

Technical Appendix

This appendix will describe how the greenhouse gas (GHG) estimates were derived for the e-bike voucher program and the mobility wallet program.

E-bike Voucher Program GHG Calculations

The Rocky Mountain Institute's [E-Bike Environment and Economics Impact Assessment Calculator](#) was used to estimate the short- and long-term impact on GHG of a multi-region e-bike voucher program. The tool estimates the amount of short trips (less than 5 miles) in a geography that could be converted to e-bike trips given a financial incentive.

The tool came equipped with the data for certain geographies, but RMI allowed ARC access to upload custom areas as needed. The following areas were uploaded: Atlanta MSA, Athens-Clarke County, and Macon-Bibb County. The tool required trip data from [Replica](#), population forecast data from the [Governor's Office of Planning and Budget](#), and housing data from the [American Community Survey](#).

It was assumed that the 29-county Atlanta MSA characteristics were similar enough to the 20-county Atlanta MPO, and that the City of Savannah, which was preloaded in the tool, was similar enough to the full Chatham County area. More geographically accurate data would have been gathered from Replica, but ARC had a limited-time license to download data, and the grant evolved beyond that timeline.

The following data in Table 1 were used as inputs for each jurisdiction.

Table 1: E-bike Calculator Inputs

	Atlanta MSA	Athens-Clarke	Macon-Bibb	Savannah
Population	5,623,466	129,291	157,148	147,088
Population growth projection (annual)	1.4%	8.5%	6.3%	0.9%
Percent of electric vehicles (EVs) registered to residents in the city	1.9%	1.9%	1.9%	1.9%
EV policy scenario*	BAU	BAU	BAU	BAU
Annual e-bike incentive program budget	\$4,250,000	\$250,000	\$250,000	\$250,000
Timeline of e-bike incentive program	4 years	4 years	4 years	4 years
Market-rate cargo e-bike incentive	\$1,500.00	\$1,500.00	\$1,500.00	\$1,500.00
Market-rate commuting e-bike incentive	\$500.00	\$500.00	\$500.00	\$500.00
Income-qualified cargo e-bike incentive	\$2,000.00	\$2,000.00	\$2,000.00	\$2,000.00
Income-qualified commuting e-bike incentive	\$1,000.00	\$1,000.00	\$1,000.00	\$1,000.00
Percent of incentives for income-qualified program participants	75%	75%	75%	75%
Percent of income-qualified incentives for commuting e-bikes	60%	60%	60%	60%
Percent of incentives for market-rate commuting e-bikes	50%	50%	50%	50%

Estimate of average miles biked per week - income-qualified program participants	32	32	32	32
Estimate of average miles biked per week - market-rate program participants	22	22	22	22

* A “Business As Usual” scenario for EV adoption was used in light of the recent federal rule on [Multi-Pollutant Emissions Standards](#). While a strong rule, the impacts will not be felt until after 2030.

When these were input into the tool, weekly GHG estimates of the e-bikes and a baseline case were calculated for ten years of the program, and the first four years of these values were used to reflect program impacts. Table 2 shows the baseline and e-bike GHG emissions for each jurisdiction.

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Table 2: 2025-2028 GHG Reduction Results from E-bike Tool

Atlanta MPO	Baseline (MT CO2E/wk)	With e-bikes (MT CO2E/wk)	Reduction (MT CO2E/wk)
2025	30,645	30,604	41
2026	30,739	30,657	82
2027	30,796	30,674	122
2028	30,799	30,635	165
Athens	Baseline (MT CO2E/wk)	With e-bikes (MT CO2E/wk)	Reduction (MT CO2E/wk)
2025	975	972	2
2026	1,047	1,042	5
2027	1,123	1,115	7
2028	1,202	1,192	10
Macon	Baseline (MT CO2E/wk)	With e-bikes (MT CO2E/wk)	Reduction (MT CO2E/wk)
2025	1,023	1,021	2
2026	1,076	1,072	5
2027	1,131	1,124	7
2028	1,187	1,177	10
Savannah	Baseline (MT CO2E/wk)	With e-bikes (MT CO2E/wk)	Reduction (MT CO2E/wk)
2025	892	889	2
2026	891	886	5
2027	889	882	7
2028	885	876	10

These years were taken directly from the tool as they are the program years, and they were multiplied by 52 to get annual amounts with the assumption that bikes would be used every week of the year for regular trips. Future years were extrapolated using these assumptions: Baseline GHG emissions would be reduced each year by 0.5% as EVs grow in market share and other ARC initiatives begin to mode shift trips in the region, and e-bike GHG emissions would reduce by 1% each year as the regional culture and

infrastructure shifts to be more bike-friendly and additional e-bikes are purchased and used beyond the years of the program. Table 3 shows the annual aggregate results of these assumptions.

Table 3: 2025-2050 E-bike Voucher Program GHG Reductions

	Baseline (MT CO2E)	With e-bikes (MT CO2E)	Annual Reduction (MT CO2E)	
2025	1,743,810	1,741,272	131,978	
2026	1,755,170	1,750,139	261,616	
2027	1,764,825	1,757,354	388,482	
2028	1,771,792	1,761,720	523,697	
2029	1,762,933	1,744,103	979,126	2030
2030	1,754,118	1,726,662	1,427,697	3,712,597
2031	1,745,347	1,709,396	1,869,491	
2032	1,736,621	1,692,302	2,304,586	
2033	1,727,938	1,675,379	2,733,062	
2034	1,719,298	1,658,625	3,154,995	
2035	1,710,701	1,642,039	3,570,463	
2036	1,702,148	1,625,618	3,979,540	
2037	1,693,637	1,609,362	4,382,303	
2038	1,685,169	1,593,268	4,778,826	
2039	1,676,743	1,577,336	5,169,182	
2040	1,668,359	1,561,562	5,553,443	
2041	1,660,018	1,545,947	5,931,682	
2042	1,651,717	1,530,487	6,303,970	
2043	1,643,459	1,515,182	6,670,377	
2044	1,635,242	1,500,031	7,030,972	
2045	1,627,065	1,485,030	7,385,825	
2046	1,618,930	1,470,180	7,735,004	
2047	1,610,835	1,455,478	8,078,576	
2048	1,602,781	1,440,923	8,416,607	
2049	1,594,767	1,426,514	8,749,164	2050
2050	1,586,793	1,412,249	9,076,312	116,586,977

