



# METRO'S SUSTAINABILITY AGENDA

Washington Metropolitan Area Transit Authority

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Every day Metro plays a critical role in supporting regional sustainability and will continue to do so as we rebuild and expand to serve the growing region. In fact, Metro takes an estimated 750,000 auto trips off the region's roadways each weekday - improving air quality and connecting communities. In addition, Metro is at the heart of sustainable regional land use patterns that support biking, walking and car sharing.

*Momentum*, Metro's Strategic Plan, sets Metro on a path to respond to today's service demands and plan to accommodate millions of new riders while continuing to support the region's economic competitiveness and quality of life. As a companion to *Momentum*, the *Sustainability Agenda* sets Metro on course to support regional sustainability, reduce resource consumption, and maximize the value of the investment placed in the system while adding value to the region through increased mobility and transit-oriented land use.

This report recognizes Metro's existing contribution to regional sustainability and sets concrete, ambitious targets that launch the Authority and the region on the path to becoming the most sustainable in the nation. The Agenda highlights not only where Metro has achieved sustainable results from investments but also lays out the resource consumption and performance data to track our ongoing progress and performance towards regional and internal sustainability targets.

For Metro, investing in financially feasible sustainable practices makes good business sense while enhancing our commitment to delivering safe, efficient and reliable service to our customers. As we integrate sustainability into our core business principles we remain committed to turning resource challenges into opportunities. Through adopting this *Sustainability Agenda* Metro provides an enduring legacy of resource efficient sustainable transit that supports a sustainably developed region.



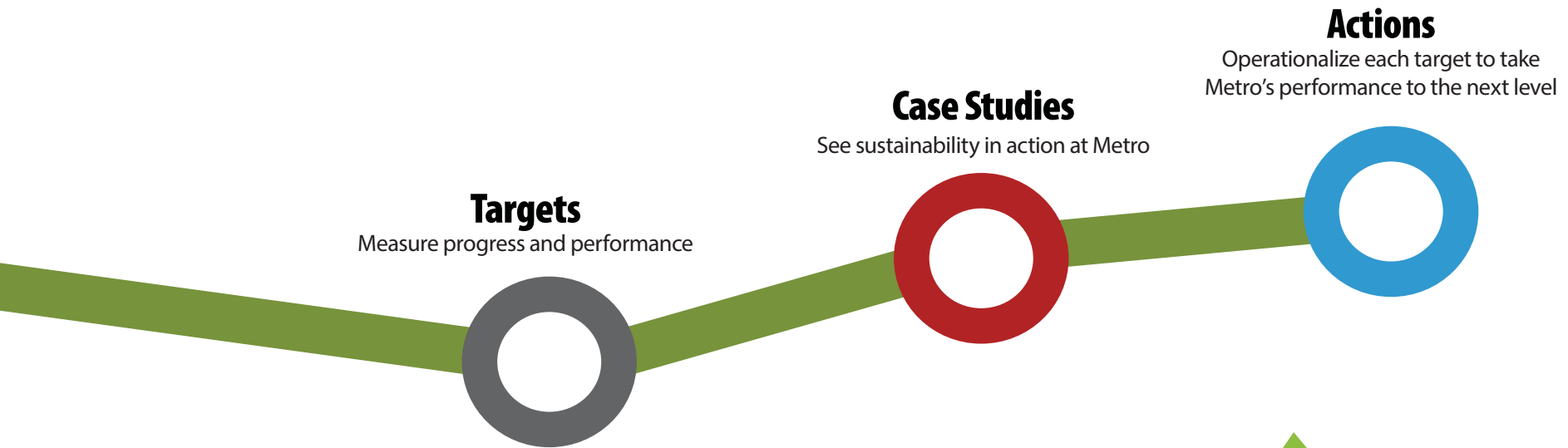
Richard Sarles  
General Manager and Chief Executive Officer

**As the region grows, so must our focus on reducing resource consumption and operating costs at Metro.**





# METRO'S SUSTAINABILITY AGENDA

Putting transit at the heart of a sustainable region





# Without Metro

<p>STORMWATER RUNOFF FROM <b>750</b> LANE MILES OF NEW ROADS WOULD NEED TO BE MANAGED</p>		<p><b>400,000</b> TONS OF CO<sub>2</sub> EQUIVALENT WOULD BE PRODUCED</p>	<p><b>22</b> TONS OF PARTICULATE MATTER WOULD BE RELEASED INTO THE ATMOSPHERE</p>	<p><b>\$9.5 million</b> OF ADDITIONAL ENVIRONMENTAL COSTS WOULD BE INCURRED ANNUALLY</p>
<p>AN ADDITIONAL <b>41 MILLION</b> GALLONS OF FUEL WOULD BE USED ANNUALLY</p>	<p>THE REGION WOULD SPEND <b>7 DAYS</b> PER HOUSEHOLD PER YEAR STUCK IN TRAFFIC</p>	<p><b>260 tons</b> OF VOLATILE ORGANIC COMPOUNDS WOULD BE RELEASED INTO THE ATMOSPHERE</p>		<p>THE <b>2.2 MILLION CALORIES</b> EXPENDED BY METRORAIL RIDERS WALKING TO RAIL STATIONS EACH WEEKDAY MORNING WOULD NOT BE BURNED</p>

Source: Making the Case for Transit: WMATA Regional Benefits of Transit Technical Report, November 2011

# Maximize Ridership

## REGIONAL TARGET

Public transit reduces vehicle miles traveled and enables compact development. Through support of increased density, regional sprawl is reduced and existing road and utility infrastructure can be maximized. As the region's population and employment growth continues, increasing the share of transit ridership is vital for sustainable development. Metro ridership has increased by 13% since 2000 and weekday ridership is forecast to reach 1.5 million by 2025. Metro will support this growth by promoting the use of system capacity around existing and emerging regional transit centers.

