

Electric BUSES

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TTC's Role Under TransformTO

December 7, 2023



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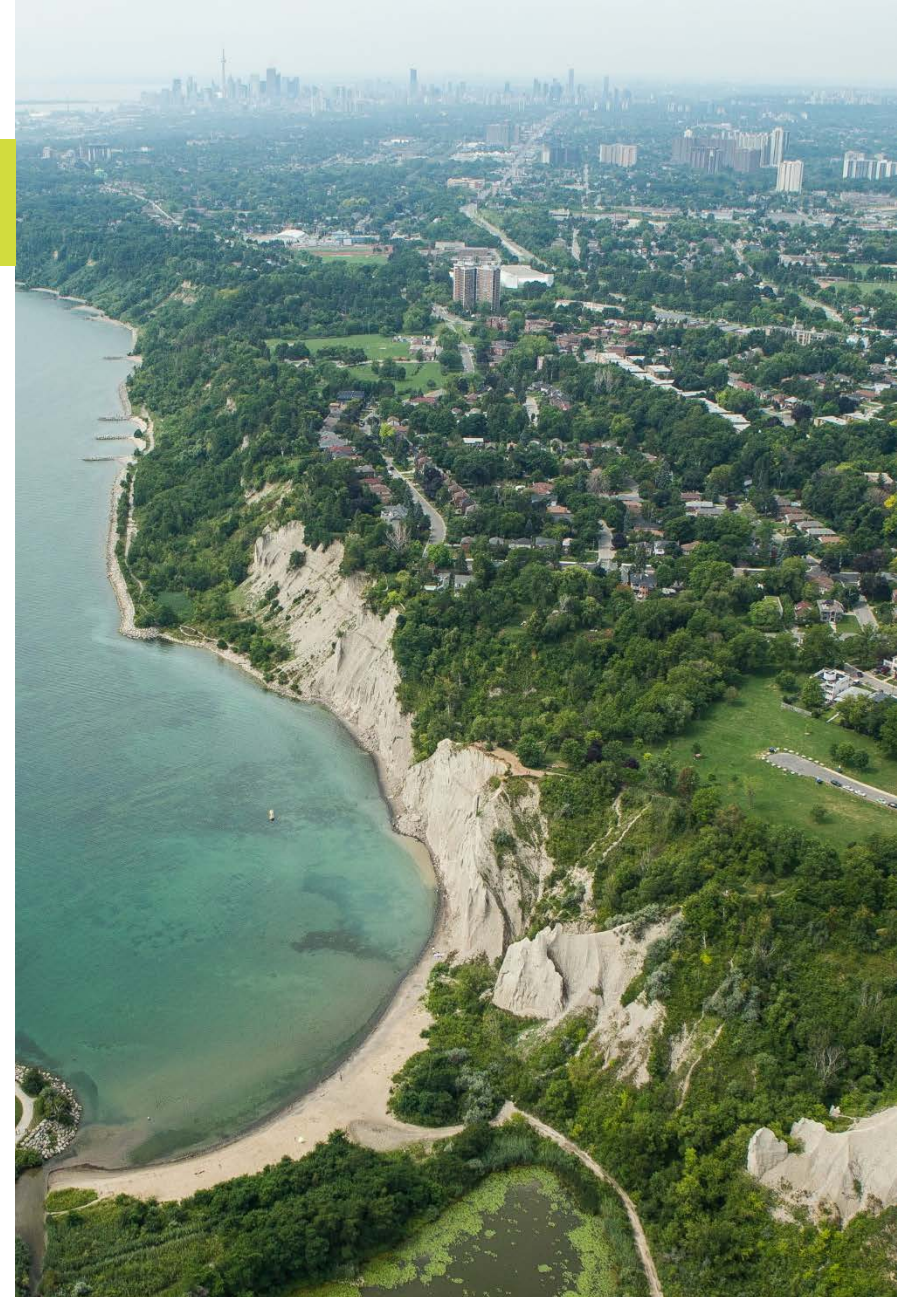
Green Fleet Program

- City Fleet Mix and Emissions Targets
- TTC's GHG Emissions Inventory
- TTC's Path to a Zero Emissions Bus Fleet
- Bus Capital Program Update
- Actual vs Target Tracking

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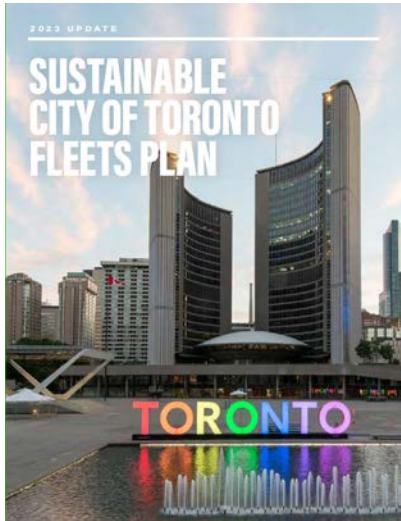
Service Frequency Enhancement

