



Finance and Capital Committee

Information Item III-A

October 10, 2024

FY2024 Environmental Sustainability Report

Washington Metropolitan Area Transit Authority

Board Action/Information Summary

☐ Action ☒ Information

Document
Number:
210840

Resolution:
☐ Yes ☒ No

Presentation Name:

FY2024 Environmental Sustainability Annual Report

Project Manager:

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Project Department:

Planning and Performance

Purpose/Key Highlights:

Update the Board of Metro's FY2024 performance on metrics aligned to Goal 4/Objective 4b: Environmental Sustainability in Metro's Strategic Transformation Plan, including key actions and initiatives underway to drive progress.

- Metro is inherently sustainable and is essential to a sustainable region. Every transit trip fosters a healthy region and prevents greenhouse gas (GHG) emissions by reducing travel-related carbon emissions.
- Metro's environmental sustainability performance is trending in the desired direction and Metro will continue to invest in decarbonization and modernization of its operations and facilities.
- Metro is a proven way to provide regional GHG emission reductions with a net impact of preventing 9.3 million metric tons of GHG emissions in FY2024 - an amount that is approximately 30 times larger than emissions from Metro operations.
- As Metro's ridership grows, our positive environmental impact increases, which helps the region meet ambitious sustainability goals.
- The region can further leverage Metro's impact by supporting mode shift through investments in safe, frequent, and reliable transit and pursuing transit-supportive policies.
- Metro relies on regional collaboration to provide investments and policies that drive increased ridership and support opportunities for innovation and modernization that are key to delivering regional benefits and achieving policy goals.

Interested Parties:

None

Background:

The Environmental Sustainability Report describes Metro's performance on a suite of metrics that align to the Environmental Sustainability objective in the Strategic Transformation Plan (STP). This report provides transparency and monitors progress on efforts to combat climate change, adapt to its impacts, and steward natural resources. Metro's Board and management collaboratively selected these metrics as part of STP development.\

The report provides an annual update on the following metrics:

- **Overall: Reduce travel-related carbon emissions in the DMV**
 - Regional greenhouse gas emissions (GHG) avoidance
- Improve environmental sustainability of Metro operations
 - Greenhouse gas (GHG) emissions intensity
 - Renewable (carbon-free) electricity
 - Facilities with green certifications
 - Zero-Emission Fleet (Bus, non-revenue, and paratransit)
 - Water Intensity

The report also provides updates on select actions driving progress within the STP environmental sustainability preliminary initiative programs:

- Modernizing design, construction, and operations to meet sustainability and climate resiliency challenges
- Utilizing nature-based solutions, such as increasing tree canopy
- Promoting innovation through Sustainability Lab investments in new technology and practices

Environmental Sustainability metrics are all trending in the right direction and Metro continues to work towards the Environmental Sustainability targets and objectives as described below.

Discussion:

Transit helps the region meet its visionary and ambitious goals, which include fighting climate change, continuing to grow the economy, investing in affordable housing, improving air quality and health, and advancing equity and justice. Our regional partners goals emphasize improving mobility and reducing greenhouse gas emissions, including targets to reduce vehicle miles traveled.

New research and analysis ([2024 Benefits of Transit Report](#)) demonstrates transit's critical importance to the Washington DC, Maryland, and Virginia (DMV) megaregion. Our region's investment in transit-oriented communities has been repaid many times over. Metro station areas hold only three percent of the region's land, but they make up 30 percent of property

value (\$330 billion), 30 percent of annual property tax revenue (\$3.2 billion), and 40 percent of jobs (960,000). In fact, more than 250,000 jobs are accessible within an hour of transit. Metro stations have twice as many businesses, three times more jobs, and three times more property value than areas without transit. Transit yields an additional \$9.4 billion in business output. An annual household saves \$2,800 from riding transit.

In the DMV, transit also results in cleaner air and improved health outcomes. For example, people who take transit get approximately 30-minutes additional daily exercise, which increases heart health, builds muscle, and reduces risk of heart disease. Transit also avoids 8 metric tons of fine particulate matter, which can cause adverse health effects, from polluting our air. In addition, transit is 20 times safer than driving a car, helping the region achieve goals to reduce transportation-related fatalities and injuries.