*Metro 2025* sets out targeted investment solutions to maximize the current transit network. These investments will take 135,000 cars off the region's roads, save drivers \$130 million per year because of reduced congestion, and save an additional \$100 million per year in reduced fuel and other out-of-pocket travel costs.

### Current Initiatives

- The Silver Line will provide high-quality, high-capacity transit service in the Dulles Corridor from Largo Town Center to Wiehle-Reston East. A second phase of the project will extend rail service to Washington Dulles International Airport and west to Ashburn.
- Bike and pedestrian infrastructure upgrades will improve station access.
- Metro Forward projects already underway will rebuild and improve the system.

## ACTIONS

### RAIL SERVICES

Operate all eight-car trains during peak periods and implement core station improvements.

### LAND USE

Promote new transit-oriented development to maximize system capacity utilization.

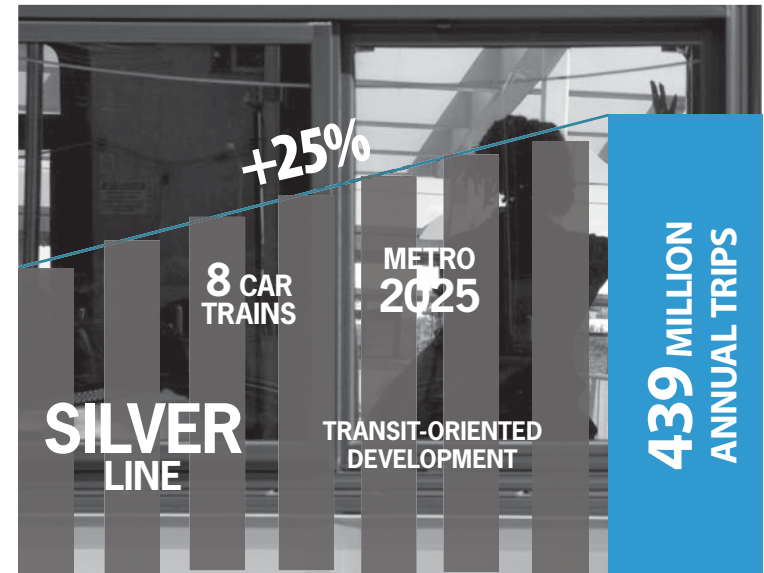
### BUS NETWORK

Fully implement Metrobus service improvements.

**TARGET**

**25% INCREASE IN RIDERSHIP BY 2025  
INCREASE MODE SHARE**

## TARGETING RIDERSHIP GROWTH




FY14

FY25

Every vehicle commute Metro takes off the region's roads saves 67 kg CO<sub>2</sub>e per week

Metro saves families \$342 million per year through reduced car dependency





The Metropolitan Washington Council of Governments (MWCOG) State of the Commute Survey, 2013 highlights that 17% of commuters in the region use transit to travel to work. Within transit-oriented jurisdictions such as the City of Alexandria, Arlington County, and the District of Columbia, transit's commuting mode share increases to 34%.

