THE CITY OF BARRIE – ALTERNATIVE FUEL STUDY

"Guiding the City's overall strategic direction of a more sustainable and environmentally greener City"

June 15th 2021

Presenter:

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Agenda

- Background
- Methodology
- Transit Fleet
  - Key Findings
  - Recommendations
- Corporate Fleet
  - Key Findings
  - Recommendations
- Q&A

PROJECT BACKGROUND

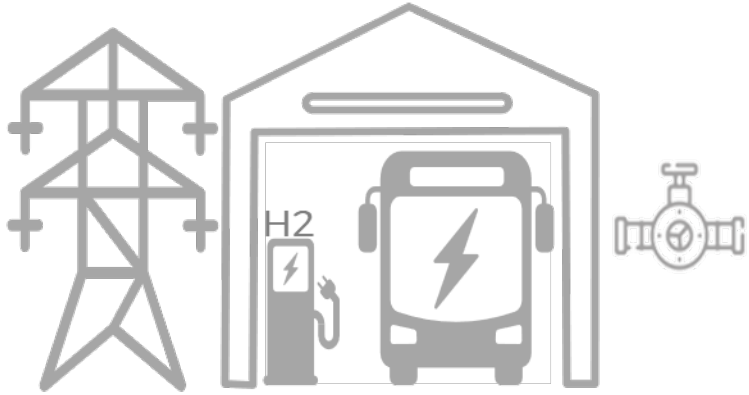
Study Objectives

- Investigate the feasibility of alternative fuel vehicles for Transit and Corporate Fleets

WHY?

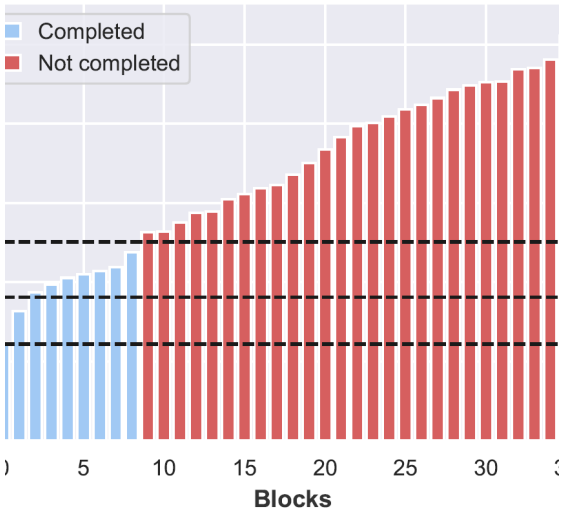
Currently developing a Net Zero Carbon Emissions Strategy.

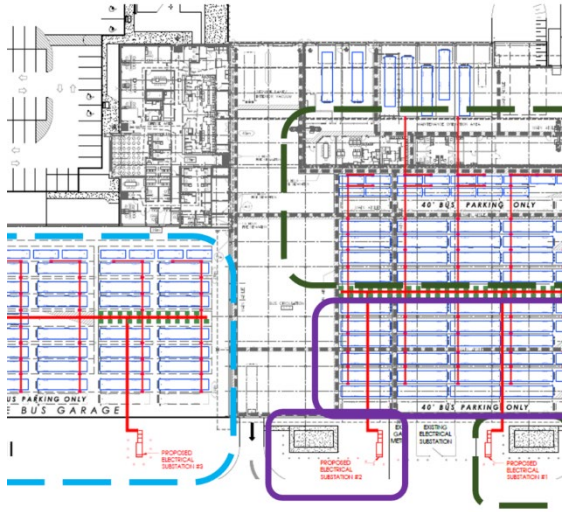
Sustainability is a strategic priority.

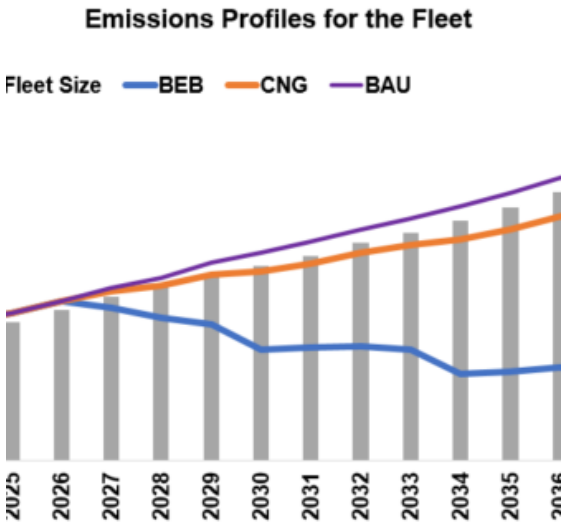


Battery ? CNG? H2?

