

RGRTA Climate Pollution Reduction Grants – Implementation Grant Proposal

1. OVERALL PROJECT SUMMARY AND APPROACH

a. Description of GHG Reduction Measures

RGRTA is requesting funding for a project consisting of three major elements:

- The construction of an addition of a Zero-Emission Bus Storage Facility to the existing Operations Building to support the storage and maintenance of zero-emission buses including hydrogen fuel cell electric and battery electric buses along with a solar array installed on the roof.
- The construction of a solar powered microgrid with an electrolyzer and stationary fuel cell to support peak load shaving and to provide zero-emission backup power to the operations building and future hydrogen fueling station.
- The purchase of up to 27 hydrogen fuel cell electric buses.

Zero-Emission Bus Storage Facility

RGRTA's fixed route service is housed at 1372 East Main Street, a facility that was constructed in the 1970's. Since that time, the buses used have gone through significant changes resulting in the existing garage lanes being poorly sized for current bus standards. Coupled with the increase in the required fleet size due to increased customer demand, RGRTA currently has room to house only 120 buses indoors, or roughly 60% of the fleet. Additionally, these facilities are not designed to accommodate bus charging at scale or to accommodate the indoor storage and maintenance of hydrogen fuel cell vehicles given current building code requirements.

The Authority is in the process of transitioning the fixed route fleet to be 100% zero emission by 2040 in order to meet NYS Executive Order 22. The first step towards meeting that goal was the introduction of twenty battery-electric buses into the fleet in 2020. Battery-electric buses currently only have a range of 160 miles in optimal operating conditions, dropping to as few as 80 or less during the coldest winter days often experienced in upstate NY due the amount of energy needed to keep the customer compartment heated to a tolerable temperature. Additionally, the battery-electric buses require approximately 4 hours to fully recharge, making it nearly impossible to redeploy a bus midday.

Due to those challenges, RGRTA is pivoting to the incorporation of hydrogen fuel cell electric buses. These buses have operational characteristics much closer to that of a standard diesel-powered bus. They have an estimated range of 300 miles without as significant effect from the cold winter weather. A fuel cell enables a chemical reaction combining on-board hydrogen with oxygen from the atmosphere with electricity, heat and water being the only by-products. The electricity powers the bus, the waste heat is captured to help heat the bus and the water is discharged. Additionally, the refueling of a hydrogen fuel cell electric bus can be accomplished in around 8 – 10 minutes as opposed to 4 hours for a battery electric bus. RGRTA will have two fuel cell electric buses delivered in April 2024 and is in the process of installing a portable liquid hydrogen fueling station. The fueller should be commissioned in May 2024 and the buses should be in revenue service in June 2024.

The construction of the Zero-Emission Bus Storage Facility will allow RGRTA to fully house its zero-emission fleet indoors. The space will be partially conditioned, being important for zero-emission buses in that it reduces the amount of onboard energy needed to bring a bus up to a comfortable traveling temperature. Additionally, internal storage of the buses decreases the damage done by the elements, thus assisting in maintaining the vehicles in a better state of good repair. Additionally, the roof of the bus storage facility will provide a 50,000 ft² footprint for a solar array to partially power an integrated microgrid.

RGRTA has recently undertaken a number of facility projects. As such, the Authority is aware of the challenges associated with this type of project. The project will include the acquisition of up to 23 private residents through the eminent domain process. In order to mitigate any risks associated with this element of the project, RGRTA has begun conversations with the City of Rochester as well as the Beachwood Neighborhood Association. To date, RGRTA has not

heard any major concerns with the project. Another challenge is the continuing supply chain issues, particularly associated with electrical elements of construction projects. The Authority is in the process of increasing the electrical supply for the campus to support the portable liquid hydrogen fueling station. This work is designed to be future proof and will be able to power a larger permanent liquid hydrogen fueling station to support the entire fleet in the long-term.

RGRTA has completed the preliminary design (30%) of the Zero-Emission Bus Storage Facility and is in the process of performing a NEPA review. The funding being requested will allow for the land acquisition, final design and construction of the addition.

