



Office of the  
Auditor General  
City of Ottawa

## Audit of Zero-Emission Buses

### Sprint 3 – Funding Mechanisms and Agreements



February 2023

## Acknowledgement

The team responsible for this audit was comprised of Margaret Sue from the Office of the Auditor General and MNP LLP (external consultant), under the supervision of Joanne Gorenstein, Deputy Auditor General and my direction. My colleagues and I would like to thank those individuals who contributed to this project.

Respectfully,



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Auditor General

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## Introduction

The audit of the Zero-Emission Buses project was approved to be included in the Office of the Auditor General's (OAG) 2021 Interim Audit Workplan, via an amendment memo, as approved by City Council (Council) on July 7, 2021.

## Background and context

As part of the Climate Change Master Plan approved by Council in January 2020 (revised in December 2020 - [ACS2020-PIE-EDP-0043](#)) to reduce greenhouse gas (GHG) emissions by 100% by 2050, the City of Ottawa (the City) has undertaken a zero-emission bus (ZEB) transformation to convert its OC Transpo fleet to battery-electric buses.

On June 23, 2021, Council approved a plan for OC Transpo to commence negotiations for a loan agreement with the Canada Infrastructure Bank (CIB) and to seek additional funding from Infrastructure Canada (INFC) to gradually convert the bus fleet to battery-electric buses. The aim would be to phase in a total of 450 ZEBs by 2027 and to have a fully electric bus fleet by 2036. To date, the City has acquired 4 ZEBs (pilot buses) which are currently in-service, which leaves 446 ZEBs to be procured in future years.

There are two primary sources of funding discussed within this audit report. The first source is a credit facility ("loan agreement") from the CIB, and the second is a grant from the INFC. The CIB and INFC are coordinating their funding programs for ZEBs to support public transit and school bus operators plans for fleet electrification. Funds from the CIB loan can only be used to cover ZEB acquisition costs, while funds from the INFC grant can be used to cover ZEB acquisition costs, infrastructure costs, and transition costs.

With the planned funding, OC Transpo will first purchase 26 40-foot battery-electric buses and associated charging infrastructure as part of the City's 2022 capital budget, with a planned in-service date of December 2023. These buses are to replace 26 40-foot diesel buses. There are additional planned procurements in later years as part of the fleet acquisition plan.

### Summary of the INFC Grant

INFC has established a Zero Emission Transit Fund to accelerate the adoption of green transit solutions in Canada by covering costs associated with ZEB implementation programs. The anticipated INFC funding will be in the form of a \$350M grant to the City and can be used to cover the purchase price of ZEBs, the infrastructure required to implement the ZEBs, and the transition costs associated with the implementation.

As of August 31, 2022, the City had not yet secured commitment from the INFC for the grant due to delays in the INFC approval process. The formal application has been submitted and multiple rounds of questions and answers have been conducted at the request of INFC as part of its review process.

### Summary of the CIB Loan Agreement

As of August 11, 2022, the City entered into a \$380M loan agreement with the CIB to fund the upfront costs of purchasing ZEBs. The \$380M loan will be used towards purchasing approximately 446 ZEBs. Funds will be provided by the CIB in multiple drawdowns during the loan period (2022 to 2027). The payback period of the loan is the useful life of the ZEBs (15 years), with a 1% interest rate per annum (well below current market rates).

The City's repayment of the loan is expected to be made from savings generated from the lower maintenance and energy costs of operating ZEBs, in comparison to traditional diesel buses.

The City, in coordination with CIB, will monitor the costs to maintain the ZEBs against the costs of maintaining the diesel buses, and will calculate the Actual Savings<sup>1</sup> which will be made as repayments towards the loan. If savings are not realized, the City will not need to repay that portion of the loan. While the City is only required to make repayments if operating the ZEBs results in savings, the City is still exposed to the following contractual and financial risks in the CIB agreement, of which management has considered possible mitigations:

- Electricity Prices – In the loan agreement, the City and the CIB have agreed on electricity price assumptions used in the determination of potential cost savings. The City takes responsibility for the risk of any increases in electricity prices outside of the agreed upon threshold.
- Specified Distance/Average Mileage – In the loan agreement, the City and the CIB have agreed on a per bus forecasted annual mileage. The City takes ownership in ensuring that all buses in operation will meet the specified mileage target. If the specified mileage is not met, the City may need to repay the Forecast Savings<sup>2</sup> on the difference in mileage or risk defaulting on the loan.

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<sup>1</sup> The actual savings realized by the City on each ZEB when compared to a diesel bus. Refer to *Appendix 1 – Definitions* for further details.

