

**City of Rochester, NY Climate Pollution Reduction Grants Program  
(CPRG) EPA-R-OAR-CPRGI-23-07: Workplan**

**City of Rochester Residential and Municipal Greenhouse Gas Reduction Program**

**Section 1: Overall Project Summary and Approach**

**a. Description of GHG Reduction Measures**

The City of Rochester is proposing four (4) projects to significantly reduce GHG emissions. These measures include the installation of renewable energy, clean heating and cooling, energy efficiency and other sustainable building improvements at high-visibility public facilities and in the homes of low-income disadvantaged residents. Two projects directed toward city residents will be incorporated into existing, successful City programs that serve low-income residents. The Residential Solar Program will supplement the City's existing residential roof replacement program to incorporate solar on the new roofs. The Residential Clean Heating and Cooling Program will enhance the City's existing emergency furnace and water heater replacement program to incorporate heat pump water heaters (HPWHs), air source heat pumps (ASHPs) and air sealing and insulation upgrades. These residential programs will reduce GHG emissions and increase access to energy efficient technologies in disadvantaged neighborhoods. Two projects are related to municipal facilities. The Municipal Facilities Solar Upgrades project will install renewable energy at three downtown public facilities. The Solid Waste Management Facility Sustainable Upgrades project will incorporate geothermal, solar, and energy efficiency improvements to reduce GHG emissions, improve safety and comfort at the facility, decrease utility costs, increase job opportunities in sustainable trades, and allow the facility to serve as a sustainable model for the public and other communities. All these projects support the Genesee Finger Lakes Regional Priority Climate Action Plan (PCAP)'s goal to reduce GHGs and align with PCAP strategies and measures. Each of the proposed projects is located entirely within low-income disadvantaged communities within the city of Rochester.

***Project #1: Residential Solar Program***

The City of Rochester's existing Owner Occupant Roof Program (OORP) provides funding to install new roofs to eligible homeowners who are unable to make this necessary improvement. The Residential Solar Program will leverage this existing City-managed program to install approximately 400 rooftop solar systems on homes located in low income and disadvantaged neighborhoods of the city of Rochester, resulting in annual generation of 3,500,000 kWhs that will replace electricity generated from the electric grid. This measure will result in annual GHG emissions reductions of 471.83 mtCO<sub>2</sub>e/ year.

The City will select residential roofs for solar installations from participants in the City's existing OORP. The current program allows income-eligible (generally, total household income not exceeding 80% of HUD's area median income) homeowners in need of a new roof to enter a lottery run by the City to receive a new roof. The Residential Solar Program will be open to households that received new roofs over the past five years and houses expected to participate over the next three years. The City will select participants based on homeowner interest and solar suitability factors such as shading, position of trees, and roof orientation. It is anticipated that approximately 400 households will be participating in the Residential Solar Program.

The City's Residential Solar program is designed to deliver the tax advantages included in the Inflation Reduction Act (IRA) to residences by using a residential lease program where the solar system is owned by a third-party solar company, who will absorb the tax credits and pass those savings on to the resident in the form of a lower initial investment and increased utility bill savings. The low-income adders and

census track tax credit adders of up to 30% additional tax credits are not available to this project because that program has been fully subscribed. EPA funds will replace those tax benefits in the amount of 33% of the per project costs. Along with GHG reductions, the City's Residential Solar Program will provide a reduction of more than 50% per year in electricity bills for 400 low-income households in Rochester, with eventual ownership of the systems by the participants.

The Program will utilize a single pay lease option. In this Program, the participating homeowner pays their lease and buyout off in a single payment allowing the third-party owner (the solar company) to take the tax advantages to reduce the system price to the participant. In conjunction with EPA funding, this creates a roughly 15% cost to the participant. If the participant has this amount in available cash, they can just pay it. If not, a loan program will be set up with an appropriate lending partner [e.g., New York State Energy Research and Development Authority (NYSERDA) Smart Energy Loan, NY Green Bank, or local lenders]. The loan term will be set to ensure 50% electricity cost savings to the participant and outright ownership of the system at the end of the term. To reduce risk to the lender and allow this program to grow, a loan loss reserve fund in the amount of 15% of the lending value will be established. Under the Program, the system will transfer ownership to the homeowner in 12 years. By comparison, standard lease options in the solar business are typically using a term of 25-30 years, which is the entire warrantied life of the solar system. This creates immediate positive cash flow and near-term equity for the host family. The project will significantly reduce the use of grid electricity in eligible households within areas of the city where clean energy technology is most inaccessible.

The City's Division of Environmental Quality (DEQ) will monitor solar energy generation through the solar installation system's online portal established by the solar installer and document participant electricity savings by accessing utility records, which will be program participation requirements. The City will document the number of solar systems installed, renewable energy capacity (kW), amount of electricity generated annually (kWhs), corresponding reduction in GHG emissions, and electricity cost savings for the homeowners. City staff will document its engagement with participants in the roof replacement program regarding any reservations or questions homeowners have regarding adding solar panels to their rooftops. The City and its solar contractor will work with participants to ensure solar credits are reflected in their utility bills. This information will assist the City and other organizations with outreach and education to encourage other disadvantaged homeowners to consider solar.

This project leverages NYSERDA solar incentive funds, IRA Tax credits, and an existing successful municipal program.

While the Program lowers utility bills for low income, disadvantaged residents, there are additional important co-benefits, including raising awareness and education around renewable energy in the community, increasing local demand for rooftop solar, demonstration of the effectiveness of the technology, and contributing to workforce development and job creation in the renewable energy field. The Program will infuse renewable energy throughout the city in locations where very little has been installed.

#### **Tasks & Milestones:**

<b>Tasks</b>		<b>Milestones</b>
1	<b>Procure contractors/ Update list annually</b>	Prepare and maintain list of approved contractors
2	<b>Identify suitable homes</b> Evaluate roofs replaced over past 5 years/identify rooftops Evaluate roofs replaced during next 5 years/ identify rooftops	Confirm suitability of homes from those participating in roof replacement program.

3	<b>Recruit Program participants</b> Enlist roof replacement participants over past 5 years Enlist roof replacement participants over next 5 years	Program participants informed and prepared to participate.
4	<b>Secure solar installers (prepare bidding specifications, obtain required permits, execute and administer contracts.</b>	Specifications, bid documents and installer contracts.
5	<b>Install solar panels.</b>	Rooftop solar installed
6	<b>Inspect work.</b>	Installation inspected.
7	<b>Monitor energy uses and GHG reductions (annually)</b>	Annual report of energy usage and GHG reductions
8	<b>Prepare and submit semi-annual and final EPA Reports.</b>	Semi-Annual/Final EPA reports

### ***Assumptions/Risks:***

The program design assumes that 400 houses will participate in the program. The average rooftop area is 1000 sq. ft., and 40% of the roof area would be available for solar panels, resulting in rooftop panel area of 400 sq. ft. The pitch of the roof is between 10 and 45 degrees. Each participating home has a single meter. Based on input from a local solar installer, panel efficiency is assumed to be 17.50 Watts/sq. ft. The cost of electricity is assumed to be \$0.14 including supply and delivery.

By supplementing an existing City-run program, administrative structures are already in place to implement the program. The technology for rooftop residential solar is mature and reliable, and local installers have experience with lease programs, ensuring a high probability of program success.

A risk exists that people may be hesitant to try new technologies. To mitigate this risk, the Clean Energy Hub, a NYSEERDA-funded initiative managed by the Climate Solutions Accelerator (CSA) to ensure that underserved communities participate in and benefit from the transition to clean energy, will provide community education and outreach to encourage residents to adopt renewable energy technology in their homes. The City will include information and FAQs through outreach provided by its Neighborhood Service Centers (NSCs), while the selected solar contractor will also assist with participant education.

***Relation to PCAP:*** This project aligns with the Genesee Finger Lakes Regional PCAP's goal to reduce energy use. It will advance Buildings & Infrastructure Strategy #1, included on p. 42 of the PCAP and p. 2 of the PCAP's Appendix C, to "Advance the Decarbonization of Buildings and Infrastructure" by replacing grid electricity with renewable (solar) energy in residential structures. The PCAP includes a measure in Strategy # 1, found on p. 42 of the PCAP and p. 2 of the PCAP's Appendix C, to establish financing mechanisms for energy efficiency upgrades for residential buildings with a focus on LIDAC communities.

### ***Project #2 Residential Clean Heating and Cooling Program***

Under the Residential Clean Heating and Cooling Program, the City will replace an estimated 160 residential gas-fired water heaters with HPWHs and 300 gas-fired or oil-burning furnaces or boilers with cold-climate ASHPs in low income, disadvantaged households over five years. The ASHPs and HPWHs will be installed in homes participating in the City's existing Emergency Assistance Program (EAP), which provides financial assistance to eligible owner-occupants (generally, total household income not exceeding 80% of HUD's area median income) to help with emergencies with furnace/boiler, hot water tanks and/or water service. The existing EAP replaces water heaters and furnaces for those in need through a lottery system with traditional natural gas models. Instead of replacing a participant's current model with a traditional gas-fired model, the program will provide all-electric cold-climate ASHPs or HPWHs. EPA funds under this measure will cover the incremental additional cost of installing ASHPs and/or HPWHs as well as the cost of improved insulation, air-sealing, and electrical panel upgrades to

ensure the highest efficiency of the heat pumps. The City will procure experienced contractors to participate in the program.

