

Zero Emission Bus Transition Plan Update & 2026 Activation

Claire Warren | Principal Engineer, Electric Bus Infrastructure
Jeremiah Riter | Assistant Director, Bus Maintenance

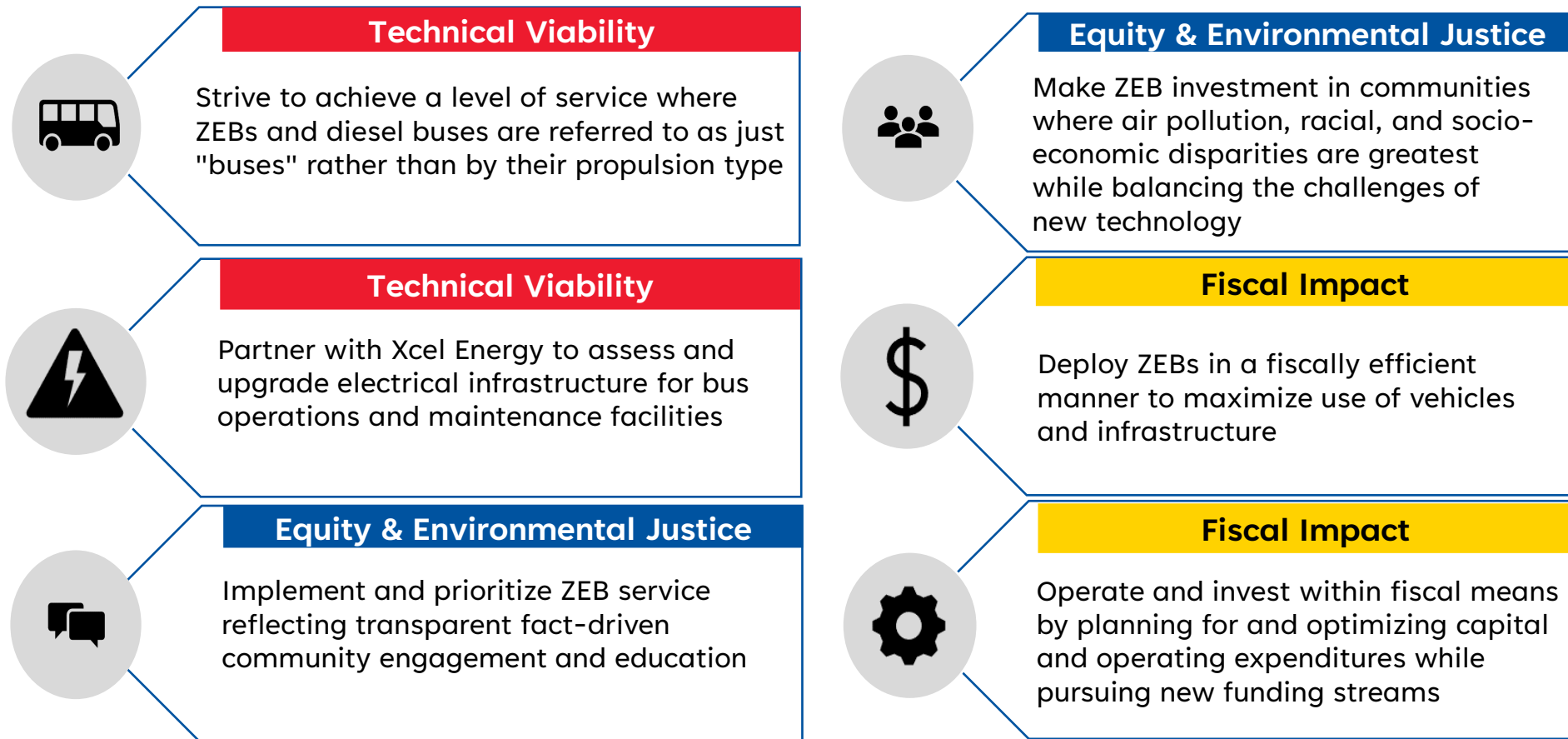
Agenda

- Zero Emission Bus Transition Plan Overview
- C Line Electric Bus Pilot Performance
- Project Updates