- TransformTO Service Frequency Targets
- Preliminary Fleet and Facility Impacts



Sustainable City of Toronto Fleets Plan

Council Directive to Green TTC's Own Fleet Operations



Transition city-owned fleet to **zero-emissions**:

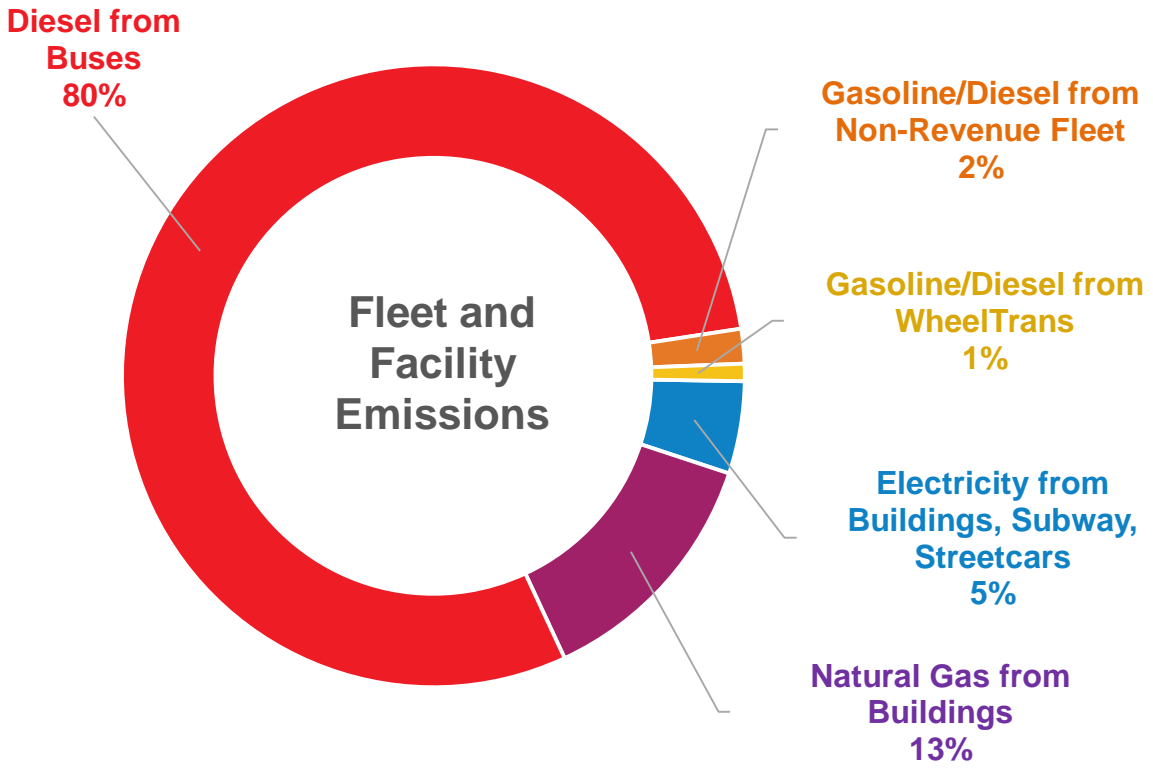
Year	Fleet Mix Targets	Fleet GHG Emissions Targets
2025	20% Zero Emissions Vehicles	45% Emissions Reduction*
2030	50% Zero Emissions Vehicles	65% Emissions Reduction*
2040	100% Zero Emissions Vehicles	100% Emissions Reduction*