Reduce travel-related carbon emissions in the DMV

Metro's biggest regional impact is the service we provide. Metro reduces regional greenhouse gas (GHG) emissions by providing a lower-carbon, sustainable transportation option for the region's residents and visitors.

We use the regional GHG emissions avoidance metric to measure our positive environmental impact on the region, which accounts for mode shift, reduced congestion, and land use efficiency. Our methodology is based on the American Public Transportation Association's [2018 Recommended Practice for Quantifying Greenhouse Gas Emissions from Transit](#), an industry best practice utilized by peer transit agencies.

- In FY2024, Metro had the net impact of preventing 9.3 million metric tons (mmt) of carbon dioxide equivalent from entering the atmosphere – a 2.1 mmt (26%) improvement compared to FY2023.
- The net emissions avoided through providing Metro's transit service are about 30 times larger than Metro's carbon footprint.

Metro is a vital part of the climate solution and as Metro's ridership grows, our positive environmental impact increases – helping the region meet clean air and emissions reduction goals.

- What Metro is doing:
 - Providing safe, frequent, and reliable service that makes transit a convenient and easy choice for customers
 - Continuing to reduce Metro's operational emissions by investing in energy efficiency, procuring carbon-free electricity, and transitioning to clean fleets
- What the region can do:
 - Pursue supportive policies that drive increased ridership – including compact land use, transit-oriented development, affordable housing, and bus prioritization
 - Invest funding in high frequency, quality service
 - Continue to support the transition to clean fleets

While cutting Metro's own carbon footprint will remain a priority, this should not come at the expense of providing the high-quality transit service that drives significant regional GHG emission reductions.

Improve environmental sustainability of Metro operations

Metro uses greenhouse gas emissions intensity (GHG emissions per revenue mile) to track our efforts to decarbonize each mile of service with a goal of reaching zero carbon by 2050.

- Metro's carbon emissions per revenue mile are decreasing. In FY2024, Metro decreased GHG per revenue mile to 2.1 kilograms carbon dioxide equivalent, an 11% improvement compared to FY2023.
- Factors influencing performance include service levels; facilities, equipment, and infrastructure; vehicle propulsion systems; and energy supply sources

Metro has several actions underway to continue lowering emissions, including: developing a decarbonization strategy, investing in energy-efficiency, and procuring carbon-free energy.

The Metro Board adopted a goal to reach 100% renewable (carbon-free) electricity by 2033 and Metro is taking actions to deliver this goal.

- In FY2024, 33% of Metro's electricity was carbon-free.
 - Metro's increased energy demand reduced the overall percentage of carbon-free energy by 2% from FY2023
- Staggered performance of carbon-free electricity is directly tied to multi-year electricity contracts in multiple jurisdictions.
 - In the State of Maryland and District of Columbia, energy markets are deregulated, where we can seek third-party contracts for electricity supply. Through this approach, Metro secures fixed priced contracts for electricity supply that last 3-5 years, locking in rates that are lower than the local utility. Our current contracts in DC and Maryland include renewable energy supply requirements that expire in 2025. FY2025 is Metro's next opportunity to increase renewable electricity as part of these energy supply contracts.
 - In the Commonwealth of Virginia, the energy market is regulated by its State Corporation Commission, where the state utility provides both supply and distribution of electricity. Metro is part of a cooperative purchasing agreement, managed by the Virginia Department of Energy, where rates and renewable requirements are approved through a regulatory process. We are exploring opportunities for renewable purchasing as part of that cooperative agreement.
- Factors influencing the transition to zero emission electricity include available clean energy market solutions, utility demand, generation and transition capacity, as well as short- and long-term financial impact considerations.
- Actions Metro is taking:

- Continue working with the General Services Administration to secure favorable and stable supply pricing and lower administrative costs
- Monitoring clean energy contracting opportunities
- Participating in a carbon-free electricity solicitation for a new electricity supply contract in Maryland

Metro uses green certifications as a tool to design and build facilities that create safe and healthy workplaces, enhance building operations and efficiency, and make us a good neighbor in the communities we serve. Third-party green certifications, include the U.S. Green Building Council's Leadership in Energy and Environmental Design ([LEED®](#)) and the Institute for Sustainable Infrastructure's [Envision](#) certification, provide a framework for modernizing facilities

- In FY2024, Metro increased the cumulative total of green-certified buildings to thirteen and is on the path to reach 18 green-certified buildings by 2028.
- Benefits of the LEED® framework include:
 - Reduced energy and water usage
 - Lower operating costs
 - Less construction waste
 - Enhanced energy monitoring

Converting vehicles to zero-emission fleets promotes clean air, health, and livability. Metro's Board set a goal to achieve a 100% zero-emission bus fleet by 2042 and 100% zero-emission non-revenue and paratransit fleets by 2050.

