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**Subject:** Transit Bus Fleet Zero Emission Transition Plan

**Department:** Infrastructure Services

**Division:** Transportation and Development

**Report #:** INS-2024-045

**Meeting Date:** 2024-09-23

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### **Recommendations**

**That report INS-2024-045, Transit Bus Fleet Zero Emission Transition Plan, be received.**

### **Overview**

The Town of Orangeville engaged a consultant with funding from Senior levels of government in the form of Zero Emission Transit Funding (ZETF) and Canda Initiative Bank's Zero (CIB) to review its current Transit fleet for the purpose of determining the feasibility of transitioning from diesel to electrically operated buses. Based on that study, it should be noted that the electric power technology currently available for smaller than full size transit buses (30-35 ft.) has not progressed to the point that makes it economically and operationally feasible for Orangeville to transition to this mode of operation at this time.

### **Background and Analysis**

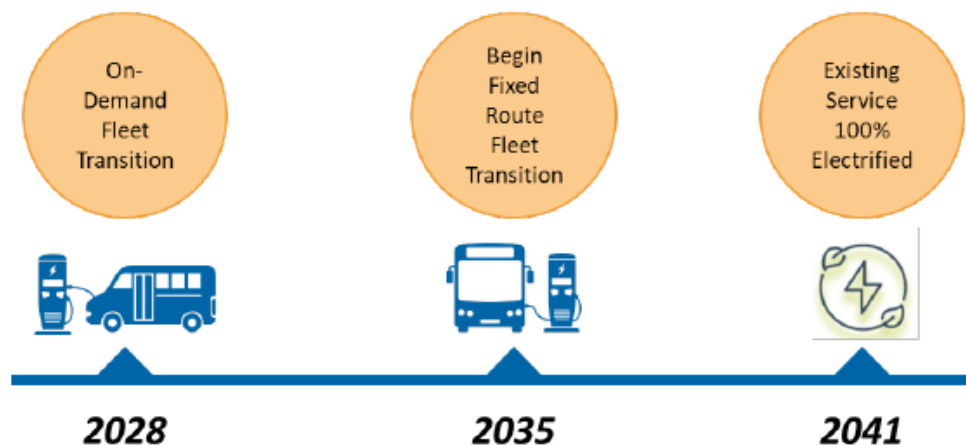
The Town of Orangeville is taking action to adapt its assets, operations, and services in response to the growing impacts of Climate Change. To support this, the Corporate Climate Change Adaptation Plan was created and a community greenhouse gas (GHG) reduction target of net zero by 2050 was adopted. To support the elimination of GHG emissions, the Town of Orangeville is exploring the feasibility of an electric transit fleet.

As part of Metrolinx's Joint Transit Procurement Initiative (TPI), the Town of Orangeville is exploring the feasibility of battery electric vehicles in the transit fleet. This exploration aimed to create a transition plan for the transit bus fleet, outlining a roadmap to shift from conventional gasoline and diesel buses to zero emissions.

This Fleet Transition Plan identifies the feasible scenarios, associated capital and operating costs, service impacts, and the preferred transition pathway. A transition of the transit fleet to zero emission vehicles will assist the Town of Orangeville in achieving net zero emissions by 2050.

### Transit Fleet Zero Emission Transition Plan

Transitioning to a zero-emission fleet involves more than buying vehicles and a fueling system; the transition introduces new technology and processes into day-to-day operations. Successful fleet transition plans take a holistic approach to consider operational requirements, market conditions, available power, infrastructure demands, and costs. This Zero Emission Fleet Transition Plan encompasses all of these elements and is intended to be a roadmap for the Town of Orangeville to convert their transit fleet to zero emission by 2041.



The plan involves the transition to three on-demand battery electric buses (BEBs) and eight fixed-route BEBs at full buildout. The energy modelling found that the current 30 ft. bus technology available in the market for fixed route service is not capable of meeting the Town's operational needs without significant changes to the bus routes or schedules. Thus, the recommendation is to first prioritize the electrification of the Town's on-demand fleet, starting in 2028, when the existing on-demand vehicle lease expires. By 2035, transition of fixed route service vehicles from diesel to BEB will begin. This delay will allow time for technology to advance for 30 ft. BEBs and for the Town to adjust its routes and schedules accordingly. Following this roadmap, the Town's service is anticipated to be 100% electrified by 2041.