Gillig electric bus parked next to a ChargePoint plug-in dispenser at North Loop Garage

Transition Plan Guiding Principles



Guiding Principles & Key Performance Indicators (KPIs)

KPI	Guiding Principle		
	Technical Viability	Equity & Environmental Justice	Fiscal Impact
Fleet Mileage	◆		◆
Bus Availability	◆		◆
Bus Reliability	◆	◆	◆
Environmental Impact		◆	
Equity and Environmental Justice (EEJ)		◆	
Energy Cost/Mile	◆		◆
Infrastructure Availability	◆		◆
Infrastructure Reliability	◆	◆	◆

Purchases through 2025

- 13 60-foot New Flyer electric buses
 - 8 C Line 466 kWh (2019)
 - 5 Gold Line 888 kWh (2025)
- 20 40-foot Gillig electric buses
 - Local Service 686 kWh (2025)
- 30 plug-in chargers
 - 8 Siemens 150kW (2019, 2021)
 - 10 ABB 150kW (2025, 2026)
 - 6 Chargepoint 200kW (2026)
 - 6 Heliox 180kW (2026)
- 4 60kW mobile maintenance chargers
- Charge Management Software
 - The Mobility House (2025)
 - Chargepoint Viriciti (2026)
- 2 on-route chargers (2019)
 - Removed from service in 2023 due to safety and reliability concerns



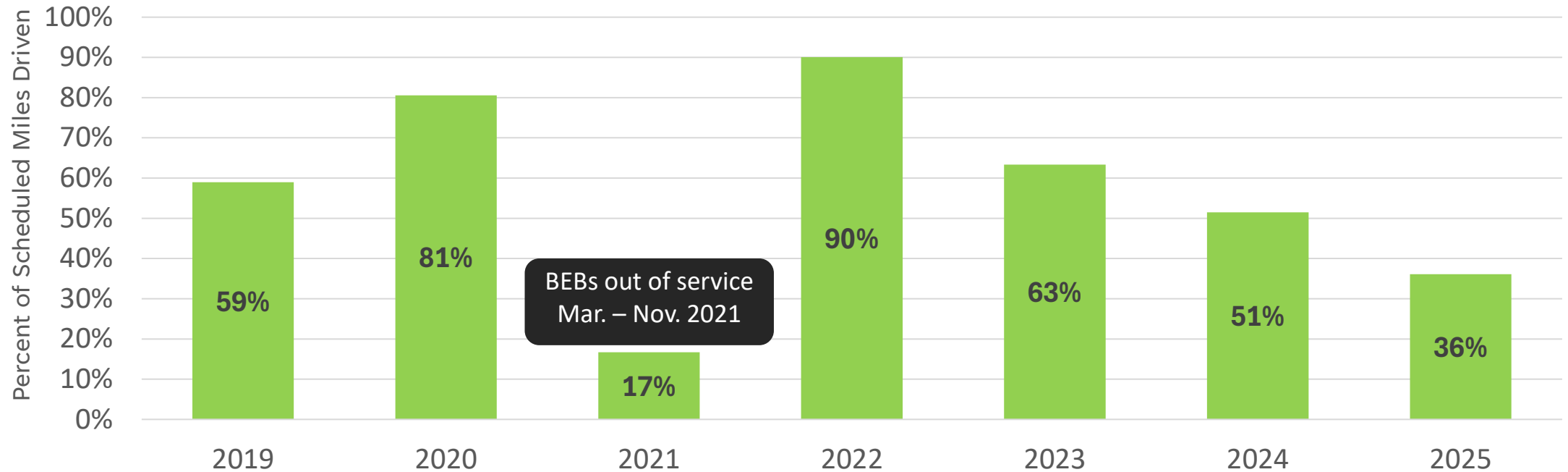
Heliox 60kW mobile maintenance charger

Fleet Key Performance Indicators

- **Fleet Mileage:** The total number of miles driven and the percent of scheduled miles driven by electric buses each year
- **Bus Availability:** The percent of electric buses available for use in service
- **Bus Reliability:** Average distance in miles between instances when a bus requires unplanned maintenance while in service
 - Also known as mean distance between chargeable road calls (MDBCRC)
- **Why are these metrics important?**
 - Fleet metrics help depict how buses perform in our service environment and help Metro Transit assess the product's ability to consistently provide reliable service to our customers

