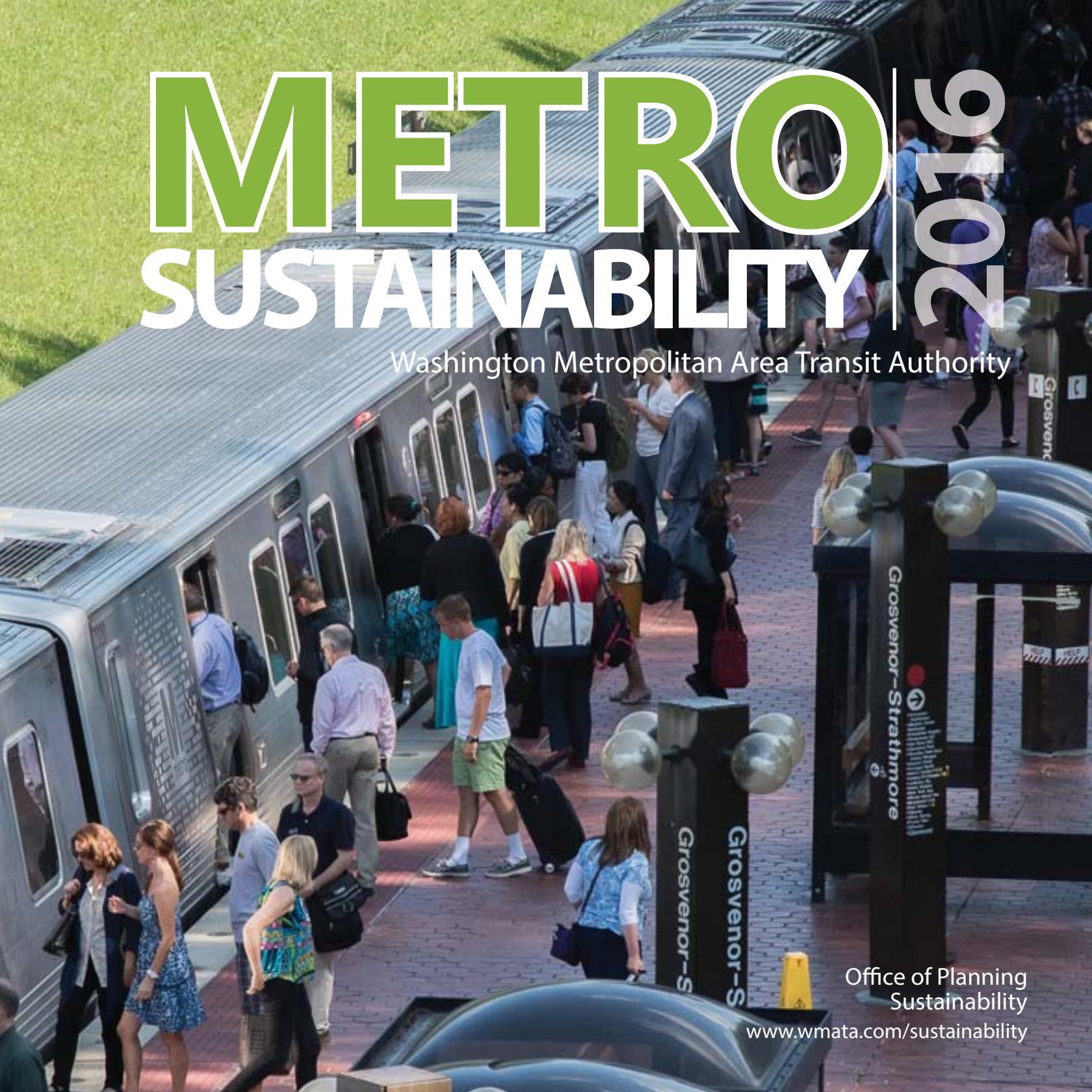


METRO

SUSTAINABILITY

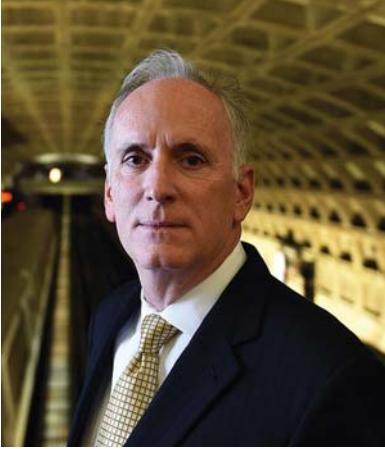
2016

Washington Metropolitan Area Transit Authority



Office of Planning
Sustainability

www.wmata.com/sustainability



“Sustainable practices will be incorporated as we rebuild”

General Manager/CEO Message

Metro is at a critical point where significant improvements must be made to provide the safe, effective and reliable service our region deserves. As Metro's new General Manager, I have confronted many hard truths about the organization and set out an action plan to move us forward and restore pride in the Metro system. This plan of action focuses on three areas: increased safety and security, improved service reliability, and financial stability.

