



REGIONAL TRANSPORTATION  
COMMISSION OF WASHOE COUNTY

## ***SUSTAINABILITY PLAN***



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***Prepared for:***



**Regional Transportation Commission of Washoe County**

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# CONTENTS

Acronyms and Abbreviations .....	ii
Letter from the Executive Director .....	iii
Executive Summary .....	ES- I
Sustainability Plan .....	I
Commitment to Sustainability .....	I
RTC Overview .....	I
Regional Setting .....	2
Operational Context .....	2
APTA Sustainability Commitment .....	7
APTA Core Principles .....	7
Application for Recognition .....	9
Sustainability Accomplishments .....	10
Transit Fleet .....	11
Facilities and Offices .....	19
Employee Programs .....	28
Sustainable Business Practices .....	28
Streets and Highways .....	29
Land Use and Transportation Connections .....	33
Regional Collaboration and Public Education .....	37
Future Improvements .....	38
Ongoing Commitment to Sustainability .....	38
Monitoring, Implementation, and Ongoing Reporting .....	42
References .....	43
Acknowledgements .....	44
Appendix A–Sustainability Inventory .....	A- I

# ACRONYMS AND ABBREVIATIONS

ADA	Americans with Disabilities Act of 1990
APTA	American Public Transportation Association
BRT	bus rapid transit
BTU	British thermal unit
CIR	cold-in-place recycling
CMAQ	Congestion Mitigation and Air Quality Improvement Program
CNG	compressed natural gas
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
EPA	Environmental Protection Agency
FY	fiscal year
GHG	greenhouse gas
HVAC	heating ventilation and air conditioning
IDT	interdisciplinary team
kW	kilowatt
kWh	kilowatt hour
LED	light emitting diode
LEED	Leadership in Energy and Environmental Design
LID	low impact development
MPO	Metropolitan Planning Organization
NDOT	Nevada Department of Transportation
NO <sub>x</sub>	nitrogen oxides
PM <sub>2.5</sub>	particulate matter, <2.5 micrometers
PM <sub>10</sub>	particulate matter, <10 micrometers
PV	photovoltaic
RRIF	regional road impact fee
RTC	Regional Transportation Commission of Washoe County
RTIP	Regional Transportation Improvement Program
RTP	Regional Transportation Plan
SEC	Southeast Connector
SPINN	Sustainability Partners in Northern Nevada
SOV	single-occupancy vehicle
SRTS	Safe Routes to School
TOD	transit-oriented development
UNR	University of Nevada, Reno
VOC	volatile organic compound
VMT	vehicle miles traveled



## LETTER FROM THE EXECUTIVE DIRECTOR

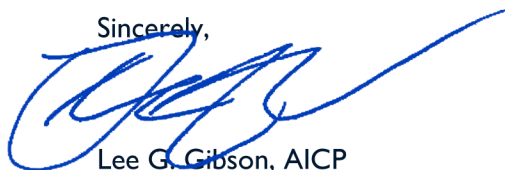
I am pleased to present the Regional Transportation Commission of Washoe County (RTC) Sustainability Plan. This comprehensive plan was developed using best practices from transit industry peers and is consistent with RTC policies, goals, and objectives. Sustainability is a core principle of the RTC, and it encompasses all areas of the organization. From providing safe and reliable transportation alternatives to using alternatively powered vehicles in our fleet, including fully electric buses. The RTC promotes sustainability through the services we offer and the projects we deliver and in our daily operations. For example, the RTC will complete construction on the 4th Street/Prater Way Bus Rapid Transit (BRT) project in 2018, one of the first fully electric BRT lines in the nation. The new Lincoln Line will generate zero emissions and improve transit accessibility between downtown Reno and downtown Sparks. The RTC also operates a commuter vanpool program, which in 2015 helped reduce fuel usage in the Truckee Meadows by over half a million gallons. Additionally, during federal fiscal year 2016, the program eliminated over 10.1 million vehicle miles traveled. This eliminated over 236 thousand pounds of carbon monoxide and 9.5 million pounds of carbon dioxide, resulting in significant air pollution reductions in the Truckee Meadows. Initiatives such as these not only reduce greenhouse gas emissions and traffic congestion but also demonstrate the RTC's commitment to sustainability.

The RTC places a high value on the efficient use of resources and creating operational efficiencies through technology and sustainable building practices. RTC facilities have become more energy efficient with the installation of solar panels and retrofits to lighting and heating/cooling systems. These have helped reduce energy use at RTC facilities by nearly 25 percent from 2010 to 2016. Furthermore, the RTC 4th Street Station and RTC Centennial Plaza transit centers are LEED certified facilities. These sustainability improvements are just some of the practical and cost-effective solutions that allow the RTC to make more efficient use of financial and environmental resources.

In 2011, we formalized this commitment to sustainability by signing the American Public Transportation Association (APTA) Sustainability Commitment. This commitment is a voluntary pledge to adhere to the core principles of sustainability, while continuing to enhance environmental, economic, and social sustainability throughout our agency and across the Truckee Meadows region. The short-term and long-term goals and strategies in this plan represent the RTC's pledge to the APTA commitment and our dedication to becoming a more sustainable organization that benefits our community.

This sustainability plan will serve as a guide for us to use innovative solutions to improve sustainability, from cutting-edge technology to practical cost-effective investments, to promote and incorporate sustainable practices. Across the agency, we are all committed to implementing the plan to make our organization and our community more sustainable.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Lee G. Gibson', is written over the word 'Sincerely,'.

Lee G. Gibson, AICP  
Executive Director

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## EXECUTIVE SUMMARY

The Regional Transportation Commission of Washoe County (RTC) is committed to providing a sustainable transportation system that supports the environmental, social, and economic vitality of the Truckee Meadows community. This commitment is supported through the RTC Sustainability Policy, which was adopted by the RTC Board in 2011, and the 2040 Regional Transportation Plan (RTP), which includes goals and policies promoting healthy and sustainable communities. This sustainability plan builds off this commitment to sustainability by cataloguing recent sustainability accomplishments and identifying short-term and long-term sustainability goals and strategies to achieve them. The plan also complements the RTC's voluntary participation in the American Public Transportation Association's (APTA) Sustainability Commitment Program. The achievements and goals included in this plan helped the RTC apply for and achieve a silver level of recognition through the APTA Sustainability Program.

The practice of sustainability affects all aspects of the RTC, from daily transit operations and maintenance to the planning and engineering of roadways and multimodal infrastructure. This plan catalogs all recent improvements in sustainability across every department in the agency since 2010. To date, the RTC has implemented or achieved 22 different strategies or goals that all improve the overall sustainability of the RTC. These initiatives have helped the RTC significantly reduce its carbon footprint and use of finite resources. In the past six years, criteria air pollutant emissions generated by RTC vehicles fell by 15 percent per passenger trip; greenhouse gas emissions from RTC vehicles fell 10 percent per passenger trip; vehicle energy use fell by nearly 7 percent per passenger trip; and facility energy use fell 32 percent per passenger trip.



Going forward, the RTC will build off this success and continue to improve the overall sustainability of the agency. In order to track the effects of implementing this plan more efficiently, the RTC developed a comprehensive, agency-wide sustainability inventory, which tracks the changes in nine different metrics, including greenhouse gas emissions, water use,

energy use, and recycling and waste diversion. The RTC will use the inventory to track the progress of implementing this plan and for annual reporting to APTA, as part of the Sustainability Commitment Program. Building off the recent sustainability achievements of the RTC, the sustainability plan identifies 24 short-term sustainability goals across the entire agency, which will be implemented within two to three years. These short-term goals are all focused on achieving the six long-term sustainability goals included in the plan. The long-term goals are intended to be completed within five to six years. These ambitious improvements are above and beyond those already accomplished, and they exemplify the RTC's commitment to becoming more sustainable as an agency and a community.

The RTC will regularly report its progress toward achieving these actions and stretch goals through regular updates to the RTC Board of Commissioners and annual reporting to APTA and by periodically updating this sustainability plan, as appropriate.

**Table E.1**, on the following page, summarizes the RTC's sustainability accomplishments and proposed future improvements.

<div>Table E.1</div> <div>Summary of RTC Sustainability Achievements and Commitments</div>		
SUSTAINABILITY THEME	ACCOMPLISHMENTS	IMPROVEMENTS
GREEN FLEETS	<ul style="list-style-type: none"> <li>Reduced energy and emissions through electric and alternative fuel vehicles</li> <li>Improved transit opportunities, with bus rapid transit (BRT) in key corridors</li> <li>Offset single-occupancy vehicle commuter trips and associated emissions with transit and vanpool</li> </ul>	<ul style="list-style-type: none"> <li>Develop a fleet sustainability plan</li> <li>Add additional electric buses to the RTC RAPID fleet, including a zero-emissions, fully electric BRT route</li> <li>Install additional fleet charging infrastructure</li> <li>Increase vanpool participation</li> <li>Adopt idling policy for revenue fleet</li> </ul>
FACILITY ENERGY USE	<ul style="list-style-type: none"> <li>Obtained green building certification for major transit stations</li> <li>Installed solar energy generation systems at three facilities</li> <li>Retrofitted facilities with occupancy sensors, energy efficient lighting, and new heating, ventilation, and air conditioning (HVAC) systems</li> <li>Reduced facility energy usage by 21 percent</li> </ul>	<ul style="list-style-type: none"> <li>Install solar-powered lighting at transit stations</li> <li>Increase the combined energy efficiency of all facilities by 5 percent through interior and exterior lighting retrofits, HVAC monitoring systems and upgrades, and energy efficient window tinting/glazing</li> </ul>
WATER	<ul style="list-style-type: none"> <li>Installed low flow toilets and water-saving fixtures in all facilities</li> <li>Used reclaimed water and reverse osmosis for fleet vehicle washing</li> <li>Used drought-tolerant landscaping and xeriscaping</li> <li>Incorporated low-impact developments (LID) into roadway projects and facilities</li> </ul>	<ul style="list-style-type: none"> <li>Install LID at transit stations</li> <li>Expand the use of xeriscaping and low-water use irrigation systems</li> </ul>
WASTE REDUCTION	<ul style="list-style-type: none"> <li>Reduced agency-wide solid waste generation and recycling by 23 percent</li> <li>Implemented a single-stream recycling program at all facilities, using high-visibility containers</li> <li>Reduced paper ticket use on transit through an electronic fare system</li> <li>Implemented a used battery recycling program</li> </ul>	<ul style="list-style-type: none"> <li>Reduce paper use by 10 percent by implementing a sustainable purchasing policy</li> <li>Increase waste diversion another 5 percent through recycling and composting</li> <li>Reduce hazardous waste and chemical use in all facilities</li> <li>Implement composting program at select administrative and transit facilities</li> </ul>
LAND USE AND TRANSPORTATION CONNECTIONS	<ul style="list-style-type: none"> <li>Adopted a Complete Streets Master Plan and implemented a complete streets program</li> <li>Promoted transit-oriented development</li> <li>Reduced vehicle trips through the employee trip reduction program</li> <li>Worked with the Safe Routes to School (SRTS) coordinator to support sustainable transportation to schools</li> <li>Achieved Bicycle-Friendly Business recognition</li> <li>Addressed the first mile/last mile challenge by implementing and promoting bicycle infrastructure and culture</li> </ul>	<ul style="list-style-type: none"> <li>Continue implementing complete streets projects</li> <li>Expand BRT services along the Virginia Street corridor</li> <li>Expand BRT to a second key corridor</li> <li>Enhance multimodal connectivity, including along the Southeast Connector route</li> <li>Continue promoting Safe Routes to School (SRTS) through coordination with the SRTS coordinator</li> <li>Continue promoting bicycle infrastructure and culture by installing new bicycle repair stations at key transit stops</li> </ul>
STREETS AND HIGHWAYS	<ul style="list-style-type: none"> <li>Used cold-in-place recycling (CIR) techniques to reduce the embodied energy of road construction</li> <li>Used pervious paving, where possible</li> <li>Maintained regional roadways through regular pavement preservation</li> <li>Improved multimodal safety, capacity, and efficiency through intersection improvements, intelligent transportation systems, and new roadway projects</li> </ul>	<ul style="list-style-type: none"> <li>Continue using CIR techniques</li> <li>Explore new applications for pervious paving</li> <li>Provide needed multimodal capacity with the opening of the Southeast Connector</li> <li>Continue pavement preservation program and implementation in coordination with the Complete Streets Master Plan</li> </ul>
EDUCATION AND COMMUNICATION	<ul style="list-style-type: none"> <li>Participated as an active member of Sustainability Partners in Northern Nevada</li> <li>Incorporated sustainability principles and objectives in public outreach and communication</li> </ul>	<ul style="list-style-type: none"> <li>Include sustainability as an agenda item at RTC all-staff meetings</li> <li>Establish an RTC green team to communicate and implement sustainability objectives</li> </ul>
SUSTAINABLE BUSINESS PRACTICES	<ul style="list-style-type: none"> <li>Used electronic systems to reduce paper use and waste</li> <li>Employed sustainable janitorial practices and on-site ecological safeguards</li> <li>Implemented sustainable purchasing program for cups, plates, utensils and related supplies</li> </ul>	<ul style="list-style-type: none"> <li>Reduce transit operating expenses by 2 percent</li> <li>Implement ISO 14001, or similar compliance program</li> <li>Achieve Green Business Certification status</li> </ul>

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# SUSTAINABILITY PLAN

## COMMITMENT TO SUSTAINABILITY

In 2011, the RTC Board of Commissioners adopted a sustainability policy. This formalized the agency's commitment to promote and continually advance sustainable practices throughout the organization. Subsequently, as part of the 2035 and 2040 Regional Transportation Plan (RTP) update processes, the RTC worked closely with the community to identify overarching themes. Because sustainability emerged as one of the central themes, it was a guiding principle of the 2035 RTP and has been carried forward into the new 2040 RTP. As one of five guiding principles in the plan, sustainability principles strongly influence short- and long-term RTC planning goals and infrastructure investments. With Board of Commissioners' support and overarching policy guidance in the RTP, agency leadership and staff are working to advance sustainability practices in the RTC and throughout the region. Consistent with its sustainability policy, the RTC has incorporated electric buses into its transit fleet, added a bus rapid transit (BRT) system along a section of the region's most urbanized corridor, implemented a robust complete streets program, and constructed two Leadership in Energy and Environmental Design (LEED) certified transit centers. Moreover, through a combination of building energy efficiency retrofits and rooftop solar facilities, the RTC reduced its overall stationary source, fossil fuel consumption by more than 20 percent. This plan highlights these and many other recent sustainability accomplishments and lays the groundwork for ongoing sustainability improvements.

### WHAT IS SUSTAINABILITY?



The American Public Transportation Association defines sustainability as follows:

- Employing practices in design and capital construction, such as using sustainable building materials, recycled materials, and solar and other renewable energy sources, to make facilities as 'green' as possible
- Employing practices in operations and maintenance such as reducing hazardous waste, increasing fuel efficiency, creating more efficient lighting, and using energy-efficient propulsion systems
- Employing community-based strategies to encourage land use and transit-oriented development designed to increase public transit ridership

## RTC OVERVIEW

Formed by the Nevada State Legislature in 1979, the RTC has three primary functions: it serves as the designated Metropolitan Planning Organization (MPO) in Washoe County; is the region's transit service provider; and is responsible for planning, designing, and constructing a regional roadway network. The RTC incorporates sustainability into each of these three functional areas.



## REGIONAL SETTING

While the MPO boundary includes nearly all of Washoe County, the RTC's primary service area, also referred to as the Transportation Management Area, is within the cities of Reno and Sparks. The remaining lands in Washoe County are either public lands administered by the federal government or are rural communities and private ranchlands. The Tahoe MPO oversees transit and transportation planning in the portion of southern Washoe County within the Lake Tahoe Basin.

In 2016, there were nearly 330,000 people in the RTC service area. After experiencing stagnant growth during the recession, the Reno-Sparks metropolitan area population is expected to increase over the coming years. Anticipated growth is due, in part, to the recent interest in the region as a hub for large-scale industrial development. Companies such as Tesla, Amazon, and Wal-Mart have manufacturing or distribution centers (**Figure 1**) that employ many workers in the region.

Data centers, such as the one owned by Switch, are also spurring additional interest in the region as a center for high-tech industries. Nevada's tax laws also make the region attractive for businesses and retirees moving from California.



**Figure 1, Amazon distribution center in Reno, Nevada (Reno Gazette-Journal 2015)**

The land use pattern in the service area includes a mix of urban commercial corridors and centers, established neighborhoods, office and light industrial areas, and suburban residential communities. Recently, land use planning in the region has begun focusing on a more compact urban growth pattern with an emphasis on infill and redevelopment in existing residential and commercial areas. At the same time, suburban residential growth and industrial development continues, especially in the northern and southern portions of the service area.

## OPERATIONAL CONTEXT

The five-member RTC Board of Commissioners governs the agency. Board membership consists of two members each from the Reno City Council and Washoe County Board of County Commissioners and one member from the Sparks City Council. Also included is the Nevada Department of Transportation (NDOT) Director as a nonvoting, ex officio member. An executive leadership team, consisting of the Executive Director and Directors of Public Transportation and Operations, Engineering, Planning, Finance, and Administrative Services, oversees the agency's departments and a staff of approximately 60.

## MPO/PLANNING

As the MPO, the RTC is responsible for developing the following core planning documents:

- 20-year RTP
- 5-year Regional Transportation Improvement Program (RTIP)
- 2-year Unified Planning Work Program (UPWP)
- Public Involvement Plan (PIP)

A unique Nevada state law that applies only to Washoe County requires the plans of affected entities, such as the RTC, to conform to the goals and policies in the Truckee Meadows Regional Plan. Administered by the Truckee Meadows Regional Planning Agency, the plan sets the region's overarching vision for land use, infrastructure, and natural resources. The RTP and RTIP conform to the regional plan by providing new transportation infrastructure to support population growth in the region's urban centers and corridors.

