grantor trust filing Form 1041 or under the Optional Filing Method 2, requiring Form 1099 (see Regulations section 1.671-4(b)(2)(i)(B))**	The trust

[1] List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

[2] Circle the minor's name and furnish the minor's SSN.

[3] You must show your individual name on line 1, and enter your business or DBA name, if any, on line 2. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

[4] List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.)

* **Note:** The grantor must also provide a Form W-9 to the trustee of the trust.

** For more information on optional filing methods for grantor trusts, see the Instructions for Form 1041.

Note: If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records From Identity Theft

Identity theft occurs when someone uses your personal information, such as your name, SSN, or other identifying information, without your permission to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax return preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity, or a questionable credit report, contact the IRS Identity Theft Hotline at 800-908-4490 or submit Form 14039.

For more information, see Pub. 5027, Identity Theft Information for Taxpayers.

Victims of identity theft who are experiencing economic harm or a systemic problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 877-777-4778 or TTY/TDD 800-829-4059.

Protect yourself from suspicious emails or phishing schemes. Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to *phishing@irs.gov*. You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration (TIGTA) at 800-366-4484. You can forward suspicious emails to the Federal Trade Commission at *spam@uce.gov* or report them at *www.ftc.gov/complaint*. You can contact the FTC at *www.ftc.gov/idtheft* or 877-IDTHEFT (877-438-4338). If you have been the victim of identity theft, see *www.IdentityTheft.gov* and Pub. 5027.

Go to *www.irs.gov/IdentityTheft* to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. commonwealths and territories for use in administering their laws. The information may also be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3406, payors must generally withhold a percentage of taxable interest, dividends, and certain other payments to a payee who does not give a TIN to the payor. Certain penalties may also apply for providing false or fraudulent information.

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

Request for Proposals

Heating Ventilation Air Conditioning Consulting Services Authority-wide

ATTACHMENT I

Sample MBE /WBE Letter of Intent

DATE:

<Name Of MBE or WBE Contact Person>
<Name of MBE or WBE firm>
<Address>

<City>, <State> <Zip>

Re: <Name of HACP Project>

Dear <Name of Contact Person at MBE or WBE Firm>

(Name of Prime Bidder> has submitted a bid for the above referenced project to the Housing Authority City of Pittsburgh (HACP).

If we are the successful bidders and awarded the contract, <Name of Prime Bidder> intends to utilize <Name of proposed MBE or WBE firm> as follows:

Scope of Proposed Services: _____

_____

_____

Estimated Dollar Value: _____

_____

Please call should you have any further questions. We thank you for your continuing interest.

Sincerely,

< Contact Person from Prime Bidder> < Contact Person from MBE/WBE>

_____ _____
(Signature) *(Signature)*

_____ _____
(Name) *(Name)*

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

Request for Proposals

Heating Ventilation Air Conditioning Consulting Services Authority-wide

ATTACHMENT J

Fee Proposal

ATTACHMENT J

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH
FEE SHEET
RFP #600-11-25
Request for Proposal Professional HVAC Engineering Consulting Services Authority-wide

	HOURLY BILLING RATES						Burdened Rates			
	Proposed Staff (Please List)	Position	Base Hourly Rates	O/H and Fringes Multiplier	Hourly Billing Rates	Profit %	Base Contract 1st Yr. – 2nd Year Burdened Rates	First Option Year Rate Escalation ___%	Second Option Year Rate Escalation ___%	Third Option Year Rate Escalation ___%
1		Principal								
2		Professional Engineer								
3		Certified Energy Professional								
4		Engineer in Training/ Intern								
5		CADD Operator								
6		Field Engineer/Construction Administrator								
7		Clerical								
8										
9										
10										

Initial Year 1 through Year 2

Base Hourly Rate **X** O/H and Fringes Multiplier **=** Hourly Billing Rates **X** Profit % **=** Initial Year 1 through Year 3 Burdened Rates

First Option Year

Initial Year 1 through Year 2 Burdened Rates **X** First Option Year Rate Escalation % **=** First Option Year Burdened Rate

Escalation for First Option Year ____%

Escalation for Second Option Year ____%

Second Option Year

First Option Year Burdened Rate **X** Second Option Year Rate Escalation % **=** Second Option Year Burdened Rate

Third Option Year

Second Option Year Burdened Rate **X** Third Option Year Rate Escalation % **=** Third Option Year Burdened Rate

Escalation for Third Option Year ____%

Signed: **Date:**

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

Heating Ventilation Air Conditioning Consulting Services
Authority-wide

Supplemental Information

ATTACHMENT K

U.S. Department of Housing and Urban Development

2024-2027 CLIMATE ADAPTATION PLAN

Submitted: May 31, 2024

Message from the Acting Secretary

Climate change poses one of the most significant challenges of our time, impacting ecosystems, economies, and communities across the globe. Addressing this challenge requires a comprehensive, science-based approach at the federal level. The Department of Housing and Urban Development (HUD) is committed to tackling the climate crisis through its existing ambitious Climate Action Plan and the following HUD Federal Climate Adaptation Plan.

The Department has already taken significant steps to address climate threats and environmental injustice. HUD has adapted its programs to help communities both prepare for and respond to the effects of climate change and will continue to take comprehensive action to advance this Administration's priorities on climate adaptation, resilience, and environmental justice. Furthermore, HUD will help lead the Federal government's response to this unprecedented challenge consistent with the Department's unique and historic role in supporting underserved communities, investing in housing across the country, and guiding communities through post disaster recovery and rebuilding.

This plan will model the integration of climate resilience and environmental justice into HUD's core programs and policies. The actions outlined in this Adaptation Plan, and HUD's Climate Action Plan, will guide HUD in taking adaptation measures to reduce climate risk in Agency mission and operations while also identifying measures to help communities across the Nation build more resilient infrastructure, promote responsible utility consumption, create good-paying jobs, and address environmental injustices.

Going forward, HUD will work to ensure our policies are guided by the latest scientific research on climate change, ensuring that our actions are evidence-based and effective. Further, we recognize that the impacts of climate change disproportionately affect marginalized communities. Our policies prioritize equity, ensuring that vulnerable populations are not left behind in the transition to a sustainable and climate-resilient future.

To complete our efforts on climate adaptation, we have implemented, and will continue to implement, policies to reduce greenhouse gas emissions across all sectors of the economy impacted by our operations, services, and activities. This includes setting ambitious emissions reduction targets and implementing projects and policies to achieve these targets. HUD will remain committed to implementing a department-wide approach that reduces climate pollution; increases resilience to the impacts of climate change; protects public health; delivers environmental justice; and spurs well-paying union jobs and economic growth.

Adrianne Todman

Acting Secretary of the U.S. Department of Housing and Urban Development (HUD)

SECTION 1: AGENCY PROFILE

Everyone deserves a safe and healthy place to live. Where a person lives is an important factor that shapes their long-term health, education, and employment outcomes. As the agency dedicated to expanding access to healthy homes and vibrant communities, it is central to HUD's mission to deploy the full capacity of its offices to combat the climate crisis and implement a Department-wide approach that reduces climate pollution; increases resilience to climate impacts; protects public health; and spurs well-paying jobs and economic growth. The Department must do so in a way that delivers on the President's commitment to environmental justice[1], as well as promoting racial equity[2].

One of President Biden's first actions in office was issuing Executive Order (EO) 14008, *Tackling the Climate Crisis at Home and Abroad*. It lays out a broad vision for how the Federal government can address climate change while creating economic opportunity. HUD will play a critical role in implementing this vision, elevating people through building more resilient, sustainable, and inclusive communities across the country. Consistent with EO 13985, *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*, and EO 14096, *Revitalizing Our Nation's Commitment to Environmental Justice for All*, HUD allocates resources in a manner that addresses the historic failure of the Federal government to invest sufficiently, justly, and equitably in underserved and disadvantaged communities, particularly low-income households and communities of color.

HUD, through its ambitious Climate Action Plan first issued in 2021 (with a technical update in 2023) as the successor to its Climate Change Adaptation Plan, issued in 2014, sets goals, tracks progress, and guides the comprehensive integration of climate resilience, sustainability, and environmental justice across its portfolio. The Department has maintained, adapted, and created programs and policies to help communities prepare for and respond to the effects of climate change. HUD's Climate Action Plan contains over 100 concrete actions, related to climate resilience, mitigation, and environmental justice, that are monitored by the Department's Climate and Environmental Justice Working Group (CEJWG) and captured in the Department's Strategic Plan.

HUD has affirmed its dedication to the Climate Action Plan's actions by centering them in the Department's current budget priorities. The President's Fiscal Year 2025 Budget included $407 million for targeted investments to improve the quality of housing through climate resilience and energy and water efficiency. As part of the Administration's whole-of-government approach to the climate crisis, the budget reflects HUD's commitment to expanding energy efficiency and climate resiliency in public and assisted housing. HUD's ability to further its commitment hinges upon the support of Congress through appropriation and authorization.

---

[1] FACT SHEET: President Biden Signs Executive Order to Revitalize Our Nation's Commitment to Environmental Justice for All | The White House

[2] FACT SHEET: President Biden Signs Executive Order to Strengthen Racial Equity and Support for Underserved Communities Across the Federal Government | The White House

The Department will lead the Federal government's response to this unprecedented challenge, consistent with its unique and historic role in supporting underserved and disadvantaged communities, investing in housing across the country, and helping communities through post disaster recovery and rebuilding. HUD will work with Federal partners, stakeholders, grantees, and members of the public to develop innovative solutions for advancing climate adaptation and resilience.

The actions outlined in the Climate Action Plan, and in this Adaptation Plan, will help to build more resilient infrastructure, promote responsible utility consumption, create good-paying jobs, and address environmental injustices. Through its Climate Adaptation Plan, HUD also advances environmental justice as part of its mission, consistent with EO 14008 and with EO 14096.

AGENCY PROFILE	
Mission	HUD's mission is to create strong, sustainable, inclusive communities and quality affordable homes for all. HUD is working to strengthen the housing market to bolster the economy and protect consumers; meet the need for quality affordable rental homes; utilize housing as a platform for improving quality of life; build inclusive and sustainable communities free from discrimination; and transform the way HUD does business.
Adaptation Plan Scope	Ginnie Mae, Federal Housing Administration (FHA)
Agency Climate Adaptation Official	Kevin McNeely, Chief Sustainability Officer, General Deputy Assistant Secretary for Administration Alexis Pelosi, Senior Advisor for Climate, Office of the Secretary
Agency Risk Officer	Wilmer J. Graham, Chief Risk Officer
Point of Public Contact for Environmental Justice	Claudette Fernandez, General Deputy Assistant Secretary for Community Planning and Development
Owned Buildings	0 - HUD does not own any buildings, except for a small amount of short-term ownership of properties under foreclosed Federal Housing Administration (FHA)-insured mortgages before sale.[3] HUD has authority to operate and maintain only the Robert C. Weaver Building, which is fully serviced under GSA leases.

[3] Given the temporary nature of ownership, these properties are not considered under this plan and the term "portfolio" or "properties" shall only refer to office leases with GSA.

Leased Buildings	91 Occupancy Agreements with a total of 3,321,331.00 RSF (2023 FASTFA Data Call).
Employees	7672 total employees and 72 contractors (2023 FASTFA Data Call).
Budget	FY22 Enacted - $65.653B (FY22 Consolidated Appropriation Act) FY23 Enacted - $72.139B (FY23 Consolidated Appropriation Act) FY24 Enacted- $75.538B (FY24 Enacted Appropriations) FY25 President's Budget- $72.6B
Key Areas of Climate Adaptation Effort	HUD's Strategic Plan outlines three core parts for advancing "Strategic Goal 4: Advance Sustainable Communities." These include to: • Invest in Climate Resilience and Carbon Reduction: Invest in climate resilience, energy efficiency, and renewable energy across HUD programs (*Objective 4A*). • Strengthen Environmental Justice: Reduce exposure to health risks, environmental hazards, and substandard housing, especially for low-income households and communities of color (*Objective 4B)*. • Integrate Healthcare and Housing: Advance policies that recognize housing's role as essential to health (*Objective 4C*). Although adaptation considerations are embedded across Goal 4, Objective 4A places emphasis on adaptation and resilience building. It identifies various strategies and major milestones to advance this work, including to: • Promote climate resilience, decarbonization, and environmental justice across HUD programs; • Create community resilience and sustainability resources; • Improve utility data collection, reporting, and tracking; • Initiate utility benchmarking requirements; • Strengthen green codes and standards across HUD programs; • Foster innovation while removing barriers to energy efficiency and renewable energy in the HUD portfolio; • Eliminate discriminatory barriers to ensure disadvantaged communities can equitably access disaster and mitigation related resources; and • Elevate customer perspectives and experiences to inform future HUD investments into climate resilience, energy efficiency, and renewable energy.

SECTION 2: RISK ASSESSMENT

HUD used the Federal Climate Mapping for Resilience and Adaptation Application (Federal Mapping App)— which was developed for federal agencies by the White House Council on Environmental Quality (CEQ) and the National Oceanic and Atmospheric Administration (NOAA) – to conduct a high-level screening of climate hazard exposure for federal facilities and personnel.

HUD assessed the exposure of its buildings and employees to five climate hazards: extreme heat, extreme precipitation, sea level rise, flooding, and wildfire risk.

Climate Data Used in Agency Risk Assessment

Hazard	Description	Scenario	Geographic Coverage
Extreme Heat	Measured as whether an asset is projected to be exposed to an increased number of days with temperatures exceeding the 99th percentile of daily maximum temperatures (calculated annually), calculated with reference to 1976-2005. Data are from high-resolution, downscaled climate model projections based on the Localized Constructed Analogs (LOCA) dataset prepared for the 4th National Climate Assessment.	RCP 4.5 RCP 8.5	CONUS CONUS
Extreme Precipitation	Measured as whether an asset is projected to be exposed to an increased number of days with precipitation amounts exceeding the 99th percentile of daily maximum precipitation amounts (calculated annually), with reference to 1976-2005. Data are from high-resolution, downscaled climate model projections based on the LOCA dataset prepared for the 4th National Climate Assessment.	RCP 4.5 RCP 8.5	CONUS CONUS and AK
Sea Level Rise	Measured as whether an asset is within the inundation extents from NOAA Coastal Digital Elevation Models and the 2022 Interagency Sea Level Rise Technical Report. Intermediate and Intermediate-High sea level rise scenarios used as proxies for RCP 4.5 and 8.5, respectively.	RCP 4.5 RCP 8.5	CONUS and PR CONUS and PR
Wildfire Risk	Measured as whether an asset is in a location that is rated as high, very high, or extreme risk based on the U.S. Forest Service Wildfire Risk to Potential Structures (a data product of Wildfire Risk to Communities), which estimates the likelihood of structures being lost to wildfire based on the probability of a fire occurring in a location and likely fire intensity. Data reflects wildfires and other major disturbances as of 2014.	Historical	All 50 States
Flooding	Measured as whether an asset is located within a 100-year floodplain (1% annual chance of flooding) or 500-year floodplain (0.2% annual chance of flooding), as mapped by the Federal Emergency Management Agency National Flood Hazard Layer.	Historical	All 50 States and PR

Exposure to extreme heat, extreme precipitation, and sea level rise were evaluated at mid-(2050) and late-century (2080) under two emissions scenarios, Representative Concentration Pathway (RCP) 4.5 and RCP 8.5. Exposure to flooding and wildfire risk were only evaluated for the present day due to data constraints.

Climate Scenarios Considered in Agency Risk Assessment

Scenario Descriptor		Summary Description from 5th National Climate Assessment (NCA5)
RCP 8.5	Very High Scenario	Among the scenarios described in NCA5, RCP 8.5 reflects the highest range of carbon dioxide (CO_2) emissions and no mitigation. Total annual global CO_2 emissions in 2100 are quadruple emissions in 2000. Population growth in 2100 doubles from 2000. This scenario includes fossil fuel development.
RCP 4.5	Intermediate Scenario	This scenario reflects reductions in CO_2 emissions from current levels. Total annual CO_2 emissions in 2100 are 46% less than the year 2000. Mitigation efforts include expanded renewable energy compared to 2000.

Additional detail about the data used in this assessment is provided in Appendix A.

2A. Climate Hazard Exposures and Impacts Affecting Federal Buildings

Because HUD does not own any facilities, HUD facilities are included within the General Services Administration (GSA) portfolio analyzed in the risk assessment conducted in the GSA Climate Adaptation Plan. HUD has 91 mission-dependent sites/facilities that are leased from or through GSA. HUD intends to formally partner directly with GSA to address the vulnerabilities of these sites and facilities to incremental climate change and variability. HUD will work with GSA during FY 2024/25 to ensure that leases are captured within the risk assessment for the GSA portfolio and to identify opportunities for partnerships to mitigate risk.

The Robert C. Weaver building, HUD Headquarters, is also a GSA owned building that HUD leases but has delegated authority to operate and maintain.

2B. Climate Hazard Exposures and Impacts Affecting Federal Employees

Indicators of Exposure of Employees to Climate Hazards	RCP 4.5 2050	RCP 4.5 2080	RCP 8.5 2050	RCP 8.5 2080
Extreme Heat: Percent of employees duty-stationed in counties projected to be exposed to more days with temperatures exceeding the 99th percentile of daily maximum temperatures (calculated annually), from 1976-2005	99%	99%	99%	99%
Extreme Precipitation: Percent of employees duty-stationed in counties projected to be exposed to more days with precipitation amounts exceeding the	99%	99%	99%	99%

99th percentile of daily maximum precipitation amount (calculated annually), from 1976-2005				
Sea Level Rise: Percent of employees duty-stationed in counties projected to be inundated by sea level rise	8%	53%	8%	58%
	High Risk	**Very High Risk**	**Extreme Risk**	
Wildfire: Percent of employees duty-stationed in counties at highest risk to wildfire	1%	3%	1%	

Using the Federal Mapping App, HUD determined that at nearly all Agency staff are expected to experience increased exposure to the identified climate hazards. These hazards include an increased number of annual days of extreme heat and extreme precipitation and rising sea levels. The percentage of employees expected to experience increased wildfire risk is minimal, with approximately 3% at very high risk, 1% within the high risk, and 1% within the extreme risk categories.

While 99% of the HUD's employees are expected to experience an increase in the number of extreme precipitation days utilizing the RCP 4.5 Mid-century projections, it is expected that the majority will see an increase of at least 20% in extreme precipitation days. Using the RCP 8.5 Late-century model, these estimates extend to a 40% increase or higher.

Exposure to extreme heat is calculated in the Federal Mapping App using the estimated annual number of days with a maximum temperature greater than the average of the four hottest days per year historically. As indicated in the chart above, nearly all of HUD's employees are expected to experience exposure to an increased number of days considered to have extreme temperatures. Exposure levels range from a roughly 300-1200% increase (3-12 times the number of days) using the RCP 4.5 Mid-century to a greater than 1500% increase (15 times or greater the number of days) using the RCP 8.5 Late-century estimates.

Sea level rise may affect 8 to 58% of HUD's employees who are located in regions susceptible to these conditions.

2C. Climate Hazard Exposures and Impacts Affecting Mission, Operations and Services

Driven by climate change, the increasing frequency, intensity, and duration of natural disasters and severe weather events present a growing risk to the health and safety of HUD-assisted households and the physical assets financed or

subsidized by HUD.[4] HUD has many programs that help communities recover and build resilience, including HUD's disaster recovery portfolio which alone accounts for the Federal government's single largest investment in recovery and resilience in low-to-moderate-income communities. Increasing investments in areas and communities that are at risk and most vulnerable to high climate hazard exposure bolsters the resilience of public and assisted housing and HUD's mission.[5] HUD's related financial risk exposure and steps to reduce these risks is being assessed through HUD's work with the Office of Management and Budget (OMB) under EO 14030, *Climate-Related Financial Risk*.[6]

[4] See HUD's published Climate Resilience Toolkit, https://www.hudexchange.info/news/resourceavailable-hud-community-resilience-toolkit/

[5] White paper by the Office of Management and Budget, "Climate Financial Risk: The federal Government's Budget Exposure to Financial Risk Due to Climate Change"

[6] https://www.whitehouse.gov/wp-content/uploads/2024/03/ap_11_climate_risk_fy2025.pdf.

SECTION 3: IMPLEMENTATION PLAN

3A. Addressing Climate Hazard Impacts and Exposure

HUD is committed to incorporating climate action and sustainability across its operations. Despite having a relatively small directly managed federal footprint, HUD recognizes opportunities that exist to integrate climate adaptation into the Department's current practices. The Department will continue to identify actions to improve climate resilience, reduce emissions, and promote environmental justice within its own operations and in the communities it supports.

1. Addressing Climate Hazard Exposures and Impacts Affecting Federal Buildings

HUD has only one facility that it manages, the Robert C. Weaver Building, which is HUD's Headquarters located in Washington, DC. The Robert C. Weaver Building is owned by GSA, but HUD has delegated authority to operate and maintain it. HUD's other mission-dependent sites/facilities are GSA leases that HUD does not control.

The Disaster Resilience Planning Act (Pub. L. No. 117-221) (DRPA) and coordinating guidance from the Office of Management and Budget (OMB) direct agencies to incorporate natural disaster resilience into real property asset management and investment decisions. HUD does not own any buildings (except for a small amount of short-term ownership of properties under foreclosed Federal Housing Administration (FHA)-insured mortgages before sale) or land, nor does the agency report its facilities in the Federal Real Property Profile Management System (FRPP MS). HUD's spaces are included within the GSA facilities data. Because HUD does not have any assets as described in DRPA or OMB Memo M-24-03, *Advancing Climate Resilience through Climate-Smart Infrastructure Investments and Implementation Guidance for the Disaster Resiliency Planning Act,* the Department manages its leases in close coordination with GSA. Lease management decisions and GSA coordination are handled within the Office of Administration. This office includes HUD's General Deputy Assistant Secretary (GDAS) for Administration, who is the agency's Chief Sustainability Officer (CSO).

HUD remains committed to advancing adaptation and climate resilience. HUD has made significant investments in building improvements and measures to reduce energy and water consumption at the Robert C. Weaver Building. HUD partnered with GSA in 2013 on a project to replace the roof of the Weaver Building, which included installation of a reflective "cool" roof coating. In 2015 the Department completed work under a large Energy Savings Performance Contract (ESPC) that included building-wide retrofits to lighting, water conservation measures, building envelope improvements, conversion to Variable Air Volume (VAV) systems for heating and cooling, and the installation of direct digital controls for energy-intensive building systems. The benefits from these improvements are multifaceted. The energy and water savings resulting from conservation

measures both reduce the strain on utility systems and reduce greenhouse gas emissions associated with the operation of the facility. These improvements also increase building reliability and resilience to adverse or severe weather conditions.

To further demonstrate HUD's commitment to resilience and energy efficiency, the Department modified the ESPC in FY2023 to fund more conservation measures that are described in the table below.

Prioritized Actions to Address Climate Hazard Exposures and Impacts Affecting Federal Buildings		
Climate Hazard Impact on and/or Exposure to Buildings	Priority Action	Timeline for implementation (2024-2027)
Collaborate with GSA to support climate readiness and net-zero emissions initiatives for government and private leased facilities, relevant to all hazards which will vary by location.	Work with the GSA to assess potential hazard impacts to HUD leased space.	Contact GSA account manager to identify and request climate adaptation measures in HUD's real property portfolio- complete during FY24.
Exposure to extreme heat.	Utilize ESPC to perform retrofits and improvements at the Robert C. Weaver Building.	Perform the following Energy Conservation Measures (ECMs): Replace main chillers at the Weaver Building, which will increase system reliability and reduce risk of cooling loss at critical times- anticipated completion July FY24. Perform LED lighting retrofit to entire Weaver building, which will save energy and reduce cooling load- anticipated completion FY25.

Exposure to extreme heat.	Collaborate with the GSA to replace the main Air Handling Units (AHUs) at the Robert C. Weaver Building.	Complete study and design FY24. Construction expected to start FY25.

2. Addressing Climate Hazard Exposures and Impacts Affecting Federal Employees

The assessment in Section 2B indicates that 99% of HUD employees will experience at least some noticeable increase in days with heat or precipitation that exceeds the 99th percentile of historical extremes. These estimates vary across geographies, ranging from marginal increases of 0-10% to greater than 50% increases in number of days with extreme precipitation. In addition, some areas are projected to see a greater than 1500% increase in number of days with extreme heat. To keep its workforce safe and informed, HUD will use the strategies outlined in the table below to address the risks and create adaptive measures.

Prioritized Actions to Address Climate Hazard Exposures and Impacts Affecting Federal Employees		
Climate Hazard Impact on and/or Exposure to Employees	Priority Actions	Timeline for implementation (2024-2027)
Collaborate with GSA on opportunities to improve climate readiness for employees.	Work with the GSA to identify opportunities to protect occupants, reduce risks, and ensure safety from potential climate hazards in HUD leased space.	Collaborate with GSA account manager(s) to identify and request climate adaptation measures in HUD's real property portfolio during FY24.

Evaluate workforce risks related to occupational hazards.	Determine hazard level to employees based on potential exposure level and factors such as: office-based employees, telework percentage, and onsite field work such as inspections or construction sites.	Develop strategies to reduce employee risks associated with occupational exposures during FY24. Create a campaign to increase employee awareness of hazards and exposure risks during FY25. Evaluate occupational health and safety policy for opportunities to mitigate climate risk and adopt and implement effective solutions – FY25.

3B. Climate-resilient Operations

1. Accounting for Climate Risk in Planning and Decision Making

HUD's mission-dependent sites/facilities are included within the GSA's facilities data. Although HUD does not have any assets as described in DRPA or OMB Memo M-24-03, the Department manages its leases in close coordination with GSA. Lease management decisions and GSA coordination are handled within the Office of Administration.

2. Incorporating Climate Risk Assessment into Budget Planning

During the budget formulation process, HUD issues guidance to all program offices requesting their budget submissions include proposals that consider or address climate risk. In addition, the Department's Annual Strategic Capital Plan is considered during budget formulation to assess funding allocations required for supporting actions designed to reduce emissions and increase sustainable practices and climate resilience within HUD's Headquarters building, field offices, and the HUD leased vehicle fleet. Funding is allocated to support reducing greenhouse gas emissions through consolidation of offices, reduction of HUD's overall footprint, and conversion of the vehicle fleet to Electric Vehicles (EVs).

HUD's budget requests have identified the Department's plan to expand the current scope of the Energy Savings Performance Contract (ESPC) to include new energy conservation measures (ECM) that will replace outdated technology and increase energy savings in the Robert C. Weaver Building. This effort will allow HUD to replace outdated, inefficient, and unreliable building chillers and other equipment and amortize costs over the remaining 10-year term of the ESPC contract. Chiller and LED lighting replacement projects began in November 2023. The benefits from these improvements are multifaceted. The energy and

water savings resulting from conservation measures both reduce the strain on utility systems and reduce greenhouse gas emissions associated with the operation of the facility. These improvements also increase building reliability and resilience to adverse or severe weather conditions.

3. Incorporating Climate Risk into Policy and Programs

HUD programs invest billions of dollars every year in housing, infrastructure, and services for disadvantaged communities. Recognizing the disproportionate impact and burdens of climate change – current and future – on the households and communities HUD serves, the Department is incorporating climate risk into policy and programs, delivering funding, expanding access to information and resources, and adjusting policies to build resilient communities and promote environmental justice. Incorporating climate risk not only protects communities but safeguards Federal dollars and investments.

HUD's Climate Action Plan (CAP) contains over 100 concrete actions related to climate adaptation and resilience, energy efficiency and greenhouse gas reduction, and environmental justice. The CAP serves as a mechanism for tracking progress across programs and policies and incorporates this data into the Agency's Strategic Plan. Policies in the Strategic Plan are coordinated closely with senior HUD leadership, including risk/resilience officers.

In line with the President's whole-of-government approach to tackling climate change, HUD is collaborating with agency partners to amplify these efforts. For example, HUD and HHS are working together to recognize housing as a social determinant of health, and HUD and DOE are continuing their partnership to reduce carbon emissions in the building sector and to cut long-term costs for consumers through energy efficiency improvements.

Climate Adaptation and Resilience: In HUD's Community Development Block Grant-Disaster Recovery (CDBG-DR) program, the Department is finalizing implementing notices to reflect climate priorities and describe policies and requirements that can foster resiliency projects and promote environmental justice. In HUD's Single-Family Program Office, HUD is in the process of reviewing and updating program standards and documentation requirements for underwriting, repairs, and escrow to make it easier for lenders and borrowers to understand and use the 203(k) Rehabilitation Mortgage Insurance Program for Energy Retrofits and Climate Mitigation.

New programs have been established through funding available under the Inflation Reduction Act, such as the Green and Resilient Retrofit Program (GRRP), a first-of-its-kind program at HUD which integrates a focus on climate risk and energy efficiency. GRRP uses FEMA's National Risk Index (NRI) as a tool to identify and prioritize high risk projects and, through funding provided, supports HUD-assisted multifamily housing property owners in increasing climate resilience and adaptation through carbon emissions reductions, utility efficiency improvements, renewable energy generation, and building resilience.

To support these efforts, HUD continues to invest in robust technical assistance, creating new guides, tools, toolkits and learning opportunities across the Department. Earlier this year, the Office of Multifamily Housing Programs developed a Resiliency Assessment Tool which is being piloted as part of GRRP. The tool assists property assessors in the analysis of the vulnerability of properties to impacts caused by natural hazards and identifies opportunities for risk mitigation measures to improve resiliency to these hazards. HUD anticipates making the tool available for broader application across its portfolio in the future.

HUD is partnering with the Federal Emergency Management Agency (FEMA) in the Pre-Disaster Housing Planning Initiative (PDHI) to support state planning for housing recovery before disasters occur and promote collaborative approaches to housing recovery.

Nature-Based Solutions: HUD is promoting nature-based solutions and supporting sustainable planning, design, and management. Development of technical assistance, such as HUD's Nature-based Solutions Implementation Guide, provides step-by-step instructions to assist communities in implementing nature-based solutions. Funds in HUD's CDBG program, which reaches every state and over 1,200 local governments across the country, are commonly used for investments in nature-based solutions: funding parks, playgrounds, open spaces, and other recreational facilities in nature-deprived communities. Since 2016, grantees have spent 3-4% of all CDBG expenditures on parks and recreational facilities. Similarly, HUD's Choice Neighborhoods program integrates nature-based solutions through enhanced or improved access to green spaces and revitalization of severely distressed public and/or assisted housing.

Environmental Justice: Environmental justice is core to HUD's mission to create strong, sustainable, and inclusive communities.

Environmental justice and climate adaptation activities are coordinated at HUD through the Climate and Environmental Justice (CEJ) Council, comprised of senior leadership across all program offices and through its accompanying CEJ Working Group, comprised of staff across the Department. HUD is also a member of the White House Environmental Justice Interagency Council (WHEJAC) and has received recommendations from the WHEJAC on climate planning, preparedness, response, recovery, and impacts.

HUD's efforts to further environmental justice flow across the Department and entail working to ensure protection from environmental and health hazards for communities while investing in the reversal of disparate health outcomes and improved economic opportunity. HUD does this through engagement with communities in the development of rules, regulations, and funding opportunities; working with Tribal communities to achieve safe, resilient housing and infrastructure; and providing technical support to improve equity in community planning and engagement. To support authentic community engagement efforts, HUD developed the Citizen Participation & Equitable Engagement (CPEE) Toolkit,

which provides recommendations and best practices for conducting inclusive and equitable engagement that will inform and help create programs for the whole community, with a special emphasis and a targeted approach on historically vulnerable and underserved areas.

HUD is committed to addressing environmental inequities through enforcement of federal fair housing and civil rights laws, including the Fair Housing Act of 1968, Title VI of the Civil Rights Act of 1964, Section 109 of Title I of the Housing and Community Development Act of 1974, Section 504 of the Rehabilitation Act of 1973, and Title II of the Americans with Disabilities Act of 1990. The Fair Housing Act not only prohibits discrimination in housing on the basis of race, color, national origin, religion, sex (including gender identity and sexual orientation), disability and familial status but also requires HUD and HUD funding recipients to take meaningful actions to overcome patterns of segregation, promote fair housing choice, and foster inclusive communities that are free from discrimination, including disparate access to healthy environments, neighborhoods and homes.

Tribal Nations: HUD works to create opportunities for Tribal partners to provide input related to climate adaptation, when applicable and relevant, through various forums. For example, throughout 2023 and 2024 HUD has engaged in Tribal consultation to solicit feedback on the Indian Community Development Block Grant (ICDBG) program. The feedback received during consultation is documented and submitted to the appropriate HUD program offices. This process is one example of how Tribal consultation and coordination are conducted on an ongoing basis through various formal and informal processes and are guided by the Department's Government-to-Government Tribal Consultation Policy.

The Tribal Intergovernmental Advisory Committee (TIAC) is another important way that HUD is continuously considering the needs of Tribal nations. The TIAC meets monthly and briefs HUD leaders semiannually and develops white papers communicating policy issues and providing formal recommendations to HUD program offices. HUD also leads The Tribal Housing and Related Infrastructure Interagency Task Force, an interagency task force to develop a coordinated and streamlined environmental review for Tribal housing projects comprised of representatives from eight federal agencies and seven Tribes. In the past year the Task Force developed the Tribal/Interagency Environmental Streamlining (TIES) toolkit. TIES is the only Tribally-focused tool that identifies environmental review requirements by agency and provides resources, tools, and best practices for Tribes to streamline environmental review processes.

Tribal consultation has resulted in improvements to program regulations, guidance, and increased technical assistance. HUD has created a Tribal Climate Resilience and Adaptation website specifically for Tribes. The site pulls together tools and resources that are tailored to Tribes, including maps, data sets, and adaptation plans. It also includes information on Federal funding that supports Tribes addressing climate change, as well as case studies. HUD has collaborated with U.S. Departments of Treasury and Energy to

deliver two webinars about federal funding for climate resilience and Tribal housing energy projects.

Co-Benefits of Adaptation: HUD is working to increase climate resilience through incorporating green building requirements or incentives across financing programs and by working to update and strengthen minimum codes or standards. HUD's Green Mortgage Insurance Premium (Green MIP) provides a strong incentive for FHA multifamily borrowers to adopt one of several approved green building standards, lowering mortgage insurance premiums by as much as 50 basis points (0.50%). HUD's Rental Assistance Demonstration (RAD), through a notice published in July 2023, has significant requirements for new construction and rehabilitation that support both energy efficiency and climate resilience. HUD's GRRP Leading-Edge Cohort requires projects to commit to adopting one of several above-code zero energy standards (e.g. Enterprise Green Communities, LEED, National Green Building Standard, Passive House, Zero Energy Ready Multifamily, or Energy Star Nextgen).

In April 2024, HUD published two rules that increase climate resilience and sustainability. On April 23rd, HUD published the **Federal Flood Risk Management Standard (FFRMS)**, a final rule ensuring that federally-funded construction projects are built to withstand current and future flood risks. On April 26th, HUD and the U.S. Department of Agriculture (USDA) published updated Minimum Energy Standards for new construction to strengthen energy efficiency standards and reduce the burden on household budgets, while protecting the environment for future generations.

Through delivering funding, expanding assistance and resources, and amending its policies, HUD programs are strengthening the capacity of communities to adapt to climate change.

4. Climate-Smart Supply Chains and Procurement

HUD's goal is to ensure that 100% of applicable new eligible contract actions, including task or delivery orders under new contracts and existing contracts, meet sustainable acquisition requirements, and require the supply or use of products and services that are energy efficient (ENERGY STAR or Federal Energy Management Program-designated), water efficient, biobased, environmentally preferable, non-ozone depleting, contain recycled content, or are non-toxic or less toxic alternatives.

HUD Procurement Handbook 2210.3, Revision 10, Subchapter 2423.4 Use of Recovered Materials and Biobased Products, states that it is the policy of the Department to procure products containing recovered materials to the greatest extent practicable in accordance with all applicable Federal statutes, regulations, policies, and other guidelines.

HUD's purchasing includes minimal mission-dependent supplies and services. The most critical of these are information and communications technology (ICT) and operational

technology (OT) products and services. Going forward, HUD will assess supply chain vulnerability to potential climate-related disruptions and implement strategies to mitigate the associated risks to operations.

5. Climate-Informed Funding to External Parties

As part of the Administration's whole-of-government approach to the climate crisis, the Department is expanding efficient and resilient housing options in Public Housing and other HUD-assisted housing.

HUD provides various grant and loan programs to help build climate adaptation and resilience while also working to embed climate resilience across the Department's portfolio. For example, through the Indian Housing Block Grant competitive program, HUD provides funds to Native American Tribes to help them build and rehabilitate housing on Tribal lands and prepare for the effects of climate change. Choice Neighborhoods grants are designed to revitalize neighborhoods in an energy-efficient and resilient manner.

HUD's Office of Policy Development and Research has several research priorities studying how best to encourage resilient communities, including housing technology research, which has produced important information on cost-effective building technologies and on building technologies that make the housing stock more energy efficient and resilient, such as the Designing for Natural Hazards Series for builders and developers.

The Department has made important changes to program delivery. For example, HUD overhauled the Agency's disaster recovery efforts to better serve communities that face the direct impacts of weather-related disasters. Based on the increasing number of disasters, the Department established the Office of Disaster Management (ODM) in the Office of the Deputy Secretary, and the Office of Disaster Recovery (ODR) within the Office of Community Planning and Development to streamline the agency's disaster recovery and resilience work by increasing coordination, streamlining internal processes, and increasing capacity to get recovery funding to communities. The CDBG-DR Consolidated Notice included new climate and environmental justice-related requirements that apply to the $10 billion in recovery funds allocated for 2020-2023 disasters to prioritize long-term environmental resilience and disadvantaged communities.

HUD supports disadvantaged communities both through its programs and outreach resources. HUD has various tools and technical assistance initiatives to help communities navigate federal funding opportunities, including the Funding Navigator, the Tribal Climate Resilience and Adaptation Website, the Community Resilience Toolkit and accompanying implementation guides, the Resilient Building Codes Toolkit, the Community Compass Technical Assistance program, and the Climate Communities Initiative (CCI). The CCI has, as of December 2023, provided direct technical assistance

to seven participating communities on local priorities or projects related to climate resilience.

The Notice of Funding Opportunity (NOFO) from HUD's Supportive Housing for the Elderly Program (Section 202), published in September 2022, awarded points for projects that incorporate green and resilient building approaches and outcomes. In January 2024, HUD finalized Climate Preference Guidance for NOFOs. HUD's Supportive Housing for the Disabled (Section 811) FY23 NOFO includes preference points for Environmental Justice and Climate. The Department's 2025 Budget requests $407 million across HUD for targeted investments to improve the quality of housing and support disadvantaged communities through climate resilience, energy, and water efficiency.

3C. Climate Training and Capacity Building for a Climate Informed Workforce

Training and Capacity Building	
Agency Climate Training Efforts	*Percent of the Agency's Federal staff that have taken a 60+ minute introductory climate training course (e.g., Climate 101).* <1% - Two HUD employees completed Climate Audio Summaries of Training, and four employees started climate trainings from the Skillsoft Percipio Training Catalog.
	Percent of the Agency's senior leadership (e.g., Sec, Dep Sec, SES, Directors, Branch Chiefs, etc.) that have completed climate adaptation training. *0%*
	Percent of budget officials that have received climate adaptation related training. *0%*
	Percent acquisition officials that have received climate adaptation related training. *0%*
	Additional efforts the Agency is taking to develop a climate informed workforce. The Department is undertaking efforts to foster a climate-informed and ready workforce, and to train

	staff on new funding resources for resilience and sustainability efforts. The Climate and Environmental Justice Working Group (CEJWG) spearheads monthly meetings to share information, trainings, and resources on key topics related to environmental justice and resilience, and to track progress on objectives outlined in the Climate Action Plan. In January 2024, 200 Denver Field Staff received training on funding opportunities made available through BIL and IRA for climate resilience. HUD maintains the goal of training all field office staff by the end of calendar year 2024. Other examples of staff engagement include: • **Climate Conversations**: HUD-wide employee climate series intended to increase employee knowledge of key elements of the climate portfolio and climate work across programs. • **Counseling trainings**: The Office of Housing hosted sessions to train housing counselors about the key role of energy efficiency in boosting housing affordability and improving health, safety, and comfort. • **Lunch and Learns**: The Office of General Counsel conducted a series on climate and environmental justice for between 140 and 170 OGC staff at each webinar. The Office of Public and Indian Housing established a Climate Action Related Lunch and Learn group that has membership of fourteen PIH Field Office Directors.
Agency Capacity	*Number of full-time Federal staff (FTE) across the Agency that have tasks relevant to climate adaptation in their job description*. Climate adaptation and resilience is part of HUD's mission to create strong, sustainable, inclusive communities and quality affordable homes for all. It is embedded in HUD's Strategic Plan and Climate Action Plan and identifies milestones and actions for each program office. HUD also has a Climate and Environmental Justice Working Group (CEJWG) led by HUD

	program offices that focuses on climate action, resources, and training opportunities across the Department.

HUD's internal Climate and Environmental Justice Working Group, led by the Senior Advisor for Climate and the Office of Environment and Energy, is focused on the long-term integration of climate action and environmental justice into the Department's programs to better achieve HUD's mission, both through implementation of the Department's Climate Action Plan and through building a climate informed workforce. The group has met monthly since 2021 and is comprised of nearly 100 members at varying levels of hierarchy across the Department.

In 2023, the Office of Environment and Energy provided 7.5 hours of climate training and capacity building to over 4,000 participants through a HUD-wide employee Climate Series. The five "Climate Conversations" focused on increasing HUD's employee knowledge of key elements of the climate portfolio and HUD's role in advancing a climate-resilient nation covering topics such as energy and carbon reduction, disaster recovery, sustainability at the HUD Headquarters building, and other cross-cutting topics. "Climate Conversations" will continue in 2024 with five additional training and capacity-building sessions being planned.

The Office of General Counsel (OGC) conducted a series of Lunch and Learns on Climate and Environmental Justice. Between 140 and 170 OGC staff attended each webinar. Topics included Environmental Justice: Its History and HUD's Role; HUD's Climate Action Plan and Justice40 Initiatives (with a focus on the Office of Lead Hazard Control and Healthy Homes); Climate-Related Threats Faced by Our Nation's Indigenous Communities Environmental Justice at HUD: Finding, Remedying, and Preventing the Impacts of Environmental Stressors; Building Flood-Resilient Communities; and Environmental Justice and Title VI. OGC offered this series in part to engage OGC staff and to help staff in different parts of OGC connect with HUD's larger climate and environmental justice goals. The series will continue in 2024.

The Office of Public and Indian Housing created the opportunity for Field Office Directors to learn more about energy efficiency financing, renewable technology, and other available resources through a lunch and learn group where information was shared to help support public housing authorities in reducing energy usage and improving climate resilience.

The Office of Policy Development and Research organized monthly sessions as part of its Knowledge Collaborative on Disaster Recovery and Risk Reduction, hosting external researchers and internal HUD staff to present their work in the disaster recovery or risk reduction space.

3D. SUMMARY FOR MAJOR MILESTONES

Section of the Implementation Plan	Description of Milestone	Climate Risk Addressed	Indicators for success
Section 3A Part 1 *Addressing Climate Hazard Exposures and Impacts Affecting Federal Buildings*	*Collaborate with GSA to support climate readiness and net-zero emissions initiatives for government and private-leased facilities.*	*Sea level rise* *Extreme heat* *Extreme precipitation* *Wildfire risk*	*HUD has a sustained relationship with GSA that convenes regularly.* *New initiatives are developed to support the resilience of GSA leases under HUD's purview. FY24/25: Collaborate with GSA to identify key account managers responsible for resilience within HUD's portfolio.*
Section 3A Part 1 *Addressing Climate Hazard Exposures and Impacts Affecting Federal Buildings*	*Utilize ESPC to perform retrofits and improvements at the Robert C. Weaver Building.*	*Extreme Heat*	*FY24/25: Complete the following Energy Conservation Measures (ECMs):* *Replace main chillers at the Weaver Building, which will increase system reliability and reduce risk of cooling loss at critical times.* *Perform LED lighting retrofit to entire Weaver Building, which will reduce energy and reduce cooling load.*

Section 3A Part 1 *Addressing Climate Hazard Exposures and Impacts Affecting Federal Buildings*	*Collaborate with the GSA to replace all the main Air Handling Units (AHUs) at the Weaver Building.*	*Extreme heat*	*Complete study and design FY24* *Construction expected to start FY25.*
Section 3A Part 2 *Evaluate workforce risks related to occupational hazards*	*Collaborate with GSA on opportunities to advance climate readiness for employees.*	*Sea level rise* *Extreme heat* *Extreme precipitation* *Wildfire risk*	*FY24: Work with GSA to identify opportunities to protect occupants, reduce risks and ensure safety from potential climate hazards in HUD leased space.*
Section 3A Part 2 *Evaluate workforce risks related to occupational hazards*	*Evaluate workforce risks related to occupational hazards.*	*Sea level rise* *Extreme heat* *Extreme precipitation* *Wildfire risk*	*FY24/25: Develop strategies to reduce employee risks associated with occupational exposures.* *FY24: Create a campaign to increase employee awareness of hazards and exposure risks.* *FY24/25: Evaluate occupational health and safety policy for opportunities to mitigate climate risk and adopt and implement effective opportunities.*
Section 3B Part 2 *Incorporating Climate Risk Assessment into Budget Planning*	*Incorporate climate risk into budget planning for programs and services.*	*Sea level rise* *Extreme heat* *Extreme precipitation* *Wildfire risk*	*Enhance knowledge through research and expand data use to evaluate and protect portfolio from climate risk,*

			such as through integrating National Risk Index data in programs and policies and advancing research through the USGCRP.
3B Part 3 *Incorporating Climate Risk into Policy and Programs*	*Advance climate adaptation and resilience in policies and programs.*	*Sea level rise* *Extreme heat* *Extreme precipitation* *Wildfire risk*	*Increase the number and percentage of goals completed under HUD's Climate Action Plan to increase climate resilience.* *Enhance the application of program funds toward adaptation and resilience building.* *Advance incentives and requirements for adopting green building codes and energy standards across the HUD portfolio.* *Deliver adaptation funding through GRRP, CDBG (CDBG-DR and CDBG-MIT), and other climate- and energy-focused programs.* *Ensure equitable access to resources through creating toolkits and services and*

			improving user experience through updates, such as to the HUD Exchange website.
3B Part 3 *Incorporating Climate Risk into Policy and Programs*	*Advance use of nature-based solutions (NBS) to address climate risks for more sustainable planning, design, and management.*	*Sea level rise* *Extreme heat* *Extreme precipitation* *Wildfire risk*	*Expand the percentage of programs and policies that include guidelines and requirements for considering NBS, when viable.* *Encourage awareness of NBS among staff and grantees through training and tools.*
3B Part 3 *Incorporating Climate Risk into Policy and Programs*	*Center environmental justice to support the resilience of disadvantaged communities that are marginalized by underinvestment and overburdened by pollution.*	*Sea level rise* *Extreme heat* *Extreme precipitation* *Wildfire risk*	*Increase the number and percentage of goals completed under HUD's Climate Action Plan to promote environmental justice.*
3B Part 3 *Incorporating Climate Risk into Policy and Programs*	*Bolster the opportunities for collecting Tribal input to meaningfully adapt programs and policies to better meet needs and priorities.*	*Sea level rise* *Extreme heat* *Extreme precipitation* *Wildfire risk*	*Ensure adaptation and environmentally focused policies and programs include and incorporate Tribal feedback.*
3B Part 3 *Incorporating Climate Risk into Policy and Programs*	*Advance sustainable communities through investing in climate resilience and carbon reduction strategies.*	*Sea level rise* *Extreme heat* *Extreme precipitation* *Wildfire risk*	*Increase the number and percentage of goals completed under HUD's Climate Action Plan to*

			increase energy efficiency.
3B Part 5 *Climate Informed Funding to External Parties*	*Maintain, improve, and create opportunities to fund resilience through HUD programs and policies.*	*Sea level rise* *Extreme heat* *Extreme precipitation* *Wildfire risk*	*Deploy funds through various programs, including CDBG, CDBG-DR, CDBG-MIT, and GRRP, and strengthen climate considerations in other programs, including Choice Neighborhoods, Section 108, Rental Assistance Demonstration Program, Section 202, and more.*
3C *Climate Training and Capacity Building for a Climate Informed Workforce*	*Foster a climate ready and climate informed workforce.*	*Sea level rise* *Extreme heat* *Extreme precipitation* *Wildfire risk*	*Increase the number of Federal staff that have participated in climate training courses, lunch and learns, and climate conversations. Offer Climate 101 to HUD staff during FY24.*

SECTION 4: DEMONSTRATING PROGRESS

4A. Measuring progress

*The metrics below include yes/no/partially questions to establish the Agency's current efforts, as well as process metrics to show how climate adaptation is being integrated across planning and budgeting efforts. These metrics provide a consistent set of information across the Federal government and feed into outcome metrics addressing the **climate resilience and adaptive capacity** of the Federal government to climate hazards in 2050 and 2080 based on RCP4.5 and RCP8.5.*

Key Performance Indicator: Climate adaptation and resilience objectives and performance measures are incorporated in planning and budgeting of agency programs by 2027.		
Section of the CAP	**Process Metric**	**Agency Response**
3A – Addressing Climate Hazard Impacts and Exposure	Step 1: Agency has an implementation plan for 2024 that connects climate hazard impacts and exposures to discrete actions that must be taken. (Y/N/Partially) Step 2: Agency has a list of discrete actions that will be taken through 2027 as part of their implementation plan. (Y/N/Partially)	Partially for both Steps 1 and 2. There are planned actions in place for HUD's Weaver Building. All other buildings are leases that will require HUD to coordinate hazard assessment and planned actions with the GSA, which owns and manages the buildings.
3B.1 – Accounting for Climate Risk in Decision-making	Agency has an established method of including results of climate hazard risk exposure assessments into planning and decision-making processes. (Y/N/Partially)	No. HUD's building portfolio is comprised of fully serviced GSA leases. HUD will work with GSA to better assess risk exposure for its locations and consider mitigation strategies accordingly.
3B.2 – Incorporating Climate Risk Assessment into Budget Planning	Agency has an agency-wide process and/or tools that incorporate climate risk into planning and budget decisions. (Y/N/Partially)	Yes. During the budget formulation process, HUD issues guidance to all program offices requesting their budget submissions include proposals that

		consider or address climate risk. The Department's Annual Strategic Plan incorporates climate risk into planning and budget decisions.
3B.5 – Climate Informed Funding to External Parties	Step 1: By July 2025, Agency will identify grants that can include consideration and/or evaluation of climate risk. Step 2: Agency modernizes all applicable funding announcements/grants to include a requirement for the grantee to consider climate hazard exposures. (Y/N/Partially)	Partially for both Steps 1 and 2. HUD has finalized Climate Preference Guidance for NOFOs. HUD will continue to apply its NOFO template and incorporate evaluation of climate risk across programs and funding opportunities.
Key Performance Indicator: Data management systems and analytical tools are updated to incorporate relevant climate change information by 2027.		
Section of the CAP	**Process Metric**	**Agency Response**
3A – Addressing Climate Hazard Impacts and Exposure	Agency has identified the information systems that need to incorporate climate change data and information and will incorporate climate change information into those systems by 2027. (Y/N/Partially)	No. HUD will coordinate with its Office of the Chief Information Officer (OCIO) and Office of the Chief Data Officer to determine by 2025 if there are any internal systems that will require the incorporation of climate change data.
Key Performance Indicator: Agency CAPs address multiple climate hazard impacts and other stressors, and demonstrate nature-based solutions, equitable approaches, and mitigation co-benefits to adaptation and resilience objectives.		
Section of the CAP	**Process Metric**	**Agency Response**
3B.3 – Incorporating Climate Risk	By July 2025, 100% of climate adaptation and resilience policies have been reviewed and revised to (as	Partially. HUD has finalized Climate Preference Guidance for NOFOs. HUD will continue

into Policy and Programs	relevant) incorporate nature-based solutions, mitigation co-benefits, and equity principles. (Y/N/Partially)	to apply its NOFO template and incorporate evaluation of climate risk across programs and funding opportunities.
Key Performance Indicator: Federal assets and supply chains are evaluated for risk to climate hazards and other stressors through existing protocols and/or the development of new protocols; response protocols for extreme events are updated by 2027.		
Section of the CAP	**Process Metric**	**Agency Response**
3B.4 – Climate-Smart Supply Chains and Procurement	Step 1: Agency has assessed climate exposure to its top five most mission-critical supply chains. (Y/N/Partially) Step 2: By July 2026, the Agency has assessed services and established a plan for addressing/overcoming disruption from climate hazards. (Y/N/Partially)	Partially for Steps 1 & 2. HUD is in the process of implementing a Supply Chain Risk Management (SCRM) Program that will include the assessment of climate hazard risk to critical supplies and services. SCRM Program is scheduled to be fully implemented FY 2025 2nd quarter.
	Agency has identified priorities, developed strategies, and established goals based on the assessment of climate hazard risks to critical supplies and services. (Y/N/Partially)	Partially. In the Climate-Smart Supply Chains and Procurement space, the Civilian Agency Acquisition Council has Federal Acquisition Regulation (FAR) Case 2022-006, Sustainable Procurement in the final rule stage of development, after the proposed rule was available for comment. The FAR Case focuses on current environmental and sustainability matters and implements a requirement for agencies to procure sustainable products and services to the maximum extent practicable, in alignment

		with Executive Order 14057, Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability, OMB Memorandum M-22-06, and the Council on Environmental Quality Implementing Instructions. Once the rule is finalized, it will be incorporated into the procurement process and the SCRM Program.
Key Performance Indicator: By 2027, agency staff are trained in climate adaptation and resilience and related agency protocols and procedures.		
Section of the CAP	**Process Metric**	**Agency Response**
3C – Climate Training and Capacity Building for a Climate Informed Workforce	Step 1: By December 2024 100% of agency leadership have been briefed on current agency climate adaptation efforts and actions outlined in their 2024 CAP. (Y/N/Partially) Step 2: Does the agency have a Climate 101 training for your workforce? (Y/N/Partially) If yes, what percent of staff have completed the training? Step 3: By July 2025, 100 % employees have completed climate 101 trainings. (Y/N/Partially)	Yes for Step 1. By December 2024, HUD will hold a full leadership briefing on current agency climate adaptation efforts and actions outlined in the 2024 CAP. No for both Steps 2 and 3. In 2024, HUD will explore opportunities to expand access to a Climate 101 training for staff to strengthen climate literacy.

4B. Adaptation in Action

HUD, since its initial 2021 Climate Adaptation Plan, has advanced its goals to (1) update climate risk data and research; (2) enhance mortgage financing; (3) strengthen disaster recovery and resilience; and (4) expand capacity building.

HUD is supporting research and data procurement to assess climate risk within its portfolio. In December 2023, the Department joined the United States Global Change Research Program (USGCRP) to guide and contribute to the federal government's scientific research. Joining USGCRP helps to ensure that the data and products developed can be accessed by and used to support the people and communities that HUD serves. It also is a step to help address challenges the Department has faced in reviewing and addressing the need for building-level, or downscaled data. HUD's working group on climate services focuses on these issues and is working to improve documentation and identify opportunities for filling data gaps. HUD is incorporating FEMA's National Risk Index (NRI) data into its Funding Navigator to assist HUD grantees or assisted property owners in assessing exposure to natural hazards while connecting to funding opportunities to build resilience to these hazards.

The Department is working to enhance mortgage financing to enable capital to fund the purchase, refinance, construction, and rehabilitation of single- and multi-family housing, assisted housing, and healthcare facilities around the country. Ginnie Mae, for instance, has expanded its low-to-moderate income (LMI) disclosure initiative to enhance environmental, social, and governance (ESG) disclosures. This initiative provides market participants with tools and data to concentrate their investments and to discern the social impact of their investment decisions in disadvantaged communities. HUD has also worked to reduce Mortgage Insurance Premiums (MIP) to incentivize property owners to adopt higher building standards.

HUD is strengthening programs to promote disaster recovery and resilience. For example, the Department updated CDBG-DR requirements and released coordinating tools to support grantees in proactively planning for future climate risk. The Department, alongside DOE and DHS, launched a joint effort with Puerto Rico to strengthen the island's grid resilience and advance new initiatives to enhance Puerto Rico's energy future. Additionally, on April 23rd, HUD updated the **Federal Flood Risk Management Standard (FFRMS)**, 24 CFR part 55, a final rule ensuring that federally funded construction projects are built to withstand current and future flood risks.

The Department is expanding capacity-building opportunities to ensure programs reach grantees in an accessible and equitable manner. As detailed in above, the Department has launched various tools and guidance on its HUD Exchange Build for the Future website. Through deploying technical assistance opportunities and planning regional convenings, the Department is working to reach LMI and disadvantaged communities to amplify their capacities for leveraging HUD's available funding sources.

HUD is continuing to reach goals set out in its 2021 Climate Action Plan and to set new ones, recognizing climate adaptation as central to HUD's mission to build resilient, sustainable, and inclusive communities across the nation.

Appendix A: Risk Assessment Data

The Federal Mapping App uses the following data:

Buildings

Buildings data comes from the publicly available Federal Real Property Profile (FRPP). The General Services Administration (GSA) maintains FRPP data and federal agencies are responsible for submitting detailed asset-level data to GSA on an annual basis. Although FRPP data is limited—for example, not all agencies submit complete asset-level data to GSA, building locations are denoted by a single point and do not represent the entirety of a structure or could represent multiple structures, and properties may be excluded on the basis of national security determinations— it is the best available public dataset for federal real property. Despite these limitations, this data is sufficient for screening-level exposure assessments to provide a sense of potential exposure of federal buildings to climate hazards.

Personnel

Personnel data comes from the Office of Personnel Management's (OPM) non-public dataset of all personnel employed by the federal government that was provided in 2023. The data contains a number of adjustments, including exclusion of military or intelligence agency personnel, aggregation of personnel data to the county level, and suppression of personnel data for duty stations of less than 5 personnel. Despite these adjustments, this data is still useful for screening-level exposure assessments to provide a sense of key areas of climate hazard exposure for agency personnel.

Climate Hazards

The climate data used in the risk assessment comes from the data in Climate Mapping for Resilience and Adaptation (CMRA) Assessment Tool. When agency climate adaptation plans were initiated in 2023, CMRA data included climate data prepared for NCA4. Additional details on this data can be found on the CMRA Assessment Tool Data Sources page. Due to limited data availability, exposure analyses using the Federal Mapping App are largely limited to the contiguous United States (CONUS). Additional information regarding Alaska, Hawai‘i, U.S. Territories, and marine environments has been included as available.

PITTSBURGH **2030** DISTRICT

2023 ANNUAL PROGRESS REPORT

Green Building Alliance

PUBLISHED MAY 2024

Statement of land acknowledgement

We recognize that the City of Pittsburgh and many of the 2030 District properties occupy the historic land of the Osage and Shawnee peoples.[1] We honor the past, present, and future people, community, and culture of the Osage and Shawnee peoples and express our gratitude for this land as we work to respect and care for it.

Exhibit Staging Center and Nature Lab at Phipps Conservatory & Botanical Gardens

FROM INDIVIDUAL ACTION TO COLLECTIVE IMPACT

What does climate change look like for Pittsburgh? More rain. More floods. More landslides. More heat. Annual precipitation is expected to increase by several inches, leading to more sewage going into our rivers. More frequent and more severe storms will lead to increased flooding, especially in Downtown, the Strip District, North Shore, South Shore, and parts of Lawrenceville.[2] Pittsburgh is already susceptible to landslides, and increased precipitation increases this risk.[3]

Though this vision of our future is scary, we can prevent the worst from happening.

Tackling climate change and cutting emissions can often feel overwhelming and impossible, but it doesn't have to be. If you have been changing lights to LEDs, upgrading your HVAC system, and improving your building performance, *you are already making an impact*.

Buildings produce 37% of global carbon emissions[4] – a key reason why improving building performance is essential to curb the effects of climate change. A project like switching your lights to LEDs may feel insignificant, but if you do it, and your neighbor does it, and their neighbor does it, these actions multiply impact to the tune of *2 billion kbtus of energy and 507,000 metric tons of carbon emissions avoided* across our region last year. This is the core of the Pittsburgh 2030 District: inspiring individuals like you to take action – big or small – towards improving your buildings and multiplying your impact across Pittsburgh and Western PA, creating a community that is greater than the sum of its parts. We did this – together.

You are not alone. Your projects and building retrofits don't exist in a vacuum. They have galvanized your neighbors, your region, and your nation into action. The connections formed in the 2030 District program later catalyzed the Oakland Energy Master Plan, a long-range effort to decarbonize the neighborhood of Oakland. Allegheny County will create its first climate action plan by July 2024 to put the county on a path to reduce carbon emissions.[5] Regionally, the Southwestern Pennsylvania Commission was awarded a $1 million grant to develop a regional climate action plan that will reduce greenhouse gas emissions across the 10 counties of southwestern PA.[6] Completing this plan unlocks $4.6B for implementation grants.

Nationally, the Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act (IRA) included significant funding for actions to reduce greenhouse gas emissions and produce clean energy. Passed in 2021, the IIJA includes funding for expanded and improved public transit, improving climate resilience, EV charging infrastructure, and environmental remediation projects.[7] The IRA expands numerous tax credits to incentivize renewable energy production, carbon capture projects, electric vehicles, and building energy efficiency.[8]

Now is the time. Funding is here. Technical assistance is here. And your community is behind you. The barriers to making buildings better are lower than ever before, and improving buildings is how we will save our region.

If you haven't yet started, reach out to us. We are here to help you every step of the way. If you have started, let's go even further. Lead the charge by electrifying your building. Put solar panels on your roof or sign a power purchase agreement with a renewable energy provider. Make improvements to your building envelope. Show your neighbors and your community how we can ensure a brighter future, *together.*

Together, we can stop the worst effects of climate change for the globe, for the region, for Pittsburgh. Together, all actions big and small will go further than ever before.

Join us.

Ashley DiGregorio
2030 District Senior Director

Paige Colao
Director of Strategy & Analysis

2023 DATA

540+
BUILDINGS COMMITTED WITHIN BOUNDARY

86M+
SQUARE FEET COMMITTED WITHIN BOUNDARY

COMMITTED
COMMITTED UNBUILT
NOT YET COMMITTED

48.0%
CARBON REDUCTION (INCLUDING RECs)

22.3%
ENERGY REDUCTION

39.4%
WATER REDUCTION

30M
SQUARE FEET EVALUATED FOR IAQ
(2021 DATA)

507,000
METRIC TONS OF CO_2e EMISSIONS AVOIDED

$75M
ANNUAL UTILITY COST SAVINGS

$469M
CUMULATIVE UTILITY COST SAVINGS

THE 2030 DISTRICTS NETWORK

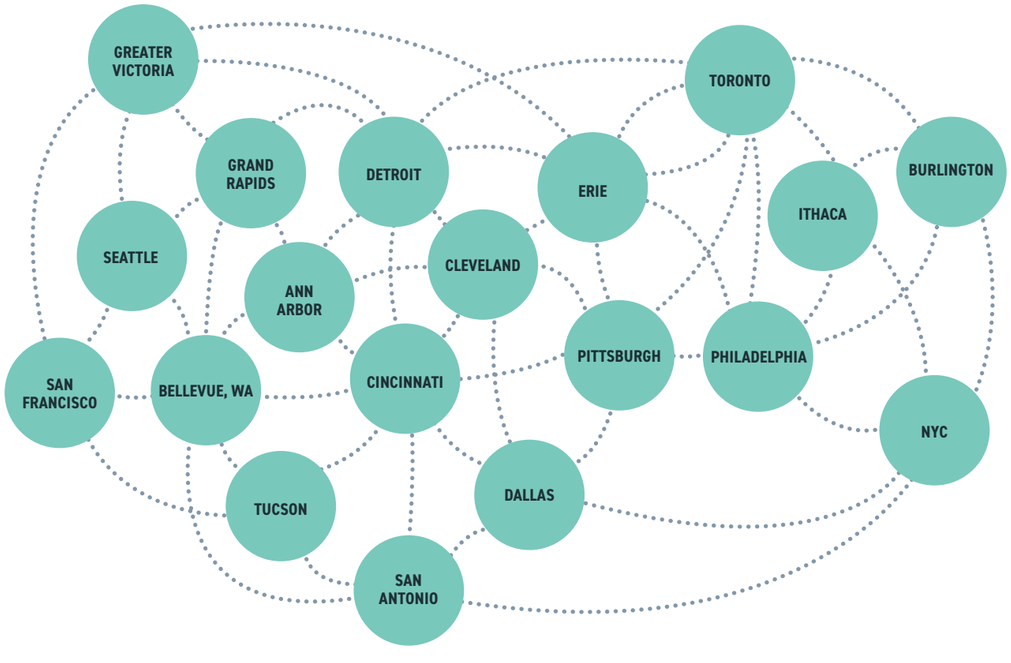
2030 Districts: A Performance-Based Model

According to the United Nations, building construction and operations accounted for 37% of energy-related carbon emissions.[4] The 2030 District Challenge aligns targets for reducing building-based carbon emissions with the United Nations 2030 Agenda for Sustainable Development. Property Partners join community organizations, utilities, designers, technology firms, financiers, and government officials to explore, test, and share a wide variety of approaches to reducing energy-related carbon emissions throughout the region.

Inspiring Leadership & Expanding Throughout Western Pennsylvania

The Pittsburgh 2030 District has set the standard for high-performance buildings. The District is a community of more than 130 organizations across numerous industries and sectors. Pittsburgh is a founding member of the 2030 Districts Network that includes 23 established 2030 Districts internationally with more than 615 million square feet and 1,650 member organizations committed to the 2030 Challenge.[9] As the Network's largest District, Pittsburgh demonstrates leadership in sustainable and high-performing buildings.

The success of the Pittsburgh 2030 District prompted the creation of the Erie 2030 District in 2018, and other communities are showing interest. This year, GBA secured funding through the West Penn Power Sustainable Energy Fund to create a 2030 District in New Kensington, and grassroots leaders in Meadville, PA, are considering adopting the program in their community. Green Building Alliance is thrilled to support these new partners as they create 2030 Districts and expand environmental, economic, and human health benefits across our region and state.



Beyond 2030: Accelerating to Zero

At the 26th Conference of Parties in Glasgow (COP26), Architecture 2030 warned "If the world is to meet the 1.5°C carbon budget set in the 2015 Paris Agreement [figure 2], we must **reduce CO_2 emissions in the entire [existing] built environment by 50–65% by 2030 and reach zero carbon by 2040**."[10] New buildings and major renovations must be designed for zero carbon immediately.

We are teetering perilously close to the 1.5°C threshold. A recent report from the European Union's Copernicus Climate Change Service revealed that average global temperatures in 2023 were 1.48°C above pre-industrial levels.[11] The time to act is now. Accelerating to zero carbon calls for education, building electrification, increasing renewable energy, reducing embodied carbon, and advocating for carbon reduction incentives.

The Pittsburgh 2030 District is a great example of how the built environment can work towards decarbonization and decrease the likelihood of devastating effects. The work of Property Partners in the Pittsburgh, Erie, and future New Kensington 2030 Districts is essential to reduce global warming.

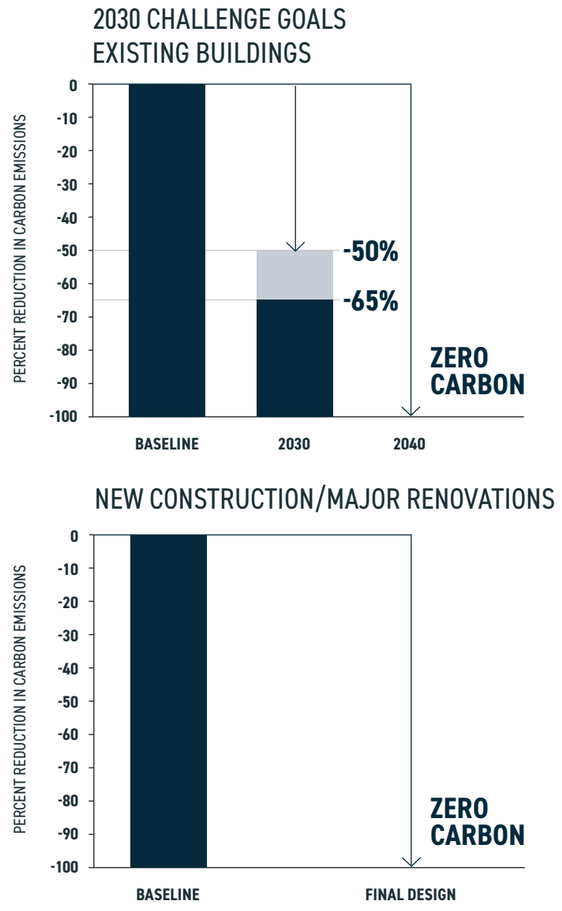


figure 1

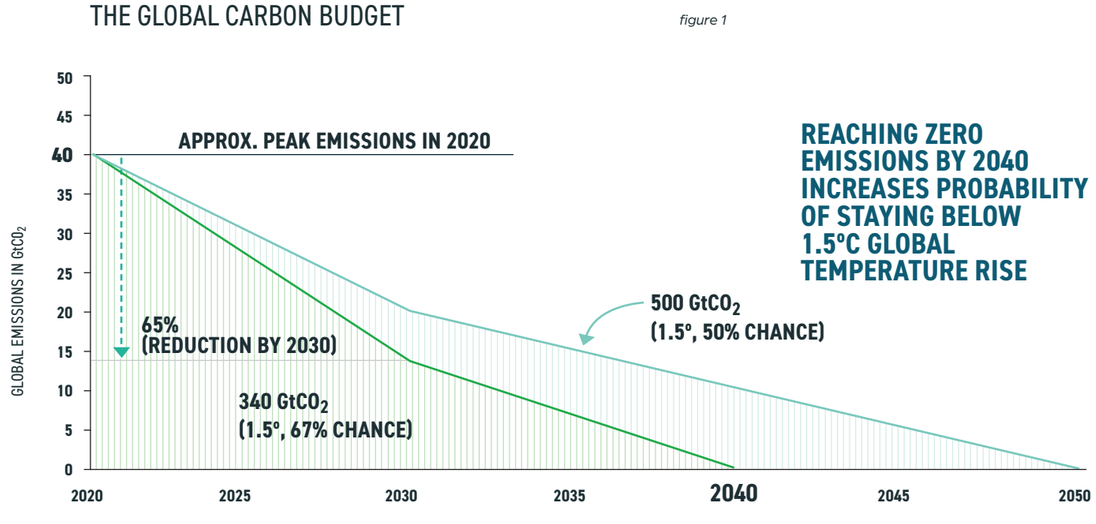


figure 2

Baseline & Performance Metrics

Determining a building's reduction in carbon emissions, energy, and water use, and their improvement in indoor air quality requires a baseline. Unique use types such as stadiums and museums have custom baselines referencing their historic performance.

	CARBON EMISSIONS	ENERGY	WATER	INDOOR AIR QUALITY
BASELINE TYPE	National Baseline	National Baseline	Local Baseline	Local Baseline + Best Practices from Building Rating Systems
BASELINE SOURCE	2003 Commercial Building Energy Consumption Survey (CBECS)	2003 Commercial Building Energy Consumption Survey (CBECS)	2009–2012 Pittsburgh Water & Sewer Authority water usage	University of Pittsburgh pilot study; best practices from building rating systems, including BREEAM, LEED, WELL, FitWell, RESET, Living Building Challenge, and Core
BASELINE CONSIDERATIONS	• Climate zone • Building use type(s) • Occupancy • Weather	• Climate zone • Building use type(s) • Occupancy • Weather	• Building use type(s) • Building size	• Building use type(s)
IMPACT METRIC	Annual Emissions Intensity (EI)	Annual Energy Use Intensity (EUI)	Annual Water Use Intensity (WUI)	N/A
MEASUREMENT UNITS	kg CO_2e/square foot/year	kBtu/square foot/year	Gallons/square foot/year	Points-based system
TRACKING METHOD	ENERGY STAR Portfolio Manager	ENERGY STAR Portfolio Manager	ENERGY STAR Portfolio Manager	GBA Indoor Air Quality Survey
REPORTING 2023 PERFORMANCE	357 buildings, 64.9 million square feet, 75% of total committed square feet	365 buildings, 66.4 million square feet, 77% of total committed square feet	267 buildings, 49.4 million square feet, 57% of total committed square feet	Reporting 2021 Performance 141 buildings, 30.2 million square feet, 35% of total committed square feet

table 1

Berner Air Curtains: Manufacturing Sustainability

Solar Array Capacity:
866 kW
Estimated Renewable Energy Generated per Year:
904,000 kWh
Estimated Carbon Savings:
277.2 Metric Tons of CO_2e
Estimated Annual Utility Cost Savings:
$45,000
Project Cost:
$1.4 million
Project Team:
PA Solar Center, EIS Solar

Photo Credit: Berner International

Berner Air Curtains has always kept sustainability at the forefront of their mission. Their air curtains help to save energy, optimize HVAC performance, and protect indoor air quality from outdoor pollutants and insects by generating a stream of air over an entryway to create a seal to regulate temperature. "At Berner International, we are committed to sustainability," Miranda Berner points out.

"Our dedication to eco-friendly manufacturing and products means energy savings and healthier spaces."

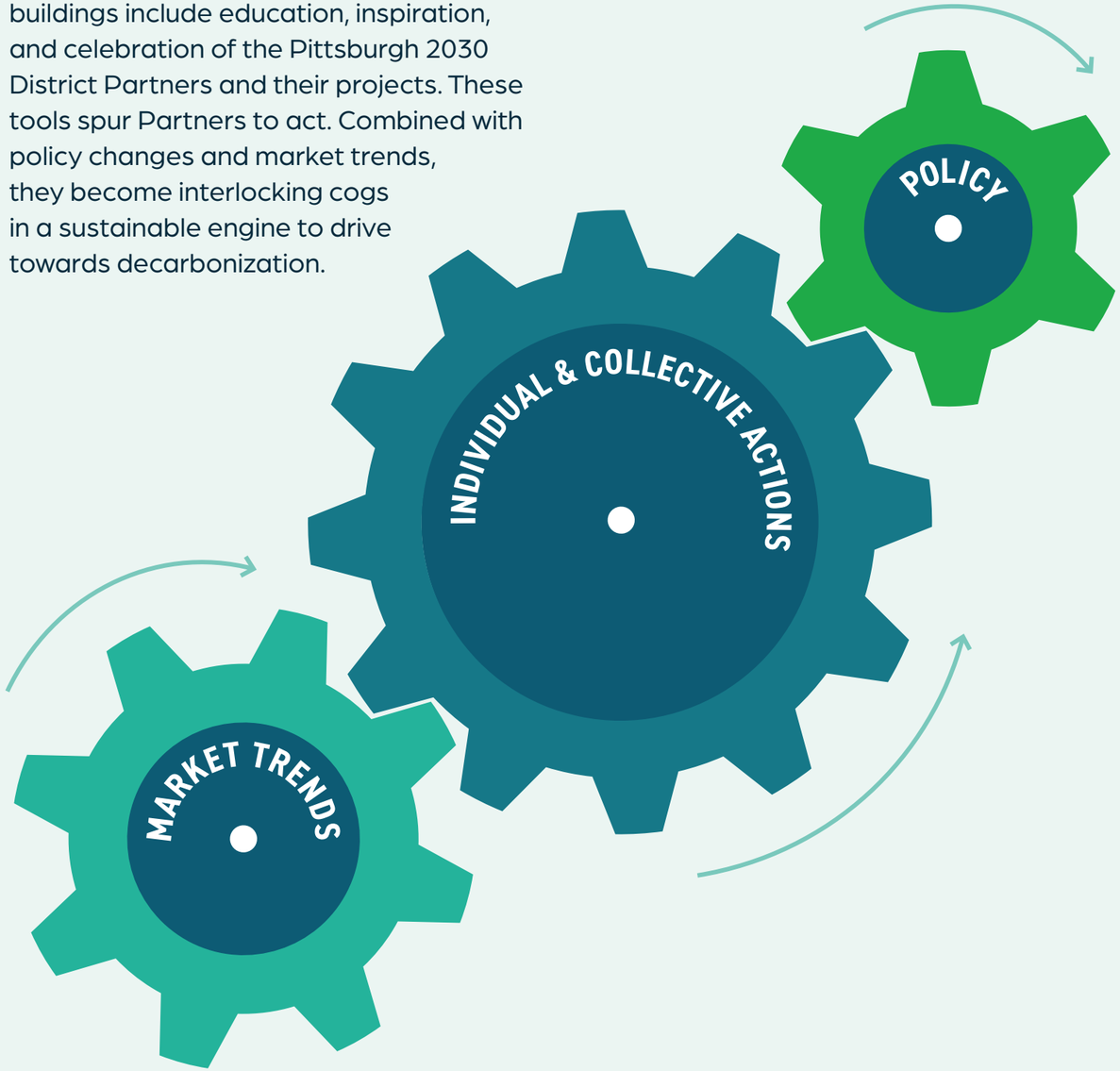
Berner has made continual sustainability improvements to its operations, such as creating a company green team, adding a recycling program, and making numerous equipment upgrades. Their most recent addition is an 866kW solar array on their manufacturing facility in New Castle, PA, expected to generate nearly 1 GWh of energy per year. The array will provide 160% of the facility's current energy use. It was intentionally oversized to account for a future building addition. Until the addition is created, Berner is selling the excess electricity generated back to the grid.

Berner had considered installing solar several times in the past, but it didn't make financial sense prior to the improved federal solar investment tax credit. With the help of the PA Solar Center, they were able to leverage several funding sources to bring the project to life. They successfully applied for a USDA Rural Energy for America Program grant that covered 40% of the project cost, with an additional 30% of the project cost covered by the tax credit.[12]

Berner's sustainability journey keeps marching forward. Additional projects include installing EV chargers for employee use, electrifying their forklifts, and implementing future green building practices. Their vision has led multiple companies to reach out to discuss this solar project and seek other ways they can invest in sustainability. In conjunction with local nonprofit Catalyst Connection, Berner recently hosted an event geared to manufacturers who are interested in starting their sustainability journey, highlighting their leadership and desire to inspire others to take action.[13]

THE DECARBONIZATION ENGINE

The tools to achieve zero carbon buildings include education, inspiration, and celebration of the Pittsburgh 2030 District Partners and their projects. These tools spur Partners to act. Combined with policy changes and market trends, they become interlocking cogs in a sustainable engine to drive towards decarbonization.



Retrofitting Existing Buildings

Building retrofit projects, while an individual action, interact heavily with policy and market trends to advance decarbonization. Look no further than LEDs. When first introduced, they were more expensive than incandescent and fluorescent bulbs, though they used significantly less energy and lasted longer. Building owners had to make a conscious decision to purchase LEDs at first. As more consumers recognized their benefits, the market expanded and prices dropped, making LEDs more cost competitive. They are now the standard in lighting. We have increasingly seen 2030 District Partners make the switch to LEDs in recent years. That one choice to switch to LEDs – whether years ago or yesterday – is part of a collective effort towards decarbonization.

Beneficial Electrification & Transitioning to a Cleaner Grid

With more renewable energy generation being added to the electric grid, it becomes "cleaner" over time. As buildings continue to electrify, their improved efficiency combined with the increasingly cleaner grid will reduce emissions. Buying renewable energy credits (RECs) and adding on-site renewable energy sources such as solar photovoltaic arrays will provide additional carbon-free energy.

