

**CPRG IMPLEMENTATION GRANTS COMPETITION  
COVER PAGE FOR APPLICATION**

**APPLICANT INFORMATION**

Organization	<input type="text"/>
Primary Contact Name	<input type="text"/>
Phone Number	<input type="text"/>
Email Address	<input type="text"/>

**TYPE OF APPLICATION**

☐

Individual Applicant

☐

Lead Applicant for a Coalition

*If lead applicant for a coalition, provide a list of the coalition members below.*

**FUNDING REQUESTED:** *Provide total EPA CPRG Implementation Grant funding requested.*

**APPLICATION TITLE:** *Provide the title of your proposed project.*

**BRIEF DESCRIPTION OF GHG MEASURES:** *Describe each GHG reduction measure contained in the application (1-2 sentences each).*

**SECTORS:** *Identify the sector(s) associated with the GHG reduction measures included in the application.*

- |  |  |
|--|--|
| <input type="checkbox"/> Industry                | <input type="checkbox"/> Commercial and Residential Buildings  |
| <input type="checkbox"/> Electricity Generation  | <input type="checkbox"/> Agriculture/Natural and Working Lands |
| <input type="checkbox"/> Transportation          | <input type="checkbox"/> Waste and Materials Management        |
| <input type="checkbox"/> Other (please describe) | <input type="text"/>   |

**EXPECTED TOTAL CUMULATIVE GHG EMISSION REDUCTIONS**

*For all proposed measures combined, provide the estimated cumulative GHG reductions:*

**Estimated cumulative GHG reductions for 2025-2030 (in metric tons)**

**Estimated cumulative GHG reductions from 2025-2050 (in metric tons)**

**LOCATIONS:** *List the primary location(s) where the proposed measures will be implemented*

City

State; Territory; Federally recognized Tribe

**APPLICABLE PRIORITY CLIMATE ACTION PLAN(S) (PCAP) ON WHICH MEASURES ARE BASED**

PCAP Lead Organization(s):

PCAP Title(s):

PCAP Website link(s) (if applicable):

**List of GHG reduction measures and PCAP page reference for each measure:**

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## **Climate Pollution Reduction Grant Application for the Columbus MSA** **Growing Green: A Community-Focused Energy Strategy for a Growing Columbus Region**

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

#### ***1A: Description of GHG Reduction Measures***

In the heart of the Midwest, the City of Columbus stands on the brink of a remarkable transformation. Over the past decade, it has welcomed over 100,000 new residents, experiencing its most explosive growth since the 1950s. As forecasts now predict a 30% population swell and a 28% surge in the workforce by 2050, the Columbus region faces a formidable challenge: a rising demand for energy and transit, set against the backdrop of an unpredictable and changing climate. Hotter summers, flash droughts, more intense rainfall and flooding, have highlighted our vulnerabilities. Our challenge now is to forge a future that is sustainable, resilient, and inclusive.

The disproportionate impact of rising energy costs and climate adversities on our most vulnerable low-income and disadvantaged communities (LIDACs) is clear, with 74 of 433 Census Tracts shouldering an energy burden far above the norm. Our response is Growing Green: A Community-Focused Energy Strategy for a Growing Columbus Region, an initiative focused on clean energy and connected, electrified transit corridors for the Columbus region. Together these projects can help transform our energy and transportation landscape into a model of sustainability and resilience.

The Regional Community Energy Strategy (ReCES) program will utilize an innovative solar financing model to install 30 MW of solar at public buildings and single-family homes in LIDAC communities, at no cost to the property owner. This unique approach eliminates the upfront cost barriers and will allow disadvantaged communities to access clean, affordable energy. Through engagement with regional stakeholders, MORPC has received 50 Letters of Commitment, identifying at least 251 potential solar sites across all ten counties.

Concurrently, our team will implement the West Broad Mobility project, focused on the first of the region's first LinkUS transit corridor. The larger LinkUS Program is designed to move people from single-occupancy vehicles to alternate modes of transit, linking safe sidewalks, bus rapid transit, protected bike lanes and expanded trails. The first phase of the W. Broad transit corridor will connect LIDAC communities on the city's west side. CPRG funds will advance the electric power components of the W. Broad transit corridor, installing the region's first battery electric bus rapid transit (BRT) line and replacing streetlights in surrounding neighborhoods with LED smart lighting.

Coordinating our proposed projects is the Mid-Ohio Regional Planning Commission (MORPC), a regional council with nearly 90 local governments and community partners, whose mission is to guide and facilitate investments in transportation and infrastructure. MORPC seeks to reach every central Ohio resident through its commitment to mobility, land use, economic development, environmental sustainability, and housing stability.

Together with the City of Columbus, the Columbus Region Green Fund (CRGF), Clean Energy Ventures (CEV), IMPACT Community Action, and the Central Ohio Transit Authority, MORPC is proposing a strategic blend of solar installations, smart LED street lighting, and electric bus rapid transit vehicles. We target the nexus of electricity and transportation—the highest contributing sectors to our region's GHG emissions.

With CPRG funding, we seek to implement four central GHG emission reduction measures:

- **Measure 1: ReCES Commercial Solar Program:** Powering municipalities, schools, nonprofits, and wastewater treatment facilities with clean, affordable energy.
- **Measure 2: ReCES Residential Solar Program for LIDAC Communities:** Bringing solar energy to the rooftops of those most in need.
- **Measure 3: Battery Electric Buses for the LinkUS W. Broad Transit Corridor:** Transforming public transit into a cleaner, more sustainable force.
- **Measure 4: Retrofitting Columbus Street Lights along the LinkUS W. Broad Transit Corridor with Smart LED Lighting:** Brightening our streets with energy-efficient lighting

The Growing Green program offers a comprehensive approach, impacting building and transportation sector emissions through projects that can be scaled and replicated across our 10-county region. Both ReCES and the LinkUS W. Broad Street Mobility project will complement each other by prioritizing projects along the W. Broad Street corridor and Justice40 census tracts in Columbus with anticipated scaling to other census tracts and counties in the region to maximize impact of both efforts.

#### **ReCES Commercial and Residential Solar Programs [GHG Reduction Measures 1 and 2]**

ReCES will deploy at least 30 MW of solar energy within five years across the Columbus region. To achieve the 30 MW target, ReCES will install 27.5 MW of solar panels on public and nonprofit buildings and spaces and 2.5 MW on single-family residences with the potential to increase these targets based on community interest and demand. ReCES will prioritize publicly-owned buildings and single-family homes along the W. Broad transit corridor, expanding into other LIDAC communities—as identified by the Climate and Economic Justice Screening Tool (CEJST)—across the Columbus region.

ReCES adopts nonprofit Clean Energy Ventures' (CEV) Impact Solar Stewardship Model, which enables the delivery of clean, affordable energy to the community through an innovative financial model and a Power Purchase Agreements (PPAs) term. Under the Impact Solar Stewardship Model, CEV will install and own the solar asset, eliminating upfront cost barriers to participate in ReCES, and will provide clean energy to the site host during a PPA term. During the PPA term, solar system hosts receive clean electricity at a rate of \$0.04-\$0.06/kWh, a significant cost reduction compared to utility rates, and the assets are transferred to the owners at the end of the PPA term.

Funding for these installations combines private investment raised by CEV with requested grant funding to be deployed through the financing partner Columbus Region Green Fund (CRGF) as grant dollars and as debt. Deploying the federal grant funds as both grant dollars and debt allows the end user to benefit from significantly reduced energy rates while also allowing the repaid debt to serve as a revolving fund that can be reinvested into future projects. This creates a sustaining program that will live beyond the initial federal funding and expand the reach of the initial dollars far beyond ReCES's original 30 MW goal.

As the nonprofit developer of the assets, CEV will capitalize the investment tax credit through the elective pay incentive and will secure a bridge loan facility from a corporate partner to align that financing with the IRS tax credit reimbursement timeline. CEV will serve as the asset steward owning, operating, and maintaining the systems for the term of the PPA. At the end of the PPA, CEV will deliver the debt free solar asset to the host for their ownership and use. The technology has an estimated lifespan of 35 years allowing for an additional 15 years of solar generation post commercial PPA term at no cost.

Public buildings eligible for solar installations include local government facilities, water treatment plants, libraries, public schools, and nonprofits. Initial review of potential sites submitted by eligible participants have an average project size of approximately 500 kW.

ReCES will also prioritize the installation of rooftop solar panels for low-income and disadvantaged, single-family homeowners that will complement existing and future solarization programs. ReCES will work with County partners and regional community action organizations such as LEADS Community Action Agency in Licking County and MORPC's Residential Services Program in Franklin County to identify income-eligible single-family homeowners with solar-ready roofs by drawing from previous home weatherization clients. Using 6-year residential term PPAs, ReCES intends to install approximately 4 kW of rooftop systems on these homes, with no upfront cost to the homeowners. The PPA model eliminates the need for homeowners to undergo credit checks, secure loans, or provide upfront capital for tax credits, which are common barriers to rooftop solar adoption. This is a crucial step in ensuring equitable access to solar energy for low- and moderate-income (LMI) households, allowing an additional 29 years of solar generation post residential PPA term at no cost.

In summary, ReCES [GHG Reduction Measures 1 and 2] will accelerate—and sustain—the adoption of clean energy throughout the Columbus MSA, providing direct advantages to underserved communities and reducing emissions from electricity consumption in residential and commercial buildings. By assisting public entities, ReCES will lower energy expenses, increase solar energy capacity, and bolster organizations that serve disadvantaged communities. ReCES will also alleviate the energy burden for LIDAC single-family households and create avenues for wealth accumulation and solar access.

#### **ReCES [GHG Reduction Measures 1 and 2] Milestones and Tasks:**

##### *Milestone 1: Project Launch*

- Prepare Marketing Materials
- Site Recruitment
- Staff Hiring
- Residential Marketing
- Education & Outreach
- Develop a quality assurance project plan (QAPP)
- Workforce Development Planning

##### *Milestone 2: Solar Preparation*

- Schedule Feasibility Assessments
- Conduct Feasibility Assessments
- Establish Installation Hierarchy and Year-to-Year Queues

##### *Milestone 3: Solar Installation*

- Contract Solar Installation
- Solar Project Development (financing, engineering and design)
- Schedule Solar Installation
- Commission System
- Post-installation Interview

##### *Milestone 4: Project Monitoring*

- Semi-annual Feedback Report
- Collect Monthly Energy Bill Reports
- Tabulate Solar Panels
- Calculate MW Production
- Calculate GHG Emissions Reductions
- Calculate Job Production
- Calculate Cost Savings
- Submit Annual Report
- Submit Final EPA Report

To reach the 30 MW goal, ReCES will employ a phased strategy spanning five years. This approach will enable broader outreach and recruitment, as well as the implementation of best practices and lessons learned to enhance project efficiency progressively.

### **Electrifying the LinkUS W. Broad Transit Corridor [GHG Reduction Measures 3 and 4]**

CPRG funds will install the region's first battery electric BRT line and replace streetlights in surrounding neighborhoods with LED smart lighting, enabling future smart technology implementation such as public EV charging. Electrifying the BRT and enhancing the historically disinvested west side of Columbus with smart street lighting addresses the transportation sector as the leading contributor of GHG emissions in the region. The end result will be a comprehensive energy-focused and community-based model for future LinkUS transit corridors within the Columbus region.

### ***Battery electric rapid transit vehicles***

With a service area of 1.2 million residents and providing nearly 19 million passenger trips annually, the Central Ohio Transit Authority (COTA) has set an ambitious goal to achieve net-zero GHG emissions by 2045. Achieving net-zero emissions will require transitioning the fleet to zero-carbon buses, ensuring the fuel being sourced for these vehicles is carbon free, and transitioning all support operations to be powered by clean energy.

CPRG funds will support this goal by replacing ten (10) forty-foot internal combustion engine buses that have exceeded their FTA minimum useful life of 12 years or 500,000 miles with high capacity, battery electric vehicles. These vehicles, which COTA will deploy along the W. Broad transit corridor, will be a first for the Columbus region.

The transition of COTA's fleet to zero-emission buses directly supports COTA's Sustainability Plan and the City of Columbus Climate Action Plan. According to the demographic index in EPA's EJ Screen tool (CEJST), there are 188 census block groups with over 60% minority and low-income populations in COTA's service area. Deploying electric buses in these communities will help to improve air quality and decrease noise pollution. According to an article in the Dispatch, Central Ohio has seen an extraordinary number of days with extremely high temperatures in recent summers and past winters have marked some of the lowest sub-zero temperatures in over 30 years. Air quality decreases during the summer when heat and sunlight enhance ozone formation.

### **Milestones:**

- Vehicle Procurement
- Engineering Configuration Audit
- Vehicle Delivery
- Vehicles In-Service

### ***Expanded LED + Smart Street Lighting Program***

To provide a complete neighborhood package that maximizes community benefits for the W. Broad transit corridor, the City will accelerate and deploy LED and smart street lighting throughout the Franklinton, Hilltop and other surrounding neighborhoods, reducing energy use, improving public safety, and allowing for addition of smart technologies, such as EV charging. The City will convert an estimated 3,162 streetlights to LED, connect an estimated 3,338 streetlights to the City of Columbus' smart lighting system, and install up to 10 air quality monitors. Smart lighting implementation will provide dimming potential, activation from a centralized control center, circuit operation coordination, outage detection, and remote issue diagnosis.