The Residential Clean Heating and Cooling Program will increase access to all-electric heating and cooling technology for disadvantaged homeowners who would not otherwise have the opportunity due to financial barriers. In offering this program to disadvantaged communities, most of which that have been disproportionately affected by the impacts of climate change and suffer disproportionate rates of asthma and other respiratory diseases, the City is able to positively impact these households through lower utility costs and improved indoor air quality and comfort. Improved indoor air quality of these homes will impact the health of residents with benefits ranging from a reduced risk of exposure to the products of natural gas combustion in the home, respiratory diseases, and reduced incidence of heat- and cold-related stress resulting from extreme weather conditions.

To monitor program performance and costs to residents, City staff in DEQ will monitor residential utility accounts and document the reduction in natural gas usage, energy costs, and overall GHG reductions annually over the next 5 years. The City will also document the number of HPWHs and ASHPs installed in residences that would otherwise have received traditional gas water heaters and furnaces, as well as the reduction in GHG emissions associated with these installations.

In addition to leveraging incentives offered by the NYSEDA, this Program offers additional co-benefits, including the demonstration of effectiveness of ASHP and HPWH technologies, particularly in cold climates, access to technology normally out of reach for low-income residents, increased public awareness of clean heating and cooling technology, improvement in participants' indoor air quality, and workforce development for clean heating and cooling jobs in the community.

**Tasks & Milestones:**

Task		Milestone
1	<b>Procure contractors/ Update list annually</b>	Contractor list updated annually
2	<b>Select participating homes from those that apply for furnace and hot water heater replacement</b>	Suitable homes identified and homeowners informed and prepared to participate.
3	<b>Prepare specifications and secure installers (prepare bidding specifications, obtain required permits, and execute and administer contracts.</b>	Specifications, bid documents and installer contracts.
4	<b>Install ASHPs and HPWHs.</b>	Complete installation
5	<b>Inspect work.</b>	Inspections by City staff
6	<b>Monitor energy uses and GHG reductions (annually)</b>	Document energy use and GHG reductions
7	<b>Prepare and submit semi-annual and final EPA Reports.</b>	Semi-Annual and Final EPA reports

**Assumptions/Risks:** Through the existing EAP program, the City replaces an average of 40 hot water tanks and 75 furnaces per year. The number of HPWHs and ASHPs to be installed assumes that 80% of the households participating in the current program will participate in the Residential Clean Heating and Cooling program over the next five years, resulting in a total of 300 houses receiving ASHPs and 160 receiving HPWHs. All 300 houses are assumed to require panel upgrades and insulation/air sealing.

The estimated cost per residence was determined based on the assumption that the typical participating house will be an older single-family home in the City of Rochester with 1,200 sq. ft. of living space. The

estimate was provided through consultation with the City's Department of Neighborhood and Business Development, which implements the existing EAP program.

There is a risk that people may be hesitant to try new technologies or unsure of additional maintenance costs. To mitigate this risk, the Clean Energy Hub, a NYSERDA-funded initiative to ensure that underserved communities participate in and benefit from the transition to clean energy, will provide community education and outreach to encourage residents to adopt clean heating and cooling technology in their homes. The City will also include information and FAQs through outreach provided by its NSCs, while the selected contractor will also assist with participant education.

**Relation to PCAP:** The project will advance the Genesee Finger Lakes Regional PCAP's goal of "Reducing energy use." It aligns perfectly with Buildings & Infrastructure Strategy #1, "Advance the Decarbonization of Buildings and Infrastructure," (p. 42 of the PCAP and p. 2 of the PCAP's Appendix C), which supports the transition to air-source and ground source heat pumps and HPWHs as well as financing mechanisms for energy efficiency upgrades and heat pumps in residential buildings with a focus on low-income disadvantaged communities.

The project will also advance Buildings & Infrastructure Strategy #3, to "Develop Programs, Provide Tools, and Strategies that Reduce Energy Efficiency Barriers in Buildings and Infrastructure," (p. 42 of the PCAP and p. 2 of the PCAP's Appendix C<sup>1</sup>). As recommended in Strategy #3.A, the program will "Incentivize building envelope insulation efforts and energy efficient purchases by supporting investments in ... heating and cooling equipment... to replace older less efficient equipment," and will "Support programs for end-of-use energy efficiency measures such as building envelope insulating... in ... existing buildings. As recommended in Strategy #3.E., the program will "Provide gap funding to support pre-weatherization work for mold removal, panel upgrades, and other things that need to be done before energy efficiency upgrades are made."

### **Project #3: Municipal Facilities Solar Upgrades**

The City of Rochester will lead by example in the prioritization of clean energy by installing renewable energy upgrades at five high profile, large downtown municipal facilities (located in low-income disadvantaged community). These upgrades will significantly reduce GHG emissions and incorporate renewable energy to replace electricity from the power grid.

Installation of solar panels on the roofs of the Blue Cross Arena, Rochester Riverside Convention Center, and the Public Safety Building will result in generation of 4,156,797 kWhs annually to replace grid electricity. The following table summarizes the solar generating capacity and projected GHG emission reductions for each facility.

Facility	Array Size (kW)	Installed Solar Capacity (kWh/year)	GHG reductions (mtCO <sub>2</sub> e/year)
Blue Cross Arena	2,187.50	2,734,375.00	368.62
Rochester Riverside Convention Center	757.31	946,640.63	127.62
Public Safety Building	380.63	475,781.25	64.14
<b>Total</b>		<b>4,156,796.88</b>	<b>560.38</b>

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<sup>1</sup> The name of Strategy #3 varies slightly between the PCAP ("Promote Programs, Provide Tools, and Encourage Strategies the Reduce Energy Efficiency Barriers in Residential Buildings") and Appendix C ("Develop Programs, Provide Tools, and Strategies that Reduce Energy Efficiency Barriers in Buildings and Infrastructure").

The Inflation Reduction Act (IRA) of 2022 provided meaningful increases in solar tax credits. Importantly, the IRA has enabled municipalities to take advantage of solar tax credits, removing a significant barrier to the adoption and installation of municipally-owned solar on public facilities. This project will leverage those new tax credits along with incentives provided by NYSERDA to assist with the funding of this project.

The facilities selected under this project will provide a large, visible demonstration of the City's commitment to renewable energy and addressing climate change in the city of Rochester. Along with long-term city taxpayer savings from reduced electricity costs, this project will encourage other municipalities, commercial entities, non-profit organizations, and residents to consider installing solar on their buildings. To enhance public education, each facility will have a display area describing the project and showing in real time the quantity of renewable energy generated and the associated impacts of that energy (e.g. tons of GHG reduction, equivalent gallons of gasoline, trees planted, other metrics.) The project will create jobs for solar installers, including opportunities for workers receiving training at a planned solar workforce training facility under development in the City.

To evaluate the impact of this project, the City will monitor the amount of renewable energy generated at each facility, associated electricity cost savings, and GHG emissions reductions.

#### **Tasks & Milestones**

<b>Task</b>	<b>Milestone</b>
1 <b>Complete engineering design</b>	Engineering Design
2 <b>Prepare bid specifications and procure contractors</b>	Bid Specifications
3 <b>Install solar arrays on municipal facility rooftops.</b>	Installation of solar arrays
4 <b>Inspect solar installation</b>	Inspection of installation
5 <b>Prepare informational display summarizing benefits.</b>	Informational displays
6 <b>Monitor energy uses and GHG reductions (annually)</b>	Annual report of energy usage and GHG reductions
7 <b>Prepare and submit semi-annual and final EPA Reports.</b>	Semi-Annual and Final EPA reports

**Assumptions/Risks:** This project presents low risk as the City owns and operates each facility. Each rooftop has been evaluated by the City's Bureau of Architecture and Engineering to determine its suitability for solar. The City controls the design, bidding, award and construction process, and provides professional oversight to ensure project specifications are followed during construction. There is a risk of some amount negative comments among a small number of members of the public who may be against municipal solar.

**Relation to PCAP:** The Municipal Facility Solar Upgrades will advance the Genesee Finger Lakes Regional Priority Climate Action Plan's (PCAP) Goal to reduce energy use. The project will advance Buildings & Infrastructure Strategy #1 (listed on p. 42 of the PCAP and p. 2 of the PCAP's Appendix C), "Advance the Decarbonization of Buildings and Infrastructure," by reducing energy use and lowering GHG emissions at municipal facilities and incorporating solar and geothermal energy implementation at municipal buildings.

