# Clean Air & Birmingham

## March 2024

Birmingham-Hoover Metropolitan Statistical Area Priority Climate Action Plan

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CLIMATE POLLUTION REDUCTION GRANTS

U.S. Environmental Protection Agency

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We would also like to thank the municipalities and stakeholders that participated in the engagement process for this plan. Their insights and guidance led to many of the reduction measures contained in this plan, and we look forward to engaging with them further in order to complete the Comprehensive Climate Action Plan. This plan is only the beginning of a very robust engagement effort with stakeholders, municipalities, and residents, especially those living in low income and disadvantaged communities.

Finally, we would like to thank the Environmental Protection Agency for funding this plan. Their financial and time commitments have been generous, and this plan certainly would not exist without their support.

DISCLAIMER:

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# Definitions and Acronyms.

**Birmingham Jefferson County Transit Authority (BJCTA)**: the public transit authority operating fixed route, and paratransit services, Bus Rapid Transit, and overseeing future mobility options in Birmingham, Alabama and surrounding cities.

**Comprehensive Climate Action Plan (CCAP)**: a narrative report that will provide an overview of the Birmingham-Hoover MSA's significant GHG sources/sinks and sectors, establish near-term and long-term GHG emission reduction goals, and provide strategies and identify measures that address the highest priority sectors to help meet those goals.

**Carbon Dioxide (CO2):** a gas that enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and other biological materials, and also as a result of certain chemical reactions (e.g., cement production). Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.

**Carbon Dioxide Equivalent (CO2E):** the number of metric tons of CO2 emissions with the same global warming potential as one metric ton of another greenhouse gas.

**Climate Pollution Reduction Grant (CPRG):** an EPA program that provides funding to states, local governments, tribes, and territories to develop and implement ambitious plans for reducing greenhouse gas emissions and other harmful air pollutions.

**Greenhouse Gas (GHG):** gases that trap heat in the atmosphere.

**Low Income/Disadvantaged Community (LIDAC):** communities with residents that have low incomes, limited access to resources, and disproportionate exposure to environmental or climate burdens.

**Metropolitan Statistical Area (MSA):** metropolitan statistical areas as defined by the US Census 2020 MSA population. The Birmingham-Hoover MSA is comprised of Bibb, Blount, Chilton, Jefferson, Shelby, St Clair, and Walker Counties.

**Priority Climate Action Plan (PCAP):** a narrative report that includes a focused list of near-term, high-priority, and implementation-ready measures to reduce GHG pollution and an analysis of GHG emissions reductions.

**Regional Planning Commission of Greater Birmingham (RPCGB):** provides planning services, economic development services, and multiple initiatives for six counties and 84 communities throughout Central Alabama.

**Vehicle Miles Travelled (VMT):** the total annual miles of vehicle travel for a designated area. VMT levels are lower in communities that are more walkable and compact and in communities that have strong public transportation systems.

# Table of Contents.

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# 1.Introduction.

## 1.1. CPRG Overview.

In 2023 the EPA allocated funding to the Birmingham-Hoover MSA in order to develop a climate action plan; the plan is required to include an inventory of greenhouse gases emitted in the MSA over a one-year time period, and emissions reduction strategies that could be implemented. The City of Birmingham elected to lead the climate action planning process, with the support of the Regional Planning Commission of Greater Birmingham (RPCGB).

The first iteration of the plan is the Priority Climate Action Plan (PCAP), which is this document. The PCAP is required to include an inventory of one emissions sector out of six:

Agriculture and Open Space
Buildings
Energy Production
Industry
Transportation
Waste

The Birmingham-Hoover MSA PCAP focuses on transportation sector emissions and projects to reduce those emissions.

The City of Birmingham will conduct a Comprehensive Climate Action Plan (CCAP), which we intend to complete by Fall of 2025. We will then focus on implementation of key projects from the CCAP until Fall 2027, at which point the CPRG planning effort will conclude.

## 1.2. Scope of PCAP.

This PCAP is limited in scope to the following elements:

A greenhouse gas inventory
Reduction measures
Review of authority to implement
Low income/disadvantaged community (LIDAC) benefit analysis

In addition, the PCAP is limited in geography to the Birmingham-Hoover MSA, which includes the following counties, which can be seen in Map 1.2.1:

