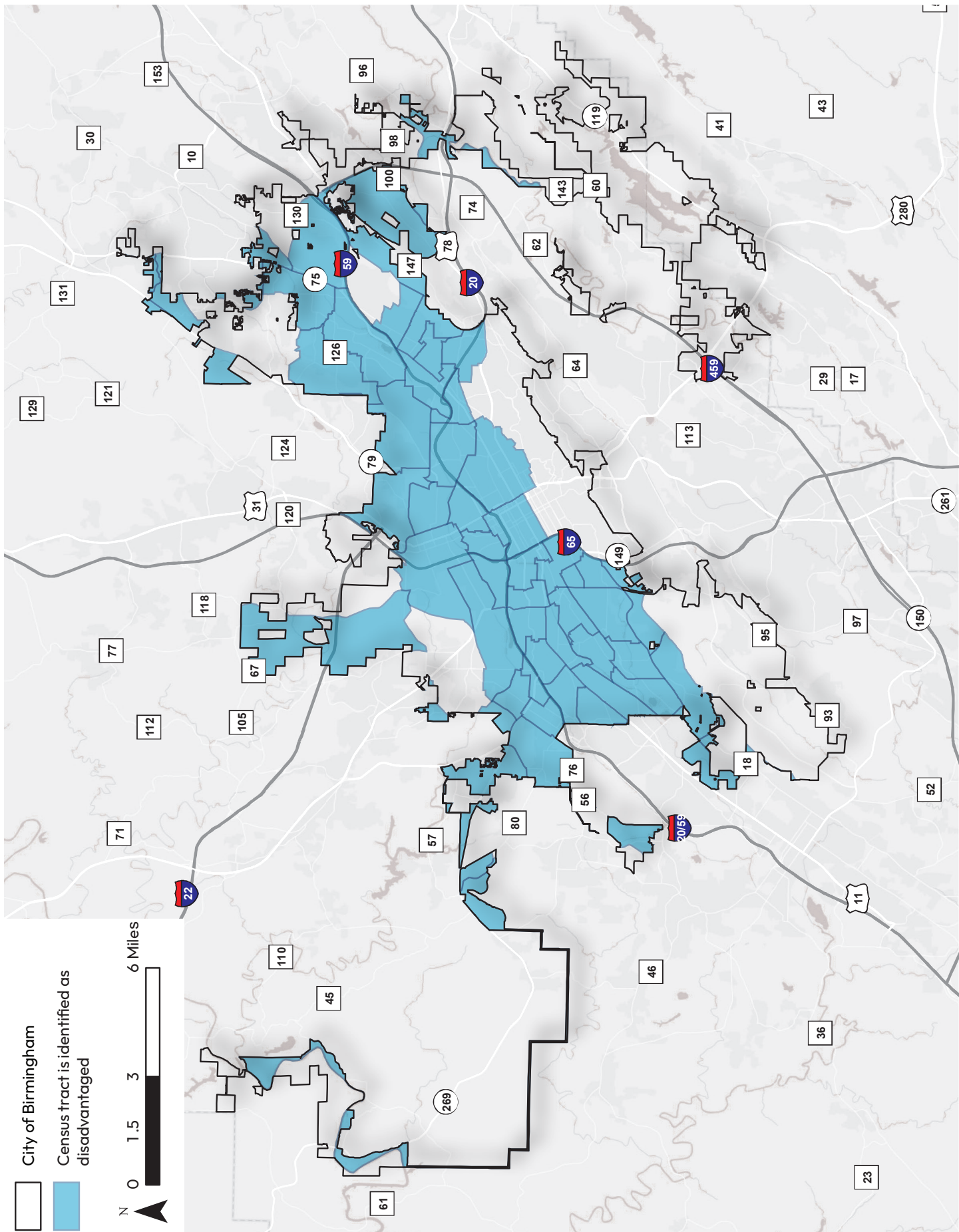


Moving Birmingham Towards
Climate Action:
CPRG Implementation Grant
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Figure 1: LIDAC Communities in Birmingham, AL Source: US Census 2020



Moving Birmingham Towards Climate Action: Technical Appendix

Figure 2: GHG Reduction Calculations for City of Birmingham Vehicle Fleet Source: EPA Local GHG Inventory Tool.



Alabama: Highest Per-Capita Gasoline Consumption in the US

The figures are calculated from 2021 motor gasoline for transportation figures drawn from the U.S. State Energy Data System (SEDS), available here: <https://www.eia.gov/state/seds/> (One barrel = 42 U.S. gallons)

If Alabamians used 226.6 fewer gallons per person in 2021 (bringing their gasoline use in line with the national average), that would add up to 1,144,260,645 gallons less consumption. According to the US EPA greenhouse gas calculator, that would save 10.2 million gallons of carbon emissions, equivalent to the pollution of 2.7 coal-fired power plants in one year. <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