Key Steps







01. Facility and Operations Review

02. Review and Select the Best-Fitted Technology by Assessing Different Scenarios

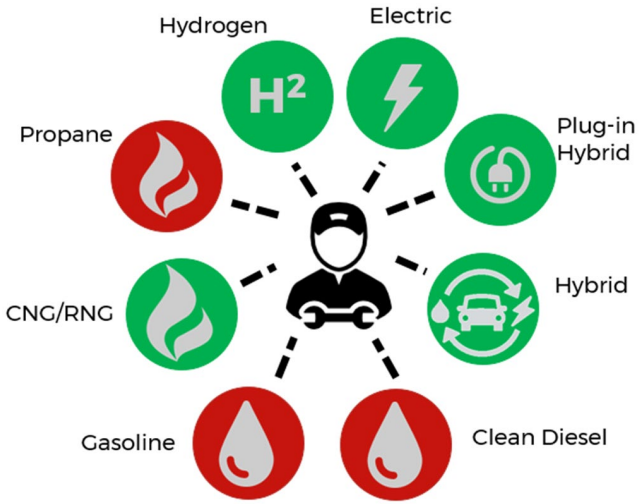
03. Supporting Infrastructure Analysis and Cost Benefit Analysis

04. Options Recommendations and Planning

TRANSIT FLEET STUDY

Technology Assessment

- Preliminary analysis shortlisted 2 technologies for further analysis
  - **Battery Electric**
  - **Compressed Natural Gas (CNG)**
  - Hydrogen discounted as not mature enough
  - Plug-in Hybrid/Hybrid may be interim measure



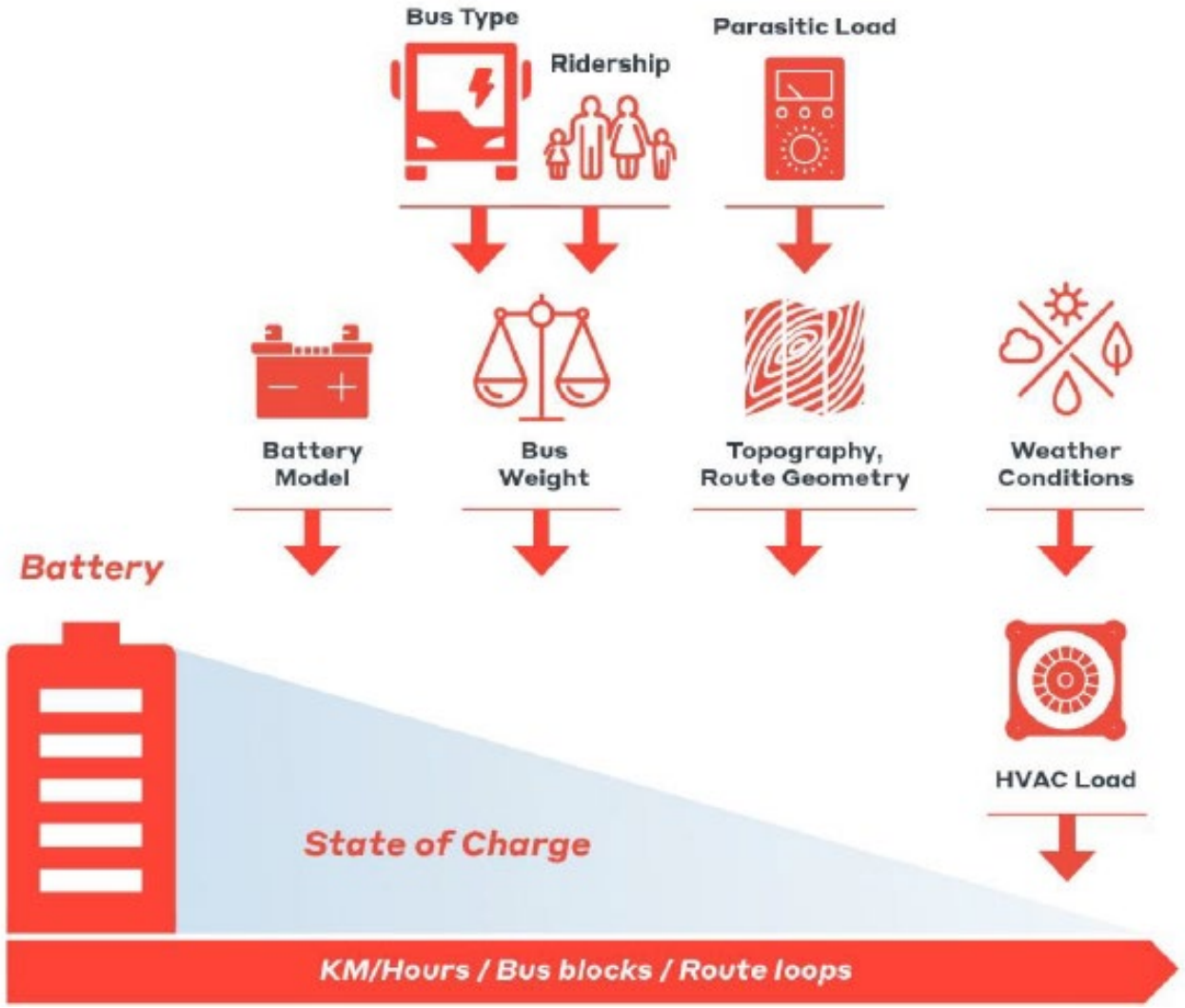
Testing eBus (60 eBuses since 2019):

