

Technical Appendix. Documentation of GHG Emission Reduction Estimates

Introduction

According to the Environmental Protection Agency (EPA), the major greenhouse gases (GHGs) emitted during the combustion of fossil fuels from on-road mobile sources are carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). The impact of the proposed e-bike voucher program on these emissions in Nashville-Davidson County was evaluated using a national spreadsheet tool for modeling vehicle trips and gasoline usage. Then, NDOT calculated the emissions based on these trips and associated fuel consumption. The following sections describe the methodologies and assumptions, including source data and other pertinent details.

GHG Reduction Estimate Method and Tools Used

As previously mentioned, a combination of a spreadsheet tool and hand calculations by NDOT in a spreadsheet was used to estimate GHG reductions. The tool *E-Bike Environment and Economics Impact Assessment Calculator for Cities* is available through the Rocky Mountain Institute (RMI). The publicly available spreadsheet provides cities with a comprehensive tool for determining the environmental and economic impact of replacing vehicle trips with e-bike trips. Although there is no specific version number for this tool, the version used was last updated by the developer in October 2023. This tool was specifically used to estimate annual short vehicle trips under 5 miles in Nashville-Davidson County for the years 2025-2030. Once outputs were converted to kilograms and grams, an average annual growth rate was applied to calculate projections for 2031-2050 years.

Measure Implementation Assumptions

To estimate the reduction in the three GHGs, assumptions are made regarding the e-bike program's implementation, milestones, and anticipated lifetime. These include 1,720 vouchers totaling \$1,000,000 being fully allocated over the 5-year program. The following assumptions are made regarding the allocation of vouchers for specific e-bike types (i.e., commuter or cargo) and by income qualification (i.e., standard or income qualifying) each year of the program. These assumptions rely upon the availability of e-bikes at participating bike shops and existing unmet demand by residents for such a program.

Annual Allocated E-Bike Voucher Assumptions					
Voucher Type	Commuter E-Bike Vouchers per Year		Cargo E-Bike Vouchers per Year		Total Voucher Value per Year
	Number	Value	Number	Value	
Standard	166	\$300	100	\$500	\$200,000
Income-Qualifying	45	\$1,200	33	\$1,400	

GHG Reduction Estimate Assumptions

Key assumptions and data sources for the RMI tool and NDOT hand calculations are provided in the table on the following page. The 'Index + Sources' and 'User Inputs' tabs in the *GHGcalcs_NDOT.xlsx* provide additional details regarding the RMI tool's assumptions and data sources.

Key Assumptions and Data Sources		
Data Point for Projections	Tool Input/Value	Data Source
RMI Tool		
Population	683,622	U.S. Census Bureau. 2022. Population.
Average Annual Growth Rate for Population Growth Projection	1.5%	U.S. Census Bureau. 2010, 2020. Population.
Percent of Electric Vehicles (EVs) Registered to Residents	0.7%	Davidson County Clerk's Office. 2023.
EV Replacements of ICEs (Business-As-Usual Scenario)	9% of Vehicles are EVs by 2030	Tool Assumption. Does not include the effect of non-CPRG federal incentives.
Estimate of Average Miles Biked per Week - Income-Qualified Program Participants	32	City of Denver E-Bike Participant Survey.
Estimate of Average Miles Biked per Week - Market-Rate (Standard) Program Participants	22	City of Denver E-Bike Participant Survey.
Trip Breakdown by Mileage and Total Miles Traveled	Various	Replica. 2023.
Percent of Weekly Miles Traveled by Vehicle Types	2.9% - 42.8% based on Vehicle Type	Julie Blackley (April 25, 2023). Which Vehicle Types is the Most Popular in Each State? I See Cars.
Representative Fuel Efficiencies for ICE Vehicles	18 mpg - 34 mpg based on Vehicle Type	ICE Vehicle Models (2007-2022). CarSheet. 2023.
Key Data Outputs from RMI Tool: Fuel Usage (Gallons of Gasoline) and VMT for Sedans, Hatchbacks, Pickup Trucks, and SUVs (2025-2030) <i>[see GHGcalcs_NDOT.xlsx 'RMI_Outputs_VMT' and 'RMI_Outputs_Gasoline' tabs]</i>		
NDOT Calculations		
CO ₂ Emission Factor (per Gallon of Gasoline)	8.78	EPA. GHG Emission Factors Hub. 2024.
CH ₄ Emission Factor – 2019 Gasoline Passenger Vehicle (Grams per Mile)	0.0051	EPA. GHG Emission Factors Hub. 2024.
CH ₄ Emission Factor – 2019 Gasoline Light Duty Vehicle (Grams per Mile)	0.0080	EPA. GHG Emission Factors Hub. 2024.
N ₂ O Emission Factor – 2019 Gasoline Passenger Vehicle (Grams per Mile)	0.0015	EPA. GHG Emission Factors Hub. 2024.
N ₂ O Emission Factor – 2019 Gasoline Light Duty Vehicle (Grams per Mile)	0.0013	EPA. GHG Emission Factors Hub. 2024.
Key Data Outputs from NDOT Calculations: CO ₂ (mtCO ₂ e), CH ₄ (mtCO ₂ e), N ₂ O (mtCO ₂ e) Emissions for Sedans, Hatchbacks, Pickup Trucks, and SUVs (2025-2030, 2025-2050) <i>[see GHGcalcs_NDOT.xlsx '5yrEmissions' and 'CPRG_Projections' tabs]</i>		