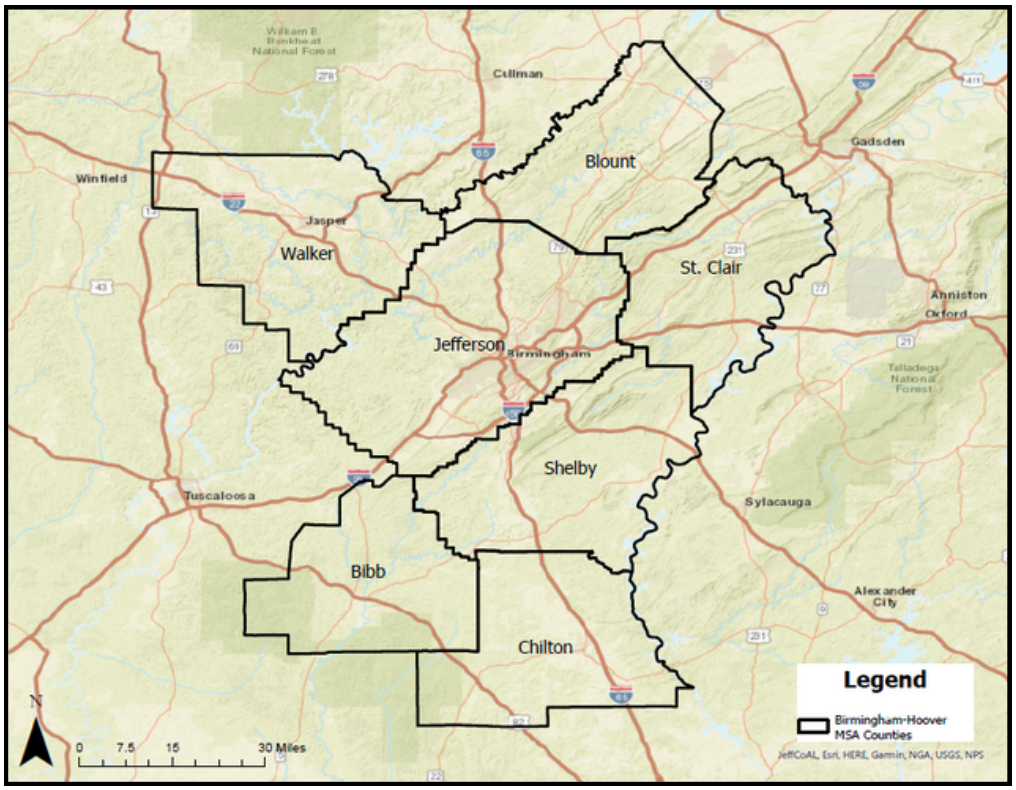
Bibb County, Alabama
Blount County, Alabama
Chilton County, Alabama
Jefferson County, Alabama
Shelby County, Alabama
St Clair County, Alabama
Walker County, Alabama

Map 1.2.2 shows the Justice 40 census tracts included in the MSA. For the purposes of this planning effort, the White House designated Justice 40 census tracts, described as "overburdened and underserved" on the Climate and Economic Justice Screening Tool (CEJST) website, were used to identify LIDAC communities. The CEJST identifies overburdened and underserved communities through metrics in eight categories: climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development.

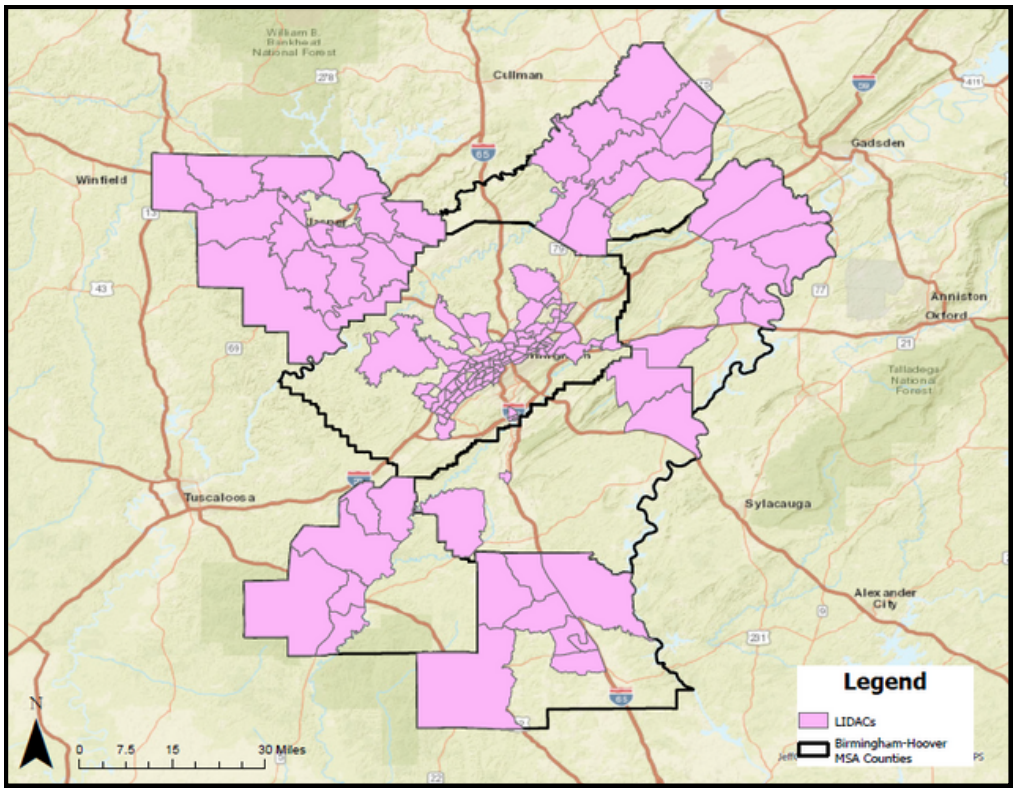
The PCAP GHG inventory is also limited to 2021 emissions data, and the inventory is also limited to the transportation sector. The CCAP may also use a 2021 baseline or may use a more recent year, and will include all sectors listed in Section 1.1.