* compared to 1990

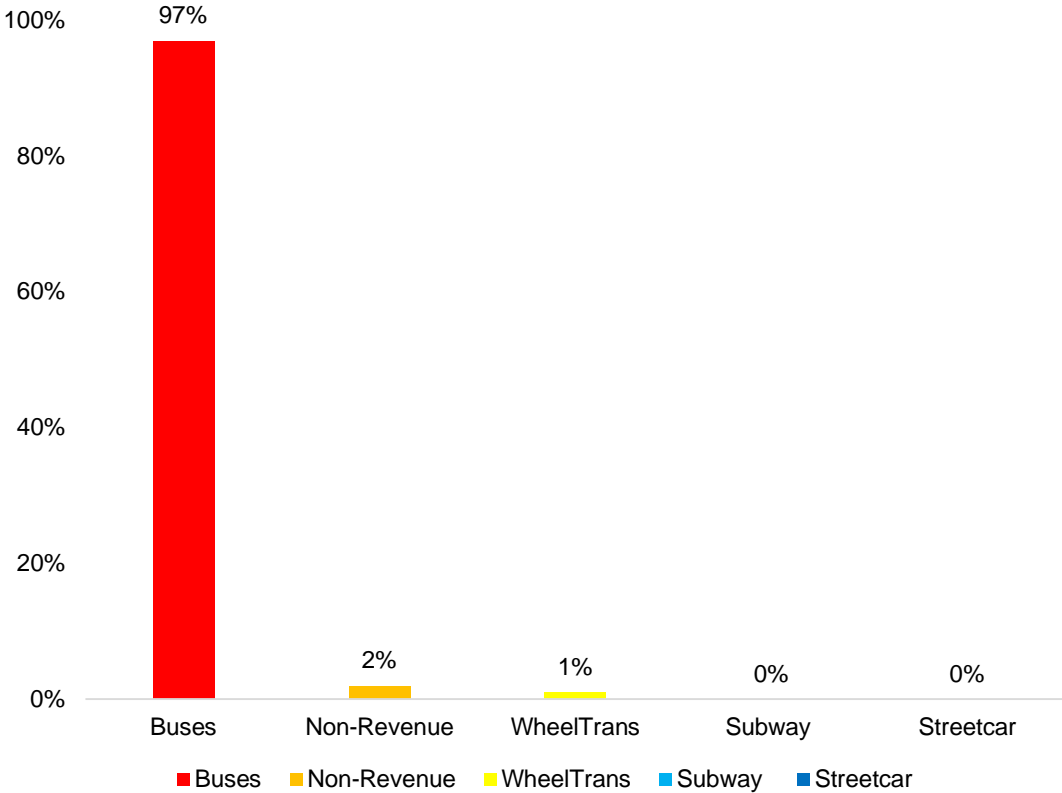


TTC's GHG Emissions Inventory

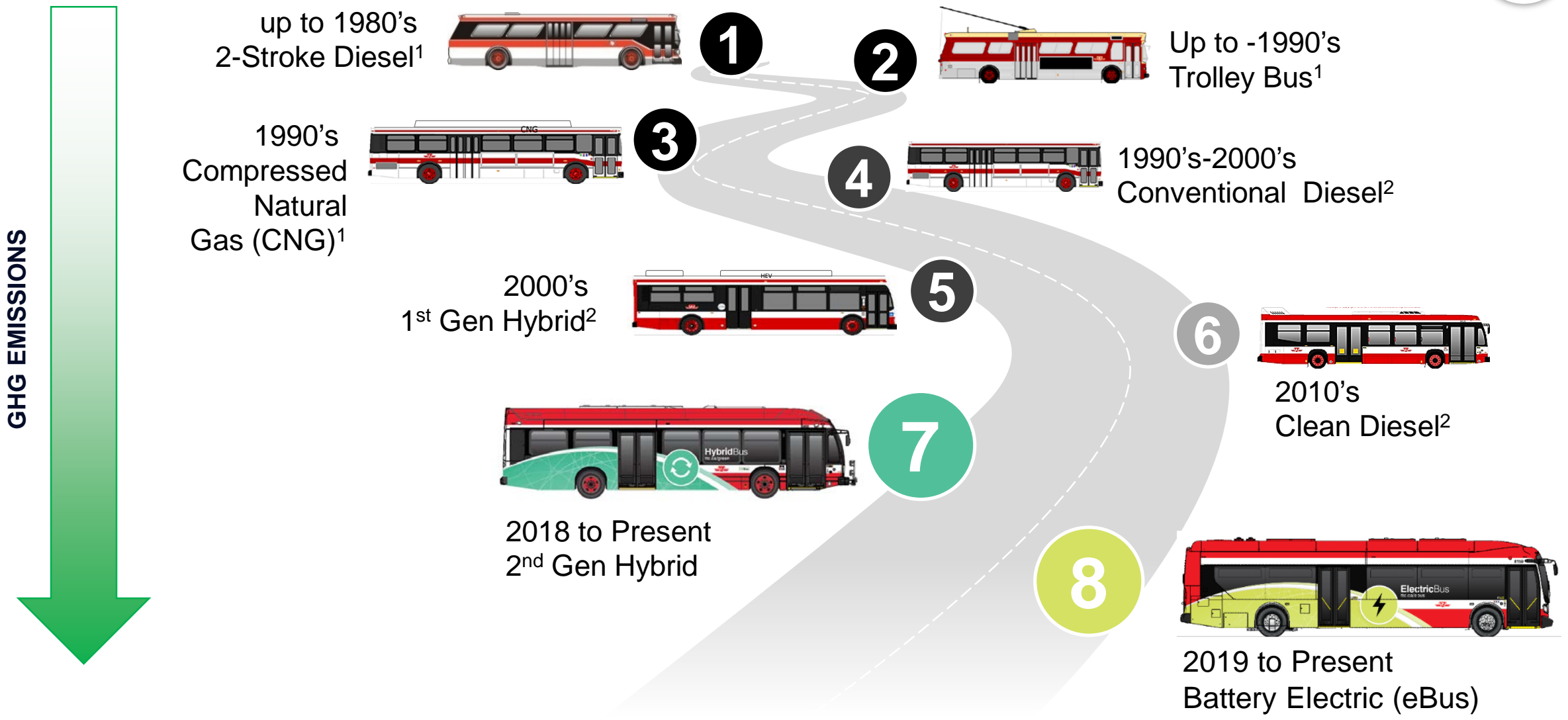
Snapshot of TTC's GHG Emissions in 2019



Fleet Tailpipe GHG Emissions



TTC's Path to a Zero Emissions Bus Fleet



5 | ¹Decommissioned
²Decommissioning in progress



