U.S. Department of Environmental Protection (EPA)

Climate Pollution Reduction Grants Program: Implementation Grants General Competition

Harnessing Transportation Alternatives to Decarbonize Travel Across Greater Philadelphia:

Technical Appendix:

City of
Philadelphia

GHG Calculation Technical Appendix

This analysis calculates the avoided greenhouse gas emissions and reports the results in avoided metric tons of CO2-e. The following projects were included in the analysis:

- Indego Bike Share Program
- Income-based E-Bike Voucher Program
- Electric Vehicle Charger Installation and Workforce Development Program
- Freight-Commuter Rail Separation
- Silverliner VI Rail Car Procurement and Facility Improvement

This analysis was conducted using Excel and greenhouse gas emission reduction estimation tools publicly available from the United States Environmental Protection Agency ("EPA") and the Rocky Mountain Institute. It considers both the reduced emissions from implementing the projects, and the increased operating emissions, if any, from operating the project. It does not consider greenhouse gas emissions from project construction. Additionally, impacts from SEPTA's rail car facility improvements are not assessed directly, though it supports GHG reductions indirectly through facilitating the use of Silverliner VI vehicles.

Table 1. GHG reduction by measure (metric tons)

			Period 1		Period 2	
Organization	**Project**	**Credit/Debit Type**	**Annual Average**	**Sum**	**Annual Average**	**Sum**
SEPTA	Freight-Commuter Rail Separation	Mode Shift Credit	-	-	1,172	30,474
		Congestion Reduction Credit	-	-	85	2,221
		Land Use Effect Credit	-	-	3,665	95,277
		Transit Operations Debit	-	-	(301)	(7,831)
		Freight Rail Operations Credit	-	-	179	4,661
		Freight Mode Shift Credit	-	-	6,569	170,782
		Freight Mode Shift Debit	-	-	(3,312)	(86,123)
		Total	**-**	**-**	**8,056**	**209,462**
	Silverliner VI Procurement and Rail Car Facility Improvement	Mode Shift Credit	-	-	2,820	73,314
		Congestion Reduction Credit	-	-	206	5,344
		Land Use Effect Credit	-	-	8,816	229,221
		Transit Operations Debit	-	-	(725)	(18,841)
		System Operations Credit	110	661	991	25,764
		Total	**110**	**661**	**12,108**	**314,803**
City of Philadelphia	Indego Bike Share Program	Mode Shift Credit	286	1,713	259	6,730
		Mode Shift Debit	(4)	(21)	(3)	(84)
		System Operations Credit	6	34	4	114
		Total	**288**	**1,726**	**260**	**6,760**
	E-Bike Rebate Program	Mode Shift Credit and Debit*	1,300	7,800	500	13,000
		Total	**1,300**	**7,800**	**500**	**13,000**
	Electric Vehicle Charger Installation and Workforce Development Program	Alternative Fuel Credit and Debit*	6,207	37,244	4,093	106,413
		Total	**6,207**	**37,244**	**4,093**	**106,413**
SEPTA	**SEPTA**	**TOTAL**	**110**	**661**	**20,164**	**524,265**
City of Philadelphia	**City of Philadelphia**	**TOTAL**	**7,795**	**46,770**	**4,853**	**126,173**
ALL	**ALL**	**TOTAL**	**7,905**	**47,431**	**25,017**	**650,437**

Source: SEPTA, City of Philadelphia, ESI, 2024

Indego Bike Share Program

This portion of the analysis considers the electrification and expansion of Philadelphia's bikeshare program. The expansion of the bikeshare program will install up to 75 bike share stations and up to 750 electric bikes. The electrification of the bikeshare program is expected to install up to 40 bike charging bikeshare stations and purchase up to 400 electric bikes.

The electrification and expansion of the bike share program were considered together in this analysis. This analysis estimates four bike share trips replace a car trip, generating GHG reductions from mode shift. Ridership assumptions are as follows:

- **No-Build:** Ridership is projected out from 1.1 million in 2023, which corresponds to the number of observed trips in this year. Growth is assumed to be 6.3 percent each year based on the post-pandemic 2021-2023 growth of the system.
- **Build:** Due to the expansion of the system, the number of annual trips on the bike share is expected to increase from 1.1 million in 2023 to 2 million at the end of 2025 and to 3 million at the end of 2028. Ridership is expected to see an additional boost by the end of 2028 to a total of 3.75 million due to a multiplier effect based on the rate of ridership increase observed after a slightly smaller bike share expansion in Toronto. Following 2028, the annual growth is expected to be slightly elevated, 10 percent, based on the larger and more electrified system. The impact of this investment on ridership is only projected out ten years from the implementation of the electrification project. This is based on a conservative 10-year estimate of the lifespan of the bike infrastructure.

