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Item No.13.1.4
Audit & Finance Standing Committee
May 21, 2025

TO: Chair and Members of Audit & Finance Standing Committee

FROM: Cathie O'Toole, Chief Administrative Officer

DATE: April 22, 2025

SUBJECT: Halifax Transit Dual-Fuel (Diesel/Hydrogen) Bus Demonstration

ORIGIN

Halifax Transit applied to the Nova Scotia Clean Fuels Fund (CFF) to deploy a dual-fuel (diesel/hydrogen) bus demonstration project at a total cost of \$490,000 (\$367,500 from CFF and \$122,500 from HRM) to advance HalifACT and Halifax Transit's decarbonization efforts.

EXECUTIVE SUMMARY

The Halifax Transit Hydrogen Bus Demonstration project is a forward-thinking initiative that aligns with HRM and the Province of Nova Scotia's clean energy adoption and emissions reduction goals. This project, scheduled for completion by December 31, 2026, aims to evaluate the potential of hydrogen in decarbonizing Halifax's public transit fleet. It entails converting four of Halifax Transit's diesel buses to dual-fuel (hydrogen/diesel) systems to operate on regular Halifax routes, providing valuable real-world data on performance, efficiency, and operational considerations. Project findings from the project will inform a future business case presented to Regional Council regarding the ideal balance between electric vehicles and hydrogen-powered vehicles in the fleet.

Halifax Transit has received \$367,500 in project funding from the Province of Nova Scotia's Nova Scotia Clean Fuels Fund (CFF). The remaining \$122,500 for the project is available from Halifax Transit's existing Capital projects.

RECOMMENDATION

It is recommended that Audit & Finance Standing Committee recommend Halifax Regional Council:

1. Approve the transfer of funds and budget increase between accounts as outlined in the *Financial Implications* section of this report and as follows:
 - a. Approve the transfer of \$75,766 (net HST included) from Project Account CV210011- Electric Bus Procurement to CV210014- Transit Strategies/Studies; and,

- b. Approve an increase to the gross budget of project CV210014, with no impact to HRM's net budget of \$443,266 (net HST included) , to support the dual-fuel (hydrogen/diesel) bus demonstration project.

BACKGROUND

HalifACT 2050: Acting on Climate Together is the Municipality's long-term climate action plan to reduce emissions and help communities adapt to a changing climate. Unanimously adopted by Regional Council on June 23, 2020, the plan aims to achieve a net-zero economy by 2050.

As part of this initiative, Halifax Transit is actively greening its fleet through the Zero Emission Bus Project, which includes the procurement of over 200 electric buses and the expansion of transit facilities to support these vehicles. However, electric buses alone cannot meet all of Halifax Transit's decarbonization needs due to limitations in range and recharging times. Therefore, hydrogen technology is being explored as a complementary solution to ensure operational flexibility and achieve deeper emissions reductions.

Recognizing the importance of clean fuels in achieving climate goals, the Province of Nova Scotia launched the Nova Scotia Clean Fuels Fund (CCF). This fund supports industries, businesses, and municipalities in adopting low-carbon and renewable fuels, such as green hydrogen, renewable natural gas, biofuels, and sustainable biomass. By providing financial assistance for clean fuel projects, the fund aims to increase Nova Scotia's capacity to produce, adopt, and transition to clean fuels, thereby reducing greenhouse gas emissions and fostering a green economy.

On February 20, 2025, HRM was notified that its Dual-Fuel (Diesel-Hydrogen) Bus Demonstration Project application to CFF was successful.

The Contribution Agreement between HRM and the Province for the Hydrogen Bus Demonstration Project, through which HRM is provided \$367,500 from the CFF, is effective as of March 15, 2025.

DISCUSSION

The Halifax Transit Hydrogen Bus Demonstration project aims to decarbonize Halifax's public transit fleet and contribute to the region's sustainable transportation goals. Scheduled for completion by December 31, 2026, the project involves converting four existing diesel buses to dual-fuel (hydrogen/diesel) systems and deploying them on regular Halifax Transit routes. Key components of the project include:

- Conversion of four buses to dual-fuel systems;
- Installation of data loggers for performance monitoring;
- Training for operators and maintenance staff;
- Analysis of operational data and performance metrics; and,
- Development of recommendations for future fleet planning.