Reference Case Scenario – GHG Emissions without E-Bike Program

The reference case scenario (i.e., baseline) models the total emissions of the three GHGs for the years 2025-2030 and 2025-2050 without the e-bike program. The RMI tool was first used to calculate annual miles traveled for trips under five miles for the years 2025-2030. Vehicles include four ICE on-road vehicle types, including pickup trucks, SUVs, sedans, and hatchbacks. In addition, weekly VMT per vehicle type was calculated for the years 2025-2030. A gradual replacement of ICE vehicle types with EV models is incorporated into RMI's model. Heavy-duty vehicles, motorcycles, and hybrid vehicles are not accounted for in the below GHG emissions calculations.

2025-2030: CO₂ (mt CO₂-e)

1.) Total gallons of gasoline per year by vehicle type = total ICE (pickup trucks) gallons of gasoline per year + total ICE (SUVs) gallons of gasoline per year + total ICE (sedans) gallons of gasoline per year + total ICE (hatchbacks) gallons of gasoline per year

**data sourced from the RMI tool*

2.) Calculation year CO₂ (kilograms) emitted, 2025-2030 = [total gallons of gasoline used by on-road passenger ITE vehicles per year (i.e., sedans and hatchbacks) + total gallons of gasoline used by light-duty ITE vehicles per year (i.e., pickup trucks and SUVs)] * 8.78 (i.e., CO₂ factor per gallon of gasoline)

3.) Calculation year CO₂ (mt CO₂-e) emitted per year, 2025-2030 = (CO₂ (kilograms) emitted per year / 1,000) * 1 (GWP factor for CO₂)

4.) Cumulative CO₂ (mt CO₂-e) emitted 2025-2030 = sum of annual CO₂ (mt CO₂-e) emitted for 2025-2030

2025-2030: CH₄, N₂O (mt CO₂-e)

5.) Total annual VMT per year by vehicle type = (weekly ICE (pickup trucks) VMT*52) + (weekly ICE (SUVs) VMT*52) + (weekly ICE (sedans) VMT*52) + (weekly ICE (hatchbacks) VMT*52)

**data sourced from the RMI tool*

6.) Calculation year CH₄ (mt CO₂-e), 2025-2030 = (CH₄ (grams) emitted per year / 1,000,000) * 28 (GWP for CH₄)

Calculation year N₂O (mt CO₂-e), 2025-2030 = (N₂O (grams) emitted per year / 1,000,000) * 265 (GWP for N₂O)

7.) Cumulative CH₄ (mt CO₂-e) emitted 2025-2030 = sum of annual CH₄ (mt CO₂-e) emitted for calculation years 2025-2030

Cumulative N₂O (mt CO₂-e) emitted 2025-2030 = sum of annual N₂O (mt CO₂-e) emitted for calculation years 2025-2030

2025-2050: CO₂, CH₄, N₂O (mt CO₂-e)

Next, to project emissions for the 2025-2050 horizon year, an average annual growth rate was applied to the emission outputs from the RMI tool (i.e., equations 2 and 6). The following equations show the

calculations for CO₂ (mt CO₂-e) as an example. CH₄ (mt CO₂-e) and N₂O (mt CO₂-e) use the same equations and methodology.