Milestones:

- Design procurement
- Engineering design completion
- Construction procurement
- Construction completion

***Description of Anticipated Risks and Proposed Mitigations***

**ReCES Program**

The ReCES program aligns with current Ohio regulations, so we do not anticipate regulatory barriers. However, there are potential risks because of other issues, such as interconnection, supply chain, and site readiness. In Ohio, we have identified several potential interconnection challenges. First, the approval process can be lengthy and complex, requiring coordination between the solar installer, utility company, and state regulatory authorities. Second, meeting the technical requirements and standards set by utility companies for grid stability and safety can be difficult and costly, adding to the overall expense of the installation. Finally, application fees, equipment upgrades, or system modifications are associated costs. Limited grid capacity may also pose a challenge, especially in areas with a high concentration of solar installations, requiring significant grid upgrades. Since ReCES is utilizing approximate system sizes of 500 kW for public buildings and 4 kW for single-family homes, projects will be well below the utility-scale threshold subject to the lengthy PJM interconnection queue. Based on similarly sized completed projects, the interconnection process should take 4-6 weeks to complete on average. Under the Impact Solar model, CEV will absorb financial risks as the nonprofit solar developer, so unforeseen interconnection costs will not be passed onto EPA or end users.

Potential supply chain availability and delays related to Build America, Buy America compliance could also be a challenge. We will issue an RFP to solar panel distributors to secure a Master Supply Agreement that would include a 12-month look forward plan to guarantee the availability of required materials and domestic content goals. This Agreement will mitigate risks around material procurement and align with EPA procurement requirements.

We are in a robust manufacturing region positioned to lead American solar manufacturing. We will prioritize purchasing from regional manufacturers whenever feasible to support the local green economy, including hiring from the Empowered! program, a local clean energy workforce development program administered by IMPACT Community Action, the local community action agency in Franklin County. The initiative will also prioritize hiring from the in-development solar job training lab (SJTb), also administered by Impact Community Action. Both the Empowered! program and SJTB recruit exclusively from LIDAC communities in the Columbus MSA.

Site readiness may pose a challenge. To maximize project efficacy, we will prioritize roofs with at least 20 years of expected lifespan. Additionally, securing buy-in from facilities' operations staff and lengthy governmental approval processes for solar installations on public buildings are anticipated. To mitigate these challenges, we will support MSA communities in pursuing a SolSmart certification to streamline local permitting. Nine communities, including Franklin County and the City of Columbus, are SolSmart certified. Our phased implementation approach will prioritize sites that are implementation-ready with motivated partners.

Other eligible public agencies can queue in the later years of the five-year ReCES program, allowing time to address roof upgrades, gain staff buy-in, and navigate the approval process in the interim. Our team has experience in conducting stakeholder engagement, including board presentations, community engagement sessions, and guidance on public procurement, to secure buy-in from key decision-makers. Through partnerships with existing organizations that provide weatherization upgrades, we will build a pipeline of LMI single-family homeowners with solar-ready roofs.

### **W. Broad Mobility**

Build America Buy America requirements can reduce the availability of electric buses for purchase and inhibit flexibility in procurement for timing and cost. Supply shortages may disrupt procurement and project timelines for vehicle purchases. To support efficient and cost-effective procurement, COTA participates in the WA State Department of Enterprise Services cooperative purchasing agreement for transit buses, which is a competitive process and includes BABA-compliant manufacturers.

Risks are minimal for the streetlight measure, as the City has successfully installed nearly 3,000 lights to date. Supply chain volatility has been a challenge that can cause a few months of material delay. However, the City has built this into the timeline and anticipates no problems in completing the W. Broad transit corridor before the end of the grant period. Additionally, based on past experience, we do not expect to face BABA compliance challenges for this measure.

### ***Connection to the Columbus MSA Priority Climate Action Plan (PCAP)***

#### **Built Environment**

In the Columbus MSA's Priority Climate Action Plan (PCAP), commercial and residential building sectors contribute significantly to greenhouse gas emissions. According to the 2022 GHG inventory (Page 5 of the [PCAP](#)), commercial buildings are responsible for 5,175,583.52 MT CO<sub>2</sub>e (17% of the 10-county MSA's total emissions), while residential buildings account for 7,527,988.72 MT CO<sub>2</sub>e (25%). Recognizing the substantial impact of buildings on the MSA's emissions, the PCAP outlines several priority measures to achieve the overarching goal of "Increase solar + battery storage capabilities on public buildings and facilities, small businesses, nonprofits, and homes."

Two of the key priority measures identified that reach this goal are "Public and Nonprofit Buildings and Spaces: Regional Community Energy Strategy (ReCES) (50 MW Solar)" and "Expansion of Solar in the Residential Sector (50 MW Residential Solar)" (Page 18 of the [PCAP](#)). Through community engagement processes in CPRG Phase 1, ReCES emerged as a top priority to tackle GHG emissions from two sectors that comprise nearly half of the region's GHG emissions. The ReCES scope of work in this grant application is a critical step in accomplishing 30 MW of solar toward the combined 100 MW goal from the PCAP.

Through ReCES, the main objective is to increase access to solar infrastructure without cost burden to public agencies and residential homeowners. ReCES is adopting and catalyzing an existing innovative model by partnering with Clean Energy Ventures and the Columbus Region Green Fund that removes the upfront capital required for the end user, while delivering long term energy rates that are below both fossil fuel-based power rates as well as existing offers for solar in Ohio.

The requested funding allows MORPC to adopt the existing Impact Solar model and catalyze regional adoption, generating even more significant cost savings for the civic organizations participating in the ReCES program. EPA funding will allow ReCES to demonstrate a replicable and scalable public private



partnership that generates clean energy for public facilities and LMI households that offsets carbon footprints while generating immediate energy savings.

### Transportation

According to the 2022 GHG inventory (Page 5 of the [PCAP](#)), transportation contributes 11,019,361.84 MT CO<sub>2</sub>e (36% of the MSA's emissions) of the 10-county MSA's total emissions). Recognizing the substantial impact that transportation has on the MSA's emissions, the PCAP outlines several priority measures to achieve reductions in this sector.

Electric vehicles for the W. Broad Street Mobility project support the Columbus MSA PCAP Priority Measure of Completion of W. Broad transit corridor W. Broad corridor by 2028 (pg. 9). Vehicle electrification for the region's first bus rapid transit corridor will bring benefits to low-income and disadvantaged communities (LIDACs) on the city's west side and leverage other federal and local funding to create a replicable and scalable model for future transit corridors throughout the region. Vehicle electrification will ensure this critical first corridor is successful in reducing greenhouse gas emissions and addressing the needs of the surrounding community.

Furthermore, the inclusion of LED and smart street lighting infrastructure in this grant supports the Columbus MSA PCAP Priority Measure of Expanding Municipal LED and smart street lighting (pg. 17). To provide a complete neighborhood package that maximizes community benefits for the W. Broad Mobility Corridor, the city will accelerate and deploy LED smart street lighting throughout the Franklinton, Hilltop and surrounding neighborhoods, reducing energy use, improving public safety, and allowing for the addition of smart technologies.

### ***1B: Description of Funding Need***

Solar power needs to be more affordable than current utility prices to equitably deploy solar in Central Ohio. Solar not only needs to provide an environmental benefit but also a financial benefit to our most underserved residents and organizations in LIDAC communities. However, solar currently costs much more than utility power for residents and organizations in the community. To combat this issue, Columbus' Green Bank, also known as the Columbus Region Green Fund (CRGF), will use these grant dollars to offer a financial solution that lowers the cost of solar on a per kWh basis to below what LIDAC residents, nonprofits, local governments and other organizations within ReCES currently pay for power. The CRGF acts akin to a revolving loan fund, where much of the capital invested by the CRGF into projects is paid back and invested into, or revolved, into new projects.

CRGF is currently funding an innovative solar program that is meeting these identified needs for nonprofits, but the demand far exceeds the available resources, as seen with the 50 referenced LOIs and the over 250 interested projects, and so the program is currently limited to nonprofit organizations in Franklin County. The current program also has yet to be able to meet some of the more extraordinarily low fossil fuel-based energy rates that municipalities and school systems have been able to achieve. This grant funding will allow MORPC to expand upon these offerings by increasing resources available for the CRGF to deploy, as well as layering in a grant function to help meet those extraordinarily low fossil fuel energy costs with competitive solar rates. This method of marrying grant funding with low-cost financing through CRGF also allows federal funding to revolve into future projects over time.

The City of Columbus City Council and Franklin County initially capitalized on the CRGF with \$8.1 million dollars in general funds that were to be lent out for the Impact Solar program to deploy equitable solar in the Franklin County area. However, based on the existing Impact Solar project pipeline and additional interest expressed for the ReCES program, there is approximately \$80 million of solar interest from nonprofits and government agencies across the Columbus MSA. CPRG funding will allow Impact Solar to scale to the entire Columbus MSA, reaching all 10 counties and focusing on LIDAC communities.

Schools and public buildings have been able to aggregate facilities and often negotiate utility rates lower than the average user. Traditionally, solar energy rates have been hard to reduce enough to be competitive with fossil fuel-based power in Ohio; these public institutions are still struggling to make renewable energy financially feasible. ReCES marries existing solutions, like the Columbus Region Green Fund and the Impact Solar program, with the catalyzing investment from CPRG to make renewable energy economically feasible for government and civic operations. These public dollars are being leveraged with regional private sector efforts to maximize the public benefit of solar in Ohio.

To do this for school districts in the MSA, the CRGF will use the grant as low-cost capital, which will be revolved into future projects once paid back over the term of the PPA, and partially as grant capital. Due to the aforementioned low-cost electricity prices that schools and public facilities can negotiate, there needs to be grant capital provided in the solar capital stack to generate a solar PPA price below what schools and public buildings currently pay. This use of grant capital in the capital stack will first prioritize school districts, nonprofits, and public buildings located in LIDAC communities and for schools that serve LIDAC students, followed by properties along W. Broad Street and other sites across the Columbus MSA.

Columbus has sought other funding sources for solar and participated in two US EPA Solar for All applications: the Industrial Heartland Solar Coalition application and the State of Ohio application, seeking funds for a 5 MW community solar project and demonstrating demand for low income single-family solar. MORPC also provided a letter of support for the State of Ohio's Solar for All application and will play a role in the program if funded. With potential for multiple federal investments in solar for Ohio, there is a significant opportunity for inter-agency collaboration to maximize program impact and prevent overlapping resource deployment through a Solar Coordinating Committee. If funded, we will establish this Committee to foster collaboration between the grant teams of ReCES, the State of Ohio's Solar for All program, and potential solar initiatives in other state programs like CPRG.

In the meantime, CPRG funding will allow for immediate implementation of shovel-ready solar projects throughout the Columbus MSA. Following a pilot project on the City's east side scheduled for summer of 2024, CPRG funding would allow for immediate scaling of this pilot for maximum impact by 2030 through the established CRGF financing model. In a rapidly growing region creating the bulk of carbon emissions in Ohio, it is critical to begin projects already in the pipeline with committed partners and sites established. CPRG funding would also allow the Greenhouse Gas Reduction Fund to scale the solar programs to all 10 counties in the MSA, extending beyond Franklin County.

The Columbus Region Green Fund also pursued additional funding and is part of three National Clean Investment Fund applications and three Clean Communities Investment Accelerator programs within the Greenhouse Gas Reduction Fund. The Columbus Region Green Fund provided its pipeline of projects that was referenced in the paragraph prior, requiring \$19.05 million in CRGF capital. To date, the EPA has not announced awards for these programs.

COTA will soon begin a suite of improvements to help transform the W. Broad transit corridor into a more accessible and connected community. Federal funds being used for corridor enhancements include the recently awarded USDOT Reconnecting Communities and Neighborhoods grant, which will help build new bus stations, a new park and ride center, and dedicated bus lanes. COTA and partners are currently pursuing an FY23 Transit-Oriented Development Grant from the FTA to conduct a detailed equity assessment for the corridor, and FTA Capital Investments Grant funds are covering planning work as well as construction costs. Local sales tax revenues, debt financing, and an upcoming 2024 ballot measure will also provide funds for enhancements.

Incorporating the GHG reduction measure of battery electric buses into the W. Broad corridor is a priority for COTA, but a funding source has not yet been committed. COTA applied for the FTA's Low or No Emissions Grant in 2023 to help transition to a zero-emission fleet but did not receive an award. Local funds and FTA Section 5307 Formula Funds are potential funding sources for the vehicles but are also needed for the E. Main corridor currently in the design phase. Like the neighborhoods surrounding the W. Broad corridor, a majority of the E. Main transit corridor is surrounded by CEJST identified census tracts, and 64% of Main Street residents live in an area of persistent poverty. CPRG funding for the W. Broad vehicles will allow COTA to leverage dollars effectively to bring maximum benefit to both of these LIDAC areas already prioritized for transit improvements. \$15.9M is needed for the vehicle purchase, and COTA will fund the associated charging infrastructure for approximately \$10M.

The Columbus Division of Power is responsible for operating and maintaining over 58,000 streetlights, 800 lighting controllers, 900 miles of overhead conductor and 850 miles of underground conductor for the City. At a total need of nearly \$70M, conversion of City streetlights to LED and smart lighting systems would take more than 20 years to complete at current funding levels. The City seeks to jumpstart LED implementation by investing CPRG funds into LIDAC neighborhoods along the W. Broad transit corridor. The project will also provide a replicable model for making similar improvements in concurrence with future planned transit corridors throughout the region.