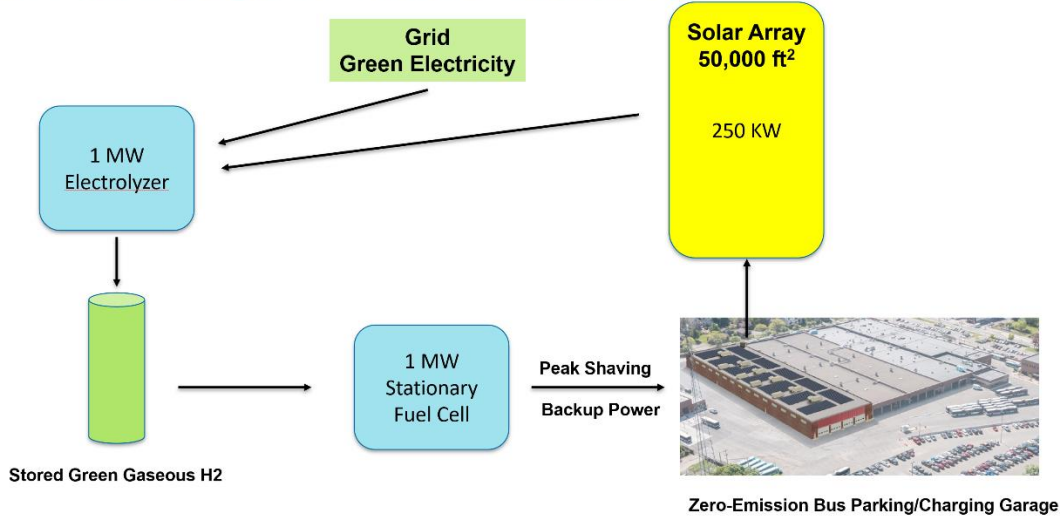


Solar-Powered Microgrid

The next component of this grant request is funding to incorporate a solar-powered electrolyzer and fuel cell microgrid to the Zero-Emission Bus Storage Facility. The microgrid will consist of a solar array on the roof of the new facility that will power an electrolyzer to produce green hydrogen, gaseous hydrogen storage, and a stationary hydrogen fuel cell. The electricity generated by the fuel cell will help lower our peak load during peak demand times to significantly reduce our demand charges and lower the strain on the electrical grid. In addition to lowering the energy costs for the authority by over \$200,000/year, the microgrid will provide 100% zero emission electricity to the Operations Building in support of heating, lighting and even the charging of battery electric buses.

The utilization of electrolyzers and stationary fuel cells as part of a microgrid is accelerating. There are always risks with early adopters to new technology and this project is no different. In order to mitigate any such risks, RGRTA has had a number of conversations with subject matter experts as well as a few other select agencies that have already or are currently incorporating this technology into their facilities.

RTS Microgrid Basic Concept



Hydrogen Fuel Cell Electric Buses

The final element of this proposal is to fund the incremental cost of purchasing up to 27 hydrogen fuel cell electric buses as called out in our 2040 fleet replacement plan. These buses will be replacing the oldest diesel-powered buses eligible for retirement starting in 2027, the worst emitting buses in the fleet. The new buses will result in a significant reduction of greenhouse gas reductions. Additionally, RGRTA is committed to utilizing “green” hydrogen fuel, fuel created from solar, hydro or wind powered green electricity. This will result in the reduction and ultimately the elimination of any greenhouse gases not only at the point of use but also from the supply-chain as well. RTS is installing a portable liquid hydrogen fueling system and will be putting 2 hydrogen fuel cell electric buses in service in June 2024 and has 3 additional buses on order.

Transportation is regularly identified as one of the largest contributors to greenhouse gas emissions. These two elements of RGRTA's request will allow for further expansion of the zero-emission bus fleet, thus eliminating all greenhouse gas emissions from fixed route public transit service in Rochester, NY. Additionally, the indoor storage will result in increased efficiency of operation of said buses, resulting in lower overall energy consumption to provide the service.

RTS is the zero-emission transit leader in New York State. With 20 battery-electric buses in service since 2020 and 2 hydrogen fuel cell buses entering service in June 2024, the first fuel cell buses in the state, RTS has the largest percentage of zero-emission buses in their fleet. These projects will provide Rochester the means to demonstrate to other public and private fleets how to successfully transition a fleet to 100% zero-emission.