The actions we take to improve the system help get riders out of their cars and onto our trains and buses, and as a result reduce greenhouse gas emissions region-wide. And wherever possible, sustainable practices will be incorporated as we rebuild. I recognize that sustainability can lead to real financial savings, and our new railcars, buses, and facility improvements are helping Metro lead the way.

Metro's Sustainability Initiative keeps Metro on track to achieve financial and environmental goals while improving safety and reliability. Programs like Metro's Sustainability Lab allow the Authority's creative minds to show what is possible as we improve the system. I encourage these programs and will look for financially-responsible, environmentally-friendly projects as improvements are made throughout the system.

A handwritten signature in black ink that reads "Paul J. Wiedefeld". The signature is fluid and cursive, with a prominent loop at the end of the last name.

Paul J. Wiedefeld
General Manager/CEO
Washington Metropolitan Area
Transit Authority



Performance Targets

Metro's Sustainability Agenda commits the Authority to 10 core sustainability targets:

REGIONAL

- 25%** Increase in Ridership by 2025
-  Increase Transit, Bike and Walk Mode Share
-  Connect Communities
- 10%** Increase in Greenhouse Gas Displacement by 2025

INTERNAL

- 15%** Reduction in Energy use per Vehicle Mile by 2025
- 50%** Reduction in Greenhouse Gas Emissions per Vehicle Mile by 2025
- 30%** Use of Renewable Electricity by 2025 (as financially feasible)
- 20%** Reduction in Water Use per Vehicle Mile by 2025
- 100%** On-Site Stormwater Management for Facilities and Stations - no target date
- 100%** Waste Diversion Rate - no target date



2016 SUSTAINABILITY

Metro is ramping up efforts to increase the efficiency of existing operations. Building upon work initiated in 2015, the projects planned for 2016 include:

- Install on-site solar carports at selected Metro parking lots
- Complete an Authority-wide energy audit to identify energy saving opportunities
- Establish an Authority-wide utility management platform to monitor and reduce utility operating costs
- Build on a successful pilot of train braking energy capture and re-use as part of traction power upgrades
- Continue to incubate resource efficient technology upgrades through the Sustainability Lab

**Sustainability
Lab savings:**

\$700,000 in
operating costs
over the next **5**
years

Sustainability Lab

Metro's Sustainability Lab is dedicated to piloting cost-saving green technology and practices across the Authority.

Since 2014, the Lab has implemented projects related to the use of energy, water, and waste disposal that are expected to save the Authority \$700,000 in operating costs over the next five years.

Employee Recognition

Employees are critical to achieving Metro's Sustainability Initiative targets. Through an annual award program, Metro rewards staff and projects that bring cost saving, sustainable business practices to the Authority.

Battery-Electric Bus Pilot

In 2016, Metrobus will begin testing a battery-electric bus on selected routes in the region. The battery-electric drive train offers nearly silent and emissions-free bus operations. It also provides fuel and maintenance savings for Metro.

The electric bus stores energy in on-board lithium-ion batteries. Metrobus will evaluate this propulsion technology for potential wider adoption as battery-electric technology continues to mature.