In summary, ReCES and electrification of the W. Broad transit corridor could significantly reduce GHG emissions through the proposed measures, distribute community benefit impacts, and expand the existing scope with CPRG funding. CPRG funding will complement secured and pending additional funding sources such as Solar for All and enable the expansion of these GHG emission reduction measures and programs.

### ***1C: Transformative Impact***

#### ReCES

The Columbus MSA has abundant untapped rooftop space that can be utilized for solar, presenting an opportunity to leverage a PPA model to make solar energy more accessible. This transformative yet practical approach could significantly reduce regional greenhouse gas (GHG) emissions by tapping into the large pool of over 200 potential solar candidates, focusing priority deployment in the W. Broad transit corridor and expanding outward into the 10-county region. The Impact Solar program also has 20 MW of solar projects that would be eligible for ReCES programming in development with almost no overlap with the sites submitted in Letters of Commitment for assessments in the ReCES program. The overwhelming response to both the initial Impact Solar program and its expansion into the ReCES program indicates a demand for commercial solar that will far exceed the 27.5 MW goal set for ReCES.

Additionally, as the region's population and energy demands grow, solar panels can enhance grid resilience by decreasing reliance on grid electricity for public buildings in a region that has been historically susceptible to rolling power outages. Schools and other public buildings equipped with solar panels could also serve as cooling or resiliency centers for communities during emergencies.

Furthermore, a regional solar project aligns with multi-agency climate goals. ReCES will expand the adoption of renewable energy, advancing EPA's Strategic Plan Goal 1, "Tackle the Climate Crisis"; and Objective 1.1, "Reduce Emissions that Cause Climate Change." ReCES will also accomplish 30 MW of the 100 MW solar adoption goal established in the Columbus MSA PCAP. ReCES will advance specific goals in the MORPC Regional Sustainability Agenda and City of Columbus Climate Action Plan to increase local renewable energy generating capacity, reduce regional greenhouse gas emissions, increase employment in green jobs, and reduce household energy burden.

By expanding solar adoption throughout the region, ReCES can also provide a pathway to engage communities around the benefits of solar, building community support in a state with relatively low solar uptake. Over the years, Ohio has experienced some shifts in its energy policy direction, including changes in regulations and incentives affecting renewable energy development. Changes in political leadership and evolving public attitudes have influenced the direction. Through regular metrics collection and highlighting the positive impacts on climate, health, finances, and equity, ReCES can be showcased as a successful and replicable solar deployment model throughout Ohio and beyond, particularly in areas with limited solar adoption.

The ReCES program model also has significant potential for scalability beyond the five-year grant period. The revolving loan fund model can be scaled across all 10 counties, reinvesting CPRG funds into future solar projects to create a virtuous, sustainable cycle. The Impact Solar Stewardship Model will continue indefinitely through the Columbus Region Green Fund (CRGF).

Finally, in accordance with the Workforce Hub designation given to Columbus by the White House in 2023, workforce development will be a central part of ReCES. Workforce development opportunities will leverage clean energy workforce pathways offered by IMPACT Community Action and will be integrated into the contractor procurement. IMPACT's comprehensive workforce development training, including the Empowered! program and the NABCEP-certified Photovoltaic Associate solar training, offer foundational knowledge for a successful "green job" and specialized instruction on introductory electrical components—an identified gap in current workforce development crucial for most clean energy careers. Additionally, IMPACT creates pathways for young adults from historically underrepresented communities, offering opportunities to explore clean energy career pathways.

#### W. Broad Mobility

Columbus is one of the largest cities in the United States without a rapid transit system. Focusing on the first of several planned LinkUS transit corridors, our project provides a model of an electrified rapid transit line with concentrated community improvements that can be replicated for future phases of LinkUS throughout the region.

LinkUS aims to enhance access to jobs, housing, healthcare, and education by building mobility systems that prioritize inclusivity and accessibility in preparation for significant future population growth. The larger W. Broad transit corridor effort incorporates numerous initiatives to improve housing, poverty, safety, and climate action, including high-capacity and advanced rapid transit, bikeways, greenways, complete streets, roadway safety, pedestrian improvements, and development along key regional

corridors throughout Central Ohio. W. Broad Street is one of the most used corridors in Central Ohio, connecting disadvantaged communities with key destinations. Under the LinkUS program, the W. Broad transit corridor will improve mobility options for non-vehicle transportation, increase transportation affordability, and improve accessibility.

The transportation sector is the region's largest source of GHG emissions and with rapid population growth, transportation emissions are expected to rise in this largely car-reliant region. To mitigate these impacts, the Columbus region has a strategic window to invest in public transportation infrastructure, beginning with the first rapid transit corridor along W. Broad. The early integration of zero-emission electric buses will provide a replicable, clean transit model. The addition of smart LED streetlights surrounding the W. Broad transit corridor enhances the GHG reduction potential of this model and creates an opportunity for replication in other LinkUS corridors. Further, conversion to smart streetlights, connected to the City's municipal power utility, enables equitable public EV charging and other technologies to be connected to the City's municipal power utility via the smart streetlights.

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

### ***2A: Magnitude of GHG Reductions from 2025 through 2030***

ReCES: ReCES will install 30 MW of solar capacity during the five-year grant period, leading to a cumulative reduction of 91,391 MT CO<sub>2</sub>e. This reduction is directly attributed to adopting 30 MW of solar energy. With CPRG funds providing 82% of the project costs, the CPRG-attributable GHG reductions are 74,903 MT CO<sub>2</sub>e.

W. Broad Mobility: Smart LED streetlight installation and start of the new battery-powered bus rapid transit service in 2028 will provide a cumulative greenhouse gas reduction of 3,556 MT CO<sub>2</sub>e for the remaining one to two years of the grant period. With CPRG funds providing 71% of the project costs, the CPRG-attributable GHG reductions are 2,512 MT CO<sub>2</sub>e.

### ***2B: Magnitude of GHG Reductions from 2025 through 2050***

ReCES: Through 2050, CPRG-funded solar installations in the Columbus MSA are estimated to avoid a total of 412,584 MT CO<sub>2</sub>e. CPRG-attributable GHG reductions for this time period are 338,151 MT CO<sub>2</sub>e. The funding provided by CPRG will help expand the Columbus Region Green Fund power purchase agreement (PPA) model. This expansion will lead to further greenhouse gas reductions as more jurisdictions, businesses, and residents participate in the revolving loan fund.

W. Broad Mobility: Through 2050, the W. Broad transit corridor clean energy projects will avoid an estimated 49,581 MT CO<sub>2</sub>e. CPRG-attributable GHG reductions for this time period are 35,021 MT CO<sub>2</sub>e.

In total the GHG emission reductions from the four measures in this application for the grant period are 94,947 MT of CO<sub>2</sub>e for the grant period and 462,165 MT of CO<sub>2</sub>e by 2050.

## 2C: Cost Effectiveness of GHG Reductions

		Funding Request	Total Project Cost	CRPG Percent of Total Project Cost	Cumulative Emissions Reductions (MT CO <sub>2</sub> e)	CRPG Attributable Cumulative Emissions Reductions (MT CO <sub>2</sub> e)	\$/MTCO <sub>2</sub> e	MTCO <sub>2</sub> e/\$
ReCES	2025 - 2030	\$73,597,720	\$89,797,720	82.0%	91,391	74,903	\$982.57	0.001018
	2025 - 2050	\$73,597,720	\$89,797,720	82.0%	412,584	338,151	\$217.65	0.004595
W. Broad	2025 - 2030	\$24,051,971	\$34,051,971	70.6%	3,556	2,512	\$9,575.92	0.000104
	2025 - 2050	\$24,051,971	\$34,051,971	70.6%	49,581	35,021	\$686.79	0.001456
Total	2025 - 2030	\$97,649,691	\$123,849,691	78.8%	94,947	74,861	\$1,304.41	0.000767
	2025 - 2050	\$97,649,691	\$123,849,691	78.8%	462,165	364,395	\$267.98	0.003732

## 2D: Documentation of GHG Emission Reduction Measures

Emission reduction, pollution reduction, and health benefits were estimated for the ReCES project and the W. Broad Mobility project individually. For ReCES, benefits were estimated using US EPA's Avoided Emissions and Generation Tool (AVERT), Co-Benefits Risk Assessment Health Impacts Screening Tool (COBRA), and US EIA's Annual Energy Outlook Reference Case for electricity emissions. For W. Broad Mobility, the transportation components were estimated using metrics and factors available from US Bureau of Transportation Statistics, Argonne National Laboratory, and US EPA. Benefits from electrifying the bus fleet and the installation of LED streetlights were estimated using the same process as ReCES. A detailed explanation of GHG emission reduction processes can be found in the Technical Appendix.

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

### 3A: Expected Outputs and Outcomes

The measurable **outputs** for both the ReCES and W. Broad Mobility initiatives are listed below.

ReCES Outputs	W. Broad Mobility Outputs
<ul style="list-style-type: none"> <li>- MW of solar deployed: 30 MW</li> <li>- Number of single-family homes served: 500 homes</li> <li>- Reduction in residential energy burden: 16 - 28%</li> <li>- Number of public buildings receiving solar panels: 60</li> <li>- Number of jobs created: 450</li> <li>- Dollars saved from reduced energy cost:               <ul style="list-style-type: none"> <li>- \$163,815 annually during the PPA (500 Homes)</li> <li>- \$6,067,782 total savings from 2025-2050</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- New vehicles purchased: 10</li> <li>- Streetlights converted to LED: 3,162</li> <li>- Streetlights connected to City smart lighting system: 3,338</li> </ul>

The measurable **outcomes** for both the ReCES and W. Broad Mobility initiatives are listed below.

#### ReCES Outcomes

- Reduction in GHG emissions from 2025-2030: 91,391 MT CO<sub>2</sub>e (74,903 MT CO<sub>2</sub>e is attributable to CPRG funding)
- Reduction in co-pollutants from 2025-2030:
  - Sulfur dioxide: 42.9 MT
  - Nitrogen oxide: 38.8 MT
  - PM<sub>2.5</sub>: 5.7 MT
  - Volatile organic compounds: 1.4 MT
  - Ammonia: 1.9 MT
- Reduction in GHG emissions from 2030-2050: 412,584 MT CO<sub>2</sub>e (338,151 MT CO<sub>2</sub>e is attributable to CPRG funding)
- Health benefits: \$3,647,307 - \$8,219,488 (2025-2030)
- Dollars deployed through the Columbus Region Green Fund revolving loan model: \$27,000,000 deployed by revolving capital (\$10,800,000 deployed as grants)
- MW of solar funded through the Columbus Region Green Fund: 30 MW
- Energy cost savings for single-family households:
  - Average annual savings during PPA: \$327 per household, \$163,815 for 500 homes
  - Average annual savings post-PPA: \$587 per household, \$458,682 for 500 homes
- Workforce development:
  - Number of high-quality jobs created: 450
  - Number of participants in clean energy workforce training: 375

#### W. Broad Mobility Outcomes

- Reduced GHG emissions -projected estimate of 3,556 MT CO<sub>2</sub>e (2,512 MT CO<sub>2</sub>e is attributable to CPRG funding)
- Reduced co-pollutant emissions
  - Cumulatively the W. Broad vehicles will avoid the following by 2030:
    - Sulfur dioxide emissions: 1 MT
    - Nitrogen oxides: 3 MT
    - Fine particles (PM<sub>2.5</sub>): 1 MT
    - Volatile organic compounds between 2028 and 2030: 1 MT
  - By 2050, the vehicles will avoid:
    - Sulfur dioxide: 6 MT
    - Nitrogen oxides: 27 MT
    - 19 MT each of PM<sub>2.5</sub> and VOCs
- Reduced energy use (LED streetlights)
  - Assuming 4,000 hours annually lights are on:
    - Current annual KWH for 3,338 lights – 2,033,148
    - Estimated annual KWH after LED conversion – 1,110,004
    - KWH reduction annually - 923,144
- Utility cost savings (LED streetlights)- \$104,500 annually (based on rate of \$0.1132/KWH)

### ***3B: Performance Measures and Plan***

The Growing Green project teams will develop a Quality Assurance Project Plan (QAPP) in alignment with EPA standards to guide environmental information operations throughout the grant period. The following performance measures will be tracked, measured, and reported throughout the project:

#### **ReCES**

Participation: To ensure the program recruits diverse public sector entities, the project will involve at least one participant from each area: public libraries, public schools, local government buildings, park shelters, and public utility providers. Participants will be invited through marketing and direct contact, particularly along the W. Broad transit corridor and in other Justice40 census tracts. Participants will be recorded in a ReCES database, including the name of the organization, address, census tract (or Justice40 tract served), date of solar installation, and metrics involving energy production. Participating members will be asked to provide semi-annual feedback on their experience. Their feedback and energy savings will be compiled into a shared annual report.

Solar Panel Installation: The ReCES database will also include the building size and number of solar panels installed at each site. The cumulative number of solar panels will be used to inform total GHG emissions reduction and track progress towards the regional 100 MW solar installation goal.

MW Generation: After installing the solar panels, the energy produced will be measured in several ways to ensure accuracy and monitor for effectiveness. At the inverter level, inverter-based monitoring software such as Solis Cloud or Hoymiles will measure the production and efficiency of the facility to report deficiencies and automatically create work orders for maintenance. Smart meters will also measure generation for utility net metering. The aggregate of the systems will be monitored by a portfolio wide monitoring system such as Also Energy. All of these systems will allow for cross-evaluation, as well as reporting and sharing of production and generation at both the site level, organization level, and portfolio level. Cumulative energy savings will be compiled into a shared annual report and cumulative MW generated will be used to quantify GHG emissions reduction.