2025 C Line electric buses drove fewer scheduled miles

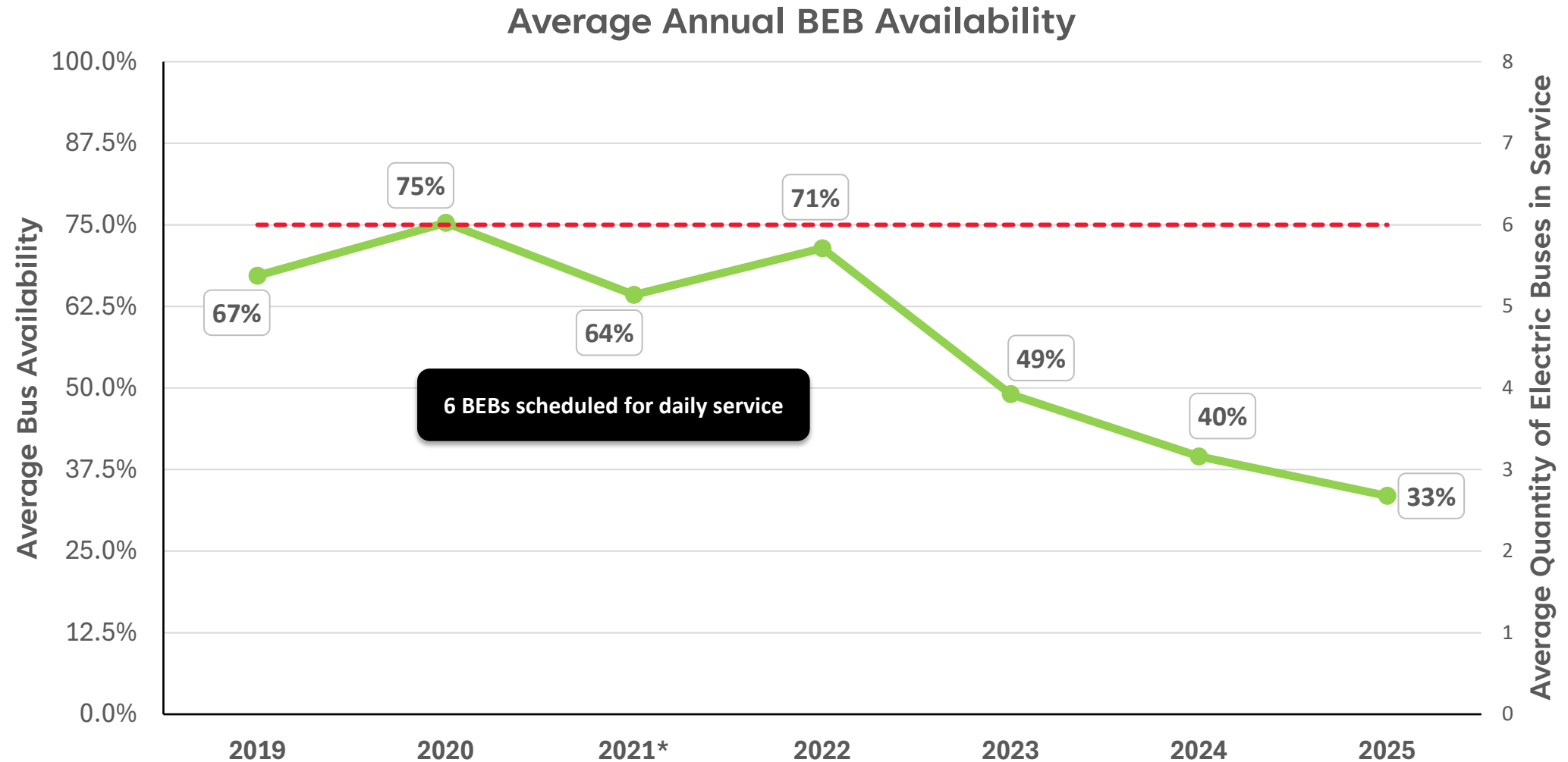
Percent of BEB miles driven vs. scheduled



