



**Executive Committee**

**Board Information Item IV-A**

**April 28, 2022**

**Sustainability and Zero-Emission  
Bus Update**

Washington Metropolitan Area Transit Authority  
**Board Action/Information Summary**

Action  Information

MEAD Number:  
202353

Resolution:  
 Yes  No

**TITLE:**

Sustainability and Zero-Emission Bus Update

**PRESENTATION SUMMARY:**

Staff will present updates on Metro's Sustainability and Zero-Emission Bus Programs and outline opportunities for regional alignment

**PURPOSE:**

This presentation highlights Metro's role as a force-multiplier and driver of progress towards federal and regional priorities.

**DESCRIPTION:**

Sustainability is a fundamental business approach at Metro that advances regional goals and provides social equity, economic and environmental benefits. This presentation includes key sustainability program updates, progress Metro has made towards implementing the Zero-Emission Bus program, and opportunities to advance the sustainability of the region moving forward.

For purposes of the Board's consideration of this information item, please see the attached list of potentially interested parties.

**Key Highlights:**

- The Board-adopted Sustainability Vision and Principles and zero-emission bus goals provided a framework to help guide long-term policy and investment decisions.
- Metro is advancing regional and federal priorities through its Sustainability Program which includes more than a dozen projects and initiatives ranging from energy efficiency and on-site solar investments to prioritizing bus service and expanding opportunities for small businesses.
- In support of the Board's Zero-Emission Bus goals, Metro has initiated a Battery-Electric Bus Test and Evaluation program, begun developing a Zero-Emission Bus Transition Plan, and taken steps to incorporate design for electric bus charging infrastructure into ongoing facility reconstruction efforts.

- Federal and regional interests in investing in climate change, equity, and electrification align with transit's ability to deliver transformational investments.
- Having received a federal grant to support our Battery-Electric Bus Test and Evaluation, Metro is continuing to pursue other funding opportunities.

### **Background and History:**

As a vital transportation link that occupies and connects communities, a major employer and purchaser of goods and services, and one of the region's largest energy consumers, Metro's investments and operational decisions have immediate and significant impacts on the region.

In 2021, Metro's Board of Directors adopted a new Sustainability Vision and eight Sustainability Principles, recognizing sustainability as a core value of Metro as well as a cost-effective way to improve performance, achieve climate and environmental goals, and contribute to livable and equitable communities.

Metro's sustainability framework aligns the agency with our jurisdictional partners who are implementing sustainability and resiliency. It commits us to planning, partnering, designing, building, operating, and maintaining transit infrastructure that meets the needs of people, communities, and businesses in the region, and fosters social wellbeing, equity, economic prosperity, and environmental stewardship.

Along with the Sustainability Vision and Principles, Metro's Board of Directors adopted the goal of transitioning our Metrobus fleet to 100% zero-emission vehicles by 2045. This transition will improve regional air quality, reduce greenhouse gas emissions, and provide customers with a cleaner, quieter ride. These zero-emission bus goals set out a phased conversion that will begin with the purchase of only lower-emission buses in 2023 so that all new buses entering service by 2030 will be electric or some other zero-emission technology. Metro will also invest in facility and infrastructure upgrades over the coming years to support the introduction of new buses in the Authority's shift to zero-emission technology.

### **Strategic Approach:**

Metro is committed to providing a sustainable transportation system that meets the needs of people, communities, and businesses in the region, and fosters social wellbeing, equity, economic prosperity, and environmental stewardship. In 2019 alone, passengers took over 300 million trips on Metrorail and Metrobus. Every trip taken with Metro instead of a car reduces greenhouse gas emissions and helps ensure clean air in the region. Metrorail and Metrobus trips in 2019 displaced over 300,000 metric tons of CO<sub>2</sub>.

Every percentage point increase in public transit as a share of regional trips would reduce GHG emissions by ~125,000 metric tons per year. Transitioning Metro's bus fleet to lower-emission vehicles and zero-emission vehicles

represents an opportunity to further reduce regional greenhouse gas emissions and improve local air quality.

Sustainability and Resilience are at the forefront of transportation planning in the region and the federal government. In alignment with our jurisdictional partners, the Sustainability Vision and Principles have allowed Metro to continue to catalyze investments in regional electrification, support regional decarbonization, advance equitable health and access to opportunity, and continue a responsible use of funds and maximize regional return on investment.

Regional and federal partners identify transit as essential to reaching the region's sustainability and greenhouse gas reduction goals, endorse investments in transit, and set targets to: significantly increase transit ridership, increase non-car trips, and reduce vehicle miles traveled.