In Service	Year	Bus Series	# of Buses	Fuel Type	Planned Retirement Month/Year	Plan 2025	Plan 2026	Plan 2027	Plan 2028	Plan 2029	Plan 2030	Plan 2031	Plan 2032	Plan 2033	Plan 2034	Plan 2035	Plan 2036	Plan 2037	Plan 2038	Plan 2039	Plan 2040
1	2011	90S Series (Golf)	21	D	Aug-2013																
2	2012	1290 Series (New Flyer)	5	D	Feb-2024																
4	2013	1300 Series/370 Series (New Flyer)	33	D	Jun-2025	7															
5	2013	370 Series	20	D	Jul-2025	10															
6	2014	1400 Series (New Flyer)	19	D	Mar-2026	19	10														
7	2016	1800 Series (New Flyer)	21	D	Aug-2028	21	21	21													
8	2016	1800 Series (New Flyer)	15	D	May-2028	15	15	15	15												
9	2019	1900 Series (New Flyer)	10	D	Dec-2031	10	10	10	10	10	10										
10	2020	2000 Series (New Flyer)	10	E	Sep-2032	10	10	10	10	10	10	10	10								
11	2022	2200 Series (New Flyer)	10	E	Jun-2035	10	10	10	10	10	10	10	10	10							
12	2023	2200 Series (New Flyer)	27	D	Mar-2035	27	27	27	27	27	27	27	27	27	27						
13	2023	2100 Series (New Flyer)	9	D	Aug-2035	9	9	9	9	9	9	9	9	9	9	9					
14	2024	2100 Series (New Flyer)	2	H	Aug-2036	2	2	2	2	2	2	2	2	2	2	2	2				
15	2025	2000 Series (New Flyer)	1	H	2033	1	1	1	1	1	1	1	1	1	1	1	1	1			
16	2025	2510 Series (RHD ZIA)	10	H	2033	10	10	10	10	10	10	10	10	10	10	10	10	10			
17	2025	2520 Series (RHD ZIA)	18	D	2033	18	18	18	18	18	18	18	18	18	18	18	18	18	18		
18	2026	2500 Active Series (RHD ZIA)	20	D	2038	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
19	2026	2600 Series (RHD ZIA)	29	D	2038	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	
20	2027	2700 Series (RHD ZIA)	10	D	2038	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
21	2028	2800 Series (RHD ZIA)	10	D	2038	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
22	2028	2900 Series (RHD ZIA)	10	D	2038	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
23	2029	3000 Series (RHD ZIA)	10	H	2037	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
24	2031	3100 Series (RHD ZIA)	10	H	2034	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
25	2032	3200 Series (RHD ZIA)	10	H	2034	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
26	2034	3400 Series (RHD ZIA)	10	H	2036	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
27	2035	3400 Series Active (RHD ZIA)	9	H	2037	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	
28	2034	3300 Series (RHD ZIA)	63	H	2036	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	
29	2036	3600 Series (RHD ZIA)	10	H	2038	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
30	2036	3600 Series (RHD ZIA)	10	H	2038	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
31	2036	3600 Series (RHD ZIA)	10	H	2038	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
32	2040	4000 Series (RHD ZIA)	21	H	2032	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	
YEAR						2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
# of diesel buses						248	259	259	159	139	123	113	113	113	86	77	77	59	50	0	0
# of CNG buses						25	20	20	20	20	20	20	20	20	0	0	0	0	0	0	0
# of ECHRs						15	15	15	96	96	57	63	73	308	127	117	117	393	164	194	154
1 year emission						1796	1886	1884	2296	2296	576	476	476	476	476	566	626	626	876	1006	1026
Plan and Peak						181	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194
Peak						194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194
Spans Ratio						206	206	204	206	206	206	206	206	206	206	206	206	206	206	206	206
Total Hours Needed vs 20% spare ratio						181	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194

b. Demonstration of Funding Need

NYS enacted Executive Order 22 that requires RGRTA to achieve a 100% zero emission fleet by 2040. RGRTA currently has a fleet of 196 40-ft and 20 60-ft transit buses that are operated for a minimum of twelve years. This would require RGRTA to purchase only zero-emission buses after 2028 in order for them to be out of service by the 2040 deadline. Despite enacting this requirement, NYS has not provided the funding needed to accomplish this transition with no awards specific for this purpose made available to date.

The incremental cost for a hydrogen fuel cell bus over the cost of a comparable diesel bus is approximately \$725,000 per bus. That means in today's dollars RGRTA would need an additional \$139M just for the incremental cost to move to hydrogen fuel cell electric buses. The funding shortfall becomes even worse when inflation is factored in. Additionally, RGRTA operates 198 smaller buses for its on demand, complimentary paratransit and rural route deviation services. There currently is no commercially available zero-emission bus that meets our operational needs so it is more challenging to identify the costs for converting those fleets to a zero-emission solution but if we use similar percentage increases to those of the heavy duty buses the unfunded costs would be around \$20M.

