

# Energy Action Plan FY21 Annual Progress Report


## Background

Metro's Energy Action Plan defines the path to a greener, safer, more reliable transit system for the National Capital Region. By following this plan, Metro is achieving environmental goals through increased energy efficiency and is generating long-term cost savings to ensure responsible stewardship of the region's dedicated funding.


## FY21 Summary — Metro is advancing strategic investments in energy efficiency


In Fiscal Year 2021, from July 2020 through June 2021, Metro advanced programs that increase energy efficiency, mitigate risk, and promote fiscal responsibility.

### Highlights from this past year:

 **Initiated test & evaluation of railcar braking energy recovery**—installed an inverter at Van Dorn St traction power substation in Virginia

 Awarded contract to Hitachi Rail Washington, LLC for **new 8000-series railcars that includes efficiency measures** such as improved braking energy recovery technology and light-weighting incentives

 Awarded a **four-year electric supply contract for District of Columbia** in coordination with the General Services Administration that requires the supplier to provide **50% of the electricity from renewables**. This contract aligns with the Sustainability Vision and Principles adopted by the Board and increases Metro's use of renewable energy

 **Secured \$4.2 million grant** from the Federal Transit Administration (FTA) Low or No Emission Program to **support the purchase of two battery electric buses and associated charging infrastructure**



Inverter cabinets for railcar braking energy recovery (Pictured: Van Dorn St traction power substation)



New 8000-series railcars include efficiency measures (Pictured: Rendering courtesy of Hitachi Rail Washington, LLC)

## Measuring Annual Progress:

Metro calculates the “energy use per vehicle mile” to measure its overall progress on energy efficiency.

In FY21, Metro’s energy use per vehicle mile decreased by 1.5% compared to the previous year. This is partially due to increased transit vehicle miles as part of the COVID-19 [gradual recovery plan](#) and continued operation of essential support assets.

Metro ran reduced transit service in FY21 in response to COVID-19. As Metro continues to increase transit service, it is anticipated that Metro will be within range of its energy efficiency target by 2025 through continued implementation of the Energy Action Plan.

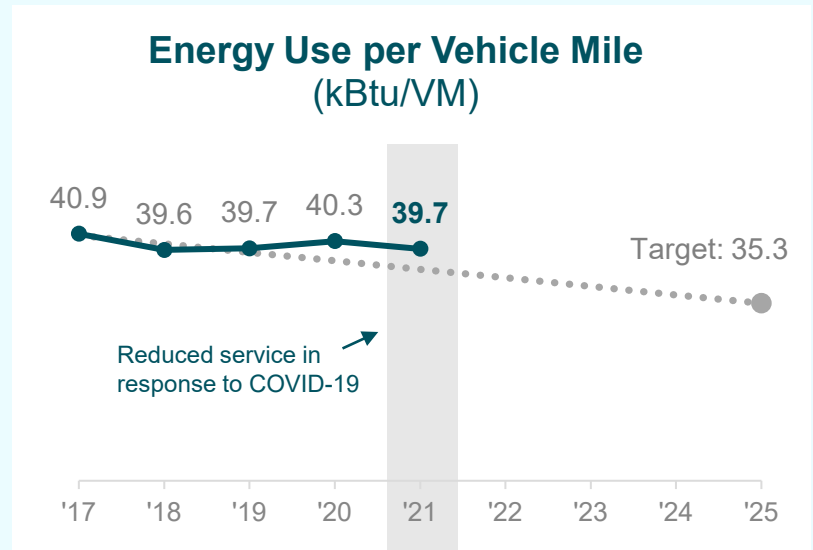


Figure 1: In 2014, Metro established the target of a 15% reduction in energy use per vehicle mile by 2025.

## In This Report

This report communicates Metro’s progress and achievements in FY21. It focuses on the three key pillars in the Energy Action Plan, including:

### 1. Implement Energy Audit Identified Investments

### 2. Modernize Design, Construction, and Operations

### 3. Engage Dynamically in the Energy Market

# 1. Implement Energy Audit Identified Investments

In FY21, Metro continued to advance energy efficiency investments within its Capital Improvement Program. Metro will continue implementation of projects that improve energy efficiency and help reduce operating costs.