- Four season testing
- Tracking energy consumption, regenerative braking, acceleration and braking performance

Evaluating vendors with different categories such as:

- Quality of contractual deliverables
- Adherence to eBus delivery schedule
- Mean Distance Between Failures

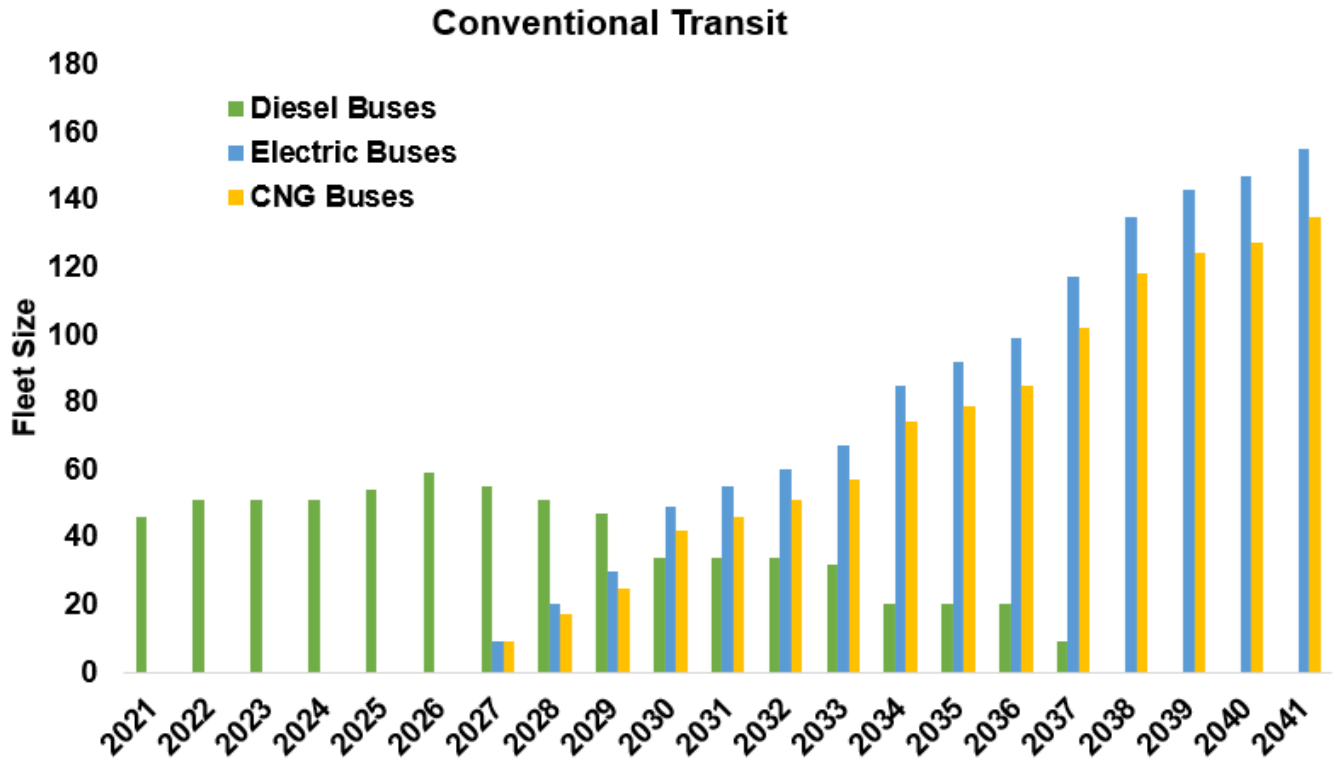
BOLT Inputs – Battery Electric



- Electrification of 24% of routes possible with current schedule
- Calculated the eBus-to-diesel bus replacement ratio of 1.3:1
- Assessed peak demand requirement
- Calculated the charger:bus ratio of 3:4.