As another option, the Town may explore the possibility of service changes which utilize 40 ft. BEBs as a pilot project which may be implemented prior to 2028. This is possible since 40 ft. BEB's are a more advanced in the current market with a wider array of vehicle options, larger batteries, and range capabilities which approximately double the range of existing 30 ft. BEBs; although it is understood that the 40 ft. bus model may be

difficult to utilize on some of Orangeville roads while maintaining appropriate or industry wide transit coverage requirements.

### Life Cycle Cost Analysis

The lifecycle cost analysis includes an analysis of capital, O&M, and fuel/electricity costs for each scenario during the study years 2023 to 2050. Although summarized in detail by the consultant, financially, two long term transition scenarios are considered, incurring a cost of \$40.2 million for the BEB leased option and \$39.6 million for the BEB buyout, while the baseline of not transitioning is \$34.3 million. See attached table for side-by-side comparison.

**Table 1 Total lifecycle cost of Diesel and Battery Electric Bus Scenarios**

Net Present Value, 2023\$	Baseline	BEB – Lease	BEB - Buyout
<b>Lifecycle Capital Costs</b>	<b>\$3.8</b>	<b>\$10.6</b>	<b>\$10.0</b>
Buses	\$2.1	\$6.8	\$6.8
On-Demand Vehicles	\$1.7	\$2.8	\$2.2
Related Infrastructure	-	\$1.0	\$1.0
<b>Lifecycle O&amp;M</b>	<b>\$30.6</b>	<b>\$29.6</b>	<b>\$29.6</b>
<b>Total Conventional Fleet O&amp;M</b>	<b>\$29.1</b>	<b>\$28.4</b>	<b>\$28.4</b>
Operations & Maintenance	\$24.8	\$25.0	\$25.0
Propulsion	\$4.3	\$3.4	\$3.4
<b>Total On-Demand Fleet O&amp;M</b>	<b>\$1.5</b>	<b>\$1.1</b>	<b>\$1.1</b>
Operations & Maintenance	\$0.9	\$0.8	\$0.8
Propulsion	\$0.5	\$0.3	\$0.3
Related Infrastructure O&M	-	\$0.1	\$0.1
<b>Total</b>	<b>\$34.3</b>	<b>\$40.2</b>	<b>\$39.6</b>

There is a cost increase over the Baseline Scenario for the BEB Scenario. While overall costs are higher, the lifecycle operating and maintenance costs for the BEB Scenario are lower than the Baseline Scenario. If the Town can secure funding for the increased capital costs, the transition should result in a lower operating cost.

### Climate Impact Benefit

By transitioning to a zero-emission fleet, the Town can avoid approximately 6,800 tonnes of GHG emissions over the study period. The annual reduced emissions from the Baseline grow substantially over time as the diesel fleet is converted to BEBs. After the full transition is complete, the annual GHG emissions are 90% less under the BEB Scenario than under the Baseline.

## Corporate Implications

This report will not generate direct implications. If future actions related to this report will have a corporate impact, a report will be presented to Council for approval as may be required. Capital and Operating budgets would then be adjusted accordingly to reflect Council's direction.

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## Conclusion

The Town continues to closely follow and monitor the advancement of battery electric power for all modes of transit including hybrid combinations such as diesel/electric, straight electric and hydrogen technology. Any changes to the technologies noted and others that may evolve will be presented to Council so that informed decisions may be made. Future budgets will be reflective of Council's direction and Staff recommendations.

At this point, Battery Electric Bus technology for 30 ft low floor fully accessible buses have not advanced to the point that make it financially and operationally feasible for Orangeville Transit to proceed with a fully electric fleet.

Transportation & Development Staff continue to work with the province and Metrolinx to explore alternative fuel options that are friendly to the environment, provide efficient transit operations, and ensure that the needs of the community are met.

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## Strategic Alignment

### Strategic Plan

Strategic Goal: Future-Readiness

Objective: Capacity

### Sustainable Neighbourhood Action Plan

Theme: Transportation System

Strategy: Improving access to transit options, reducing single occupancy vehicle use

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**Notice Provisions**

Not Applicable

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Respectfully submitted,

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**Attachment(s):** N/A