For both scenarios, the average length of a bike trip is 1.5 miles (based on historic Indego data). Reduced VMT attributable to these projects was used to calculate the reduced fuel usage (749,600 fewer gallons) and metric tons of CO2-e emissions.[1] This was subtracted from the CO2-e emissions from electricity usage of travelling the same number of miles on an electric bike (198,736 kilowatt hours).[2]

Electrifying 40 bike stations is expected to avoid additional emissions through increasing the efficiency of system maintenance. Charging docks are expected to reduce the 750 average annual vehicle miles travelled to maintain one station by 75 percent for the 40 stations included in the electrification portion of the project. This is calculated as a reduction in gallons of fuel consumed each year (12,857 gallons fewer), then converted to metric tons of CO2-e emissions.[3]

[1] Emission factors from the Climate Registry were used: 8.81 kilogram of CO2/ gallon, 0.0147 grams of CH4 per mile, 0.0079 grams per mile of N20. These were adjusted for units and by Global warming potential to calculate a final coefficients: 19.423 for CO2, 0.00091 for CH4, and 0.00462 for N20.

[2] This calculation uses a factor of 0.000417 derived from the EPA Greenhouse Gas Equivalencies Calculator to convert kilowatt hours to CO2-e.

[3] Emission factors from the Climate Registry were used: 8.81 kilogram of CO2/ gallon, 0.0147 grams of CH4 per mile, 0.0079 grams per mile of N20. These were adjusted for units and by Global warming potential to calculate a final coefficients: 19.423 for CO2, 0.00091 for CH4, and 0.00462 for N20.

Avoided CO2-e emissions by year from both modal shift and system maintenance efficiencies were summed to understand the project's total impact. These values are summed to determine greenhouse gas reductions for the first (2025-2030) and second performance period (2025-2050) of the EPA grant.

Income-based e-Bike Voucher Program

This portion of the analysis considers the reduction to greenhouse gas emissions attributable to providing vouchers for low- and moderate- income Philadelphia residents to purchase e-bikes and e-cargo bikes. The impact of this program was calculated using Rocky Mountain Institute's e-bike impact tool. This tool considers the mode shift (short car trips become e-bike trips) and accounts for the bike's electricity usage. It calculates emissions by vehicle type and includes projected grid CO2-e intensity reductions, as provided by NREL's Cambium model. Rocky Mountain Institute's tool outputs the weekly metric tons of avoided CO2-e emissions, which this analysis converted to an annual reduction. The reduction was applied using the assumption that avoided emissions will continue for ten years based on a ten-year life span for the purchased bikes starting in 2025. CO2-e reductions are then summed for the first (2025-2030) and second performance period (2025-2050) of the EPA grant.

Electric Vehicle Charger Installation and Workforce Development Program

This portion of the analysis considers the impact of installing 75 electric vehicle chargers that support the charging of 6,713 electric vehicles. The impact of these chargers was estimated using the EPA AVERT web tool. The analysis assumes the chargers are used by light-duty battery electric vehicles in the Mid-Atlantic region. The tool compares the emission output of these vehicles compared to new combustion engine vehicles to estimate the annual averted tons of CO2 emissions. This emission reduction is then spread over the lifespan of the electric vehicle chargers, which is estimated to be ten years. This analysis assumes these chargers will gradually come online then be decommissioned during five-year ramp up and ramp down periods. CO reductions, reported in metric tons, are then summed for the first (2025-2030) and second performance period (2025-2050) of the EPA grant.

Freight-Commuter Rail Separation

This portion of the analysis calculates the net CO2-e emission reductions generated by a freight realignment project, which will increase regional rail service frequency, support more freight train movements, and decrease freight rail delays.

Freight-Commuter Rail Separation: Regional Rail Improvements

This analysis calculates the impact of increased regional rail frequency and ridership on CO2-e emissions. Emission reduction categories include mode shift, congestion relief, and land use effects. These reductions are considered against increased electricity demands of more frequent service to develop a net CO2-e emission reduction.