Hybrid-Electric Bus – Capital Program Update

Hybrid-Electric Bus Procurement Plan														
	2018-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2040	Total
Funded	255	226	110											591
Unfunded														0

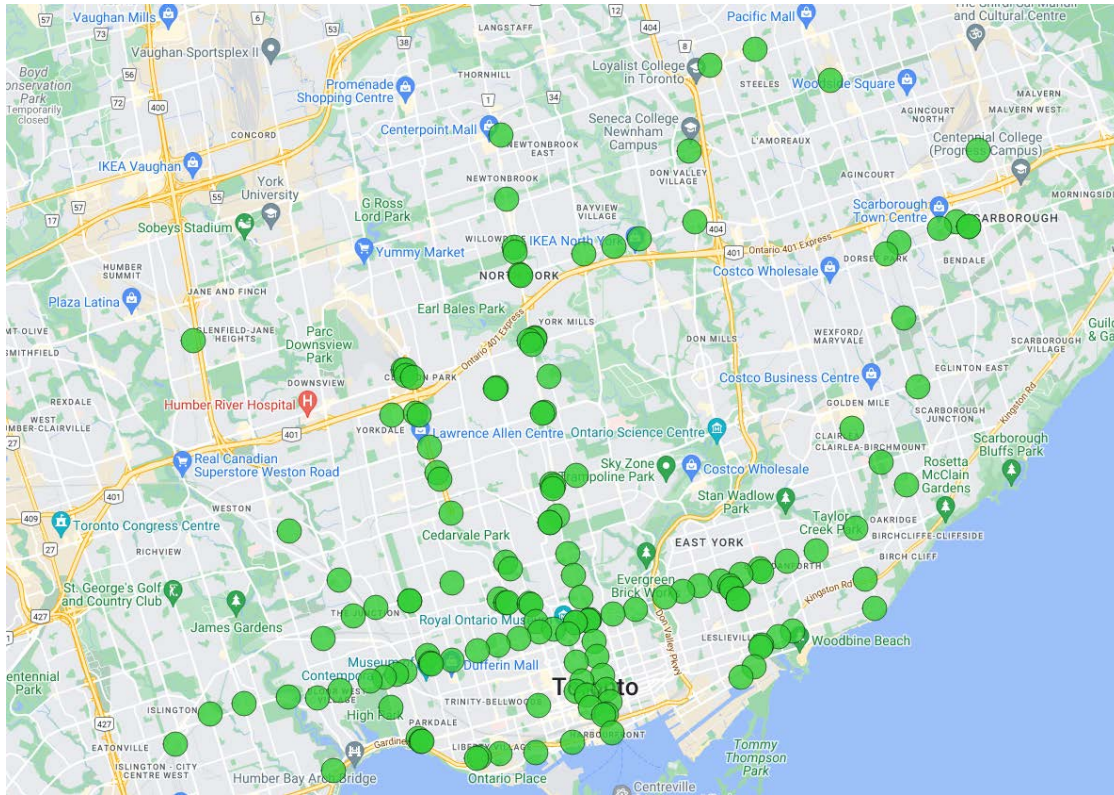
2018 – Introduced 255 of the latest Hybrid-Electric buses