Cost Savings: Before installation, we will conduct a feasibility study that includes an analysis of the previous year's energy consumption at the site, the host's current supply rates for electricity, and an analysis of the anticipated lifetime savings generated both through the term of the PPA as well as post-PPA. In the year following solar installation, the property owner will be responsible for reporting monthly energy bills to the project team to determine actual savings via an online, easy-to-use intake form. A cost comparison will be conducted to determine the overall cost savings at the site, while an average monthly cumulative energy savings will be shared in an annual report.

Job Creation & Workforce Development: An estimated 450 jobs will be created during project implementation. With each solar project, a sub-contracted team will install the solar equipment. Furthermore, new full-time staff will be required to oversee project deliverables, record data, and schedule sites for new solar infrastructure. In addition, 375 individuals will complete IMPACTCA Empowered! Workforce development training or Photovoltaic Associate solar training. Sub-contracted team size, new staff, and graduates from workforce development programs will be documented in the annual report shared with participating members and the project team.

Health Benefits: These benefits will stem from the energy transition from nonrenewable energy sources to renewable energy sources. Reduced air pollutants emitted by nonrenewable energy sources will consequently reduce the likelihood of nonfatal heart attacks and respiratory-related illnesses. Annual



health benefits will be calculated by correlating the number of MW of solar installed to reduced air pollutants using the US EPA AVERT and COBRA tools. The findings will be included in the annual report provided to solar program participants.

Education: MORPC's role as a regional convenor will help bolster the education and outreach activities, essential for participant acquisition and solar installation. Schools will be given the opportunity to integrate the new solar panels through living laboratories: utilizing curriculum for solar and renewable energy, assigning classroom projects, teachers attending professional development on solar education, and educating students on real-time energy generation and clean energy careers. After-school programs at participating nonprofit organizations may also take the opportunity to discuss solar energy and clean energy sector careers. MORPC and Columbus Region Green Fund will track requests for participation, and number of participants will be reported annually.

#### **W. Broad Mobility - Battery Electric Buses**

Health Benefits: By increasing the availability of rapid transit, protected bike lanes, and micro-mobility hubs, the project will reduce vehicle trips, relieve traffic congestion, and reduce air pollution, resulting in a significant health benefit to the surrounding communities. We anticipate approximately \$40,000 in avoided health impacts annually, and a cumulative \$1.2M in avoided health impacts through 2050 (see the *Technical Appendix and Calculations Worksheet* for more detail).

Transportation Improvements: Once vehicles are in service, COTA will partner with the Center for Transportation and the Environment (CTE) on performance monitoring to track performance along the Key Performance Indicators developed by the American Public Transportation Association. The BRT will be a significant upgrade to the current Route 10 line that currently operates along the corridor, which already provides COTA's second highest ridership fixed route service with nearly 4,000 weekday trips. Upgrading the system to BRT is expected to increase ridership in the corridor to 7,300 trips per weekday by 2040. The larger vehicles will fit more people with off-board fare collection, level boarding at stations, and traffic signal priority, thereby improving transit travel speed and reliability.

COTA will provide CTE with data on utility bills (for cost metrics); operational logs (for metrics by route or operator, e.g. Clever Devices or similar); maintenance logs (for total cost per mile; scheduled and unscheduled, if possible/desired) and passenger loading data.

GHG Emissions Reduction: The following data will be used to calculate GHG emissions avoided and will be provided to EPA during the final year of the grant period, when the BRT is in service: Electric Bus Utilization, Energy Use, Efficiency, Operating Cost, Maintenance and Availability, Emissions Reductions, Charger Utilization Performance, and Charger Maintenance and Availability.

#### **W. Broad Mobility - Streetlights**

The City's Division of Power project manager will track all phases of the project from design procurement through to construction acceptance. Project timeline and schedule will be tracked in the City's project management system, PMIS. A construction administration and construction inspection firm will administer the construction contract and inspect the selected contractor's work.

GHG reductions will be measured by the number of lights installed. We will compare energy bills and wattage data from before and after construction to calculate KWH saved and energy costs saved. Once connected to the smart lighting system, real time energy usage of each luminaire will be collected.

### ***3C: Authorities, Implementation Timeline, and Milestones***

#### **ReCES - Roles and Responsibilities:**

The **Mid-Ohio Regional Planning Commission (MORPC)** is a regional planning agency with over 50 years of experience serving 15 counties in Central Ohio, including the 10-county Columbus MSA. As the lead applicant, MORPC will be responsible for project management and grant administration, including maintaining and distributing project funds, overseeing subgrantee activities, convening meetings with project partners, measuring project performance, and reporting to partners and the EPA. For the ReCES residential solar scope of work, MORPC Residential Services will be responsible for education, outreach, and recruitment of LIDAC homeowners interested in installing solar. Each public sector member and nonprofit participating in ReCES will have the authority to install solar infrastructure on a site-by-site basis. MORPC has received 50 Letters of Support from potential partners expressing interest in implementing solar at 251 sites, including local governments, water treatment plants, local school districts, and nonprofits.

The **Columbus Region Green Fund (CRGF)** is a nonprofit organization that leverages private investments to maximize public investments in clean energy infrastructure. With support from the City of Columbus, Franklin County, and MORPC, CRGF has the authority to finance solar installation projects, contract solar installation teams, and educate and provide regional awareness on clean energy benefits. CRGF will be responsible for funding and overseeing solar panel construction on ReCES member sites. Funding responsibilities include: receiving CPRG funds from MORPC and leveraging grant funding, private investments, and public investments to support construction costs. Implementation responsibilities include education and outreach to interested parties, and measuring energy production, jobs created, and number of solar panels installed.

**Clean Energy Ventures (CEV)** is the nonprofit solar developer using the Impact Solar operating system to implement the solar facilities for ReCES program participants. As an implementing partner, they will provide free feasibility studies for all interested program participants. They will also be responsible for developing the projects, including placing the financing, capitalizing the investment tax credit, designing and engineering the projects, procuring materials, and installing the facilities. Upon commissioning, they will provide long term operation and maintenance of the systems for the tenure of the PPA. *They will procure all materials and labor for execution of each project in compliance with 2CFR200 guidelines and provide data and reporting on activities as required by MORPC and the EPA.*

**IMPACT Community Action (IMPACTCA)** is a nonprofit community action organization that provides services and programs for housing stability and crisis assistance, job training and certification, financial wellness services, climate justice, and home energy efficiency programs. IMPACTCA's Empowered! workforce development program creates paid pathways for young adults to explore clean energy careers. CPRG funds will support the workforce development program to ensure young adults, particularly women, and residents from low-income and disadvantaged communities, are successfully employed in the solar industry.

**Sustainable Columbus** is a branch within the City of Columbus Department of Public Utilities that focuses on promoting and advancing sustainability initiatives throughout the City. Sustainable Columbus will be responsible for engaging public sector participants in ReCES within the City of Columbus. Staff will also assist with LIDAC outreach and education around ReCES residential solar programming within the City, with an initial focus on community facilities surrounding the W. Broad transit corridor.

### **W. Broad Mobility - Roles and Responsibilities:**

The **Central Ohio Transit Authority (COTA)** is the regional public transit provider for greater Columbus and Central Ohio. With a service area of 1.2 million residents, COTA provides nearly 19 million passenger trips annually. COTA is responsible for the vehicle electrification component of this proposal.

The **Columbus Division of Power (DoP)** is a full-service, publicly owned electrical utility that provides power to industry, business, and residential customers in the central city core; DoP also provides citywide street lighting. DoP will provide project management for the LED street lighting improvements, procure engineering services via a public request for proposals, and procure a construction contractor via a public construction bid.

### ReCES - Project Implementation Timeline:

#### *Project Launch*

In Year 1 following the award, the project team will develop and distribute outreach materials to increase awareness of the ReCES program and garner participation in solar installation. To build capacity for site intake, outreach, and solar installation, new full-time staff will be hired at MORPC, CRGF, and IMPACTCA. The project team at MORPC and IMPACTCA will then contact clients who previously participated in the MORPC or IMPACTCA Home Weatherization Assistance Programs (HWAP) to invite them to participate in the single-family residential solar initiative at ReCES. IMPACTCA will serve as the main contact to leverage residential units covered by other community action organizations in the Columbus MSA. Furthermore, outreach materials will be shared across MORPC and CRGF networks to recruit additional public sector and nonprofit participants. Capacity-building, education, and outreach will recur in Years 2-5 to reach the target of 30 MW solar installation and to build a waitlist for additional solar installations beyond the grant timeline.

#### *Solar Preparation*

Before installing solar panels, Clean Energy Ventures will conduct solar feasibility assessments for interested participants in order to assess site readiness. Clean Energy Ventures will provide feasibility assessments for each potential ReCES participant at no cost to the program or participant. They will use LIDAR technology to assess irradiance and shading, analyze existing bills and rate structures and do initial modeling to recommend a projected system size and production for the site. The provided study will detail a projected PPA rate, recommended placement, system size and anticipated projection. It will also detail estimated savings over the course of the technology's lifetime based on actual energy costs and proposed PPA rates. Informed by the recommendations and with input from MORPC, CEV will develop a prioritization schedule for project installation. Funded by CRGF, solar feasibility assessments will be scheduled and completed on a rolling basis in Years 1-5, beginning in Year 1 and ending early in Year 5. During the feasibility assessments, the contractor will review roof quality, roof lifespan (at least 20 years), and current energy consumption and prices.

Informed by input from MORPC and the feasibility assessments, CEV will develop a prioritization schedule for project installation. Public buildings and single-family residences within Justice40 census tracts and along the W. Broad Street corridor will receive the first priority for solar installation (Tier 1), followed by public, nonprofit, single-family residential, and school buildings outside of Franklin County (Tier 2), followed by all other sites with completed feasibility assessments (Tier 3). Out of the Letters of Commitment received, the breakdown of interested sites by county is Fairfield (10), Franklin (126), Delaware (13), Hocking (13), Licking (15), Madison (4), Morrow (1), Perry (58), Pickaway (5), Union (2).

### *Solar Installation*

Following the feasibility assessment, the selected solar contractor will develop and install solar. Solar development will include analysis of the feasibility assessment, project development, PPA execution, design and engineering, and financing. Once the solar project has been approved by the host, a Power Purchase Agreement setting the project rate and anticipated construction schedule is set with the host. Following the PPA execution, CEV will work in collaboration with CPRG to complete the project finance, and engineering and procurement of materials and labor will commence. Upon competitive selection of the installer, construction will begin with integration of workforce development programming. Solar installation will include permitting, interconnection, construction, and commissioning.

Solar development will begin immediately upon notice of award and depending on interconnection and permitting processes, the first projects can potentially be installed immediately upon availability of funding. Due to high demand for the program, we anticipate feasibility studies, development and installation will continue throughout the program as funding is available on a rolling basis and will continue during the seasons when solar panels can be installed safely (spring, summer, autumn) in Years 2 through 5. A post-installation interview will be completed within three months of each installation.

### *Project Monitoring*

Project monitoring in Year 1 by MORPC will be limited to collecting monthly energy bills, calculating the total number of solar panels installed, and distributing a semi-annual feedback form to clients receiving solar panels. In Years 2 through 5, the project team will continue to tabulate the number of solar panels installed and track energy bills on a rolling basis. Twice per year, the project team will calculate the total participation (including LIDAC communities), energy produced, jobs created, community engagement, and energy cost savings. In addition to a summary of the semi-annual feedback, these values will be compiled into a semi-annual report distributed to the project team, ReCES participants, and US EPA. A final project report will be submitted to the US EPA upon completion in Year 5.

### W. Broad Mobility Vehicle Implementation Timeline:

- **Q1 2026:** Procurement
- **Q4 2026:** Engineering Configuration Audit
- **Q2 2027:** Vehicle Delivery
- **2028:** Vehicles In-Service

The COTA-led W. Broad BRT project team will track the project schedule and coordinate with COTA's procurement and Vehicle Engineering teams to ensure vehicle delivery and commissioning in advance of the BRT project completion. A configuration audit conducted in conjunction with the manufacturer and COTA's Vehicle Engineering team will be completed prior to completion of vehicle assembly to ensure adherence to all design specifications. COTA's Vehicle Engineering team in coordination with the vehicle and charging system manufacturer representatives will test and commission the vehicles once on site to ensure all performance specifications and functionalities are met, including charging system interoperability and optimization. Progress on these procedures and milestones will be incorporated into MORPC's semi-annual reporting to EPA.

### W. Broad Mobility LED Streetlights Implementation Timeline:

- **April 2025:** Design procurement
- **April 2026:** Engineering design completion
- **September 2026:** Construction procurement
- **September 2027:** Construction completion

This project will follow the City's typical design and construction schedule with four main project phases executed in three years: design procurement, engineering design, construction procurement and construction. Estimated time frames for each phase are:

- **Design procurement – 6 months:** Includes RFP advertisement, selection of firm and contract execution
- **Engineering Design – 1 year:** Engineering design to prepare detailed construction plans with 60%, 90% and 100% submittals routed for citywide review
- **Construction Procurement – 5 months:** Estimated from date of signed plans, includes preparation of bid documents, advertising of bid, award and contract execution
- **Construction – 1 year:** Estimated from date of notice to proceed, construction will have completion milestones (50%, 75% typical, with substantial completion in 9 months)

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

### ***4A: Community Benefits***

#### **ReCES Program**

The ReCES program is poised to deliver significant direct and indirect benefits to low-income and disadvantaged communities through strategic deployment of solar energy on public facilities and single-family homes. ReCES will prioritize public buildings in LIDAC communities and along the W. Broad corridor, including government buildings, libraries, nonprofits, and water treatment facilities and schools that reside in or serve Justice40 census tracts. ReCES will also prioritize LMI single-family homeowners in LIDAC communities for outreach and selection into the program for rooftop deployment on single-family homes. All participants will benefit from energy cost savings and a reduction in energy burden.