Purchasing the buses is only a piece of what is needed to support this transition, with infrastructure nearly matching the required investment. RGRTA currently estimates that an additional \$140M in infrastructure investments needed to be made in order to support the transition. All of these costs are above and beyond those needed to continue to operate status quo without transitioning to zero-emission.

The majority of RGRTA funding to progress capital projects come from annual apportionments of Federal and NYS funding. After programming funding for routine vehicle replacement there is little funding left to do much else. Currently, the Authority has a number of current needs without sufficient funding to progress including a new operations facility for paratransit service, construction of a maintenance warehouse, replacement of aged IT systems and continued investment in the existing infrastructure needed to support public transit.

In order to supplement this funding, RGRTA routinely seeks discretionary grants to support both zero-emission and other non-routine projects. In the past several years RGRTA has requested funding under the FTA's Bus & Bus Facilities Grant Program, FTA's Low or No Emission Grant Program, various programs under the New York State Energy Research and Development Authority (NYSERDA), USDOT's Rebuilding American Infrastructure with Sustainability Equity (RAISE) program, Congressionally Directed Spending Program, FHWA Congestion Mitigation and Air Quality Improvement (CMAQ), among others. No funding has been secured to date for the GHG reduction measures being requested under this proposal.

c. Transformative Impact

The implementation of these projects removes long-term zero-emission transition obstacles. Indoor housing of zero-emission buses in Western New York is necessary given the cold-weather climate. Incremental funding for fuel cell electric allows the fleet replacement capital plan to progress towards zero-emissions without additional funding from traditional capital sources. The microgrid provides a zero-emission energy source that reduces energy operating costs and reduces RTS's burden on the grid. RTS strives to be a climate solutions leader that can be leveraged as a resource by other agencies.

2. IMPACT OF GHG REDUCTION MEASURES

a. Magnitude of GHG Reductions from 2025 through 2030

GHG reductions from 2025 through 2030 would be based on the 27 fuel cell electric buses replacing 27 diesel buses. 21 buses would enter service in 2028 and 6 additional buses would enter service in 2029. Assuming the buses average 48,000 miles traveled annually the total GHG reduction would be 7,034 MTCO₂eq.

Additionally, there would be GHG reductions resulting from the microgrid by displacing some non-green electricity from the grid with green electricity from the microgrid. The actual GHG reduction is difficult to

calculate but using Emissions per kWh of .000699 MTCO₂eq and assuming that the grid in Rochester, NY is 50% non-green the expected GHG reduction through 2030 would be 478 MTCO₂eq.

b. Magnitude of GHG Reductions from 2025 through 2050

GHG reductions from 2025 – 2050 would be based on the Zero-Emission Bus Storage Facility being constructed allowing for a full fleet transition to zero-emission. A 100% zero-emission would be realized in 2039 in the current fleet plan resulting in a staggering total GHG reduction through 2050 of 9,136,278,720 MTCO₂eq.

Using the same assumptions with the microgrid, the expected GHG reduction with the microgrid would be 3,668 MTCO₂eq.

c. Cost Effectiveness of GHG Reductions

The current budget estimate for the Zero-Emission Bus Storage Facility is \$50,010,349 and the budget estimate for the incremental cost for 27 fuel cell electric buses is \$29,600,000. The cost per MTCO₂eq reduction through 2030 is \$29,600,000/7,034 MTCO₂eq resulting in \$4,028 per MTCO₂eq reduced. Looking at the total investment through 2050, the cost per MTCO₂eq reduction would be \$79,610,349/9,136,278,720 MTCO₂eq resulting in \$0.008714 per MTCO₂eq reduced – less than a penny per MT.

The current cost estimate for the microgrid is \$19.8M Looking at the total microgrid investment through 2050 the cost per MTCO₂eq reduction would be \$19,800,000/3,668 MTCO₂eq resulting in \$5,398 per MTCO₂eq reduced. It should be pointed out that there are other positive outcomes with the microgrid other than a direct GHG reduction.

d. Documentation of GHG Reduction Assumptions

Emissions per mile per year	0.001954		2028	2029	2030
Average miles per year: 2028 - 2030	48000	FCEB's In Service	21.0	27.0	27.0
MTCO ₂ eq per vehicle per year	93.792	Total MTCO ₂ eq Reduction	1,970	2,532	2,532
		Total Reduction Through 2030	7,034		