Sustainability is an underlying theme in the regional plan. It emphasizes compact urban development, multimodal transportation options, infill development, and efficient transit options. The RTP and RTIP fully support these regional sustainability objectives.

## TRANSIT SERVICE

As the region's transit service provider, the RTC operates the regional transit system, which includes the fixed route bus system (RTC RIDE and RTC RAPID), RTC ACCESS paratransit demand-response service, and RTC VANPOOL. The fixed route bus system provides transit



service along 26 routes, including BRT on Virginia Street and commuter service between Reno and Carson City via RTC INTERCITY (**Figure 2**). The RTC also operates the RTC SIERRA SPIRIT, which is a low-cost circulator service linking downtown Reno with the University of Nevada, Reno (UNR) campus.

**Figure 2, Transit services (RTC 2017)**

## CONSTRUCTION (ROADS)

The RTC's third function is to plan, design, and build the regional roadway network. In this role, the RTC uses pavement preservation techniques to ensure the longevity of existing roads. Where additional capacity is needed, the RTC plans, designs, and constructs new or expanded roadway infrastructure and intersection improvements.

## FACILITIES

RTC facilities include two transit centers, four administrative facilities, and hundreds of transit stops. Transit centers are the RTC's public-facing facilities, whereas the administrative facilities provide employee office space and vehicle maintenance and storage. Each of these facility types includes unique sustainability elements.

## TRANSIT CENTERS AND STATIONS

The RTC owns and operates two transit centers in the region: RTC 4TH STREET STATION in Reno and RTC CENTENNIAL PLAZA in Sparks. These centers serve as regional transit hubs and are primary transfer points for many RTC fixed-route transit services.

### RTC 4TH STREET STATION

Opened in October 2010, RTC 4TH STREET STATION is the RTC's newest transit center (**Figure 3**). This modern 8,400-square-foot facility replaced the former CITICENTER transit facility in downtown Reno. The new center occupies a 2.6-acre site in downtown Reno, near the Reno Aces Baseball Stadium. The transit center serves as the main regional hub for transit services, including backbone north-south transit routes along Virginia Street and east-west routes along East 4th Street/Prater Way. The station is the northerly terminal for RTC RAPID



**Figure 3, RTC 4TH STREET STATION (RTC 2017)**

services along Virginia Street and will be the westerly terminal for BRT services along East 4th Street/Prater Way, which is currently under construction and scheduled to begin service in 2019. Within a mile of the RTC 4TH STREET STATION, riders can walk to Aces Stadium, the Reno Convention Center, National Bowling Stadium, the Downtown Reno Riverwalk District and Truckee River whitewater park, Reno City Hall, the Reno Arch, as well as many hotels, restaurants, and downtown residences.

In making the decision to relocate the transit center, the RTC Board committed to incorporate green building practices into the location, design, and construction of the new facility. Specifically, 4TH STREET STATION is a LEED Gold Certified building (see *Sustainability Accomplishments*, below, for green building details). Site and building design features reduce

energy and water use, support waste reduction, promote multimodal transportation options, and provide passengers with clean, healthy, indoor air quality.

As described in *Sustainability Accomplishments*, below, the RTC 4TH STREET STATION is the hub for the RTC's expanding electric bus fleet. Integrated in one of the station's terminals are two 62.5-kilowatt (kW) overhead charging systems, which can seamlessly charge the RTC's four fully electric buses. To properly accommodate the expanding electric bus fleet, the RTC will be installing new chargers and expanded capacity for additional chargers.

#### CENTENNIAL PLAZA

Opened in October 2008 on Victorian Avenue in downtown Sparks, CENTENNIAL PLAZA is the primary hub for RTC's transit services in the eastern portion of the Truckee Meadows. CENTENNIAL PLAZA is within close walking distance of Victorian Square and the Nugget Hotel/Casino, where, in the summer, special events bring thousands of visitors to the area. The facility will also be an important multimodal access point for the Fountainhouse residential community being constructed across the street on Victorian Avenue. CENTENNIAL PLAZA will also become the eastern terminal of the newest RTC RAPID BRT route, which is under construction along East 4th Street/Prater Way. Like the RTC 4TH STREET STATION, RTC CENTENNIAL PLAZA is LEED Certified, highlighting the use of sustainable design and building practices (see *Sustainability Accomplishments*, below, for green building details).

#### TRANSIT STATIONS

In addition to the RTC 4TH STREET STATION and RTC CENTENNIAL PLAZA transit centers, the RTC owns and operates hundreds of local transit stops throughout the service area, including eight new RTC RAPID BRT stations (**Figure 4**) along Virginia Street. Basic transit stops include benches, waste bins, and informational signs. BRT stations include shade structures, raised platforms, benches, signs, lighting, and waste bins. Transit stops and stations provide important nodes for non-automobile access throughout the region. Their importance in supporting a sustainable land use pattern and overall regional sustainability is discussed in further detail below.



**Figure 4, RTC RAPID STATION along Virginia Street (RTC 2017)**



## ADMINISTRATIVE FACILITIES

The RTC's four administrative facilities provide for a combination of office space and vehicle maintenance and storage. Following a multiyear effort to consolidate administrative functions, nearly all administrative office space is now in a single office building on Terminal Way in Reno. The three other facilities—Villanova, Sutro, and 6th Street—are used primarily for vehicle maintenance and storage.

### TERMINAL WAY FACILITY

The Terminal Way Facility is a three-story, 30,500-square-foot office building constructed in 1983. It provides approximately 18,300 square feet of office space for the agency's engineering, planning, transit, communication, financial, and other administrative functions. The building also includes approximately 12,200 square feet of leased tenant space; it is 100 percent occupied.

As discussed under *Sustainability Accomplishments*, below, the RTC is continually investing in sustainability upgrades and operational improvements for the Terminal Way Facility. For example, in 2011, with funding through the American Recovery and Reinvestment Act and NV Energy's RenewableGenerations and Sure Bet Programs, the RTC installed rooftop photovoltaic (PV) solar panels. Other energy-related upgrades are lighting retrofits, heating and cooling system upgrades, and occupancy sensor installations. Water-saving upgrades include low-flow toilets and mechanical auto shutoff faucets in all restrooms.

### VILLANOVA FACILITY

The Villanova Facility previously housed the RTC Executive and Public Transportation-Operations staff and its Board of Commissioners boardroom. It also served as a storage and maintenance facility for RTC RIDE buses. In 2012, the agency began transitioning the building away from administrative uses, and by late 2017 it will be used exclusively for vehicle maintenance, washing, and storage. Nearly all of the redesigned 90,175-square-foot facility is under a raised portion of Interstate 580 in Reno. (See *Sustainability Accomplishments*, below, for more information regarding the facility's water and energy-saving features.)

### SUTRO FACILITY

In the past, the 9,700-square-foot Sutro Facility provided office space for RTC Planning and Facilities Maintenance staff; now it is used primarily as the headquarters for the RTC ACCESS program and fleet. Using the same renewable energy funding mechanisms described above for the Terminal Way Facility, the RTC added on-site solar PV energy generation at the Sutro Facility. Additional energy efficiency efforts are described under *Sustainability Accomplishments*, below.

### 6TH STREET FACILITY

The 6th Street Facility includes approximately one acre of storage area for the RTC ACCESS fleet and a 1,550-square-foot, single-story office building. The office building is dedicated entirely for use by RTC ACCESS personnel.

## APTA SUSTAINABILITY COMMITMENT

As part of the agency's overall commitment to sustainability, the RTC Board of Commissioners directed staff in 2010 to participate in the American Public Transportation Association's (APTA) Sustainability Commitment Program. APTA's program provides a framework in which agencies can track and report on progress toward achieving sustainability goals. Through the program, transit agencies measure and identify sustainability actions for its fleets, facilities, and operations. Participating in the program is voluntary and begins with an initial commitment to a set of core principles. As signatory agencies become more proficient and active in advancing their sustainability efforts, they can receive higher levels of recognition. From the entry level, the increasing levels of recognition are bronze, silver, gold, and platinum. The RTC became an entry-level signatory agency in 2010.



### APTA CORE PRINCIPLES

As an entry-level signatory, the RTC committed to meeting APTA's four core principles. Listed below are the four core principles and a summary of how the RTC has achieved each one.

#### **Core Principle 1: Make sustainability part of the agency's strategic objectives**

The RTC Board of Commissioners' adoption of an agency-wide sustainability policy in 2011 formalized its commitment to promote and continually advance sustainable practices. Adopting this policy coincided with the RTC's participation in the APTA Sustainability Commitment Program. The RTC Board of Commissioners is expected to update this policy in 2017. The 2040 RTP, adopted in 2017, further describes the RTC's current and ongoing commitment to supporting a sustainable region through transit, community planning, and natural resource protection. Sustainability is a cornerstone of the agency's strategic planning objectives and its day-to-day transit operations, highways program, and administrative functions.

#### **Core Principle 2: Identify a sustainability champion within the organization**

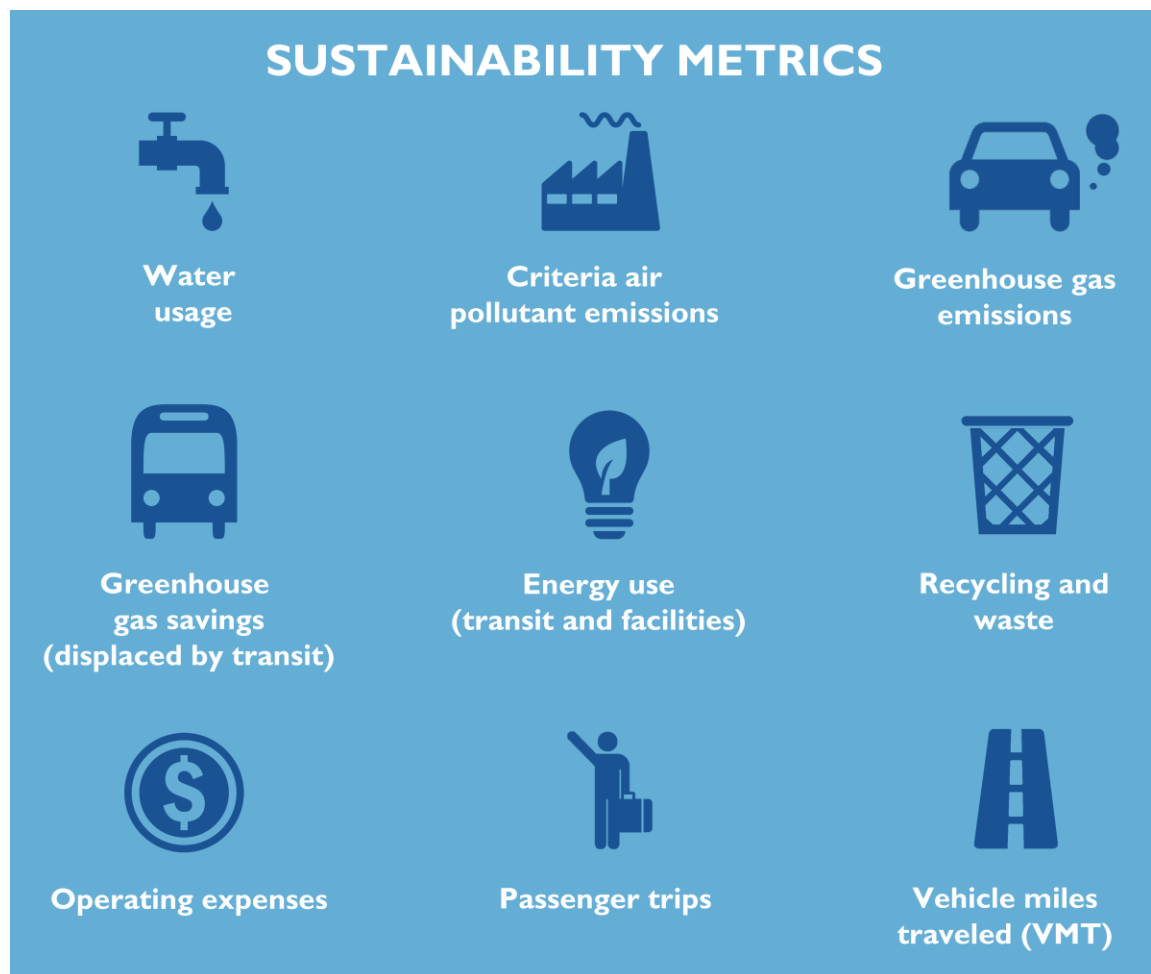
The RTC is fortunate to have many sustainability champions, including its executive director, department directors, facilities and fleet managers, and other staff. In 2016, the RTC assigned its sustainability portfolio to a single project manager, who is responsible for coordinating and reporting on the agency's sustainability efforts. The sustainability project manager is supported by an interdisciplinary team (IDT) of experts in the agency's various program areas. Each of these IDT members is proficient in sustainable practices relative to his or her area of expertise. With input from the IDT, the sustainability project manager oversaw the development of this plan and will be responsible for ongoing reporting through APTA.

#### **Core Principle 3: Establish an employee outreach program that informs staff how to advance the agency's sustainability mission, such as through weekly meetings, communication programs, and updates, regarding the agency's progress toward its sustainability goals**

Sustainability IDT members regularly share sustainability objectives and progress with their teams. For example, the RTC facilities supervisor distributes agency-wide e-mail notices, informing staff of recent sustainability initiatives and best practices. A recent internal communication informed staff about energy efficiency upgrades and new recycling containers at the Terminal Way Facility. In developing this plan, the sustainability IDT met regularly to provide input and share information on the agency's various programs. RTC staff also provide periodic sustainability updates to the RTC Board of Commissioners.

***Core Principle 4: Prepare a sustainability inventory; the data-driven inventory requires signatory agencies to establish a baseline for nine sustainability metrics and a set of normalization factors, from which progress can be measured***

The RTC completed Core Principle 4 in 2016 by making a comprehensive sustainability inventory, which includes data for the agency's transit system and facilities. The inventory (**Appendix A**) addresses nine sustainability metrics (see **Figure 5**).



**Figure 5, Sustainability Metrics (APTA 2012)**



Inventory data are current through 2016. Where possible, the inventory also includes prior year data, which allows the RTC to mark progress, relative to several sustainability metrics. For APTA reporting, the RTC is using 2010 as the baseline year for all metrics except recycling, which uses 2015 as the baseline year.

The inventory also includes data for the following nine normalization factors:

- Passenger miles traveled
- Vehicle revenue hours
- Vehicle miles
- Vehicle revenue miles
- Unlinked passenger trips
- Produced seat miles
- Revenue vehicle length
- Service area population
- RTC employees

These normalization factors, when applied to a sustainability metric, provide needed context and assist the RTC in describing its progress toward meeting certain sustainability objectives.

## **APPLICATION FOR RECOGNITION**

Achieving higher recognition levels through the APTA program requires signatories to first adhere to the core principles, then to set and achieve increasingly more rigorous sustainability targets. The APTA Sustainability Commitment recognizes signatories through their achievement of a combination of action items, reduction factors, and stretch goals. Action items are 1- to 2-year commitments, which might include actions related to operations, maintenance, facilities, or public outreach. Reduction targets are based on the sustainability inventory and generally relate to one of the nine sustainability metrics. Stretch goals are 3- to 5-plus-year, policy-level commitments that challenge the signatory agency to achieve comprehensive organizational and functional changes. As signatories advance through the recognition levels, the number of required action items, reduction targets, and stretch goals increases. For example, Bronze recognition, which is the next level above entry, requires signatory agencies to demonstrate their achievement of five action items, while committing to five additional action items. For Platinum, the highest recognition level, agencies must meet 40 action items, meet and commit to a series of reduction targets (with the most aggressive being a 20 percent reduction), meet six stretch goals, and set three additional stretch goals. Out of the approximately 130 signatories to the APTA Sustainability Commitment, roughly 40 have Bronze, Silver, Gold, or Platinum status.

In May 2017, APTA awarded the RTC with Silver level recognition. The RTC is one of fewer than 30 signatories with a Silver level recognition or higher. Silver level recognition shows that the RTC demonstrated a combination of existing sustainability accomplishments and future sustainability commitments.

The sections below describe the RTC’s sustainability accomplishments and establish the baseline from which future sustainability commitments are based. For the purposes of APTA reporting, the RTC identified 22 completed sustainability action items and achievement of at least a 2 percent reduction for three sustainability indicators.

In the sections below, sidebars such as the example to the right indicate achieved action items and reduction factors for APTA reporting.

**Achieved Action Item**  
*Obtain LEED Green Building certification for RTC facilities*

### RTC COMMITMENT

Achieving Silver level recognition reflects the RTC’s ongoing sustainability commitment. In addition to the accomplishments described in this sustainability plan, the RTC is committed to the following:

- **24** new action items
- **2** percent reduction for **two** additional indicators
- **5** percent reduction for another **three** indicators
- **6** stretch goals

The final section of this plan describes the RTC’s ongoing improvements and future sustainability commitments. It also lists the action items, reduction targets, and stretch goals that the RTC will strive to achieve and will be reporting to APTA over the coming years.

## SUSTAINABILITY ACCOMPLISHMENTS

Adopted in 2011, the RTC’s sustainability policy states that it “shall provide a safe, effective, and efficient transportation system that addresses environmental, social, and economic sustainability issues....” Through its major public transportation programs—RTC RIDE, RTC SMART TRIPS, planning initiatives, and RTC VANPOOL—and its highways program, the RTC provides safe, efficient, and convenient multimodal transportation options that are environmentally, socially, and economically sustainable. Since adopting the sustainability policy, the RTC’s sustainability accomplishments have advanced beyond its fleet and highways programs. Sustainability is now an essential facet of all RTC facilities, programs, and operations. It is also a foundational theme in the RTP. The RTC intends to update its sustainability policy in 2017.

### RTC SUSTAINABILITY POLICY

The RTC shall provide a safe, effective, and efficient transportation system that addresses environmental, social, and economic sustainability issues. By providing sustainable transportation, the RTC can play an active role in improving the health and economic competitiveness of the region, as well as reduce costs by using resources more efficiently.

