



Environmental Protection Agency (EPA)
Climate Pollution Reduction Grants (CPRG) Program:

Carbon-Free Shared Mobility

Work Plan

April 1, 2024



SECTION 1: OVERALL PROJECT SUMMARY AND APPROACH

a. Description of GHG Reduction Measures

Regional Background

The Regional Transportation Commission of Southern Nevada (RTC, the agency) is leading a paradigm shift in reducing greenhouse gas emissions in the state of Nevada by enhancing mobility throughout the Las Vegas region, especially for low-income and disadvantaged communities. As the federally designated Metropolitan Planning Organization (MPO), the RTC directs transportation planning and funding allocation for the entire Southern Nevada region, which includes the unincorporated areas of Clark County and the cities of Las Vegas, North Las Vegas, Henderson, and Boulder City.

The RTC operates transit services across this area. As such, RTC has a responsibility to be a part of the solution to help reduce the carbon footprint of southern Nevada's transportation sector and improve air quality in the region. Clark County covers an area of 7,910 square miles, with approximately 90% under federal ownership. Although RTC's 400-square-mile service area represents only 5% of the land area, it provides vital connectivity and accessibility to over 85% of Clark County residents (see Figure 2).¹ Nevada's population is highly concentrated in southern Nevada, with more than 70 percent of the state's population residing in Clark County.² This region has a vibrant tourism industry that attracts over 42 million visitors annually, significantly contributing to the hospitality and tourism industries that drive a major portion of local employment.

As the 14th busiest public transit provider nationwide, the RTC has positioned itself as an industry leader in advanced mobility solutions.

The agency is integrating smart technologies while committing to an ambitious goal of converting its entire transit fleet to zero emissions by 2050 (see Figure 1). This forward-thinking approach extends to actively supporting underserved populations, including minority-majority, low-income, and high-unemployment communities that are disproportionately vulnerable to climate change impacts.

Figure 1: RTC Hydrogen Bus Fleet



In recent years, southern Nevada has grappled with intensifying climate shifts such as rising temperatures, extreme precipitation events, wildfires, high wind incidents, and persistent drought conditions. These compounding factors pose tangible threats to regional well-being, economic stability, and public safety. Recognizing the urgency, Clark County Department of Environment and Sustainability took action by conducting a comprehensive 2019 greenhouse gas (GHG) emissions inventory to quantify emissions sources across all communities. Building on this data-driven approach,

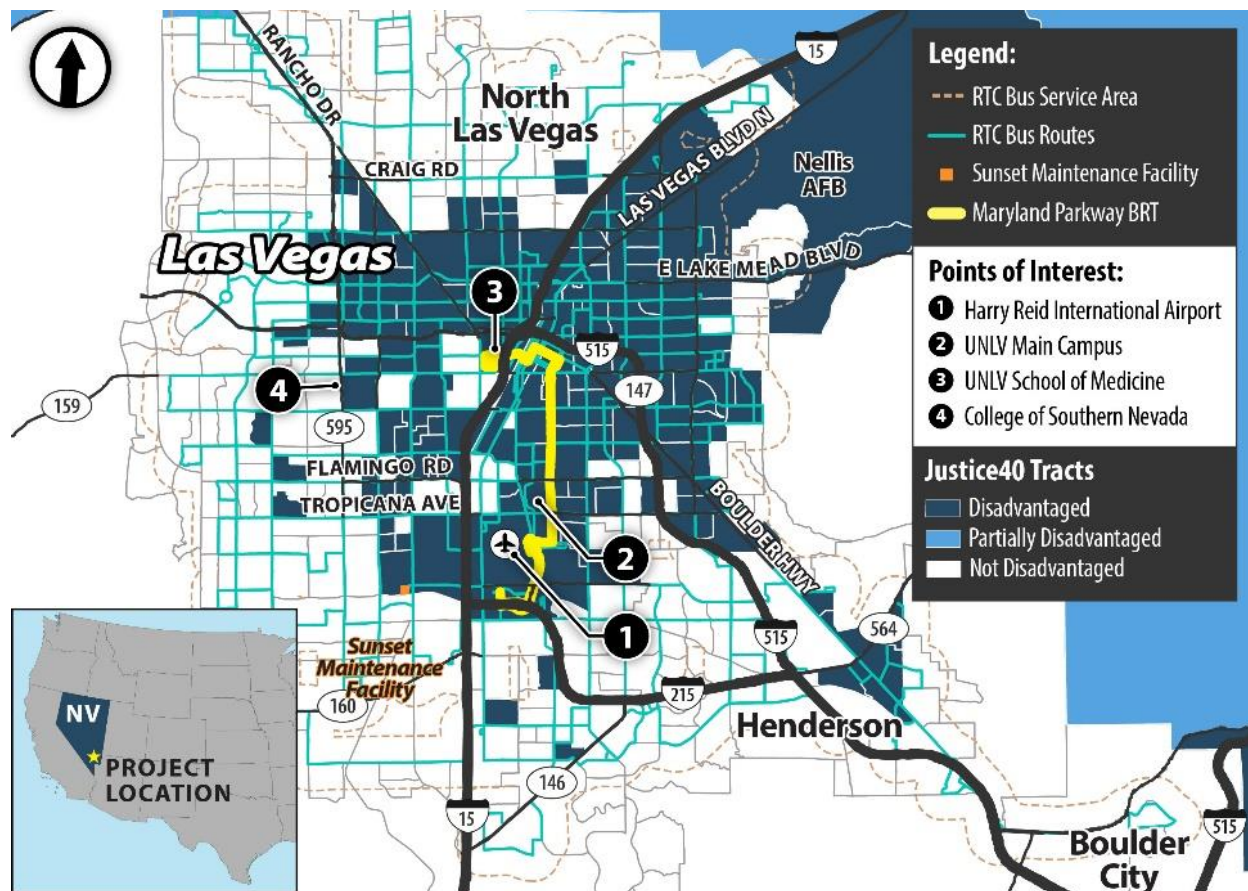
¹ National Transit Database. 2020. RTC of Southern Nevada.

<https://www.nationaltransitdatabase.org/nevada/regional-transportation-commission-of-southern-nevada/>

² U.S. Census Bureau. 2022 American Community Survey 5-year estimates.

Clark County spearheaded a regional effort to develop the All-In Clark County Community Sustainability and Climate Action Plan (All-In Plan) in 2021. As the agency responsible for regional transportation planning and transit operations, RTC provided crucial input and expertise to shape the transportation-related strategies and goals within the All-In Plan. This strategic framework provides a long-term roadmap for mitigating climate risks and building resilience through multi-stakeholder collaboration.

Figure 2: RTC Bus Service Area



Climate Pollution Reduction Grant Program

Clark County developed a Priority Climate Action Plan (PCAP) explicitly focused on identifying implementation-ready, high-impact measures to accelerate progress toward state, regional and local climate targets. The PCAP was funded through the U.S. Environmental Protection Agency's (EPA) Climate Pollution Reduction Grant (CPRG).

Rooted in the comprehensive GHG inventory findings, the PCAP measure selection prioritized strategies that could deliver region-wide benefits, provide tangible support to low-income and disadvantaged communities (LIDACs), and demonstrate a clear path toward near-term implementation readiness. Extensive stakeholder input captured through the All-In Plan development, climate collaborative working sessions, and targeted community engagement activities further refined the screening criteria.

The two highest categories driving GHG emissions in Clark County include buildings, which was responsible for 48% of GHG emissions, followed by on-road transportation activity, which was responsible for 33%. Although mitigating the impacts of climate change will require reductions across all sectors, addressing electricity consumption and on-road mobility combustion are the biggest

opportunities for GHG emission reductions. Two priority GHG reduction measures emerged as the cornerstones of the PCAP for the Las Vegas-Henderson-Paradise metropolitan area:

1. The **All-In Home and Building Improvement Hub** initiative to catalyze energy efficiency retrofits and building decarbonization while mitigating household energy burdens and enhancing indoor air quality.
2. The **Carbon-Free Shared Mobility** project spearheaded by the RTC to drive a transformative transition of the public transit bus fleet toward hydrogen propulsion and significantly expand the regional bike share system.

This CPRG Implementation Grant application focuses on the Carbon-Free Shared Mobility Project (the Project) as RTC is the primary transit agency for the Las Vegas metropolitan area and has authority to procure transit fleet and fueling facilities. In addition, RTC currently operates the downtown Las Vegas Bike Share system with the ability to implement expansion. Separate but complementary, work is underway by Clark County to move forward the All-In Home and Building Improvement Hub initiative discussed in the PCAP.

Carbon-Free Shared Mobility

As the primary transit agency serving the Las Vegas metropolitan area, the RTC is well-positioned to lead the multi-faceted Project (Figure 3). RTC is planning the first bus rapid transit (BRT) project in the region; the Maryland Parkway BRT will provide high-capacity transit service, connecting urban activity centers. The Project aligns two synergistic strategies with the upcoming Maryland Parkway BRT project to provide improved mobility and passenger experience, increase access to opportunities for disadvantaged communities, and yield air quality benefits. The Project, building on the investments in the Maryland Parkway corridor, will transform mobility within the region and lead to GHG emission reduction. The Project aligns with the goals of the CPRG to protect human health and the environment by reducing GHG emissions and other harmful pollutants.

