

Welcome to this week's presentation & conversation hosted by the **Canadian Association for the Club of Rome**, a Club dedicated to intelligent debate & action on global issues.

The views and opinions expressed in this presentation are those of the speaker & do not necessarily reflect the views or positions of CACOR.

CACOR Live

OC Transpo and Electric Buses

Summary: Raymond was part of a team that worked with City Council in Ottawa to have OC Transpo study the possibility of transitioning to electric transit buses (e-buses). In this presentation we will explain why e-buses are the best choice for transit agencies, the road to getting OC Transpo to agree to try e-buses and the final plan to deploy 354 e-buses by the end of 2027.

Profile: Raymond Leury, who has always been interested in science & environmental issues. Ten years ago, he bought his first EV, which led him to become President of the Electric Vehicle Council of Ottawa (EVCO). Now retired from a long IT career, Raymond spends much of his time researching and advocating for EVs of all sizes from light duty to medium and heavy-duty vehicles. This led to a successful campaign to get OC Transpo to transition to e-buses.

The presentation will be followed by a conversation, questions, & observations from the participants.

CACOR acknowledges that we all benefit from sharing the traditional territories of local Indigenous peoples (First Nations, Métis, & Inuit in Canada) and their descendants.



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OC Transpo Electric Buses 2026/01/21

Electric Vehicle Council of Ottawa

www.evco.ca

Raymond Leury, President



EVCO - Electric Vehicle Council of Ottawa

- ▶ Founded in 1982 - www.evco.ca
- ▶ 100% volunteer, non-profit
- ▶ No affiliation or funding from industry
- ▶ Subject Matter Experts on EV's
- ▶ Passenger vehicles, Buses, light, medium, heavy-duty trucks
- ▶ Promote the electrification of the transportation system (mainly to reduce GHG emissions)



OC Transpo - Why e-buses?

- ▶ Over 50% of Ottawa's corporate GHGs
 - ▶ 125,000 tons of CO₂/year
 - ▶ Two tanker trucks per day
- ▶ Transit good, but 4l/passenger/100km
- ▶ Started campaign in 2019
 - ▶ LRT was priority for OC Transpo
- ▶ 1,000 buses - now 763
- ▶ OC Transpo was a laggard
 - ▶ Fear that electrification would take a back seat



Alternative Options

- ▶ CNG (Compressed Natural Gas)
 - ▶ GHGs similar to diesel
 - ▶ Enbridge
- ▶ Hydrogen
 - ▶ More expensive at purchase
 - ▶ Double operational cost of diesel
 - ▶ Heavier vehicles!
- ▶ Trolley bus
 - ▶ Unsightly wires and expensive
 - ▶ Only one supplier
 - ▶ Lack of flexibility
- ▶ E-buses only viable option



(Battery) Electric Buses

- ▶ Zero emissions, quiet
- ▶ Maintenance - \$20,000 less/bus/year
 - ▶ Conservative estimate
- ▶ “Fuel” costs - >\$30,000 less/bus/year
 - ▶ \$.10/kWh, \$.90/l for diesel
 - ▶ TTC ~ \$60k/bus/year
 - ▶ \$50,000 closer to reality
- ▶ Total:
 - ▶ \$50,000-70,000/bus/year savings
 - ▶ \$750,000 to \$1,050,000 over bus 15-year lifetime

A blurred image of a high-speed train moving from left to right, with a person visible inside. The background is a dark blue-grey gradient with green geometric shapes on the right side.

Summary

- ▶ Lower cost
- ▶ Better for health
- ▶ Zero GHGs, quiet
- ▶ Win-win for the environment and taxpayers
 - ▶ No brainer, right?

OC Transpo Culture

- ▶ Risk Averse, slow to change
 - ▶ Normal
 - ▶ Have been doing the same thing for decades
- ▶ Burned by the LRT issues
- ▶ Burned by issues with Hybrid buses
 - ▶ Used them on long runs instead of stop and go
- ▶ Not Invented Here syndrome - “we are special”
 - ▶ Need to test everything
 - ▶ Don’t seek outside advice
- ▶ FUD
 - ▶ OC Transpo service area smaller than Edmonton’s
 - ▶ Avg bus speed 10-20km/hr
 - ▶ Avg run ~250km
 - ▶ Ability to charge during the day
 - ▶ Software supports e-buses for planning routes



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E-BUS RESEARCH AND BACKGROUND

VOLUNTEER TOOLS

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Electric Vehicle Council of Ottawa



Healthy Transportation
Coalition

Fighting Climate Change, Improving Transit, Saving Money

SUCCESS! A GREAT BEGINNING..

English

<http://www.plugincanada.ca/electric-bus-faq/>

www.plugincanada.ca

GHG Emission

-The base data for these calculations is from OC Transpo's **2016 stats** which are **no longer published**.

-**We use a round number of 125,000 tons of CO2e per year** throughout. Well to wheel factor takes into account the emissions of fuel production. The optimistic well to wheel factor assumes diesel from crude oil from Saudi or the North Sea, the realistic number is representative of Canadian sourced diesel, mostly from bitumen.