# MAXIMIZE RIDERSHIP

**34% commuting mode share  
within transit-oriented jurisdictions**



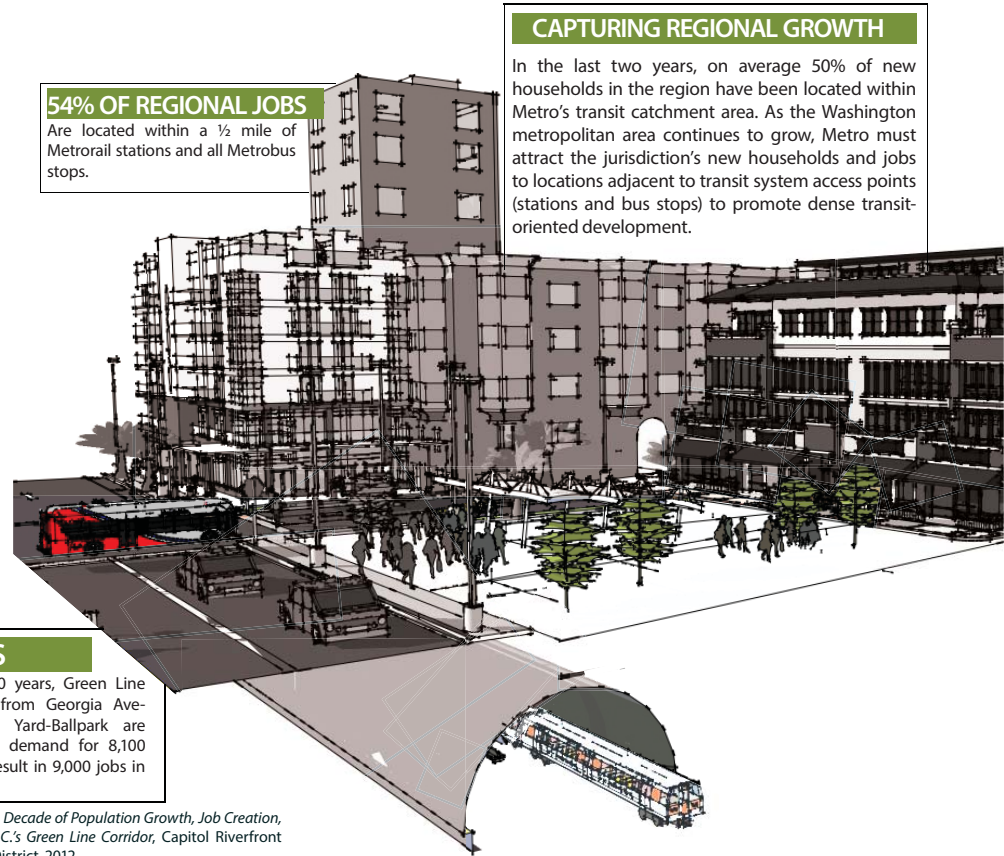
# Connect Communities

## REGIONAL TARGET

This Key Performance Indicator (KPI) will measure progress in achieving one of *Momentum's* strategic goals: "Improve Regional Mobility and Connect Communities." This measure will track the amount of new household growth located within Metro's "transit catchment area." This is defined as the area in which transit stations and stops have the greatest influence on household site selection and therefore highest potential for influencing ridership growth. This KPI uses the 1/2 mile radius as an effective catchment area for rail transit stations and the 1/4 mile radius for regional Metrobus transit stops.

### Current Initiatives

- The Connect Communities KPI will be reported annually for the Compact jurisdictions as a whole as well as shown at the jurisdictional level.
- The regional bus network optimization program will bring improvements to ridership, maximize system effectiveness and quality of service.
- Support for the development of an infill Metrorail station at Potomac Yard.



**54% OF REGIONAL JOBS**  
Are located within a 1/2 mile of Metrorail stations and all Metrobus stops.

**CAPTURING REGIONAL GROWTH**  
In the last two years, on average 50% of new households in the region have been located within Metro's transit catchment area. As the Washington metropolitan area continues to grow, Metro must attract the jurisdiction's new households and jobs to locations adjacent to transit system access points (stations and bus stops) to promote dense transit-oriented development.

**9,000 JOBS**  
Over the next 18-20 years, Green Line stations stretching from Georgia Ave-Petworth to Navy Yard-Ballpark are projected to create demand for 8,100 housing units and result in 9,000 jobs in the vicinity of Metro.<sup>1</sup>

<sup>1</sup> *GreenPrint of Growth - A Decade of Population Growth, Job Creation, and Investment Along D.C.'s Green Line Corridor, Capitol Riverfront Business Improvement District, 2012.*

## ACTIONS



# TARGET

**This KPI will be reported through Metro's Vital Signs Report in 2014.**





# CONNECT COMMUNITIES NoMa- Gallaudet U

The NoMa-Gallaudet U station was the first infill station constructed on the Metrorail system. Utilizing what would have been excess capacity on the Red Line, the NoMa neighborhood, anchored by the station, has emerged as a high-density mixed-use hub for residents and commuters alike.

Three years before the station opened, the assessed value of real estate in the 35 surrounding blocks was \$535 million. Three years after the opening, in 2007, it was \$2.3 billion - a 330-percent increase. Ridership has grown steadily since the station opened in 2004. From 2,100 trips in 2005 the station now has an average of 7,400 riders each weekday.