<sup>2</sup> The savings that the CIB and City forecast to be achieved based on the difference of operating costs between ZEB and diesel buses. Refer to *Appendix 1 – Definitions* for further details.



- Interest Accrued on Missed Savings<sup>3</sup> – In the loan agreement, the City and the CIB agree on a 1% interest rate on the \$380M loan, translating to approximately \$38M in interest costs on the loan assuming the entirety of the loan facility (\$380M) is used to purchase electric buses.
- If the City's ZEB fleet does not incur savings as expected, interest will also accrue on any missed savings (i.e., difference between forecasted savings and actual savings). Therefore, total interest accrued on the loan may exceed \$38M, but is paid back from realized and accrued savings.

At maturity, if the City does not have the savings to repay the outstanding balance of the loan, the CIB will not have recourse to collect on the remaining amount owed. However, if the City continues to operate the ZEBs beyond their 15-year expected useful life, the CIB will extend the maturity date of the loan, and the City will continue to accrue savings. The City will then have to continue making repayments to the CIB, including any interest accrued.

In addition, if the City disposes of a ZEB or repurposes part(s) of a bus, the net disposition proceeds<sup>4</sup> or value of the repurposed part must be paid to the CIB up to the amount owing.

### **Audit objective and scope**

The objective of this audit sprint was to assess the mechanisms developed by the City to support the application and negotiation of funding with each of CIB and INFC.

The scope focused on the activities undertaken by the City to secure the funding and lending agreements with INFC and CIB. This included the negotiation and contracting process for establishing the agreements and identifying whether any pertinent risks exist that require attention. The scope also included reviewing the draft loan agreement to ensure that the City evaluated the reasonableness of the estimates and assumptions contained within the agreement and positioned itself to meet the associated contractual obligations going forward.

It is worth noting that the scope of this audit did not include a legal review of any contracts or agreements. The City's Legal Services were involved in the contract review and negotiations for the CIB agreement. Please refer to **Appendix 2** for the audit criteria and details.

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<sup>3</sup> Missed Savings is the difference between Actual Savings and Forecast Savings. Refer to *Appendix 1 – Definitions* for further details.

<sup>4</sup> Net disposition proceeds are the net proceeds arising from disposal of ZEB. Refer to *Appendix 1 – Definitions* for further details.

The audit fieldwork was conducted between March and April 2022. Audit reporting continued from July to September 2022.

### **Conclusion**

The funding arrangements with the CIB and INFC represent an opportunity for the City to accelerate its ZEB program and cover capital and infrastructure costs to reduce the financial burden on the City. However, there are operational and financial risks that have been identified within this report in meeting the numerous reporting requirements of the CIB agreement, and with the scheduling and funding amount of the INFC grant.

The loan agreement the City signed with the CIB includes various calculations and reporting requirements. The City is working on the development of the procedures and reports that will be required before the first planned drawdown in 2023.

The processes and mechanisms have not been fully established by the City, including the definition of clear roles and responsibilities of the resources responsible for ongoing monitoring.

The timing of INFC funding and delays in meeting the program schedule may result in the next round of 26 ZEBs not achieving the expected in-service date (December 2023). This may create challenges in meeting OC Transpo service requirements as more diesel buses reach the end of their useful lives. The funding is a key dependency to purchasing and installing additional electrical infrastructure before the ZEBs are put into revenue service. While we understand that City Council's direction was for this project to leave the City in a net neutral position, the City may need to assess the financial implications of keeping the program on schedule.

Additionally, the anticipated amount of the INFC grant through INFC's current grant program – the Zero Emission Transit Fund - will cover fewer buses than was originally forecasted by the City. In the event that the INFC funding program is not extended and does not cover the entire fleet (i.e., 446 ZEBs) the City may need to evaluate the impact of reduced funding on the existing fleet and on fleet requirements in the upcoming years.

## Audit findings and recommendations

### 1. Readiness to Meet CIB Loan Requirements

The loan agreement with the CIB, which was finalized in mid-August, mandates various calculations, reporting, and disclosure requirements.

Since the project charter and integrated workplan were established before the agreement was finalized, they do not reflect the specific requirements and obligations contained in the CIB agreement (e.g., CIB financial reporting, calculations, electronic systems to monitor ZEB metrics, cost center mapping, etc.). As such, the integrated workplan needs to define the tasks, timelines, roles and responsibilities to meet these requirements.

While the City is not currently set-up to readily track the various variables required in the loan agreement, we were informed that the City plans on developing the processes and mechanisms to meet these requirements before the first drawdown in 2023.