	2019	2020	2021	2022	2023	2024	2025
Annual C Line BEB Miles*	66,400	162,700	37,800	175,300	117,400	64,000	41,600
Annual C Line Diesel Miles*	312,600	466,700	625,200	476,900	561,800	631,100	613,700

*Values rounded to the nearest 100

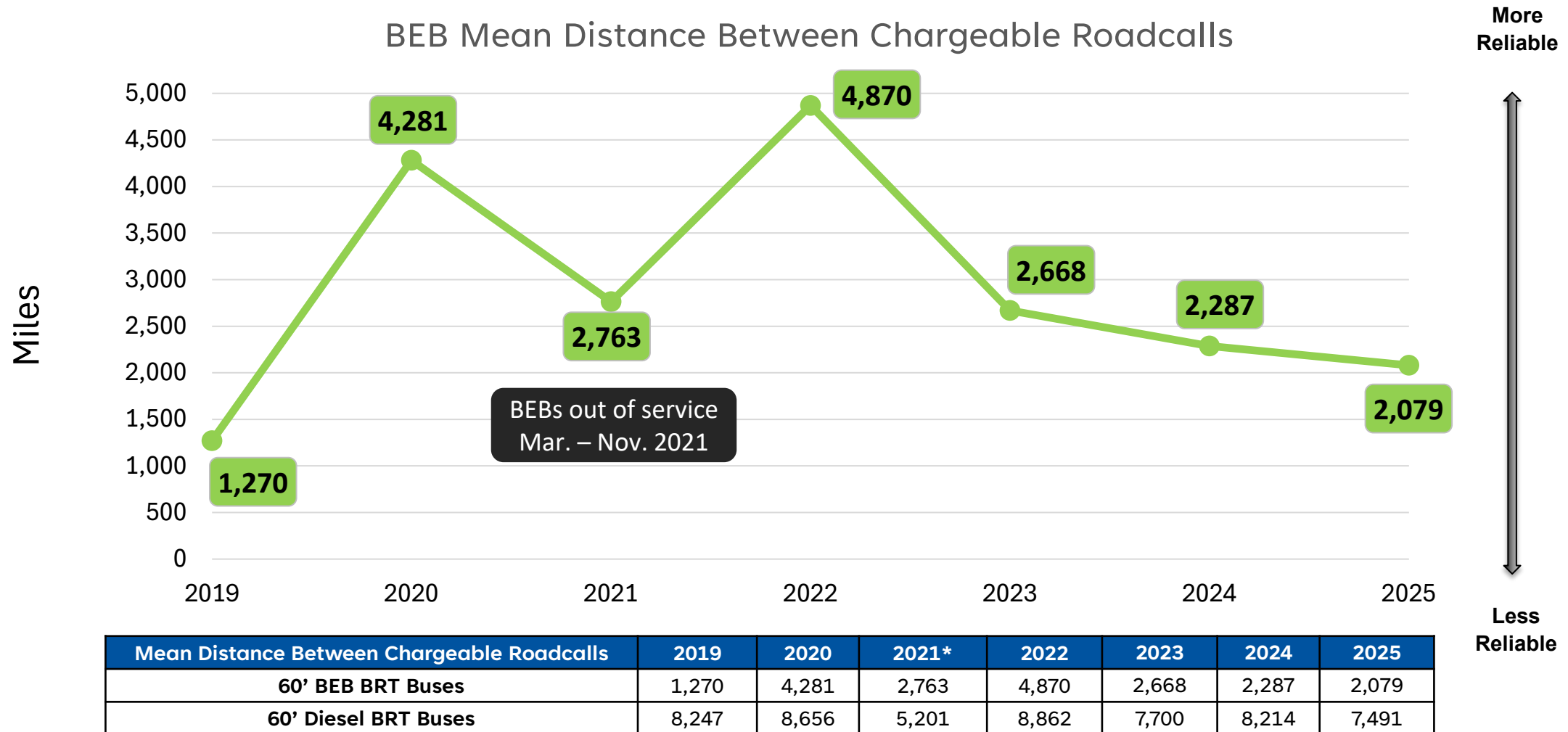
C Line bus availability declined in 2025