By deploying solar in LIDAC communities, ReCES will not only reduce greenhouse gas emissions but also enhance local resilience to climate change. Solar installations on public buildings can improve air quality, particularly in and around schools and community centers, and reduce reliance on non-renewable energy sources during extreme weather events, bolstering community and grid resilience.

Healthcare savings will be an indirect benefit from the ReCES program, resulting from health benefits through the reduction of air pollutants from decreased fossil fuel use in the energy portfolio. ReCES will result in at least \$607,884 in health benefits, 34 fewer minor restricted activity days, and 6 fewer days of work lost each year. Health savings stem directly from reductions in nonfatal heart attacks and respiratory irritation.

Financially, the participants can expect to purchase energy at significantly lower rates over the course of the power purchase agreement (PPA) term, with energy costs ranging from \$0.04 to \$0.06 per kilowatt-hour (kWh) compared to AEP's residential rate of \$0.1132/kWh and public entity rates between \$0.04 and \$0.11/kWh. These savings can be reinvested by public entities into student services, staff stipends, electric fleets, or other sustainability initiatives, amplifying the program's climate and community benefits. Additionally, at the conclusion of the PPA term, asset ownership will be transferred to the property owner free of charge, fostering local wealth creation.

There are also education and engagement benefits of the ReCES program, particularly for solar installations on public school districts. These installations present opportunities for integrating solar energy education into the curriculum, transforming campuses into living laboratories where students

can engage with clean energy concepts and develop workforce skills to prepare for the clean energy economy. Schools can organize faculty boot camps, guest lectures, and sustainability ambassador programs to deepen student understanding and involvement in sustainability efforts. Furthermore, collaboration with peer schools can facilitate the sharing of best practices and convene student leaders for youth climate action summits and conferences, accelerating the adoption of sustainable practices across the region. We will work actively with the participating schools and school districts to coordinate, communicate, and develop innovative and collaborative ways to bring all aspects of solar technology to students, faculty, staff, and prospective employees, equipping them with the skills necessary to succeed in the clean energy economy through the formation of a Workforce Development Committee. Letters of intent for this committee have been submitted by the Ohio Energy Project, IMPACT Community Action, the Columbus Zoo and Aquarium, CRGF, and CEV.

### **W. Broad Mobility**

The W. Broad Street BRT will significantly increase the accessibility and safety of public transit along this high-density corridor in a manner designed to reconnect disadvantaged communities who have been displaced by dividing and burdening facilities along the corridor. Approximately 75% of the W. Broad transit corridor's alignment is bordered by a CEJST identified census tract on at least one side, and numerous census blocks throughout the corridor exceed the EJScreen 90th percentile for PM2.5 and diesel particulate matter.

COTA riders who will benefit the most are those from historically underrepresented and underserved populations as shown by COTA ridership survey data. In a 2018 ridership survey, 373 surveys were from riders with a home zip code along the portion of Route 10 along the proposed BRT corridor. Of those, 65.4% reported earning less than \$35,000 per year; 49.9% indicated at least one non-White/Caucasian ethnicity; 64.9% did not have a driver's license; 61.9% had no vehicles in their household, and 64.1% who had access to a household vehicle could not have used it for their current trip.

The new rapid transit will enable disadvantaged individuals, including those with low incomes and those with disabilities, to access critical infrastructure such as affordable housing, employment opportunities, healthcare settings, grocery stores, education and training institutions, places of worship, and recreation spaces. Within walking distance of the corridor, there are seven grocery stores, twelve pharmacies, nine K-12 schools, twenty daycare facilities, four hospitals, and six addiction treatment facilities.

The BRT will foster thriving communities along the corridor in an area where nearly 15% of residents lack access to a vehicle. In addition to making the corridor more accessible, it will create an active transportation spine while supporting denser housing nearby. The W. Broad BRT will connect to other fixed routes in Downtown Columbus and along the corridor, including the CMAX BRT, other north-south fixed routes, and future LinkUS rapid transit lines such as the E. Main Street and Northwest Corridors.

BRT community benefits will be assessed primarily by ridership data and how ridership is faring after the BRT is in service. COTA anticipates that it will take several years for ridership to mature parallel with the amount of new development and growth that will come to the corridor and specifically around BRT Stations. Ridership data will be included in reporting to EPA once the BRT is placed in service.

As part of the smart LED street lighting system, air sensors will leverage MORPC's EPA-funded Enhanced Air Quality Monitoring for Communities grant program and provide BRT localized data. New corridor LED streetlights will address the community's frequent complaints of lighting outages and will facilitate safe, connected neighborhoods. Residents will also benefit from improved response times to outages, since the smart lighting system will notify the utility of outages and enable remote diagnosis of problems. To

track and report LED streetlight community benefits, the City maintains a database of 311 service requests, including reports of lighting problems. In 2023, nearly 70% of the approximately 15,000 calls to 311 were for streetlights. The City will monitor and report changes in call volume as LEDs are installed.

#### Assessment and Monitoring

The Growing Green team has developed a comprehensive approach to assess, quantify, and report benefits. ReCES will establish a database of completed projects to quantify the number of installed panels and GHG emission reductions. We will also employ a monitoring system across our portfolio to quantify solar generation at the individual, organizational, and portfolio levels. Additionally, participants will submit their monthly energy bills annually, enabling the ReCES team to quantify cost savings. Throughout the implementation process, we will evaluate job creation, including subcontractors. Lastly, ReCES will monitor health benefits through the COBRA system.

By establishing robust data collection systems, we can consistently report benefits, such as GHG emission reductions, installed panels, clean energy generated, cost savings, job creation, and health benefits to participating community members. Once annual reports are compiled, ReCES will publicly share the findings to enhance awareness and understanding of solar benefits. Following the initial implementation year, we will incorporate these metrics into outreach efforts for prospective participants in years 2-5, showcasing the tangible benefits that disadvantaged communities can gain by participating in ReCES.

#### ***4B: Community Engagement***

##### Previous Community Engagement

In 2020, the LinkUS project team deployed diverse public engagement strategies to understand residents' priorities for mobility and transit enhancements. Engagement strategies included virtual and in-person public meetings, pop-up events, community festivals, tactical urbanism experiences, small group focused presentations, tabling events, community design charrettes, virtual open houses, corridor tours, videos, distribution of project flyers, and a bike-along event. LinkUS reached more than 10,000 residents and businesses to help shape the W. Broad and future E. Main Street transit corridors.

The project team also identified the highest priority LIDAC regions, as determined by overlaying the CEJST data with the Center for Disease Control Environmental Justice Index (EJI) and identifying census tracts at or above the 96th percentile on both the CEJST and EJI. The Ohio State University (OSU), a partner in the region's PCAP development, then conducted numerous visioning sessions throughout these regions between September 2023 and January 2024, including a location in the Hilltop neighborhood adjacent to the W. Broad corridor. These sessions revealed strong support from all LIDACs for BRT and better connectivity with other transit options (see [PCAP](#) p. 31), as well as widespread support for solar panels on existing public infrastructure.

Between October and December 2023, OSU held community meetings in high priority LIDAC areas: Hilltop, Near East/South Side, and Linden neighborhoods in Franklin County; City of Circleville in Pickaway County; and City of Newark in Licking County. With 143 attendees, these meetings facilitated group discussions and workshops and distributed surveys to understand priorities and measure support for potential environmental policies. Four out of five regions agreed that air quality, breathing issues, and cancer were high environmental concerns. When ranking potential policies to address their concerns, 50% of respondents indicated that solar panels on homes were a "top three" priority policy, and 58% of respondents indicated that solar panels on businesses were a "top three" priority policy.

In December 2023, MORPC distributed an additional survey to gather feedback on the overall direction of the PCAP and priorities for the CPRG Phase II grant application. Approximately 109 respondents reported living or working in a region with a LIDAC census tract and at least one response from each LIDAC region was received. When asked to select their projects for implementation, “Investing in Public Transit” and “Install Solar on Public Buildings” were the first and third most-selected projects. “Install Solar on Public Buildings” was the second most selected project by non-LIDAC respondents.

Also in 2023, MORPC also conducted its “[Leaders Listen](#)” survey to understand Central Ohio residents’ opinions on experiences and services, such as transportation, housing, and sustainability. Of the 2,000 respondents who completed the Leaders Listen: Sustainability survey, 59% support large solar projects in their communities, while only 12% of respondents opposed the idea. Furthermore, out of the 2,000 respondents who completed the Leaders Listen: Transportation survey, approximately 52% of respondents reported that riding the bus takes too long and respondents are not at all or slightly satisfied with current transportation planning decisions.

In early 2024, the regional CPRG team hosted a stakeholder “Pitch Session,” during which four potential project ideas were presented to community leaders, nonprofit organizations, local government, and other stakeholders across the Columbus MSA. The ReCES project and a home weatherization project were tied for the first choice. Furthermore, a preliminary search for potential solar sites revealed overwhelming enthusiasm from more than 50 partners, including municipalities, water treatment plants, schools, nonprofit organizations, and recreation and parks buildings.

#### Planned Community Engagement

MORPC will lead a comprehensive outreach and education strategy with critical community partnerships by engaging diverse communities through targeted outreach strategies and will implement educational initiatives to raise awareness, knowledge, and understanding around solar siting and electrified bus rapid transit in the region. MORPC and its partners will conduct workshops, create informational materials, and collaborate with key stakeholders.

MORPC proactively engages with members and the public via social media, the MORPC website, press releases, and YouTube. It also does so via numerous existing working groups, committees and boards developed by MORPC and its partners. Virtual, hybrid, and in-person public outreach regarding both the ReCES program and the LinkUS W. Broad transit corridor has been completed and will continue through the following channels: MORPC Commission, MORPC Transportation Advisory Committee (TAC), MORPC Community Advisory Committee (CAC), the Central Ohio Rural Planning Organization (CORPO), MORPC Sustainability Advisory Committee (SAC), Central Ohio Greenways (COG), MORPC LinkUS Updates, MORPC Solar Siting Board, Annual MORPC Member Visits by MORPC Leadership, Quarterly Regional Collaboration Meetings, and MORPC Rural Forums.

In addition to the meetings that MORPC currently facilitates, MORPC will collaborate with the following agencies to reach their audiences: One Columbus, the Columbus Partnership, Smart Columbus, the City of Columbus, Franklin County and Related School Districts, COTA, AEP, Columbus Region Green Fund, IMPACT Community Action, and the MORPC Sustainable2050 Program.

In May 2023, the LinkUS partners created a W. Broad Street Public Involvement Plan, outlining tactics and strategies to inform the public on planning and design progress, gather feedback and input, and report on outreach and engagement metrics.



The LinkUS partners have also formed three advisory groups focusing on community engagement and visioning, workforce advancement, and equitable transit-oriented development (ETOD). The ETOD group comprises hundreds of representatives from Central Ohio development, development finance, public sector economic development, and affordable housing organizations. Through this advisory group, we will foster partnerships between private and public sector leaders to create the most equitable, safe, and inviting walkable neighborhoods around each of the W. Broad transit corridor BRT stations.

Furthermore, the LinkUS partners will engage the Franklin Area Commission, Greater Hilltop Area Commission, and the Westland Area Commission to ensure that the needs of local communities are met, considering their roles in reviewing proposed development projects and making recommendations to their respective City Councils.

The engagement efforts conducted in the planning and engineering phases of the W. Broad transit corridor will evolve as the project transitions into construction, shifting to project updates and feedback on impacts and changes to the corridor. Outreach will focus on impacts to existing COTA transit routes and service, maintenance of traffic and any business impacts as the construction progresses to minimize the impacts for small and minority businesses along the Corridor. COTA is currently applying for a FY23 TOD grant to hire a facilitator to coordinate the community input process through the primary streams of Community Co-Creation, Stakeholder Alignment, and Communications and Education.

COTA on-board surveys take place every five years, with the next round in 2028. Information obtained from COTA's riders include origin-destination information, frequency of travel, car ownership, and rider demographic information to help guide COTA's operations. Once the W. Broad St. BRT is in service, route specific information will be compared to help determine the impact on the W. Broad transit corridor and the community benefits.

## **Section 5: Job Quality**

### ***Job Creation***

Workforce development will occur directly and indirectly through ReCES. Direct workforce impact includes approximately 450 new FTE opportunities across the five-year project for both public and residential solar projects, whereas indirect workforce development will occur at IMPACT Community Action through job shadowing, internships, and cooperative education. New employees will be essential for successfully planning, scheduling, implementing, and tracking the success of ReCES. Multiple, discrete on-site solar projects create more jobs than large, utility-scale solar projects, both in installation and maintenance.