By providing affordable, reliable, and efficient transportation, Metro is a central element to achieving these targets and creating connected communities where trips can be made by walking, biking, and transit.

Investments in sustainability at Metro create regional capacity on new technologies including electric vehicles, provide environmental enhancements, align with local and regional plans and make the DMV more sustainable and a better place to live.

Outcomes from Metro's investments include:

1. **Catalyze Investments in regional electrification.** Metro is uniquely placed to accelerate electrification in the region by catalyzing investments in regional electrification, and other new technologies.
2. **Support regional decarbonization.** As one of the largest energy consumers in the region, a clean energy generation sponsor, a leader in energy efficiency and a provider of a service that is a proven solution for reducing transportation emissions, Metro is both essential to and can accelerate regional decarbonization efforts.
3. **Advance equitable health and access to opportunity.** Transit is the backbone of the region's mobility and a key instrument for attaining social equity, economic development, and healthy community goals. Recently approved service and fares improvements support the region's recovery, encourage more customers to use transit, and advance equity and provide ridership growth opportunities and support regional recovery as more riders return to school, work, and other activities.
4. **Continue responsible use of funds and maximizing regional return on investment.** Metro's capital program focuses on improving the safety of the system for all customers and employees, improving the customer experience, and keeping the region's infrastructure in a state of good repair. In spending local taxpayer dollars, Metro is also seeking to reinvest in our hometown economy, create jobs and encourage participation from disadvantaged, minority-owned, and small businesses in the region, in order to prepare the

region for a more sustainable and equitable future.

### **Discussion:**

Metro continues to engage and support projects to maximize and accelerate the benefits of sustainable investment as profiled in the recently released 2020-2021 Annual Sustainability and FY21 Energy Action Plan reports.

### **Energy Action Plan (EAP)**

Recent updates noted in the FY21 Energy Action Plan report include:

- Awarded contract to Hitachi Rail Washington, LLC for new 8000-series railcars with energy-efficiency measures including braking energy recovery technology and light-weighting incentives.
- Installed railcar braking energy recovery equipment at Van Dorn St traction power substation in Virginia for test and evaluation.
- Continued to incorporate green design standards in major facilities under development (Heavy Rail Overhaul facility, Potomac Yard Station, Northern and Bladensburg Bus Garages, Grosvenor-Strathmore Parking Garage and the three new Metro headquarters buildings).
- Completed lighting upgrades at Metro's 48 underground stations with new, brighter lights that improve visibility and enhance safety and security while reducing energy costs.

### **Clean Energy**

- In June 2021, Metro awarded a new District of Columbia electric supply contract requiring the supplier to provide 50% of the electricity from renewables. By working with GSA and other federal agencies (incl. DOT, DOE, Smithsonian, FBI), Metro benefitted from being part of a larger group of buyers; resulting in lower energy prices and lower administrative costs. This contract aligns with the Sustainability Vision and Principles adopted by the Board and increases Metro's use of renewable energy. This shift will have a decarbonization impact equivalent to 25,000 families in DC purchasing clean power each year.
- In support of regional clean energy goals, Metro sought an innovative approach to develop solar canopies at parking facilities. In 2020, Metro negotiated a lease agreement to install approximately 10 MW of solar photovoltaic power at four Metrorail stations in Maryland and DC. In 2021, the project was approved for community solar, and in 2022 construction started at two sites. Once operational, the solar panels will reduce greenhouse gas emissions by up to 7,500 metric tons of CO<sub>2</sub> annually and generate long-term revenue for Metro. This is the first phase of our engagement in solar. Metro's solar lease was recognized by the RMI for making one of the 10 "Most Noteworthy Local Government Renewables Deals of 2020."

- We are actively designing phase 2 - incorporating solar into new construction and identifying opportunities to actively support local clean energy investments.

### **Sustainable Capital Investments**

- The incorporation of energy efficient and environmental design standards in major facilities under development—including the Heavy Rail Overhaul facility, Potomac Yard Station, Northern and Bladensburg Bus Garages, Grosvenor Strathmore Parking Garage, New Carrollton Parking Garage, and the three new Metro headquarters buildings.
- Completion of nine LEED buildings in support of the board adopted LEED requirement in 2008, including Dulles Rail Yard buildings in 2021.