This model uses ridership projections from the affected SEPTA regional rail lines – the Manayunk-Norristown and Airport lines, which this freight realignment project will enable to become a single high-frequency line, Silver Line 1 (S1). Ridership projections used in this analysis were developed by the Delaware Valley Regional Planning Commission (DVRPC) using its four-step travel demand model. The

DVRPC model uses 2019 ridership on the Manayunk-Norristown and Airport lines as a baseline to project ridership in 2045 for both no-build and preferred scenarios.[4] In the preferred scenario Silver Line 1, and the associated frequency increases, are implemented. In the no-build scenario the Silver Line 1 combination and frequency increases are not implemented. Both 2019 ridership and 2045 projections are reported as weekday ridership by station.

To calculate the ridership difference between the preferred and no build scenarios, this analysis performed the following steps:

1. Group stations into two categories: stations that serve only one line and stations serving multiple lines. Ridership at stations serving multiple lines reported in DVRPC baselines and projections includes boardings for all the lines serving the station.
    - For 2019 Count, ridership at one-line stations and line-level ridership from SEPTA Route Statistics 2019 report were used to calculate by-line ridership at both station types. This provided a ridership count for multi-line stations that did not include ridership from other lines.
    - For 2019 Assignment and both 2045 projections, ridership was summed by station type.
2. Convert weekday ridership to annual ridership using factors provided by SEPTA
3. Calculate the ridership increment between 2045 projection scenarios and 2019 Assignment for both one-line and multi-line stations on the Manayunk-Norristown and Airport Lines.
4. Apply these increments to 2019 Count annual ridership to calculate the projected ridership for each scenario, line, and station type.
5. Estimate ridership for the years between 2019 and 2050 using projected ridership divided by 2019 count ridership to calculate the Compound Annual Growth Rates (CAGR) for both lines and station types.
    - No-Build Scenario Assumptions
        - 2019-2045 – Applies the CAGRs calculated using no-build projected ridership divided by 2019 count ridership (0.03% to 1.4%)
        - 2046-2050 – Assumes growth continues at the same rate as previous years. Uses the same CAGRs as 2019-2045. (0.03% to 1.4%)
    - Preferred Scenario Assumptions
        - 2019-2035 – Applies the same CAGRs as the no-build scenario prior to the proposed investment impacting service. (0.03% to 1.4%)
        - 2036-2045 – Increased frequency (20-minute headways) is expected to be implemented in this scenario. Calculates and applies a CAGR for the growth between 2036 no-build ridership and preferred scenario 2045 projected ridership. (6.6% to 14.6%)
        - 2046 – Increased frequency (15-minute headways) is expected to be implemented in this scenario. Calculates a CAGR using this increased frequency

[4] This analysis includes “2019 Count” and a “2019 Assignment.” “2019 Count” are the ridership numbers as recorded by SEPTA. “2019 Assignment” are the ridership numbers the DVRPC model used as its baseline.

and a ridership elasticity related to service hour increase from the Victoria Transportation Policy Institute. (10.0%)
- 2047-2050 – Following the increase in 2046 due to 15-minute headways, ridership is assumed to return to the annual growth rates seen in the no-build scenario for the remaining years of the analysis. (0.03% to 1.4%)

6. Subtract the no-build scenario ridership from the preferred scenario ridership for each year, line, and station type. Then sum to find the total ridership difference by year for the two lines.

The above analysis outputs the number of new passenger trips attributable to the project investment. Passenger trip counts are used to develop other metrics including passenger miles, vehicle mile traveled (VMT) equivalents, and reduced car VMT (from a mode shift assumption). Reduced car VMT is used with greenhouse gas emission factors to calculate avoided CO2-e emissions (reported in pounds and metric tons) from mode shift,[5] congestion relief,[6] and land use effect.[7] These are calculated for each year from the investment implementation, 2036, until 2050.

Half of these total emissions are then allocated to this project and the other half are allocated to Silverliner VI procurement project, as both track capacity improvements and replacement of the aging rolling stock are necessary conditions to achieve and maintain the service scheduled envisioned by the Reimaging Regional Rail plan. These results are discussed in the next section. This is then shared down to account for only the proportion of the total project cost funded by this grant – $90 million out of $386 million, or 23 percent.

This project is expected to reduce the gallons of gasoline used by 3.4 million due to mode shift and 252,134 gallons due to congestion. The emission reduction due to the land use effect was calculated based on the difference in build versus no build regional rail passenger miles, 159.9 million[8] from 2036 to 2050.