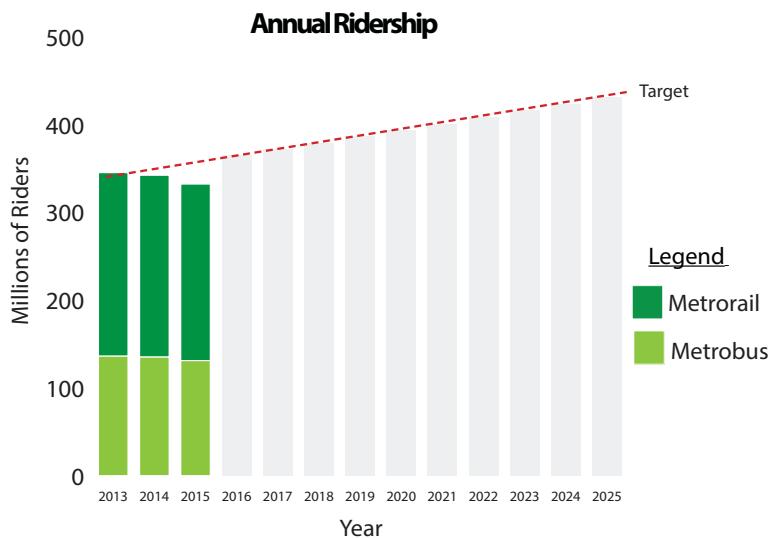
Ridership and Mode Share

In 2015, ridership on Metrorail and Metrobus declined by a combined total of 3%. Problems with service reliability, reduced federal transit benefit, and low gasoline prices contributed to this decline, particularly on long-haul routes. In areas closer to the downtown core with transit-oriented development - such as Navy-Yard Ballpark and NoMa-Gallaudet - ridership increased.

By the end of 2015, Metro improved service by:

- Bringing 80 state-of-art 7000-series railcars into revenue service
- Opening the Silver Spring Transit Center
- Completing mezzanine lighting upgrades at 12 rail stations
- Extending car sharing service to all Metrorail stations with parking

In 2016, Metro will focus on delivering reliable service to riders while maintaining increased safety and security throughout the system.



Regional Transit Ridership





Service Delivery

The reliability of Metro service is a key driver of customer satisfaction. When rail on-time performance dropped last year to 84% and mechanical failures doubled the number of late trains, it was not surprising that Metro ridership declined.

Now, Metro is undertaking a wide range of actions to deliver better service and win back our riders. That includes implementing a rail service reliability plan to ensure trains arrive as scheduled, fixing our railcars to reduce delays and offloads, and accelerating delivery of new 7000-series railcars.

Metro also plans to strategically position platform attendants to assist customers in key transfer stations during peak travel and continue station improvements to signage, lighting, elevators and escalators.

Metro is partnering with regional and state departments of transportation to introduce traffic signal prioritization in key bus corridors to reduce travel times, and will improve Metrobus and Metro Access reliability through continued introduction of new vehicles.

Delivering reliable service while maintaining safety and security

Connect Communities

This year the newly developed Connecting Communities key performance indicators were added to Metro's Vital Signs Report. These indicators measure how effectively communities with transit service take advantage of transit infrastructure investments. The two metrics are:

- Density Around Stations: Measures household and job concentrations around Metrorail stations
- Station Walkability: Measures how much of the ½ mile area around Metrorail stations is accessible on foot

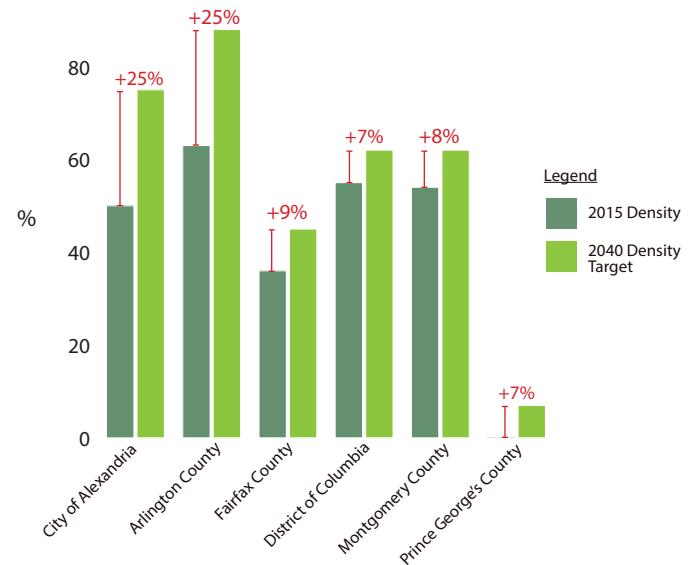
While the Connected Communities metrics measure the performance of areas around transit, Metro is also a partner in accessibility and development improvements.