### **Sustainability Action Plan and Equity**

- Metro's first-ever Climate Bonds Certified (CBI) bonds were issued in spring 2021, helping to finance sustainable infrastructure and climate resiliency projects included in the Capital Improvement Program.
- In June 2021, Amazon announced a program that would support the creation of affordable housing at Stations where WMATA has Joint Development Agreements. As part of this collaboration, Amazon will provide \$125 million in below-market capital from its Housing Equity Fund to developers. Twenty-five million of the total will be available exclusively for use by minority-led developers. This unique approach to transit-oriented development and affordable housing promotes equity and inclusion by supporting diverse, connected, and sustainable communities.
- In collaboration with the region, Metro is implementing the vision and strategies of the region's Bus Transformation Project through strategic wayside and on bus technologies for prioritizing buses on the region's roadways. Those initiatives increase bus reliability and operating speeds for improved rider experience, environmental sustainability, and financial stewardship. Coordinated action with District Department of Transportation has resulted in bus queue jumps in 14 key intersections in DC, 5 permanent dedicated bus lanes, and completed final design for transit signal priority corridors in SE and NE DC. Metro is also collaborating with Prince George's County and Montgomery County to implement queue jumps, and transit signal priority in Northern Virginia.
- To support the implementation of the Sustainability Vision and principles, Metro is developing an action plan to help guide planning and investment decisions and to develop draft goals, targets, and performance measures expanding beyond environmental measures, along with engaging in climate resiliency planning to prepare for climate hazards. This will enable regional continuity, increase the reliability of transit service, and help to control long-term capital and operating costs.

## Zero-Emission Bus Program

- In June 2021, Metro adopted zero-emission bus goals that include the purchase of only lower-emission and electric buses in next bus procurement and transition to 100% zero-emission bus purchases by 2030, leading to a 100% zero-emission bus fleet by 2045. This transition will improve regional air quality, reduce greenhouse gas emissions, and provide customers with a cleaner, quieter bus ride.
- Steps are underway to begin to transition the bus fleet to zero emissions, including the Battery-Electric Bus Test and Evaluation, the Zero-Emission Bus Transition Plan, and the planned inclusion of battery-electric bus infrastructure as part of Northern and Bladensburg Bus Division reconstruction efforts.
  - A Battery-Electric Test and Evaluation is being implemented at Shepherd Parkway Bus Division to inform the future large-scale rollout of a zero-emission fleet. The Shepherd Parkway Division serves low-income communities on routes in DC, Maryland, and Virginia. The Test and Evaluation will include 12 electric buses and is supported by a \$4.2 million grant awarded in 2020 from the Federal Transit Administration's Low or No Emission Vehicle Program. Project implementation is underway, with initial bus deliveries expected in late 2022 to early 2023 and analysis completion expected by the end of 2024.
  - A Zero-Emission Bus Transition Plan is being developed, which will outline a path for transitioning our fleet, facilities, and internal workforce and operations to support a fully zero-emission bus fleet.
  - Metro will invest in facility and infrastructure upgrades over the coming years to support the introduction of new buses in the Authority's shift to zero-emission technology.
- The transition to a zero-emission bus fleet includes many supporting activities and requires coordination across internal and external groups. For example, utilities are key partners in supplying the large amount of power needed to support electric bus charging at our facilities.

### FUNDING IMPACT:

No funding impact from providing an information item.

### TIMELINE:

<b>Previous Actions</b>	July 2020 – <a href="#">Sustainability Initiative Update</a> July 2020 – <a href="#">Transit Equity Framework</a> November 2020 – <a href="#">Framework for Transit Equity: Sustainability</a> June 2021 – <a href="#">Sustainability Vision &amp; Principles and Metrobus Fleet Plan</a> December 2021 - <a href="#">Approval of Metrorail and Metrobus Fleet Plans and Metrorail Service Standards</a>
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**Anticipated actions after  
presentation**

**RECOMMENDATION:**



# Sustainability and Zero-Emission Bus - Update

Executive Committee  
April 28, 2022



## Purpose

- Sustainability Program Update
- Zero-Emission Bus Program progress and framework
- Opportunities and Partnerships Required for Success



# Metro Sustainability Vision and Principles

In June 2021 Metro Board adopted Sustainability Vision and Principles

## ***Sustainability vision:***

*WMATA provides a sustainable transportation system that meets the needs of people, communities, and businesses in the region, and fosters social wellbeing, equity, economic prosperity, and environmental stewardship*

## ***Sustainability principles:***

Develop and implement an **Action Plan** with specific priorities, strategies and targets to advance sustainability at WMATA and in the region

Recognize that our investments and operational decisions change lives. Make those decisions intentionally to **address historical, social, environmental, economic disparities, and racial and social injustice**

Build, operate and maintain a resilient transportation system to **improve livability, public health, the environment, equity, and access to opportunity**