#### **Project #4: Solid Waste Facility Sustainable Upgrades**

The City's Solid Waste Operations Building is in need of renovation, providing an excellent opportunity for innovation with geothermal heating and cooling, rooftop solar, energy efficient lighting, and improved insulation. The City will renovate the building as a sustainable facility to provide a showcase

for these technologies in an essential public facility. The aging 45,270 sq. ft. facility, built in 1955, has been in constant service for 65 years, currently housing refuse and recycling operations, and other ancillary functions associated with Solid Waste Operations. This critical facility is essential to the success of the Solid Waste Operations Division in providing residents and businesses with refuse and recycling collection services. The site, located on a portion of the City's Former Emerson Street Landfill (FESL), is a brownfield and has a New York State Department of Environmental Conservation (NYSDEC) Site Management Plan (SMP) that regulates all subsurface activities at the site. The site is located within a low-income disadvantaged community, near Edison Tech High School, allowing for an educational component to showcase different technologies to the community.

Improvements at this site include replacing current natural gas boiler and air conditioning with geothermal heating and cooling, installation of rooftop solar, improved levels of building insulation, and LED lighting upgrades. In addition to reducing GHG emissions and improving safety and comfort at the facility, these improvements will decrease utility costs to ease the strained City budget, increase job opportunities in sustainable trades, and allow the facility to serve as a sustainable model for the public and other communities to demonstrate the effectiveness of this technology at a busy municipal operations center. The City will monitor and report on energy usage, energy cost savings, renewable energy production, and GHG reductions.

The Inflation Reduction Act (IRA) has enabled municipalities to take advantage of geothermal and solar energy tax credits, removing a significant barrier to the installation of municipally owned geothermal and solar on public facilities. This project will leverage those new tax credits with incentives provided by NYSERDA to assist with the funding of this project.

**Tasks & Milestones:**

Tasks	Milestone
Procure consultant to for engineering services	Engineering services consultant agreement
1 Complete engineering design	Engineering design complete
2 Prepare bid specifications and procure contractors	Contractor agreement
3 Install sustainable upgrades.	Completion of construction
4 Inspect construction	Inspection of completed work
5 Prepare informational display summarizing benefits.	Informational display
6 Monitor energy uses and GHG reductions (annually)	Annual report of energy usage and GHG reductions
7 Prepare/submit semi-annual and final EPA Reports.	Semi-Annual and Final EPA reports

**Assumptions/Risks:** This project presents low risk as the City owns and operates the facility. The proposed facility improvements have been evaluated by the City's Bureau of Architecture and Engineering to determine their feasibility and suitability for the facility. The City controls the design, bidding, award, and construction process, and provides professional oversight to ensure project specifications are followed during construction. The City has a long-standing relationship with the NYSDEC for the implementation of the SMP at this former Emerson Street Landfill brownfield site, with well-established processes and procedures in place to ensure compliance with the SMP. There is a risk of some amount negative comments among a small number of members of the public who may be against solar and/or geothermal at municipal facilities.

**Relation to PCAP:** The sustainable municipal facility upgrades align with the Genesee Finger Lakes Regional Priority Climate Action Plan's (PCAP) Goal to reduce energy use. The project will advance

Buildings & Infrastructure Strategy #1 (listed on p. 42 of the PCAP and p. 2 of the PCAP's Appendix C), "Advance the Decarbonization of Buildings and Infrastructure," by reducing energy use and lowering GHG emissions at municipal facilities and incorporating solar and geothermal energy implementation at municipal buildings.

#### **b. Demonstration of Funding Need**

Data from the US Census Bureau's American Community Survey shows the City of Rochester as the 5<sup>th</sup> poorest city among the top 75 metro area in the country. Rochester's poverty rate for adults is 28.9 percent, placing it second among comparably sized cities. The national average 12.6 percent. More than 50 percent of Rochester's children live in poverty, making the Rochester the poorest US city of its size for children. Rochester ranks No. 1 in the percent of people living below half the federal poverty level; and this percentage is more than five points higher than the mid-point of comparably sized cities.

The statistics cited above highlight the severe challenges faced by the residents in disadvantaged areas of the city and the difficulties faced by city government in addressing all the needs of the community. Considering these factors, the activities proposed for funding cannot be supported through the City's current budget nor entirely through other grant programs. The City has devoted extensive resources from its operating and capital budget and has secured grant funding over the past 10 years to support many other programs and projects that have and will reduce GHG emissions. However, EPA CPRG grant funds are necessary to accomplish the significant GHG emission reductions described in this proposal. Additional considerations for each proposed project are described below.

#### ***Project #1: Residential Solar Program***

The Residential Solar Program will supplement the City's existing Owner Occupant Roof Program (OORP) by installing solar panels on roofs of households that received a new roof through this program. The City's OORP is funded through the City's annual Community Development Block Grant (CDBG) through the U.S. Department of Housing and Urban Development (HUD). The program offers financial assistance for roof replacement to income-eligible owner-occupants through a lottery.

Funds for the roof repair program are limited and are not sufficient to meet the demand for new roofs. To implement the Residential Solar Program as part of the OORP, grant funding is needed to benefit these low-income homeowners. Additional sources of funding to leverage and supplement EPA funds received will include IRA solar tax credits, NYSEDA solar incentives, and loans from program lending partners.

#### ***Project #2: Residential Clean Heating and Cooling Program***

The Residential Clean Heating and Cooling Program will supplement the City's existing Emergency Assistance Program supported by funding through the U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant (CDBG). Funding for the current program year is \$200,000 for emergency replacement of furnaces and hot water heaters at 80 owner-occupied residences.

Leveraged funds for this program include NYSEDA and utility incentives, but additional grant funding is needed to incorporate the more costly HPWH and ASHP systems, plus improved insulation and air sealing.

#### ***Project #3: Municipal Facilities Solar Upgrades***

The City has limited funds to install solar generation to municipal facilities due to many competing demands on the City budget for other facility and building upgrades. The City owns and maintains over 200 buildings, many of which are decades old and require significant capital improvements to keep the facilities open for public use. While installing solar on City facilities will provide cost savings, the initial capital is not readily available. Leveraging IRA tax credits and NYSERDA incentives with EPA funding requested under this grant program provide an opportunity to make these investments in public facilities, provide some relief to the City's budget, and reduce GHG emissions in the community.

#### ***Project #4: Solid Waste Facility Sustainable Upgrades***

As described above, the City does not have sufficient funding in its capital budget to carry out the sustainable upgrades proposed for the Solid Waste Management Facility, a critical public works facility. EPA grant funds, along with leveraged IRA tax credits and utility incentives will allow the City to incorporate these GHG reduction measures into the facility renovation.

#### **c. Transformative Impact**

Each of the projects proposed provide transformative opportunities and impacts while significantly contributing to GHG reductions. The projects are replicable and easily scalable to other communities and increase the deployment of GHG reduction technologies in the community in a very visible manner. Since the city of Rochester is so heavily impacted by poverty and the City's budget is under constant strain due to competing demands, these projects will provide GHG reductions in hard to abate sectors where reduction measures have not been widely adopted. The increased deployment of these technologies will contribute to a transformation in the market and workforce to accelerate adoption of these technologies and programs.

#### ***Project #1: Residential Solar Program and Project #2: Residential Clean Heating and Cooling Program***

The Residential Solar Program and Residential Clean Heating and Cooling Programs will be models to the region and nationwide, showcasing the demand for and viability of residential rooftop solar, clean heating and cooling technologies, and energy efficiency improvements for low-income homeowners in disadvantaged neighborhoods. Access to these upgrades by low-income homeowners will demonstrate the feasibility and economic benefits that these technologies provide to those who otherwise would be unable to access this technology. Widespread adoption of rooftop solar, heat pumps and energy efficiency improvements in low-income disadvantaged communities will reduce economic and energy insecurity, help homeowners build wealth and equity, and instill a sense of pride at the contributions to reducing GHG emissions in their community.

Despite efforts to bring solar to low-income households across the US, owner-occupied housing has seen the lowest uptake. Residential solar and clean heating and cooling and energy efficiency improvements are a supportive measure in providing families a path out of poverty. These programs designed to reduce overall utility costs to participants providing an immediate cash flow for participating households. These programs will provide the opportunity to build equity in their home while experiencing immediate monthly electricity savings, and the project will significantly contribute to GHG reductions. The wider community will benefit from the compounding GHG reduction as more households adopt the upgrades and this wave of adoptees will serve as a model for neighboring communities, encouraging others to embrace their own version of the program.

Finally, the local clean energy job creation to be realized from these programs is significant. Training opportunities and high paying clean energy jobs for city residents created as a result of these programs can significantly transform the lives of people unemployed or underemployed and provide a pathway

out of poverty. The City will work with local employers and trainers to ensure citizens of Rochester benefit from jobs created to implement these projects.

***Project #3: Municipal Facilities Solar Upgrades and Project #4: Solid Waste Management Facility Sustainable Upgrades***

The CPRG funds will allow the City of Rochester to lead by example and demonstrate the benefits of incorporating renewable energy, clean heating and cooling technology, and energy efficiency improvements at public facilities to other municipalities in the region and nationwide. Utilizing the new tax credits made available through the Inflation Reduction Act in conjunction with USEPA CPRG funding, the City can showcase the benefits of these improvements at large, critical, highly utilized, very visible public facilities. These solar installations will transform the roovescape of downtown Rochester, provide a model for incorporating rooftop solar at municipal facilities, and help ease a strained City budget in a community grappling with the impacts of poverty. The sustainable upgrades the Solid Waste Facility represent innovative, comprehensive approach to municipal facility upgrades on a brownfield site to incorporate, renewable energy, and reductions in fossil fuel use for heating and cooling.