In 2015, Metro improved access and connections to rail stations and bus services by:

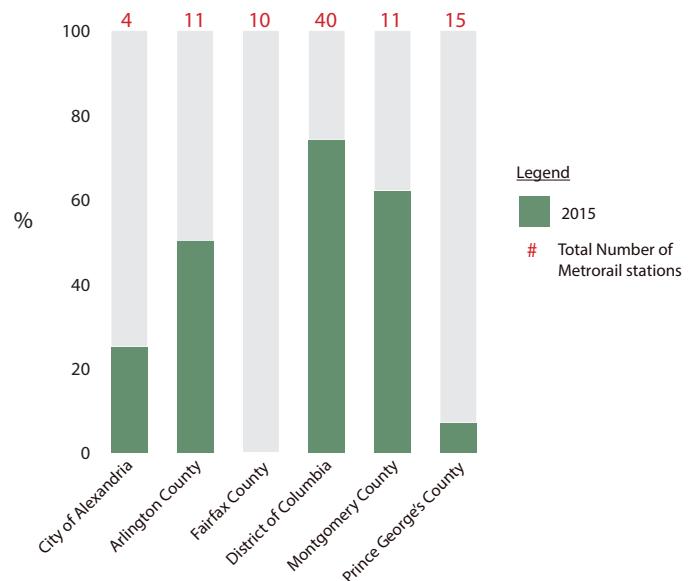
- Upgrading the bus loop and parking garage at the Dunn Loring-Merrifield Metrorail station
- Moving forward with transit-oriented development at Fort Totten Metrorail station
- Increasing bicycle infrastructure with a total of 2,400 bicycle racks and 1,300 bicycle lockers, now available throughout the system

In 2016, Metro will construct new secure Bike & Rides at Vienna and East Falls Church stations, and replace 200 bike lockers throughout the system that have reached the end of their useful life. To continue progress on pedestrian investments, Metro will complete a station area strategic investment plan with an online mapping tool that helps municipal agencies prioritize pedestrian and bicycle infrastructure around Metrorail stations.

Percentage of Stations Achieving Density Threshold



Percentage of Stations Achieving Walkshed Target





Making Connections

If the region increases the number of riders where transit already exists, this means transit is being efficiently utilized and the cost of transit to taxpayers is reduced.

By making improvements to pedestrian and bicycle networks surrounding our stations, Metro can also support non-motorized access to the system and reduce the need for parking and/or bus services.

**Improve
Access**



**Improve
Service**



**Grow Near
Transit**

**Regional
Growth
Near Transit**

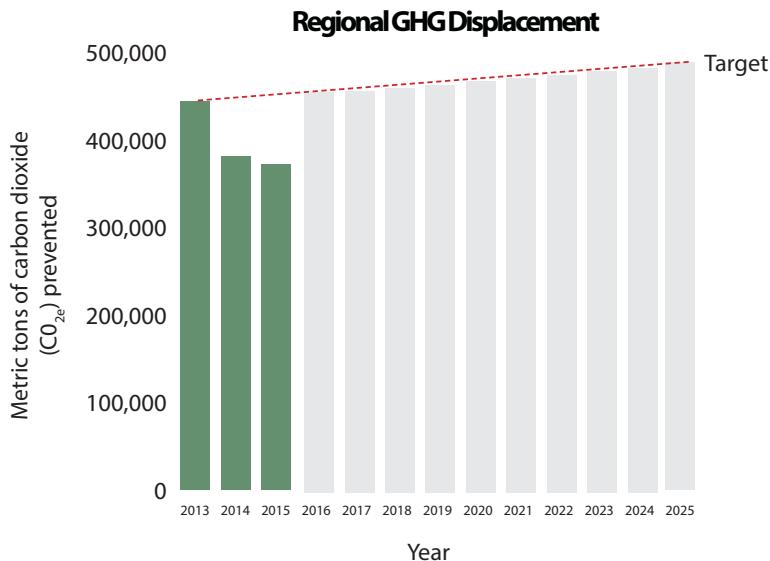
Climate Change

Metro measures the net amount of greenhouse gas (GHG) avoided (displaced) when customers use transit instead of personal vehicles. In 2015, Metro's GHG displacement declined by 2% due to a declining ridership and increases in service related to the first full year of Silver Line operations.