Total Fuel	42,460,000 l
GHG kg CO2e/l	2.66
Optimistic Well to Wheel Factor	1.1
GHG Emissions	124,238 tonnes
Realistic Well to Wheel Factor	1.46
Emissions	164,898 tonnes

OC Transpo Bus Efficiency - 2016 Numbers

- ▶ On average, it takes 4.1 l of diesel to move each passenger 100 km.
- ▶ For reference, a Toyota Prius uses 4.5 l of gasoline to drive 100 km.
- ▶ Diesel is significantly worse than gas (petrol)

Total Diesel	42,460,000 l
Passenger km	1,036,600,000 km
l/100 passenger km	4.10



Air Quality Impact

In 2016, OC Transpo buses exhausts emitted about:

- ▶ 93,000 kg of NO_x,
- ▶ 1,000 kg of PM_{2.5}
- ▶ 11,000 kg of PM₁₀
- ▶ NO_x causes smog and causes health problems including premature death.
- ▶ PM_{2.5} and PM₁₀ are particulate matter pollution mainly consisting of black carbon. PM_{2.5} is a leading cause of health problems in cities.
- ▶ e-Buses will eliminate all of the exhaust pollution. Buses also emit **PM₁₀ from brake wear**. e-Buses use regenerative braking and **rely far less on mechanical braking**, reducing pollution.
- ▶ NOTE: heating in colder temperatures is provided using “Wabasto” diesel powered auxiliary heaters, so some diesel remains

How did we make this happen?

- ▶ Mayor Watson had promised an e-bus pilot during election campaign
 - ▶ Novabus brought a demonstration bus to Ottawa
 - ▶ EVCO pushed for this
- ▶ Worked with Councillor McKenney
 - ▶ Query to OC Transpo on feasibility of using e-buses
 - ▶ Response: yes, they would be feasible in Ottawa
- ▶ Mayor Watson and John Manconi (head of Transportation in Ottawa)
 - ▶ \$6M to buy two **short range** e-buses and charging equipment
 - ▶ Range of ~30km - top-up charge at end of run
 - ▶ Sole-source to Novabus - designed to fail?



How did we make this happen?

- ▶ Councillor Brokington
 - ▶ We can't do sole source
 - ▶ Motion to compete the procurement and specify **long range** e-buses
- ▶ Procurement resulted in 4 e-buses and charging equipment
 - ▶ Average of \$1.5M total for each
 - ▶ Overhead (catenary) charging
- ▶ OC Transpo pilot
 - ▶ Needed to understand integration into operations
 - ▶ Instead focused on “do these work in Ottawa?”



Initial Proposal

- ▶ Federal funding available
 - ▶ Infrastructure bank - called to propose a deal
- ▶ 450 e-buses by end of 2027
 - ▶ 100 articulated 60 foot
 - ▶ 350 40 foot
- ▶ “60 foot” not available or not tested
 - ▶ Need to test 60 foot articulated e-buses - really?
 - ▶ Removed the 100 articulated e-buses - did not replace
 - ▶ New Flyer industries sells them
 - ▶ Novabus does not sell them
 - ▶ Volvo sells them in Europe
- ▶ In 2024, OC Transpo bought 50 60-foot articulated diesel buses

Analysis - 60 foot articulated

- ▶ Original plan went from 450 e-buses to 350 40 foot and zero 60 foot
 - ▶ “No options”
 - ▶ Untested
- ▶ 60 foot e-buses are just a longer 40 foot e-bus
 - ▶ Traction at middle wheels - much better than diesel in winter
 - ▶ No need for testing - they didn’t test the 40 foot Novabus e-buses
- ▶ Should not need many 60 footers after stage 2
 - ▶ Should not buy only 60 foot
- ▶ Delivery delays are the same for diesel or electric
 - ▶ Why not buy the 100 electric 60 foot e-buses that were planned in 2023?
 - ▶ Buses ordered today won’t be here until 2028
- ▶ What is the plan post 2027?
 - ▶ Need to avoid another multi-year delay in bus procurement
 - ▶ When are we electrifying the other garages?



Electric Mobility Canada Conference Nov 2023



Milan Sept 2019



Final Procurement

- ▶ “\$1B investment”...was announced by Mayor Watson
- ▶ 354 e-buses by end of 2027
 - ▶ Average of \$2-3M/bus
- ▶ Charging infrastructure
 - ▶ Sole-sourced to Envari
- ▶ Retrofit existing St Laurent garage
 - ▶ All e-buses in one location...
 - ▶ Build adjoining garage
- ▶ Backup power using natural gas
 - ▶ Not needed - cost/benefit not there

History and milestones

Converting our entire bus fleet to ZEBs is no easy feat. Here is a timeline of the key steps in this process