The transportation sector has historically been the highest sector for GHG emissions in the US. EPA found that in 2021 transportation sector accounted for 28% of emissions, higher than any other sector (electricity production was second highest at 25%).

Map 1.2.1 Birmingham-Hoover Metroplitan Statistical Area




Map 1.2.2 Low Income and Disadvantaged Communities in the Birmingham-Hoover MSA



## 1.3. Approach to Developing the PCAP.

The Birmingham-Hoover MSA has never conducted a comprehensive climate action planning effort before. Due to this, quite a bit of groundwork and coalition building was required for the completion of the PCAP. First, identifying a strong partner with experience inventorying GHG emissions was needed to develop the PCAP in the timeline required through CPRG. RPCGB has previously tracked VMT and quantified emissions from the transportation sector and was a natural fit to partner with to bring expertise to the table and to jump-start our GHG inventorying efforts.

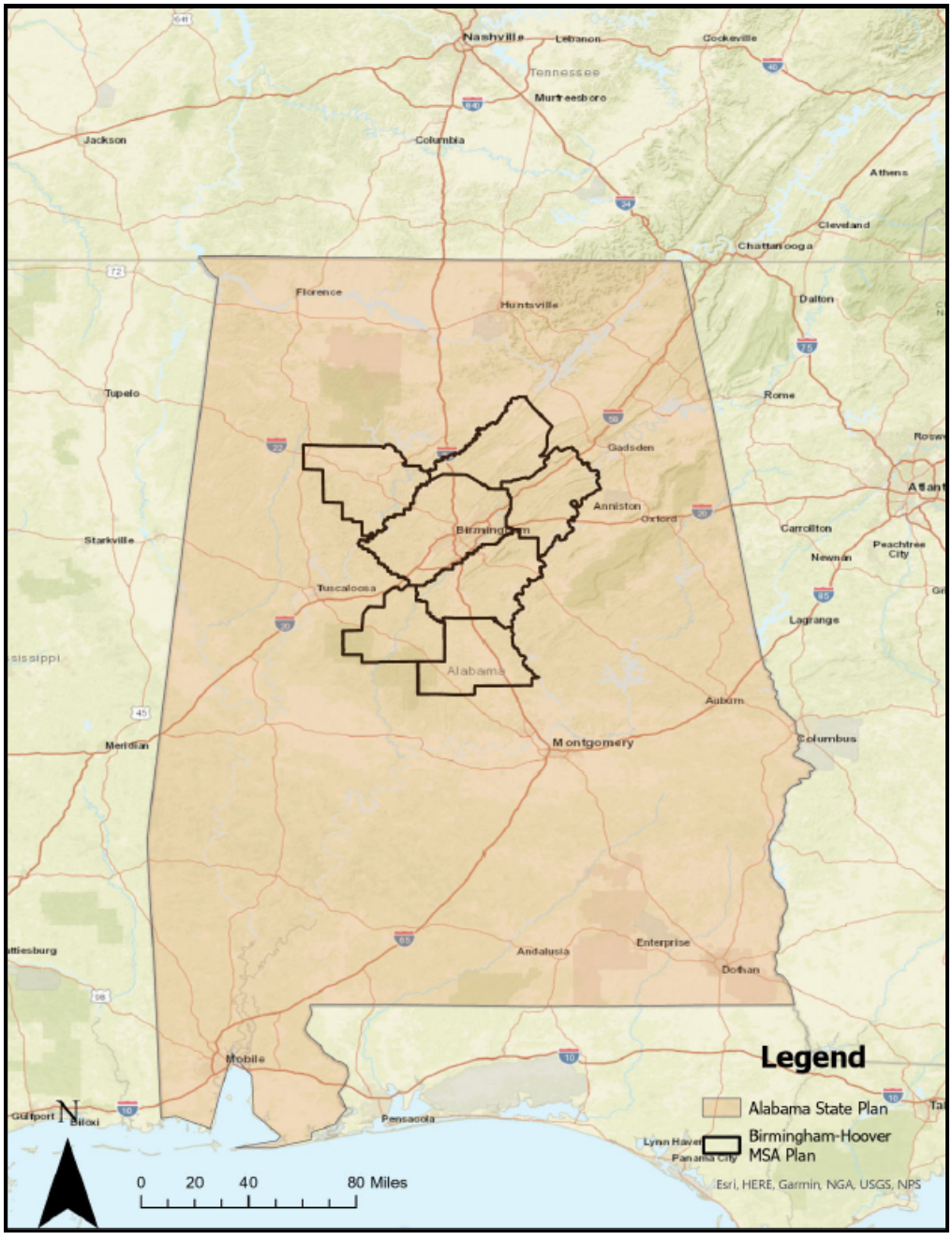
In order to engage relevant stakeholders, a series of meetings was held. A kickoff meeting was held virtually with stakeholders on January 12, 2024, where the requirements of the PCAP were discussed and the types of reduction measures that were eligible were described. Afterwards, the project management team corresponded with stakeholders in order to develop a list of reduction measures. Finally, a follow-up meeting was held February 2, 2024, where the completed GHG inventory and the list of quantifiable reduction measures was presented.