Figure 3: RTC Bike Share and Bus Service



Transitioning RTC Transit Fleet to Zero Emissions Hydrogen Buses

Major Features

The RTC is steadfast in implementing its goal to fully transition to a zero-emission fleet by 2050 as outlined in the agency's Zero Emission Vehicle Plan. The agency plans to purchase five hydrogen fuel cell electric buses ("hydrogen buses") through this funding opportunity. The RTC already has two hydrogen buses in service and has procured an additional 22 buses through other grant opportunities. Purchasing an additional five buses as part of this Project is a core component of the RTC's commitment to

mitigating climate change and reducing GHG emissions, aligning with the Nevada State Priority Climate Action Plan.³

The RTC's deployment of hydrogen buses is pivotal to addressing air quality and reducing direct carbon emission of the RTC bus fleet, particularly in disadvantaged communities that are disproportionately impacted by air pollution. The range achieved by hydrogen buses enables the RTC to provide sustainable travel options and serve riders without impacting service quality.

Hydrogen buses are currently the only zero-emission transit option capable of achieving over 300 miles of range - a critical threshold for the RTC to serve longer routes connecting low-income outlying communities to urban job centers.

Tasks and Milestones

The RTC is undertaking a two-pronged approach to incorporate hydrogen buses into its fleet:

1. **New Vehicle Procurement** – The agency plans to purchase five new hydrogen buses from a hydrogen bus manufacturer. The key milestones are:
 - Develop specifications for hydrogen buses
 - Advertise request for proposals and select hydrogen buses model/vendor
 - Issue notice to proceed and complete production 24 months later
2. **Hydrogen Fueling Infrastructure** – To support hydrogen bus operations, the RTC is increasing hydrogen fueling capabilities aligned with vehicle delivery schedule. The key milestones are:
 - Procurement process for contractor
 - Approval and issue notice to proceed for selected contractor
 - Complete construction of fueling infrastructure

Potential Risks

This strategic approach aims to demonstrate the viability of hydrogen fuel cell technology at scale while directly reducing the RTC's carbon footprint through replacement of compressed natural gas (CNG) buses. However, certain risks and assumptions require ongoing management. Key assumptions for successful hydrogen bus implementation include continued technological advances and declining costs for fuel cell vehicles, securing adequate renewable hydrogen supply through regional contracts, and availability of funding sources to offset vehicle/infrastructure expenditures. However, risks that could hamper progress and diminish benefits include higher upfront costs, pricing and supply uncertainties for green hydrogen, potential reliability or maintenance issues with the new technology, manufacturing delays, lack of a regional hydrogen hub, and over-reliance on carbon-intensive hydrogen production. Constraints around technology, sustainable fuel, or fiscal resources necessitate proactive risk mitigation, optimized strategies, and adaptability to realize economic, environmental, and social advantages from zero-emission hydrogen buses. To maximize the GHG emissions reduction benefits, the RTC will implement comprehensive testing protocols, optimize fuel management strategies, and continuously evaluate new technology pathways. Flexibility in approach, proactive risk mitigation strategies, and demonstrated leadership in sustainable transit solutions will ensure the Zero Emission Vehicle Plan remains on target.

³ Nevada Division of Environmental Protection. 2024. State of Nevada Priority Climate Action Plan. https://ndep.nv.gov/uploads/air-cprg-docs/State_of_Nevada_-_Priority_Climate_Action_Plan.pdf

Expanding RTC Bike Share Program

Major Features

RTC is seizing a transformative opportunity to significantly expand its Bike Share program. Recognizing the importance of reducing reliance on private vehicles, the RTC is set to expand its Bike Share program into the Maryland Parkway corridor and the University of Nevada Las Vegas (UNLV) area (see Figure 4). The current Bike Share program operates both traditional bikes and electric pedal assist bikes. New docking stations will be strategically situated along the Maryland Parkway BRT corridor, sited directly at transit stops as well as within a 0.5 to 1-mile radius. The Project will add 275 e-bikes across 55 new stations. This robust bike transit integration enhances first/last mile connectivity by improving walking and bicycling access to seamlessly complement the zero emission hydrogen bus routes.

Aligning bike share with high-capacity transit is widely viewed as a mobility best practice, facilitating seamless multi-modal journeys and reducing car dependency.

Since RTC Bike Share expansion is planned in the city of Las Vegas, Clark County, and near the UNLV, the RTC will consult these organizations to identify and implement new stations. Engaging the community to identify station locations will also be critical. The agency will implement a comprehensive education and robust outreach program that will promote the expanded Bike Share program, work with the community to identify bike share station locations, teach riders how to safely operate the e-bikes, and encourage people to replace short vehicle trips with biking and thus resulting in a decrease of vehicle miles traveled and associated greenhouse gas emissions. The Maryland Parkway BRT project will have shared bus and bike lanes, which are 11-feet wide and have shown to be successful in other communities and should provide comfort for everyone. The wider lanes give cyclists more space to ride together and increase the distance from cars. As is required by Nevada law, RTC's bus operators will change lanes to pass cyclists.

RTC envisions the system expansion to rapidly grow in lockstep with the upcoming BRT network along Maryland Parkway and serving UNLV. The agency plans for an expansive network of next-generation bike share stations integrated directly into the BRT corridor's infrastructure. These will be seamlessly incorporated into well-designed bus stops incorporating shelters and pedestrian amenities.

To enhance accessibility and inclusivity for the public, the expanded system will integrate with the current Bike Share system, which features multiple payment options including smartphone applications, QR codes, and capabilities to apply reduced fares for Supplemental Nutrition Assistance Program (SNAP) recipients. SNAP is a federal program that provides food-purchasing assistance to low-income households to purchase nutritious food essential to health and wellbeing. Multimodal integration is facilitated through a smartphone application that allows travelers to purchase RTC transit and Bike Share passes, encouraging trips that can be taken by transit and bikes. Comprehensive wayfinding and community outreach initiatives will educate riders on how to access and navigate the system.

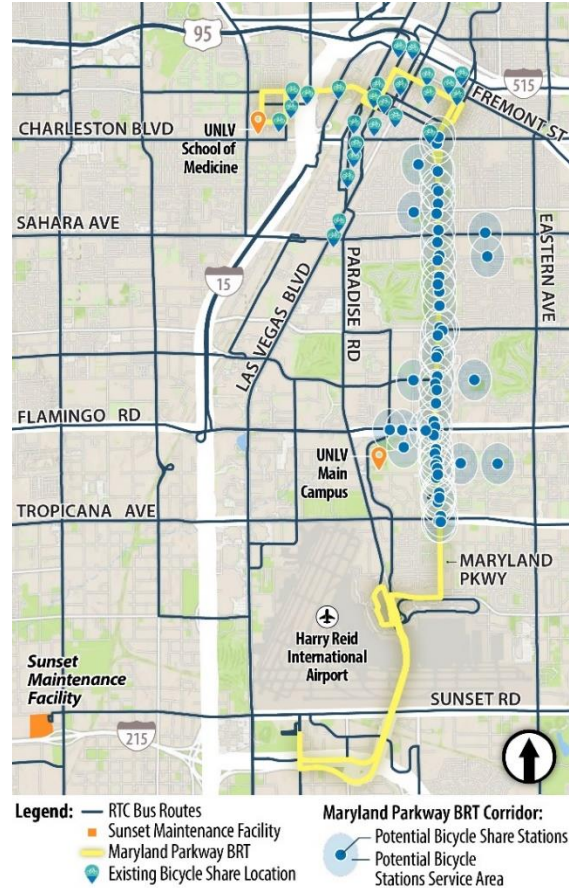
Tasks and Milestones

While the RTC has developed a preliminary map identifying priority zones for locating future stations, the agency is taking a flexible, community-driven approach for buildout within residential areas. RTC will solicit neighborhood-level input on locations of the stations, ensuring bike share facilities are placed at the most advantageous spots to drive adoption and equitable mobility access.

Potential Risks

The bike share expansion relies on securing sufficient grant funding like CPRG to accelerate the buildout, sustained local revenue to support operations long-term, successful collaboration with partners on bike-

Figure 4: Carbon-Free Shared Mobility Project Elements



friendly street projects, and integration with transit, driving significant mode shift away from personal vehicles. Risks that could hamper effectiveness include poorly sited station locations due to insufficient community input leading to underutilization, personal safety/security concerns deterring ridership, and socioeconomic barriers limiting access for disadvantaged groups. The RTC is expecting to continue to offer reduced fares for SNAP recipients.

