# Sustainable Fleet Strategy

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# Introduction to the updated Green Fleet Strategy

- Overview of the city's commitment to sustainability.
- Importance of reducing corporate emissions through fleet management.
- Alignment with long-term climate goals and community health.
- Overview of innovative technologies and strategies in the plan.
- Decarbonization scenarios

City of Kelowna

# City of Kelowna Sustainable Fleet Strategy

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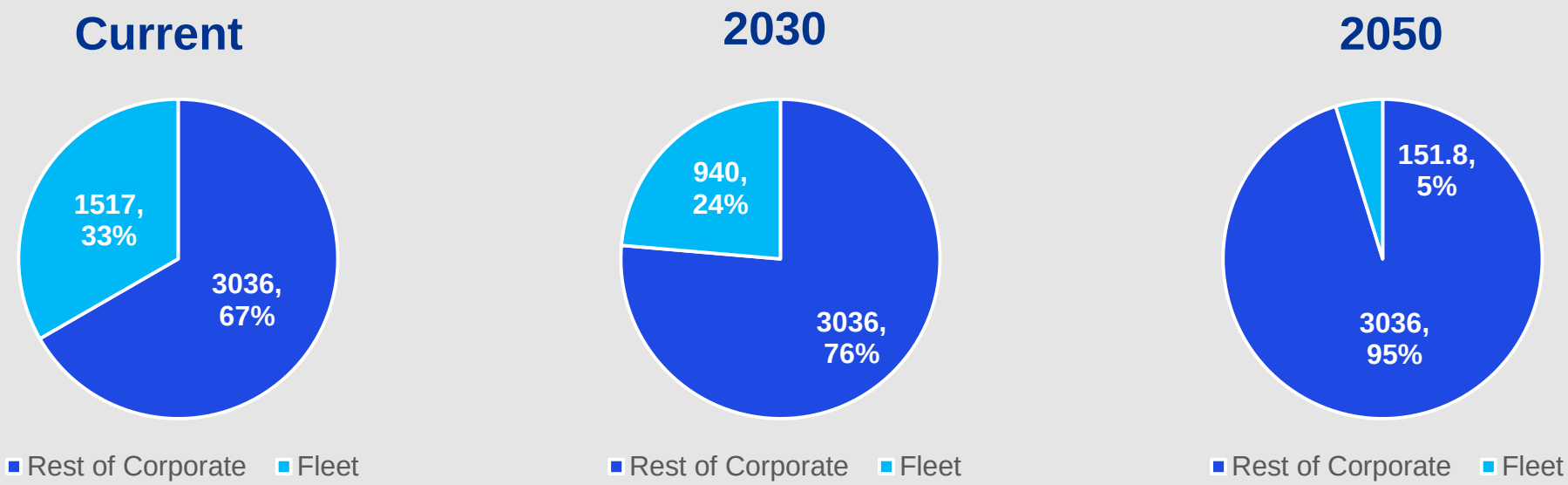
# Context and Objectives



