# Report to Council

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| **Date:** | June 9, 2025 |
| **To:** | Council |
| **From:** | City Manager |
| **Subject:** | Sustainable Fleet Strategy |
| **Department:** | Infrastructure Operations |

**Recommendation:**

THAT Council receives, for information, the report from the Infrastructure Operations Department dated June 9, 2025, on the updated Sustainable Freet Strategy;

AND THAT Council directs staff to further explore and report back on, the key initiatives as noted in the Sustainable Fleet Strategy, based on decarbonization scenario 1, as described in the report from the Infrastructure Operations Department dated June 9, 2025.

**Purpose:**

To receive the Sustainable Fleet Strategy and to direct staff to further explore and report back on, key initiatives, as actions in the Sustainable Fleet Strategy based on decarbonization scenario 1.

**Council Priority Alignment:**

**Climate & Environment**

**Background:**

Building upon the City of Kelowna's commitment to climate and environment, the Sustainable Fleet Strategy (SFS) integrates a forward-looking approach that balances environmental stewardship with economic prudence. By prioritizing innovative solutions, such as the integration of hybridized operational frameworks and investments in cutting-edge vehicle technologies, the SFS ensures adaptability to emerging trends while addressing immediate climate goals.

It further advocates fostering partnerships with industry leaders to accelerate the adoption of groundbreaking practices and to establish Kelowna as a regional leader in sustainable fleet management.

This vision of transformation not only enhances mobility but also contributes to a healthier urban environment, laying the foundation for long-term resilience and community well-being whilst being fiscally prudent.

**Discussion:**

The Sustainable Fleet Strategy (SFS) for the City of Kelowna is a detailed plan aimed at addressing the critical environmental challenges posed by municipal vehicle and equipment operations. Currently, fleet operations contribute approximately 48% of the city's corporate greenhouse gas (GHG) emissions, therefore, the strategy underscores the need for effective decarbonization. Aligning with the Corporate Strategic Energy Management Plan, the primary objectives of the SFS include achieving a 40% reduction in GHG emissions by 2030 compared to 2007 levels and attaining net-zero corporate emissions by 2050. This document serves as a roadmap to transform the fleet into a model of efficiency, sustainability, and innovation while preserving operational capacity.

Key Initiatives and Strategic Directions:

Fleet Rightsizing:
Fleet rightsizing is a foundational pillar of the strategy, involving a comprehensive assessment of the number of vehicles and utilization. By identifying redundancies and inefficiencies, the city can expect to reduce the fleet by potentially up to 50 vehicles, ensuring only essential vehicles remain in service. This initiative not only mitigates emissions but also lowers costs related to vehicle acquisition, maintenance, fuel consumption, and eventual replacement, aligning with sustainability goals without compromising service quality.

Adoption of Low-Carbon Technologies:
The SFS emphasizes transitioning to low-carbon technologies. This shift is central to achieving significant and meaningful emissions reductions and operational efficiencies. Recommended technologies include:

- Electric Vehicles (EVs): Recognized as the optimal choice for light-duty applications, EVs offer mature technology, operational cost savings, and reduced environmental impact. Their reliability and affordability make them a cornerstone of the strategy for our light fleet.
- Hydrogen Solutions: For medium and heavy-duty vehicles, hydrogen-power technologies are identified as critical for long-term decarbonization. While challenges such as infrastructure development and market penetration remain, hydrogen internal combustion engines (H2-ICE) are anticipated by 2031, providing compelling zero emission solutions for heavy-duty applications.. Cost effective partial decarbonization can currently be achieved by applying direct hydrogen injection technologies on existing equipment. These retrofits are technologically mature, reasonably priced and deliver an immediate reduction in tailpipe emissions thus providing a cost effective and meaningful interim solution. In the longer term, hydrogen fuel cell solutions (HFCE) will be considered where applicable, viable and best value.
- Renewable Diesel: Hydrotreated vegetable oil (HVO), or 'renewable diesel', is made from vegetable oils and animal fats. It can be used in select diesel engines without modification as a 'drop-in' replacement for diesel, it performs equally well. HVO tailpipe emissions are marginally cleaner than diesel. Net $CO_2$ emissions for HVO are typically 70% lower than diesel, depending on the production and distribution methods, as the renewable feedstock used to make HVO

absorbs carbon during its growth. HVO remains more expensive than diesel, particularly where there are no government subsidies thus making it a temporary, transitional solution.