**Achieved Action Item I**  
*Incorporate sustainability as a foundational theme in the RTP*

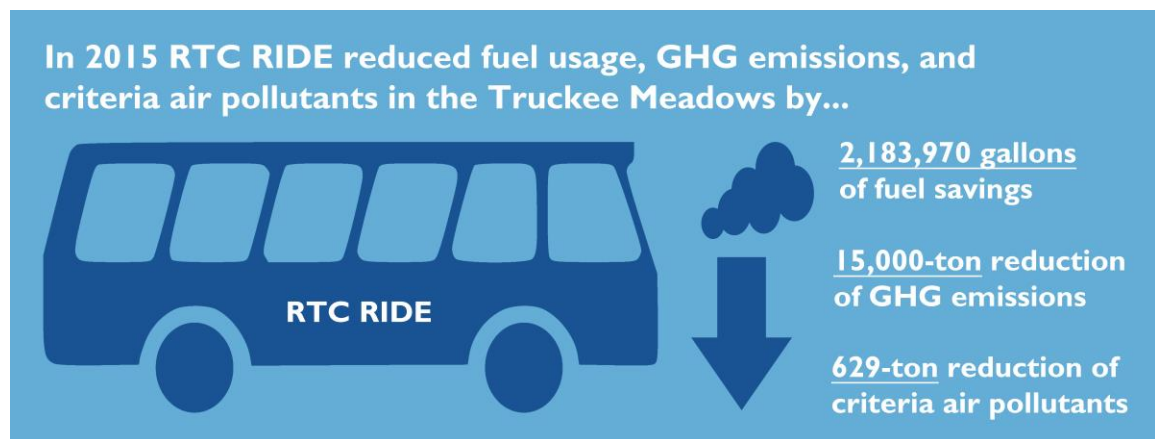
## TRANSIT FLEET

A safe and efficient public transportation system is an essential element of regional sustainability. Transit displaces greenhouse gases (GHGs), ozone, and other air pollutants that would otherwise be emitted from private automobiles. Transit also supports an active, healthy lifestyle, where transit riders can walk or bicycle to and from transit stations. The RTC's transit fleet has four components: fixed route buses, commuter buses, vanpool, and demand response paratransit.

### FIXED ROUTE BUSES

There are 66 active vehicles in the RTC RIDE and RTC RAPID bus fleet. They provide transit service throughout a 90-square-mile service area. Of these vehicles, there are 52 40-foot and eight 60-foot articulated standard diesel fuel models, two 40-foot hybrid diesels, and four 35-foot 100 percent electric buses. The eight 60-foot articulated buses comprise the RTC RAPID fleet.

The RTC RIDE fleet has a total seating capacity of over 3,100 seats, and all buses are accessible under the Americans with Disabilities Act (ADA). In 2015, RTC RIDE buses traveled a combined 2.94 million miles, enough to circle the globe 118 times. Fixed route buses provided over 8 million unlinked passenger trips and carried passengers a combined distance of over 23.6 million miles. In the process, diesel and hybrid buses consumed nearly 525,000 gallons of diesel fuel, while the electric buses used approximately 23,400 kilowatt hours (kWh) of electricity. However, in 2015, compared with single-occupancy vehicles (SOVs) and considering the congestion mitigation effects of transit, RTC RIDE reduced private vehicle fuel use by nearly 2,183,970 gallons and avoided over 15,000 tons of GHGs (**Figure 6**). RTC RIDE also mitigated 629 tons of criteria air pollutants (US Environmental Protection Agency [EPA] 2016).



**Figure 6, RTC Ride Fuel and Pollutant Reductions (EPA 2016)**

## BUS RAPID TRANSIT

Recognizing the need for high-capacity, rapid transit service in the Virginia Street corridor, the RTC began offering its signature BRT service, RTC RAPID (**Figure 7**), in 2013. It provides service along an approximately 4.5-mile transit corridor, from the RTC 4TH STREET STATION



**Figure 7, RTC RAPID (RTC 2017)**

to Meadowood Mall. RTC RAPID functions like light rail in that it offers a fixed route service with level boarding stations and is served by 60-foot articulated vehicles. There are eight vehicles in the RTC RAPID fleet, each with a combined seating and standing capacity of 89 passengers. Design improvements along Virginia Street, coupled with signal timing technology, allows RTC RAPID buses to travel up and down Virginia Street faster than regular transit buses.

All RTC RAPID vehicles are powered by 330-horsepower, hybrid diesel/electric engines. In fiscal year (FY) 2015/2016, RTC RAPID buses traveled 280,500 miles and moved all passengers a combined distance of over 4.6 million miles. Accounting for congestion mitigation effects and the energy savings of using transit over single-occupancy vehicles, RTC RAPID service saved approximately 474,000 gallons in fuel, which reduced GHG emissions by over 3,400 tons and criteria air pollutants by over 120 tons.

### **Achieved Action Item 2**

*Implement BRT services on one major transit corridor*

The RTC is rapidly expanding its RTC RAPID service in the community. Construction is underway on a new RTC RAPID 4th Street/Prater Way Bus RAPID Transit Project, which will connect RTC 4TH STREET STATION in Reno and RTC CENTENNIAL PLAZA in Sparks. This BRT line will be one of the first fully electric routes in the nation. Including \$16 million in funding through the federal Transportation Investment Generating Economic Recovery grant program, the project is part of a \$58 million investment in the community to improve safety and mobility and to advance sustainability.

The new RTC LINCOLN LINE, expected to come online in 2019, will be a zero-emissions route served by four new 100 percent electric buses. In addition to the new electric RAPID

*The new RTC LINCOLN LINE, expected to come online in 2019, will be a zero-emissions route served by four new 100 percent electric buses. It will be one of the first fully electric routes in the nation.*

service, there will be eight new stations, wider sidewalks and bike lanes along 4th Street and Prater Way, and new landscaping. All utilities will be placed underground.

As part of a comprehensive vision involving the City of Reno, NDOT, UNR, the Washoe County Health District, and the RTC, the Virginia Street Bus RAPID Transit Extension Project will expand RTC RAPID service northward, from 4TH STREET STATION to the UNR campus. The 1.8-mile extension will enhance the existing transit network and will provide a quicker,

safer, and more convenient multimodal connection between the university and popular locations along the Virginia Street corridor. Extending RTC RAPID service will eliminate the need for passengers to transfer at 4TH STREET STATION, saving passengers 12 to 20 minutes.

In addition to expanding transit service and adding five new RTC RAPID transit stations (**Figure 8**), the project will add, repair, and expand sidewalks along the corridor, including bringing them into compliance with current ADA standards. These improvements will enhance walkability and overall mobility throughout the Virginia Street corridor. The project is scheduled for completion in 2019.



**Figure 8, RTC RAPID Station (Car Talk 2014)**

This project advances the RTC's sustainability commitment by providing expanded transit service to one of the region's largest employment and residential centers, UNR. With a student, faculty, and staff population of 20,000, UNR is a logical nexus for expanded multimodal connectivity. The RTC anticipates that the corridor improvements will reduce the number of vehicle trips in the corridor, thereby reducing criteria air pollutant and GHG emissions.

### **ELECTRIC BUSES**

In 2012, with funding through the Federal Transit Administration's Small Starts Program and



**Figure 9, RTC SIERRA SPIRIT (RTC 2017)**

Federal Highways Administration Congestion Mitigation and Air Quality Improvement (CMAQ) Program, the RTC purchased and began operating four 100 percent electric buses (**Figure 9**) replacing four diesel-powered vehicles on the RTC SIERRA SPIRIT route.

Each 35-foot long Proterra EcoRide transit vehicle is battery powered with a standard range of more than 50 miles between charges. The buses use approximately 1.7 kilowatts of energy per mile travelled, which is the same as 0.04 gallons of diesel or gasoline or the equivalent of about 19 miles per gallon (MPG). For comparison, a standard diesel bus averages 4 MPG. In 2015, RTC electric buses traveled a combined 452,000 miles, providing over 1.1 million passenger trips. These 100 percent electric trips resulted in zero air or GHG emissions. Operating the electric buses instead of diesel-powered vehicles saves nearly 340 barrels of oil per

**Achieved Action Item 3**  
*Achieve partial electrification  
of RTC RIDE transit fleet*

year. Accounting for the region's mix of energy sources, the RTC estimates that the electric vehicles reduce greenhouse gas emissions by more than 60 percent compared with diesel buses, or the equivalent of 190 tons of GHGs annually.

The RTC 4TH STREET STATION transit facility is equipped with a 62.5-kW overhead charging system. Using this system, electric buses can receive a quick charge in as little as three minutes. In January 2017, the RTC Board of Commissioners approved funding for the purchase of new charging infrastructure to support an expanding electric vehicle fleet. The new 62.5 kW charging systems will be installed at the Villanova Facility. There could also be future installations at RTC 4TH STREET STATION and RTC CENTENNIAL PLAZA.

Beginning in October 2017, there will be five new electric buses in the RTC RIDE fleet. These zero emission vehicles will replace half of the remaining active model year 2004 or older vehicles. Phasing out the older vehicles will greatly improve the fleet's energy efficiency while reducing criteria air pollutant and GHG emissions. Starting in 2019, the new electric buses will anchor the zero emission RTC LINCOLN LINE BRT route along 4th Street/Prater Way. Assuming the new buses travel similar distances as the current 2004 diesel buses, the electric vehicles would save over 30,000 gallons in fuel, eliminate criteria air pollutant emissions, and avoid 240 tons of GHG emissions.

The RTC is actively seeking funding sources and evaluating opportunities to expand the number of electric vehicles in its RTC RIDE fleet. Eventually, the RTC hopes to have a 100 percent electric RTC RIDE fleet. See the *Future Improvements* section, below, for further discussion on the RTC's short- and long-term sustainability actions and goals.

#### **DIESEL HYBRID ELECTRIC BUSES**

In addition to the four fully electric buses, the RTC RIDE fleet includes 10 diesel hybrid electric vehicles (HEVs). The 40-foot long Gillig Corporation buses (**Figure 10**) have an Allison Hybrid H40/50 EP



**Figure 10, RTC RIDE (RTC 2017)**

electrical transmission system that supplements the standard diesel engine. The HEVs provide passengers with a quiet, comfortable ride. This is because hybrid technology allows for smoother acceleration and braking and quieter operation.

The HEVs also advance the RTC's sustainability commitment by reducing fuel consumption and emissions. In 2015, the RTC RIDE HEVs traveled over 484,000 miles. Compared with 10 standard diesel buses traveling the same distance, the HEVs used approximately 7,000 fewer gallons of fuel, resulting in a 20 percent overall GHG emissions savings. Through reduced emissions during idling and in-traffic use, the buses also reduce criteria air pollutant emissions by up to 90 percent.



## COMMUTER BUSES

RTC INTERCITY provides weekday commuter service, bridging the approximately 30 miles between Reno and Carson City. The RTC INTERCITY fleet includes three 40-foot diesel buses. In 2015, these buses traveled 114,500 miles, provided 36,100 unlinked passenger trips, and carried commuters a total distance of nearly 907,500 miles. Commuter buses consumed approximately 24,200 gallons of diesel fuel in 2015; however, compared with SOV commutes, RTC INTERCITY reduced private vehicle fuel use by nearly 48,000 gallons and avoided 378 tons of GHGs and 19 tons of criteria air pollutants.

RTC RIDE and INTERCITY buses are among the most fuel efficient and lowest emission vehicles on the road. In 2004, the EPA issued a rule that applied more stringent emissions standards for 2004 and later model year, highway, heavy-duty vehicles. The rule prompted heavy-duty vehicle manufacturers to produce significantly cleaner engines, which generally lowered emissions for these vehicles by 40 percent or more. All but two of the buses in the RTC RIDE and INTERCITY fleets are model year 2004 or later. The two remaining 2003 model year buses were driven the fewest miles of any buses in 2015 (approximately 2 percent of the total miles); they will be phased out of the fleet in late 2017.

Compared with the RTC's fixed route transit fleet in 2010, the 2015 fleet emits approximately 57 percent fewer criteria air pollutants. This reduction is largely attributable to the RTC's phasing out of older model year buses; the 2010 fleet had 31 buses that were model year 2003 or older. Incorporating electric buses into the RTC RIDE fleet in 2013 has also reduced annual air pollutant emissions. Planned fleet retrofits in 2017 will further reduce air pollutant and GHG emissions in the future (see below).

## VANPOOL

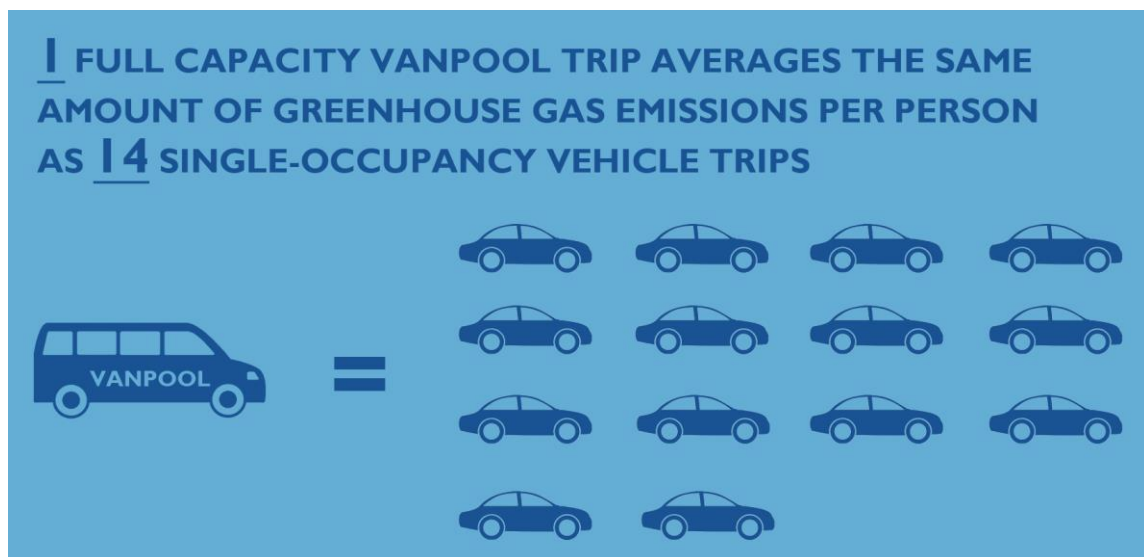
RTC VANPOOL serves groups that regularly travel long distances to similar locations, such as employees at large out-of-town employers. The RTC VANPOOL program is a central part of the agency's overall trip reduction strategy (see below) and commitment to sustainability. RTC VANPOOL allows for those with similar employment schedules and locations the option of commuting together in a single vehicle. Vanpool vehicles can accommodate between 7 and 14 passengers depending on the vehicle type. Vanpools serve employees commuting from Reno to Carson City and the communities of Susanville and Herlong, California. Others travel from Reno to the Tahoe Reno Industrial Center, located in Storey County. Another vanpool connects residents in Garnerville, Nevada with employers in Stead. In 2016, RTC VANPOOL served 105 groups with an average trip length (one-way commute) of 48 miles. The number of vanpools is expected to increase as the Tahoe Reno Industrial Center continues to add jobs over the coming years.

The active RTC VANPOOL fleet in 2015, contained 70 gasoline-powered passenger vans of various makes and models. Combined, vehicles in the RTC VANPOOL fleet traveled over 1.8 million miles in 2016. With 236,000 unlinked passenger trips, RTC VANPOOL carried passengers a combined total of over 11 million miles in 2016. This number is expected to increase. As of March 2017, the RTC VANPOOL fleet has 95 vehicles.

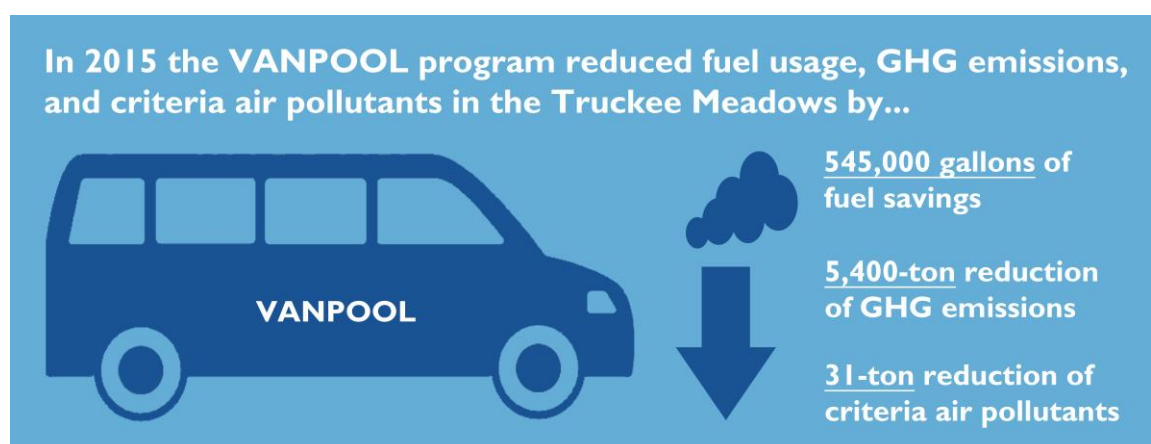


Every passenger mile traveled in a vanpool eliminates the need for an equivalent VMT in a single-occupancy vehicle, resulting in fewer emissions and associated environmental impacts. For example, 14 vanpool passengers on a 50-mile round-trip commute would reduce their combined daily GHG emissions by 46 pounds compared with the same number of single-occupancy vehicle trips traveling the same distance (**Figure 11**). The group's annual GHG emission reduction would be over 146,000 lbs.

Program-wide, RTC VANPOOL's contribution toward reducing the number of passenger vehicles on the road and lessening congestion results in an annual net fuel savings of 545,000 gallons and avoids nearly 5,400 tons of GHGs and 31 tons of criteria air pollutants every year (see **Figure 12**).