- Ongoing Activities:
 - Two 60' and two 40' battery-electric buses (BEBs) in service, remaining eight BEBs to be delivered CY2024-2025
 - Three bus garages in design/construction
 - 500 employees trained
 - Initial planning for non-revenue and paratransit fleets
- Metro's transition to a zero-emission bus fleet is underway but continuing challenges in market include:
 - Limited manufacturers
 - High demand for vehicles, charging, transformers, and batteries
- Metro and our partners must:
 - Continue to adapt and remain flexible to emerging technologies
 - Advance supportive policies and rate structures
 - Invest funding in fleet and facility conversions

Metro is committed to resource efficiency, including managing our water use intensity, which is

how many gallons of water are required to provide a unit of service. Water is used in chillers to cool Metro rail stations, at bus garages and rail yards for vehicle washing, and in Metro's administrative/support facilities.

- Metro's water use remains under target. In FY2024, our water intensity was 0.70 gallons per vehicle revenue mile — surpassing our target of 1 gallon of water per revenue mile.
- Running more service and using less water improves water intensity
 - Metro reduces water use through investments such as efficient plumbing fixtures, chillers, and bus washes, as well as use of drought resistant landscaping and rainwater harvesting.

Actions driving progress within the STP environmental sustainability preliminary initiative programs

Metro is embedding sustainability and resiliency into design and operations to address today's challenges through continuous improvement.

- In 2024, Metro updated its Manual of Design Criteria to consider updated climate projections.
 - Incorporating climate resiliency into design criteria allows for early accounting of climate risks and identifying small, upfront investments that can reduce future costs.
- Metro will continue to:
 - Make incremental investments through the capital program
 - Build relationships and work with regional partners to resolve problems upstream
 - Pursue funding opportunities

Metro is increasing tree canopy as a nature-based solution.

- Metro entered a partnership with Casey Trees, a regional non-profit, to plant approximately 450 trees in nine stations over the next two years, with funding from the U.S. Department of Agriculture. All stations are in equity emphasis areas, as defined by the Metropolitan Washington Council of Governments.
- Increasing tree canopy at Metro stations will provide health, environmental, and customer experience benefits by:
 - Providing shade and cooling
 - Improving air quality
 - Sequestering carbon
 - Mitigating stormwater impacts
 - Reducing stress and anxiety, which can lower blood pressure and improve mood

Metro's Sustainability Lab supports innovation by testing and evaluating new technology and practices to improve resource- and cost-efficiency and sustainability.

- The Lab is currently supporting the track and structures team in testing and evaluating electric jackhammers that are expected to reduce water and fuel usage, provide operational efficiencies, and improve working conditions for employees.
- Prior Lab supported projects include efficient switch heaters, remote chiller water treatment, maintenance of way vehicle tracking, battery-electric leaf blowers, and battery-powered track maintenance equipment.

Opportunities to improve transit and drive regional sustainability

Metro continues to make investments towards achieving environmental sustainability goals. However, our regional stakeholders can have a multiplier effect on the benefits of transit through sufficient funding and supportive policies in the following areas:

- Service: Safe, frequent, and reliable service optimizes existing transit investments and reduces regional emissions. Example areas of opportunity include: Bus Network Redesign, All-day All-week Frequent Service, Regional Bus Stop Guidelines, Automatic Train Operations.
- Regional Partnership: Prioritizing transit, walking, and biking reduces vehicle miles traveled and boosts regional benefits. Example areas of opportunity include: Transit-Oriented Development, Data Sharing and Transparency, Bus Priority, Clear Lanes, Bus Lanes, DMVMoves.
- Modernization: Investing in new technologies and practices enhances energy and cost efficiency. Example areas of opportunity include: Zero-Emission Bus, Rail Automation, 8000-Series Railcars, On-site Solar, Climate Resiliency, and Cooperative Procurement of New Technologies including vehicles.
- Metro continues to maximize and accelerate the benefits of sustainable and climate-resilient investments. Collaboration is necessary to increase Metro's positive impact on the DMV.