Indirect workforce development opportunities will stem from the Empowered! program at IMPACT Community Action. This program creates clean energy career pathways for young adults, emphasizing historically underrepresented populations. Cohorts ages 18 to 24 participate in the program to explore careers that improve air quality, residential living conditions, and infrastructure. Each participant receives a weekly stipend of \$250 plus a \$17 hourly wage while exploring various pathways and earning on-the-job experience. Approximately 375 participants are expected to complete the workforce development project in year 3 through year 5. Although participants may not be directly involved in the Regional Community Energy Strategy, the Empowered! program will ensure a strong and diverse clean energy workforce beyond the grant's completion.

The W. Broad Mobility measures will utilize COTA's and the City of Columbus's existing workforce for implementation.

### ***Job Quality***

At MORPC, equity is at the heart of the work that we do. We understand that it's critical to keep equity at the forefront when any infrastructure is developed in Central Ohio. Solar panel development and transit initiatives are no exception to this. We will work to ensure that selected vendors will complete installation and maintenance activities in a safe and equitable manner. If awarded funding, our process will strongly encourage each project sub-partner to commit to covering the minimum standards and requirements covered in the NOFO and best practices learned by regional partners like Smart Columbus and MORPC's own solar siting working group.

To support high job satisfaction and quality, employees will be paid, at minimum, the prevailing wage. Installers will also be strongly encouraged to consider candidates new to the installation field or who have completed workforce development programs in the clean energy sector. Companies contracted by Community Renewable Energy will be strongly encouraged to satisfy prevailing wage requirements and adhere to best practices in diversity, equity, and solar workforce development. All contracts will include an addendum with the best practices documentation created by the Solar Energy Industries Association and The Solar Foundation.

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

### ***6A: Past Performance & Reporting Requirements***

MORPC has deep experience administering federal grants to successful project completion. As the Metropolitan Planning Organization, MORPC is responsible for the management of USDOT formula and discretionary grant programs and the development of Ohio's Metropolitan Transportation Plan that sets the framework for \$30 billion in regional transportation projects. More recently, the agency was awarded a Safe Streets and Roads For All Safety Action Plan grant. MORPC also received a FY2020 EPA Brownfields Coalition Assessment Grant for Hazardous Substances and Petroleum, assistance agreement number BF00E02892-0, and Karla Auken was MORPC's Project Officer. MORPC successfully met federal reporting requirements, and outputs included 12 Phase I ESAs, 2 Hazardous Materials Assessments, 11 Phase II ESAs, and 1 Cleanup Plan. MORPC recently applied for a FY2024 EPA Community-Wide Brownfields Assessment Grant to grow capacity to support brownfield redevelopment and revitalization of underserved and older industrial areas throughout the region.

MORPC successfully applied to the EDA's Public Works and Economic Adjustment Assistance (CFDA 11.307) program in October 2020. The grant awarded MORPC \$400,000 with a \$100,000 internal match and lasted 30 months. The Assistance Agreement Number is 06-69-06284; URI: 116820 and EDA assigned Michelle Velazquez as Project Officer. An amendment to extend the grant period was approved on September 19, 2023 and the grant closed on March 18, 2024. The grant funds allowed MORPC to update the region's Comprehensive Economic Development Strategy (CEDS) and coordinate regional economic recovery during the Coronavirus pandemic. The EDA approved the CEDS on February 1, 2022. In December 2022, MORPC applied to become an Economic Development District (EDD) and in September 2023 MORPC gained approval for EDD designation. MORPC submitted timely and adequate reports and met federal requirements.

### **6B: Staff Expertise**

The Mid-Ohio Regional Planning Commission (MORPC) has the technical capacity to successfully deliver the proposed project. In addition to bringing communities together to collaborate on best practices and plan for the future growth and sustainability of the region, MORPC services also include nonpartisan data analysis, community resources, and long-range planning. MORPC has extensive experience coordinating planning studies, and managing projects funded by federal sources, the Ohio Department of Transportation, the Environmental Protection Agency, and local governments throughout Central Ohio. Other examples of federal funding programs under MORPC's management include the Surface Transportation Block Grant, Congestion Mitigation and Air Quality, Transportation Alternatives Program, and the Carbon Reduction Program.

MORPC will partner with the Columbus Region Green Fund, Clean Energy Ventures, City of Columbus, IMPACT Community Action, and Central Ohio Transit Authority. Key project staff are listed below, and additional information can be found in the *Team Biographies Attachment*:

- Brian Filiatraut - Energy and Sustainability Program Manager, MORPC
- Brandi Whetstone - Associate Director of Sustainability, MORPC
- Karina Peggau - Senior Sustainability Planner, MORPC
- Zach McGuire - Executive Director, Columbus Region Green Fund
- Jackie Kemble - Head of Operations, Columbus Region Green Fund
- Sean Grant - Chief Financial Officer, The Columbus Partnership
- Mark Patton - Executive Vice President, The Columbus Partnership
- Erin Beck - Assistant Director of Sustainability, Department of Public Utilities, City of Columbus
- Jodi Stefanik, Engineer III, City of Columbus Division of Power
- Beth Urban, Chief Operating Officer, IMPACT Community Action
- Katie Devlin, Director, Climate Justice Initiatives, IMPACT Community Action
- Andy Biesterveld, Chief Engineer, Central Ohio Transit Authority

## **Section 7: Budget**

### **7A & C: Budget Details and Reasonableness of Costs**

Please see the attached Budget Narrative.

### **7B: Expenditure of Awarded Funds**

MORPC has a long and successful history of managing federal and other public funds, and with a \$23.6M budget, is ready and capable of administering this grant. MORPC has received the Certificate of Achievement for Excellence in Financial Reporting from the Government Finance Officers Association and has received awards from the Ohio Auditor of State for several years for clean audits. All costs proposed are reasonable, allowable, allocable, and necessary to the project. MORPC has great experience overseeing these types of projects through past and current programs. Additionally, MORPC will subgrant funds to Columbus Region Green Fund, City of Columbus, IMPACT Community Action, and Central Ohio Transit Authority to conduct critical work to support the project. MORPC has processes and procedures in place and adheres to segregation of duties to ensure that all local, state, and federal financial rules are followed, and public funds are protected. Financial services are centralized at MORPC, and the Finance Department will oversee the program's finances.

**Budget Narrative**  
**Mid-Ohio Regional Planning Commission**  
**Climate Pollution Reduction Grants Program**

Category	Justification & Reasonableness of Costs	Total
<b>Personnel</b>		
Vacant - Chief Regional Planning Officer@\$179,233/yr, 0.05 FTE with salary increases	This position is responsible for overseeing and managing the Planning Department as its Senior Director, which includes Data & Mapping, Community Development, and Sustainability teams. This position will provide leadership support on overall CPRG program administration, implementation, and budget. These activities support all four GHG measures in the proposed project.	\$47,579
Whetstone, Brandi-Associate Director of Sustainability@\$110,376/yr, 0.1 FTE with salary increases	This position provides leadership to direct and develop sustainability programming at MORPC, and oversees projects across water, air quality, energy, and climate programs. This position will provide direct support and supervision of the CPRG Project Manager and relevant team members, support CPRG grant administration, outreach and engagement, and ensure communication and collaboration with the project team, MORPC committees, and members. These activities will support all four GHG measures in the proposed project.	\$58,600
Filatrat, Brian - Energy & Sustainability Program Manager@\$79,911/yr, 0.5 FTE with salary increases	This position is responsible for developing and managing regional energy initiatives for MORPC. This position will serve as MORPC's Project Manager for the CPRG implementation grant program, including managing the work plan and deliverables across the CPRG project team and subawardees, reporting coordination, outreach and engagement, and will provide support and management of both the Sr. Planner and Grant Administrator. These activities will support all four GHG measures proposed in the project.	\$212,131
Peggau, Karina -Senior Planner@\$69,028/yr, 0.3 FTE, with salary increases	This position is responsible for supporting key regional sustainability initiatives, and will serve as a liaison to the Central Ohio community, supporting outreach and engagement by preparing CPRG materials and facilitating meetings with MORPC members, partners, stakeholders, and the public, in addition to supporting the CPRG Project Manager. These activities will support all four GHG measures proposed in the project.	\$109,944
Borger, Mike - Regional Engagement Manager@\$101,549/yr, 0.03 FTE with salary increases	This position serves MORPC's Government Affairs and Community Relations department, the agency as a whole and MORPC's 85+ members through public engagement / outreach efforts, project scoping and delivery, grant writing and development. This position brings extensive experience working with rural communities and will support outreach and strategy with rural MORPC members across 10 counties. These activities will support all four GHG measures proposed in the project.	\$16,330
Jurist, Niel -Sr. Director of C&E@\$140,948/yr, 0.03 FTE with salary increases	This position serves as the agency's chief communications officer and oversees the agency's public information, outreach and engagement, DEI, and events programming. In this project, this position will assist with developing communications, marketing and engagement strategies and oversee a team to support the implementation of those strategies. These activities will support all four GHG measures proposed in the project.	\$2,158
Rapp, Melissa -Public Information Manager @81,518/yr, 0.05 FTE with salary increases	This position leads MORPC's media relations which includes drafting press releases, pitching media stories, responding to public and media inquiries, coordinating media interviews and digital media planning and strategy. This position also supports the agency in content creation, public outreach activities, and event planning. This position will have a role implementing the communications and engagement strategies for the project. These activities will support all four GHG measures proposed in the project.	\$2,491
Frey, Amanda - Executive Assistant @65,600/yr, 0.05 FTE with salary increases	This position provides program and administrative support to the Communications & Engagement department, including PowerPoint templates, reviewing documents to ensure brand and messaging alignment. This position will support this project by coordinating project needs with the C&E team, and reviewing proposed communications content. These activities will support all four GHG measures proposed in the project.	\$1,171

Johnson, Devin -Graphic Designer @70,335/yr, 0.05 FTE with salary increases	This position creates the visual assets to enhance MORPC’s brand identity and messaging through digital media graphics, flyers, advertisements, and more. This position will support the project by designing branded materials (one-pagers, PPT and report templates) and digital media graphics to promote the CPRG funded project. These activities will support all four GHG measures proposed in the project.	\$7,181
Vacant - Customer Service Outreach Specialist @49,566/yr, 1 FTE with salary increases	This position will be responsible for contacting current and past MORPC home weatherization clients and explaining that a new solar energy program may be available to them. This position will include vetting clients, asking for or retrieving information from their MORPC weatherization file, and transferring that information to the solar energy provider to administer the program. These activities will support the ReCES residential solar program for LIDAC communities.	\$263,201
Vacant - Customer Service Outreach Specialist @49,566/yr, 0.5 FTE with salary increases	This position will be responsible for contacting current and past MORPC home weatherization clients and explaining that a new solar energy program may be available to them. This position will include vetting clients, asking for or retrieving information from their MORPC weatherization file, and transferring that information to the solar energy provider to administer the program. These activities will support the ReCES residential solar program for LIDAC communities	\$131,601
Vacant -Intern@\$37,440/yr, 1 FTE	Under Project Manager supervision, this position will generate various reports, collaborate with staff on project tasks as needed, and perform other duties as assigned to support the full program. These activities will support all four GHG measures proposed in the project.	\$187,200
Vacant - Grant Administrator @\$72,800/yr, 1 FTE, with salary increases	This position will play a critical role in ensuring efficient grant management and effective collaboration with subgrantees. The Grant Administrator will be responsible for tracking compliance with federal award conditions, overseeing subgrantees' activities, reviewing contracts, subgrants, and supporting documentation for vendor/subgrantee invoices for completeness and accuracy, as well as assisting the program with numerous reports.These activities will support all four GHG measures proposed in the project.	\$386,504
<b>TOTAL PERSONNEL</b>		<b>\$1,426,090</b>
<b>Fringe Benefits</b> 57.5%	Fringe benefits include Holiday, Sick and Vacation Leave, PERS, Hospitalization, Workers Compensation, etc.	\$820,002
<b>TOTAL FRINGE BENEFITS</b>		<b>\$820,002</b>
<b>Travel</b> Mileage for local travel (1000 miles per year at \$0.67/mi)	Grant staff local mileage reimbursement for travel to stakeholder meetings, project coordination, and visits to subgrantees.Estimated Budget - 1000 miles/year x \$0.67/mi = \$670/year x 5 = \$3,350	\$3,350
<b>TOTAL TRAVEL</b>		<b>\$3,350</b>
<b>Equipment</b>	None requested	\$0
<b>TOTAL EQUIPMENT</b>		<b>\$0</b>
<b>Supplies</b> General Office Supplies	Staff members will use office supplies to carry out daily activities for the program. Pens, paper, etc. = \$100/months per 1 FTE x 4.5 staff	\$27,000
Marketing Materials	Materials will be used to illustrate and promote ReCES Solar Program. Educational Pamphlets 3,000 copies x \$2.5/each = \$7,500	\$7,500
<b>TOTAL SUPPLIES</b>		<b>\$34,500</b>
<b>Contractual</b>		