The RTC Bike Share 2024 Annual Plan documents that bike availability, partially due to bike loss, was the main programmatic challenge in 2023 and contributed to a 7% decrease in total annual ridership compared to 2022. To address this issue, the RTC is equipping all bikes with GPS units prior to deployment. The agency hired an Asset Recovery Coordinator in 2023, resulting in the recovery of 20 bikes in the last quarter of 2023 and 23% decrease in overall bike loss over 2022.

Failure to address risks like funding potential, inequitable access, bike loss/theft, and safety issues could diminish the system's environmental benefits and realization of anticipated greenhouse gas reductions from reduced vehicle miles traveled (VMT). Proactive mitigation strategies are crucial for the expanded bike share network to maximize its

effectiveness and sustainability impacts across the region.

b. Demonstration of Funding Need

Hydrogen Buses

RTC operates a fleet of approximately 800 buses, which are primarily CNG fuel.⁴ In its efforts to transition to a 100% zero-emission fleet by 2050, the RTC has explored various clean transportation technologies. While the agency has introduced four battery electric buses to its fleet in 2023, the limited range of these vehicles has posed challenges in maintaining service quality and reliability. Battery electric buses often lack the range to complete longer routes without stopping to charge, which can disrupt schedules and inconvenience passengers.

In contrast, hydrogen buses offer a promising solution, providing the extended range necessary to serve the RTC's expansive service area and maintain operational efficiency. Recognizing this potential, the RTC plans to purchase 10 additional hydrogen fuel cell buses by 2025 per the FY25 Capital Plan, with an expected delivery in 2027 due to a 2-year manufacturing timeline. These planned acquisitions are in addition to the 2 hydrogen buses currently in operation and the 22 already procured and awaiting delivery, which demonstrates the RTC's bold approach transitioning to a zero-emission fleet. To support

⁴ Regional Transportation Commission of Southern Nevada. 2022. Zero Emissions Bus Rollout Transition Plan.

this significant expansion, the agency has actively pursued federal funding opportunities, recognizing the crucial role of grants and other financial support in making this transition feasible and sustainable in the long term. Federal Transit Administration (FTA) discretionary funding in fiscal year (FY) 2021-2022 allowed the RTC to purchase seven 60-foot, hydrogen fuel cell buses that are expected to be delivered in the fall of 2024. Additionally, RTC secured \$3.8 million from Low or No Emission Grant from the U.S. Department of Transportation (USDOT) in 2021 to purchase two hydrogen buses (Figure 5).

Despite these successes, the RTC still faces a significant funding gap in establishing the necessary hydrogen fueling infrastructure to support its growing zero-emission fleet. The agency applied for the FY 2023 Low No Emissions Grant from the USDOT to bolster its hydrogen fueling capacity and increase operational resiliency by ensuring a steady and sufficient supply of liquid hydrogen for the growing fleet; however, the RTC did not receive an award of the grant.

To fulfill its commitment to a 100% zero-emission fleet by 2050, the RTC must have adequate fueling capacity in place as hydrogen buses are introduced into revenue service. With the growing fleet of

Figure 5: RTC Hydrogen Buses in Operation



hydrogen buses, the RTC is preparing to meet operational needs by constructing robust fueling infrastructure that will align with bus delivery schedules. The CPRG funds will be instrumental in bridging the funding gap and ensuring the successful deployment of these clean transit vehicles. To continue this effort and progress towards improving access to sustainable mobility, the RTC is seeking funds from the CPRG. **Nevada is one of four states that does not provide dedicated funding to support urban transit operations, so RTC is turning to federal funding opportunities to electrify its fleet.**

Bike Share

The All-In Plan sets a goal to reduce transportation emission in Clark County by investing in 2,020 miles of bicycle and pedestrian network improvements by 2040; however, **State transportation revenues are legally restricted from being spent on bicycle and pedestrian facilities unless they are part of a larger roadway project and within highway right of way.**

Historically, RTC has been building out the bike share network by leveraging grants and earmarks that are locally funded through sales tax, which provided a small, slow and steady amount of funding. The RTC Bike Share program received federal funding through FY2022 Community Project Funding to expand the existing program, adding 37 new e-bikes and 24 stations to the program. The enthusiastic support of the community for the Bike Share program has been demonstrated by local grant funding through Nevada Energy and the Southern Nevada Health District that has contributed to the growth of the program. The CPRG Implementation Grant funding would enable RTC to accelerate expansion of the Bike Share program and take advantage of the launch of the Maryland Parkway BRT. The momentum generated by this tremendous infrastructure investment will enable the system to rapidly grow in lockstep with the upcoming bus rapid transit network along Maryland Parkway and serving UNLV.

The RTC currently has multiple plans and initiatives to enhance walking and bicycling infrastructure, including a Complete Streets Initiative to improve safety of all road users in and around Las Vegas. However, to implement any bicycle and pedestrian measures, the RTC will have to pursue federal funding opportunities.

c. Transformative Impact

The Project represents a convergence of innovative strategies and multi-stakeholder efforts to address the climate crisis and transportation inequities facing southern Nevada communities, creating transformative opportunities to significantly reduce GHG emissions. The Project elements directly align with the vision and "Big Moves" outlined in the RTC's Regional Mobility Plan⁵ to address evolving transportation needs through high-capacity transit, smart technologies, and diversified transportation choices.

Las Vegas is located in the only air basin in the state of Nevada that does not meet the Environmental Protection Agency's air quality standards and is designated as an ozone non-attainment area. The American Lung Association's 2020 report ranked Las Vegas as the 9th most polluted U.S. city for ozone, underscoring the need for urgent interventions.⁶

Synergetic Programing

The Project uniquely aligns other planned regional projects and programs to provide sustainable mobility to communities served by the RTC, leading to significant GHG emission reductions. The RTC's Zero Emissions Vehicle Plan envisions an ambitious goal to transition 50% of its fleet by 2030 and 100% of its fleet by 2050. This improves the resiliency of the transportation network by reducing reliance on fossil fuel and imported oil. The RTC first introduced two hydrogen fuel cell buses to its fleet in 2023— pioneering the operation of hydrogen buses in Nevada. The Project highlights the RTC's continuing efforts to use zero emission transportation technology for a balanced and sustainable transit future. The proposed hydrogen fueling skid at the Sunset Maintenance Facility will be introduced in addition to the current fueling skid to ensure resiliency in RTC's liquid hydrogen supply and support the transition of future CNG buses to hydrogen fuel. In addition to serving the RTC service area, the hydrogen buses will be strategically integrated into the fleet to operate and

The Project will encourage behavior change away from car-centric travel and address environmental justice issues such as health issues as a result of poor air quality and access to affordable transportation options.

Figure 6. Existing Bike Share station at a transit center



serve disadvantaged populations.

By unifying public transit decarbonization with walking and biking, the Project represents a comprehensive commitment to sustainability, equity, and quality of life for all residents (Figure 6). The Project expands RTC Bike Share from downtown Las Vegas to include stations near UNLV and along the Maryland Parkway BRT route, addressing first-last mile connectivity. The Maryland Parkway BRT project, anticipated to be completed in 2026, provides a timely catalyst to accelerate this transformation. The BRT route will be serviced by hydrogen buses. The Maryland Parkway BRT is an 8.7-

mile-long route that will replace the existing local Route 109 bus service with an enhanced transit

⁵ Regional Transportation Commission of Southern Nevada. 2020. On Board Mobility Plan.

<https://assets.onboardsnv.com/wp-content/uploads/2021/02/11111731/On-Board-Mobility-Plan.pdf>

⁶ American Lung Association. 2020. Las Vegas Air Quality Worsened for Ozone, Finds 2020 'State of Air Report'.

<https://www.lung.org/media/press-releases/state-of-the-air-nevada>

system that will provide speed and service quality improvements and enhance the viability of transit as a transportation choice. Currently, Route 109 generates the 2nd highest ridership of all north-south routes in RTC's system, and the highest productivity in terms of passengers per service hour and per mile. Maryland Parkway is a vital corridor, extending from the Las Vegas Medical District in the north to the South Strip Transit Terminal in the south and connects many activity centers, such as downtown Las Vegas; McCarran International Airport; University of Nevada Las Vegas (UNLV); Sunrise Hospital; the Boulevard Mall; and numerous commercial, employment, and residential areas.

The corridor is oriented towards residents, employees, and students with time-sensitive trip needs; disabled persons and persons in wheelchairs who use the transit system to access various medical facilities in the corridor; and employees making critical connections to the east-west routes going to/from the major employment centers along the corridor. To improve accessibility, safety, and comfort, the BRT project along this corridor will enhance transit shelters, construct shared bus-bike lanes,

Figure 7. RTC Bus Enhanced Transit Shelters



construct wider sidewalks, and improve lighting and landscaping. Extension of the RTC Bike Share program will build on this effort.

Both city of Las Vegas and Clark County have created Transit Oriented Development (TOD) plans for areas along the Maryland Parkway. The TOD plans aim to create walkable, mixed-use neighborhoods near transit to support sustainable and equitable communities. This is a substantial opportunity to deliver sustainable travel options for these communities to reduce GHG emissions.