Funding Impact:

There is no direct funding impact.

Previous Actions:

- June 2021 - Sustainability Vision and Principles: [Sustainability and Metro Bus Fleet](#)
- February 2023 - Strategic Transformation Plan: [MEAD 203431 – Adoption of Your Metro, The Way Forward](#)

Next Steps:

Recommendation:

Information Only

FY2024 Environmental Sustainability Annual Report





Environmental Sustainability, a strategic goal from Your Metro, the Way Forward



Environmental Sustainability | Take action to combat climate change, adapt to its impacts, and steward natural resources

Preliminary initiative programs:

- Decarbonize Metro infrastructure and equipment
- Optimize natural resource stewardship
- Modernize design, construction and operations





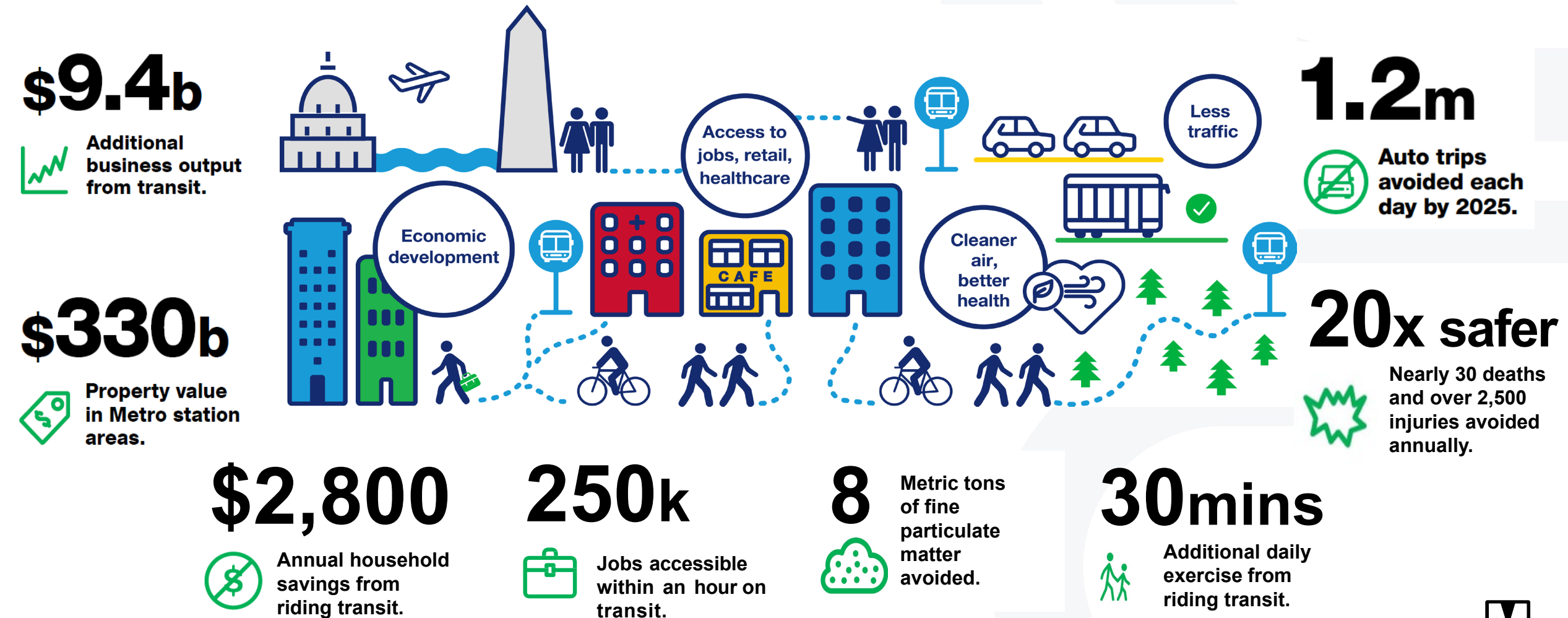
The region has ambitious sustainability goals

Metro delivers the high-quality transit that helps our region and federal partners meet mobility, climate, resiliency, health, and equity goals





Transit is essential to meeting the region's goals



Source: [2024 Benefits of Transit Report](#)