2020

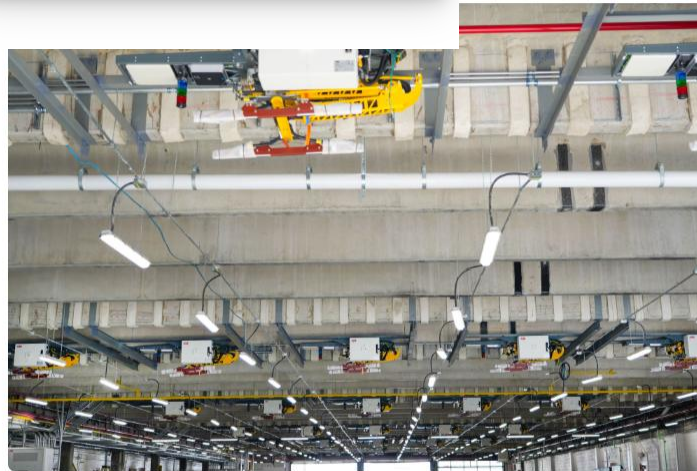
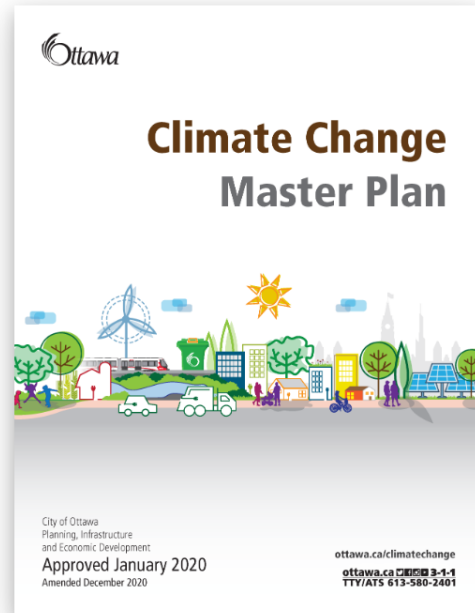
[Climate Change Master Plan](#)  approved

2021

ZEB pilot kickoff

2022

First four ZEBs enter service



Overhead charging infrastructure at St-Laurent South Garage

JUN 2023

[Structural retrofit](#) of St-Laurent South Garage starts

AUG 2024

[Electrical infrastructure](#) upgrades of St-Laurent South Garage begin

DEC 2024 – Q2 2025

22 [New Flyer Industries XE40](#) ZEBs delivered



🌿 **100% électrique** 🌿

Q4 2025 – 2026

- + 29 [New Flyer Industries XE40](#) ZEBs delivered
- + 51 additional Nova Bus LFSe+ buses delivered

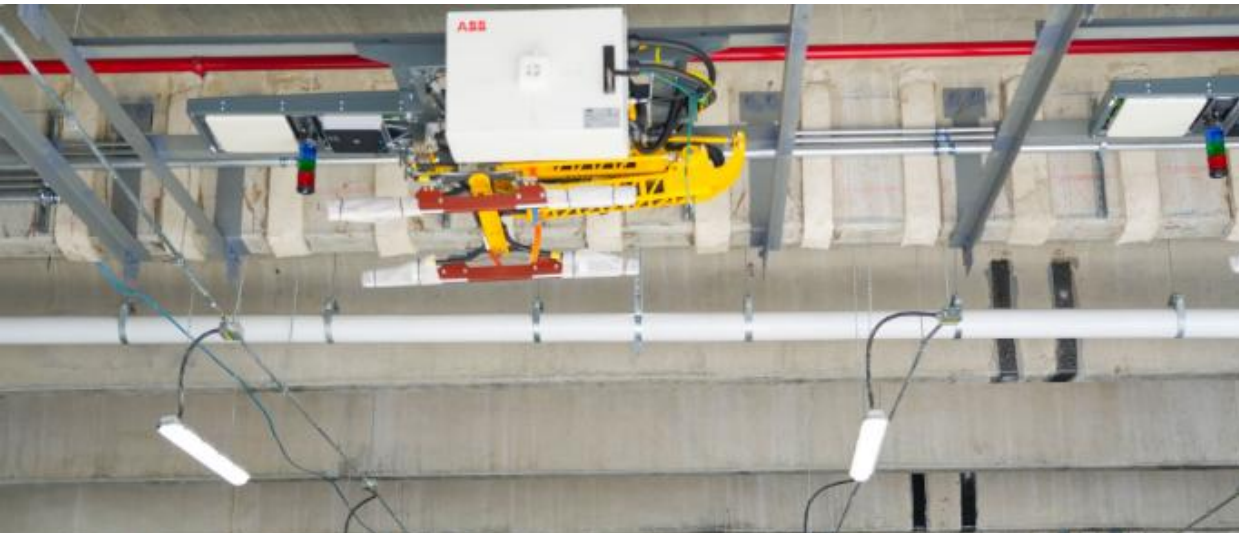
2026

- + 124 ZEBs delivered
- Work at St-Laurent North Garage complete

2027

- + 120 ZEBs delivered
- New parking garage opens at 1500 St-Laurent

Bus Fleet Onboarding Schedule



Questions?