Consulting Services (Legal, Accounting, Fiscal)	Contractor Name(s): To be determined (TBD), potentially involving multiple contractors, Description of Service: Legal, fiscal, and accounting assistance. Estimated Cost: @\$40,000/year (based on 200 hours at \$200/hour). Method of Selection: The procurement method chosen will adhere to federal rules and regulations to ensure compliance, selecting the most appropriate method for the specific circumstances. Period of Performance: TBD. Scope of Work: Includes legal, accounting, and fiscal assistance such as subgrant and contract review, compliance inquiries, advisory on special accounting treatments, etc. Method of Accountability: Work will be overseen by the Grant Manager and Grant Administrator, with engagement from the Finance Director and Accounting Manager as needed. Periodic check-ins and calls will be conducted, and invoices will be verified for supporting documentation.	\$200,000
<b>TOTAL CONTRACTUAL</b>		<b>\$200,000</b>
<b>OTHER</b>		
Subaward - Columbus Region Green Fund (CRGF)	CRGF will be responsible for the solar financing program, Impact Solar, to deploy all 30 MW of ReCES solar (residential and commercial). Revolving Capital - \$27,000,000. To ensure the solar power purchase agreement (PPA) provides a utility benefit to the customers of the Impact Solar program in day 1 of operations, CRGF will use federal grant dollars to deploy to each project as both debt to be repaid as well as grants. These federal dollars deployed as debt will be lent to the Impact Solar projects at a reduced rate of 0.5% and coupled with the grant dollars will enable a low cost PPA for the end user and immediate energy savings in day 1 of operation. The repayment of the debt allows the CRGF to re-lend that money to future ReCES projects expanding the reach from the original 30 MW request and sustaining the program beyond the initial grant funding. Grant Capital \$10,800,000. To further reduce the cost of the Impact Solar PPA to the level many schools, libraries and government buildings receive from their utility, a portion of the financial assistance needs to come from a grant source. This financial assistance is approximately 20% of the total capital for these projects, meaning the grant capital is leveraged 4:1 with other capital brought to each project. The remaining 80% of the capital comes from the revolving capital that the CRGF will lend, and private capital brought to bear by Columbus Energy Ventures (CEV). Both of these forms of financial assistance enables the Impact Solar PPA price to provide a financial benefit to the LIDAC nonprofit clients of the program. This coupling of deployment of federal funds as both low interest debt and grant allow ReCES to provide clean energy for civic buildings that save money for their facilities day 1 of operations. Administrative Costs - \$3,780,000. Funds will be used to manage program activities.	\$41,580,000
Partner - Clean Energy Ventures (CEV)	Clean Energy Ventures (CEV) is a nonprofit organization specifically dedicated to the delivery of clean energy assets for benefit of nonprofit organizations, government agencies, and low to moderate income residents in Central Ohio. As a partner in implementing the ReCES solar projects, CEV will use the Impact Solar model to bring at least 30% of the project cost by capitalizing the investment tax credit through direct pay on behalf of the projects. CEV serves as the asset owner placing the financing, capitalizing the investment tax credit and retiring the debt on the systems while also operating and maintaining the facilities for the duration of the Power Purchase Agreement. The Impact Solar operating system also includes bridge loan financing to align the upfront capital costs with the IRS timeline for direct pay capitalization. Clean Energy Ventures makes performance guarantees to lenders to support this undertaking. They will bring forward an estimated ~\$16,200,000 to deploy the solar projects. Letter of Intent is included in application. The allocation of \$16,200,000 is within the total grant budget but it is not a component of the federal assistance request.	\$16,200,000
Subaward - Central Ohio Transit Authority	The Central Ohio Transit Authority (COTA) is the regional public transit provider for greater Columbus and Central Ohio. With a service area of 1.2 million residents, COTA provides nearly 19 million passenger trips annually. COTA is responsible for the transit vehicle electrification component of this package along the W. Broad Mobility Corridor. Budget: 10 battery electric buses X estimated cost per unit - \$1,515,769 = \$15,157,690; 5% contingency - \$757,884. Total estimated budget is \$15,915,575.	\$15,915,575

Subaward - City of Columbus	The award will go to City of Columbus for two departments implementing the program. Division of Power (DoP) will provide project management for the LED smart street lighting improvements along the W. Broad Mobility Corridor, procure engineering services via a public request for proposals, and procure a construction contractor via a public construction bid. The Department of Public Utilities Fiscal Office will provide financial and grant management support for the project. This cost estimate is based on LED installation already completed in the Columbus City and considers Build America, Buy America requirements. Total cost per unit includes equipment and labor. Sustainable Columbus, another division of City of Columbus, will receive \$500,000 of this budget for activities including administration, engaging public sector participants for ReCES (commercial solar) within the City of Columbus, and assisting with LIDAC outreach and education around ReCES residential solar programming within the City.	\$8,636,396
Subaward - IMPACT Community Action	IMPACT Community Action (IMPACTCA) is a nonprofit community action organization provides services and programs for housing stability and crisis assistance, job training and certification, financial wellness services, climate justice, and home energy efficiency programs. CPRG funds will create necessary staffing to connect the ReCES financial model run by the CRGF with LIDAC residents who would greatly benefit from the health and financial wealth benefits of going solar. Additionally, IMPACTCA's "Empowered!" workforce development program creates paid pathways for young adults to explore careers in the clean energy sector. CPRG funds will support the workforce development program to ensure young adults, particularly women, and residents from low-income and disadvantaged communities, are successfully employed in the solar industry. Estimated budget - Workforce Administrative Costs - \$50,000/year; Workforce Staff = 4 FTEs @\$82,000/year - \$328,000; Workforce Marketing & Recruitment - \$50,000/year; Workforce Development - \$285,600/year. Estimated total cost per year - \$713,600 x 5 years = \$3,568,000	\$3,568,000
Printing	\$166/per month x 12 months x 5 years = \$10,000 for the maintenance of copiers, including both black/white and color copiers.	\$10,000
TOTAL OTHER		\$85,909,971
TOTAL DIRECT		\$88,393,913
<b>Indirect Costs</b>		
	Approved Indirect Cost Allocation Plan is included in attachments.	\$1,403,807
	The base for allocating indirect costs is direct salaries plus fringe benefits.	
TOTAL INDIRECT		\$1,403,807
<b>TOTAL Funding for Climate Pollution Reduction Grants Program</b>		\$89,797,720
<b>Total EPA Funding for Climate Pollution Reduction Grants Program</b>		\$73,597,720

## ***Budget Narrative (continued)***

### ***c. Reasonableness of Costs:***

The budget table includes detailed narrative addressing justification and reasonableness of costs by line item. Additional information regarding the Impact Solar program is provided below as further justification for reasonableness of costs.

The Impact Solar operating system uses a stewardship model to generate solar energy for public hosts while limiting risk and capital burden for the civic organizations participating in the ReCES program. The program uses a Power Purchase Agreement model and an innovative asset stewardship financial operating system. As the 501c3, CEV capitalizes the investment tax credit through direct pay on behalf of the projects. CEV serves as the asset owner placing the financing, capitalizing the investment tax credit, and retiring the debt on the systems while also operating and maintaining the facilities for the duration of the Power Purchase Agreement. The Impact Solar operating system also includes bridge loan financing to align the upfront capital costs with the IRS timeline for direct pay capitalization. The operating system utilizes its existing Impact Solar pipeline to achieve competitive pricing on materials and labor and integrates workforce development programs into its hiring practices as well as within its requirements for contractors and vendors participating in the Impact Solar program. Clean Energy Ventures makes performance guarantees to lenders to support this undertaking.

The Impact Solar program marries this asset stewardship model, the innovative financial model, economies of scale, and a holistic approach to deploying solar to significantly reduce the clean energy costs for participants, offset carbon footprints, and maximize the public benefit born from solar deployment.

The Impact Solar program relies on a stewardship model where the nonprofit CEV installs and owns the solar asset on behalf of the benefiting school, community organization or municipal building. The stewardship model limits the risk as well as the need for an upfront financial commitment for the host entity while providing them with the environmental and financial benefits of going solar. In addition, CEV as a nonprofit can apply for and leverage the investment tax credit on behalf of installed projects to improve the bottom line return on these projects.

This model allows for the financing of solar installations at no cost to the building owner, with ownership of the assets transferred, at no charge, after a fixed term. Under this arrangement, public and nonprofit organizations and single-family homeowners will access low-cost, clean energy at an estimated rate of \$0.04 to \$0.06 per kilowatt/hour for the term of the PPA and \$0/kwh after. The current price to compare for AEP residential electricity is \$0.1132/kWh, and public organizations have secured various short-term rates for their fossil fuel-based power ranging from \$0.04 - \$0.11/kWh. This program allows users to save money with renewable energy immediately after installation, with significant additional savings when the PPA terms expire.



# ReCES and West Broad Measure Analyses

**Technical Appendix:** Power a Clean Future Ohio assessed two components of the CPRG Phase II application:

- ReCES Program
- West Broad Project

The approach for estimating benefits follows.

## ReCES Methodology

### Project Background

As part of the Columbus MSA CPRG Phase II Grant proposal, Power a Clean Future Ohio assessed the following components of the ReCES Program:

Data Point	Description	Data Source	Unit	2025	2026	2027	2028	2029
New Solar Capacity	Public Facilities	MORPC	KW	7,000	7,000	5,500	4,000	4,000
New Solar Capacity	Residential	MORPC	KW	0	0	0	1,000	1,000
New Solar Capacity	Community Solar	MORPC	KW	0	0	500	0	0

This assessment included estimating carbon-equivalent reductions, pollution reductions, health benefits, and reduction in energy burden as a result of deploying solar photovoltaic (PV) capacity at public facilities and single-family homes.

The processes for estimating these values and their results follow. An Excel workbook (*Combined File Measure Analysis – CPRG Phase II*) providing sources, input values, calculations, and model outputs is submitted as an attachment to the grant proposal.

### Process

1. Workbook Tab (R)1.0 Emissions. Carbon-equivalent reductions associated with the installation of PV capacity were estimated using the following approach:
  - 1.1 Acquire quantity of capacity installed (KW) by sector and year from the Mid-Ohio Regional Planning Commission (MORPC).
  - 1.2 Employing the web version of US EPA's *Avoided Emissions and Generation Tool*<sup>1</sup> (AVERT):
    - a. Run the following scenarios representing individual installations:
      - 1.2.a.1 7.0 MW Solar Rooftop Midwest 2025 and 2026
      - 1.2.a.2 5.5 MW Solar Rooftop Midwest 2027
      - 1.2.a.3 0.5 MW Solar Rooftop Midwest 2027
      - 1.2.a.4 4.0 MW Solar Rooftop Midwest 2028 and 2029
      - 1.2.a.5 1.0 MW Solar Rooftop Midwest 2028 and 2029
    - b. Acquire output files to be used as inputs in US EPA's *Co-Benefits Risk Assessment Health Impacts Screening Tool*<sup>2</sup> (COBRA).
  - 1.3 Enter results into *Combined File Measure Analysis – CPRG Phase II* workbook ((R)02. AVERT Results).
  - 1.4 Calculate cumulative CO<sub>2</sub>e reductions by year for 2025 through 2050 using a 25-year lifetime for PV.
  - 1.5 Reduce emission reductions based on modeled grid decarbonization for the Midwest using US EIA's *Annual Energy Outlook 2023*<sup>3</sup> suprab 18.3 Reference Case East North Central.
  - 1.6 Convert CO<sub>2</sub> to CO<sub>2</sub>e

<sup>1</sup> US EPA. EPA's Avoided Emissions and Generation Tool (AVERT). <https://www.epa.gov/avert>. Accessed 03 Feb 2024.

<sup>2</sup> US EPA. Co-Benefits Risk Assessment Health Impacts Screening Tool (COBRA). <https://www.epa.gov/cobra>. Accessed 03 Feb 2024.

<sup>3</sup> US EIA. Annual Energy Outlook 2023. <https://www.eia.gov/outlooks/aeo/>. Accessed 03 Feb 2024.

- a. Calculate CO<sub>2</sub> percent of CO<sub>2</sub>e output emissions rate percent using 2022 values for Reliability First Corporation West subregion from US EPA's *Emissions & Generation resource Integrated Database*<sup>4</sup> (eGRID).
    - b. Apply percent factor to cumulative CO<sub>2</sub> output calculated.
  - 1.7 Sum annual values for 2025 through 2030, and for 2025 through 2050.
2. Workbook Tab (R) *2.0 Pollution*. Pollution reductions associated with the installation of PV capacity were estimated using the following approach:
  - 2.1 Acquire quantity of capacity installed (KW) by sector and year from the Mid-Ohio Regional Planning Commission (MORPC).
  - 2.2 Employing the web version of US EPA's AVERT:
    - a. Run the following scenarios representing individual installations:
      - 2.2.a.1 7.0 MW Solar Rooftop Midwest 2025 and 2026
      - 2.2.a.2 5.5 MW Solar Rooftop Midwest 2027
      - 2.2.a.3 0.5 MW Solar Rooftop Midwest 2027
      - 2.2.a.4 4.0 MW Solar Rooftop Midwest 2028 and 2029
      - 2.2.a.5 1.0 MW Solar Rooftop Midwest 2028 and 2029
    - b. Acquire output files to be used as inputs in US EPA's COBRA.
  - 2.3 Enter results into *Combined File Measure Analysis – CPRG Phase II* workbook.
  - 2.4 Calculate cumulative reductions by year for 2025 through 2050 using a 25-year lifetime for PV:
    - a. Avoided SO<sub>2</sub> Emissions
    - b. Avoided NO<sub>x</sub> Emissions
    - c. Avoided PM<sub>2.5</sub> Emissions
    - d. Avoided VOC Emissions
    - e. Avoided NH<sub>3</sub> Emissions
  - 2.5 Reduce emission reductions based on modeled grid decarbonization for the Midwest using US EIA's *Annual Energy Outlook 2023* suptab 18.3 Reference Case East North Central.
  - 2.6 Sum annual values for 2025 through 2030, and for 2025 through 2050.
3. Workbook Tab (R) *3.0 Health*. Dollar value of avoided health incidence and days of avoided health incidence associated with the installation of PV capacity were estimated using the following approach:
  - 3.1 Acquire quantity of capacity installed (KW) by sector and year from the Mid-Ohio Regional Planning Commission (MORPC).
  - 3.2 Employing the desktop version of US EPA's COBRA, input the following:
    - a. Each scenario AVERT output file.
    - b. Use 2028 as analysis year.
    - c. Use 3% as discount rate.
  - 3.3 Enter results into *Combined File Measure Analysis – CPRG Phase II* workbook (0.3 COBRA Results).
  - 3.4 Calculate cumulative impacts by year for 2025 through 2050 using a 25-year lifetime for PV, for any criteria that returns a significant result (>1).
  - 3.5 Reduce health benefits based on modeled grid decarbonization for the Midwest using US EIA's *Annual Energy Outlook 2023* suptab 18.3 Reference Case East North Central.
  - 3.6 Sum annual values for 2025 through 2030, and for 2025 through 2050.