The project plan is divided into six phases:

- Project Initiation and Planning: April 1, 2025 – July 31, 2025
- Pre-Conversion Planning: August 1, 2025 – August 31, 2025
- Bus Conversion and Training: September 1, 2025 - December 31, 2025
- Operational Integration and Initial Testing: January 1, 2026 - April 30, 2026
- Extended Data Collection and Monitoring: May 1, 2026 - October 31, 2026
- Project Evaluation and Reporting: November 1, 2026 - December 31, 2026

Project objectives include evaluating hydrogen fuel technology performance in public transit, gathering real-

world data, assessing potential emissions reductions, and informing future fleet planning decisions. The project aims to increase Nova Scotia's capacity to produce, adopt, and transition to clean fuels.

Benefits of the project include significant potential reductions in greenhouse gas emissions, improved local air quality, and economic benefits such as job creation in vehicle maintenance, hydrogen refueling infrastructure, and engineering services. Additionally, the project aims to enhance Halifax Transit's capacity to operate and maintain hydrogen-powered vehicles, increase public awareness and acceptance of hydrogen as a clean fuel option, and support the development of a hydrogen economy in Nova Scotia.

Rationale for the project stems from several key factors:

Complementary Decarbonization Strategy: While Halifax Transit has invested \$112 million in a Zero Emission Bus Project for electric buses, hydrogen technology offers additional benefits such as longer range, faster refueling times, and more consistent performance in varying weather conditions.

Alignment with Municipal and Provincial Goals: The project aligns with HalifACT, Nova Scotia's Climate Change Plan for Clean Growth, and Link Nova Scotia's (Link NS) development of a long-term, coordinated vision for the regional transportation system.

Economic Development: By participating in this initiative, Halifax Transit positions itself at the forefront of sustainable public transportation in Atlantic Canada, supporting both climate action goals and the region's emerging hydrogen economy.

Flexibility and Risk Mitigation: The dual-fuel approach allows for operational flexibility and risk mitigation, ensuring a comprehensive and adaptable strategy for sustainable public transportation.

Safety and Compliance: In May 2021, Regional Council was briefed on the hydrogen economy by HRM staff, which is regulated to ensure compliance with applicable standards. Edmonton and Winnipeg have successfully deployed hydrogen bus demonstration projects, showcasing the viability of this technology in public transit. Additionally, Balodis Inc. and King Freight in Pictou, Nova Scotia, have received CFF support to convert their vehicles to dual-fuel systems. Halifax Regional Fire & Emergency (HRFE) is engaged in this project. It will include the development and implementation of fire safety and emergency response plans for the storing, handling, and operation of hydrogen-and hydrogen-powered vehicles.

HRM is committed to sharing comprehensive project information to industry and community groups and will collaborate with Link NS to integrate project insights into regional transportation planning.

This project will also serve as a demonstration for other transit operators in Nova Scotia and the region. Fleet operators can observe the technology in real-world applications. HRM will share insights and lessons learned with other fleet operators, helping them evaluate this alternative technology's viability. As a living laboratory, the project aims to promote sustainable transit solutions across the region while directly informing Link NS refinement and implementation of the Regional Transportation Plan.

By implementing this hydrogen bus demonstration, Halifax Transit establishes itself as a leader in sustainable public transportation in Atlantic Canada, supporting both climate action goals and the region's emerging hydrogen economy.

Ultimately, the insights gained from this demonstration will inform a future business case presented to Regional Council regarding the optimal composition of Halifax Transit's fleet, analyzing the ideal balance between electric and hydrogen-powered vehicles to achieve the municipality's climate action goals.

FINANCIAL IMPLICATIONS

The total project budget is approximately \$490,000, of which \$367,500 has been secured as external

funding through the Nova Scotia Clean Fuels Fund (CFF). The municipal portion can be allocated from residual funds in the E-Bus Phase 1 account - CV210011 - and remaining funds in the Transit Strategies/Studies account - CV210014 with no impact to those projects.