Running regional rail service at increased frequency requires more electricity, which must also be calculated to understand net impact of the Silver Line 1 service changes. To do so, this analysis

[5] The factors for calculating CO2-e pounds from annual auto vehicle miles traveled reduction are calculated using a large metro area mode shift factor from Transit Performance Monitoring System (TPMS) and adjusted for global warming potential using the IPCC Second Assessment Report (SAR) 1995. The factor for CO2 is 19.423; for CH4 is 0.00068; for N2O is 0.00540.

[6] The CO2 emission calculation for congestion relief uses new unliked passenger trips with a factor from TTI -Urban Mobility Report abstract (0.036) on wasted fuel increase if transit is discontinued in a large urban area. The result is further adjusted using a large metro area mode shift factor from TPMS (0.470) and the congestion reduction factor for an average vehicle occupancy of 1.25 from TTI (0.800). This result is then multiplied by a coefficient (19.423) based on the emission displacement of reduced congestion in kilograms per gallon from the Climate Registry, Chapter 13, Page 93 - Tier B/C Method - "Motor Gasoline."

[7] The calculation of the number of pounds of CO2-e emissions reduced due to land use effect divides passenger miles by the product of two factors: the average vehicle occupancy from the National Household Travel Survey (1.390) and the land use multiplier from ICF (1.900). This is then multiplied by kilogram emissions per vehicle miles (0.436) and converted to pounds.

[8] Numbers in this paragraph includes only those attributable to the proportion of the project supported by this grant request.

developed estimates of annual service miles in the for 2019 levels of service, 20-minute service and 15-minute service, using route lengths and frequencies. The Federal Transit Administration produces an annual report with an estimate of the efficiency rate, or miles per kilowatt hour, for SEPTA regional rail service. The five-year average of this efficiency rate and added service mileage were used to develop an estimate of increased electricity use. Using factors from EPA and DVRPC,[9] this was converted to metric tons of CO2-e emissions by year.[10]

Freight-Commuter Rail Separation: Freight Rail Efficiency

In addition to supporting improved regional rail service frequency, the freight-commuter rail separation is expected to allow for additional freight rail movements and reduced freight rail delays. These improvements will reduce CO2-e emissions from tractor-trailer trips and idling freight trains. These benefits are considered against the increased freight rail emissions of running additional freight trains.

Freight realignment would allow an estimated 12 additional freight rail movements each day. These freight trains are estimated to haul the equivalent of 300 trucks, and the analysis assumes average haul distance per truck to be 100 miles, roughly the distance to nearby hubs like Newark, NJ or Baltimore, MD. Assuming a 300-day operation year, this would reduce annual truck miles by 108 million. Using a conversion factor,[11] annual truck miles were converted into metric tons of CO2-e. This was then shared down by the proportion of the project funded by the grant request, 23 percent. Benefits would accrue from the first year after construction is complete (2036) to the end of the analysis horizon (2050).

Running these additional trains also requires fuel, offsetting some benefits from reduced truck miles. The gallons of diesel used annually by the 12 new trains was calculated using the average number of tons hauled by a freight train, the fuel efficiency per ton per mile of a freight train, an average trip distance of 100 miles, and a 300-day operating year. Using a conversion factor,[12] annual gallons of diesel

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[9] The coefficients for calculating pound per kilowatt hour for propulsion/on-site electricity are from the Environmental Protection Agency, eGRID2018 version 1.1, year 2020 - Region: RFC East and adjusted for global warming potential using the IPCC Second Assessment Report (SAR) 1995. The pound of CO2-e per kilowatt hour conversion factor used for CO2 is 0.716; for CH4 is 0.00128; for N2O is 0.00248.

[10] The coefficients for calculating pound per kilowatt hour for propulsion/on-site electricity are from the Environmental Protection Agency, eGRID2018 version 1.1, year 2020 - Region: RFC East and adjusted for global warming potential using the IPCC Second Assessment Report (SAR) 1995. The pound of CO2-e per kilowatt hour conversion factor used for CO2 is 0.716; for CH4 is 0.00128; for N2O is 0.00248.