**Figure 11, GHG Emissions Comparison of Vanpool and Single-Occupancy Vehicle Trips**



**Figure 12, VANPOOL Fuel and Pollutant Reductions**

## PARATRANSIT



**Figure 13, RTC ACCESS (RTC 2017)**

The RTC's demand response paratransit program, RTC ACCESS (**Figure 13**), provides on-demand transit service to certain individuals with disabilities that prevent them from accessing or using RTC RIDE buses. There are 50 vehicles in the RTC ACCESS fleet, all of which are powered by compressed natural gas (CNG). Although the emissions gap between

CNG vehicles and conventional diesel has narrowed thanks to more stringent diesel emissions standards, CNG vehicles still provide an overall emissions savings compared with conventional fuels. This is because CNG is a lower carbon, cleaner burning fuel.

**Achieved Action Item 4**  
*Transition RTC ACCESS fleet to 100 percent CNG*

In FY 2015/2016, RTC ACCESS vehicles travelled a combined distance of 1.38 million miles and provided 208,945 unlinked passenger trips. These trips consumed an equivalent of 172,800 gallons of fuel. Using CNG instead of conventional gasoline for these trips reduces the RTC ACCESS program's average GHG emissions by approximately 10 percent.

## TRIP REDUCTION PROGRAMS

Automobile use in the region affects regional air quality, hinders physical activity, and through the combustion of fossil fuels, contributes to climate change. Particularly in the winter months when temperature inversions trap cold air in the Truckee Meadows, particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), and carbon dioxide (CO<sub>2</sub>) pollutants from vehicle emissions can contribute to unhealthy air quality. Fewer automobiles on the road would alleviate health concerns from poor air quality.

The RTC is committed to reducing SOV trips, especially the most common trip, which is a person's round-trip commute from home to work. Through its RTC SMART TRIPS program, the RTC reduces vehicle trips and associated criteria air pollutant emissions. Strategies include bus pass subsidies, telecommuting, carpooling, compressed work weeks, and resources to encourage walking and bicycling to work. The RTC's bus pass subsidy program, for example, provides a 20 percent match to companies that offer monthly transit passes to their employees.

**Achieved Action Item 5**  
*Reduce vehicle trips through ridesharing and trip reduction programs*

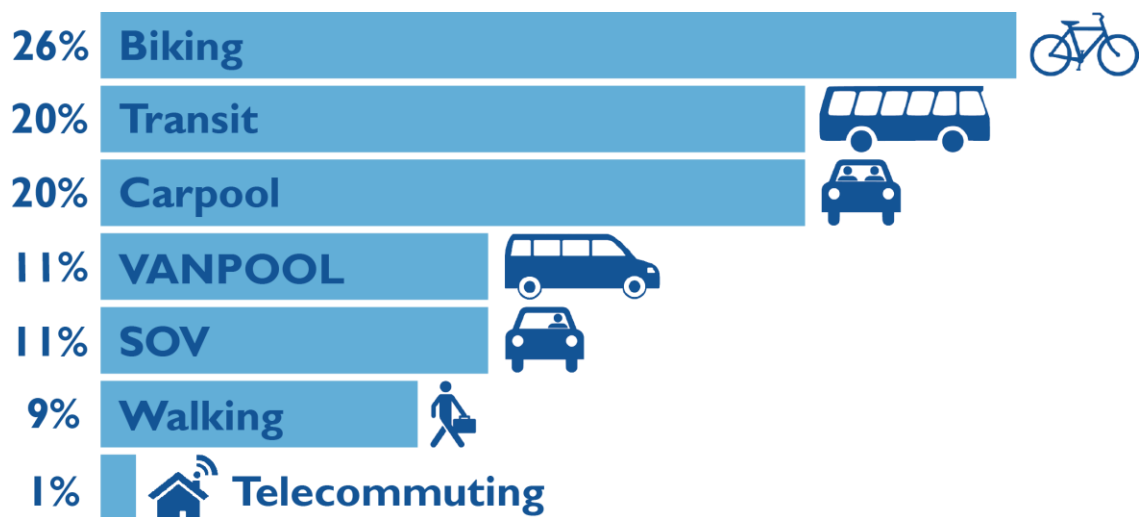
The RTC also provides free online ridesharing resources at its Smart Trips trip matching website, RTC TRIP MATCH (<https://rtcwashoe.greenride.com>), where users can find carpool and walk/bike/bus partners. The website includes:

- *Route and Origin Destination Matching:* matches riders with similar trip origins and destinations. Users can modify parameters (such as route, times, start/end points) and

search for other users, either within their employer's group or the pool of community-wide users. There are 137 employers listed on the website.

- *Commute Calendar*: an interactive tool where users can schedule and log trips, record the mode type of each trip, receive cost and pollution reduction summary charts, and download data.
- *Social Networking*: users can link ridesharing routes and experiences to their social network.
- *Quickflow Features*: allows users to update their Commute Calendar, receive weather reports along their commute route, and request instant ride matches from a mobile device.
- *School Pool Module*: specifically designed for parents and caregivers to match up with other users from the same school. School groups can customize the user settings to require a shared PIN for added security.

In FY 2016, the trip matching website had 1,672 users, who logged over 3,400 commutes. The number of users increased 13.7 percent from FY 2015 and 118 percent since FY 2010. Using the website's Commute Calendar feature, users reported commute types by mode. **Figure 14** shows the distribution of these recorded commute modes. By diversifying commuter's trip options, the RTC is fulfilling and advancing its commitment to sustainability. **Figure 15** summarizes the VMT, financial, health, and environmental benefits resulting from the 3,400 Smart Trips commutes in FY 2016.



**Figure 14, FY 2016 Recorded Commute Modes (RTC 2016a)**

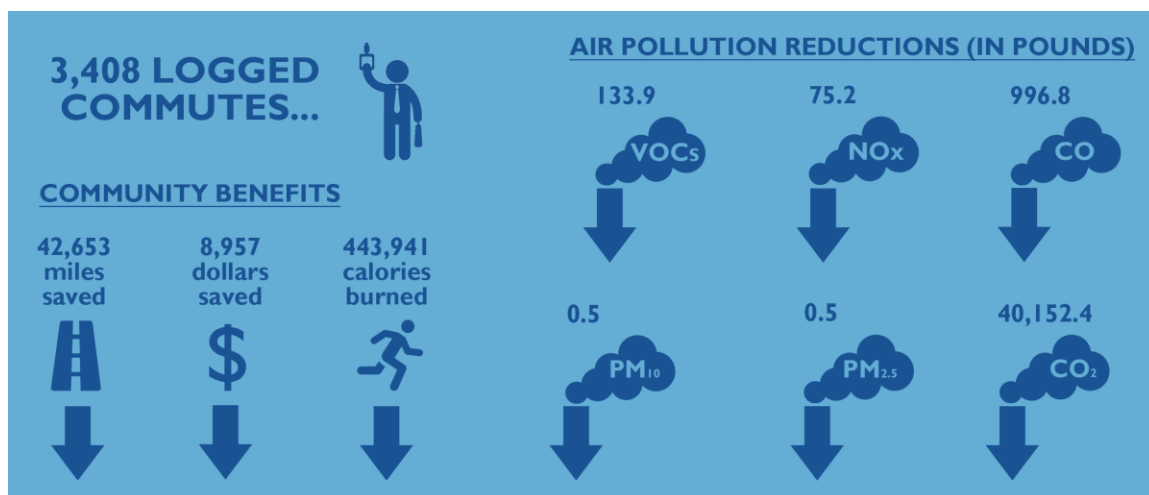


Figure 15, FY 2016 Smart Trips Commute Summary (RTC 2016a)

### NONREVENUE FLEET

The RTC owns and operates seven nonrevenue vehicles, which support the administrative needs of the transit and engineering programs. Weather conditions and the need to access construction sites require nonrevenue vehicles to be four-wheel drive, which limits options for alternative fuel vehicles. Nonetheless, the RTC's nonrevenue fleet includes hybrid-electric and CNG sport utility vehicles. The RTC has a Dodge RAM 2500 CNG/gasoline hybrid vehicle and will add another one soon. As new technology becomes available, the RTC will evaluate opportunities to incorporate additional, more fuel efficient, alternative fuel vehicles into its nonrevenue fleet. The RTC's Sustainability Inventory (**Appendix A**) does not incorporate nonrevenue fleet energy usage or emissions; however, the agency anticipates that future iterations will include it.

**Achieved Action Item 6**  
*Incorporate alternative fuel technology in nonrevenue fleet*

### FACILITIES AND OFFICES

Part of the RTC's sustainability commitment involves reducing energy usage, water consumption, and solid waste disposal from its various administrative and transit facilities. Implementing this commitment involves a combination of physical strategies, such as green building techniques, and operational strategies, such as recycling programs and green product procurement.

### GREEN BUILDING

#### RTC 4TH STREET STATION



In 2012, the US Green Building Council awarded the RTC 4TH STREET STATION with Gold Certification under the LEED Building Design and Construction, Version 2.2. The 8,400-square-foot facility occupies a brownfield site\* formerly used by the Union Pacific Railroad. Surrounding the building are several early twentieth century historic buildings, including the former Southern

Pacific Depot and former Nevada-California-Oregon Railroad Depot. The facility borrows its architectural design from these nearby buildings.

In addition to earning LEED credit for redeveloping a brownfield site, the RTC 4TH STREET STATION's location in downtown Reno provides essential multimodal connectivity and access to and within the region's urban core.

During construction of the building, over 75 percent of the construction waste was diverted from the landfill. Approximately 20 percent of the building's raw materials were obtained from sources less than 500 miles from the site. Using locally sourced materials reduces the project's embodied energy, which includes energy from fuel used to transport the materials from their point of origin to the project site.

#### **\*BROWNFIELD SITE**

An area where new development is complicated by environmental contamination from previous activities on the site. Developing a brownfield site requires remediating contaminants; it reduces pressures on undeveloped (greenfield) lands.

Building and site design techniques that reduce on-site and regional energy usage include a cool roof\*, canopies, and landscaping to reduce urban heat island effects; a centralized water source

#### **\*COOL ROOF**

A cool roof has light-colored paint or other materials that minimize heat absorption into the building, which reduces cooling loads.

heating and cooling system for enhanced building commissioning and energy savings; and an energy efficient building enclosure that includes masonry walls, insulated glazing, and revolving doors. Building materials must meet LEED standards for indoor environmental air quality. Paints, coatings, sealants, carpeting, and composite wood materials are low or no volatile organic compound (VOC) products that do not emit harmful or

irritating odors. Daylighting is also provided throughout more than 75 percent of the building, which reduces energy consumption from artificial lighting.

Design and operational techniques also reduce water usage and solid waste disposal. Drought-tolerant landscaping reduces outdoor water use by 50 percent, compared with more water-intensive landscaping. Waterless urinals and mechanical auto shutoff low-flow water fixtures reduce indoor water use by 20 percent. Recycling containers provided throughout the facility support the agency's efforts to divert solid waste from entering the landfill.

### **CENTENNIAL PLAZA**

Completed in 2008, RTC CENTENNIAL PLAZA was the RTC's first certified green building, which the US Green Building Council awarded with a LEED Building Design and Construction (Version 2.1) rating in 2011. Like the RTC 4TH STREET STATION, RTC CENTENNIAL PLAZA is an important multimodal link to and within downtown Sparks. The 13,200-square-foot facility is within walking distance of Victorian Square, the Nugget Hotel/Casino, and the new Fountainhouse high-density residential project. There is also bicycle storage at the facility for those accessing transit via bicycle.

Green building practices used during construction included diverting more than 75 percent of construction waste from the landfill, using 20 percent regionally sourced materials, and incorporating recycled content building materials. At least half of the wood-based materials and products are Forest Stewardship Council-certified. This certification ensures wood is sourced from responsibly managed forests, such as those where harvesting methods do not outpace the ability of the forest to regenerate or degrade the forest ecosystem.

**Achieved Action Item 7**  
*Obtain LEED Green Building  
 certification for RTC transit  
 facilities*



**Figure 16, RTC CENTENNIAL PLAZA (RTC 2017)**

RTC CENTENNIAL PLAZA (Figure 16) uses modern heating and cooling technology that minimizes energy consumption. A cool roof and shading of outdoor spaces further reduces the facility's summertime cooling needs. These design features also minimize the facility's contribution to the urban heat island effect, which influences regional energy usage. Daylighting provided throughout 90 percent of the building nearly eliminates the need for interior lighting during the

daytime. Paints, coatings, adhesives, sealants, carpeting, and composite wood materials are low or no VOC products that meet LEED standards for indoor environmental air quality. Drought-tolerant landscaping reduces outdoor water use by 50 percent, while low water-use toilet and lavatory fixtures reduce indoor water use by 20 percent. The use of recycling receptacles throughout the facility help divert recyclable materials from landfills.

#### **TERMINAL WAY FACILITY**

Although not a LEED certified green building, the Terminal Way Facility incorporates several green building elements found in the LEED rating system. For example, the building incorporates cool roof technology, which reduces cooling loads in the building and mitigates the building's contribution to the urban heat island effect. As part of the interior renovations, which

#### **ENERGY EFFICIENT FACILITIES**

From 2010/2011 to 2015/2016, combined energy use from electricity and natural gas consumption at RTC facilities fell by 21 percent. The energy saved is equivalent to almost 1.6 million kWh of electricity, or enough energy to power the RTC 4TH STREET STATION and RTC CENTENNIAL PLAZA for a year.

reconfigured office space to consolidate most administrative functions in the building, the RTC re-used office partitions, furniture, and other supplies from the other facilities. New doors added during the renovation are Forest Stewardship Council-certified. Additionally, approximately 20 percent of the interior lighting was retrofitted with energy-efficient light-emitting diodes (LEDs).



The LEED Green Building rating system recognizes the sustainability benefits of locating development in existing urban areas. Furthermore, the Truckee Meadows Regional Plan (Truckee Meadows Regional Planning Agency 2012) emphasizes concentrating commercial development in existing urban areas, rather than at the fringe. When the RTC sought to consolidate its administrative functions, it made the decision to adaptively reuse the Terminal Way Facility, rather than construct a new facility on undeveloped land. The Terminal Way Facility's location in Reno's urban core also supports multimodal access and shorter commuting distances for facility employees. RTC RIDE routes 12 and 14 provide transit access to the facility, and there is a transit stop on Terminal Way, next to the building. There are bicycle lanes and sidewalks along Terminal Way for bicycle and pedestrian access.

## ENERGY USAGE AND IMPROVEMENTS

Reducing energy consumption from stationary and mobile sources is another important element of the RTC's sustainability commitment. The agency uses electricity and natural gas for heating and cooling, lighting, and general electronics needs at its administrative and transit facilities. It also uses diesel, gasoline, CNG, and electricity to power its revenue fleets.

### FLEETS

In 2015/2016, energy used in all revenue fleet (transit, vanpool, and paratransit) operations, excluding electric buses, accounted for 83 percent of the RTC's total energy usage. Two-thirds of the energy used for mobile sources was from the diesel fuel needed to power the RTC's various diesel-powered vehicles. As described above, the RTC is transitioning away from standard diesel technology and incorporating less energy-intensive hybrid, CNG, and electric vehicles into its fleets. The improvements are paying off. Despite nearly doubling in size and traveling 1,230,691 (21 percent) more miles than in 2010/2011, the entire RTC revenue fleet in 2015/2016 consumed only 3 percent more energy than the 2010/2011 fleet (see **Appendix A**). Soon, the RTC hopes to begin tracking energy usage associated with its nonrevenue fleet and identify opportunities to reduce energy usage from those vehicles.

### ENERGY EFFICIENT FLEET

Despite nearly doubling in size and traveling 5,415,425 (26 percent) more miles than in 2010/2011, the entire RTC fleet in 2015/2016 consumed only 3 percent more energy than the 2010/2011 fleet.

### FACILITIES

Even though facilities account for less of the RTC's overall energy usage compared with the transit fleet, reducing energy use from these sources is part of the RTC sustainability commitment and critical strategy in decreasing its overall energy usage. In 2010/2011, RTC facilities used approximately 3,487,700 kWh of electricity and 134,875 Therms of natural gas. At the time, these facilities did not include RAPID stations or the 6th Street Service Facility.

In 2015/2016, even with the addition of RAPID stations and the 6th Street Facility, electricity use decreased by 6 percent, compared with 2010/2011. During the same time, natural gas use fell by 41 percent. From 2010/2011 to 2015/2016, combined energy use from electricity and natural gas consumption at RTC facilities fell by 25 percent, or more than 6 billion British



thermal units (BTUs). The energy saved is equivalent to almost 1.8 million kWh of electricity, or enough energy to power the Terminal Way Facility, RTC 4TH STREET STATION and RTC CENTENNIAL PLAZA for a year (see **Appendix A**). These energy savings are the result of a comprehensive, ongoing, agency-wide, energy auditing and efficiency improvement program and the incorporation of on-site renewable energy generation systems at two RTC facilities, all of which are discussed in more detail below.

Including energy usage from transit and facilities, the agency's total energy consumption between 2010/2011 and 2015/2016 fell over 3 billion BTUs, or 3 percent. In 2015/2016, RAPID transit stations used a combined 29,500 kWh of electricity, mainly for lighting. These facilities, which are illuminated throughout the night, incorporate LED lighting technology to reduce energy use and costs. Future improvements could involve installing small PV solar systems at certain RAPID stations to offset their energy usage.

#### **Achieved Reduction Factor 1**

*Reduce agency-wide energy use  
by 3 percent*

### **RENEWABLE ENERGY GENERATION**

With funding through the American Recovery and Reinvestment Act and rebates from NV Energy's RenewableGenerations Program, the RTC installed a combined 230 kW worth of rooftop PV solar panels at the Terminal Way Facility and ground-mounted PV panels at the Sutro Facility. RTC 4TH STREET STATION also has onsite solar energy generation. The renewable energy generated from these systems annually offsets more than 10 tons of GHGs.