Emissions per mile per year	0.001954
Average miles per year: 2028 - 2050	30000
MTCO ₂ eq per vehicle per year	2813760

	2028	2029	2030	2031	2032	2033
FCEB's In Service	21	27	27	61	71	71
Total MTCO ₂ eq Reduction	59,088,960	75,971,520	75,971,520	171,639,360	199,776,960	199,776,960
Total Reduction Through 2050	9,136,278,720					

2034	2035	2036	2037	2038	2039	2040	2041
108	117	117	135	164	194	194	194
303,886,080	329,209,920	329,209,920	379,857,600	461,456,640	545,869,440	545,869,440	545,869,440
2042	2043	2044	2045	2046	2047		
194	194	194	194	194	194		
545,869,440	545,869,440	545,869,440	545,869,440	545,869,440	545,869,440		
2048	2049	2050					
194	194	194					
545,869,440	545,869,440	545,869,440					

Emissions per kWh (MTCO ₂ eq)	0.000699		2028	2029	2030	2031	2032	2033
Assume grid is 50% non-green	0.00035	MTCO ₂ eq per day	0.436875	0.436875	0.436875	0.436875	0.436875	0.436875
kWh/day (250 kW * 5 hrs)	1250	Total MTCO ₂ eq Reduction	159	159	159	159	159	159
MTCO ₂ eq per day	0.436875	Total Reduction Through 2050	3,668					

2034	2035	2036	2037	2038	2039	2040	2041	2042
0.436875	0.436875	0.436875	0.436875	0.436875	0.436875	0.436875	0.436875	0.436875
159	159	159	159	159	159	159	159	159

2043	2044	2045	2046	2047	2048	2049	2050
0.436875	0.436875	0.436875	0.436875	0.436875	0.436875	0.436875	0.436875
159	159	159	159	159	159	159	159

3. ENVIRONMENTAL RESULTS – OUTPUTS, OUTCOMES, AND PERFORMANCE MEASURES

a. Expected Outputs and Outcomes

Significant GHG reductions are realized as the fleet transitions to zero-emission resulting in a much better environment for the City of Rochester.

b. Performance Measures and Plan

GHG reductions from the vehicles will be measured annually against expected targets based on vehicle miles traveled for all zero-emission buses including our existing 20 battery-electric and fuel cell electric buses and the 27 fuel cell electric buses partially funded with this grant. GHG reductions from the grid will be measured by the energy consumed from the grid's stationary fuel cell.

c. Authorities, Implementation Timeline, and Milestones

All work associated with the construction projects will be bid out so there currently are no specifically identified contractors. RGRTA currently has a 50-option contract with New Flyer for fuel cell electric buses that expires in January 2028 that will be utilized to purchase the 27 fuel cell electric buses.

General timeline and milestones:

ZEB Storage Facility final design contract awarded:	Q1 2025
Microgrid design contract awarded:	Q2 2025
ZEB Storage Facility final design complete:	Q4 2025
Property acquisition for expansion complete:	Q4 2025
Microgrid design complete:	Q1 2026
ZEB Storage Facility construction contract awarded:	Q1 2026
21 Hydrogen Fuel cell Buses Ordered	Q1 2026
21 Hydrogen Fuel cell Buses Delivered	Q1 2027
6 Hydrogen Fuel cell Buses Ordered	Q1 2027
ZEB Storage Facility construction complete:	Q2 2027
Microgrid construction contract awarded:	Q2 2027
Microgrid construction complete:	Q1 2028
6 Hydrogen Fuel cell Buses Delivered	Q2 2028

4. LOW-INCOME AND DISADVANTAGED COMMUNITIES

a. Community Benefits

The progression of the projects in this proposal will have significant impacts for the community directly surrounding RGRTA's 1372 East Main Street Campus as well as the overarching fixed-route service area that the hydrogen fuel cell powered electric buses will be deployed in. The construction of a Garage D will allow RGRTA to continue its transition to a 100% zero emission fixed-route fleet. This transition results in diesel buses being phased out, not only eliminating any GHG emissions while on route but also eliminates any idling at the existing campus in order to bring vehicles up to

tolerable operating temperatures. Additionally, the inclusion of the hydrogen fuel cell microgrid will increase RGRTA's utilization of green energy, thus reducing potential upstream emissions.

