

# Report

Date January 18, 2023  
Subject Electrifying the Municipal Light-duty Fleet

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## PURPOSE

To provide an update on the Climate Action and Energy Plan goal to electrify the municipal fleet and present a light-duty electric fleet replacement schedule for 2023-2025. A staff presentation will be provided at the meeting.

## BACKGROUND

Council approved the [Climate Action and Energy Plan](#) (CAEP) in January 2022, including the goal to reduce emissions to 80% below the 2007 levels, with interim targets of 15% by 2025 and 35% by 2030<sup>1</sup>. Goal 7 in the CAEP is to “electrify 100% of transit and municipal fleet by 2030” by dedicating an annual capital budget to facilitate replacement. The [Climate Action and Energy Plan Reserve Fund Terms of Reference](#) (July 2022) provides funds to projects that reduce corporate emissions.

This report covers the municipal fleet's light and medium duty segment only (“Light fleet”). Transit vehicles are not within the Municipality’s function, and heavy-duty vehicles will be the subject of future assessment.<sup>2</sup>

The Municipality owns 156 fleet vehicles and equipment, with capital replacements provided through the Office Vehicle and the Machinery and Equipment Reserve Funds. The light fleet consists of 51 trucks and cars (33% of the fleet), many of which are in constant daily use for municipal services to the public, with 460,000 vehicle kilometres travelled per year. North Cowichan has two electric fleet vehicles, supported by a single dual-head charging station and a single connection from an outbuilding located at the Municipal Hall.

## DISCUSSION

Fleet vehicles are essential for the operation of municipal services but generate greenhouse gas emissions in doing so. In 2021, the fleet represented the largest source of municipal emissions (53% or 735 tonnes of CO<sub>2</sub>-e). The light fleet contributed 298 tonnes or 41% of fleet emissions.

North Cowichan assigns a 10-year lifespan for the replacement to the light fleet. After this time, vehicles tend to experience greater maintenance expenses and the resale potential of the vehicle deteriorates. North Cowichan finances asset replacement through the Office Vehicle and the Machinery and Equipment Reserve Funds. The current balance of North Cowichan’s Office Vehicle and Machinery and

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<sup>1</sup> Interim targets are outlined in the emissions reduction summary on page 44 of the CAEP.

<sup>2</sup> Light, medium, and heavy-duty classifications are defined by [Transport Canada](#). A light-duty vehicle is under the gross vehicle weight rating of 3,856 kg (cars and light trucks) and heavy-duty are greater than 3,856 kg. A medium duty vehicle is under 4,536 kg and designed for the transport of people such as vans and sport utility vehicles.

Equipment Reserves is approximately \$1.7 million. An annual contribution to the funds of \$623,000 (in total) enables funds for required asset replacements. North Cowichan's annual capital expenditures for the entire fleet are \$600,000-\$1 million per year, depending on vehicle needs.

In 2022, North Cowichan contracted ChargeFWD to perform a fleet replacement assessment of our light-duty vehicles. This assessment reviewed operational fleet requirements, replacement timelines, and electric replacement to meet the CAEP goals. Environment, operational and financial impacts were assessed, and ChargeFWD recommended a phased approach to vehicle replacement, given projections for improved costing later this decade.

The assessment concluded that all assessed vehicles were technically feasible to electrify, with 17 offering a positive business case with current electric vehicle purchase costs and utilization, compared with an internal combustion engine (ICE) vehicle. The assessed total cost of vehicle replacement, using 2022 rates, was determined to be \$2,252,953 for a business-as-usual approach and \$3,373,653 for electric vehicles. The premium of \$1,245,700 (including charging infrastructure) is expected to be adjusted each model year to offer greater parity between ICE and electric models.

### **2023-2025 Vehicle Replacements**

As vehicles are replaced, an opportunity presents itself to work on the CAEP goals in parallel. Incremental replacement of the fleet starting now is imperative given the scale of fleet replacement required and upcoming CAEP interim targets. With only two electric vehicles in the municipal fleet, nearly the entire fleet needs replacement to meet the CAEP goals.