*2021 metrics measured for the 90 days BEBs were used in revenue service

**2023-2025 metrics affected by battery cell failures

C Line electric bus reliability declined in 2025



* 2023-2025 BEB metrics affected by battery cell failures and out-of-service on-route chargers

Environmental key performance indicators

- **Environmental Impact:** Greenhouse gas emission reductions compared to a baseline diesel fleet using Argonne National Laboratory's 2024 ([AFLEET](#)) model
- **Equity and Environmental Justice:** Percent of electric bus deployments on “High Priority” EEJ service blocks as defined in Section 7.5 of Metro Transit's Zero-Emission Bus Transition Plan (February 2025)
- **Why is it Important?**
 - The environmental metrics quantify the impact the transition towards electric buses has on reducing emissions and demonstrates how we are doing relative to our prioritization method that was co-created with community members for where electric buses operate in the region

Environmental benefit

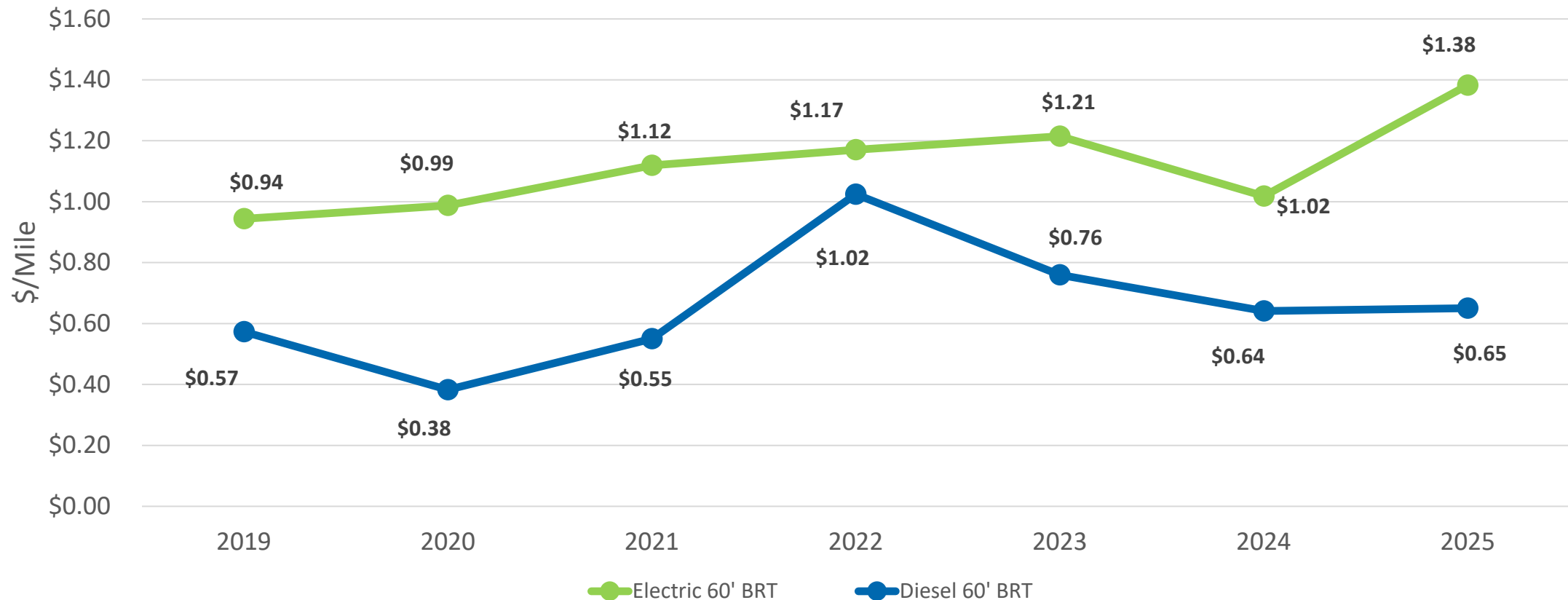
- Well-to-Wheel GHG emission reduction equivalencies (June 2019 – December 2025)
-  – GHG emissions from **115** gasoline-powered passenger vehicles driven for one year
-  – CO₂ emissions from **48,527** gallons of diesel consumed
-  – CO₂ emissions from **103** homes' electricity use for one year
- In 2025, 100% of electric bus deployments were on "high priority" EEJ blocks

