

Town of Ajax Report



Report To: General Government Committee
Prepared By: Scott Glew, Manager of Fleet Services
Report #: OES-2024-27
Subject: **Sustainable Green Fleet Strategy**
Ward(s): All
Date of Meeting: November 12th, 2024
Reference: N/A

Recommendation:

- 1. That the Sustainable Green Fleet Strategy, prepared by AECOM Canada Ltd., dated October 9, 2024, be approved in principle;**
- 2. That Staff be directed to bring forward recommendations for projects and initiatives that have financial implications to be approved through future budget processes.**

Background:

At their meeting held on April 19th, 2022, Council passed the following resolution:

1. That Ajax Council direct Operations & Environmental Services staff to embark on the development of a green fleet strategy in the next 1-2 years; and that the return on investment of such a program be examined as part of this exercise.
2. This motion be circulated to the Clean Air Partnership, Durham Region Roundtable on Climate Change Committee, and all Durham area municipalities.

In 2023, AECOM Canada Ltd., were retained by the Town of Ajax to develop a Sustainable Green Fleet Strategy. The Sustainable Green Fleet Strategy is intended to guide decision-making, with a specific emphasis placed on meeting the Greenhouse Gas (GHG) emission reduction targets set out by Council and a balanced approach to procuring leading edge automotive technology while being fiscally responsible. The acquisition of electric vehicles and equipment is predicated on the required infrastructure and maintenance planning programs being installed prior to deployment of the technology. This will ensure a successful implementation of the electric units into the current work plan.

The scope of work to be captured within the strategy included the following:

- An assessment of existing Fleets GHG emissions and reduction targets

- Create a replacement plan for each vehicle and piece of equipment with a lower/zero emission unit with available and emerging technologies
- An identification of the number of chargers required at each facility to support operations
- An analysis of existing electrical capacity at each facility, compared to peak demand for electric vehicles and required infrastructure upgrades for future acquisitions
- Develop an overall framework for the Sustainable Green Fleet Strategy including an Action Plan, vision, goals, and objectives

Throughout 2024, the Project Team has worked to identify infrastructure related needs and electrical requirements for each facility based on current and future demands. The assessment of need has been based on the following:

- Council Approved GHG emission reductions targets
- Available and future technologies
- Leveraging existing capacity
- Identifying Charging Hubs
- Feedback received through the consultation process;
- Alignment with the Town's Strategic Plan
- Maintaining established service levels

Discussion:

The Sustainable Green Fleet Strategy ("SGFS") will guide fleet replacements and facility infrastructure requirements with respect to electric vehicle and equipment charging over the 15-year period between 2025 and 2040.

Electric vehicles (EVs), which include battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), and hydrogen fuel cell electric vehicles (FCEVs), are being adopted by many fleet operators as part of long-term strategies to reduce or eliminate fleet-related emissions, reduce maintenance activities, and align with climate targets from all levels of government. The Town of Ajax is advancing the deployment of EVs and battery-powered maintenance equipment within its fleet to achieve emissions reduction targets set by Council, including a 40% greenhouse gas (GHG) emissions reduction from all sources by 2030, and 100% GHG emissions reduction by 2050, below 2019 levels.

The Sustainable Green Fleet Strategy builds on early fleet and equipment electrification efforts. It provides a framework for the transition to EVs including anticipated costs and replacement timelines and precedes detailed design work for charging stations and selection of individual EVs to replace existing models.

Best practices from other Canadian jurisdictions were reviewed to inform the strategy, and technical research was conducted into suitable EV and battery-operated equipment which could be added to the fleet beginning in the near-term to support meeting Council's emission reduction targets.

As the market for EV's grows, and federal zero-emission vehicle (ZEV) regulations come into play in the next decade, such as the phase-out of internal combustion engine vehicles (ICEVs), building on early efforts and accelerating infrastructure deployment will be needed to maintain operational resiliency while reducing emissions.

Today's fleet of 126 on-road vehicles and 92 motorized off-road/unlicensed vehicles emits about 822 tonnes of CO₂ per year. Many of these vehicles are overdue for replacement based on the Town's holding policies, with the average age of the fleet approaching 10 years. Though some vehicles are ready to be electrified, the market for EVs is still maturing and many heavy-duty vehicles and other equipment do not have suitable EV alternatives yet available. In developing the SGFS, two (2) transition scenarios have been examined for implementation in Ajax:

- i) a Cost Optimized scenario, where EVs are added to the fleet only when they have a lower total cost of ownership than an ICEV, and
- ii) a Technology Leadership scenario where ICEVs are replaced with EVs more quickly.

The Town is scheduled to replace about 15 vehicles per year over the lifetime of the plan. Early in the transition to EVs, a higher number of ICEVs are replaced by either new ICEVs, hybrid electric vehicles (HEVs), or PHEVs. Over time, more EVs are added to the fleet as parity of cost and performance is achieved relative to ICEVs. By the mid-2030s, very few non-electrified new models are planned to be added to the fleet.