Impactful GHG Reduction

The Project is part of a regional, multimodal transportation network, with opportunities to greatly increase GHG reduction in Clark County. The five new zero emission hydrogen buses, coupled with sustainable mobility catapulted by the Project, will improve local air quality by reducing critical emissions of criteria pollutants NOx, CO, VOC that contribute to the formation of ground level ozone. These reductions directly support state and local government efforts to achieve the National Ambient Air Quality Standards (NAAQS) ozone "attainment" classification. In addition, zero emission vehicles do not emit particulate matter (PM2.5) and contribute to significant reductions in GHG emissions, further contributing to improved local air quality. Aligning bike share with high-capacity transit is widely viewed as a mobility best practice, facilitating seamless travel and reducing car dependency. The National Association of City Transportation Officials recommends placing bike share stations in close, visual proximity to bus and train stops to broaden the reach of transit and solve first/last mile problems.⁷

Market Transformation

The Project will encourage local trips by bike and increase cycling connections to transit, replacing the need for car travel. In 2021, RTC fully integrated bike share and transit within their Transit mobile application. Riders can purchase transit and bike share passes with a single account, seamlessly

⁷ National Association of City Transportation Officials (NACTO). Bike Share Station Siting Guide. https://nacto.org/wp-content/uploads/2016/04/NACTO-Bike-Share-Siting-Guide_FINAL.pdf

transitioning from bike to bus. Bike share near transit increases the opportunity for trips that can be linked by bikes and transit, thus further reducing GHG emissions by replacing longer, regional vehicle trips. Additionally, riders can use the rideRTC mobile or website application to plan their trips, purchase transit passes, and receive arrival information about routes and bus stops. This improves convenience and the customer experience, allowing travelers to use public transportation for regional trips via the RTC’s extensive transit network. By investing in sustainable technology like hydrogen bus, the RTC is creating green-collar jobs that benefit the environment and economy.

RTC is uniquely positioned to drive progress through its extensive involvement with industry associations and coalitions. As an active member of groups like the American Public Transportation Association’s Zero Emission Fleet Committee, Zero Emission Bus Resource Alliance, and Hydrogen Bus Fuel Cell Council, the RTC takes a thought leadership role in exploring cutting edge technology, such as fuel cell electric bus commercialization, that can transform the transportation industry. The agency frequently reviews and provides feedback on new products, policies, and best practices.

RTC’s strategic participation allows the agency to stay ahead of the innovation curve while sharing its own experiences and lessons learned from this hydrogen bus implementation. Insights around infrastructure planning, operations/maintenance requirements, and sustainable fuel provisioning can help guide other transit providers undertaking similar zero emission fleet transitions. Moreover, the RTC’s participation gives it a platform to amplify the importance of investing in sustainable mobility solutions that explicitly meet the needs of disadvantaged communities. As an early adopter, the agency can make the case for hydrogen’s suitability in serving equitable transportation and environmental justice goals.

SECTION 2: IMPACT OF GHG REDUCTION MEASURES

a. Magnitude of GHG Reductions from 2025 through 2030

CPRG funds will replace five CNG transit buses with hydrogen fuel buses and provide 275 e-bikes across approximately 55 stations, reducing tail pipe emissions, and providing shared mobility options to reduce vehicle miles traveled. In addition to reducing 691.01 metric tons of carbon dioxide equivalent (MTCO_{2e}) by 2030, transitioning to hydrogen buses will directly reduce criteria pollutants that contribute to the formation of ground level ozone. Considering the proposed bike share stations are along the planned BRT route and near UNLV, the measure to expand bike share increases the opportunity for mode shift to walking, biking, and transit trips. This measure is expected to reduce 77.2 MTCO_{2e} between 2025 and 2030. As shown in Table 1, both measures are expected to reduce a cumulative total of 768.21 MTCO_{2e} between 2030 and 2050.

Table 1. GHG Reductions from 2025 through 2030

GHG Reduction Measure	MTCO _{2e} Reduction
Hydrogen Buses and Fuel Skid	691.01
Bike Share	77.2
Total	768.21

b. Magnitude of GHG Reductions from 2025 through 2050

Replacing five compressed natural gas buses with zero-emission hydrogen fuel cell electric buses will eliminate tailpipe emissions, projected to reduce GHG output by 6,833.34 metric tons of CO₂ equivalent

cumulatively between 2025 and 2050. Powered by hydrogen, these reductions represent a permanent decrease in carbon intensity.

Simultaneously, expanding the RTC Bike Share program with 275 new electric pedal-assist bikes across an enlarged station network will facilitate a mode shift away from personal vehicles. This measure is estimated to achieve 463.1 MTCO₂e in cumulative GHG reductions from displaced vehicle miles traveled between 2025 and 2050.

In total, the two measures will deliver an estimated 7,296.44 MTCO₂e in total cumulative GHG emissions reductions between 2025 and 2050. The durability of these reductions is reinforced by the transition toward renewable hydrogen and electric mobility lasting beyond 2050. This programmatic shift positions the RTC and the region to make substantial progress on statewide 2030 and 2050 emissions targets while realizing the environmental benefits of a zero emission transportation ecosystems. Table 2 summarizes the metric tons of CO₂ equivalent reduction for each measure and the cumulative total from 2025 through 2050.

Table 2. GHG Reductions from 2025 through 2050

GHG Reduction Measure	MTCO ₂ e Reduction
Hydrogen Buses and Fuel Skid	6,833.34
Bike Share	463.1
Total	7,296.44

c. Cost Effectiveness of GHG Reductions

The ask from CPRG implementation grant funding is \$15,972,454.45. The Project will cumulatively reduce 768.21 MTCO₂e through 2030 and will cost \$20,791.78 to reduce one metric ton of carbon dioxide equivalent. Project costs include the installation of a hydrogen fuel skid, ensuring reliable access to hydrogen fuel. The planned fueling skid enables future transition of other CNG buses to hydrogen fuel. Hydrogen buses, while requiring an initial investment in fueling infrastructure, demonstrate favorable operational efficiencies. The fuel economy for hydrogen buses is approximately two times that of CNG and diesel buses and approximately 1.6 times that of hybrid buses.⁸ The extended operational hours between recharge and refueling can result in more efficient routes and decreased operational costs over time.

Education and outreach are also included in this Project. The RTC will partner with non-profit and community-based organizations to expand bicycle education programs and to address concerns related to accessibility.

d. Documentation of GHG Reduction Assumptions

Hydrogen Buses

The Project aligns with the RTC's Zero Emission Vehicle Plan, which establishes a strategy to reduce GHG emissions from the transit bus fleet. Table 3 summarizes the assumptions to calculate emissions benefits resulting from a shift from CNG to liquid hydrogen. The average block lengths of transit routes, provided by RTC Transit, were multiplied by the number of buses intended to be replaced to determine the daily miles serviced by hydrogen buses. To determine the annual miles serviced by hydrogen buses, weekday

⁸ National Renewable Energy Laboratory of the U.S. Department of Energy. 2021. Fuel Cell Buses in the U.S. Transit Fleets: Current Status 2020. <https://www.nrel.gov/docs/fy21osti/75583.pdf>

estimates were multiplied by 260 operating days while Saturday and Sunday estimates were multiplied by 52 operating days. The GHG emissions factors for CNG transit buses, which were obtained from Clark County Air Quality Department, and the emission factor for hydrogen bus, which was obtained from the FTA Transit Bus Electrification Tool. The emissions factors were applied to the projected annual miles serviced by hydrogen buses to estimate the annual GHG emissions reduction. Transitioning five CNG 40' transit buses to hydrogen is estimated to reduce GHG emissions by 307.12 MTCO₂e per year, or a 691.01 MTCO₂e cumulative reduction by 2030.

Table 3. Annual Emissions Based on Average Block Length and Number of Buses to Upgrade

	Transit Bus	Block Length (mile)	Number of Buses Replaced	GHG Emissions (MTCO ₂ e)		
				CNG 40'	Hydrogen	Savings
Weekday	CNG 40'	223	5	609.94	392.52	217.42
Saturday	CNG 40'	230	5	125.82	80.97	44.85
Sunday	CNG 40'	230	5	125.82	80.97	44.85
Total				861.58	554.46	307.12

Bike Share

The GHG reduction potential for the addition of bike share stations and accompanying electric bikes was calculated through quantifying the level of automobile VMT reduced and assigning emission factors to the VMT reduced. Annual VMT reduction was calculated through the following equation based on findings from the Colorado Department of Transportation⁹:

$$\text{Annual VMT Reduction} = \text{PSOV} * \text{Nd} * \text{D}$$

The assumptions are summarized in Table 4 and further details for the assumptions are shown below.