8.) Average annual growth rate for CO₂ (mt CO₂-e) for 2031-2050 emissions projections = $1 - (((2025 \text{ CO}_2 \text{ (mt CO}_2\text{-e)} - 2030 \text{ CO}_2 \text{ (mt CO}_2\text{-e)}) / 2025 \text{ CO}_2 \text{ (mt CO}_2\text{-e)}) / 10)$

9.) Calculation year CO₂ (mt CO₂-e), 2031-2050 = previous calculation year CO₂ (mt CO₂-e) * average annual growth rate

10.) Cumulative CO₂ (mt CO₂-e) emitted 2025-2050 = sum of annual CO₂ (mt CO₂-e) emitted for calculation years 2025-2050

Cumulative CH₄ (mt CO₂-e) emitted 2025-2050 = sum of annual CH₄ (mt CO₂-e) emitted for calculation years 2025-2050

Cumulative N₂O (mt CO₂-e) emitted 2025-2050 = sum of annual N₂O (mt CO₂-e) emitted for calculation years 2025-2050

Results are shown in the table below.

Baseline GHG Emission Projections Without E-Bike Program								
Horizon Year	Pollutant	Metric Tons CO ₂ -Equivalent (mtCO ₂ e)	Horizon Year	Pollutant	Metric Tons CO ₂ -Equivalent (mtCO ₂ e)	Horizon Year	Pollutant	Metric Tons CO ₂ -Equivalent (mtCO ₂ e)
2025	CO ₂	4,996.55	2034	CO ₂	4,976.19	2043	CO ₂	4,963.15
	CH ₄	74.92		CH ₄	77.47		CH ₄	79.17
	N ₂ O	166.86		N ₂ O	172.54		N ₂ O	176.32
	Total	5,238.34		Total	5,226.20		Total	5,218.64
2026	CO ₂	5,013.95	2035	CO ₂	4,974.74	2044	CO ₂	4,961.71
	CH ₄	75.59		CH ₄	77.66		CH ₄	79.36
	N ₂ O	168.34		N ₂ O	172.96		N ₂ O	176.75
	Total	5,257.88		Total	5,225.35		Total	5,217.81
2027	CO ₂	5,026.10	2036	CO ₂	4,973.29	2045	CO ₂	4,960.26
	CH ₄	76.18		CH ₄	77.85		CH ₄	79.55
	N ₂ O	169.66		N ₂ O	173.37		N ₂ O	177.17
	Total	5,271.93		Total	5,224.51		Total	5,216.99
2028	CO ₂	5,027.67	2037	CO ₂	4,971.84	2046	CO ₂	4,958.82
	CH ₄	76.61		CH ₄	78.03		CH ₄	79.74
	N ₂ O	170.62		N ₂ O	173.79		N ₂ O	177.60
	Total	5,274.89		Total	5,223.67		Total	5,216.16
2029	CO ₂	5,013.12	2038	CO ₂	4,970.39	2047	CO ₂	4,957.37
	CH ₄	76.80		CH ₄	78.22		CH ₄	79.94
	N ₂ O	171.04		N ₂ O	174.21		N ₂ O	178.03
	Total	5,260.95		Total	5,222.82		Total	5,215.33

Baseline GHG Emission Projections Without E-Bike Program								
Horizon Year	Pollutant	Metric Tons CO ₂ -Equivalent (mtCO ₂ e)	Horizon Year	Pollutant	Metric Tons CO ₂ -Equivalent (mtCO ₂ e)	Horizon Year	Pollutant	Metric Tons CO ₂ -Equivalent (mtCO ₂ e)
2030	CO ₂	4,981.99	2039	CO ₂	4,968.94	2048	CO ₂	4,955.93
	CH ₄	76.73		CH ₄	78.41		CH ₄	80.13
	N ₂ O	170.89		N ₂ O	174.63		N ₂ O	178.46
	Total	5,229.61		Total	5,221.98		Total	5,214.51
2031	CO ₂	4,980.54	2040	CO ₂	4,967.49	2049	CO ₂	4,954.48
	CH ₄	76.92		CH ₄	78.60		CH ₄	80.32
	N ₂ O	171.30		N ₂ O	175.05		N ₂ O	178.89
	Total	5,228.75		Total	5,221.15		Total	5,213.69
2032	CO ₂	4,979.09	2041	CO ₂	4,966.05	2050	CO ₂	4,953.04
	CH ₄	77.10		CH ₄	78.79		CH ₄	80.52
	N ₂ O	171.71		N ₂ O	175.47		N ₂ O	179.32
	Total	5,227.90		Total	5,220.31		Total	5,212.87
2033	CO ₂	4,977.64	2042	CO ₂	4,964.60			
	CH ₄	77.29		CH ₄	78.98			
	N ₂ O	172.13		N ₂ O	175.90			
	Total	5,227.05		Total	5,219.48			