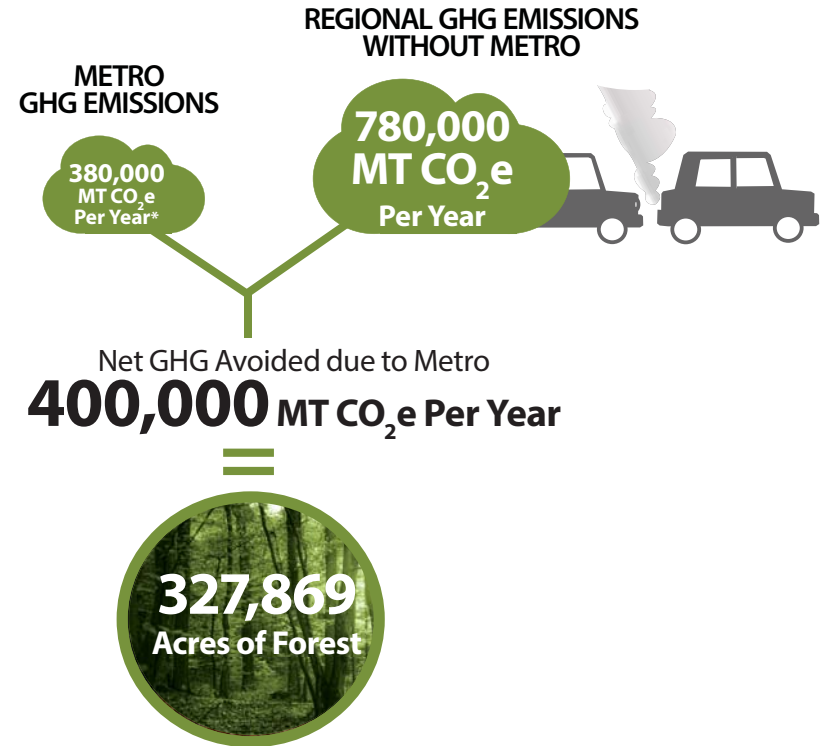
# Climate Change

## REGIONAL TARGET

Metro provides the transit network around which a compact, low-carbon region can prosper. By advocating for transit-oriented development as the region grows and by adding capacity, Metro can continue to increase its cost effectiveness and net GHG benefits to the region.

### Current Initiatives

- The Silver Line will provide high-quality, high-capacity transit service in the Dulles Corridor from Largo Town Center to Wiehle-Reston East. A second phase of the project will extend rail service to Washington Dulles International Airport and west to Ashburn.
- *Metro 2025* will support the region's economic competitiveness, climate change goals, and quality of life by delivering a regional transit system that can support additional ridership.
- The regional bus network optimization program will bring improvements to ridership, maximize system effectiveness and quality of service.
- Metro's Greenhouse Gas Savings Calculator helps our riders make environmentally informed mobility choices (See <http://planitmetro.com/greenhouse-gas-emissions-savings-calculator-2/>).



Equivalent to the carbon consumed annually by **327,869** acres of forest (a land area approximately **25%** larger than Fairfax County).

Based on 2010 Performance Data and Current Vehicle Emissions Profiles  
 \* Fleet emissions only. Not inclusive of facilities and non revenue vehicles

## ACTIONS



## TARGET

**10% INCREASE IN GHG DISPLACEMENT BY 2025**





**Five** additional lanes on all Potomac River crossings would be required without Metro and the regional transit system

# CLIMATE CHANGE

Compact development provides more efficient access to employment and services for the regional population and a host of other significant environmental benefits including:

- Quality of Life - Living in proximity to transit provides convenient access to services and drastically reduces the need for vehicle travel time spent in congestion.
- Open Space - Open space on the urban periphery is preserved by focusing development on existing underutilized brownfield and greyfield sites adjacent to transit and by encouraging vertical development.
- Estuarine and Riparian Protection - Stormwater runoff is reduced by focusing development in existing urban areas. Detention and retention can be maximized on land on the urban periphery.
- Air Quality - Compact transit-oriented development reduces mobile emissions from vehicle travel and helps improve regional air quality.



# Energy

## INTERNAL TARGET

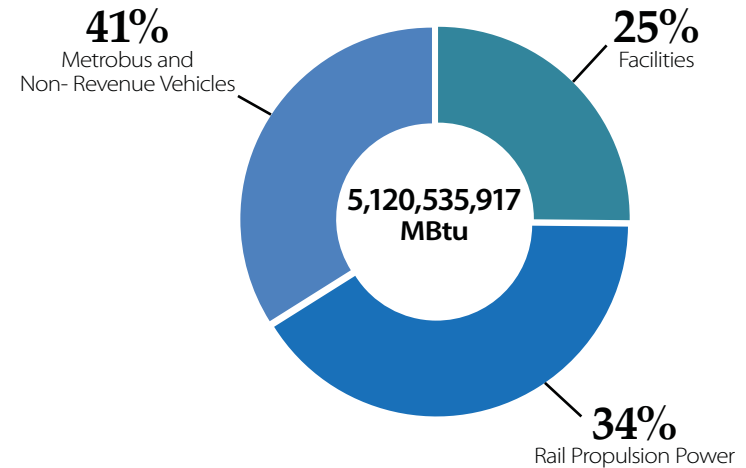
To reduce operating costs and improve efficiency as Metro rebuilds and expands to serve regional growth, Metro's facilities and operational fleet will actively strive to become more energy efficient.

### Current Initiatives

- All new Metro facility construction and major facility retrofits are US Green Building Council's Leadership in Energy and Environmental Design (LEED) Silver Certified. Buildings that are LEED certified use 25% less energy and have 36% less GHG emissions.<sup>2</sup> Metro LEED certified buildings include Shepherd Parkway Bus Facility and the new Glenmont Garage.
- Wayside energy storage pilot project stores and reuses energy captured by Metrorail braking.
- High efficiency lighting system upgrades at all Metro parking garages will save 15,000,000 kWh (nearly \$1.5 million) of energy annually.
- New efficient station chillers will save an estimated \$15,000 in annual energy costs per station. Chiller upgrades will be undertaken at Forest Glen, Wheaton, Crystal City, and Potomac Avenue in 2014.
- Metro's new *Sustainability Lab* will pilot energy efficiency technology and practices that can then be rolled out Authority wide.

<sup>2</sup> Green Building Performance White Paper, General Services Administration, August 2011.