Leverage the special nature of WMATA's service and our unique market position to **advance regional goals**

Make **cost-effective and data-driven business decisions** that provide WMATA and its partners with the best return on their investment

Advance the region's efforts by leading **transparent and authentic collaboration** with stakeholders and community partners

Foster a **culture of** continuous improvement by growing staff capacity and leveraging regional expertise and **innovation**

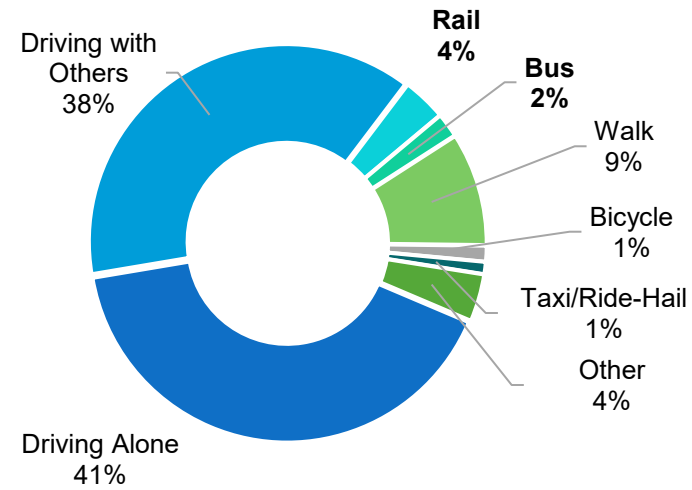
Establish measurable **performance indicators** to track implementation and successes of WMATA's strategies and actions



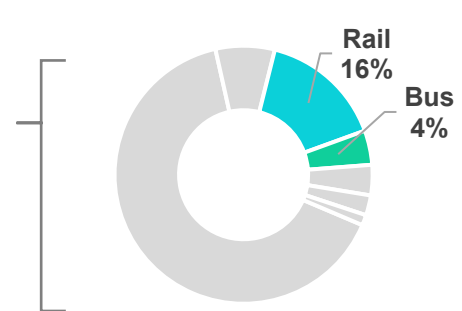
# Transit Ridership Reduces Emissions

- Every transit trip taken instead of a car reduces greenhouse gas emissions and helps ensure clean air
- Metrorail and Metrobus trips in 2019 displaced over **300,000 metric tons of CO<sub>2</sub>**
- Rail trips emit ~65% less and bus trips emit ~25% less per mile compared to a single-occupancy car
- Every percentage point increase in transit trips as a share of regional trips would reduce GHG emissions by **~125,000 metric tons per year**
- Decarbonizing service, including through bus electrification, is an opportunity to **further reduce greenhouse gas emissions and improve local air quality**