[11] A factor of 367 from "Environmental Life-cycle Assessment of Passenger Transportation: A Detailed Methodology for Energy, Greenhouse Gas and Criteria Pollutant Inventories of Automobiles, Buses, Light Rail, Heavy Rail and Air v.2." (2008) from University of California Berkley and a conversion from grams to metric tons was used to convert vehicle miles traveled to metric tons of CO2 emissions. CH4 was determined using a factor of 0.580 grams per gallon from the climate registry for large utility diesel fuel adjusted by the global warming potential and units. N20 was calculated using a factor of 0.260 grams per gallon from the same source and adjusted by the global warming potential and units.

[12] A factor of 10,217 from Environmental Protection Agency, Technical Highlights: Emissions Factors for Locomotives (2009) and a conversion from grams to metric tons was used to convert the total annual gallons of diesel used to metric tons of CO2 emissions. CH4 was determined using a factor of 0.580 grams per gallon from the climate registry for large utility diesel fuel adjusted by the global warming potential and units. N20 was calculated using a factor of 0.260 grams per gallon from the same source and adjusted by the global warming potential and units.

fuel used was converted into metric tons of CO2-e. This was then shared down by the proportion of the project funded by the grant request, 23 percent. These increased emissions accrue from the first year after construction is complete (2036) to the end of the analysis horizon (2050).

Additionally, this project would reduce the frequency of freight delays by an estimated six per day. Freight trains require about 25 gallons of fuel per locomotive to accelerate from rest. This analysis assumes three locomotives per train. The annual gallons of diesel fuel cumulatively used, assuming a 300-day operating year, is 129,375. Using conversion factors,[13] annual gallons of diesel fuel used was converted into metric tons of CO2-e. This was then shared down by the proportion of the project funded by the grant request, 23 percent. Benefits would accrue from the first year after construction is complete (2036) to the end of the analysis horizon (2050).

Freight-Commuter Rail Separation: Overall Impact

To calculate the net greenhouse gas emission reduction for the freight realignment project, the following were summed for each year of the analysis:

- Regional Rail Improvements: This includes the CO2-e emission reduction of the mode shift, congestion relief and land use effects minus the increased energy of operating additional regional rail service.
- Freight Mode Shift Credit: This includes the CO2-e emission reduction of shifting freight transport from truck to train.
- Freight Mode Shift Debit: This includes the increased CO2-e emissions from running additional freight trains. It is reported as a negative CO2-e emissions.
- Freight Operations Credit: This includes the CO2-e emission reduction of decreasing the number of freight train delays.

The total impact of the freight realignment project was then calculated for the first (2025-2030) and second performance period (2025-2050) of the EPA grant.

Silverliner VI Procurement

The procurement of new Silverliner VI vehicles for SEPTA's regional rail service reduces greenhouse gas emissions in two ways. The first is by increasing vehicle energy efficiency, with new vehicles using less energy per mile than the aging rolling stock they will replace. The second is through increasing ridership by facilitating the making service changes related to the Reimagining Regional Rail plan, including the Silver Line 1, possible through enhanced vehicle reliability.

[13] A factor of 10,217 from Environmental Protection Agency, Technical Highlights: Emissions Factors for Locomotives (2009) and a conversion from grams to metric tons was used to convert the total annual gallons of diesel used to metric tons of CO2 emissions. CH4 was determined using a factor of 0.580 grams per gallon from the climate registry for large utility diesel fuel adjusted by the global warming potential and units. N20 was calculated using a factor of 0.260 grams per gallon from the same source and adjusted by the global warming potential and units.

Silverliner VI Procurement: Vehicle Efficiency

This portion of the analysis considers the CO2-e emission reductions from procurement of 6 percent of the 230 of Silverliner VI vehicles required in SEPTA's regional rail operation. This proportion is a calculation to understand the EPA CPRG grant impact on the car procurement, based on the proportion of EPA CPRG grant money requested, ($80 million) to the total estimated project cost needed to replace all vehicles of $1.3 billion. The full procurement would replace all 230 aging Silverliner IV vehicles. Reductions calculated in this section are driven by the increased efficiency of Silverliner VI vehicles compared to the current fleet.

This analysis models the annual CO2-e impact of the purchase of the full order of Silverliner VI cars (230) on the entire regional rail network from 2019 to 2050. The impact of this procurement is then shared down by the cost of the grant request compared to the total procurement cost.