Table 4. Bike Share VMT Reduction Calculation Assumptions

Variable	Description	Assumption
PSOV	Proportion of users that formerly commuted by single occupant vehicle	6.75%
Nd	Number of benefit days per year	365 days
D	Average daily number of miles traveled on shared bicycles	2,228 daily miles traveled on shared bicycles in 2026

To quantify the share of mode shift from single occupancy vehicles to bike share, RTC reviewed other bike share systems. Data from bike share networks in Barcelona, Lyon, Montreal, and Paris suggests that there is an impact on reducing trips made by cars. The percentage of automobile trips replaced by bike sharing in these cities ranges from 2% to 10%.¹⁰ This analysis assumes an average of reductions to apply to the Las Vegas metropolitan area to estimate the level of mode shift from automobile to bike sharing, which is 6.75%. Favorable weather conditions enable bike sharing operations throughout the year, thus the assumed benefit days per year is 365.

⁹ Colorado Department of Transportation. 2010. Congestion Mitigation & Air Quality Program 2007-2008 Report. https://www.codot.gov/programs/innovativemobility/assets/commuterchoices/documents/CMAQ_2007_2008_AnnualReport.pdf

¹⁰ Midgley, Peter. 2011. Bicycle-Sharing Schemes: Enhancing Sustainable Mobility in Urban Areas. https://www.un.org/esa/dsd/resources/res_pdfs/csd-19/Background-Paper8-P.Midgley-Bicycle.pdf

E-bikes in the current Bike Share system in downtown Las Vegas average three trips per day, thus the proposed expansion of 275 bicycles at project opening in 2026 will result in approximately 825 daily bike share trips. According to RTC's 2023 Household Travel Survey, the average bicycle trip length is 2.7 miles.¹¹ Based on these assumptions, the proposed system expansion will produce approximately 2,228 daily miles traveled and reduce 54,892 VMT annually on shared bicycles in 2026. The emission factors, obtained from Clark County Department of Air Quality, were applied to the annual VMT reduction to estimate annual emissions reductions. The expansion of bike share stations and related e-bikes is expected to result in a GHG emissions reduction of 19.3 MTCO₂e annually, or a 77.2 MTCO₂e reduction by 2030.

SECTION 3: ENVIRONMENTAL RESULTS – OUTPUTS, OUTCOMES, AND PERFORMANCE MEASURES

a. Expected Outputs and Outcomes

The Project will expand the RTC's hydrogen fuel fleet by five buses and provide a hydrogen fueling skid that allows the use of liquid hydrogen. Additionally, the Project will expand RTC Bike Share in downtown Las Vegas to the Maryland Parkway corridor and University of Nevada Las Vegas by adding 275 e-bikes across approximately 55 stations. This will increase the number of destinations that can be reached through active mobility and enhance the effectiveness of the hydrogen fuel fleet by alleviating first and last mile challenges for many potential bus riders.

Transportation is the primary source of greenhouse gas emissions in Nevada where it accounts for 34% of emissions¹², and on-road transportation accounts for 23% of emissions in Clark County¹³. As the transit provider, traffic management agency, and MPO for Clark County, the RTC has a responsibility to be a part of the solution to help reduce the carbon footprint of southern Nevada's transportation sector and improve air quality in the region. Creating sustainable transportation options that cut carbon emissions and help reduce the region's carbon footprint has long been a goal of the agency. Improvements to walking, biking, and public transportation is crucial for disadvantaged communities to connect to services and employment centers. Hydrogen buses and bike share provide this link without producing harmful emissions.

Las Vegas is in the only air basin in the state of Nevada that does not meet the EPA's air quality standards and is designated as an ozone non-attainment area.

The outcomes of the Project aligns with the EPA's FY 2022-2026 Strategic Plan, specifically with the goal to tackle the climate crisis and the objective to reduce emissions that cause climate change. The Project enhances accessibility, mitigates traffic-related pollutants, and stimulates economic development. The construction of fueling infrastructure will support the RTC's procurement of hydrogen buses, improving local air quality by reducing critical emissions of criteria pollutants NO_x, CO, VOC that contribute to the formation of ground level ozone. These reductions directly support state and local government efforts to achieve the NAAQS ozone "attainment" classification. **Hydrogen technology produces zero tailpipe emissions, directly addressing the reduction of hazardous air pollutants and greenhouse gas emissions.** This translates into substantial improvement in local air quality, mitigating the environmental impact associated with traditional combustion engine vehicles and reducing reliance on fossil fuel and

¹¹ Regional Transportation Commission of Southern Nevada. 2023. Household Travel Survey.

¹² Nevada Division of Environmental Protection. 2023. Nevada Statewide Greenhouse Gas Emissions Inventory and Projections, 1990-2043. https://ndep.nv.gov/uploads/air-pollutants-docs/ghg_report_2023.pdf

¹³ Clark County. 2021. Regional Community Greenhouse Gas Inventory Report.

https://webfiles.clarkcountynv.gov/Environmental%20Sustainability/Sustainability/CC_GHG_FINAL_HR.pdf

imported oil. In addition, improving local air quality and providing options for people to walk, bike, and take public transportation can contribute to physical health and overall well-being. Hydrogen buses offer a clean alternative to conventional diesel or natural gas buses, greatly contributing to the reduction of the transportation sector's carbon footprint. Transitioning five CNG transit buses to hydrogen is estimated to reduce GHG emissions by 307.12 MTCO₂e per year, or a 691.01 MTCO₂e reduction by 2030 and 6,833.34 MTCO₂e by 2050.

Figure 8. Sustainable mobility options



Expanding bike share in southern Nevada will serve local trips that can be made fully by bike and provide first and last mile connections to RTC transit services, reducing the need to travel by car. Station locations will be focused along transit stops and major destinations, such as the Maryland Parkway Bus Rapid Transit line and UNLV. This will provide a convenient and flexible alternative mode of travel for shorter trips, trips that require multiple modes of transportation, and tourism. Some bike sharing trips directly replace vehicle trips, reducing vehicle miles traveled, GHG emissions, and air pollution (Figure 8). When located near transit, bike sharing increases

the feasibility and accessibility of transit as it offers crucial first and last mile connections, increasing the opportunity for bike-transit trips in the region. The ease and convenience of e-bikes allows for users to travel farther, giving the opportunity to replace more car trips. The expansion of bike share stations and related e-bikes is expected to result in a GHG emissions reduction of 19.3 MTCO₂e annually, or a 77.2 MTCO₂e reduction by 2030 and 463.1 MTCO₂e by 2050. Extending the Bike Share program to Maryland Parkway and UNLV will encourage mode shift to improve air quality and reduce carbon emissions to the region, building on the over 5 million pounds of carbon reduced due to the use of the existing RTC Bike Share program.

At its core, the Project is committed to equitable transit access and enhanced mobility and connectivity to improve public health and quality of life. This aligns with the EPA Strategic Plan's goals of advancing environmental justice and ensuring clean and healthy air for all communities. The Project bolsters the objectives of improving air quality and reducing localized pollution and health impacts. In Clark County, 13.4% of residents live below the federal poverty line, which is higher than the state's percentage of 12.7%. Over 50% of Clark County residents belong to minority groups.¹⁴ The Project provides a low-carbon mobility solution and removes the financial barrier of owning a bike for residents and visitors. Enhancements in public transportation would not only yield a decrease in individual carbon footprints but also create job opportunities and enhance economic prospects for residents by increasing access to jobs, specifically in low-income areas with limited access to private vehicles (Figure 9).¹⁵

According to the EPA's Environmental Justice Screening and Mapping Tool, many of the communities in the Las Vegas metropolitan area that have a high percentage of low-income households and people of color are the communities that experience high exposure to air toxins, ozone levels, and diesel particulate matter.

¹⁴ U.S. Census Bureau. 2020 American Community Survey.

¹⁵ Marlon G. Boarnet, David Flores Moctezuma, and James Gross. 2022. New Open-Source Analyses of Transit Job Access and Transit Ridership. UC Davis: National Center for Sustainable Transportation.
<http://dx.doi.org/10.7922/G2862DSW>

The Project employs a multifaceted strategy aimed at fostering behavior change and shifting away from a car-centric system to reduce vehicle miles traveled. The RTC will focus extensively on removing barriers to access by proactively engaging groups and organizations that represent marginalized communities throughout the Project. The progress towards achieving these outcomes will be tracked, as discussed in the next section.

b. Performance Measures and Plan

The proposed performance measures for the hydrogen buses include distance driven, fuel efficiency (liquid hydrogen kilograms/mile), fuel efficiency compared to outdoor temperature, days in operation, GHG emission reduction, and customer satisfaction. The RTC will utilize tools, such as telematics systems and fleet management software, to enable real-time data collection for continuous monitoring of the buses' operational parameters. Additionally, energy monitoring systems will be employed on each bus to track and evaluate the energy consumption, facilitating a detailed analysis of their efficiency. Integral to the implementation of the buses is a commitment to stakeholder engagement. The RTC will utilize community surveys and workshops to capture public perception and acceptance of hydrogen buses, while workshops will facilitate collaboration and feedback from transit users, operators, and the agency. The RTC will conduct baseline assessments to establish benchmarks for the existing fleet, providing a comparative framework for evaluating the performance of the hydrogen buses.