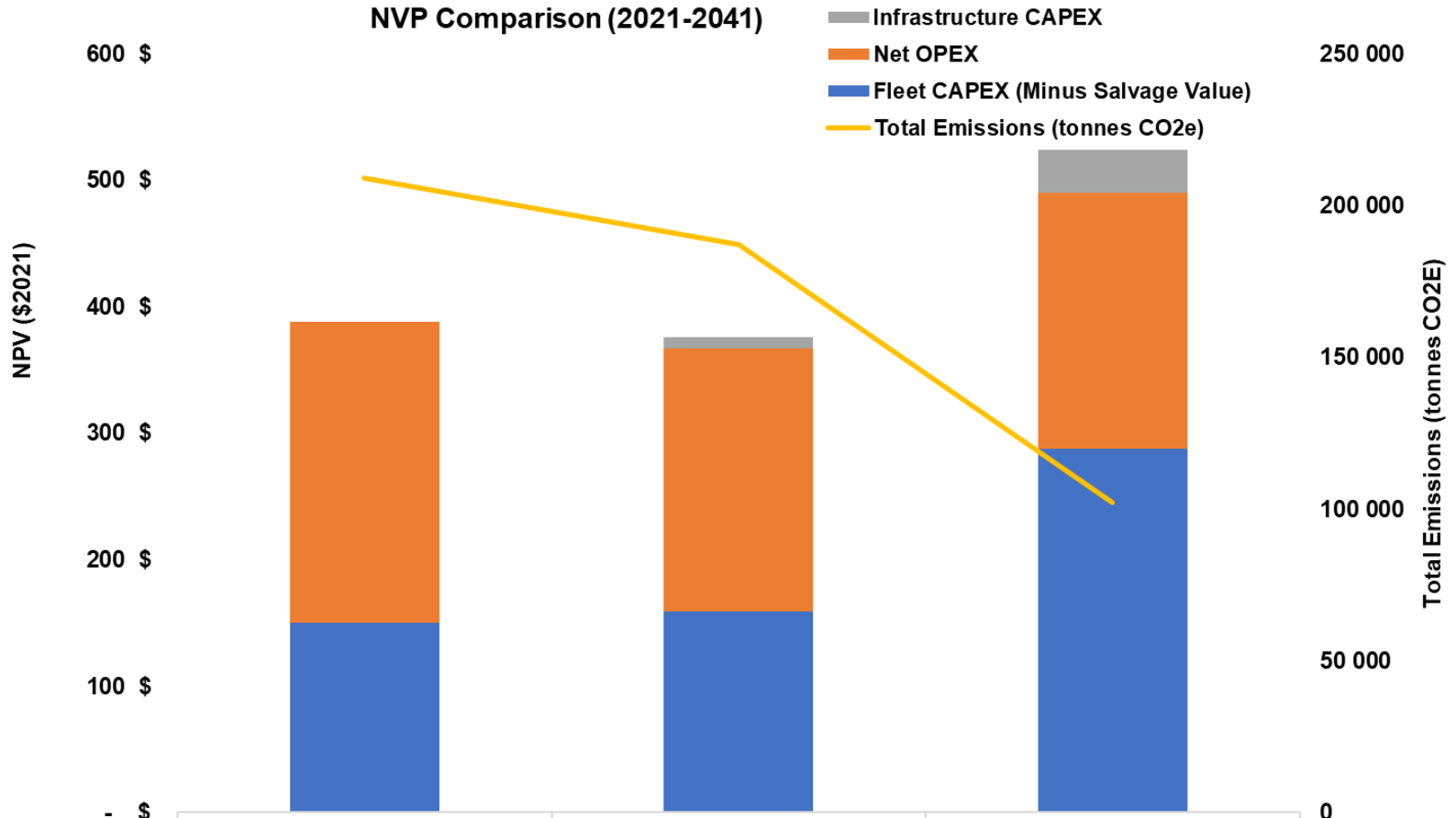
Phased Conversion Scenario

- Work required at facilities including facility expansion and a new facility
- Expected growth rate between 0 – 10% annually from 2021-2041
- First electric and CNG vehicles arrive in service by 2027. Full conversion by 2038.



Cost Analysis

- Fleet procurement and net OPEX are key cost drivers
- CNG - $12.7M (3.2%) savings
- Battery Electric - $135.9M (35%) increase
- EV scenario reduces emission by 80% in 2041, compared to 16% for CNG



	BAU	Scenario 1 CNG Conversion (2021-2041)	Scenario 2 EV Conversion (2021-2041)
Infrastructure CAPEX	- $	9 $	34 $
Net OPEX	238 $	208 $	202 $
Fleet CAPEX (Minus Salvage Value)	150 $	159 $	288 $