## SCORECARD

### FY19–21 Project Accomplishments and FY22 Priorities

Project Category		Action	19	20	21	22	
Lighting	<a href="#">Station lighting systems</a> (trackbeds, pylons, and parapets)	Upgrades at 25 underground stations (FY19); all 48 underground stations (FY20) (project 100% complete)	✓	✓			
	Non-revenue facilities	Upgrades at 11 facilities for Phase 1 (FY19), 23 facilities for Phase 2 (FY20-21)*	✓	+	✓		
		Upgrades at 14 facilities for Phase 2 (FY22-23)*			+	☐	
	Tunnel lighting	Systemwide upgrades to 20% of segments (FY19), 58% (FY20), 63% (FY21)*	✓	✓	✓		
		Systemwide upgrades to 77% of segments (approx. 17,000 total fixtures) (FY22)*			+	☐	
Station backrooms	Upgrades at 25 stations for Phase 1 (FY20), 56 stations for Phase 2 (FY21)		✓	✓			
Traction Power	<a href="#">8000-series railcar procurement</a>	Include efficiency incentives and penalties in solicitation (FY19), select vendor (FY21-22)*	✓		+	☐	
	Maintenance of way vehicle tracking	Installation (FY20-21), measurement and verification of tracking devices (FY22)*		✓	✓	☐	
	Braking energy recovery	Design (FY20) and install two energy recovery units for test and evaluation (FY22)*		✓	+	☐	
		Update specifications to require modern technology in traction power upgrades*			→	→	☐
		Develop designs/specifications for two battery storage systems and initiate procurement*			→	→	☐
7000-series traction power settings	Update software settings (FY21)			✓			

\*Action impacted by COVID-19 Pandemic

#### Scorecard Key

- ✓ Action completed
- +
- Action moved to next fiscal year
- ☐ Planned action

Project Category		Action	19	20	21	22
Facilities	Investments in efficient facilities	Andrews Federal Bus Garage built and operating to LEED® Silver Standards (FY19), certified (FY20); est. 30% energy savings from ASHRAE 90.1-2007	✓	✓		
		Cinder Bed Road Bus Garage built, certified, and operating to LEED® Gold Standards (FY19); est. 20% energy savings from ASHRAE 90.1-2007	✓			
	Manage to Energy Action Plan recommendations	Establish ownership for management of facilities		✓		
Stations	Chiller plant upgrades (incl. frictionless bearings and variable frequency drives (VFDs))	Upgrades at 8 sites (FY19), 5 sites (FY20) (systemwide approx. 90% complete)	✓	✓		
	Manage to Energy Action Plan recommendations	Establish ownership for management of stations		✓		
	Variable Frequency Drive (VFD) test and evaluation	Install VFDS on four air conditioning units and four drainage pumping stations			✓	
Bus	<a href="#">Zero-emission fleet strategy</a>	Conduct electric bus strategy research (FY19), release Zero-Emission Bus Update (FY20)	✓	✓		
		Secure Metro's Board adoption of zero-emission bus goals (FY21); develop Metrobus Fleet Plan (FY22)			✓	☐
		Initiate electric bus test and evaluation phase (FY20), secure FTA Low-No Grant for two buses and charging equipment (FY21), release RFP for additional ten buses (FY22)		✓	✓	
	Bus priority measures	Conduct analysis of transit signal priority (TSP) (FY19), install TSP devices on Metrobus fleet (FY21)	✓		✓	
		Partner with jurisdictions to implement dedicated bus lanes and other bus improvements, such as queue jumps and TSP (FY20-22)		✓	✓	☐
	<a href="#">Cashless fare payment</a>	Conduct a 12-month cashless fare payment pilot on the 79-bus route	✓			
	Bus eco-driving	Install and evaluate efficient transmissions with FuelSense software on 7% of fleet (FY19), 14% of fleet (FY20), FuelSense software re-evaluated (FY21)	✓	✓	×	
	<a href="#">Bus Transformation Project</a>	Engage with jurisdictions and the public to develop draft strategy	✓			
Release final strategy and action plan			✓			

\*Action impacted by COVID-19 Pandemic

**Scorecard Key**

- ✓ Action completed
- + Action underway, partially completed
- × Action reevaluated, no longer pursued
- ☐ Planned action

## 2. Modernize Design, Construction, and Operations

In FY21, Metro continued to incorporate energy-efficient design standards in major facilities under development—including ‘electric-bus-ready’ design into bus garages, trained staff in Leadership in Energy and Environmental Design (LEED®) and Envision® standards, and completed the Grosvenor-Strathmore Garage Expansion to meet Parksmart® standards. Metro will continue to standardize and adopt best practices for design, construction, and operation of Metro facilities.

### SCORECARD

#### FY19–21 Project Accomplishments and FY22 Priorities

Project Category	Action	19	20	21	22	
Design, Construction & Operations	Design criteria & specifications update		+	+	☐	
	Energy efficient operating procedures		+	+	☐	
	Capital Improvement Program prioritization	Include utilities operating cost impact in project initiation review	✓			
		Integrate energy efficiency best practices into DC&S, contract language, lifecycle costing, etc.		+	+	☐
		Train staff in LEED® and Envision® standards			✓	
	Lifecycle costing and energy efficient building standards included in major capital investment contracts	Release RFPs (FY19) and design Northern and Bladensburg Bus Garages and the Heavy Repair & Overhaul facility using LEED® criteria	✓	+	+	☐
		Evaluate design of Metro’s new headquarter facilities using 30-year return on investment (ROI) threshold and LEED® criteria	✓			
		Incorporate ‘electric-bus-ready’ design in new bus garages currently under development (Northern and Bladensburg)		✓	✓	☐
	Project support for major capital projects	Design/build Potomac Yard Station to meet LEED® for Transit standards (FY20-21) and submit for certification (FY22)		+	+	☐
		Design/build Metro’s headquarters as LEED-certified buildings*				☐
		Design/build Grosvenor-Strathmore Garage expansion to meet Parksmart® standards (FY21)			✓	
	Best practice consultation with peer agencies and industries	Actively participate in APTA Sustainability Committee, CoMET/NOVA and UITP research and benchmarking efforts	✓	✓	✓	☐