The existing Bike Share program serves downtown Las Vegas with around 130 classic and e-bikes across 31 stations. Currently, RTC works with Bicycle Transit Systems to share RTC Bike Share trip data with the public, and the data is based on estimation using trip duration and origin/destination location. By expanding stations near UNLV and along Maryland Parkway BRT route, data for trips that use the new stations will be included in the overall dataset. The proposed performance measures for bike share include pounds of carbon dioxide emissions reduced, number of passes sold, number of trips taken, miles traveled, trip duration, trip origin and destination, and calories burned. Data analysis is a core element of the Project, allowing the interpretation of performance metrics, identification of trends, and informed decision-making to optimize the Project's outcomes.

Additionally, the following proposed performance measures can be tracked or measured to evaluate mode shift from personal vehicles, health, and equity impacts: vehicle miles traveled per capita; mode share of trips; annual hours of delay; the share of population in disadvantaged communities; employment within half a mile of a transit stop or bike share station; and the number of reduce fare trips and passes.

c. Authorities, Implementation Timeline, and Milestones

Schedule and Milestones

The Project schedule is shown in Table 5.

Figure 9. RTC Bus Riders



Table 5. Project Schedule

Task Description	Date
Overall Project Milestones	
Project Award	10/01/2024
Project Kick-Off Meeting	11/1/2024
Semi-Annual Report	6/30/2025
Final Report	12/31/2027
Hydrogen Fuel Skid	
Procurement of Contractors Start	11/15/2024
RTC Approval of Selected Contractors	4/10/2025
Issue Notices to Proceed for Contractors	5/1/2025
Fueling Infrastructure Construction Complete	12/31/2026
Hydrogen Bus Procurement	
Hydrogen Bus Specification Development	April 2024– July 2024 (3 months)
Advertise RFP- Select Contractor	August 2024 – March 2025 (7 months)
Issue NTP	March 2025
Production Complete	March 2027 (24-month schedule)
Bus Commissioning Complete	May 2027 (2 months)
Bike Share Expansion	
Procurement of Vendor	October 1, 2024 – May 1, 2025
RTC Approval of Selected Vendor	May 31, 2025
Stakeholder Engagement	June 1, 2025 – September 30, 2027
Site Selection	July 1, 2025 – September 30, 2026
Station Installation and Bicycle Deployment	September 30, 2026

Hydrogen Buses

As the primary transit agency for the Las Vegas metropolitan area, the RTC has authority to procure transit fleet and fueling facilities. Transit service with hydrogen buses will be provided by the RTC, who operates in unincorporated areas of Clark County and the cities of Las Vegas, North Las Vegas, Henderson, and Boulder City. The hydrogen fleet will operate for approximately 27 months of the grant period from a start date of July 2027. The hydrogen buses will be operating on existing transit routes including the Maryland Parkway BRT, which is expected to be in service Fall 2026.

Bike Share

RTC operates the Bike Share program in downtown Las Vegas with the authority to implement expansion. Due to the small footprint of bike share docks, stations are typically located within the

amenity zone of existing public sidewalks. Local agencies authorize stations within the public right-of-way through a permitting process; the RTC will work with the City of Las Vegas and Clark County to permit bike share stations. Since the bike share expansion is proposed near UNLV and along the Maryland Parkway BRT route, RTC will continue to collaborate with communities nearby to identify station locations and coordinate implementation. The RTC will also partner with non-profit and community-based organizations to expand “how to bike” education programs and use of bike share by vulnerable populations.

The RTC intends to contract a service provider to operate and administer an equitable and financially sustainable expansion of the RTC Bike Share program. The contract award for the work is anticipated in May 2025. The schedule for design, procurement and purchasing is anticipated to last 14 months, with completion in September 2026, allowing expeditious spending of all CPRG funds prior to the September 30, 2029, statutory deadline.

SECTION 4: LOW-INCOME AND DISADVANTAGED COMMUNITIES

a. Community Benefits

Regional Context and Community Needs

To determine the impact of the Project, data was obtained from the EPA's Environmental Justice Screening and Mapping Tool, the Climate and Economic Justice Screening Tool, and transit rider information gathered through a recent on-board transit survey conducted by the RTC. In Clark County, 13.4% of residents live below the federal poverty line, which is higher than the state's percentage of 12.7%. Over 50% of Clark County residents belong to minority groups. Based on recent survey results of bus riders in Las Vegas, 60% of RTC customers are from minority populations and primarily ride the bus (70%) to and from work, which is 15% higher than the other transit agencies in the country on average.¹⁶ Almost 30% of riders have household incomes below \$20,000 per year. As of March 2023, Nevada has some of the highest unemployment rates in the nation at 5.4% as reported by the US Bureau of Labor Statistics, compared to the US average of 3.6% in unemployment. Nearly 20% of riders experience barriers to accessing jobs and social services and 95% of RTC customers are dependent on buses to access employment opportunities, social services, and healthcare.

The population within ¼ mile of RTC fixed route service area is 1,285,000 people. Based on disadvantaged census tracts detailed in the list of CEJST Census Tract IDs attached, 52.3% of the population will be impacted by the Project. While vibrant, the roughly 8-square-mile target area has experienced economic, social, and environmental challenges. All 16 census tracts that fall within the area are either “disadvantaged” and/or “Areas of Persistent Poverty,” per the Climate and Economic Justice Screening Tool. Target area residents are more than four times more likely to rely on public transportation to get to work than the average Southern Nevadan (9.6% compared to 2.3%) and are more than four times more likely to walk or bike to work (6.3% compared to 1.5%). Unsurprisingly, the share of car-less households in the target area (26.2%) is roughly four times that of the region (7.5%).

The Project supports the Justice40 Initiative because the benefits positively impact disadvantaged communities within the RTC service area. Low-income, high unemployment, and racially segregated communities served by the RTC will benefit from a more connected and reliable transit system as well as

¹⁶ Regional Transit Commission of Southern Nevada. 2020. On Board Survey.

a reduction in air pollution through increased zero emission vehicles in the RTC's fleet. The Project maps (Figure 2) detail the Justice40 populations within the RTC service area.

Additionally, southern Nevada residents are disproportionately affected by climate change. With an extreme desert climate, Las Vegas is the fastest warming city in the United States, with an average temperature increase of nearly six degrees since 1970 according to a Southern Nevada Heat Vulnerability Study¹⁷ detailing the impacts of climate change in the region. There is an urgent need to reduce GHG emissions to address the climate change crisis. Low-income and disadvantaged communities have limited resources to mitigate and adapt to climate change and air quality concerns.

Benefits to Low-Income and Disadvantaged Communities

Enhance Mobility

The Project will improve infrastructure and services for people using alternative modes of travel and offer the community equitable and convenient mobility options (Figure 10). The transition to hydrogen buses is poised to improve operational resiliency and enhance existing service. The expansion of the Bike Share program removes barriers to opportunity through integrating pedestrian and bicycle

connectivity and access to transit and local destinations. The Bike Share program expansion would connect the newly constructed Maryland Parkway BRT line. New bike share stations would be located at BRT stops along the line, with additional stations added within a half mile to form a connected bike share network. The Project improves connection to other RTC services, expanding mobility throughout the region.

Improve Air Quality and Health

Improving air quality is a key focus of the Project. A 2018 EPA study reported that minority and lower income communities are disproportionately affected by air pollution relative to the overall population.¹⁸ The Project promotes walking, bicycling, and using transit, which enhances public health and improves air quality. Since the RTC Bike Share program was launched in 2016, more than 200,000 trips have been reported, with cyclists traveling more than 1.1 million miles and reducing carbon dioxide emissions across Southern Nevada by more than 3.8 million pounds. More than 75% of riders make up minority ethnic groups and more than 10% of riders use Bike Share as an essential means to get to and from work. The shift towards more sustainable modes reduces air pollution and promotes opportunities for outdoor activities, thereby lowering health issues associated with poor air quality and lack of exercise.

In 2021, the RTC, in partnership with the Southern Nevada Health District, created a special membership for low-income residents who do not have debit or credit cards to be able to access the Bike Share program using their Nevada SNAP EBT card at a significantly discounted cost. The addition of more

Figure 10. RTC Bike Share connection to transit



¹⁷ Regional Transit Commission of Southern Nevada. 2023. Southern Nevada Extreme Heat Vulnerability Analysis. <https://www.rtcnv.com/projects-initiatives/planning/planning-studies-reports/extreme-heat-vulnerability/?highlight=Southern%20Nevada%20Heat%20Vulnerability%20Study>

¹⁸ U.S. Environmental Protection Agency. 2018. Our Nation's Air. <https://gispub.epa.gov/air/trendsreport/2018/>

electric bikes to the fleet will bolster the viability of the RTC Bike Share program and provide residents and visitors affordable, healthy, and alternative options to get around without the need to depend on car travel.

Improve Quality of Life

The Project is critical to improving mobility and access to the larger transit system and RTC services, connecting low-income and disadvantaged communities to jobs, education, services, and opportunities. The Project improves affordable mobility options to alleviate transportation burdens for low-income and disadvantaged communities. Promoting and expanding walking, biking, and public transit reduces vehicle dependence and lowers an individual's transportation costs associated with vehicle operation and maintenance.