Embodied Carbon & Designing for Reuse

Embodied carbon encompasses carbon emissions produced from the energy used to make a product.[14]

Adaptive reuse of buildings and materials is instrumental in reducing embodied carbon for both new construction and existing building renovations. Reusing building materials or designing for deconstruction drastically decreases the total embodied carbon of new or renovated spaces. Green Building Alliance has helped the City of Pittsburgh to address embodied carbon by integrating it into the performance points system in its zoning code in Oakland.[15]

Refrigerants: Small Leaks, Huge Impact

Refrigerants act as potent greenhouse gases when released into the atmosphere from leaks or improper disposal. While the Montreal Protocol ended the use of the most damaging refrigerants, many high global warming potential refrigerants are still being used in new and existing equipment.[16] Proper disposal and leak management is essential to reducing their effects. Thankfully, the 2016 Kigali Amendment to the Montreal Protocol is phasing out the worst refrigerants, like R-134a[17], which will be eliminated in new chillers this year.[16] The Pittsburgh 2030 District has been discussing refrigerant management with Partners during annual building performance reviews.

Innovative Policy: Building Energy Codes + Performance Standards

Enhancing building energy codes and policies is pivotal in curbing carbon emissions in both new and existing buildings. The International Energy Conservation Code sets the energy performance standard for new and renovated buildings. In Pennsylvania, the adoption process takes 4+ years, resulting in the state lagging behind the latest code.[18] Consequently, new buildings are built to a less stringent energy performance standard, resulting in wasted energy and excess carbon emissions. Updating energy codes could save an estimated 160 trillion BTU of energy and $2M in energy costs in Pennsylvania while also unlocking at least $5.2M in funding from the DOE for implementation.[19]

For existing buildings in PA, there are no policies in place to improve energy performance over time. Building Performance Standards (BPS) address this gap by requiring existing buildings to meet specific energy or carbon emissions performance targets.[20] BPS give building owners flexibility on what measures to implement, and have been successful in 4 states and 11 cities.[20] The 2030 District is a great example of a voluntary program that helps building owners lower their energy use, and policies like BPS can ensure **all** buildings continue to improve energy performance.

CARBON EMISSIONS

From Energy to Carbon: Tracking Progress

Except for renewable energy, producing and using energy creates carbon emissions, and different types of energy have different emissions factors. Depending on the amount of each fuel type that a building uses, the volume of emissions produced will differ. ENERGY STAR Portfolio Manager tracks emissions by determining the amount of each fuel type used and multiplying the amount of fuel used by the corresponding emissions factor.[21]

Carbon Performance & Renewable Energy

2021 marked the first year that the Pittsburgh 2030 District measured carbon emissions on an individual basis. 2023 showed continued performance improvements from 2030 District Partners, achieving carbon emissions reductions of 37% below the baseline. Adding renewable energy production and purchases, 2030 District Partners reached an astounding 48.0% reduction in carbon emissions in 2023!

The increase in performance between 2022 and 2023 was largely due to 2030 District Partners producing and purchasing more renewable energy. In 2023, renewables accounted for 11% of the carbon emissions performance, compared to 8.3% in 2022. Partners produced or purchased a total of 243,000 MWh of carbon-free electricity in 2023. This boost was partially due to members of the Western Pennsylvania Energy Consortium (WPEC) purchasing renewables in 2023 and Pitt's 20MW Gaucho Solar array coming online in July.[22] WPEC members include the Sports & Exhibition Authority, Public Parking Authority of Pittsburgh, the City of Pittsburgh, and Allegheny County, and they purchased enough renewables to cover over 8% of their combined electricity usage in 2023. Pitt's Gaucho array produced more than 16,000 MWh of carbon-free electricity in the short time it has been active.

Higher education is leading the charge in purchasing or producing renewable energy. Duquesne University sourced nearly 12,000 MWh of renewables, which accounted for all their electricity usage in 2023, and Carnegie Mellon University continued to cover *over 100%* of their electricity usage in 2023. Regarding other nonprofits, Phipps produced more than 10% of their renewable electricity on site and purchased the remainder. Producing solar energy will become increasingly important as more buildings begin to electrify. The current solar investment tax credits in the Inflation Reduction Act can cover 30% of project costs through 2033![12] We encourage more partners to make use of this credit and install solar arrays.

DISTRICT CARBON EMISSIONS PERFORMANCE

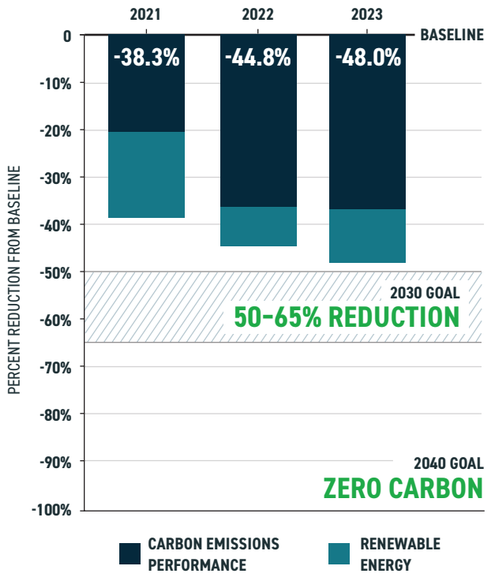


figure 3

The Social Cost of Carbon Emissions

Carbon emissions include air pollutants that cause increased rates of asthma, respiratory illnesses, and heart disease. These toxins have direct costs for families, businesses, and governments. The 'social cost of carbon' is a measurement that accounts for these economic impacts by assigning a dollar value to each ton of carbon emitted.[23] In 2023, Partners avoided 507,000 metric tons of CO2e emissions, equating to $25.8M saved in social costs relating to carbon.

2023 SOCIAL COST OF CARBON SAVED:

$25.8M

CUMULATIVE SOCIAL COSTS OF CARBON SAVED:

$152.7M

TOTAL CARBON EMISSIONS AVOIDED

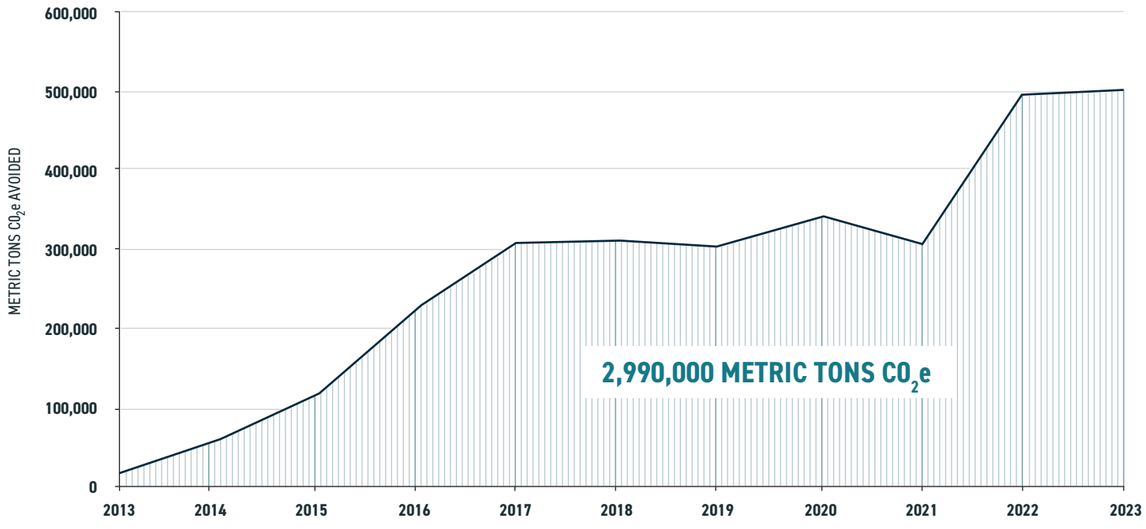


figure 4

DISTRICT AFFILIATES

Thinking Outside the Boundary

With the success of the Pittsburgh 2030 District and interest from properties outside of the District boundary depicted on pages 4–5, Green Building Alliance created the District Affiliate program in 2018. This program allows any commercial, multifamily, nonprofit, government, or industrial property in Western Pennsylvania to join the 2030 Challenge Goals, and currently encompasses over 43 million square feet. The partners featured on pages 9 and 15 are District Affiliates and show how 2030 District partners are making enormous strides towards sustainability and inspiring others to take action far beyond the Pittsburgh city core.

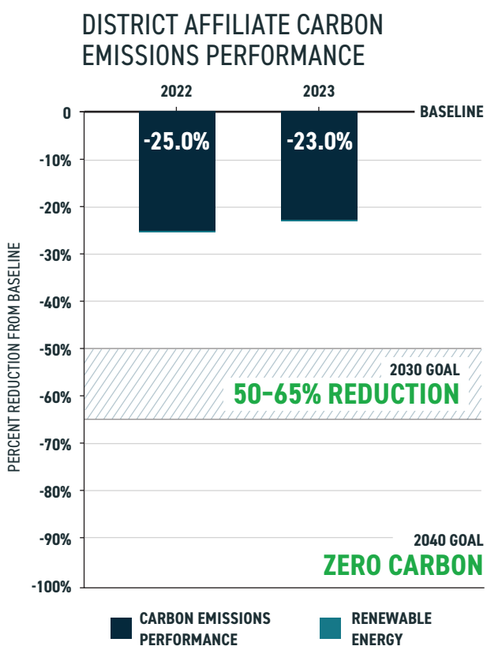


figure 5

Carbon Performance

In 2023, District Affiliates achieved a 23% reduction in carbon emissions against baseline, compared to 25% in 2022. This is reflective of District Affiliate energy use, which also increased from 2022 to 2023. Similarly to 2022, Affiliates purchased few renewable energy credits, only accounting for a 0.4% reduction in carbon emissions. Affiliates' performance is expected to improve as more energy efficiency measures are implemented and more Partners invest in renewable energy.

The two most common use types among District Affiliates are K–12 schools and hospitals. Both use types have unique challenges that hinder their ability to improve building performance. K–12 schools have struggled to access the resources to implement energy efficiency measures, which has been analyzed in greater depth on page 17. Hospitals have had difficulty retrofitting rooms due to 24/7 operation and near-constant bed occupancy.

Compared with the buildings inside of the District boundary, District Affiliate properties are dispersed across Western Pennsylvania. It is assumed that part of the difference in carbon performance between the two exists because District Affiliates do not have a regional or geographic identity that ties them together. Part of the strength of Property Partners is that they can form relationships with neighbors and share information, strategies, and engage in friendly competition toward sustainability goals. District Affiliates' distance from each other hampers their ability to develop the same sense of community that exists within the District boundary. The Pittsburgh 2030 District seeks to foster these relationships through participating in the program.

38.8M

SQUARE FEET COMMITTED

520+

DISTRICT AFFILIATE BUILDINGS COMMITTED

Forest Hills Borough: Pathways to a Net Zero Carbon Community

Solar Array Capacity:
387 kW

Estimated Energy Saved per Year:
243,000 kWh

Estimated Annual Utility Cost Savings:
~$92,000, 79% less than baseline

Project Cost:
$3.2M

Project Team:
Siemens, EIS Solar

Photo Credit: Volpatt Construction

Forest Hills Borough is a sustainability maverick. They completed their Borough building in 2018, creating the newest net zero energy building in the region, and passed a resolution in 2020 to achieve net zero emissions throughout the community by 2050. The municipality realized reaching net zero emissions across the borough would feel daunting to residents. To show everyone that it is possible, they decided to retrofit their seven existing municipal buildings as an example. **Municipal governments own their buildings over a long period of time and need to prepare their buildings for a distant future.** This was front of mind for Forest Hills Borough when determining the scope of the project.

They considered several funding options but ultimately settled on a guaranteed energy savings contract with Siemens. Rather than requiring payment for a majority of project costs upfront, the contract allows Forest Hills to apply the resulting energy savings from building upgrades to those costs over the lifetime of the project. The $3.2 million project began in 2022 with investment grade energy audits for the borough's seven buildings and a wide variety of building retrofits. Major renovations included updating HVAC systems, electrifying buildings, upgrading lights to LEDs, adding more insulation, replacing windows, and replacing two roofs. The project also outlined implementing routine maintenance schedules to ensure all systems are operating properly. These intensive upgrades will collectively reduce the borough's energy use by 243,000 kWh, lowering their annual utility costs by 79% and improving building comfort and system reliability.

A critical component of the project was expanding the borough's renewable energy generation capacity. Seven new solar arrays will bring the borough's total capacity from 175kW to 387 kW and support future EV charging and were funded in part by the IRA solar tax credit. Combined with the extensive building retrofits and existing performance of the Borough building, the project is expected to achieve net zero carbon emissions. One of the most exciting aspects of Forest Hills' initiative is its proof of concept, confirming that transformative projects are possible in both new construction and older buildings, and that these impacts are attainable for local governments across our region.

ENERGY

Plateauing Performance, Re-Energizing Funds

2030 District partners achieved a 22.3% reduction in energy usage in 2023, saving Property Partners a total of $60.5M in utility costs. District-wide energy performance has hovered around 22%-27% reduction below baseline since 2020, suggesting a plateau in performance. We anticipate a break in this plateau over the next few years through the infusion of federal funds in the Inflation Reduction Act (IRA). IRA tax credits such as 179D focus on energy efficiency for commercial and nonprofit properties either owned or leased and can provide funds up to $5.36 per square foot.[24] It is essential property owners and managers make use of 179D *as soon as possible,* as retrofits completed after 2026 will have to perform better than the more stringent ASHRAE 90.1-2019 standard instead of the 2007 standard.[25]

This year, the 2030 District team collected and analyzed retrofit data of 2030 District Property Partners. LED retrofits were most common – 75% of surveyed buildings had completed at least a partial LED replacement, suggesting there is still significant progress possible. Similarly, only 45% confirmed having occupancy or vacancy sensors in some of their spaces. Switching to LEDs and adding these sensors are a simple way to reduce energy usage.

Retro-commissioning – the process of measuring, verifying, and adjusting existing building systems so that they are working properly – was underrepresented in this dataset. Only 5% of buildings in the survey had done a retro-commissioning project, which is a low or no cost measure for building owners to increase energy performance and one we encourage all buildings to do.

IRA tax credits and Act 129 funds though local electric utilities can be used for these energy efficiency projects. We look to this new and existing funding and the success of our Partners to help improve performance and reach beyond this plateau.

DISTRICT ENERGY PERFORMANCE AGAINST BASELINE

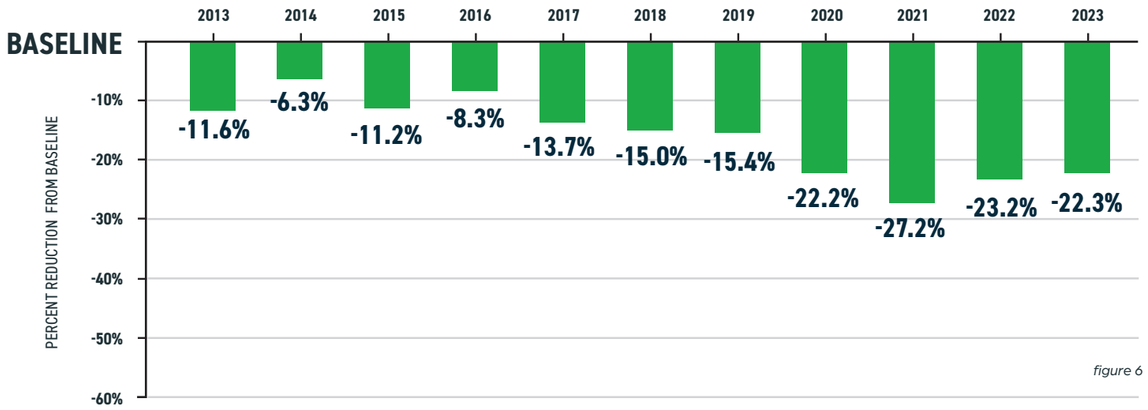


figure 6

2023 ENERGY COST SAVINGS:

$60.5M

CUMULATIVE ENERGY COST SAVINGS:

$374M

TOTAL ENERGY USE AVOIDED

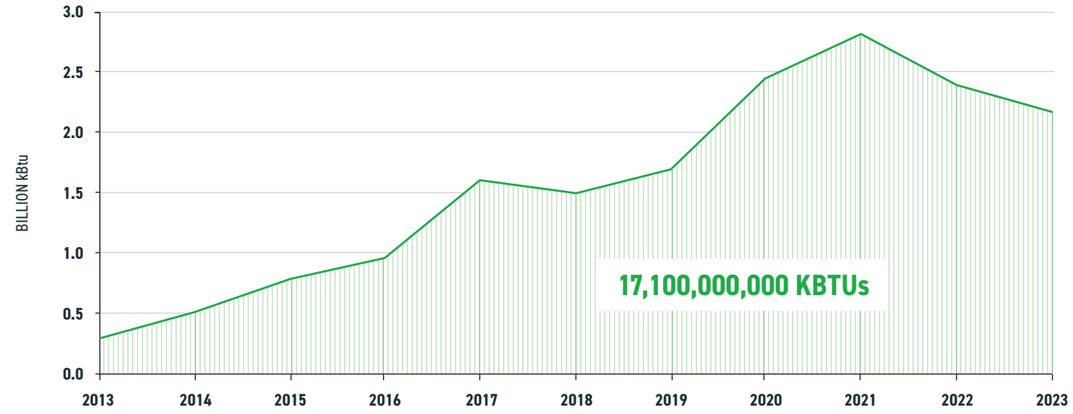


figure 7

Taking the Long View: Understanding K-12 Schools Energy Performance

Over the past two years, there has been a concentrated effort to engage K-12 schools to help improve their building performance. This has resulted in a significant increase in the number of schools that have joined the District. Overall, this cohort performed at 11% below their energy baseline. Schools have unique challenges that help explain why they have not performed as well as the District as a whole. With a median construction year of 1932, school buildings are significantly older than the majority of the District and have not had the same access to financial resources as commercial properties. Schools also suffer from a shortage of facilities staff who are a key element of high performing buildings.[26] Much like commercial buildings, schools will benefit from energy efficiency improvements ranging from simpler upgrades such as lighting retrofits, to more complex upgrades such as new system controls and envelope improvements. In the past year, GBA has offered GPRO: Operations and Maintenance trainings tailored specifically to help school facility teams identify energy and water saving measures while also improving the indoor air quality of their buildings.

K-12 SCHOOLS ENERGY PERFORMANCE

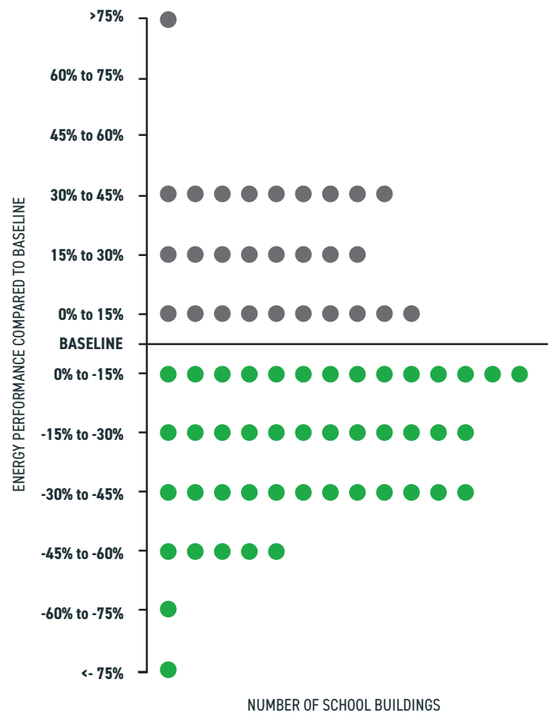


figure 8

Mt. Lebanon School District was pleased to join the Pittsburgh 2030 District to support our existing commitment to building a sustainable, healthy teaching and learning environment. With more opportunities available to K–12 schools and local governments, now is the time for all of our schools and communities to make real investments in their buildings, operations, and culture because they are ultimately investments in our students and our future.

Richard Marciniak
Director of Facilities
Mt. Lebanon School District

View of Pittsburgh from the roof of the U.S. Steel Tower

WATER

Stormwater Fee Updates

Climate change has been exacerbating Pittsburgh's stormwater problems. The city's combined sewer system is frequently overwhelmed with stormwater, causing *9 million gallons of untreated sewage* to overflow into our waterways each year.[27] To help combat this, PWSA implemented a fee in 2022 based on each tax parcel's impervious surface. This fee funds the construction of green infrastructure projects like rain gardens to manage stormwater and prevent flooding.[28] Boosting this effort, the city updated the Stormwater Management Ordinance as part of city Zoning Code in 2022.[29] The ordinance requires some development projects to design a stormwater management plan able to handle a 95th percentile rain event, using future climate change rainfall projections.[30] The Federal Government's Fifth National Climate Assessment highlighted this innovative policy as an example of how municipal governments are implementing climate adaptation measures.[31]

Fluctuating Water Usage

The District reduced water use by 39.4% in 2023, much less water usage per square foot than pre-pandemic which was 19.8%. Water is closely related to occupancy but can be reduced by adding automatic or push faucets, adding aerators, and installing low flow toilets. Of the surveyed 2030 District Partners, 25% have aerators and 26% have low-flow toilets, suggesting there are more water performance projects that Partners can capitalize on. In 2023, District Partners avoided using over 451 million gallons of water, equivalent to the use of 26 million showers.

2023 WATER COST SAVINGS:
$14.4M

CUMULATIVE WATER SAVINGS:
$95.1M

TOTAL WATER USE AVOIDED

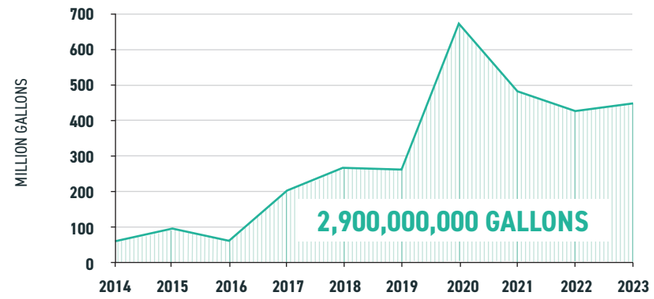


figure 9

DISTRICT WATER PERFORMANCE AGAINST BASELINE

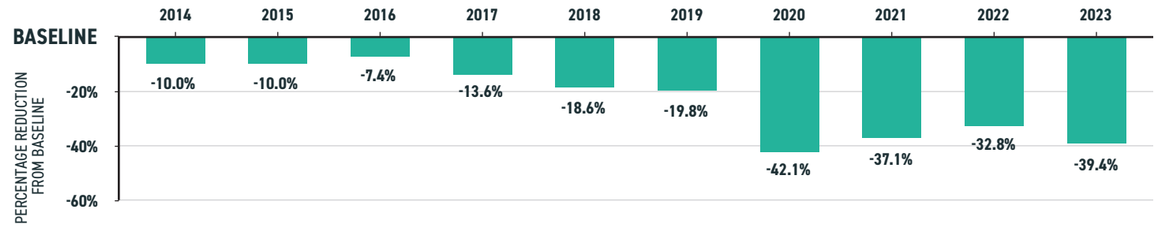


figure 10

INDOOR AIR QUALITY

Measuring Indoor Air Quality (IAQ)

While significantly cleaner than its industrial past, Pittsburgh continues to experience poor air quality, ranking 14th in the nation for levels of annual particle pollution.[32] Because outdoor air quality directly affects indoor air, IAQ was chosen as the Pittsburgh 2030 District's fourth performance metric. IAQ is measured via a survey created in 2019 that was administered again in 2022. The next survey will be in 2025.

The 2030 District created scorecards or baselines for individual buildings and use types to measure their performance. Questions were divided into five categories: testing + monitoring, building policy + occupant behavior, building characteristics + ventilation systems, operations + maintenance, and materials policy. Points earned for individual answers were totaled by category to provide partners with a diagnostic to highlight areas in which they are performing well and those that have room for improvement.

IAQ & Employee Performance: The CogFX Study

Though COVID-19 brought attention to indoor air quality, it continues to have less emphasis compared to other building performance metrics. This comes as no surprise – building managers receive bills for energy and water use, but the impact of indoor air quality is harder to quantify. Enter the CogFx study. Participants' cognitive function was tested in different buildings with varying levels of PM2.5 and CO_2 across an entire year.

Buildings with better ventilation and filtration had lower levels of PM2.5 and CO_2, leading to faster response times and better cognitive performance of occupants.[33,34]

Cognitive scores were at least 26% better in buildings with good indoor air quality versus conventional peers.[34] What does this mean for companies? Offices in high performing spaces will see greater productivity from their workers than those in average buildings. Building owners can leverage good IAQ performance to gain tenants, knowing their spaces will increase health and productivity for employees more than peers. As companies spend 90% of their costs on salaries and benefits, improving indoor air quality maximizes workforce investment.[35] IAQ is a metric that 2030 District partners are starting to improve as referenced in figure 11, with at least 15% reporting they have CO_2 monitors in high occupancy areas like conference rooms and office spaces.

Q20. DOES THIS BUILDING HAVE FUNCTIONAL CO_2 MONITORS IN HIGH OCCUPANCY AREAS?

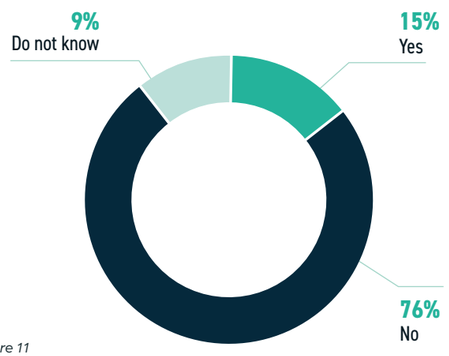


figure 11

Our organization is proud to partner with GBA as it works tirelessly to advance critical projects that support a reduction in climate pollution. GBA's Pittsburgh 2030 District initiative has created a model that many communities throughout Southwestern Pennsylvania can follow as they develop their own ways to reduce pollution.

Rich Fitzgerald
Executive Director
Southwestern Pennsylvania Commission

Barco Law Building Green Roof at the University of Pittsburgh

JOIN THE PITTSBURGH 2030 DISTRICT

The Value of Community

The Pittsburgh 2030 District's success stems from its extensive community of partners and sponsors. Our network spans multiple sectors of Pittsburgh, welcoming all to explore facets of building efficiency and possibilities for future progress in their buildings. Partners are invited to monthly meetings that feature presentations from technical experts, service providers, and building owners that showcase successful projects. These sessions are framed through a regional lens in which partners share best practices and challenges with a diverse group of public and private organizations. In over ten meetings throughout the year, partners gain direct access to policymakers, regional thought leaders, university researchers, and financial organizations. Pittsburgh 2030 District Partners form a community of educated, purposeful leaders that have the knowledge to positively impact building development and operations throughout the region.

Individual Building Performance Evaluations

GBA consults with Property Partners one-on-one to identify critical investments toward achieving individual reduction targets. Partners receive a confidential annual performance report that analyzes their progress towards zero carbon, energy reductions, water reductions, and indoor air quality performance. These reports highlight Partners' current and former performance, while GBA staff provide context and ideas for specific building upgrades. Where possible, reports also compare a building's performance to similar, anonymous local buildings.

Become a Property Partner

Distinguish your organization or school district by joining Western Pennsylvania's most influential network of building owners and developers! Upon commitment to the 2030 Challenge goals, Property Partners gain access to a community of technical experts, service providers, and fellow building management professionals, as well as individualized property benchmarking and evaluation. Any new or existing developments in Western Pennsylvania are welcome to join.

Property Partners & District Affiliates:

A.W. Beattie Career Center*
ALCO Parking
Allegheny Center Alliance Church
Allegheny County Airport Authority*
Allegheny County*
Allegheny Health Network*
ASCEND Pittsburgh*
Avenu/Innovate PGH
Avison-Young
Bellefield Presbyterian Church
Benedum Trees
Berner International Corp.*
Bethlehem Haven Of Pittsburgh
Blind & Vision Rehabilitation Services
BNY Mellon
BPG 360 Real Estate Services
Braskem America
Bridgeway Capital*
Burns Scalo Real Estate
Butler Area School District*
California Area School District*
Carlow University
Carnegie Library of Pittsburgh*
Carnegie Mellon University
Carnegie Museums
CBRE
Central Catholic High School
Chatham University*
Children's Museum
City of Pittsburgh*
Collaborative Real Estate
Community College of Allegheny County (CCAC)*
DMI Companies*
Dollar Bank
Duquesne University
East Liberty Lutheran Church*
Elmhurst Group
Environmental Charter School*
Faros Properties
First Presbyterian Church
Forest Hills Borough*
General Services Administration
Giant Eagle
Global Links*
Grant Liberty Development Group Associates & lx Liberty Center Venture
Hazelwood Green*
Heinz History Center
Hertz Investment Group
Highmark
Highwoods Properties
Housing Authority of the City of Pittsburgh (HACP)
Hullet Properties
JLL
Kossman Development*
M&J Wilkow
McAllister Equities
McKnight Property Management*
Mt. Lebanon School District*
Mountain Watershed Association*
Murland Associates
National Aviary
Neighborhood Legal Services
Newmark Grubb Knight Frank
Oakland Planning and Development Corporation
Oxford Development
Penn Hills School District*
Pennsylvania Department of Conservation and Natural Resources (DCNR)
Phipps Conservatory and Botanical Gardens
Piatt Companies
Pittsburgh Cultural Trust
Pittsburgh Gateways
Pittsburgh Musical Theater*
Pittsburgh Parking Authority
Pittsburgh Parks Conservancy*
Pittsburgh Penguins
Pittsburgh Pirates
Pittsburgh Public School District*
Pittsburgh Steelers
Planned Parenthood of Western PA
PNC Financial Services Group
Point Park University
Project Love Coalition*
Protohaven*
Residences at Wood Street
RIDC*
RJ Community Management*
Rodef Shalom Congregation
Rothschild Doyno Collaborative*
Rugby Realty/Rexxhall Management
Shadyside Academy*
Shorenstein
Soldiers & Sailors Memorial Hall & Museum Trust
South Fayette Township School District*
Sports & Exhibition Authority of Pittsburgh and Allegheny County
The Davis Companies
The Ellis School*
Tree Pittsburgh*
University of Pittsburgh*
UPMC*
Walnut Capital*
Western Pennsylvania School for Blind Children*
Wexford SciTech*
Winchester-Thurston School*
Winthrop Management
Woodland Hills School District*
WQED Multimedia
YWCA Greater Pittsburgh*

*Properties with an asterisk denote the Partner has at least one building committed outside of the boundary as a District Affiliate.

Green Building Alliance

Green Building Alliance (GBA) positively transforms the world through the built environment for a sustainable, healthy, and just future for everyone. As Greater Pittsburgh's authority on sustainable design, GBA drives the market for healthy communities while equipping designers, manufacturers, developers, and policymakers to catalyze systemic change. GBA manages the largest 2030 District in North America, and in 2019, established Pittsburgh as the 2nd International Center of Excellence on High Performance Building in the world. GBA partners with organizations across Western Pennsylvania and internationally, with strategic alliances including the 2030 District Network, Architecture 2030, the United Nations, and International Living Future Institute.

Community/ Resource Partners:

AIA Pittsburgh

Allegheny Conference on Community Development

Allegheny County Health Department

Allegheny County

Architecture 2030

ASHRAE – Pittsburgh

Bike Pittsburgh

Bridgeway Capital

Building Owners & Managers Association of Pittsburgh (BOMA)

Carnegie Museum of Natural History & BirdSafe Pittsburgh

City of Pittsburgh

Community Resilience Action Network of Erie (CRANE)

Congress of Neighboring Communities (CONNECT)

Cordia Energy

Duquesne Light Company

Erie Bird Observatory

Generation180

Group Against Smog and Pollution (GASP)

International Living Future Institute

International Union of Operating Engineers, Local 95

Keystone Energy Efficiency Alliance (KEEA)

Master Builders' Association of Western Pennsylvania

NAIOP Pittsburgh

New Sun Rising

Northside/Northshore Chamber of Commerce

Oakland Business Improvement District (OBID)

Oakland Planning and Development Corp. (OPDC)

Oakland Task Force

Oakland Transportation Management Association (OTMA)

PA Sea Grant

Pennsylvania Solar Center

PennFuture

Pennsylvania Environmental Council

Pennsylvania Resources Council

Pennsylvania Technical Assistance Program (PennTAP)

Pittsburgh Downtown CDC

Pittsburgh Downtown Partnership

Pittsburgh Parks Conservancy

Pittsburgh Regional Transit (PRT)

Pittsburgh Water and Sewer Authority

POGOH

Riverlife

Southwestern Pennsylvania Commission

Student Conservation Association

Sustainable Pittsburgh

Uptown Partners of Pittsburgh

Urban Land Institute – Pittsburgh

Urban Redevelopment Authority

VisitPittsburgh

Report Prepared By:

Ashley DiGregorio
2030 District Senior Director

Paige Colao
Director of Data & Analysis

Tobias Chan
2030 District Performance & Outreach Coordinator

With Assistance From:
Jenna Cramer
President & CEO

Chris Cieslak
Chief Operating Officer

Paige Colao

Tobias Chan

Ashley DiGregorio

THANK YOU TO OUR SPONSORS AND FUNDERS

Presenting Sponsor:

covestro

Program Sponsors:

When the doors are open.™ BERNER AIR CURTAINS

FRANKLIN ENERGY™

Stantec

ten a DLH company

Viridis INITIATIVE

VOLPATT CONSTRUCTION

Progress Report Reception Sponsor:

filtech INC.

Meeting Level Sponsors:

Blue Delta Energy

BranchPattern

BUSS

Cordia Energy

Duquesne Light Company

evolveEA

Filtech

The Garland Company

Jendoco Construction

Mascaro Construction

NAIOP Pittsburgh

S&B Construction

Tall Timber Group

Trane

WGL Energy

Funders:

HILLMAN FAMILY FOUNDATIONS

RICHARD KING MELLON FOUNDATION

The Erie Community Foundation

Erie Insurance

WPPSEF WEST PENN POWER SUSTAINABLE ENERGY FUND

The Metropolitan Edison Company/Pennsylvania Electric Company SUSTAINABLE ENERGY FUND

LAUREL FOUNDATION

REFERENCES

1 Native Land Digital. (n.d.) [Map of Indigenous Lands]. Retrieved March 25, 2022, from https://native-land.ca

2 Moss, J. (2023, July 16). *Pittsburgh region faces increasing rain, flood risks as planet warms*. Pittsburgh Union Progress. https://www.unionprogress.com/2023/07/16/pittsburgh-region-faces-increasing-rain-flood-risks-as-planet-warms/

3 Glabicki, Q., & Wolfson, C. (2023, January 5). *Slippy slopes: Pittsburgh, built on slide-prone riverbanks, could face a deluge of impacts from climate change*. https://www.publicsource.org/pittsburgh-landslides-2022-pennsylvania-allegheny-county-climate-change/

4 UN Environment Programme. (2022). *2022 Global status report for buildings and construction: Towards a zero-emissions, efficient and resilient buildings and construction sector*. https://globalabc.org/sites/default/files/2023-03/2022%20Global%20Status%20Report%20for%20Buildings%20and%20Construction_1.pdf

5 Deto, R. (2023, August 29). *Allegheny County to draft climate action plan*. TribLIVE. https://triblive.com/local/allegheny-county-to-draft-climate-action-plan/

6 Southwestern Pennsylvania Commission. (n.d.). *Climate pollution reduction implementation grants*. Retrieved January 29, 2024 from https://www.spcregion.org/cprg/

7 The White House. (2021, August 2). *Updated fact sheet: Bipartisan Infrastructure Investment and Jobs Act*. https://www.whitehouse.gov/briefing-room/statements-releases/2021/08/02/updated-fact-sheet-bipartisan-infrastructure-investment-and-jobs-act/

8 Voegele, H., & Ugalde, A. (2022, August 24). *What's in the Inflation Reduction Act?* The National Law Review. https://www.natlawreview.com/article/what-s-inflation-reduction-act

9 2030 District Network. (n.d.). *The 2030 Districts network*. https://2030districts.org/

10 Mazir, E. (2021, August 19). *CarbonPositive: If we act together now, we can change the world*. Architect Magazine. https://www.architectmagazine.com/carbon-positive/carbonpositive-if-we-act-together-now-we-can-change-the-world_o

11 Copernicus Climate Change Service. (2024, January 9). *Copernicus: 2023 is the hottest year on record, with global temperatures close to the 1.5°C limit*. European Centre for Medium-Range Weather Forecasts. https://climate.copernicus.eu/copernicus-2023-hottest-year-record

12 Office of Energy Efficiency and Renewable Energy. (2023, August). *Federal Solar Tax Credits for Businesses*. https://www.energy.gov/eere/solar/federal-solar-tax-credits-businesses

13 Catalyst Connection. (n.d.). *Sustainability in action: Berner Air Curtains*. Retrieved February 20, 2024 from https://www.catalystconnection.org/event/sustainability-in-action-berner-air-curtains/

14 Building Green. (n.d.). *Embodied carbon*. Retrieved February 14, 2023, from https://www.buildinggreen.com/embodied-carbon

15 Pittsburgh Zoning Code, Pittsburgh, Pennsylvania Code of Ordinances. Chapter 922 §15.K. 23 December 2022. https://library.municode.com/pa/pittsburgh/codes/code_of_ordinances?nodeId=PIZOCO_TITNINEZOCO_ARTVIIIREEN_CH922DEREPR_922.15MIUSDEST

16 William J Worthen Foundation. (2022, March 7). Building decarbonization practice guide volume 2: Universal design, construction, and operational phase considerations. https://worthenfoundation.org/s/Building-Decarb-Practice-Guide_vol_1-2_v11_3RD-EDITION.pdf

17 Overby, D. (2021, December 1). Global warming potential of common refrigerants. Building Enclosure. https://www.buildingenclosureonline.com/blogs/14-the-be-blog/post/90387-global-warming-potential-of-common-refrigerants

18 Pennsylvania Statutes Title 35 §7201. Pennsylvania Construction Code Act. https://www.dli.pa.gov/ucc/Documents/act_45/act_45_amended.pdf

19 U.S. Department of Energy. (2023, October). *Pennsylvania codes savings*. https://www.energy.gov/sites/default/files/2023-10/pennsylvania-codes-savings.pdf

20 Office of Energy Efficiency & Renewable Energy. (n.d.). *Building performance standards*. Retrieved March 12, 2024 from https://www.energy-codes.gov/BPS

21 Energy Star Portfolio Manager. (2022, December). *Technical reference: Greenhouse gas emissions*. https://portfoliomanager.energystar.gov/pdf/reference/Emissions.pdf

22 University of Pittsburgh. (2023, August 16). *Pitt & Vesper Energy cut ribbon on new gaucho solar project near Pittsburgh International Airport*. https://www.sustainable.pitt.edu/pitt-vesper-gaucho-operational/

23 Evans, S., Pidcock, R., & Yeo, S. (2017, February 14). *Q&A: The social cost of carbon*. Carbon Brief. https://www.carbonbrief.org/qa-social-cost-carbon

24 Suttora, J., & St. Martin, D. (2023, February 1). *Recent changes to the Sec. 179D energy-efficient commercial buildings deduction*. The Tax Adviser. https://www.thetaxadviser.com/issues/2023/feb/recent-changes-to-the-sec-179d-energy-efficient-commercial-buildings-deduction.html

25 Watkins, T., Charin, J., Cordova, E., & Belbot, J. (2023, January 1). *IRS announces updated reference standard for section 179D*. RSM. https://rsmus.com/insights/tax-alerts/2023/IRS-announces-updated-Reference-Standard-section-179D.html

26 21st Century School Fund. (2021). *2021 state of our schools: America's PK-12 public school facilities*. https://www.facilitiescouncil.org/s/SOOS-IWBI2021-2_21CSF-print_final.pdf

27 Alcosan. (n.d.). *Clean water plan*. Retrieved February 5, 2024 from https://www.alcosan.org/clean-water-plan

28 Pittsburgh Water and Sewer. (n.d.). *Stormwater fee FAQ*. Retrieved February 2, 2024 from https://www.pgh2o.com/your-water/stormwater/stormwater-fee/stormwater-fee-faq

29 City of Pittsburgh. (n.d.). *Stormwater code & ordinance review and update*. Retrieved February 6, 2024 from https://engage.pittsburghpa.gov/stormwater-code

30 Pittsburgh Zoning Code, Pittsburgh, Pennsylvania Code of Ordinances. Chapter 1303. 16 January 2024. https://library.municode.com/pa/pittsburgh/codes/code_of_ordinances?nodeId=PIZOCO_TITTHIRTEENSTMA_CH1303STMAST

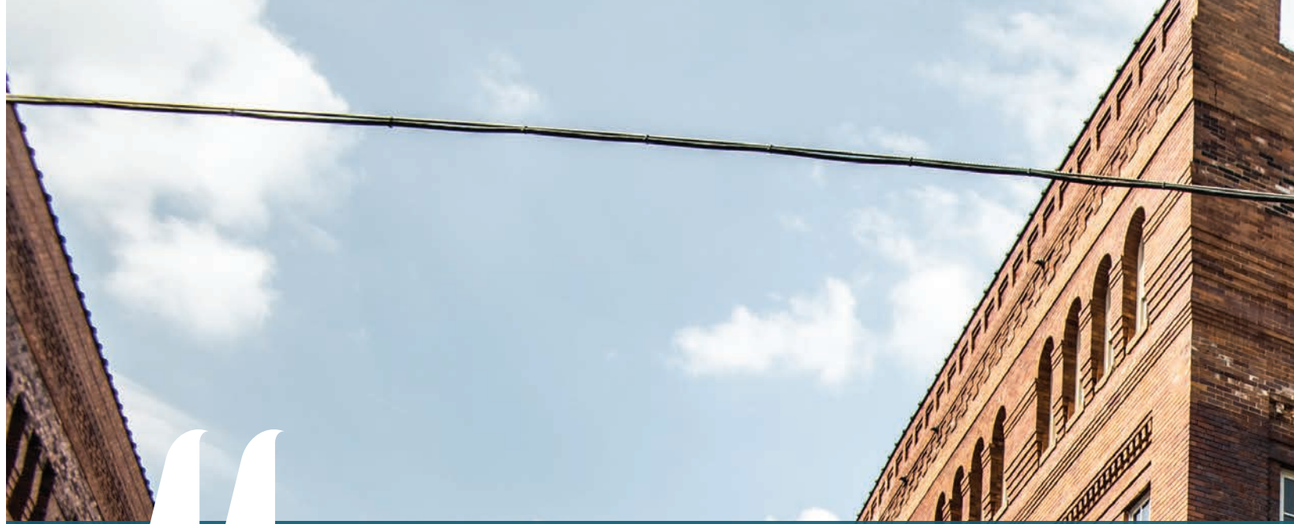
31 U.S. Global Change Research Program. (2023). *Fifth national climate assessment*. https://nca2023.globalchange.gov/

32 American Lung Association. (2023). *State of the air 2023 key findings: Year-round particle pollution trends*. https://www.lung.org/research/sota/key-findings/year-round-particle-pollution

33 Laurent, J. G. C., MacNaughton, P., Jones, E., Young, A. S., Bliss, M., Flanigan, S., Vallarino, J., Chen, L. J., Cao, X., & Allen, J. G. (2021). Associations between acute exposures to PM2.5 and carbon dioxide indoors and cognitive function in office workers: a multicountry longitudinal prospective observational study. *Environmental Research Letters, 16*(9). https://doi.org/10.1088/1748-9326/ac1bd8

34 MacNaughton, P., Satish, U., Laurent, J. G. C., Flanigan, S., Vallarino, J., Coull, B., Spengler, J. D., & Allen, J. G. (2017). The impact of working in a green certified building on cognitive function and health. *Building and Environment, 114*. https://doi.org/10.1016/j.buildenv.2016.11.041

35 The CogFx Study. (n.d.). *Why you should care*. Retrieved March 4, 2024 from https://thecogfxstudy.com/why-you-should-care/



Funding is here. Technical assistance is here. And your community is behind you. The barriers to making buildings better are lower than ever before, and improving buildings is how we will save our region.

Ashley DiGregorio
2030 District Senior Director
&
Paige Colao
Director of Strategy & Analysis

Walkway at the Highline Building

Green Building Alliance

317 East Carson Street, Suite 122
Pittsburgh, PA 15219

412.773.6000
gba.org

City of Pittsburgh

CLIMATE ACTION PLAN

Version 3.0

ACKNOWLEDGEMENTS

Thank you to the following organizations for their contributions to the Climate Action Plan

ACCESS
Airport Corridor Transportation Association
Action Housing
AgRecycle
Allegheny County Sanitary Authority
Allegheny CleanWays
Allegheny Conference
Allegheny County
Allegheny County Conservation District
Allegheny County Economic Development
Allegheny Land Trust
American Geophysical Union
American Health Care Group, LLC
Aquion Energy
Aramark
Avison Young
Bike Pittsburgh
BiodiverCity
BNY Mellon
Brazen Kitchen
Bridgeway Capital
BuroHappold
Carnegie Mellon University, Program for Deliberative Democracy
Carnegie Mellon Traffic21
Carnegie Mellon University School of Art
Carnegie Museum of Natural History
Castriota Metals & Recycling
Chatham University
CJL Engineering
Committee for Accessible Transportation (CAT)
Conservation Consultants Inc
Construction Junction
Covestro
Delta Development Group
Direct Energy
Duquesne Light Company
Duquesne University
Duquesne University's Center for Environmental Research and Education
Dylamato's Market
East End Food Co-op
Eat n Park
Eaton Corporation
EcoCraft Homes
EIS Solar
EnerNoc
Ethos Collaborative
Eutectics
EverPower
EvolveEA
Group Against Smog and Pollution
Google
Green Building Alliance
Grow Pittsburgh
GTECH Strategies
Housing Authority of the City of Pittsburgh
Hillman Foundation
Homewood Children's Village
IMG Midstream
International Code Council
Itron Inc.
Just Harvest
Michael Baker International
Mitsubishi Electric Power Products
Mount Washington Community Development Corporation
NAIOP
National Academy of Sciences
National Energy Technology Laboratory
National Renewable Energy Laboratory
NRG Energy, Inc
Oakland Transportation Management Association
Oakland Planning and Development Corporation
Oxford Development
Port Authority of Allegheny County
Pittsburgh Center for Creative Reuse
Pittsburgh Community Reinvestment Group
Pittsburgh Penn State Extension
Pennsylvania Department of Transportation
PennFuture
Pennsylvania Environmental Council
Peoples Natural Gas
Phipps Conservatory
Pittsburgh Downtown Partnership
Pittsburgh Food Policy Council
Pittsburgh Parking Authority
Pittsburgh Parks Conservancy
Pittsburgh Pirates
Pittsburgh Water and Sewer Authority
Pittsburghers for Public Transit
PNC
Port Authority of Allegheny County

Pennsylvania Resources Council
Putting Down Roots
Pittsburgh Botanical Garden
RAND Corporation
Regional Industrial Development Corporation
Richard King Mellon Foundation
Riverlife
Rye Development
Science & Engineering Ambassadors Program
Shadyside Worms
Solarize Allegheny
Southwestern Pennsylvania Commission
Sports & Exhibition Authority
Steel City Soils
Sustainable Pittsburgh
The Heinz Endowments
Thriving Earth Exchange
Tree Pittsburgh
University of Pittsburgh
University of Pittsburgh Medical Center
Urban Redevelopment Authority
Urban Land Institute
Walnut Capital
Waste Management
Western Pennsylvania Conservancy
Westinghouse Electric Company
Women for a Healthy Environment
Zipcar
412 Food Rescue

Cover photographs are by Flore Marion

Table of Contents

EXECUTIVE SUMMARY

Climate change is a major threat to communities around the world. Potential consequences of climate change include an increase in extreme weather events, higher rates of infectious diseases and heat-related illnesses, the possible shortage of food and basic goods as well as an increase in public expenditures to mitigate these effects. The City of Pittsburgh has long recognized that wide-ranging action must be taken in order to mitigate the effects of climate change on both local and global communities.

As a result, on February 9, 2007, the City of Pittsburgh signed the U.S. Mayors Climate Protection Agreement, pledging to implement local climate change mitigation solutions that would save taxpayer dollars and reduce long-term energy use.

Pittsburgh's Green Government Task Force (GGTF) was charged with developing the first ever Pittsburgh Climate Action Plan, adopted by the City as a guiding document in July 2008. This document provided an outline of specific strategies for achieving reductions in greenhouse gas emissions.

In 2012, the Pittsburgh Climate Action Plan 2.0 was created to review and revise the efforts of government, private businesses, institutions of higher education, and Pittsburgh residents toward the reduction of greenhouse gas emissions. New measures were proposed that could be implemented in order meet a greenhouse gas reduction target of 20% below 2003 levels by the year 2023.

By 2017, it was clear that expedited measures must be taken to help mitigate the local effects of global climate change. Building on the successes of the previous versions, Pittsburgh Climate Action Plan, Version 3.0 has been created to track progress made through the first two plans and to propose new measures to counteract the adverse effects of climate change. This document aligns with Mayor William Peduto's climate goals[1] signed in 2015 at the Paris Accords, where he was one of 12 mayors representing the United States. In June 2017, Mayor Peduto also joined 175 other U.S. mayors in signing an Executive Order1 to pledge efforts to meet the "1.5 degrees Celsius target" as set forth by the Paris Agreement.

The Pittsburgh Climate Action Plan 3.0 takes a renewed approach to climate change mitigation by presenting action plans and strategies regarding six key areas: Energy Generation & Distribution, Buildings & End Use Efficiency, Transportation & Land Use, Waste & Resource Recovery, Food & Agriculture, and Urban Ecosystems.

While each area has specific goals and actions, there is significant overlap among action areas. This helps to create a more holistic plan that provides opportunities for greater impact through coordination across sectors. Of the six focus areas, the overlapping actions naturally create two action clusters; energy and ecosystems.

Many strategies related to energy usage and sources are presented within the first three chapters, Energy Generation & Distribution, Buildings, and Transportation & Land Use. Improved energy efficiency and increased fuel shift are the two main goals in these chapters. In order to reach these ambitious

[1] https://apps.pittsburghpa.gov/mayorpeduto/Climate_exec_order_06.02.17_(1).pdf

goals, projects must address both goals. For example, when shifting to electric vehicles, carbon-free charging sources must also be implemented.

The remaining three chapters; Waste and Resource Recovery, Food & Agriculture, and Urban Ecosystems follow a similar, overlapping plan. The main idea presented in all three chapters is waste reduction and proper resource management.

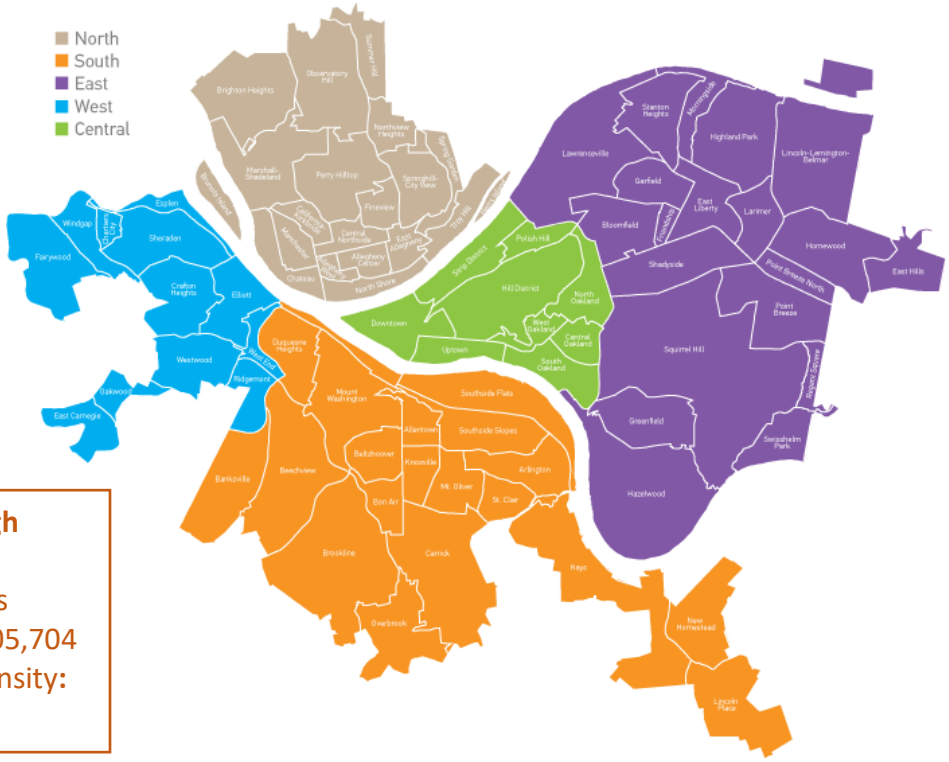
Why a Climate Action Plan for Pittsburgh

Pittsburgh has come a long way from the days of smoke darkened skies that were a result of the extensive steel industry. However, as global temperatures continue to rise and the costly impact of climate change becomes more prevalent, cities are at the forefront of climate action.

Local government has a responsibility to provide for the health, safety, and welfare of its residents. The Climate Action Plan provides a road map for reducing Greenhouse Gas Emissions in the City of Pittsburgh while also improving the resilience, health, and overall quality of life for Pittsburgh residents. The Climate Action Plan is designed to serve as a guiding document that will support future decision making in Pittsburgh.

How the Action Plan Developed

The Climate Action Plan 3.0 was a multi-year process that was focused on thoughtful civic engagement. The deliberative civic engagement process included over 400 residents representing 90 organizations from the Pittsburgh business community, non-profit sector, and local, state, and federal government partners. This process allowed the City to adopt pragmatic strategies that account for and expand upon many actions and initiatives already underway. [2]



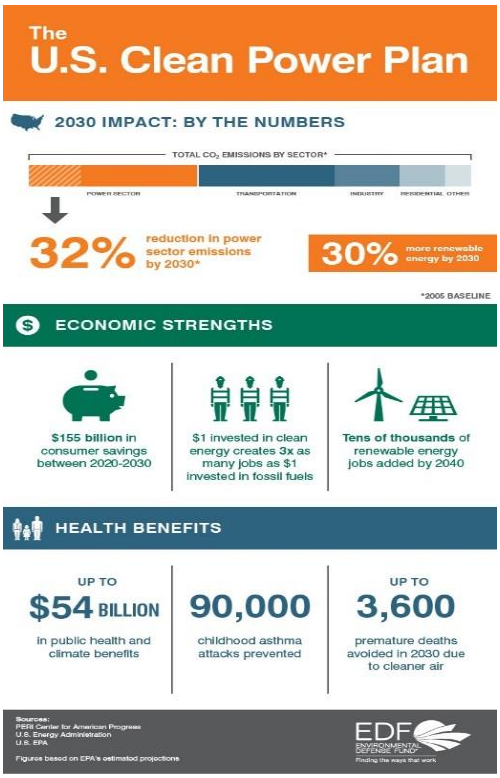
A Picture of Pittsburgh

- ✓ 58.35 sq. miles
- ✓ Population: 305,704
- ✓ Population density: 5,483/sq. mile

[2] www.nextpittsburgh.com

Clean Power Plan

In the development process, Pittsburgh modeled many goals and strategies after the U.S. Clean Power Plan framework. The Clean Power Plan (CPP) requires the state of Pennsylvania to reduce power sector emissions by 24% below 2012 levels. At a national level, the CPP aims to reduce emissions from coal-burning power plants, increase the use of renewable electricity, and improve energy conservation and efficiency. Similar to the CPP, the Pittsburgh Climate Action Plan supports strategies for reducing dependence on coal, encouraging conversion of coal fired powerplants to natural gas, protecting existing carbon free nuclear power, increasing utilization and generation of renewable electricity, and decreasing energy consumption through optimization and efficiency improvements in both the power and transportation sectors. [3]



Environmental Defense Fund

Pittsburgh's Resilience Challenges

While the Climate Action Plan is designed first and foremost as a carbon mitigation strategy, there is a broad scope of 'co-benefits' that can be achieved through the proposed actions. When putting forth strategies and pathways for deep carbon reductions, these co-benefits were analyzed to assist with action prioritization. Mitigation actions can help address Pittsburgh's Resilience Challenges and achieve key co-benefits such as improved equity, increased economic development and decreased negative health impacts.

The threats to Pittsburgh's resilience include both chronic stresses—long-term, slow burning issues that overwhelm the capacity of city resources and erode resident wellbeing—and potential acute shocks—sudden, large-scale disasters that disrupt city services and threaten residents due to extreme events. While the city's inland geography protects its residents from many of the natural hazards that are expected to occur more frequently in coastal regions, the city's endemic stresses disproportionately affect some of its most vulnerable residents and represent its core resilience challenges. Specifically, Pittsburgh faces significant challenges with social, racial, and economic inequities that have persisted for decades, leading to unequal access to housing, transportation, employment, and services. Other key stresses affecting vulnerable Pittsburghers include aging infrastructure and poor air and water quality. Potential future shocks include extreme weather, flooding, landslides, and extreme temperatures, among other concerns identified during strategy development. Action on climate change provides a unique opportunity for coordination and collaboration that can address Pittsburgh's most significant stressors.

Alignment with Existing Plans

The measures laid out in this plan aim to reduce carbon emissions, but also have been prioritized based on the ability to impact additional shocks and stressors identified within Pittsburgh's OnePGH Resilience

[3] *https://www.edf.org/sites/default/files/Clean-Power-Plan-Infographic.jpg*

Strategy.[4] Actions high on the prioritization list will not only reduce emissions but will also improve overall resiliency, increase innovation, foster leadership, promote workforce development, introduce economic opportunities and align with the OnePGH Strategy and Pittsburgh's p4 Criteria.

Pittsburgh's Resilience Framework

The Pittsburgh Climate Action Plan is designed to be a subheading of the OnePGH Resilience Strategy. Similar to the resilience strategy, the Climate Action Plan is also meant to align with the four "p"s of the p4 framework, already adopted by partners across the city to inspire innovative, sustainable, and inclusive action. Priority actions in the Climate Action Plan will reduce emissions as well as act collectively to make Pittsburgh a resilient city in terms of its **P**eople, **P**lace, **P**lanet, and **P**erformance.

PEOPLE Pittsburgh will empower all residents to contribute to thriving and supportive communities by ensuring that basic needs are met. We will be an inclusive city of innovation that celebrates our diversity, and all residents will have equal access to resources and opportunity.

PLACE Pittsburgh will use land to benefit all residents; to increase social cohesion, connectivity, public and ecological health; and to protect against current and future risks. We will design, scale, and maintain our infrastructure for current and future needs, providing benefits and services to our neighborhoods during times of calm and crisis.

PLANET Pittsburgh will achieve long-term environmental health through wise stewardship, improved use of our resources, and a reduced carbon footprint.

PERFORMANCE Pittsburgh will work closely with neighbors and partners for improved planning and decision-making.

OnePGH

OnePGH is the strategy for Pittsburgh to thrive in the 21st century as a city of engaged, empowered, and coordinated neighbors. Pittsburgh will be resilient when our city is livable for all residents. OnePGH establishes a bold vision for the City, buildings on recent successes and a wealth of community assets, while directly confronting the complex challenges that we all continue to face.

p4 Initiative

The p4 initiative is based on a central unifying framework: People, Planet, Place, and Performance. Launched in 2015 to create a new sustainable, innovative, and inclusive model for development and design, p4 aims to establish Pittsburgh as a "city of the future." In the past decades, Pittsburgh has transformed dramatically since the steel industry's collapse. This transformation will continue through a major new wave of development, representing approximately 500 acres across the urban core. This development potential and the manner in which it is guided, will influence Pittsburgh's built and natural environments, and communities for generations to come.

[4] https://pittsburghpa.gov/onepgh/documents/pgh_resilience_strategy.pdf

Climate Action Plan Implementation

The Division of Sustainability and Resilience, as a part of the Department of City Planning, will serve as the lead office for implementation of the Climate Action Plan. The Division of Sustainability and Resilience will support a series of implementation steps to facilitate the effective rollout and adoption of the Climate Action Plan across sectors and stakeholders. As implementation progresses, there are a number of keys, such as policy intervention, funding and budget allocations, community engagement, data analysis, and partnership coordination, that can be activated to optimize the success of the Climate Action Plan.

Sustainability and Resilience Commission

In order to fully recognize all of the actions and initiatives laid out in the Climate Action Plan, serious effort will be required on behalf of the City and its many stakeholders. The first action needed to begin implementing the Climate Action Plan is the creation of a Sustainability and Resilience Commission. Currently, the City has an existing Sustainability Commission comprised of representatives from various City Departments whose main focus has been to make city operations more sustainable. The proposed Sustainability and Resilience Commission would be an amendment to the existing commission. Expanding the Commission to include members from the nonprofit, education, utility, and corporate sectors will allow for greater impact and coordination among stakeholders. Once established, the updated commission will oversee implementation of the Climate Action Plan as well as tracking of progress toward goals. This commission will ensure that the CAP 3.0 is implemented in a way that benefits all Pittsburghers.

Institution Engagement

The City of Pittsburgh will need ongoing support and engagement from all parties, especially large institutions such as hospitals and universities that operate within the city, in order to achieve these ambitious goals. These institutions have the opportunity to create significant impact across all sectors. Additionally, their expertise and research capabilities have proven invaluable to the climate action process. Expanding upon these existing partnerships will help foster innovation and expedite progress toward the 2030 Goals.

Community Engagement

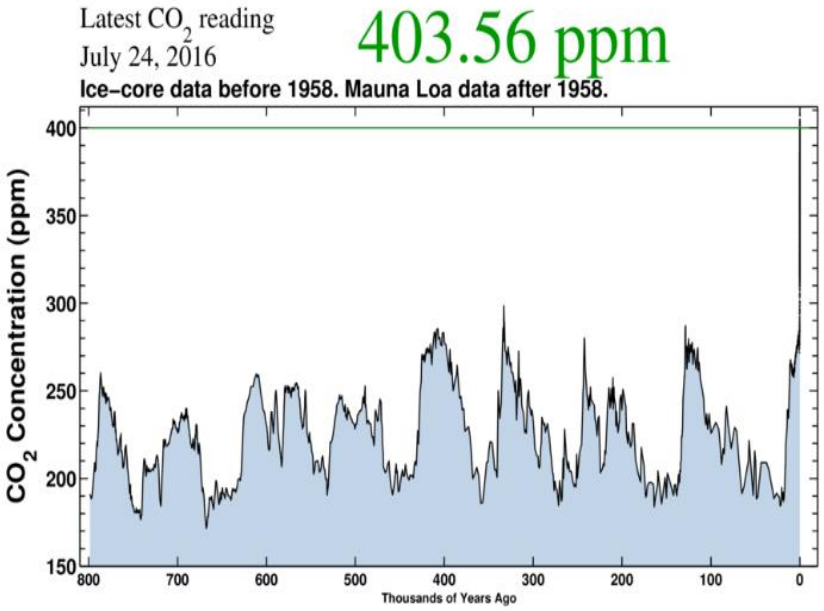
Community engagement and grass roots action is a vital aspect of successful climate initiatives. Organizations such as the Citizens Climate Lobby, Climate Realities Leadership Corp, and the Sierra Club work to engage community members in climate related issues and policy decisions. These organizations will play an important role in educating the public and encouraging action at the neighborhood and household levels.

Pittsburgh Climate Action Plan 4.0

This current Climate Action Plan provides a holistic approach to reducing Pittsburgh's impact on climate change and improving the overall resilience of the city and its residents. This plan provides pathways for emission reduction and is designed to be a guiding document for the City of Pittsburgh and relevant partners. It is meant to be a living document that evolves as actions progress. Additionally, this Climate Action Plan is designed to be a 5 year plan. As technology improves and policies change, an updated CAP can be written. Actions started as a result of this plan and the associated data to be collected will inform the next iteration of the Pittsburgh Climate Action Plan.

Climate Change Introduction

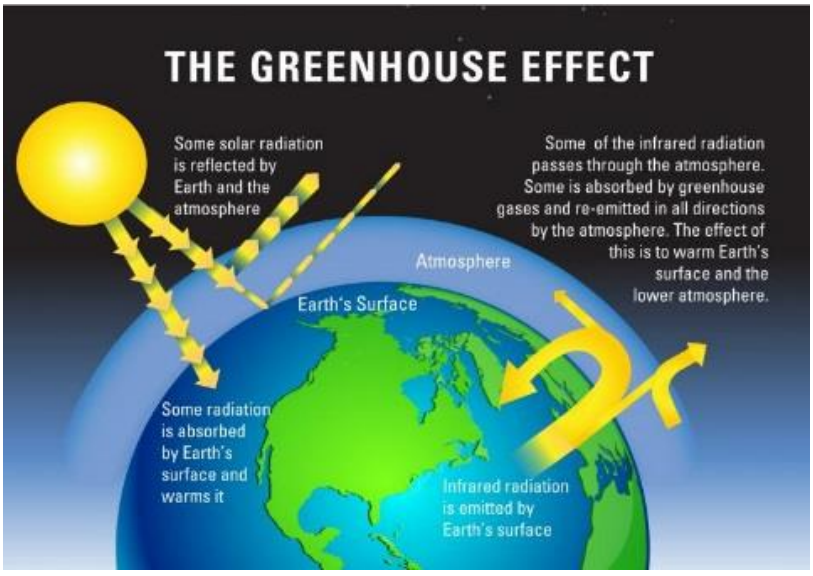
In 2016, Earth's surface temperatures were the warmest since modern recordkeeping began in 1880, according to independent analyses conducted by National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA)[5]. Earth's average surface temperature has risen approximately 2.0 degrees Fahrenheit (1.1 degrees Celsius) since the start of the industrial revolution in the late 1700's, a change driven largely by increased activities releasing carbon dioxide and other human-made emissions into the atmosphere. Most of the warming occurred in the past 35 years, with 16 of the 17 warmest years on record occurring since 2001.



Climate Change

Greenhouse gases (GHGs) such as carbon dioxide (CO_2), methane (CH_4) and ozone (O_3) in the atmosphere, absorb some of the infrared radiation (heat) emitted by Earth's surface, which keeps our planet livable. Without the greenhouse effect, Earth's average temperature would be near 0 degrees Fahrenheit, rather than the 20th century average of 57.1 degrees F.

However, human activities such as burning fossil fuels and destroying forests have increased the amount of GHGs in the atmosphere over the last 100 years. This is disturbing the optimum levels of GHGs, amounting to increased heating effects. As emissions increase, more heat is trapped, leading to numerous changes in the Earth's natural processes.



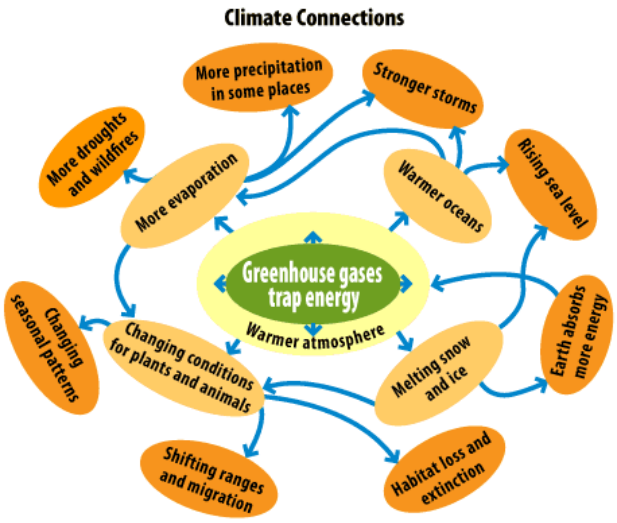
For over 800,000 years the atmospheric concentration of carbon dioxide has fluctuated but has not exceeded 300 parts per million (ppm). Currently, the levels hover above 400 ppm.

The dramatic increase in GHGs in the atmosphere has already led to a 1.5°F (0.85°C) increase in global average surface temperature from 1880 to 2015.

[5] https://www.nasa.gov/press-release/nasa-noaa-data-show-2016-warmest-year-on-record-globally

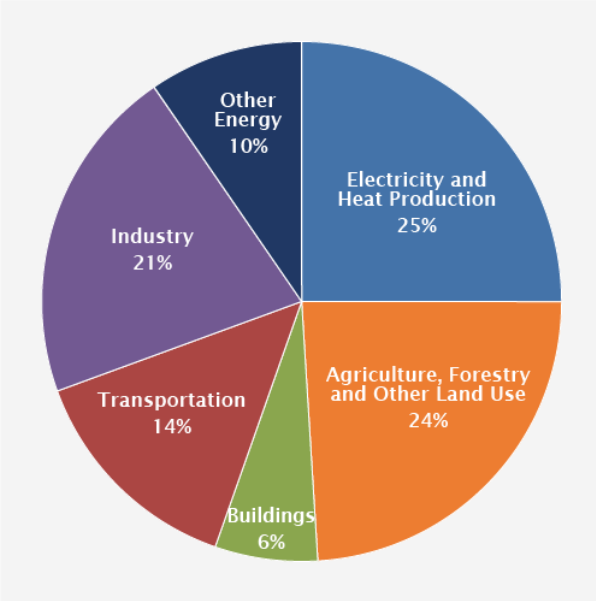
Climate Change Consequences

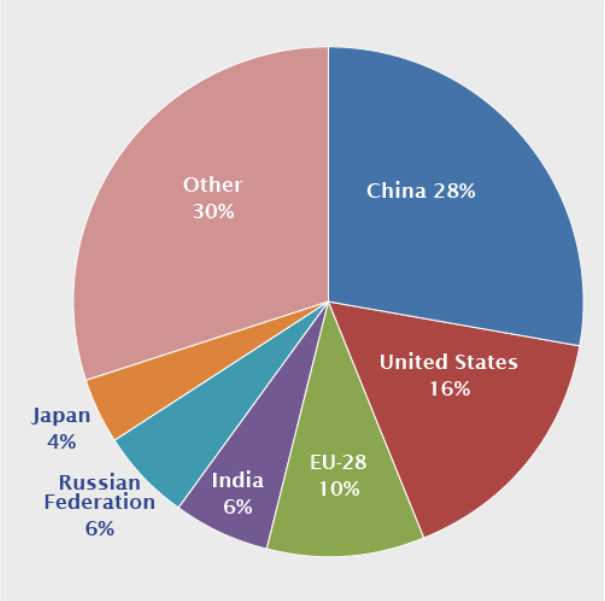
Earth is a resilient planet with many complex interconnected systems that work to keep the planet in balance. However, global warming has already changed climates by altering evaporation and precipitation patterns, melting snow and ice and warming the ocean. This has caused heat waves, droughts, extreme storms, wildfires, hurricanes and tornadoes of varying severity across several regions of the world. If carbon emitting activities continue at the same rate, the planet could see an 8.1°F (4.5°C) increase over preindustrial temperatures by 2100. This could result in the extinction of 16% of the species on Earth.[6]



Global Sources of Emissions

The majority of human-caused GHG emissions are due to burning fossil fuels like coal, natural gas, gasoline, and diesel for electricity, heat and transportation. However, it is important to recognize that almost 24% of global emissions are due to deforestation, industrial agriculture and the impact of other land uses. China, the U.S., the European Union, Russia, and Japan are responsible for 70% of the world's GHG emissions. Developed nations with relatively small populations are disproportionately responsible for climate change, largely driven by resource intensive lifestyles.





7

[6] https://archive.epa.gov/climatechange/kids/basics/concepts.html
[7] https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data

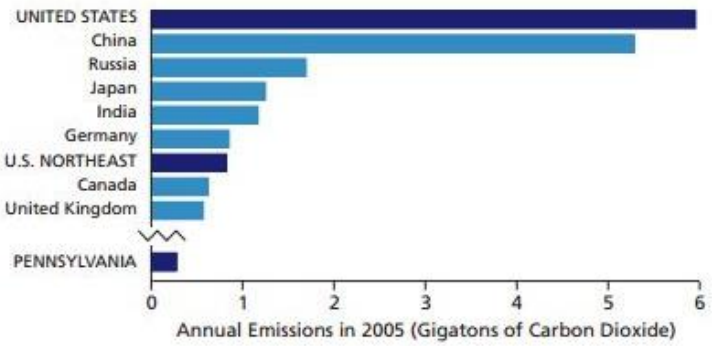
The Paris Agreement

In December 2015, global leaders from 195 countries met in France for the 21st Conference of Parties (COP 21) of the United Nations Framework Convention on Climate Change (UNFCCC). The mission of COP21 was to "achieve a legally binding and universal agreement on climate, with the aim of keeping global warming below 2°C." Prior to the conference, 185 countries submitted an Intended Nationally Determined Contributions (INDC) that outlined their strategies and goals for reducing their carbon emissions as a basis for negotiation. However, these INDCs put the world on track for a 2.7 to 3.7°C increase, surpassing the COP21 2°C goal. Meanwhile, leading climate scientist James Hansen published a paper outlining the dangers of feedback loops caused at 2°C. Vulnerable countries, such as low-lying island nations – the Maldives, the Marshall Islands and the Seychelles – have long called for a 1.5°C ceiling.

On December 12, 2015, the Paris Agreement[8] was adopted by consensus, and the treaty has been signed by 179 parties and ratified by 20. Article 2.1 states that parties agree to "Hold[ing] the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change."

However, even if all emissions ceased tomorrow, GHGs already in the atmosphere would still trigger an additional 0.6°C rise above the current 1.1°C, causing a 1.7°C increase overall. Therefore, immediate action is needed to minimize emissions as soon as possible, and also sequester atmospheric carbon in large quantities.

Climate change in Pennsylvania

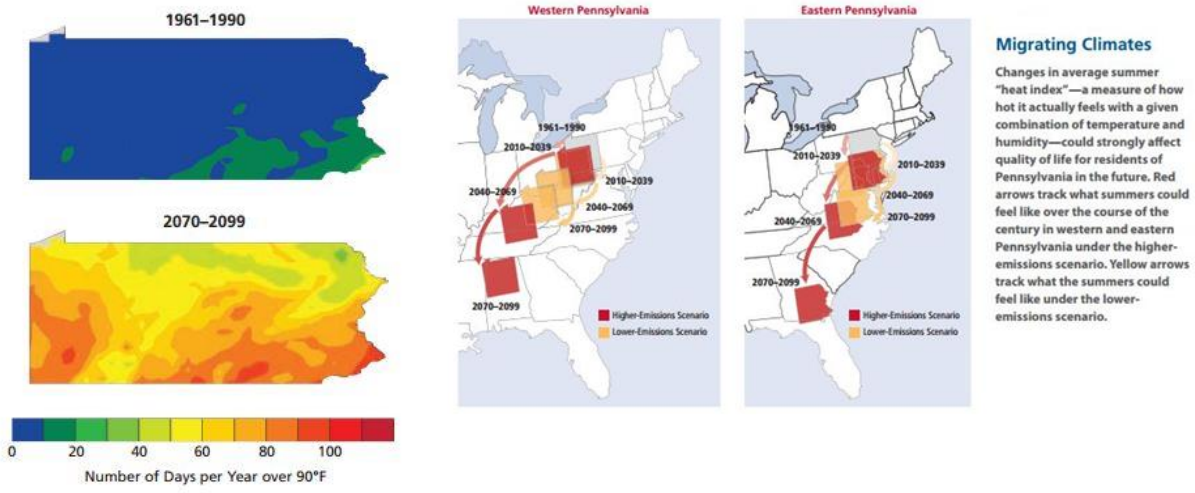


Pennsylvania's emissions are high enough to compare with some of the largest nations in the world. The Energy Information Administration (EIA) conducted a study in 2005[9] and found that, when compared globally, Pennsylvania's emissions were high enough to rank as world's twenty-second largest emitter of CO_2. For comparison, Pennsylvania's emissions are higher than those of the states of New York and Wyoming combined, and the per capita emissions are more than double those of New York State.

Increased Temperatures

In addition to being a significant contributor to climate change, Pennsylvania is also projected to see significant impact due to climate change.[10] By the end of the century, Pennsylvania is projected to experience a dramatic increase in the number of extremely hot days. The regions that will experience the greatest warming are in the southwest and southeast.

[8] https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement
[9] https://www.eia.gov/environment/emissions/state/analysis/pdf/stateanalysis.pdf
[10] https://www.researchgate.net/publication/216769159_Confronting_Climate_Change_in_the_US_Northeast_Science_Impacts_and_Solutions



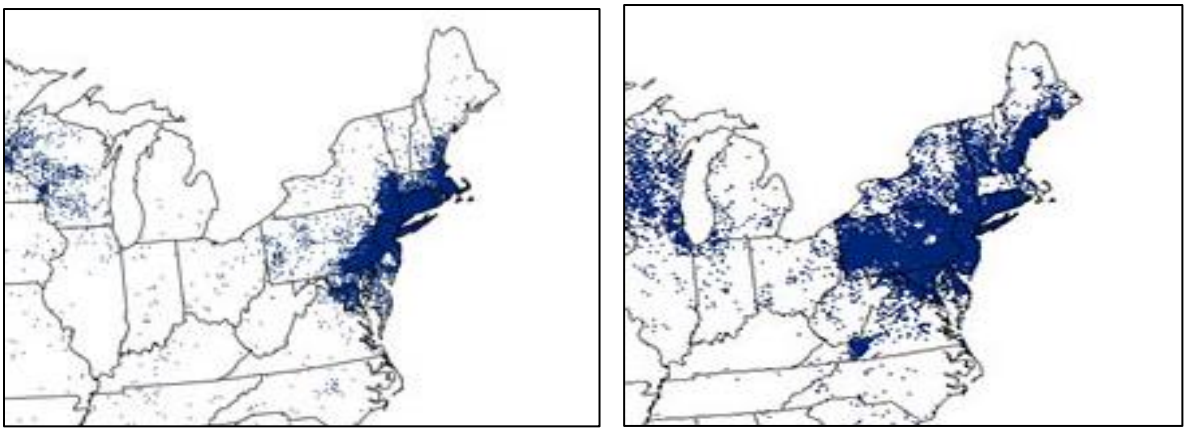
Statewide, Pennsylvania is projected to experience dramatic increases in the number of extremely hot days over the coming century, especially under the higher-emissions scenario. The greatest warming will be in the southwest and southeast regions, where daytime temperatures by late century (2070–2099) could hover over 90°F for nearly the entire summer.

Although Pittsburgh is an inland city that is sheltered from many 'typical' consequences of climate change such as sea level rise and extreme hurricanes, Pittsburgh has seen numerous climate related impacts in recent year.

Increase in Lyme disease

The incidence of Lyme disease in the U.S. continues to rise rapidly, especially in the Northeast and Great Lakes regions. If left untreated, Lyme disease can cause severe and debilitating health symptoms. According to the CDC, Pennsylvania had the highest number of Lyme disease cases in the nation for three straight years, with many of the highest numbers occurring in Western Pennsylvania.[11] Lyme disease infections usually occur most frequently in the spring and fall due to increased tick activity. Deer ticks that transmit the disease are dormant during the winter, but become active when the temperature rises above freezing. Warmer weather and milder winters mean that the ticks become active earlier and remain active for a longer period of time, allowing the disease to become more widespread.

Lyme disease cases in 2001 vs 2016



[11] https://www.cdc.gov/lyme/datasurveillance/index.html

Washington Boulevard Flooding

In August 2011, two storms hit the Pittsburgh area, dropping 3-4 inches of rain in one day, with 2.1 inches coming in a single hour during the evening rush hour. The storm water overwhelmed the area's drainage system and caused manhole covers to pop off the road. Four people were killed when flash floods swamped cars and water quickly rose up to 9 feet in some areas along Washington Boulevard near the Allegheny River. Overall, 18 vehicles were stranded. The boulevard is in the basin of a large watershed and receives runoff from surrounding neighborhoods. As the climate changes, heavy rain events and extreme flooding will continue to occur more frequently. [12]

Flooding on Washington Boulevard

Air Quality Impacts

Pittsburgh first rose to prominence through fossil fuel extraction and carbon-intensive industries, thus establishing its legacy as the 'Steel City'. Coal was mined from Pittsburgh's hillsides, and then burned to forge steel. For several decades, the city was polluted with smoke and particulate matter that choked out the sky and required streetlights to be lit during the day. Along with being the "City that Built America" Pittsburgh earned the nickname "Hell with the Lid Off" due to the extreme air pollution created by the steel industry.