#### **Achieved Action Item 8**

*Install on-site renewable energy  
generation systems*

### **ENERGY RETROFITS**



With funding from NV Energy through the utility's Sure Bet Program, the RTC conducted an energy efficiency audit for the Terminal Way Facility. As a result, the agency made several energy efficiency upgrades, such as converting all exterior lighting to LED bulbs, installing interior lighting occupancy sensors, upgrading the building's heating ventilation and air conditioning (HVAC) system, installing smart thermostat technology, and applying energy-efficient tinting on windows. These energy retrofits, combined with the on-site solar energy generation, have reduced the building's total energy consumption by nearly 20 percent since FY 2010/2011. This offsets approximately 88 tons of GHG emissions annually (EPA 2016).

#### **Achieved Action Item 9**

*Retrofit RTC facilities with  
energy efficient lighting  
systems—occupancy sensors*

#### **Achieved Action Item 10**

*Put in place tinted windows for  
at least one main facility  
(Terminal)*

### **LED LIGHTING UPGRADES**

Beginning in 2016, the RTC initiated a multiyear exterior lighting retrofit for all its administrative facilities. At the Terminal Way Facility, the RTC replaced 29 exterior fixtures with LEDs. The

retrofit is expected to save nearly 30,000 kWh of electricity annually, with an emissions savings of 44,780 pounds of carbon dioxide (CO<sub>2</sub>), equal to the average annual emissions of four automobiles. Over the life of the LEDs, the retrofit will divert nearly 200 bulbs from the landfill

#### **WHY LED?**

LEDs use less energy to produce the same amount of light as incandescent or compact fluorescent bulbs. LEDs are durable and dimmable, and they do not contain toxic chemicals. Replacing one 75-watt incandescent bulb with a 13-watt LED saves 68 kWh of electricity and 105 pounds of CO<sub>2</sub> annually. Through lower energy costs, LEDs typically pay for themselves in less than 18 months and save \$90 per bulb over their 14-year lifetime (Energy Star 2017). Plus, LEDs save on unnecessary cooling loads in buildings and reduce waste generation. This is because they emit very little wasted heat and rarely need replacing.

and save over \$78,000 in energy and maintenance costs. Subsequent retrofits planned throughout 2017 will replace exterior lighting at the Villanova, Sutro, RTC CENTENNIAL PLAZA, and RTC 4TH STREET STATION facilities. These projects will replace a total of 385 fixtures with LEDs, resulting in a combined annual savings of over 343,800 kWh of electricity. The amount of energy expected to be saved annually from these exterior LED retrofits is enough to power the current RTC RAPID stations for over 12.5 years.

Recognizing the many sustainability benefits of LED lighting, the RTC also has a plan to retrofit all interior lighting in all facilities with LEDs by June 2019. This interior LED retrofit plan is identified, below, as one of the agency's future action items.

#### **HVAC UPGRADES**

Aside from lighting, the next most energy-intensive component of a commercial building is typically heating and cooling. The RTC's newer HVAC systems use less energy than older systems and are less costly to operate and maintain. The RTC also upgrades HVAC software, as needed, which can improve performance and reduce HVAC energy use and costs.

Beginning in 2017, the RTC will begin participating in NV Energy's Commercial Energy Services Program. The RTC will receive new thermostats for the Terminal Way facility, which will allow NV Energy to remotely control interior building temperatures. Minor thermostat adjustments to reduce cooling loads during peak times on certain days in the summer are expected to reduce energy demand and HVAC costs.

#### **Achieved Action Item 11**

*Install automatic shutoff sensors on all faucets at all facilities*

#### **WATER**

On average, the Truckee Meadows receives 7.4 inches of precipitation each year (National Oceanic and Atmospheric Administration 2017) and is one of the most arid locations in the country. For this reason, water conservation is an essential element of the RTC's sustainability commitment. In all facilities, restrooms are equipped with mechanical automatic shutoff faucets and ultra-low-flow toilets. The men's restroom at RTC CENTENNIAL PLAZA includes two waterless urinals.

#### **Achieved Action Item 12**

*Install ultra-low-flow or waterless toilets and urinals at all facilities*

There is minimal outdoor landscaping at each RTC facility, largely because they are in urban environments. Landscaping at the RTC 4TH STREET STATION and RTC CENTENNIAL PLAZA consists of small trees and shrubs. These are incorporated into the hardscape design through planting pockets, tree wells, and vegetated medians. Landscaping at the Sutro and Terminal Way Facilities consists mostly of deciduous trees next to the buildings. These trees are water efficient and provide shading for the buildings, which decreases building energy loads in the summer.



**Figure 17, Bus chassis wash bay at Villanova Facility (RTC 2017)**

On completion in summer 2017, the 90,200-square-foot Villanova Facility will include expanded bus chassis wash bays (**Figure 17**), which will serve the RTC RIDE, RTC INTERCITY, and RTC RAPID fleets. The Sutro Facility also has vehicle wash bays for the RTC VANPOOL fleet. These wash bays minimize water use and are more environmentally responsible than normal washing processes. This is because they employ a reverse osmosis filtration process that prevents washing solvents from entering the environment and allows wash water to be reused. Frequent vehicle washing also prevents heavy metals from

vehicle components, such as brakes, from entering the environment during vehicle operation.

Low impact development (LID) is another sustainable water management practice the RTC is evaluating for its various facilities, especially transit stops. Unlike traditional stormwater systems that capture and convey stormwater using drains, pipes, underground concrete chambers, and other hardscape solutions, LID mimics natural systems.

Typical LID uses vegetated swales and basins to capture water in natural surface environments where it can slowly infiltrate and evaporate. In urban areas, LID solutions are site specific and include small catchment basins with street trees. Benefits of LID include lower installation and maintenance costs, improved water quality, and better integration of natural systems into urban environments. The RTC Southeast Connector highway project is using LID principles to restore the Steamboat Creek floodplain (see *Streets and Highways*, below). There are other opportunities to incorporate LID into the new RTC LINCOLN LINE transit stations and as part of future improvements along the Virginia Street corridor.

#### **Achieved Action Item 13**

*Use reclaimed water and reverse osmosis filtration systems for fleet vehicle washing*

## WASTE AND RECYCLING

Solid waste disposal has broad-scale, long-term impacts on the regional and global environment. The EPA identifies methane released from landfills as the third-largest source of human-related methane emissions (EPA 2016). Disposing of waste is an energy- and land-intensive process, which is not sustainable in the long term. To address this issue, the RTC adheres to the basic “three Rs” principle for solid waste management: reduce, reuse, recycle. Acknowledging that the best way to manage waste is to not produce it in the first place, the RTC is constantly seeking new ways to reduce the amount of materials used at its administrative facilities.

### Achieved Action Item 14

*Establish an agency-wide recycling program*

After reducing and reusing materials, the next best approach is to recycle them. The RTC has an agency-wide recycling program that promotes waste diversion from the landfill. Thanks to this program, the amount of waste from all facilities has fallen by more than 161 tons (5 percent) since 2015 (see **Appendix A**). The RTC is continually expanding its recycling infrastructure to make it more convenient for the public and employees to recycle. Collectively, this will further reduce the RTC’s contribution to landfill waste and associated impacts from methane emissions.

### Achieved Reduction Factor 2

*Increase agency-wide solid waste diversion (recycling) rate by 5 percent*

## ADMINISTRATIVE FACILITIES

The RTC is promoting a culture of waste reduction and recycling throughout its administrative facilities. To encourage recycling, the RTC’s facilities maintenance supervisor periodically distributes e-mail memos to staff with educational materials and information on how and where to recycle. Employee education and support is critical for ongoing waste reduction and recycling. As part of its sustainability commitment, the RTC is pursuing a 10 percent reduction in paper use over the next 3-6 years (see *Future Improvements*, below).

The backbone of the RTC’s waste reduction program is its waste collection infrastructure. Every administrative facility has separate, distinct recycling containers placed throughout the building. Recently, six new high-profile mixed recycling containers were added to the Terminal Way Facility. Employees can recycle plastic, glass, aluminum, and paper in a single container. The mixed-recycling containers clearly indicate the materials that can be recycled, which avoids confusion and the need to sort materials into different containers.



Each RTC administrative facility has a four-cubic-yard bin where mixed-recycling materials are consolidated for pick up by Waste Management, the region’s primary solid waste services provider. Waste Management recently implemented a residential and commercial single-stream recycling program. As part of the program, it provides the collection bins and disposal services every other week. All recycled materials are sorted at the regional facility.

Collectively, the RTC's employee education program and recycling infrastructure and Waste Management's regional single-stream recycling program helped the RTC achieve a 43 percent waste diversion rate for its administrative facilities. In 2016, the RTC recycled 700 tons of material collected from the Terminal Way, Villanova, and Sutro Facilities. Since 2010, the total amount of waste generated at those facilities has dropped by 50 percent.

#### **PUBLIC FACILITIES AND TRANSIT VEHICLES**

Minimizing the amount of nonrecyclable materials collected from the RTC's transit centers, RAPID stations, and transit stops is also part of the agency's overall waste reduction and recycling strategy. Waste Management's single-stream recycling program, which started in 2013, enables the RTC to cost-effectively provide high-profile mixed-recyclable containers throughout the RTC 4TH STREET STATION and RTC CENTENNIAL PLAZA transit centers. The containers collect nearly 300 tons of recycled materials annually, all of which previously ended up in the landfill.

##### **Achieved Action Item 15**

*Install high-profile recycling containers at administrative and transit facilities*

In November 2016, the RTC unveiled the Token Transit smartphone application which is available for both Android and Apple products. This application allows transit passengers to purchase transit fare tickets electronically on their smartphone without needing to have a paper ticket. This helps to reduce the paper usage on the bus and makes boarding a faster process. This application is continuing to grow in popularity and usage; as of January 2017, it helped reduce paper tickets by 5 percent.

##### **Achieved Action Item 16**

*Implement electronic fare system, reducing paper ticket use*

#### **HAZARDOUS WASTE**

Federal law (40 CFR, Parts 239 through 282) defines hazardous waste as a type of solid waste that is ignitable, corrosive, reactive, or toxic. Improper disposal or handling of hazardous waste can result in personal injury and environmental contamination. Hazardous waste in landfills introduces heavy metals and contaminants into groundwater systems and the soil. RTC operations use industry best practices and proper disposal techniques when dealing with and disposing of hazardous substances. Recently, the RTC implemented a hazardous waste diversion program that recycles used batteries. The RTC is also exploring opportunities to repurpose used electric vehicle batteries for on-site energy storage and load equalization. This strategy would support more efficient and cost-effective electric vehicle charging and could support additional on-site renewable energy generation.

##### **Achieved Action Item 17**

*Implement hazardous waste diversion program for used batteries*

## EMPLOYEE PROGRAMS

In early 2017, the Center for Urban Transportation Research named the RTC as one of the best workplaces for commuters. One of only three organizations state-wide to receive the honor, the RTC is recognized for its many commuter benefits. Two strategies to reduce the number of vehicle trips are teleworking and flexible work weeks.

Teleworking enables employees to work remotely on certain days. Flexible work weeks allow employees to compress their work time into fewer days, which eliminates the need to commute to the office on the remaining days. Employees also receive free transit passes and options to use carpools and vanpools. Employee education programs also encourage RTC staff to walk and bike to work and to exercise regularly. There are bicycle racks at all RTC administrative facilities.

### Achieved Action Item 18

*Optimize employee travel by offering free transit passes, telecommuting, and flexible work schedules*

## SUSTAINABLE BUSINESS PRACTICES

Implementing sustainable business practices reduces the consumption of raw materials, waste, energy, and emissions and improves the health and well-being of RTC employees and customers. The RTC's sustainable business practices include green procurement, use of sustainable janitorial products, operational efficiencies, and ecological safeguards.

Green procurement considers a product or service's environmental and human health effects along each stage of the supply chain. Before making a purchase, RTC administrative staff often consider sustainability factors such as the product's recycled content and recyclability. Ideally, products not purchased for immediate consumption or single use are durable to avoid frequent disposal and replacement. For services, the RTC is increasingly evaluating and requiring sustainability standards for its contractors. In many ways, contractors are an extension of the RTC and should be held to the same sustainability standards.

Cleaning products used in all RTC facilities are biodegradable and nontoxic. Using these products protects regional water quality, reduces indoor air pollution, and is safer for RTC employees and the public. Because they do not contain harmful chemicals, sustainable cleaning products also typically have fewer environmental and human health impacts during production and transport.

With tablet computers, mobile software, and web-based applications, the RTC is streamlining many of its business practices and, in the process, reducing its paper consumption. For example, the RTC Engineering Department frequently reviews project plans digitally, both in the office and in the field. Viewing digital plans reduces the need for paper plots and allows for instant transmittal and viewing of plans in the field without the need to have a plan set delivered.

Another recently completed operational improvement is the RTC's updated Regional Road Impact Fee (RRIF) On-line Automation Program, which is the system that manages RRIF credits for developers. The Automation Program operates as an on-line depository of RRIF credits, where certificate holders can use their credits to pay their impact fees or to transfer to a third



party. The upgrade added a feature to tie the RRIF Automation Program to the Washoe County Assessors' database. The program automatically checks the assessor parcel numbers to the RRIF credit account information to ensure RRIF credits are being used within the correct RRIF Benefit District and Development of Record. The RRIF Automation Program has reduced paper consumption from the need for hard copy credit books, eliminated hard copy documentation of credit transfers, and has increased the program's overall efficiency and accuracy.

RTC facilities exist in tandem with the natural processes occurring around them; for this reason, in addition to the many sustainability considerations described throughout this plan, the RTC employs on-site ecological safeguards to minimize impacts on wildlife and their habitat. At RTC 4TH STREET STATION, there are bird buffers that spray a pesticide-free, non-aerosol mist into the air and spinning reflective devices that deter birds from approaching or nesting on the building. Insect and rodent control techniques are also pesticide-free. Pest management practices for all facilities are carried out in a manner and with techniques that protect wildlife and human health.

#### Achieved Action Item 19

*Employ sustainable janitorial practices, including the use of sustainable janitorial products and on-site ecological safeguards*

## STREETS AND HIGHWAYS

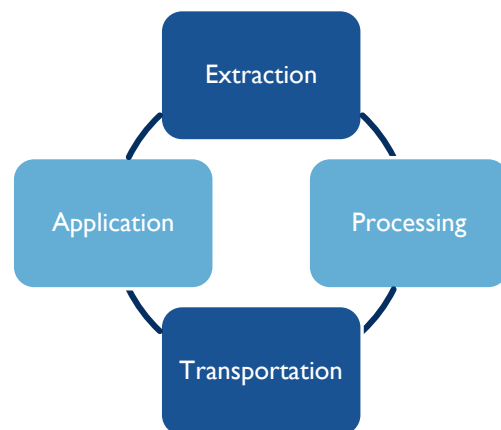
In Washoe County, where nearly all forms of transportation use the region's network of streets and highways, the design, content, condition, and capacity of regional roadways influence sustainability. As part of its sustainability commitment, the RTC Engineering Department incorporates sustainability practices during roadway engineering, construction, system management and capacity upgrades, and pavement preservation. Sustainable road construction practices reduce raw material content, curb emissions from the construction process, preserve water quality, and decrease overall water use. An efficient roadway network has sufficient capacity to support multimodal travel and minimize emissions from idling vehicles. Proper pavement preservation ensures the network's long-term functionality, which reduces the demand for new materials needed to rebuild degraded roads and allows vehicles to operate as efficiently as possible.

## CONSTRUCTION AND MAINTENANCE

### RECYCLED CONTENT IN PAVING MATERIALS

The regional roadway network includes a combination of asphalt and concrete surface roadways. Raw materials, such as gravel and clay, used in the construction process must be extracted, processed, transported, and applied. Each of these phases contributes to the road's embodied energy (**Figure 18**).

Using recycled content in paving materials



**Figure 18, Embodied Energy of Road Construction**

eliminates or reduces the embodied energy associated with certain phases in road building. For example, roads constructed or resurfaced using materials obtained by repurposing nearby roads substantially reduces the energy associated with extraction and transportation. In most cases, a higher percentage of recycled content in a road surface equates to a lower overall embodied energy for that roadway. On average, the RTC uses 15 percent recycled content for all road construction and resurfacing projects.

### **COLD-IN-PLACE RECYCLING**

Cold-in-place recycling (CIR) is another construction and maintenance technique that reduces the embodied energy and outside material use for roadway projects. During the CIR process, a milling machine grinds the road surface, which is then reused as the primary ingredient for the new pavement. Typically, an emulsifier is the only new material added to the milled surface before it is used for repaving. In some cases, an outside aggregate material is added to achieve the correct material strength for resurfacing. Using CIR reduces the need for raw materials, decreases emissions for transporting new materials to the site, lessens energy used during the construction process because minimal additional heating is needed, and typically results in a shorter construction timeline.

### **PERVIOUS PAVING**

An additional technique to mitigate stormwater impacts from the RTC streets and highways program is pervious paving. While not viable in high traffic volume areas or major roadways, pervious paving is being used in parking areas and along roadway shoulders. This pavement technology has the necessary structural integrity to accommodate normal vehicle travel, but it is more challenging and costly to maintain in high volume areas. Unlike standard road surfaces that do not allow water to pass vertically through the road surface, water flowing over pervious paving seeps through tiny holes in the surface into the soil below. Pervious paving enables stormwater to be captured on-site rather than flowing across the surface into stormwater capture systems or into surrounding unpaved areas. This reduces stormwater system requirements and avoids erosions from sheet flows hitting surrounding bare soils. Maintenance challenges may prevent wider use of pervious paving in the region. Over time, the tiny holes can become clogged with sand, dirt, and debris and the surface may lose its porosity; however, street sweeping can mitigate some of this. Expansion cracks from freeze-thaw cycles is another challenge. The RTC engineering team will continue evaluating current pervious pavement areas and determine opportunities for additional applications.