METRO SITE ENERGY CONSUMPTION BY END USE FY13



## ACTIONS

### ENERGY MANAGEMENT

Conduct facility audits and expand the use of energy management systems for facilities.

### ENERGY EFFICIENCY UPGRADES

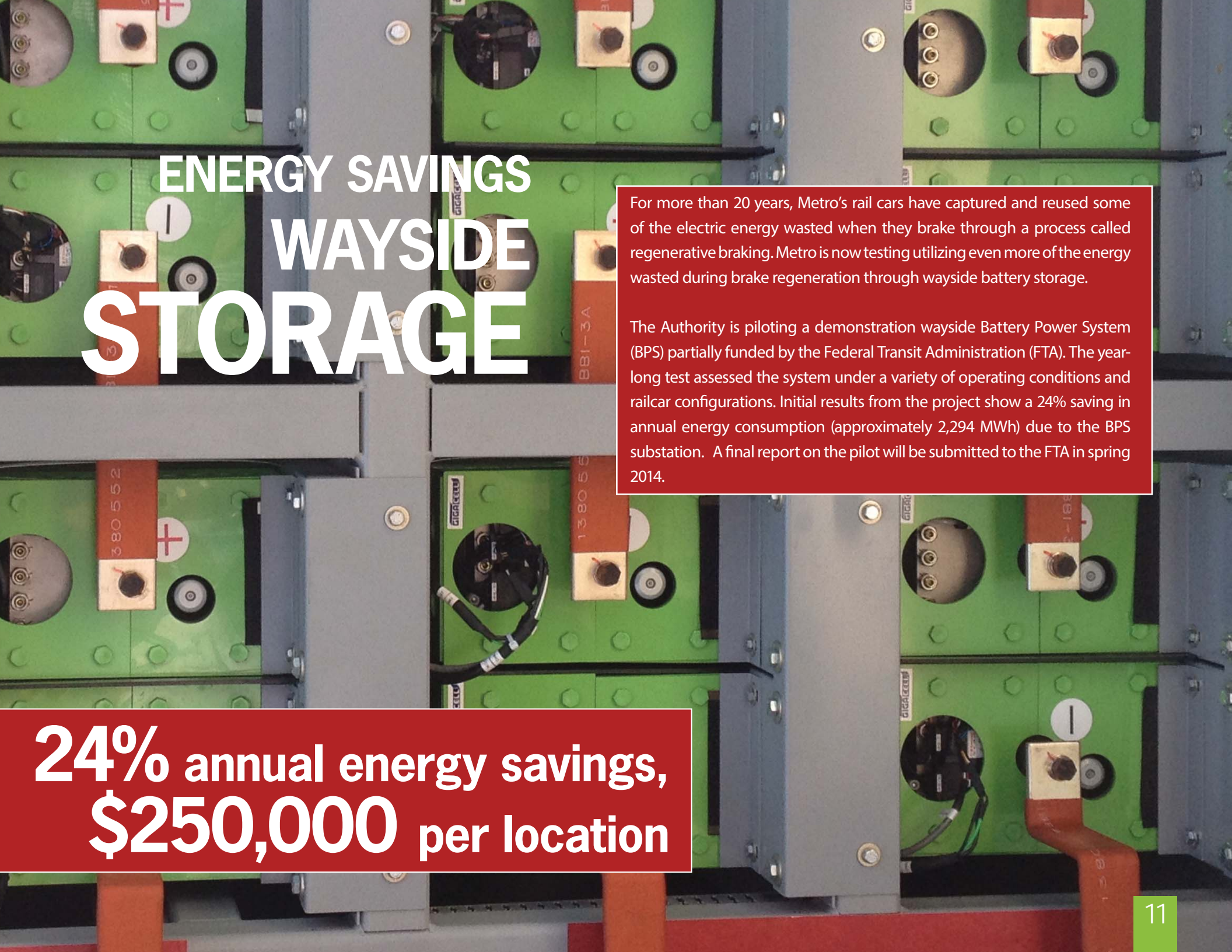
Maintain *Sustainability Lab* to test new technologies and practices for Authority-wide rollout.

### OPTIMIZE OPERATIONS

Implement operational efficiency measures.

**TARGET**

**15% REDUCTION IN ENERGY USE PER VEHICLE MILE BY 2025**



# ENERGY SAVINGS WAYSIDE STORAGE

For more than 20 years, Metro's rail cars have captured and reused some of the electric energy wasted when they brake through a process called regenerative braking. Metro is now testing utilizing even more of the energy wasted during brake regeneration through wayside battery storage.

The Authority is piloting a demonstration wayside Battery Power System (BPS) partially funded by the Federal Transit Administration (FTA). The year-long test assessed the system under a variety of operating conditions and railcar configurations. Initial results from the project show a 24% saving in annual energy consumption (approximately 2,294 MWh) due to the BPS substation. A final report on the pilot will be submitted to the FTA in spring 2014.