Using the findings from the ChargeFWD assessment and funds available in the Office Vehicle and the Machinery and Equipment Reserves on an annual basis, 12 vehicles are recommended for replacement in 2023-2025 due to vehicle age (Table 1). These 12 vehicles are between 12 and 17 years old. The vehicles were then prioritized based on annual mileage. Vehicles with higher mileage tend to have more maintenance and higher fuel costs and offer a greater return ahead of older vehicle models. The annual emission savings to electrify these vehicles is 21 tonnes of CO<sub>2</sub>-e, representing 8% of emissions from light vehicle operations and 1.5% of total municipal emissions.

The 12 vehicles listed in Table 1 all offer a compelling economic case to electrify as the preferred investment. While the initial capital replacement cost is higher, the electric vehicle offers a lower cost of ownership than the equivalent ICE vehicle.

This 3-year plan is dynamic and will adjust with maintenance, operational and planning needs. Pricing is based on 2022-2023 vehicle models and available incentives. Pricing will be updated with each model year.

Table 1 2023-2025 Recommended Fleet Replacement Schedule

Vehicle	Vehicle Type	Vehicle Age (years) in 2023	KM / year	ICE Replacement Cost	Electric Replacement Cost*	Electric Replacement TCO comparison
<b>2023</b>						
2011 Toyota Tacoma	Light pick-up	12	16,167	\$40,998	\$77,445	-30%
2006 Chevrolet Van	Cargo Van	17	10,480	\$58,479	\$82,000	-25%
2007 Honda Civic Hybrid	Compact	16	10,585	\$31,295	\$36,147	-25%
2011 Ford Transit Connect	Cargo Van	12	9,452	\$58,479	\$82,000	-15%
<b>2024</b>						
2011 Chevrolet Colorado	Light pick-up	12	9,203	\$45,797	\$77,445	-15%
2011 Ford Transit	Cargo Van	12	8,460	\$58,479	\$82,000	-14%
2008 Chevrolet Colorado	Light pick-up	15	6,304	\$45,000	\$77,445	-14%
2011 Ford Escape	SUV	12	7,537	\$34,165	\$54,190	-8%
<b>2025</b>						
2008 Pontiac Vibe	Compact	15	5,914	\$31,295	\$36,147	-6%
2009 Honda Fit	Compact	14	5,634	\$31,295	\$36,147	-6%
2009 Honda Fit	Compact	14	5,174	\$31,295	\$36,147	-4%
2010 Honda Fit	Compact	13	4,53	\$31,295	\$36,147	-1%
<b>Total</b>				<b>\$493,870</b>	<b>\$713,260</b>	<b>Electric Premium: \$219,390</b>

\*Electric replacement costs include available federal rebates for small cars of \$5,000. Additional federal and provincial vehicle incentives could improve the business case further and will be assessed at the time of vehicle purchase (potential for an additional \$10,000 per cargo van and fleet incentive of \$30,000).

The Office Vehicle and the Machinery and Equipment Reserves allocate vehicle replacement costs using traditional ICE vehicle values and have not been resourced to fund the premium for electric vehicles. The current Office Vehicle and the Machinery and Equipment Reserves will cover the ICE replacement portion of the 2023-2025 vehicles. Staff recommend that \$144,114 be allocated to accommodate the capital premium to electrify these units from the CAEP Reserve Fund as a corporate loan and \$75,276 from the provincial Local Government Climate Action Program grant.

### Charging Infrastructure

The 2023-2025 capital investment will require charging infrastructure for the light-duty fleet replacement ahead of the timeline of vehicle delivery. Staff recommends that \$125,000 be allocated from the provincial Local Government Climate Action Program grant for installing 16 charging stations at municipal facilities.