Much of RGRTA fixed-route service is provided for low-income communities. Of the trips provided, 89% originate in areas with above average levels of poverty. Additionally, 84% trips begin in areas of persistent poverty. Finally, 44% of trips begin in census tracts with above average levels of unemployment. The funding requested in this proposal will not only allow RGRTA to continue to service these communities, but additionally increase efficiency and reduce emissions for providing the service.

RGRTA's service area covers the following CEJST census tracts:

36055001000, 36055010300, 36055010400, 36055010500, 36055010601, 36055010602, 36055010901, 36055010902, 36055011000, 36055011100, 36055011503, 36055011507, 36055011601, 36055011603, 36055011604, 36055011605, 36055011705, 36055011707, 36055011708, 36055011711, 36055011712, 36055011800, 36055011901, 36055011904, 36055012000, 36055012100, 36055012201, 36055012202, 36055012301, 36055012500, 36055012600, 36055012700, 36055012800, 36055012900, 36055001300, 36055013003, 36055013004, 36055013005, 36055013006, 36055013101, 36055013103, 36055013104, 36055013507, 36055013508, 36055013601, 36055013603, 36055013604, 36055013702, 36055013800, 36055013901, 36055014001, 36055014003, 36055014004, 36055014102, 36055014103, 36055014104, 36055014202, 36055014204, 36055014205, 36055014301, 36055014302, 36055014400, 36055014501, 36055014503, 36055014504, 36055014601, 36055014602, 36055014802, 36055014805, 36055015101, 36055015102, 36055015200, 36055001600, 36055001800, 36055001900, 36055000200, 36055002000, 36055002100, 36055002200, 36055002300, 36055002400, 36055002700, 36055002900, 36055003000, 36055003101, 36055003102, 36055003200, 36055003300, 36055003400, 36055003500, 36055003600, 36055003700, 36055003806, 36055003807, 36055003900, 36055004000, 36055004100, 36055004602, 36055004701, 36055004702, 36055004800, 36055004900, 36055005000, 36055005100, 36055005200, 36055005400, 36055005500, 36055005600, 36055005700, 36055005800, 36055005900, 36055006000, 36055006100, 36055006200, 36055006300, 36055006400, 36055006500, 36055006600, 36055006700, 36055006800, 36055006900, 36055000700, 36055007000, 36055007100, 36055007500, 36055007600, 36055007700, 36055007801, 36055007802, 36055007900, 36055008000, 36055008100, 36055008200, 36055008301, 36055008400, 36055008500, 36055008600, 36055008702, 36055008801, 36055009200, 36055009301, 36055009302, 36055009401, 36055009402, 36055009404, 36055009500, 36055009601, 36055009602, 36055009605, 36055980000, 36055980200.

b. Community Engagement

RGRTA has presented its plans for the 1372 East Main Street campus to the City of Rochester leadership as well as the Beachwood Neighborhood Association where the facility is located. RGRTA is committed to continuing to keep the general public informed about the planned changes to the facility.

5. JOB QUALITY

RGRTA has worked with the local ATU 282 to establish a training program to enable front-line employees that are working as bus washers and other unskilled positions to transition to technician roles. Every 6 months a training class is offered prior to administering a written qualification test. Any employee who passes the test is eligible to take a job trial for the next available opening based on seniority. Since 2017, 11 employees have successfully transitioned to technician roles. Additionally, RGRTA is in the process of developing a formalized maintenance apprenticeship program to further opportunities for individuals to gain the skills and knowledge to maintain a zero emissions fleet.

Finally, estimates of jobs created from investments in surface transportation are as high as 20.6 for every million dollars. These jobs include direct jobs, indirect jobs and induced jobs. Based on these estimates we can extrapolate to the creation of as many as according to the construction of the Garage D addition is anticipated to result in the creation of upwards of 1900 jobs.

6. PROGRAMMATIC CAPABILITY AND PAST PERFORMANCE

a. Past Performance

RGRTA is a regular recipient of Federal, State and other funding sources. Below is a sampling of some of the recent Federal grants it has secured:

RGRTA FY 2022 Section 5339(c) Low or No Emission Vehicles Discretionary Grant Application

NY-2023-055-00

Federal Transit Administration – 20.526

Funding for the purchase of hydrogen fuel cell buses and fueling infrastructure.