State	Gallons per Capita	Population (thousands)	Thousand barrels	Barrels per Capita
AL	617.6	5,050	74,260	14.7
MS	566.4	2,950	39,782	13.5
WY	540.9	579	7,457	12.9
SD	532.3	896	11,356	12.7
SC	515.5	5,193	63,732	12.3
ND	504.5	778	9,345	12.0
MO	490.8	6,170	72,098	11.7
AR	482.1	3,028	34,755	11.5
MT	480.1	1,106	12,642	11.4
DE	469.5	1,005	11,235	11.2
NH	468.2	1,388	15,472	11.1
TN	465.6	6,968	77,252	11.1
KY	462.3	4,507	49,608	11.0
NM	461.3	2,117	23,254	11.0
IA	459.5	3,198	34,985	10.9
TX	459.2	29,559	323,151	10.9
ME	458.5	1,377	15,032	10.9
LA	457.2	4,627	50,367	10.9
OK	455.1	3,991	43,243	10.8
VA	440.6	8,657	90,826	10.5
NE	433.9	1,964	20,292	10.3
NC	433.9	10,566	109,146	10.3
WV	432.1	1,786	18,374	10.3
IN	431.1	6,814	69,945	10.3
GA	420.4	10,788	107,972	10.0
MI	418.6	10,038	100,040	10.0
WI	417.3	5,880	58,416	9.9

Moving Birmingham Towards Climate Action: Technical Appendix

Figure 3: GHG Reduction Calculations for E-Bike Voucher Program Source: Rocky Mountain Institute (RMI)

E-bike environmental and economics impact assessment calculator

Impacts of an e-bike incentive program for Birmingham, AL

Assumptions and Notes

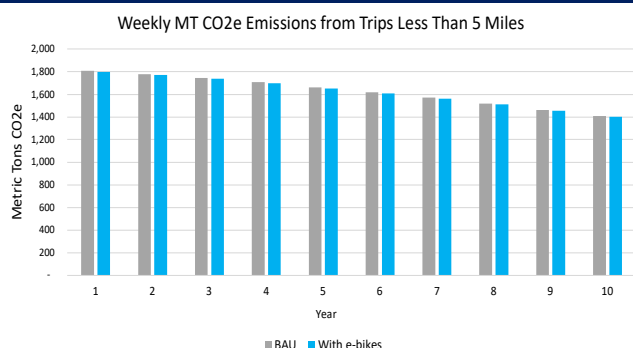
1. BAU on this tab refers to "Business-as-Usual." BAU assumes that vehicles are used to continue driving short vehicle trips, rather than being replaced with another mode.

2. The number of trips taken by cars is assumed to grow each year in accordance with the projected population growth, which is 0.2% for Birmingham. The number of miles biked and the total bikes stays consistent with the amount that the user notes on the the inputs tab.

Selected User Inputs

Variable	Selected Input
Annual program budget for incentives	\$ 1,000,000.00
Timeline (Years)	1
Income-qualified commuting e-bike incentive	\$ 1,200.00
Income-qualified cargo e-bike incentive	\$ 1,700.00
Market-rate commuting e-bike incentive	\$ 400.00
Market-rate cargo e-bike incentive	\$ -
Percent of incentives for income-qualified participants	50%
Percent of incentives for commuting e-bikes	54%
Average miles per week by income-qualified participants	32
Average miles per week by market-rate participants	22

Greenhouse Gas Emissions



CO₂e emissions from these short car trips would be 0% lower in Year 10 compared to the baseline scenario, where motor vehicles continue to be used for short trips. This calculation only looks at emissions from fuel and electricity usage.

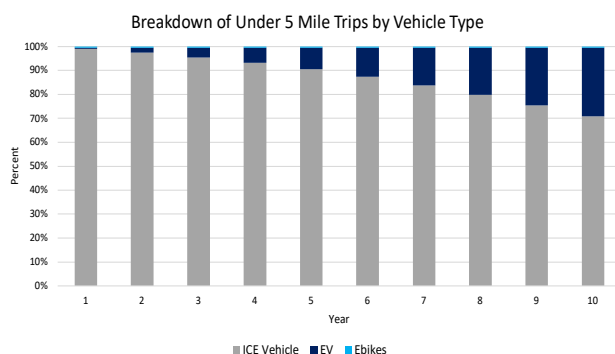
In the first year, this is the same as avoiding 20 barrels of oil per week, or 9 metric tons of CO₂e per week. Over ten years, assuming users continue to bike the same number of miles per week, this would avoid 9,410 barrels of oil total.

The National Renewable Energy Laboratory (NREL) has found that e-bikes have less than 1% of the operational emissions of an ICE vehicle.

Air Quality Impacts

Pollutant	Impact	Percent Reduction from BAU Case	Pounds Reduced from BAU Case in Year 10	Source
PM _{2.5}	PM _{2.5} exposure is linked to a variety of problems, including premature death in people with heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms. PM _{2.5} can occur from combustion, but also due to wear from cars' tires and brakepads.	0%	218	US Environmental Protection Agency
NO _x	Exposure to NO _x can irritate airways in the human respiratory system. Longer exposure to elevated concentrations of may contribute to the development of asthma. NO _x occurs from fuel combustion.	0%	2,729	US Environmental Protection Agency
CO	Breathing air with high CO concentrations reduces the amount of oxygen that can be transported in the blood stream to critical organs like the heart or brain. This can be of particular concern for individuals with some types of heart disease. CO occurs from fuel combustion.	0%	75,647	US Environmental Protection Agency

VMT Reductions



The selected trip data results in a total of 0.5% total VMT reduction for cars trips under five miles in Year 10. The selected data will reduce all VMT from the selected urban area by 0.05% in Year 10.

As represented in the chart, replacing short car trips with e-bikes will predominantly replace current trips taken by ICE vehicles. In a BAU case, 71% of trips would be done with ICE vehicles in ten years, rather than 71% in a scenario where e-bike adoption meets the selected goal.

Figure 4: GHG Reduction Calculations for E-Bike Voucher Program continued Source: Rocky Mountain Institute (RMI) E-bike environmental and economics impact assessment calculator