The requirements defined in the CIB loan agreement include:

- Large number of repayment obligations, covenants of the borrower, and calculations for costs, savings, repayment, and fund amounts.
- Reporting and disclosure obligations, including calculations, variance reports, status reports, and remedial plans.
- Multiple interdependencies between the calculations and repayment amounts.
- Meeting quarterly and annual reporting requirements as per defined frequency (e.g., calculations, reports, and statements within 45 days of each financial quarter and within 120 days of year-end).
- Lifecycle Reserve Account<sup>5</sup> will need to be managed by the City.
- Implementing processes and mechanisms to track and manage internal cash disbursements between drawdowns.

While City staff have been involved with providing input to the financial model and the agreement, the City has also been using an external financial consultant to support the commercial negotiations and financial due diligence process. Considering the complexity of the agreement, assumptions to inform the repayment framework, and calculations involved, it is imperative that the City set up the mechanisms to complete

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<sup>5</sup> The Lifecycle Reserve Account is an account opened in the name of the City, where funds will be deposited based on a savings calculation and used towards eligible expenditure. Refer to *Appendix 1 – Definitions* for further details.



the knowledge transfer from the external consultant to City staff on the mechanics of the financial model supporting the agreement.

***RECOMMENDATION 1 –ENSURE THE CITY IS READY TO ADDRESS CIB AGREEMENT REQUIREMENTS***

The City Treasurer and the General Manager (GM) of Transit Services should ensure that the mechanisms, processes, and systems to address the CIB loan agreement's reporting/monitoring requirements are in place prior to the first drawdown. This includes tracking of costs related to maintenance, operating, and overhead components.

***MANAGEMENT RESPONSE 1***

Management agrees with this recommendation.

The mechanisms, processes and systems required to address the CIB loan agreement reporting/monitoring requirements will be put in place prior to the first draw down on the loan for the first tranche of buses, expected to be in Q4 2023.

Procedures will be documented with roles and responsibilities defined. The cost centres and GL accounts in SAP and labour rates/data in M5 will be structured to a sufficient level of detail to properly track the actual maintenance, operating and overhead costs for each tranche. The loan terms and repayment requirements, including deferred savings/payments, will be recorded and tracked in the SAP Treasury module using existing functionality and implemented by Q4 2023.

***RECOMMENDATION 2 –SET-UP SYSTEMS TO MONITOR ZEB METRICS***

The GM of Transit Services, in consultation with the City Treasurer, should expedite the set-up of electronic systems and cost centre mapping, to monitor ZEB metrics and calculations, such as energy consumption, maintenance costs in order to accurately track and report on cost savings as well as fulfill their contractual obligations.

***MANAGEMENT RESPONSE 2***

Management agrees with this recommendation.

SAP cost centre and GL account mapping are currently being updated and will be set up to capture maintenance costs at a sufficient level of detail to accurately track and report on cost savings. This mapping will be put in place prior to the first draw down on the loan for the first tranche of buses, expected to be in Q4 2023.

Processes and systems to capture energy consumption per vehicle will be implemented as part of the ZEB infrastructure implementation program and will be in place before the first tranche of buses become operational, expected to be in Q1 2024.

**RECOMMENDATION 3 –ENSURE ADEQUATE KNOWLEDGE TRANSFER TO CITY STAFF**

The City Treasurer, in consultation with the GM of Transit Services, should continue the knowledge transfer between the external consultant and designated City staff to ensure continuity and handoff in place on the terms, conditions, covenants, obligations, and calculations pertaining to the credit facility.

**MANAGEMENT RESPONSE 3**

Management agrees with this recommendation.

Procedures will be documented with roles and responsibilities clearly defined to ensure that each staff member responsible for key components of the agreement understand each element (e.g., terms, conditions, covenants, obligations, and calculations) relating to their area of responsibility for this agreement. The procedures will be finalized and communicated to key staff by Q4 2023.

## 2. Operational and Financial Risks due to Timing and Amount of Funding

As mentioned in the background section of this report, the requested INFC funding, if approved, will be in the form of a \$350M grant to the City and will be used primarily to cover the infrastructure costs required to implement the ZEBs, including installing electrical charging infrastructure. Due to delays in the INFC approval process, as of August 31, 2022, the City had not yet secured the agreement with INFC for the grant (noting that the original plan by the City was to sign an agreement by May/June of 2022). Management has indicated that any future procurement and draw down on the CIB credit facility is dependent on securing a commitment for the INFC grant, as without the access to infrastructure funding from INFC, the program could not meet the Council direction of being net neutral<sup>6</sup>.

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<sup>6</sup> Net neutral meaning at no additional cost to the City when compared to the Long Range Financial Plan (LRFP) projected operating and capital costs for diesel buses.