Regardless of scenario, light-duty vehicles such as passenger cars and equipment such as mowers and golf carts are recommended for immediate electrification when they come due for replacement.

In the medium term, light and medium-duty trucks, fire apparatus, and some specialty equipment, like forklifts, are recommended for electrification. In the long-term, heavy-duty vehicles and equipment like snow-plows, large trucks, and road repair equipment is recommended for electrification, with the market expected to mature for these assets.

A significant investment in infrastructure will be required to accomplish the fleet transition goals. The majority of infrastructure will be required at the Town's Operations Centre, where 89 vehicles and 75 powered equipment assets are stored. The majority of infrastructure will be Level 2 charging stations supporting overnight charging, but some higher output DC Fast Charging will be required to support assets like fire apparatus, heavy-duty vehicles, and high-mileage vehicles. Other facilities will also require charging infrastructure to support new EVs and equipment.

The total cost of the program between 2024 and 2039 is estimated to be between \$29.8 million and \$36.4 million, depending on whether a Cost Optimized or Technology Leadership scenario is pursued. If business as usual (BAU) operations were maintained, with no EVs added to the fleet, the total fleet related capital and operating costs between 2024 and 2039 would be expected to cost \$31.5 million. This indicates that despite significant investment being required, a transition to EVs is expected to save the Town some capital and operating expenses over the lifetime of the plan.

Between 2024 and 2039, the Technology Leadership scenario is expected to result in about \$6.6 million of additional capital and operating costs relative to the Cost Optimized scenario, and \$4.9 million additional capital and operating costs relative to BAU. The Cost Optimized scenario, in contrast, is expected to result in about \$1.7 million in cost savings relative to BAU between 2024 and 2039. The additional costs of the Technology Leadership scenario are associated with additional EV procurements and charging infrastructure, which are not offset

sufficiently by slight maintenance and fuel costs savings to achieve cost parity or savings with the Cost Optimized scenario or BAU.

Both scenarios help achieve a GHG emissions reduction. The Technology Leadership scenario achieves Council's 2030 emissions reduction target between 2029 and 2030, while the Cost Optimized scenario achieves the full 40% reduction below baseline emissions between 2031 and 2032. This indicates that a more aggressive EV and electric equipment adoption, in line with the assumptions of the Technology Leadership scenario, is required to achieve the desired emissions reduction goal established by Council. Given that some vehicles are not yet ready to transition to EVs, given their duty cycle, some on-road vehicles could be transitioned more gradually (in line with a Cost Optimized scenario) while other, such as off-road/unlicensed assets could be transitioned more aggressively (in line with a Technology Leadership scenario) to achieve the desired emissions reduction. With both scenarios, deploying adequate charging infrastructure will be critical to ensure EVs and electric equipment is ready for operation once procured.

In addition to the costs of vehicles and infrastructure to support fleet transition, operational changes within the organization will be required to manage the new EV fleet. Managing the Town's new fleet will carry unique considerations relative to the current ICEV fleet to ensure consistent delivery of services. Namely, the maintenance and servicing of EVs will require specific care and attention to the lithium-ion battery packs, and charging at the end of a driver's shift will require a change in daily habits.

The electrification of the fleet and equipment will occur in various phases, which can be broken into phases. The percentage of the on-road fleet that is low- and zero-emissions, and anticipated emissions reduction from baseline, will depend on the scenario that is pursued.

A variety of recommendations to help build on the early fleet electrification efforts, in order to meet Council's GHG emissions reduction targets and manage the transition effectively, include the following. They are described in detail within this report.

Management Activities

1. Evaluate current fleet policies including Policy 053 – Mileage Reimbursement, Policy 080 – Use of Municipal Vehicles, and Fleet Utilization Policy to identify which driver duties may need to be adjusted, changes to mileage reimbursement rates given the different cost of ownership of EVs, and vehicle retirement ages for EVs.
2. Establish appropriate vehicle lifecycle standard for municipal EVs, based on early EV deployment. EVs may have a longer or shorter lifespan than ICEVs, depending on the nature of their use.
3. Assess End of Life planning impacts of EVs compared to ICEVs and implement any necessary procedures to accommodate these impacts.
4. Monitor emerging technologies such as solid-state batteries, hydrogen vehicles, and other emerging fuel types through industry engagement and peer networks with other municipalities and agencies to evaluate which EV solutions may present the best opportunities for vehicles that remain difficult to transition, such as those in the medium- and heavy-duty segments.

5. Undertake a Yard Utilization Study to determine how the Operations Centre yard is being used and could be optimized, including where EV charging stations could best be located to avoid operational conflicts.
6. Stay informed about local, provincial, and federal regulations related to EVs and fleet management and ensure that fleet operations comply with the latest safety standards, environmental regulations, and industry best practices.
7. Identify key stakeholders within the Town who will act as EV champions and coordinate a team to engage with staff at each site location where corporate vehicles and equipment are being converted to EVs.
8. Consider how leasing an FCEV or medium-/heavy-duty EV could enable a streamlined and lower-risk pilot project for the Town, prior to a potential larger investment in FCEVs and associated infrastructure.
9. Evaluate whether other municipalities move to a leased vehicle ownership model for some fleet vehicles and use this to inform the Town's own planning process.