Travel Mode, Share of All Weekday Trips



Commuter Trips Only



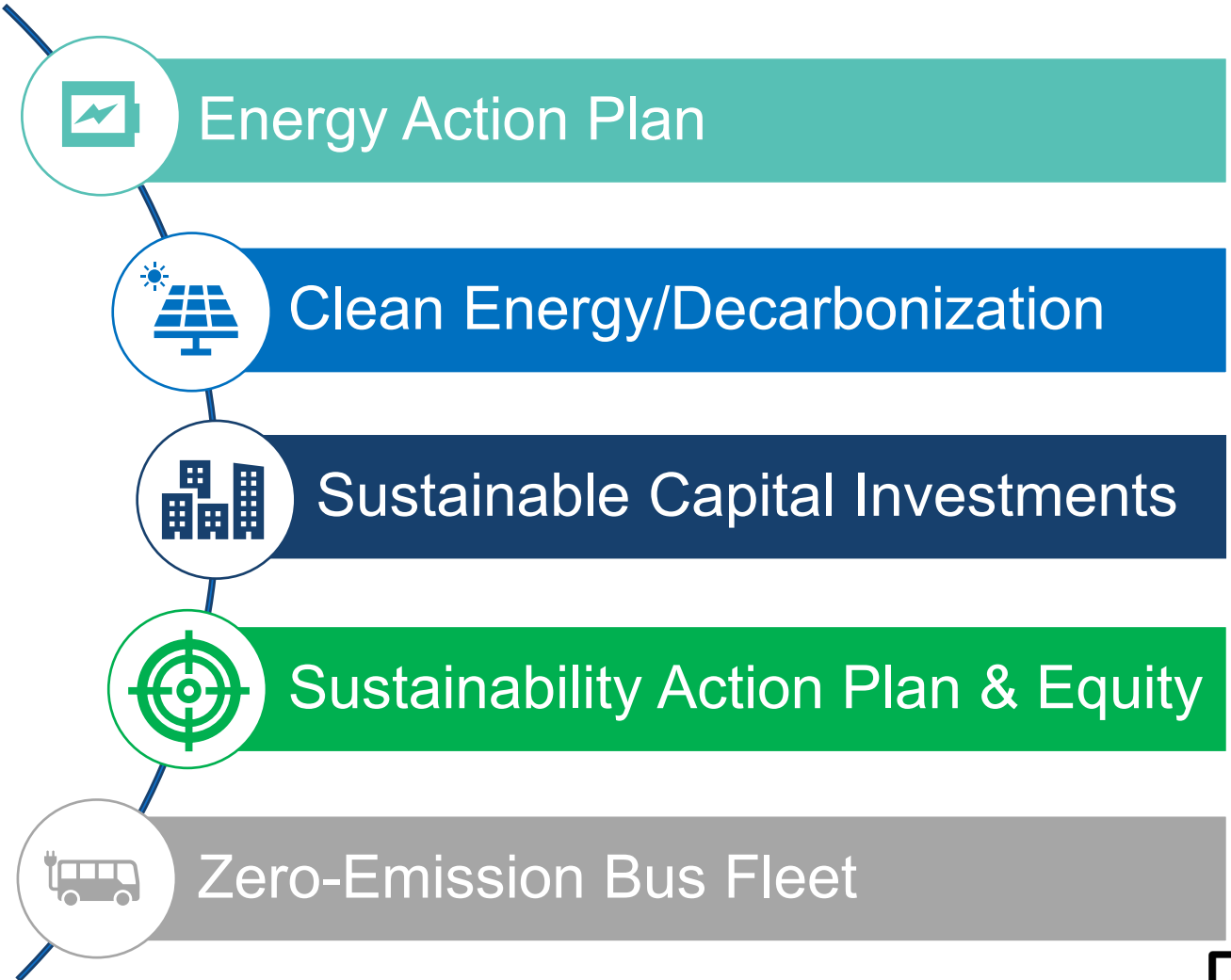
National Capital Region Transportation Planning Board  
2017-2018 Regional Travel Survey

Travel mode	Pounds of CO <sub>2</sub> / mile
Drive alone	~0.95
Metrobus	~0.70
Metrorail	~0.35

U.S. Department of Transportation Federal Transit Administration  
Public Transportation's Role in Responding to Climate Change



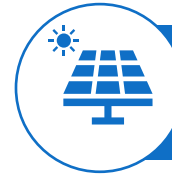
# Sustainability Program Advances



## Solar Construction Underway



Solar Installation at Anacostia Garage

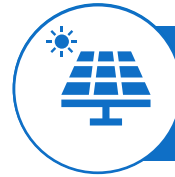


### On-Site Solar

- Solar Carport Lease Agreement
  - Four Metrorail stations - Anacostia, Southern Avenue, Naylor Rd, and Cheverly
  - Solar capacity – nearly 10 MW
  - Supplies community solar market in DC and MD
  - Lessee constructed, owned, operated, and maintained
  - Annual lease revenue goes to Metro
- Solar Planned at New Facilities
  - Northern and Bladensburg Bus Garages
  - Heavy Repair & Overhaul Facility
  - New Carrollton Garage



# Decarbonizing Electricity



## Clean Energy/Decarbonization

- Four-year electric supply contract for District of Columbia to provide 50% renewables
- Working with GSA lowered energy prices and administrative costs
- Pursuing increased renewable electricity supply in Maryland and Virginia
- As one of the largest users of electricity, decarbonizing Metro's electricity is essential to supporting regional clean energy goals

## Building Efficiently for the Future



**Metro's New Headquarters**



### Sustainable Capital Investments

- New Metro office buildings designed to LEED® standard
  - Aligns with regional targets
  - Guided by ROI analysis of investment efficiency
- Dulles Rail Yard buildings awarded LEED® Silver Certification
- Continue to design to green standards for major facilities:
  - Heavy Repair & Overhaul Facility
  - Northern and Bladensburg Bus Garages
  - Potomac Yard Station (LEED® for Transit Pilot)



## Adopting Best Practices/Incubating New Ideas



**Energy Efficient Switch Heaters**



### Sustainability lab

- Tests and evaluates new practices and technologies
- Completed Initiatives
  - Remote water treatment technology for station chillers
  - Maintenance of way vehicle tracking
  - Modern energy efficient track switch heaters
- Current Projects
  - Waste/Recycling Best Practice Implementation
  - Battery Powered Track Maintenance Equipment
  - Battery Electric Leaf Blowers