Increase Resilience to Climate Change

The transportation sector, particularly single occupancy vehicles, is a major source of GHG emissions, contributing to climate change. Residents in the target area are disproportionately burdened by climate and environmental impacts, chiefly poor air quality and extreme heat. Investing in non-auto modes of transportation, such as Bike Share and hydrogen buses that run along the new BRT line, stands to reduce GHG emissions, which contribute to warming temperatures. The Project prioritizes efficient and sustainable modes of travel, such as walking, biking, and using transit. This reduces the reliance on personal vehicles, lowering GHG emissions. Increasing travel options builds system resiliency in the case of extreme weather or climate events, as people do not have to rely on a singular transportation mode to travel.

Transit-focused measures enhance accessibility, mitigate traffic-related pollutants, and stimulate economic development at an average rate of \$5 for every dollar invested.

Enhance Economic Opportunity

Enhancements in public transportation would not only yield a decrease in individual carbon footprints but also create job opportunities and enhance economic prospects for residents¹⁹ by increasing access to jobs, specifically in low-income areas with limited access to private transportation.

b. Community Engagement

Meaningful Community and Stakeholder Engagement to Develop the Project

The Project was developed in partnership with the community and other key stakeholders, and the RTC will continue that engagement work to ensure the Project's success after implementation. To develop the GHG reduction measures for the PCAP, the RTC worked closely with Clark County, who led the development of the PCAP. Clark County hosted stakeholder meetings and working sessions, focus groups, and community workshops. Translation was provided at community workshops for Spanish-speakers and specific engagement events were hosted in Spanish. The Regional Climate Collaborative was created to develop the PCAP, which includes the RTC, Clark County, the five cities within the County—Boulder City, Henderson, Las Vegas, North Las Vegas, and Mesquite. A Sustainability and Climate Advisory Group and Engagement Team was formed to ensure diverse representation in the engagement process. Over 150 organizations and 220,000 individuals were involved, generating

¹⁹ Marlon G. Boarnet, David Flores Moctezuma, and James Gross. 2022. New Open-Source Analyses of Transit Job Access and Transit Ridership. UC Davis: National Center for Sustainable Transportation. <http://dx.doi.org/10.7922/G2862DSW>.

approximately 6,000 survey responses. These efforts identified regional and community priorities, leading to the development of the Project.

Additional outreach completed for the RTC Bike Share program and Maryland Parkway Transit-Oriented Development informed the potential locations of bike share stations and amenities. The surveys were promoted using email blasts, direct outreach through professional and community organizations, press

Figure 11. RTC employees engaging with the public



releases, social media advertising, and community boards. The 2023 RTC Bike Share User Survey reached over 200 individuals to capture their experience in using the existing Bike Share program, informing future station locations and additional bike and station amenities to improve users' experiences. This survey contributed to the development of the three strategies to improve utilization and travelers' experience in the RTC Bike Share 2024 Annual Plan: increase bike and station availability, grow the number of passholders through fare integration, and improve equitable access to the Bike Share program.

Through the development of the Maryland Parkway TOD Plan, the city of Las Vegas, Clark County, and the RTC conducted a six-week community survey to understand the current conditions and needs of the communities along the corridor. More than 750 individuals responded to the survey, and the majority of respondents use the corridor to access McCarran International Airport and UNLV campus. Many of the respondents supported mixed-use development and increasing mobility services along the corridor. A separate outreach effort was conducted to survey seven communities along the Maryland Parkway corridor between October 2020 and January 2021. This survey focused on the vision of the corridor, asking respondents where they travel to in the Las Vegas region and what community amenities they would like to see. Locations identified as highly traveled in these surveys are potential routes to operate the hydrogen buses.

Community and Stakeholder Engagement Moving Forward

Public outreach and partnerships for the Project will continue to build upon the engagement efforts for the PCAP and Maryland TOD. As part of the funding request, RTC is seeking \$400,000 to develop and implement a comprehensive education and outreach program that will promote the expanded Bike Share program, work with the community to identify bike share station locations, teach riders how to safely operate the e-bikes, and encourage people to replace short vehicle trips with biking and thus decreasing vehicle miles traveled and associated greenhouse gas emissions.

The RTC will continue to use robust outreach strategies such as community meetings, surveys, social media, interactive displays, and partnerships with community-based organizations to engage the community through all stages of the Project. As a result of the responses from the 2023 RTC Bike Share User Survey, the RTC will partner with community-based organizations to host bike rides and classes to encourage behavior shift as well as addressing some of the greatest barriers to entry, such as knowing how to ride a bike, feeling safe riding a bike, and understanding how the Bike Share program works. Comprehensive wayfinding and community outreach initiatives will educate riders on how to access and navigate the system.

SECTION 5: JOB QUALITY

The RTC continues to expand the training capacity of workers to support the emerging and rapidly growing Transportation & Logistics Technologies and Clean Technologies sectors. It is the RTC's intent to provide pathways to well-paying and quality jobs, especially for marginalized and underserved populations. The transportation and renewable energy sectors have contributed to job creation and economic growth in the region and is part of a larger effort to diversify the state's economy. These two industries were identified in the Las Vegas Global Economic Alliance's Comprehensive Economic Development Strategy, Workforce Blueprint, and Target Industry Validation Study for their growth potential.

Nevada's population is highly concentrated in southern Nevada, with 73% of the state's population residing in Clark County.²⁰ The Project will improve access to mobility for millions of people and play a vital role in the economy of southern Nevada. The need for cross-training existing workers in renewable technology and the need for providing a career pathway to the future workforce is crucial. The Trade, Transportation, and Utilities sectors have gained 50,900 jobs in southern Nevada between May 2020 and May 2023²¹ and are expected to add 44,040 jobs in Nevada through 2026.²² The Project advances employment and training opportunities.

Effectively reducing GHG emissions in southern Nevada will require the expertise and skills of a diverse workforce to maintain and operate a connected transportation system (Figure 12). The RTC has taken great strides in converting to cleaner air technologies and will continue to remain an active part in transforming the public transportation industry. Workforce development to implement, operate and maintain the Project aims to advance the workforce for underserved communities, including those who are minority, low income, experience high unemployment, and disproportionately impacted by climate change. The RTC is a member of the Transportation and Logistics Industry Sector Partnership through the local Workforce Board and Innovation Opportunities Act (WIOA). This provides an opportunity to connect people to job prospects at various phases of the Project. Nevada Revised Statutes (NRS) require the inclusion of the use of apprentices on public works projects and the RTC will include an apprenticeship provision in the contracts procured under this award. The RTC continues to collaborate with College of Southern Nevada (CSN) to increase the pipeline of skilled workers in technical services occupations, such as in the operations and maintenance of hydrogen buses. In addition, the RTC and CSN developed accredited training programs and registered apprenticeship opportunities for disadvantaged groups facing barriers to employment. RTC staff and representatives will continue to contribute to training curriculum development and will closely collaborate with schools and job centers regarding employment needs and job opportunities for the Project.

The Project integrates and aligns with the U.S. Department of Labor's and Department of Commerce's eight Good Jobs Principles:

- **Recruitment and Hiring:** The RTC partakes in outreach and recruitment services, training activities, and employment assistance. RTC's contractors currently work closely with Workforce

Figure 12. RTC Bus Driver



²⁰ U.S. Census Bureau. 2022 American Community Survey 5-year estimates.

²¹ U.S. Bureau of Labor Statistics. Occupational Employment and Wage Statistics.

²² Workforce Innovation and Opportunity Act. Nevada State Plan. 2022.

https://wioaplans.ed.gov/sites/default/files/pdfs/state-plan/2020/Nevada_PYs_2020-2023.pdf

Innovation and Opportunities Act funded partners in the community, leveraging the supportive services offered with employment opportunities for disadvantaged populations and those facing extraordinary barriers to employment. Additionally, the RTC has met with the Southern Nevada Building Trades Unions to discuss workforce needs that will be essential to ensure that high-impact strategies for the Project can yield the greatest impact in the shortest amount of time.