Energy cost per mile

- **What is being measured?**
 - Energy cost a bus uses to travel one mile inclusive of propulsion energy (diesel or electricity) and diesel fuel for bus auxiliary heat
- **Why is it important?**
 - The energy cost per mile metric will help Metro Transit understand the ongoing costs and necessary budget to operate electric buses

Average energy costs per mile are higher for electric buses than diesel buses

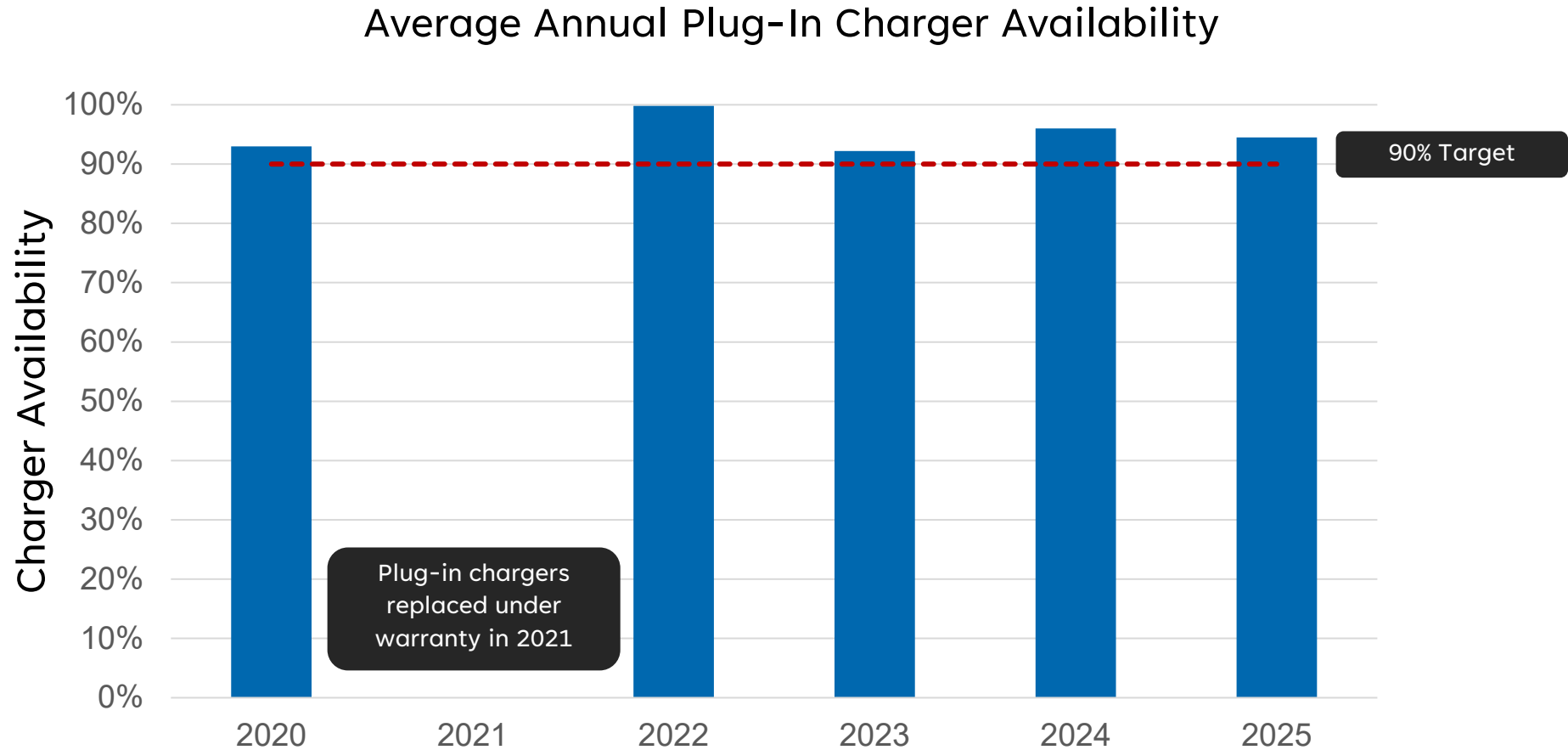
Average Annual Energy Cost/Mile by Propulsion Type