ChargeFWD conducted an infrastructure assessment to evaluate electrical infrastructure and electrical demand and recommended modifications to support the electrified fleet. To support the full light-duty fleet conversion, ChargeFWD recommended the installation of Level 2 charging stations, with 14 stations combined for the Municipal Hall and the Operations Building/Yard, one at Fuller Lake Arena, and one at the Aquatic Centre. Municipal Hall charging stations will be on one or more dedicated BC Hydro meters so that the Municipality can take advantage of electric vehicle charging tariffs set out by BC Hydro and provide a simple way to track electric vehicle charging reporting requirements in the provincial Renewable and Low Carbon Fuel Requirements Regulation.

## Beyond 2025

The automotive sector is moving to a partially or fully electric product line in the next 10-20 years. Available light-duty electric vehicle options have increased fourfold since 2015, with new models now offering an average range of 35 kilometres with improved battery technology ([Global EV Outlook 2021, IEA](#)). Federal and provincial sales target mandates and renewable fuels regulation are driving this transition, and 100% of new light-duty vehicle sales will be zero emission by 2035. In 2021, 13% of all new light-duty sales in BC were zero-emission vehicles ([BC Government, 2022](#)).

Medium and heavy-duty vehicle options are lagging behind those of light-duty vehicles but are slowly increasing and are expected to follow a similar technology adoption trend. Manufacturing of larger vehicles (e.g. pickup trucks) is expected to reach mass production later this decade, which in turn will offer improved vehicle selection and cost options.

Staff will continue to work to advance a fleet strategy that transitions the municipal fleet to zero-emission and will continue to monitor these trends to develop the business case. The use of renewable fuels as a bridging strategy will also be considered while the technology develops and costs improve. Renewable diesel meets the specifications of diesel while being made from renewable sources and has been recently trialled by the City of Vancouver.

At this time, staff recommend that additional vehicle electrification follow the asset replacement schedule, allowing the Municipality greater options in vehicle selection and reduced costs.

## OPTIONS

### 1. **(Recommended Option)** THAT Council:

- (1) Endorse the electrification of 12 light-duty vehicles between 2023-2025;
  - (2) Allocate \$219,390 to cover the electric premium of 12 vehicles, with \$144,114 from the Climate Action and Energy Plan Corporate Reserve Fund as a corporate loan and \$75,276 from the Local Government Climate Action Program grant; and,
  - (3) Allocate \$125,000 for fleet electric vehicle charging station installation from the Local Government Climate Action Program grant.
- This option aligns the consideration of fleet electrification to the vehicle asset replacement schedule, allowing for an optimal economic approach. The identified vehicles may result in cost savings for the Municipality while delivering reduced emissions.

### 2. THAT Council direct staff to explore options to undertake a more aggressive schedule for fleet electrification.

- While the Office Vehicle and the Machinery and Equipment Reserves appear to have a much larger balance at \$1.7 million, a more aggressive approach to electrify the light fleet is impossible without impacting the replacement requirements of heavy-duty vehicles and equipment. Costs are expected to improve with greater vehicle selection before 2030.

## IMPLICATIONS

### Financial

Current market rates for electric vehicles have a cost premium over internal combustion engine models. This premium is expected to move towards cost parity in the later part of this decade. The accumulated annual operating savings associated with lower fuel and maintenance costs are expected to continue to improve as well as help with financial risk reduction of fossil fuel price volatility and continued scheduled carbon tax increases through 2050. By undertaking 3-year capital plans for fleet investments, a more compelling business case could be prepared with improved cost certainty for Council's future consideration. Figure 1 depicts this schedule with 2022 pricing.