**Section 2: Impact of GHG Reduction Measures**

The City of Rochester has proposed four projects to achieve significant reductions in GHG emissions. Presented below in Table 1 is a summary of the projected annual reduction in GHG emissions for each project, including total GHG reductions and qualified GHG reductions that directly from funding provided by the CPRG. All GHG reductions are in metric tons of carbon dioxide equivalent (mtCO<sub>2</sub>e). Quantities of methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) have been converted into carbon dioxide equivalent (CO<sub>2</sub>e) using the Global Warming Potential (GWP) Cumulative Forcing over 20 years value presented in the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report, Box 3.2, Table 1. Quantities for CH<sub>4</sub> and N<sub>2</sub>O can be found in the detailed calculations in the attached Technical Appendix.

<b><i>Table 1 - Annual Impact on GHG Emissions</i></b>			
No.	Project	Estimated Annual GHG Reduction (mtCO <sub>2</sub> e)	Qualified GHG Reductions-CPRG Funding (mtCO <sub>2</sub> e)
1	Residential Rooftop Solar	471.83	179.63
2	Clean Heating and Cooling	1,111.16	683.60
3	Municipal Rooftop Solar	560.38	374.22
4	Sustainable Municipal Upgrades	949.03	757.08
<b>TOTALS:</b>		<b>3,092.4</b>	<b>1,994.5</b>

**a. Magnitude of GHG Reductions from 2025 through 2030**

Each of the four projects in this application will result in significant GHG reductions in the short-term. Table 2 provides a summary of projected cumulative GHG emissions reductions for each project from 2025 - 2030, including total GHG reductions and qualified GHG reductions that result directly from funding provided by the CPRG over this time period.

<b><i>Table 2 - Short-Term Cumulative Impact on GHG Emissions - 2025 Through 2030</i></b>			
No.	Project	Estimated Cumulative GHG Reduction (mtCO <sub>2</sub> e)	Qualified Cumulative GHG Reductions-CPRG Funding (mtCO <sub>2</sub> e)
1	Residential Rooftop Solar	1,887.34	718.51
2	Clean Heating and Cooling	17,778.58	10,937.64

3	Municipal Rooftop Solar	3,106.37	2,074.43
4	Sustainable Municipal Upgrades	4,862.23	3,878.77
<b>TOTALS:</b>		<b>27,634.52</b>	<b>17,609.35</b>

**Project #1: Residential Rooftop Solar**

The Residential Rooftop Solar project is expected to have the following GHG emissions reduction impacts:

*Short-Term (2025 – 2030) GHG Reductions:*

Annual GHG Reduction (at end of project):	471.83	mtCO <sub>2</sub> e
Estimated Cumulative GHG Reduction (2025 – 2030):	1,887.37	mtCO <sub>2</sub> e
<b>Qualified Estimated Cumulative GHG Reduction (2025 – 2030):</b>	<b>718.51</b>	<b>mtCO<sub>2</sub>e</b>

Emissions reductions resulting from this program from 2025 – 2030 will increase as solar is deployed on residential rooftops over the span of three years. By the end of the program (i.e. end of the installation period of five years), it is expected that fluctuations in GHG emissions reductions will result from natural variations in available solar energy. Panel efficiency will not to decrease over the short-term, and thus GHG reduction will be relatively consistent in the short-term.

**Project #2: Residential Clean Heating and Cooling Program**

The Residential Clean Heating and Cooling program is expected to have the following GHG emissions reduction impacts:

*Short-Term (2025 – 2030) GHG Reductions:*

Annual GHG Reduction (at end of program):	5,555.81	mtCO <sub>2</sub> e
Estimated Cumulative GHG Reduction (2025 – 2030):	17,778.58	mtCO <sub>2</sub> e
<b>Qualified Estimated Cumulative GHG Reduction (2025 – 2030):</b>	<b>10,937.64</b>	<b>mtCO<sub>2</sub>e</b>

Emissions reductions resulting from this program from 2025 – 2030 will increase as existing furnaces and hot water heaters are replaced over the span of five years. By the end of the project, it is expected that fluctuations in GHG emissions reductions will result from natural variations in temperature that will dictate heating needs from new air-source heat pump (ASHP) heating. Hot water heat pump (HWHP) usage will to remain consistent during this period. GHG reduction will be consistent in the short-term. Homes that receive new ASHPs will be insulated and sealed to improve the overall efficiency of these new heating systems. While it is difficult to quantify the GHG impacts of new insulation and air sealing due to the high variability of existing insulation conditions, it is expected that new ASHP systems will be installed in properly insulated houses that allow these systems to operate efficiently.

**Project #3: Municipal Facilities Solar Upgrades**

The Municipal Facilities Solar Upgrades project is expected to have the following GHG emissions reduction impacts:

*Short-Term (2025 – 2030) GHG Reductions:*

Annual GHG Reduction (at end of program):	560.38	mtCO <sub>2</sub> e
Estimated Cumulative GHG Reduction (2025 – 2030):	3,106.37	mtCO <sub>2</sub> e
<b>Qualified Estimated Cumulative GHG Reduction (2025 – 2030):</b>	<b>2,074.43</b>	<b>mtCO<sub>2</sub>e</b>

Emissions reductions resulting from this program from 2025 – 2030 will to ramp up as solar is deployed on municipal rooftops over the span of five years. By the end of the program it is expected that fluctuations in GHG emissions reductions will result from natural variations in available solar energy.

Panel efficiency will not decrease over the short-term, and thus GHG reduction will be relatively consistent in the short-term.

**Project #4: Solid Waste Facility Sustainable Upgrades**

The Solid Waste Facility Sustainable Upgrades project is expected to have the following GHG emissions reduction impacts:

*Short-Term (2025 – 2030) GHG Reductions:*

Annual GHG Reduction (at end of program):	949.03	mtCO <sub>2</sub> e
Estimated Cumulative GHG Reduction (2025 – 2030):	4,862.23	mtCO <sub>2</sub> e
<b>Qualified Estimated Cumulative GHG Reduction (2025 – 2030):</b>	<b>3,878.77</b>	<b>mtCO<sub>2</sub>e</b>

Emissions reductions resulting from this program from 2025 – 2030 will be realized relatively quickly, as upgrades are expected to be completed by 2026. These GHG emissions reductions will vary slightly based on natural variations in available solar energy and based on heating and cooling needs of the facility. Panel efficiency will not to decrease over the short-term, and thus GHG reduction will be relatively consistent in the short-term.

**b. Magnitude of GHG Reductions from 2025 through 2050**

Each of the five proposed projects will result in significant GHG reductions in the long-term. Table 3 provides a summary of the projected cumulative GHG emissions reductions for each project from 2025 - 2050, including total GHG reductions and qualified GHG reductions that result directly from funding provided by the CPRG over this time period.

<b>Table 3 - Long-Term Cumulative Impact on GHG Emissions - 2025 Through 2050</b>			
No.	Project	Cumulative GHG Reduction (mtCO <sub>2</sub> e)	Qualified Cumulative GHG Reduction-CPRG Funding (mtCO <sub>2</sub> e)
1	Residential Rooftop Solar	11,324.04	4,311.08
2	Clean Heating and Cooling	40,001.81	24,609.69
3	Municipal Facility Solar	14,313.92	9,558.81
4	Solid Waste Facility Sustainable Upgrades	23,842.89	19,020.29
<b>TOTALS:</b>		<b>89,482.66</b>	<b>57,499.87</b>

**Project #1 Residential Rooftop Solar Program**

The Residential Rooftop Solar project will have the following long-term GHG emissions reduction impacts:

*Long-Term (2025 – 2050) GHG Reductions:*

Estimated Cumulative GHG Reduction (2025 – 2050):	11,324.01	mtCO <sub>2</sub> e
<b>Qualified Estimated Cumulative GHG Reduction (2025 – 2050):</b>	<b>4,311.08</b>	<b>mtCO<sub>2</sub>e</b>

GHG emissions reductions resulting from this program from 2025 – 2050 will slightly decrease over time, with the National Energy Research Laboratory (NREL) estimating an annual efficiency loss of 0.5% - 0.8% per year. These losses are not incorporated into panel production as part of GHG reduction calculations. However, it is expected that GHG emissions reductions will decrease over time mainly due to the influx of zero-emissions or renewable energy into New York State's grid. As fossil fuel-powered plants are removed from the power grid, annual GHG reduction due to residential rooftop solar installations is expected to decrease through 2050.