Additionally, a meeting with municipalities in the MSA was held on February 8, 2024. Over 90 municipalities were invited to attend. In this meeting, the GHG inventory and the list of reduction measures was presented. Afterwards, the project management team corresponded with municipality contacts to ensure included projects aligned with potential CPRG implementation applications that were being planned by municipalities in the MSA or goals related to alternative transportation and land use policy more broadly.

## 1.4 State/MSA Context.

While the Birmingham-Hoover MSA was eligible for a CPRG planning grant, the State of Alabama was also eligible. All geographies outside of the MSA are included in the State's plan, being conducted by the Alabama Department of Environmental Management. A map of what Alabama counties are included in the MSA plan vs the State plan can be seen below. Eligible applicants for CPRG implementation grants in Alabama should determine which plan their project would fall under, and ensure their project is identified as a reduction measure in that plan.

Map 1.4.1 Birmingham-Hoover MSA Plan and State of Alabama Plan Comparison



# 2. PCAP Elements.

## 2.1 Greenhouse Gas (GHG) Inventory.

A GHG inventory produced by the RPCGB was used in order to understand baseline emissions rates from the transportation sector for the Birmingham-Hoover MSA. This inventory focuses on over-the-road transportation emissions, and is for the entire calendar year of 2021. The inventory was produced using the EPA MOVES program. It should be noted that MOVES was used to produce the Jefferson and Shelby County transportation emission inventories, however the remaining county emission estimates were produced using an extrapolation from Shelby County's per capita emissions rates. The CCAP will include original estimates for all seven counties.

In 2021, it is estimated that 432,238,822 kilograms of CO2 equivalent (CO2E) were produced in the Birmingham-Hoover MSA. A breakdown of emissions per county can be seen below.

Table 2.1.1 Greenhouse Gas Emissions for 2021 by County in Kilograms

| | CO2 Equivalent | Atmospheric CO2 | Methane (CH4) | Nitrous Oxide (N2O) |
|---|---|---|---|---|
| Jefferson County | 250,774,640 | 246,870,272 | 16,349 | 11,748 |
| Shelby County | 80,535,512 | 79,340,912 | 5,381 | 3,563 |
| St Clair County | 32,919,532 | 32,431,230 | 2,200 | 1,456 |
| Walker County | 23,006,191 | 22,664,936 | 1,537 | 1,018 |
| Blount County | 20,955,731 | 20,644,890 | 1,400 | 927 |
| Chilton County | 16,069,337 | 15,830,977 | 1,074 | 711 |
| Bibb County | 7,977,879 | 7,859,541 | 533 | 353 |

For context, it would take almost 20 million trees to sequester the CO2 produced in 2021 by the transportation sector alone.

This emissions inventory was validated by the program's Quality Assurance Manager using the EPA LGGIT community GHG inventorying tool. Both the Jefferson County and Shelby County inventories were executed in LGGIT, and both were within 7% of the MOVES inventory, well within the stated 15% tolerance goal for the PCAP. This indicates a high level of validity in the inventory, and is a testament to the quality of work put into the RPCGB inventory. Additionally, the MOVES inventory was re-ran by the program manager to validate results, which were identical to the original RPCGB inventory.

## 2.2 GHS Reduction Measures.

### 2.2.1 Electric Vehicle Charging Stations for Employers.

An incentive program to promote electric vehicle (EV) charging stations at employer sites project would subsidize or fully fund deployment of EV charging equipment at various employment sites in the MSA. If EVs are to see widespread adoption, charging stations will need to be conveniently located and abundant. Installing EV charging stations at major employers can help to address EV adoption challenges like concern about charging availability, which discourages widespread adoption of EV vehicles. This is especially true for residents of multifamily housing where installation of a personal charger is infeasible.

#### 2.2.1A Estimated GHG emissions reductions

Like most of the reduction measures in this plan, an EV charging station for employers program would reduce GHGs on a sliding scale depending on level of adoption/implementation and funding levels provided to support the program. This program would reduce GHGs at these estimated rates, based on usage and reduction in fuels consumed:

| Funding Level | Estimated 5 Year CO2E Reduction (in KG) |
|---|---|
| $8 million | 27,356,156 |
| $10 million | 34,191,793 |
| $20 million | 68,388,122 |

#### 2.2.1B Review of Authority

Municipalities across the MSA could implement this project with the right partners. Generally, municipalities do not have authority to provide a direct thing of value to individuals. If municipalities partnered with a community-based organization, the organization could administer the funds, or even directly install the infrastructure.

#### 2.2.1C Implementation Schedule

EV charging equipment could be deployed quickly, and the benefits therein would be experienced quickly as well. Once participating employers were identified and installation occurred, the reduction in fuels consumed, and therefore GHG emission rates, would occur as soon as employees began using the chargers.