# Investing in the Local Economy



## Expanding Opportunity for Small Businesses

- Minority Business Enterprise Program, Small Business Program, and Micro-Business Program
  - Provides additional contracting opportunities for small, women, and minority-owned businesses
  - Conducted seven outreaches to introduce the programs and promote opportunities
- Businesses Certified to date:
  - 80 Minority Business Enterprise (MBE)
  - 30 Small Business Program (SBP)
  - 31 Micro Business Program (MBP)

# Contributing to Livable Communities



## Affordable Housing near Transit

- Announced Strategic Plan for Joint Development, detailed roadmap to increase private development opportunities on Metro-owned land
- Promotes equity and inclusion by supporting diverse, connected, and sustainable communities



## Prioritizing Bus Service in the Region



**Dedicated Bus Lanes in the District**



### Bus Transformation Program

- Implementation of bus prioritization on region's roadways
  - Increases bus reliability and operating speeds
  - Improves rider experience
  - Reduces environmental impacts
  - Reduces operating costs
- Coordinated with DDOT to deliver:
  - Bus queue jumps at 14 key intersections
  - Five permanent dedicated bus lanes
  - Transit signal priority deployments across the District
- Northern Virginia - Transit signal priority in Alexandria and Falls Church
- Montgomery County and Prince George's County bus lanes and queue jumps currently under development

## Issuing Climate Bonds



### FY2021 Bonds

- In May 2021, Metro issued its first Climate Bonds
- Independent certification that Metro's capital investment plan supports climate change solutions
- Bond proceeds finance state of good repair, safety, resiliency, and electrification
- Climate and Sustainability Bonds provide market advantage
- Metro will pursue climate or sustainability bond certification for next issuance

# Transition to Zero-Emission Buses Supports Regional Sustainability

- Metro is committed to transition the bus fleet to zero-emission as quickly as feasible (Fleet plan adoption, December 2021)
- Transition includes many supporting activities and requires coordination across internal and external groups
- Metro is already implementing several key activities to begin the transition

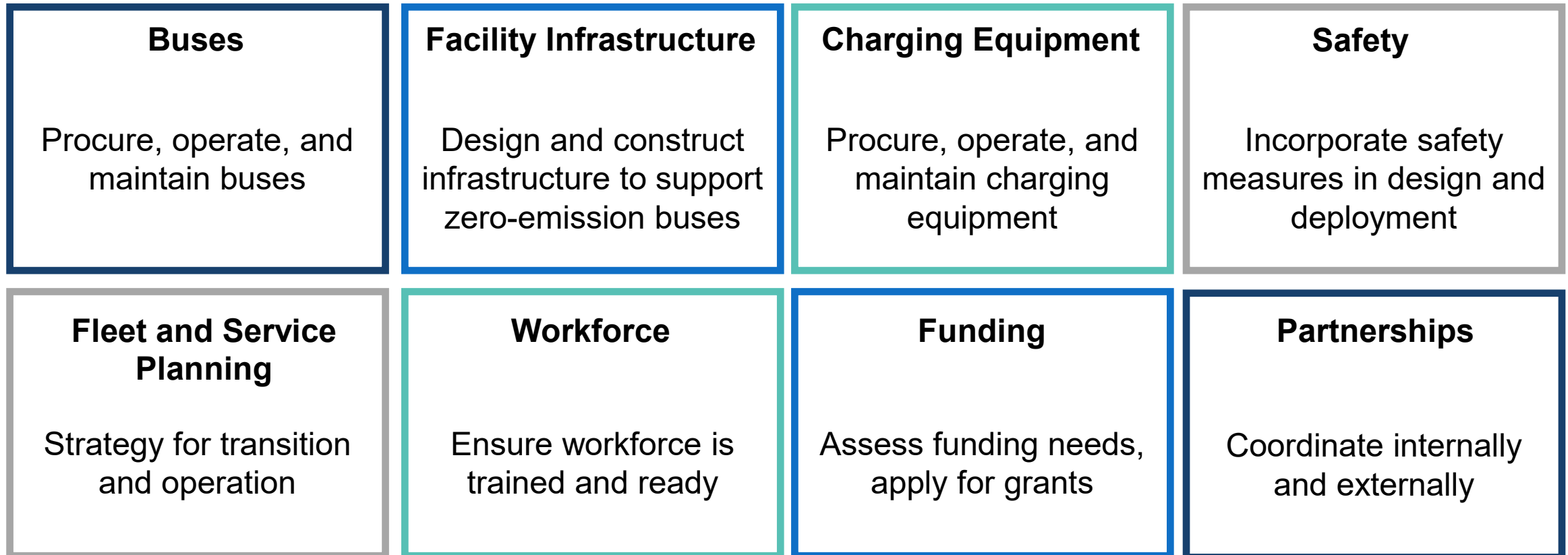
## ***Board adopted zero-emission bus goals (June 2021)***