**Project #2: Residential Clean Heating and Cooling Program**

The Residential Clean Heating and Cooling program will have the following long-term GHG emissions reduction impacts:

*Long-Term (2025 – 2050) GHG Reductions:*

Estimated Cumulative GHG Reduction (2025 – 2050):	40,001.81	mtCO <sub>2</sub> e
<b>Qualified Estimated Cumulative GHG Reduction (2025 – 2050):</b>	<b>24,609.69</b>	<b>mtCO<sub>2</sub>e</b>

Decreases in GHG emissions reduction would result from expected warming of the climate over the remainder of the 21<sup>st</sup> century resulting in a general decrease in energy demand for heating. ASHP and HWHP efficiencies will not decrease significantly over time, and it is expected that New York’s grid will be nearly emissions free by 2050. Any decreases in heating energy demand would be offset by a “cleaner” grid. Therefore, GHG emissions reductions resulting from this program in the long-term will remain relatively constant over time.

**Project #3: Municipal Facility Solar Upgrades**

The Municipal Facility Solar Upgrades project is expected to have the following long-term GHG emissions reduction impacts:

*Long-Term (2025 – 2050) GHG Reductions:*

Estimated Cumulative GHG Reduction (2025 – 2050):	14,313.92	mtCO <sub>2</sub> e
<b>Qualified Estimated Cumulative GHG Reduction (2025 – 2050):</b>	<b>9,558.81</b>	<b>mtCO<sub>2</sub>e</b>

GHG emissions reductions resulting from this project from 2025 – 2050 will to slightly decrease over time, with the National Energy Research Laboratory (NREL) estimating an annual efficiency loss of 0.5% - 0.8% per year. These losses are not incorporated into panel production as part of GHG reduction calculations. However, it is expected that GHG emissions reductions will decrease over time mainly due to the influx of zero-emissions or renewable energy into New York State’s grid. As fossil fuel-powered plants are removed from the power grid, annual GHG reduction due to residential rooftop solar installations is expected to decrease through 2050.

**Project #4: Solid Waste Facility Sustainable Upgrades**

The Solid Waste Facility Sustainable Upgrades project is expected to have the following long-term GHG emissions reduction impacts:

*Long-Term (2025 – 2050) GHG Reductions:*

Estimated Cumulative GHG Reduction (2025 – 2050):	23,842.89	mtCO <sub>2</sub> e
<b>Qualified Estimated Cumulative GHG Reduction (2025 – 2050):</b>	<b>19,020.29</b>	<b>mtCO<sub>2</sub>e</b>

Decreases in GHG emissions reduction would result from expected warming of the climate over the remainder of the 21<sup>st</sup> century resulting in a general decrease in energy demand for heating. Geothermal system efficiencies will not decrease significantly over time, and it is expected that New York’s grid will be nearly emissions free by 2050. Decreases in heating energy demand would be offset by a “cleaner” grid. Solar panel efficiency will decrease over time, having a minor impact on GHG emissions reduction in the long-term. GHG emissions reductions resulting from this program in the long-term are expected to remain relatively constant over time.

**c. Cost Effectiveness of GHG Reductions**

Table 4 below shows the cost-effectiveness of each proposed project, presented in cost per metric ton of carbon dioxide equivalent (\$/mtCO<sub>2</sub>e) removed using CPRG funding.

Table 4 - Cost Effectiveness of Proposed Programs (Through 2030)		
No.	Project	Cost per mtCO <sub>2</sub> e Removed with CPRG Funding
1	Residential Rooftop Solar	\$ 5,565.24
2	Residential Clean Heating and Cooling	\$ 438.54
3	Municipal Facilities Solar Upgrades	\$ 3,063.54
4	Solid Waste Facility Sustainable Upgrades	\$ 1,250.29

Project #2, Residential Clean Heating and Cooling, is the most cost-effective program (\$438.54/mtCO<sub>2</sub>e removed) due to the replacement of natural gas heating appliances with electric heating appliances. Project #4, Solid Waste Facility Sustainable Upgrades, is the next most cost-effective measure (\$1,250.29/ mtCO<sub>2</sub>e removed) as it includes the replacement of natural gas heating appliances with efficient electric heating and cooling. Installation of rooftop solar and LED lighting replacements drive the cost-effectiveness of this program down, but are important components that reduce overall energy consumption and costs at the facility. Project #3, Municipal Facilities Solar Upgrades (\$3,063.54/ mtCO<sub>2</sub>e removed) and Project #1, Residential Rooftop Solar (\$5,565.24/ mtCO<sub>2</sub>e removed) are the two least cost-effective measures, respectively, as New York's electrical grid is relatively clean in terms of emissions. Project #3 is more cost effective than Project #1 due to economy of scale.

#### **d. Documentation of GHG Reduction Assumptions**

A description of calculations used is attached in the GHG emission reduction calculations spreadsheet. Assumptions made; references for calculations and assumptions are provided in the attached Technical Appendix.

### **Section 3: Environmental Results – Outputs, Outcomes, and Performance Measures**

#### **a. Expected Outputs and Outcomes**

Outcomes across all projects include reductions in GHG emissions; reduced energy cost and increased financial security for disadvantaged households; improved indoor air quality and long-term health benefits to the residents; reduced GHG emissions citywide; increased familiarity and capacity among local contractors and housing organizations about installation techniques, costs, and benefits of installing clean energy improvements such as ASHPs and HPWHs and solar panels; and increased community awareness of the need for and benefits of clean energy improvements.

Project-specific outputs and outcomes are listed below.

#### ***Project #1: Residential Solar Program***

**Outputs:** The City will install solar panels on the roofs of 400 residences occupied by low-income homeowners within disadvantaged neighborhoods.

**Outcomes:** The total amount of electricity generated by these residential installations is estimated at 3,500,000 kWh per year. Replacing grid electricity with solar energy will reduce GHG emissions by 1,887.34 mtCO<sub>2</sub>e during the period 2025-2030 and by 11,324.04 mtCO<sub>2</sub>e between 2025 and 2050. Homeowners who receive the solar panels as part of their roof replacement will save approximately \$1,225 in electricity cost annually per house during the first 5 years. The total electricity cost savings for disadvantaged homeowners is expected to approximately \$33,000 per household for the entire 30-year life of the system. Awareness and education on renewable energy throughout the community will increase adoption. The project also provides greater capacity for workforce development in the renewable energy field.

### ***Project #2: Residential Clean Heating and Cooling Program***

**Outputs:** The City will replace 300 gas or oil-fired furnaces or boilers with ASHPs for heating and cooling and 160 gas-fired water heaters with HPWHs in houses owned and occupied by low-income residents in disadvantaged neighborhoods. The 300 homes will also be improved with air sealing, additional insulation, and panel upgrades, as needed.

**Outcomes:** The replacement of gas-fired water heaters with HPWHs will reduce GHG emission by 87.80 mtCO<sub>2</sub>e during the first year of operation. The replacement of gas or oil-fired furnaces or boilers with ASHPs will reduce emission by 1,198.96 mtCO<sub>2</sub>e during the first year of operation. The total reduction in GHG emissions is 1,111.16 mtCO<sub>2</sub>e, 92.7 percent. The project will improve indoor air quality and health outcomes among program participants. Health results will include reduced risk of asthma and other respiratory diseases associated with natural gas heating and appliances and reduced incidence of heat- and cold-related stress. The project provides increased access to technology inaccessible to low-income disadvantaged residents, lowering utility costs to the residents. The project will also produce workforce development opportunities for clean heating and cooling jobs in the community. Increased awareness of cold climate clean heating and cooling technology throughout the community will follow successful project implementation and municipalities, commercial entities, and residents will increasingly adopt these technologies as a result of this project's compelling model.

### ***Project #3: Municipal Facilities Solar Upgrades***

**Outputs:** The City will install 3,325.44 kW of solar generating capacity at three downtown municipal facilities: the Blue Cross Arena (2,187.50 kW), Rochester Riverside Convention Center (757.31 kW) and the Public Safety Building (380.63 kW).

**Outcomes:** The replacement of grid electricity with solar is projected to reduce GHG emission by 560.38 mtCO<sub>2</sub>e the first year, 3,106.37 during the period 2025-2030, and 14,313.92 between 2025 and 2050. The City will be an example for other municipalities, commercial entities, and residents alike demonstrating the merits of solar energy.

### ***Project #4: Solid Waste Facility Sustainable Upgrades***

**Outputs:** Improvements at the City's Solid Waste Management facility will include installation of a geothermal system to replace the existing HVAC system; installation of a 635.6 kW PV system; upgraded facility insulation; and installation of LED lighting.

**Outcomes:** The geothermal facility at the City's Solid Waste Management facility will replace 5,424.47 mmBTU of natural gas annually, resulting in GHG emission reduction of 823.41 mtCO<sub>2</sub>e. The electricity annual energy production/usage for the solar array installation will be 794,500.00 kWh. Overall implementation of these measures will result in a facility GHG reduction of 949.03 mtCO<sub>2</sub>e/year, 4,862.23 mtCO<sub>2</sub>e 2025-2030 and 23,842.89 mtCO<sub>2</sub>e 2025-2050. Each upgrade of this facility will serve as a case study to increase community awareness of these innovative technologies and provide a model, encouraging more municipalities, commercial entities, and residents to take on similar projects.

## **b. Performance Measures and Plan**

The City will track, measure and report on the following metrics annually during the life of each program component.