<sup>4</sup> US EPA. Emissions & Generation resource Integrated Database. <https://www.epa.gov/egrid>. Accessed 03 Feb 2024.

## Results

### Avoided Emissions

<b>Program Outcome s - Public Facilities</b>	Total Emissions Avoided	2025 – 2030	MT CO2e	86,833
	Annual Emissions Avoided	2025 – 2030	Average Annual MT CO2e	14,472
	Total Emissions Avoided	2025 - 2050	MT CO2e	381,260
	Annual Emissions Avoided	2025 - 2050	Average Annual MT CO2e	14,664

<b>Program Outcome s - Residential</b>	Total Emissions Avoided	2025 – 2030	MT CO2e	4,557
	Annual Emissions Avoided	2025 – 2030	Average Annual MT CO2e	760
	Total Emissions Avoided	2025 - 2050	MT CO2e	31,324
	Annual Emissions Avoided	2025 - 2050	Average Annual MT CO2e	1,205

<b>Program Outcome s - Community Solar</b>	Total Emissions Avoided	2025 – 2030	MT CO2e	0
	Annual Emissions Avoided	2025 – 2030	Average Annual MT CO2e	0
	Total Emissions Avoided	2025 - 2050	MT CO2e	0
	Annual Emissions Avoided	2025 - 2050	Average Annual MT CO2e	0

<b>Program Outcome s - Total</b>	Total Emissions Avoided	2025 – 2030	MT CO2e	91,391
	Annual Emissions Avoided	2025 – 2030	Average Annual MT CO2e	15,232
	Total Emissions Avoided	2025 - 2050	MT CO2e	412,584
	Annual Emissions Avoided	2025 - 2050	Average Annual MT CO2e	15,869

### Avoided Pollution

			Avoided SO2 Emissions	Avoided NOx Emissions	Avoided PM2.5 Emissions	Avoided VOC Emissions	Avoided NH3 Emissions
<b>Program Outcomes</b>	2025 – 2030	MT	42.9	38.8	5.7	1.4	1.9
	2025 – 2030	Average Annual MT	7.1	6.5	1.0	0.2	0.3
	2025 - 2050	MT	192.0	173.5	25.7	6.2	8.5
	2025 - 2050	Average Annual MT	7.4	6.7	1.0	0.2	0.3

### Avoided Health Impacts

			\$ Total Health Benefits (low estimate)	\$ Total Health Benefits (high estimate)	Minor Restricted Activity Days	Work Loss Days
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<b>Program Outcomes</b>	2025 – 2030	MT	\$3,647,307	\$8,219,488	202	34
	2025 – 2030	Average Annual MT	\$607,884	\$1,369,915	34	6
	2025 – 2050	MT	\$16,294,694	\$36,721,367	901	153
	2025 – 2050	Average Annual MT	\$626,719	\$1,412,360	35	6

## Energy Burden

4. Energy burden impacts associated with the installation of PV capacity on residential properties were estimated using the following approach:

- 4.1 Acquire the following inputs:

Data Point	Unit	Value	Source
Average Electricity Consumption – Single-Family Home	KWh	9,345	EIA RECS 2020 Midwest East-North Central Single-Family Home
Cost of Electricity (2024)	\$/KWh	0.11	AEP - MORPC
Cost of Electricity (PPA)	\$/KWh	0.05	MORPC
Cost of Electricity (Post PPA)	\$/KWh	0.00	MORPC
Average Annual Cost of Electricity	USD	\$1,057.85	Calculated
Average Natural Gas Consumption - Single Family Home	CCF	763	EIA RECS 2020 Midwest East-North Central Single-Family Home
Average Cost of Natural Gas	\$/CCF	\$1.38	US EIA Natural Gas ( <a href="https://www.eia.gov/dnav/ng/hist/n3010oh3A.htm">https://www.eia.gov/dnav/ng/hist/n3010oh3A.htm</a> )
Average Annual Cost of Natural Gas	USD	\$1,049.13	Calculated
Average Annual Cost of Residential Energy		\$2,106.98	Calculated
Electricity Generation per KW PV - Central Ohio	KWh	1,296	Calculated

- 4.2 Calculate energy burden for:

- 2024 (reference year)
- PPA years
- Post-PPA years

- 4.3 Calculate delta from reference year.

## Outcomes

	2024	During PPA	Post-PPA
Average Annual Cost of Residential Energy	\$2,106.98	\$1,779.35	\$1,520.15
Energy Burden at Income Level			
\$25,000.00	8.4%	7.1%	6.1%
\$35,000.00	6.0%	5.1%	4.3%
\$50,000.00	4.2%	3.6%	3.0%
\$75,000.00	2.8%	2.4%	2.0%
\$100,000.00	2.1%	1.8%	1.5%
\$125,000.00	1.7%	1.4%	1.2%
<b>Change in Energy Burden from 2024</b>	<b>-</b>	<b>15.5%</b>	<b>27.9%</b>

## Project Background

As part of the Columbus MSA CPRG Phase II Grant proposal, Power a Clean Future Ohio (PCFO) assessed the potential emissions impacts for bus rapid transit and LED streetlights as part of the LinkUS expansion in the West Broad area of Columbus.

This assessment included estimating carbon-equivalent reductions, pollution reductions, and health benefits.

The processes for estimating these values and their results follow. An Excel workbook (*West Broad Measure Analysis – CPRG Phase II*) providing sources, input values, calculations, and model outputs is submitted as an attachment to the grant proposal.

## Analysis Process

The analysis employed the following process:

1. Workbook Tab (WB) 0.1 Background Data
  - a. Estimate expected grid decarbonization using US EIA Annual Energy Outlook 2023<sup>5</sup> Reference Case East North Central (suptab 18.3), from a baseline year of 2024 to serve as a modifier for emission, pollution, and health impacts.
  - b. Acquire vehicle pollution factors from Bureau of Transportation Statistics *Estimated U.S. Average Vehicle Emissions Rates per Vehicle by Vehicle Type Using Gasoline and Diesel*<sup>6</sup> and Argonne National Laboratory's *Estimated U.S. Average Vehicle Emissions Rates per Vehicle by Vehicle Type Using Gasoline and Diesel*.<sup>7</sup>
  - c. Acquire CO<sub>2</sub>e output emissions rate percent using 2022 values for Reliability First Corporation West subregion from US EPA's *Emissions & Generation Resource Integrated Database*<sup>8</sup> (eGRID).
  - d. Acquire AR5 emission weighting from EPA Emission Factor Hub<sup>9</sup> to develop carbon dioxide equivalents (CO<sub>2</sub>e) as needed.
2. Workbook Tab (WB) 0.2 AVERT Output
  - a. Employing the web version of US EPA's *Avoided Emissions and Generation Tool*<sup>10</sup> (AVERT) run 268 MW energy efficiency in Midwest region scenario. Acquire output files to be used as inputs in US EPA's *Co-Benefits Risk Assessment Heath Impacts Screening Tool*<sup>11</sup> (COBRA).
3. Workbook Tab (WB) 0.3 COBRA Results
  - a. Using the desktop version of COBRA, run the following scenario:
    - i. Analysis year: 2028
    - ii. Discount Rate: 3%
    - iii. AVERT output reflective of net electricity savings.
    - iv. Franklin County, Ohio – Highway Vehicles, Diesel, Heavy Duty: using average annual pollution reductions on Workbook Tab 2.0 Pollution.
    - v. Franklin County, Ohio – Highway Vehicles, Gasoline, Light Duty: using average annual pollution reductions on Workbook Tab 2.0 Pollution.
  - b. Tally results by MSA and Rest of Country.
  - c. Enter results into Tab.

<sup>5</sup> US EIA. Annual Energy Outlook 2023. <https://www.eia.gov/outlooks/aeo/>. Accessed 03 Mar 2024.

<sup>6</sup> US BTS. Estimated U.S. Average Vehicle Emissions Rates per Vehicle by Vehicle Type Using Gasoline and Diesel. <https://www.bts.gov/content/estimated-national-average-vehicle-emissions-rates-vehicle-vehicle-type-using-gasoline-and-diesel>. Accessed 11 Mar 2024.

<sup>7</sup> Argonne National Laboratory. Estimated U.S. Average Vehicle Emissions Rates per Vehicle by Vehicle Type Using Gasoline and Diesel. <https://greet.anl.gov/files/vehicles-13>. Accessed 11 Mar 2024.

<sup>8</sup> US EPA. Emissions & Generation resource Integrated Database. <https://www.epa.gov/egrid>. Accessed 03 Mar 2024.

<sup>9</sup> US EPA. GHG Emission Factor Hub. <https://www.epa.gov/climateleadership/ghg-emission-factors-hub>. Accessed 06 Mar 2024.

<sup>10</sup> US EPA. EPA's Avoided Emissions and Generation Tool (AVERT). <https://www.epa.gov/avert>. Accessed 03 Mar 2024.

<sup>11</sup> US EPA. Co-Benefits Risk Assessment Heath Impacts Screening Tool (COBRA). <https://www.epa.gov/cobra>. Accessed 03 Mar 2024.

4. Workbook Tab (WB) 1.0 Outcomes
  - a. Tally estimated avoided emissions for all measures from Tabs 1.1 and 1.2.
5. Workbook Tab (WB) 1.1 West Broad BRT
  - a. Acquire input values from COTA.
  - b. Calculate expected miles driven by BRT in corridor.
  - c. Calculate electricity consumption and emissions. Assumes electric conversion is permanent as LinkUS is a systems-level change.
  - d. Calculate energy and emission savings from diesel retirement.
  - e. Calculate energy and emission savings from avoided passenger VMT.
  - f. Calculate cumulative CO2e reductions by year for 2025 through 2050 using a 25-year lifetime for PV.
  - g. Reduce emission reductions based on modeled grid decarbonization for the Midwest.
  - h. Tally emission savings.
  - i. Sum annual values for 2025 through 2030, and for 2025 through 2050.
6. Workbook Tab (WB) 1.2 LED Streetlights
  - a. Acquire input data from the *City of Columbus Smart Street Lighting Strategic Deployment Plan* provided by the City of Columbus.
  - b. Calculate annual KWh savings based on assumed replacement equipment. Assumes 10 year lifetime.
  - c. Calculate emission reductions based on electricity savings.
  - d. Sum annual values for 2025 through 2030, and for 2025 through 2050.
7. Workbook Tab (WB) 2.0 Total Avd Pollution
  - a. Calculate NOx, SOx, VOC, and PM2.5 for original diesel and gasoline consumption.
  - b. Calculate net energy savings (additional MWh from bus electrification subtracted from avoided electricity consumption from LED streetlights).
  - c. Estimate pollution reductions from net electricity savings using AVERT. Net electricity savings are treated as energy efficiency spread evenly throughout the day.
  - d. Reduce pollution reductions based on modeled grid decarbonization for the Midwest.
  - e. Sum annual values for 2025 through 2030, and for 2025 through 2050.
8. Workbook Tab (WB) 3.0 Avoided Health
  - a. Pull in COBRA results from Tab 0.3.
  - b. Calculate impacts by year for 2025 through 2050.
  - c. Reduce health benefits based on modeled grid decarbonization for the Midwest.
  - d. Sum annual values for 2025 through 2030, and for 2025 through 2050.

## Results

### Avoided Emissions

2025 - 2030	Total MT CO2e	3,556
2025 - 2030	Average Annual MT CO2e	593
2025 - 2050	Total MT CO2e	49,581
2025 - 2050	Average Annual MT CO2e	1,907

### Avoided Pollution

		Avoided SO2 Emissions	Avoided NOx Emissions	Avoided PM2.5 Emissions	Avoided VOC Emissions	Avoided NH3 Emissions
2025 - 2030	Total MT	0	2	1	1	0
2025 - 2030	Average Annual MT	0	0	0	0	0
2025 - 2050	Total MT	1	19	19	19	0
2025 - 2050	Average Annual MT	0	1	1	1	0

## Avoided Health Impacts

		\$ Total Health Benefits (low estimate)	\$ Total Health Benefits (high estimate)	Minor Restricted Activity Days	Work Loss Days
2025 - 2030	Total	\$71,860	\$161,759	5	1
2025 - 2030	Average Annual	\$11,977	\$26,960	1	0
2025 - 2050	Total	\$466,896	\$1,051,003	32	5
2025 - 2050	Average Annual	\$17,958	\$40,423	1	0