Pittsburgh has made vast improvements in air quality since the height of the steel industry, including enactment of the nation's first Clean Air Act. However, the American Lung Association still ranks Pittsburgh the eighth worst of more than 200 metropolitan areas in the nation for long-term (annual) soot pollution, the 14th worst for short-term or daily soot pollution, and the 29th worst for ozone, the main precursor of unhealthy smog.[13] Air quality has significant health implications in our region. A recent study, conducted by Dr. Deborah Gentile of the Pediatric Alliance, showed that while the national average for pediatric asthma is about 8%, nearly 23% of children in the Pittsburgh region have been diagnosed with asthma.[14] In Southwestern Pennsylvania, there are an estimated 1500 deaths that can be attributed to poor air quality each year. As Pittsburgh strives to reduce GHG emissions, there must also be a focus on improved air quality and the related human health benefits.

Pittsburgh: Carbon Legacy to Climate Leadership

Existing Climate Commitments

For years, Pittsburgh has shown a commitment to action on climate change. Programs such as the Sustainable Pittsburgh Challenge (formerly the Green Workplace Challenge) and the 2030 District

[12] https://pittsburgh.cbslocal.com/2011/08/19/woman-2-children-found-dead-after-flash-flooding-on-washington-blvd/
[13] *http://www.stateoftheair.org/2013/*
[14] *https://www.ahn.org/news/9-8-2017/study-local-schoolchildren-reveals-alarming-rates-uncontrolled-asthma-exposure-to*

are the direct result of previous climate action plans and the Pittsburgh Climate Initiative. The first two Climate Action Plans also led to the creation and eventual expansion of the City's Office of Sustainability. Pittsburgh has also signed on to a number of national and international climate agreements and initiatives. These partnerships provide technical assistance, city-to-city collaboration, peer to peer learning, and offer metrics by which Pittsburgh can track progress.

We Are Still In

We Are Still In is the broadest cross-section of the U.S. economy ever assembled in pursuit of climate action. Over 2,500 leaders strong and growing, We Are Still In shows the world that leaders from across America's state houses, city halls, board rooms, and college campuses stand by the Paris Agreement and are committed to meeting its goals.

Global Covenant of Mayors for Climate and Energy

The Global Covenant of Mayors for Climate & Energy is an international alliance of cities and local governments with a shared long-term vision of promoting and supporting voluntary action to combat climate change and move to a low emission, resilient society.

ICLEI

ICLEI – Local Governments for Sustainability is the leading global network of more than 1,500 cities, towns and regions committed to building a sustainable future. ICLEI provides technical consulting, training, and information services to build capacity, share knowledge, and support local government in the implementation of sustainable development at the local level. Their basic premise is that locally designed and driven initiatives can provide an effective and cost-efficient way to achieve local, national and global sustainability objectives.

Under 2 Coalition

The *Under2 MOU* is a commitment by sub-national governments to reduce their greenhouse gas (GHG) emissions toward net-zero by 2050. Central to this is the public commitment by all signatories to reduce their GHG emissions by 80-95% on 1990 levels, or to 2 metric tons of carbon dioxide-equivalent per capita, by 2050. Every government faces different challenges on this journey, and the Under2 Coalition provides a global forum that supports Under2 signatories in developing bold, impactful strategies and aligning on a trajectory consistent with 2050 carbon neutrality.

Pittsburgh Climate Action Plans

PCAP 3.0 builds upon the information gathered from PCAP 1.0 and 2.0.The first two climate action plans were organized into four sectors: Business, Community, Higher Education and Local Government. Within each sector, approaches targeted energy, transportation, and waste management as well as education, advocacy, and coordination. Given that many strategies for greenhouse gas reduction require extended time-frames, some planned activities have not been completed; however, PCAP 1.0 & 2.0 set in motion many important measures.

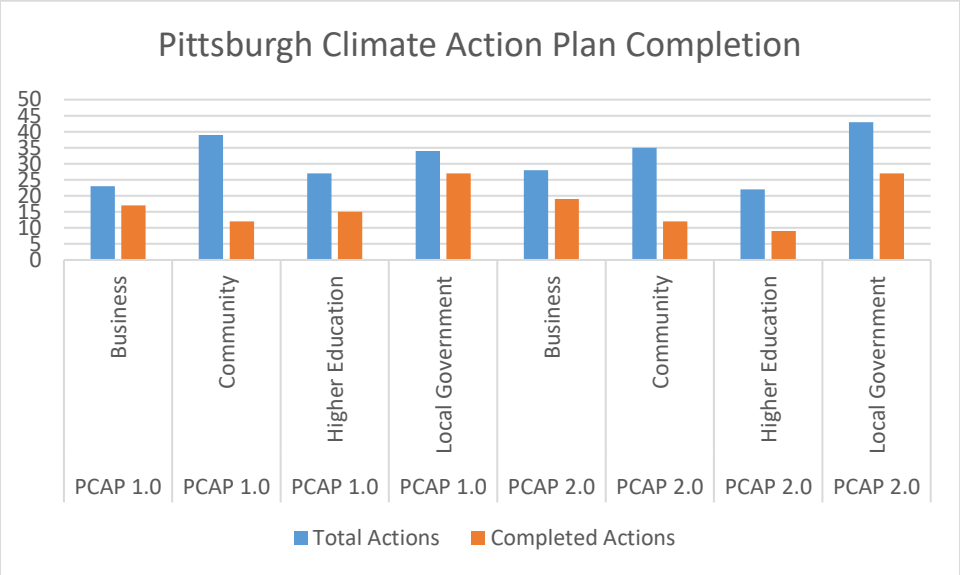


Chart 1: Actions outlined in completed in previous Climate Action Plans

The first two Pittsburgh Climate Action Plans laid the groundwork for and supported the creation of successful citywide programs like the Green Workplace Challenge and the Pittsburgh 2030 District, which encourage organizations and building owners to implement sustainable practices and measure energy and water conservation.

From 2011-2017 over 250 participating organizations have completed 7,840 measurable actions in the Green Workplace Challenge, have saved more than 127 million kWh and prevented 23,283 metric tons of CO_2.

In the Pittsburgh 2030 District, 104 Property Partners managing over 79.2 million square feet across 492 commercial buildings have reduced energy use by 10.7%, water use by 7.4%, and carbon emissions from transportation by 24.2% below baselines. The 2016 energy use reduction of 982 million kBtu is equivalent to 113,540 metric tons of CO_2.

The 12-member Pittsburgh Higher Education Climate Consortium (HECC) has collectively achieved a 20% reduction in carbon emissions since 2003. These reductions have come as a result of bold actions such as Carnegie Mellon University's purchase of100% renewable electricity and University of Pittsburgh's adoption of the Sustainable Development Goals.

PCAP 1.0 also led to the codification of the City of Pittsburgh's Sustainability Coordinator position, which has since evolved into the City's Division of Sustainability and Resilience, now with five full-time

staff members. PCAP 2.0 helped to create a position for a Sustainability Coordinator at Pittsburgh Water and Sewer Authority (PWSA). This is in addition to Sustainability Coordinators at the Sports & Exhibition Authority (SEA) and the Urban Redevelopment Authority (URA).

Building on results from PCAP 1.0 and 2.0, PCAP 3.0 is structured according to emission sources, with a focus on instrumental, measurable actions with assigned stakeholders. Action plans are broken into six categories or chapters:

1) **Energy Generation and Distribution**
2) **Buildings and End Use Efficiency**
3) **Transportation and Land Use**
4) **Waste and Resource Reduction**
5) **Food and Agriculture**
6) **Urban Ecosystems**

This PCAP 3.0 lays out pathways, strategies, and a framework for achieving Pittsburgh's greenhouse gas reduction goals by the year 2030 and beyond, as follows:

Pittsburgh's Greenhouse Gas Emission Reduction Goals (below on a 2003 baseline)

- 20% GHG Reduction by 2023
- 50% GHG Reduction by 2030
- 80% GHG Reduction by 2050
- Pursue a future carbon neutral goal

Pittsburgh 2030 Climate Goals

Internal City Operations:

1) 100% renewable electricity use
2) 100% fossil fuel free fleet
3) Divestment from fossil fuels

City of Pittsburgh:

1) 50% energy use reduction
2) 50% water use reduction
3) 50% transportation emission reduction
4) Zero Waste- 100% diversion from landfills

In short, Pittsburgh follows a 0-50-100 goal; zero waste, 50% emissions reduction, and 100% renewable electricity. These broad, ambitious goals allow for innovation and collaboration with a variety of stakeholders.

CHAPTER ONE: Measuring Pittsburgh's Impact

Goal: Measure Pittsburgh's climate and ecological impact and report annually

Developing a Greenhouse Gas Inventory is the first step in managing climate change. The Greenhouse Gas (GHG) Inventory quantifies emissions and analyzes the sources of those emissions. This data informs mitigation strategies and is essential for tracking progress toward future reduction goals.
A citywide greenhouse gas inventory, based on 2013 data, was compiled and used to inform the Climate Action Plan 3.0.

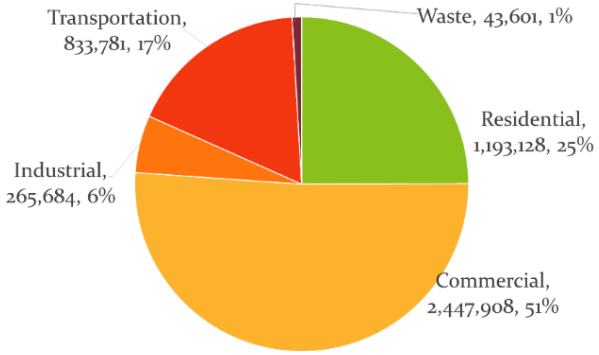


Chart 2: 2013 Pittsburgh Greenhouse Gas Inventory Summary

[15]

Scope	Definition
Scope 1	GHG emissions from sources located within the City boundary
Scope 2	Indirect GHG emissions occurring as consequences of the use of grid-supplied electricity, heat, steam and/or cooling within city boundary.
Scope 3	All other GHG emissions that occur outside city boundary as a result of activities taking place within the City boundary.

Table 1: Greenhouse Gas Inventory Scope Definitions

Sector Based Inventory
GHG inventory protocols tend to focus on Scope 1 and Scope 2 emissions, as defined in Table 1, while Scope 3 emissions are more difficult to quantify. Scope 1 emissions come from sources within the city limits, such as gasoline that is burned by vehicles on city roads. Scope 2 emissions occur as a consequence of electricity demand within city limits. Burning of fossil fuels at power plants located outside of Pittsburgh to satisfy electricity demands within the city are a main contributor to Scope 2 emissions. Scope 3 emissions are other emissions associated with activities that occur within city limits.

For example, Pittsburgh residents generate waste, but that waste is hauled to landfills outside of the city. Methane from that waste is therefore part of Pittsburgh scope 3 emissions. Pittsburgh's GHG inventory primarily focuses on Scope 1 and Scope 2 emissions as prescribed in the ICLEI methodology. These emissions are related to data that is more reliable and readily available.

2013 Greenhouse Gas Inventory
In the 2013 GHG Inventory, included as an appendix to this Climate Action Plan, emissions are categorized by sources and activities in each sector: Residential, Commercial, Industrial, Transportation, and Waste.

In terms of annual emissions, Pittsburgh saw a 12% increase in emissions from 2003 to 2008, but a decrease of 2% from 2008 to 2013. It is difficult to draw conclusions from Pittsburgh's existing greenhouse gas inventories due to different methods and scopes of consumption data. However, it is clear that Pittsburgh needs to take more ambitious action in order to ensure achievement of the 2030 goals.

[15] *http://www.ghgprotocol.org/calculationg-tools-faq*

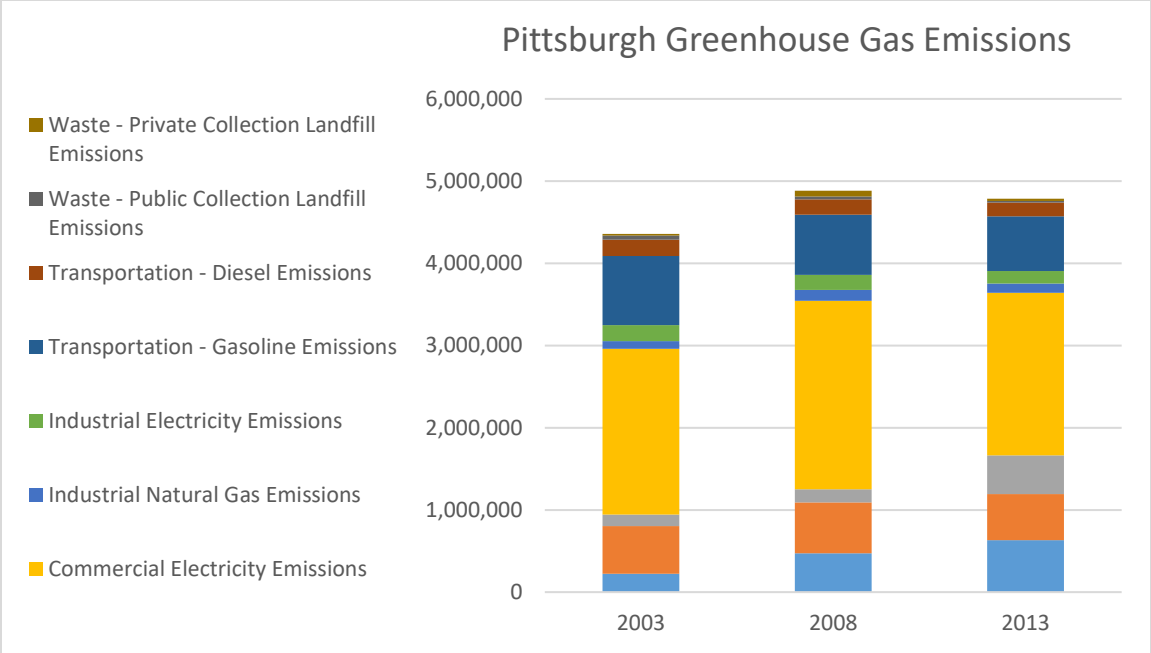


Chart 3: Weather Normalized-Pittsburgh Greenhouse Gas Emissions by Sector

Future Inventories

Using data that is nearly five years old is not ideal and makes it difficult to demonstrate the impact of recent programs and initiative. In order to truly track progress and align actions with measurable GHG reductions, more up to date, readily available data is needed. Moving forward, one of the first steps in tracking progress is to establish a more consistent process for conducting a greenhouse gas inventory.

With the new resources available to the City of Pittsburgh, through the American Geophysical Union (AGU), and Local Governments for Sustainability (ICLEI) extensive effort was put into standardizing the data collection and analysis process in order to develop the 2013 inventory. With this methodology and strong partnerships with the local utility companies in place, future inventories should be less time intensive and more reliable. This will allow for a yearly GHG Inventory to be compiled.

Several cities are adjusting inventory protocols to account for more scope 3 emissions, such as the carbon and ecological footprints associated with the consumption of products and services within city limits. Pittsburgh also plans to take steps to further understand and track its Scope 3 emissions for the future exercises in GHG inventory management.

CHAPTER TWO: Energy Generation & Distribution

Goal: 50% Emissions Reduction below 2003 levels by 2030
Goal: Power all City facilities with 100% clean electricity by 2030

Objective:

- Reduce natural gas fugitive emissions by 50% by 2030
- Reduce line loss from electricity
- Create a 21st Century energy system and support the utilities of the future
- Install 200 Megawatts of local, clean power by 2030
- Convert 50% of Pittsburgh customers to clean electricity

Strategies:

- Calculate reasonable estimates for annual methane leakage volume
- Calculate reasonable estimates for annual transmission loss for local grid
- Improve gas line leak detection
- Implement a long term infrastructure plan to replace aging natural gas delivery lines and to optimize electricity delivery grids
- Install smart meters to provide better customer data access
- Duquesne Light to install solar microgrid pilot at Woods Run facility
- Support alternative utility rate-making in Pennsylvania such as decoupling, formula rates, cost-recovery mechanisms, etc.
- Develop and implement Pittsburgh's District Energy Plan
- Create a local Energy Authority to enable community choice aggregation, power purchase agreements, and renewable regulatory approvals
- Support Duquesne Light with the Public Utility Commission (PUC) to install local renewable power generation in order to meet Pennsylvania's Alternative Energy Portfolio Standards (AEPS) for Provider of the Last Resort (POLAR) customers
- Support and allow for community source aggregation and renewable regulatory approvals (Big Opportunity)

Challenges:

- Regulations and policies regarding energy grids are often enacted at the state rather than local level
- Aging infrastructure
- Population growth and new development will increase energy demands

Existing Projects and Previous Work:

- Ecoinnovation District
- District Energy Pittsburgh
- People's Gas Methane Mapping Project
- Duquesne Light Woods Run Microgrid
- NRG Fuel Cell

Energy Champions

- University of Pittsburgh
- Carnegie Mellon University
- National Energy Technology Laboratory
- Green Building Alliance
- People's Gas
- Duquesne Light Company
- Sustainable Pittsburgh

Greenhouse Gas Emissions from Energy Use

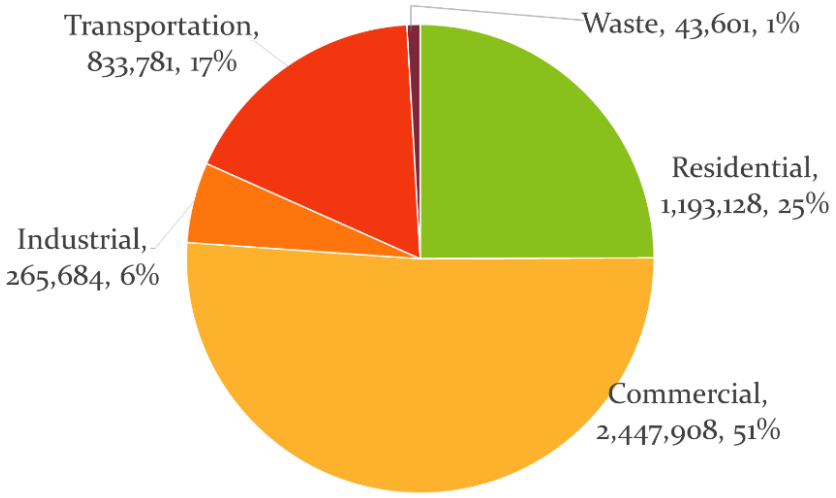


Chart 4: 2013 Weather Normalized-Pittsburgh Greenhouse Gas Emissions by Sources

Emissions from the built environment dominate Pittsburgh's emission with 99% of emissions coming from energy use. These emissions come from the use of electricity, natural gas, and transportation energy use.

Pittsburgh Electricity

Pittsburgh is served by Duquesne Light Company (DLC), which is an investor-owned electricity distribution company. Duquesne Light does not generate electricity, and Pittsburgh does not have a municipal utility. Within the Duquesne Light service territory, nearly 70% of electrical generation is nuclear or hydroelectric, but given greenhouse gas inventory protocols, Pittsburgh calculates its emissions from electricity using the EPA eGRID emission factors for RFC-West (RFC-W), which includes coal generation in West Virginia, Ohio and Indiana.

Generators within the Duquesne Light Company Service Territory [16]

Generator	Generation Type	Output (MW)	Percent (%)
Beaver Valley	Nuclear	1831	69.46
Brunot Island	Natural Gas (Peaker)	220	8.34
Cheswick	Coal	578	21.93
Patterson	Hydroelectric	2	0.27
Townsend	Hydroelectric	5	
	Total MW	2636	

Table 2: Electricity Generation within Duquesne Light Company Service Territory

[16] https://www.netl.doe.gov/sites/default/files/netl-file/City-of-Pittsburgh-Energy-Baseline-20171103-FINAL_0.pdf

EPA eGRID Emission Factors Year 2004 and Year 2012 Comparison[17]

	EPA eGRID Y2004 RFC-W	EPA eGRID Y2012 RFC-W
CO2 lbs/MWh	1,556.39	1,379.48
CH4 lbs/GWh	20.00	17.11
N2O lbs/GWh	24.00	21.67

Table 3: EPA eGRID Emission Factors

Over the years, the grid has gotten inherently 'cleaner' resulting in an overall reduction in electricity - related emissions. However, bold action is needed in order to deeply decarbonize the electric grid and recognize necessary emission reductions.

Greenhouse Gas Emissions from Transmission Loss & Inefficiency

As shown in the Sankey Diagram, significant amounts of energy is wasted due to inefficiencies in production and delivery of energy and electricity. Nearly 41% of the energy in the Power of 32 Region (32 counties in southwestern Pennsylvania, eastern Ohio, western Maryland and northern West Virginia) is 'wasted'. This is largely due to waste heat in the energy generation process, especially in the conversion of coal to electricity.

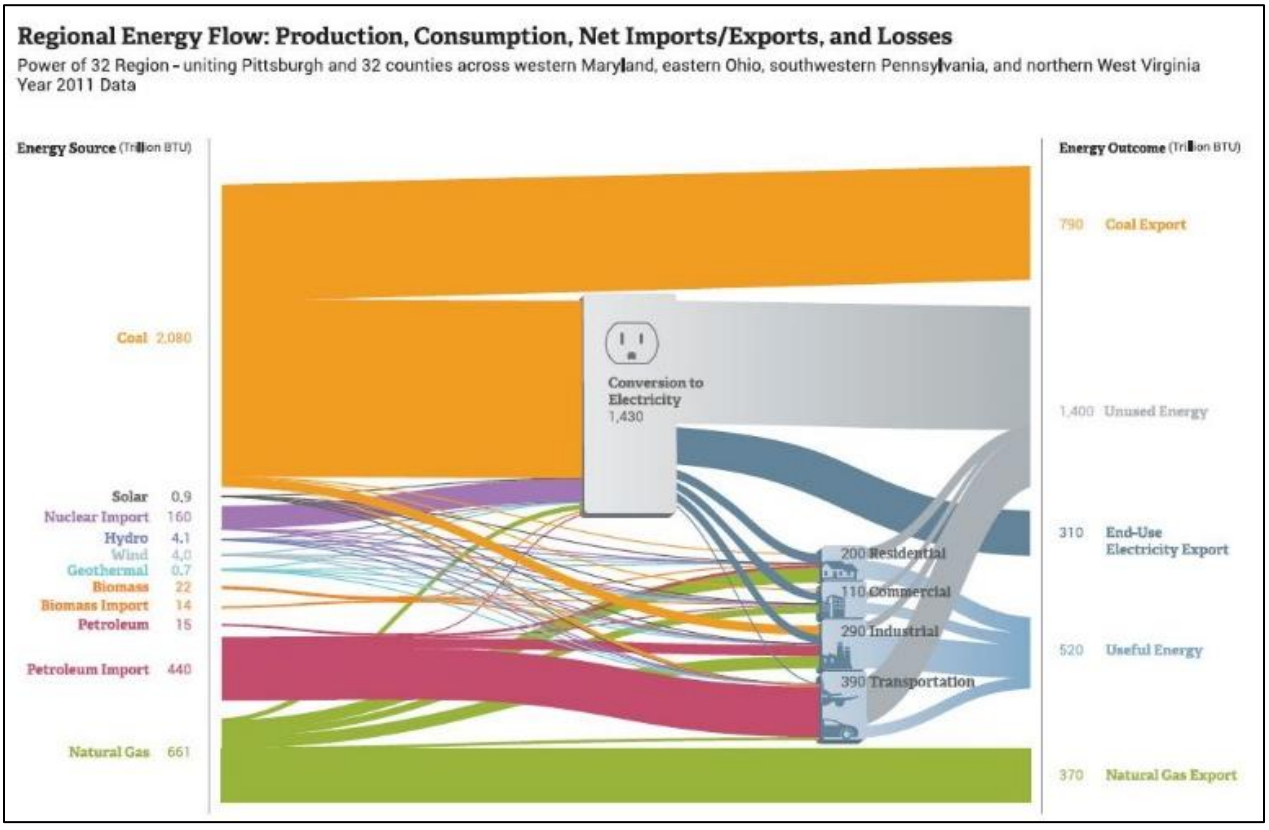


Chart 5: Regional Energy Flow Analysis for Power of 32 Region [18]

[17] https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid
[18] https://powerof32.org

Objective: Reduce line loss by 50% by 2030

Line Replacement and Methane Mapping Project
An essential first step in reducing energy emissions is to reduce wasted energy. Due to a lack of data, Pittsburgh's previous inventories have accounted for emissions related to natural gas leaks, electricity transmission loss, and energy that is lost while being used to treat water. However, recent studies show that transmission loss of electricity and natural gas accounts for approximately 9% of the region's energy consumption. These transmission-loss emissions comprise 3% of Pittsburgh's community emissions profile. Duquesne Light Company and People's Gas are taking the initiative by enacting multi-year infrastructure upgrades and grid modernization projects in order to improve the efficiency of delivery systems and reduce these losses.

Infrastructure upgrades for People's Gas include replacing miles of aging pipe used to deliver natural gas. Working with Google Earth Outreach, Carnegie Mellon University and the Environmental Defense Fund, People's Gas is improving the tracking of methane leaks throughout their infrastructure in order to target specific locations for line replacement and infrastructure improvement projects.

For this project, Google Map vehicles equipped with sensors to effectively and efficiently detect methane leaks created a map of leaks throughout the Pittsburgh area. There were 201 leaks identified during the study period, many in the 50% of natural gas pipes that are more than 50 years old. These leaks do not typically have immediate risk implications, but can have a serious impact on climate. Since natural gas has a warming potential more than 80 times greater than carbon dioxide, reducing leaks from these pipes can produce major greenhouse gas reduction.

The methane mapping pilot was one step in a larger, 20-year pipeline replacement plan. Over the next 20 years, People's Gas will invest $100 million a year in infrastructure upgrades with 60% of that capital to be focused within the City of Pittsburgh. [19] Throughout this process, People's is also working with Carnegie Mellon University to create a risk ranking of pipe infrastructure. These rankings take into account pipe age, material, and leak history in order to prioritize areas for upgrade. As a result of these investments, People's will be able to significantly impact and reduce Pittsburgh's overall emissions inventory.

Objective: Modernize Energy Systems

In order to reach the 2030 Goals, Pittsburgh needs to (1) reduce energy demand, (2) create efficiency district energy systems, (3) decarbonize the electric grid, and (4) convert systems from combustion to electrification. (*Demand reductions are addressed in Chapter 3, Buildings and End Use Efficiency. More information on Electrification can be found in Chapter 3, Buildings and End Use Efficiency and Chapter 4, Transportation and Land Use*.)

Decarbonize the electric grid
In order to decarbonize the electric grid, Pittsburgh needs to install more local renewable electricity generation systems, eliminate dependence on coal powered electricity, and protect existing zero carbon nuclear power. Action such as converting coal fired power plants to natural gas and protecting the

[19] https://www.edf.org/media/edf-google-use-special-street-view-cars-map-and-measure-leaks-pittsburgh-natural-gas-system

nuclear facilities which provide 60% of Pittsburgh's electricity without producing carbon emissions are important components of any plan to decarbonize the electric grid.

Western Pennsylvania Energy Consortium

The City of Pittsburgh manages the Western Pennsylvania Energy Consortium (WPEC), a group of 30 local government entities and universities who use reverse auctions to purchase electricity at a lower cost. WPEC acquired 10% non-certified REC in the first auction in 2008, and has increased that percentage by 5% each auction, and currently purchase 35% non-local non certified renewable electricity. The City of Pittsburgh has committed to using 100% renewable electricity to meet its operational loads by 2030 through both city-owned generation and purchase power agreements that install more renewable electricity production locally. In collaboration with the other members of the WPEC, the City of Pittsburgh will design options that allow members to transition to 100% local renewable electricity purchase, acknowledging that some existing members already reach or aspire toward these goals via multiple means.

Local Renewable Electricity

In order to fully realize the benefits of renewable electricity, a focus on local generation is needed. Generation of renewable electricity in southwestern Pennsylvania can provide a multitude of benefits. Increased availability of local renewable electricity will connect large power consumers with local providers. Deployment of local renewable electricity will spur economic growth, create employment opportunities, and enhance residents' well-being while improving Pittsburgh's economic competitiveness. As Pittsburgh looks to transition to clean electricity sources, the goal is to install 200MW of new, local renewable electricity. Local generation of renewable electricity in southwestern Pennsylvania will provide a myriad of economic, resiliency, and air quality benefits in addition to reduced greenhouse gas emissions.

District Energy

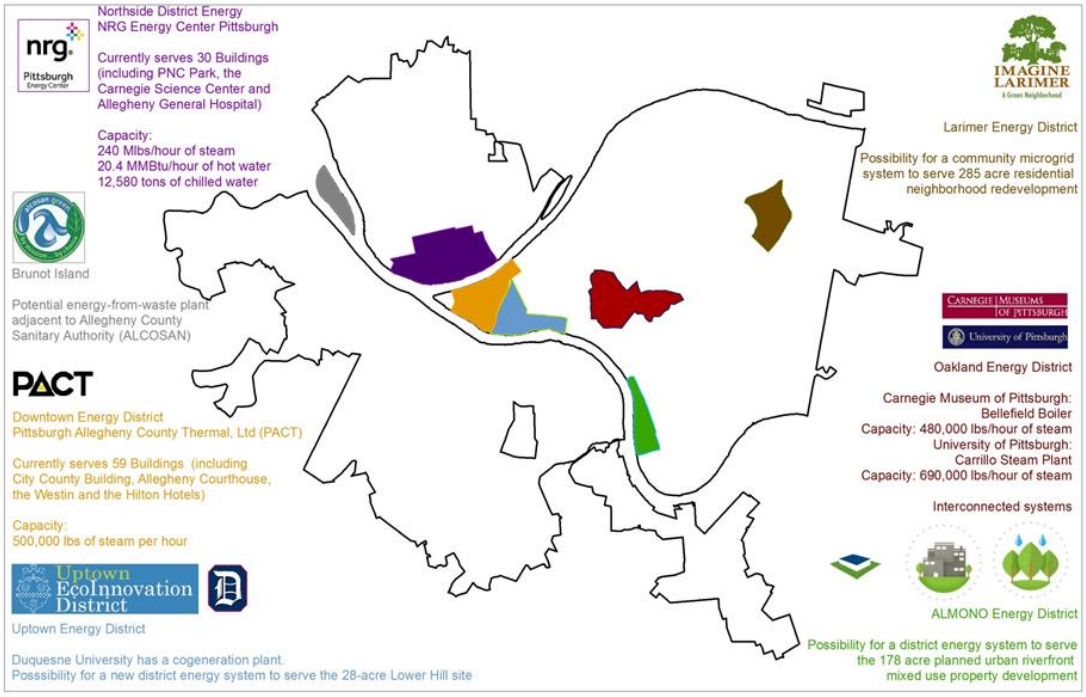
Municipalities across the nation face issues with deteriorating energy infrastructure. It has been shown that up to 60% of the energy that moves along aging gas and electric lines can be lost during transmission.[20] The City of Pittsburgh, in partnership with the Department of Energy, the National Energy Technology Lab, Duquesne Light, and the University of Pittsburgh Center for Energy, is currently developing a 21st century energy infrastructure plan to address these issues. The plan calls for the expansion and optimization of district scale energy systems, such as microgrids, thermal loops, combined heat and power systems and other innovative technologies.

Most cities rely on energy provided by power plants far outside of city boundaries. A district energy system allows a city to develop energy infrastructure on a smaller scale to optimize delivery, create resiliency in the grid system and minimize energy disruption. District scale systems also deliver cleaner and more efficient energy to customers while promoting economic development. A district energy system can provide local, reliable, and affordable energy for urban communities, while also providing economical solutions for commercial and industrial consumers and lowering greenhouse gas (GHG) emissions.

[20] https://www.netl.doe.gov/sites/default/files/netl-file/City-of-Pittsburgh-Energy-Baseline-20171103-FINAL_0.pdf

A microgrid is, in many ways, a smaller version of a traditional power grid. It is a discrete energy system with clearly defined electrical boundaries consisting of components for power generation, distribution, and demand management. A microgrid can act in parallel with, or independent from, the main power grid. However, microgrids provide a much closer proximity between power generation and usage, resulting in increased efficiency. Microgrids can also take advantage of renewable electricity sources such as solar and wind power, geothermal and combined heat and power systems as well as other innovative energy production systems.

Distributed energy resources (DER) are smaller than utility-scale generating systems and are located closer to the customers that they serve. Due to this proximity, there is a reduction in thermal line-losses associated with transmitting electricity over long distances from centralized power plants. The electrical resistance of transmission and distribution lines results in energy being "lost" to heat. These thermal line losses increase as demand on the electrical grid increase. At peak times, line losses are approximately 50% higher, and can approach 8-10% of the power sent through the lines. Locally-sited district energy resources would reduce the need for long-distance transmission and distribution of electricity, Duquesne Light believes that the deployment of microgrids and their associated DER has the ability to significantly reduce the line-losses for electricity generated by DER. If line-losses were reduced by the 8-10% mentioned above, then 8-10% less electricity would need to be generated in order to provide end-users with electricity. Assuming that this 8-10% of electricity was being generated by fossil-fuel power plants, district energy resources have the potential to reduce greenhouse gas emissions. In addition, during peak usage or at times of primary power grid failure, a microgrid can operate independently of the larger grid. If problems arise within the microgrid, it can isolate itself without affecting the larger grid's integrity. Microgrids are also capable of supplying power back to the larger grid during times of grid failure or power outages.



Existing and potential district energy systems in Pittsburgh[21]

[21] *https://www.netl.doe.gov/mou/energy_districts*

The electrical grid uses AC (alternating current) because large power plants create AC power and transformers need AC power to step up the voltage to send electricity long distances with lower transmission loss. Direct current is not ideal for long transmission but works well for local energy networks, and eliminates the need to convert grid AC power to DC in order to power LED lights, electronics, data and telecommunications. The grid was built in an era of fossil fuel expansion, where having a coal-fired generator on every block was not a desirable situation. However, solar and wind power can be integrated into the fabric of the City with enough regularity to feed a DC grid, and renewable sources already generate DC power. For this reason, District Energy Pittsburgh has proposed two DC microgrids powered by solar photovoltaic electricity; one at the Duquesne Light training facility and one at the Second Avenue parking lot.

Designing systems around the specific energy needs of a neighborhood will allow developers to create systems that take advantage of local resources, infrastructure, and other regional features. While these systems may require more up-front engineering, they can be highly efficient and more cost effective than traditional, off-the-shelf technologies. Pittsburgh already has two steam districts in the downtown triangle, two interconnected university steam systems, and a university cogeneration plant. These systems are all evaluating opportunities for increased efficiency; several opportunities for new district energy systems have been identified.

District-scale energy systems also have a number of notable benefits when compared to the development of multiple stand-alone systems in individual buildings or businesses. A broader customer base will allow for higher utilization rates as well as a broader range of systems available for development. A single point of maintenance (compared to having to go into each commercial and residential building served by the system) will streamline upkeep and repairs, requiring only one system to be monitored for optimal operation. Economies of scale and reduced overhead will decrease the cost of potential upgrades and expansion of a single system compared to many separate systems deployed in different buildings. An example of this is Duquesne University, which has continued to upgrade its combined heat and power (CHP) system, integrating cooling systems and thermal storage. District energy systems within the City of Pittsburgh can provide secure, reliable energy with higher efficiency, lower carbon emissions, and lower capital and operating costs. They will enhance the integration of distributed and renewable electricity sources and enable integration of smart grid technology. District energy systems will minimize the City's carbon footprint and greenhouse gas emissions by maximizing clean, locally controlled energy generation.

Pittsburgh is at the cutting edge of a global model for the development of municipal energy production to provide area communities and businesses with clean, affordable, efficient energy. The successful design and deployment of energy districts will enable these systems to be replicated throughout the region. Pittsburgh can become a center for innovation, not just in energy district design, but also in the advanced energy technologies that will sustain those districts.

EcoInnovation District: Case Study

The EcoInnovation District is a unique initiative that was developed to address many of the typical challenges faced across Pittsburgh's neighborhoods. It is a plan that combines the goals of EcoDistricts, dedicated to equity and environmental resiliency, with the goals of Innovation Districts that focus on job growth through the establishment of new and innovative businesses. The EcoInnovation District in Pittsburgh is an area "dedicated to sustainability, innovative development practices and inclusive job

growth." In other words, it is a community plan that centers on supporting existing residents while increasing job opportunities and protecting the environment.

The EcoInnovation District in Pittsburgh encompasses the Uptown and West Oakland communities. These neighborhoods present both challenges and opportunities. They are located between the thriving Downtown and Oakland areas. However, they have not seen the same level of growth and recovery as these other regions. As the Downtown and Oakland areas experienced significant growth, the Uptown and West Oakland communities have faced divestment and deterioration. In addition, due to their location near transportation corridors, they suffer from problems of air quality, access as well as safety. They also face significant challenges related to housing affordability, storm water runoff, and infrastructure issues.

However, community organizations in Uptown and West Oakland have encouraged investment while creating opportunities for local residents. As prices rise and space for development falls in the Downtown and Oakland areas, the EcoInnovation District presents an opportunity to develop an environmentally resilient community based on equitable land use, job growth for residents and reliable transportation and infrastructure systems.

Community ownership of this plan is essential and all members of the community were invited to participate in the process. Collaboration and trust among community residents, institutions, businesses, and government is essential in order for successful investment and sustainable growth in the corridor.

The EcoInnovation District reflects a new approach to development that is focused on job growth and economic opportunity, universal access, smart and efficient infrastructure, and green building practices. Neighborhoods that are walkable, bikeable, and transit-oriented result in healthier lifestyles for residents, promote greater equity in access, and create a better environment for businesses to succeed.

CHAPTER THREE: Buildings & End Use Efficiency

Goal: Reduce energy and water consumption by 50% by 2030

Objectives:

- Improve quality of energy and water use data
- Ensure all new buildings are carbon neutral by 2030
- Ensure all new buildings have optimum location efficiency by 2030
- Mitigate high energy burdens in vulnerable communities
- Improve energy efficiency in residential, commercial, and industrial buildings
- Reduce sewer volume by 50% below 2013 levels by 2030
- Improve the efficiency and effectiveness of public street lighting and traffic signals

Strategies:

- Collect monthly electricity consumption data by sector by zip code
- Collect monthly natural gas consumption data by sector by zip code
- Collect monthly potable water use data by sector by zip code
- Implement Commercial Building Energy Benchmarking Ordinance
- Create legal framework for Property Assessed Clean Energy (PACE) program
- Encourage demand response program participation
- Promote Green and Healthy Homes Initiative and related programs
- Allow for 'green' information to be included in the Allegheny County Multi List Service
- Support state level legislation enabling residential energy and water disclosure
- Support state level legislation enabling adoption of most recent building codes
- Promote Passive House building guidelines
- Create a location efficiency overlay and use transfer of development rights to encourage density while protecting open space
- Educate homeowners and renters on existing energy efficiency programs
- Create a building owner manual and expand first-time building owner classes
- Create a revolving loan fund for energy and water efficiency retrofits
- Create a map/matrix of resources for energy efficiency retrofits
- Promote home energy scores and home energy audits
- Install smart meters to provide better customer data access
- Pass local graywater and rainwater use legislation to facilitate irrigation/toilet flushing with graywater and rainwater
- Implement a stormwater fee to improve green infrastructure and prevent stormwater from entering the combined sewer
- Transition to LED streetlights

Challenges:

- Buildings currently account for 81% of Pittsburgh's greenhouse gas emissions
- Pittsburgh has the among the highest energy burdens in the U.S.
- More than 70% of Pittsburgh homes were built before 1970

Existing Projects and Previous Work:

- Building benchmarking ordinance
- 2030 District
- Green Garage Initiative
- Green and Healthy Homes Initiative

Building Champions

- Green Building Alliance
- Pennsylvania Environmental Council
- Conservation Consultants Inc.
- Pittsburgh Water and Sewer Authority
- Urban Redevelopment Authority
- Pittsburgh Parking Authority
- Sports and Exhibition Authority
- Department of City Planning

Greenhouse Gas Emissions from Buildings

Based on Pittsburgh's 2013 sector-based GHG inventory, buildings are responsible for 81% of the City's carbon emissions through electricity and natural gas consumption.

As the City's largest contributor of greenhouse gas emissions, Pittsburgh's vertical built environment provides many opportunities for deep carbon reductions. Improving energy generation and distribution systems is one approach to reduce GHG emissions. However, improving end use conservation and efficiency will also significantly reduce emissions. For both energy source and end use demand, Pittsburgh's building stock offers many improvement opportunities in the commercial, residential, and industrial sectors; strategies specific to each end use type abound and have much opportunity to be deployed at greater scale.

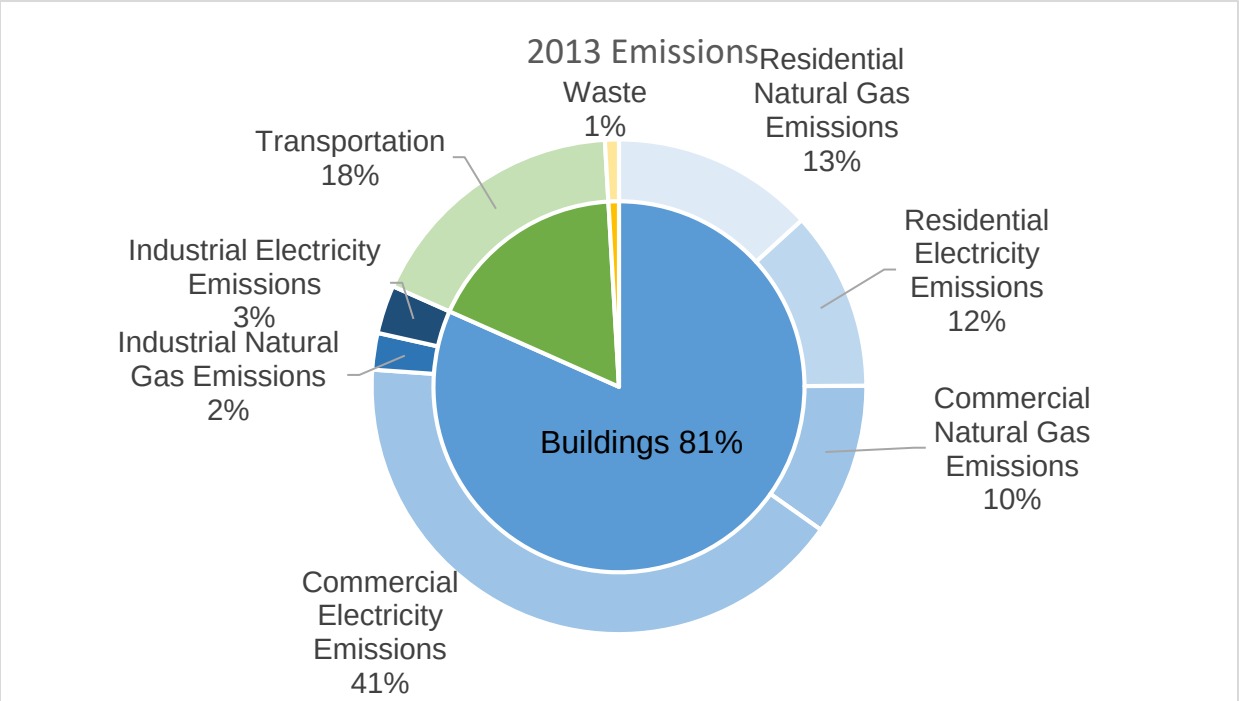


Chart 6: 2013 GHG Emissions by Source

Energy Use Intensity

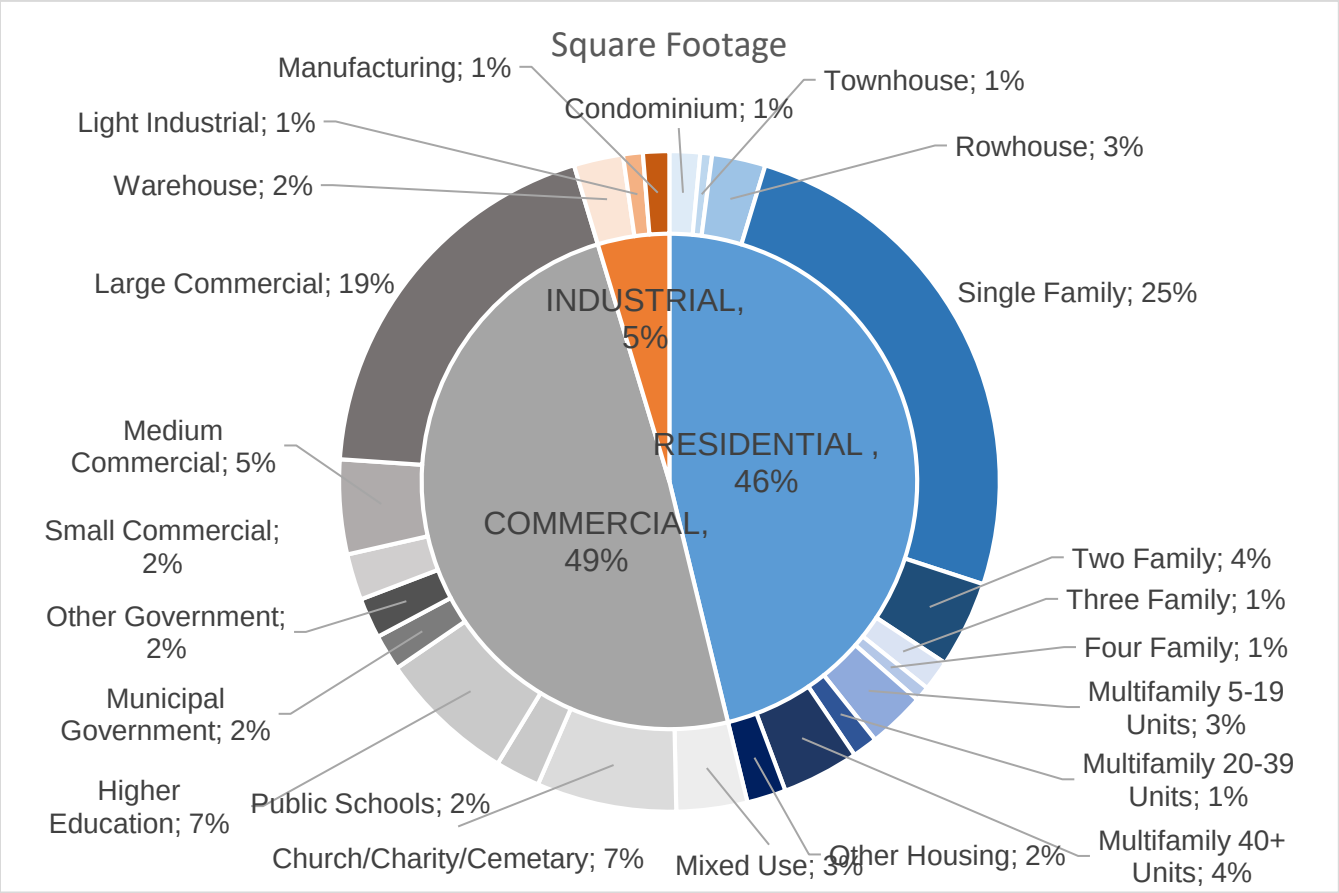


Chart 7: 2013 Building Square Footage by Use Type

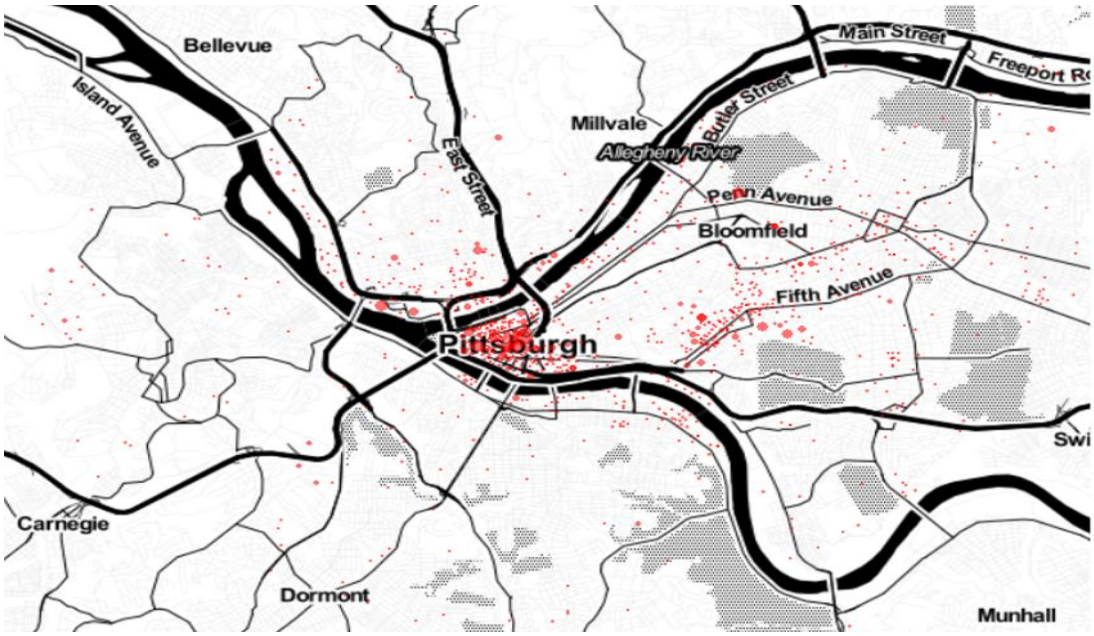
Energy use intensity (EUI) measures how much energy a building uses per square foot, which is largely determined by the building use type with other contributing factors such as occupancy, building age, and quality of building systems. For example, a manufacturing facility with heavy machinery traditionally uses much more energy than a simple warehouse; a home building to passive house standards will be more efficient than a poorly insulated home, thus using less energy per square foot. Using EUI measurements allows for efficiency to be analyzed and compared to similar buildings regardless of building size.

Given currently available local data sources, it is not possible to link energy use back to a specific building or use type, so energy use by sector is divided by that sector's total square footage. In future years' inventories it will be possible to link energy consumption to building use type, size, and geographic location to tell a better story of Pittsburgh's energy use.

Objective: Improve energy efficiency in existing commercial buildings

Building Benchmarking: "You can't manage what you can't measure."

In October 2016, the City of Pittsburgh adopted a new Building Benchmarking ordinance requiring all nonresidential building 50,000 square feet and larger to report annual water and energy consumption starting in June 2018.[22]



Map of buildings in the City of Pittsburgh 'covered' by the benchmarking ordinance

The first step in making any reductions in building energy and water use is to get a better understanding of how and where those resources are used. Benchmarking buildings allows owners, operators, and tenants to understand how each building is performing in relation to its local and national peers. This detailed, benchmarking information can then help inform future decisions and investments, perpetuating cost, and resource savings.

In adopting building benchmarking legislation, Pittsburgh joined 16 cities across the U.S. in requiring transparency toward measurable success. In New York City, the first year of benchmarking legislation, resulted in nearly 6% cumulative energy savings; San Francisco saw an 8% energy reduction with a similar policy. Given that commercial buildings contribute 51% of the City's GHG emissions profile, Pittsburgh hopes to recognize similar cost, resource, and emissions reductions.

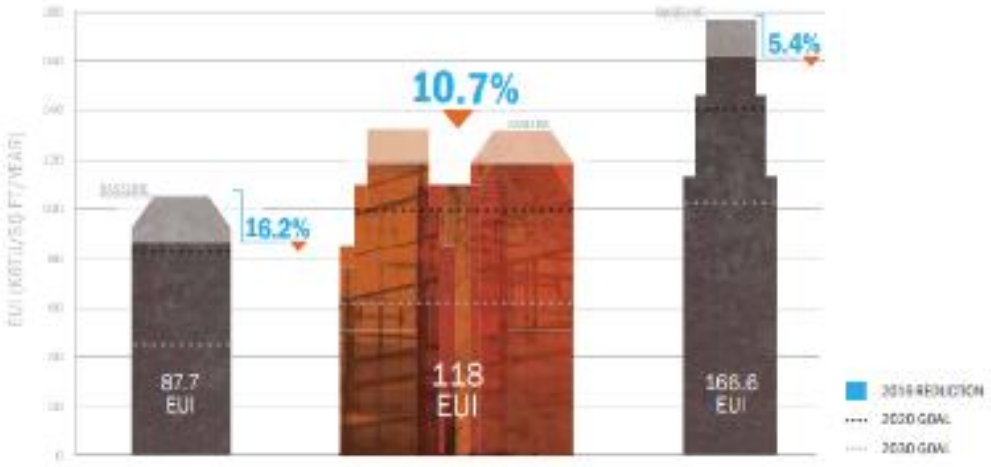
Pittsburgh 2030 District

Pittsburgh's building benchmarking ordinance will expand upon the efficiency improvements already being recognized within the Pittsburgh 2030 District. A Green Building Alliance strategic initiative, the

[22] https://www.imt.org/wp-content/uploads/2018/02/DATA_Benchmarking_Fact_Sheet.pdf

Pittsburgh 2030 District is a collaborative, nationally recognized, local community of high performance buildings in Downtown, Oakland, and three other neighborhoods. It consists of building owners, facility managers, and community and resource partners working together to dramatically reduce energy and water consumption, decrease transportation emissions, and improve indoor air quality while increasing regional competitiveness and returns on investment.

Using performance targets provided by the global Architecture 2030 Challenge, the Pittsburgh 2030 District is demonstrating that high performing buildings are the most profitable buildings in the City. Over 492 buildings have already committed to reducing energy use, water consumption, and transportation emissions 50% below baselines by the year 2030.[23]



Since 2012, the Pittsburgh 2030 District's partners has reduced energy consumption an average of 10.7% below the baseline. This equates to 2.6 Billion kBTUs -- the equivalent of more than 305,000 tons of CO_2 equivalent -- and savings of $52.3 million.

These collective efforts have established the Pittsburgh 2030 District as an international example of a multi-sector endeavor that maximizes performance and profitability while significantly reducing greenhouse gas emissions. This type of collaborative action will keep Pittsburgh competitive as it makes ongoing investments in Pittsburgh's future.

Energy Intelligence Network

Through a partnership with Carnegie Mellon University's Center for Building Performance and Diagnostic Performance and Metro 21 center, the City of Pittsburgh recently rolled out a building energy use dashboard. This dashboard is part of a larger 'Energy Intelligence Network' (EIN) currently in development.

The Energy Intelligence Network is designed to improve data quality and access in order to better understand and thus reduce the environmental impact of City facilities. Starting in the City County Building, the EIN utilizes a number of monitors to collect and display real time energy consumption data. While these monitors have currently only been piloted in the City County Building, the City will expand

---

23 http://www.2030districts.org/sites/default/files/atoms/files/Pittsburgh%202030%20District%20Progress%20Report%202016%20-web.pdf

the Energy Intelligence Network to all 300 city owned facilities. Real time, granular data about the energy being used by plug loads, lighting, and HVAC systems as well as the total energy being consumed can be used in numerous future projects and decision making processes.

Demand Response

Improved data quality as supplied by initiatives such as the Energy Intelligence Network can improve energy management capabilities. Energy management such as demand response programs can reduce energy costs and emissions and improve the resiliency of electric grid infrastructure. Demand response allows building operators to reduce or shift energy consumption during periods of peak consumption across the grid. Through a variety of options individual buildings can impact the demand and supply ratios of electricity in order to help ensure the demand does not exceed the available supply. Additionally, a more level load throughout the day will ensure that the supply is not too great which results in wasted energy.

Currently, if electric companies are unable to manage peak demands for energy, supplemental sources of energy generation, typically supplied by 'restarting' coal fired power plants, must be added to the grid. Peak load shaving, load shifting, and time of use pricing, are a few demand response programs that can help reduce energy costs and prevent grid failures. Through participation in a formal demand response program, building owners can receive payment for reducing or shifting their peak loads. Building owners and operators may use these payments to pay for additional building efficiency improvements, permanently reducing energy loads.

Building Code Updates

Building Codes are put in place to protect the health and well-being of building occupants and ensure that best practices are used in construction and renovations. As codes are updated, new technology, techniques, and best practices are incorporated.

The Commonwealth of Pennsylvania follows the 2009 International Building Codes (IBC), despite the International Code Council (ICC) instituting twice updated codes in 2012 and 2015. To date, state level legislation has prevented the adoption of the most up to date building codes.[24]

Composition of the 2009 building codes began in 2006, meaning that technology developed in the past 10 years are not accounted for in Pennsylvania codes. Due to the lack of adoption of present day codes, Pennsylvania buildings are subjected to higher insurance premiums, higher building operating costs (due to the lack of compliance with leading standards and improved efficiencies), and higher greenhouse gas emissions. The content of modern building codes includes updated technology and standards that allow buildings to be more energy efficient, cost-effective, and resilient.

With the help of many stakeholders, the City of Pittsburgh continues to advocate for adopting up-to-date building codes in the Commonwealth of Pennsylvania. ACT 35 of 2017 amended Pennsylvania's Uniform Construction Code (UCC) thus allowing first class cities (a city with a population greater than one million) to independently adopt more stringent building codes. Philadelphia is the only first-class city in the state of Pennsylvania so everyone else is unable to enforce any building codes beyond the UCC. Moving forward, the City of Pittsburgh is campaigning for, at minimum, a similar amendment allowing second class cities (population of 250,000 to 999,999) such as Pittsburgh to adopt up to date

[24] https://www.dli.pa.gov/ucc/Pages/default.aspx

building codes. However, the ideal situation would be an amendment that automatically updates the UCC to the most recently passed IBC. An amendment such as this would prevent future lags in code adoption and have economic, environmental, and safety benefits across the entire state of Pennsylvania.

Property Assessed Clean Energy (PACE)

Property Assessed Clean Energy (PACE) is an initiative to provide funding for projects that improve energy efficiency, utilize renewable electricity, or promote water conservation.[25]

PACE is a national initiative with locally established programs. Individual states pass legislation that authorizes municipalities to develop appropriate PACE programs. Currently, 33 states plus the District of Columbia have authorized PACE financing for energy projects.[26]

PACE programs provide multiple benefits to property owners and local governments. By providing 100% of project funding upfront, it allows immediate, significant energy savings while spreading the cost over an extended period of time. Businesses may benefit from a positive cash flow because annual energy savings are often greater than the annual assessment. For local governments, PACE is an Economic Development initiative. The program creates local jobs, lowers the cost of doing business and encourages new investment in the area. PACE projects also have a positive impact on air quality and energy efficiency, creating healthier, more livable neighborhoods.

In Pennsylvania, Senators John Blake and Guy Reschenthaler, with the support of business, labor, and environmental communities, have introduced legislation to establish a PACE program. If this legislation passes, Pittsburgh will be able to implement PACE programs locally.

Case Study: Pittsburgh Green Garage Initiative

Though wide in scope, the Pittsburgh Green Garage Initiative (PGGI) is an example of a cross-sector collaboration galvanized by a simple energy efficiency approach.[27] Several local owners realized that dramatic energy savings could be realized by reconciling a few lines of building code, allowing for the use of more controlled and complex LED lights in parking garages. As a result, PGGI was created as a collaboration between the City of Pittsburgh, Green Building Alliance (GBA), Pittsburgh Parking Authority (PPA), Sports and Exhibition Authority of Pittsburgh and Allegheny County (SEA), and Urban Redevelopment Authority (URA). PGGI's goal is to improve parking garages' energy efficiency, reduce environmental impacts, and encourage sustainable solutions for municipally operated parking facilities in Pittsburgh.

The model for much of PGGI's activity has been the SEA which experienced a 64% reduction in annual electricity use at two garages following lighting and controls upgrades. In 2014, the PGGI collaboration built on this approach and received a $470,000 state PEDA grant for lighting upgrades and controls that the collaboration leveraged into sustainable revolving funds for PPA and URA.

---

[25] https://www.legis.state.pa.us/cfdocs/billInfo/billInfo.cfm?sYear=2017&sInd=0&body=S&type=B&bn=0234

[26] https://keealliance.org/c-pace/

[27] https://www.go-gba.org/initiatives/pittsburgh-green-garage-initiative/

As part of PGGI, URA retrofitted five local parking structures that are averaging a 57% reduction in electricity use in their first nine months of operations. The URA's complete retrofit portfolio includes five parking garages with a total of 3,051 parking spaces lit by 1,436 new fixtures. The URA is investigating applying a similar model on its one other parking garage – and leveraging savings by reinvesting into other facilities via a new sustainability revolving fund.

Pittsburgh Parking Authority completed a similar lighting and controls upgrade on its First Avenue Garage in August 2016. This enterprise is expected to have comparable extraordinary electricity reductions of up to 60%. PPAP is now designing similar retrofits on nine additional garages in the City. A recent study also concluded that 6,000 kW of solar photovoltaics (PV) could be installed on Pittsburgh Parking Authority garage roofs and at its' Second Avenue parking lot. The installation of solar PV can further reduce the GHG emissions resulting from the operation of these parking garages. This is an excellent example of how energy efficiency upgrades and renewable electricity generation can be combined to have the greatest impact, eventually allowing for net zero buildings.

Objective: Improve energy efficiency in existing residential buildings

Residential Building Data

With 51% of emissions coming from commercial buildings, it is easy to focus attention solely on commercial energy efficiencies. However, residential efficiency actions also offer opportunities for significant impact. As with commercial buildings, updated building codes will help ensure that energy efficiency is prioritized as new homes are built. However, over seventy percent of existing residential buildings in Pittsburgh were built prior to 1960, many years before energy efficiency standards were integrated into national building codes in the 1970s. While sturdily built, these older homes need renovations to improve efficiency, health and safety.

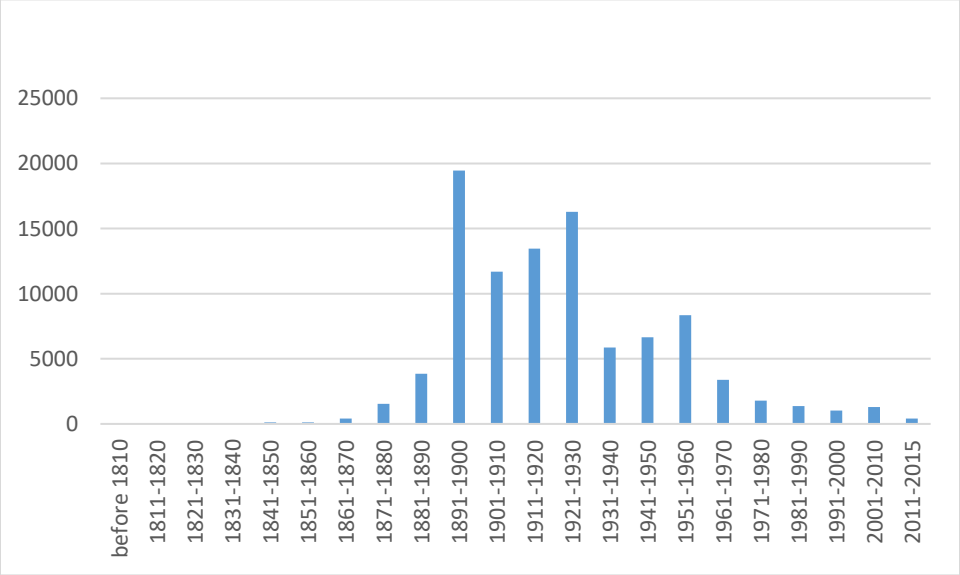


Chart 8: Year in Which Pittsburgh Homes were Built[28]

[28] https://www.netl.doe.gov/sites/default/files/netl-file/City-of-Pittsburgh-Energy-Baseline-20171103-FINAL_0.pdf

Residential energy efficiency projects can offer equity benefits in addition to the potential emission reduction benefits. The American Council for an Energy-Efficient Economy (ACEEE) recently ranked Pittsburgh among the top ten cities where energy burdens, the ratio of utility bills to annual household income, were found to be greatest for low-income households. Nationally, the average energy burden for American households is approximately 4%. However, low income households' in Pittsburgh experience an energy burdens upwards of 15%.[29]

In commercial buildings, electricity reduction offers the greatest opportunity for energy savings. In residential buildings, natural gas efficiency generates the maximum impact. Heating-related natural gas usage constitutes up to 56% of all natural gas usage in the City, 38% of all non-transportation energy usage, and up to 25% of the non-transportation related greenhouse gas emissions in the City. The residential sector is of particular interest, as up to 68% of gas usage in that sector is heating-related, amounting to an estimated 17% of energy use for the City (not including transportation sector emissions). Especially with the aging housing stock, which often lacks insulation or other heat saving updates, a significant amount of heat-related energy is 'lost' or wasted.

There have been a number of initiatives targeting residential improvements however, the ReEnergize Pittsburgh Coalition identified key barriers to increasing residential energy efficiency in Pittsburgh including;

1) Lack of homeowner education and awareness around energy efficiency programs and home performance issues
2) Difficulty connecting homeowners with available programs
3) Homeowner misconceptions about the value and ease of energy efficiency project implementation
4) Uncertainty around demand for and ability to sustain a skilled workforce

ReEnergize Pittsburgh Coalition also identified key strategies for improving residential efficiencies that include; improving consumer education resources, monetizing the value of home energy investments, integrating regional organizations and planning efforts, and identifying financing options and opportunities (Solving the Residential Home Energy Efficiency Challenge).

Green and Healthy Homes

In July 2017, Pittsburgh became the 19th U.S. city to join the Green and Healthy Homes Initiatives (GHHI). The Baltimore based organization utilize eight key elements to help create healthier, more energy efficient homes. These whole-house strategies address issues from lead-based paint contamination, to poor indoor air quality, to energy efficiency in order to reduce housing costs specifically in low income households. These actions can help alleviate costs due to not only high energy burdens but also the socio-economic costs of related issues such as lead poisoning, asthma, lost labor force productivity, and high residence turn-over rates. In the U.S., nearly six million households are exposed to 'unhealthy homes.' Led by Conservation Consultants Inc. (CCI), Green and Healthy Homes is striving to improve the living conditions in those households through education, hazard remediation, advocacy, and efficiency services. Moving forward, the City of Pittsburgh will help promote and implement Green and Healthy Homes Initiatives.[30]

[29] https://aceee.org/research-report/u1602
[30] https://getenergysmarter.org/node/120

Residential Energy Labeling

The new building benchmarking ordinance mandates transparency in the commercial building sector, however, similar transparency does not always exist at the residential level. The U.S. Department of Energy offers a Home Energy Score program that aims at improving residential energy efficiency. Similar to vehicle fuel efficiency, the Home Energy Score provides useful energy use and efficiency information to homeowners and buyers. The scoring process also provides homeowners with suggested energy efficiency projects or updates for the home. Promoting Home Energy Scoring and increasing the number of households that utilize this program can have benefits comparable to those expected to be seen through benchmarking in the commercial sector.

Greening the MLS

A multiple listing service (MLS) is used by real estate brokers to share information about residential and commercial properties with other brokers and their agents. The information is also utilized to enable accurate appraisals.

The West-Penn Multiple List Service is the primary source of information for realtors, home buyers, and appraisers in the Pittsburgh area. Green information such as, solar panels, high-efficiency HVAC, insulation levels, or Home Energy Scores, are not currently included in multi-listing databases. However, this information could have a significant impact on appraisal values and accounting for the true value of these items. Additionally, potential buyers would be able to search for environmentally friendly features and make a better informed purchase. Multiple studies have found that energy efficiency and green features are important to new home and property buyers, and that buyers are willing to pay more for those features. The *ENERGY STAR® for New Homes* label was found to be "very important" to 91% of new home buyers.[1] A survey of home buyers and sellers found that heating and cooling costs were "important" or "very important" to 84% of respondents. It was also found that 73% of home builders have built or are planning to build a net-zero home and green construction is projected to continue to grow. Home energy scores, green listings, and point of sale energy audits can help improve transparency in the home buying process. Increasing the information available to potential homeowners can allow those individuals make informed decisions and, as with the commercial energy benchmarking ordinance, begin to prioritize energy efficiency in residential reality.

Act 129

Utility-managed energy saving initiatives, such as Act 129 in Pennsylvania, represent a significant portion of available efficiency programs available for homeowners, renters, and commercial or industrial buildings owners. While these programs have a number of applications and benefits, they are often underutilized. Act 129 is legislation which requires Electric Distribution Companies (EDCs), such as Duquesne Light, to reduce electricity consumption. Improving education and access to Act 129 benefits can help significantly reduce energy use in cost-effective way. In the residential sector, Act 129 provides an opportunity for efficiency upgrades that would otherwise be unaffordable for homeowners. Increased utilization of Act 129 programs is an important tool in order to reduce energy burdens.

Objective: Improve energy efficiency in existing industrial buildings

Despite Pittsburgh's heavily industrial past, industry currently accounts for only 5% of greenhouse gas emissions in the City of Pittsburgh. While that 5% includes activities such as potable water and sanitary treatment, a granular analysis of the emissions sources has not yet been conducted. The first step to improve industrial efficiency is to conduct this analysis and set a better baseline of industrial based GHG sources. Greenhouse gas emissions from industrial sites is often a single indicator of overall environmental impact; onsite activity can have additional air, water, and soil quality implications, which in turn affect human and environmental health. In order to better account for the true environmental impact of industry in the City, a concise database is needed. With improved information, key stakeholders can be brought to the table and further action can be taken.

Additionally, while the industry may only account for 5% of the GHG emissions inside boundaries of the City of Pittsburgh, there are industrial activities in southwestern Pennsylvania that do not factor in to Pittsburgh's GHG inventory but that have a significant impact on air quality and water quality in Pittsburgh. In Beaver County, about 30 miles North West of Pittsburgh, a new petrochemical processing complex is set to be developed. This single site is permitted to emit 2.2 million tons of CO_2 equivalent annually. For comparison, if Pittsburgh reaches the 2030 goal of 50% emission reduction, 2.1 million tons will be eliminated, compared to the 2003 baseline. This Climate Action Plan addresses what can be done within the 58 square miles that make up the City of Pittsburgh. However, regional action is needed to ensure a healthy future for southwestern Pennsylvania.

Objective: Ensure all new buildings are location efficient by 2030

Updated building codes will help ensure that all new construction incorporates new beyond a building's energy and water use, location has a significant impact on greenhouse gas emissions. If a new building is sited on a green field far away from residential areas and transit, the building decreases carbon sequestration and increases emissions from cars traveling to it. If the building is far from existing infrastructure, there is additional cost and energy loss conveying electricity and natural gas to the site. (More about location efficiency can be found in Chapter 4: Transportation and Land Use)

Beyond a building's energy and water use, location has a significant impact on greenhouse gas emissions. If a new building is sited on a greenfield far away from residential areas and transit options, the building will most likely increase overall emissions due to the distance vehicles will have to travel to and from the building. If the building is far from existing infrastructure, there will also be additional cost and energy loss conveying electricity and natural gas to the site. Pittsburgh defines a location efficiency using overlay map that integrates the walksheds around job centers (1/4 mile), walksheds to frequent service transit (fixed guideways) and protected bikeways to job centers/frequent service transit.

Objective: Ensure all new buildings are carbon neutral by 2030

Enacting the most up to date building codes will ensure that all new buildings, at minimum, incorporate the latest energy efficiency measures. However, buildings can go beyond meeting minimum code requirements and choose to build to passive house standards.

The Passive House, or more accurately, Passive Building, is based on standards designed to cut carbon emissions and energy consumption while providing superior comfort, air quality and resilience. In addition to energy efficiency, passive building standards produce exceptionally resilient buildings. Passive design strategies balance factors such as heat emissions from occupants and appliances to maintain consistent indoor temperatures, even in extreme weather conditions. Continuous ventilation also provides superior indoor air quality.

A Passive Building is designed and built in accordance with five principles[31]:

1. Continuous insulation throughout the building's thermal envelope with no thermal bridging. The thermal envelope is the building's heat flow control layer and a thermal bridge is an area that has higher thermal conductivity and results in heat transfer into or out of a space.
2. An air-tight building envelope that prevents the infiltration of outside air and the loss of conditioned inside air.
3. High-performance windows and doors
4. A balanced heat and moisture recovery ventilation system and a minimal space conditioning system.
5. Management of solar effects to maximize heat gain during the heating season and minimize heating during the cooling season.

Passive building principles can be applied to all types of buildings from single-family homes to multi-family apartment buildings, businesses, and large-scale office buildings. These principles minimize the renewable electricity that is required, and therefore provide a potential means to achieve Net-Zero and Net-Positive buildings.

[31] *https://www.passivehouse-international.org/*

CHAPTER FOUR: Transportation & Land Use

Goal: Reduce on-road transportation emission by 50%

Objective:

- Reduce on-road transportation relate emissions by 50% by 2030
- Reduce Vehicle Miles Traveled per capita by 50% below 2013 levels by 2030
- Increase shift in fuel sources by promoting vehicle electrification
- Reduce freight emissions by 25% by 2030

Strategies:

- Develop a Comprehensive Plan for the City of Pittsburgh
- Synchronize traffic signals to ensure smooth traffic movement, bus prioritization, after hours freight prioritization, etc.
- Increase bike commute rate to 10% of trips
- Increase walking commute rates by 50%
- Implement citywide bike plan and increase access to bike infrastructure
- Promote and grow bike share programs
- Increase Port Authority ridership
- Implement Bus Rapid Transit system
- Integrated bike infrastructure with public transit systems
- Expand transit hubs to promote multimodal trips

Challenges:

- Due to the nature of transportation, accurate, complete data is difficult to compile
- As population of Pittsburgh increase and additional jobs are created in the City, mobility needs will also increase
- Overcoming inequity in access to transit systems

Existing Projects and Previous Work:

- Bus Rapid Transit System
- Uptown EcoInnovation District
- Bike Plan
- Complete Streets Plan
- Bike Share

Transportation Champions:

- Pittsburgh Community Reinvestment Group
- Port Authority of Allegheny County
- Department of Mobility and Infrastructure
- Pittsburgh Parking Authority
- Bike Pittsburgh

Greenhouse Gases from Transportation

Transportation sources of greenhouse gas emissions in Pittsburgh include on-road vehicles such as passenger cars, mass transit, freight trucks, and off-road vehicles, such as construction vehicles, boats, and trains.

It is important to have accurate measurements of GHG emissions from various modes of transportation. Emissions from the use of electricity and natural gas are able to be calculated from aggregate consumption information for specific geographic areas that can be collected from utility monopolies. However, for gasoline and diesel fuel, the location of fuel sales and the location at which emissions are

produced are not necessarily the same. Therefore, total fuel sales within a boundary are not used to calculate transportation emissions. Instead, vehicle miles traveled and emissions per mile are used.

An estimated 18% of Pittsburgh's greenhouse gas emissions come from the tailpipes of vehicles traveling on roads within Pittsburgh city limits. However, there are significant data challenges that require assumptions within this calculation. In order to estimate annual vehicle miles traveled in the City boundary, the Southwestern Pennsylvania Commission (SPC), the Pittsburgh region's local Metropolitan Planning Organization, used a transportation model to provide the weekday total vehicle miles traveled (VMT) on all Pittsburgh roads. A local breakdown of vehicle types was unavailable, so the national average road composition was used, along with average emission factors for each vehicle type. This model only considers gasoline and diesel vehicles, and does not account for emissions from idling vehicles.

To improve the inventory in the future, the model should simulate the entire year of VMT and include emissions from idling. The model should also use the local vehicle composition from DMV registrations, which will allow for emission factors based on vehicle make, model, and year, rather than relying on national averages.

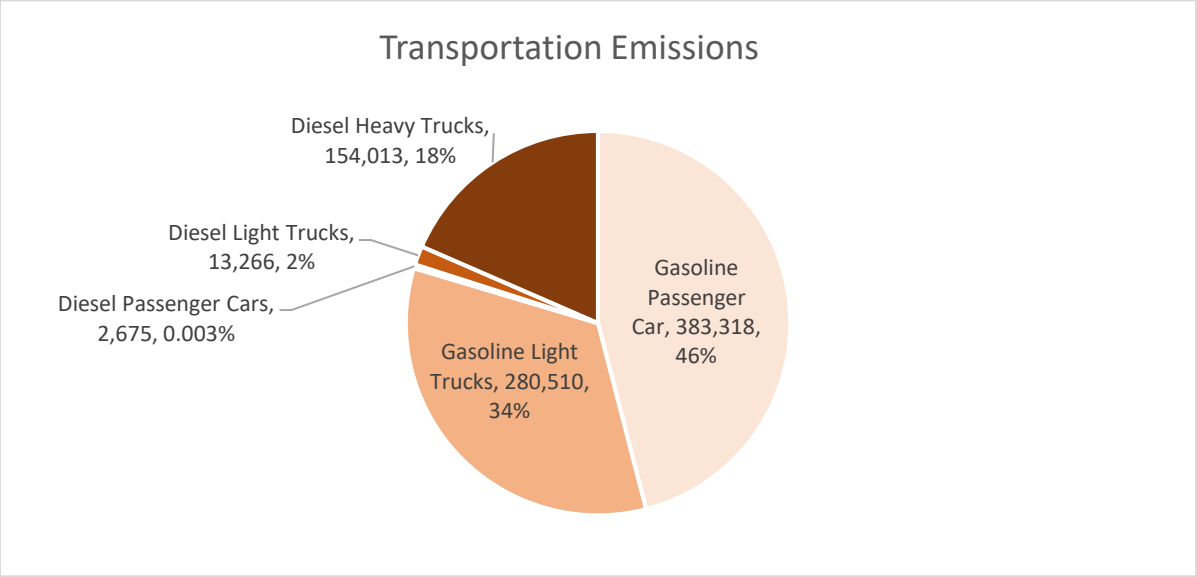


Chart 9: 2013 Sector based profile for transportation related emission

Based on the modeling done by SPC and Carnegie Mellon University, emissions were categorized by vehicle and fuel type. Of the 833,000 tons of CO_2 emissions from transportation, 80% are created by gasoline powered vehicles. In order to reach the 2030 Goal of 50% reduction in transportation-related emissions, significant reductions in vehicle miles traveled (VMT) by gasoline powered vehicles must be attained.

Vehicle Miles Traveled

Since 2003, emissions from on-road vehicles have been tracked in Pittsburgh and the City is following the national trend in decreased vehicle miles traveled (VMT). Since 2004, total VMT in the U.S. has declined slowly. In 2012, total VMT reached the lowest level since 1996. [32]

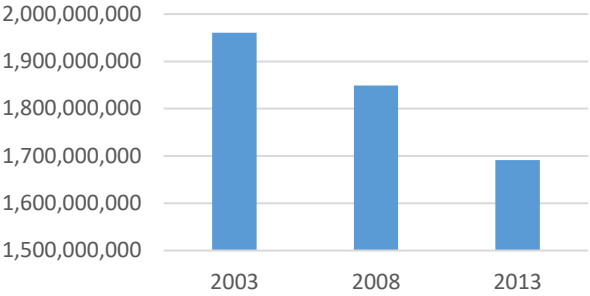


Chart 10: Annual Vehicle Miles Traveled

The decrease in VMT and increase in average fuel efficiency of vehicles has resulted in a decrease in transportation-related greenhouse gas emissions between 2003 and 2013, however, these emissions still account for 18% of Pittsburgh's overall GHG emissions. In order to achieve Pittsburgh's 2030 goals and carbon neutrality, several actions will be required. The increasingly stringent U.S. EPA vehicle emission and fuel economy standards will help reduce on-road transportation emissions. Achieving target reduction will also require actions that reduce vehicle miles traveled on Pittsburgh roads, shift modes away from single occupancy motor vehicles, and shift away from relying on fossil fuels. In addition, equitable access to public transit and alternate modes of transportation is essential to ensure that all residents in the City of Pittsburgh are able to access essential resources such as major job centers, social and human services, grocery stores, recreational centers, schools, and medical facilities.