### ***Project #1: Residential Solar Program***

**Performance measures:** The City will track, measure and report on the following metrics for the Residential Solar program: Number of participating houses per year (Year 1 through Year 5); number of solar panels and generating capacity (kW) installed on each participating house per year (Year 1 through Year 5); amount of electricity generated (kWhs) in each participating house annually through 2050 and; reduction in GHG emissions annually resulting from replacing grid electricity with solar energy (MTCO<sub>2e</sub> through 2050).

**Plan for tracking and measuring progress toward output and outcomes:** City staff will work with the participating homeowners to monitor total household electricity usage and costs annually. City staff will work with the solar installer and the homeowner to monitor the amount of electricity generated by each residential solar system. City staff will report the amount of electricity generated annually and the corresponding reduction of GHG emissions resulting from replacing grid electricity with solar energy.

**Evaluation of GHG reduction measures:** The GHG reduction resulting from Residential Solar Program will be calculated based on the total annual reduction in GHG emissions for all participating homeowners replacing grid electricity with solar energy.

#### ***Project #2: Residential Clean Heating and Cooling Program***

**Performance measures:** The City will track, measure and report on the following metrics for the Residential Clean Heating and Cooling Program: number of participating houses per year (Year 1 through Year 5); number of HPWHs and ASHPs installed and insulation/air sealing improved on each participating house per year (Year 1 through Year 5); amount of energy consumed in each participating house annually through 2050, and; reduction in GHG emissions annually resulting from replacing traditional furnaces, boilers and hot water heaters with ASHPs, HPWHs and improved insulation/air sealing (MTCO<sub>2e</sub> through 2050).

**Plan for tracking and measuring progress toward output and outcomes:** City staff will coordinate with participating residents to monitor their utility accounts and document reductions in natural gas usage and GHG reductions annually over the next 20 years.

**Evaluation of GHG reduction measures:** The GHG reduction resulting from Residential Clean Heating and Cooling Program will be calculated based on the total annual reduction in GHG emissions for all participating homeowners replacing furnaces, boilers and hot water heaters with ASHPs, HPWHs and improved insulation/air sealing.

#### ***Project #3: Municipal Facilities Solar Upgrades***

**Performance measures:** The City will track, measure and report on the following metrics: number of solar panels and generating capacity (kW) installed on each facility; amount of electricity generated (kWhs) by each facility annually through 2050, and; reduction in GHG emissions annually resulting from replacing grid electricity with solar energy (MTCO<sub>2e</sub> through 2050).

**Plan for tracking and measuring progress toward output and outcomes:** City staff in DEQ will monitor electricity production from the PV system at each facility through the monitoring systems installed as part of each system. Electricity costs for each facility will also be tracked.

**Evaluation of GHG reduction measures:** The resulting GHG reduction will be calculated based on the production of renewable electricity from each system and comparisons of annual GHG emissions following the improvements to the baseline year.

#### ***Project #4: Solid Waste Facility Sustainable Upgrades***

**Performance measures:** The City will track, measure and report on the following metrics for the sustainability improvements at the Solid Waste Operations Facility: capacity of geothermal system for heating, cooling and hot water supply installed to replace current natural gas boiler and air conditioning (window units); number of solar panels and generating capacity (kW) installed; installed quantities of building insulation, and; number and type of LED lighting fixtures installed.

**Plan for tracking and measuring progress toward output and outcomes:** City staff in DEQ will monitor energy use the facility through EPA Portfolio Manager and PV monitoring systems. Staff will designate a baseline year prior to installation of the improvements and compare the total GHG emissions from each facility yearly to the baseline emissions.

**Evaluation of GHG reduction measures:** The GHG reduction resulting from sustainable building improvements will be calculated based on the comparison of yearly GHG emissions following the improvements to the baseline year.

### c. Authorities, Implementation Timeline, and Milestones

**Authorities:** City staff in DEQ will manage all projects, coordinate with other City Departments, oversee work of contractors, and prepare required EPA reports. Experienced private contractors will install rooftop solar, clean heating and cooling and energy efficiency improvements. The City will coordinate education to program participants and the public. DEQ grants/ budget financial coordinator will be responsible for maintaining financial records and submitting required reports to the EPA.

#### **Project #1: Residential Solar Program**

##### **Implementation Timeline & Milestones:**

Milestones		Month
1	Procure contractors/ Update list annually	3, 15, 27, 39, 51
2	Identify suitable homes Evaluate roofs of roof replacement program participants over past 5 years and identify suitable homes. Evaluate roofs and identify suitable homes annually	4, 19, 31, 43
3	Recruit Program participants Contact and enlist roof replacement participants over past 5 years Contact and enlist roof replacement participants over next 5 years	5, 21, 33, 45
4	Secure solar installers (prepare bidding specifications, obtain required permits, and execute and administer contracts.	6 -52
5	Install solar panels.	
6	Inspect work.	
7	Monitor energy uses and GHG reductions (annually)	
8	Prepare and submit semi-annual and final EPA Reports.	6, 12, 18, 24, 25, 36, 37, 48, 49, 60

#### **Project #2 Residential Clean Heating and Cooling Program**

##### **Implementation Timeline & Milestones:**

Milestones		Month
1	Procure contractors/ Update list annually	3, 15, 27, 39, 51
2	Select participating homes from those that apply for furnace and hot water heater replacement	4-52
3	Prepare specifications and secure installers (prepare bidding specifications, obtain permits, and execute and administer contracts.	5 -53
4	Install ASHPs and HPWHs.	
5	Inspect work.	
6	Monitor energy uses and GHG reductions (annually)	12, 24, 36, 48, 60
7	Prepare and submit semi-annual and final EPA Reports.	6, 12, 18, 24, 25, 36, 37, 48, 49, 60

### ***Project #3: Municipal Facilities Solar Upgrades***

#### ***Implementation Timeline & Milestones:***

Milestones		Month
1	Complete engineering design	2-6
2	Prepare bid specifications and procure contractors	7-8
3	Install solar arrays on municipal facility rooftops.	9-15
4	Inspect solar installation	16-17
5	Prepare informational display summarizing benefits.	18-20
6	Monitor energy uses and GHG reductions (annually)	24, 36, 48, 60
7	Prepare and submit semi-annual and final EPA Reports.	6, 12, 18, 24, 25, 36, 37, 48, 49, 60

### ***Project #4: Solid Waste Facility Sustainable Upgrades***

#### ***Implementation Timeline & Milestones:***

Milestones		Month
	Procure consultant to for engineering services	2-4
1	Complete engineering design	5-13
2	Prepare bid specifications and procure contractors	14-16
3	Install sustainable upgrades.	17 - 30
4	Inspect construction	31-32
5	Prepare informational display summarizing benefits.	33-34
6	Monitor energy uses and GHG reductions (annually)	36, 48, 60
7	Prepare and submit semi-annual and final EPA Reports.	6, 12, 18, 24, 25, 36, 37, 48, 49, 60

## **Section 4: Low-Income and Disadvantaged Communities**

### **a. Community Benefits**

#### ***Project #1: Residential Solar Program***

***Direct and indirect benefits:*** The Residential Solar Program will directly benefit 400 low-income disadvantaged households who will receive solar panels on the new roofs installed through the City's

existing OORP. All benefiting households will be located within Census Tracts designated as disadvantaged by the CEJST (attached).

Participating households will benefit from lower electricity costs (an estimated total of \$33,000 per household over the life of the system.) The reduction in utility costs will improve financial stability of participating households and reduce the risk of homelessness. The State and Local Planning for Energy (SLOPE) tool provided by NREL shows that most Census tracts in Rochester have energy burden of more than 5%. Potential for rooftop solar generation in many of these areas is significant.

Indirect benefits include increased public awareness of the viability of rooftop solar in City neighborhoods. Outreach through the City's NSCs will publicize financial assistance programs available to subsidize the cost of residential solar. Climate Solutions Accelerator will publicize the program's success to demonstrate the feasibility of rooftop solar generation for low-income homeowners as part as their role as the local NYSERDA Energy Hub.

**Potential disbenefits, anticipated negative impacts and strategies for mitigating those risks:** As the solar installations will be completed on existing buildings, the construction will have minimal impacts on the surrounding neighborhoods.

**Plan and process for continuing to assess, quantify, and report benefits:** City staff will monitor the number of inquiries from the community, public meetings/events, and outreach and education activity. The City will track this information internally and report to EPA during the grant period.

**Impacted communities outside the City:** The project will not directly impact communities outside the City of Rochester. However, the project will demonstrate for other municipalities the viability and effectiveness of installing solar on residential rooftops in low-income neighborhoods. The CSA and the Genesee Finger Lakes Regional Planning Council (GFLRPC) will publicize benefits and encourage replication of this program in other municipalities.

**Workforce development:** The Residential Rooftop Solar program will be carried out by contractors engaged by the City of Rochester in accordance with its procurement laws and policies. Staffing for these projects will be bolstered by workers trained at a new training facility under development within a disadvantaged neighborhood in Rochester at a former brownfield that has been largely vacant since the mid-1970s. Reducing barriers to entry into the skilled trades will provide direct wealth-building and poverty reduction for residents, including those from disadvantaged and underserved communities. Educational programs will focus on hands-on training for roof-top and ground mounted solar installations, battery and EV charger installations, electrical service upgrades and electrical basics.