2022 – Awarded last Hybrid-Electric contract for 336 buses

As of December 6, 2023:
214 buses delivered and 142 in service

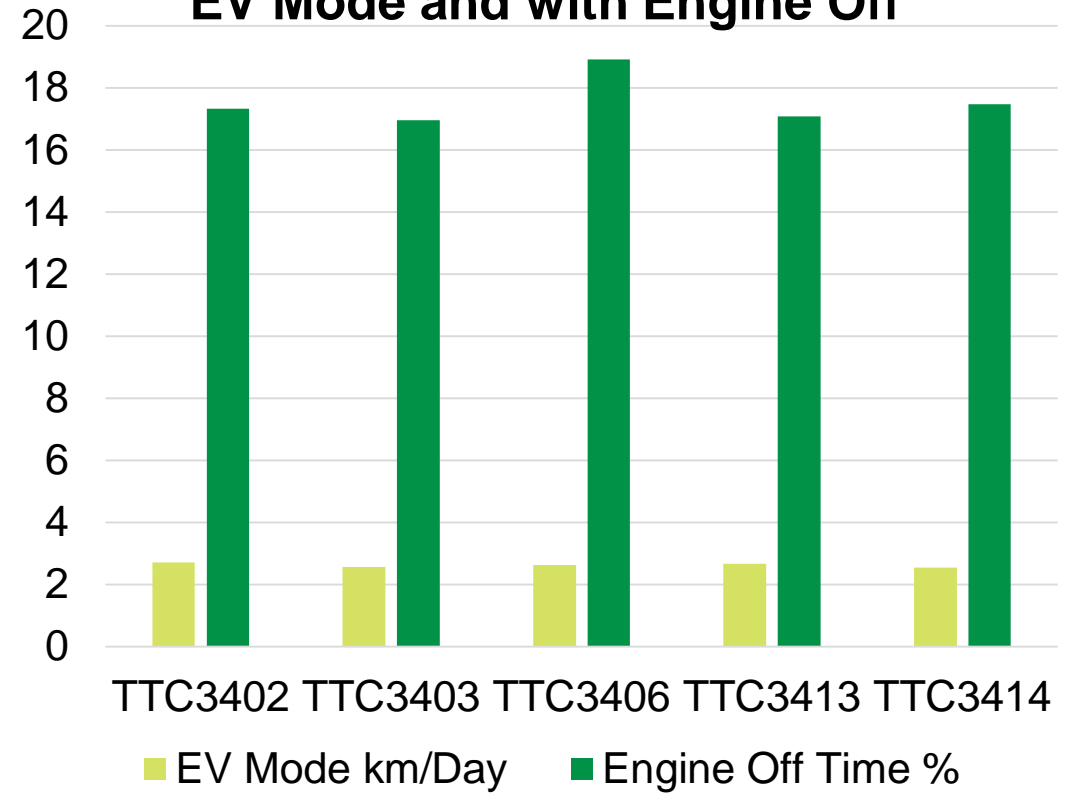


Hybrid-Electric Bus – Green Bus Transit Zones



Map of Green Bus Transit Zones for New Hybrid Buses

TTC Hybrid-Electric Buses Operating in EV Mode and with Engine Off



Battery-Electric Bus – Capital Program Update

eBus Procurement Plan

	2018-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2040	Total
Funded*	60		50	290										400
Unfunded				60	170	175	175	165	190	190	190	195	1,365	2,875