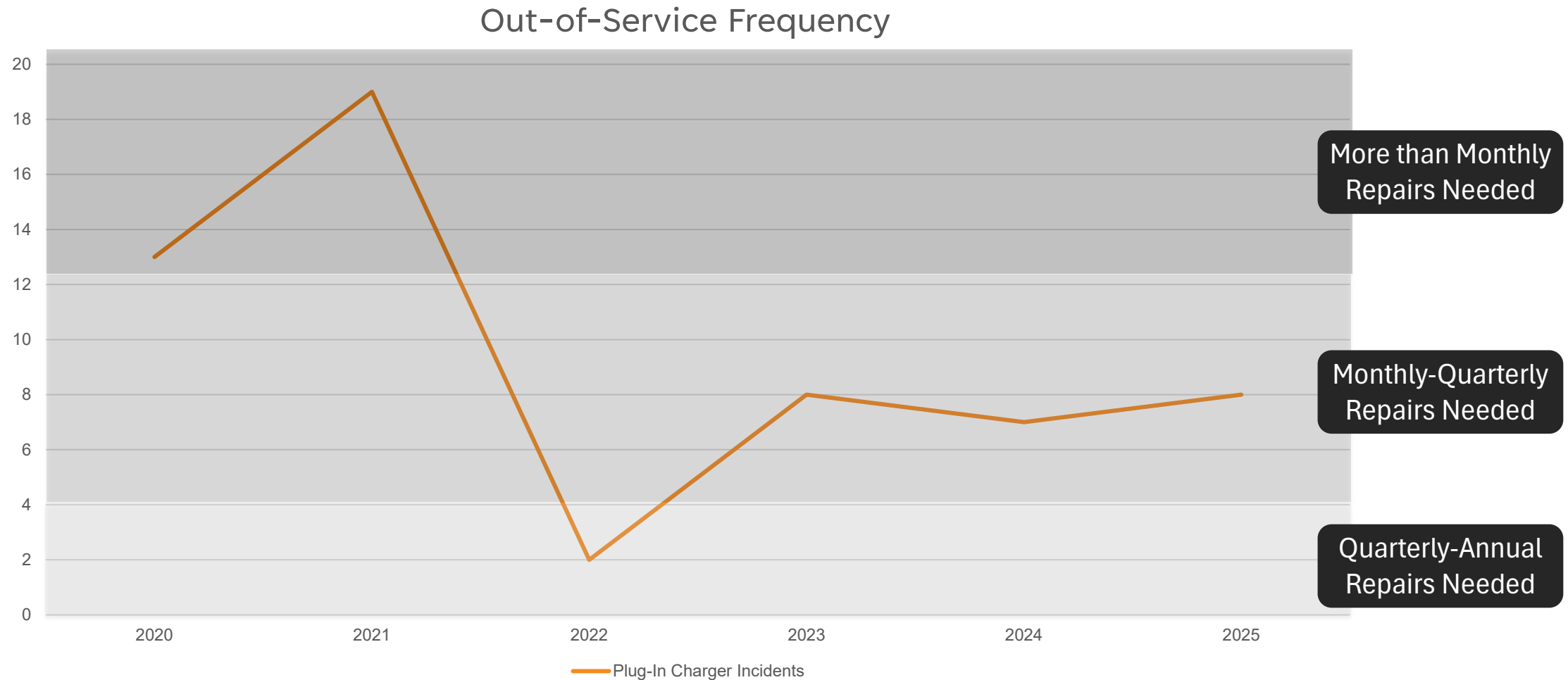
Infrastructure key performance indicators