## **Project #2: Residential Clean Heating and Cooling Program**

**Direct and indirect benefits:** The Residential Clean Heating and Cooling Program will directly benefit 300 low-income disadvantaged households who will receive new ASHPs, HPWHs, and improved insulation and air sealing. All benefiting households will be located within Census Tracts designated as disadvantaged by the CEJST (attached).

These households will benefit from lower utility costs, which will improve financial stability of participating households and reduce the risk of homelessness. The U.S. Department of Energy Low-Income Energy Affordability Data Tool (LEAD) shows high levels of energy burden, with New York households with incomes between 30% and 60% of the Area Median Income paying 5% of their income for energy (4% for electricity and 1% for utility gas). Households with incomes less than 30% of AMI pay up to 13% of their income on energy costs.

Participating households will benefit from reduced health risks associated with natural gas appliances. These include reduced risk of asthma and other respiratory illnesses. Most of the disadvantaged neighborhoods in Rochester already have high rates of asthma. As the ASHPs will provide air-conditioning as well as heating, residents will be protected from heat stress and risk of serious illness or death due to extreme heat events. People from underserved communities and vulnerable populations, disproportionately impacted by the impacts of climate change and health risks of natural gas use, will directly benefit from access to this program.

Leaks of methane from furnaces and hot water heaters cause GHG emissions that are 25 times more potent than carbon dioxide. Burned methane contributes to premature mortality and increased risk for illness including ischemic heart disease, stroke, COPD, lung cancer, type 2 diabetes, and lower-respiratory infections.

Indirect benefits include increased public awareness of the viability of HPWHs and ASHPs in city neighborhoods. Outreach through the City's NSCs will publicize financial assistance programs available to subsidize the cost of additional insulation and installing all-electric heating and cooling and water heaters.

The program will build capacity among local building contractors, developers and partner agencies with the installation clean heating and cooling technology. The increased familiarity and documentation of benefits will build momentum and lead to more widespread use of these technologies. This program is specifically designed to reach disadvantaged community members negatively impacted by climate change and least able to adapt to these impacts.

The neighborhood outreach and educational activities provided by CSA, GFLRPC, and Rochester's NSCs will amplify the stories of participants and demonstrate the benefits of electrification through tours of rehabilitated buildings and information shared with neighbors on the organizations' websites and other media.

***Plan and process for continuing to assess, quantify, and report benefits:*** City staff will monitor the number of inquiries from the community, public meetings/events, and outreach and education activity. These metrics will be reported to EPA at least annually.

***Impacted communities outside the City:*** The project will not directly impact communities outside the City of Rochester. However, the project will demonstrate for other municipalities the effectiveness of installing ASHPs and HPWHs in low-income neighborhoods. The CSA and the GFLRPC will publicize benefits and encourage replication of this program in other municipalities.

***Workforce development:*** The Residential Clean Heating & Cooling program will be carried out by contractors engaged by the City of Rochester in accordance with its procurement laws and policies. (Described above.)

### ***Project #3: Municipal Facilities Solar Upgrades***

***Direct and indirect benefits:*** The installation of solar panels on municipal facilities will benefit low-income and disadvantaged communities by demonstrating the feasibility and effectiveness of solar installations on rooftops of high-profile City facilities. Public informational display will be installed to explain the environmental and financial benefits from solar energy. The reduced operating costs will benefit disadvantaged neighborhoods by enabling the City to devote funds to other vital community facilities and services.

**Potential disbenefits, anticipated negative impacts and strategies for mitigating those risks:** As the solar installations will be completed on existing buildings, the construction will have minimal impacts on the surrounding neighborhood. No disbenefits will result from the solar installations.

**Plan and process for continuing to assess, quantify, and report benefits:** City staff will monitor outreach events, jobs created and educational program events and report to EPA at least annually.

**Impacted communities outside the City:** The project will not directly impact communities outside the City of Rochester. However, the project will demonstrate for other municipalities the viability and effectiveness of installing solar generating capacity and other sustainable building improvements in municipal buildings.

**Workforce development:** The municipal facilities improvements will be carried out by contractors procured by the City of Rochester in accordance with its procurement laws and policies. (See description above.) The City will track the number of jobs created through the work funded by the grant. Creating these additional solar installation jobs at high profile City buildings will encourage residents to consider training for these jobs and improve job security for workers currently in the field.

#### **Project #4: Solid Waste Facility Sustainable Upgrades**

**Direct and indirect benefits:** The sustainable upgrades to the Solid Waste Management Facility will benefit low-income and disadvantaged communities by demonstrating the feasibility and effectiveness of these technologies. This vital public works facility will serve as an educational model to the nearby Edison Tech High school, demonstrating a variety of sustainable technologies for students. The reduced operating costs will benefit disadvantaged neighborhoods by enabling the City to devote funds to other vital community facilities and services. The high concentration of poverty in the City requires high level of services from City government to address issues such as crime, homelessness, and health disparities.

**Potential disbenefits, anticipated negative impacts and strategies for mitigating those risks:** As most of the sustainable upgrades will be completed within the existing building, the construction will have minimal impacts on the surrounding neighborhood. No disbenefits will result from the solar installations nor from the sustainable upgrades to the facility.

**Plan and process for continuing to assess, quantify, and report benefits:** City staff will monitor outreach events, jobs created and educational program events and report to EPA at least annually.

**Impacted communities outside the City:** The project will not directly impact communities outside the City of Rochester. However, the project will demonstrate for other municipalities the effectiveness of installing geothermal, solar and other sustainable building improvements in municipal buildings.

**Workforce development:** The municipal facilities improvements will be carried out by contractors procured by the City of Rochester in accordance with its procurement laws and policies. (See description above.) The project will increase opportunities for solar and geothermal contractors and workers. City will track the number of jobs for solar installers generated by this project.

#### **b. Community Engagement**

The City will prepare a public outreach and engagement plan for each of the components to be funded by the CPRG. The plan will specify methods of outreach for each component and include measures to ensure that affected residents and potential participants in residential programs as well as people who may be affected by municipal facility construction projects have an opportunity to be heard. These measures will include providing information in languages other than English and ensuring effective

communication to people with disabilities. City staff regularly provide information to residents in Spanish and other languages to ensure that all residents have an opportunity to participate in housing rehabilitation and other programs and will do so for the implementation projects included in this proposal.

The City will maintain information about each project component on the City's website. Residents can also obtain information and ask questions via e-mail to [info@cityofrochester.gov](mailto:info@cityofrochester.gov). The City will also coordinate with the City's Communications Bureau to post information on social media. The City's four NSCs will serve as points of contact for residents interested in the programs, as well as for information about solar job training, and municipal facilities upgrades. The NSCs work directly with residents to resolve quality of life issues and connect residents to information about programs in their neighborhoods. Each of the four NSCs are located in low-income disadvantaged areas within the City.

The Residential Solar Program and the Residential Clean Heating & Cooling Program will directly engage with residents of disadvantaged neighborhoods. For the Residential Solar Program, City staff will contact potential participants via direct mailings and phone calls to homeowners who participated in the roof replacement program over the past five years, whose roofs appear to be suitable for solar, to determine their interest in adding rooftop solar. Participation in the program will be voluntary. City staff and the contractor will be available to answer questions that homeowners may have regarding the program.

The design of the Residential Solar and Residential Clean Heating and Cooling programs are in response to input from previous community outreach. The City's experience with the Sustainable Homes Rochester Program, a NYSEDA-funded program, found that the biggest barriers to installing heat pump technology are cost and lack of information about effectiveness and maintenance. The Residential Clean Heating & Cooling Program will eliminate the cost barrier.

City staff will incorporate feedback from participants and others into the design and delivery of the program. This outreach and engagement will build on the City's Energy Smart Rochester public education program established in 2020, which connects residents to information about solar energy, heat pumps, energy efficiency and other sustainable practices.

The City currently partners with CSA via the NYSEDA Clean Energy Hubs Program which promotes electrification, including residential solar and clean heating and cooling. City staff will supplement this awareness effort with targeted outreach to homeowners.

The City has extensive experience in engaging residents of disadvantaged neighborhoods. For example, the BEST and REJOB Brownfield Job Training programs funded through the EPA recruit participants from disadvantaged neighborhoods disproportionately impacted by brownfields and environmental pollution. City staff regularly engage with program participants and interested residents to identify additional concerns and needs.

## **Section 5: Job Quality**

All of the grant-funded activities will create high-quality, family-sustaining jobs, including union jobs, that ensure strong labor standards. Contractors retained by the City, in accordance with its procurement laws and policies, projects, which includes paying their workers prevailing wages as required by New York State Public Works Law and Davis-Bacon. The City offers incentives to contractors if 10% or more of the contractor's total gross payroll is paid to City residents. Rochester requires companies entering contracts with the City valued at \$50,000 or more to pay a "living wage" to its employees. The current minimum is \$14.85/ hour if employees receive health insurance and \$16.59/hour if they do not receive health insurance.