It is recommended that Audit and Finance approve the transfer of \$75,766 (Net HST included from Capital Project Account CV210011-Electric Bus Procurement to CV210014- Transit Strategies/Studies and increase the gross project budget of Project account CV210014 by \$443,266 for the amount received from CFF plus the transfer from CV210011. The remaining \$46,734 required to make up the full project cost of \$490,000 is available in CV210014 due to previous project savings. No additional HRM funding is being requested for this project.

Budget Summaries

Project Account No. CV210011-Electric Bus Procurement

Cumulative Unspent Budget	\$ 14,211,536
Less: Transfer to Project No. CV210014	<u>(\$75,766)</u>
Balance:	\$14,135,770

Project Account No. CV210014-Transit Strategies/Studies

Cumulative Unspent Budget	\$ 46,734
Plus: Transfer From CV210011	\$75,766
Plus: External Funding –NS Clean Fuels Fund	\$367,500
Less: Hydrogen Bus Demonstration Project	<u>(\$490,000)</u>
Balance:	\$0

The remaining balances of existing projects will be used for future Transit projects.

RISK CONSIDERATION

The risks associated with this project, including cost overruns, delays, performance issues, hydrogen supply and handling concerns, permit challenges, community support, and data accuracy, are considered low to medium. These risks will be mitigated as per the agreement between HRM and the Province of Nova Scotia. Measures include financial contingencies, partnerships with experienced organizations, clear timelines and maintenance contracts, regulatory compliance with HRFE's involvement, a community engagement plan, and the use of existing data logging systems for accurate data collection.

COMMUNITY ENGAGEMENT

No community engagement was required.

ENVIRONMENTAL IMPLICATIONS

Real-world tests of dual-fuel trucks and motor coaches in Alberta show significant environmental benefits, including potential reductions of up to 69.8% in CO2 emissions and 74.9% in NOx emissions, alongside a 70.2% decrease in diesel use.

Halifax Transit consumes approximately 10.8 million liters of diesel fuel annually. The demonstration project could reduce a modest 160 liters of diesel fuel daily. However, it could have much larger-scale positive environmental benefits by informing the future business case to Council about the ideal composition of Halifax Transit's bus fleet.

ALTERNATIVES

1. Audit & Finance Standing Committee could choose not to approve the recommendation to allocate funding for the municipal portion of this dual-fuel demonstration project from the residual funding in the E-Bus Phase 1 Account – CV210011 and the remaining funds in the Transit Strategies/Studies account - CV210014 with no impact to those projects. However, this would result in the cancellation of a Bus Demonstration project which aligns with both regional and provincial goals for clean energy adoption and emissions reduction. Furthermore, Halifax Transit will need to send a notification of “Termination of the Agreement” to the Province Clean Fuels Fund, along with the immediate return of the \$367,500 contribution funding in accordance with the Clean Fuels Fund Contribution Agreement.

LEGISLATIVE AUTHORITY

Halifax Regional Municipality Charter, S.N.S. 2008, c. 39 as amended

79A (1) Subject to subsections (2) to (4), the Municipality may only spend money for municipal purposes if

- (a) the expenditure is included in the Municipality’s operating budget or capital budget or is otherwise authorized by the Municipality.
- (b) the expenditure is in respect of an emergency under the Emergency Management Act; or
- (c) the expenditure is legally required to be paid.

(2) The Municipality may expend money provided for in an operating budget or capital budget for a purpose other than that set out in the operating budget or capital budget for that fiscal year if the expenditure does not affect the total of the amounts estimated for the operating budget and the capital budget.

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Administrative Order One, the Procedures of Council Administrative Order, Schedule 2 - Audit and Finance Standing Committee Terms of Reference

8. The Audit and Finance Standing Committee shall review and make recommendations on proposals coming to the Council outside of the annual budget or tender process including:

- (a) new programs or services not yet approved or funded;
- (b) programs or services that are being substantially altered;
- (c) proposed changes in any operating or project budget items;
- (d) the commitment of funds where there is insufficient approved budget;
- (e) new or increased capital projects not within the approved budget;
- (f) increases in project budget due to cost sharing; and
- (g) the creation or modification of reserves and withdrawals not approved in the approved budget.