#### 2.2.1D Geographic Location

This measure could be implemented anywhere a reasonably large employer site was located in the MSA. For instance, within the City of Birmingham the largest employers are University of Alabama at Birmingham, Alabama Power, and City of Birmingham.

#### 2.2.1E Metrics for Tracking Success

Metrics for success would be number of participating employers, number of chargers deployed, kWh used, and reduction in GHG emissions.

### 2.2.1F LIDAC Benefits Analysis

EV charging presents an especially difficult to overcome barrier to EV ownership for LIDAC residents. LIDAC residents are more likely to rent than own their home, and as such the installation of EV charging stations in their residence may not be feasible. This is especially true for residents of multi-family developments who are entirely reliant on the property owners desire to install EV charging infrastructure and often share large surface-parking lots without assigned parking.

If area employers were able to provide accessible and reliable EV charging facilities this challenge could be overcome for some residents by giving them the peace of mind and assurance that their vehicle could be charged while at work.

## 2.2.2 City Vehicle Fleet Conversion.

City vehicle fleet conversion would entail phasing out an organization's vehicles that use traditional fossil fuels in favor of alternative fuel or electric vehicles. In this project proposal, municipal vehicles would be replaced by EVs. The City of Birmingham has been used as an example of a fairly aggressive, short-term fleet conversion project. For this example conversion project, 90% of cars, 50% of light trucks, and 10% of vans would be converted to EV; this is based on availability and appropriateness of currently offered EVs on the market. As more EV models become available the rate of adoption would greatly increase, and allow for more heavy-duty service vehicles to become eligible for conversion.

### 2.2.2A Estimated GHG emissions reductions

Using the EPA LGGIT tool and data from the City of Birmingham's 2021 fleet operations, it was concluded that a conversion following the example described above would yield a reduction of GHGs by 1,846,780 kg per year. This is only one example in a MSA with over 90 municipalities. The reduction potential for fleet conversion is a very promising opportunity to greatly reduce GHG emissions.

### 2.2.2B Review of Authority

The City of Birmingham, like all municipalities in the MSA, have full authority over their ability to purchase and maintain a fleet of vehicles to serve them in their efforts to provide services to their constituents. There are opportunities to purchase vehicles as part of larger procurements often led by state governments, and it would be beneficial to advocate for those procurements to prioritize EVs.

### 2.2.2C Implementation Schedule

While it is admirable to be expeditious in the rate of EV adoption, municipalities are generally expected to maintain vehicles at least to the end of their useful life, which is an estimate based on years or miles driven of how long a vehicle should be operable. It would be inappropriate for a municipality to dispose of vehicles that had not met their useful life; this limits how quickly this project could be implemented. However, municipalities could immediately begin prioritizing EVs in fleet procurements.

### 2.2.2D Geographic Location

Any municipality in the MSA could take on this project.

### 2.2.2E Metrics for Tracking Success

Metrics could include number of municipalities that own an EV, number of EVs purchased by municipalities, miles driven by municipal EVs, and estimated reduction in GHG emissions from municipal fleets.

### 2.2.2F LIDAC Benefits Analysis

Replacing a portion of a municipality's fleet with EVs can have numerous benefits to LIDACs. The greatest benefit may be in the reduction of GHGs in the immediate vicinity of where vehicles operate. Exposure to these vehicle exhaust emissions has both short and long-term health consequences such as increased rates of asthma, susceptibility to short-term illnesses, lung and heart problems, and cancer. Noise pollution is also reduced as traditional combustion engines are known to be louder than EVs. LIDAC communities are often located near interstates, highways, and other high traffic roadways so any reduction in noise can have benefits to the quality of life for those nearby residents.

Many vehicle fleet operators are also residents of LIDACs; by increasing the share of EV vehicles, operator exposure to harmful emission is reduced. Finally, converting city vehicles to EVs could increase LIDAC residents' exposure to EV vehicles and demonstrate that the technology may be more attainable than initially perceived thanks to federal voucher and rebate programs.

### 2.2.3 Electric bike Voucher Program.

As part of its carbon reduction efforts, municipalities could establish an E-bike and E-cargo bike rebate voucher program to assist residents in the purchase of E-bikes. With a growing bicycle network of both separated paths and on-street facilities and an effective Complete Streets policy the MSA has seen an increase of 32% in active transportation trips from 2019 to 2023 (Source: STRAVA Metro Data; Birmingham Metropolitan Area). E-bikes have been shown to increase bicycling as a preferred mode of travel; helping users overcome physical limitations, difficult terrain, longer distances, and the need to carry cargo. To accommodate residents with disabilities, vouchers could also be utilized for recumbent E-bikes or other electric alternative transportation devices built to accommodate the physically disabled.

The intent of an E-bike rebate program would be to eliminate barriers to E-bike ownership, with an emphasis on aiding low-income and economically stressed individuals. E-bikes are more expensive than conventional bicycles, with the average E-bike selling for $2,000 as opposed to $753 for a conventional bicycle purchased at a specialty bike store. (Source: Transportation Research and Education Center: The E-Bike potential Despite the higher cost in relation to conventional bicycles, the cost of E-bike ownership is far less than that of an automobile, especially when accounting for annual maintenance, registration, insurance, and other incidental cost associated with vehicle ownership.