2019 - Introduced 60 eBuses

2023 - Awarded first bulk contracts for 340 eBuses

Q2 2024 - First new eBus delivery expected

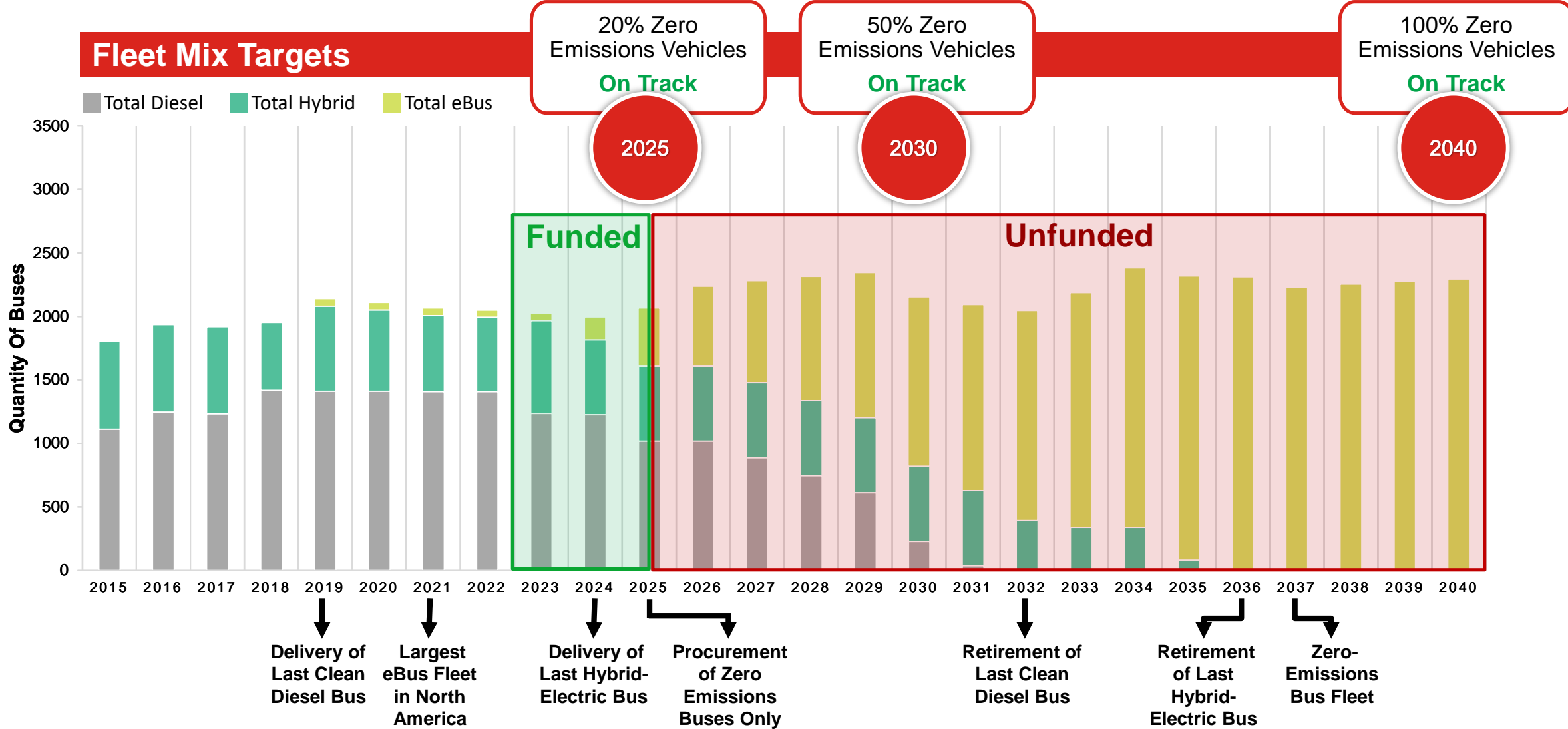
CIP Unfunded: \$4,019M

*Infrastructure Canada's ZETF matches City of Toronto's City Building Fund for 340 of 400 eBuses required to 2025





Projected Fleet Mix & Target Achievement



Bus Charging Systems – Capital Program Update

eBus Charging Systems Delivery Plan														
	2017-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034-2040	Total
Funded	60	20*	84*	154*										318
Unfunded				225	106	170	181	114	101	216	112	100	185	1510

2019 - Introduced 60 chargers with Toronto Hydro

2022 - Entered Agreement with PowerON Energy Solutions, a subsidiary of OPG

2023 - PowerON deployed 20 additional chargers

CIP Unfunded: \$943M

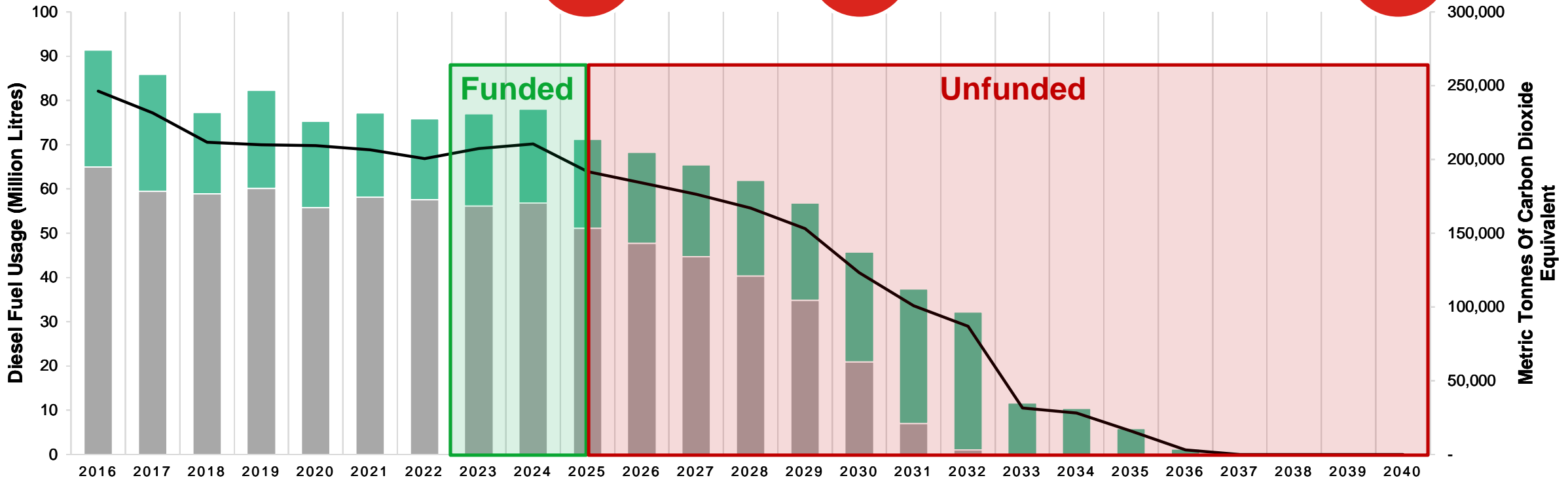
*Infrastructure Canada's ZETF matches City of Toronto's City Building Fund for 340 of 400 eBuses required to 2025