Current funding limitations will have an operational impact on the overall program schedule and ultimately on the ability to meet OC Transpo service levels as follows:

- **Program Schedule:** The next round of 26 ZEBs has a preferred in-service date of December 1, 2023, and the lead time required to get charging infrastructure to a ready-to-use state could be between 14 to 18 months due to supply chain complications.

Given supply chain issues and lead time requirements on both the fleet and infrastructure side, delays in funding available to the City impacts the ability for the City to stay on track towards the overall ZEB Program objectives.

- **Service Requirements:** The City risks not having enough buses to support OC Transpo's service needs over the next 1-2 years (2023-2024), as more buses are scheduled to reach their end-of-life than will be added to the fleet. Between 2023-2024, approximately 95 diesel buses will reach their end-of-life. Procurement of the next round of ZEBs has not yet been completed, and considering the lead time needed for ordering, customization, delivery and testing, the City may need to evaluate how to extend the life of a portion of diesel buses (resulting in added costs for staff, facilities, etc.) to meet service needs.

There are also financial risk considerations with the funding amount and unknown infrastructure costs:

- **Amount of INFC Funding:** The amount of the INFC grant is expected to be less than initially anticipated, and could cover 350 ZEBs, rather than 446 ZEBs, which the City plans to phase in by 2027. If the Zero Emission Transit Fund (ZETF) program is not extended past 2025/26, the City may need to explore other financing options to cover the infrastructure costs of the 96 ZEBs not covered by the INFC grant (e.g., incurring debt at an average borrowing rate and delaying planned debt on other capital projects).

It is worth noting that infrastructure costs are still largely unknown, and final costs could vary significantly from the current City estimate.

Overall, if delays in the ZEB Program due to funding commitments continue, this could potentially result in both operational and financial risks to the City, including a potential impact on bus service availability and unexpected costs to maintain schedule and implementation timelines.

**RECOMMENDATION 4 – COMPLETE CONTINGENCY ANALYSIS**

While we understand that City Council’s direction was for this project to leave the City in a net neutral position, the City Treasurer and the GM of Transit Services should work together to complete a contingency analysis to determine the impact of the delays and reduced funding on fleet requirements in the upcoming years, with options to be presented to Council for their decision on how to proceed.

**MANAGEMENT RESPONSE 4**

Management agrees with this recommendation.

OC Transpo staff have been closely reviewing ridership recovery levels and will be conducting a strategic review of transit routes beginning in Q4 2022. At the same time, OC Transpo is finalizing plans to realign bus routes with the extensions to the O-Train system as part of Stage 2 light rail and are working with Finance Services to review service levels in the context of the next Transit Long Range Financial Plan (LRFP). Staff in OC Transpo and Finance Services are also working closely to review available federal funding for zero-emission transit beyond the current Zero Emission Transit Fund program end date of Q1 2026.

Ottawa’s transit system will be in a state of transformation until at least 2026; as such, adjustments to transit service levels are anticipated. To ensure that service is aligned to best meet the needs of OC Transpo’s customers, adjustments may be made within the budgets approved by Council. Future fleet requirements, including the lifecycle replacement of diesel-powered buses with electric-powered buses, will be one of many variables examined as part of these analyses. It is expected that this work will be ongoing and that recommendations on fleet requirements would be brought to Council as part of the annual budget process starting in Q4 2023.

## Appendix 1 – Definitions

Term	Definition
<b>Actual Savings</b>	The actual savings realized by the City based on fuel and maintenance savings of ZEB when compared to Diesel. It is calculated by the realized fuel savings, <i>plus</i> the realized maintenance savings, <i>plus</i> an amount equal to the Forecast Savings for any ZEB that was not operated for the specified distance, during any period of time throughout the loan.
<b>Agile Audit</b>	The approach and methodology used for the audit of ZEB; designed to provide periodic reports, be performed in iterative cycles (or sprints) of audit on a continual basis with a focus on areas of greatest risk to the City.
<b>Credit Facility</b>	An agreement between a lender and a borrower that allows for greater flexibility than a traditional loan.
<b>Drawdown</b>	The amount of funds to be drawn or taken from a loan or funding amount e.g., there will be multiple drawdowns from the CIB credit facility or loan between 2023 and 2027 for each tranche of bus purchases.
<b>Forecast Savings</b>	The savings that the CIB and City forecast to be achieved based on the difference of operating costs between ZEB and Diesel buses. In summary, it is the estimated diesel bus operating costs, <i>minus</i> the estimated ZEB operating costs, <i>times</i> the percentage of savings to be used by the borrower to repay the loan. Note that the remaining savings not used to repay the loan will go towards the Lifecycle Reserve Account, defined below.
<b>Grant</b>	An award, usually financial, given by one entity (typically a company, foundation, or government) to an individual or a company to facilitate a goal or incentivize performance.
<b>Lifecycle Reserve Account</b>	An account opened in the name of the Borrower. Prior to the Maturity Date, or at the earliest date the Obligations become payable, the Borrower shall use the funds deposited in the Lifecycle Reserve Account solely for the purpose of paying eligible expenditure, as defined in the Credit Facility.