Outreach and Engagement

1. Educate drivers and fleet managers about the unique fire risks associated with EVs and lithium-ion batteries. Ensure fire extinguishers are accessible near fleet vehicles and charging stations. Train personnel on how to safely extinguish EV fires and evacuate affected areas.
2. Develop and communicate clear emergency response protocols for EV-related incidents, such as accidents, fires, or vehicle malfunctions. Ensure drivers are aware of emergency procedures and receive training on how to safely evacuate or respond to different scenarios.
3. Coordinate with the Fire Department to make them aware of the locations for EVs, in case firefighting is needed. Review and update as needed fire-fighting procedures to address the different approach for EV fires.
4. Develop a series of educational and awareness materials and programs for Town staff that aims to promote the positive impacts of transitioning corporate fleets to EVs and equipment and overcome any knowledge barriers regarding EV technology.

Infrastructure

1. Evaluate DC Fast Charging needs for the fleet and the infrastructure implications of necessary electrical upgrades to accommodate these needs, including coordinating a potential new utility connection with Elexicon for the Fire Headquarters and/or Operations Centre.
2. To ensure the EV fleet can support emergency operations in the event of a power outage, establish the minimum duration of backup power required, based on the expected duration of power outages and the power demands of critical fleet assets. Then, evaluate emergency backup power requirements based on the maximum energy demand of critical fleet assets and use this information to size backup generators and alternative energy solutions.
3. Deploy networked/smart charging stations for the Town's fleet to enable monitoring of utilization, remote monitoring and diagnostics, and manage energy use. By strategically

managing charging loads and charging times with these stations, the Town can avoid excessive energy consumption at peak demand periods.

4. For electric vehicle supply equipment (EVSE) maintenance and servicing, prior to the RFP phase for EVSE design and installation, establish a minimum uptime requirement for EVSE and determine whether routine EVSE maintenance will be conducted by the vendor or vendor's third party, a third party contracted by the Town, or by Town staff.

5. For EVSE maintenance and servicing on an ongoing basis, after EVSE design and installation, conduct regular maintenance and inspection for all EVs and EVSE to identify any potential issues before they escalate. For EVs, this includes checking battery healthy, tire pressure, brake systems, and other critical components. For EVSE, this means conducting routine functional testing of the equipment to ensure it is operating properly. Train drivers on correct EVSE usage, including correct charging port seating and cable management.

6. When facilities are retrofitted to implement EVSE and maintenance infrastructure, evaluate technologies that can monitor and mitigate potential EV fires such as thermal imaging cameras and gas sensors to identify sudden fluctuations or irregularities that can indicate potential issues leading to thermal runaway.

Operations and Education

1. Take the first step towards EV deployment by leveraging the existing PHEV fleet and underutilized charging infrastructure. Encourage minimizing the use of the gasoline engine in PHEVs to maximize GHG emissions reductions and cost savings.

2. Implement protocols for monitoring and managing battery health of EVs such as establishing a minimum state-of-charge for plugging in, optimizing charging schedules, monitoring driver usage and correcting behaviour if necessary, and identifying signs of battery degradation or malfunction early.

3. Provide comprehensive training to drivers on the safe operation of electric vehicles including understanding EV-specific features, charging procedures, regenerative braking, and emergency protocols. This can be incorporated into the Town's Vehicle Use Policy which should be updated to reflect operation of EVs, such as driver expectations and charging etiquette.

Financial Implications:

There are a number of recommendations that have financial implications. While many of the projects are currently identified within the Town's 10-Year Long Range Capital Forecast, the projects are not currently funded. Staff will review the recommendations of this Strategy annually, and make recommendations to Council. Projects identified within this Strategy will have different funding sources, as some are growth related, whereas others may be considered as part of the Town's asset replacement strategy.

Communication Issues:

N/A

Relationship to the Strategic Plan:

The implementation of a Sustainable Green Fleet Strategy aligns with the following sections of the Strategic Plan:

Pillar 3: Modernizing Our Community (MC)
MC Priority 4: Ready Our Organization for the Future
4.2: Ensure an efficient and effective service delivery

Conclusion:

The Sustainable Green Fleet Strategy will provide a framework for strategic investments relating to low or zero emission fleet acquisitions for the next fifteen (15) years. Understanding the value that Ajax residents place upon the environment and local GHG emissions, it is essential that the Town make the appropriate investments to meet the community needs.

Although this is a 15-year Plan, it will be important to monitor the progress, complete annual reviews, understand emerging technologies and track the emission reductions annually to ensure the reduction targets are being met or exceeded.

Attachments:**Appendix A: Sustainable Green Fleet Strategy**

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Submitted by:

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Approved By:

Dianne Valentim – Director of Finance/Treasurer

Approved by:

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