### **PAVEMENT PRESERVATION**

In northern Nevada, frequent freeze-thaw cycles, combined with normal use, degrade road surfaces over time. Each summer, the RTC implements a preventive maintenance and rehabilitation program to preserve pavement conditions through the following winter and beyond. Pavement preservation maintains safe and accessible streets and highways for all users; it also lengthens the time between major resurfacing projects. The most common pavement preservation application is slurry sealing. This process applies a thin bituminous mixture to roadway surfaces; once in place, the mixture seals the surface and cracks to prevent future moisture penetration and expansion during the freeze-thaw cycle. Lane striping done after each

slurry seal project makes lane lines, pedestrian crossings, and other painted road markings more visible; this improves safety and mobility for all users. When done in combination with a complete streets project, slurry sealing creates a blank roadway template on which bike lanes can be added and vehicle travel made more efficient.

## **ROADWAY EFFICIENCY AND CAPACITY IMPROVEMENTS**

### **INTELLIGENT TRANSPORTATION SYSTEMS**

The RTC recently completed the first phase of the Intelligent Transportation Systems Traffic Management Project, which connects traffic signal systems of Reno, Sparks, the RTC, and NDOT through fiber optic communication lines. The project also included design of the next phases of the Intelligent Transportation Systems Regional Master Plan. The project will expand communications to outlying signal systems and will install intelligent transportation systems devices to monitor and remotely adjust traffic signals. This will be useful during special events and changing traffic conditions and will provide information to drivers on traffic-related incidents.

In conjunction with the Cities of Reno and Sparks and UNR's Center for Advanced Transportation Education and Research group, the RTC recently retimed one-third of the traffic signals in the Truckee Meadows on an annual basis. Signal retiming optimizes the operation of signalized intersections through a variety of low-cost improvements, including the development and implementation of new signal timing parameters, phasing sequences, and improved control strategies. Regular reviews of signal operations are necessary to respond to ever-changing traffic patterns caused by the addition of new developments or improvements to the roadway network. Signal retiming has significant benefits for the traveling public, through fewer stops along coordinated corridors, reduced fuel consumption resulting in improved air quality, and safety benefits for all modes of traffic.

### **SOUTHEAST CONNECTOR**

When completed, the Southeast Connector (SEC) will provide a long-awaited boost in regional roadway capacity, especially for those who travel frequently from southeastern Sparks to southern Reno. The SEC project, which will become Veterans Parkway when completed, will be a 5.5-mile roadway, with three travel lanes in each direction. Recent and projected growth will continue adding congestion to the US 395/I-580 freeway and the limited number of surface streets in eastern Sparks and Reno. The SEC will alleviate that congestion and will improve safety by providing motorists with another travel option with a limited number of intersections. Expanding travel options and connectivity between the northern and southern parts of the region will reduce idling at busy intersections, will reduce emissions by providing a shorter, more direct route, and will provide new multimodal connectivity. The SEC will include a 5.5-mile, dedicated nonmotorized, multiuse pathway (Figure 19). It will connect the Truckee River bike path with recreation areas in Hidden Valley



**Figure 19, SEC's New Multiuse Path (RTC 2017)**

and outdoor recreation opportunities in southern Reno. The RTC hopes the SEC will also support future transit services, including the potential for an expanded RTC INTERCITY route.

Throughout the SEC design, engineering, and construction process, the RTC and the design team worked with other agency partners to ensure the project meets and exceeds all applicable environmental regulations. As part of the project, the RTC developed a Soil Management Plan to minimize future ecological exposure to mercury contaminated soils throughout the roadway corridor. Also, because the SEC crosses over several tributaries to the Truckee River and is within the Truckee River floodplain, the RTC incorporated several LID flood mitigation and water quality enhancement techniques. For example, the project relocated portions of Steamboat Creek to reconnect it with its natural floodplain. This improves the creek's hydrologic function and improves downstream water quality. Displaced wetlands were replaced at a ratio of 3 acres for every 1 acre removed. The self-sustaining wetland system and bioswales attenuate flooding, improve water quality and provide additional habitat for the area's native and migratory waterfowl. Overall, these stream restoration and enhancement techniques protect and improve the sustainability of the region's air, water, and wildlife habitat.

Once completed, the RTC anticipates the SEC will achieve at least a silver-level rating through the Federal Highway Administration's Infrastructure Voluntary Evaluation Sustainability Tool (INVEST). This self-evaluation tool includes numerous planning, design, and construction criteria for transportation agencies to measure the sustainability of their projects. To achieve a silver achievement level, the SEC would need at least 40 percent of the total possible criteria points available. The RTC is one of approximately 65 transportation agencies using the tool (Federal Highway Administration 2017).

### **INTERSECTION IMPROVEMENTS**

Regional population growth contributes to vehicle congestion at major intersections. Congested intersections increase vehicle idling, which increases vehicle emissions. Congested intersections typically do not support safe, efficient multimodal access. The RTC's RTP and RTIP identify short- and long-term intersection investments to add multimodal capacity, alleviate congestion, and reduce idling. The RTC regularly conducts intersection improvement projects around the region. These projects are intended to improve efficiency and overall traffic operations at key intersections. Examples of recent major intersection improvement projects are discussed below.

The RTC recently completed the North McCarran/North Virginia intersection improvements, which addressed capacity issues at one of the region's busiest intersections. The RTC completed major improvements to the intersection, which is directly north of UNR, by providing dual left-turn lanes on all legs of the intersection to increase capacity and reduce delay. In addition, the project added dual left-turn lanes for eastbound Sierra Street traffic onto northbound Virginia Street. These improvements reduced idling and vehicle emissions, especially during peak travel times associated with commuter traffic from UNR and downtown Reno. It also provides a safer multimodal connection between the university and residential areas to the north.

Construction on the Pyramid Highway and McCarran Boulevard intersection improvement project began in early 2016 and is scheduled to be completed in spring 2018. When complete,

the intersection will ease congestion and improve safety by adding new north and south travel lanes through the intersection on Pyramid Highway and new turn lanes on McCarran Boulevard and Pyramid Highway. The improvements will also include new sidewalks and a paved multiuse pathway that will parallel Pyramid Way. Providing dedicated spaces for pedestrians and bicyclists encourages those uses and provides safer access along and across these major roadways.

## LAND USE AND TRANSPORTATION CONNECTIONS

The RTC recognizes the many sustainability benefits of connecting its transportation investments with local and regional land use objectives. Linking land use and transportation, for example, leads to better air and water quality, fewer GHG emissions, more efficient use of land and more open space, lower overall transportation costs, reduced congestion, greater mobility for non-automobile users, and fewer health risks from diabetes, heart disease, and automobile accidents. A multimodal transportation system encourages compact urban growth, where walking, bicycling, and taking public transit are as safe and convenient as driving a car. The connection is also self-reinforcing. To be economically and environmentally sustainable, healthy, and inclusive, a community must have an efficient public transportation system with safe, walkable spaces. Fostering and strengthening this connection is at the core of the RTC's sustainability commitment.

## COMPLETE STREETS

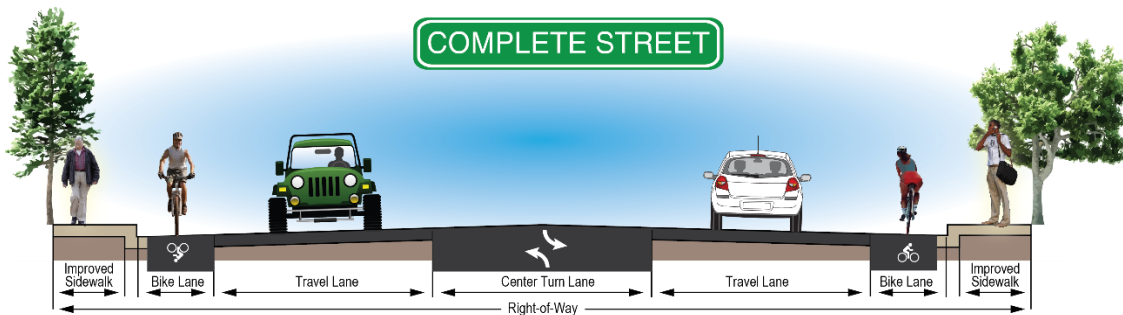
Streets are the common denominator for most RTC planning, infrastructure, and sustainability strategies. Supported by the 2040 RTP guiding principles and goals and the RTC's Bicycle and Pedestrian Master Plan, the RTC's complete streets strategy integrates mobility, equity, safety, economic, cultural, and environmental considerations into street design and function. Complete streets employ design, construction, operation, and maintenance techniques to balance automobile use with walking, bicycling, taking public transportation, and other non-automobile modes, so that people of all ages and abilities have safe and convenient access to their community. The RTC implements its complete street strategy primarily through its Pavement Preservation Program and in accordance with its Complete Streets Master Plan (RTC 2016b). The Pavement Preservation Program identifies and prioritizes preventive maintenance projects for the RTC's regional roadway network. The Complete Streets Master Plan also includes recommended complete street segments. Streets that are candidates for complete street improvements undergo further traffic and engineering studies, and the RTC holds public meetings to get public input on the improvements. If selected, the RTC implements the complete streets improvements as part of a comprehensive slurry seal or roadway rehabilitation project.

### COMPLETE STREETS

Complete streets employ design, construction, operation, and maintenance techniques to balance automobile use with walking, bicycling, taking public transportation, and other non-automobile modes, so that people of all ages and abilities have safe and convenient access to their community.

Complete street projects may result in a modified number of automobile travel lanes, but maintain operational efficiency (**Figure 20**). Most streets that have undergone complete street

improvements were oversized for the number of average daily vehicle trips. Complete streets accommodate all roadway users and may include bike lanes, wide sidewalks, center turn lanes, or on-street parking. Crosswalks, signs, and traffic calming features are also common elements used in complete streets projects. Because complete streets decrease vehicle travel speeds and provide dedicated spaces for bicyclists, the RTC and NDOT have reported fewer incidents and injuries on these roadways. The result is a safer streetscape for all users, which encourages sustainable travel choices.



**Figure 20, Complete Street (RTC 2017)**

## TRANSIT-ORIENTED DEVELOPMENT

The American Planning Association defines transit-oriented development (TOD) as compact, mixed-use development near transit that creates sustainable communities where people of all ages and incomes have transportation and housing choices. The primary transportation modes emphasized in TODs are transit, walking, and bicycling. In Washoe County, the Truckee Meadows Regional Plan directs future capital investment and urban growth to TOD corridors. The RTC's plans, programs, and investments underpin the regional TOD strategy by providing essential transit service, including BRT, implementing regional road and pedestrian infrastructure improvements, and coordinating closely with land use planners and developers on proposed plans and projects in TODs.

In Reno's Virginia Street TOD corridor, the RTC's ongoing BRT investments have helped spur new TOD-style development throughout the corridor. The Midtown District, south of downtown Reno is one of the region's most desirable for new residential and commercial investments. Development in the Midtown District has generally complemented transit by providing pedestrian-oriented frontages along Virginia Street, bicycle parking, and convenient access to transit stations.

Going forward, implementing the RTC's Virginia Street Corridor Investment Plan, coupled with the UNR Master Plan, will extend RTC RAPID service and associated infrastructure northward to the UNR main campus. The Virginia Street Bus RAPID Transit Extension Project will create an efficient way for UNR students and employees to access downtown and midtown Reno via transit. The project will also encourage new TOD investments along the extended route.



## EMPLOYEE TRIP REDUCTION

With support from the local government community development departments, the RTC works with large employers to develop and implement a trip reduction program. Before issuing a certificate of occupancy, local governments require new projects proposing more than 100 employees to work with the RTC Trip Reduction Analyst in developing the program. Each trip reduction program is tailored to the specific employer, with the objective of mitigating project traffic and emissions. Each trip reduction program addresses a combination of transportation modes, such as transit use, bicycling, walking, carpooling, and vanpooling, with parking management, flexible work schedules, telecommuting, and park and ride strategies. As part of the program, employers identify an on-site trip reduction coordinator. This person serves as the point of contact for the RTC and is responsible for implementing the program. As a condition of project approval, employers must continuously maintain and operate the program. There are 37 employer partners listed on the RTC's trip match website. Trip reduction participation and emission savings vary by employer and program elements.

## SAFE ROUTES TO SCHOOL

Community safety and health were core themes that emerged from the 2035 RTP community outreach process. These themes became part of the 2035 RTP's Guiding Principles and have been carried forward into the 2040 RTP. Providing safe, pedestrian-accessible connections to community nodes, such as schools, is an important element in reducing automobile trips, improving air quality, and promoting an active and healthy community. The National Center for Safe Routes to School found that approximately 55 percent of students arrived at school by car, while the other 45 percent arrived by bus, on foot, or bicycle (**Figure 21**); of these, approximately 18 percent walked or rode (National Center for Safe Routes to School 2012).



**Figure 21, How Children Arrive to School (National Center for Safe Routes to School 2012; HART Commuter Information Services 2017)**

In Washoe County, the mode split varies from school to school, based on community demographics and distance of the school from residential areas. The Washoe County School District's School Police, in conjunction with NDOT and the RTC, implement the regional Safe

Routes to School (SRTS) program. Its main facets are education, development review, capital investment, and site-specific access improvements.

Each year, the RTC partners with the Washoe County School District to host an SRTS event. The event encourages families to walk, bike, or take the bus to school, rather than drive. Throughout the year, the RTC supports the SRTS education outreach program by providing input on educational outreach materials and attending school-based events with the SRTS coordinator.

The RTC is often involved in the review phases for new development proposals near schools. In conjunction with the Washoe County SRTS Coordinator, RTC staff provide input on potential impacts on school access and opportunities to incorporate new access points and strategic design principles into the proposed development plans.

A safe route to school includes adequate sidewalks, crosswalks, signalization, and signs. For schools located on regional roads, the RTC works with the SRTS Coordinator to identify necessary capital investments that maintain or improve pedestrian safety. The RTC's FY 2016–2020 RTIP allocates \$628,000 for safe routes to school-related transportation enhancement activities.

Based on input from the SRTS Coordinator, the RTC also supports school-specific improvements that are designed to improve pedestrian access and safety near schools. These improvements include new or improved crosswalks and sidewalks, signs, and other safety equipment. The FY 2016–2020 RTIP contributes nearly \$12,000 for these improvements.

### **BICYCLE FRIENDLY BUSINESS**

For those who engage in bicycling as a means of primary transportation, recreation, or both, the RTC's sustainability initiatives are making bicycling in Washoe County safer and more accessible. Complete streets projects are increasing the number of bike lane miles along frequently used bike routes. Bike racks on all RTC RIDE, RAPID, and INTERCITY vehicles, combined with bike racks at transit centers, are addressing the first mile/last mile challenge\* of transit, which considers the availability of travel options to and from transit stops. At the same time, the RTC's employee trip reduction program is encouraging employers to provide their employees with opportunities to bike to work. In December 2016, the League of American Bicyclists named the RTC a

silver-level bicycle friendly business for its efforts to encourage bicycling as a sustainable transportation mode, especially for RTC employees and transit users. The silver-level award

#### **\*FIRST MILE/LAST MILE CHALLENGE**

For transit passengers, each trip includes the transit ride, but also the act of getting to and from transit stops. Providing safe convenient access for transit riders' first mile (trip from home to transit stop) and last mile can be the most challenging barrier for transit agencies to increase transit ridership.

#### **Achieved Action Item 20**

*Achieve bicycle-friendly business recognition*

#### **Achieved Action Item 21**

*Implement and promote bicycle infrastructure and culture to address the first mile/last mile challenge*

recognizes the bike racks, repair station, and video surveillance provided at RTC 4TH STREET STATION and the bike locker and repair station at RTC CENTENNIAL PLAZA. The bike repair station includes basic tools and a bike pump so that customers can make minor repairs and adjustments to their bicycle.



**Figure 22, RTC Bike Repair Station**

## REGIONAL COLLABORATION AND PUBLIC EDUCATION

The RTC recognizes the importance of collaboration and education in creating a sustainable region and in achieving its own sustainability objectives. RTC transit and operations, planning, and engineering staff continually engage with other local, regional, state, and federal stakeholders, the business community, and the public to discuss issues related to RTC plans, projects, and initiatives. By implementing its sustainability initiatives and being an active participant in sustainability discussions, the agency is increasingly looked to as one of the region's sustainability leaders.

## SUSTAINABILITY PARTNERS IN NORTHERN NEVADA

For nearly a decade, RTC staff have participated as part of an informal group of sustainability professionals from various local, regional, and state government organizations. In 2015, with assistance from the City of Reno's new sustainability manager, the group added participants and adopted Sustainability Partners in Northern Nevada (SPINN) as the group's name. SPINN meets every other month to share sustainability accomplishments and advance sustainability initiatives. In addition to being a member of SPINN, RTC staff participate in the electric vehicles and land use and transportation sub-committees of SPINN. The latter sub-committee is developing recommendations for incorporating more robust sustainability policies and benchmarks into the regional plan. In addition to RTC, other SPINN organizations are as follows:

### Achieved Action Item 22

*Participate in regional sustainability collaboration efforts*

- Carson City
- City of Reno
- City of Sparks
- University of Nevada, Reno
- Reno Sparks Indian Colony
- Nevada State Office of Energy
- NV Energy
- Nevada Division of Environmental Protection
- Reno-Tahoe Airport Authority
- Truckee Meadows Regional Planning Agency
- Truckee Meadows Water Authority
- Nevada Department of Transportation
- Washoe County Health District
- Washoe County School District

## **PUBLIC OUTREACH AND EDUCATION**

Educating community stakeholders and the public is ongoing, as the RTC continually advances sustainability within the organization and region. RTC communication staff work with technical staff to post important sustainability accomplishments or project details on the RTC website and to provide press releases to local media sources. For major planning and construction projects, the RTC hosts multiple public meetings to solicit community input and incorporate public concerns into the project design and planning effort.

## **FUTURE IMPROVEMENTS**

### **ONGOING COMMITMENT TO SUSTAINABILITY**

In its ongoing commitment and efforts to align agency actions with the RTP Guiding Principles, the RTC is continually evaluating its current sustainability initiatives and seeking new avenues to reduce its environmental footprint. Achieving Silver recognition status through voluntary participation in the APTA sustainability commitment program exemplifies this ongoing commitment. Silver recognition shows that the RTC completed the first component of the APTA commitment, which is the establishment of a series of baseline sustainability metrics and demonstrated progress from that baseline.