Baseline GHG Emission Projections Without E-Bike Program				
	Total CO ₂ (mtCO ₂ e)	Total CH ₄ (mtCO ₂ e)	Total N ₂ O (mtCO ₂ e)	Total (mtCO ₂ e)
2025-2030	30,059.38	456.83	1,017.40	31,533.61
2025-2050	129,394.94	2,030.88	4,522.99	135,948.81

Measure-Specific Activity Data – GHG Emissions with E-Bike Program

Like the baseline scenario, the emissions scenario used the RMI tool for base calculations of the three GHG emissions for 2025-2030. While the intent is to carry the program forward using local funding after the program's 5 years, the calculations assume the e-bike program ends. An annual average growth rate was applied to emissions to project the years between 2030-2050 for the e-bikes that were sourced by the CPRG. It should be noted that all e-bikes are likely not to last through this timeframe and, therefore, emissions numbers by ICE vehicles are likely higher in latter years; however, the difference may be negligible as the share of non-emitting EVs increases and ICE vehicles are increasingly phased out.

It was assumed that an average of 54 miles of weekly vehicle trips completed by ICE on-road passenger and light duty vehicles were replaced with non-emitting e-bike trips. Thirty-two (32) miles were assumed to be completed weekly by income-qualified program participants while 22 miles were assumed to be completed by standard program participants.

2025-2030: CO₂ (mt CO₂-e) [with E-Bike Program]

- 1.) Total gallons of gasoline per year by vehicle type = total ICE (pickup trucks) gallons of gasoline per year + total ICE (SUVs) gallons of gasoline per year + total ICE (sedans) gallons of gasoline per year + total ICE (hatchbacks) gallons of gasoline per year

**data sourced from the RMI tool, reduction in VMT calculated in model*

- 2.) Calculation year CO₂ (kilograms) emitted, 2025-2030 = [total gallons of gasoline used by on-road passenger ITE vehicles (i.e., sedans and hatchbacks) per year + total gallons of gasoline used by light-duty ITE vehicles (i.e., pickup trucks and SUVs) per year] * 8.78 (i.e., CO₂ factor per gallon of gasoline)
- 3.) Calculation year CO₂ (mt CO₂-e) emitted per year, 2025-2030 = (CO₂ (kilograms) emitted per year / 1,000) * 1 (GWP for CO₂)
- 4.) Cumulative CO₂ (mt CO₂-e) emitted 2025-2030 = sum of annual CO₂ (mt CO₂-e) emitted for 2025-2030

2025-2030: CH₄, N₂O (mt CO₂-e) [with E-Bike Program]

- 5.) Total annual VMT per year by vehicle type (i.e., pickup trucks, SUVs, sedans, and hatchbacks) = [weekly ICE (pickup trucks) VMT*52] + [weekly ICE (SUVs) VMT*52] + [weekly ICE (sedans) VMT*52] + [weekly ICE (hatchbacks) VMT*52]

**data sourced from the RMI tool, reduction in VMT calculated in model*

- 6.) Calculation year CH₄ (mt CO₂-e), 2025-2030 = (CH₄ (grams) emitted per year / 1,000,000) * 28 (GWP for CH₄)

Calculation year N₂O (mt CO₂-e), 2025-2030 = (N₂O (grams) emitted per year / 1,000,000) * 265 (GWP for N₂O)

- 7.) Cumulative CH₄ (mt CO₂-e) emitted 2025-2030 = sum of annual CH₄ (mt CO₂-e) emitted for calculation years 2025-2030

Cumulative N₂O (mt CO₂-e) emitted 2025-2030 = sum of annual N₂O (mt CO₂-e) for calculation years 2025-2030

2025-2050: CO₂, CH₄, N₂O (mt CO₂-e) [with E-Bike Program]

Next, to project emissions for the 2025-2050 horizon year, an average annual growth rate was applied to the emission outputs from the RMI tool (i.e., equations 2 and 6). The following equations show the calculations for CO₂ (mt CO₂-e) as an example. CH₄ (mt CO₂-e) and N₂O (mt CO₂-e) use the same equations and methodology. Results are shown in the table on the following page.