- **Infrastructure availability:** Percent of chargers available to charge a bus for revenue service
- **Infrastructure reliability:** The quantity of incidents that take a charger out of service
- **Why is it important?**
 - Historically, fuel pump availability and reliability were not a concern. Infrastructure metrics will help Metro Transit assess technology ability to provide reliable service to our customers and understand infrastructure maintenance requirements

In 2025, C Line plug-in charger availability met operational needs



In 2025, 8 C Line charger incidents occurred, each affecting a single charger



Battery electric bus KPI summary

2022 - 2025

KPI	BEB 2022	BEB 2023	BEB 2024	BEB 2025*
Fleet Mileage*	175,300	117,400	64,000	41,600
Bus Availability (% of BEBs Available for Use in Revenue Service)	71%	49%	39.5%	33.5%
Bus Reliability (Mean distance between chargeable road calls)	4,870	2,668	2,287	2,079
Environmental Impact** (GHG [CO ₂ e] reduction in metric tons)	144	58	32	36
Equity and Environmental Justice (EEJ) (% of BEB deployments on “High Priority” EEJ Blocks)	100%	100%	100%	100%
Energy Cost/Mile	\$1.17 (\$1.02 for diesel bus)	\$1.21 (\$0.76 for diesel bus)	\$1.02 (\$0.64 for diesel bus)	\$1.38 (\$0.65 for diesel bus)
Infrastructure Availability (Avg. full days available to charge a bus for revenue service)	Garage: 99.8%	Garage: 92%	Garage: 96%	Garage: 95%
Infrastructure Reliability (Total incidents that take chargers out of service)	Garage: 2	Garage: 8	Garage: 7	Garage: 8

*Rounded to the nearest 100 miles

**The larger GHG reduction in 2025, despite fewer miles traveled, were due to these reasons: 1) diesel buses in 2025 used more fuel per mile (lower mpg) than in 2024, and 2) electric buses required less kWh of electricity per mile than in 2024.

North Loop Garage: Metro Transit's testing & training hub

- 20 40-foot Gillig electric buses entered revenue service on Aug. 22
- Charger commissioning near completion
- Infrastructure scope includes:
 - 18 chargers from 3 different manufacturers
 - 36 plug-in dispensers
 - 1 mobile charger for maintenance
 - Charge Management Software



ChargePoint plug-in dispensers at North Loop Garage

North Loop Garage charger room



Eighteen new chargers installed in the dedicated charger room at North Loop Garage.
Left to right: ChargePoint chargers, Heliox chargers, and ABB chargers.

Gold Line buses returning after battery replacements

- By the end of 2026, five 60-foot New Flyer electric buses are expected to return to East Metro
 - As of Aug. 31, two buses have returned with upgraded battery packs
 - Upgraded battery packs increase capacity which increases range
- East Metro chargers were used in revenue service from March to August 2026 with no notable issues



New flyer electric bus and ABB plug-in dispensers

Thank you!

metrotransit.org/electric-buses