Total Emissions (tonnes CO2e)	209 124	187 309	102 263

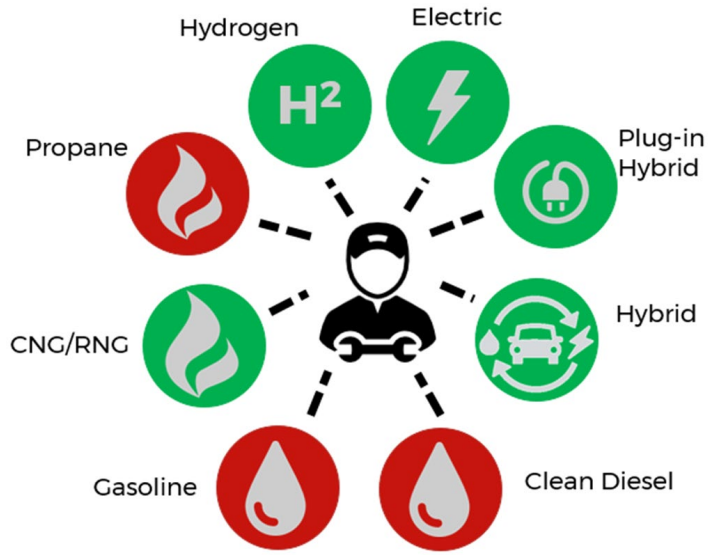
Conclusions and Next Steps

- Battery Electric and CNG are both feasible with a trade off between cost and carbon emissions
- Battery Electric is the recommended technology to align with the City's future Net Zero Carbon Emissions Strategy (currently under development - expected in 2021)
- Next Steps:
  - Dedicate staff to lead pilot and fleet transition
  - Identify funding
  - Engage with utility
  - Kick off Pilot Project opportunity
  - Complete operational analysis and fleet transition & deployment plan:
    - Resilience Strategy
    - Detailed costing analysis for facility expansions and infrastructure upgrades