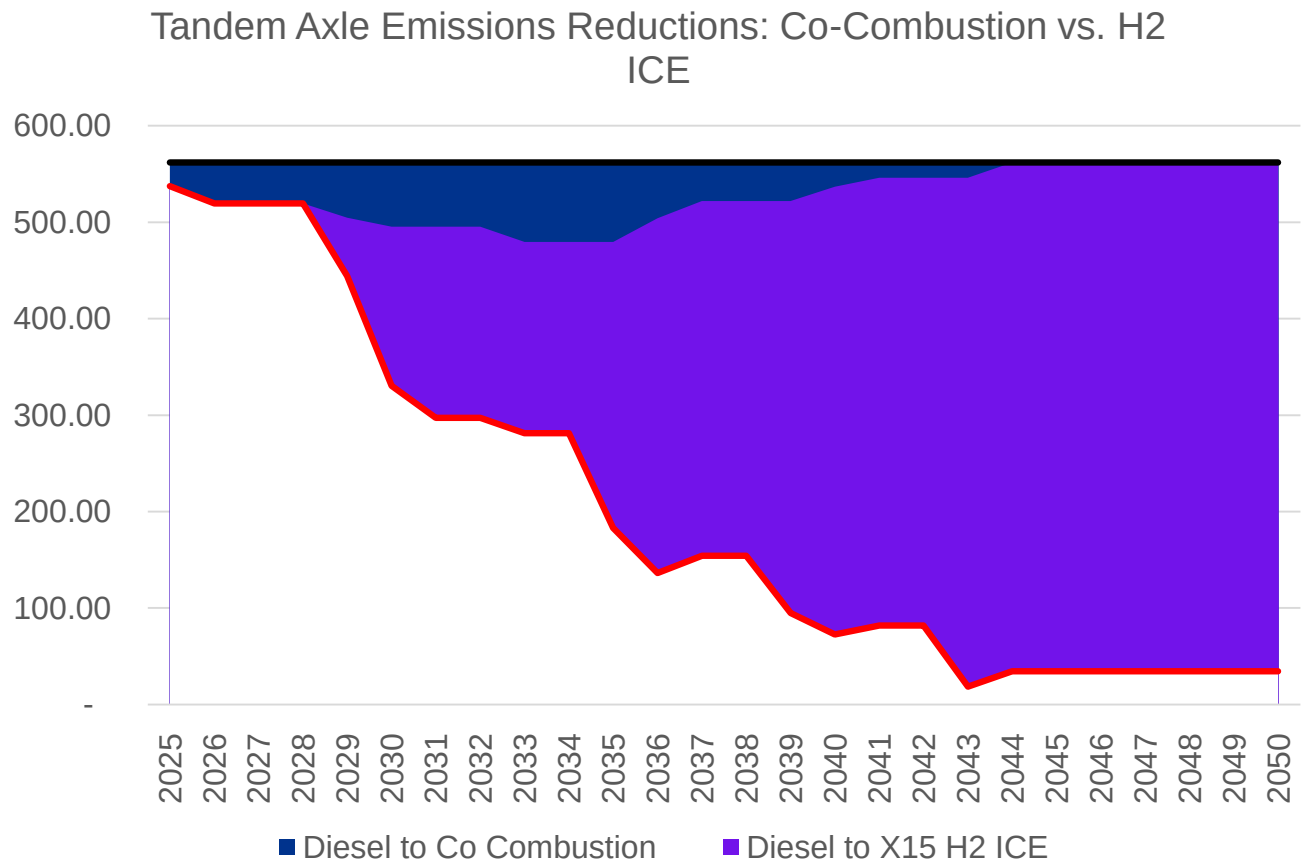

**The timely adoption of recommended fleet technologies can play a substantial role in reducing the City's corporate emissions.**

# Fleet Rightsizing

| | Number of Vehicles | |
|---|---|---|
| **Vehicle Class** | **Current** | **Range of Reduction** |
| Cars | 32 | 1 - 2 |
| Vans | 31 | 9 - 13 |
| SUV | 13 | 3 - 5 |
| Light Duty Truck | 157 | 11 - 16 |
| Single Axle Truck | 22 | 6 - 9 |
| Tandem Axle Truck | 17 | - |
| | **TOTAL** | 30 - 45 |

# Adoption of Low-Carbon Technologies

| Vehicle Class* | Short-Term (2025-203X) | Long-Term (203X-2050) |
|---|---|---|
| **Light Duty** | EV | EV |
| **Other Heavy Duty** | Hybrid Range Extenders | H2 ICE |
| **Tandem Axle** | Co-combustion retrofits | H2 ICE/FC EV (shown right) |



# The City's Hydrogen Journey

70%

Despite challenges with hydrogen production, supply, infrastructure, and market penetration, it remains critical to reducing the City's fleet emissions, because **~70%** of fleet emissions are from heavier duty vehicles that cannot be electrified at this point in time.