Because of Metro more than 9.3 million metric tons of emissions were avoided in FY2024



Path to increased emission reductions

What Metro is doing:

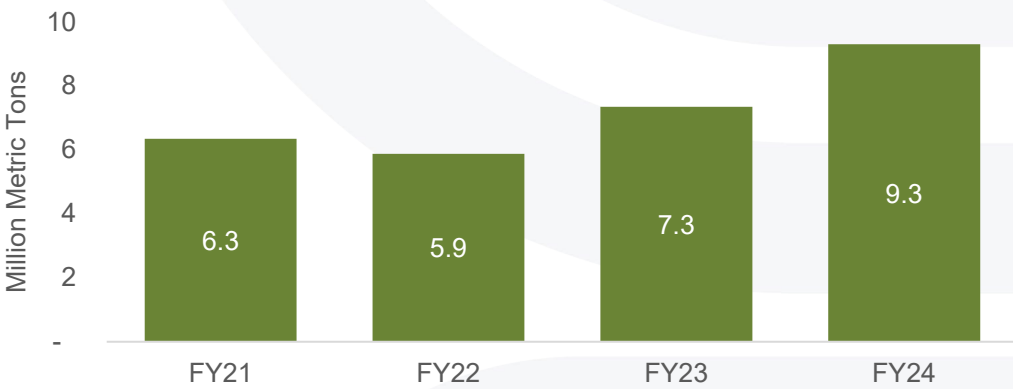
- Provide safe, frequent, and reliable service that makes transit a convenient and easy choice for customers ★
- Continue to reduce Metro’s operational emissions (0.3 million metric tons in FY2024):
 - Investment in energy efficiency
 - Procurement of carbon-free electricity
 - Transition to clean fleets

What the region can do:

- Pursue transit-oriented land use, policies, and investments ★
- Invest funding in high frequency, quality service ★
- Continue to support transition to clean fleets

Net Regional Emissions Avoidance

Direction of desired performance: up ↑



Annual avoided emissions is a net estimate derived from subtracting service delivery emissions from estimated gross annual avoided transportation emissions due to Metro service; methodology follows APTA’s [2018 Recommended Practice for Quantifying Greenhouse Gas Emissions from Transit](#)

Industry Benchmarking

Transit Agency	SEPTA	NY MTA	MARTA
Emissions Avoided (Million Metric Tons)	0.7 (FY23)	17.0 (FY22)	2.0 (FY22)

★ Most impactful

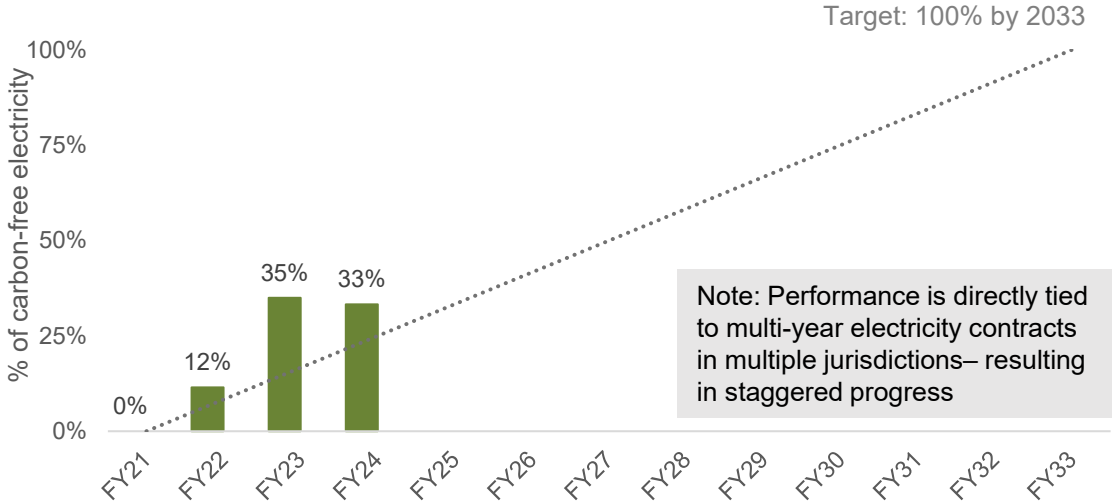




Transitioning to clean electricity through supply contracting

% of Metro's electricity from carbon-free sources

Direction of desired performance: **up** ↑



Path to 100% clean electricity

Factors influencing performance:

- Evolving clean energy market solutions
- Increasing electricity demand locally, regionally, and nationally
- Clean energy transmission infrastructure investments
- Short and long-term financial impact considerations

Actions we are taking:

- Continue working with the General Services Administration (GSA) to:
 - Secure favorable and stable supply pricing
 - Lower administrative costs
 - Meet carbon-free electricity requirements
- Monitoring clean energy contracting opportunities
- Participating in a carbon-free electricity solicitation for a new electricity supply contract in Maryland



Zero-emission fleets promote clean air, health, and livability



100% zero-emission fleets

Continuing challenges in market include:

- Limited manufacturers
- High demand
 - Vehicles
 - Charging
 - Transformers
 - Batteries

What the region can do:

- Flexibility and adaptability to emerging technologies
- Advance supportive policies and rate structures
- Invest funding in fleet and facility conversions



Passengers boarding battery-electric Metrobus

Ongoing Activities:

- Two 60' and two 40' battery-electric buses (BEBs) in service, remaining eight BEBs to be delivered CY2024-2025
- Three bus garages in design/construction
- 500 employees trained
- Initial planning for non-revenue and paratransit fleets



Opportunities to improve transit and drive regional sustainability



Service

Safe, frequent, and reliable service optimizes existing transit investments and reduces regional emissions

Examples: Bus Network Redesign, All-day All-week Frequent Service, Regional Bus Stop Guidelines, Automatic Train Operations



Regional Partnership

Prioritizing transit, walking, and biking reduces vehicle miles traveled and boosts regional benefits

Examples: Transit-Oriented Development, Data Sharing and Transparency, Bus Priority, Clear Lanes, Bus Lanes, DMV Moves



Modernization

Investing in new technologies and practices enhances energy and cost efficiency

Examples: Zero-Emission Bus, Rail Automation, 8000-Series Railcars, On-site Solar, Climate Resiliency, and Cooperative Procurement of New Technologies including vehicles

Appendix



Metro's carbon emissions per revenue mile are decreasing



Path to zero carbon by 2050

Reduced greenhouse gas (GHG) emissions per revenue mile from 2.4 kilograms (FY2023) to 2.1 kilograms (FY2024) – an 11% improvement

Factors influencing performance:

- Service levels
- Facilities, equipment, and infrastructure
- Vehicle propulsion systems
- Energy supply sources

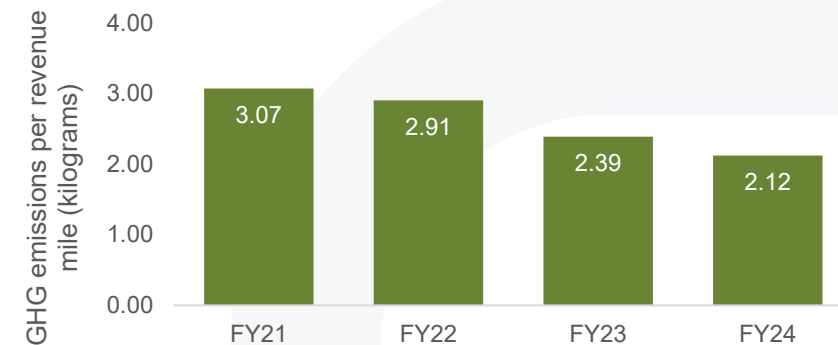
Actions we are taking:

- Developing decarbonization strategy
- Investing in energy efficiency
- Procuring carbon-free energy