<b>Missed Savings</b>	The difference between Actual Savings and Forecast Savings, for every quarterly payment period.
<b>Net Disposition Proceeds</b>	Proceeds received from the direct or indirect sale, lease, assignment, transfer, exchange for a different class of ZEB, conveyance or gift of such ZEB, <i>minus</i> the reasonable fees and out-of-pocket expenses paid by the borrower in connection with the disposition of ZEBs.
<b>Revenue service</b>	The service when the buses run on actual bus routes and carry passengers.
<b>Zero-Emission Buses</b>	Buses that adopt a zero-emission technology e.g., battery-electric buses and hydrogen fueled buses. For the City of Ottawa, the selected technology for ZEBs are battery-electric buses.
<b>ZEB charging infrastructure</b>	The infrastructure needed to charge ZEBs. Including pantograph chargers, service bays, garages, retooling of existing garages, etc.

## Appendix 2 – About the audit

### Audit objectives and criteria

The original objective of this audit sprint was to provide reasonable assurance that the City had established accurate and complete financial plans and frameworks and conducted sufficient analysis to enable the program to secure funding for the procurement of ZEBs. Criteria listed below were developed in line with the audit objective and scope above. The criteria were defined by considering the results of the preliminary risk assessment, program milestones, and stakeholder priorities.

	<b>Financial Planning and Modelling</b>
1.1	A plan has been established with defined governance, roles and responsibilities, and timelines, for financial activities to ensure that funds are secured within the timeline needed before the next procurement.
1.2	Management has established and validated a complete financial model that considers the estimates, assumptions, and contingencies to accurately identify forecasted costs and savings.
1.3	Management has developed the mechanisms and processes to allocate the funding and monitor the costs and savings for repayment in line with lending requirements.
	<b>Agreements and Contractual Obligations</b>
2.1	Management has established the mechanisms to coordinate with funding stakeholders (e.g., CIB) to meet deliverables and any contractual obligations.
2.2	There is agreement and clear understanding between the City and funding stakeholders on the framework to calculate savings, when repayment will be required, and the dependencies between both parties.
2.3	The draft agreements define the contractual obligations for the City and risk exposures for repayment and fulfilment of loan obligations are identified and managed.

During fieldwork, the audit team learned that the City’s financial model would not be used as the basis for the CIB loan agreement. Instead, the CIB provided a financial

model that was used for negotiations and will be used as the baseline for monitoring and repayment. Therefore, this audit report does not make any conclusions on the City's financial model(s). Further, the objective of this audit sprint was limited to the assessment of the mechanisms developed by the City to support the application and negotiation of funding with each of CIB and INFC.

Based on greatest risk posed to the City at the time of the audit, and the need to provide timely advice on the CIB loan agreement, the scope of this audit focused primarily on audit criteria related to Agreements and Contractual Obligations (2.1, 2.2, and 2.3). This audit report does not conclude on the City's financial model (i.e., criteria 1.2).

### Audit approach

Audit staff performed the following procedures to complete this audit:

- Reviewed relevant documents related to the financial model, loan and fund applications, financial planning, CIB draft agreement, and grant application.
- Conducted interviews and walkthroughs with stakeholders from the ZEB program, and external stakeholders.
- Performed other analysis and tests related to funding management.

### Audit methodology

The Audit of Zero-Emission Buses will be leveraging an **agile audit approach**. This methodology is designed to provide periodic reports, performed in iterative cycles ("sprints") that successively refine scope based on new information or changing environmental circumstance and providing the greatest value and insight to City management and the Council. This methodology is well suited to the ZEB transformation as the audit cycles can work together with the progress of individual projects and activities to provide timely insights to Council on specific risk areas.

Each iterative cycle includes the following steps:

- A. Follow-up on previous audit sprint results
- B. Assess risk
- C. Perform analysis
- D. Identify findings and recommendations
- E. Update plan (next iteration and overall plan)

At the end of each sprint, there is an opportunity to, in conjunction with management, review and update the plan to ensure subsequent sprint scope areas and planned timing are still relevant.

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