The second component provides a framework for advancing sustainability initiatives even further. For this component, the RTC sustainability IDT developed several short-term action items, additional reduction targets, and three long-term stretch goals. Over time, as the RTC realizes these goals and targets, it may pursue higher recognition levels through the APTA program. This would require further innovation, action, and commitment. Beyond the APTA commitment, the RTC Board of Commissioners and staff will continually integrate sustainability concepts and best practices into strategic decision-making and program funding allocations.

### **SHORT-TERM COMMITMENTS**

Short-term commitments are action items the RTC intends to accomplish in less than two years. As part of its application for Silver recognition through the APTA sustainability commitment program, the RTC sustainability IDT identified 24 action item commitments. Action items apply to discrete elements of the RTC transit fleet and operations, facilities management, administrative functions, engineering, and communication program. An action can address an agency-wide sustainability objective or a specific outcome for a program or facility. The RTC commits to achieving the action items in the table below by FY 2019/2020:

## APTA ACTION ITEM COMMITMENTS

SUSTAINABILITY THEME	APTA ACTION ITEM COMMITMENTS
GREEN FLEETS	1. ADOPT A FLEET ELECTRIFICATION POLICY
	2. INSTALL ADDITIONAL FLEET CHARGING INFRASTRUCTURE
	3. EXPAND BRT SERVICES TO A SECOND MAJOR CORRIDOR
	4. INSTALL A PUBLIC ELECTRIC VEHICLE CHARGING STATION AT ONE OR MORE RTC FACILITIES
	5. ADOPT IDLING POLICY FOR REVENUE FLEET
	6. INSTALL BIKE REPAIR STATIONS AT KEY TRANSIT STOPS (TRUCKEE MEADOWS COMMUNITY COLLEGE AND MEADOWOOD MALL)
	7. DEVELOP A FLEET SUSTAINABILITY PLAN
WASTE REDUCTION	8. ESTABLISH A SUSTAINABLE PURCHASING POLICY FOR ALL OFFICE SUPPLIES AND EQUIPMENT
	9. ESTABLISH A PAPERLESS PROPOSALS STRATEGY
	10. PROVIDE COMPOSTING INFRASTRUCTURE AT THE TERMINAL FACILITY
	11. REDUCE HAZARDOUS WASTE AND CHEMICAL USAGE IN ALL AGENCY FACILITIES
WATER	12. REDUCE OUTDOOR WATER USE BY EXPANDING THE USE OF XERISCAPING AND LOW WATER-USE IRRIGATION SYSTEMS AT RTC FACILITIES
	13. INSTALL LOW-IMPACT DEVELOPMENT STORMWATER INFRASTRUCTURE AT TRANSIT FACILITIES
FACILITY ENERGY USE	14. INSTALL SOLAR-POWERED LIGHTING AT TRANSIT STATIONS
	15. APPLY LOW-E TINTING/GLAZING AT ALL ADMINISTRATIVE FACILITIES
	16. RETROFIT THE TERMINAL WAY, SUTRO, AND VILLANOVA FACILITIES WITH LED INTERIOR AND EXTERIOR LIGHTING
	17. INSTALL HVAC MONITORING SYSTEM AND UPGRADES
SUSTAINABLE BUSINESS PRACTICES	18. INCLUDE SUSTAINABILITY UPDATE AS AN AGENDA ITEM AT ALL-STAFF MEETINGS
	19. ACHIEVE GREEN BUSINESS CERTIFICATION STATUS

SUSTAINABILITY THEME	APTA ACTION ITEM COMMITMENTS
	20. ADOPT AGENCY-WIDE SUSTAINABILITY PLAN
	21. ESTABLISH RTC SUSTAINABILITY WORKING GROUP (GREEN TEAM) TO TRACK IMPLEMENTATION, COMMUNICATE INTERNALLY ABOUT THE RTC'S SUSTAINABILITY EFFORTS, AND DEVELOP CONTENT FOR OUTREACH PROGRAMS
EMISSIONS REDUCTION	22. PROVIDE EMPLOYEES WITH ACCESS TO ELECTRIC BICYCLES FOR WORK TRIPS AND COMMUTING
	23. DEVELOP INCENTIVIZATION PROGRAM FOR EMPLOYEE COMMUTING AND EMISSIONS REDUCTIONS
	24. REDUCE CARBON FOOTPRINT OF MEETINGS BY ENCOURAGING VIRTUAL COLLABORATION

### LONGER-TERM COMMITMENTS

In addition to short-term action, advancing sustainability requires specific quantitative reduction targets and ambitious, but realizable policy-level goals that help guide longer term, strategic decision-making. The RTC's application for Silver recognition included a combination of reduction target commitments and stretch goals. Collectively, these longer-term commitments encourage the RTC to continually seek and implement new sustainability opportunities throughout the organization.

### REDUCTION TARGETS

Using the sustainability inventory (see **Appendix A**), which established baseline data for several key sustainability indicators, the RTC sustainability IDT identified five unique reduction targets. These targets are specific quantitative milestones that the RTC will strive to meet within the next 3 to 6 years. As required for Silver recognition, reduction target commitments are in addition to those already achieved. They include two targets with a minimum 2 percent reduction, and three targets, with a minimum 5 percent reduction. Each reduction target also uses unlinked passenger trip data to normalize the reduction target data. To be eligible for higher recognition, the RTC must realize these targets and then commit to increasingly ambitious ones.



<b>PROPOSED REDUCTION</b>	<b>APTA REDUCTION TARGET</b>	<b>NORMALIZATION FACTOR</b>
<b>2%</b>	<b>1. GREENHOUSE GAS EMISSIONS REDUCTION</b>	<b>UNLINKED PASSENGER TRIPS</b>
	<b>2. OPERATING EXPENSE</b>	
<b>5%</b>	<b>1. AGENCY-WIDE ENERGY USE</b>	
	<b>2. RECYCLING/WASTE DIVERSION</b>	
	<b>3. CRITERIA AIR POLLUTANT EMISSIONS</b>	

### **STRETCH GOALS**

Stretch goals required as part of the APTA sustainability commitment program are long-term, policy-level, programmatic statements of intent. Generally, stretch goals are those that can be reasonably achieved in less than six years. Although there are many ways of attaining a stretch goal, success depends on the RTC's ability to align decision-making and short-term actions with the goal. For each of the six stretch goals, listed below, the RTC will develop more specific pathways for reaching the goal.

<b>SUSTAINABILITY THEME</b>	<b>APTA STRETCH GOALS</b>
<b>GREEN FLEETS</b>	<b>1. ADD 15–20 NEW ELECTRIC BUSES</b>
<b>WASTE REDUCTION</b>	<b>2. REDUCE AGENCY-WIDE PAPER USE BY 10%</b>
<b>EMISSIONS REDUCTION</b>	<b>3. INCREASE ALTERNATIVE MODE SPLITS IN THE VIRGINIA STREET AND 4TH STREET/PRATER WAY BRT CORRIDORS BY 2%, RESPECTIVELY</b>
	<b>4. INCREASE RTC VANPOOL RIDERSHIP BY 5%</b>
<b>ENERGY USE</b>	<b>5. INCREASE ENERGY EFFICIENCY OF FACILITIES BY 5%</b>
<b>SUSTAINABLE BUSINESS PRACTICES</b>	<b>6. IMPLEMENT ENVIRONMENTAL MANAGEMENT SYSTEM, SUSTAINABLE MANAGEMENT SYSTEM, INTERNATIONAL ORGANIZATION FOR STANDARDIZATION 14001, OR SIMILAR PROGRAM AT MAJOR TRANSIT FACILITIES</b>

## MONITORING, IMPLEMENTATION, AND ONGOING REPORTING

Implementing the actions, reduction targets, and stretch goals described above will be an ongoing, agency-wide effort led by the Sustainability Project Manager and the Green Team. Over time, the types of actions taken may shift, as new data, technology, or funding becomes available. Accordingly, the RTC will continually evaluate the mechanisms for achieving its sustainability goals. Regular monitoring and data collection, such as through energy, water, and waste stream audits, annual NTD reporting, and employee surveys, will reveal the efficiency and success of certain decisions and programs.

An annual progress report required as part of the RTC's participation in the APTA sustainability commitment program will provide another opportunity to compile recent data and evaluate progress. This report can also be used to apply for a higher recognition level. Normalization factors used in the APTA reporting process ensure progress is measured relative to current ridership, fleet, VMT, population, and RTC employee data. Based on monitoring and reporting results, RTC staff will provide periodic updates and recommendations to the RTC Board of Commissioners and will make the appropriate changes when and where they are needed or requested by the Board.

## REFERENCES

APTA (American Public Transportation Association). 2012. Quantifying and Reporting Transit Sustainability Metrics. Washington, D.C.

Car Talk. 2014. Photo from website: <http://www.cartalk.com/blogs/jim-motavalli/all-aboard-renos-electric-shuttle-bus-tomorrows-answer-today>.

Energy Star. 2017. Learn About LED Bulbs. Internet website: [https://www.energystar.gov/products/lighting\\_fans/light\\_bulbs/learn\\_about\\_led\\_bulbs](https://www.energystar.gov/products/lighting_fans/light_bulbs/learn_about_led_bulbs).

EPA (US Environmental Protection Agency). 2016. Greenhouse Gas Equivalencies Calculator. Internet website: <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>.

Federal Highway Administration. 2017. About INVEST. Internet website: <https://www.sustainablehighways.org/100/about.html>.

HART Commuter Information Services. 2017. Photo from website: <http://www.harttma.com/Safe-Routes-to-School/Overview>.

National Center for Safe Routes to School. 2017. Trends in Walking and Bicycling to School from 2007 to 2013. Internet website: [http://saferoutesinfo.org/sites/default/files/SurveyTrends\\_2007-13\\_final.pdf](http://saferoutesinfo.org/sites/default/files/SurveyTrends_2007-13_final.pdf).

National Oceanic and Atmospheric Administration. 2017. Climatological Report (Annual). National Weather Service, Reno, Nevada.

Truckee Meadows Regional Planning Agency. 2012. Truckee Meadows Regional Plan. Reno, Nevada.

*Reno Gazette-Journal*. 2015. Photo from website: <http://www.rgj.com/story/money/business/2015/04/24/amazon-reno-fulfillment-center-like-small-city-technobubble/26270199/>.

RTC (Regional Transportation Commission of Washoe County). 2016a. SMART TRIPS Data. Internet website: <https://rtcwashoe.greenride.com/>.

RTC. 2016b. Complete Streets Master Plan. Reno, Nevada.

RTC. 2017. Photo from website: <http://www.rtcwashoe.com/>.

## ACKNOWLEDGEMENTS

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## **APPENDIX A–SUSTAINABILITY INVENTORY**

## Water Usage

*Summary: Measures metered use of potable water (including outdoor irrigation).*

*Unit of Measure: Gallons*

Facility	Year						
	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	
Villanova	2,660,000	1,856,000	2,752,000	2,719,000	3,834,000	2,186,000	Gallons
Terminal	897,000	373,000	451,000	476,000	945,000	587,000	
Sutro (building)	385,000	363,200	338,000	325,000	379,000	328,000	
Sutro (irrigation)	198,000	567,000	295,000	571,000	510,000	263,000	
CENTENNIAL PLAZA (building)	118,000	111,000	136,000	147,000	192,000	301,000	
CENTENNIAL PLAZA (irrigation)	434,000	583,000	673,000	697,000	738,000	168,000	
4TH STREET STATION (building)	622,000	1,114,000	1,175,000	1,285,000	1,676,000	2,853,000	
4TH STREET STATION (irrigation)	169,000	286,000	177,000	232,000	194,000	236,000	
6th Street Service Facility	15,000	2,000	2,000	3,000	176	1,000	
<b>Total (All Facilities)</b>	<b>5,498,000</b>	<b>5,255,200</b>	<b>5,999,000</b>	<b>6,455,000</b>	<b>8,468,176</b>	<b>6,923,000</b>	



2010 Criteria Air Pollutant Emissions					
<i>Summary: Measures criteria air pollutant emissions from mobile fleets.</i>					
<i>Units of Measure: Tons/year and Grams per Mile (g/mi*)</i>					
	Pollutant				
	NO <sub>x</sub>	PM <sub>2.5</sub>	HCS	CO	CO <sub>2</sub>
<b>Fleet Total (tons/year)</b>	54.22	3.15	4.35	18.52	7,396.30
<b>Fleet Total (g/mi)</b>	10.90	0.63	0.87	3.72	1,486.94

Source: EPA Diesel Emissions Quantifier Tool and 2010 NTD report data

\*g/mi used for APTA reporting

2015 Criteria Air Pollutant Emissions					
<i>Summary: Measures criteria air pollutant emissions from mobile fleets.</i>					
<i>Units of Measure: Tons/year and Grams per Mile (g/mi*)</i>					
	Pollutant				
	NO <sub>x</sub>	PM <sub>2.5</sub>	HCS	CO	CO <sub>2</sub>
<b>Fleet Total (tons/year)</b>	25.48	0.66	1.37	5.29	7,008.30
<b>Fleet Total (g/mi)</b>	4.03	0.10	0.22	0.84	1,107.23
<b>% Change from 2010</b>	-63%	-84%	-75%	-78%	-26%

Source: EPA Diesel Emissions Quantifier Tool and 2015 NTD report data

\*g/mi used for APTA reporting

## Greenhouse Gas (GHG) Emissions\*

*Summary: Measures emissions from mobile fleets and stationary sources for three types of greenhouse gases - CH<sub>4</sub> (methane), CO<sub>2</sub>, and N<sub>2</sub>O.*

*Unit of Measure: Metric Tons CO<sub>2</sub> Equivalent (CO<sub>2</sub>e)/year*

Source**	GHG***		
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
Mobile Fleet	6,441.95	22.16	28.39
Facilities	436.18	1.59	5.88
<b>Total Emissions</b>	<b>6,878.13</b>	<b>23.75</b>	<b>34.27</b>

\*Uses APTA's "basic approach"

\*\*RTC does not have traction electricity

\*\*\*Based on 2014 data

## Greenhouse Gas (GHG) Savings (Displacement)

*Summary: Measures the amount of greenhouse gases(CO<sub>2</sub>e) that are displaced by transit in the service area.*

*Units of Measure: Displaced CO<sub>2</sub>e/year*

	Year				
	2010	2011	2012		2016*
PMTs	26,176,628	31,451,157	33,922,572		33,737,908
Mode Shift	0.34	0.34	0.34		0.34
Average Fuel Economy	22.6	22.4	23.7		24.8
<b>Displaced CO<sub>2</sub>e/year</b>	<b>3,469.45</b>	<b>4,205.75</b>	<b>4,287.41</b>		<b>4,074.94</b>

\*Uses EPA 2015 Avg. Fuel Economy (24.8mpg)

2010 Mobile Sources (Scope 1 Emissions)						
Energy Type	Category	Unit of Measure	Source	Total Gallons***	BTUs*****	Total Miles
Fuel	Gasoline	Gallons	Nonrevenue (Vanpool)	7,225	823,650,000	118,488
	Gasoline	Gallons	Nonrevenue (Admin Fleet)	TBD	TBD	TBD
	Bio Diesel	Gallons	Revenue, Transit*	617,490	73,049,067,000	2,926,902
	CNG		Nonrevenue (DR)	155,027	19,378,375,000	1,240,217
			<b>Totals</b>	<b>624,715</b>	<b>93,251,092,000</b>	<b>4,285,607</b>

2010 Stationary Sources (Scope 2 Emissions)				
Energy Type	Category	Unit of Measure	Source	Totals
Heating/Cooling	Natural Gas	Therms	NV Energy	134,875
Electricity	Purchased Electricity	kWh	NV Energy	3,487,729
<b>Totals</b>			<b>Gallons</b>	<b>134,875</b>
			<b>Therms</b>	<b>3,487,729</b>

2010 Emissions*/**			
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	63.65	0.00	0.00
	TBD	TBD	TBD
	5,841.46	0.0146	0.0146
	434.81	0.91	0.06
<b>Total</b> (metric tons/year)	<b>6,339.92</b>	<b>0.93</b>	<b>0.08</b>

2010 Stationary Source Emissions*/****			
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
<b>Total</b> (metric tons/year)	610.95	0.1063	0.0266

\*Uses 2008 Climate Registry Default Emission Factors

\*\*For CH<sub>4</sub> and N<sub>2</sub>O emission factors, transit vehicles are heavy-duty; vans are light duty. Assumes EPA Tier 2

\*\*\*From Transit Emissions Quantifier Tool

\*\*\*\*Uses standard emission factor for Natural Gas (53.06 kg CO<sub>2</sub>/MMBtu) because natural gas is the primary energy source for electricity and heating and cooling.