- 8.) Average annual growth rate for CO₂ (mt CO₂-e) for 2031-2050 emissions projections = $1 - ((2025 \text{ CO}_2 \text{ (mt CO}_2\text{-e)} - 2030 \text{ CO}_2 \text{ (mt CO}_2\text{-e)}) / 2025 \text{ CO}_2 \text{ (mt CO}_2\text{-e)}) / 10$
- 9.) Calculation year CO₂ (mt CO₂-e), 2031-2050 = previous calculation year CO₂ (mt CO₂-e) * average annual growth rate

10.) Cumulative CO₂ (mt CO₂-e) emitted 2025-2050 = sum of annual CO₂ (mt CO₂-e) emitted for calculation years 2025-2050

Cumulative CH₄ (mt CO₂-e) emitted 2025-2050 = sum of annual CH₄ (mt CO₂-e) emitted for calculation years 2025-2050

Cumulative N₂O (mt CO₂-e) emitted 2025-2050 = sum of annual N₂O (mt CO₂-e) emitted for calculation years 2025-2050

Scenario GHG Emission Projections With E-Bike Program								
Horizon Year	Pollutant	Metric Tons CO2-Equivalent (mtCO ₂ e)	Horizon Year	Pollutant	Metric Tons CO2-Equivalent (mtCO ₂ e)	Horizon Year	Pollutant	Metric Tons CO2-Equivalent (mtCO ₂ e)
2025	CO ₂	4,993.66	2034	CO ₂	6,702.28	2043	CO ₂	7,580.04
	CH ₄	74.88		CH ₄	77.18		CH ₄	78.70
	N ₂ O	166.77		N ₂ O	171.88		N ₂ O	175.28
	Total	5,235.31		Total	6,951.34		Total	7,834.02
2026	CO ₂	5,008.24	2035	CO ₂	6,794.56	2044	CO ₂	7,684.40
	CH ₄	75.50		CH ₄	77.35		CH ₄	78.87
	N ₂ O	168.15		N ₂ O	172.26		N ₂ O	175.66
	Total	5,251.89		Total	7,044.16		Total	7,938.94
2027	CO ₂	5,017.64	2036	CO ₂	6,888.11	2045	CO ₂	7,790.20
	CH ₄	76.05		CH ₄	77.51		CH ₄	79.05
	N ₂ O	169.37		N ₂ O	172.63		N ₂ O	176.04
	Total	5,263.06		Total	7,138.26		Total	8,045.29
2028	CO ₂	5,016.07	2037	CO ₂	6,982.95	2046	CO ₂	7,897.46
	CH ₄	76.43		CH ₄	77.68		CH ₄	79.22
	N ₂ O	170.23		N ₂ O	173.01		N ₂ O	176.43
	Total	5,262.73		Total	7,233.64		Total	8,153.11
2029	CO ₂	4,998.52	2038	CO ₂	7,079.09	2047	CO ₂	8,006.20
	CH ₄	76.57		CH ₄	77.85		CH ₄	79.39
	N ₂ O	170.54		N ₂ O	173.39		N ₂ O	176.81
	Total	5,245.63		Total	7,330.33		Total	8,262.40
2030	CO ₂	4,967.70	2039	CO ₂	7,176.56	2048	CO ₂	8,116.43
	CH ₄	76.51		CH ₄	78.02		CH ₄	79.56
	N ₂ O	170.40		N ₂ O	173.76		N ₂ O	177.20
	Total	5,214.61		Total	7,428.34		Total	8,373.19
2031	CO ₂	6,432.89	2040	CO ₂	7,275.37	2049	CO ₂	8,228.18
	CH ₄	76.68		CH ₄	78.19		CH ₄	79.74
	N ₂ O	170.77		N ₂ O	174.14		N ₂ O	177.58
	Total	6,680.34		Total	7,527.70		Total	8,485.50

Scenario GHG Emission Projections With E-Bike Program								
Horizon Year	Pollutant	Metric Tons CO2-Equivalent (mtCO ₂ e)	Horizon Year	Pollutant	Metric Tons CO2-Equivalent (mtCO ₂ e)	Horizon Year	Pollutant	Metric Tons CO2-Equivalent (mtCO ₂ e)
2032	CO ₂	4,962.54	2041	CO ₂	4,939.36	2050	CO ₂	4,916.30
	CH ₄	76.84		CH ₄	78.36		CH ₄	79.91
	N ₂ O	171.14		N ₂ O	174.52		N ₂ O	177.97
	Total	5,210.52		Total	5,192.24		Total	5,174.17
2033	CO ₂	4,959.96	2042	CO ₂	4,936.79			
	CH ₄	77.01		CH ₄	78.53			
	N ₂ O	171.51		N ₂ O	174.90			
	Total	5,208.48		Total	5,190.23			

Scenario GHG Emission Projections With E-Bike Program				
	Total CO ₂ (mtCO ₂ e)	Total CH ₄ (mtCO ₂ e)	Total N ₂ O (mtCO ₂ e)	Total (mtCO ₂ e)
2025-2030	30,001.83	455.95	1,015.45	31,473.23
2025-2050	128,815.21	2,021.60	4,502.33	135,339.14

GHG Emissions Reduced

This section includes the absolute annual reductions for each of the three pollutants for the near-term (2025-2030) and long-term (2025-2050) timeframes, as well as the cumulative reductions for these timeframes. Bar charts of modeled emission reductions for each pollutant are included on the final page.