Objective: Reduce Vehicle Miles Traveled by 50% per capita below 2013 levels

As vehicle fuel efficiencies improve, transportation-related emissions per vehicle will decrease. However, if Pittsburgh's population increases and the number of jobs within the City increases as expected, the demand for transportation will increase thus adding more emissions. To counteract the increased population, the per capita VMT must be reduced. By shifting away from single occupancy vehicles, vehicle miles traveled (VMT) within the City can be drastically reduced. This will help reduce emissions, improve air quality, reduce infrastructure maintenance costs and reduce congestion throughout the City of Pittsburgh.

The best way to reduce VMT is to increase the percentage of trips made by other modes of transportation. Increasing the use of public transit, shared rides, or non-motor vehicle trips will reduce the trips taken in single occupancy vehicles, the largest contributor to transportation related emissions.

Comprehensive Plan Priorities

The City of Pittsburgh is developing its first Comprehensive Plan, which will include a transportation component and complete streets guidelines, prioritizing pedestrian, cyclist, public transit and carpool trips over single occupancy motor vehicles. By weaving together a cohesive network of public transit, bike and pedestrian infrastructure, car-sharing and Transportation Network Company (TNC) services, Pittsburgh will become a city in which single occupancy auto ownership is not required for a high-quality lifestyle. Planning for transit-oriented development and mixed-use, walkable

[32] *https://www.ssti.us/2013/02/per-capita-vmt-ticks-down-for-eighth-straight-year/*

neighborhoods will reduce the miles people must travel to meet their needs and will deter personal vehicle ownership. This will have an added benefit of significantly reducing household transportation costs, improving mobility, and addressing issues of equitable access to goods, services, and places of employment.

As the City aims to reduce reliance on personal auto ownership, there are also efforts in place to increase the viability of electric vehicles and replace internal combustion engines that negatively impact Pittsburgh's air quality and cause adverse health effects. The plan will include a streetlight overhaul, converting sodium bulbs to LEDs, designed to improve visibility and safety for all users of the road.

Setting 2030 Mode Shift Goals

The Pittsburgh Community Reinvestment Group was has led efforts around determining realistic city-wide mode shift goals, identified in the table below:

Mode	2016 Commuter Mode Split	Objective	2030 Commuter Mode Split Goal
Walk	10.3% (+/- 0.6)	55% increase	15.5%
Bike	2.6% (+/-0.2)	285% increase	10%
Public Transit	18.1% (+/- 0.7)	100% increase	36.2%
Single Occupancy Vehicle (Drove Alone)	55.5% (+/-0.9)	50% decrease	27.75%

Table 4: Mode split for commuter trips in Pittsburgh and goal mode split for 2030

In the Southwestern Pennsylvania Commission's 2015 travel model, it is estimated that approximately 29% of all trips were commuter trips, 35% of car-based trips were commuter-based, and around 49% of transit trips were commuter trips. The existing data covers only commuter trips, not leisure trips. Better data for non-commute trips is needed in order to get a more accurate mode split analysis. Assessments such as the "Green Building Alliance, Make My Trip Count" survey can help provide this data in the future. [33]

Increasing Mode Shift

In order to decrease the percentage of commuters driving alone, there must be other viable and easily accessible choices available to replace or supplement driving. There are various transportation demand management (TDM) strategies and actions that can impact a mode shift from personal autos. These include having employers and landlords offer universal transit passes, car/bike share subscriptions, telecommuting and flexible work schedules, road and parking pricing, and road space allocation to promote bike lanes and transit-only lanes.

Increasing Port Authority Ridership

Increasing the percentage of public transit trips requires capital outlay to accommodate increased demand with more frequent routes, additional busses and drivers, and bus facility space available. The Port Authority is currently working to identify the latent demand of people who could potentially take

[33] *https://data.wprdc.org/dataset/make-my-trip-count-2015*

transit but currently are not. Another reconfiguration of the system, to update reforms enacted in 2009-11 should be explored as well.

Increase Bikeability and Walkability

Commuting by bike has shown a steady increase in the past few years and is expected to continue to grow with the creation of new bike infrastructure, including the expansion of total miles of protected bike lanes and bike repair stations. However, there are still deterrents to the choice of a bicycle as one's primary mode of transit, such as winter weather and unsafe traffic conditions. Difficulty using more than one mode of transportation per trip can also deter potential bike commuters. Increasing multi-modal choices through the further integration of biking with transit such as including bike racks on all buses, installing bike share stations at bus and T stops, increasing dedicated bike storage on the T, integrating access to Bike Share with ConnectCard, and ensuring secure bike parking at transit hubs will help promote biking.

Increasing the percentage of commuters walking to work is difficult without strategic land use changes designed to create more walkable and complete neighborhoods. Overall, to see real changes in mode shift, a general shift in development patterns and land use designation – specifically around zoning – is required in order to have a real impact across the City of Pittsburgh. As the City continues to transition and begins attracting more people to the region, it is important to emphasize that all new development projects and re-development efforts are focused on creating a multimodal environment.

Bike Plan

The Pittsburgh Department of City Planning is creating a new citywide bike plan that will clarify the strategy for expanding the City's biking infrastructure, policies, events, and education initiatives. This new Bike Plan will replace the 1999 version and will set the agenda for Pittsburgh's goal to improve the City's bicycling environment. Meetings were held so that residents provide feedback to indicate which areas should become safer and more accessible for cyclists. Residents also provided input on what types of infrastructure, such as bike racks and bike lanes, the City should invest in and where bike share stations should be located.

Designing and Implementing Transit Streets

Strategically designing streets to balance transit operations, car volumes, and pedestrians/cyclists is vital in order for people to easily and efficiently access destinations across a city. Many cities have re-focused their efforts to design transit streets in economic centers to address growth in these areas, transportation mode shift, carbon neutrality, and economic development.

Generally, transit streets offer a way to efficiently integrate on-street transit vehicle facilities, service-enhancing stops and stations, pedestrian and bicycle infrastructure, and general traffic lanes in a variety of street sizes and types. Additionally, transit streets offer a way to design streets through the combination of several elements to form a vibrant streetscape with transit as its spine. When creating these street environments, several key elements must be considered for implementation: service design, capital facilities development, wayfinding, and placemaking.

Complete Streets Policy

On November 21, 2016, the Pittsburgh City Council approved the Complete Streets Policy. The purpose of the policy is "to develop a safe and accessible multimodal transportation system that will promote enhanced mobility for all users regardless of mode of travel, including people of all ages and abilities."

The Complete Streets policy is based on several existing principles for the City's mobility and design planning. It aims to provide access to safe, comfortable travel for all users and modes of transportation while preserving Pittsburgh's environment and incorporating green infrastructure when applicable. Equity for every neighborhood is a goal so that communities dependent on walking, biking, and public transportation have access to safe, convenient, connected infrastructure. For new projects, consideration of all users must be addressed from the start of a project, and the burden is on decision-makers to accommodate all forms of transportation. For existing infrastructure, Complete Streets principles are to be implemented, incrementally over time as the areas are maintained and improved.

In addition, the policy directs the City to work with other agencies such as PennDOT to incorporate Complete Streets principles as appropriate.

Bus Rapid Transit

Allegheny County, the City of Pittsburgh, the Port Authority of Allegheny County, and the Urban Redevelopment Authority of Pittsburgh have proposed a Bus Rapid Transit (BRT) system that connects Downtown Pittsburgh with Uptown, Oakland, and Wilkinsburg and that includes branches to Squirrel Hill and Highland Park.

This route is projected to link more than 30,000 people across 24 neighborhoods via rapid, frequent, and more reliable transit service that is as fast and comfortable as light rail, but could be built much sooner and at a fraction of the cost. In addition to enhancing public transit, this project has the potential to unlock development and contribute to neighborhood growth while linking residents to job centers, educational opportunities, medical services, and cultural attractions.

Parking Codes and Reform

Parking regulations can contribute to transportation efficiency by allowing flexibility in addressing vehicle parking and access issues. Parking reform can be a disincentive to driving by limiting parking spaces, enforcing metering and removing the existing requirement for minimum parking at buildings.

The City of Pittsburgh promotes bicycle commuting in order to lessen car-related congestion by requiring the provision of adequate and safe facilities for the storage of bicycles. The Code also allows for a reduction in required automobile parking spaces when bicycle parking is accommodated and defines minimum bike parking requirements for most new development. The code specifically lists that 60% of bike parking for multifamily dwelling developments must be protected parking in order to replace a portion of car parking requirements.

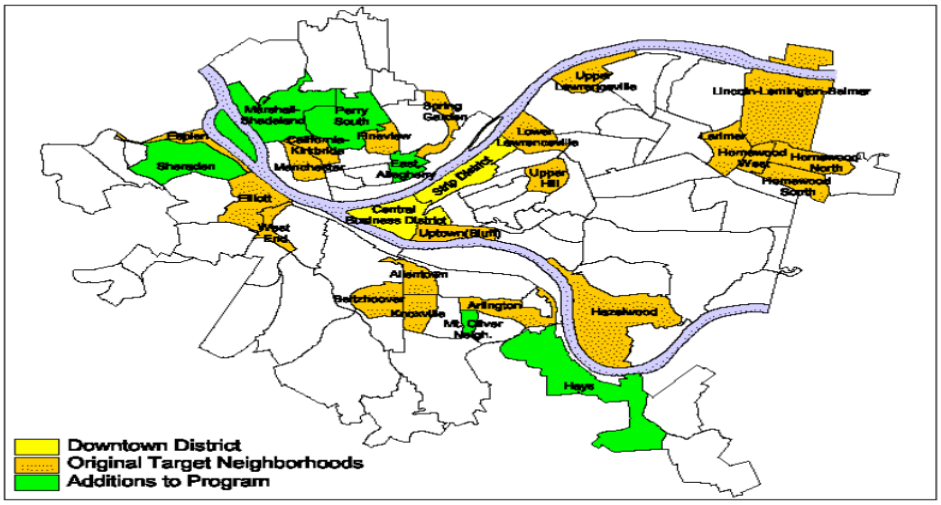
Transit stops can also be incorporated into new development in order to satisfy current standards. Up to 20% of the required parking spaces can be eliminated, provided that certain conditions are met. Transit stops must be clearly identified and open to the public, designed as an integral part of the development project, with direct access to the station or a covered waiting area. They must be well-lit with seating for a minimum of 20 persons. The transit stop must also be maintained by the developer for the life of the project. Additionally, clearly defining Transit Oriented Development (TOD) in the Code would help to limit the various interpretations of what "direct access" to a stop means and would offer an opportunity to develop a TOD overlay

Other cities such as Cleveland, Indianapolis, and Philadelphia have successfully developed parking codes that promote alternatives to car transportation. They require a minimum number of bike spaces

for new development and may allow up to 10% of parking requirements to be met by bike parking spaces. Developers may also reduce the number of required parking spaces if they include electric-car charging stations, car sharing spots, or other "green" amenities. Parking requirements may also be reduced by 10, 30 or even 50% if development is in close proximity to transit systems. Defining what "close proximity" means within the Code is essential for developers to abide by. Implementing similar codes and policies in Pittsburgh can significantly reduce the number of single occupancy vehicles being used.

Land Use and Transit Oriented Development

Despite having many high frequency transit corridors in the City – including Penn Avenue, Butler Street, and Centre Avenue – accessing these frequent service corridors can be difficult. The City will consider implementing a location efficiency policy, such as establishing priority development areas, for all new multi-unit developments and commercial developments within the City limits to create a targeted investment strategy.



Pittsburgh's Targeted Growth Zones, 29 total neighborhoods [34]

Location Efficiency through Tax Abatements

There is a common misconception that property tax abatements are only available for new homeowners rather than for homeowners' repair or rehabilitation projects. Real estate property tax abatements can greatly improve the quality of the existing housing stock by making renovation financially feasible for property owners. Additionally, property tax abatements can allow a wider range of socioeconomic groups to maintain rents at affordable levels. For developers interested in building affordable housing units, tax abatements are a tool that can be used to spur the development of affordable housing.

The Local Economic Revitalization Tax Assistance (LERTA) is a Pennsylvania tax abatement program that was created to improve the economic and business climate of certain residential and commercial districts with declining populations, blighted, vacant properties and a dwindling tax base by lessening the tax burden and encouraging new development. The City of Pittsburgh currently offers various types of tax abatement assistance programs depending on the type of property involved, including the

[34] *https://www.ura.org/media/Act42Enhanced_ExistAreaDescriptions.pdf*

Residential LERTA, the Residential Enhanced LERTA, the Commercial LERTA, and the Act 42 Enhanced Residential Abatement.

Too often in southwestern Pennsylvania, affordable housing developments are designed using traditional suburban methods, contributing to urban sprawl. Consideration must be given to the essential overlap between reliable access to transportation, housing, and job centers. Ultimately, by ensuring this balance of transportation, housing, and job centers, the smart growth model ensures location efficiency by reducing the likelihood of long commute times, mitigating traffic congestion, and creating more opportunities for alternative means of travel.

Location Efficient Affordable Housing

Other tools exist, such as Tax Increment Financing (TIF), to provide incentive for economic development in areas where a high number of vacant or distressed parcels exist. TIF is a tool that has already been utilized in Pittsburgh, and there are approximately 20 sites across Pittsburgh that currently utilizes TIF. Aside from TIF and tax abatement options, there are many other possible solutions that have not yet been utilized in the Pittsburgh region, including Developer Impact Fees, Inclusionary Zoning/Housing, Special Improvement Districts, and District Improvement Funds.

Objective: Increase Vehicle Electrification

City of Pittsburgh Fleet Conversion

The City of Pittsburgh has set a goal of converting to a 100% fossil fuel free fleet. As a part of this goal, a fleet assessment was conducted to better analysis the needs and best options for the fleet conversion.

Downsize of City Fleet

The City of Pittsburgh has had a vehicle replacement policy that requires departments to retire a vehicle before purchasing a replacement, unless the department can demonstrate the need for additional vehicles. However, there are 122 sedans, 35 SUVs and 123 pickup trucks that average fewer than 8,000 miles per year, which indicates opportunities reduce the size of the fleet. The City of Pittsburgh is committed to working with each department to determine the necessity of each vehicle and exploring alternatives such as Zipcar on demand car sharing.

Shift Vehicle Types

Beyond selling off underused vehicles, the City of Pittsburgh plans to identify the necessary vehicle specifications and minimum performance standards for all vehicle uses in the fleet to ensure that each department is well equipped to perform services, using electric vehicles and fuel efficient models wherever possible.

Procurement and Operations

The Equipment Leasing Authority (ELA) and the Office of Management (OMB) maintain a 5-year vehicle acquisition plan that is updated annually. The plan identifies vehicles to retire and aims for a 6-year turnover of sedans and a 10-year turnover of trucks. The ELA established a Green Vehicles Ordinance in 2008 to prioritize purchasing vehicles with high fuel efficiencies and alternative fuels. The fleet currently includes 7 gas-electric hybrid vehicles, 5 CNG trucks, and 24 diesel refuse trucks outfitted with biodiesel tanks.

ELA has drafted a 3-year Electric Vehicle Acquisition Plan that allocates $5 million dollars to purchase 10 electric motorcycles, 81 electric sedans, 14 electric medium SUVs and 107 level 2 charging stations from 2017 to 2019. Electric vehicles will be rotated into the fleet as conventional vehicles are retired and as technology improves.

The City was recently awarded $250,000 in funding from the Alternative Fuels Incentive Grant Program (AFIG) run by the Pennsylvania Department of Environmental Protection. Of these funds, $80,000 funds will be used to help purchase 10 electric vehicles to begin the conversion of the Bureau of Permits, Licensing, and Inspection's (PLI) fleet to fossil fuel free vehicles. The PLI vehicles are ideal candidates for electrification due to their low daily mileage and non-emergency usage.

Purchase and Install Renewable electricity

Given the state of the grid, Pittsburgh recognizes the need to purchase or install renewable electricity to cover the projected demand for electric vehicle charging. The City of Pittsburgh already purchases 35% renewable electricity through the Western Pennsylvania Energy Consortium, a power purchasing agreement with almost thirty local governments and schools. However, these non-certified Renewable Energy Credits (RECs) are not local and will not displace local coal-fired power. Where possible, the City of Pittsburgh plans to install carbon free charging infrastructure for EV chargers. $170,000 of AFIG funding will go towards the installation of this charging infrastructures. As a starter, Pittsburgh is looking to install portable, solar powered charging stations. These stations will allow EVs to be charged without having to tie into the grid. Additionally, these stations can be deployed throughout the City in emergency situations, blackouts or interruptions in electricity supply which will improve the overall resiliency of Pittsburgh and its residents. The first charging stations will charge the DPLI fleet at night and then will be open to the public during the day.

Conversion of other Fleets

Port Authority

In addition to the City of Pittsburgh fleet, electrification of the Port Authority of Allegheny County, whose fleet of over 700 diesel public transit buses have a significant impact on local air quality, is a top priority. Electrifying the public bus fleet will improve rider experience, reduce vehicle lifetime costs and increase the visibility of electric vehicles. In 2017, the Port Authority received a $500,000 grant to transition the 88 Bus line to electric buses. This is a first step in an overall goal of transitioning all buses to electric.

Institution Fleet Conversion

As the City moves towards a fossil fuel free fleet, facilitating the conversion of private fleets will also be a priority. Shuttle buses used by universities, hospitals, and other large campuses can easily be converted with existing technology.

Private Vehicle Electrification

The Pittsburgh Parking Authority (PPA) operates 10 parking garages and one large surface lot, on Second Avenue, in Downtown Pittsburgh. There are currently 15 level-2 electric vehicle chargers in PPA garages. As commercial and municipal fleets move towards electric vehicles, available charging infrastructure will continue to expand. Improved access to charging stations and increased visibility of electric vehicles will help drive the integration of EVs into individual households.

Resilient EV Charging Hubs

Pittsburgh neighborhoods typically lack driveways and garages, making home charging prohibitive for many city residents. Neighborhood charging stations would not only insure access to localized charging infrastructure, but these neighborhood stations would be operated with off-grid solar generation and battery backup, providing a resilient hub for residents to gather and charge devices or vehicles in times of grid failure. The kiosk can also serve other two-way communication purposes, such as a base to distribute weather advisories or similar information in times of emergency.

As an EPA air quality nonattainment zone, vehicle electrification comes with the very important co-benefit of improving local air quality by reducing tailpipe emissions. Using the Resilient EV Charging Hubs as a reporting station for idling or other air quality violations would enable residents to make the connection between the carbon reduction benefits of electrification and their direct health. The Hubs could also be utilized to improve the ease of commuting via less carbon intensive transit modes, as a place to purchase bus tickets, post City transit option maps, and connect people to car, van and bike pools. The kiosks can also provide space for advertising to offset the cost of energy and maintenance.

Objective: Reduce freight emissions by 25% by 2030

In addition to municipal and private vehicle emissions, it is important to address freight-related emissions within the City of Pittsburgh. Conversion to alternative fuel cannot be required, but it is critical to enforce existing laws and policies concerning freight deliveries, idling laws, truck routes, and loading zones. Loading and unloading can be incentivized during off-peak hours. In addition, improved signage around loading zones will encourage compliance. Designated loading zones can be designed to take advantage of existing transit lanes and plans can be developed for efficient coordination of freight deliveries.

CHAPTER FIVE: Waste & Resource Recovery

Goal: Zero waste landfilled by 2030

Objective:

- Achieve zero waste goal by 2030
- Shift toward a circular economy
- Improve data quality on waste characterization and existing diversion rates

Strategies:

- Implement the Roadmap to Zero Waste
- Modernize waste collection systems
- Improve education around waste diversion efforts and options
- Decrease organic materials in landfills
- Utilize anaerobic digestion technology
- Increase composting efforts
- Pursue a circular economy
- Support a statewide bottle bill
- Promote composting
- Increase collection of yard waste
- Increase 'hard to recycle' events and drop off locations
- Distribute recycle bins to all residents
- Enforce existing waste and recycling policies

Challenges:

- There are large data gaps in relation to privately hauled waste
- Numerous private waste haulers operating in Pittsburgh
- Low recycle participation rates
- Decreasing market for recycled materials
- Hauling waste to landfills requires a ~75 mile round trip

Existing Projects and Previous Work:

- Roadmap to zero waste
- Northside bin distribution pilot
- Sustainable Pittsburgh Challenge

Waste Champions:

- Pennsylvania Resources Council
- Sustainable Pittsburgh
- Department of Public Works

Waste Data

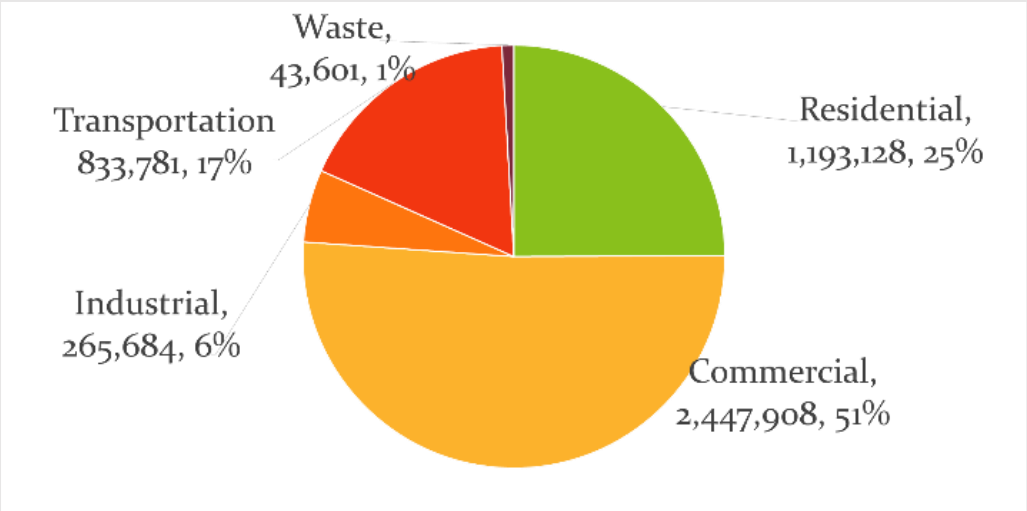


Chart 11: 2013 Pittsburgh Greenhouse Gas Inventory Summary

Based on 2013 data, waste-related emissions only accounted for 1% of the City's total emissions. However, the sector-based inventory methodology, used to develop Pittsburgh's greenhouse gas inventory, only reflects a very small portion of the greenhouse gases that are emitted as a consequence of consumption and waste habits. The sector-based inventory measures only the methane that escaping from landfills, rather than taking into account all sources.

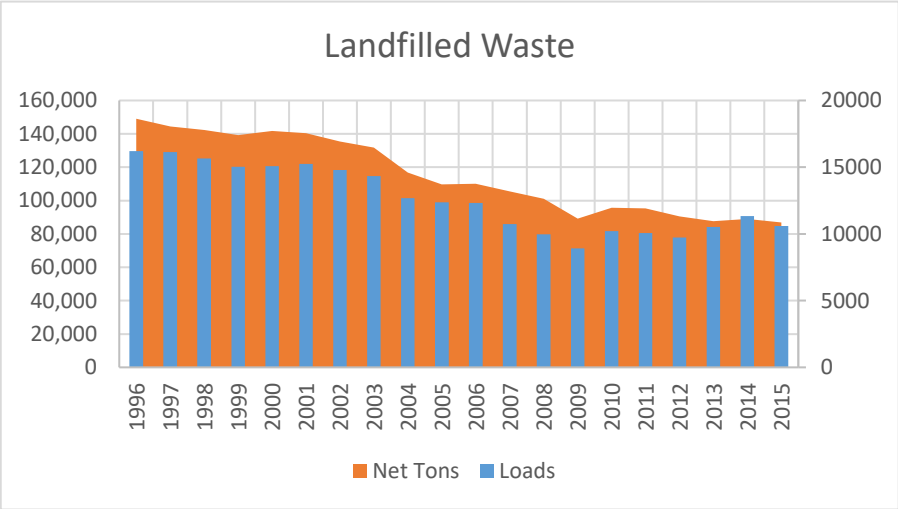


Chart 12: 2013 Net Tons of waste and total loads taken to landfill by DPW- ES

The City of Pittsburgh Department of Public Works - Environmental Services (DPW ES) only collects waste and recycling from residential buildings with four or less units. Therefore, the waste data collected by DPW-ES only accounts for a portion of the total waste being generated in Pittsburgh. Over the years, the scope of service of DPWES has changed, so though total volume and loads of waste hauled to landfill have decreased, this does not necessarily mean that the average Pittsburgh household is producing less waste.

Commercial buildings, including multi-unit residential buildings, individually contract with private waste haulers. Approximately 50 local private waste haulers operate within city limits. Due to the number of buildings that fall within this category it is difficult to gather data about privately collected waste. Solid waste volumes are reported to the state by county of origin so it is possible to estimate Pittsburgh's waste volumes based on the Allegheny County profile. In 2013, Allegheny County landfilled the equivalent of 4 pounds per person per day. Given Pittsburgh's 2013 residential population of 306,062, the City generated an estimated 221,675 tons of solid waste. Of that estimate, 87,710 tons were collected by DPW ES, leaving 133,965 for private collection.

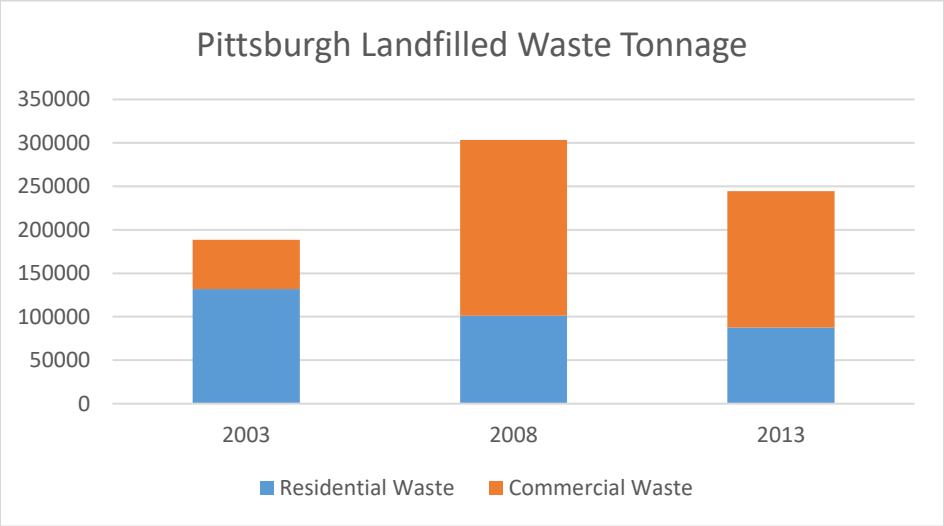


Chart 13: Tonnage of Waste Sent to Landfill from Pittsburgh by Sector 2013

Based on the available data, waste hauled from Pittsburgh has increased between 2003 and 2013. By 2030, Pittsburgh has a goal of diverting 100% of waste from landfills. Because the goal is to reach zero waste, the baseline data is not as important for waste as in other sectors.

EPA Diversion Rates

The U.S. EPA produced a report based on 2013 national municipal solid waste and found that after diversion for compost and recycling, landfill volume had the following composition, here applied to the total estimated landfill waste generated within Pittsburgh. [35]

	2013 EPA US Discard Composition	Pittsburgh Volume (tons)
Paper & Paperboard	15.10%	33,472.99
Yard Trimmings	8.10%	17,955.71
Metals	9.10%	20,172.46
Glass	5%	11,083.77
Plastics	17.70%	39,236.55
Wood	8%	17,734.03
Food	21.10%	46,773.51
Rubber, leather & Textiles	11.60%	25,714.35
Other	4.30%	9,532.04

Table 5: EPA Estimate Diversion Rate-Average for United State Modeled to Pittsburgh Populations

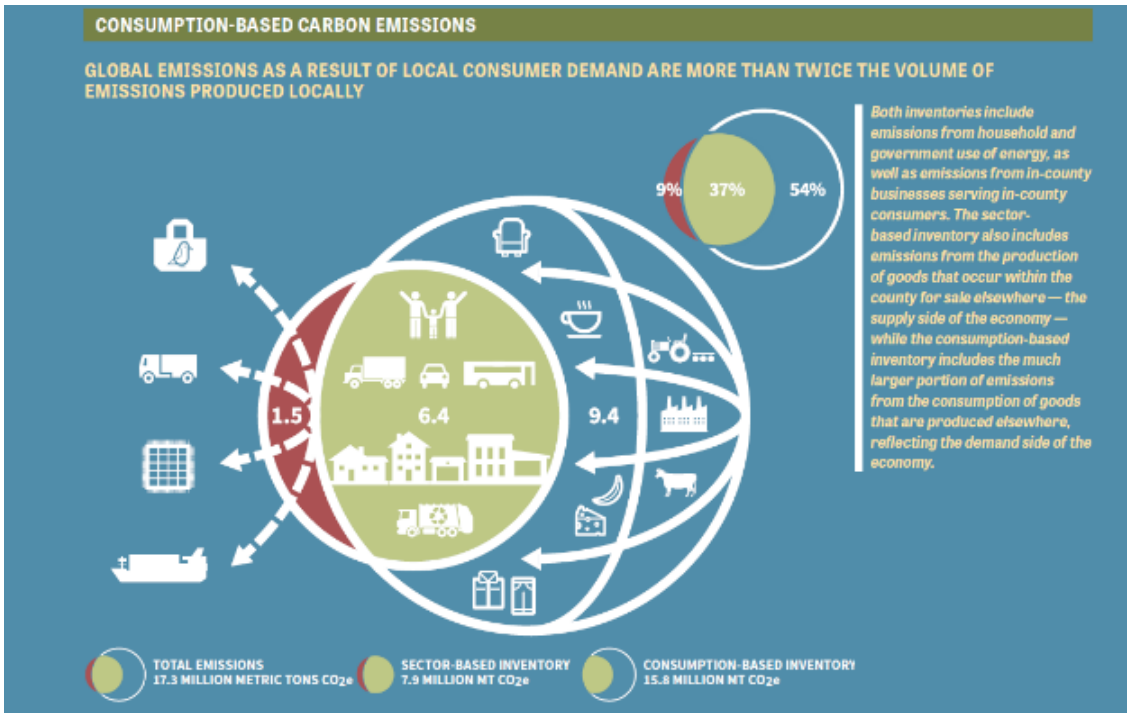
The EPA also produces the Waste Reduction Model (WARM) to help estimate greenhouse gas reductions from solid waste management practices. If the City of Pittsburgh were to recycle all the paper, metals, glass, and plastics and compost all food waste and yard trimmings, it would result in 260,078 MT CO2e avoided, rather than 34,733 MT CO2e emitted.

Objective: Improve waste related data quality

Consumption Based Inventory

The most efficient way to reduce waste is to reduce consumption. Reducing consumption completely removes materials from the waste stream. Additionally, reduced consumption will help mitigate emissions from the creation, transportation, and distribution of materials and products. Before significant consumption changes can begin, a better understanding of consumption trends and practices is needed. With a better understanding of consumption patterns, steps can be taken to reduce the associated environmental impact.

[35] *https://www.epa.gov/sites/production/files/2015-09/documents/2013_advncng_smm_fs.pdf*



Consumption Base Carbon Emission Inventory Methodology [36]

The sector-based greenhouse gas inventory uses the national average waste characterization to determine waste composition and therefore the amount of methane that is released as the waste decomposes. Both landfills that receive Pittsburgh waste have methane capture-in-place systems. However, some gas still escapes into the atmosphere. This methane release is only 1% of Pittsburgh's total greenhouse gas emissions. However, the greenhouse gas implications of Pittsburgh's consumption and waste are much larger. The emissions from the manufacturing, utilization and transportation of products that ultimately end up in the landfill are not easily accounted for in the sector based inventory.

Portland and Multnomah County in Oregon use a consumption-based inventory to track greenhouse gases that are burned outside of their boundaries in the production and transportation of products to satisfy demand within their boundaries. This inventory concluded that 54% of emissions are due to consumption. When comparing the sector-based inventory and the consumption-based inventory, emissions increased from 7.9 million MT CO2e to 17.3 MT CO2e respectively. [37] A consumption based inventory provides a better look into what goods are transported into the City as well as the origin of those goods. This information can be utilized to reduce emissions and to determine key areas of economic development that could provide local alternatives to previously imported goods.

Waste Characterization Study

In addition to a consumption based inventory which analyzes the sources of various goods, a waste characterization study is needed in order to get a better understanding of Pittsburgh's waste streams. A characterization study of the waste that is collected by the City and private hauling companies will help to quantify what is currently being taken to the landfill, what is being recycled, and what recyclable items are not being diverted from landfills.

[36] https://sustainableconsumption.usdn.org/climate/cbei-guidebook/cbei-basics

[37] *https://www.portlandoregon.gov/bps/article/531984*

Building on the waste characterization study, a long-term waste tracking system is needed. The characterization study sets the baseline but a measurement system is needed to track progress toward the 2030 goal. Studies show that active measurement and tracking of recycling information increases participation and encourage citizen ownership of waste reduction goals.

Objective: Implement improved waste collection system

Roadmap to Zero Waste

In partnership with the 100 Resilient Cities, the City of Pittsburgh worked with R20, a non-profit environmental organization, to develop a "Roadmap to Zero Waste." The roadmap outlines a 13-year strategy for achieving zero waste by the year 2030.[38] Actions that can be started or completed in the first 5- years are extracted for the purposes of the Climate Action Plan.

Current vs Proposed Collection Systems

Under the current system, the City provides trash, recycling, and yard waste collection service only to single-family homes and multi-unit buildings with five units or less. There is no food waste collection program and no bins are provided by the City for trash or recycling.

Under the system proposed by the Roadmap, each route and neighborhood will be evaluated to determine the feasibility of using automated cart tipping for waste collection. Where appropriate, automated collection bins and dual-compartment trucks will be used. This will allow one driver to support both the trash and recycling route service at the same time. The new trucks will be fueled by bio-gas because City garbage trucks with a fuel –efficiency of 3 miles per gallon are the largest contributors to air pollution in the City vehicle fleet. Traditional rear-loading trucks could be used for routes where automated trucks are not feasible. They would also continue to be used for yard waste pickups, for special pickups such as Christmas trees, and for collection of construction and demolition waste from various city projects. Unneeded trucks will be sold. It is also recommended that there be an increase in collection frequency for recycling to once-per-week. In order to encourage recycling, the frequency of collection must be at least equal to that of trash collection.

Supporting Policies

It is essential that enforcement be a part of any effective Zero Waste plan. Requirements for recycling are currently in place, but not being enforced. The current source separation mandate will be enforced to encourage support of the recycling program. Education and technical assistance will be provided for multi-family unit residents and for businesses in order to enforce participation in recycling and composting programs and reach recovery rates above 70%.

2015 Northside Bin Initiative: Case Study

The Northside Bin Initiative is a pilot project in which approximately 1,100 recycling containers were distributed to residents served by a single recycling route in the Northside area of Pittsburgh. It was developed to test the impact of converting the collection system from bagged set-outs to provided bins. During the course of the project, data was gathered in order to analyze the impact of the City's proposed new approach for recycle collection. These considerations included: impact to the City's

[38] *https://pittsburghpa.gov/onepgh*

vehicle fleet, staff time, routing, finances, changes to recycling participation rates, material quality and contamination levels, and resident feedback. The primary objectives of this pilot program were to:

- Decrease blue plastic bag contamination at the Materials Recovery Facility (MRF)
- Determine baseline recycling participation data
- Increase resident awareness of recycling
- Increase tonnage of materials recycled
- Measure & track changes in pre/post bin distribution participation & weight
- Measure & track impact to city and route operations
- Educate as many residents in person as possible about recycling and the bin project

The information gathered through this pilot project will assist in the City's plan to expand the bin recycling system citywide. The pilot project will serve as building block for the City of Pittsburgh's "Roadmap to Zero Waste" in the pursuit of a more circular economy. The next phase of implementation will expand the bin initiative from a neighborhood level to a citywide scale that will encompass about 115,200 households. Expanding the project will cost an estimated $2,923,400 to cover bin purchase, distribution, and education citywide. The pilot project was funded by the ALCOA Foundation with support from the City of Pittsburgh and the Pennsylvania Resources Council. Continued funding for the expansion of this project is proposed for the 2018 City of Pittsburgh capital budget, and the City is seeking further grant opportunities.

Benefits of the Northside Bin Initiative

CO2 Reduction: The main goal of this project was to increase the City's diversion rate and reduce waste going to the landfill. More than 44,000 tons of CO_2 equivalents can be attributed to the waste collected by the City of Pittsburgh Department of Public Works. Although this is only about 1% of the City's total greenhouse gas inventory, it is an area in which deep cuts can easily be made. An additional 154,000 tons of CO_2 equivalent are due to the use of diesel heavy trucks, such as refuse vehicles. By increasing diversion rates and reducing waste being dumped at landfills, emissions can be reduced from both the 'waste' and the 'transportation' sectors of Pittsburgh's Greenhouse Gas Inventory[39].

Economic co-benefits: Increased recycling will reduce the cost of waste hauling by reducing the number of trips to the landfills. This will save money through reduced tipping fees, reduced operational and fuel costs, and an increase in the lifespan of refuse vehicles.

RFID tags added to the bins will allow the City to collect better data about household participation and diversion rates. State of the art garbage bin sensor technology will alert the City's Department of Public Works when public garbage bins need to be emptied. This will allow DPW crews to strategically plan collections, resulting in improved efficiency and the elimination of unnecessary trips to cans that are not full.

Environmental co-benefits: Reduction in the volume of waste traveling to landfills and improved quality of materials being processed at the MRF will improve the system's efficiency and resource recovery. Improved waste practices will also help to reduce the amount of 'illegal dumping' that occurs in the City.

[39] *https://pcrg.org/northside*

Health co-benefits: Improved data will allow optimization and reduction of routes that refuse vehicles take to the local landfill. This will reduce vehicle emissions and improve the local air quality.

Social co-benefits: Using a bin system will help to reduce recycling clutter, keeping sidewalks clear for pedestrians and bicyclists, and improving neighborhood aesthetics. Resident outreach and education will increase participation and the quantity of material recycled.

The bin distribution, educational components, and data collection developed through the Northside Bin Initiative will help to advance the City's Zero Waste goal.

Drop-off Sites

Drop-off sites will primarily be used for tires, excess yard waste, scrap metal and for residents with an excess of "traditional" recyclables that will not fit in the recycling bin.

In order to improve these sites, bins at each site should be clearly labeled, hours of the manned sites will be extended to include weekly Saturday hours in order to improve accessibility for residents with day jobs. The sites could also consider adding other hard-to-recycle materials to the list of acceptable materials at the manned sites.

Objective: Eliminate organic materials from landfills

Yard Waste

It's recommended that the residential yard waste collection service be expanded. Current options for city residents include two designated, curb-side, yard waste collection days each year. City residents can also choose to bring their yard waste to one of three manned drop-off sites. These sites also take larger branches, shrubs and Christmas trees, but the drop-off hours are limited to Monday-Friday from 8:00 a.m. to 2:00 p.m. In addition, residents are allowed to set out yard waste on their designated garbage collection day. Any yard waste collected on these days is transported with the garbage to the landfill.

Food Waste

It would prohibit food waste from large volume commercial and industrial generators of food waste entering the landfill. In order to meet that goal, the City will work with the state and the county to promote growth of the infrastructure of facilities to handle food waste. Potential options include the construction of a city-owned compost facility for food waste and landscaping green waste, or enhancement of the county water treatment (ALCOSAN) system to include an anaerobic digestion. The City could also encourage private sector investment in newer/larger compost systems or encourage private sector investment in anaerobic digesters. They could also work with local farmers with existing manure digesters to upgrade their systems to include food waste. In order to reach Zero Waste, a food waste ordinance must be part of a systematic, long-term plan. Commercial businesses that generate more than a set amount of waste per week will be required to recycle organics. When fully operational for commercial businesses, the plan will add single-family households, multi-family housing units and smaller businesses. The plan could also require that new or renovated multi-family housing buildings have adequate handling systems for trash, recyclable, and compostable materials collection.

Anaerobic Digestion

To effectively reduce the carbon footprint of waste, it is important to divert as much material as possible. Pre-sorting organic waste before it reaches the landfill would prevent methane release and allow the material to be used to create energy. Organic matter, including food and yard waste, occupies approximately 21% of landfill space. These organic materials can be separated from the municipal solid waste (MSW) stream and processed in an anaerobic digester to produce biogas. Organic waste that can be broken down by anaerobic digesters includes food and yard waste, fats, oils, and greases, industrial food waste, biosolids from sewage sludge, waste water, and animal manures. All anaerobic digestion systems adhere to the same basic principles, no matter what organic material is being processed.

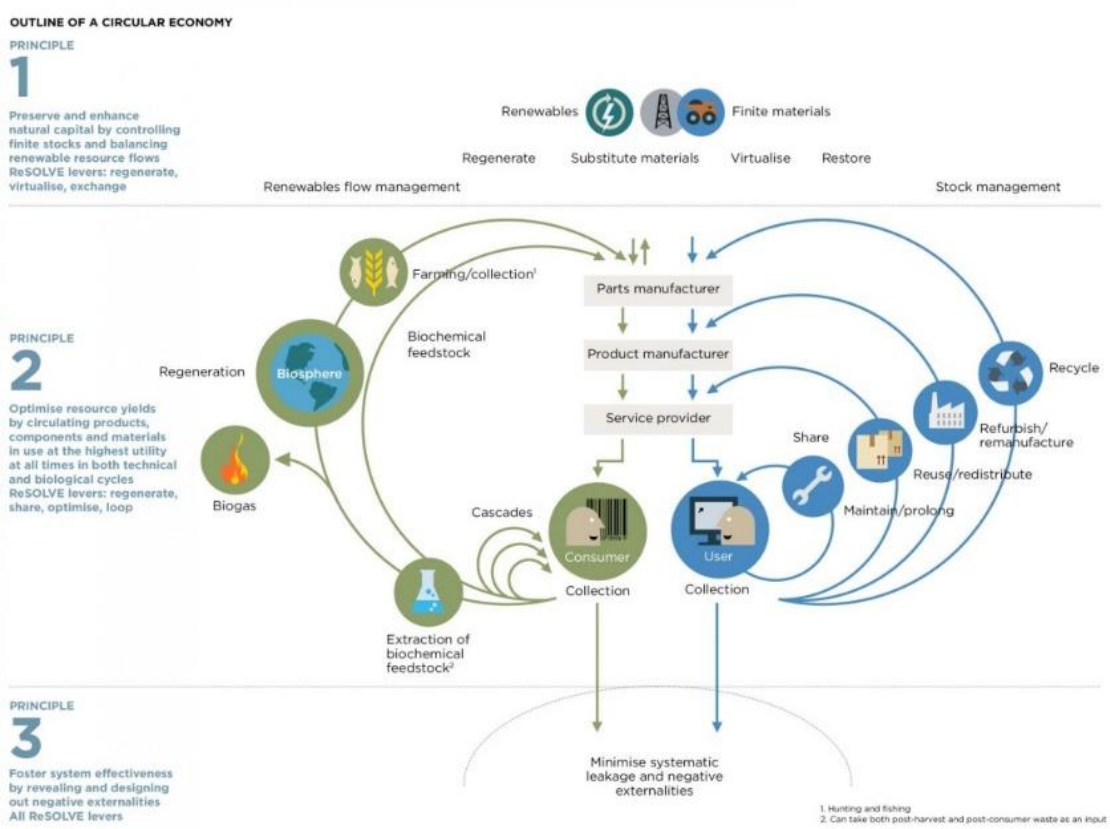
Anaerobic digestion also produces digestate, a nutrient-rich material that is left over following the anaerobic process. Technology exists to separate the digestate into solid and liquid components that have multiple potential uses. The solid component can be composted or heat-processed into fertilizer pellets. It can also be used for animal bedding or converted into other products such as flower pots. The liquid component of digestate can be directly applied to land as a fertilizer or soil amendment. Land application of digestate can improve overall soil health.

Objective: Pursue a more circular economy

Circular Economy

In addition to greenhouse gas emissions, the manner in which we use and dispose of products is a significant concern. We are rapidly depleting the world's natural resources at a rate much faster than they can be replenished. Vast quantities of energy are consumed in the extraction of raw materials in order to manufacture products that are then discarded, creating the need to extract even more resources. Our goal is to transition to a closed loop system, or circular economy in which materials are regenerated, recovered and restored in order to create zero waste.

The concept of a circular economy is in contrast to our current industrial model that relies on a "take, make, and dispose" process. Our current, linear economic model is based on the consumption of large quantities of inexpensive materials and energy that are finite in nature. A circular economy is based on renewable energy sources and relies on innovation to redefine products and services in order to design out waste and minimize negative impact. A circular economy is a continuous cycle that has both technical and biological components. In the biological cycle, resources are used and regenerated through natural processes. In the technical cycle, materials are designed to be recovered and restored with the highest quality retention through minimal use of renewable energy.



Outline of Circular Economy Principles[40]

[40] *https://www.ellenmacarthurfoundation.org/assets/downloads/insight/Circularity-Indicators_Methodology_May2015.pdf*

CHAPTER SIX: Food & Agriculture

Goal: Improve local food systems

Objective:

- Eliminate food waste by increasing food donation systems
- Strengthen the local food system
- Increase the demand for locally grown produce
- Increase the supply of locally grown produce
- Increase small farm profitability
- Promote growth and sales of local produce
- Determine realistic baseline numbers and relevant KPIs
- Increase composting of food waste

Strategies:

- Work with local schools in order to promote healthy eating habits
- Promote 'ugly' fruits and vegetables
- Increase cooking education
- Increase awareness of garden donation programs
- Pilot community composting programs
- Utilize biodigestion to reduce food decay in landfills
- Reduce beef consumption by 30% to meet USDA guidelines
- Adopt a city-wide definition of 'local' food
- Develop an Office of Food Initiatives
- Develop a regional food plan
- Increase institutional purchase of local foods
- Create a prescription program
- Promote climate-resilient, small-scale production methods such as silvopasture and alley cropping
- Increase the number of gardens, urban farms, and peri-urban farms
- Support alternative growing platforms such as hydroponics, aquaponics, and green rooftops
- Continued support for 2012 Healthy School Food requirements
- Create food hubs
- Create cottage food law
- Promote grant programs such as "Local Foods, Local Places"

Challenges:

- Many strategies and objectives do not have reliable baselines
- Inequity in food access
- Poor soil quality limits growing ability

Previous Work:

- Mulan Food Compact
- Food Policy Council
- Adopt-a-Lot program
- Food Bank
- Sustainable Restaurants Program

Food Champions:

- Food Policy Council
- Greater Pittsburgh Food Bank
- Sustainable Pittsburgh
- Grow Pittsburgh

Food System Greenhouse Gas Emissions

The City of Pittsburgh is currently not a major agricultural producer and consequently does not collect data for this category of GHG emissions. However, there is data at the state level that can be used as a proxy for measuring the potential benefits in changes at the City level. The Department of Environmental Protection divides agricultural emissions into three categories: enteric fermentation from livestock digestion, agricultural soil management from fertilizer application, and manure management. According to the Pennsylvania Greenhouse Gas Emission Inventory, each factor contributed approximately 48.47 percent, 34.13 percent, and 17.29 percent, respectively, to the state's agricultural emissions. [41]

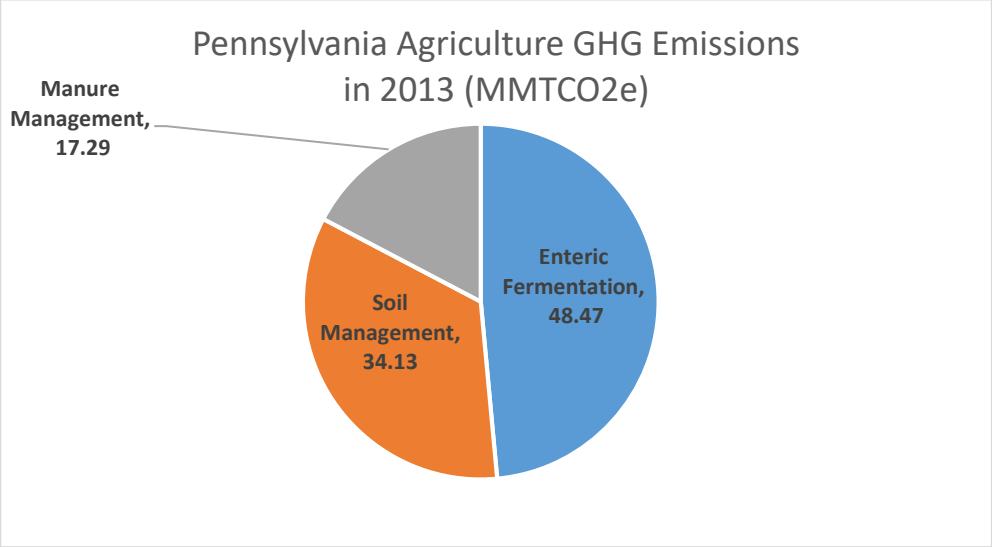


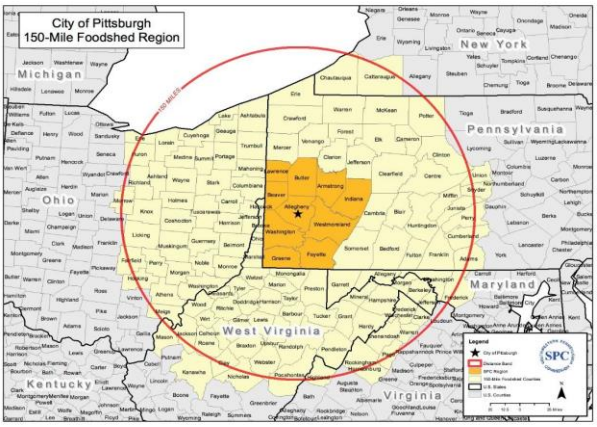
Chart 14– 2/3 of agricultural emissions are a direct result of livestock management, with 1/3 resulting from incorrect application of fertilizers.

Nationally, the agriculture sector as a whole contributes up to one-third of all greenhouse gas emissions when emissions from the farming operations, fertilizer manufacture, and the machinery and vehicles used for production, transportation, and storage are factored in. Although there are no large livestock farms or vegetable farms within the City, residents can help reduce food-related emissions and improve resiliency by supporting the development of local and regional food systems, and reducing food waste.

[41] *https://www.dep.pa.gov/Business/Energy/OfficeofPollutionPrevention/climatechange/*

Objective: Setting baselines

Define 'Local'



While there is no universally agreed upon definition of "local food," informal interviews suggest that a 150-mile radius from the city center is appropriate. Pittsburgh food distributors and organizations, including Parkhurst, Paragon Foods, Giant Eagle, Sustainable Pittsburgh, and the Pittsburgh Public School system all use a 150-mile radius to define locally sourced food. (See *Figure 2*) In practice, farmers tend to travel even less, although they may be encouraged to drive in from further away if there is sufficient demand for their products. Because 150-miles can include multiple counties or states, many food systems professionals and activists also advocate for cities to form partnerships to develop a regional food plan that will account for shared watersheds and growing climates.

Determine Baseline Metrics

As this is the first inclusion of a Food and Agriculture chapter in the Climate Action Plan, baseline data is not as robust as in other chapters. The City of Pittsburgh will work with local stakeholders such as the food policy council to determine the best metrics by which to track the 'quality' of local food systems. Upon choosing these metrics, baselines will be determined using the best available data. This will allow for consistent comparison of progress in future years.

Objective: Support local food systems

Promoting Seasonal Local Food

Increasing and promoting seasonal local food production serves a number of purposes. First, 83% of the greenhouse gases associated with food are a result of the methods used to produce it, while 11% are result of transportation. Therefore, consuming seasonal produce from closer to home can reduce both the emissions associated with transportation and storage, as well as avoid the emissions generated from heated greenhouses during winter months. With 90% of domestically grown broccoli, grapes, strawberries and tomatoes coming from California, the opportunity to reduce emissions by eating more locally produced fruits and vegetables when in season is huge.

As the chart below shows, southwestern Pennsylvania produced less than 10% of what it consumed in 2012, so there is considerable room for more growth in the local agricultural sector.

USDA Category	Production per Capita 2012 ($)				Maximum Local Food		
	USA	PA (Adjusted)**	SW PA	150-Mile Foodshed (Adjusted)**	PA (% of US)	SW PA (% of US)	150 Mile Foodshed (% of US)
Fruits, tree nuts, and berries	$ 89.62	$ 6.05	$ 0.54	$ 9.02	15.26%	1.37%	22.76%
Grains, oilseeds, dry beans, and dry peas	$ 423.47	$ 96.16	$ 40.93	$ 164.02	22.71%	9.67%	38.73%
Other crops and hay3	$ 51.14	$ 20.69	$ 15.04	$ 25.82	40.46%	29.42%	50.49%
Vegetables, melons, potatoes, and sweet potatoes	$ 36.43	$ 7.49	$ 4.23	$ 7.74	20.56%	11.62%	21.26%
Aquaculture	$ 7.71	$ 3.19	$ 0.02	$ 1.14	41.38%	0.31%	14.75%
Cattle and calves	$ 240.99	$ 55.64	$ 18.99	$ 79.76	23.09%	7.88%	33.10%
Hogs and pigs	$ 57.52	$ 28.80	$ 0.13	$ 17.74	50.06%	0.22%	30.84%
Milk and other dairy products from cows	$ 110.39	$ 110.39	$ 32.80	$ 110.39	100.00%	29.71%	100.00%
Other animals and other animal products3	$ 3.91	$ 2.61	$ 0.77	$ 2.54	66.63%	19.66%	64.87%
Poultry and eggs	$ 113.31	$ 88.78	$ 0.48	$ 113.31	78.35%	0.43%	100.00%
TOTAL	$ 1,158.11	$ 419.78	$ 115.12	$ 608.85	36.25%	9.94%	52.57%

Table 6: Comparing Regional Food Production Capacity[42]

In the past, the Pennsylvania *Buy Fresh Buy Local®* (BFBL) program, coordinated by the Pennsylvania Association for Sustainable Agriculture (PASA), organized events and marketing campaigns to promote local foods. This program has been discontinued in Southwestern Pennsylvania due to lack of funding, but local government and organizations can utilize advocates at the state level to secure funding to reinstate programs such as BFBL. The city will also continue to host its own food entrepreneur networking events with the SPC and Allegheny Conference, and promote the resources such as *PA Preferred* website that provides links to local food producers and shops carrying local foods.

The city will also encourage residents and development partners to seek out grants from federal programs such as *Local Foods, Local Places* which assist in local food system development. *Local Foods, Local Places* "helps cities and towns across the country protect the environment and human health by engaging with local partners to reinvest in existing neighborhoods as they develop local food systems." In 2017, these partners invested $810,000 in 24 communities that were selected to implement projects such as creating local food cooperatives, community gardens and farmers markets.

Promote Community Building

When community members take the time to get to know their local farmers and food processors, they can build relationships that encourage cooperation and accountability. A localized food system is more responsive to the needs of its community and will know if members are willing to support the implementation of specific low emissions practices such as construction of solar panel milking stations, biodigesters for organic waste, and new varieties of crops that are more drought tolerant.

Increase institutional purchasing of local foods

The successful development and promotion of a local food system will require the participation of all city sectors. The municipal government can lead this effort by offering local produce and products in government buildings, public institutions, and city schools. In 2017, for example, city employees were invited to participate in a Community Supported Agriculture (CSA) program. Participants paid in advance for a weekly or biweekly share of a farmer's harvest, which they later picked up at the Department of City Planning. CSA programs are not new, but encouraging city employee participation is one way to support the local food economy and show private businesses how easy it can be to incorporate a similar program in their offices.

[42] *https://www.nass.usda.gov/Publications/AgCensus/2012/#full_report*

The Pittsburgh Public School District (PPS) also actively seeks to increase its number of food contracts with local farmers and producers. According to the most recent Farm to School Census Report published by the USDA, PPS devoted approximately 24% of its almost $7 million food budget to local foods during the 2013-2014 school year.

To further promote the purchase of local produce and food products, the City will implement a local food procurement policy for public institutions and government entities that would give preference to local farmers and producers that may otherwise be overshadowed by large corporations. The Los Angeles Unified School District, for example, successfully increased its purchasing of locally produced fruits and vegetables from 9% to 25% after enacting its Good Food Purchasing Program in 2012. Vermont, New Hampshire, and New York City have also enacted local food procurement policies that may serve as models for the creation of a Pittsburgh local food procurement plan.

Encourage institutions to grow gardens

Growing fruit and vegetable gardens in schools and other institutions throughout the city serves two purposes. First, depending on the entity's certification level, produce may be harvested and used in school lessons and workplace lunches, thereby increasing local produce consumption and decreasing the City's carbon footprint. Second, the gardens serve as an educational tool and encourage individuals to make fresher, better food choices for healthier lifestyles in an era of rising rates of obesity.

In their mission to assist schools in expanding garden education, Grow Pittsburgh developed a CORE-aligned garden education program for schools and added 9,400 square feet of growing space in the city through 15 garden installations in public and charter schools. The program has engaged more than 6,000 students and teachers while educating them in food growth and production.

Many large hospitality and food service institutions are supplementing their purchases from local farmers by growing or expanding their on-site gardens. The David Lawrence Convention Center, operated by Levy Restaurants, has three outdoor spaces—in addition to its North Terrace with 27 rooftop raised beds gardens—that supply food for the convention center. Parkhurst Dining, another large corporation in Pittsburgh, has an extensive client portfolio, including Google, Reed Smith, Bayer Corporation, the Pittsburgh Steelers, and Chatham University. At each of these locations, there is a rooftop or urban garden of some sort, providing a percentage of the produce, herbs, and honey direct to the businesses in which they are located.

Hospitals are also key players in sourcing locally grown foods, some even from their own facilities. University of Pittsburgh Medical Center (UPMC) at Magee Women's Hospital recently implemented food production and gardening classes in their Japanese garden as a component of the wellness program. Approximately 2,000 pounds of fresh vegetables harvested from the garden are used in patient meals and the hospital's cafeteria annually.

Increase the number of gardens—particularly in areas with high food insecurity rates

Urban farms and gardens will never replace the important role that rural farms, however, these smaller food production sites serve a multitude of important functions. Urban farms and gardens can provide an additional layer of food security to communities that may lack convenient or affordable access to fresh produce. These green spaces also help to capture carbon and improve air quality, minimize energy

required by grey infrastructure systems to direct and treat stormwater, and electricity demands by mitigating the urban heat island effect.

Grow Pittsburgh has installed 26 school gardens throughout Allegheny County—in addition to its community gardens—and the Phipps Conservatory and Botanical Garden has installed nearly 200 private vegetable gardens for Homewood community members participating in its *Homegrown* project. Both organizations plan to significantly increase the number of gardens in the coming years, but have already greened more than three acres of land within the City of Pittsburgh, and given residents the capacity to produce approximately 10,000 pounds of food.

Adopt-A-Lot

The city's Adopt-A-Lot program has also helped many community groups and individuals to begin growing their own food. Created in November 2015, the Adopt-A-Lot program allows residents to obtain leases and licenses to establish vegetable, flower, or rain gardens on vacant, city-owned land. The leases are renewed each year and licenses can be renewed for a three-year term after the first year. As of December 2017, 78 lots have been adopted with enthusiastic community members spending an average of $10,000 to create vegetable and rain garden on their lots. Much of the money is spent on improving the soil—which often contains little organic matter and may suffer from lead contamination. However, this investment returns big dividends as it increases the lot's capacity to sequester carbon, reduce stormwater runoff and grow more nutritious food. The planned Hilltop Farm, at the former site of St. Clair Village, expects to store and reuse over one million gallons of stormwater annually. It will also save 133,356 kilowatts of energy and reduce carbon emissions by 12,555 pounds.

Recognizing the significant financial investment that goes into creating some of these production areas, and the time commitment of garden members and urban farmers to keep their sites operating at maximum capacity, the city has begun to examine ways to give farmers and gardeners more secure land tenure. Whether through the Urban Redevelopment Authority, the Land Bank, the Land Trust, the Greenways program or some other community development structure, preserving urban farmland will be important for both community food security and continued reduction of emissions totals through soil carbon sequestration.

Support the Urban Agriculture Act

On September 28, 2016, Mich. Sen. Debbie Stabenow introduced a comprehensive urban agriculture bill to the U.S. Senate for inclusion in the 2018 Farm Bill. The Urban Agriculture Act establishes an Office of Urban Agriculture within the USDA and provides funding for a number of programs committed to urban food systems in order to expanding community gardening, and urban farms and rooftop agriculture. The office will develop pilot programs for municipal composting and other food waste reduction strategies and strengthen the connection between healthy food consumption, the environment, and health. The City, along with numerous local stakeholders, will advocate for this bill to better serve the community and further develop urban agriculture in Pittsburgh.

Encourage Plant-Rich Diets

A diet rich in vegetables reduces emissions from livestock production and feed, in addition to decreasing obesity rates. The country has already made huge strides over the past thirty years in terms of reduce beef consumption: USDA data shows that beef consumption peaked in 1976 at 91.5 pounds per person and had fallen to approximately 52.3 pounds by 2012. This has been largely due to increases in the price of beef and the growing popularity of chicken, but may also be partly attributed to the revival of

historical campaigns like "Meatless Monday," that bring attention to health and environmental implications of beef consumption. However, making a small effort to go beyond Meatless Monday campaigns to eat plant-based meals twice a week would reduce meat consumption by nearly 30% and make it easier for a larger portion of the city's demand for meat to be met by local, sustainable, producers. For those who want to make a bigger impact, a switch to a weekday vegetarian diet would reduce meat consumption by more than 70%.

How Many Days Should You Cut Out the Meat to Make a Difference?

Number of Vegetarian Meal Days	Percentage of Meat Consumption Reduced	Car Miles Reduced (200 miles = 82.2kg CO_2)
1	14%	1 hamburger = 200 miles
2	29%	2 hamburgers = 400 miles
3	43%	3 hamburgers = 600 miles
4	57%	4 hamburgers = 800 miles
5	71%	5 hamburgers = 1,000 miles
6	86%	6 hamburgers = 1,200 miles
7	100%	7 hamburgers = 1,400 miles

Table 7: Small changes in diet add up to big savings.[43]

Expand food hubs

A food hub is a business or organization that collects produce from farms in the region and creates channels in which the produce can easily be distributed. Food hubs assist small and medium farmers and producers by aggregating, labeling, marketing, and selling their product for them. By selling the products collectively, hubs help small farmers reach the volume that they need to produce to compete for contracts with large grocery store chains and institutions. The hubs also reduce transportation emissions by having a single entity responsible for collection of the products and bringing them into the City. Penn's Corner Farm Alliance, Republic Food Enterprise Center, and Three Rivers Grown are examples of three food hubs that serve the greater Pittsburgh region, increasing small farm participation in the local market.

Adopt a cottage food law in Allegheny County

Food preservation techniques, such as canning, fermenting, and dehydrating, as well as preparing value-added food products help prevent the waste of imperfect and surplus produce and can provide an important source of additional income. These products are regulated by the Pennsylvania Food Safety Act, which designates residential kitchens as limited food establishments when used to create products intended for sale.

Although state law allows residents to create value-added products intended for sale in their homes, local regulations administered by the Allegheny County Health Department require these products to be made in a commercial kitchen. The local regulations, therefore, prevent residents and small business owners from producing value-added products intended for sale in their homes and impart additional barriers on individuals seeking new business ventures. The city will explore options with the county to remove or modify barriers in small-scale food production. This would give small food businesses the opportunity to grow without the burden of installing an expensive commercial kitchen.

[43] *https://www.earthday.org/take-action/cutting-your-foodprint/*

Permitting food production in residential kitchens not only increases the quantity and diversity of local foods available, thereby reducing emissions totals from imported food, it can also have tremendous economic benefits. California enacted the California Homemade Food Act in 2012, and it went into effect in January 2013. Within a year, over 1,200 local food businesses opened their doors, generating income and supporting local food production. Similarly, Pittsburgh would have a more robust local food economy, while also combatting food waste, if it permitted food production in residential homes or provided easier access to commercial kitchens.

Objective: Prevent Edible Food from Entering Waste Streams

Food Waste Data

The EPA estimates that 40% of food is wasted: the U.S. spends "$218 billion a year, or 1.3% of GDP, growing, processing, transporting, and disposing of food that is never eaten." This wasted food accounts for 21% of all fresh water, 19% of all fertilizer, 18% of cropland, and 21% of landfill volume. If food waste were a country, it would be the third largest producer of greenhouse gases in the world, after China and the U.S. Preventing food from entering the waste stream will eliminate GHG emissions from landfills as well as the production of that food. [44]

Most of this chapter focuses on removing food from the waste streams. Additional information regarding composting, anaerobic digestion, and preventing organic waste from entering landfills can be found in Chapter 5: Waste and Resource Recovery.

Eat "ugly" fruits and vegetables.

Notwithstanding its appearance, "ugly" produce is completely edible and just as nutritious as "perfect" produce, however, ugly produce typically ends up being thrown away because people choose to purchase food that looks perfect. 412 Food Rescue promotes eating ugly produce to combat food waste and recently developed a partnership with Penn's Corner Farm Alliance to begin an UglyCSA program. Stores that offer imperfect fruits and vegetables at reduced prices, and consumers who purchase them, help to reduce this source of food waste and greenhouse gas emissions.

Create community canning centers

The City, its business, and philanthropic partners can help residents to reduce greenhouse gases from wasted food and food imported during winter months by creating community canning centers. Such centers used to be widespread and served as a place where individuals and families could go to get professional instruction and assistance in canning the harvests from home gardens. At a time when few people retain these skills, such community canning centers can significantly increase food security and reduce food waste. Community canning centers existing in neighboring states such as New York, Ohio, and Virginia could provide a model for Pittsburgh. Potential be funding for these centers could come through a grant from the USDA's *Local Food, Local Places* program.

Promote food recovery for all institutions and events.

Established in 2015, 412 Food Rescue is another organization that strives to reduce food waste. The organization utilizes volunteer "heroes" to "rescue" food from donors and deliver to other organizations that re-distribute food directly to those in the community that need it most. Since its inception, the

[44] *https://www.epa.gov/sciencematters/americas-food-waste-problem*

organization has rescued nearly 1,600,000 pounds of food and served over 1,300,000 meals, reducing local emissions by over 855,000 pounds. PPS has begun creating "sharing tables" where kids can exchange parts of their lunch that they do not plan to eat instead of throwing the food away. At the University of Pittsburgh, students launched a food recovery program in fall 2014, collecting and delivering more than 4,000 pounds of food to local entities. In May 2016, the University of Pittsburgh became Food Recovery Certified by the Food Recovery Network, a student movement committed to fighting food waste and hunger. Students recovered over 9,300 pounds of food in 2016. As more companies and institutions support food recovery organizations, food waste will cease to be the major contributor to agricultural greenhouse gas emissions that is now.

Greater Pittsburgh Community Food Bank-Case Study

The Greater Pittsburgh Community Food Bank has led food recovery efforts in the southwestern Pennsylvania region for more than 35 years. Currently, the Food Bank receives donations from grocery stores, restaurants, distributors, manufacturers, farmers, gardeners, and stadiums. The Food Bank and its network of over 150 city-based partners serve 41,000 Pittsburgh residents struggling to put food on the table.

Currently, the Food Bank and their member agencies rescue about 15,000,000 pounds of food per year, including 3,500,000 pounds of food from retail stores, restaurants and other food donors within the city of Pittsburgh. Of those pounds, about 1,700,000 are high-value perishable products: produce, dairy, bakery and meat. Greater Pittsburgh Community Food Bank member agencies directly rescued 4,700,000 pounds of food last year. The Food Bank and its member agencies in the city rely on thousands of volunteers to sort product for safety and pack product for quick distribution. Greater Pittsburgh Community Food Bank is investing in its member agencies to increase their ability to transport and distribute product swiftly while ensuring safe and equitable distribution. Of the 15,000,000 pounds of food, 4,600,000 pounds were picked up by agencies right at the donor's door, ensuring fresh food, and minimizing waste while complying with the rigorous food safety requirements of their contracts with us and our contract with Feeding America. Over the last five years, the Food Bank has doubled the pounds of food rescued directly by agencies. Efforts to increase this activity must be supported to ensure the greatest amount of food is going to the greatest number of people in need in the most efficient way possible.

The Food Bank is also implementing technology to streamline the connections between the food donors and food distribution agencies. In partnership with Feeding America, the Food Bank will be rolling out "Meal Connect," a localized platform for local donors to offer donations to local agencies trained and equipped to safely rescue food. The Food Bank played a leadership role in the creation of the Pennsylvania Agricultural Surplus System (PASS), a state funded program administered by the Department of Agriculture which provides food banks with the ability to defray the costs farmers incur picking and packing excess produce and other agricultural items. PASS has enabled the Food Bank to recover 1.7 million pounds of food that would otherwise have gone to waste since it was first funded by the commonwealth in 2016. [45]

Home garden donation program awareness

Working in partnership with the Greater Pittsburgh Community Food Bank, home gardeners are also able to donate surplus food at a number of locations throughout the city each day, and the Food Bank

[45] *https://www.pittsburghfoodbank.org/financials/2016AnnualReport*

Community Harvest program ensures produce is provided to families in need. The city can support this program by providing information on how to donate produce and work with local organizations in donation marketing.

Objective: Develop an Office of Food Initiatives

For Pittsburgh to successfully address these issues associated with food and climate, there must be an individual leading the conversation. To that end, there is a need to develop an Office of Food Initiatives, which will act as a liaison between residents, the city, and the network of stakeholders comprising the Pittsburgh food system to facilitate conversation and action in the local food climate. The office will have a designated manager to represent the city in an official capacity at meetings and conferences pertaining to food, oversee the implementation of food-related policy recommendations, coordinate efforts related to food policy, and communicate with other food policy advisors and managers throughout the country. With the development of an office dedicated to food policy, the city will then be able to focus on creating a local food plan and working with regional partners to create a regional food plan guided by the principles of the Milan Urban Food Pact and the 100 Resilient Cities project. The Climate Action Plan only delineates a few of those initial steps, but a comprehensive food system plan will contain more information and strategies to further transform Pittsburgh into a more sustainable and resilient community that fosters and promotes a strengthened local economy and diverse food climate.

CHAPTER SEVEN: Urban Ecosystems

Goal: Increase carbon sequestration by 100% by 2030

Objectives:

- Increase tree canopy to 60% (from 42% now) by 2030
- Prioritize habitat conversion from lawns and concrete to urban forest
- Improve urban soil conditions through the use of compost and biomass material
- Increase biodiversity at all levels of the urban environment
- Species diversification/invasive species removal
- Design and implement guidelines for the greenways

Strategies:

- Restore soil by increasing organic matter, reducing compaction
- Halt tree canopy loss due to development
- Minimize loss of trees due to pests and disease
- Encourage sound management practice to limit soil disturbance
- Support efficient water use and storm water management, limit erosion
- Support sustainability in park design, development, maintenance, and management
- Allocate adequate resources to sustain the public open space
- system
- Recover vacant spaces and brownfields for vegetation or urban agriculture
- Establish/continue public education efforts
- Prioritize wetland restoration where applicable

Challenges:

- Climate change will increase extreme weather events and invasive species
- Lack of data on Pittsburgh ecosystems
- Lack of functionality of existing green space
- Development pressure from building industry and current development practices
- Lack of species balance
- Lack of funding for green spaces
- Green space is often viewed as loss of tax revenue
- Legacy contaminants

Previous Work:

- Greenways Plans
- Biophilic City Designation
- Shade Tree Commission
- PWSA Green First Plan

Ecosystem Champions

- Pittsburgh Parks Conservancy
- Phipps Botanical Garden
- BiodiverCITY
- Department of City Planning

Introduction to Urban Ecosystems

Urban areas have unique challenges and opportunities with regard to climate change. Many cities are growing, both in area and in population. They cover only 2-3% of the earth's surface, but hold more than 50% of the world's population and have been estimated to produce around 75% of the total global anthropogenic carbon dioxide emissions. However, urban ecosystems have also been shown to store more carbon per acre than surrounding regions[1]. When discussing a carbon neutral goal, the amount of carbon that can be sequestered by the city's ecosystems is a critical piece of the equation.

In Pittsburgh, there is an opportunity to lower net greenhouse gas emissions through the assessment, protection, management, and improvement of the vegetation, soil, and water.

Objective: Calculate carbon sequestration capacity

Many cities are developing policies to promote urban vegetation in order to reduce their net greenhouse gas emissions. Urban centers are diverse areas with significant potential both to reduce carbon emissions and to increase carbon sequestration and storage. Carbon sequestration is the process of incorporating atmospheric carbon into plants, soil, and water for long term storage. Terrestrial sequestration uses plants to capture CO_2 from the atmosphere and store it as carbon in plants and soil. Geologic sequestration allows carbon to be deposited into long-term storage in geologic zones deep underground. Urban areas have both carbon sources and sinks. A source is any process or activity through which greenhouse gas is released into the atmosphere. A sink is an area of storage for this carbon. Carbon sinks in the carbon cycle include the atmosphere, vegetation, bodies of water, and soil.

Extensive research has been conducted over the years looking at ways CO_2 can be sequestered via vegetation and soil. However, the potential for urban vegetation to remove CO_2 from the atmosphere has is not well-documented. Assessments usually consider only the carbon accumulated by trees and do not take into consideration the effects of soil respiration or the emissions associated with the management of green spaces. In soil, microorganisms and bacteria drive the decomposition and mineralization processes. Soil respiration is dependent on the microclimate within soil including factors such as temperature, water content, aeration conditions, organic matter characteristics, and the presence of organisms. It has been found that green spaces may either act to sequester carbon or as a source of CO_2 emission, depending on the characteristics, species present and the amount and conditions of pervious surfaces for soil respiration. In order to develop an effective plan for management of urban ecosystems in Pittsburgh, more information and quantifiable data is needed about the carbon sources and sinks within the City.

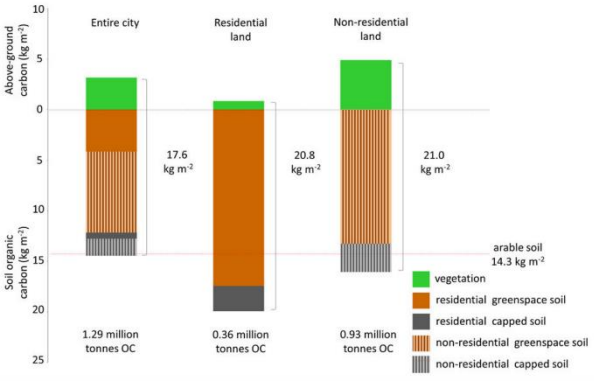


Chart 14: Organic carbon storage density across cities [46]

[46] *https://www.nature.com/articles/srep00963*

In order to develop the best practices for GHG reduction, carbon sequestration must be accurately calculated. Only then can the city and partners act to increase carbon sequestration and storage.

Objective: Ensure Healthy Vegetation is Able to Thrive

Tree Canopy Coverage

Pittsburgh leads major US cities in urban tree canopy coverage with 42% of the City sheltered by trees. Almost 40,000 street trees help Pittsburgh avoid around 3,265 metric tons of CO_2e through shading and cooling. These trees are able to sequester approximately 13,900 metric tons of CO_2e (this considers only the carbon stored in the trees, not carbon stored in the soil).[47] The existing tree canopy cover also provides shade, reduction the heat island effect, and are able to absorb runoff, reducing severity of flooding in cases of heavy rains. The existing benefits are significant, however, to pursue a carbon neutral goal for the City of Pittsburgh, more extensive carbon sequestration is needed. This can be accomplished by protecting existing trees and vegetation and planting additional trees in order to maintain a widespread, healthy, urban forest.

Shade Tree Commission

The shade trees play a vital role in the City's green spaces and they are an essential element of a healthy urban ecosystem. In April 2017 Mayor William Peduto issued an executive order calling for new methods to protect the city's trees. A task force on Tree Protection was created in order centralize all of the City's tree policies and to build on the work being done by the Pittsburgh Shade Tree Commission (PSTC) and the Public Works Forestry Division. Included in the order is the requirement for an inventory of the city's street trees and urban forest as well as a 10-year plan for maintenance, implementation, and a streamlined process for disbursements from the PSTC dedicated funds. The task force will develop a tree policy manual and all Pittsburgh departments, agencies and contractors will adhere to those policies and will be held accountable to the Mayor for upholding the tree protection standards. The policies and standards established by the Task Force on Tree Protection will allow for ongoing maintenance, protection and sustainability of the city's vital tree canopy.

Prevent the Spread of Harmful Pests

As climate change progresses, invasive species such as the Asian Longhorned Beetle pose a serious risk to native forests. As much as 70% of Pittsburgh's trees could be lost if the Asian Longhorned Beetle were to come to Pittsburgh.[48] The Asian Longhorn Beetle is just one example of many invasive species that can endanger native flora and fauna. Due to the quick moving nature of invasive species, educating the public on how to identify, report, and prevent the spread of invasive species is essential to protecting Pittsburgh's ecosystems.

Implement Biophilic Cities Initiatives

Biophilia is a term used to describe the extent to which humans are hard-wired to need connection with nature and other forms of life. Biophilic design is a growing field that recognizes and implements the need for biophilic workplaces, gardens and natural light in hospitals, and the utilization of daylight, natural ventilation, plants, and greenery. Biophilic cities are globally responsible cities that recognize the importance of actions to limit the impact of resource use on nature. They often include a number of attributes such an abundance of green spaces in nature, opportunities for residents to be outside and

[47] *https://www.nationalgeographic.com/news-features/urban-tree-canopy/*

[48] *https://www.phipps.conservatory.org/blog/detail/biopgh-blog-asian-longhorned-beetle*

enjoy nature, multisensory environments, and biodiversity educational programs. Creative and effective means for incorporating nature on a city scale is becoming increasingly important as the world's human population becomes more urban.

The City of Pittsburgh partnered with Phipps Conservatory and Botanical Gardens to apply to the Biophilic Cities Network and was formally inducted into the global network on September 16, 2016. The city's main biophilic endeavors have focused on improvements to water and air quality, and to increasing city residents' engagement with the natural world. The city will create partnerships to enhance biodiversity, increase the tree canopy, install green infrastructure, daylight streams, and plan EcoInnovation districts. Pittsburgh will measure success in these areas through tree canopy coverage over time, extent of biodiversity, participation in monthly biophilic meet-ups, percent of city budget devoted to nature conservation, restoration, and education, among other indicators.