Madeleine Duchatellier, 212-668-2202, Madeleine.Duchatellier@dot.gov

RGRTA Lapsing FFY 2019 Section 5339 Program and FFY2020 - FFY 2022 Section 5307 & 5339 Programs Capital Assistance Grant Application

NY-2022-046-00

Federal Transit Administration – 20.507 & 20.526

Purchase of 36 40-ft diesel buses and eight (8) paratransit buses to replace the existing vehicle fleet that is past its useful life, as well as 10 on-demand vans to expand the existing fleet, construction of 2 new connection hubs, as well as 12 bus shelters to replace existing facilities that are past the useful life, design and environmental review of an addition to the existing maintenance garage ('Garage D') and preventive maintenance.

Madeleine Duchatellier, 212-668-2202, Madeleine.Duchatellier@dot.gov

RGRTA 2022 Enhancing Mobility Innovation

NY-2023-001-00

Federal Transit Administration – 20.530

Funding to improve mobility, enhance the rider experience, and explore data-driven solutions to bolster riders' access to equitable transit fare programs with a focus on innovative service delivery models, creative financing, novel partnerships, and integrated payment solutions. The project will look to connect to states' databases run by social programs to drive automated enrollment into low-income fare programs utilizing new data tools to streamline and simplify access to these transit programs.

Natalie Covill-Fontaine, 202-366-7564, n.covillfontaine@dot.gov

b. Reporting Requirements

All of above grant agreements are subject to quarterly financial and milestone progress reporting. RGRTA has submitted all reports on time. When there are changes in project schedule they are updated with an explanation of the cause of the change. RGRTA's most recent FTA Triennial Review noted no deficiencies in meeting reporting requirements or any other requirements associated with Federal awards.

c. Staff Expertise

Since first successfully competing for funding for the Authority's first battery electric buses in 2016 it has become apparent that purchasing the vehicles is just a small piece of what is needed to full transition to a zero-emission fleet. Significant infrastructure improvements are needed to charge buses, dispense hydrogen, meet changes in code requirements associated with the different power sources, address differences in operating capabilities. All of these projects require significant financial investments. As such, RGRTA appointed a Vice President of Zero-Emission Strategies, overseeing all bus purchases, engineering efforts, capital planning and grant management. The grouping of all of these functions into one department ensures a cohesive approach towards the achievement of a fully zero-emission fleet.

RGRTA is active in transit working groups such as Zero Emission Bus Resource Alliance (ZEBRA), Hydrogen Fuel Cell Bus Council, New York Public Transportation Association, The Bus Coalition and American Public Transit Association. These groups allow for significant coordination across transit agencies that are all working towards some level of incorporation of zero emission vehicles. RGRTA has regularly been recognized as a leader in this effort, being selected for presenting at several conferences to better educate agencies on what is needed to make this transition. These efforts have resulted in strong working relationships with transit agencies and vendors across the country, resulting in a number of visits to other agencies to learn about the investments they have made related to zero emission technologies.

7. BUDGET (OPTIONAL BUDGET SPREADSHEET AND UP TO 10 ADDITIONAL PAGES MAY BE ADDED IF NEEDED AS AN APPENDIX TO THE WORKPLAN)

a. Budget Summary

A budget summary is listed below. More detailed budgets for the microgrid would be developed as an output of the associated design services.

Zero-Emission Bus Storage Facility + Campus Expansion	\$ 50,010,349
Microgrid	
Microgrid Design Services	\$ 2,500,000
Solar Array (50,000 ft ² /250 KW) Equipment and Construction	\$ 4,000,000
Electrolyzer (1 MW) Equipment and Construction	\$ 2,500,000
Hydrogen Storage	\$ 3,300,000
Stationary Fuel Cell (600 KW) Equipment and Construction	\$ 3,500,000
Engineering & Installation	\$ 2,500,000
BoP	\$ 1,500,000
Microgrid Total	\$ 19,800,000
Parking Facility and Microgrid Total	\$ 69,810,349
FCEB (27) Incremental Cost	\$ 29,600,000
Project Total	\$ 99,410,349

b. Detailed Budget: Zero-Emission Bus Storage Facility

The following 2 pages were developed as part of the 30% design work performed by Stantec. The original scope of the building included accommodations and equipment to also support electric bus charging. Subsequently these items were removed from the scope of the building. The following table details the descoped items and associated cost estimate reduction. The campus expansion costs are expected to be approximately \$10M additional and are added to the building cost in the summary above.