Solar installers employed by contractors selected for the Residential Solar Program and the Municipal Facilities Solar upgrades will be well-paid. According to the U.S. Bureau of Labor Statistics, the Mean Annual Wage for solar installers in the Rochester, New York Metropolitan region is \$44,160 and the mean hourly wage is \$21.23. (Source: US BLS Occupational Employment and Wages, May 2022).

## **Section 6: Programmatic Capability and Past Performance**

### **a. Past Performance**

Within the past 3 years, the City managed several EPA grant agreements. Recent activity is summarized below:

Category	EPA Funding	Announce Year (FY)	Cooperative Agreement (CA) Number & Use of Funds	Estimated Completion
Sustainable Housing Rehabilitation/Beneficial Electrification	\$1,000,000	2023	Pending: The City of Rochester Home Electrification & Revitalization Opportunity (HERO) Program EPA-R-OEJECR-OCS-23-02. CA anticipated 5/24.	April 2027 (Anticipated)
Job Training	\$500,000	2023	4J96234023 - Brownfields Environmental Skills Training Program (BEST)	July 2028
Job Training	\$200,000	2022	JT96241222 – Rochester Environmental Job Training Program (REJob 3.0)	May 2025
Multipurpose	\$800,000	2021	BF96242500 – Brownfield Site Planning, Assessment, and Cleanup	Sept. 2026
Cleanup	\$408,000	2020	BF96251020 – Cleanup at 24 & 32 York Street	Sept. 2024

City DEQ has successfully managed 30 EPA brownfield assessment, cleanup, Revolving Loan Fund (RLF), Environmental Workforce Development Job Training (EWDJT), Brownfields Job Training (BJT) and area-wide planning grants since 1995. EPA-funded grants include four (4) job training grants which are employment-focused, multi-partner efforts designed to lead to successful and sustainable long-term employment in environmental remediation fields. The training programs target veterans, dislocated workers, severely underemployed individuals, and unemployed individuals including low-income and minority residents and those with little or no advanced education. To date, the job training programs have achieved a 100% graduation and 100% job placement rate for 176 individuals.

### **b. Reporting Requirements**

For all its EPA funded projects, the City has submitted all required reports. DEQ has an effective grants monitoring process and has achieved its work plan tasks and met the required terms and conditions for previous EPA agreements. Quarterly progress, reporting measures, ACRES, and annual financial reports for the existing EPA job training and assessment and cleanup grants are up to date and were made in a timely and acceptable manner. The quarterly reporting routinely links actual performance to progress toward achieving grant output goals. Annual financial reporting is complete. The City also has submitted acceptable final technical reports under previous agreements.

### **c. Staff Expertise**

The DEQ has extensive experience providing efficient, high quality environmental compliance and pollution prevention, brownfield investigation, cleanup and redevelopment, and energy, climate and

sustainability planning for the City of Rochester and will serve as the PM. The PM will utilize the existing infrastructure within the City to manage each program and reach homeowners in underserved communities. As the proposed activities to be funded with the EPA CPRG will build on existing programs and structures, DEQ is perfectly suited to manage the program. DEQ also oversees EPA funded brownfield workforce development programs, for disadvantaged and underserved populations in the City. DEQ has extensive experience in implementing sustainability initiatives to improve the quality of life and well-being of city residents, including Sustainable Homes Rochester and Energy Smart Rochester; both programs are designed to provide residents with information about sustainable upgrades that can be made to their homes, including heat pumps, solar, and EV charging. DEQ will ensure that underserved communities have access to information and opportunities provided through the projects by conducting education and outreach measures to residents in disadvantaged neighborhoods.

DEQ will be responsible for the completion of all technical, administrative, and financial requirements of the project and the grant. DEQ has successfully managed 30 EPA grants since 1995. Anne Spaulding, the Manager of Environmental Quality, who has more than 30 years of professional environmental experience and has been working for the City since 1993, oversees DEQ. In her position as Manager of DEQ, Anne manages educational programs and City initiatives to reduce fossil fuel use citywide through building electrification, the increased use of renewable energy and the City's other sustainability programs. The DEQ team consists of six full-time, degreed professionals, including an Energy and Sustainability Manager (ESM), Shalini Beath, and a full-time grants/budget financial coordinator, Michelle Costanzo. The ESM implements and raises public awareness of and develops educational materials for sustainability and climate resilience initiatives. The ESM also manages multiple grants for DEQ. The grants/budget financial coordinator, Michelle Costanzo, manages the current EPA grant-funded programs for DEQ and is responsible for maintaining financial records and submitting required reports to the EPA.

The professional staff located with the City's Bureau of Architecture will assist with project oversight for the work completed under the Municipal Solar Program and Solid Waste Management Sustainable Upgrades. This staff carries the responsibility for oversight and project management for over 200 City-owned facilities and successfully oversees multiple capital improvement projects annually.

## **Section 7: Budget**

The City's grant management system involves: (1) a Project Manager and other key DEQ personnel supported by the DEQ grants/budget coordinator and (2) central finance and budget grants oversight. DEQ will be responsible for ensuring the timely and successful expenditure of EPA grant funds. The City's DEQ grants/budget coordinator will be responsible for maintaining financial records and submitting required reports to the EPA. The grants/budget coordinator monitors compliance with cooperative agreements, work plans, financial budgets, and deliverables and helps assemble data.

### **a. Budget Detail**

<b>BUDGET BY PROJECT</b>			
<b>Project Number</b>	<b>Project Name</b>	<b>EPA Funds</b>	<b>% of Total</b>
<b>1</b>	<b><i>Residential Solar Program</i></b>	<b><i>\$3,998,699</i></b>	<b><i>20%</i></b>
<b>2</b>	<b><i>Residential Clean Heating and Cooling Program</i></b>	<b><i>\$4,796,579</i></b>	<b><i>24%</i></b>
<b>3</b>	<b><i>Municipal Facilities Solar Upgrades</i></b>	<b><i>\$6,355,095</i></b>	<b><i>32%</i></b>

<b>4</b>	<b><i>Solid Waste Facility Sustainable Upgrades</i></b>	<b><i>\$4,849,604</i></b>	<b><i>24%</i></b>
<b>Total</b>		<b><i>\$19,999,977</i></b>	<b><i>100%</i></b>

The attached Budget Narrative and Budget Spreadsheet contain additional budget details.

***Project #1: Residential Solar Program***

Total project costs will be approximately \$26,258.75 per household for 400 houses for a total cost of \$10,503,499. EPA funds in the amount of \$3,998,699 will be utilized, leveraging other funds of \$6,504,800. Personnel costs covering grant administration and project oversight will be \$15,482 with fringe costs totaling \$8,097. Contractual costs for consultant services to track and monitor the project total and participant outreach and education amount to \$135,000. Construction costs for the contractor's installation of rooftop solar on 80 low-income resident's homes per year total \$3,603,600. Other costs include a loan loss reserve fund in the amount of \$236,520 established to reduce risk to the lender. This project leverages NYSERDA PV incentive funds and IRA Tax credits totaling \$4,928,000.00 and a homeowner contribution of \$1,576,800.

***Project #2 Residential Clean Heating and Cooling Program***

Total project costs will be \$7,796,579. EPA funds in the amount of \$4,796,579 will be utilized, leveraging NYSERDA incentive program funds of \$3,000,000. Personnel costs covering grant administration and project oversight will be \$15,482 with fringe costs totaling \$8,097. Contractual costs for consulting services for program monitoring and measurement of GHG end energy cost reduction amount to \$35,000. Construction costs to provide ASHPs, HPWHs, and insulation/air sealing to participants in the City program amount to \$4,738,000.

***Project #3: Municipal Facilities Solar Upgrades***

Total project costs to install PV systems on Blue Cross Arena, Rochester Riverside Convention Center, and the Public Safety Building will be \$9,516,473. EPA funds in the amount of \$6,355,095 will be utilized, leveraging NYSERDA PV incentive funds and IRA Tax credits totaling \$3,161,378. Personnel costs covering grant administration and project oversight will be \$15,482 with fringe costs totaling \$8,097. Contractual costs for design and construction oversight costs and consulting services for program monitoring/reporting and GHG/energy cost savings calculations amount to \$894,808. Construction costs to install rooftop solar PV systems on five municipal facilities amount to \$5,436,708.

***Project #4: Solid Waste Facility Sustainable Upgrades***

Total project costs will be \$6,079,204. EPA funds in the amount of \$4,849,604 will be utilized, leveraging NYSERDA incentive funds and IRA Tax credits for the geothermal system and PV system totaling \$1,229,600. Personnel costs covering grant administration and project oversight will be \$15,482 with fringe costs totaling \$8,097. Contractual costs of \$1,239,125 include design and construction oversight and consulting services for program monitoring/reporting and GHG/energy cost savings calculations. Construction costs of \$3,586,900 cover the sustainable upgrades to the Solid Waste Operations Facility (rooftop solar, geothermal HVAC, enhanced insulation and LED lighting upgrades).