The carbon emissions reduction potential of increased e-bike ridership is clear. Researchers in Portland, Oregon developed a model which compared a number of studies across North American and European Cities to determine an average reduction in single-occupancy vehicle trips when individuals are given E-bikes. The study found that E-bike owners replace 15% of vehicle trips with E-bike rides, this resulted in a potential of an 11% reduction in CO2 emissions. The research also showed that as E-bike ridership increased, so did mass transit utilization, by helping residents overcome first and last mile challenges. This ancillary increase in transit ridership may be especially applicable to the MSA due to the low average density of 1,365 persons per square mile (U.S. Census American Community Survey 2023) which presents a barrier to transit users who must often walk long distances to transit stops. Additionally, an E-bike voucher program would complement other actions identified in this plan, including:the planning of transit-oriented developments, construction of priority trail projects, and establishing small-scale intermodal facilities. These facilities could provide safe, secure parking for E-bike devices and therefore help remedy first and last mile problems often associated with low density transit systems.

In another recently published journal, it was found that E-bike voucher recipients traveled on average 1.9 miles further by E-bike when compared to a control group not using E-bikes. Overall bike mode share increased 12.6% (Source: The effects of subsidizing E-bikes on mode share a physical activity – a natural experiment; Journal of Transport and Health; Hanne Beate Sundfør) this is in line with the research conducted in Oregon and supports the belief that by eliminating cost barriers to E-bike ownership, cycling mode-share rises and single-occupancy vehicle trips decrease. This increase in mode share also has the ancillary benefit of increased physical activity which yields health benefits for riders.

Several existing models for E-Bike voucher programs already exist in the United States from cities such as Denver, CO, Boulder, CO, and Tucson, AZ and have seen great success. Cities could look to and model an E-bike voucher program based on these existing case studies.

**2.2.3A Estimated GHG emissions reductions**

While it would be wonderful to assume a recepient of an E-bike voucher would exclusively ride their e-bike, the research does not support that conclusion. Using the aforementioned 15% of trips estimate, it is expected that a E-bike voucher program would have the following reductions in GHG emissions, at a per capita reduction of roughly 56 kg per person per year.

The GHG emission reductions are estimated as follows for varying levels of implementation:

| Funding level | CO2E reduction estimate |
|---|---|
| $1 million | 46,875 kg |
| $5 million | 234,375 kg |
| $10 million | 468,750 kg |

### 2.2.3B Review of Authority

Municipalities are generally limited in their ability to provide direct benefit to individuals. Municipalities should partner with community-based organizations to administer a project such as an E-bike voucher program.

### 2.2.3C Implementation Schedule

The project would require identifying a community-based organization, entering into an agreement with that organization, and the organization to stand up the program. Additionally, it would require individuals to take advantage of the voucher. This project could take 1-2 years before E-bikes are purchased and on the street.

### 2.2.3D Geographic Location

While this project could technically be implemented anywhere in the MSA, it would be most beneficial in areas with land use patterns that support bikes, and especially in areas with bike-friendly infrastructure like bike lanes and bike racks.

### 2.2.3E Metrics for Tracking Success

Metrics for success could include number of E-bike vouchers redeemed, money saved by participants, and even mileage ridden if a reporting requirement was included in the voucher.

### 2.2.3F LIDAC Benefits Analysis

E-Bike voucher programs can greatly benefit LIDAC communities by removing a large cost barrier to reliable transportation. Municipalities could model their program after the City of Denver's, which increases the value of the voucher for applicants whose annual income is a percentage below the area median income. An E-Bike voucher program would have the potential to give these residents a reliable and efficient transportation option for significantly lower cost than an automobile.

In some LIDAC communities in the MSA as many as 41% of households (Source: American Community Survey Data Birmingham MSA 2023) do not have a single automobile – which presents a great challenge for getting to work and accessing healthcare as well as basic goods and services. An E-bike voucher program could target these individuals and help to overcome these challenges.

## 2.2.4. Transportation Oriented Development Area Planning.

This project would involve a land use planning effort focused on high frequency transit stations in the MSA. Most of these stations are located along the bus rapid transit corridor in Birmingham or the Magic City Connector routes in Birmingham and Homewood. An analysis of existing conditions, including current land use, future land use, existing zoning, and barriers to increased, context appropriate density would be conducted. This would inform municipalities as to whether increasing the allowed density per zoning would be appropriate. Further, surrounding neighborhood land-use could be analyzed and recommendations made to increase density and walkability while decreasing perceived and real barriers to transit access.

Planning could include large-scale transit oriented development (TOD) alongside supporting smaller scale intermodal facilities centered in neighborhoods. These smaller scale centers could be modeled after Dutch Mobility Hubs and feature an array of transportation amenities and options helping to connect users and easing first-and-last mile trip challenges.