	Descoped Item	Cost Estimate
	Equipmwnr Platforms	\$ 420,945.00
	StainlessSringer	\$ 132,000.00
	Pantograph Wlakway	\$ 131,875.00
	Platforms	\$ 297,400.00
	Radiant floor loop	\$ 317,043.00
	Transformers	\$ 240,500.00
	switchgear	\$ 506,300.00
	15kVa switchgear	\$ 114,900.00
	metering, power system	\$ 50,000.00
	Pantopgrahp	\$ 2,899,000.00
	Photo panels	\$ 2,362,280.00
	General feeders	\$ 1,043,229.00
	Generators	\$ 380,000.00
	Feeders	\$ 1,208,469.00
	Rock Excavation	\$ 252,872.00
	Façade	\$ 566,010.00
	Total	\$ 10,922,823.00
10%	Design Contingency	\$ 1,092,282.30
10%	General Conditions	\$ 1,092,282.30
10%	Overhead & Profit	\$ 1,092,282.30
8%	Escalation	\$ 873,825.84
	Grand Total	\$ 15,073,495.74
	Total from Estimate	\$ 54,711,704.00
	Revised Estimate	\$ 39,638,208.26

CATEGORY	Total 68,393 SF		
		(\$/SF)	TOTAL
A10 Foundations	1.92%	10.68	730,573
A20 Subgrade Enclosures	0.00%		
A40 Slabs-On-Grade	4.48%	24.92	1,704,156
A90 Substructure Related Activities	1.18%	6.59	450,771
Total A Substructure	7.58%	42.19	2,885,500
B10 Superstructure	20.98%	116.77	7,985,977
B20 Exterior Vertical Enclosure	5.92%	32.97	2,255,050
B30 Exterior Horizontal Enclosures	5.67%	31.55	2,157,560
Total B SHELL	32.58%	181.28	12,398,587
C10 Interior Construction	0.79%	4.37	298,780
C20 Interior Finishes	0.33%	1.85	126,390
Total C INTERIORS	1.12%	6.22	425,170
D10 Conveying	0.00%	-	-
D20 Plumbing	3.55%	19.76	1,351,752
D30 HVAC	13.60%	75.68	5,176,315
D40 Fire Protection	2.73%	15.20	1,039,866
D50 Electrical	28.37%	157.88	10,797,650
D60 Communications	0.00%		
D70 Electric Safety and Security	0.00%		
D80 Integrated Automation	0.00%		
Total D SERVICES	48.25%	268.53	18,365,582
E10 Equipment	0.00%		
E20 Furnishings	0.00%		
Total E EQUIPMENT & FURNISHINGS	0.00%		
F10 Special Construction	0.00%		
F20 Selective Building Demolition	0.00%		

RGRTA Garage D - Issued for Final 30% Schematic Design

UNIFORMAT SUMMARY

December 16, 2022

CATEGORY	Total 68,393 SF		
	%	(\$/SF)	TOTAL
Total F SPECIAL CONSTRUCTION & DEMOLITION	0.00%	-	-
G10 Site Preparation	2.30%	12.82	876,892
G20 Site Improvements	2.06%	11.46	783,665
G30 Liquid and Gas Utilities	1.20%	6.69	457,277
G40 Electrical Site Improvements	0.15%	0.82	55,750
G50 Site Communications	0.00%	-	-
G90 Miscellaneous Site Construction	0.00%		
Total G SITEWORK	5.71%	31.78	2,173,585
Z10 GENERAL REQUIREMENTS	4.76%	26.50	1,812,421
TOTAL TRADE COSTS	100.00%	557	38,060,845
Design Contingency	10.00%	55.65	3,806,085
Subtotal		612	41,866,930
General Conditions	10.00%	61.22	4,186,693
Overhead & Profit	10.00%	67.34	4,605,362
Subtotal		741	50,658,985
Escalation	8.00%	59.26	4,052,718.81
TOTAL CONSTRUCTION COSTS 3Q2022		800	54,711,704

c. Expenditure of Awarded Funds

As a regular recipient of Federal funding, RGRTA is prepared to deliver this project while meeting the requirements specific to this source. The Finance Department has the established tracking system to ensure only eligible expenses are charged to grants through automated reviews for all contracts, purchase orders and invoices that are related to Federal funding sources. Monthly entries are made to ensure the timely drawdown of funding. Additionally, RGRTA has a history of delivering projects of this nature. Due to these experiences, RGRTA is confident that the project can be delivered on schedule.

d. Reasonableness of Costs

All of these costs are based on either direct quotes or estimates developed by industry-specific vendors and developers and are determined to be fair and reasonable.