Greenways Plan-Case Study

The “Greenways for Pittsburgh” program was established in 1980 in order to protect steeply sloped hillsides that were unsuitable for building and to consolidate and preserve this land. The Pittsburgh City Council defined the term “greenway” as a permanent, passive open space that benefits the adjacent neighborhoods and the general public. As of today, there are 12 designated greenways in the city, totaling 605 acres of protected land. Emerald View Park contains 61.5 of those acres, and three neighborhood parks contain a combined total of 8.9 acres. Currently, 14% of Pittsburgh’s public open space is designated as greenways. Twenty-one additional potential greenways would add over 450 acres to the system. As a point of reference, the city’s largest park, Frick Park, is 644 acres in size.
The Greenways for Pittsburgh program faces many obstacles to its success. Economic constraints have limited the time and staff available to maintain these open spaces, and defined methods for maintaining these areas must be developed. In addition, these areas are vulnerable to destructive actions such as overuse by motorized vehicles, dumping of refuse and possible unlawful activity. Greenways are also threatened by natural elements such as pests, disease, and invasive species. Resources and methods to deal with all of these issues are needed. Residents of the city have indicated a desire for more greenways as well as improved access to and protection of existing natural areas that are not designated as greenways.

In July 2013, the city adopted the Open Space Plan. One recommendation that came from the plan was “Greenways for Pittsburgh 2.0,” an update of the Greenways for Pittsburgh project. The intent of Greenways 2.0 was to expand and enhance the city’s greenways, improve connectivity of open spaces, and to develop a network of hiking/biking trails. A second recommendation of the Open Space Plan was the development of a Natural Resources Manager. The Greenways for Pittsburgh 2.0 Resource Guide will be released in 2017. The Resource Guide is a how-to manual for citizens who are interested in becoming stewards of one of the city’s greenways. The guide explains the Greenway Program and provides useful information for stewards of existing greenways or those interested in designating a new greenway. A second recommendation of the Open Space Plan was the development of a Natural Resources Manager. The role of this position would be to oversee the management and conservation of the city’s natural resources to meet the public desire for quality, accessible, connected open spaces while striving for the highest level of sustainability.

Objective: Improve Overall Soil Quality

Urban Soil Rehabilitation

Urban soils have unique characteristics that create unique challenges. About one-third of urban carbon emissions result from changes in land use, such as the replacement of vegetated surfaces with developed or industrial land. Soil disturbance due to typical land development practices reduce the organic matter and carbon stored in the soil and increase the carbon emitted from the soil into the atmosphere during construction processes even when the topsoil is replaced. Land management practices for urban agriculture, landscaped areas and lawns can also increase emissions. In addition, urban soils often exhibit altered physical, chemical, and biological characteristics in comparison to local non-urbanized soils. They can be contaminated by pollutants due to anthropogenic activities or degraded due to the influence of past land use on soil properties. These unique attributes can promote non-native invasive vegetation and can create novel soil types that cause difficulties for the ecological restoration of urban soils. Both the loss and gain of carbon in soil depend heavily on the pattern of interaction between plants, microbes, and the soil itself.

Improvement of urban soils is crucial to improving overall ecosystem function. Urban soil quality can be improved by using local resources such as composts and biosolids to restore soil and improve carbon sequestration. It has been shown that soil biodiversity has a positive impact on soil carbon sequestration. Ecosystems with high biodiversity sequester more carbon in the soil and living organisms than those with reduced biodiversity. Methods to reduce compaction of the subsoil also have potential to increase soil carbon storage below the surface. Soil rehabilitation can mitigate the risks from pollutants and improve the soil quality. It has been shown to have the potential to increase carbon storage both above ground and in below ground communities.

Residential Education and Landscaping

In addition to acting as carbon reservoirs, urban forests also affect the soil. It has been found that urban forest soils emitted the least CO2 as compared to lawns and landscaped cover. Conversely, the success of tree-planting projects in cities is also dependent on healthy soil. Healthy soils are critical for vigorous tree growth, so soil restoration, site preparation and management improves the traits of urban soils that are critical for success of any urban forestation projects. The preparation of urban soils for tree planting will improve the health of urban soils and therefore improve the entire urban environment. In the City of Pittsburgh, 60% of private landscaping is residential. The greatest potential for urban forest occurs on residential land, but it is also the area of highest risk of removal of trees. Homeowners must be educated about the effects of their individual decisions on the urban ecosystem.

Vacant Lots and Land Use Decisions

Urban green-spaces and parks can also contribute to carbon sequestration. Urban park soils can act as a carbon sink. The type of land-cover within a park determines the effectiveness of each area. Wetland soils had the highest levels of stored carbon, although their effectiveness may be limited by the release of methane gases into the atmosphere. After urban forests, lawns and bare soils were less effective, but can still influence the carbon budget of urban parks. Turf grass is a major vegetation type in the urban environment, however, plants linked with fruiting and mushroom-type fungi have been found to store 70% more carbon per unit of nitrogen in the soil. In addition, management practices related to turf grass, such as species selection, irrigation, and mowing will also affect carbon release and storage.

Therefore, understanding the land-use history and the choosing the correct type of land-cover in park planning can substantially impact the effectiveness of carbon sequestration.

Due to the decline of industrial manufacturing, many urban centers have experienced population declines that have resulted in large areas of vacant land. Since vacant lots have a limited capacity for carbon sequestration, urban agriculture may be an appropriate land use for these spaces. However, degraded soils are common. Soil amendments such as compost and urban yard waste can significantly improve soil quality and increase crop yields for urban agriculture, thereby improving potential carbon storage in these areas.

Improve ecosystem education

Education and outreach are needed to build an understanding of the importance of sustaining, protecting and improving the urban environment. Public education is necessary for citizens to understand the impact of the urban environment on GHG levels. Resource allocation is also needed in order to support efforts to manage the urban ecosystem. Cooperation between public and private sectors and innovative approaches to the various challenges are essential for success.

Protecting and improving the urban ecosystem in the City of Pittsburgh will provide many benefits to its residents, businesses, and communities beyond reducing the impact of climate change. Natural ecosystems can not only provide climate benefits, but also make our city healthier and more livable. Creating a resilient urban ecosystem will benefit the environment and property owners as well as local and regional communities and economies. A successful process will respect and enhance the relationship between nature and the built environment.

Objective: Improve water quality and increase retention

Sound management of the urban ecosystem will take into account the possible effects on groundwater as well as local waterways. Proper maintenance of soils and vegetation will help to manage storm water run-off and prevent erosion. Erosion causes not only the loss of soil, but also carries organic carbon into the waterways, impacting the health of aquatic habitats. In addition, reduction of GHG will reduce the presence of acid rain and its effects on the environment.

Carbon stored in organic matter gives soil its water-retention capacity. Soil with a higher organic carbon level will help prevent run-off and maintain healthy vegetation while requiring less maintenance and fewer resources. Soil water content and temperature directly affect the production and/or consumption of greenhouse gases. Increased water in the soil helps to increase microorganism and root activity in the soil and allow more carbon to be sequestered.

Ground and surface water are directly impacted by the condition of the soils in the area.
Healthy soils not only help to sequester carbon but also filter pollutants, reduce runoff, control erosion and protect the water supply. Improving degraded soils with compost and biosolids will improve the soil ecosystem with minimal impact to surface water. Likewise, improving the efficiency of water use can reduce soil disturbance and therefore reduce the release of carbon into the atmosphere.

Application of Green Infrastructure

The Pittsburgh Water and Sewer Authority along with the City of Pittsburgh recently developed the ‘City-Wide Green First Plan,’ a plan to manage storm water related issues. Utilizing ‘green first’ methods,

the plan calls for increased green infrastructure to increase water retention, improve water quality, and decrease flooding events. Green infrastructure (GI) (as opposed to more traditional 'gray infrastructure' storm drains and concrete pipes') can provide cost-effective, environmentally friendly water management strategies. Additions such as bioswales and rain gardens can not only reduce storm water

City of Pittsburgh
Department of City Planning
414 Grant St.
Pittsburgh, PA 15219

@resilientPGH #resilientPGH

climate@pittsburghpa.gov

ONEPGH
RESILIENT PITTSBURGH

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

CLIMATE ADAPTATION PLAN

SEPTEMBER 2021

U.S. Department of
Housing and Urban Development

CONTENTS

Introduction

Background

Climate change is a crisis impacting communities across the United States. From severe storms and flooding, to wildfires, drought, and extreme heat, Americans are already feeling the effects. As the Federal agency tasked with creating strong, sustainable, inclusive communities and quality affordable homes, HUD is on the front lines of the nation's efforts to increase resilience to climate impacts.

HUD has significant influence over how the Nation's households and communities will respond to the climate crisis. In addition to public and assisted housing, HUD's FHA-insured portfolio consists of 7,627,918 single family insured loans, 11,213 multifamily insured loans (1,405,260 units), 3,825 residential healthcare facilities, and 88 hospitals with $1.2 trillion, $111 billion, $33 billion and $6.3 billion respectively of mortgage balances (as of June 30, 2021).

Further, the Department invests billions of dollars every year in housing, infrastructure, and services in neighborhoods and cities across the U.S. through its ever-increasing role in disaster relief and recovery. This investment includes over $89.8 billion appropriated since 1993 by Congress for Community Development Block Grant-Disaster Recovery (CDBG-DR) grants, $15.9 billion of which is allocated for CDBG-Mitigation (CDBG-MIT) for States and local governments that experienced Presidentially-declared disasters in 2015 – 2018. HUD's disaster-related grants have driven innovation and elevated the national conversation on resilient recovery through Rebuild by Design and the National Disaster Resilience Competition.

The most recent National Climate Assessment from the U.S. Global Change Research Program (USGCRP)[1] underscores the necessity of HUD's climate change mitigation and adaptation work. It shows that climate change creates new risks and exacerbates existing vulnerabilities in communities across the U.S., presenting growing challenges to human health and safety, quality of life, and economic prosperity. Though these challenges are universal, our Nation's low-income families and communities of color are disproportionately impacted by climate change due to historic disinvestment and a longstanding pattern of residential segregation. For low-income households and communities of color, climate change exacerbates existing vulnerabilities in their communities, such as aging infrastructure and the siting of toxic waste facilities.

Responding to this crisis is core to the Department's mission, which is why HUD recently established an internal Climate and Environmental Justice Council with representation at the Assistant Secretary level. HUD's Senior Advisor for Climate Change will lead the Council with support from the Office of Environment and Energy. The Climate and Environmental Justice Council will manage the implementation and monitoring of the climate priorities detailed in this plan. This Council is the main body responsible for the long-term integration of climate and environmental justice into HUD's programs and operations.

In recognition of this responsibility, the Climate and Environmental Justice Council will also be developing the next phase of this adaptation plan, which will incorporate mitigation and environmental justice. HUD plays an essential role in mitigating climate change by reducing greenhouse gas emissions, due to its

[1] https://nca2018.globalchange.gov/

portfolio of approximately 4.5 million public and assisted housing units. Furthermore, because HUD's programs focus on improving the lives and environments of low- and moderate-income individuals, HUD must also be a leader in achieving environmental justice. In the coming months, HUD will build off the work in this plan and develop a strategy that incorporates both carbon reduction and environmental justice actions, together creating a comprehensive agency Climate Action Plan.

Policy Statement

One of President Biden's first actions in office was Executive Order (EO) 14008, *Tackling the Climate Crisis at Home and Abroad*. It lays out a broad vision for how the Federal government can address climate change while creating economic opportunity. The Department supports the President's message that our Nation has limited time to act to avoid the most catastrophic impacts of this crisis and seize the opportunity that tackling climate change presents. HUD will play a critical role in implementing this vision.

It is the policy of the Department to organize and deploy the full capacity of its offices to combat the climate crisis and implement a department-wide approach that reduces climate pollution; increases resilience to the impacts of climate change; protects public health; delivers environmental justice; and spurs well-paying union jobs and economic growth. The Department's policy is to do so in a way that delivers on the President's commitment to environmental justice and promoting racial equity, consistent with Executive Order 13985, which requires that HUD allocate resources in a manner that addresses the historic failure of the Federal government to invest sufficiently, justly, and equally in underserved communities, particularly communities of color. HUD is committed to taking actions that address the intersection of these two policy directives.

Indeed, the Department has already taken significant steps to address climate threats and environmental injustice. HUD has adapted its programs to help communities both prepare for and respond to the effects of climate change and will continue to take comprehensive action to advance this Administration's priorities on climate adaptation, resilience, and environmental justice. Furthermore, HUD will help lead the Federal government's response to this unprecedented challenge consistent with the Department's unique and historic role in supporting underserved communities, investing in housing across the country, and guiding communities through post disaster recovery and rebuilding.

HUD is recommitting to tackling the climate crisis through the development of an ambitious Climate Action Plan. When fully developed, this plan will guide the integration of climate resilience and environmental justice into HUD's core programs and policies. The actions outlined in this adaptation plan, and forthcoming more comprehensive Climate Action Plan, will help communities across the nation build more resilient infrastructure, promote responsible utility consumption, create good-paying jobs, and address environmental injustices.

Moreover, HUD has affirmed its dedication to the Climate Action Plan's actions by centering them in the Department's current budget priorities, which highlight HUD's intent to promote climate resilience, environmental justice, and energy efficiency within its portfolio and across the housing sector. The Department's Fiscal Year 2022 budget request included $800 million to reduce carbon pollution, increase resilience to climate impacts, and address environmental injustice. As part of the Administration's whole-of-government approach to the climate crisis, the budget reflects HUD's commitment to expanding

energy efficiency and climate resiliency in public and assisted housing. HUD's ability to further its commitment hinges upon the support of Congress through appropriation and authorization.

HUD is not alone in this effort; the Department will work with Federal partners, stakeholders, grantees, and members of the public to develop innovative solutions to equitably prepare for and adapt to climate change. The Administration has recognized the profound climate crisis facing the U.S. and the world – yet in this crisis, there is opportunity to build back better. Tackling climate change is an opening to meaningfully improve the lives of individuals and communities across the nation through increased resilience and equity.

Plan Organization

In response to the policy set forth in Executive Order 14008, this Plan is organized around one overarching goal for programs and policies under HUD's purview: Increase Climate Resilience

The Plan contains four key objectives. Each objective contains a sub-goal or sub-goals with a table that describes the specific actions that HUD will undertake to achieve the primary goal. Each action will serve as a metric that, when accomplished, will move HUD closer to accomplishing its primary goal. For each of these actions, the plan identifies the method for implementing such action (e.g., rulemaking, technical assistance, coordination), the lead office(s) responsible for implementation, the implementation timeline, and the resource needs. Given that each action contains a subset of actions, HUD has detailed the common approach used for each implementation method. The implementation method summaries below give an overview of the underlying work that will be required for each type of action.

To emphasize HUD's commitment to addressing climate change, HUD will be integrating this Climate Adaptation Plan and the future Climate Action Plan into its agency Strategic Plan. Integrating the actions from these plans into the Strategic Plan not only underscores the importance of this work to HUD achieving its mission, but also provides a platform for HUD to track and report on the progress of achieving its climate goals.

Implementation methods: For each action, HUD has identified seven distinct implementation methods, each with specific processes and timelines according to agency procedure. These are further outlined below.

1. Research. This includes studies of problems and issues within HUD's purview, evaluations of HUD programs, and identification and evaluation of new technologies and approaches to solving problems. Studies and reports include housing and community development matters such as climate-related research on high-performance buildings, energy, and the environment. HUD's Office of Policy Development and Research (PD&R) accepts independent proposals, carries out research in-house, and contracts with external researchers to fulfill HUD's research agenda. Research projects typically take several years to complete.

   HUD notes the importance of PD&R research studies to inform Department climate policy and program implementation. PD&R is committed to exploring new studies and research opportunities that will enable HUD to assess the success of the actions identified in this plan as

well as expand climate and environmental justice efforts in the future depending on available resources.

2. Assessment. These are short-term reviews or evaluations of specific topics that need to be addressed to implement a policy or program. Assessments are conducted in response to staff or stakeholder concerns or to determine the impact of potential policy or program changes. Assessments can take between 6 months and 2 years.

3. Coordination. This involves cross-program and/or interagency collaboration on initiatives or policies in which the organizations share objectives or concerns. While individual programs may have specific regulations or requirements, some objectives can be met by maximizing coordination across programs and partnering with other Federal agencies to harmonize climate-related goals and policies. Agencies can formalize coordination through Memorandums of Understanding and through participation on Federal task forces and working groups.

4. Rulemaking. Where program regulations require updating or modification, or when required by Congress to implement a statute, HUD implements a rulemaking process following procedures outlined in 24 CFR part 10. Rulemaking involves multiple rounds of Federal Register publications, Paperwork Reduction Act compliance, stakeholder consultation, legal and program analysis, and approval from the Office of Management and Budget. From beginning to end, rulemaking processes usually takes at least 24 months While rulemaking itself may not require additional resources, the actions and responsibilities that stem from the rulemaking may require additional funding to implement.

5. Information Technology. HUD develops IT systems to improve both data collection and program monitoring or reporting. This plan identifies several IT updates needed to improve tracking, monitoring or assessing energy and climate related performance of HUD's inventory of public and assisted housing. IT solutions often take 2 to 4 years to implement.

6. Guidance. Guidance as referenced in this report may be published through a program notice, Mortgagee Letter, or guides or handbooks posted on HUD Exchange or www.hud.gov. Depending on the implementation requirements under statute and regulations, new guidance may be based on internal program office deliberation, so it can be drafted and released in a shorter time period (e.g., 2 to 4 months).

7. Technical Assistance. Technical Assistance (TA) is the transfer of skills and knowledge to HUD customers that may need additional capacity. HUD TA is guidance which enables HUD's customers to overcome a lack of specific skills or knowledge of an associated HUD program, which results in the successful performance of and compliance with that program. TA can take many forms and can be provided directly by HUD staff or delivered by HUD TA providers through the HUD-funded TA program. HUD funds TA and capacity building activities for HUD customers through the departmentwide Community Compass Technical Assistance program. Outside of the standard Departmentwide two-year, Congressionally funded Community Compass program,

Congress often provides supplemental funding for TA tied to specific program appropriations (e.g., HOME-American Rescue Plan, CDBG-DR, CDBG-CV).

Resource Implications: This column in each table indicates the nature of the resources needed to implement each proposed action—whether offices can undertake proposed actions using existing resources, are anticipating using funds that were included in the President's FY22 Budget request to Congress, or will need to reprioritize existing resources.

1. None. Many of the actions identified in this plan utilize existing HUD authority and staff in the implementation and therefore do not require any additional resources.

2. FY22 Budget Request. The Department has existing resources and authorities that can be deployed to increase the efficiency and resilience of HUD-funded new construction and substantial rehabilitation; however, there are meaningful gaps in the Departments existing resources that if filled, could result in more influential climate change action. Recognizing these gaps, the Department was the first ever federal agency to have a climate-specific section in its budget request. HUD requested $800M in its FY22 budget, across five programs, for energy and resilience. If appropriated, these new resources would be a critical component of this plan and the future Climate Action Plan.

3. Reprioritize Existing Resources. For HUD funded TA, the reprioritization of existing resources may require an update to HUD TA Plans from previous years, depending on the nature of the priority adjustment and the source year of the funding identified in each case. The program office will work with the Technical Assistance Division to assess any adjustments to approved plans and ensure the proper process is followed prior to assigning TA. For forthcoming actions, these will be reflected in upcoming HUD TA Plans and Notice of Funding Opportunities (NOFO), not yet issued. For other aspects of HUD programs and TA provided directly by HUD staff, reprioritizing existing resources can occur at the program or office level through leadership approval, temporary staff rotations, and reprogramming older or expiring funds to new priorities.

Timeline: The timeline is defined by the fiscal year (FY) and quarter (Q) in which the action is expected to be initiated and completed.

Increasing Climate Resilience

Affordable housing (including but not limited to public and assisted housing) is increasingly at risk from both extreme weather events and sea-level rise. Recent analysis and mapping by Climate Central projects that the number of affordable housing units at risk from flooding in coastal areas will triple by 2050.[2] Coastal communities are especially at risk – a report from the Denali Commission found that 144 Native Alaskan Villages (43 percent of all Alaskan communities) experienced infrastructure damage from erosion, flooding, and permafrost thaw.[3]

A specific threat to HUD programs is the potential vulnerability of the Federal Housing Administration (FHA) Mutual Mortgage Insurance (MMI) and General Insurance and Special Risk (GI/SR) Funds to increased defaults and loss severities due to physical damage, disruptions in borrowers' ability to repay, and declining property values in vulnerable communities. Johns Hopkins researchers warn of a "potential threat to the stability of financial institutions" as global warming leads to more frequent and more severe disasters, forcing more HUD-insured and other loans to go into default as homeowners cannot or will not make mortgage payments.[4]

Many HUD programs help communities recover from and build resilience to climate hazards and natural disasters. HUD's disaster recovery portfolio alone accounts for the federal government's single largest investment in recovery and resilience in low-to-moderate-income communities. While HUD already plays a major role in this space, the Department must expand its climate resilience work to increase resources for grantees and stakeholders and make it easier for them to implement climate resilient activities. HUD can accomplish its goal of increasing the resilience of communities nationwide through improving climate resources and continuing investment in areas most vulnerable to the impacts of climate threats.

Scale: Nationwide.

Risks and opportunities: Low-income families and communities of color are disproportionately impacted by climate change.[5] Without targeted intervention, this climate injustice will continue.

Accomplishments to Date

Disaster recovery and mitigation: HUD works with communities to respond to or prepare for natural disasters through two primary funding sources: CDBG-DR and CDBG-MIT. Since 1993, Congress has appropriated a total of $89.8 billion for CDBG-DR. As of April 2021, this encompasses 137 grants awarded to 64 grantees (34 states and territories and 30 local governments). Active CDBG-DR and CDBG-MIT grants total over $67 billion. This includes funding to support resilient rebuilding after Superstorm Sandy

[2] https://www.climatecentral.org/

[3] Denali Commission, *Statewide Threat Assessment: Identification of Threats from Erosion, Flooding, and Thawing Permafrost in Remote Alaska Communities*, November 2019. https://www.denali.gov/wp-content/uploads/2019/11/Statewide-Threat-Assessment-Final-Report-20-November-2019.pdf

[4] Amine Ouazad, Matthew E. Kahn, *Mortgage Finance and Climate Change: Securitization Dynamics in the Aftermath of Natural Disasters*, http://www.ouazad.com/resources/paper_kahn_ouazad.pdf. January 2021. See also New York Times September 27, 2019, https://www.nytimes.com/2019/09/27/climate/mortgage-climate-risk.html

[5] https://nca2018.globalchange.gov/

in New York, New Jersey, and Connecticut; Hurricane Katrina on the Gulf Coast; and, more recently, Hurricane Harvey in Texas, Hurricanes Irma and Maria in Florida, Puerto Rico, and the U.S. Virgin Islands; and wildfires in California – as well as many other disasters.

Since 2019, HUD has allocated more than $16 billion of CDBG-MIT funds to 22 states and local governments for activities that lessen the impact of future disasters. Fifty percent of these grant funds must benefit low- and moderate-income persons. The State of Louisiana, for example, will use its $1.2 billion CDBG-MIT allocation to implement the Louisiana Watershed Initiative, to "fundamentally change Louisiana's approach to statewide flood mitigation activities" (https://www.watershed.la.gov/action-plan). CDBG-MIT is a unique and significant opportunity for grant recipients to use this assistance in areas impacted by recent disasters to carry out strategic and high-impact activities that mitigate disaster risk and reduce future losses, especially for low- and moderate-income families and households.

CDBG-DR grants are also a significant source of Federal support for building resilience, particularly in low- and moderate-income areas. HUD has long required CDBG-DR grantees to implement certain climate-related measures as part of recovery (e.g., elevation of structures in the flood plain, green building standards) and many CDBG-DR grantees have implemented additional forward-looking investments in resilience. The State of New Jersey, for example, has used $200 million of funding from its Hurricane Sandy CDBG-DR grant to increase the energy resilience of many of its hospitals, allowing for continued operations in the event of future power disruptions.

Additionally, HUD obligated nearly $1 billion of funding through the National Disaster Resilience competition, funding 13 innovative resilience projects across the country. This includes initiatives in Virginia to foster the development of businesses focused on resilience[6] and to increase California's resilience to wildfires.[7] HUD has also obligated $930 million for regional flood mitigation projects in New York, New Jersey, and Connecticut through Rebuild by Design.[8]

While CDBG-DR and CDBG-MIT grants are not permanently authorized, after more than 20 years of supplemental appropriations to fund the awards, CDBG-DR is one of the largest sources of funding for recovery and resilience building, and the largest source that primarily benefits persons with low and moderate income.

Flood resilience: HUD has implemented program-specific policies to increase climate resilience, particularly related to flooding. For example, residential new construction and substantial improvements funded with CDBG-DR assistance are now required to elevate two feet above base flood elevation. Similarly, the Federal Housing Administration (FHA) Office of Multifamily Housing (MF) recently updated its standards to require new construction projects in 100-year floodplains to elevate two feet above base flood elevation. FHA MF has extended the same limitations that apply in Coastal High Hazard Areas (V Zones) to all areas within the Limit of Moderate Wave Action (LiMWA) for new construction and substantial rehabilitation, with lesser but still significant limitations on existing properties. HUD will continue this effort by assessing and initiating a modernization of its floodplain management regulations in 24 CFR part 55, potentially extending increased flood protection across all HUD programs.

[6] https://riseresilience.org/
[7] https://www.hcd.ca.gov/community-development/disaster-recovery-programs/ndrc.shtml
[8] http://www.rebuildbydesign.org/our-work/sandy-projects

Community Development Block Grants (CDBG): CDBG is both a flexible and widespread program, reaching over 1,200 local governments in all states and territories. The program's scope and promotion of community-specific solutions make CDBG a powerful tool for climate resilience. As a condition for funding, CDBG grantees are required to submit a Consolidated Plan every three to five years. In 2016, HUD promulgated the rule *Modernizing HUD's Consolidated Planning Process to Narrow the Digital Divide and Increase Resilience to Natural Hazards.*[9] This rule requires jurisdictions to incorporate resilience to natural hazard risks and a discussion of how climate change will increase those risks into their Consolidated Plan. The rule also requires CDBG grantees to address the impacts of climate change on low- and moderate-income residents. HUD has developed guidance for grantees, such as the HUD Community Resilience Toolkit, a user-friendly guide to help Community Planning and Development (CPD) recipients learn how current and future natural hazard risks may impact their community and how to reduce said risks. HUD plans to create additional resources and guidance around this rule to help grantees better incorporate climate change adaptation into their regular planning process.

Indian Housing Community Development Block Grant (ICDBG): The ICDBG Program provides eligible grantees with direct grants for use in developing Indian and Alaska Native communities, including the provision of decent housing, a suitable living environment, and economic opportunities, primarily for low- and moderate-income persons. The ICDBG provides single purpose grants which are awarded on a competition basis as well as imminent threat grants which are awarded first come, first served to lessen or eliminate problems which pose an imminent threat to the health and safety of tribal residents.

Objective 1: Update Climate Risk Data and Research

1.1 Collect Data and Map Risk

Implementing offices: Housing, PD&R, CPD, FHEO

Description: Collect complete and accurate building-level data across HUD programs to map existing climate risks and environmental justice concerns. Comprehensive and modernized data collection can help inform how to best address climate impacts to protect HUD-assisted assets and their occupants, with a focus on underserved communities, tribal communities, communities of color, and individuals with disabilities. Accurate and easily available data will enable HUD, grantees, borrowers, and the public to conduct vulnerability assessments and develop resilience plans addressing climate impacts.

Office	Action	Implementation Method	Resource Implications	Timeline
FHA MF, PIH	Review current building-level data to ensure accuracy and facilitate mapping of the portfolio's climate risk	Assessment, IT Solution	Requested in the President's FY22 Budget	FY22 Q3 – FY23 Q3
Housing	Procure data sources to enable modeling for climate risks	IT Solution	Reprioritize Existing Resources	FY22 Q3 – FY23 Q4

[9] 81 FR 90997 (Dec. 16, 2016).

FHA SF	Identify additional data elements during underwriting and servicing for all FHA insured mortgages	Assessment	None	FY22 Q2 – FY23 Q4
OEE, FHEO, PIH, Housing	Implement vulnerability assessments for multifamily properties, including a consideration of equity and the impact on relevant protected class groups	Technical Assistance	Reprioritize Existing Resources	FY22 Q4 – ongoing
PD&R	Assess feasibility of expanding existing HUD planning applications to include climate risk data	Assessment	None	FY22 Q1 – FY22 Q3
PD&R	Assess HUD's research and capacity-building needs related to climate risk of underrepresented communities for inclusion in HUD's 2022-25 Learning Agenda	Assessment	None	FY22 Q1 – FY22 Q2

1.2 Conduct Research on Climate Resilience

Implementing Offices: PD&R, FHEO

Description: HUD's Office of Policy Development and Research's research agenda will include new studies to assess the effectiveness of current building efficiency codes and recovery programs and to identify resilience best practices. This research will inform and encourage HUD policy makers, grantees, and stakeholders to adopt stricter building requirements, improve programs, and invest in climate resilience.

Office	Action	Implementation Method	Resource Implications	Timeline
PD&R	Assess HUD's research and capacity-building needs related to building efficiency and resiliency codes for inclusion in HUD's 2022-25 Learning Agenda	Research	None	FY22 Q3 – FY23 Q1
PD&R	Assess HUD's research and capacity-building needs related to buyouts and resettlement for inclusion in HUD's 2022-25 Learning Agenda	Research & Guidance	None	FY22 Q2 – FY22 Q4
PD&R	Conduct cost effectiveness research of CDBG-DR resilience funding and generate guidance on best practices, vulnerability assessments, and evaluative framework	Research & Guidance	None	FY23 Q1 - FY24 Q1
PD&R	Provide resources and expertise to the Advanced Research Projects Agency – Climate (ARPA-C) at the Department of Energy for research on housing, climate adaptation, and resilience.	Research, Coordination	Requested in FY22 Budget	FY22 - ongoing

Objective 2: Enhance Mortgage Financing

2.1 Reduce Climate-Related Financial Risk

Implementing Offices: PD&R, Housing, FHEO

Description: HUD mortgage financing programs, primarily its insurance programs, enable billions of dollars of capital to fund the purchase, refinance, construction and rehabilitation of single- and multifamily housing, assisted housing, and healthcare facilities around the country. Per the Executive Order on Climate-Related Financial Risk (EO 14030), HUD is collaborating with the Departments of Veterans Affairs and Agriculture to consider approaches to better integrate climate-related financial risk into underwriting standards, loan terms and conditions, and asset management and servicing procedures. HUD is also exploring market strategies to incentivize both energy and water efficiency and climate-resilient building practices.

Office	Action	Implementation Method	Resource Implications	Timeline
PD&R	Assess HUD's research and capacity-building needs related to economic threats of climate change to housing finance ecosystem for inclusion in HUD's 2022-25 Learning Agenda.	Assessment	None	FY22 Q3 – FY23 Q2
PD&R	Assess HUD's research and capacity-building needs related to benefits and fair housing implications of including climate risk in FHA underwriting for inclusion in HUD's 2022-25 Learning Agenda.	Assessment	None	FY22 Q1 – FY22 Q2
FHA	Identify and assess approaches to integrate climate-related financial risk into underwriting standards, loan terms and conditions, and asset management and servicing procedures.	Assessment	None	FY 22 Q2 – FY 23 Q4
FHA SF, OHP	Consider using reduced Mortgage Insurance Premiums to incentivize property owners to adopt higher building standards.	Assessment	None	FY 22 Q2 – FY23 Q4
FHA SF	Review and update the standards for Manufactured Housing to allow the use of stretch ratios for a Manufactured Home that is certified as ENERGY STAR.	Guidance	None	FY22 Q1
FHA SF	Review and update program standards and documentation requirements for underwriting, repairs, and escrow to make it easier for lenders and borrowers to	Assessment, Guidance, Rulemaking	None	FY22 Q4 – FY25 Q2

	understand and use the Single Family 203(k) Program for Energy Retrofits and Climate Mitigation.			
FHA SF	Assess the benefits and risks of introducing a new loan product, Resilience and Energy Assistance Loan (REAL) Title 1 Property Improvement Program, to provide low-cost financing for consumers making climate hazard mitigation and energy efficiency improvements.	Assessment	Reprioritize Existing Resources	FY22 Q2 - FY 25 Q1
FHA MF	Assess benefits and risks of expanding the Green MIP Program to encourage climate resilience actions. Expansion could include incentives for climate resilience actions such as creating defensible space in fire-prone areas; building or retrofitting to withstand extreme weather; or mitigating for flood risk.	Assessment	Reprioritize Existing Resources	FY22 Q4 - FY 23 Q4
Ginnie Mae	As part of an overall environmental, social, and governance (ESG) strategy, enhance (i) analytical capabilities for environmental assessments; (ii) securities disclosures that create value for investors utilizing ESG metrics, and (iii) pooling, issuance and reporting flexibilities to support FHA, VA, USDA and PIH program innovations having ESG aspects.	IT Solution	Reprioritize Existing Resources	FY22 Q2 – FY23 Q4
Ginnie Mae	Until such time that the new platform goes into production, Ginnie Mae will explore how current capabilities can be leveraged in current form, or with some level of modification, to support shorter term goals of supporting environmental justice initiatives that may be pursued by FHA, VA, USDA and PIH. Securities disclosures are routinely enhanced to meet the ever-evolving demands of MBS investors and Ginnie Mae will explore opportunities to target increased ESG data disclosure with a goal of generating greater investor demand for securities supporting ESG objectives.	Assessment	None	FY22 Q1 – FY23 Q4

Objective 3. Strengthen Disaster Recovery and Resilience

3.1 Update CDBG-DR Grant Requirements to Promote Resilience and Environmental Justice

Implementing Offices: CPD

Description: With over $67 billion in active grants, CDBG-DR and CDBG-MIT funds represent the Federal Government's largest vehicle for supporting resilience and addressing environmental injustice in some of the nation's most vulnerable areas. 2020 was the sixth consecutive year in which there were ten or more weather and climate disaster events impacting the United States that caused more than a billion dollars in damage. The sheer scale of these events illustrates the importance of HUD's disaster recovery work. A more holistic integration of resilience and environmental justice principles into the CDBG-DR program will ensure that communities recovering from disasters are more resilient in the future. A commitment to environmental justice means ensuring equal protection from environmental and health hazards and providing all people a meaningful opportunity to participate in the decision-making process to achieve a healthy environment.

Office	Action	Implementation Method	Resource Implications	Timeline
CPD	Finalize the CDBG-DR Universal Notice to describe policies and requirements that can foster resilient projects and promote environmental justice. The Universal Notice describes waivers and alternative requirements that can be applied to future CDBG-DR grants to incorporate mitigation measures, impose sustainable building construction standards, compliance with accessibility requirements, and prioritize underserved communities	Guidance	None	FY22 Q1 – FY22 Q2

3.2 Enable a Sustainable Recovery for Puerto Rico and the U.S. Virgin Islands

Implementing Office: CPD

Description: Collaborate with Puerto Rico and the U.S. Virgin Islands (USVI) to support targeted resilience plans and innovative energy solutions for their sustainable long-term recovery.

Office	Action	Implementation Method	Resource Implications	Timeline
OEE	Work with the DOE, Puerto Rico Field Office and Public Housing Authority (PHA) to train HUD customers on PowerOasis solar plus battery storage pilot	Coordination, Technical Assistance, Assessment	None	FY22 Q2 – FY23 Q1

DRSI	Collaborate with the grantees on their work with Federal partners (DOE, DOI, FEMA) to implement the required actions in the Federal Register Notice providing $2 billion for resilient CDBG-DR Electrical Power Systems for Puerto Rico and USVI	Coordination, Guidance	None	FY22 Q1 – FY22 Q3
DRSI	Provide technical assistance to Puerto Rico and USVI to deliver the clean energy and green building programs outlined in their CDBG-DR and CDBG-MIT Action Plans	Coordination, Technical Assistance	None	FY22 Q1

3.3 Strengthen Flood Resilience Standards

Implementing Offices: CPD

Description: Implement EO 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input, by implementing the Federal Flood Risk Management Standard (FFRMS) and updating HUD's floodplain management regulations in 24 CFR part 55 (EO 13690 was revoked in 2017 by EO 13807, but was recently reinstated through EO 14030, Climate-Related Financial Risk). This rulemaking will focus on increasing flood resilience, clarifying processes and standards, promoting environmental justice concerns in floodplain decision-making, improving fiscal security, and minimizing adverse impacts to the beneficial functions of floodplains and wetlands.

Office	Action	Implementation Method	Resource Implications	Timeline
OEE	Update floodplain management and wetlands protection regulations in 24 CFR part 55 to implement FFRMS and otherwise increase flood resilience standards in HUD projects.	Rulemaking	None[10]	In Progress - FY23 Q1
Departmentwide	Develop a training series for HUD grantees and update HUD's online tools to reflect updated policy	Technical Assistance, IT Solution	Reprioritize Existing Resources	FY22 Q4 - FY23 Q2

Object 4. Expand Capacity Building

4.1 Provide Climate Resilience and Environmental Justice Training

Implementing Offices: PD&R, PIH, CPD, FHEO

[10] Although there may be resource implications for implementing any rulemaking, the full resource implications cannot be known until the rule has been drafted. Therefore, the resource implications for rulemaking apply only to the resources required to draft and publish the rule.

Description: Before HUD can advance its work on climate adaptation, mitigation, and environmental justice, it will be necessary for HUD staff, grantees, and stakeholders to have a baseline understanding of climate resilience and environmental justice. HUD will begin to create spaces, both formal and informal, for mutual learning around climate change and its impacts. This learning culture will also focus on environmental justice issues impacting low-income, communities of color, individuals with disabilities, and other protected classes.

Office	Action	Implementation Method	Resource Implications	Timeline
Department-wide	Facilitate trainings for grantees and partners that includes climate adaptation and environmental justice, incorporating climate risk in their areas	Technical Assistance	None	FY22 Q4, ongoing
PIH, CPD, FHEO	Conduct trainings and provide information to PHAs on adaptation and mitigation activities	Technical Assistance	None	FY22 Q4, ongoing

4.2 Create Community Resilience and Sustainability Resources

Implementing Office(s): PD&R, CPD, FHEO

Description: Design the next generation of best practices, case studies, and tools developed from HUD research studies and collaboration with other federal agencies and HUD stakeholders. These resources will be dynamic, user-friendly, and inclusive.

Office	Action	Implementation Method	Resource Implications	Timeline
PD&R	Generate case studies and guidance on resilience planning, disaster recovery, strategic funding strategies, and land use planning for HUD customers	Guidance, Technical Assistance	None	FY22 Q1, ongoing
PD&R, FHEO	Collaborate with Home Innovation Research Labs to create a series of residential resilience guidelines for homebuilders and developers. Guidelines will incorporate the latest resilience construction techniques and best practices presented in a practical, user-friendly format	Coordination, Guidance	None	FY21 Q1 – FY22 Q3
CPD	Develop a tool and webinar series for HUD customers on the need to incorporate resilience measures and stronger building codes when rebuilding after a disaster	Technical Assistance	None	FY22 Q1 – FY22 Q4
CPD	Conduct grant “launch” and program implementation technical assistance	Technical Assistance	None	FY22 Q2, ongoing

	to CDBG-MIT grantees who are working to implement hazard mitigation projects			
CPD	Work with HUD CDBG-DR and CDBG grantees to improve resilience decision making using science-based tools	Technical Assistance	None	FY 2 Q2, ongoing
CPD, FHEO	Organize and expand online library of resources, trainings, and toolkits for climate resilience and environmental justice. Resources will include a range of on-demand webinars and trainings, as well as toolkits, implementation guides, and best practices	Technical Assistance	Reprioritize Existing Resources	FY22 Q2, ongoing
OLHCHH	Collaborate with the Centers for Disease Control and Prevention on its Building Resilience Against Climate Effects (BRACE) grant program	Guidance	None	FY22 Q1, ongoing

Appendix A: Abbreviations and Acronyms

AFFH	Affirmatively Furthering Fair Housing
AOS	Add-On Subsidy
ARPA-C	Advanced Research Projects Agency – Climate
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
BBC	Better Buildings Challenge
Btus	British thermal units
CDBG	Community Development Block Grant
CDBG-DR	Community Development Block Grant Disaster Recovery program
CDBG-MIT	Community Development Block Grant Mitigation program
CEQ	White House Council on Environmental Quality
CFR	Code of Federal Regulations
CNA	Capital Needs Assessment
CPD	Office of Community Planning and Development
DOE	U.S. Department of Energy
DOI	U.S. Department of Interior
DRSI	Disaster Recovery and Special Issues Division
EEH	Energy Efficient Home
EJ	Environmental Justice
EO	Executive Order
EPA	Environmental Protection Agency
EPC	Energy Performance Contract
ESG	Environmental, Social, and Governance
FEMA	Federal Emergency Management Agency
FFRMS	Federal Flood Risk Management Standard
FHA MF	Federal Housing Administration, Multifamily Housing
FHA SF	Federal Housing Administration, Single-Family Housing
FHEO	Office of Fair Housing and Equal Opportunity
FRB	Frozen Rolling Base
FY	Fiscal Year
GAO	Government Accountability Office
GHG	Greenhouse Gas
GI/SR	General Insurance and Special Risk
HHS	U.S. Department of Health and Human Services
HUD	U.S. Department of Housing and Urban Development
IECC	International Energy Conservation Code
IT	Information Technology
LiMWA	Limit of Moderate Wave Action
LISC	Local Initiatives Support Corporation

MIP	Mortgage Insurance Premium
MMI	Mutual Mortgage Insurance
MW	Megawatt
NEPA	National Environmental Policy Act
NIST	National Institute of Standards and Technology
NPL	National Priorities List
OCIO	Office of the Chief Information Officer
OEE	CPD Office of Environment and Energy
OHP	Housing Office of Healthcare Programs
OLHCHH	Office of Lead Hazard Control and Healthy Homes
OMHP	Housing Office of Manufactured Housing Programs
ONAP	Office of Native American Programs
PD&R	Office of Policy Development and Research
PHA	Public Housing Authority
PIH	Office of Public and Indian Housing
Q	Quarter
RAD	Rental Assistance Demonstration
REAL	Resilience and Energy Assistance Loan
RPU	Resident Paid Utility
SOVI	Social Vulnerability Index
TA	Technical Assistance
USVI	U.S. Virgin Islands

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

CLIMATE ACTION PLAN

NOVEMBER 2021

U.S. Department of Housing and Urban Development

Climate Action Plan

INTRODUCTION

Introduction

Background

Climate change is a crisis impacting communities across the United States. From severe storms and flooding, to wildfires, drought, and extreme heat or cold, Americans are already feeling its effects. As the Federal agency dedicated to creating strong, sustainable, inclusive communities and quality affordable homes, HUD is on the front lines of the nation's efforts to increase resilience to climate impacts.

HUD also plays an essential role in mitigating climate change by reducing greenhouse gas emissions, due to its portfolio of approximately 4.5 million public and assisted housing units[1] and given its role in the development and preservation of affordable housing. HUD's spending on utilities in public and assisted housing is an estimated $6.9 billion annually and, according to an internal analysis, consumes as much as 14 percent of the agency's total budget and produces an estimated 19.1 million metric tons of carbon emissions each year. HUD is committed to improving the efficiency of public and assisted housing to not only lower carbon emissions, but also to increase housing affordability and quality by allowing more funds to be spent on the provision of housing instead of on utilities.

HUD has significant influence over how the nation's households and communities will respond to the climate crisis. In addition to public and assisted housing, HUD provides mortgage financing for both single-family home buyers and multifamily rental housing. HUD's FHA-insured portfolio consists of 76 million single family insured loans, 11,213 multifamily insured loans (1,405,260 units), 3,825 residential healthcare facilities, and 88 hospitals with $1.2 trillion, $111 billion, $33 billion, and $6.3 billion respectively of mortgage balances (as of June 30, 2021).

Further, the Department invests billions of dollars every year in housing, infrastructure, and services in neighborhoods and cities across the U.S. through its ever-increasing role in disaster recovery and risk mitigation. This investment includes over $89.8 billion appropriated since 1993 by Congress for Community Development Block Grant-Disaster Recovery (CDBG-DR) grants, $15.9 billion of which is allocated for CDBG-Mitigation (CDBG-MIT) for States and local governments that experienced Presidentially-declared disasters in 2015 – 2018 (as of November 2021). These grants have driven innovation and elevated the national conversation on resilient recovery through such initiatives as Rebuild by Design and the National Disaster Resilience Competition.

The most recent National Climate Assessment from the U.S. Global Change Research Program (USGCRP)[2] underscores how critical HUD's climate change mitigation and adaptation work is to achieving climate justice. It shows that climate change creates new risks and exacerbates existing vulnerabilities in communities across the U.S., presenting growing challenges to human health and safety, quality of life, and economic prosperity. Though these challenges are universal, our nation's low-income families and communities of color are disproportionately

[1] For the purposes of this plan HUD public and assisted housing consists of Public Housing, multifamily assisted housing and Housing Choice Vouchers.
[2] https://nca2018.globalchange.gov/

impacted by climate change due to historic disinvestment and a longstanding pattern of residential segregation. For low-income households and communities of color, climate change exacerbates existing vulnerabilities in their communities, such as aging infrastructure and the siting of toxic waste facilities.

Responding to this crisis is core to the Department's mission, which is why HUD recently established an internal Climate and Environmental Justice Council with representation at the Assistant Secretary level as well as a staff-level Working Group. HUD's Senior Advisor for Climate Change will lead the Council with support from the Office of Environment and Energy. The Climate and Environmental Justice Council will manage the implementation and monitoring of the climate and environmental justice priorities detailed in this plan. This Council is the main body responsible for the long-term integration of climate and environmental justice into HUD's programs and operations.

Policy Statement

One of President Biden's first actions in office was Executive Order (EO) 14008, *Tackling the Climate Crisis at Home and Abroad*. It lays out a broad vision for how the Federal government can address climate change while creating economic opportunity. The Department supports the President's message that our nation has limited time to act to avoid the most catastrophic impacts of this crisis and seize the opportunity that tackling climate change presents. HUD will play a critical role in implementing this vision.

It is the policy of the Department to organize and deploy the full capacity of its offices to combat the climate crisis and implement a department-wide approach that reduces greenhouse gas emissions; increases resilience to the impacts of climate change; protects public health; delivers environmental justice; and spurs well-paying union jobs and economic growth. The Department's policy is to do so in a way that delivers on the President's commitment to environmental justice and promoting racial equity, consistent with Executive Order 13985, which requires that HUD allocate resources in a manner that addresses the historic failure of the Federal government to invest sufficiently, justly, and equally in underserved communities, particularly communities of color. HUD is committed to taking actions that address the intersection of these two policy directives.

Indeed, the Department has already taken significant steps to address climate threats and environmental injustice. HUD has adapted its programs to help communities both prepare for and respond to the effects of climate change and will continue to take comprehensive action to advance this Administration's priorities on climate adaptation and resilience, decarbonization, and environmental justice. Furthermore, HUD will help lead the Federal government's response to this unprecedented challenge consistent with the Department's unique and historic role in supporting underserved communities, investing in housing across the country, and guiding communities through post disaster recovery and rebuilding.

HUD is recommitting to tackling the climate crisis through the development of this ambitious Climate Action Plan. This plan will guide the integration of climate resilience and environmental justice into HUD's core programs and policies. The actions outlined in this plan will help communities across the nation build more resilient infrastructure, promote responsible utility consumption, create good-paying jobs, and address environmental injustices.

Moreover, HUD has affirmed its dedication to this plan's actions by centering them in the Department's current budget priorities, which highlight HUD's intent to promote climate resilience, environmental justice, and energy efficiency within its portfolio and across the housing sector. The Department's fiscal year 2022 budget request included $800 million in proposed funding to reduce carbon pollution, increase resilience to climate impacts, and address environmental injustice. As part of the Administration's whole-of-government approach to the climate crisis, the budget reflects HUD's commitment to expanding energy efficiency and climate resiliency in public and assisted housing. HUD's ability to further its commitment hinges upon the support of Congress through appropriation and authorization.

HUD is not alone in this effort; the Department will work with Federal partners, stakeholders, grantees, and members of the public to develop innovative solutions that equitably prepare for and adapt to climate change. The Administration has recognized the profound climate crisis facing the U.S. and the world – yet in this crisis, there is opportunity to build back better. Tackling climate change is an opportunity to improve the lives of individuals and communities across the nation through increased resilience and equity.

Plan Organization

In response to the policy set forth in Executive Order 14008, this Plan is organized around three overarching Climate Action Goals for programs and policies under HUD's purview:

Goal 1: Increase Climate Resilience

Goal 2: Reduce Greenhouse Gas Emissions

Goal 3: Pursue Environmental Justice

Each goal contains a number of subgoals, organized into topic areas. Each subgoal contains a table with the specific actions that HUD will undertake to achieve the primary goal. Each action will serve as a metric that, when accomplished, will move HUD closer to accomplishing its primary goal. For each of these actions, the plan identifies the method for implementing such action (e.g., rulemaking, technical assistance, coordination), the lead office(s) responsible for implementation, the implementation timeline, and the resource needs. Given that each action contains a subset of actions, HUD has detailed the common approach used for each implementation method. The implementation method summaries below give an overview of the underlying work that will be required for each type of action.

To emphasize HUD's commitment to addressing climate change, HUD will be integrating this Climate Action Plan into its agency Strategic Plan. Integrating the actions from this plan into the Strategic Plan not only underscores the importance of this work to HUD achieving its mission, but also provides a platform for HUD to track and report on the progress of achieving its climate goals.

HUD's Climate Action Plan has been developed in close consultation with the Office of Management and Budget. Under OMB's guidance, HUD has chosen a format for its plan for climate action that better fits the nature of HUD's programs and authorities and reflects the fact that HUD does not own buildings or infrastructure.

Additionally, HUD determined it was important to incorporate Environmental Justice into this plan because of the close link between climate change and issues of environmental justice.

Placing environmental justice actions in the Department's Climate Action Plan allows for an integrated response to interlinked climate and environmental justice challenges and recognizes advancing environmental justice as core to HUD's mission.

Implementation methods: For each action, HUD has identified seven distinct implementation methods, each with specific processes and timelines according to agency procedure. These are further outlined below.

1. **Research**. This includes studies of problems and issues within HUD's purview, evaluations of HUD programs, and identification and evaluation of new technologies and approaches to solving problems. Studies and reports include housing and community development matters such as climate-related research on high-performance buildings, energy, and the environment. HUD's Office of Policy Development and Research (PD&R) accepts independent proposals, carries out research in-house, and contracts with external researchers to fulfill HUD's research agenda. Research projects typically take several years to complete.

   HUD notes the importance of PD&R research studies to inform Department climate policy and program implementation. PD&R is committed to exploring new studies and research opportunities that will enable HUD to assess the success of the actions identified in this plan as well as expand climate and environmental justice efforts in the future depending on available resources.

2. **Assessment**. These are short-term reviews or evaluations of specific topics that need to be addressed to implement a policy or program. Assessments are conducted in response to staff or stakeholder concerns or to determine the impact of potential policy or program changes. Assessments can take between 6 months and 2 years.

3. **Coordination**. This involves cross-program and/or interagency collaboration on initiatives or policies in which the organizations share objectives or concerns. While individual programs may have specific regulations or requirements, some objectives can be met by maximizing coordination across programs and partnering with other Federal agencies to harmonize climate-related goals and policies. Agencies can formalize coordination through Memorandums of Understanding and through participation on Federal task forces and working groups.

4. **Rulemaking**. Where program regulations require updating or modification, or when required by Congress to implement a statute, HUD implements a rulemaking process following procedures outlined in 24 CFR part 10. Rulemaking involves multiple rounds of Federal Register publications, Paperwork Reduction Act compliance, stakeholder consultation, legal and program analysis, and approval from the Office of Management and Budget. From beginning to end, rulemaking processes usually takes at least 24 months. While rulemaking itself may not require additional resources, the actions and responsibilities that stem from the rulemaking may require additional funding to implement.

5. **Information Technology**. HUD develops IT systems to improve both data collection and program monitoring or reporting. This plan identifies several IT updates needed to improve tracking, monitoring or assessing energy and climate related performance of HUD's inventory of public and assisted housing. IT solutions often take 2 to 4 years to implement.

6. **Guidance**. Guidance as referenced in this report may be published through a program notice, Mortgagee Letter, or guides or handbooks posted on HUD Exchange or www.hud.gov. Depending on the implementation requirements under statute and regulations, new guidance is based on internal program office deliberation, so it can be drafted and released in a shorter time period (e.g., 2 to 4 months).

7. **Technical Assistance**. Technical Assistance (TA) is the transfer of skills and knowledge to HUD customers that may need additional capacity. HUD TA is guidance which enables HUD's customers to overcome a lack of specific skills or knowledge of an associated HUD program, which results in the successful performance of and compliance with that program. TA can take many forms and can be provided directly by HUD staff or delivered by HUD TA providers through the HUD-funded TA program. HUD funds TA and capacity building activities for HUD customers through the Departmentwide Community Compass Technical Assistance program. Outside of the standard Departmentwide two-year, Congressionally funded Community Compass program, Congress often provides supplemental funding for TA tied to specific program appropriations (e.g., HOME-American Rescue Plan, CDBG-DR, CDBG-CV).

Resource Implications: This column in each table indicates the nature of the resources needed to implement each proposed action—whether offices can undertake proposed actions using existing resources, are anticipating using funds requested in President's Budgets, or will need to reprioritize existing resources.

1. **None.** Many of the actions identified in this plan utilize existing HUD authority and staff in the implementation and therefore do not require any additional resources.

2. **Budget Request.** The Department has existing resources and authorities that can be deployed to increase the efficiency and resilience of HUD-funded new construction and substantial rehabilitation; however, there are meaningful gaps in the Departments existing resources that if filled, could result in more influential climate change action. Recognizing these gaps, the Department was the first ever Federal agency to have a climate-specific section in its budget request. If appropriated, these new resources would be a critical component of this plan.

3. **Reprioritize Existing Resources.** For HUD funded TA, the reprioritization of existing resources may require an update to HUD TA Plans from previous years, depending on the nature of the priority adjustment and the source year of the funding identified in each case. The program office will work with the Technical Assistance Division to assess any adjustments to approved plans and ensure the proper process is followed prior to assigning TA. For forthcoming actions, these will be reflected in upcoming HUD TA Plans and Notice of Funding Opportunities (NOFO), not yet issued. For other aspects of

HUD programs and TA provided directly by HUD staff, reprioritizing existing resources can occur at the program or office level through leadership approval, temporary staff rotations, and reprogramming older or expiring funds to new priorities.

Timeline: The timeline for each action listed in this Plan is defined by the fiscal year (FY) and quarter (Q) in which the action is expected to be initiated and completed.[3]

[3] In 2023, a technical update to the 2021 Climate Action Plan was completed to correct grammatical inconsistencies or errors, update funding resources, and address external changes to actions.

GOAL 1:
Increase Climate Resilience

01

Goal 1: Increase Climate Resilience

Affordable housing (including but not limited to public and assisted housing) is increasingly at risk from both extreme weather events and sea-level rise. Recent analysis and mapping by Climate Central projects that the number of affordable housing units at risk from flooding in coastal areas will triple by 2050.[4] Coastal communities are especially at risk – a report from the Denali Commission found that 144 Native Alaskan Villages (43 percent of all Alaskan communities) experienced infrastructure damage from erosion, flooding, and permafrost thaw.[5]

A specific threat to HUD programs is the potential vulnerability of the Federal Housing Administration (FHA) Mutual Mortgage Insurance (MMI) and General Insurance and Special Risk (GI/SR) Funds to increased defaults and loss severities due to physical damage, disruptions in borrowers' ability to repay, and declining property values in vulnerable communities. Johns Hopkins researchers warn of a "potential threat to the stability of financial institutions" as global warming leads to more frequent and more severe disasters, forcing more HUD-insured and other loans to go into default as homeowners cannot or will not make mortgage payments.[6]

Many HUD programs help communities recover from and build resilience to climate hazards and natural disasters. HUD's disaster recovery portfolio alone accounts for the Federal government's single largest investment in recovery and resilience in low-to-moderate-income communities. While HUD already plays a major role in this space, the Department must expand its climate resilience work to increase resources for grantees and stakeholders and make it easier for them to implement climate resilient activities. HUD can accomplish its goal of increasing the resilience of communities nationwide through improving climate resources and continuing investment in areas most vulnerable to the impacts of climate threats.

Scale: Nationwide.

Risks and opportunities: Low-income families and communities of color are disproportionately impacted by climate change.[7] Without targeted intervention, this climate injustice will continue.

Accomplishments to Date

Disaster recovery and mitigation. HUD works with communities to respond to or prepare for natural disasters through two primary funding sources: CDBG-DR and CDBG-MIT. Since 1993, Congress has appropriated a total of $89.8 billion for CDBG-DR. As of April 2021, this encompasses 137 grants awarded to 64 grantees (34 states and territories and 30 local governments). Active CDBG-DR and CDBG-MIT grants total over $67 billion. This includes

---

[4] https://www.climatecentral.org/

[5] Denali Commission, *Statewide Threat Assessment: Identification of Threats from Erosion, Flooding, and Thawing Permafrost in Remote Alaska Communities*, November 2019. https://www.denali.gov/wp-content/uploads/2019/11/Statewide-Threat-Assessment-Final-Report-20-November-2019.pdf

[6] Amine Ouazad, Matthew E. Kahn, *Mortgage Finance and Climate Change: Securitization Dynamics in the Aftermath of Natural Disasters*, http://www.ouazad.com/resources/paper_kahn_ouazad.pdf. January 2021. See also New York Times September 27, 2019, https://www.nytimes.com/2019/09/27/climate/mortgage-climate-risk.html

[7] https://nca2018.globalchange.gov/

funding to support resilient rebuilding after Superstorm Sandy in New York, New Jersey, and Connecticut; Hurricane Katrina on the Gulf Coast; and, more recently, Hurricane Harvey in Texas, Hurricanes Irma and Maria in Florida, Puerto Rico, and the U.S. Virgin Islands; and wildfires in California – as well as many other disasters.

Since 2019, HUD has allocated more than $16 billion of CDBG-MIT funds to 22 states and local governments for activities that lessen the impact of future disasters. Fifty percent of these grant funds must benefit low- and moderate-income persons. The State of Louisiana, for example, will use its $1.2 billion CDBG-MIT allocation to implement the Louisiana Watershed Initiative, to "fundamentally change Louisiana's approach to statewide flood mitigation activities" (https://www.watershed.la.gov/action-plan). CDBG-MIT is a unique and significant opportunity for grant recipients to use this assistance in areas impacted by recent disasters to carry out strategic and high-impact activities that mitigate disaster risk and reduce future losses, especially for low- and moderate-income families and households.

CDBG-DR grants are also a significant source of Federal support for building resilience, particularly in low- and moderate-income areas. HUD has long required CDBG-DR grantees to implement certain climate-related measures as part of recovery (e.g., elevation of structures in the flood plain, green building standards) and many CDBG-DR grantees have implemented additional forward-looking investments in resilience. The State of New Jersey, for example, has used $200 million of funding from its Hurricane Sandy CDBG-DR grant to increase the energy resilience of many of its hospitals, allowing for continued operations in the event of future power disruptions.

Additionally, HUD obligated nearly $1 billion of funding through the National Disaster Resilience competition, funding 13 innovative resilience projects across the country. This includes initiatives in Virginia to foster the development of businesses focused on resilience[8] and to increase California's resilience to wildfires.[9] HUD has also obligated $930 million for regional flood mitigation projects in New York, New Jersey, and Connecticut through Rebuild by Design.[10]

While CDBG-DR and CDBG-MIT grants are not permanently authorized, after more than 20 years of supplemental appropriations to fund the awards, CDBG-DR is one of the largest sources of funding for recovery and resilience building, and the largest source that primarily benefits persons with low and moderate income.

Flood resilience**.** HUD has implemented program-specific policies to increase climate resilience, particularly related to flooding. For example, residential new construction and substantial improvements funded with CDBG-DR assistance are now required to elevate two feet above base flood elevation. Similarly, the Federal Housing Administration (FHA) Office of Multifamily Housing (MF) recently updated its standards to require new construction projects in 100-year floodplains to elevate two feet above base flood elevation. FHA MF has extended the same limitations that apply in Coastal High Hazard Areas (V Zones) to all areas within the Limit of

[8] https://riseresilience.org/
[9] https://www.hcd.ca.gov/community-development/disaster-recovery-programs/ndrc.shtml
[10] http://www.rebuildbydesign.org/our-work/sandy-projects

Moderate Wave Action (LiMWA) for new construction and substantial rehabilitation, with lesser but still significant limitations on existing properties. HUD will continue this effort by assessing and initiating a modernization of its floodplain management regulations in 24 CFR part 55, potentially extending increased flood protection across all HUD programs.

Community Development Block Grants (CDBG). CDBG is both a flexible and widespread program, reaching over 1,200 local governments in all states and territories. The program's scope and promotion of community-specific solutions make CDBG a powerful tool for climate resilience. As a condition for funding, CDBG grantees are required to submit a Consolidated Plan every three to five years. In 2016, HUD promulgated the rule *Modernizing HUD's Consolidated Planning Process to Narrow the Digital Divide and Increase Resilience to Natural Hazards.* [11] This rule requires jurisdictions to incorporate resilience to natural hazard risks and a discussion of how climate change will increase those risks into their Consolidated Plan. The rule also requires CDBG grantees to address the impacts of climate change on low- and moderate-income residents. HUD plans to create additional resources and guidance around this rule to help grantees better incorporate climate change adaptation into their regular planning process.

HUD Climate Communities Initiative. HUD, in partnership with local leaders, is announcing a suite of resources, support, and tools to help cities respond to equitably the climate crisis. This includes the HUD Community Resilience Toolkit, a user-friendly guide to help Community Planning and Development (CPD) grant recipients learn how current and future natural hazard risks may impact their community and how to reduce said risks, as well as implementation models, peer-to-peer learning opportunities, stakeholder engagement with underserved communities, and direct support to a cohort of climate cities. With the suite of flexible block grant funding that local governments already receive, this concerted effort will help cities focus climate action on the needs of the most vulnerable and further climate justice.

Indian Housing Community Development Block Grant (ICDBG). The ICDBG Program provides eligible grantees with direct grants for use in developing Indian and Alaska Native communities, including the provision of decent housing, a suitable living environment, and economic opportunities, primarily for low- and moderate-income persons. The ICDBG provides single purpose grants which are awarded on a competition basis as well as imminent threat grants which are awarded first come, first served to lessen or eliminate problems which pose an imminent threat to the health and safety of Tribal residents.

Climate Risk Data

1.1 Collect Data and Map Risk

Implementing offices: Housing, PD&R, CPD, FHEO

Description: Collect complete and accurate building-level data across HUD programs to map existing climate risks and environmental justice concerns. Comprehensive and modernized data collection can help inform how to best address climate impacts to protect HUD-assisted assets and their occupants, with a focus on underserved communities, tribal communities, communities of color, and individuals with disabilities. Accurate and easily available data will enable HUD,

[11] 81 FR 90997 (Dec. 16, 2016).

grantees, borrowers, and the public to conduct vulnerability assessments and develop resilience plans addressing climate impacts.

Office	Action	Implementation Method	Resource Implications	Timeline
FHA MF	Review current building-level data to ensure accuracy and facilitate mapping of the portfolio's climate risk	Assessment	None	FY22 Q3 – FY23 Q3
Housing	Procure data sources to enable modeling for climate risks	IT Solution	Reprioritize Existing Resources	FY22 Q3 – FY23 Q4
FHA SF	Consider collecting additional data elements and developing policy, in both underwriting and servicing, as conclusions from the study assessing climate-related financial risk in the FHA portfolio become available	Assessment	None	FY22 Q2 – FY23 Q4
OEE, FHEO, PIH, Housing	Implement vulnerability assessments for multifamily properties, including a consideration of equity and the impact on relevant protected class groups	Technical Assistance	Reprioritize Existing Resources	FY22 Q4 – ongoing
PD&R	Assess feasibility of expanding existing HUD planning applications to include climate risk data	Assessment	None	FY22 Q1 – FY22 Q3
PD&R	Assess HUD's research and capacity-building needs related to climate risk of underrepresented communities for inclusion in HUD's 2022-25 Learning Agenda	Assessment	None	FY22 Q1 – FY22 Q2

1.2 Conduct Research on Climate Resilience

Implementing Offices: PD&R, FHEO

Description: HUD's Office of Policy Development and Research's research agenda will include new studies to assess the effectiveness of current building efficiency codes and recovery programs and to identify resilience best practices. This research will inform and encourage HUD policy makers, grantees, and stakeholders to adopt stricter building requirements, improve programs, and invest in climate resilience.

Office	Action	Implementation Method	Resource Implications	Timeline
PD&R	Assess HUD's research and capacity-building needs related to building efficiency and resiliency codes for inclusion in HUD's 2022-25 Learning Agenda	Assessment	None	FY22 Q3 – FY23 Q1

PD&R	Assess HUD's research and capacity-building needs related to buyouts and resettlement for inclusion in HUD's 2022-25 Learning Agenda	Research & Guidance	None	FY22 Q2 – FY22 Q4
PD&R	Conduct cost effectiveness research of CDBG-DR resilience funding and generate guidance on best practices, vulnerability assessments, and evaluative framework	Research & Guidance	None	FY23 Q1 - FY24 Q1

Mortgage Financing

1.3 Reduce Climate-Related Financial Risk

Implementing Offices: PD&R, Housing, FHEO

Description: HUD mortgage financing programs, primarily its insurance programs, enable billions of dollars of capital to fund the purchase, refinance, construction and rehabilitation of single- and multifamily housing, assisted housing, and healthcare facilities around the country. Per the Executive Order on Climate-Related Financial Risk (EO 14030), HUD is collaborating with the Departments of Veterans Affairs and Agriculture to consider approaches to better integrate climate-related financial risk into underwriting standards, loan terms and conditions, and asset management and servicing procedures. HUD is also exploring market strategies to incentivize both energy and water efficiency and climate-resilient building practices.

Office	Action	Implementation Method	Resource Implications	Timeline
PD&R	Assess HUD's research and capacity-building needs related to economic threats of climate change to housing finance ecosystem for inclusion in HUD's 2022-25 Learning Agenda	Assessment	None	FY22 Q3 – FY23 Q2
PD&R	Assess HUD's research and capacity-building needs related to benefits and fair housing implications of including climate risk in FHA underwriting for inclusion in HUD's 2022-25 Learning Agenda	Assessment	None	FY22 Q1 – FY22 Q2
FHA	Identify and assess approaches to integrate climate-related financial risk into underwriting standards, loan terms and conditions, and asset management and servicing procedures	Assessment	None	FY22 Q2 – FY23 Q4
FHA SF, OHP	Consider using reduced Mortgage Insurance Premiums to incentivize property owners to adopt higher building standards	Assessment	None	FY22 Q2 – FY23 Q4
FHA SF	Review and update the standards for Manufactured Housing to allow the use of	Guidance	None	FY22 Q1 – FY22 Q2

	stretch ratios for a Manufactured Home that is certified as ENERGY STAR			
FHA SF	Review and update program standards and documentation requirements for underwriting, repairs, and escrow to make it easier for lenders and borrowers to understand and use the Single Family 203(k) Program for Energy Retrofits and Climate Mitigation	Assessment, Guidance, Rulemaking	None	FY22 Q4 – FY25 Q2
FHA SF	Assess the benefits and risks of introducing a new loan product, Resilience and Energy Assistance Loan (REAL) Title 1 Property Improvement Program, to provide low-cost financing for consumers making climate hazard mitigation and energy efficiency improvements	Assessment	Reprioritize Existing Resources	FY22 Q2 – FY25 Q1
FHA MF	Assess benefits and risks of expanding the Green MIP Program to encourage climate resilience actions. Expansion could include incentives for climate resilience actions such as creating defensible space in fire-prone areas; building or retrofitting to withstand extreme weather; or mitigating for flood risk	Assessment	Reprioritize Existing Resources	FY22 Q4 – FY23 Q4
Ginnie Mae	As part of an overall environmental, social, and governance (ESG) strategy, enhance (i) analytical capabilities for environmental assessments; (ii) securities disclosures that create value for investors utilizing ESG metrics, and (iii) pooling, issuance and reporting flexibilities to support FHA, VA, USDA and PIH program innovations having ESG aspects	IT Solution	Reprioritize Existing Resources	FY22 Q2 – FY23 Q4
Ginnie Mae	Until such time that the new platform goes into production, Ginnie Mae will explore how current capabilities can be leveraged in current form, or with some level of modification, to support shorter term goals of supporting environmental justice initiatives that may be pursued by FHA, VA, USDA and PIH. Securities disclosures are routinely enhanced to meet the ever-evolving demands of MBS investors and Ginnie Mae will explore opportunities to target increased ESG data disclosure with a goal of generating greater investor demand for securities supporting ESG objectives.	Assessment	None	FY22 Q1 – FY23 Q4

Disaster Recovery and Resilience

1.4 Update CDBG-DR Grant Requirements to Promote Resilience and Environmental Justice

Implementing Offices: CPD

Description: With over $67 billion in active grants, CDBG-DR and CDBG-MIT funds are arguably the Federal Government's largest investment in resilience and addressing environmental injustice in some of the nation's most vulnerable areas. 2020 was the sixth consecutive year in which there were ten or more weather and climate disaster events impacting the United States that caused more than a billion dollars in damage. The sheer scale of these events illustrates the importance of HUD's disaster recovery work. A more holistic integration of resilience and environmental justice principles into the CDBG-DR program will ensure that communities recovering from disasters are more resilient in the future. A commitment to environmental justice means ensuring equal protection from environmental and health hazards and providing all people a meaningful opportunity to participate in the decision-making process to achieve a healthy environment.

Office	Action	Implementation Method	Resource Implications	Timeline
CPD	Finalize the CDBG-DR implementing notices to reflect climate priorities and describe policies and requirements that can foster resilient projects and promote environmental justice.	Guidance	None	FY22 Q1 – FY22 Q2

1.5 Enable a Sustainable Recovery for Puerto Rico and the U.S. Virgin Islands

Implementing Office: CPD

Description: Collaborate with Puerto Rico and the U.S. Virgin Islands (USVI) to support targeted resilience plans and innovative energy solutions for their sustainable long-term recovery.

Office	Action	Implementation Method	Resource Implications	Timeline
OEE	Work with the DOE, Puerto Rico Field Office and Public Housing Authority (PHA) to train HUD customers on PowerOasis solar plus battery storage pilot	Coordination, Technical Assistance, Assessment	None	FY22 Q2 – FY23 Q1
ODR	Collaborate with the grantees on their work with Federal partners (DOE, DOI, FEMA) to implement the required actions in the Federal Register Notice providing $2 billion for resilient CDBG-DR Electrical Power Systems for Puerto Rico and USVI	Coordination, Guidance	None	FY22 Q1 – Ongoing

ODR	Provide technical assistance to Puerto Rico and USVI to deliver the clean energy and green building programs outlined in their CDBG-DR and CDBG-MIT Action Plans	Coordination, Technical Assistance	None	Ongoing

1.6 Strengthen Flood Resilience Standards

Implementing Offices: CPD

Description: Implement EO 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input, by implementing the Federal Flood Risk Management Standard (FFRMS) and updating HUD's floodplain management regulations in 24 CFR part 55. (EO 13690 was revoked in 2017 by EO 13807, but was recently reinstated through EO 14030, Climate-Related Financial Risk.) This rulemaking will focus on increasing flood resilience, clarifying processes and standards, promoting environmental justice concerns in floodplain decision-making, improving fiscal security, and minimizing adverse impacts to the beneficial functions of floodplains and wetlands.

Office	Action	Implementation Method	Resource Implications	Timeline
OEE	Update floodplain management and wetlands protection regulations in 24 CFR part 55 to implement FFRMS and otherwise increase flood resilience standards in HUD projects	Rulemaking	None[12]	In Progress – FY23 Q4
Department-wide	Develop a training series for HUD grantees and update HUD's online tools to reflect updated policy	Technical Assistance, IT Solution	Reprioritize Existing Resources	FY23 Q3 – FY24 Q1

Capacity Building

1.7 Provide Climate Resilience and Environmental Justice Training

Implementing Offices: PD&R, PIH, CPD, FHEO, OGC

Description: Before HUD can advance its work on climate adaptation, mitigation, and environmental justice, it will be necessary for HUD staff, grantees, and stakeholders to have a baseline understanding of climate resilience and environmental justice. HUD will begin to create spaces, both formal and informal, for mutual learning around climate change and its impacts. This learning culture will also focus on environmental justice issues impacting low-income communities, communities of color, individuals with disabilities, and other protected classes.

[12] Although there may be resource implications for implementing any rulemaking, the full resource implications cannot be known until the rule has been drafted. Therefore, the resource implications for rulemaking apply only to the resources required to draft and publish the rule.

Office	Action	Implementation Method	Resource Implications	Timeline
Department-wide	Facilitate trainings for grantees and partners that includes climate adaptation and environmental justice, incorporating climate risk in their areas	Technical Assistance	None	FY22 Q4 – ongoing
PIH, CPD, FHEO	Conduct trainings and provide information to PHAs on adaptation and mitigation activities	Technical Assistance	None	FY22 Q4 – ongoing

1.8 Create Community Resilience and Sustainability Resources

Implementing Office(S): PD&R, CPD, FHEO, FPM

Description: Design the next generation of best practices, case studies, and tools developed from HUD research studies and collaboration with other Federal agencies and HUD stakeholders. These resources will be dynamic, user-friendly, and inclusive.

Office	Action	Implementation Method	Resource Implications	Timeline
PD&R	Generate case studies and guidance on resilience planning, disaster recovery, strategic funding strategies, and land use planning for HUD customers	Guidance, Technical Assistance	None	FY22 Q1 – ongoing
PD&R, FHEO	Collaborate with Home Innovation Research Labs to create a series of residential resilience guidelines for homebuilders and developers. Guidelines will incorporate the latest resilience construction techniques and best practices presented in a practical, user-friendly format	Coordination, Guidance	None	FY21 Q1 – FY22 Q3
CPD	Develop a tool and webinar series for HUD customers on the need to incorporate resilience measures and stronger building codes when rebuilding after a disaster	Technical Assistance	None	FY22 Q1 – FY22 Q4
CPD	Conduct grant “launch” and program implementation technical assistance to CDBG-MIT grantees who are working to implement hazard mitigation projects	Technical Assistance	None	FY22 Q2 – ongoing
CPD	Work with HUD CDBG-DR and CDBG grantees to improve resilience decision making using science-based tools	Technical Assistance	None	FY22 Q2 – ongoing

CPD, FPM	Collaborate with local climate city leaders to facilitate peer-to-peer learning opportunities, stakeholder engagement, and direct support as part of the HUD Climate Communities Initiative	Technical Assistance	Reprioritize Existing Resources	FY22 Q2 – FY24 Q1
CPD, FHEO	Organize and expand online library of resources, trainings, and toolkits for climate resilience and environmental justice. Resources will include a range of on-demand webinars and trainings, as well as toolkits, implementation guides, and best practices	Technical Assistance	Reprioritize Existing Resources	FY22 Q2 – ongoing
OLHCHH	Collaborate with the Centers for Disease Control and Prevention on its Building Resilience Against Climate Effects (BRACE) grant program	Guidance	None	FY22 Q1 – ongoing

GOAL 2:
Reduce Greenhouse Gas Emissions

02

Goal 2: Reduce Greenhouse Gas Emissions

HUD has a portfolio of approximately 4.5 million public and assisted housing units (including 2.2 million market-rate apartments occupied by Housing Choice Voucher households) and plays a key role in the development and preservation of affordable housing. HUD's annual outlays on utilities in this portfolio (primarily subsidizing energy and water costs for both property owners and tenants) account for as much as 14 percent of the agency's total budget and, according to an internal HUD analysis, consume enough on-site energy to produce an estimated 19.1 million metric tons of carbon emissions.[13] HUD spends at least $6.9 billion on utilities across the components of its portfolio: 36 percent or $2.49 billion in multifamily assisted housing; 30 percent or $2.02 billion in public housing; and 34 percent or $2.35 billion for Housing Choice Voucher utility allowances.[14]

In order to meet the Administration's goal of lowering economy-wide net greenhouse gas pollution by 50-52 percent by 2030[15], HUD must significantly improve the energy performance of HUD-assisted and FHA-insured assets while scaling up deployment of renewable energy. HUD will accomplish this goal by increasing investments in climate and energy retrofits of existing housing, incentivizing green building design in new construction, and proactively advancing climate mitigation and adaptation strategies across HUD programs. In addition to spurring significant reductions in carbon emissions associated with public and assisted housing, these actions will advance economic equity by reducing utility costs for HUD assisted and FHA insured stakeholders and creating green job opportunities in disadvantaged communities. HUD must also explore incentivizing or otherwise assisting communities to implement land use changes that allow for denser, transit-oriented housing development that reduces households' reliance on cars, by far the largest source of greenhouse gas emissions in the transportation sector, which is itself the greatest contributor to economy-wide emissions since surpassing the electricity generation sector in 2017.[16] These land-use changes will simultaneously help to address exclusionary policies that have resulted in racial disparities in wealth, public health, and economic opportunity (see Goal 3 below).[17]

Scale: Nationwide.

---

[13] Preliminary internal HUD estimate of carbon emissions, updated April 2022. Assisted multifamily and Housing Choice Voucher unit counts from *Characteristics of HUD-Assisted Renters and Their Units in 2017* (2020) and public housing unit counts from PIC database were used to estimate total BTU consumption for each subsidy type by Census Division, using per-household annual BTU consumption rates from the Residential Energy Consumption Survey (RECS).
[14] HUD 2019 Energy Report to Congress
[15] *FACT SHEET: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies,* April 2021, www.whitehouse.gov.
[16] *Data Highlights: Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2019*, Environmental Protection Agency.
[17] Cecilia Rouse, Jared Bernstein, Helen Knudsen, and Jeffery Zhang, "Exclusionary Zoning: Its Effect on Racial Discrimination in the Housing Market," June 17, 2021, www.whitehouse.gov.

Risks and opportunities: Up to 14 percent of HUD's budget is tied up in utility payments. Investing in substantially lowering the budget impact of utilities will lower the per-household subsidy for public and assisted housing, freeing up resources to allow HUD to serve more low-income families while improving health and comfort for existing residents. In addition, 67 percent of low-income households in the U.S. face a high energy burden. Black, Hispanic, Native American, and older adult households, as well as families residing in low-income multifamily housing, manufactured housing, and older buildings experience disproportionately high energy burdens.[18] Without targeted intervention, this climate injustice will continue.

Accomplishments to Date

HUD has a demonstrated history of promoting clean energy and energy efficiency investments through voluntary leadership and incentive programs, as well as mandatory above-code building standard requirements. Current and previous energy and water conservation initiatives demonstrate the potential for achieving energy savings and carbon reduction with the right mix of incentives, direct financial support, and/or technical assistance. This includes the following initiatives.

Renew300. Under the Obama Administration, HUD launched the Renew300 Initiative, aimed at significantly increasing the adoption of solar and renewable energy in federally assisted housing properties through on-site installations or community solar. A 300-Megawatt (MW) target was established to take advantage of millions of square feet of federally subsidized roofs with on-site or community generation potential. More than 80 affordable housing owners committed to the installation of 344 MW of renewable energy using technical assistance though Renew300.

The Green Mortgage Insurance Premium (Green MIP) provides a strong incentive for FHA multifamily borrowers to adopt one of several approved green building standards. A total of $38.2 billion in multifamily mortgage insurance for green projects has been endorsed for 1,413 developments with 281,000 units of multifamily housing since the Green MIP was introduced in 2016.[19] Green MIP borrowers must also commit to benchmarking utilities and achieve a minimum 75 Energy Star score in the Environmental Protection Agency's (EPA) Portfolio Manager.