Key components of TOD and Small Scale Intermodal Facilities

- Bus shelters
- Wayfinding for the transit and active transportation system
- Docks and dedicated parking for shared mobility devices such as e-bikes and scooters
- Sheltered and secure parking for bicycles and other active transportation devices
- Dedicated parking and identified stops for On-Demand transit and ride-share.
- EV charging stations
- Bike repair stations
- Delivery lockers
- Car share parking
- Housing and supportive mixed-use businesses
- Pocket parks

Research has shown that mobility hubs and TOD function best as a network (Journal of Transport Geography: An analysis of the mobility hub concept in the Netherlands: historical lessons for its implementation) Therefore a municipality working on this project would work to identify potential sites in coordination with the transit authority to deploy numerous TODs and mobility hubs to help establish the existence and identity of the facilities throughout the communities. Multiple designs and plans could be established  to make quick deployment easier while being adaptable to the chosen site.

Additionally, pattern books could be implemented to streamline the proliferation of context appropriate missing middle development in TOD areas. Missing middle housing is bridging the gap between single-family homes and high-density apartments. These housing types are multi-unit dwellings ranging between 2-12 units that match the scale of a typical single-family home. A missing middle pattern book project would entail working with architects and municipal permitting offices to create pre-approved missing middle building plans. If a person wanted to build a medium density housing project, they could use a preapproved building plan; this would reduce design costs and time for permitting, allowing for additional housing to be built. When additional density is encouraged in this way it creates more walkable, transit oriented communities, and ultimately leads to reductions in VMTs.

**2.2.4A Estimated GHG emissions reductions**

This combination of land use policies was quantified using EPA's TEAM method. By increasing density of housing and amenities, implementing TOD station area planning efforts, and decreasing access time to transit, it is estimated this project would reduce GHG emissions by 2,581 kg of CO2E per year along the Birmingham bus rapid transit line. If this project were implemented across the entire BJCTA service area, it would result in a reduction of 29,152kg of CO2E per year.

**2.2.4B Review of Authority**

Municipalities are generally authorized to develop land use plans for areas within their boundaries. It would be wise to coordinate with BJCTA or any transit authority providing service in the study areas in order to ensure maximum coordination between land use and alternative transportation providers.

Municipalities are generally charged with zoning and planning, and also the regulation of building in their city limits. A missing middle housing pattern book should fall within their authority to regulate building.

**2.2.4C Implementation Schedule**

A station area plan could be conducted relatively quickly, likely taking about one year. However, zoning changes may take an additional year or more to implement, and it could take several years before the benefits of these plans would be seen in the way of increased density and reduced VMTs.

It could take multiple years to procure design services, develop approved plans, and implement the processes needed to streamline the approval process for missing middle housing projects. Additionally, it could take several years to see the effects of such a policy, as increases in density and reductions in VMTs would not come to fruition until several missing middle projects were completed in proximity of one another.

### 2.2.4D Geographic Location

While TOD plans could theoretically be implemented anywhere, it is important that they are strategically situated around moderate to high-frequency transit routes. The best locations for these plans would be at stops along the bus rapid transit system or the Magic City Connector route in Birmingham and Homewood.

Missing middle housing pattern books could be implemented in any municipality in the MSA. However, such pattern books would be most immediately useful in areas that have zoning that allows for missing middle housing typologies.

### 2.2.4E Metrics for Tracking Success

Metrics for success could include number of station area plans conducted, percent of recommendations from those plans implemented, increase in density allowed per zoning around high frequency transit stops, increased population density around those stops, and reduced VMT.

Metrics for the pattern book could include number of municipalities offering preapproved missing middle housing plans, number of preapproved plans offered, number of building projects permitted or completed using preapproved plans, and increase in population density in appropriately zoned areas.

### 2.2.4F LIDAC Benefits Analysis

TOD helps reinforce a sense of place and offers a  higher quality of life for LIDAC residents by prioritizing their access to high-quality transit and amenities that promote socioeconomic equity. It promotes public health and community safety, and reduces LIDACs susceptibility to climate change. TOD also helps to mitigate negative impacts of sprawl by increasing density and allowing for more focused development along transit corridors. Several of the benefits LIDACs will experience with TOD are traffic calming, more attractive communities, neighborhood revitalization, economic development, and reduced infrastructure cost.

In addition to the previously stated benefits, TOD also presents an opportunity for affordable housing production. Across the country, TOD developments have seen success with mixed-rate housing models where a percentage of units are sold or rented at market rate and the remainder are reserved for individuals or families earning at or below area median income (AMI). TOD centered housing could feature a diversity of housing types to increase density and save cost for prospective renters or buyers by not providing excessive parking, a development cost which is typically passed on to residents.

## 2.2.5 Priority Trail and Complete Streets Projects.

In an effort to build off of recent success, municipalities could build additional portions of critical trail infrastructure such as those identified in the Red Rock Trail System Action Plan and B-ACTIVE Plan.