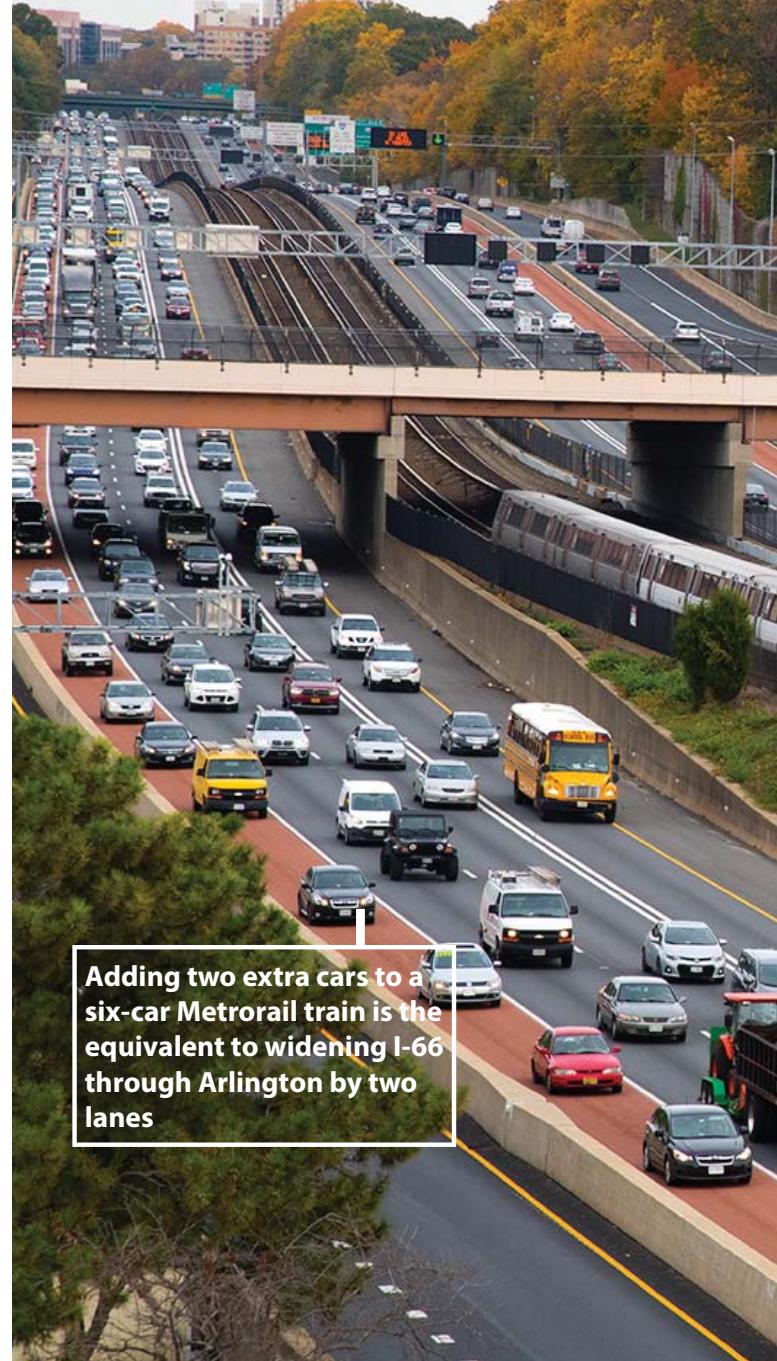
In 2015, Metro continued to address climate change in the region by:

- Improving Metrobus service efficiency by adjusting bus routes
- Receiving the first of five new 40-foot compressed natural gas (CNG) buses under a large order of nearly 300 buses to replace Metro's oldest diesel buses
- Supporting in the Metropolitan Washington Council of Governments regional GHG reduction efforts

Area growth trends and Metro's current investments in improving service reliability will help build ridership over the next decade. Combined with Metro's continued investment in energy efficient projects, this suggests that Metro's GHG displacement rate will increase by 2025.



Greenhouse Gas Benefits of Transit



The Transit Advantage

Transit reduces vehicle-based greenhouse gas (GHG) emissions in two ways:

1. Shifting People From Cars to Transit

Metro takes cars off the road, avoiding emissions from cars idling in traffic jams. Transit moves people with fewer GHG emissions than most automobiles. The average Metrorail ride cuts a typical car commuter's emissions by half and an average bus ride gets nearly 40 miles/gallon.

2. Sustainable Land Use Patterns

Metro helps the region grow in ways that are pedestrian and bike-friendly and has allowed people to travel less – one can live, work, shop, and enjoy recreation opportunities in places closer to each another.

67kg of carbon dioxide emissions are prevented by the average Metrorail rider each week

Orange Line trains today normally run at around 35 miles per hour, while congested travel speeds on I-66 average around 18 miles per hour