Benchmarking. HUD's primary benchmarking initiative is the Multifamily Better Buildings Challenge (Multifamily BBC), part of the Department of Energy's (DOE) Better Buildings Challenge. Its goal is to support participating partners who have made a commitment to reducing their portfolio-wide energy consumption by at least 20 percent over 10 years through the use of better utility usage data collection and tracking methods. There are 92 Multifamily BBC partners, accounting for approximately 553,400 units of public and assisted housing (accounting for 23 percent of those programs' units). As of 2020, 70 percent of multifamily partners are successfully benchmarking, producing actionable data on over 400,000 multifamily units. As a result, the multifamily program has facilitated over 21 billion British thermal units (Btus) of documented energy savings, equating to about $54 of energy savings for every $1 in

[18] Ariel Drehobl, Lauren Ross, and Roxana Ayala, *How High Are Household Energy Cost Burdens? An Assessment of National and Metropolitan Energy Burden across the United States*, September 2020, American Council for an Energy-Efficient Economy.
[19] HUD Office of Multifamily Housing, Internal Green MIP Report, Through 2021, Quarter 2.

Community Compass cross-cutting Technical Assistance contributed by HUD from 2013 through 2019.

Energy Incentives in Public Housing Operating Fund. Energy incentives including Add-On Subsidy (AOS), Resident Paid Utility (RPU), and Frozen Rolling Base (FRB) are used to incentivize investment for energy and water efficiency measures and renewable energy through the Public Housing Energy Performance Contract (EPC).

Rental Assistance Demonstration (RAD). All RAD conversions undertake an environmental review to assess the site and proposed activities for hazards to the residents, including lead, asbestos, radon, or flooding. PHAs and owners undergoing RAD conversion are required to mitigate any environmental risks that arise from the environmental review. For rehab and new construction projects, PHAs complete a green Capital Needs Assessment (CNA) that provides a detailed analysis of energy-saving alternatives and other green building components and are required to utilize the most energy- and water-efficient options that are financially feasible. At minimum, PHAs or owners must use Energy Star®, WaterSense® or Federal Energy Management Program (FEMP)-designated products and appliances. HUD has also adopted innovative program provisions to ensure that owners have incentives to undertake cost-effective energy and water efficient improvements, regardless of whether utilities are paid by the owner or by the tenant. All rehab projects are strongly encouraged to use building components that improve air quality and/or reduce environmental impact if doing so would incur little or no cost premium. Public Housing Projects converting with any new construction are encouraged to meet or exceed the requirements for Energy Star for New Homes or Energy Star for Multifamily High-Rise buildings and to use industry-recognized green building certifications such as the US Green Building Council's LEED Rating System, Enterprise Green Communities Criteria, the National Green Building Standard, Green Globes, GreenPoint Rating, EarthCraft, Earth Advantage, Passive House, or Living Buildings. In addition, HUD has required above-code building standards in the Capital Fund Program, Choice Neighborhoods Program, the Section 202 Supportive Housing for the Elderly program for new construction, and recent CDBG-DR grants.

Benchmarking and Data Collection

In order to achieve significant reductions in greenhouse gas pollution, HUD must be able to measure the performance of its portfolio, prioritize investments in energy and water conservation, and track savings over time. To do this, HUD will need to collect and analyze comprehensive data on utility consumption and expenditures as well as building characteristics and investments in energy efficiency and renewable energy. OEE will provide cross-agency coordination to ensure alignment between program office actions and the enterprise-wide data collection and analysis that are required to meet HUD's greenhouse gas reduction goals.

2.1 Assess Current Data Collections

Implementing Offices: PIH, Housing, PD&R, CPD

Description: Assess current data collections and identify alternative data sources where necessary to improve data collection on energy- and hazard mitigation. In order to meet the ambitious goal of cutting greenhouse gas pollution across public, assisted, and FHA-insured housing by 50-52 percent by 2030, HUD needs to have a full accounting of all utility

consumption and expenditures in its portfolio. The first step will be to analyze current data collections and identify gaps and deficiencies.

Office	Action	Implementation Method	Resource Implications	Timeline
PIH	Assess utility data collection and analysis and identify deficiencies	Assessment	None	FY22 Q3 – FY23 Q1
OEE, PIH	Compare and analyze data collected in EPA Portfolio Manager and data reported through Forms 52722 and 52723	Assessment	Included in the President's FY23 budget request	FY23 Q1 – FY24 Q1

2.2 Improve Utility Data Reporting and Tracking

Implementing Offices: Housing, PIH, CPD, PD&R, OCIO

Description: In 2016, PIH and Multifamily Housing proposed utility benchmarking requirements for their portfolios of public and assisted housing that will play a foundational role in achieving HUD's emission reduction goals. Both program offices will reevaluate the proposed rules in light of public comments and determine how to proceed toward the adoption of this crucial requirement. Separately, Multifamily Housing proposes to fund utility benchmarking for a majority of units in the Multifamily-assisted portfolio through the Green and Resilient Retrofit Program (GRRP).

Concurrent with reevaluation of approaches to benchmarking, HUD will work to assess existing data collections and take steps to address identified gaps and deficiencies and create a more effective agency-wide data architecture consistent with Data Governance principles established under the leadership of the Chief Data Officer and OCIO Enterprise Architect. These efforts will include developing agency-wide data standards for utility management and risk mitigation such that all data collections across programs can contribute to an enterprise-wide analysis of climate risks and carbon reduction opportunities. The data on building performance and energy usage HUD collects as part of these actions will be critical to HUD's Equitable Decarbonization Roadmap discussed in 2.3, Publish Actionable Analysis on Greenhouse Gas Reduction.

Office	Action	Implementation Method	Resource Implications	Timeline
FHA SF	SFH will monitor and review third party studies that analyze cost-effective, residential energy efficiency improvements and policies. SFH will evaluate the findings for policy updates or data collection.	Assessment	None	FY23 Q4 – FY25 Q3
PIH	Migrate HUD Forms 52722 and 52723 to the Operating Fund Web Portal	IT Solution, Guidance	Reprioritize Existing Resources	FY22 Q1 – FY24 Q3

CPD, FHA, PIH	Develop enterprise -wide minimum data standards for utility management	Coordination	None	FY22 Q1 – FY22 Q3
FHA MF, PIH, OEE	Formulate and implement an updated enterprise-wide approach to utility benchmarking	Rulemaking, TA	Included in the President's FY23 budget request	FY22 Q1 – FY24 Q4
OCIO, FHA	Pursue Portfolio Manager interoperability solutions	IT solution	Funded through the Inflation Reduction Act	FY22 Q2 – FY24 Q4
FHA MF	Develop utility-consumption benchmarking and the establishment of utility baseline data through GRRP	TA	Funded through the Inflation Reduction Act	FY22 Q1 – FY24 Q1

2.3 Publish Actionable Analysis on Greenhouse Gas Emissions Reduction

Implementing Offices: PIH, OEE

Description: HUD will work to provide new data products and data analysis that help program offices and grantees better understand their utility consumption and energy efficiency and renewable energy opportunities nationwide.

Office	Action	Implementation Method	Resource Implications	Timeline
PIH	Publish utility data dashboards for PHAs and HUD	IT solution, policy	Reprioritize Existing Resources	FY23 Q1 – FY23 Q2
OEE	Develop scope for a High-Performance Building Database in partnership with DOE	Coordination	Reprioritize Existing Resources	FY22 Q2 – FY24 Q1
OEE	Develop updated approach to modeling carbon reductions and energy savings as part of Decarbonization Roadmap	Research	None	FY22 Q3 – FY24 Q2
Departmentwide, OEE	Publish an Equitable Decarbonization Roadmap establishing a path for HUD’s portfolio to meet the Nation’s climate commitments equitably	Assessment	Reprioritize Existing Resources	FY22 Q1 – FY23 Q1

Green Building Requirements and Incentives

2.4 Update Codes and Standards

Implementing Offices: CPD, Housing, PD&R, PIH

Description: Some HUD funding sources, including Choice Neighborhoods, CDBG-DR, and CDBG-MIT, have set minimum above-code Energy Star New Home or green building standards for new construction. Other programs, such as RAD, encourage adoption of these above-code green building standards. HUD will take steps to strengthen these green building standards and update minimum HUD new construction standards to align with IECC and ASHRAE 90.1 standards contingent on an affordability analysis as required by statute.

Office	Action	Implementation Method	Resource Implications	Timeline
OEE, FHA, PIH	Update Minimum Energy Standards through rulemaking	Rulemaking	None	FY23 Q3 – FY25 Q1
OEE	Evaluate and coordinate voluntary stretch energy and/or resilience codes	Assessment	None	FY22 Q4 – FY24 Q2
OMHP	Consult with DOE on updating the building and energy efficiency standards for manufactured homes	Coordination, Rulemaking	None	FY22 Q1 – FY23 Q1

2.5 Align Incentives with Efficiency

Implementing Offices: PD&R, CPD, OLHCHH, Housing, FHEO

Description: Existing utility subsidies in HUD public and assisted housing programs do not encourage or discourage recipients from taking steps to make their buildings more energy and water efficient. Program offices will take every opportunity to shift incentives toward energy- and water-saving investments in an equitable manner consistent with civil rights requirements and identify persistent barriers that require congressional action.

Office	Action	Implementation Method	Resource Implications	Timeline
Department-wide	Establish points for climate mitigation and adaptation measures in competitive Notices of Funding Opportunity (NOFOs), where appropriate	Coordination	None	Ongoing
PIH	Implement Small Rural Frozen Rolling Base program	Technical Assistance	Reprioritize Existing Resources	FY23 Q1 – FY23 Q4
PIH	Initiate an Energy Performance Contracting (EPC) Innovation Pilot to encourage new	New Resource	Included in the President's	FY23 Q1 – FY24 Q4

	strategies and approaches to utilizing the EPC Program		FY23 budget request	
PIH	Implement the Public Housing Rapid Return Utility Conservation Program, offering competitive grants to fund capital investments to reduce utility consumption	New Resource	Included in the President's FY23 budget request	FY23 Q1 – FY24 Q4
PIH	Target resources to make Indian Housing Block Grant-assisted housing more energy efficient and resilient, and to reduce energy and water consumption and utility burden	NOFO	None	FY23 Q2 – ongoing
PIH	Continue Choice Neighborhoods Implementation grants to support energy efficient and resilient design	NOFO	None	FY22 Q2 – ongoing
OEE	Coordinate with DOE to qualify HUD-assisted properties for DOE weatherization assistance	Coordination	None	FY22 Q1 – FY24 Q4
OEE, OLHCHH	Streamline and harmonize income eligibility requirements among HUD-funded rehab and lead hazard control programs, and DOE and HHS/LIHEAP-funded weatherization assistance programs	Coordination	None	FY22 Q1 – FY22 Q2
OLHCHH	Award cooperative agreements for joint interventions by OLHCHH Lead Hazard Reduction grantees and DOE Weatherization Assistance Program subgrantees to improve residential energy efficiency	NOFO	Reprioritizing Existing Resources	FY22 Q1 – ongoing
OEE, OLHCHH	Pilot a model for integrating Lead Hazard Control, HOME/CDBG rehab, HHS and DOE weatherization funds	Coordination, Assessment	None	FY22 Q2 – FY23 Q3
FHA SF	Assess single family mortgage programs to identify opportunities to incentivize energy efficiency	Assessment	None	FY22 Q2 – FY23 Q4
FHA MF	Create the Green and Resilient Retrofit Program to combine direct loan subsidy and competitive grants to support energy efficiency and climate resilient	New Resource	Funded through the Inflation Reduction Act	FY 22 Q1 – ongoing

	improvements in assisted multif amily properties			
Housing	Strengthen energy and resilience investments in RAD conversions	Rulemaking, Guidance	None	FY22 Q2 – FY22 Q4
OEE	Create working group with program offices to assess current programmatic barriers to energy efficiency, including utility allowance methodologies	Coordination, Assessment	None	FY22 Q2 – FY24 Q1

Capacity Building

2.6 Deliver Education and Training

Description: HUD program offices will provide educational materials and training to increase utilization of existing incentives for energy efficiency and resilience improvements among grantees, borrowers, and other program beneficiaries.

Implementing Offices: Housing, PIH, PD&R, CPD

Office	Action	Implementation Method	Resource Implications	Timeline
FHA SF	Develop stakeholder education strategy regarding tools and resources FHA offers to finance energy-related improvements and to mitigate climate hazards	Technical Assistance	Reprioritize Existing Resources	FY22 Q2 – FY24 Q4
FHA SF	Make necessary updates to training and marketing materials to ensure lenders and consumers are aware of flexibility of FHA's 203(k) program	Technical Assistance	None	FY22 Q2 – FY24 Q4
FHA SF	Develop and deliver training to ensure single family appraisers are aware of approaches for valuing energy- and hazard-mitigation-related improvements into valuation	Technical Assistance	Reprioritize Existing Resources	FY22 Q2 – FY24 Q4
PIH	Update guidance, and training for EPC, Energy Incentive Programs, and other programs, to support rural communities' energy efficiency hazard risk reduction efforts	Guidance, Technical Assistance	None	FY22 Q1 – FY23 Q3
CPD	Deliver training to spur adoption of Health@Home Rehabilitation Guidelines by HUD grantees	Technical Assistance	None	FY22 Q1 – FY23 Q1
PD&R	Collaborate with DOE to hold HUD-wide training and	Training	None	FY21 Q4 – FY22 Q1

	informational forum on energy efficiency			

2.7 Foster Innovation and Remove Barriers

Implementing Offices: CPD, PD&R, PIH

Description: PHAs and owners of HUD-assisted multifamily housing face a unique collection of barriers to energy and water conservation. The multifamily portfolio has a greater range of building types and systems than in any other building sector, there are potentially hundreds of different utility accounts per building, access to financing is limited by program rules, and organizations often lack the staff capacity to plan and implement a portfolio-wide investment strategy. HUD offices, often in partnership with the Department of Energy, will add to the current state of knowledge and find new strategies and solutions to help HUD grantees overcome these barriers.

Office	Action	Implementation Method	Resource Implications	Timeline
CPD	Support DOE Multifamily Solar Collaborative to address barriers and implement community solar in affordable multifamily housing	Coordination	None	FY22 Q1 – FY23 Q4
PD&R	Assess HUD's research and capacity-building needs related to health and safety compliance of older manufactured housing units for inclusion in HUD's 2022-25 Learning Agenda	Assessment	None	FY22 Q4 – FY24 Q2
PD&R	Assess HUD's research and capacity-building needs related to submetering and sale of renewable energy for inclusion in HUD's 2022-25 Learning Agenda	Assessment	None	FY22 Q4 – FY24 Q2
CPD	Partner with DOE on Low-Carbon Pilot and launch of Better Climate Challenge	Coordination	None	FY22 Q1 – FY23 Q4

GOAL 3:
Pursue Environmental Justice

03

Goal 3: Pursue Environmental Justice

Addressing climate and environmental justice is at the core of HUD's mission to create strong, sustainable, inclusive communities. Environmental justice means ensuring equal protection from environmental and health hazards and providing equal and meaningful opportunity to participate in the decision-making process to achieve a healthy environment. In this plan, HUD commits to a variety of actions to empower communities to achieve climate resilience, facilitate economic opportunities, and eliminate health risks caused by environmental injustices. HUD has established environmental justice as a budget priority, ensuring that both HUD staff and its external stakeholders are aware of the significance of avoiding and reversing environmental inequities.

HUD strongly supports the Administration's whole-of-government effort to ensure that at least 40 percent of overall Federal investments in climate and clean energy are delivered to disadvantaged communities. Because of its unique focus on supporting low-income communities, HUD anticipates that most of its programs already exceed this goal. Nonetheless, HUD will strive to maximize investments in low-income communities, communities of color, and other disadvantaged and historically underserved communities.

Scale: Nationwide.

Risks and opportunities: Low-income communities and communities of color experience disproportionately large impacts from climate change and environmental hazards due to a history of disinvestment and discrimination. Without targeted intervention, these environmental inequities will widen.

Accomplishments to Date

Affirmatively Furthering Fair Housing. In addition to barring housing discrimination, the Fair Housing Act requires HUD and its grantees to administer programs and activities relating to housing and urban development in a manner that affirmatively furthers the purposes of the Fair Housing Act. This means taking meaningful actions that not only overcome patterns of segregation but foster inclusive communities free from barriers that restrict access to opportunity based on protected characteristics. Specifically, Affirmatively Furthering Fair Housing (AFFH) means implementing concrete changes that, taken together, address significant disparities in housing needs and in access to opportunity. These actions would replace segregated living patterns with truly integrated and balanced living patterns, transform racially or ethnically concentrated areas of poverty into areas of opportunity, and foster and maintain compliance with civil rights and fair housing laws. On July 31, 2021, HUD's interim final rule to restore certain definitions related to AFFH and certifications incorporating those definitions became effective. Program participants covered by the rule certify that they will comply with the obligation to AFFH, consistent with the restored definitions. Program participants may voluntarily engage in fair housing planning to support their certifications, and HUD provides technical assistance and support to assist program participants in carrying out their obligation to AFFH, including by supporting funding recipients that carry out this voluntary fair housing planning process. HUD intends to undertake a separate rulemaking to build upon and further improve the 2015 AFFH rule by instituting a new fair housing planning process and framework to achieve material, positive change that affirmatively furthers fair housing.

Partnership with EPA's Superfund program. Since 2017, EPA and HUD have been engaged in a coordinated effort to address potential Superfund site-related exposure to residents of HUD Public Housing and multifamily assisted housing. This effort has helped EPA prioritize site work to protect communities located within Superfund site areas while also helping to inform future decisions and coordination with HUD. HUD and EPA continue to refine this analysis both to inform the interagency workgroup's ongoing effort to review HUD-assisted properties that may be at risk for site contamination and to reach the goal of providing accurate data to the public. Next steps and goals for this effort are discussed in section 3.4 below.

Radon protection. HUD's Offices of Housing, Multifamily Housing, and Healthcare have existing radon policies that are leading the mortgage insurance industry. HUD's Office of Multifamily Housing received the AARST Policy Leadership Award for "Leadership in Establishing and Implementing Effective Radon Risk Reduction Policies that Save Lives" in September 2019. Multifamily and Healthcare continuously refine radon policy in the MAP guide, 232 Handbook and the RAD program in coordination with HUD's Office of Healthy Homes, EPA, and the ANSI-AARST standards.

Empowering Disadvantaged Communities

3.1 Promote Climate Justice in Tribal Communities

Implementing Offices: PIH, PD&R

Description: HUD recognizes the unique legal and political relationship that exists between the United States and Tribal governments. The Department also recognizes the history of environmental inequities that has created barriers to achieving climate resilience in Tribal communities. HUD intends to help Tribal communities achieve safe, resilient housing and infrastructure through improved access to data, technical support, and funding opportunities.

Office	Action	Implementation Method	Resource Implications	Timeline
PD&R, ONAP	Assess HUD's research and capacity-building needs related to exclusion of Tribal Lands and communities in national climate, weather, utility, geological and infrastructure data for inclusion in HUD's 2022-25 Learning Agenda, and Coordinate with National Labs to address exclusions	Coordination	None	FY22 Q1 – FY23 Q1
PD&R, ONAP	Assess HUD's research and capacity-building needs related to Sustainable Construction in Indian County for inclusion in HUD's 2022-25 Learning Agenda.	Assessment, Guidance	None	FY22 Q1 – FY23 Q1
ONAP	Build capacity of Tribes and Federal agencies to develop efficient, coordinated environmental reviews and strengthen environmental	Technical Assistance	None	In progress – FY24 Q1

	compliance through the Tribal Housing and Related Infrastructure Interagency Task Force, led by HUD's Office of Native American Programs			
ONAP	Provide technical assistance to HUD customers to support sustainable, net zero/next generation building that is reflective of Tribal cultures and supports job creation	Technical Assistance	Reprioritize Existing Resources	FY22 Q3 – FY23 Q3

3.2 Create Green Job Opportunities

Implementing Offices: PIH, CPD

Description: Invest in the creation of green jobs in partnership with PHAs and local workforce partners. Many HUD programs are subject to requirements in section 3 of the Housing and Community Development Act of 1968, which requires that employment and other economic opportunities generated by Federal financial assistance for housing and community development programs be directed, to the greatest extent feasible, toward low- and very low-income persons, particularly those who are recipients of government assistance for housing. HUD has an opportunity to guide and empower Section 3 compliance that supports green workforce development in the communities that HUD serves.

Office	Action	Implementation Method	Resource Implications	Timeline
CPD, PIH	Provide direct technical assistance to help PHAs and local workforce partners leverage Section 3 training and improve green economy employment outcomes through the newly created Building Futures pilot	Technical Assistance	None	FY21 Q3 – FY23 Q1
CPD, PIH	Based on experience in the Building Futures pilot, identify best practices and possibilities to scale up the program	Assessment	None	FY23 Q1 – FY23 Q2
PIH	Leverage EPC (including EPC Innovation Pilot Program) and Small Rural Frozen Rolling Base Programs to support investment and green jobs at the public housing level	Rulemaking, Guidance	Included in the President's FY23 budget request	In progress – FY23 Q4

3.3 Encourage Equitable Community Planning and Engagement

Implementing Offices: FHEO, PD&R, CPD

Description: Provide resources and technical support to help communities improve equity in both community planning and community engagement. HUD will seek to include best practices related to removing barriers to and promoting the development of affordable housing in areas with low environmental hazards, providing meaningful access for individuals with Limited English Proficiency (LEP) and effective communication for individuals with disabilities, and advancing equity with selection criteria that avoid disproportionate allocations based on race and other protected characteristics.

Office	Action	Implementation Method	Resource Implications	Timeline
PD&R, FHEO	Generate guidance for achieving disaster risk mitigation through best practices in community land use and site planning	Research, Guidance	None	In progress – FY23 Q3
CPD, FHEO	Create a Citizen Participation and Engagement Toolkit for CDBG-DR and CDBG-MIT grantees. This online, interactive toolkit will help to ensure whole community recovery and resilience by providing information and resources to help grantees bring in the “whole” community to the conversation, specifically historically disadvantaged populations and protected classes	Technical Assistance	None	In progress – FY22 Q3
FHEO	Consider expanding Citizen Participation and Engagement Toolkit to other programs and audiences	Assessment	None	FY22 Q4 – FY24 Q1
CPD, FHEO	Publish guidance on how to incorporate use of Social Vulnerability Index (SOVI) or similar data into Consolidated Plan development and grantee priority setting	Guidance	None	FY22 Q3 – FY22 Q4
PD&R, FHEO	Assess practices that advance equitable implementation of disaster recovery resilience funding and generate guidance on best practices	Assessment, Guidance	None	FY23 Q1 – FY24 Q1
CPD	HUD’s Office of Block Grant Assistance is assessing ways to provide specialized TA, best practices and guidance to field	Assessment, Guidance, TA		FY22 Q1 – FY23 Q1

	office staff and grantees around the existing required regulatory barriers element of the Consolidated Plan			

Healthy Housing Initiatives

3.4 Prevent Residential Lead Poisoning

Implementing Offices: OLHCHH, PD&R, PIH, CPD, Housing

Description: HUD is a leader in increasing awareness of lead poisoning prevention and reducing childhood lead exposure. HUD will continue to prioritize comprehensive reductions in Americans' exposure to lead pollution in their homes by addressing lead contamination in soil, air, water, and paint. This includes expanding HUD's existing lead control programs as well as continuing an ongoing partnership with EPA to assess and remediate potential health risks to residents of public and assisted housing both within and near Superfund site boundaries.

Office	Action	Implementation Method	Resource Implications	Timeline
OLHCHH	Update the soil-lead hazard standard for OLHCHH Lead Hazard Reduction Program grants by working with the EPA to identify a lower, more protective "action level" than the current standard	Guidance	None[20]	FY22 Q3 – FY23 Q3
OLHCHH, PD&R	Assess HUD's research and capacity-building needs related to lead risk and geospatial products for inclusion in HUD's 2022-25 Learning Agenda	Assessment	Reprioritize Existing Resources	FY22 Q1 – FY23 Q3
PIH	Issue policy guidance, provide technical assistance, and monitor public and voucher housing to further compliance with lead-based paint safety regulations	Guidance, Technical Assistance	None	FY22 Q1 – FY24 Q1
PIH	Continue competitive Lead-based Paint Capital Funds program for PHAs to test and abate lead paint	NOFO	None	FY22 Q4 – FY24 Q4
OLHCHH	Develop plans and implement Justice40 pilot in Lead Hazard Control and Healthy Homes Grants	Assessment, Guidance	None	FY22 Q1 – FY23 Q1
CPD, PIH,	Continue ongoing partnership with EPA to identify and investigate Public Housing and Multifamily	Coordination, Assessment	None	Ongoing

[20] Although there may be resource implications for implementing any rulemaking, the full resource implications cannot be known until the rule has been drafted. Therefore, the resource implications for rulemaking apply only to the resources required to draft and publish the rule.

Housing, OLHCHH	assisted housing in which lead pollution and other contaminants of concern from NPL sites could impact residents' health			
CPD, PIH, Housing, OLHCHH	Where contamination is found in HUD-assisted housing, work across Federal, Tribal, State, and Local agencies and nongovernmental organizations to help the impacted community identify available resources and appropriate solutions to eliminate hazards and improve residents' overall health	Coordination, assessment	None	FY21 Q4–FY23 Q4
PD&R, CPD, PIH, Housing, OLHCHH	Collaborate with EPA's Office of Brownfields and Land Revitalization, as well as State and Tribal Response Programs, to ensure cross-agency alignment with respect to changing climate conditions and brownfields policies	Coordination	None	Ongoing

3.5 Minimize Residential Radon Exposure

Implementing Offices: OLHCHH, CPD, Housing, PIH

Description: Coordinate across programs to develop targeted policy, guidance, and technical assistance to HUD customers to minimize radon exposure in the Nation's housing stock.

Office	Action	Implementation Method	Resource Implications	Timeline
OLHCHH, CPD, PIH, Housing	Deliver radon training series and guidance materials to HUD customers covering topics including radon basics, regulatory requirements, and testing and mitigation best practices	Technical Assistance	None	FY22 Q1-FY23 Q4
OEE, OLHCHH	Develop a simple departmental radon policy clarifying current regulatory minimums	Guidance	None	FY21 Q4-FY22 Q1
CPD, PIH	Develop program-specific radon policies for grantees and PHAs	Guidance	None	FY22 Q1-FY22 Q43
OEE, OLHCHH, PIH, Housing	Refine departmentwide radon testing and mitigation standards by rule	Rulemaking	None	FY22 Q1-FY24 Q4

3.6 Update HUD's National Environmental Policy Act (NEPA) Policies

Implementing Offices: CPD, PIH, Housing

Description: Revise HUD's environmental review policies to ensure consideration of climate- and environmental justice-related hazards and health risks in all proposed site selection and placement of new assistance activities. HUD will update its NEPA-implementing regulations, guidance materials, and online tools to specify how HUD and grantees will consider climate-related hazards and environmental justice concerns in environmental reviews prepared pursuant to 24 CFR parts 50 and 58. This effort will reflect diverse concerns and resources, including guidance from the White House Council on Environmental Quality (CEQ), recent evaluations of the potential health risks from lead and radon in public and assisted housing, and the particular impacts of climate change on vulnerable communities. CPD will work closely with program offices across the department to define program-specific policies and standards.

Office	Action	Implementation Method	Resource Implications	Timeline
OEE	Follow up on HUD's 2014 Climate Adaptation Plan and CEQ guidance by updating guidance on how to assess climate resilience and environmental justice when completing Environmental Assessments under 24 CFR parts 50 and 58	Guidance	None	FY22 Q1 – FY22 Q3
OEE	Revise HUD's environmental regulations – including 24 CFR parts 50, 55, and 58 – to better integrate strategies to mitigate climate- and EJ-related hazards and health risks in HUD-assisted activities	Rulemaking	None	FY22 Q1- FY24 Q3
CPD	Update guidance on how to assess climate resilience and environmental justice when completing Environmental Assessments	Guidance	None	FY22 Q1 – FY22 Q3
CPD, PIH, Housing	Update Program guidance on environmental review procedures to include analysis of climate mitigation measures, adaptation strategies, and environmental justice	Guidance	None	FY22 Q2- FY23 Q4
CPD	Develop a training series for HUD customers and update HUD's online tools to reflect updated policy	Technical Assistance, IT Solution	None	FY22 Q3- FY23 Q4
CPD, PIH, Housing, FHEO	Extend ongoing efforts to improve environmental review compliance across HUD programs through improved guidance, technical support, and monitoring	Guidance, Technical Assistance	None	Ongoing

APPENDIX

Appendix A: Abbreviations and Acronyms

AFFH	Affirmatively Furthering Fair Housing
AOS	Add-On Subsidy
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
BBC	Better Buildings Challenge
Btus	British thermal units
CDBG	Community Development Block Grant
CDBG-DR	Community Development Block Grant Disaster Recovery program
CDBG-MIT	Community Development Block Grant Mitigation program
CEQ	White House Council on Environmental Quality
CFR	Code of Federal Regulations
CNA	Capital Needs Assessment
CPD	Office of Community Planning and Development
DOE	U.S. Department of Energy
DOI	U.S. Department of Interior
EEH	Energy Efficient Home
EJ	Environmental Justice
EO	Executive Order
EPA	Environmental Protection Agency
EPC	Energy Performance Contract
FEMA	Federal Emergency Management Agency
FFRMS	Federal Flood Risk Management Standard
FHA MF	Federal Housing Administration, Multifamily Housing
FHA SF	Federal Housing Administration, Single-Family Housing
FHEO	Office of Fair Housing and Equal Opportunity
FPM	Office of Field Policy and Management
FRB	Frozen Rolling Base
FY	Fiscal Year
GAO	Government Accountability Office
GHG	Greenhouse Gas
GI/SR	General Insurance and Special Risk
HHS	U.S. Department of Health and Human Services
HUD	U.S. Department of Housing and Urban Development
IECC	International Energy Conservation Code
IT	Information Technology
LiMWA	Limit of Moderate Wave Action
MIP	Mortgage Insurance Premium
MMI	Mutual Mortgage Insurance
MW	Megawatt
NEPA	National Environmental Policy Act

NIST	National Institute of Standards and Technology
NPL	National Priorities List
OCIO	Office of the Chief Information Officer
ODR	Office of Disaster Recovery
OEE	Office of Environment and Energy
OGC	Office of General Counsel
OLHCHH	Office of Lead Hazard Control and Healthy Homes
ONAP	Office of Native American Programs
PD&R	Office of Policy Development and Research
PHA	Public Housing Authority
PIH	Office of Public and Indian Housing
Q	Quarter
RAD	Rental Assistance Demonstration
REAL	Resilience and Energy Assistance Loan
RPU	Resident Paid Utility
SOVI	Social Vulnerability Index
TA	Technical Assistance
USVI	U.S. Virgin Islands

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

City of Pittsburgh

CLIMATE ACTION PLAN

Version 3.0

ACKNOWLEDGEMENTS

Thank you to the following organizations for their contributions to the Climate Action Plan

ACCESS
Airport Corridor Transportation Association
Action Housing
AgRecycle
Allegheny County Sanitary Authority
Allegheny CleanWays
Allegheny Conference
Allegheny County
Allegheny County Conservation District
Allegheny County Economic Development
Allegheny Land Trust
American Geophysical Union
American Health Care Group, LLC
Aquion Energy
Aramark
Avison Young
Bike Pittsburgh
BiodiverCity
BNY Mellon
Brazen Kitchen
Bridgeway Capital
BuroHappold
Carnegie Mellon University, Program for Deliberative Democracy
Carnegie Mellon Traffic21
Carnegie Mellon University School of Art
Carnegie Museum of Natural History
Castriota Metals & Recycling
Chatham University
CJL Engineering
Committee for Accessible Transportation (CAT)
Conservation Consultants Inc
Construction Junction
Covestro
Delta Development Group
Direct Energy
Duquesne Light Company
Duquesne University
Duquesne University's Center for Environmental Research and Education
Dylamato's Market
East End Food Co-op
Eat n Park
Eaton Corporation
EcoCraft Homes
EIS Solar
EnerNoc
Ethos Collaborative
Eutectics
EverPower
EvolveEA
Group Against Smog and Pollution
Google
Green Building Alliance
Grow Pittsburgh
GTECH Strategies
Housing Authority of the City of Pittsburgh
Hillman Foundation
Homewood Children's Village
IMG Midstream
International Code Council
Itron Inc.
Just Harvest
Michael Baker International
Mitsubishi Electric Power Products
Mount Washington Community Development Corporation
NAIOP
National Academy of Sciences
National Energy Technology Laboratory
National Renewable Energy Laboratory
NRG Energy, Inc
Oakland Transportation Management Association
Oakland Planning and Development Corporation
Oxford Development
Port Authority of Allegheny County
Pittsburgh Center for Creative Reuse
Pittsburgh Community Reinvestment Group
Pittsburgh Penn State Extension
Pennsylvania Department of Transportation
PennFuture
Pennsylvania Environmental Council
Peoples Natural Gas
Phipps Conservatory
Pittsburgh Downtown Partnership
Pittsburgh Food Policy Council
Pittsburgh Parking Authority
Pittsburgh Parks Conservancy
Pittsburgh Pirates
Pittsburgh Water and Sewer Authority
Pittsburghers for Public Transit
PNC
Port Authority of Allegheny County

Pennsylvania Resources Council
Putting Down Roots
Pittsburgh Botanical Garden
RAND Corporation
Regional Industrial Development Corporation
Richard King Mellon Foundation
Riverlife
Rye Development
Science & Engineering Ambassadors Program
Shadyside Worms
Solarize Allegheny
Southwestern Pennsylvania Commission
Sports & Exhibition Authority
Steel City Soils
Sustainable Pittsburgh
The Heinz Endowments
Thriving Earth Exchange
Tree Pittsburgh
University of Pittsburgh
University of Pittsburgh Medical Center
Urban Redevelopment Authority
Urban Land Institute
Walnut Capital
Waste Management
Western Pennsylvania Conservancy
Westinghouse Electric Company
Women for a Healthy Environment
Zipcar
412 Food Rescue

Cover photographs are by Flore Marion

Table of Contents

EXECUTIVE SUMMARY

Climate change is a major threat to communities around the world. Potential consequences of climate change include an increase in extreme weather events, higher rates of infectious diseases and heat-related illnesses, the possible shortage of food and basic goods as well as an increase in public expenditures to mitigate these effects. The City of Pittsburgh has long recognized that wide-ranging action must be taken in order to mitigate the effects of climate change on both local and global communities.

As a result, on February 9, 2007, the City of Pittsburgh signed the U.S. Mayors Climate Protection Agreement, pledging to implement local climate change mitigation solutions that would save taxpayer dollars and reduce long-term energy use.

Pittsburgh's Green Government Task Force (GGTF) was charged with developing the first ever Pittsburgh Climate Action Plan, adopted by the City as a guiding document in July 2008. This document provided an outline of specific strategies for achieving reductions in greenhouse gas emissions.

In 2012, the Pittsburgh Climate Action Plan 2.0 was created to review and revise the efforts of government, private businesses, institutions of higher education, and Pittsburgh residents toward the reduction of greenhouse gas emissions. New measures were proposed that could be implemented in order meet a greenhouse gas reduction target of 20% below 2003 levels by the year 2023.

By 2017, it was clear that expedited measures must be taken to help mitigate the local effects of global climate change. Building on the successes of the previous versions, Pittsburgh Climate Action Plan, Version 3.0 has been created to track progress made through the first two plans and to propose new measures to counteract the adverse effects of climate change. This document aligns with Mayor William Peduto's climate goals[1] signed in 2015 at the Paris Accords, where he was one of 12 mayors representing the United States. In June 2017, Mayor Peduto also joined 175 other U.S. mayors in signing an Executive Order1 to pledge efforts to meet the "1.5 degrees Celsius target" as set forth by the Paris Agreement.

The Pittsburgh Climate Action Plan 3.0 takes a renewed approach to climate change mitigation by presenting action plans and strategies regarding six key areas: Energy Generation & Distribution, Buildings & End Use Efficiency, Transportation & Land Use, Waste & Resource Recovery, Food & Agriculture, and Urban Ecosystems.

While each area has specific goals and actions, there is significant overlap among action areas. This helps to create a more holistic plan that provides opportunities for greater impact through coordination across sectors. Of the six focus areas, the overlapping actions naturally create two action clusters; energy and ecosystems.

Many strategies related to energy usage and sources are presented within the first three chapters, Energy Generation & Distribution, Buildings, and Transportation & Land Use. Improved energy efficiency and increased fuel shift are the two main goals in these chapters. In order to reach these ambitious

[1] https://apps.pittsburghpa.gov/mayorpeduto/Climate_exec_order_06.02.17_(1).pdf

goals, projects must address both goals. For example, when shifting to electric vehicles, carbon-free charging sources must also be implemented.

The remaining three chapters; Waste and Resource Recovery, Food & Agriculture, and Urban Ecosystems follow a similar, overlapping plan. The main idea presented in all three chapters is waste reduction and proper resource management.

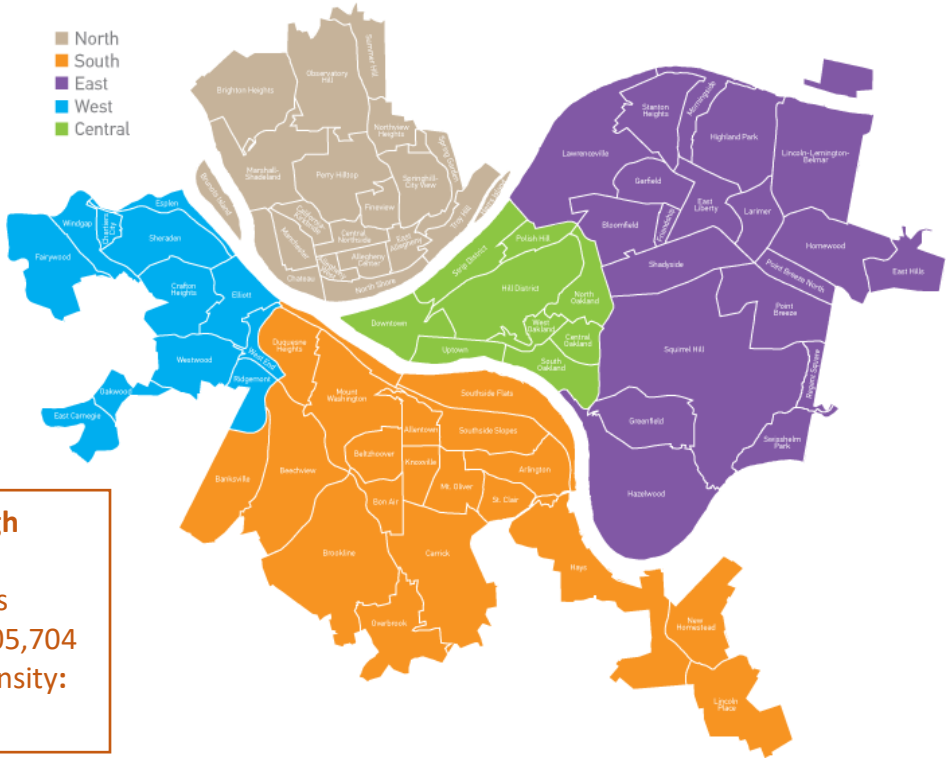
Why a Climate Action Plan for Pittsburgh

Pittsburgh has come a long way from the days of smoke darkened skies that were a result of the extensive steel industry. However, as global temperatures continue to rise and the costly impact of climate change becomes more prevalent, cities are at the forefront of climate action.

Local government has a responsibility to provide for the health, safety, and welfare of its residents. The Climate Action Plan provides a road map for reducing Greenhouse Gas Emissions in the City of Pittsburgh while also improving the resilience, health, and overall quality of life for Pittsburgh residents. The Climate Action Plan is designed to serve as a guiding document that will support future decision making in Pittsburgh.

How the Action Plan Developed

The Climate Action Plan 3.0 was a multi-year process that was focused on thoughtful civic engagement. The deliberative civic engagement process included over 400 residents representing 90 organizations from the Pittsburgh business community, non-profit sector, and local, state, and federal government partners. This process allowed the City to adopt pragmatic strategies that account for and expand upon many actions and initiatives already underway. [2]



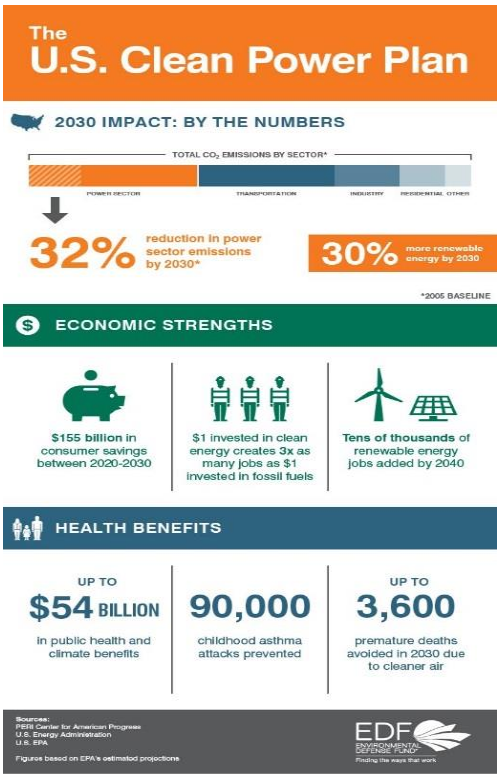
A Picture of Pittsburgh

- ✓ 58.35 sq. miles
- ✓ Population: 305,704
- ✓ Population density: 5,483/sq. mile

[2] www.nextpittsburgh.com

Clean Power Plan

In the development process, Pittsburgh modeled many goals and strategies after the U.S. Clean Power Plan framework. The Clean Power Plan (CPP) requires the state of Pennsylvania to reduce power sector emissions by 24% below 2012 levels. At a national level, the CPP aims to reduce emissions from coal-burning power plants, increase the use of renewable electricity, and improve energy conservation and efficiency. Similar to the CPP, the Pittsburgh Climate Action Plan supports strategies for reducing dependence on coal, encouraging conversion of coal fired powerplants to natural gas, protecting existing carbon free nuclear power, increasing utilization and generation of renewable electricity, and decreasing energy consumption through optimization and efficiency improvements in both the power and transportation sectors. [3]



Environmental Defense Fund

Pittsburgh's Resilience Challenges

While the Climate Action Plan is designed first and foremost as a carbon mitigation strategy, there is a broad scope of 'co-benefits' that can be achieved through the proposed actions. When putting forth strategies and pathways for deep carbon reductions, these co-benefits were analyzed to assist with action prioritization. Mitigation actions can help address Pittsburgh's Resilience Challenges and achieve key co-benefits such as improved equity, increased economic development and decreased negative health impacts.

The threats to Pittsburgh's resilience include both chronic stresses—long-term, slow burning issues that overwhelm the capacity of city resources and erode resident wellbeing—and potential acute shocks—sudden, large-scale disasters that disrupt city services and threaten residents due to extreme events. While the city's inland geography protects its residents from many of the natural hazards that are expected to occur more frequently in coastal regions, the city's endemic stresses disproportionately affect some of its most vulnerable residents and represent its core resilience challenges. Specifically, Pittsburgh faces significant challenges with social, racial, and economic inequities that have persisted for decades, leading to unequal access to housing, transportation, employment, and services. Other key stresses affecting vulnerable Pittsburghers include aging infrastructure and poor air and water quality. Potential future shocks include extreme weather, flooding, landslides, and extreme temperatures, among other concerns identified during strategy development. Action on climate change provides a unique opportunity for coordination and collaboration that can address Pittsburgh's most significant stressors.

Alignment with Existing Plans

The measures laid out in this plan aim to reduce carbon emissions, but also have been prioritized based on the ability to impact additional shocks and stressors identified within Pittsburgh's OnePGH Resilience

[3] *https://www.edf.org/sites/default/files/Clean-Power-Plan-Infographic.jpg*

Strategy.[4] Actions high on the prioritization list will not only reduce emissions but will also improve overall resiliency, increase innovation, foster leadership, promote workforce development, introduce economic opportunities and align with the OnePGH Strategy and Pittsburgh's p4 Criteria.

Pittsburgh's Resilience Framework

The Pittsburgh Climate Action Plan is designed to be a subheading of the OnePGH Resilience Strategy. Similar to the resilience strategy, the Climate Action Plan is also meant to align with the four "p"s of the p4 framework, already adopted by partners across the city to inspire innovative, sustainable, and inclusive action. Priority actions in the Climate Action Plan will reduce emissions as well as act collectively to make Pittsburgh a resilient city in terms of its **P**eople, **P**lace, **P**lanet, and **P**erformance.

PEOPLE Pittsburgh will empower all residents to contribute to thriving and supportive communities by ensuring that basic needs are met. We will be an inclusive city of innovation that celebrates our diversity, and all residents will have equal access to resources and opportunity.

PLACE Pittsburgh will use land to benefit all residents; to increase social cohesion, connectivity, public and ecological health; and to protect against current and future risks. We will design, scale, and maintain our infrastructure for current and future needs, providing benefits and services to our neighborhoods during times of calm and crisis.

PLANET Pittsburgh will achieve long-term environmental health through wise stewardship, improved use of our resources, and a reduced carbon footprint.

PERFORMANCE Pittsburgh will work closely with neighbors and partners for improved planning and decision-making.

OnePGH

OnePGH is the strategy for Pittsburgh to thrive in the 21st century as a city of engaged, empowered, and coordinated neighbors. Pittsburgh will be resilient when our city is livable for all residents. OnePGH establishes a bold vision for the City, buildings on recent successes and a wealth of community assets, while directly confronting the complex challenges that we all continue to face.

p4 Initiative

The p4 initiative is based on a central unifying framework: People, Planet, Place, and Performance. Launched in 2015 to create a new sustainable, innovative, and inclusive model for development and design, p4 aims to establish Pittsburgh as a "city of the future." In the past decades, Pittsburgh has transformed dramatically since the steel industry's collapse. This transformation will continue through a major new wave of development, representing approximately 500 acres across the urban core. This development potential and the manner in which it is guided, will influence Pittsburgh's built and natural environments, and communities for generations to come.

[4] https://pittsburghpa.gov/onepgh/documents/pgh_resilience_strategy.pdf

Climate Action Plan Implementation

The Division of Sustainability and Resilience, as a part of the Department of City Planning, will serve as the lead office for implementation of the Climate Action Plan. The Division of Sustainability and Resilience will support a series of implementation steps to facilitate the effective rollout and adoption of the Climate Action Plan across sectors and stakeholders. As implementation progresses, there are a number of keys, such as policy intervention, funding and budget allocations, community engagement, data analysis, and partnership coordination, that can be activated to optimize the success of the Climate Action Plan.

Sustainability and Resilience Commission

In order to fully recognize all of the actions and initiatives laid out in the Climate Action Plan, serious effort will be required on behalf of the City and its many stakeholders. The first action needed to begin implementing the Climate Action Plan is the creation of a Sustainability and Resilience Commission. Currently, the City has an existing Sustainability Commission comprised of representatives from various City Departments whose main focus has been to make city operations more sustainable. The proposed Sustainability and Resilience Commission would be an amendment to the existing commission. Expanding the Commission to include members from the nonprofit, education, utility, and corporate sectors will allow for greater impact and coordination among stakeholders. Once established, the updated commission will oversee implementation of the Climate Action Plan as well as tracking of progress toward goals. This commission will ensure that the CAP 3.0 is implemented in a way that benefits all Pittsburghers.

Institution Engagement

The City of Pittsburgh will need ongoing support and engagement from all parties, especially large institutions such as hospitals and universities that operate within the city, in order to achieve these ambitious goals. These institutions have the opportunity to create significant impact across all sectors. Additionally, their expertise and research capabilities have proven invaluable to the climate action process. Expanding upon these existing partnerships will help foster innovation and expedite progress toward the 2030 Goals.

Community Engagement

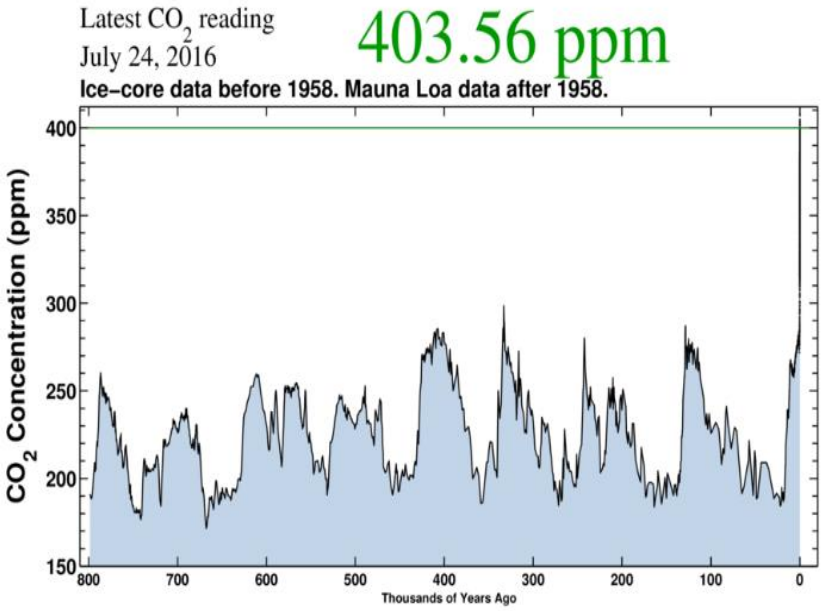
Community engagement and grass roots action is a vital aspect of successful climate initiatives. Organizations such as the Citizens Climate Lobby, Climate Realities Leadership Corp, and the Sierra Club work to engage community members in climate related issues and policy decisions. These organizations will play an important role in educating the public and encouraging action at the neighborhood and household levels.

Pittsburgh Climate Action Plan 4.0

This current Climate Action Plan provides a holistic approach to reducing Pittsburgh's impact on climate change and improving the overall resilience of the city and its residents. This plan provides pathways for emission reduction and is designed to be a guiding document for the City of Pittsburgh and relevant partners. It is meant to be a living document that evolves as actions progress. Additionally, this Climate Action Plan is designed to be a 5 year plan. As technology improves and policies change, an updated CAP can be written. Actions started as a result of this plan and the associated data to be collected will inform the next iteration of the Pittsburgh Climate Action Plan.

Climate Change Introduction

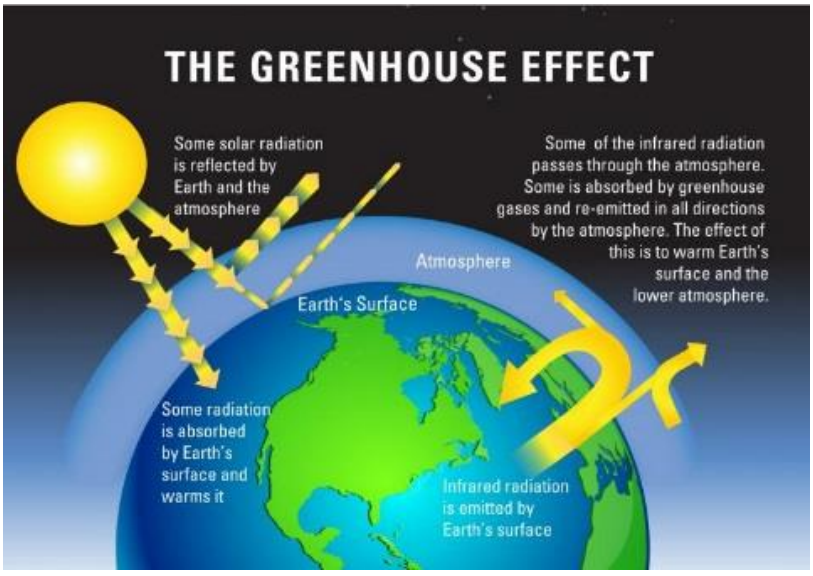
In 2016, Earth's surface temperatures were the warmest since modern recordkeeping began in 1880, according to independent analyses conducted by National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA)[5]. Earth's average surface temperature has risen approximately 2.0 degrees Fahrenheit (1.1 degrees Celsius) since the start of the industrial revolution in the late 1700's, a change driven largely by increased activities releasing carbon dioxide and other human-made emissions into the atmosphere. Most of the warming occurred in the past 35 years, with 16 of the 17 warmest years on record occurring since 2001.



Climate Change

Greenhouse gases (GHGs) such as carbon dioxide (CO_2), methane (CH_4) and ozone (O_3) in the atmosphere, absorb some of the infrared radiation (heat) emitted by Earth's surface, which keeps our planet livable. Without the greenhouse effect, Earth's average temperature would be near 0 degrees Fahrenheit, rather than the 20th century average of 57.1 degrees F.

However, human activities such as burning fossil fuels and destroying forests have increased the amount of GHGs in the atmosphere over the last 100 years. This is disturbing the optimum levels of GHGs, amounting to increased heating effects. As emissions increase, more heat is trapped, leading to numerous changes in the Earth's natural processes.



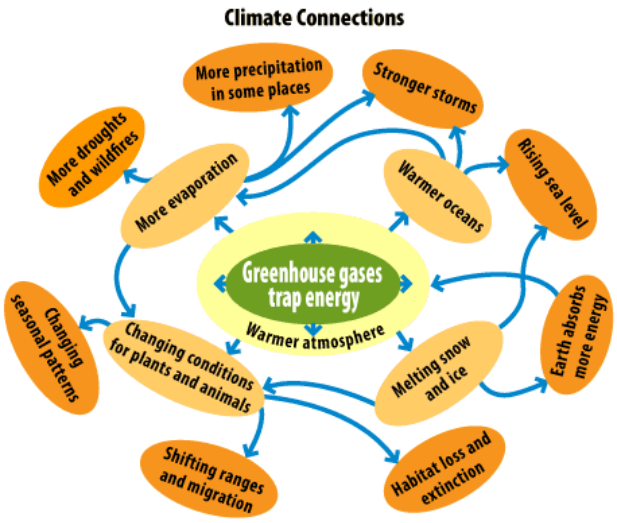
For over 800,000 years the atmospheric concentration of carbon dioxide has fluctuated but has not exceeded 300 parts per million (ppm). Currently, the levels hover above 400 ppm.

The dramatic increase in GHGs in the atmosphere has already led to a 1.5°F (0.85°C) increase in global average surface temperature from 1880 to 2015.

[5] https://www.nasa.gov/press-release/nasa-noaa-data-show-2016-warmest-year-on-record-globally

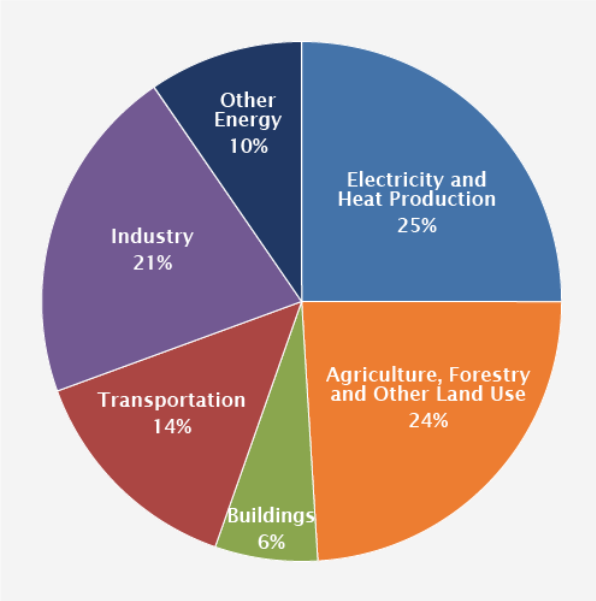
Climate Change Consequences

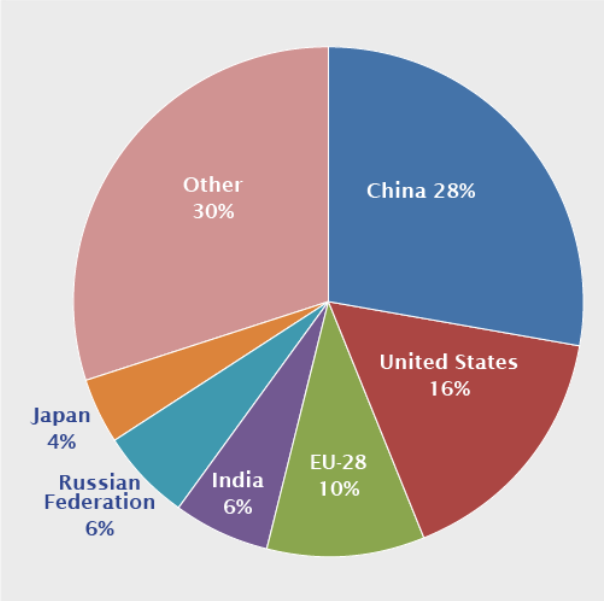
Earth is a resilient planet with many complex interconnected systems that work to keep the planet in balance. However, global warming has already changed climates by altering evaporation and precipitation patterns, melting snow and ice and warming the ocean. This has caused heat waves, droughts, extreme storms, wildfires, hurricanes and tornadoes of varying severity across several regions of the world. If carbon emitting activities continue at the same rate, the planet could see an 8.1°F (4.5°C) increase over preindustrial temperatures by 2100. This could result in the extinction of 16% of the species on Earth.[6]



Global Sources of Emissions

The majority of human-caused GHG emissions are due to burning fossil fuels like coal, natural gas, gasoline, and diesel for electricity, heat and transportation. However, it is important to recognize that almost 24% of global emissions are due to deforestation, industrial agriculture and the impact of other land uses. China, the U.S., the European Union, Russia, and Japan are responsible for 70% of the world's GHG emissions. Developed nations with relatively small populations are disproportionately responsible for climate change, largely driven by resource intensive lifestyles.





7

[6] https://archive.epa.gov/climatechange/kids/basics/concepts.html
[7] https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data

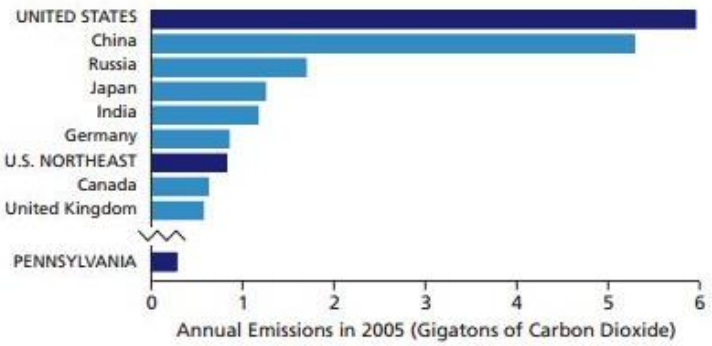
The Paris Agreement

In December 2015, global leaders from 195 countries met in France for the 21st Conference of Parties (COP 21) of the United Nations Framework Convention on Climate Change (UNFCCC). The mission of COP21 was to "achieve a legally binding and universal agreement on climate, with the aim of keeping global warming below 2°C." Prior to the conference, 185 countries submitted an Intended Nationally Determined Contributions (INDC) that outlined their strategies and goals for reducing their carbon emissions as a basis for negotiation. However, these INDCs put the world on track for a 2.7 to 3.7°C increase, surpassing the COP21 2°C goal. Meanwhile, leading climate scientist James Hansen published a paper outlining the dangers of feedback loops caused at 2°C. Vulnerable countries, such as low-lying island nations – the Maldives, the Marshall Islands and the Seychelles – have long called for a 1.5°C ceiling.

On December 12, 2015, the Paris Agreement[8] was adopted by consensus, and the treaty has been signed by 179 parties and ratified by 20. Article 2.1 states that parties agree to "Hold[ing] the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change."

However, even if all emissions ceased tomorrow, GHGs already in the atmosphere would still trigger an additional 0.6°C rise above the current 1.1°C, causing a 1.7°C increase overall. Therefore, immediate action is needed to minimize emissions as soon as possible, and also sequester atmospheric carbon in large quantities.

Climate change in Pennsylvania

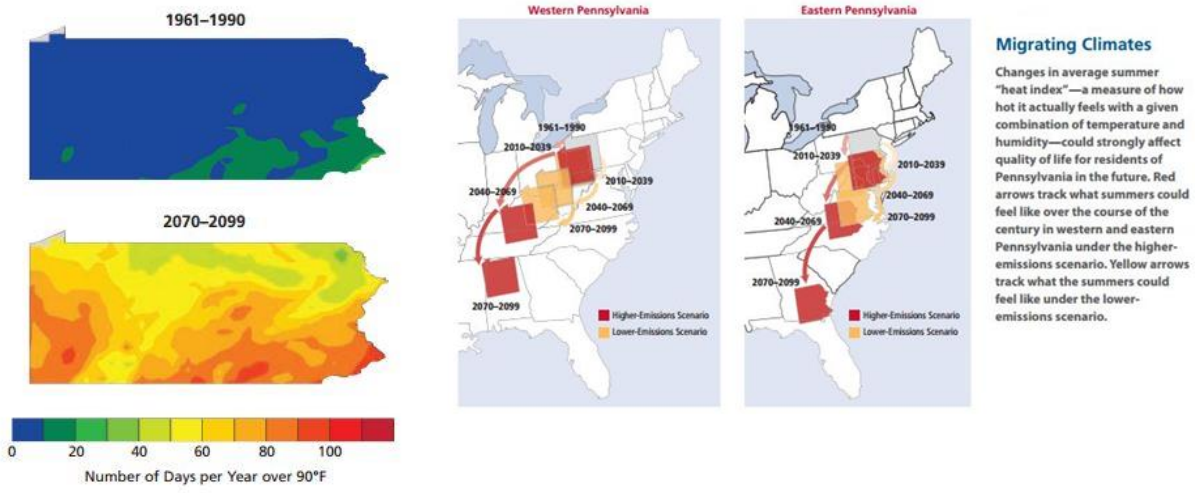


Pennsylvania's emissions are high enough to compare with some of the largest nations in the world. The Energy Information Administration (EIA) conducted a study in 2005[9] and found that, when compared globally, Pennsylvania's emissions were high enough to rank as world's twenty-second largest emitter of CO_2. For comparison, Pennsylvania's emissions are higher than those of the states of New York and Wyoming combined, and the per capita emissions are more than double those of New York State.

Increased Temperatures

In addition to being a significant contributor to climate change, Pennsylvania is also projected to see significant impact due to climate change.[10] By the end of the century, Pennsylvania is projected to experience a dramatic increase in the number of extremely hot days. The regions that will experience the greatest warming are in the southwest and southeast.

[8] https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement
[9] https://www.eia.gov/environment/emissions/state/analysis/pdf/stateanalysis.pdf
[10] https://www.researchgate.net/publication/216769159_Confronting_Climate_Change_in_the_US_Northeast_Science_Impacts_and_Solutions



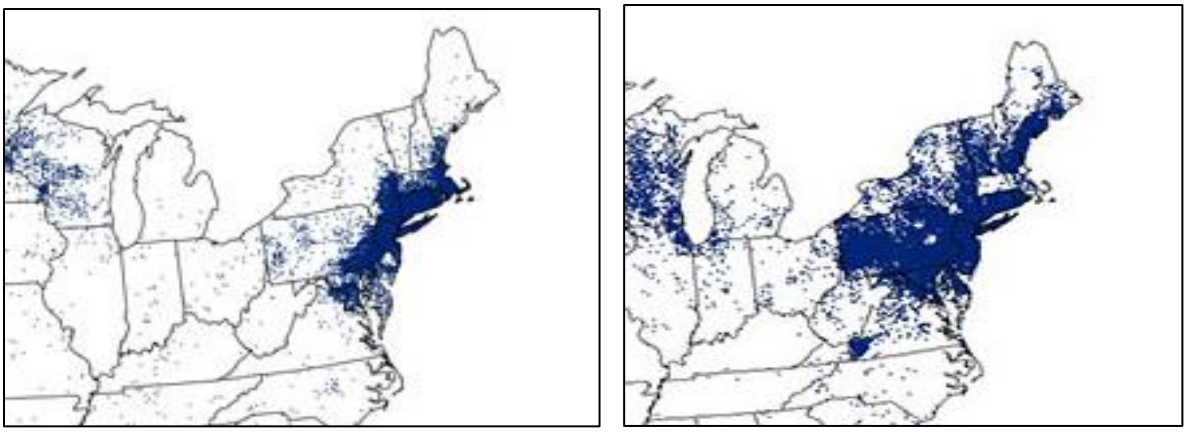
Statewide, Pennsylvania is projected to experience dramatic increases in the number of extremely hot days over the coming century, especially under the higher-emissions scenario. The greatest warming will be in the southwest and southeast regions, where daytime temperatures by late century (2070–2099) could hover over 90°F for nearly the entire summer.

Although Pittsburgh is an inland city that is sheltered from many 'typical' consequences of climate change such as sea level rise and extreme hurricanes, Pittsburgh has seen numerous climate related impacts in recent year.

Increase in Lyme disease

The incidence of Lyme disease in the U.S. continues to rise rapidly, especially in the Northeast and Great Lakes regions. If left untreated, Lyme disease can cause severe and debilitating health symptoms. According to the CDC, Pennsylvania had the highest number of Lyme disease cases in the nation for three straight years, with many of the highest numbers occurring in Western Pennsylvania.[11] Lyme disease infections usually occur most frequently in the spring and fall due to increased tick activity. Deer ticks that transmit the disease are dormant during the winter, but become active when the temperature rises above freezing. Warmer weather and milder winters mean that the ticks become active earlier and remain active for a longer period of time, allowing the disease to become more widespread.

Lyme disease cases in 2001 vs 2016



[11] https://www.cdc.gov/lyme/datasurveillance/index.html

Washington Boulevard Flooding

In August 2011, two storms hit the Pittsburgh area, dropping 3-4 inches of rain in one day, with 2.1 inches coming in a single hour during the evening rush hour. The storm water overwhelmed the area's drainage system and caused manhole covers to pop off the road. Four people were killed when flash floods swamped cars and water quickly rose up to 9 feet in some areas along Washington Boulevard near the Allegheny River. Overall, 18 vehicles were stranded. The boulevard is in the basin of a large watershed and receives runoff from surrounding neighborhoods. As the climate changes, heavy rain events and extreme flooding will continue to occur more frequently. [12]

Flooding on Washington Boulevard

Air Quality Impacts

Pittsburgh first rose to prominence through fossil fuel extraction and carbon-intensive industries, thus establishing its legacy as the 'Steel City'. Coal was mined from Pittsburgh's hillsides, and then burned to forge steel. For several decades, the city was polluted with smoke and particulate matter that choked out the sky and required streetlights to be lit during the day. Along with being the "City that Built America" Pittsburgh earned the nickname "Hell with the Lid Off" due to the extreme air pollution created by the steel industry.

Pittsburgh has made vast improvements in air quality since the height of the steel industry, including enactment of the nation's first Clean Air Act. However, the American Lung Association still ranks Pittsburgh the eighth worst of more than 200 metropolitan areas in the nation for long-term (annual) soot pollution, the 14th worst for short-term or daily soot pollution, and the 29th worst for ozone, the main precursor of unhealthy smog.[13] Air quality has significant health implications in our region. A recent study, conducted by Dr. Deborah Gentile of the Pediatric Alliance, showed that while the national average for pediatric asthma is about 8%, nearly 23% of children in the Pittsburgh region have been diagnosed with asthma.[14] In Southwestern Pennsylvania, there are an estimated 1500 deaths that can be attributed to poor air quality each year. As Pittsburgh strives to reduce GHG emissions, there must also be a focus on improved air quality and the related human health benefits.

Pittsburgh: Carbon Legacy to Climate Leadership

Existing Climate Commitments

For years, Pittsburgh has shown a commitment to action on climate change. Programs such as the Sustainable Pittsburgh Challenge (formerly the Green Workplace Challenge) and the 2030 District

[12] https://pittsburgh.cbslocal.com/2011/08/19/woman-2-children-found-dead-after-flash-flooding-on-washington-blvd/
[13] *http://www.stateoftheair.org/2013/*
[14] *https://www.ahn.org/news/9-8-2017/study-local-schoolchildren-reveals-alarming-rates-uncontrolled-asthma-exposure-to*

are the direct result of previous climate action plans and the Pittsburgh Climate Initiative. The first two Climate Action Plans also led to the creation and eventual expansion of the City's Office of Sustainability. Pittsburgh has also signed on to a number of national and international climate agreements and initiatives. These partnerships provide technical assistance, city-to-city collaboration, peer to peer learning, and offer metrics by which Pittsburgh can track progress.

We Are Still In

We Are Still In is the broadest cross-section of the U.S. economy ever assembled in pursuit of climate action. Over 2,500 leaders strong and growing, We Are Still In shows the world that leaders from across America's state houses, city halls, board rooms, and college campuses stand by the Paris Agreement and are committed to meeting its goals.

Global Covenant of Mayors for Climate and Energy

The Global Covenant of Mayors for Climate & Energy is an international alliance of cities and local governments with a shared long-term vision of promoting and supporting voluntary action to combat climate change and move to a low emission, resilient society.

ICLEI

ICLEI – Local Governments for Sustainability is the leading global network of more than 1,500 cities, towns and regions committed to building a sustainable future. ICLEI provides technical consulting, training, and information services to build capacity, share knowledge, and support local government in the implementation of sustainable development at the local level. Their basic premise is that locally designed and driven initiatives can provide an effective and cost-efficient way to achieve local, national and global sustainability objectives.

Under 2 Coalition

The *Under2 MOU* is a commitment by sub-national governments to reduce their greenhouse gas (GHG) emissions toward net-zero by 2050. Central to this is the public commitment by all signatories to reduce their GHG emissions by 80-95% on 1990 levels, or to 2 metric tons of carbon dioxide-equivalent per capita, by 2050. Every government faces different challenges on this journey, and the Under2 Coalition provides a global forum that supports Under2 signatories in developing bold, impactful strategies and aligning on a trajectory consistent with 2050 carbon neutrality.

Pittsburgh Climate Action Plans

PCAP 3.0 builds upon the information gathered from PCAP 1.0 and 2.0.The first two climate action plans were organized into four sectors: Business, Community, Higher Education and Local Government. Within each sector, approaches targeted energy, transportation, and waste management as well as education, advocacy, and coordination. Given that many strategies for greenhouse gas reduction require extended time-frames, some planned activities have not been completed; however, PCAP 1.0 & 2.0 set in motion many important measures.

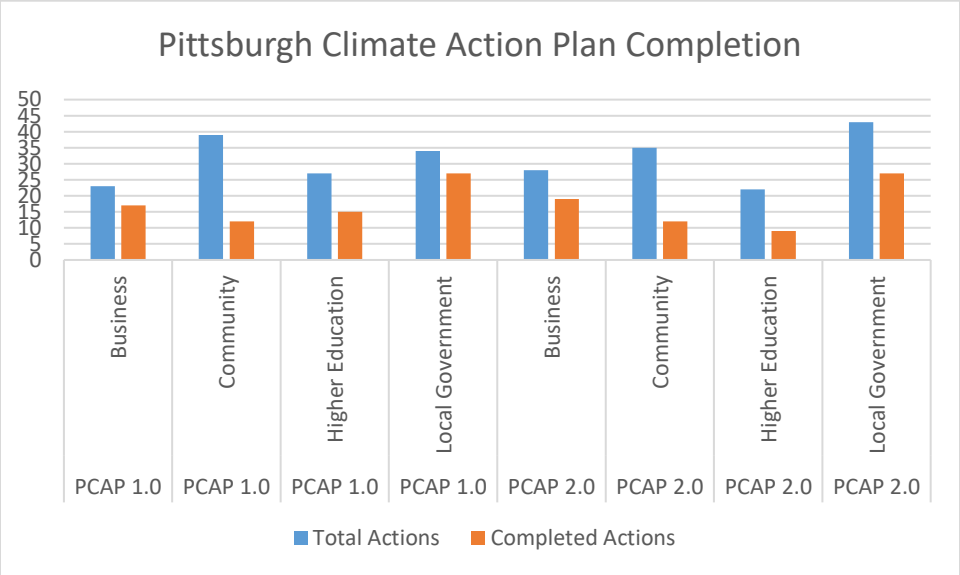


Chart 1: Actions outlined in completed in previous Climate Action Plans

The first two Pittsburgh Climate Action Plans laid the groundwork for and supported the creation of successful citywide programs like the Green Workplace Challenge and the Pittsburgh 2030 District, which encourage organizations and building owners to implement sustainable practices and measure energy and water conservation.

From 2011-2017 over 250 participating organizations have completed 7,840 measurable actions in the Green Workplace Challenge, have saved more than 127 million kWh and prevented 23,283 metric tons of CO_2.

In the Pittsburgh 2030 District, 104 Property Partners managing over 79.2 million square feet across 492 commercial buildings have reduced energy use by 10.7%, water use by 7.4%, and carbon emissions from transportation by 24.2% below baselines. The 2016 energy use reduction of 982 million kBtu is equivalent to 113,540 metric tons of CO_2.

The 12-member Pittsburgh Higher Education Climate Consortium (HECC) has collectively achieved a 20% reduction in carbon emissions since 2003. These reductions have come as a result of bold actions such as Carnegie Mellon University's purchase of100% renewable electricity and University of Pittsburgh's adoption of the Sustainable Development Goals.

PCAP 1.0 also led to the codification of the City of Pittsburgh's Sustainability Coordinator position, which has since evolved into the City's Division of Sustainability and Resilience, now with five full-time

staff members. PCAP 2.0 helped to create a position for a Sustainability Coordinator at Pittsburgh Water and Sewer Authority (PWSA). This is in addition to Sustainability Coordinators at the Sports & Exhibition Authority (SEA) and the Urban Redevelopment Authority (URA).

Building on results from PCAP 1.0 and 2.0, PCAP 3.0 is structured according to emission sources, with a focus on instrumental, measurable actions with assigned stakeholders. Action plans are broken into six categories or chapters:

1) **Energy Generation and Distribution**
2) **Buildings and End Use Efficiency**
3) **Transportation and Land Use**
4) **Waste and Resource Reduction**
5) **Food and Agriculture**
6) **Urban Ecosystems**

This PCAP 3.0 lays out pathways, strategies, and a framework for achieving Pittsburgh's greenhouse gas reduction goals by the year 2030 and beyond, as follows:

Pittsburgh's Greenhouse Gas Emission Reduction Goals (below on a 2003 baseline)

- 20% GHG Reduction by 2023
- 50% GHG Reduction by 2030
- 80% GHG Reduction by 2050
- Pursue a future carbon neutral goal

Pittsburgh 2030 Climate Goals

Internal City Operations:

1) 100% renewable electricity use
2) 100% fossil fuel free fleet
3) Divestment from fossil fuels

City of Pittsburgh:

1) 50% energy use reduction
2) 50% water use reduction
3) 50% transportation emission reduction
4) Zero Waste- 100% diversion from landfills

In short, Pittsburgh follows a 0-50-100 goal; zero waste, 50% emissions reduction, and 100% renewable electricity. These broad, ambitious goals allow for innovation and collaboration with a variety of stakeholders.

CHAPTER ONE: Measuring Pittsburgh's Impact

Goal: Measure Pittsburgh's climate and ecological impact and report annually

Developing a Greenhouse Gas Inventory is the first step in managing climate change. The Greenhouse Gas (GHG) Inventory quantifies emissions and analyzes the sources of those emissions. This data informs mitigation strategies and is essential for tracking progress toward future reduction goals.
A citywide greenhouse gas inventory, based on 2013 data, was compiled and used to inform the Climate Action Plan 3.0.

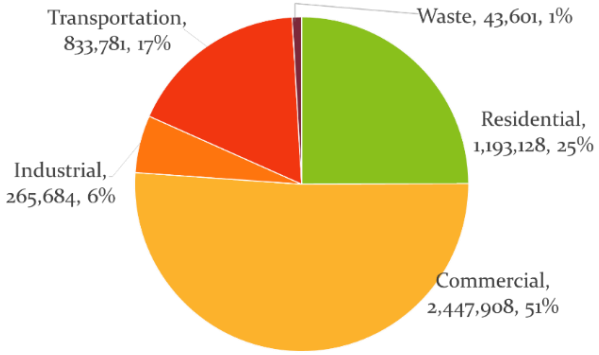


Chart 2: 2013 Pittsburgh Greenhouse Gas Inventory Summary

[15]

Scope	Definition
Scope 1	GHG emissions from sources located within the City boundary
Scope 2	Indirect GHG emissions occurring as consequences of the use of grid-supplied electricity, heat, steam and/or cooling within city boundary.
Scope 3	All other GHG emissions that occur outside city boundary as a result of activities taking place within the City boundary.

Table 1: Greenhouse Gas Inventory Scope Definitions

Sector Based Inventory
GHG inventory protocols tend to focus on Scope 1 and Scope 2 emissions, as defined in Table 1, while Scope 3 emissions are more difficult to quantify. Scope 1 emissions come from sources within the city limits, such as gasoline that is burned by vehicles on city roads. Scope 2 emissions occur as a consequence of electricity demand within city limits. Burning of fossil fuels at power plants located outside of Pittsburgh to satisfy electricity demands within the city are a main contributor to Scope 2 emissions. Scope 3 emissions are other emissions associated with activities that occur within city limits.

For example, Pittsburgh residents generate waste, but that waste is hauled to landfills outside of the city. Methane from that waste is therefore part of Pittsburgh scope 3 emissions. Pittsburgh's GHG inventory primarily focuses on Scope 1 and Scope 2 emissions as prescribed in the ICLEI methodology. These emissions are related to data that is more reliable and readily available.

2013 Greenhouse Gas Inventory
In the 2013 GHG Inventory, included as an appendix to this Climate Action Plan, emissions are categorized by sources and activities in each sector: Residential, Commercial, Industrial, Transportation, and Waste.

In terms of annual emissions, Pittsburgh saw a 12% increase in emissions from 2003 to 2008, but a decrease of 2% from 2008 to 2013. It is difficult to draw conclusions from Pittsburgh's existing greenhouse gas inventories due to different methods and scopes of consumption data. However, it is clear that Pittsburgh needs to take more ambitious action in order to ensure achievement of the 2030 goals.

[15] *http://www.ghgprotocol.org/calculationg-tools-faq*

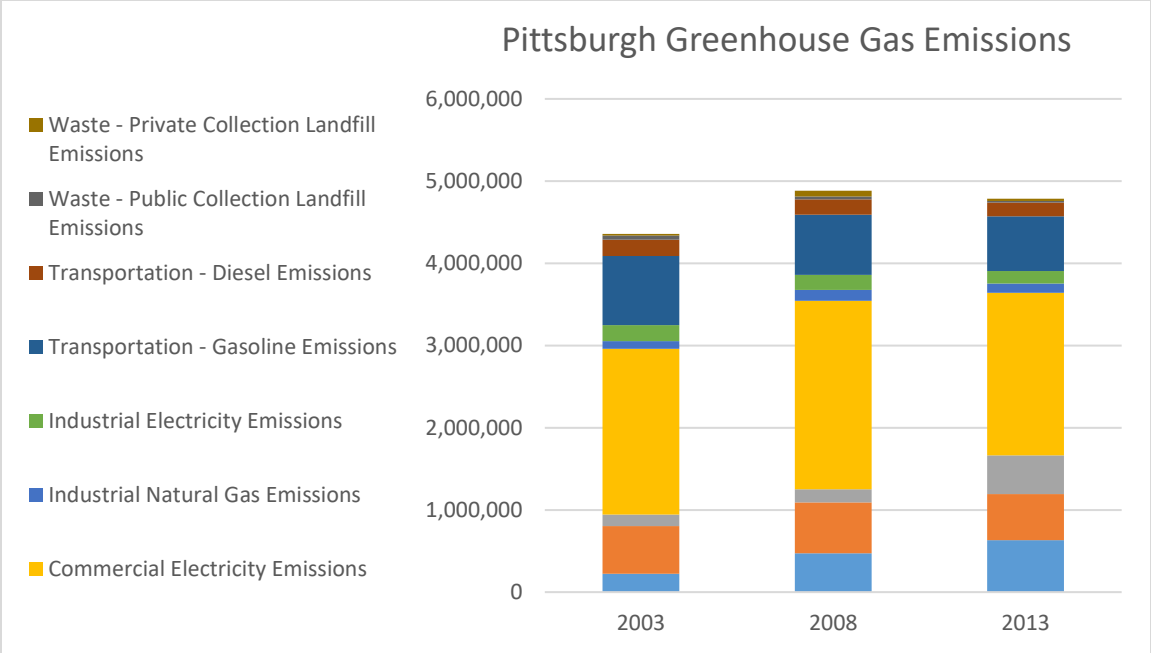


Chart 3: Weather Normalized-Pittsburgh Greenhouse Gas Emissions by Sector

Future Inventories

Using data that is nearly five years old is not ideal and makes it difficult to demonstrate the impact of recent programs and initiative. In order to truly track progress and align actions with measurable GHG reductions, more up to date, readily available data is needed. Moving forward, one of the first steps in tracking progress is to establish a more consistent process for conducting a greenhouse gas inventory.