The [California Air Resources Board's Clean Mobility Tool](#) was used to estimate the GHG impacts of the mobility wallet. The tool and user manual can be referenced on the CARB website for more details and information on how specifically the tool operates.

The Basic Inputs Tab of the tool was filled in with the entries in Table 4.

- The San Diego (Air Basin) was assumed to be similar enough to the Atlanta region
- \$1,080,000.00 for transit bus subsidies over 4 years
- \$810,000.00 for transit train subsidies over 4 years
- \$540,000.00 for rideshare subsidies over 4 years
- \$270,000.00 for micromobility subsidies over 4 years

Table 4: Entries in Basic Input tab of Mobility Wallet tool

Region	Air Basin / County	Number of Components	Component Type	Funds Requested (\$)
Air Basin	San Diego (Air Basin)	4	Subsidies	\$1,080,000.00
			Subsidies	\$810,000.00
			Subsidies	\$540,000.00
			Subsidies	\$270,000.00

The Main Inputs tab required entries and assumptions as detailed in Table 5.

Table 5: Entries in Main Inputs tab of Mobility Wallet tool

Vehicle Information				
Vehicle Type	Project Vehicle Model Year	Project Vehicle Fuel Type	Number of Vehicles in Year 1	Number of Vehicles in Final Year
Transit Bus				
Train				
Sedan	2018	Gasoline	1	1
Electric Scooter			1	1
VMT (Vehicle Miles Traveled) Information				
Are Input Values for One-way Trips or Roundtrips?	Average Expected Number of Vehicle Trips per Vehicle in Year 1	Average Expected Number of Vehicle Trips per Vehicle in Final Year	Length of Average Vehicle Trip (miles)	

One-way Trips	72,000	72,000				13.5
One-way Trips	22,500	22,500				1.75
Passenger Information						
Adjustment Factor (Between 0 and 1) for Displaced Auto Trips	Average Occupancy per Vehicle in Year 1	Average Occupancy per Vehicle in Final Year	Percent Deadhead Miles	Increase in Fixed-route Transit Ridership Associated with the Project in Year 1	Increase in Fixed-route Transit Ridership Associated with the Project in Final Year	Length of Average Passenger Trip on Fixed-route Transit (miles)
0.90				13,687,500	1,368,750	6
0.85				1,204,500	1,204,500	7
0.00	1.55	1.55	41%			
1.00						
Travel Cost Information						
Annual Number of Fares Associated with Project (quantity per year)	Average Fare Associated with Project (\$)		Annual Number of Subsidies Associated with Project (quantity per year)		Average Value of Each Subsidy Associated with Project (\$)	
			1,500		\$47.50	
			1,500		\$47.50	
			1,500		\$45.00	
			1,500		\$10.00	

Transit passes in the Atlanta region average \$95 per month upfront, and the subsidy amount is split between the bus and train as seen under Travel Cost Information. More money is allocated to bus trips in the Basic Inputs with the assumption that more mobility wallet users will be bus-reliant and spend more money on bus trips than train trips. The Average Passenger Trip on Fixed Route Transit values were pulled from the National Transit Database.

The full GHG reduction from this program between 2025-2029 was calculated to be 16,222 MT CO2E. This was divided evenly over the years. Future years held a constant 80% of the impact until 2050 with

the assumption that transit ridership among the pilot cohort would remain elevated. Table 6 shows the results from 2025-2050.

Table 6: 2025-2050 Mobility Wallet GHG Reductions

Year	Reduction (metric ton CO2E)	
2025	4,055	
2026	4,055	
2027	4,055	
2028	4,055	
2029	4,055	2030
2030	3,244	23,521
2031	3,244	
2032	3,244	
2033	3,244	
2034	3,244	
2035	3,244	
2036	3,244	
2037	3,244	
2038	3,244	
2039	3,244	
2040	3,244	
2041	3,244	
2042	3,244	
2043	3,244	
2044	3,244	
2045	3,244	
2046	3,244	
2047	3,244	
2048	3,244	
2049	3,244	2050
2050	3,244	88,408

Final GHG Calculations

Table 7 has the combined GHG reductions from both the E-bike Voucher Program and the Mobility Wallet pilot program.

Table 7: 2025-2050 Combined E-bike Voucher Program and Mobility Wallet GHG Reductions

	Reduction (metric ton CO2)	
2025	136,034	
2026	265,672	
2027	392,537	
2028	527,753	
2029	983,182	2030
2030	1,430,942	3,736,118
2031	1,872,735	
2032	2,307,831	
2033	2,736,306	
2034	3,158,239	
2035	3,573,707	
2036	3,982,785	
2037	4,385,548	
2038	4,782,070	
2039	5,172,426	
2040	5,556,687	
2041	5,934,926	
2042	6,307,214	
2043	6,673,621	
2044	7,034,216	
2045	7,389,070	
2046	7,738,248	
2047	8,081,820	
2048	8,419,851	
2049	8,752,409	2050
2050	9,079,556	116,675,385