Metro supports a sustainable region



Energy Consumption

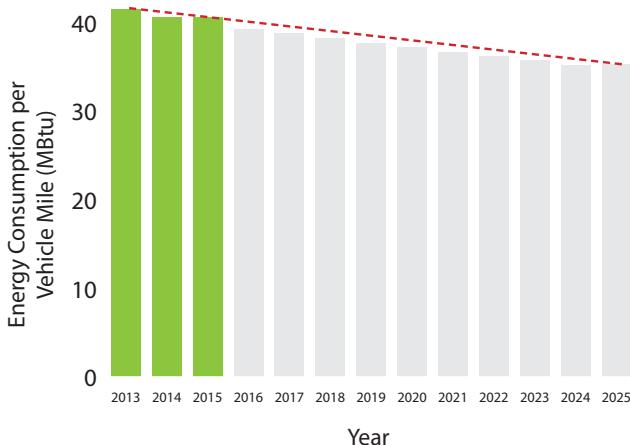
In 2015, Metro's energy consumption per vehicle mile remained steady - consolidating the efficiency gains from 2014 and staying on target for 2025. Facility natural gas and electricity consumption continued to decline, but these gains were offset by increases in energy consumed for rail service and by the Metrobus CNG fleet.

Metro continued to take steps to reduce energy consumption in 2015 by:

- Completing Leadership in Energy & Environmental Design (LEED) Silver certification for Metro's Transit Police Department (MTPD) II Police Station and Range Training Facility
- Receiving new 7000 Series railcars that are 30% more efficient at recovering and reusing braking energy
- Piloting new energy efficient equipment such as hot water heaters and shop compressed air systems
- Reducing energy consumption at Metro parking garages by nearly 70% as high efficiency Light Emitting Diode (LED) lighting upgrades continue throughout garages

This coming year Metro plans to advance energy efficiency through station lighting upgrades at Shaw-Howard U, U Street, Columbia Heights, and Georgia Avenue stations, data center infrastructure replacement at support facilities, and the implementation of an Authority-wide energy management program.

Annual Energy Consumption per Vehicle Mile



Track Switch Heaters



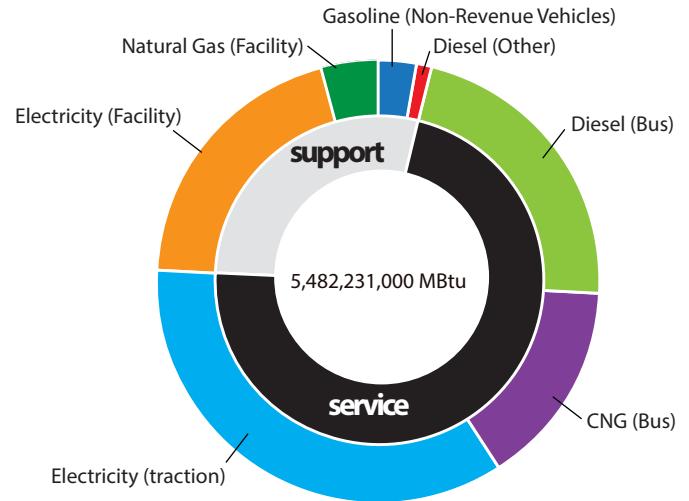
Sustainability Lab Pilot

A Sustainability Lab funded pilot of new high efficiency switch heaters estimated to produce energy savings of \$135,000 annually is now underway.

Switch heaters provide switch protection in cold weather to enable switches to remain operational. If this pilot proves successful, Metro has 285 yard switches that could be converted.



Energy Consumption Support/Service Delivered - 2015



Energy Management

To reduce operating costs and improve efficiency as Metro rebuilds and expands to serve regional growth, an Authority-wide initiative to make facilities and fleet more energy efficient is needed. By incorporating the management of energy across the Authority as part of business, Metro will remain on track to achieve its energy reduction targets.

An Authority-wide energy audit will be completed in 2016

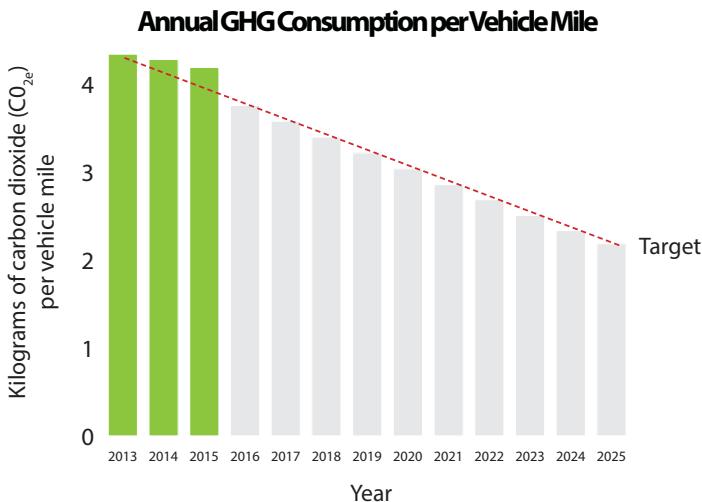
Greenhouse Gas

In 2015, Metro's greenhouse gas (GHG) emissions per vehicle mile decreased by 2% but still remains above targeted reduction levels. This reflects less GHG intensive regional electrical power sourcing combined with a stabilization of overall Metrobus fleet emissions.