CORPORATE FLEET STUDY

Technology Assessment

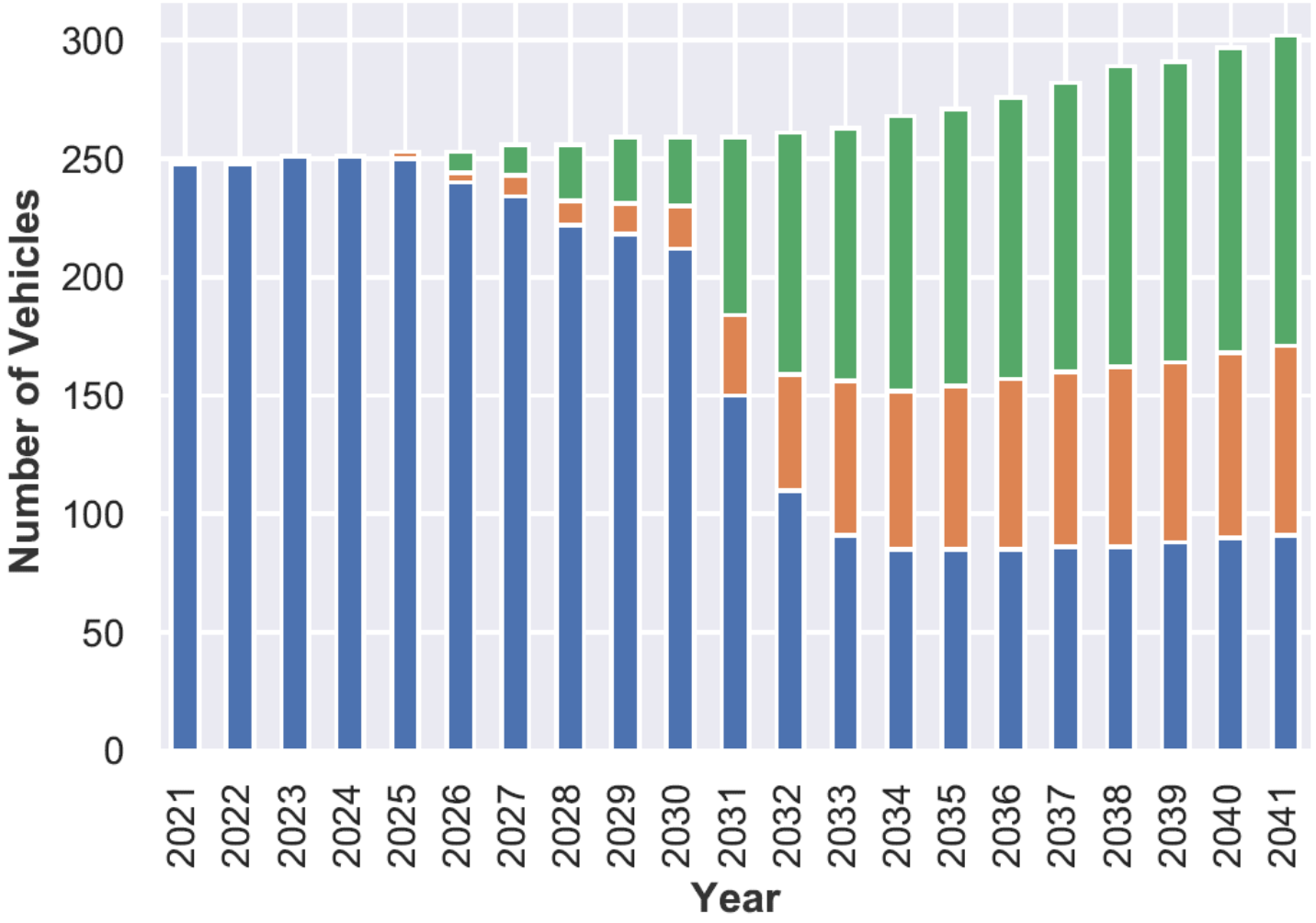
Vehicle Class	Vehicle Type	BAU	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Heavy Duty	Dump Truck	Diesel	Diesel	Diesel	Diesel	CNG
Heavy Duty	Fire Truck	Diesel	Diesel	Diesel	Diesel	Biodiesel
Heavy Duty	Pickup Truck	Diesel	Diesel	Diesel	Diesel	CNG
Heavy Duty	Plow	Diesel	Diesel	Diesel	Diesel	Biodiesel
Heavy Duty	Salter/Sander	Diesel	Diesel	Diesel	Diesel	Biodiesel
Large Medium Duty	Dump Truck	Diesel	Diesel	Diesel	Diesel	CNG
Large Medium Duty	Pickup Truck	Diesel	Diesel	Diesel	Diesel	CNG
Large Medium Duty	Vactor Truck	Diesel	Diesel	Diesel	Diesel	Biodiesel
Light Duty	Car	Gasoline	HEV	BEV	BEV	BEV
Light Duty	Mower	Gasoline	Gasoline	Gasoline	BEV	BEV
Light Duty	Pickup Truck	Gasoline	HEV	CNG	BEV	BEV
Light Duty	SUV	Gasoline	HEV	BEV	BEV	BEV
Light Duty	Tractor	Diesel	Diesel	Diesel	Diesel	BEV
Light Duty	Van	Gasoline	HEV	CNG	BEV	BEV
Medium Duty	Pickup Truck	Gasoline	Gasoline	CNG	CNG	CNG
Equipment	Ice Resurfacer	CNG	CNG	CNG	CNG	BEV



Electrification is feasible for some of the fleet, but not all.