- **Benefits:** RTC employees enjoy a highly competitive and comprehensive benefits and compensation package that includes family-sustaining benefits that promote economic security and mobility.
- **Diversity, Equity, Inclusion, and Accessibility:** The RTC developed the Road to Inclusion, Diversity, and Equity (RiDE) program that has a council to oversee Diversity, Equity, and Inclusion initiatives, ensuring that all employees feel valued and represented. Additionally, RTC has the Resources, Involvement, Support, Education (RiSE) program, which focuses on empowering local small businesses (LSB) and local diverse businesses (LDB).
- **Empowerment and Representation:** All RTC contracted operators and maintenance workers have a free and fair choice to join a union, and RTC's diversity policies provide for equitable hiring and retention practices. Employees can engage in protected, concerted activity without fear of retaliation.
- **Job Security and Working Conditions:** The RTC and its contractors recognize the value of providing good jobs with fair pay and is committed to fair labor standards and strong investments in workforce development that result in sustainable career pathways with growth opportunities.
- **Organizational Culture:** The RTC provides employees with a stable work environment, channels of open communication, and empowerment to make impactful decisions.
- **Pay:** Training and required certifications for employees working with the new buses will warrant increases in pay for skilled labor in an in-demand industry.
- **Skills and Career Advancement:** The RTC has approached workforce development and planning with retention and stability in mind. In developing the RTC's Zero Emission Transition Plan, current operators and maintenance staff were consulted and provided input for training goals. Current staff have training opportunities to operate and maintain hydrogen buses. Continued partnerships with the local Workforce Board and the College of Southern Nevada will assist in developing registered apprenticeship opportunities for zero emission bus mechanics.

SECTION 6: PROGRAMMATIC CAPABILITY AND PAST PERFORMANCE

a. Past Performance

The RTC has proven itself to be an effective and efficient steward of public funds. According to the National Transit Database Top 50 Transit Agencies, in 2020 the RTC ranked second in the nation when compared to other transit agencies under Bus Mode Only in the following category: "Operating costs recouped through fare revenues (fare recovery ratio)".²³

The RTC brings many years of experience in successfully applying for discretionary grants and successfully executing the grant-funded projects. The list of federally or non-federally funded assistance

²³ Federal Transit Administration. 2020. 2020 Summary and Complete Profile Set: Top 50 Agencies. <https://www.transit.dot.gov/ntd/profiles/2020-top-50>

agreements within the last three years in which RTC is performing or has completed include the following shown in Table 6.

The RTC has an established record for managing federal grants and the oversight of federally funded projects. The agency has the technical, legal, and financial capacity to carry out the work for activities requested in those grant agreements. RTC staff have demonstrated competency with project management. The RTC has extensive experience delivering federal-aid projects. This experience has given the agency an understanding of federal contracting and procurement requirements, and the RTC procedures comply with applicable laws and regulations. The RTC has also established a synergistic working relationship with federal grant funding partners, including FTA Region 9, Federal Highway Administration (FHWA), and other funding partners, that has resulted in successful completion and management of the listed agreements. The RTC intends to use this same successful inter-agency coordination approach to successfully manage and complete this Project.

Table 6: List of Federally funded assistance agreements for RTC within the last three years

Grant/Funding Program Name	FY 20 Low No Emissions Grant	FY 20 Helping Obtain Prosperity for Everyone Program	FY 22 US Department of Defense funding	FY 22 Low No Emissions Grant	FY 23 RAISE grant
Project Title	Hydrogen Fuel Cell Electric Buses (FCEBs), Fueling Station and Infrastructure	Expanded Mobility Options to Ensure Equal Access to Healthy Food and Community Services	Nellis AFB Transportation Study	Hydrogen Fuel Cell Fixed Route Buses and Innovative Safety Measures within Transit Service Area	Charleston Blvd High-Capacity Transit Planning
Award Amount	\$3,853,200	\$125,000	\$720,000	\$6,737,042	\$5,861,631
Assistance Agreement Number	NV-2021-027-00	NV-2021-008-00	EN734-22-03	NV-2023-010-00	NV-2024-006-00
CFDA Number	20.526	20.505	12.610	20.526	20.933
Description	Selected in June 2020, the \$3,853,200 Low-No grant was executed on 8/5/21 and is funding the procurement of two hydrogen buses and the construction of the related fueling infrastructure.	The award studied potential microtransit routes targeting low-income areas in Clark County, Nevada, to improve access to jobs, community services and healthy food. Project was successfully completed, and grant closed out within proposed timeframe.	Awarded under 12.610 Community Economic Adjustment Assistance for Compatible Use and Joint Land Use Studies, RTC completed a congestion management study for the northeast region of the Las Vegas Valley that includes Nellis Air Force Base.	Selected in August 2022, RTC received funding to buy four hydrogen fuel cell electric buses and workforce development training.	RTC received funding to plan for future high-capacity transit along Charleston Boulevard. This project is in the procurement phase and has received recognition from USDOT who conducted a press conference in Las Vegas to announce the award.
Contact	Victor Waldron, FTA Office of Program Management, 202-366-5183, or victor.waldron@dot.gov	Charles Goodman, FTA Office of Planning and Environment, 202-366-1944 or Charles.goodman@dot.gov	Mary Beth Greiner, OLDCC, Direct: 703-501-6227 mary.e.greiner3.civ@mail.mil	Amy Volz, USDOT, Direct: 202-366-7484 ftalownobusnofo@dot.gov	Howard Hill, USDOT 202-366-0301 or RAISEgrants@dot.gov

b. Reporting Requirements

The RTC has an established record for managing federal grants and the oversight of federally funded projects. The RTC expects to receive approximately \$60 million annually in combined apportionments of the Urbanized Area Formula Program (5307), Enhanced Mobility of Seniors and Individuals with Disabilities (5310), State of Good Repair Formula (5337) and the Bus and Bus Facilities Program (5339).

RTC always submits required grant funded project and financial reports in a timely manner to the granting agency. Any perceived project delays are immediately coordinated with the granting agency. If required, the RTC prepares written budget revisions or amendments to the grant agreements as instructed by the granting agency to facilitate project delays. The granting agency advises and approves any such budget revisions or amendments.

Since the COVID-19 pandemic there have been various manufacturing delays and parts/equipment shortages which resulted in requests for budget revisions/amendments to extend the period of performance on some grants.

RTC successfully coordinated with FTA on the FY2020 5339 Low No Emissions grant to extend the period of performance for the project from 6/30/2024 to 12/31/2025 because the bids received for the project did not meet federal criteria and RTC had to re-solicit the bid. Subsequently, RTC was notified that lead times of specific hydrogen equipment had increased from six months to 12 months.

RTC successfully coordinated with FTA on the FY2020 Access and Mobility for All program grant to extend the period of performance from 7/1/2023 to 2/28/2025. The manufacturing of the paratransit vehicles experienced delays due to shortage of materials twice, once for the low floor chassis and another time for the CNG conversion kits to convert the gas-powered vehicle to CNG. Both times the RTC communicated the delays to FTA Region IX to extend the budget revision due date. RTC submitted a budget revision to FTA Region IX that was subsequently approved to extend the period of performance end date.

The RTC successfully coordinated with FTA on the FY2021 5312 Public Transportation COVID-19 Demonstration Program grant to extend the period of performance end date from 12/31/2023 to 12/31/2024. There were various delays experienced due to the COVID-19 pandemic and the software developer. Currently, RTC is coordinating with the FHWA in amending the FY2020 Advanced Transportation and Congestion Management (ATCMTD) agreement to extend the period of performance and revise the overall project cost and funding.

c. Staff Expertise

The RTC is well-positioned to undertake the ambitious Carbon-Free Shared Mobility Project, drawing upon a robust organizational framework and a team equipped with the requisite knowledge, expertise, and qualifications. As an organization committed to GHG reductions, RTC has cultivated a skilled and diverse staff capable of navigating the intricacies of sustainable urban mobility planning and implementation. With a proven track record in coordinating sustainable mobility initiatives, the team possesses a deep understanding of the unique challenges and opportunities associated with the proposed Project's goals and GHG reduction measures. The other attachment form includes a separate team biography attachment with resumes of key staff who will be involved in implementing this Project.

Angela Brookins, Senior Financial Analyst for the RTC, has over a decade of experience in federal grant management. This includes researching grant opportunities and responding to discretionary and formula grants and coordinating with federal agencies and management. She prepares drawdown submissions, federal financial reports, milestone progress reports, federal obligation reports, grant budget revisions, grant closeouts, and quarterly overviews of grant reporting for federal agencies and

RTC management. Her role for this Project will help to ensure that the RTC is meeting reporting requirements and maintaining compliance with EPA guidelines and regulations.

Roger Johnson, Manager of Zero Emission Fleet Technology for the RTC, has over 20 years of experience in preventive maintenance, quality control and managing and procuring fleet vehicles and supporting infrastructure. He develops, plans, and directs the purchase, operation and disposal of fleet vehicles; creates specifications for hydrogen and electric public transit vehicles; develops training programs to support new technologies; supports operations and planning departments through fleet acquisition and retirement; and works with consultants to develop fuel stations and electrification of facilities. Roger is the project manager for the zero-emissions vehicle portion of this Project.

Daniel Fazekas, Manager of Transportation Planning for the RTC, has over a decade of experience in transportation planning in local government. He is involved in a variety of transportation and regional planning studies such as the On-Board Mobility Plan. Prior to joining the RTC in 2016, Fazekas helped develop the regional sustainability plan called Southern Nevada Strong. Daniel is the project manager for RTC Bike Share and will be involved in the expansion of the program to Maryland Parkway and UNLV.

SECTION 7: BUDGET

Details of the costs associated with the Project is included in the Budget Narrative and Budget Spreadsheet attachments.