**24% annual energy savings,  
\$250,000 per location**

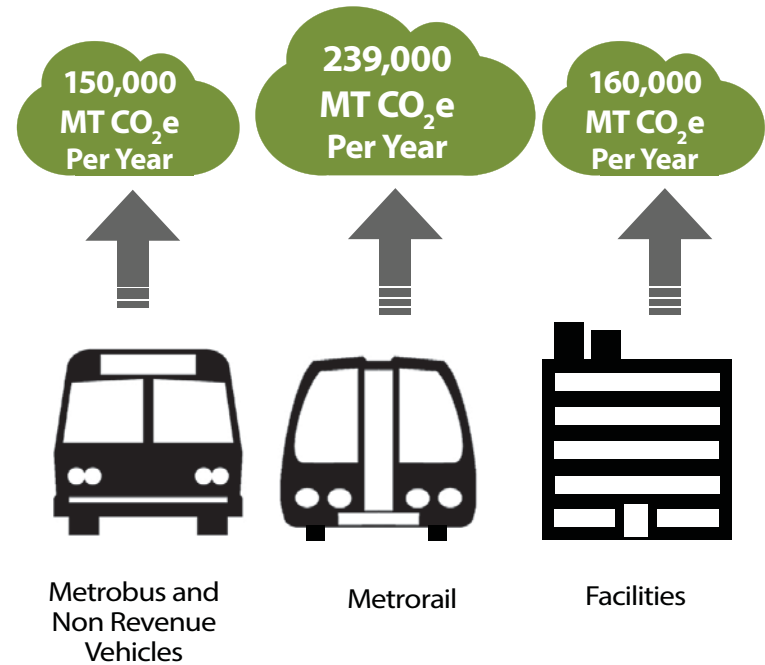
# Greenhouse Gas

## INTERNAL TARGET

As a long-term infrastructure asset for the region, Metro is also seeking to reduce its greenhouse gas (GHG) emissions. Energy efficient operations and fleet will directly address both energy reduction and GHG emissions targets. Utilizing cleaner more efficient energy systems will transition the Authority away from fossil fuels. Powering Metro facilities and rail system through a portfolio of renewable and low carbon alternatives such as wind and solar will begin to make this transition.

### Current Initiatives

- Evaluations of distributed combined heat and power installations to replace diesel backup generators at facilities will provide an opportunity to reduce grid electric consumption and meet facility heating and cooling loads through on-site resources.
- Asset inventory, now underway, will provide a solid foundation to explore financially feasible on-site solar generation capacity.



## ACTIONS



### FLEET EFFICIENCY UPGRADES

Increase the use of hybrid diesel and compressed natural gas (CNG) buses.

### ENERGY EFFICIENCY UPGRADES

Implement energy efficiency upgrades and policies.

### RENEWABLE ENERGY

Convert 30% of Authority electric consumption to renewables (on-site or grid purchased).

## TARGETS

**50% REDUCTION IN GHG EMISSIONS PER VEHICLE MILE BY 2025**  
**30% RENEWABLE ELECTRICITY BY 2025 (AS FINANCIALLY FEASIBLE)**



Metrobuses travel nearly 50 million miles every year. By the end of FY18, hybrid and clean diesel buses will increase from 44% (current) to 53% of the bus fleet. Compressed natural gas vehicles will make up the remaining 47% of the fleet. These changes in fleet composition will yield a decrease in GHG emissions of 4,580 MT of CO<sub>2</sub>e.

Over the past eight years, the average fuel economy of Metro's bus fleet has increased by 30 percent, from 2.78 miles per gallon (MPG) to 3.62 in 2013. This compares to a national average of 3.07 MPG. Since every Metrobus is carrying on average 10 people, the bus overall performance is similar to getting 37 miles to the gallon. Every half-mile per gallon improvement in fuel economy saves Metro nearly \$6 million a year in fuel costs.



metrobus

**Metrobus fuel economy  
+30% over 8 years**

**GHG EMISSIONS BUS  
EFFICIENCY**



# Water

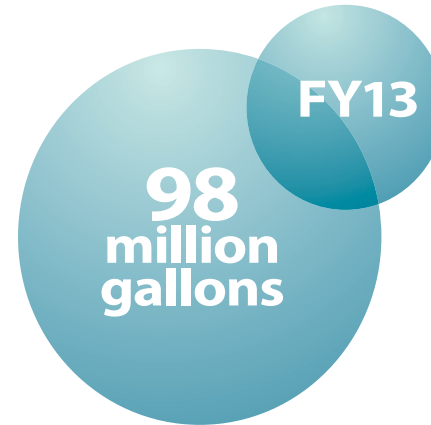
## INTERNAL TARGET

Metro uses water for facility maintenance, refrigeration, facility cooling processes, revenue vehicle washing and parts cleaning. Metro has made significant investments to conserve water. To advance water stewardship the Authority will continue to focus on water as a strategic resource critical to long-term operational effectiveness of Metro.