With the new resources available to the City of Pittsburgh, through the American Geophysical Union (AGU), and Local Governments for Sustainability (ICLEI) extensive effort was put into standardizing the data collection and analysis process in order to develop the 2013 inventory. With this methodology and strong partnerships with the local utility companies in place, future inventories should be less time intensive and more reliable. This will allow for a yearly GHG Inventory to be compiled.

Several cities are adjusting inventory protocols to account for more scope 3 emissions, such as the carbon and ecological footprints associated with the consumption of products and services within city limits. Pittsburgh also plans to take steps to further understand and track its Scope 3 emissions for the future exercises in GHG inventory management.

CHAPTER TWO: Energy Generation & Distribution

Goal: 50% Emissions Reduction below 2003 levels by 2030
Goal: Power all City facilities with 100% clean electricity by 2030

Objective:

- Reduce natural gas fugitive emissions by 50% by 2030
- Reduce line loss from electricity
- Create a 21st Century energy system and support the utilities of the future
- Install 200 Megawatts of local, clean power by 2030
- Convert 50% of Pittsburgh customers to clean electricity

Strategies:

- Calculate reasonable estimates for annual methane leakage volume
- Calculate reasonable estimates for annual transmission loss for local grid
- Improve gas line leak detection
- Implement a long term infrastructure plan to replace aging natural gas delivery lines and to optimize electricity delivery grids
- Install smart meters to provide better customer data access
- Duquesne Light to install solar microgrid pilot at Woods Run facility
- Support alternative utility rate-making in Pennsylvania such as decoupling, formula rates, cost-recovery mechanisms, etc.
- Develop and implement Pittsburgh's District Energy Plan
- Create a local Energy Authority to enable community choice aggregation, power purchase agreements, and renewable regulatory approvals
- Support Duquesne Light with the Public Utility Commission (PUC) to install local renewable power generation in order to meet Pennsylvania's Alternative Energy Portfolio Standards (AEPS) for Provider of the Last Resort (POLAR) customers
- Support and allow for community source aggregation and renewable regulatory approvals (Big Opportunity)

Challenges:

- Regulations and policies regarding energy grids are often enacted at the state rather than local level
- Aging infrastructure
- Population growth and new development will increase energy demands

Existing Projects and Previous Work:

- Ecoinnovation District
- District Energy Pittsburgh
- People's Gas Methane Mapping Project
- Duquesne Light Woods Run Microgrid
- NRG Fuel Cell

Energy Champions

- University of Pittsburgh
- Carnegie Mellon University
- National Energy Technology Laboratory
- Green Building Alliance
- People's Gas
- Duquesne Light Company
- Sustainable Pittsburgh

Greenhouse Gas Emissions from Energy Use

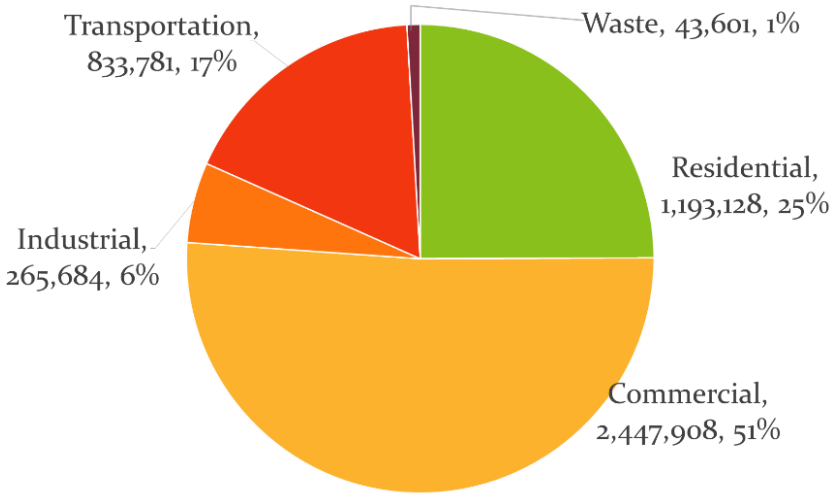


Chart 4: 2013 Weather Normalized-Pittsburgh Greenhouse Gas Emissions by Sources

Emissions from the built environment dominate Pittsburgh's emission with 99% of emissions coming from energy use. These emissions come from the use of electricity, natural gas, and transportation energy use.

Pittsburgh Electricity

Pittsburgh is served by Duquesne Light Company (DLC), which is an investor-owned electricity distribution company. Duquesne Light does not generate electricity, and Pittsburgh does not have a municipal utility. Within the Duquesne Light service territory, nearly 70% of electrical generation is nuclear or hydroelectric, but given greenhouse gas inventory protocols, Pittsburgh calculates its emissions from electricity using the EPA eGRID emission factors for RFC-West (RFC-W), which includes coal generation in West Virginia, Ohio and Indiana.

Generators within the Duquesne Light Company Service Territory [16]

Generator	Generation Type	Output (MW)	Percent (%)
Beaver Valley	Nuclear	1831	69.46
Brunot Island	Natural Gas (Peaker)	220	8.34
Cheswick	Coal	578	21.93
Patterson	Hydroelectric	2	0.27
Townsend	Hydroelectric	5	
	Total MW	2636	

Table 2: Electricity Generation within Duquesne Light Company Service Territory

[16] https://www.netl.doe.gov/sites/default/files/netl-file/City-of-Pittsburgh-Energy-Baseline-20171103-FINAL_0.pdf

EPA eGRID Emission Factors Year 2004 and Year 2012 Comparison[17]

	EPA eGRID Y2004 RFC-W	EPA eGRID Y2012 RFC-W
CO2 lbs/MWh	1,556.39	1,379.48
CH4 lbs/GWh	20.00	17.11
N2O lbs/GWh	24.00	21.67

Table 3: EPA eGRID Emission Factors

Over the years, the grid has gotten inherently 'cleaner' resulting in an overall reduction in electricity - related emissions. However, bold action is needed in order to deeply decarbonize the electric grid and recognize necessary emission reductions.

Greenhouse Gas Emissions from Transmission Loss & Inefficiency

As shown in the Sankey Diagram, significant amounts of energy is wasted due to inefficiencies in production and delivery of energy and electricity. Nearly 41% of the energy in the Power of 32 Region (32 counties in southwestern Pennsylvania, eastern Ohio, western Maryland and northern West Virginia) is 'wasted'. This is largely due to waste heat in the energy generation process, especially in the conversion of coal to electricity.

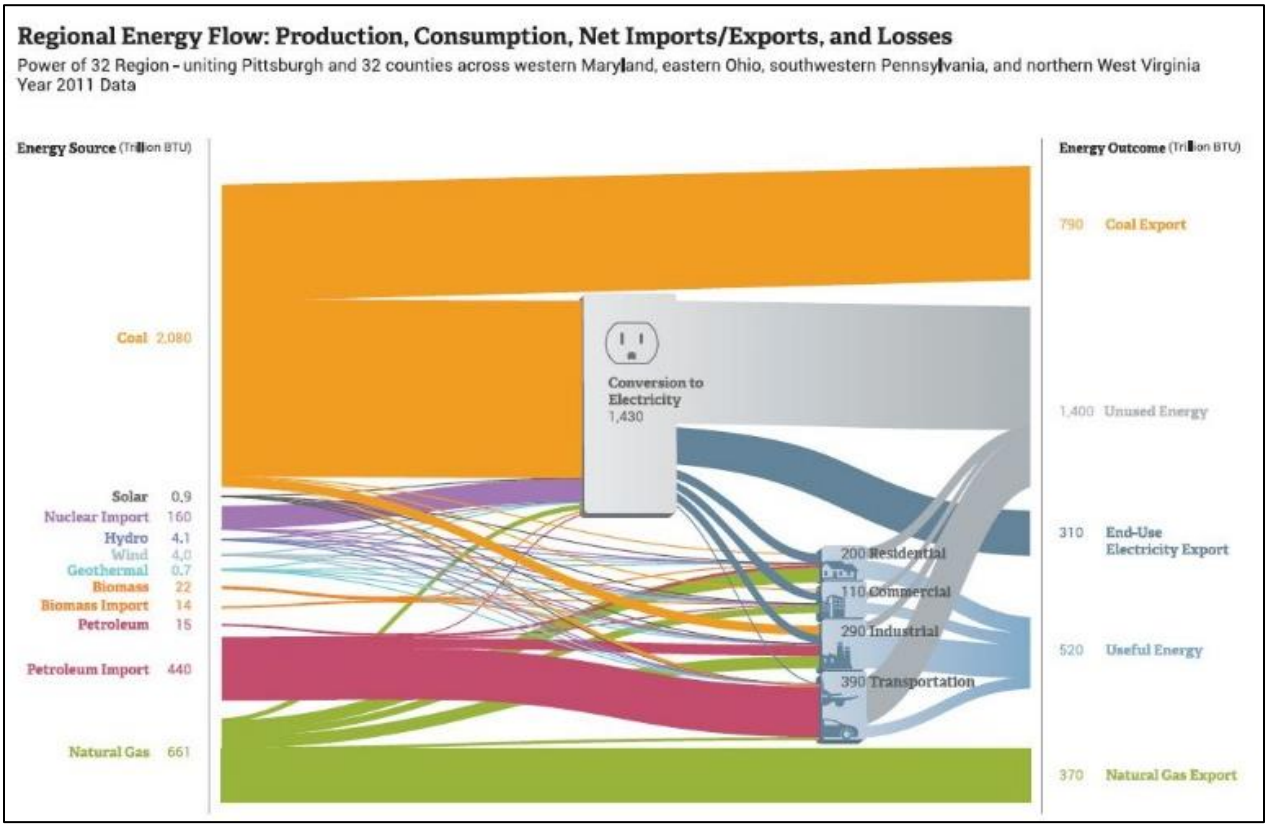


Chart 5: Regional Energy Flow Analysis for Power of 32 Region [18]

[17] https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid
[18] https://powerof32.org

Objective: Reduce line loss by 50% by 2030

Line Replacement and Methane Mapping Project
An essential first step in reducing energy emissions is to reduce wasted energy. Due to a lack of data, Pittsburgh's previous inventories have accounted for emissions related to natural gas leaks, electricity transmission loss, and energy that is lost while being used to treat water. However, recent studies show that transmission loss of electricity and natural gas accounts for approximately 9% of the region's energy consumption. These transmission-loss emissions comprise 3% of Pittsburgh's community emissions profile. Duquesne Light Company and People's Gas are taking the initiative by enacting multi-year infrastructure upgrades and grid modernization projects in order to improve the efficiency of delivery systems and reduce these losses.

Infrastructure upgrades for People's Gas include replacing miles of aging pipe used to deliver natural gas. Working with Google Earth Outreach, Carnegie Mellon University and the Environmental Defense Fund, People's Gas is improving the tracking of methane leaks throughout their infrastructure in order to target specific locations for line replacement and infrastructure improvement projects.

For this project, Google Map vehicles equipped with sensors to effectively and efficiently detect methane leaks created a map of leaks throughout the Pittsburgh area. There were 201 leaks identified during the study period, many in the 50% of natural gas pipes that are more than 50 years old. These leaks do not typically have immediate risk implications, but can have a serious impact on climate. Since natural gas has a warming potential more than 80 times greater than carbon dioxide, reducing leaks from these pipes can produce major greenhouse gas reduction.

The methane mapping pilot was one step in a larger, 20-year pipeline replacement plan. Over the next 20 years, People's Gas will invest $100 million a year in infrastructure upgrades with 60% of that capital to be focused within the City of Pittsburgh. [19] Throughout this process, People's is also working with Carnegie Mellon University to create a risk ranking of pipe infrastructure. These rankings take into account pipe age, material, and leak history in order to prioritize areas for upgrade. As a result of these investments, People's will be able to significantly impact and reduce Pittsburgh's overall emissions inventory.

Objective: Modernize Energy Systems

In order to reach the 2030 Goals, Pittsburgh needs to (1) reduce energy demand, (2) create efficiency district energy systems, (3) decarbonize the electric grid, and (4) convert systems from combustion to electrification. (*Demand reductions are addressed in Chapter 3, Buildings and End Use Efficiency. More information on Electrification can be found in Chapter 3, Buildings and End Use Efficiency and Chapter 4, Transportation and Land Use*.)

Decarbonize the electric grid
In order to decarbonize the electric grid, Pittsburgh needs to install more local renewable electricity generation systems, eliminate dependence on coal powered electricity, and protect existing zero carbon nuclear power. Action such as converting coal fired power plants to natural gas and protecting the

[19] https://www.edf.org/media/edf-google-use-special-street-view-cars-map-and-measure-leaks-pittsburgh-natural-gas-system

nuclear facilities which provide 60% of Pittsburgh's electricity without producing carbon emissions are important components of any plan to decarbonize the electric grid.

Western Pennsylvania Energy Consortium

The City of Pittsburgh manages the Western Pennsylvania Energy Consortium (WPEC), a group of 30 local government entities and universities who use reverse auctions to purchase electricity at a lower cost. WPEC acquired 10% non-certified REC in the first auction in 2008, and has increased that percentage by 5% each auction, and currently purchase 35% non-local non certified renewable electricity. The City of Pittsburgh has committed to using 100% renewable electricity to meet its operational loads by 2030 through both city-owned generation and purchase power agreements that install more renewable electricity production locally. In collaboration with the other members of the WPEC, the City of Pittsburgh will design options that allow members to transition to 100% local renewable electricity purchase, acknowledging that some existing members already reach or aspire toward these goals via multiple means.

Local Renewable Electricity

In order to fully realize the benefits of renewable electricity, a focus on local generation is needed. Generation of renewable electricity in southwestern Pennsylvania can provide a multitude of benefits. Increased availability of local renewable electricity will connect large power consumers with local providers. Deployment of local renewable electricity will spur economic growth, create employment opportunities, and enhance residents' well-being while improving Pittsburgh's economic competitiveness. As Pittsburgh looks to transition to clean electricity sources, the goal is to install 200MW of new, local renewable electricity. Local generation of renewable electricity in southwestern Pennsylvania will provide a myriad of economic, resiliency, and air quality benefits in addition to reduced greenhouse gas emissions.

District Energy

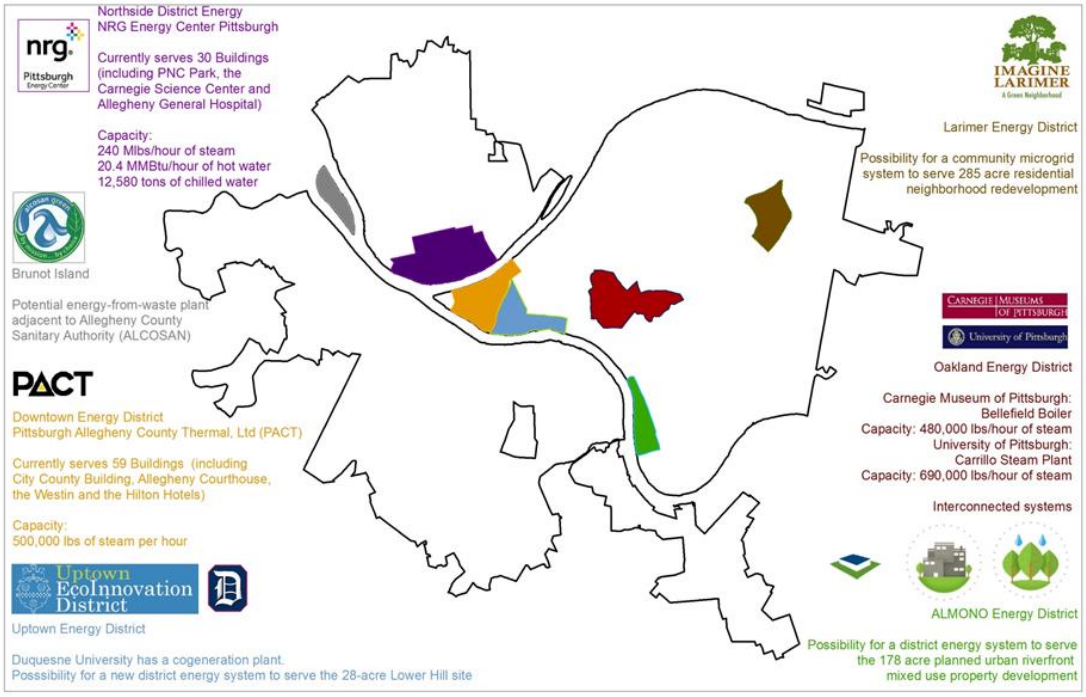
Municipalities across the nation face issues with deteriorating energy infrastructure. It has been shown that up to 60% of the energy that moves along aging gas and electric lines can be lost during transmission.[20] The City of Pittsburgh, in partnership with the Department of Energy, the National Energy Technology Lab, Duquesne Light, and the University of Pittsburgh Center for Energy, is currently developing a 21st century energy infrastructure plan to address these issues. The plan calls for the expansion and optimization of district scale energy systems, such as microgrids, thermal loops, combined heat and power systems and other innovative technologies.

Most cities rely on energy provided by power plants far outside of city boundaries. A district energy system allows a city to develop energy infrastructure on a smaller scale to optimize delivery, create resiliency in the grid system and minimize energy disruption. District scale systems also deliver cleaner and more efficient energy to customers while promoting economic development. A district energy system can provide local, reliable, and affordable energy for urban communities, while also providing economical solutions for commercial and industrial consumers and lowering greenhouse gas (GHG) emissions.

[20] https://www.netl.doe.gov/sites/default/files/netl-file/City-of-Pittsburgh-Energy-Baseline-20171103-FINAL_0.pdf

A microgrid is, in many ways, a smaller version of a traditional power grid. It is a discrete energy system with clearly defined electrical boundaries consisting of components for power generation, distribution, and demand management. A microgrid can act in parallel with, or independent from, the main power grid. However, microgrids provide a much closer proximity between power generation and usage, resulting in increased efficiency. Microgrids can also take advantage of renewable electricity sources such as solar and wind power, geothermal and combined heat and power systems as well as other innovative energy production systems.

Distributed energy resources (DER) are smaller than utility-scale generating systems and are located closer to the customers that they serve. Due to this proximity, there is a reduction in thermal line-losses associated with transmitting electricity over long distances from centralized power plants. The electrical resistance of transmission and distribution lines results in energy being "lost" to heat. These thermal line losses increase as demand on the electrical grid increase. At peak times, line losses are approximately 50% higher, and can approach 8-10% of the power sent through the lines. Locally-sited district energy resources would reduce the need for long-distance transmission and distribution of electricity, Duquesne Light believes that the deployment of microgrids and their associated DER has the ability to significantly reduce the line-losses for electricity generated by DER. If line-losses were reduced by the 8-10% mentioned above, then 8-10% less electricity would need to be generated in order to provide end-users with electricity. Assuming that this 8-10% of electricity was being generated by fossil-fuel power plants, district energy resources have the potential to reduce greenhouse gas emissions. In addition, during peak usage or at times of primary power grid failure, a microgrid can operate independently of the larger grid. If problems arise within the microgrid, it can isolate itself without affecting the larger grid's integrity. Microgrids are also capable of supplying power back to the larger grid during times of grid failure or power outages.



Existing and potential district energy systems in Pittsburgh[21]

[21] *https://www.netl.doe.gov/mou/energy_districts*

The electrical grid uses AC (alternating current) because large power plants create AC power and transformers need AC power to step up the voltage to send electricity long distances with lower transmission loss. Direct current is not ideal for long transmission but works well for local energy networks, and eliminates the need to convert grid AC power to DC in order to power LED lights, electronics, data and telecommunications. The grid was built in an era of fossil fuel expansion, where having a coal-fired generator on every block was not a desirable situation. However, solar and wind power can be integrated into the fabric of the City with enough regularity to feed a DC grid, and renewable sources already generate DC power. For this reason, District Energy Pittsburgh has proposed two DC microgrids powered by solar photovoltaic electricity; one at the Duquesne Light training facility and one at the Second Avenue parking lot.

Designing systems around the specific energy needs of a neighborhood will allow developers to create systems that take advantage of local resources, infrastructure, and other regional features. While these systems may require more up-front engineering, they can be highly efficient and more cost effective than traditional, off-the-shelf technologies. Pittsburgh already has two steam districts in the downtown triangle, two interconnected university steam systems, and a university cogeneration plant. These systems are all evaluating opportunities for increased efficiency; several opportunities for new district energy systems have been identified.

District-scale energy systems also have a number of notable benefits when compared to the development of multiple stand-alone systems in individual buildings or businesses. A broader customer base will allow for higher utilization rates as well as a broader range of systems available for development. A single point of maintenance (compared to having to go into each commercial and residential building served by the system) will streamline upkeep and repairs, requiring only one system to be monitored for optimal operation. Economies of scale and reduced overhead will decrease the cost of potential upgrades and expansion of a single system compared to many separate systems deployed in different buildings. An example of this is Duquesne University, which has continued to upgrade its combined heat and power (CHP) system, integrating cooling systems and thermal storage. District energy systems within the City of Pittsburgh can provide secure, reliable energy with higher efficiency, lower carbon emissions, and lower capital and operating costs. They will enhance the integration of distributed and renewable electricity sources and enable integration of smart grid technology. District energy systems will minimize the City's carbon footprint and greenhouse gas emissions by maximizing clean, locally controlled energy generation.

Pittsburgh is at the cutting edge of a global model for the development of municipal energy production to provide area communities and businesses with clean, affordable, efficient energy. The successful design and deployment of energy districts will enable these systems to be replicated throughout the region. Pittsburgh can become a center for innovation, not just in energy district design, but also in the advanced energy technologies that will sustain those districts.

EcoInnovation District: Case Study

The EcoInnovation District is a unique initiative that was developed to address many of the typical challenges faced across Pittsburgh's neighborhoods. It is a plan that combines the goals of EcoDistricts, dedicated to equity and environmental resiliency, with the goals of Innovation Districts that focus on job growth through the establishment of new and innovative businesses. The EcoInnovation District in Pittsburgh is an area "dedicated to sustainability, innovative development practices and inclusive job

growth." In other words, it is a community plan that centers on supporting existing residents while increasing job opportunities and protecting the environment.

The EcoInnovation District in Pittsburgh encompasses the Uptown and West Oakland communities. These neighborhoods present both challenges and opportunities. They are located between the thriving Downtown and Oakland areas. However, they have not seen the same level of growth and recovery as these other regions. As the Downtown and Oakland areas experienced significant growth, the Uptown and West Oakland communities have faced divestment and deterioration. In addition, due to their location near transportation corridors, they suffer from problems of air quality, access as well as safety. They also face significant challenges related to housing affordability, storm water runoff, and infrastructure issues.

However, community organizations in Uptown and West Oakland have encouraged investment while creating opportunities for local residents. As prices rise and space for development falls in the Downtown and Oakland areas, the EcoInnovation District presents an opportunity to develop an environmentally resilient community based on equitable land use, job growth for residents and reliable transportation and infrastructure systems.

Community ownership of this plan is essential and all members of the community were invited to participate in the process. Collaboration and trust among community residents, institutions, businesses, and government is essential in order for successful investment and sustainable growth in the corridor.

The EcoInnovation District reflects a new approach to development that is focused on job growth and economic opportunity, universal access, smart and efficient infrastructure, and green building practices. Neighborhoods that are walkable, bikeable, and transit-oriented result in healthier lifestyles for residents, promote greater equity in access, and create a better environment for businesses to succeed.

CHAPTER THREE: Buildings & End Use Efficiency

Goal: Reduce energy and water consumption by 50% by 2030

Objectives:

- Improve quality of energy and water use data
- Ensure all new buildings are carbon neutral by 2030
- Ensure all new buildings have optimum location efficiency by 2030
- Mitigate high energy burdens in vulnerable communities
- Improve energy efficiency in residential, commercial, and industrial buildings
- Reduce sewer volume by 50% below 2013 levels by 2030
- Improve the efficiency and effectiveness of public street lighting and traffic signals

Strategies:

- Collect monthly electricity consumption data by sector by zip code
- Collect monthly natural gas consumption data by sector by zip code
- Collect monthly potable water use data by sector by zip code
- Implement Commercial Building Energy Benchmarking Ordinance
- Create legal framework for Property Assessed Clean Energy (PACE) program
- Encourage demand response program participation
- Promote Green and Healthy Homes Initiative and related programs
- Allow for 'green' information to be included in the Allegheny County Multi List Service
- Support state level legislation enabling residential energy and water disclosure
- Support state level legislation enabling adoption of most recent building codes
- Promote Passive House building guidelines
- Create a location efficiency overlay and use transfer of development rights to encourage density while protecting open space
- Educate homeowners and renters on existing energy efficiency programs
- Create a building owner manual and expand first-time building owner classes
- Create a revolving loan fund for energy and water efficiency retrofits
- Create a map/matrix of resources for energy efficiency retrofits
- Promote home energy scores and home energy audits
- Install smart meters to provide better customer data access
- Pass local graywater and rainwater use legislation to facilitate irrigation/toilet flushing with graywater and rainwater
- Implement a stormwater fee to improve green infrastructure and prevent stormwater from entering the combined sewer
- Transition to LED streetlights

Challenges:

- Buildings currently account for 81% of Pittsburgh's greenhouse gas emissions
- Pittsburgh has the among the highest energy burdens in the U.S.
- More than 70% of Pittsburgh homes were built before 1970

Existing Projects and Previous Work:

- Building benchmarking ordinance
- 2030 District
- Green Garage Initiative
- Green and Healthy Homes Initiative

Building Champions

- Green Building Alliance
- Pennsylvania Environmental Council
- Conservation Consultants Inc.
- Pittsburgh Water and Sewer Authority
- Urban Redevelopment Authority
- Pittsburgh Parking Authority
- Sports and Exhibition Authority
- Department of City Planning

Greenhouse Gas Emissions from Buildings

Based on Pittsburgh's 2013 sector-based GHG inventory, buildings are responsible for 81% of the City's carbon emissions through electricity and natural gas consumption.

As the City's largest contributor of greenhouse gas emissions, Pittsburgh's vertical built environment provides many opportunities for deep carbon reductions. Improving energy generation and distribution systems is one approach to reduce GHG emissions. However, improving end use conservation and efficiency will also significantly reduce emissions. For both energy source and end use demand, Pittsburgh's building stock offers many improvement opportunities in the commercial, residential, and industrial sectors; strategies specific to each end use type abound and have much opportunity to be deployed at greater scale.

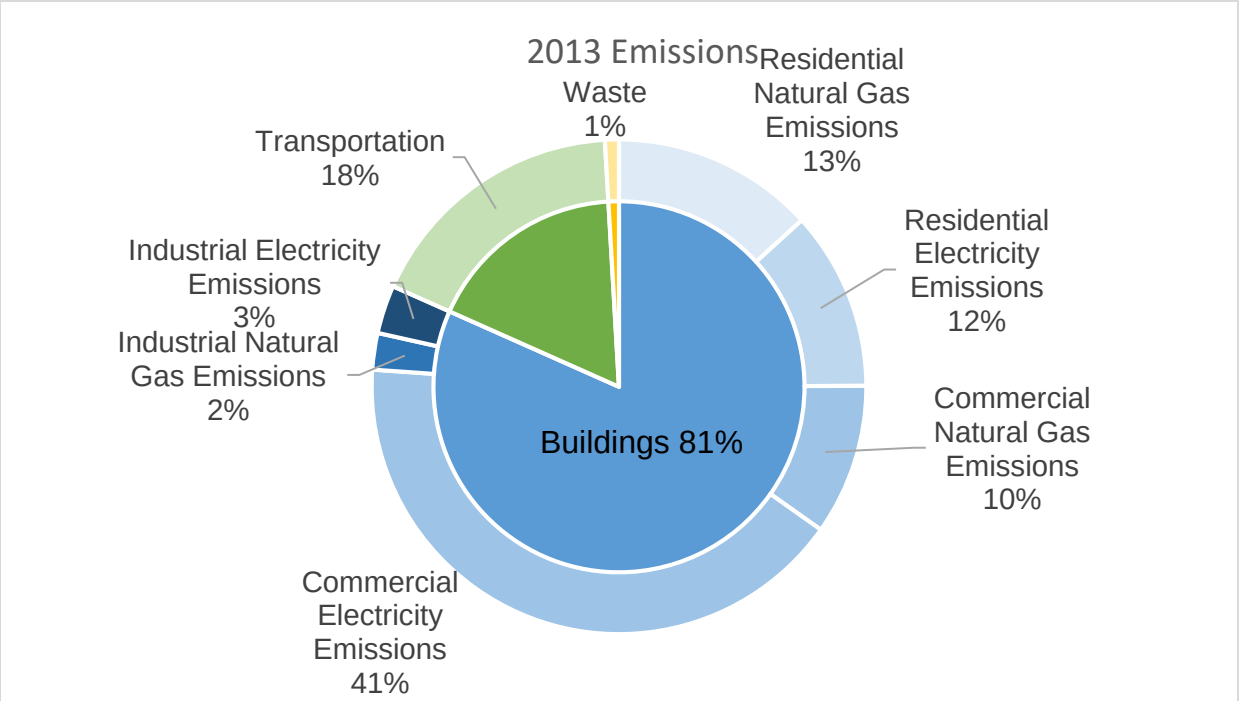


Chart 6: 2013 GHG Emissions by Source

Energy Use Intensity

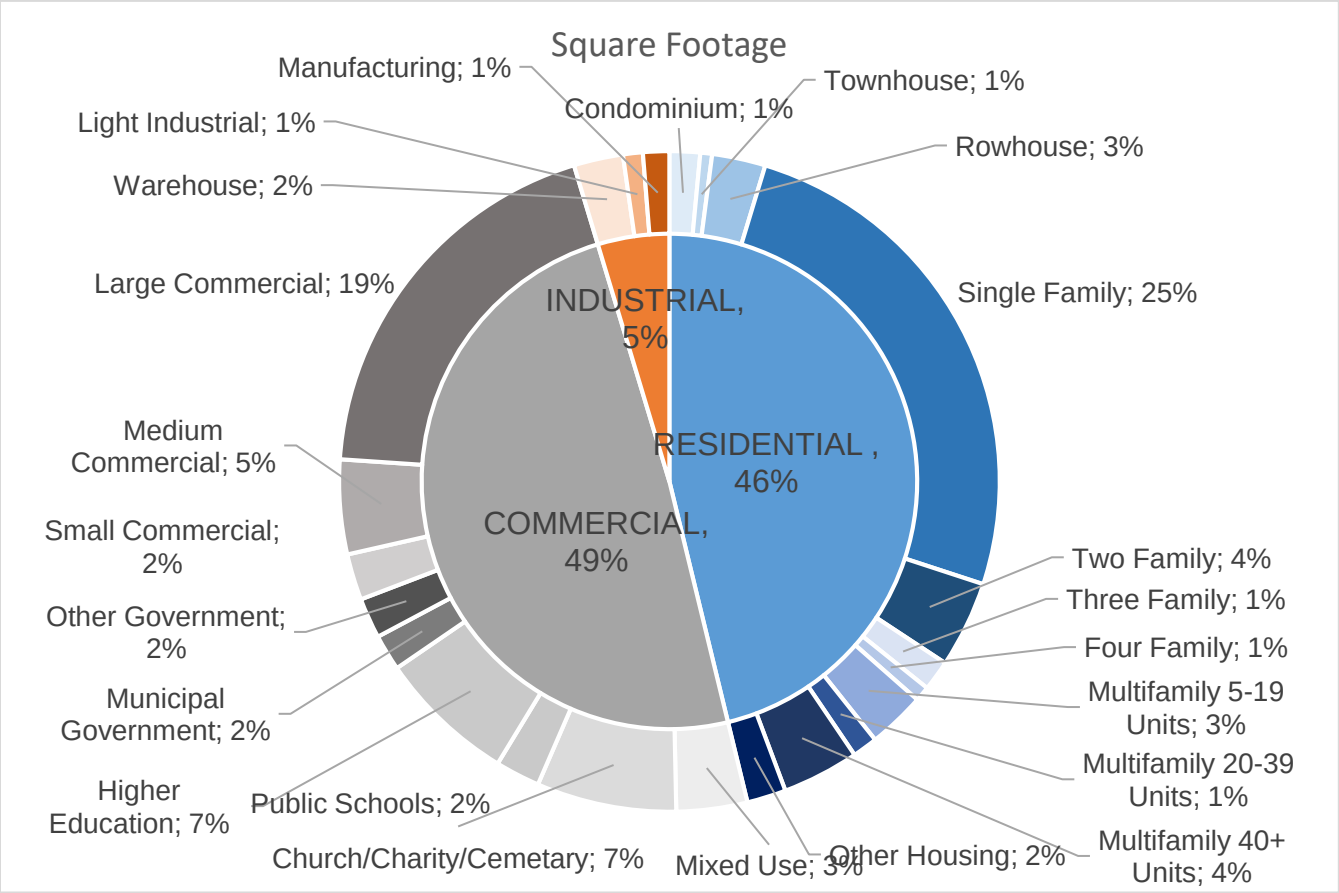


Chart 7: 2013 Building Square Footage by Use Type

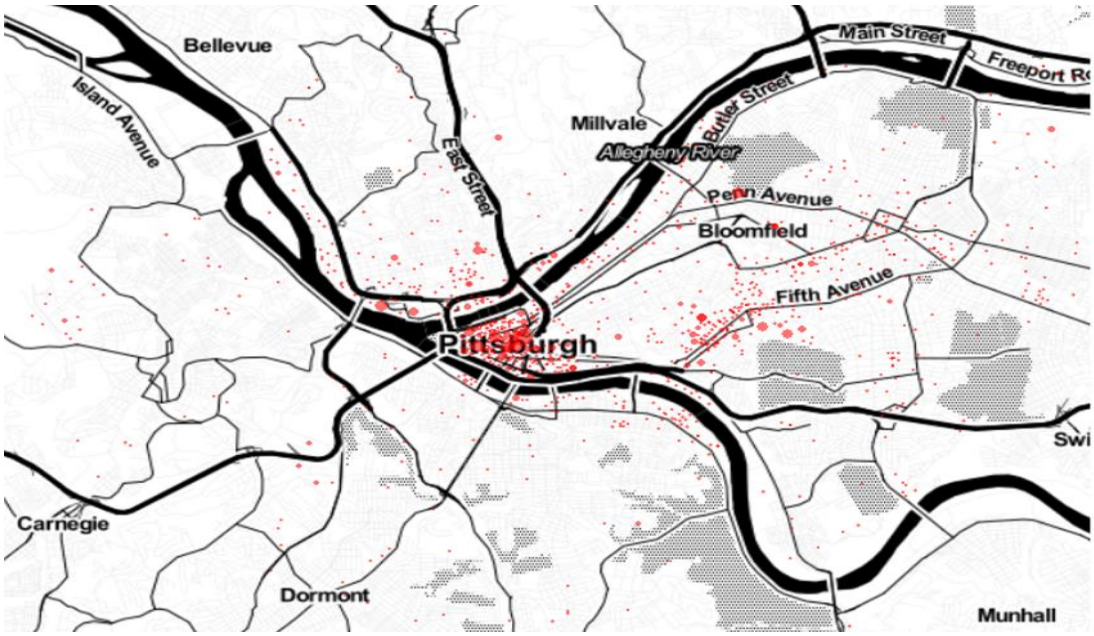
Energy use intensity (EUI) measures how much energy a building uses per square foot, which is largely determined by the building use type with other contributing factors such as occupancy, building age, and quality of building systems. For example, a manufacturing facility with heavy machinery traditionally uses much more energy than a simple warehouse; a home building to passive house standards will be more efficient than a poorly insulated home, thus using less energy per square foot. Using EUI measurements allows for efficiency to be analyzed and compared to similar buildings regardless of building size.

Given currently available local data sources, it is not possible to link energy use back to a specific building or use type, so energy use by sector is divided by that sector's total square footage. In future years' inventories it will be possible to link energy consumption to building use type, size, and geographic location to tell a better story of Pittsburgh's energy use.

Objective: Improve energy efficiency in existing commercial buildings

Building Benchmarking: "You can't manage what you can't measure."

In October 2016, the City of Pittsburgh adopted a new Building Benchmarking ordinance requiring all nonresidential building 50,000 square feet and larger to report annual water and energy consumption starting in June 2018.[22]



Map of buildings in the City of Pittsburgh 'covered' by the benchmarking ordinance

The first step in making any reductions in building energy and water use is to get a better understanding of how and where those resources are used. Benchmarking buildings allows owners, operators, and tenants to understand how each building is performing in relation to its local and national peers. This detailed, benchmarking information can then help inform future decisions and investments, perpetuating cost, and resource savings.

In adopting building benchmarking legislation, Pittsburgh joined 16 cities across the U.S. in requiring transparency toward measurable success. In New York City, the first year of benchmarking legislation, resulted in nearly 6% cumulative energy savings; San Francisco saw an 8% energy reduction with a similar policy. Given that commercial buildings contribute 51% of the City's GHG emissions profile, Pittsburgh hopes to recognize similar cost, resource, and emissions reductions.

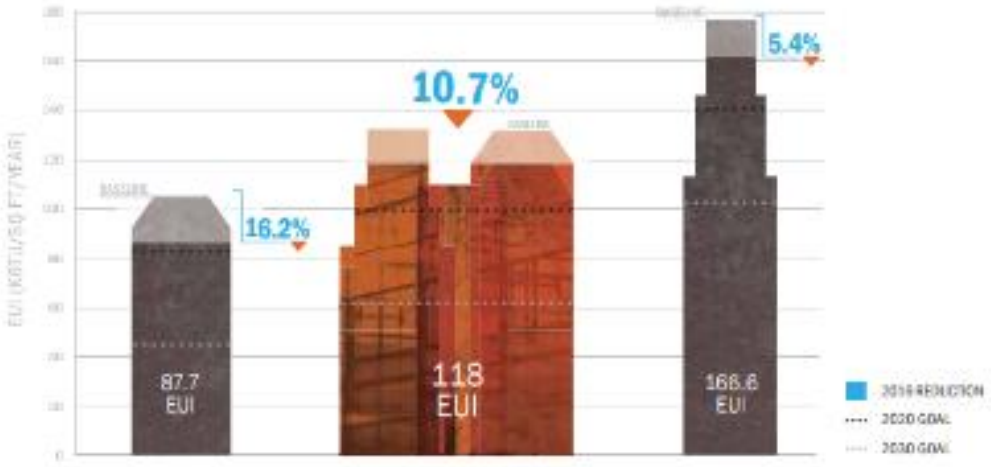
Pittsburgh 2030 District

Pittsburgh's building benchmarking ordinance will expand upon the efficiency improvements already being recognized within the Pittsburgh 2030 District. A Green Building Alliance strategic initiative, the

[22] https://www.imt.org/wp-content/uploads/2018/02/DATA_Benchmarking_Fact_Sheet.pdf

Pittsburgh 2030 District is a collaborative, nationally recognized, local community of high performance buildings in Downtown, Oakland, and three other neighborhoods. It consists of building owners, facility managers, and community and resource partners working together to dramatically reduce energy and water consumption, decrease transportation emissions, and improve indoor air quality while increasing regional competitiveness and returns on investment.

Using performance targets provided by the global Architecture 2030 Challenge, the Pittsburgh 2030 District is demonstrating that high performing buildings are the most profitable buildings in the City. Over 492 buildings have already committed to reducing energy use, water consumption, and transportation emissions 50% below baselines by the year 2030.[23]



Since 2012, the Pittsburgh 2030 District's partners has reduced energy consumption an average of 10.7% below the baseline. This equates to 2.6 Billion kBTUs -- the equivalent of more than 305,000 tons of CO_2 equivalent -- and savings of $52.3 million.

These collective efforts have established the Pittsburgh 2030 District as an international example of a multi-sector endeavor that maximizes performance and profitability while significantly reducing greenhouse gas emissions. This type of collaborative action will keep Pittsburgh competitive as it makes ongoing investments in Pittsburgh's future.

Energy Intelligence Network

Through a partnership with Carnegie Mellon University's Center for Building Performance and Diagnostic Performance and Metro 21 center, the City of Pittsburgh recently rolled out a building energy use dashboard. This dashboard is part of a larger 'Energy Intelligence Network' (EIN) currently in development.

The Energy Intelligence Network is designed to improve data quality and access in order to better understand and thus reduce the environmental impact of City facilities. Starting in the City County Building, the EIN utilizes a number of monitors to collect and display real time energy consumption data. While these monitors have currently only been piloted in the City County Building, the City will expand

---

23 http://www.2030districts.org/sites/default/files/atoms/files/Pittsburgh%202030%20District%20Progress%20Report%202016%20-web.pdf

the Energy Intelligence Network to all 300 city owned facilities. Real time, granular data about the energy being used by plug loads, lighting, and HVAC systems as well as the total energy being consumed can be used in numerous future projects and decision making processes.

Demand Response

Improved data quality as supplied by initiatives such as the Energy Intelligence Network can improve energy management capabilities. Energy management such as demand response programs can reduce energy costs and emissions and improve the resiliency of electric grid infrastructure. Demand response allows building operators to reduce or shift energy consumption during periods of peak consumption across the grid. Through a variety of options individual buildings can impact the demand and supply ratios of electricity in order to help ensure the demand does not exceed the available supply. Additionally, a more level load throughout the day will ensure that the supply is not too great which results in wasted energy.

Currently, if electric companies are unable to manage peak demands for energy, supplemental sources of energy generation, typically supplied by 'restarting' coal fired power plants, must be added to the grid. Peak load shaving, load shifting, and time of use pricing, are a few demand response programs that can help reduce energy costs and prevent grid failures. Through participation in a formal demand response program, building owners can receive payment for reducing or shifting their peak loads. Building owners and operators may use these payments to pay for additional building efficiency improvements, permanently reducing energy loads.

Building Code Updates

Building Codes are put in place to protect the health and well-being of building occupants and ensure that best practices are used in construction and renovations. As codes are updated, new technology, techniques, and best practices are incorporated.

The Commonwealth of Pennsylvania follows the 2009 International Building Codes (IBC), despite the International Code Council (ICC) instituting twice updated codes in 2012 and 2015. To date, state level legislation has prevented the adoption of the most up to date building codes.[24]

Composition of the 2009 building codes began in 2006, meaning that technology developed in the past 10 years are not accounted for in Pennsylvania codes. Due to the lack of adoption of present day codes, Pennsylvania buildings are subjected to higher insurance premiums, higher building operating costs (due to the lack of compliance with leading standards and improved efficiencies), and higher greenhouse gas emissions. The content of modern building codes includes updated technology and standards that allow buildings to be more energy efficient, cost-effective, and resilient.

With the help of many stakeholders, the City of Pittsburgh continues to advocate for adopting up-to-date building codes in the Commonwealth of Pennsylvania. ACT 35 of 2017 amended Pennsylvania's Uniform Construction Code (UCC) thus allowing first class cities (a city with a population greater than one million) to independently adopt more stringent building codes. Philadelphia is the only first-class city in the state of Pennsylvania so everyone else is unable to enforce any building codes beyond the UCC. Moving forward, the City of Pittsburgh is campaigning for, at minimum, a similar amendment allowing second class cities (population of 250,000 to 999,999) such as Pittsburgh to adopt up to date

[24] https://www.dli.pa.gov/ucc/Pages/default.aspx

building codes. However, the ideal situation would be an amendment that automatically updates the UCC to the most recently passed IBC. An amendment such as this would prevent future lags in code adoption and have economic, environmental, and safety benefits across the entire state of Pennsylvania.

Property Assessed Clean Energy (PACE)

Property Assessed Clean Energy (PACE) is an initiative to provide funding for projects that improve energy efficiency, utilize renewable electricity, or promote water conservation.[25]

PACE is a national initiative with locally established programs. Individual states pass legislation that authorizes municipalities to develop appropriate PACE programs. Currently, 33 states plus the District of Columbia have authorized PACE financing for energy projects.[26]

PACE programs provide multiple benefits to property owners and local governments. By providing 100% of project funding upfront, it allows immediate, significant energy savings while spreading the cost over an extended period of time. Businesses may benefit from a positive cash flow because annual energy savings are often greater than the annual assessment. For local governments, PACE is an Economic Development initiative. The program creates local jobs, lowers the cost of doing business and encourages new investment in the area. PACE projects also have a positive impact on air quality and energy efficiency, creating healthier, more livable neighborhoods.

In Pennsylvania, Senators John Blake and Guy Reschenthaler, with the support of business, labor, and environmental communities, have introduced legislation to establish a PACE program. If this legislation passes, Pittsburgh will be able to implement PACE programs locally.

Case Study: Pittsburgh Green Garage Initiative

Though wide in scope, the Pittsburgh Green Garage Initiative (PGGI) is an example of a cross-sector collaboration galvanized by a simple energy efficiency approach.[27] Several local owners realized that dramatic energy savings could be realized by reconciling a few lines of building code, allowing for the use of more controlled and complex LED lights in parking garages. As a result, PGGI was created as a collaboration between the City of Pittsburgh, Green Building Alliance (GBA), Pittsburgh Parking Authority (PPA), Sports and Exhibition Authority of Pittsburgh and Allegheny County (SEA), and Urban Redevelopment Authority (URA). PGGI's goal is to improve parking garages' energy efficiency, reduce environmental impacts, and encourage sustainable solutions for municipally operated parking facilities in Pittsburgh.

The model for much of PGGI's activity has been the SEA which experienced a 64% reduction in annual electricity use at two garages following lighting and controls upgrades. In 2014, the PGGI collaboration built on this approach and received a $470,000 state PEDA grant for lighting upgrades and controls that the collaboration leveraged into sustainable revolving funds for PPA and URA.

---

[25] https://www.legis.state.pa.us/cfdocs/billInfo/billInfo.cfm?sYear=2017&sInd=0&body=S&type=B&bn=0234

[26] https://keealliance.org/c-pace/

[27] https://www.go-gba.org/initiatives/pittsburgh-green-garage-initiative/

As part of PGGI, URA retrofitted five local parking structures that are averaging a 57% reduction in electricity use in their first nine months of operations. The URA's complete retrofit portfolio includes five parking garages with a total of 3,051 parking spaces lit by 1,436 new fixtures. The URA is investigating applying a similar model on its one other parking garage – and leveraging savings by reinvesting into other facilities via a new sustainability revolving fund.

Pittsburgh Parking Authority completed a similar lighting and controls upgrade on its First Avenue Garage in August 2016. This enterprise is expected to have comparable extraordinary electricity reductions of up to 60%. PPAP is now designing similar retrofits on nine additional garages in the City. A recent study also concluded that 6,000 kW of solar photovoltaics (PV) could be installed on Pittsburgh Parking Authority garage roofs and at its' Second Avenue parking lot. The installation of solar PV can further reduce the GHG emissions resulting from the operation of these parking garages. This is an excellent example of how energy efficiency upgrades and renewable electricity generation can be combined to have the greatest impact, eventually allowing for net zero buildings.

Objective: Improve energy efficiency in existing residential buildings

Residential Building Data

With 51% of emissions coming from commercial buildings, it is easy to focus attention solely on commercial energy efficiencies. However, residential efficiency actions also offer opportunities for significant impact. As with commercial buildings, updated building codes will help ensure that energy efficiency is prioritized as new homes are built. However, over seventy percent of existing residential buildings in Pittsburgh were built prior to 1960, many years before energy efficiency standards were integrated into national building codes in the 1970s. While sturdily built, these older homes need renovations to improve efficiency, health and safety.

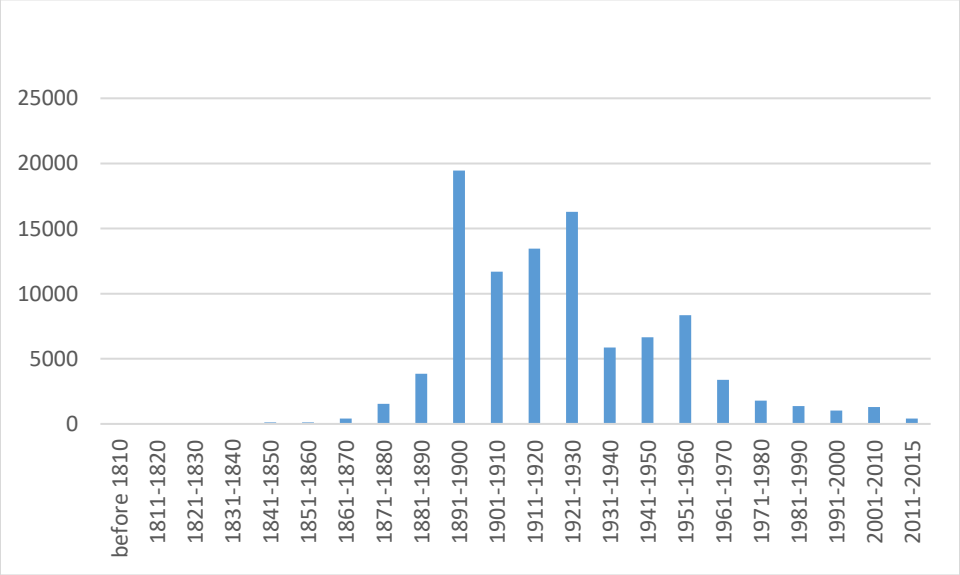


Chart 8: Year in Which Pittsburgh Homes were Built[28]

[28] https://www.netl.doe.gov/sites/default/files/netl-file/City-of-Pittsburgh-Energy-Baseline-20171103-FINAL_0.pdf

Residential energy efficiency projects can offer equity benefits in addition to the potential emission reduction benefits. The American Council for an Energy-Efficient Economy (ACEEE) recently ranked Pittsburgh among the top ten cities where energy burdens, the ratio of utility bills to annual household income, were found to be greatest for low-income households. Nationally, the average energy burden for American households is approximately 4%. However, low income households' in Pittsburgh experience an energy burdens upwards of 15%.[29]

In commercial buildings, electricity reduction offers the greatest opportunity for energy savings. In residential buildings, natural gas efficiency generates the maximum impact. Heating-related natural gas usage constitutes up to 56% of all natural gas usage in the City, 38% of all non-transportation energy usage, and up to 25% of the non-transportation related greenhouse gas emissions in the City. The residential sector is of particular interest, as up to 68% of gas usage in that sector is heating-related, amounting to an estimated 17% of energy use for the City (not including transportation sector emissions). Especially with the aging housing stock, which often lacks insulation or other heat saving updates, a significant amount of heat-related energy is 'lost' or wasted.

There have been a number of initiatives targeting residential improvements however, the ReEnergize Pittsburgh Coalition identified key barriers to increasing residential energy efficiency in Pittsburgh including;

1) Lack of homeowner education and awareness around energy efficiency programs and home performance issues
2) Difficulty connecting homeowners with available programs
3) Homeowner misconceptions about the value and ease of energy efficiency project implementation
4) Uncertainty around demand for and ability to sustain a skilled workforce

ReEnergize Pittsburgh Coalition also identified key strategies for improving residential efficiencies that include; improving consumer education resources, monetizing the value of home energy investments, integrating regional organizations and planning efforts, and identifying financing options and opportunities (Solving the Residential Home Energy Efficiency Challenge).

Green and Healthy Homes

In July 2017, Pittsburgh became the 19th U.S. city to join the Green and Healthy Homes Initiatives (GHHI). The Baltimore based organization utilize eight key elements to help create healthier, more energy efficient homes. These whole-house strategies address issues from lead-based paint contamination, to poor indoor air quality, to energy efficiency in order to reduce housing costs specifically in low income households. These actions can help alleviate costs due to not only high energy burdens but also the socio-economic costs of related issues such as lead poisoning, asthma, lost labor force productivity, and high residence turn-over rates. In the U.S., nearly six million households are exposed to 'unhealthy homes.' Led by Conservation Consultants Inc. (CCI), Green and Healthy Homes is striving to improve the living conditions in those households through education, hazard remediation, advocacy, and efficiency services. Moving forward, the City of Pittsburgh will help promote and implement Green and Healthy Homes Initiatives.[30]

[29] https://aceee.org/research-report/u1602
[30] https://getenergysmarter.org/node/120

Residential Energy Labeling

The new building benchmarking ordinance mandates transparency in the commercial building sector, however, similar transparency does not always exist at the residential level. The U.S. Department of Energy offers a Home Energy Score program that aims at improving residential energy efficiency. Similar to vehicle fuel efficiency, the Home Energy Score provides useful energy use and efficiency information to homeowners and buyers. The scoring process also provides homeowners with suggested energy efficiency projects or updates for the home. Promoting Home Energy Scoring and increasing the number of households that utilize this program can have benefits comparable to those expected to be seen through benchmarking in the commercial sector.

Greening the MLS

A multiple listing service (MLS) is used by real estate brokers to share information about residential and commercial properties with other brokers and their agents. The information is also utilized to enable accurate appraisals.

The West-Penn Multiple List Service is the primary source of information for realtors, home buyers, and appraisers in the Pittsburgh area. Green information such as, solar panels, high-efficiency HVAC, insulation levels, or Home Energy Scores, are not currently included in multi-listing databases. However, this information could have a significant impact on appraisal values and accounting for the true value of these items. Additionally, potential buyers would be able to search for environmentally friendly features and make a better informed purchase. Multiple studies have found that energy efficiency and green features are important to new home and property buyers, and that buyers are willing to pay more for those features. The *ENERGY STAR® for New Homes* label was found to be "very important" to 91% of new home buyers.[1] A survey of home buyers and sellers found that heating and cooling costs were "important" or "very important" to 84% of respondents. It was also found that 73% of home builders have built or are planning to build a net-zero home and green construction is projected to continue to grow. Home energy scores, green listings, and point of sale energy audits can help improve transparency in the home buying process. Increasing the information available to potential homeowners can allow those individuals make informed decisions and, as with the commercial energy benchmarking ordinance, begin to prioritize energy efficiency in residential reality.

Act 129

Utility-managed energy saving initiatives, such as Act 129 in Pennsylvania, represent a significant portion of available efficiency programs available for homeowners, renters, and commercial or industrial buildings owners. While these programs have a number of applications and benefits, they are often underutilized. Act 129 is legislation which requires Electric Distribution Companies (EDCs), such as Duquesne Light, to reduce electricity consumption. Improving education and access to Act 129 benefits can help significantly reduce energy use in cost-effective way. In the residential sector, Act 129 provides an opportunity for efficiency upgrades that would otherwise be unaffordable for homeowners. Increased utilization of Act 129 programs is an important tool in order to reduce energy burdens.

Objective: Improve energy efficiency in existing industrial buildings

Despite Pittsburgh's heavily industrial past, industry currently accounts for only 5% of greenhouse gas emissions in the City of Pittsburgh. While that 5% includes activities such as potable water and sanitary treatment, a granular analysis of the emissions sources has not yet been conducted. The first step to improve industrial efficiency is to conduct this analysis and set a better baseline of industrial based GHG sources. Greenhouse gas emissions from industrial sites is often a single indicator of overall environmental impact; onsite activity can have additional air, water, and soil quality implications, which in turn affect human and environmental health. In order to better account for the true environmental impact of industry in the City, a concise database is needed. With improved information, key stakeholders can be brought to the table and further action can be taken.

Additionally, while the industry may only account for 5% of the GHG emissions inside boundaries of the City of Pittsburgh, there are industrial activities in southwestern Pennsylvania that do not factor in to Pittsburgh's GHG inventory but that have a significant impact on air quality and water quality in Pittsburgh. In Beaver County, about 30 miles North West of Pittsburgh, a new petrochemical processing complex is set to be developed. This single site is permitted to emit 2.2 million tons of CO_2 equivalent annually. For comparison, if Pittsburgh reaches the 2030 goal of 50% emission reduction, 2.1 million tons will be eliminated, compared to the 2003 baseline. This Climate Action Plan addresses what can be done within the 58 square miles that make up the City of Pittsburgh. However, regional action is needed to ensure a healthy future for southwestern Pennsylvania.

Objective: Ensure all new buildings are location efficient by 2030

Updated building codes will help ensure that all new construction incorporates new beyond a building's energy and water use, location has a significant impact on greenhouse gas emissions. If a new building is sited on a green field far away from residential areas and transit, the building decreases carbon sequestration and increases emissions from cars traveling to it. If the building is far from existing infrastructure, there is additional cost and energy loss conveying electricity and natural gas to the site. (More about location efficiency can be found in Chapter 4: Transportation and Land Use)

Beyond a building's energy and water use, location has a significant impact on greenhouse gas emissions. If a new building is sited on a greenfield far away from residential areas and transit options, the building will most likely increase overall emissions due to the distance vehicles will have to travel to and from the building. If the building is far from existing infrastructure, there will also be additional cost and energy loss conveying electricity and natural gas to the site. Pittsburgh defines a location efficiency using overlay map that integrates the walksheds around job centers (1/4 mile), walksheds to frequent service transit (fixed guideways) and protected bikeways to job centers/frequent service transit.

Objective: Ensure all new buildings are carbon neutral by 2030

Enacting the most up to date building codes will ensure that all new buildings, at minimum, incorporate the latest energy efficiency measures. However, buildings can go beyond meeting minimum code requirements and choose to build to passive house standards.

The Passive House, or more accurately, Passive Building, is based on standards designed to cut carbon emissions and energy consumption while providing superior comfort, air quality and resilience. In addition to energy efficiency, passive building standards produce exceptionally resilient buildings. Passive design strategies balance factors such as heat emissions from occupants and appliances to maintain consistent indoor temperatures, even in extreme weather conditions. Continuous ventilation also provides superior indoor air quality.

A Passive Building is designed and built in accordance with five principles[31]:

1. Continuous insulation throughout the building's thermal envelope with no thermal bridging. The thermal envelope is the building's heat flow control layer and a thermal bridge is an area that has higher thermal conductivity and results in heat transfer into or out of a space.
2. An air-tight building envelope that prevents the infiltration of outside air and the loss of conditioned inside air.
3. High-performance windows and doors
4. A balanced heat and moisture recovery ventilation system and a minimal space conditioning system.
5. Management of solar effects to maximize heat gain during the heating season and minimize heating during the cooling season.

Passive building principles can be applied to all types of buildings from single-family homes to multi-family apartment buildings, businesses, and large-scale office buildings. These principles minimize the renewable electricity that is required, and therefore provide a potential means to achieve Net-Zero and Net-Positive buildings.

[31] *https://www.passivehouse-international.org/*

CHAPTER FOUR: Transportation & Land Use

Goal: Reduce on-road transportation emission by 50%

Objective:

- Reduce on-road transportation relate emissions by 50% by 2030
- Reduce Vehicle Miles Traveled per capita by 50% below 2013 levels by 2030
- Increase shift in fuel sources by promoting vehicle electrification
- Reduce freight emissions by 25% by 2030

Strategies:

- Develop a Comprehensive Plan for the City of Pittsburgh
- Synchronize traffic signals to ensure smooth traffic movement, bus prioritization, after hours freight prioritization, etc.
- Increase bike commute rate to 10% of trips
- Increase walking commute rates by 50%
- Implement citywide bike plan and increase access to bike infrastructure
- Promote and grow bike share programs
- Increase Port Authority ridership
- Implement Bus Rapid Transit system
- Integrated bike infrastructure with public transit systems
- Expand transit hubs to promote multimodal trips

Challenges:

- Due to the nature of transportation, accurate, complete data is difficult to compile
- As population of Pittsburgh increase and additional jobs are created in the City, mobility needs will also increase
- Overcoming inequity in access to transit systems

Existing Projects and Previous Work:

- Bus Rapid Transit System
- Uptown EcoInnovation District
- Bike Plan
- Complete Streets Plan
- Bike Share

Transportation Champions:

- Pittsburgh Community Reinvestment Group
- Port Authority of Allegheny County
- Department of Mobility and Infrastructure
- Pittsburgh Parking Authority
- Bike Pittsburgh

Greenhouse Gases from Transportation

Transportation sources of greenhouse gas emissions in Pittsburgh include on-road vehicles such as passenger cars, mass transit, freight trucks, and off-road vehicles, such as construction vehicles, boats, and trains.

It is important to have accurate measurements of GHG emissions from various modes of transportation. Emissions from the use of electricity and natural gas are able to be calculated from aggregate consumption information for specific geographic areas that can be collected from utility monopolies. However, for gasoline and diesel fuel, the location of fuel sales and the location at which emissions are

produced are not necessarily the same. Therefore, total fuel sales within a boundary are not used to calculate transportation emissions. Instead, vehicle miles traveled and emissions per mile are used.

An estimated 18% of Pittsburgh's greenhouse gas emissions come from the tailpipes of vehicles traveling on roads within Pittsburgh city limits. However, there are significant data challenges that require assumptions within this calculation. In order to estimate annual vehicle miles traveled in the City boundary, the Southwestern Pennsylvania Commission (SPC), the Pittsburgh region's local Metropolitan Planning Organization, used a transportation model to provide the weekday total vehicle miles traveled (VMT) on all Pittsburgh roads. A local breakdown of vehicle types was unavailable, so the national average road composition was used, along with average emission factors for each vehicle type. This model only considers gasoline and diesel vehicles, and does not account for emissions from idling vehicles.

To improve the inventory in the future, the model should simulate the entire year of VMT and include emissions from idling. The model should also use the local vehicle composition from DMV registrations, which will allow for emission factors based on vehicle make, model, and year, rather than relying on national averages.

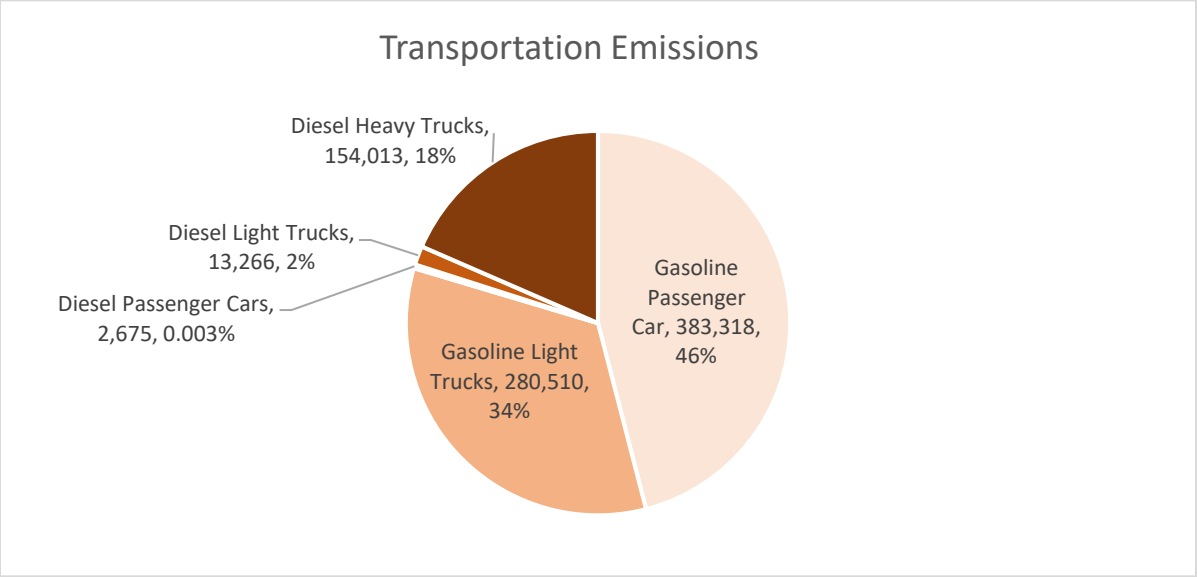


Chart 9: 2013 Sector based profile for transportation related emission

Based on the modeling done by SPC and Carnegie Mellon University, emissions were categorized by vehicle and fuel type. Of the 833,000 tons of CO_2 emissions from transportation, 80% are created by gasoline powered vehicles. In order to reach the 2030 Goal of 50% reduction in transportation-related emissions, significant reductions in vehicle miles traveled (VMT) by gasoline powered vehicles must be attained.

Vehicle Miles Traveled

Since 2003, emissions from on-road vehicles have been tracked in Pittsburgh and the City is following the national trend in decreased vehicle miles traveled (VMT). Since 2004, total VMT in the U.S. has declined slowly. In 2012, total VMT reached the lowest level since 1996. [32]

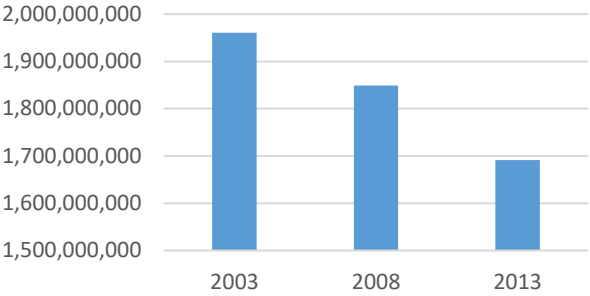


Chart 10: Annual Vehicle Miles Traveled

The decrease in VMT and increase in average fuel efficiency of vehicles has resulted in a decrease in transportation-related greenhouse gas emissions between 2003 and 2013, however, these emissions still account for 18% of Pittsburgh's overall GHG emissions. In order to achieve Pittsburgh's 2030 goals and carbon neutrality, several actions will be required. The increasingly stringent U.S. EPA vehicle emission and fuel economy standards will help reduce on-road transportation emissions. Achieving target reduction will also require actions that reduce vehicle miles traveled on Pittsburgh roads, shift modes away from single occupancy motor vehicles, and shift away from relying on fossil fuels. In addition, equitable access to public transit and alternate modes of transportation is essential to ensure that all residents in the City of Pittsburgh are able to access essential resources such as major job centers, social and human services, grocery stores, recreational centers, schools, and medical facilities.

Objective: Reduce Vehicle Miles Traveled by 50% per capita below 2013 levels

As vehicle fuel efficiencies improve, transportation-related emissions per vehicle will decrease. However, if Pittsburgh's population increases and the number of jobs within the City increases as expected, the demand for transportation will increase thus adding more emissions. To counteract the increased population, the per capita VMT must be reduced. By shifting away from single occupancy vehicles, vehicle miles traveled (VMT) within the City can be drastically reduced. This will help reduce emissions, improve air quality, reduce infrastructure maintenance costs and reduce congestion throughout the City of Pittsburgh.

The best way to reduce VMT is to increase the percentage of trips made by other modes of transportation. Increasing the use of public transit, shared rides, or non-motor vehicle trips will reduce the trips taken in single occupancy vehicles, the largest contributor to transportation related emissions.

Comprehensive Plan Priorities

The City of Pittsburgh is developing its first Comprehensive Plan, which will include a transportation component and complete streets guidelines, prioritizing pedestrian, cyclist, public transit and carpool trips over single occupancy motor vehicles. By weaving together a cohesive network of public transit, bike and pedestrian infrastructure, car-sharing and Transportation Network Company (TNC) services, Pittsburgh will become a city in which single occupancy auto ownership is not required for a high-quality lifestyle. Planning for transit-oriented development and mixed-use, walkable

[32] *https://www.ssti.us/2013/02/per-capita-vmt-ticks-down-for-eighth-straight-year/*

neighborhoods will reduce the miles people must travel to meet their needs and will deter personal vehicle ownership. This will have an added benefit of significantly reducing household transportation costs, improving mobility, and addressing issues of equitable access to goods, services, and places of employment.

As the City aims to reduce reliance on personal auto ownership, there are also efforts in place to increase the viability of electric vehicles and replace internal combustion engines that negatively impact Pittsburgh's air quality and cause adverse health effects. The plan will include a streetlight overhaul, converting sodium bulbs to LEDs, designed to improve visibility and safety for all users of the road.

Setting 2030 Mode Shift Goals

The Pittsburgh Community Reinvestment Group was has led efforts around determining realistic city-wide mode shift goals, identified in the table below:

Mode	2016 Commuter Mode Split	Objective	2030 Commuter Mode Split Goal
Walk	10.3% (+/- 0.6)	55% increase	15.5%
Bike	2.6% (+/-0.2)	285% increase	10%
Public Transit	18.1% (+/- 0.7)	100% increase	36.2%
Single Occupancy Vehicle (Drove Alone)	55.5% (+/-0.9)	50% decrease	27.75%

Table 4: Mode split for commuter trips in Pittsburgh and goal mode split for 2030

In the Southwestern Pennsylvania Commission's 2015 travel model, it is estimated that approximately 29% of all trips were commuter trips, 35% of car-based trips were commuter-based, and around 49% of transit trips were commuter trips. The existing data covers only commuter trips, not leisure trips. Better data for non-commute trips is needed in order to get a more accurate mode split analysis. Assessments such as the "Green Building Alliance, Make My Trip Count" survey can help provide this data in the future. [33]

Increasing Mode Shift

In order to decrease the percentage of commuters driving alone, there must be other viable and easily accessible choices available to replace or supplement driving. There are various transportation demand management (TDM) strategies and actions that can impact a mode shift from personal autos. These include having employers and landlords offer universal transit passes, car/bike share subscriptions, telecommuting and flexible work schedules, road and parking pricing, and road space allocation to promote bike lanes and transit-only lanes.

Increasing Port Authority Ridership

Increasing the percentage of public transit trips requires capital outlay to accommodate increased demand with more frequent routes, additional busses and drivers, and bus facility space available. The Port Authority is currently working to identify the latent demand of people who could potentially take

[33] *https://data.wprdc.org/dataset/make-my-trip-count-2015*

transit but currently are not. Another reconfiguration of the system, to update reforms enacted in 2009-11 should be explored as well.

Increase Bikeability and Walkability

Commuting by bike has shown a steady increase in the past few years and is expected to continue to grow with the creation of new bike infrastructure, including the expansion of total miles of protected bike lanes and bike repair stations. However, there are still deterrents to the choice of a bicycle as one's primary mode of transit, such as winter weather and unsafe traffic conditions. Difficulty using more than one mode of transportation per trip can also deter potential bike commuters. Increasing multi-modal choices through the further integration of biking with transit such as including bike racks on all buses, installing bike share stations at bus and T stops, increasing dedicated bike storage on the T, integrating access to Bike Share with ConnectCard, and ensuring secure bike parking at transit hubs will help promote biking.

Increasing the percentage of commuters walking to work is difficult without strategic land use changes designed to create more walkable and complete neighborhoods. Overall, to see real changes in mode shift, a general shift in development patterns and land use designation – specifically around zoning – is required in order to have a real impact across the City of Pittsburgh. As the City continues to transition and begins attracting more people to the region, it is important to emphasize that all new development projects and re-development efforts are focused on creating a multimodal environment.

Bike Plan

The Pittsburgh Department of City Planning is creating a new citywide bike plan that will clarify the strategy for expanding the City's biking infrastructure, policies, events, and education initiatives. This new Bike Plan will replace the 1999 version and will set the agenda for Pittsburgh's goal to improve the City's bicycling environment. Meetings were held so that residents provide feedback to indicate which areas should become safer and more accessible for cyclists. Residents also provided input on what types of infrastructure, such as bike racks and bike lanes, the City should invest in and where bike share stations should be located.

Designing and Implementing Transit Streets

Strategically designing streets to balance transit operations, car volumes, and pedestrians/cyclists is vital in order for people to easily and efficiently access destinations across a city. Many cities have re-focused their efforts to design transit streets in economic centers to address growth in these areas, transportation mode shift, carbon neutrality, and economic development.

Generally, transit streets offer a way to efficiently integrate on-street transit vehicle facilities, service-enhancing stops and stations, pedestrian and bicycle infrastructure, and general traffic lanes in a variety of street sizes and types. Additionally, transit streets offer a way to design streets through the combination of several elements to form a vibrant streetscape with transit as its spine. When creating these street environments, several key elements must be considered for implementation: service design, capital facilities development, wayfinding, and placemaking.

Complete Streets Policy

On November 21, 2016, the Pittsburgh City Council approved the Complete Streets Policy. The purpose of the policy is "to develop a safe and accessible multimodal transportation system that will promote enhanced mobility for all users regardless of mode of travel, including people of all ages and abilities."

The Complete Streets policy is based on several existing principles for the City's mobility and design planning. It aims to provide access to safe, comfortable travel for all users and modes of transportation while preserving Pittsburgh's environment and incorporating green infrastructure when applicable. Equity for every neighborhood is a goal so that communities dependent on walking, biking, and public transportation have access to safe, convenient, connected infrastructure. For new projects, consideration of all users must be addressed from the start of a project, and the burden is on decision-makers to accommodate all forms of transportation. For existing infrastructure, Complete Streets principles are to be implemented, incrementally over time as the areas are maintained and improved.

In addition, the policy directs the City to work with other agencies such as PennDOT to incorporate Complete Streets principles as appropriate.

Bus Rapid Transit

Allegheny County, the City of Pittsburgh, the Port Authority of Allegheny County, and the Urban Redevelopment Authority of Pittsburgh have proposed a Bus Rapid Transit (BRT) system that connects Downtown Pittsburgh with Uptown, Oakland, and Wilkinsburg and that includes branches to Squirrel Hill and Highland Park.

This route is projected to link more than 30,000 people across 24 neighborhoods via rapid, frequent, and more reliable transit service that is as fast and comfortable as light rail, but could be built much sooner and at a fraction of the cost. In addition to enhancing public transit, this project has the potential to unlock development and contribute to neighborhood growth while linking residents to job centers, educational opportunities, medical services, and cultural attractions.

Parking Codes and Reform

Parking regulations can contribute to transportation efficiency by allowing flexibility in addressing vehicle parking and access issues. Parking reform can be a disincentive to driving by limiting parking spaces, enforcing metering and removing the existing requirement for minimum parking at buildings.

The City of Pittsburgh promotes bicycle commuting in order to lessen car-related congestion by requiring the provision of adequate and safe facilities for the storage of bicycles. The Code also allows for a reduction in required automobile parking spaces when bicycle parking is accommodated and defines minimum bike parking requirements for most new development. The code specifically lists that 60% of bike parking for multifamily dwelling developments must be protected parking in order to replace a portion of car parking requirements.

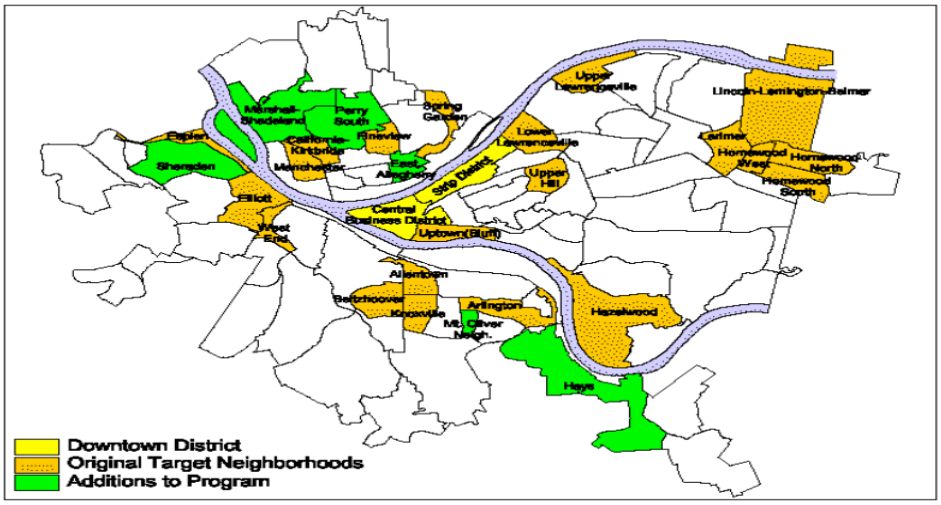
Transit stops can also be incorporated into new development in order to satisfy current standards. Up to 20% of the required parking spaces can be eliminated, provided that certain conditions are met. Transit stops must be clearly identified and open to the public, designed as an integral part of the development project, with direct access to the station or a covered waiting area. They must be well-lit with seating for a minimum of 20 persons. The transit stop must also be maintained by the developer for the life of the project. Additionally, clearly defining Transit Oriented Development (TOD) in the Code would help to limit the various interpretations of what "direct access" to a stop means and would offer an opportunity to develop a TOD overlay

Other cities such as Cleveland, Indianapolis, and Philadelphia have successfully developed parking codes that promote alternatives to car transportation. They require a minimum number of bike spaces

for new development and may allow up to 10% of parking requirements to be met by bike parking spaces. Developers may also reduce the number of required parking spaces if they include electric-car charging stations, car sharing spots, or other "green" amenities. Parking requirements may also be reduced by 10, 30 or even 50% if development is in close proximity to transit systems. Defining what "close proximity" means within the Code is essential for developers to abide by. Implementing similar codes and policies in Pittsburgh can significantly reduce the number of single occupancy vehicles being used.

Land Use and Transit Oriented Development

Despite having many high frequency transit corridors in the City – including Penn Avenue, Butler Street, and Centre Avenue – accessing these frequent service corridors can be difficult. The City will consider implementing a location efficiency policy, such as establishing priority development areas, for all new multi-unit developments and commercial developments within the City limits to create a targeted investment strategy.



Pittsburgh's Targeted Growth Zones, 29 total neighborhoods [34]

Location Efficiency through Tax Abatements

There is a common misconception that property tax abatements are only available for new homeowners rather than for homeowners' repair or rehabilitation projects. Real estate property tax abatements can greatly improve the quality of the existing housing stock by making renovation financially feasible for property owners. Additionally, property tax abatements can allow a wider range of socioeconomic groups to maintain rents at affordable levels. For developers interested in building affordable housing units, tax abatements are a tool that can be used to spur the development of affordable housing.

The Local Economic Revitalization Tax Assistance (LERTA) is a Pennsylvania tax abatement program that was created to improve the economic and business climate of certain residential and commercial districts with declining populations, blighted, vacant properties and a dwindling tax base by lessening the tax burden and encouraging new development. The City of Pittsburgh currently offers various types of tax abatement assistance programs depending on the type of property involved, including the

[34] *https://www.ura.org/media/Act42Enhanced_ExistAreaDescriptions.pdf*

Residential LERTA, the Residential Enhanced LERTA, the Commercial LERTA, and the Act 42 Enhanced Residential Abatement.

Too often in southwestern Pennsylvania, affordable housing developments are designed using traditional suburban methods, contributing to urban sprawl. Consideration must be given to the essential overlap between reliable access to transportation, housing, and job centers. Ultimately, by ensuring this balance of transportation, housing, and job centers, the smart growth model ensures location efficiency by reducing the likelihood of long commute times, mitigating traffic congestion, and creating more opportunities for alternative means of travel.

Location Efficient Affordable Housing

Other tools exist, such as Tax Increment Financing (TIF), to provide incentive for economic development in areas where a high number of vacant or distressed parcels exist. TIF is a tool that has already been utilized in Pittsburgh, and there are approximately 20 sites across Pittsburgh that currently utilizes TIF. Aside from TIF and tax abatement options, there are many other possible solutions that have not yet been utilized in the Pittsburgh region, including Developer Impact Fees, Inclusionary Zoning/Housing, Special Improvement Districts, and District Improvement Funds.