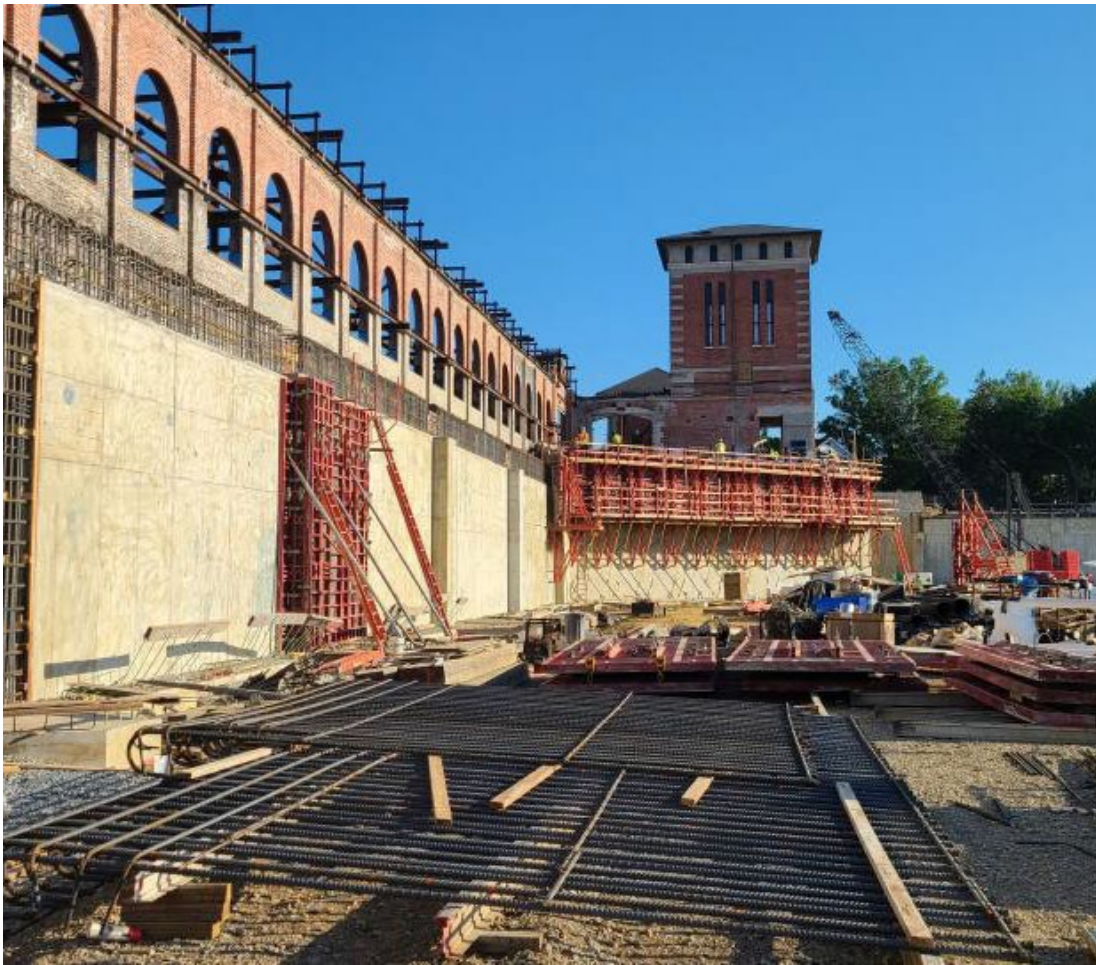
GHG Emissions Intensity

Direction of desired performance: **down** ↓





Driving facility modernization and efficiency



Construction underway at Northern Bus Garage – pursuing LEED®



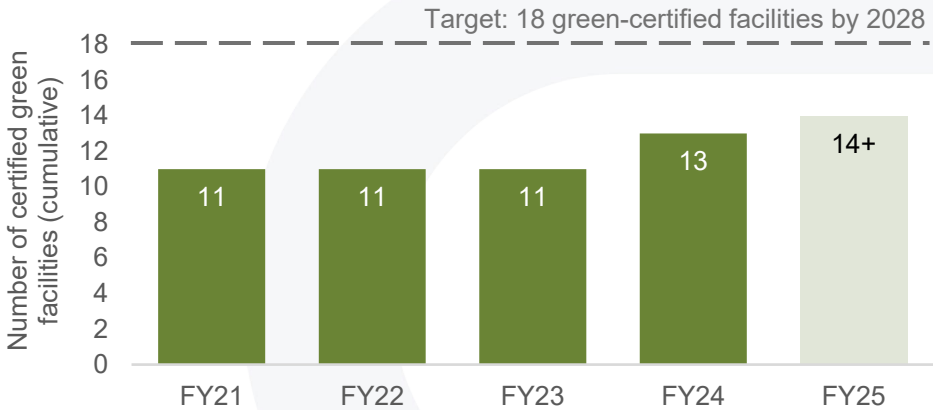
Delivering Green Facilities

Metro uses LEED® as a tool to design and build facilities that create safe and healthy workplaces, enhance building operations and efficiency, and make us a good neighbor.