Absolute GHG Emission Reductions With E-Bike Program								
Horizon Year	Pollutant	Metric Tons CO2-Equivalent (mtCO ₂ e)	Horizon Year	Pollutant	Metric Tons CO2-Equivalent (mtCO ₂ e)	Horizon Year	Pollutant	Metric Tons CO2-Equivalent (mtCO ₂ e)
2025	CO ₂	2.89	2034	CO ₂	18.81	2043	CO ₂	28.93
	CH ₄	0.04		CH ₄	0.29		CH ₄	0.47
	N ₂ O	0.10		N ₂ O	0.66		N ₂ O	1.04
	Total	3.03		Total	19.76		Total	30.43
2026	CO ₂	5.71	2035	CO ₂	19.94	2044	CO ₂	30.05
	CH ₄	0.09		CH ₄	0.31		CH ₄	0.49
	N ₂ O	0.19		N ₂ O	0.70		N ₂ O	1.08
	Total	5.99		Total	20.95		Total	31.62
2027	CO ₂	8.46	2036	CO ₂	21.07	2045	CO ₂	31.16
	CH ₄	0.13		CH ₄	0.33		CH ₄	0.51
	N ₂ O	0.29		N ₂ O	0.74		N ₂ O	1.13
	Total	8.87		Total	22.14		Total	32.80

Absolute GHG Emission Reductions With E-Bike Program								
Horizon Year	Pollutant	Metric Tons CO2- Equivalent (mtCO ₂ e)	Horizon Year	Pollutant	Metric Tons CO2- Equivalent (mtCO ₂ e)	Horizon Year	Pollutant	Metric Tons CO2- Equivalent (mtCO ₂ e)
2028	CO ₂	11.60	2037	CO ₂	22.19	2046	CO ₂	32.28
	CH ₄	0.18		CH ₄	0.35		CH ₄	0.53
	N ₂ O	0.39		N ₂ O	0.78		N ₂ O	1.17
	Total	12.17		Total	23.33		Total	33.98
2029	CO ₂	14.60	2038	CO ₂	23.32	2047	CO ₂	33.40
	CH ₄	0.22		CH ₄	0.37		CH ₄	0.55
	N ₂ O	0.50		N ₂ O	0.82		N ₂ O	1.22
	Total	15.32		Total	24.51		Total	35.16
2030	CO ₂	14.29	2039	CO ₂	24.44	2048	CO ₂	34.51
	CH ₄	0.22		CH ₄	0.39		CH ₄	0.57
	N ₂ O	0.49		N ₂ O	0.87		N ₂ O	1.26
	Total	15.00		Total	25.70		Total	36.34
2031	CO ₂	15.42	2040	CO ₂	25.56	2049	CO ₂	35.63
	CH ₄	0.24		CH ₄	0.41		CH ₄	0.59
	N ₂ O	0.53		N ₂ O	0.91		N ₂ O	1.31
	Total	16.19		Total	26.88		Total	37.52
2032	CO ₂	16.55	2041	CO ₂	26.69	2050	CO ₂	36.74
	CH ₄	0.26		CH ₄	0.43		CH ₄	0.61
	N ₂ O	0.57		N ₂ O	0.95		N ₂ O	1.35
	Total	17.38		Total	28.07		Total	38.70
2033	CO ₂	17.68	2042	CO ₂	27.81			
	CH ₄	0.28		CH ₄	0.45			
	N ₂ O	0.61		N ₂ O	1.00			
	Total	18.57		Total	29.25			

Cumulative GHG Emission Reductions With E-Bike Program				
	Total CO ₂ (mtCO ₂ e)	Total CH ₄ (mtCO ₂ e)	Total N ₂ O (mtCO ₂ e)	Total (mtCO ₂ e)
2025-2030	57.55	0.88	1.96	60.38
2025-2050	579.73	9.28	20.66	609.67