Purchase only lower-emission and electric buses in next bus procurement

Transition to 100% zero-emission bus purchases by 2030

Have a 100% zero-emission bus fleet by 2045

# Bus Fleet Transition (it's not just buses and money)



## Key Zero-Emission Bus Accomplishments to Date

### Battery-Electric Bus Test and Evaluation



Completed Electric Bus Alternatives Assessment	Dec 2019
Awarded FTA Low-No Grant to support Test & Evaluation	June 2020
Completed 30% design drawings for Shepherd Parkway	Mar 2021
Issued RFP for 10 electric buses	Dec 2021
Completed 60% design drawings for Shepherd Parkway	Feb 2022

### Facilities



Announced Northern will be first all-electric garage	Sept 2021
Began process to add electric bus design work to Bladensburg reconstruction project	Fall 2021

### Strategic Planning



Board adopted Metrobus Fleet Plan with ZEB goals and submitted to FTA	Dec 2021
Initiated Zero-Emission Bus Transition Plan	Jan 2022

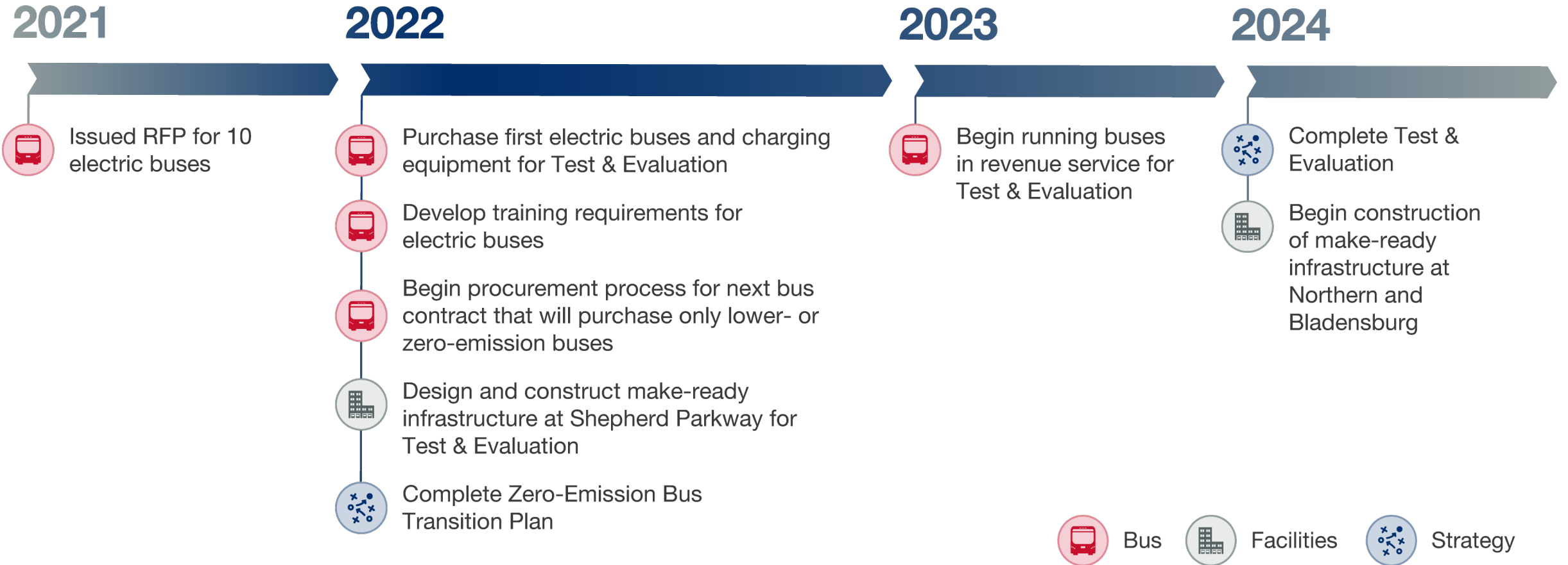
### External Coordination



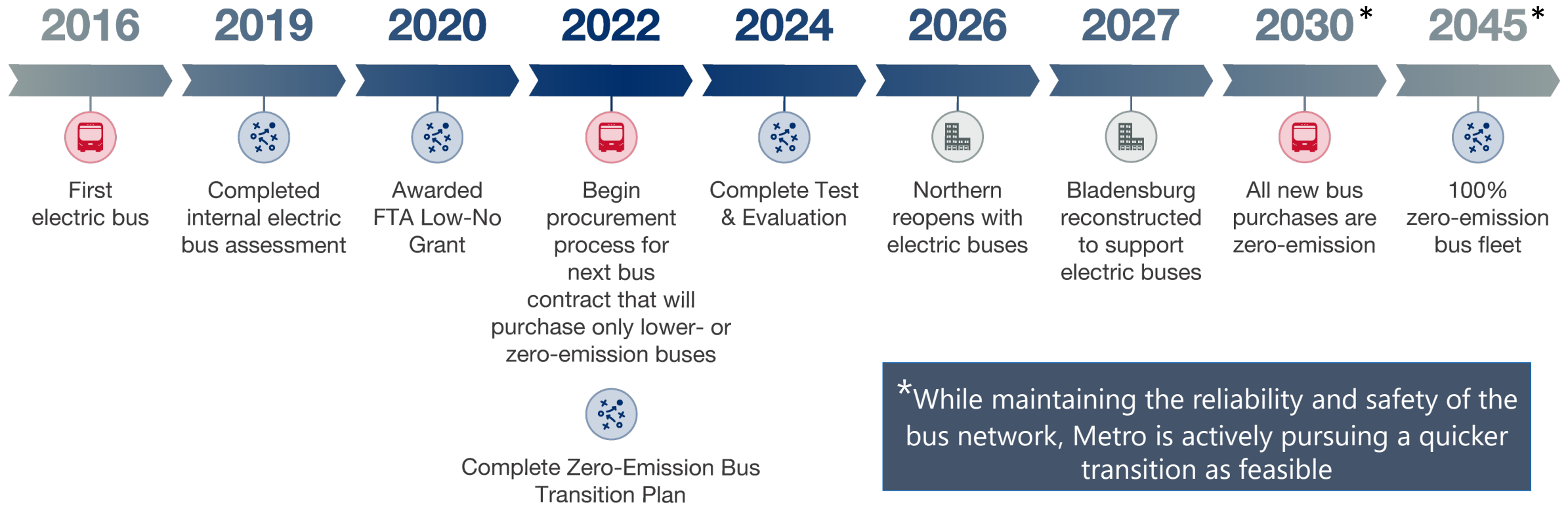
Developed Zero-Emission Bus updates for WMATA website	Jan 2020, Sept 2021
Led development of a letter to local Congressional leaders from regional partners supporting federal funding for zero-emission transit	Sept 2021
Coordinate regularly with Pepco and Dominion on utility needs; work with Pepco on power needs for new ZEB facilities, and development of rate designs or incentives to support transition	Ongoing



# Ongoing Implementation of Zero-Emission Bus



# Driving toward a 100% Zero-Emission Bus Fleet



# Bus Fleet Transition Investment Outlook

- Planned investment in six-year capital program