The B-ACTIVE Plan is the regional active transportation plan for the region and was adopted by RPCGB in 2019. The purpose of the plan was to establish a clear vision for building and expanding a multimodal transportation network in the metro area. (https://www.b-activeplan.com/

The  Red Rock Trail System Action Plan was completed in 2023, and envisions a connected trail system of both on and off-road infrastructure focused on making connections to the regions three major parks: Red Mountain Park, Railroad Park, and Ruffner Mountain Nature Preserve. By focusing on connecting these three parks, a contiguous and looped trail system would be established for the region. Research has shown that a network of protected bicycle facilities is as effective at reducing carbon emissions as highways are at creating them. In a report by the FIA Foundation it was found that for every 200 USD spent on highways one ton of GHG emissions will be created, in contrast spending the same amount on protected bicycle facilities mitigates one ton of GHG. B-ACTIVE Plan segments influenced the proposed Red Rock Action Plan segments. (https://freshwaterlandtrust.org/what-we-do/about-red-rock-trail-system/featured-trail-projects/

The implementation of the top priority project identified in the Red Rock Action Plan is already underway, the Birmingham Civil Rights Crossroads trail project, which was the recipient of a FY2023 RAISE Grant. Additionally, the City of Homewood recently completed the Lakeshore Trail Extension, nearly completing the contiguous trail facility to Red Mountain Park, which is also a part of the Action Plan.  The region is poised to capitalize on the momentum from these successful trail projects and can continue to build additional active transportation facilities as identified in the Red Rock Action Plan.

**2.2.5A Estimated GHG emissions reductions**

The full implementation of both trail and connector segments of the Jones Valley Trail project was used as an example. It is estimated that between 4,000,000 and 7,000,000 kg of CO2E would be reduced if the full 89.6 miles of trail and on-road connectors and complete streets projects were implemented. With many more trail projects in addition to Jones Valley Trail planned and ready to begin implementation, trail and complete street projects represent a strong emissions reduction category with a high potential for reductions in GHG emissions.

**2.2.5B Review of Authority**

Any municipality could take on this project. It would be beneficial to coordinate with relevant landowners and trail building experts such as Freshwater Land Trust in the planning and implementation of this project.

**2.2.5C Implementation Schedule**

This project would likely take over one year to complete. Land acquisition, engineering and design, and construction would all need to occur to implement this project.

**2.2.5D Geographic Location**

Trial projects could be implemented anywhere in the MSA. There are no real limiting factors to where a trail could be implemented, although it would be beneficial to consult existing trail planning efforts such as the Red Rock Action Plan.

**2.2.5E Metrics for Tracking Success**

Metrics for success could include number of trail projects implemented, linear feet of trails implemented, and number of users on an average day (using trail cam or pedestrian counters).

**2.2.5F LIDAC Benefits Analysis**

The Action Plan sets forth a vision for seven key trail corridors to be established throughout the City with a focus on implementing equitable connections to active transportation options in historically disadvantaged communities. As part of the plan, an equity and demand analysis was conducted for each potential trail segment and the results of that analysis directly factored into the priority weighting for each potential project.

Additionally, the proposed facility types within the plan are based on providing a network that serves all ages and abilities, meaning that facilities are meant to make all users regardless of physical ability, age, gender, or race feel safe.

## 2.2.6. Bus fare Vouchers.

This project proposes utilizing a voucher program to reduce or eliminate public transportation fares, incentivizing residents to use public transit and eliminating financial barriers to transit access.

### 2.2.6A Estimated GHG emissions reductions

Using an estimated 150,000 people living in the BJCTA service area, and a reduction in cost per trip from $2.00 one-way to $0.25 one-way, this project would result in an estimated reduction of 1,579,347 kg of CO2E per year.

### 2.2.6B Review of Authority

There are two models for accomplishing this project, with differing authorities required. First, a municipality could provide funding to a public transit provider, who in turn could charge less in fares; in this option, municipalities have existing authority to enter into agreements and provide funding to public transit authorities. In the other option, municipalities could attempt to provide vouchers or bus passes directly to residents; municipalities generally do not have the authority to provide such direct benefits to individuals, and would need to partner with either a transit authority or a community-based organization in order to provide the vouchers.

### 2.2.6C Implementation Schedule

This project could be implemented quickly, and benefits would likely been seen almost immediately.

### 2.2.6D Geographic Location

While traditional fixed route service is concentrated largely in Jefferson County, rural on demand public transit providers exist in many of the municipalities in the MSA, and could also participate in a bus fare voucher program.

### 2.2.6E Metrics for Tracking Success

Metrics could include number of vouchers provided, percent discounted on bus fares, total savings to individual riders, and increases in ridership (and the GHG emissions reductions calculated based on those.

### 2.2.6F LIDAC Benefits Analysis

A bus fare voucher project would provide several meaningful benefits to LIDAC communities. LIDAC residents are more likely to be “dependent riders” of transit, as opposed to “choice riders”. This reliance on public transit creates the opportunity to provide very direct, consequential transportation cost reductions to communities that could benefit most from said reduction. This not only increases disposable income for LIDACs, it also increases their abilities to access critical services such as health care, healthy foods, and education.

A mode shift could also reduce the exposure of LIDACs to tailpipe pollutants. By shifting from single occupancy vehicles to public transit, LIDACs would have lower VMT in their neighborhoods, reducing exposure to pollutants and noise pollution. Additionally, riders would increase facetime with neighbors and members of their community while on the bus, increasing the sense of community.