Projected Fleet Tailpipe Emissions & Target Achievement



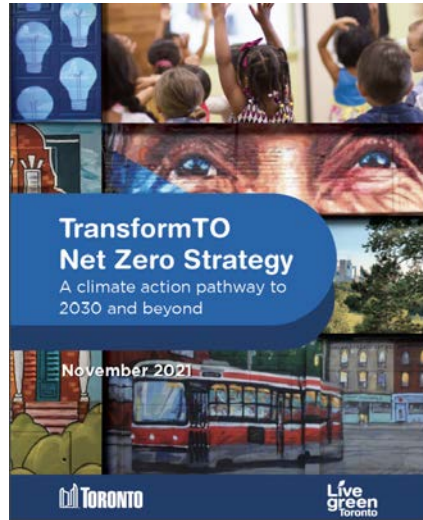
■ Total Diesel ■ Total Hybrid
— Total Bus Tailpipe GHG Emissions



TransformTO Surface Frequency Enhancement

Council Directive to Facilitate a Modal Shift To Reduce Community Wide Emissions

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Modeling for TransformTO identified the following suite of transit related actions as a pathway to support achieving the City's transportation emission reduction goals:

TTC to increase service frequency on all transit routes over 2016 levels by:

- **70% for bus**
- **50% for streetcar**
- **Subway off-peak service increased to every 3 mins**

TTC/City to convert one lane of traffic to exclusive bus lanes on all arterials

City to Implement: No transit fares, Tolls of \$0.66/km on all arterial roads, 50% of professional/management/technical and general office/clerical workers in the GTHA work from home on any given day, Shift 75% of car and transit trips under 5km to bikes or ebikes by 2040, Shift 75% of trips under 2km to walking by 2040.

TransformTO Bus Frequency Enhancement

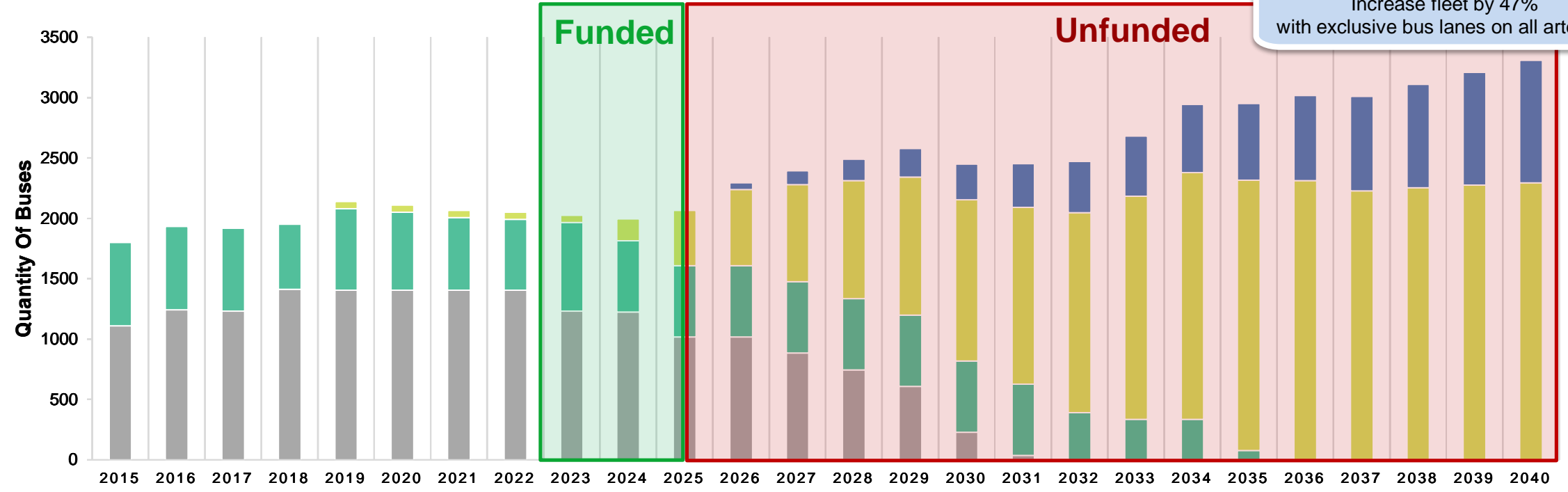
Increase service frequency by 70% compared to 2016