\*\*\*\*\*Assumes the following conversions: 1:114,000 for gas, 1:118,300 for biodiesel, and 1:125,000 for CNG

2016 Mobile Sources (Scope 1 Emissions)						
Energy Type	Category	Unit of Measure	Source	Total Gallons****	BTUs*****	Total Miles
Fuel	Gasoline	Gallons	Nonrevenue (Vanpool)	87,283	9,950,262,000	1,431,440
	Gasoline	Gallons	Nonrevenue (Admin Fleet)	TBD	TBD	TBD
	Bio Diesel	Gallons	Revenue, Transit	548,895	64,934,278,500	2,601,762
	CNG	Gallon equivalent	Nonrevenue (DR)	172,778	21,597,250,000	1,382,223
	Electricity	kWh	Revenue, Transit	2,323	7,926,428	77,603
			<b>Totals</b>	<b>811,279</b>	<b>96,489,716,928</b>	<b>5,493,028</b>
			<b>Change from 2010</b>	<b>30%</b>	<b>3%</b>	<b>28%</b>

2016 Stationary Sources (Scope 2 Emissions)					
Energy Type	Category	Unit of Measure	Source	Totals	% Change from 2010
Heating/Cooling	Natural Gas	Therms	NV Energy	79,238.00	-41%
Electricity	Purchased Electricity*	kWh	NV Energy	3,269,157.15	6%
<b>Totals</b>			<b>Gallons</b>	<b>79,238.00</b>	
			<b>Therms</b>	<b>3,269,157.15</b>	

2016 Emissions**/**			
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	766.34	0.02	0.01
	TBD	TBD	TBD
	5,187.06	0.0130	0.0130
	488.55	1.02	0.07
	0.00	0.00	0.00
<b>Total</b> metric tons/year	<b>6,441.95</b>	<b>1.06</b>	<b>0.09</b>
<b>Change from 2010</b>	<b>2%</b>	<b>13%</b>	<b>18%</b>

2016 Stationary Source Emissions**/**			
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
<b>Total</b> metric tons/year	<b>436.18</b>	<b>0.0759</b>	<b>0.019</b>

\*Electricity for electric bus charging at 4TH STREET STATION accounted for in mobile sources

\*\*Uses 2016 Climate Registry Default Emission Factors

\*\*\*For CH<sub>4</sub> and N<sub>2</sub>O emission factors, transit vehicles are heavy-duty; vans are light duty. Assumes EPA Tier 2

\*\*\*\*From Transit Emissions Quantifier Tool

\*\*\*\*\*Uses standard emission factor for Natural Gas (53.06 kg CO<sub>2</sub>/MMBtu) because natural gas is the primary energy source for electricity and heating and cooling. Assumes 5% GHG reduction from rooftop solar and geothermal mix in the power grid.

\*\*\*\*\*Assumes the following conversions: 1:114,000 for gas, 1:118,300 for biodiesel, 1:125,000 for CNG, and 1:3,412 for electric

Energy Usage (Electricity)							
<i>Summary: Measures annual agency electricity usage.</i>							
<i>Unit of Measure: kilowatt hour (kWh)</i>							
Facility							
	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	
Villanova	1,209,984	1,078,848	1,073,835	1,116,672	1,065,354	985,416	kWh
Terminal	587,450	491,800	541,000	494,800	471,510	505,800	
Sutro	557,731	360,768	365,568	407,424	399,936	393,627	
CENTENNIAL PLAZA	527,670	583,780	595,840	618,280	658,940	655,821	
4TH STREET STATION*	600,560	590,000	591,480	567,203	564,945	689,843	
Meadowood Mall	2,592	4,569	4,499	3,484	3,621	4,187	
RAPID Stations	-	13,373	28,762	28,167	28,385	29,530	
6th Street Service Facility	-	22	936	7,395	5,952	3,396	
Other	1,742	1,608	1,608	1,608	1,608	1,537	
<b>Total (All Facilities)</b>	<b>3,487,729</b>	<b>3,124,768</b>	<b>3,203,528</b>	<b>3,245,033</b>	<b>3,200,251</b>	<b>3,269,157</b>	

\*Accounts for CitiCenter during FY10/11

Energy Usage (Natural Gas)							
Summary: Measures annual agency natural gas usage.							
Unit of Measure: Therms							
Facility							Therms
	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	
Villanova	100,824	66,267	50,846	36,543	38,797	47,279	
Terminal	11,899	9,121	8,110	10,653	7,249	8,794	
Sutro	20,861	18,000	19,061	20,368	19,440	18,940	
CENTENNIAL PLAZA	614	604	589	794	469	564	
4TH STREET STATION*	327	2,039	4,391	4,503	3,859	3,134	
Meadowood Mall	-	-	-	-	-	-	
RAPID Stations	-	-	-	-	-	-	
6th Street Service Facility	350	185	485	662	263	527	
Other	-	-	-	-	-	-	
Total (All Facilities)	134,875	96,216	83,482	73,523	70,077	79,238	

\*Accounts for CitiCenter during FY10/11



Total Facilities Energy Usage (BTUs)*							
<i>Summary: Measures total annual agency energy usage.</i>							
<i>Unit of Measure: British thermal units (BTUs)</i>							
Facility							BTUs
	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	
Villanova	14,208,627,088	10,306,298,395	8,747,461,891	7,463,669,644	7,513,911,489	8,089,148,991	
Terminal	3,194,078,216	2,589,973,263	2,656,774,794	2,753,373,073	2,333,585,650	2,605,051,061	
Sutro	3,988,658,587	3,030,561,313	3,153,014,235	3,426,501,597	3,308,173,660	3,236,658,409	
CENTENNIAL PLAZA	1,861,870,101	2,052,325,607	2,091,976,394	2,189,039,952	2,295,285,399	2,294,140,658	
4TH STREET STATION	2,081,887,964	2,217,014,831	2,457,208,588	2,385,570,031	2,313,479,067	32,667,167,630	
Meadowood Mall	8,844,271	15,590,075	15,351,225	11,887,901	12,355,365	14,286,637	
RAPID Stations	-	45,630,570	98,140,018	96,109,793	96,853,640	100,760,542	
6th Street	34,991,635	18,570,646	51,682,173	91,416,966	46,602,781	64,275,038	
Other	5,943,951	5,486,724	5,486,724	5,486,724	5,486,724	5,244,462	
<b>Total (All Facilities)</b>	<b>25,384,901,813</b>	<b>20,281,451,423</b>	<b>19,277,096,041</b>	<b>18,423,055,682</b>	<b>17,925,733,775</b>	<b>19,076,733,428</b>	

\*BTUs is the required unit of measure for APTA reporting

Total Energy Usage (BTUs) Facilities and Transit			
<i>Summary: Measures total annual agency energy usage.</i>			
<i>Unit of Measure: British thermal units (BTUs)</i>			
Source			
	2010/2011	2015/2016	% Change
Total All Facilities	25,384,901,813	19,076,733,428	-25%
Total All Transit	93,251,092,000	96,489,716,928	3%
<b>Total (All Sources)</b>	<b>118,635,993,813</b>	<b>115,566,450,356</b>	<b>-3%</b>

Recycling and Waste							
2015 Base Data Assumptions							
Material Type	Facility	Number of Annual Services/Pick-Ups		Uncompacted Cubic Yards			
		4 Cubic Yard Container	20 Cubic Yard Container	Compaction Ratio	Annual Capacity (yd <sup>3</sup> )	Utilization Factor	Estimated Utilization (yd <sup>3</sup> )
Waste (landfill) Material*	Sutro*	68		1	272	0.8	218
	Villanova**		68	1	1,360	0.8	1,088
	Terminal*	68		1	272	0.8	218
	Centennial Plaza*	68		1	272	0.5	136
	4th Street Station*	68		1	272	0.8	218
	<b>Total</b>	272	68		<b>2,448</b>		<b>1,877</b>
Recycled Material*	Sutro*	28		1	112	0.8	90
	Villanova*	28		1	112	0.8	90
	Terminal*	28		1	112	0.8	90
	Centennial Plaza	28		1	112	0.5	56
	4th Street Station*	28		1	112	0.5	56
	<b>Total</b>	140	-		<b>560</b>		<b>381</b>

\*Assumes 4yd<sup>3</sup> bin that is full on each pick up

\*\*Assumes 20yd<sup>3</sup> bin that is full on each pick up

Recycling and Waste							
2016 Data Assumptions							
Material Type	Facility	Number of Annual Services/Pick-Ups		Uncompacted Cubic Yards			
		4 Cubic Yard Container	20 Cubic Yard Container	Compaction Ratio	Annual Capacity (yd³)	Utilization Factor	Estimated Utilization (yd³)
Waste (landfill) Material*	Sutro*	52		1	208	0.8	166
	Villanova**		52	1	1,040	0.8	832
	Terminal*	52		1	208	0.8	166
	CENTENNIAL PLAZA*	52		1	208	0.5	104
	4TH STREET STATION*	52		1	208	0.8	166
	<b>Total</b>	156	52		1,872		1,435
Recycled Material*	Sutro*	52		1	208	0.8	166
	Villanova*	52		1	208	0.8	166
	Terminal*	52		1	208	0.8	166
	CENTENNIAL PLAZA	52		1	208	0.5	104
	4TH STREET STATION *	52		1	208	0.5	104
	<b>Total</b>	260	-		1,040		707

\*Assumes 4yd³ bin that is full on each pick up

\*\*Assumes 20yd³ bin that is full on each pick up

Recycling and Waste				
<i>Summary: Measures annual municipal waste quantities and recycling diversion rates.</i>				
<i>Unit of Measure: Tons</i>		Year		
Material Type	Facility	2015	2016	
Waste (landfill) Material*	Sutro*	304.6	232.96	Tons
	Villanova**	1,523.2	1,164.80	
	Terminal*	304.6	232.96	
	CENTENNIAL PLAZA *	190.4	145.60	
	4TH STREET STATION *	304.6	232.96	
	<b>Total Waste</b>	<b>2,627.5</b>	<b>2,009.3</b>	
Recycled Material*	Sutro*	125.4	232.96	
	Villanova*	125.4	232.96	
	Terminal*	125.4	232.96	
	CENTENNIAL PLAZA	78.4	145.60	
	4TH STREET STATION *	78.4	145.60	
	<b>Total Recycled</b>	<b>533.1</b>	<b>990.1</b>	
<b>Total Material</b>		<b>3,160.6</b>	<b>2,999.4</b>	
<b>Diversion Rate</b>		<b>17%</b>	<b>33%</b>	

\*Assumes 4yd<sup>3</sup> bin that is full on each pick up

\*\*Assumes 20yd<sup>3</sup> bin that is full on each pick up

## Operating Expenses

*Summary: Compares relative efficiency of changes in agency operating expenditures by service mode in industry-wide service mode standard.*

Unit of Measure: \$	Year (Year over Year Percent Change)											
Mode	2010	% Change	2011	% Change	2012	% Change	2013	% Change	2014	% Change	2015	% Change
<b>Operating Expenses</b>	\$31,690,179	N/A	\$32,312,330	2%	\$30,644,738	-5%	\$30,836,009	1%	\$31,429,617	2%	\$31,730,579	1%
<b>Passenger Miles</b>	26,176,628	N/A	31,450,957	20%	33,922,572	8%	35,112,560	4%	34,286,005	-2%	35,262,434	3%
<b>Performance (\$/mile)</b>	\$1.85	N/A	\$1.87	1%	\$1.63	-12%	\$2.23	37%	\$1.77	-21%	\$1.74	-2%

2010 (Base Year)			
Agency			
Mode*	Operating Expense**	Passenger Miles	Performance Metric (\$/mile)
Demand Response	\$5,946,199.00	1,429,521	\$4.16
Motorized Bus	\$25,203,364.00	23,753,700	\$1.06
Vanpool	\$61,380.00	871,708	\$0.07
Commuter Bus	\$-	-	\$-
Demand Response Taxi	\$479,236.00	121,699	\$3.94
<b>Total</b>	<b>\$31,690,179.00</b>	<b>\$26,176,628.00</b>	<b>\$1.85</b>

2011			
Agency			
Mode*	Operating Expense**	Passenger Miles	Performance Metric (\$/mile)
Demand Response	\$5,872,398.00	1,361,229	\$4.31
Motorized Bus	\$25,728,187.00	26,472,621	\$0.97
Vanpool	\$315,873.00	3,517,090	\$0.09
Commuter Bus	\$-	-	\$-
Demand Response Taxi	\$395,872.00	100,017	\$3.96
<b>Total</b>	<b>\$32,312,330.00</b>	<b>31,450,957</b>	<b>\$1.87</b>

\*Motorized Bus includes BRT and electric buses (starting in 2013)

\*\*Includes total operating expenses, purchased fare revenues, and ADA costs



2012			
Agency			
Mode*	Operating Expense**	Passenger Miles	Performance Metric (\$/mile)
Demand Response	\$5,487,277.00	1,390,328	\$3.95
Motorized Bus	\$23,989,890.00	27,260,680	\$0.88
Vanpool	\$390,839.00	5,019,911	\$0.08
Commuter Bus	\$384,775.00	147,971	\$2.60
Demand Response Taxi	\$391,957.00	103,682	\$3.78
<b>Total</b>	<b>\$30,644,738.00</b>	<b>33,922,572</b>	<b>\$1.63</b>

2014			
Agency			
Mode*	Operating Expense**	Passenger Miles	Performance Metric (\$/mile)
Demand Response	\$6,101,311.00	1,560,159	\$3.91
Motorized Bus	\$23,843,115.00	23,695,995	\$1.01
Vanpool	\$728,078.00	7,987,847	\$0.09
Commuter Bus	\$378,527.00	931,561	\$0.41
Demand Response Taxi	\$378,586.00	110,443	\$3.43
<b>Total</b>	<b>\$31,429,617.00</b>	<b>34,286,005</b>	<b>\$1.77</b>

2013			
Agency			
Mode*	Operating Expense**	Passenger Miles	Performance Metric (\$/mile)
Demand Response	\$5,819,514.00	1,454,472	\$4.00
Motorized Bus	\$23,793,017.00	27,565,692	\$0.86
Vanpool	\$470,437.00	5,843,028	\$0.08
Commuter Bus	\$382,143.00	146,495	\$2.61
Demand Response Taxi	\$370,898.00	102,873	\$3.61
<b>Total</b>	<b>\$30,836,009.00</b>	<b>35,112,560</b>	<b>\$2.23</b>

2015			
Agency			
Mode*	Operating Expense**	Passenger Miles	Performance Metric (\$/mile)
Demand Response	\$6,246,876.00	1,524,726	\$4.10
Motorized Bus	\$23,612,433.00	23,626,673	\$1.00
Vanpool	\$1,068,826.00	9,072,453	\$0.12
Commuter Bus	\$403,096.00	907,460	\$0.44
Demand Response Taxi	\$399,348.00	131,122	\$3.05
<b>Total</b>	<b>\$31,730,579.00</b>	<b>35,262,434</b>	<b>\$1.74</b>

\*Motorized Bus includes BRT and electric buses (starting in 2013)

\*\*Includes total operating expenses, purchased fare revenues, and ADA costs

Unlinked Passenger Trips		
<i>Summary: Number of times passengers board an agency-operated vehicle.</i>		
<i>Unit of Measure: Passengers</i>	Year	
	2010	2016
<b>Unlinked Passenger Trips</b>	7,474,905	7,715,419
<b>Service Area Population</b>	319,977	327,768*
<b>Unlinked Passenger Trips per Capita</b>	<b>23.36</b>	<b>23.54*</b>

\*Estimated 2015 population used for 2016 calculations

Vehicle Miles Traveled (VMT)			
<i>Summary: Provides passenger vehicle travel trends in the agency's service area.</i>			
<i>Unit of Measure: Passenger vehicle miles</i>			
VMT Type	Year		
	2010	2015	
<b>Total VMT</b>	2,745,000,000	3,049,000,000	<b>Miles</b>
<b>Annual per Capita VMT</b>	8,579	9,302	
<b>Daily per Capita VMT</b>	23.5	25.5	

## Normalization Factors

### Passenger Miles Traveled (PMT)

**Summary:** The cumulative sum of the distances ridden by each passenger. Measures service consumed taking into account productivity and operation efficiency.

	Year				
	2010	2011	2012	...	2016
<b>Passenger Miles Traveled</b>	26,176,628	31,451,157	33,922,572		33,737,908

### Vehicle Revenue Hours (VRH)

**Summary:** Hours traveled when the vehicle is in revenue service. Measures service provided while accounting for roadway congestion and deadheading.

	Year				
	2010	2011	2012	...	2016
<b>Vehicle Revenue Hours</b>	325,598	345,514	351,402		364,248

### Vehicle Miles (VM)

**Summary:** Miles a vehicle travels from start to finish, including miles without passengers (deadhead miles). Measures service provided taking into account facility, vehicle, and fuel efficiency.

	Year				
	2010	2011	2012	...	2016
<b>Vehicle Miles</b>	4,516,544	4,857,821	4,570,589		5,747,235

Vehicle Revenue Miles (VRM)					
<b>Summary:</b> Miles traveled when vehicle is in revenue service. Measures service provided taking into account facility, vehicle, and fuel as well as deadheading and congestion.					
	Year				
	2010	2011	2012	...	2016
<b>Vehicle Revenue Miles</b>	4,138,949	4,606,776	4,821,437		5,693,250

Unlinked Passenger Trips (UPT)					
<b>Summary:</b> The number of times passengers board vehicles regardless of method of payment and how many vehicles they use to travel from their origin to their destination.					
	Year				
	2010	2011	2012	...	2016
<b>Unlinked Passenger Trips</b>	7,712,918	7,967,708	8,277,735		8,559,590
<b>Unlinked Passenger Trips per Capita</b>	24.1	24.3	25.3		26.1

Produced Seat Miles		
<b>Summary:</b> Provides the product of seating capacity of all vehicles in revenue service and the miles they have traveled.		
	Year	
	2016	
<b>Total Seats</b>	...	
<b>Produced Seat Miles</b>	12,281,963,684	

Revenue Vehicle Length (2016)		
<i>Summary: Provides a measurement of vehicle length (in feet) for different fleet types,* which can be used for measuring the efficiency of vehicle washing systems.</i>		
	Vehicle Length	
	Combined Length (Feet)	Average (feet)
<b>Commuter Bus</b>	120	40.0
<b>Bus Rapid Transit</b>	480	60.0
<b>Demand Response</b>	1,060	21.2
<b>Standard Bus</b>	2,730	39.0
<b>Vanpool</b>	1,287	17.9

\*See Separate Input Table

Per Capita (Service Area Population)					
<i>Summary: The number of people in the agency's service area with access to transit services.</i>					
	Year				
	2010	2011	2012	...	2016
<b>Per Capita (Service Area Pop.)</b>	319,977	327,768	327,768		327,768*
*2015 data					

RTC Employees					
<i>Summary: The number of people employed full-time at RTC.</i>					
	Year				
	2010	2011	2012	...	2016
<b>RTC Employees</b>	87	75	68		61.5