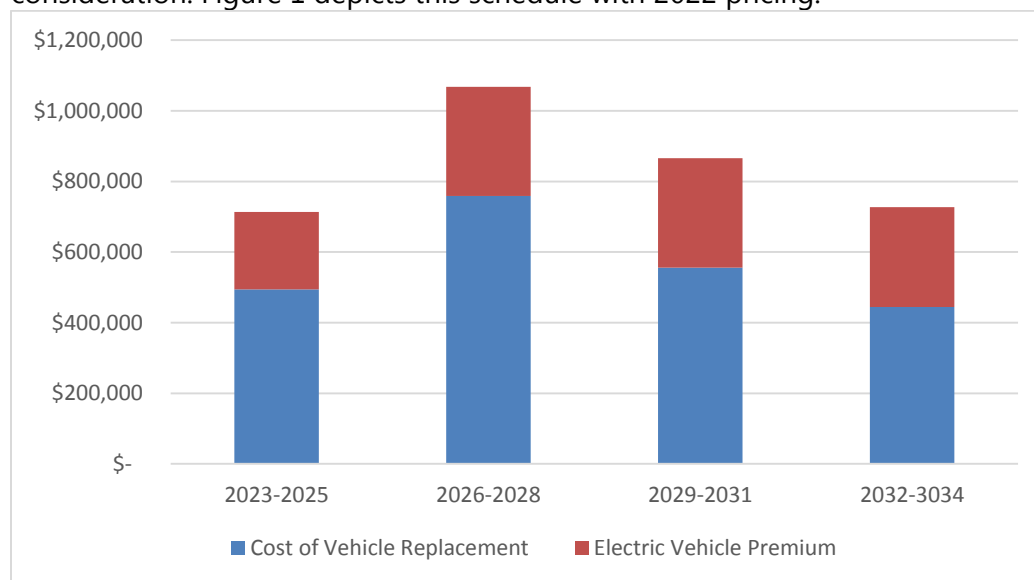


Figure 1. Capital investment of light duty fleet in 3-year investment increments

### Personnel

No new staff resources are requested. Maintenance savings are expected as electric vehicles have fewer parts associated with the drivetrain. This benefit has not been fully quantified for the North Cowichan fleet, and a maintenance management program is now in place to collect this data for future assessment.

While electric vehicles will require fleets to think about their maintenance shops in new ways, potential changes are expected to be minimal, and much will remain the same as it is today. North Cowichan performs in-house fleet maintenance services, and contractors are utilized as needed. Fleet purchases come with typical 5-year warranty packages, which include the power train and in-house maintenance requirements during this time are limited. In the first year of operation, staff will fully assess service requirements and receive training to service equipment once the warranty expires. A part-time skill upgrade program is offered in BC for Red Seal automotive technicians looking to upgrade their skills to maintain electric vehicles. North Cowichan mechanics will be trained through this EV Maintenance Training program offered through BCIT and Camosun College. Staff will continue to evaluate if shop upgrades are required and receive factory certification from the various manufacturers.

Future electric vehicle models are expected to offer bidirectional charging and onboard charging capability. This will enable greater staff response in times when emergency backup power is required or for in-field electric equipment recharging.

### Environment

In addition to greenhouse gas emission savings, electric vehicles offer improved air quality, environmental improvements, and noise reduction. Manufacturing electric vehicles requires physical resources and energy. Operating an electric vehicle in BC is zero-emission. [PlugInBC](#) assessed that an electric vehicle in BC breaks even for environmental life cycle assessment once 30,000 km are reached, and any distance travelled beyond is carbon-negative. Car manufacturers and battery recycling companies are investing in end-of-life solutions for batteries.

### Social

The social benefits of electric cars are mostly found through the anticipated reductions in air pollution, which could lead to lower health care costs by improving respiratory and cardiovascular health. A 2020 study by the [Ontario Public Health Association and Environmental Defence](#) modelled the air quality impacts of electrifying vehicle traffic in the Greater Toronto area to quantify the benefits.

### Communications

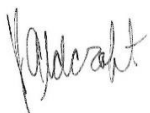
Electrifying 12 fleet vehicles can be communicated as a successful implementation of the Municipality's CAEP and be a visual expression of the Municipality's leadership in climate action in the community.

## RECOMMENDATION

THAT Council:

- (1) Endorse the electrification of 12 light-duty vehicles between 2023-2025;
- (2) Allocate \$219,390 to cover the electric premium of 12 vehicles, with \$144,114 from the Climate Action and Energy Plan Corporate Reserve Fund as a corporate loan and \$75,276 from the Local Government Climate Action Program grant; and,
- (3) Allocate \$125,000 for fleet electric vehicle charging station installation, from the Local Government Climate Action Program grant.

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**Approved to be forwarded to Council:**



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