Benefits of the LEED® framework include:

- Reduced energy and water usage
- Lower operating costs
- Less construction waste
- Enhanced energy monitoring

Green Certified Facilities




LEED® = U.S. Green Building Council’s Leadership in Energy and Environmental Design rating system



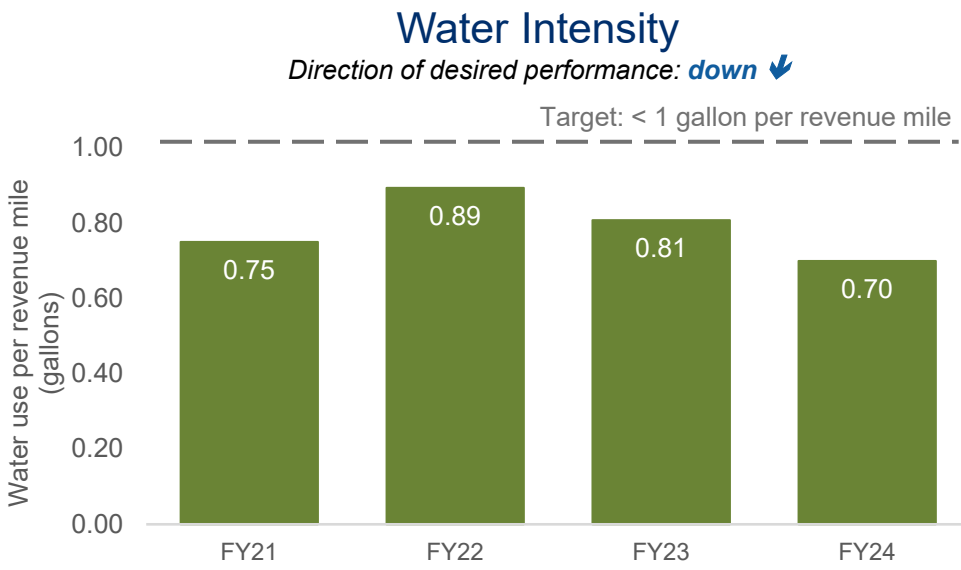


Metro’s water use per revenue mile is decreasing



Modernization supports efficient water use

Metro reduces water use through investments such as efficient plumbing fixtures, chillers, and bus washes, as well as use of drought resistant landscaping and rainwater harvesting.



Energy and water efficient boiler at Andrews Bus Garage





Embedding sustainability and resiliency into design and operations



Solar panels at the Naylor Road Station parking lot provide passengers shelter from sun, rain, and snow while waiting for Metrobus



At locations vulnerable to flooding, raised vent shafts can reduce service disruptions (Archives Station)



— Addressing today's challenges through continuous improvement

Incremental investment through capital program

Updated Metro's Manual of Design Criteria to consider updated climate projections

- Early identification of climate risks
- Small upfront investments can reduce future costs

Continue to build relationships and work with jurisdictional partners to resolve problems upstream

Continue to pursue funding opportunities



Increasing tree canopy as a nature-based solution



Tree Planting

Planting ~450 trees at nine Metro stations over the next two years

- Partnership with Casey Trees with funding from U.S. Department of Agriculture
- Located in equity emphasis areas*

Trees provide customer experience, environmental, and health benefits

- Provides shade and cooling
- Improves air quality
- Sequesters carbon
- Mitigates stormwater impacts
- Reduces stress and anxiety, lowers blood pressure, and improves mood



Tree planting in partnership with Anacostia Watershed Society (Anacostia Station, 2019)

*As defined by Metropolitan Washington Council of Governments



Sustainability Lab tests and evaluates new technology



Innovation & Best Practice Adoption

Metro's Sustainability Lab supports innovation by testing and evaluating new technology and practices to improve resource- and cost-efficiency and sustainability.

Prior projects:

- Efficient switch heaters
- Remote chiller water treatment
- Maintenance of way vehicle tracking
- Battery-electric leaf blowers
- Battery-powered track maintenance equipment

Current projects:

- Electric masonry equipment



Battery-powered rail surface grinder (K-Line shutdown, summer 2023)