This year Metro has reduced GHG emissions by:

- Continuing to increase Metrobus fuel economy and reducing operating costs to \$1.64 per mile
- Achieving a 77% reduction in monthly natural gas consumption at Metro headquarters following conversion to a high-efficiency on demand hot water heater
- Equipping non-revenue vehicles (NRV) with automatic vehicle location systems to ensure usage, and therefore fuel consumption, is aligned with business needs
- Completing a solar asset assessment to guide future deployment of on-site electricity generation

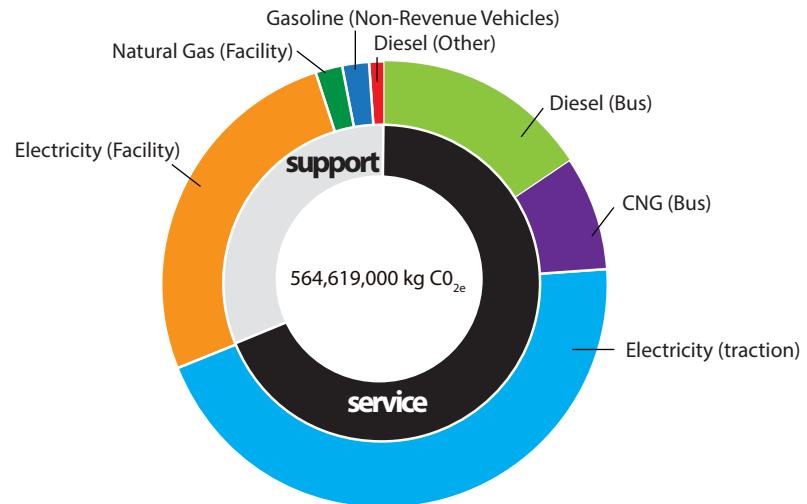
In 2016, Phase 1 of Metro's solar program will begin installation. Solar canopies will provide new lighting and covered surface parking and generate clean renewable energy. Metro anticipates issuing a Phase II on-site solar procurement in late 2016.



Lowering emissions

Metro has set a target of sourcing 30% of its electricity supply from renewable sources (where cost effective) by 2025. A full report detailing Metro's plans for on-site solar generation is available at wmata.com/sustainability. Metro continues to investigate opportunities for cost-effective off-site renewable power purchases.

GHG Emissions by Support/Service Delivered-2015



On-Site Solar Underway

Metro's Largo Water Treatment Facility produces approximately 20,000 kWh of energy each year. The facility pumps an estimated 27,000 gallons of water per day from Metrorail tunnels near the Largo Town Center Station

The solar generation potential at Metro is extensive; however Metro's on site solar development locations are not all currently economically feasible. Metro continues to investigate opportunities for sourcing off-site economically beneficial renewable energy generation to achieve its 30% renewable target by 2025



Water and Stormwater

In 2015, Metro's water consumption per vehicle mile declined by 4%. This reflects water savings from improved chiller equipment and water treatment processes. Metro remains on track to achieve its 2025 target.

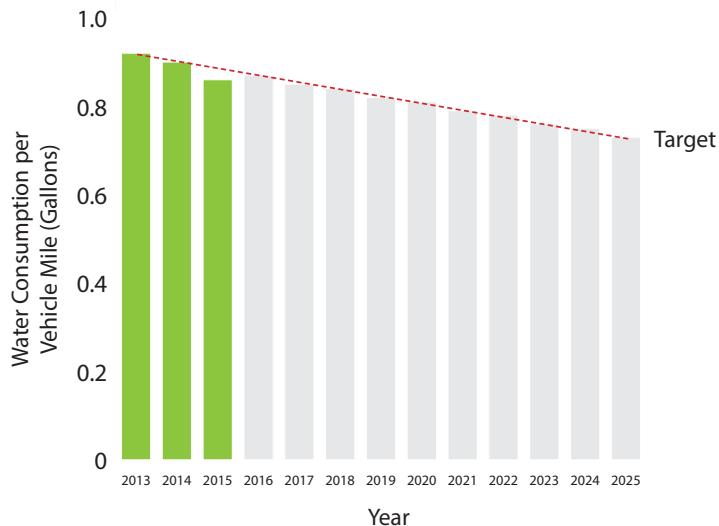
This year Metro has actively sought to reduce water consumption and improve stormwater management through:

- Upgrading seven chiller plants by adding a water treatment system that reduced water consumption by 500,000 gallons or \$10,000 per station. Following this successful Sustainability Lab pilot, a full system roll out is estimated to produce over \$500,000 in water savings each year
- Continuing a system-wide program of chiller replacement at Crystal City, Metro Center and Potomac Avenue stations to be ready for the 2016 chilling season
- Installing stormwater best management practices at new facilities such as the MTPD II Police Station and Range Training Facility

In 2016, the Authority plans to continue to make improvements to the efficiency of train and bus wash operations, improve water sub metering, and evaluate pilot locations for facility rainwater harvesting.



Annual Water Consumption per Vehicle Mile



Chiller Water Treatment/Monitoring

Water treatment upgrades now completed at Capitol Heights, Crystal City, Farragut West, Metro Center, Navy Yard-Ballpark, Pentagon City, Potomac Avenue, U Street, and Woodley Park stations

Chiller plant water chemistry monitoring technology reduces water consumption and improves chiller performance

New efficient station chillers save an estimated \$15,000 in annual energy costs per station

Waste and Supply Chain

In 2015, Metro implemented auditing of the Authority's waste stream at the point of disposal. This revealed that station waste recycling numbers were inaccurate and resulted in an additional 100 tons of recycling now being classified as solid waste. As a consequence of corrected data, Metro's waste diversion rate declined by 7%.

This year, Metro actively sought to reduce waste and improve supply chain operations through:

- Eliminating paper farecards and moving solely to the reusable SmarTrip farecard media
- Initiating a trash pickup and removal contract for track construction waste
- Awarding a contract for the salvage and decommissioning of obsolete railcars
- Generating \$2.9 million in asset recovery and disposal revenue
- Eliminating the printing of approximately 10,000 timetables annually by moving to a print-on-demand model

In 2016, the Authority plans to continue to make improvements to the efficiency of station waste recycling, expand revenue generating recycling to new waste streams such as cardboard, and continue to enhance supply chain operations to reduce overall waste flow.

In 2015 Metro Recycled:

19

Miles of Running Rail

6,700

Rail Ties

3,200

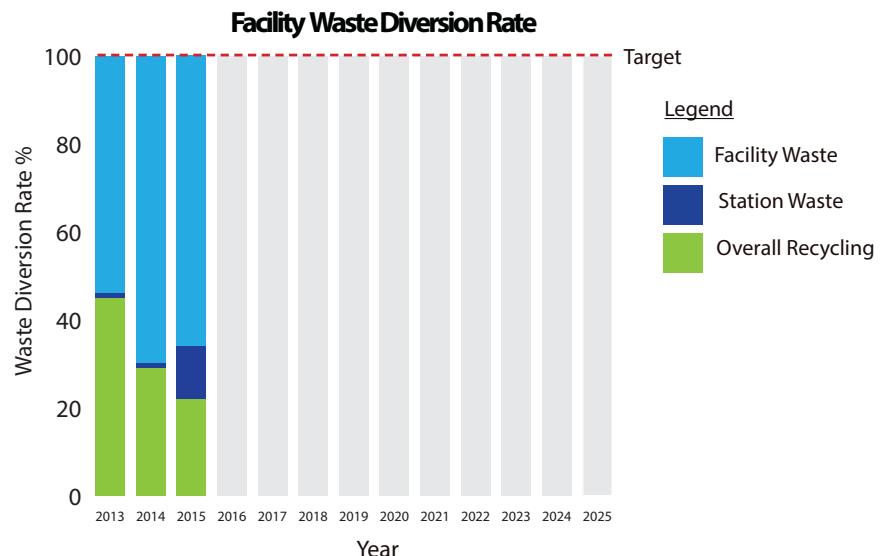
Gallons of Antifreeze

56,000

Gallons of Oil

1,600

Tons of Scrap Metal



Paperless Fare Media

By moving to paperless farecard media paper use from 9 million farecard sales will be eliminated

SmarTrip® gives customers the benefit of balance protection, online account management and AutoReload of value and passes

More than 450 fare vending machines in every Metrorail station now dispense SmarTrip cards only

Over the past three years, Metro sold more than 38 million paper farecards. Stretched end-to-end, that's enough to go from Washington, DC to Las Vegas



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