2040

Increase fleet by 47% with exclusive bus lanes on all arterials

TransformTO Fleet Impact

■ Total Diesel
 ■ Total Hybrid
 ■ Total eBus
 ■ TransformTO Buses



The Bus Design Innovation Program



Bem Case
Executive Director, Innovation and Sustainability
Toronto Transit Commission



Andrew Falotico
Health and Safety Director
Amalgamated Transit Union (ATU)



Program Scope Overview

This project explores safe & environmentally-friendly design features that will enhance operator and passenger experience and inform the design of future buses.

Objectives

- Explore the feasibility, desirability, and viability of new designs
- Reflect lessons learned into future bus procurements

Potential benefits

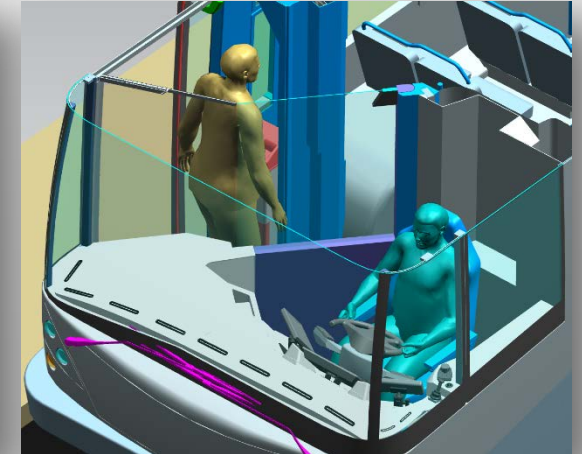
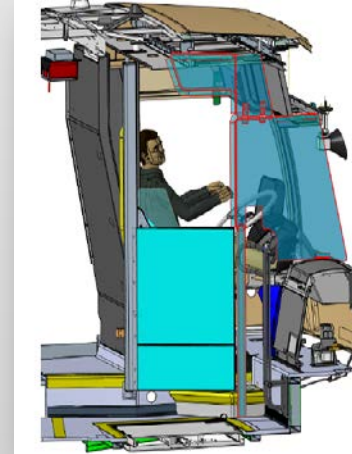
- Reduce assaults and illnesses
- Reduce collision risk
- Enhance customer experience
- Optimize ergonomics
- Reduce vehicle emissions
- Increase accessibility & sustainability

Current Status

- Completed Project Charter
- Developing Scope and Schedules: finalizing design features based on technical feasibility, user desirability and financial viability. Establishing a timeline and roadmap for pilot testing

Current Areas of Exploration

Full operator barrier: Reduces assault risk, enhances protection



Active/Semi Active Seat: Reduced injury risk for operators

Camera Mirror System: Increased operator visibility, reduced collision risk



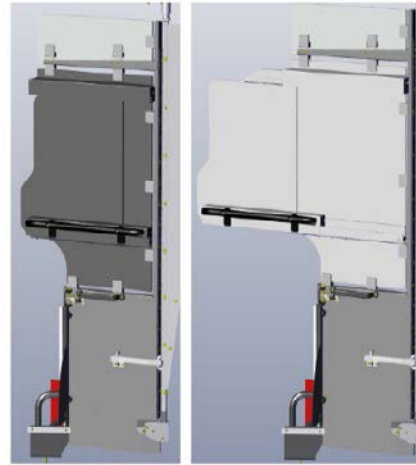
Evolution of TTC's Bus Operator Barrier



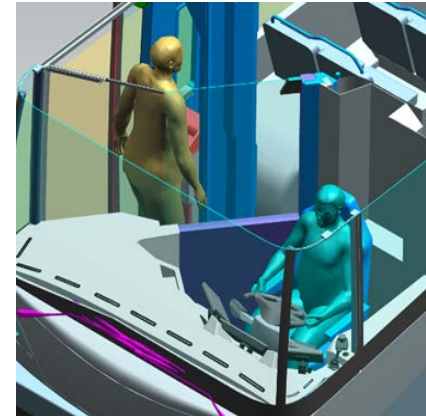
Original Barrier
2009



Full Height
Prototype
Q1 2021



Full Height
Improved
Sightlines
Prototype
Q4 2023



Full Height
Improved Pre-
Production
Prototype
Q1 2024

Extended Glass
Fleet Wide
Q1 2020



Extended
Sliding
Glass Latest
Hybrids
Q4 2023



Electric BUSES

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Thank you