For most heavy duty vehicles, there are no, or few alternative fuel options

Phased Conversion



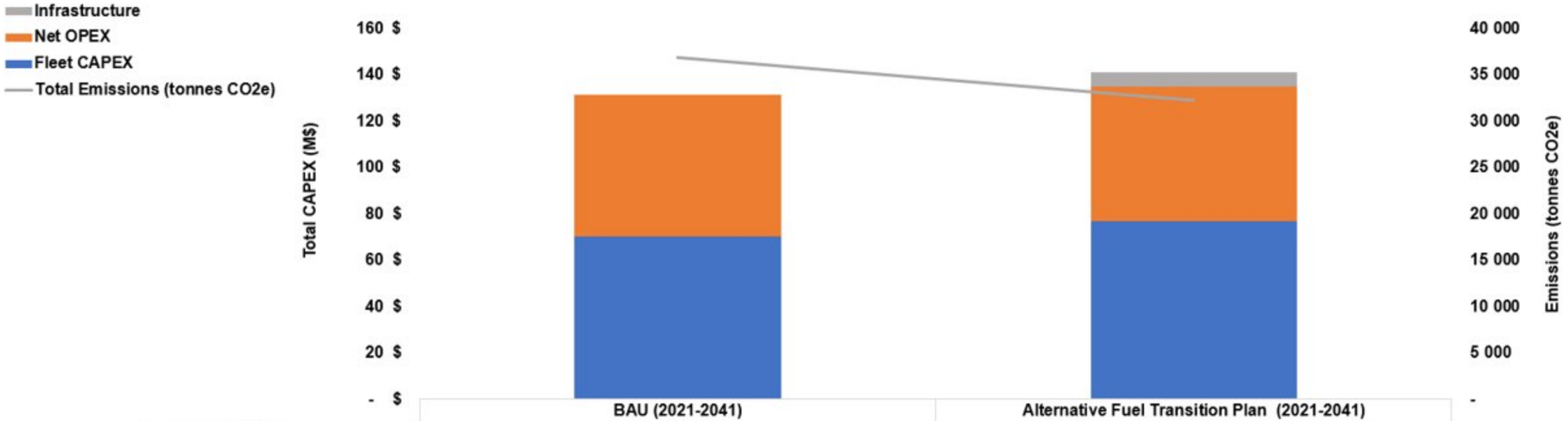
Information based on 2020's fleet

- Conversion requires:
  - Charging/fueling infrastructure
  - Staff training
  - Funding
  - Alignment with end of life replacement

- Based on this scenario by 2041, about half the fleet could be converted to electric

Cost Analysis

Net Cost (2021-2041) for the Four Facilities with Scenario 3



	BAU (2021-2041)	Alternative Fuel Transition Plan (2021-2041)
Infrastructure	0	5.8 $
Net OPEX	61 $	58 $
Fleet CAPEX	70 $	77 $
Total Emissions (tonnes CO2e)	36 925	32 266

- Largest CAPEX investment is for the Operation Centre, but facility upgrades are only 8% of the total CAPEX
- 13% emissions saved over the next 20 years, or 25% reduction in 2041

Conclusions and Next Steps

Conversion of the City's corporate fleet

- Is technically feasible for most light/medium duty
- Would require increased investment, but is not cost prohibitive
- Provides an opportunity to balance emission reductions
- Requires change management
- Aligns with Council's priorities and is the right thing to do

Next Steps:

- Dedicate staff to lead pilots and fleet transition
- Identify funding opportunities
- Engage with utility
- Kick off Pilot Project opportunity
- Complete fleet transition & deployment plan:
  - Resilience Strategy
  - Detailed costing analysis for facility expansions and infrastructure upgrades

Q&A

Thank you