#### Scorecard Key

- ✓ Action completed
- +
- ☐ Action underway, partially completed
- ☐ Planned action

## Metro's Dulles Rail Yard Facilities Score LEED Silver

In FY21, Metro's Maintenance of Way, Transportation, and Service & Inspection buildings at Dulles Rail Yard on the Silver Line were awarded LEED® Silver Certification. Through the LEED framework, Metro prioritizes energy efficiency, employee wellbeing, and reducing environmental impact. Sustainability features include:

- Use of recycled materials and regional materials during construction—with over 90% of waste diverted from landfill
- Use of energy-efficient lighting that also reduces lighting pollution to the surrounding community and habitat
- Operating 100% of traction power load directly off direct current (DC) power—increasing levels of energy system efficiency, resilience and reliability
- Abundant natural light and best practices in ventilation including increased amounts of fresh air



Silver Line Dulles Rail Yard and Maintenance Facility was a collaborative effort between the Metropolitan Washington Airports Authority (MWAA) and Metro (Pictured: Service & Inspection Building at Dulles Rail Yard)

### 3. Engage Dynamically in the Energy Market

In FY21, Metro continued to advance energy market engagement and secured a new electricity supply contract with a high renewable energy requirement and engaged with utilities for electrification planning. Next year, Metro will continue to explore energy market opportunities, including renewable energy.

#### SCORECARD

#### FY19–21 Project Accomplishments and FY22 Priorities

Project Category		Action	19	20	21	22
Energy Market Engagement	Strategic energy purchasing	Establish cross-departmental group to support strategic energy purchases	✓			
		Secure new natural gas supply contract in coordination with GSA		✓		
		Engage technical resources to prepare for new electricity supply contracts		✓		
		Evaluate renewable natural gas opportunity (FY20)		✓		
		Explore and implement renewable energy purchasing; award District of Columbia electric supply contract in coordination with GSA and include renewables requirement				✓

#### Scorecard Key

✓ Action completed



Project Category	Action	19	20	21	22	
Energy Market Engagement	Enterprise Energy Monitoring Software (EEMS)	✓				
	Launch EEMS 2.0 and train interdepartmental staff to leverage tool capacity and analyze energy usage		✓			
	Solar program	Phase 1– Solar Carports: Develop business case (FY19), issue RFP and select vendor for third party design and operation at four Metro sites (Southern Ave, Cheverly, Naylor Rd, and Anacostia) (FY20), Initiate design review and permitting approval for solar carports (FY21-22); initiate construction at Anacostia (FY22)	✓	✓	✓	□
		Phase 2—Other Metro facilities: Evaluate and advance designs for solar at additional facilities			✓	□
	Utility rebates	Apply for/receive utility energy efficiency rebates: \$430K (FY19), \$245K (FY20), \$300K (FY21)	✓	✓	✓	
	Active engagement with regional stakeholders and working groups	Continue collaboration and advocacy with stakeholders (e.g., DC Power Path, Connected DMV, Washington Advanced Energy Group, and local Public Utility Commissions)	✓	✓	✓	□
Continue to work with utilities for fleet electrification (incl. garage and on-route charging) and EV charging opportunities at parking facilities			✓	✓	□	

**Scorecard Key**

- ✓ Action completed
- Planned action

## Solar Carports Coming Soon to Four Metrorail Stations

In support of regional clean energy goals, Metro sought an innovative approach to develop solar carports at Metro parking facilities. In FY20, Metro negotiated a lease agreement to install approx. 10 MW of solar photovoltaic power at four Metrorail stations in DC and Maryland. In FY21, Metro advanced designs to 90% for all four sites and is on track to begin construction at the first site by end of 2021.

Under this agreement, TotalEnergies (formerly SunPower Corp.) will install, and Goldman Sachs Renewable Power LLC (GSRP) will own and operate the solar carports through 2045 at no cost to Metro; reducing regional greenhouse gas emissions by up to 7,500 metric tons of carbon dioxide annually. In FY21, the project was approved for community solar—once operational, the solar panels will provide renewable electricity to customers in D.C. and Prince George’s County, MD.

In FY21, this agreement was recognized by the Rocky Mountain Institute as one of the 10 ["Most Noteworthy Local Government Renewables Deals of 2020"](#).



Metro is leveraging its real estate portfolio to support regional clean energy goals (Pictured: Rendering of solar carports at Cheverly Station courtesy of TotalEnergies)