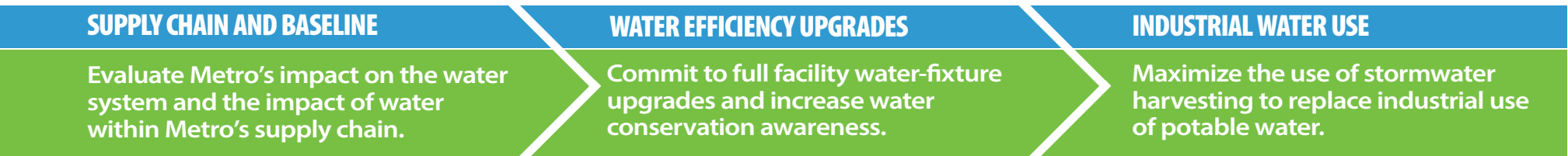
### Current Initiatives

- Vehicle wash reclaim systems that incorporate high efficiency water saving equipment.
- Parts washers at maintenance facilities that recycle water.
- Low-flow water fixture upgrades are standard as part of facility renovations.
- New 7000-series railcars will require less use of acidic cleaning agents.

### METRO'S FY13 WATER CONSUMPTION



## ACTIONS



**TARGET**

**20% REDUCTION IN WATER USE PER VEHICLE MILE BY 2025**



A photograph of a white and blue Metro bus being washed in a facility. The bus is positioned on a conveyor belt, and water is being sprayed onto its windshield and front. The bus has a green LED display on the roof that reads "IN SERVICE". The license plate is "B 4309". The bus is being washed by a system with multiple nozzles and brushes. The background shows the industrial structure of the wash facility.

# WATER USE REDUCTION AT NEXT GENERATION BUS FACILITIES

Shepherd Parkway Metrobus facility was Metro's first bus facility to meet LEED Silver certification requirements. Opened in 2012, Shepherd Parkway features a stormwater filtration system, white roof, drought-tolerant landscaping, and low-flow plumbing fixtures. All Metro's new and renovated bus garages feature bus wash systems that incorporate high efficiency water saving equipment. During the wash cycle, the wastewater mix is drained off and pumped through water filter reclaim modules to be reused in future wash cycles.

The Cinder Bed Road Bus Operations and Maintenance Facility, Metro's second "next generation" bus facility, is anticipated to be completed in 2016. The facility will also be designed to LEED specifications and will feature many of the same sustainable design features as Shepherd Parkway.



# Stormwater

## INTERNAL TARGET

As a stakeholder in the future of the Chesapeake Bay, Metro maintains a commitment to complying with and exceeding stormwater quality, retention, and detention requirements for stations and facilities. Through the use of Low Impact Development (LID) and green infrastructure techniques Metro can strengthen its commitment to stormwater sensitive development.

### Current Initiatives

- Consolidated stormwater, spill prevention and hazardous waste contingency plans provide one location for environmental compliance information within the Authority.
- Introducing stormwater Best Management Practices at new facilities.
- Largo Water Treatment Facility designed to net zero specifications that includes a green roof and rain garden to reduce stormwater runoff.
- Regional stormwater regulatory constraints strategy is being developed to target effective stormwater management opportunities.

### METRO'S STORMWATER FOOTPRINT INCLUDES:



**39** ABOVE GROUND STATIONS

**47** UNDERGROUND STATIONS

**500+** ROOFTOPS

## ACTIONS

### DROUGHT TOLERANT SPECIES

Introduce plant species that are drought tolerant and low maintenance.

### RAINWATER HARVESTING

Collect rainwater for reuse in vehicle washing, irrigation and custodial uses.

### LID STANDARD SPECIFICATIONS

Develop LID design criteria and standard specifications

**TARGET**

**100% ON SITE STORMWATER MANAGEMENT FOR STATIONS AND FACILITIES**



# REDUCING STORMWATER RUNOFF NET ZERO WATER TREATMENT FACILITY

Near the Largo Town Center Metrorail Station, Metro has begun construction of a water treatment facility that features a modular green roof system and rain garden that will act as a filter for stormwater. The facility will manage subsurface water from the track bed and has been designed with photovoltaic panels and battery storage system to achieve net zero energy specifications. Designing the facility to net zero means the building will produce as much energy as it needs on-site, without drawing power from the electric grid, to perform the entire subsurface water treatment process.

Currently, in accordance with State of Maryland requirements, track bed water at the station is treated to balance pH and other discharge requirements prior to being released into the storm sewer system. New regulations require Metro to undertake more comprehensive treatment to also remove iron and suspended solids. The new treatment building will contain a combination of gravity fed surge tanks and settling tanks to treat subsurface water that are fed by three submersible pumps.