- New and Emergent Technologies: Continuous innovations will present options that were not contemplated as part of this strategy. Should those opportunities arise, we should remain open to evaluate and integrate new technologies into our strategy when deemed viable.

Strategic Charging Infrastructure Development:

Transitioning to EVs necessitates robust charging infrastructure which is crucial for operational continuity and cost optimization. Two strategic configurations are proposed:

1. Daisy Chain Configuration: Featuring 54 Level 1 chargers and 86 Level 2 chargers, this setup addresses approximately 99% of fleet charging needs. A daisy-chain configuration is where each charger's output is linked to the next charger's output. This allows multiple devices to share a common power source, streamlining wiring and reducing the number of power supplies needed.
2. Dedicated Chargers: Incorporating 126 Level 1 chargers and 88 Level 2 chargers, this configuration offers comprehensive coverage for all fleet requirements. Dedicated EV charges have their own circuit and provide faster, more reliable charging. However, it involves coordination challenges, longer implementation timelines and has higher associated costs.

Given the advantages in terms of lower expenditure and streamlined deployment and scalability, the Daisy Chain Configuration is preferred.

Financial Implications:

Comprehensive financial analysis forms the backbone of the strategy, ensuring cost-effectiveness while prioritizing sustainability:

- Electric Vehicles: Offering the highest Net Present Value (NPV) and lowest Marginal Abatement Cost (MAC), EV adoption presents significant financial and environmental benefits.
- Hydrogen Vehicles: Although characterized by higher capital and operational costs, hydrogen-powered solutions are indispensable for medium and heavy-duty decarbonization. Their inclusion is vital for achieving our long-term objectives for emissions and sustainability.

Maintenance and Operational Adaptations:

The transition to a sustainable fleet is hindered by limitations in the existing maintenance infrastructure:

- Space constraints and dated facilities restrict the integration of advanced EV and hydrogen technologies.
- Technician capacity is insufficient and specialized training programs for emerging technologies are lacking.
- Tools and protocols tailored to EVs and hydrogen vehicles are not yet in place, complicating effective fleet management.

Future Requirements:

To address these challenges, the SFS outlines the following measures:

- Expanding and upgrading maintenance facilities by 4 bays to 12 bays, equipped for traditional ICE vehicles, EVs, and hydrogen vehicles. (further expansion to 16 bays by 2050).
- Developing technician training programs focused on EV and hydrogen vehicle technologies to build a skilled workforce.

- Integrating advanced telematics systems for improved fleet management, alongside updated safety protocols for new technologies.

Fleet Decarbonization Scenarios:
The strategy explores two potential scenarios for fleet decarbonization:

- Scenario 1: Assuming timely adoption of recommended technologies, this scenario predicts a 37% reduction in emissions by 2030 and a 95% reduction by 2050. It represents the ideal pathway to achieving ambitious climate goals.
- Scenario 2: In the event of delayed adoption, emissions reductions are projected to be limited to a 26% reduction by 2030, catching up to Scenario 1 by 2050. This pathway highlights the critical nature of prompt and decisive action for short-term gains.

Both scenarios underscore the importance of grid decarbonization in achieving full net-zero emissions, with utilities and energy providers playing a key role in addressing this aspect.

**Conclusion:**

The Sustainable Fleet Strategy is a visionary plan that positions the City of Kelowna as a leader in municipal fleet sustainability. By leveraging advanced technologies, optimizing fleet size, and investing in infrastructure and training, the city demonstrates its commitment to addressing climate change while ensuring operational efficiency and fiscal responsibility.

It will also serve as a catalyst for our community partners that are looking for cost effective ways to decarbonize their fleet by sharing the approach and the success of the emerging technologies as well as the associated ecosystem challenges for alternative fuels such as hydrogen.

This strategy not only serves as a roadmap to a greener future but also establishes Kelowna as a role model for municipalities aiming to achieve ambitious climate goals.

**Internal Circulation:**
Fleet Services
Energy Management
Climate action and Environment
**Considerations not applicable to this report:**
Legal/Statutory Authority:
Legal/Statutory Procedural Requirements:
Existing Policy:
Financial/Budgetary Considerations:
Consultation and Engagement:

**Submitted by:** G. Bos, Infrastructure Operations Department Manager

**Approved for inclusion:** M. Logan, General Manager, Infrastructure

**Attachments:**
Attachment A: Sustainable Fleet Strategy Report