  - 12 electric bus and charger test and evaluation
  - Design, construction and equipment acquisition for electrification of Northern and Bladensburg Bus Divisions
  - Initial electric bus vehicle purchases to begin transition
  - Implementation planning for full transition
  
- Multi-billion dollar capital investment required in facilities, vehicles, infrastructure over next 20+ years to complete transition

# Federal Funding Outlook for Zero-Emission Bus

- Federal grants received:
  - 2020: \$4.2 million Low or No Emission Program Grant to support the Battery-Electric Bus Test and Evaluation
  
- Federal grant applications submitted in 2022:
  - DOT RAISE Grant for Northern electrification (\$25 million max)
  
- Potential future federal grant applications:
  - FTA Low or No Emission Program
  - FTA Buses and Bus Facilities Program
  
- We will continue to apply for future competitive funding opportunities

## Partnerships Required for Success

- Supporting engagement on regional sustainability policy objectives
- Regional rollout and installation of utility infrastructure to support electrification and clean energy
- Supportive utility rate agreements
- Availability of funding, including discretionary grant opportunities

2020–2021  
Metro  
Sustainability  
Report

Washington Metropolitan Area Transit Authority  
[wmata.com/sustainability](http://wmata.com/sustainability)



Zero-Emission Bus Update

Washington Metropolitan Area Transit Authority



2025 Energy Action Plan

Washington Metropolitan Area Transit Authority