# Waste & Supply Chain

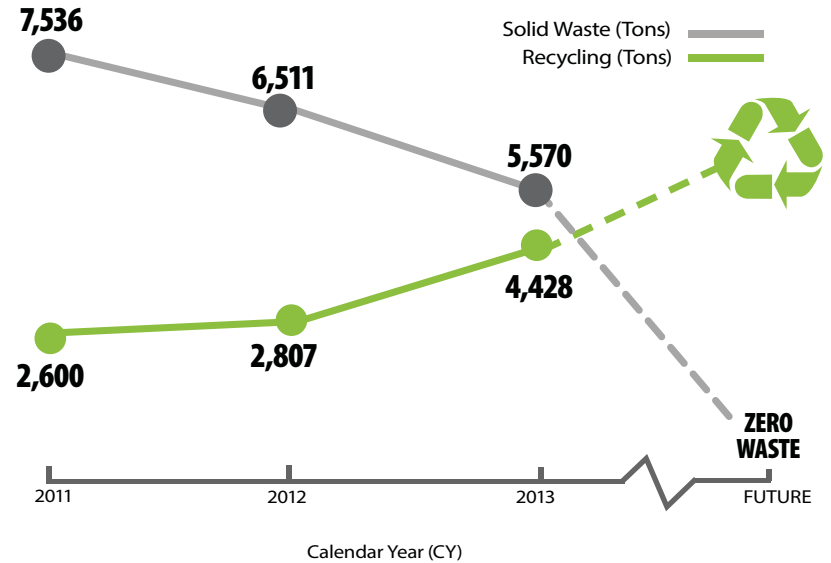
**INTERNAL  
TARGET**

Transforming waste into usable resources and properly managing hazardous wastes provides an opportunity for Metro to implement a life cycle-based approach to consumption. Waste disposal is no longer a cost of doing business, but a controllable expense that, when properly managed, results in bottom line savings and environmental benefits.

**Current Initiatives**

- Robust passenger newspaper recycling program results in a significant diversion of 2,014 tons (39% of total Authority waste stream) of recycling in the first six months of 2013.
- Extensive fluorescent lamp recycling program to minimize exposure to mercury vapor.
- All rail replacement is 100% recycled premium steel rail reducing consumption of natural resources.
- Employee training program on Environmental Standard Operating Procedures ensures Authority wide consistency of standard environmental processes and procedures.

**SOLID WASTE AND RECYCLING**



## ACTIONS



**TARGET** **100% WASTE DIVERSION RATE**

On a daily basis the Metrorail track infrastructure system is subject to the stress and strain of operational and climatic variations. Using a combination of a proactive maintenance program and the latest in rail materials and technology, Metro upholds a commitment to the highest levels of system wide safety, passenger comfort, operational sustainability, and reliability. System maintenance under the FTA *State of Good Repair* program has allowed Metro to maintain its commitment to an aggressive “fix it first” policy that features:

**Recycled Rail Composition** – For all replacement rails Metro uses a premium head hardened rail made from 100% recycled steel. These rails are the highest possible quality available and have the longest possible service life.

**Continuously Welded Rail** – Using a state of the art flash butt welding system Metro has a system-wide program of rail joint elimination to improve ride quality and cut service disruptions. Flash butt welding applies a strong electrical current to the touching ends of two sections of rail. The ends become white hot due to electrical resistance and can then be fused together to form a single rail. The new continuously welded rail is strong, gives a smoother passenger ride, and allows trains to travel with less friction - thereby increasing system efficiency.

Through Metro’s comprehensive rail infrastructure maintenance program upgrades are put in place for the future of the system and transit in the region.



# WASTE & SUPPLY CHAIN STATE OF GOOD REPAIR

Rail made from  
**100% recycled steel**



# Actions & Targets Summary

## Maximize Ridership

- Operate all eight-car trains during peak periods and implement core station improvements.
- Promote transit-oriented development to maximize system capacity utilization.
- Fully implement Metrobus service improvements.

**+25%**

**Ridership**

**INCREASE  
MODE SHARE**

## Connect Communities

- Support the location of employment and population growth around rail stations and bus routes.
- Expand the reach of transit through new system access points (rail stations and bus stops).
- Make stations more walkable and fix accessibility barriers to existing development.

**TO BE  
REPORTED IN  
2014**

## Climate Change

- Increase ridership through enhanced service.
- Promote transit oriented development in the region.
- Convert 30% of Authority electric consumption to renewables (on-site or grid purchased).

**+10%**

**GHG  
Displacement**

## Energy

- Conduct facility audits and expand the use of energy management systems for facilities.
- Maintain *Sustainability Lab* to test new practices for Authority-wide rollout.
- Implement operational efficiency measures.

**-15%**

**Energy Use  
Per Vehicle Mile**

## Greenhouse Gas

- Increase the use of hybrid diesel and CNG buses.
- Implement energy efficiency upgrades and policies.
- Convert 30% of Authority electric consumption to renewables (on-site or grid purchased).

**-50%**

**GHG Emissions  
Per Vehicle Mile**

**+30%**

**Renewables (Electric)**

## Water

- Evaluate Metro's impact on the water system and the impact of water within Metro's supply chain.
- Commit to full facility water-fixture upgrades and increase water conservation awareness.
- Maximize the use of stormwater harvesting to replace industrial use of potable water.

**-20%**

**Water Use  
Per Vehicle Mile**

## Stormwater

- Introduce plant species that are drought tolerant and low maintenance.
- Collect rainwater for reuse in vehicle washing, irrigation and custodial uses.
- Develop LID design criteria and standard specifications.

**100%**

**On-site stormwater  
management  
for stations and  
facilities**

## Waste & Supply Chain

- Coordinate with vendors and suppliers to reduce waste stream.
- Expand Authority-wide recycling policy to new waste streams.
- Reduce landscaping waste through mulching and composting.

**100%**

**Waste  
Diversion Rate**

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Washington Metropolitan  
Area Transit Authority  
Office of Planning

[www.wmata.com/sustainability](http://www.wmata.com/sustainability)