To determine the impact on CO2-e of the Silverliner VI procurement, this analysis compares a no-build scenario (maintain the current stock with no Silverliner VI and similar energy efficiency) to a build scenario (the more efficient and more modern 230 Silverliner VI cars are purchased to replace the current stock). To isolate the impact of the new vehicles, the number of system service miles and the number of peak vehicles is held constant between scenarios. The build scenario assumes a gradual roll out of Silverliner VI vehicles from 2029 to 2034 with all vehicles in service through 2050. As other vehicle types, such as Silverliner V, will remain in service even after the full roll out of the Silverliner VI, this analysis calculates the proportion of the peak fleet that could be made up of Silverliner VI vehicles in each year. Assuming each vehicle takes on the same milage every year, the proportion of the vehicle miles covered by Silverliner VI versus other vehicle types that do not have changes in efficiency can be estimated based in the proportion of peak fleet that could be made up of Silverliner VI.

The efficiency of the Silverliner VI is compared to a baseline efficiency rate:

- **No-Build:** The Federal Transit Administration produces an annual report with an estimate of the efficiency rate, or miles per kilowatt hour, of SEPTA regional rail service. The no-build scenario uses the five-year average, 2018 to 2022, of this report to develop a baseline efficiency.
- **Build:** Silverliner VI vehicles are designed to be more efficient than current regional rail vehicles. SEPTA estimates that regenerative braking, recapturing energy created by braking vehicles, will reduce the overall amount of energy consumed by 20 percent, possibly more. Additionally, Silverliner VI vehicles will use AC traction motors instead of the Silverliner IV's DC traction motors. Silverliner V vehicles also use AC traction motors, which offers a basis for comparison between DC and AC traction motors used on SEPTA's system. To estimate the efficiency rate of Silverline VI vehicles, this analysis modifies the efficiency rate of the no-build scenario by applying reductions from regenerative braking (20 percent) and the same power factor difference as Silverliner IV versus Silverliner V vehicles.

  This analysis did not model other Silverliner VI design features that may reduce emissions such as a lower top speed, decreased vehicle weight, and reduced auxiliary power requirements. Information about the impact of these features was more limited and so was not modelled. As such, emission reductions in this section should be taken as a conservative estimate of the overall reductions from new passenger rail vehicles.

Using service miles, the Silverline VI proportion of peak service vehicles, and the efficiency rate, this analysis calculates the difference between the kilowatt hour usage of the build and the no-build scenario. As only $80 million of the $1.3 billion funding effort cars is be attributed to this grant, the difference is then shared down by the proportion of the grant request cost to the full procurement. The procurement covered by the EPA grant is estimated to reduce the number of kilowatts hours used by 78.9 million through 2050.

Using factors developed by the EPA and Delaware Valley Regional Planning Commission (DVRPC), the difference between the scenarios is converted to Metric Ton of CO2-e savings per year. This investment is expected to reduce emissions from 2029 through the end of the grant period (2050) and likely beyond.

Silverliner VI Procurement: Regional Rail Improvements

Procuring Silverliner VI cars will replace an aging fleet with new reliable vehicles. This upgrade of the stock is necessary to implement and maintain the service and frequency improvements of the Reimagining Regional Rail plan and associated ridership increase over time. Greenhouse gas reductions considered in this section originate from mode shift, congestion, and land use effect.

The previous section, "Freight-Commuter Rail Separation: Regional Rail Improvements," details the assumptions and ridership projections for increased service on the Airport and Manayunk-Norristown lines, as well as the developed of greenhouse gas reduction estimates based on mode shift, congestion, land use effect. This analysis uses the greenhouse gas reductions from the total ridership and passenger mile shift as a starting point. These emissions are divided in two, with half attributed to the Freight-Commuter Rail Separation reductions and half attributed considered in the Silverliner VI procurement reductions to avoid any double counting of benefits.

Since service improvements are considered for the Airport and Manayunk-Norristown Lines only in this analysis, proportional impacts from the procurement and use of new vehicles through funding requested in this grant are considered as if they were assigned only to these lines. In 2019, these two lines made up 11 percent of service miles. The request is for $80 million of the $1.3 billion funding for the car procurement, or 6 percent. The percentage of funding is divided by the percent of service miles covered by this line to estimate the portion of emission reductions generated by this new ridership attributable to the requested grant funding for the vehicle procurement, or 56 percent.

The impact of this procurement from both vehicle efficiency and regional rail improvements was then summed by year and calculated for the first (2025-2030) and second performance period (2025-2050) of the EPA grant.