Objective: Increase Vehicle Electrification

City of Pittsburgh Fleet Conversion

The City of Pittsburgh has set a goal of converting to a 100% fossil fuel free fleet. As a part of this goal, a fleet assessment was conducted to better analysis the needs and best options for the fleet conversion.

Downsize of City Fleet

The City of Pittsburgh has had a vehicle replacement policy that requires departments to retire a vehicle before purchasing a replacement, unless the department can demonstrate the need for additional vehicles. However, there are 122 sedans, 35 SUVs and 123 pickup trucks that average fewer than 8,000 miles per year, which indicates opportunities reduce the size of the fleet. The City of Pittsburgh is committed to working with each department to determine the necessity of each vehicle and exploring alternatives such as Zipcar on demand car sharing.

Shift Vehicle Types

Beyond selling off underused vehicles, the City of Pittsburgh plans to identify the necessary vehicle specifications and minimum performance standards for all vehicle uses in the fleet to ensure that each department is well equipped to perform services, using electric vehicles and fuel efficient models wherever possible.

Procurement and Operations

The Equipment Leasing Authority (ELA) and the Office of Management (OMB) maintain a 5-year vehicle acquisition plan that is updated annually. The plan identifies vehicles to retire and aims for a 6-year turnover of sedans and a 10-year turnover of trucks. The ELA established a Green Vehicles Ordinance in 2008 to prioritize purchasing vehicles with high fuel efficiencies and alternative fuels. The fleet currently includes 7 gas-electric hybrid vehicles, 5 CNG trucks, and 24 diesel refuse trucks outfitted with biodiesel tanks.

ELA has drafted a 3-year Electric Vehicle Acquisition Plan that allocates $5 million dollars to purchase 10 electric motorcycles, 81 electric sedans, 14 electric medium SUVs and 107 level 2 charging stations from 2017 to 2019. Electric vehicles will be rotated into the fleet as conventional vehicles are retired and as technology improves.

The City was recently awarded $250,000 in funding from the Alternative Fuels Incentive Grant Program (AFIG) run by the Pennsylvania Department of Environmental Protection. Of these funds, $80,000 funds will be used to help purchase 10 electric vehicles to begin the conversion of the Bureau of Permits, Licensing, and Inspection's (PLI) fleet to fossil fuel free vehicles. The PLI vehicles are ideal candidates for electrification due to their low daily mileage and non-emergency usage.

Purchase and Install Renewable electricity

Given the state of the grid, Pittsburgh recognizes the need to purchase or install renewable electricity to cover the projected demand for electric vehicle charging. The City of Pittsburgh already purchases 35% renewable electricity through the Western Pennsylvania Energy Consortium, a power purchasing agreement with almost thirty local governments and schools. However, these non-certified Renewable Energy Credits (RECs) are not local and will not displace local coal-fired power. Where possible, the City of Pittsburgh plans to install carbon free charging infrastructure for EV chargers. $170,000 of AFIG funding will go towards the installation of this charging infrastructures. As a starter, Pittsburgh is looking to install portable, solar powered charging stations. These stations will allow EVs to be charged without having to tie into the grid. Additionally, these stations can be deployed throughout the City in emergency situations, blackouts or interruptions in electricity supply which will improve the overall resiliency of Pittsburgh and its residents. The first charging stations will charge the DPLI fleet at night and then will be open to the public during the day.

Conversion of other Fleets

Port Authority

In addition to the City of Pittsburgh fleet, electrification of the Port Authority of Allegheny County, whose fleet of over 700 diesel public transit buses have a significant impact on local air quality, is a top priority. Electrifying the public bus fleet will improve rider experience, reduce vehicle lifetime costs and increase the visibility of electric vehicles. In 2017, the Port Authority received a $500,000 grant to transition the 88 Bus line to electric buses. This is a first step in an overall goal of transitioning all buses to electric.

Institution Fleet Conversion

As the City moves towards a fossil fuel free fleet, facilitating the conversion of private fleets will also be a priority. Shuttle buses used by universities, hospitals, and other large campuses can easily be converted with existing technology.

Private Vehicle Electrification

The Pittsburgh Parking Authority (PPA) operates 10 parking garages and one large surface lot, on Second Avenue, in Downtown Pittsburgh. There are currently 15 level-2 electric vehicle chargers in PPA garages. As commercial and municipal fleets move towards electric vehicles, available charging infrastructure will continue to expand. Improved access to charging stations and increased visibility of electric vehicles will help drive the integration of EVs into individual households.

Resilient EV Charging Hubs

Pittsburgh neighborhoods typically lack driveways and garages, making home charging prohibitive for many city residents. Neighborhood charging stations would not only insure access to localized charging infrastructure, but these neighborhood stations would be operated with off-grid solar generation and battery backup, providing a resilient hub for residents to gather and charge devices or vehicles in times of grid failure. The kiosk can also serve other two-way communication purposes, such as a base to distribute weather advisories or similar information in times of emergency.

As an EPA air quality nonattainment zone, vehicle electrification comes with the very important co-benefit of improving local air quality by reducing tailpipe emissions. Using the Resilient EV Charging Hubs as a reporting station for idling or other air quality violations would enable residents to make the connection between the carbon reduction benefits of electrification and their direct health. The Hubs could also be utilized to improve the ease of commuting via less carbon intensive transit modes, as a place to purchase bus tickets, post City transit option maps, and connect people to car, van and bike pools. The kiosks can also provide space for advertising to offset the cost of energy and maintenance.

Objective: Reduce freight emissions by 25% by 2030

In addition to municipal and private vehicle emissions, it is important to address freight-related emissions within the City of Pittsburgh. Conversion to alternative fuel cannot be required, but it is critical to enforce existing laws and policies concerning freight deliveries, idling laws, truck routes, and loading zones. Loading and unloading can be incentivized during off-peak hours. In addition, improved signage around loading zones will encourage compliance. Designated loading zones can be designed to take advantage of existing transit lanes and plans can be developed for efficient coordination of freight deliveries.

CHAPTER FIVE: Waste & Resource Recovery

Goal: Zero waste landfilled by 2030

Objective:

- Achieve zero waste goal by 2030
- Shift toward a circular economy
- Improve data quality on waste characterization and existing diversion rates

Strategies:

- Implement the Roadmap to Zero Waste
- Modernize waste collection systems
- Improve education around waste diversion efforts and options
- Decrease organic materials in landfills
- Utilize anaerobic digestion technology
- Increase composting efforts
- Pursue a circular economy
- Support a statewide bottle bill
- Promote composting
- Increase collection of yard waste
- Increase 'hard to recycle' events and drop off locations
- Distribute recycle bins to all residents
- Enforce existing waste and recycling policies

Challenges:

- There are large data gaps in relation to privately hauled waste
- Numerous private waste haulers operating in Pittsburgh
- Low recycle participation rates
- Decreasing market for recycled materials
- Hauling waste to landfills requires a ~75 mile round trip

Existing Projects and Previous Work:

- Roadmap to zero waste
- Northside bin distribution pilot
- Sustainable Pittsburgh Challenge

Waste Champions:

- Pennsylvania Resources Council
- Sustainable Pittsburgh
- Department of Public Works

Waste Data

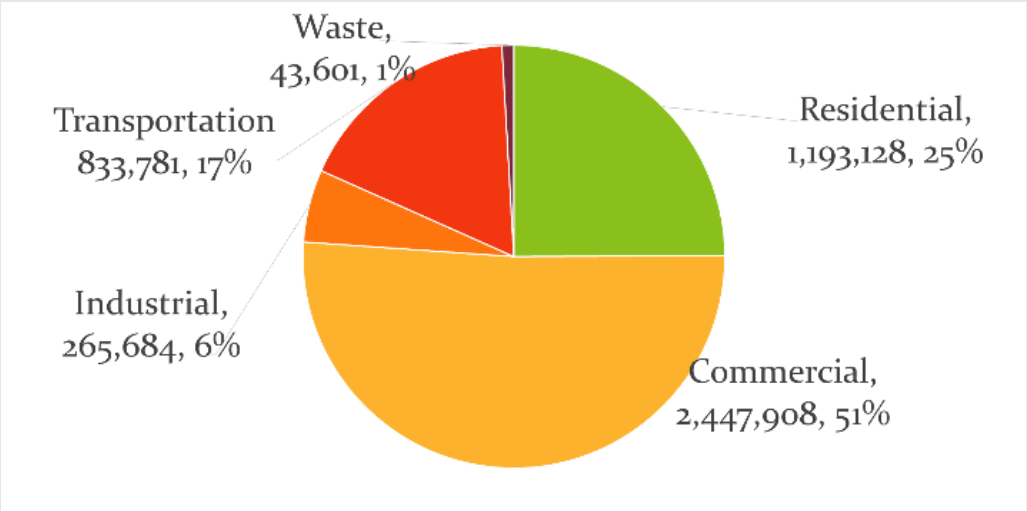


Chart 11: 2013 Pittsburgh Greenhouse Gas Inventory Summary

Based on 2013 data, waste-related emissions only accounted for 1% of the City's total emissions. However, the sector-based inventory methodology, used to develop Pittsburgh's greenhouse gas inventory, only reflects a very small portion of the greenhouse gases that are emitted as a consequence of consumption and waste habits. The sector-based inventory measures only the methane that escaping from landfills, rather than taking into account all sources.

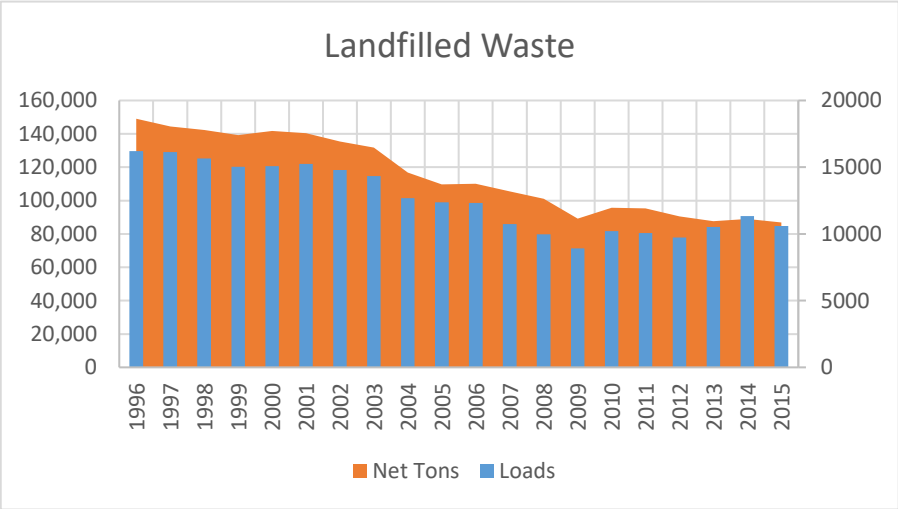


Chart 12: 2013 Net Tons of waste and total loads taken to landfill by DPW- ES

The City of Pittsburgh Department of Public Works - Environmental Services (DPW ES) only collects waste and recycling from residential buildings with four or less units. Therefore, the waste data collected by DPW-ES only accounts for a portion of the total waste being generated in Pittsburgh. Over the years, the scope of service of DPWES has changed, so though total volume and loads of waste hauled to landfill have decreased, this does not necessarily mean that the average Pittsburgh household is producing less waste.

Commercial buildings, including multi-unit residential buildings, individually contract with private waste haulers. Approximately 50 local private waste haulers operate within city limits. Due to the number of buildings that fall within this category it is difficult to gather data about privately collected waste. Solid waste volumes are reported to the state by county of origin so it is possible to estimate Pittsburgh's waste volumes based on the Allegheny County profile. In 2013, Allegheny County landfilled the equivalent of 4 pounds per person per day. Given Pittsburgh's 2013 residential population of 306,062, the City generated an estimated 221,675 tons of solid waste. Of that estimate, 87,710 tons were collected by DPW ES, leaving 133,965 for private collection.

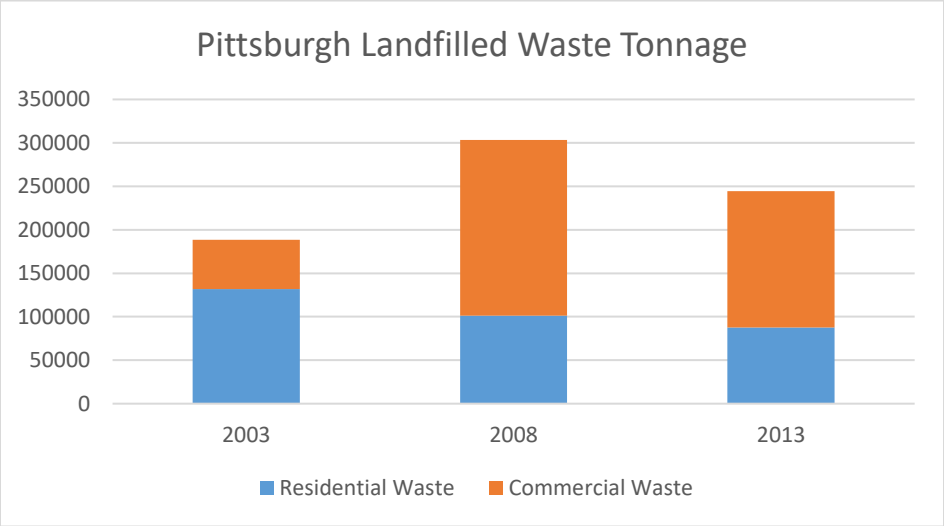


Chart 13: Tonnage of Waste Sent to Landfill from Pittsburgh by Sector 2013

Based on the available data, waste hauled from Pittsburgh has increased between 2003 and 2013. By 2030, Pittsburgh has a goal of diverting 100% of waste from landfills. Because the goal is to reach zero waste, the baseline data is not as important for waste as in other sectors.

EPA Diversion Rates

The U.S. EPA produced a report based on 2013 national municipal solid waste and found that after diversion for compost and recycling, landfill volume had the following composition, here applied to the total estimated landfill waste generated within Pittsburgh. [35]

	2013 EPA US Discard Composition	Pittsburgh Volume (tons)
Paper & Paperboard	15.10%	33,472.99
Yard Trimmings	8.10%	17,955.71
Metals	9.10%	20,172.46
Glass	5%	11,083.77
Plastics	17.70%	39,236.55
Wood	8%	17,734.03
Food	21.10%	46,773.51
Rubber, leather & Textiles	11.60%	25,714.35
Other	4.30%	9,532.04

Table 5: EPA Estimate Diversion Rate-Average for United State Modeled to Pittsburgh Populations

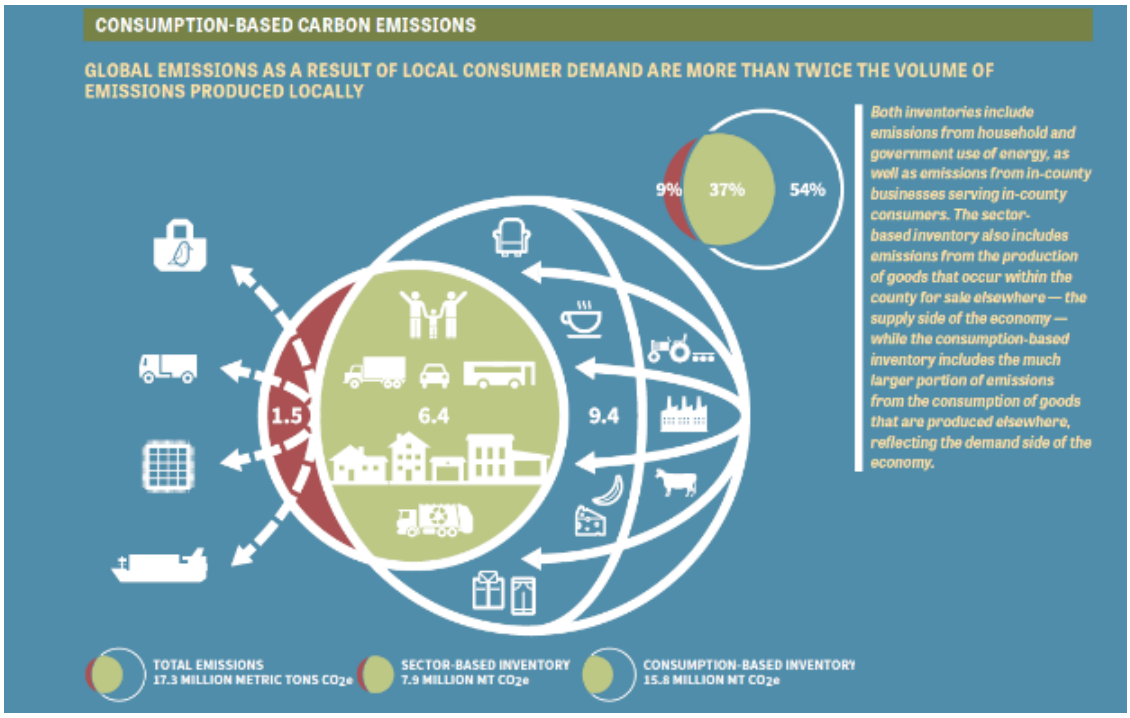
The EPA also produces the Waste Reduction Model (WARM) to help estimate greenhouse gas reductions from solid waste management practices. If the City of Pittsburgh were to recycle all the paper, metals, glass, and plastics and compost all food waste and yard trimmings, it would result in 260,078 MT CO2e avoided, rather than 34,733 MT CO2e emitted.

Objective: Improve waste related data quality

Consumption Based Inventory

The most efficient way to reduce waste is to reduce consumption. Reducing consumption completely removes materials from the waste stream. Additionally, reduced consumption will help mitigate emissions from the creation, transportation, and distribution of materials and products. Before significant consumption changes can begin, a better understanding of consumption trends and practices is needed. With a better understanding of consumption patterns, steps can be taken to reduce the associated environmental impact.

[35] *https://www.epa.gov/sites/production/files/2015-09/documents/2013_advncng_smm_fs.pdf*



Consumption Base Carbon Emission Inventory Methodology [36]

The sector-based greenhouse gas inventory uses the national average waste characterization to determine waste composition and therefore the amount of methane that is released as the waste decomposes. Both landfills that receive Pittsburgh waste have methane capture-in-place systems. However, some gas still escapes into the atmosphere. This methane release is only 1% of Pittsburgh's total greenhouse gas emissions. However, the greenhouse gas implications of Pittsburgh's consumption and waste are much larger. The emissions from the manufacturing, utilization and transportation of products that ultimately end up in the landfill are not easily accounted for in the sector based inventory.

Portland and Multnomah County in Oregon use a consumption-based inventory to track greenhouse gases that are burned outside of their boundaries in the production and transportation of products to satisfy demand within their boundaries. This inventory concluded that 54% of emissions are due to consumption. When comparing the sector-based inventory and the consumption-based inventory, emissions increased from 7.9 million MT CO2e to 17.3 MT CO2e respectively. [37] A consumption based inventory provides a better look into what goods are transported into the City as well as the origin of those goods. This information can be utilized to reduce emissions and to determine key areas of economic development that could provide local alternatives to previously imported goods.

Waste Characterization Study

In addition to a consumption based inventory which analyzes the sources of various goods, a waste characterization study is needed in order to get a better understanding of Pittsburgh's waste streams. A characterization study of the waste that is collected by the City and private hauling companies will help to quantify what is currently being taken to the landfill, what is being recycled, and what recyclable items are not being diverted from landfills.

[36] https://sustainableconsumption.usdn.org/climate/cbei-guidebook/cbei-basics

[37] *https://www.portlandoregon.gov/bps/article/531984*

Building on the waste characterization study, a long-term waste tracking system is needed. The characterization study sets the baseline but a measurement system is needed to track progress toward the 2030 goal. Studies show that active measurement and tracking of recycling information increases participation and encourage citizen ownership of waste reduction goals.

Objective: Implement improved waste collection system

Roadmap to Zero Waste

In partnership with the 100 Resilient Cities, the City of Pittsburgh worked with R20, a non-profit environmental organization, to develop a "Roadmap to Zero Waste." The roadmap outlines a 13-year strategy for achieving zero waste by the year 2030.[38] Actions that can be started or completed in the first 5- years are extracted for the purposes of the Climate Action Plan.

Current vs Proposed Collection Systems

Under the current system, the City provides trash, recycling, and yard waste collection service only to single-family homes and multi-unit buildings with five units or less. There is no food waste collection program and no bins are provided by the City for trash or recycling.

Under the system proposed by the Roadmap, each route and neighborhood will be evaluated to determine the feasibility of using automated cart tipping for waste collection. Where appropriate, automated collection bins and dual-compartment trucks will be used. This will allow one driver to support both the trash and recycling route service at the same time. The new trucks will be fueled by bio-gas because City garbage trucks with a fuel –efficiency of 3 miles per gallon are the largest contributors to air pollution in the City vehicle fleet. Traditional rear-loading trucks could be used for routes where automated trucks are not feasible. They would also continue to be used for yard waste pickups, for special pickups such as Christmas trees, and for collection of construction and demolition waste from various city projects. Unneeded trucks will be sold. It is also recommended that there be an increase in collection frequency for recycling to once-per-week. In order to encourage recycling, the frequency of collection must be at least equal to that of trash collection.

Supporting Policies

It is essential that enforcement be a part of any effective Zero Waste plan. Requirements for recycling are currently in place, but not being enforced. The current source separation mandate will be enforced to encourage support of the recycling program. Education and technical assistance will be provided for multi-family unit residents and for businesses in order to enforce participation in recycling and composting programs and reach recovery rates above 70%.

2015 Northside Bin Initiative: Case Study

The Northside Bin Initiative is a pilot project in which approximately 1,100 recycling containers were distributed to residents served by a single recycling route in the Northside area of Pittsburgh. It was developed to test the impact of converting the collection system from bagged set-outs to provided bins. During the course of the project, data was gathered in order to analyze the impact of the City's proposed new approach for recycle collection. These considerations included: impact to the City's

[38] *https://pittsburghpa.gov/onepgh*

vehicle fleet, staff time, routing, finances, changes to recycling participation rates, material quality and contamination levels, and resident feedback. The primary objectives of this pilot program were to:

- Decrease blue plastic bag contamination at the Materials Recovery Facility (MRF)
- Determine baseline recycling participation data
- Increase resident awareness of recycling
- Increase tonnage of materials recycled
- Measure & track changes in pre/post bin distribution participation & weight
- Measure & track impact to city and route operations
- Educate as many residents in person as possible about recycling and the bin project

The information gathered through this pilot project will assist in the City's plan to expand the bin recycling system citywide. The pilot project will serve as building block for the City of Pittsburgh's "Roadmap to Zero Waste" in the pursuit of a more circular economy. The next phase of implementation will expand the bin initiative from a neighborhood level to a citywide scale that will encompass about 115,200 households. Expanding the project will cost an estimated $2,923,400 to cover bin purchase, distribution, and education citywide. The pilot project was funded by the ALCOA Foundation with support from the City of Pittsburgh and the Pennsylvania Resources Council. Continued funding for the expansion of this project is proposed for the 2018 City of Pittsburgh capital budget, and the City is seeking further grant opportunities.

Benefits of the Northside Bin Initiative

CO2 Reduction: The main goal of this project was to increase the City's diversion rate and reduce waste going to the landfill. More than 44,000 tons of CO_2 equivalents can be attributed to the waste collected by the City of Pittsburgh Department of Public Works. Although this is only about 1% of the City's total greenhouse gas inventory, it is an area in which deep cuts can easily be made. An additional 154,000 tons of CO_2 equivalent are due to the use of diesel heavy trucks, such as refuse vehicles. By increasing diversion rates and reducing waste being dumped at landfills, emissions can be reduced from both the 'waste' and the 'transportation' sectors of Pittsburgh's Greenhouse Gas Inventory[39].

Economic co-benefits: Increased recycling will reduce the cost of waste hauling by reducing the number of trips to the landfills. This will save money through reduced tipping fees, reduced operational and fuel costs, and an increase in the lifespan of refuse vehicles.

RFID tags added to the bins will allow the City to collect better data about household participation and diversion rates. State of the art garbage bin sensor technology will alert the City's Department of Public Works when public garbage bins need to be emptied. This will allow DPW crews to strategically plan collections, resulting in improved efficiency and the elimination of unnecessary trips to cans that are not full.

Environmental co-benefits: Reduction in the volume of waste traveling to landfills and improved quality of materials being processed at the MRF will improve the system's efficiency and resource recovery. Improved waste practices will also help to reduce the amount of 'illegal dumping' that occurs in the City.

[39] *https://pcrg.org/northside*

Health co-benefits: Improved data will allow optimization and reduction of routes that refuse vehicles take to the local landfill. This will reduce vehicle emissions and improve the local air quality.

Social co-benefits: Using a bin system will help to reduce recycling clutter, keeping sidewalks clear for pedestrians and bicyclists, and improving neighborhood aesthetics. Resident outreach and education will increase participation and the quantity of material recycled.

The bin distribution, educational components, and data collection developed through the Northside Bin Initiative will help to advance the City's Zero Waste goal.

Drop-off Sites

Drop-off sites will primarily be used for tires, excess yard waste, scrap metal and for residents with an excess of "traditional" recyclables that will not fit in the recycling bin.

In order to improve these sites, bins at each site should be clearly labeled, hours of the manned sites will be extended to include weekly Saturday hours in order to improve accessibility for residents with day jobs. The sites could also consider adding other hard-to-recycle materials to the list of acceptable materials at the manned sites.

Objective: Eliminate organic materials from landfills

Yard Waste

It's recommended that the residential yard waste collection service be expanded. Current options for city residents include two designated, curb-side, yard waste collection days each year. City residents can also choose to bring their yard waste to one of three manned drop-off sites. These sites also take larger branches, shrubs and Christmas trees, but the drop-off hours are limited to Monday-Friday from 8:00 a.m. to 2:00 p.m. In addition, residents are allowed to set out yard waste on their designated garbage collection day. Any yard waste collected on these days is transported with the garbage to the landfill.

Food Waste

It would prohibit food waste from large volume commercial and industrial generators of food waste entering the landfill. In order to meet that goal, the City will work with the state and the county to promote growth of the infrastructure of facilities to handle food waste. Potential options include the construction of a city-owned compost facility for food waste and landscaping green waste, or enhancement of the county water treatment (ALCOSAN) system to include an anaerobic digestion. The City could also encourage private sector investment in newer/larger compost systems or encourage private sector investment in anaerobic digesters. They could also work with local farmers with existing manure digesters to upgrade their systems to include food waste. In order to reach Zero Waste, a food waste ordinance must be part of a systematic, long-term plan. Commercial businesses that generate more than a set amount of waste per week will be required to recycle organics. When fully operational for commercial businesses, the plan will add single-family households, multi-family housing units and smaller businesses. The plan could also require that new or renovated multi-family housing buildings have adequate handling systems for trash, recyclable, and compostable materials collection.

Anaerobic Digestion

To effectively reduce the carbon footprint of waste, it is important to divert as much material as possible. Pre-sorting organic waste before it reaches the landfill would prevent methane release and allow the material to be used to create energy. Organic matter, including food and yard waste, occupies approximately 21% of landfill space. These organic materials can be separated from the municipal solid waste (MSW) stream and processed in an anaerobic digester to produce biogas. Organic waste that can be broken down by anaerobic digesters includes food and yard waste, fats, oils, and greases, industrial food waste, biosolids from sewage sludge, waste water, and animal manures. All anaerobic digestion systems adhere to the same basic principles, no matter what organic material is being processed.

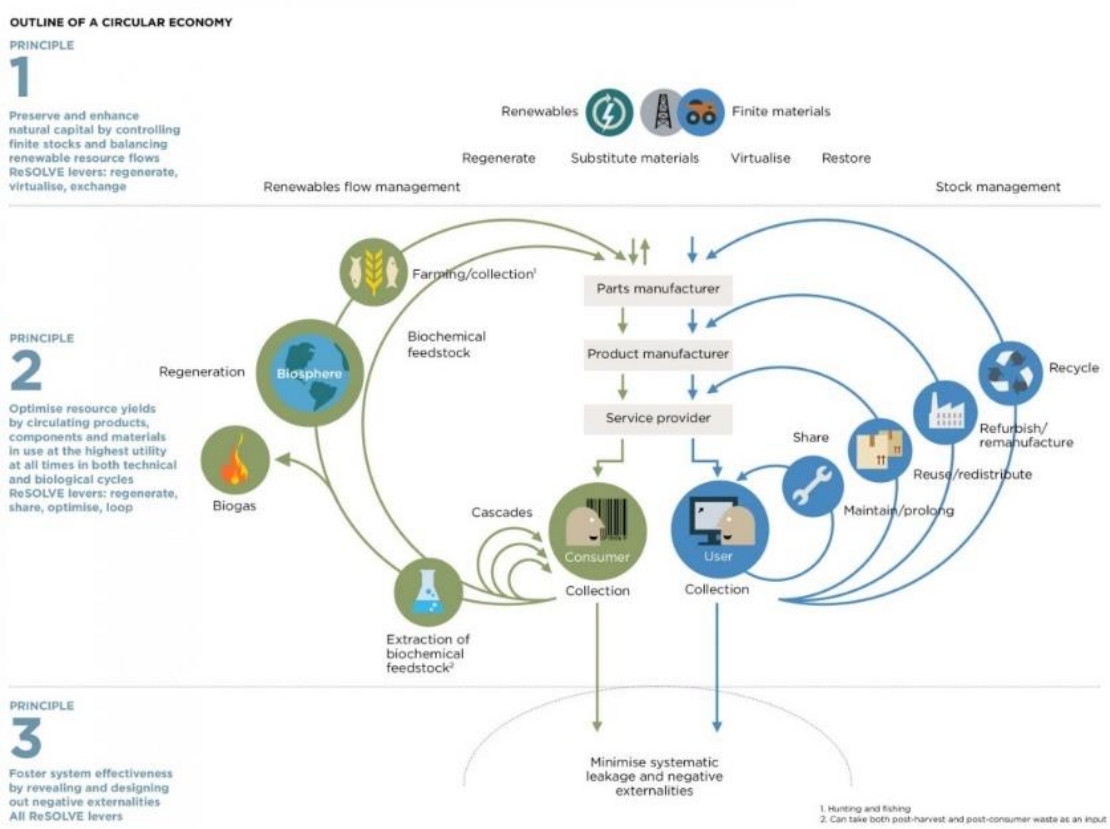
Anaerobic digestion also produces digestate, a nutrient-rich material that is left over following the anaerobic process. Technology exists to separate the digestate into solid and liquid components that have multiple potential uses. The solid component can be composted or heat-processed into fertilizer pellets. It can also be used for animal bedding or converted into other products such as flower pots. The liquid component of digestate can be directly applied to land as a fertilizer or soil amendment. Land application of digestate can improve overall soil health.

Objective: Pursue a more circular economy

Circular Economy

In addition to greenhouse gas emissions, the manner in which we use and dispose of products is a significant concern. We are rapidly depleting the world's natural resources at a rate much faster than they can be replenished. Vast quantities of energy are consumed in the extraction of raw materials in order to manufacture products that are then discarded, creating the need to extract even more resources. Our goal is to transition to a closed loop system, or circular economy in which materials are regenerated, recovered and restored in order to create zero waste.

The concept of a circular economy is in contrast to our current industrial model that relies on a "take, make, and dispose" process. Our current, linear economic model is based on the consumption of large quantities of inexpensive materials and energy that are finite in nature. A circular economy is based on renewable energy sources and relies on innovation to redefine products and services in order to design out waste and minimize negative impact. A circular economy is a continuous cycle that has both technical and biological components. In the biological cycle, resources are used and regenerated through natural processes. In the technical cycle, materials are designed to be recovered and restored with the highest quality retention through minimal use of renewable energy.



Outline of Circular Economy Principles[40]

[40] *https://www.ellenmacarthurfoundation.org/assets/downloads/insight/Circularity-Indicators_Methodology_May2015.pdf*

CHAPTER SIX: Food & Agriculture

Goal: Improve local food systems

Objective:

- Eliminate food waste by increasing food donation systems
- Strengthen the local food system
- Increase the demand for locally grown produce
- Increase the supply of locally grown produce
- Increase small farm profitability
- Promote growth and sales of local produce
- Determine realistic baseline numbers and relevant KPIs
- Increase composting of food waste

Strategies:

- Work with local schools in order to promote healthy eating habits
- Promote 'ugly' fruits and vegetables
- Increase cooking education
- Increase awareness of garden donation programs
- Pilot community composting programs
- Utilize biodigestion to reduce food decay in landfills
- Reduce beef consumption by 30% to meet USDA guidelines
- Adopt a city-wide definition of 'local' food
- Develop an Office of Food Initiatives
- Develop a regional food plan
- Increase institutional purchase of local foods
- Create a prescription program
- Promote climate-resilient, small-scale production methods such as silvopasture and alley cropping
- Increase the number of gardens, urban farms, and peri-urban farms
- Support alternative growing platforms such as hydroponics, aquaponics, and green rooftops
- Continued support for 2012 Healthy School Food requirements
- Create food hubs
- Create cottage food law
- Promote grant programs such as "Local Foods, Local Places"

Challenges:

- Many strategies and objectives do not have reliable baselines
- Inequity in food access
- Poor soil quality limits growing ability

Previous Work:

- Mulan Food Compact
- Food Policy Council
- Adopt-a-Lot program
- Food Bank
- Sustainable Restaurants Program

Food Champions:

- Food Policy Council
- Greater Pittsburgh Food Bank
- Sustainable Pittsburgh
- Grow Pittsburgh

Food System Greenhouse Gas Emissions

The City of Pittsburgh is currently not a major agricultural producer and consequently does not collect data for this category of GHG emissions. However, there is data at the state level that can be used as a proxy for measuring the potential benefits in changes at the City level. The Department of Environmental Protection divides agricultural emissions into three categories: enteric fermentation from livestock digestion, agricultural soil management from fertilizer application, and manure management. According to the Pennsylvania Greenhouse Gas Emission Inventory, each factor contributed approximately 48.47 percent, 34.13 percent, and 17.29 percent, respectively, to the state's agricultural emissions. [41]

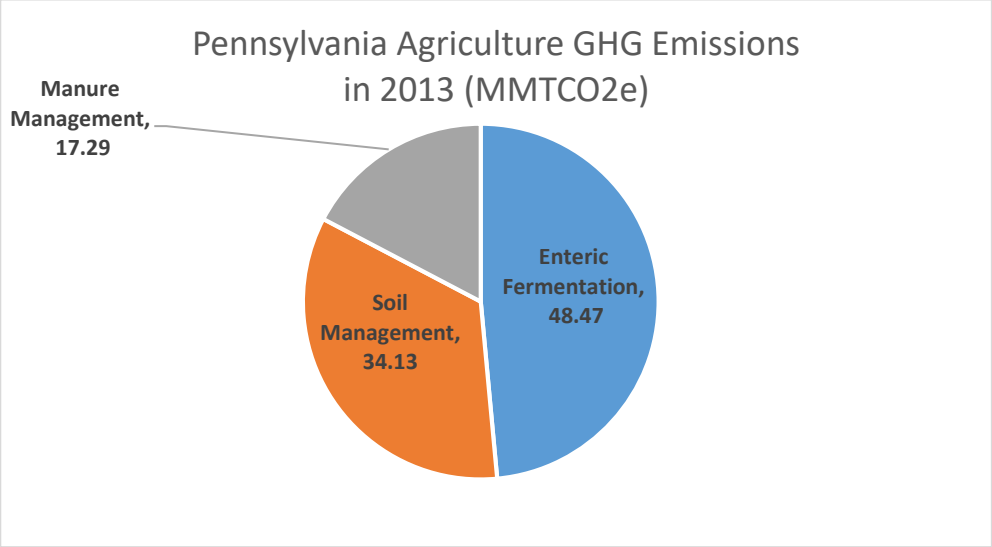


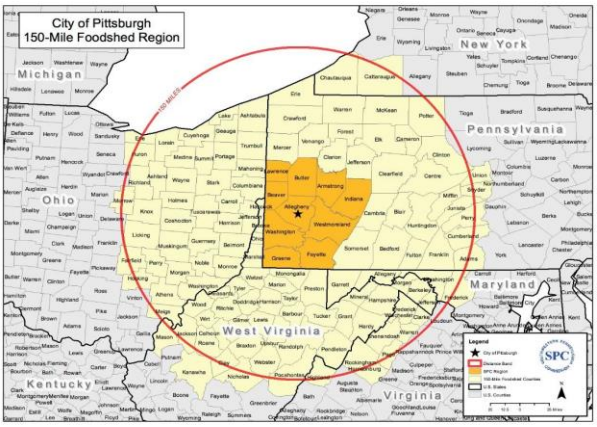
Chart 14– 2/3 of agricultural emissions are a direct result of livestock management, with 1/3 resulting from incorrect application of fertilizers.

Nationally, the agriculture sector as a whole contributes up to one-third of all greenhouse gas emissions when emissions from the farming operations, fertilizer manufacture, and the machinery and vehicles used for production, transportation, and storage are factored in. Although there are no large livestock farms or vegetable farms within the City, residents can help reduce food-related emissions and improve resiliency by supporting the development of local and regional food systems, and reducing food waste.

[41] *https://www.dep.pa.gov/Business/Energy/OfficeofPollutionPrevention/climatechange/*

Objective: Setting baselines

Define 'Local'



While there is no universally agreed upon definition of "local food," informal interviews suggest that a 150-mile radius from the city center is appropriate. Pittsburgh food distributors and organizations, including Parkhurst, Paragon Foods, Giant Eagle, Sustainable Pittsburgh, and the Pittsburgh Public School system all use a 150-mile radius to define locally sourced food. (See *Figure 2*) In practice, farmers tend to travel even less, although they may be encouraged to drive in from further away if there is sufficient demand for their products. Because 150-miles can include multiple counties or states, many food systems professionals and activists also advocate for cities to form partnerships to develop a regional food plan that will account for shared watersheds and growing climates.

Determine Baseline Metrics

As this is the first inclusion of a Food and Agriculture chapter in the Climate Action Plan, baseline data is not as robust as in other chapters. The City of Pittsburgh will work with local stakeholders such as the food policy council to determine the best metrics by which to track the 'quality' of local food systems. Upon choosing these metrics, baselines will be determined using the best available data. This will allow for consistent comparison of progress in future years.

Objective: Support local food systems

Promoting Seasonal Local Food

Increasing and promoting seasonal local food production serves a number of purposes. First, 83% of the greenhouse gases associated with food are a result of the methods used to produce it, while 11% are result of transportation. Therefore, consuming seasonal produce from closer to home can reduce both the emissions associated with transportation and storage, as well as avoid the emissions generated from heated greenhouses during winter months. With 90% of domestically grown broccoli, grapes, strawberries and tomatoes coming from California, the opportunity to reduce emissions by eating more locally produced fruits and vegetables when in season is huge.

As the chart below shows, southwestern Pennsylvania produced less than 10% of what it consumed in 2012, so there is considerable room for more growth in the local agricultural sector.

USDA Category	Production per Capita 2012 ($)				Maximum Local Food		
	USA	PA (Adjusted)**	SW PA	150-Mile Foodshed (Adjusted)**	PA (% of US)	SW PA (% of US)	150 Mile Foodshed (% of US)
Fruits, tree nuts, and berries	$ 89.62	$ 6.05	$ 0.54	$ 9.02	15.26%	1.37%	22.76%
Grains, oilseeds, dry beans, and dry peas	$ 423.47	$ 96.16	$ 40.93	$ 164.02	22.71%	9.67%	38.73%
Other crops and hay3	$ 51.14	$ 20.69	$ 15.04	$ 25.82	40.46%	29.42%	50.49%
Vegetables, melons, potatoes, and sweet potatoes	$ 36.43	$ 7.49	$ 4.23	$ 7.74	20.56%	11.62%	21.26%
Aquaculture	$ 7.71	$ 3.19	$ 0.02	$ 1.14	41.38%	0.31%	14.75%
Cattle and calves	$ 240.99	$ 55.64	$ 18.99	$ 79.76	23.09%	7.88%	33.10%
Hogs and pigs	$ 57.52	$ 28.80	$ 0.13	$ 17.74	50.06%	0.22%	30.84%
Milk and other dairy products from cows	$ 110.39	$ 110.39	$ 32.80	$ 110.39	100.00%	29.71%	100.00%
Other animals and other animal products3	$ 3.91	$ 2.61	$ 0.77	$ 2.54	66.63%	19.66%	64.87%
Poultry and eggs	$ 113.31	$ 88.78	$ 0.48	$ 113.31	78.35%	0.43%	100.00%
TOTAL	$ 1,158.11	$ 419.78	$ 115.12	$ 608.85	36.25%	9.94%	52.57%

Table 6: Comparing Regional Food Production Capacity[42]

In the past, the Pennsylvania *Buy Fresh Buy Local®* (BFBL) program, coordinated by the Pennsylvania Association for Sustainable Agriculture (PASA), organized events and marketing campaigns to promote local foods. This program has been discontinued in Southwestern Pennsylvania due to lack of funding, but local government and organizations can utilize advocates at the state level to secure funding to reinstate programs such as BFBL. The city will also continue to host its own food entrepreneur networking events with the SPC and Allegheny Conference, and promote the resources such as *PA Preferred* website that provides links to local food producers and shops carrying local foods.

The city will also encourage residents and development partners to seek out grants from federal programs such as *Local Foods, Local Places* which assist in local food system development. *Local Foods, Local Places* "helps cities and towns across the country protect the environment and human health by engaging with local partners to reinvest in existing neighborhoods as they develop local food systems." In 2017, these partners invested $810,000 in 24 communities that were selected to implement projects such as creating local food cooperatives, community gardens and farmers markets.

Promote Community Building

When community members take the time to get to know their local farmers and food processors, they can build relationships that encourage cooperation and accountability. A localized food system is more responsive to the needs of its community and will know if members are willing to support the implementation of specific low emissions practices such as construction of solar panel milking stations, biodigesters for organic waste, and new varieties of crops that are more drought tolerant.

Increase institutional purchasing of local foods

The successful development and promotion of a local food system will require the participation of all city sectors. The municipal government can lead this effort by offering local produce and products in government buildings, public institutions, and city schools. In 2017, for example, city employees were invited to participate in a Community Supported Agriculture (CSA) program. Participants paid in advance for a weekly or biweekly share of a farmer's harvest, which they later picked up at the Department of City Planning. CSA programs are not new, but encouraging city employee participation is one way to support the local food economy and show private businesses how easy it can be to incorporate a similar program in their offices.

[42] *https://www.nass.usda.gov/Publications/AgCensus/2012/#full_report*

The Pittsburgh Public School District (PPS) also actively seeks to increase its number of food contracts with local farmers and producers. According to the most recent Farm to School Census Report published by the USDA, PPS devoted approximately 24% of its almost $7 million food budget to local foods during the 2013-2014 school year.

To further promote the purchase of local produce and food products, the City will implement a local food procurement policy for public institutions and government entities that would give preference to local farmers and producers that may otherwise be overshadowed by large corporations. The Los Angeles Unified School District, for example, successfully increased its purchasing of locally produced fruits and vegetables from 9% to 25% after enacting its Good Food Purchasing Program in 2012. Vermont, New Hampshire, and New York City have also enacted local food procurement policies that may serve as models for the creation of a Pittsburgh local food procurement plan.

Encourage institutions to grow gardens

Growing fruit and vegetable gardens in schools and other institutions throughout the city serves two purposes. First, depending on the entity's certification level, produce may be harvested and used in school lessons and workplace lunches, thereby increasing local produce consumption and decreasing the City's carbon footprint. Second, the gardens serve as an educational tool and encourage individuals to make fresher, better food choices for healthier lifestyles in an era of rising rates of obesity.

In their mission to assist schools in expanding garden education, Grow Pittsburgh developed a CORE-aligned garden education program for schools and added 9,400 square feet of growing space in the city through 15 garden installations in public and charter schools. The program has engaged more than 6,000 students and teachers while educating them in food growth and production.

Many large hospitality and food service institutions are supplementing their purchases from local farmers by growing or expanding their on-site gardens. The David Lawrence Convention Center, operated by Levy Restaurants, has three outdoor spaces—in addition to its North Terrace with 27 rooftop raised beds gardens—that supply food for the convention center. Parkhurst Dining, another large corporation in Pittsburgh, has an extensive client portfolio, including Google, Reed Smith, Bayer Corporation, the Pittsburgh Steelers, and Chatham University. At each of these locations, there is a rooftop or urban garden of some sort, providing a percentage of the produce, herbs, and honey direct to the businesses in which they are located.

Hospitals are also key players in sourcing locally grown foods, some even from their own facilities. University of Pittsburgh Medical Center (UPMC) at Magee Women's Hospital recently implemented food production and gardening classes in their Japanese garden as a component of the wellness program. Approximately 2,000 pounds of fresh vegetables harvested from the garden are used in patient meals and the hospital's cafeteria annually.

Increase the number of gardens—particularly in areas with high food insecurity rates

Urban farms and gardens will never replace the important role that rural farms, however, these smaller food production sites serve a multitude of important functions. Urban farms and gardens can provide an additional layer of food security to communities that may lack convenient or affordable access to fresh produce. These green spaces also help to capture carbon and improve air quality, minimize energy

required by grey infrastructure systems to direct and treat stormwater, and electricity demands by mitigating the urban heat island effect.

Grow Pittsburgh has installed 26 school gardens throughout Allegheny County—in addition to its community gardens—and the Phipps Conservatory and Botanical Garden has installed nearly 200 private vegetable gardens for Homewood community members participating in its *Homegrown* project. Both organizations plan to significantly increase the number of gardens in the coming years, but have already greened more than three acres of land within the City of Pittsburgh, and given residents the capacity to produce approximately 10,000 pounds of food.

Adopt-A-Lot

The city's Adopt-A-Lot program has also helped many community groups and individuals to begin growing their own food. Created in November 2015, the Adopt-A-Lot program allows residents to obtain leases and licenses to establish vegetable, flower, or rain gardens on vacant, city-owned land. The leases are renewed each year and licenses can be renewed for a three-year term after the first year. As of December 2017, 78 lots have been adopted with enthusiastic community members spending an average of $10,000 to create vegetable and rain garden on their lots. Much of the money is spent on improving the soil—which often contains little organic matter and may suffer from lead contamination. However, this investment returns big dividends as it increases the lot's capacity to sequester carbon, reduce stormwater runoff and grow more nutritious food. The planned Hilltop Farm, at the former site of St. Clair Village, expects to store and reuse over one million gallons of stormwater annually. It will also save 133,356 kilowatts of energy and reduce carbon emissions by 12,555 pounds.

Recognizing the significant financial investment that goes into creating some of these production areas, and the time commitment of garden members and urban farmers to keep their sites operating at maximum capacity, the city has begun to examine ways to give farmers and gardeners more secure land tenure. Whether through the Urban Redevelopment Authority, the Land Bank, the Land Trust, the Greenways program or some other community development structure, preserving urban farmland will be important for both community food security and continued reduction of emissions totals through soil carbon sequestration.

Support the Urban Agriculture Act

On September 28, 2016, Mich. Sen. Debbie Stabenow introduced a comprehensive urban agriculture bill to the U.S. Senate for inclusion in the 2018 Farm Bill. The Urban Agriculture Act establishes an Office of Urban Agriculture within the USDA and provides funding for a number of programs committed to urban food systems in order to expanding community gardening, and urban farms and rooftop agriculture. The office will develop pilot programs for municipal composting and other food waste reduction strategies and strengthen the connection between healthy food consumption, the environment, and health. The City, along with numerous local stakeholders, will advocate for this bill to better serve the community and further develop urban agriculture in Pittsburgh.

Encourage Plant-Rich Diets

A diet rich in vegetables reduces emissions from livestock production and feed, in addition to decreasing obesity rates. The country has already made huge strides over the past thirty years in terms of reduce beef consumption: USDA data shows that beef consumption peaked in 1976 at 91.5 pounds per person and had fallen to approximately 52.3 pounds by 2012. This has been largely due to increases in the price of beef and the growing popularity of chicken, but may also be partly attributed to the revival of

historical campaigns like "Meatless Monday," that bring attention to health and environmental implications of beef consumption. However, making a small effort to go beyond Meatless Monday campaigns to eat plant-based meals twice a week would reduce meat consumption by nearly 30% and make it easier for a larger portion of the city's demand for meat to be met by local, sustainable, producers. For those who want to make a bigger impact, a switch to a weekday vegetarian diet would reduce meat consumption by more than 70%.

How Many Days Should You Cut Out the Meat to Make a Difference?

Number of Vegetarian Meal Days	Percentage of Meat Consumption Reduced	Car Miles Reduced (200 miles = 82.2kg CO_2)
1	14%	1 hamburger = 200 miles
2	29%	2 hamburgers = 400 miles
3	43%	3 hamburgers = 600 miles
4	57%	4 hamburgers = 800 miles
5	71%	5 hamburgers = 1,000 miles
6	86%	6 hamburgers = 1,200 miles
7	100%	7 hamburgers = 1,400 miles

Table 7: Small changes in diet add up to big savings.[43]

Expand food hubs

A food hub is a business or organization that collects produce from farms in the region and creates channels in which the produce can easily be distributed. Food hubs assist small and medium farmers and producers by aggregating, labeling, marketing, and selling their product for them. By selling the products collectively, hubs help small farmers reach the volume that they need to produce to compete for contracts with large grocery store chains and institutions. The hubs also reduce transportation emissions by having a single entity responsible for collection of the products and bringing them into the City. Penn's Corner Farm Alliance, Republic Food Enterprise Center, and Three Rivers Grown are examples of three food hubs that serve the greater Pittsburgh region, increasing small farm participation in the local market.

Adopt a cottage food law in Allegheny County

Food preservation techniques, such as canning, fermenting, and dehydrating, as well as preparing value-added food products help prevent the waste of imperfect and surplus produce and can provide an important source of additional income. These products are regulated by the Pennsylvania Food Safety Act, which designates residential kitchens as limited food establishments when used to create products intended for sale.

Although state law allows residents to create value-added products intended for sale in their homes, local regulations administered by the Allegheny County Health Department require these products to be made in a commercial kitchen. The local regulations, therefore, prevent residents and small business owners from producing value-added products intended for sale in their homes and impart additional barriers on individuals seeking new business ventures. The city will explore options with the county to remove or modify barriers in small-scale food production. This would give small food businesses the opportunity to grow without the burden of installing an expensive commercial kitchen.

[43] *https://www.earthday.org/take-action/cutting-your-foodprint/*

Permitting food production in residential kitchens not only increases the quantity and diversity of local foods available, thereby reducing emissions totals from imported food, it can also have tremendous economic benefits. California enacted the California Homemade Food Act in 2012, and it went into effect in January 2013. Within a year, over 1,200 local food businesses opened their doors, generating income and supporting local food production. Similarly, Pittsburgh would have a more robust local food economy, while also combatting food waste, if it permitted food production in residential homes or provided easier access to commercial kitchens.

Objective: Prevent Edible Food from Entering Waste Streams

Food Waste Data

The EPA estimates that 40% of food is wasted: the U.S. spends "$218 billion a year, or 1.3% of GDP, growing, processing, transporting, and disposing of food that is never eaten." This wasted food accounts for 21% of all fresh water, 19% of all fertilizer, 18% of cropland, and 21% of landfill volume. If food waste were a country, it would be the third largest producer of greenhouse gases in the world, after China and the U.S. Preventing food from entering the waste stream will eliminate GHG emissions from landfills as well as the production of that food. [44]

Most of this chapter focuses on removing food from the waste streams. Additional information regarding composting, anaerobic digestion, and preventing organic waste from entering landfills can be found in Chapter 5: Waste and Resource Recovery.

Eat "ugly" fruits and vegetables.

Notwithstanding its appearance, "ugly" produce is completely edible and just as nutritious as "perfect" produce, however, ugly produce typically ends up being thrown away because people choose to purchase food that looks perfect. 412 Food Rescue promotes eating ugly produce to combat food waste and recently developed a partnership with Penn's Corner Farm Alliance to begin an UglyCSA program. Stores that offer imperfect fruits and vegetables at reduced prices, and consumers who purchase them, help to reduce this source of food waste and greenhouse gas emissions.

Create community canning centers

The City, its business, and philanthropic partners can help residents to reduce greenhouse gases from wasted food and food imported during winter months by creating community canning centers. Such centers used to be widespread and served as a place where individuals and families could go to get professional instruction and assistance in canning the harvests from home gardens. At a time when few people retain these skills, such community canning centers can significantly increase food security and reduce food waste. Community canning centers existing in neighboring states such as New York, Ohio, and Virginia could provide a model for Pittsburgh. Potential be funding for these centers could come through a grant from the USDA's *Local Food, Local Places* program.

Promote food recovery for all institutions and events.

Established in 2015, 412 Food Rescue is another organization that strives to reduce food waste. The organization utilizes volunteer "heroes" to "rescue" food from donors and deliver to other organizations that re-distribute food directly to those in the community that need it most. Since its inception, the

[44] *https://www.epa.gov/sciencematters/americas-food-waste-problem*

organization has rescued nearly 1,600,000 pounds of food and served over 1,300,000 meals, reducing local emissions by over 855,000 pounds. PPS has begun creating "sharing tables" where kids can exchange parts of their lunch that they do not plan to eat instead of throwing the food away. At the University of Pittsburgh, students launched a food recovery program in fall 2014, collecting and delivering more than 4,000 pounds of food to local entities. In May 2016, the University of Pittsburgh became Food Recovery Certified by the Food Recovery Network, a student movement committed to fighting food waste and hunger. Students recovered over 9,300 pounds of food in 2016. As more companies and institutions support food recovery organizations, food waste will cease to be the major contributor to agricultural greenhouse gas emissions that is now.

Greater Pittsburgh Community Food Bank-Case Study

The Greater Pittsburgh Community Food Bank has led food recovery efforts in the southwestern Pennsylvania region for more than 35 years. Currently, the Food Bank receives donations from grocery stores, restaurants, distributors, manufacturers, farmers, gardeners, and stadiums. The Food Bank and its network of over 150 city-based partners serve 41,000 Pittsburgh residents struggling to put food on the table.

Currently, the Food Bank and their member agencies rescue about 15,000,000 pounds of food per year, including 3,500,000 pounds of food from retail stores, restaurants and other food donors within the city of Pittsburgh. Of those pounds, about 1,700,000 are high-value perishable products: produce, dairy, bakery and meat. Greater Pittsburgh Community Food Bank member agencies directly rescued 4,700,000 pounds of food last year. The Food Bank and its member agencies in the city rely on thousands of volunteers to sort product for safety and pack product for quick distribution. Greater Pittsburgh Community Food Bank is investing in its member agencies to increase their ability to transport and distribute product swiftly while ensuring safe and equitable distribution. Of the 15,000,000 pounds of food, 4,600,000 pounds were picked up by agencies right at the donor's door, ensuring fresh food, and minimizing waste while complying with the rigorous food safety requirements of their contracts with us and our contract with Feeding America. Over the last five years, the Food Bank has doubled the pounds of food rescued directly by agencies. Efforts to increase this activity must be supported to ensure the greatest amount of food is going to the greatest number of people in need in the most efficient way possible.

The Food Bank is also implementing technology to streamline the connections between the food donors and food distribution agencies. In partnership with Feeding America, the Food Bank will be rolling out "Meal Connect," a localized platform for local donors to offer donations to local agencies trained and equipped to safely rescue food. The Food Bank played a leadership role in the creation of the Pennsylvania Agricultural Surplus System (PASS), a state funded program administered by the Department of Agriculture which provides food banks with the ability to defray the costs farmers incur picking and packing excess produce and other agricultural items. PASS has enabled the Food Bank to recover 1.7 million pounds of food that would otherwise have gone to waste since it was first funded by the commonwealth in 2016. [45]

Home garden donation program awareness

Working in partnership with the Greater Pittsburgh Community Food Bank, home gardeners are also able to donate surplus food at a number of locations throughout the city each day, and the Food Bank

[45] *https://www.pittsburghfoodbank.org/financials/2016AnnualReport*

Community Harvest program ensures produce is provided to families in need. The city can support this program by providing information on how to donate produce and work with local organizations in donation marketing.

Objective: Develop an Office of Food Initiatives

For Pittsburgh to successfully address these issues associated with food and climate, there must be an individual leading the conversation. To that end, there is a need to develop an Office of Food Initiatives, which will act as a liaison between residents, the city, and the network of stakeholders comprising the Pittsburgh food system to facilitate conversation and action in the local food climate. The office will have a designated manager to represent the city in an official capacity at meetings and conferences pertaining to food, oversee the implementation of food-related policy recommendations, coordinate efforts related to food policy, and communicate with other food policy advisors and managers throughout the country. With the development of an office dedicated to food policy, the city will then be able to focus on creating a local food plan and working with regional partners to create a regional food plan guided by the principles of the Milan Urban Food Pact and the 100 Resilient Cities project. The Climate Action Plan only delineates a few of those initial steps, but a comprehensive food system plan will contain more information and strategies to further transform Pittsburgh into a more sustainable and resilient community that fosters and promotes a strengthened local economy and diverse food climate.

CHAPTER SEVEN: Urban Ecosystems

Goal: Increase carbon sequestration by 100% by 2030

Objectives:

- Increase tree canopy to 60% (from 42% now) by 2030
- Prioritize habitat conversion from lawns and concrete to urban forest
- Improve urban soil conditions through the use of compost and biomass material
- Increase biodiversity at all levels of the urban environment
- Species diversification/invasive species removal
- Design and implement guidelines for the greenways

Strategies:

- Restore soil by increasing organic matter, reducing compaction
- Halt tree canopy loss due to development
- Minimize loss of trees due to pests and disease
- Encourage sound management practice to limit soil disturbance
- Support efficient water use and storm water management, limit erosion
- Support sustainability in park design, development, maintenance, and management
- Allocate adequate resources to sustain the public open space
- system
- Recover vacant spaces and brownfields for vegetation or urban agriculture
- Establish/continue public education efforts
- Prioritize wetland restoration where applicable

Challenges:

- Climate change will increase extreme weather events and invasive species
- Lack of data on Pittsburgh ecosystems
- Lack of functionality of existing green space
- Development pressure from building industry and current development practices
- Lack of species balance
- Lack of funding for green spaces
- Green space is often viewed as loss of tax revenue
- Legacy contaminants

Previous Work:

- Greenways Plans
- Biophilic City Designation
- Shade Tree Commission
- PWSA Green First Plan

Ecosystem Champions

- Pittsburgh Parks Conservancy
- Phipps Botanical Garden
- BiodiverCITY
- Department of City Planning

Introduction to Urban Ecosystems

Urban areas have unique challenges and opportunities with regard to climate change. Many cities are growing, both in area and in population. They cover only 2-3% of the earth's surface, but hold more than 50% of the world's population and have been estimated to produce around 75% of the total global anthropogenic carbon dioxide emissions. However, urban ecosystems have also been shown to store more carbon per acre than surrounding regions[1]. When discussing a carbon neutral goal, the amount of carbon that can be sequestered by the city's ecosystems is a critical piece of the equation.

In Pittsburgh, there is an opportunity to lower net greenhouse gas emissions through the assessment, protection, management, and improvement of the vegetation, soil, and water.

Objective: Calculate carbon sequestration capacity

Many cities are developing policies to promote urban vegetation in order to reduce their net greenhouse gas emissions. Urban centers are diverse areas with significant potential both to reduce carbon emissions and to increase carbon sequestration and storage. Carbon sequestration is the process of incorporating atmospheric carbon into plants, soil, and water for long term storage. Terrestrial sequestration uses plants to capture CO_2 from the atmosphere and store it as carbon in plants and soil. Geologic sequestration allows carbon to be deposited into long-term storage in geologic zones deep underground. Urban areas have both carbon sources and sinks. A source is any process or activity through which greenhouse gas is released into the atmosphere. A sink is an area of storage for this carbon. Carbon sinks in the carbon cycle include the atmosphere, vegetation, bodies of water, and soil.

Extensive research has been conducted over the years looking at ways CO_2 can be sequestered via vegetation and soil. However, the potential for urban vegetation to remove CO_2 from the atmosphere has is not well-documented. Assessments usually consider only the carbon accumulated by trees and do not take into consideration the effects of soil respiration or the emissions associated with the management of green spaces. In soil, microorganisms and bacteria drive the decomposition and mineralization processes. Soil respiration is dependent on the microclimate within soil including factors such as temperature, water content, aeration conditions, organic matter characteristics, and the presence of organisms. It has been found that green spaces may either act to sequester carbon or as a source of CO_2 emission, depending on the characteristics, species present and the amount and conditions of pervious surfaces for soil respiration. In order to develop an effective plan for management of urban ecosystems in Pittsburgh, more information and quantifiable data is needed about the carbon sources and sinks within the City.

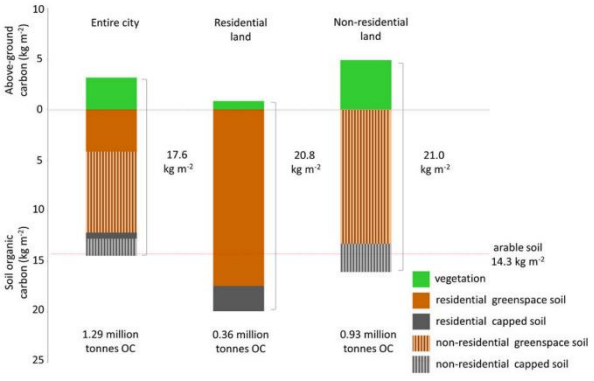


Chart 14: Organic carbon storage density across cities [46]

[46] *https://www.nature.com/articles/srep00963*

In order to develop the best practices for GHG reduction, carbon sequestration must be accurately calculated. Only then can the city and partners act to increase carbon sequestration and storage.

Objective: Ensure Healthy Vegetation is Able to Thrive

Tree Canopy Coverage

Pittsburgh leads major US cities in urban tree canopy coverage with 42% of the City sheltered by trees. Almost 40,000 street trees help Pittsburgh avoid around 3,265 metric tons of CO_2e through shading and cooling. These trees are able to sequester approximately 13,900 metric tons of CO_2e (this considers only the carbon stored in the trees, not carbon stored in the soil).[47] The existing tree canopy cover also provides shade, reduction the heat island effect, and are able to absorb runoff, reducing severity of flooding in cases of heavy rains. The existing benefits are significant, however, to pursue a carbon neutral goal for the City of Pittsburgh, more extensive carbon sequestration is needed. This can be accomplished by protecting existing trees and vegetation and planting additional trees in order to maintain a widespread, healthy, urban forest.

Shade Tree Commission

The shade trees play a vital role in the City's green spaces and they are an essential element of a healthy urban ecosystem. In April 2017 Mayor William Peduto issued an executive order calling for new methods to protect the city's trees. A task force on Tree Protection was created in order centralize all of the City's tree policies and to build on the work being done by the Pittsburgh Shade Tree Commission (PSTC) and the Public Works Forestry Division. Included in the order is the requirement for an inventory of the city's street trees and urban forest as well as a 10-year plan for maintenance, implementation, and a streamlined process for disbursements from the PSTC dedicated funds. The task force will develop a tree policy manual and all Pittsburgh departments, agencies and contractors will adhere to those policies and will be held accountable to the Mayor for upholding the tree protection standards. The policies and standards established by the Task Force on Tree Protection will allow for ongoing maintenance, protection and sustainability of the city's vital tree canopy.

Prevent the Spread of Harmful Pests

As climate change progresses, invasive species such as the Asian Longhorned Beetle pose a serious risk to native forests. As much as 70% of Pittsburgh's trees could be lost if the Asian Longhorned Beetle were to come to Pittsburgh.[48] The Asian Longhorn Beetle is just one example of many invasive species that can endanger native flora and fauna. Due to the quick moving nature of invasive species, educating the public on how to identify, report, and prevent the spread of invasive species is essential to protecting Pittsburgh's ecosystems.

Implement Biophilic Cities Initiatives

Biophilia is a term used to describe the extent to which humans are hard-wired to need connection with nature and other forms of life. Biophilic design is a growing field that recognizes and implements the need for biophilic workplaces, gardens and natural light in hospitals, and the utilization of daylight, natural ventilation, plants, and greenery. Biophilic cities are globally responsible cities that recognize the importance of actions to limit the impact of resource use on nature. They often include a number of attributes such an abundance of green spaces in nature, opportunities for residents to be outside and

[47] *https://www.nationalgeographic.com/news-features/urban-tree-canopy/*

[48] *https://www.phipps.conservatory.org/blog/detail/biopgh-blog-asian-longhorned-beetle*

enjoy nature, multisensory environments, and biodiversity educational programs. Creative and effective means for incorporating nature on a city scale is becoming increasingly important as the world's human population becomes more urban.

The City of Pittsburgh partnered with Phipps Conservatory and Botanical Gardens to apply to the Biophilic Cities Network and was formally inducted into the global network on September 16, 2016. The city's main biophilic endeavors have focused on improvements to water and air quality, and to increasing city residents' engagement with the natural world. The city will create partnerships to enhance biodiversity, increase the tree canopy, install green infrastructure, daylight streams, and plan EcoInnovation districts. Pittsburgh will measure success in these areas through tree canopy coverage over time, extent of biodiversity, participation in monthly biophilic meet-ups, percent of city budget devoted to nature conservation, restoration, and education, among other indicators.

Greenways Plan-Case Study

The “Greenways for Pittsburgh” program was established in 1980 in order to protect steeply sloped hillsides that were unsuitable for building and to consolidate and preserve this land. The Pittsburgh City Council defined the term “greenway” as a permanent, passive open space that benefits the adjacent neighborhoods and the general public. As of today, there are 12 designated greenways in the city, totaling 605 acres of protected land. Emerald View Park contains 61.5 of those acres, and three neighborhood parks contain a combined total of 8.9 acres. Currently, 14% of Pittsburgh’s public open space is designated as greenways. Twenty-one additional potential greenways would add over 450 acres to the system. As a point of reference, the city’s largest park, Frick Park, is 644 acres in size.
The Greenways for Pittsburgh program faces many obstacles to its success. Economic constraints have limited the time and staff available to maintain these open spaces, and defined methods for maintaining these areas must be developed. In addition, these areas are vulnerable to destructive actions such as overuse by motorized vehicles, dumping of refuse and possible unlawful activity. Greenways are also threatened by natural elements such as pests, disease, and invasive species. Resources and methods to deal with all of these issues are needed. Residents of the city have indicated a desire for more greenways as well as improved access to and protection of existing natural areas that are not designated as greenways.

In July 2013, the city adopted the Open Space Plan. One recommendation that came from the plan was “Greenways for Pittsburgh 2.0,” an update of the Greenways for Pittsburgh project. The intent of Greenways 2.0 was to expand and enhance the city’s greenways, improve connectivity of open spaces, and to develop a network of hiking/biking trails. A second recommendation of the Open Space Plan was the development of a Natural Resources Manager. The Greenways for Pittsburgh 2.0 Resource Guide will be released in 2017. The Resource Guide is a how-to manual for citizens who are interested in becoming stewards of one of the city’s greenways. The guide explains the Greenway Program and provides useful information for stewards of existing greenways or those interested in designating a new greenway. A second recommendation of the Open Space Plan was the development of a Natural Resources Manager. The role of this position would be to oversee the management and conservation of the city’s natural resources to meet the public desire for quality, accessible, connected open spaces while striving for the highest level of sustainability.

Objective: Improve Overall Soil Quality

Urban Soil Rehabilitation

Urban soils have unique characteristics that create unique challenges. About one-third of urban carbon emissions result from changes in land use, such as the replacement of vegetated surfaces with developed or industrial land. Soil disturbance due to typical land development practices reduce the organic matter and carbon stored in the soil and increase the carbon emitted from the soil into the atmosphere during construction processes even when the topsoil is replaced. Land management practices for urban agriculture, landscaped areas and lawns can also increase emissions. In addition, urban soils often exhibit altered physical, chemical, and biological characteristics in comparison to local non-urbanized soils. They can be contaminated by pollutants due to anthropogenic activities or degraded due to the influence of past land use on soil properties. These unique attributes can promote non-native invasive vegetation and can create novel soil types that cause difficulties for the ecological restoration of urban soils. Both the loss and gain of carbon in soil depend heavily on the pattern of interaction between plants, microbes, and the soil itself.

Improvement of urban soils is crucial to improving overall ecosystem function. Urban soil quality can be improved by using local resources such as composts and biosolids to restore soil and improve carbon sequestration. It has been shown that soil biodiversity has a positive impact on soil carbon sequestration. Ecosystems with high biodiversity sequester more carbon in the soil and living organisms than those with reduced biodiversity. Methods to reduce compaction of the subsoil also have potential to increase soil carbon storage below the surface. Soil rehabilitation can mitigate the risks from pollutants and improve the soil quality. It has been shown to have the potential to increase carbon storage both above ground and in below ground communities.

Residential Education and Landscaping

In addition to acting as carbon reservoirs, urban forests also affect the soil. It has been found that urban forest soils emitted the least CO2 as compared to lawns and landscaped cover. Conversely, the success of tree-planting projects in cities is also dependent on healthy soil. Healthy soils are critical for vigorous tree growth, so soil restoration, site preparation and management improves the traits of urban soils that are critical for success of any urban forestation projects. The preparation of urban soils for tree planting will improve the health of urban soils and therefore improve the entire urban environment. In the City of Pittsburgh, 60% of private landscaping is residential. The greatest potential for urban forest occurs on residential land, but it is also the area of highest risk of removal of trees. Homeowners must be educated about the effects of their individual decisions on the urban ecosystem.

Vacant Lots and Land Use Decisions

Urban green-spaces and parks can also contribute to carbon sequestration. Urban park soils can act as a carbon sink. The type of land-cover within a park determines the effectiveness of each area. Wetland soils had the highest levels of stored carbon, although their effectiveness may be limited by the release of methane gases into the atmosphere. After urban forests, lawns and bare soils were less effective, but can still influence the carbon budget of urban parks. Turf grass is a major vegetation type in the urban environment, however, plants linked with fruiting and mushroom-type fungi have been found to store 70% more carbon per unit of nitrogen in the soil. In addition, management practices related to turf grass, such as species selection, irrigation, and mowing will also affect carbon release and storage.

Therefore, understanding the land-use history and the choosing the correct type of land-cover in park planning can substantially impact the effectiveness of carbon sequestration.

Due to the decline of industrial manufacturing, many urban centers have experienced population declines that have resulted in large areas of vacant land. Since vacant lots have a limited capacity for carbon sequestration, urban agriculture may be an appropriate land use for these spaces. However, degraded soils are common. Soil amendments such as compost and urban yard waste can significantly improve soil quality and increase crop yields for urban agriculture, thereby improving potential carbon storage in these areas.

Improve ecosystem education

Education and outreach are needed to build an understanding of the importance of sustaining, protecting and improving the urban environment. Public education is necessary for citizens to understand the impact of the urban environment on GHG levels. Resource allocation is also needed in order to support efforts to manage the urban ecosystem. Cooperation between public and private sectors and innovative approaches to the various challenges are essential for success.

Protecting and improving the urban ecosystem in the City of Pittsburgh will provide many benefits to its residents, businesses, and communities beyond reducing the impact of climate change. Natural ecosystems can not only provide climate benefits, but also make our city healthier and more livable. Creating a resilient urban ecosystem will benefit the environment and property owners as well as local and regional communities and economies. A successful process will respect and enhance the relationship between nature and the built environment.

Objective: Improve water quality and increase retention

Sound management of the urban ecosystem will take into account the possible effects on groundwater as well as local waterways. Proper maintenance of soils and vegetation will help to manage storm water run-off and prevent erosion. Erosion causes not only the loss of soil, but also carries organic carbon into the waterways, impacting the health of aquatic habitats. In addition, reduction of GHG will reduce the presence of acid rain and its effects on the environment.

Carbon stored in organic matter gives soil its water-retention capacity. Soil with a higher organic carbon level will help prevent run-off and maintain healthy vegetation while requiring less maintenance and fewer resources. Soil water content and temperature directly affect the production and/or consumption of greenhouse gases. Increased water in the soil helps to increase microorganism and root activity in the soil and allow more carbon to be sequestered.

Ground and surface water are directly impacted by the condition of the soils in the area.
Healthy soils not only help to sequester carbon but also filter pollutants, reduce runoff, control erosion and protect the water supply. Improving degraded soils with compost and biosolids will improve the soil ecosystem with minimal impact to surface water. Likewise, improving the efficiency of water use can reduce soil disturbance and therefore reduce the release of carbon into the atmosphere.

Application of Green Infrastructure

The Pittsburgh Water and Sewer Authority along with the City of Pittsburgh recently developed the ‘City-Wide Green First Plan,’ a plan to manage storm water related issues. Utilizing ‘green first’ methods,

the plan calls for increased green infrastructure to increase water retention, improve water quality, and decrease flooding events. Green infrastructure (GI) (as opposed to more traditional 'gray infrastructure' storm drains and concrete pipes') can provide cost-effective, environmentally friendly water management strategies. Additions such as bioswales and rain gardens can not only reduce storm water

City of Pittsburgh
Department of City Planning
414 Grant St.
Pittsburgh, PA 15219

@resilientPGH #resilientPGH

climate@pittsburghpa.gov

ONEPGH
RESILIENT PITTSBURGH

Building Name	Address	Tax Parcel ID	# Occupants/FT Employees	Gross Sq. Feet	Rentable Sq. Feet	# Floors - ESPM has property info as well.	Year Built
02 Bedford	2305 Bedford Ave pgh. PA 15219	0010-F-00210-0000-00	411	303,550.00	NA	2 floor, 3 floor walkups	1939
04 Arlington Heights	3132 Cordell Place pgh. PA 15210	0030-P-00001-0000-00	143	92,310.00	NA	3 flr walk-ups	1940
05 Allegheny Dwellings	1702 Belleau St pgh PA 15214	0023-C-00012-0000-00	175	114,445.80	NA	3 flr walk-ups	1943
09 Northview Heights High Rise	533 Mt. Pleasant Road, Pittsburgh PA 15214	0077-D-00046-0000-00	145	115,250.00	NA	10	1965
09 Northview Heights Family Community	525 Mt. Pleasant Rd pgh. PA 15214	0077-D-00046-0000-00	538	595,100.00	NA	2 floor, 3 floor walkups	1963
15 PA Bidwell	1014 Sheffield St pgh. PA 15233	0022-R-00065-0000-00	120	135,300.00	NA	11	1969
17 Pressley	601 Pressley St, Pittsburgh PA 15212	0009-A-00125-0000-00		163,000.00	NA	16	1969
20 Homewood North	10 Albertice St pgh. PA 15208	174-G-360, 174-H-1, 174-C-350, 174-C-135-0-1	126	145,550.00	NA	2 fl and 3 fl	1970
31 Murray Towers	2825 Murray Ave pgh. PA 15217	0087-K-00105-0000-00		48,000.00	NA	8	1965
40 Mazza Pavilion	920 Brookline Blvd pgh. PA 15226	0097-D-00067-000A-00	30	23,000.00	NA	5	1984
41 Caligiuri Plaza	803 E Warrington Ave pgh. PA 15210	14-B-303, 14-B-263	104	61,750.00	NA	11	1984
44 Finello Pavilion	3206 Niagara St pgh. PA 15213	28-P-174, 28-P-176	60	43,000.00	NA	7	1985
45 Morse	2416 Sarah St pgh. PA 15203	0012-L-00296-0000-00	70	57,000.00	NA	3 flr & 5 flr	1874 Phase I - original 3 story school. Phase 2 is 5 story constructed in 1985.
46 Carrick Regency	2129 Brownsville Rd pgh. PA 15210	0095-H-00075-0000-00	66	57,950.00	NA	8	1985
47 Gualtieri Manor	2125 Los Angeles Ave pgh. PA 15216	0035-N-00329-0000-00	31	31,780.00	NA	5	1985 (original school 1925)

Pittsburgh & Erie 2030 Districts
Commitment Pledge

Locally driven, internationally recognized

The Pittsburgh & Erie 2030 Districts, a strategic initiative of Green Building Alliance (GBA), sets national standards for high performance building. Local properties commit to the 2030 Challenge goals: 50-65% reductions in carbon emissions for existing buildings and zero carbon for new construction and major renovations by the year 2030, while reducing water consumption and improving indoor air quality. Becoming a 2030 Partner means joining the largest 2030 District in the world.

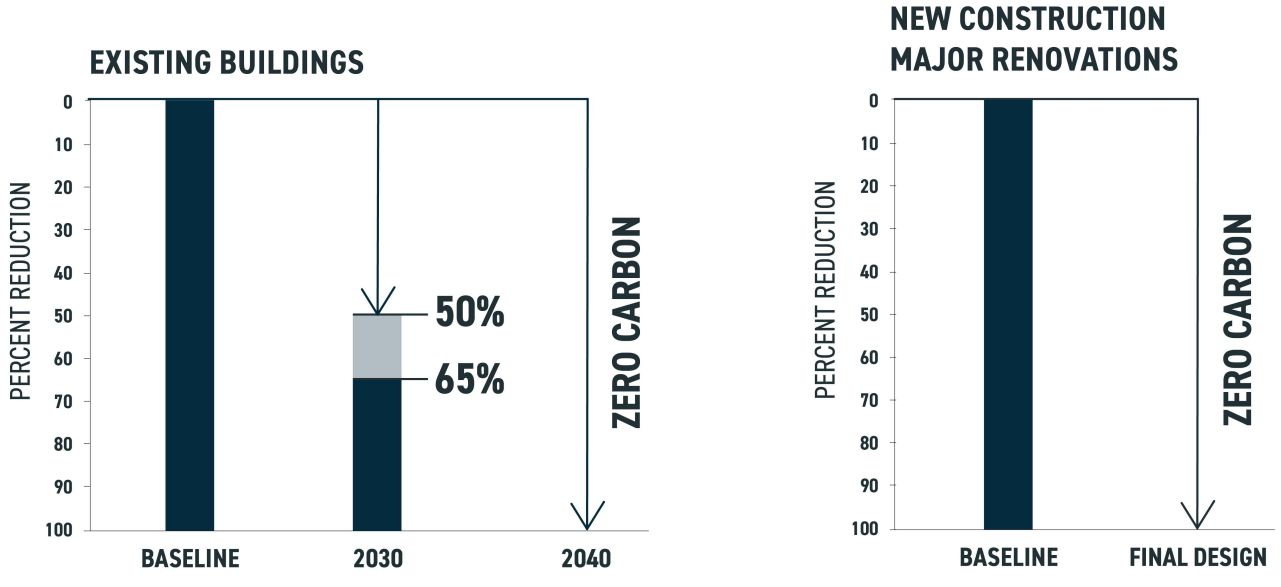
Benefits

- Annual building performance reports
- Invitations to exclusive, educational monthly Partner meetings with discussions on market trends, new technology, and financing
- Access to technical assistance on all building projects from GBA staff
- Recognition on published lists of committed partners and maps
- Connections to 2030 District Resource and Community Partners
- Support with City Benchmarking Ordinance as applicable

Requested Actions

- Support GBA through organizational membership - contact Megan Zeigler at meganz@gbapgh.org
- Make a good faith effort to improve building performance and reach 2030 Challenge Goals
- Report annual water and energy usage to GBA staff via an excel document, or Energy Star Portfolio Manager account
- Contact Paige Colao (paigec@gbapgh.org) if you have any technical assistance needs!

2030 CHALLENGE GOALS



ERIE 2030 DISTRICT PITTSBURGH 2030 DISTRICT Green Building Alliance