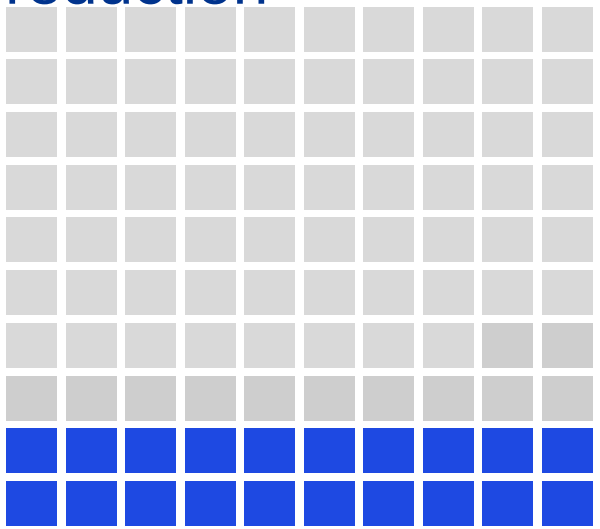
Co-combustion offers a **gradual, measured transition** towards hydrogen, providing immediate GHG reductions while leveraging current infrastructure based on actual data.

Kelowna can **pilot hydrogen with co-combustion** in the short term while gradually transitioning to H2 ICE or FCEV as hydrogen infrastructure develops and new technologies become available

**By securing supply and testing hydrogen on a smaller scale early-on, the City can better take advantage of the H2 ICE opportunity when vehicles hit the market.**

# Renewable Diesel

20%
reduction



- Renewable diesel can present opportunities for emissions reductions of up to 85% on a lifecycle basis,
- Origin and feedstock reduce **lifecycle emissions reduction opportunities of only 20%.**
- Tailpipe emissions for renewable diesel are only slightly lower than conventional diesel.
- **renewable diesel significantly reduces non-GHG tailpipe pollutants.**
- Use of agricultural products as an input to fuel production (**diverting resources from food to fuel)**

# Strategic Charging Infrastructure Development

| Scenario: | DC | PDC |
|---|---|---|
| **Total level 1:** | 54 | 126 |
| **Total level 2:** | 88 | 88 |
| **Total Hours of Charging** | 3,510 | 3,510 |
| **Total Range (km)** | 26,000 | 52,000 |
| **Charging Speed (km/hr)** | 7 | 15 |
| **% Fleet Needs Met** | 99% | 100% |
| **% Surplus over Fleet Need** | 72% (~15,000 daily adjusted utilization) | 245% (~15,000 daily adjusted utilization) |

While both DC (Daisy Chain) and PDC (prioritized dedicated Charging) ensure that vehicles can reliably be charged overnight, DC is recommended due to its efficiency, lower labour needs, and potential cost savings.

# Financial Implications

| Vehicle Class* | Short-Term Tech | MAC | Emissions Reductions | Long-Term Tech | MAC | Emissions Reductions |
|---|---|---|---|---|---|---|
| **Light Duty** | EV | High Net Savings | 403 | | | |
| **Other Heavy Duty** | Hybrid Range Extenders | High Net Savings | 150 | H2 ICE /HFCE | High Net Cost | 530 |
| **Tandem Axle** | Co-combustion retrofits | Low Net Cost | 86 | H2 ICE /HFCE | High Net Cost | 530 |

# Maintenance and Operational Adaptations

| | Current State | Future Requirements |
|---|---|---|
| **Space** | Space restrictions and outdated facilities restrict integration of advanced EV and hydrogen technologies. | Expand maintenance facilities to include 12-16 bays for EVs, hydrogen, and traditional ICE. |
| **Technicians** | Insufficient technician capacity and there is a lack of upskilling and specialized training programs in new technologies. | Develop training programs focused on EV and hydrogen technologies to build a skilled workforce. |
| **Tools and Software** | Tools, protocols, and software tailored to EVs and hydrogen are not in place. | Integrate advanced telematics systems for improved fleet management.<br>Establish robust safety protocols for high-voltage and hydrogen systems. |

# Fleet Scenario Analysis Overview

The scenario analysis is the cumulative result of all previous analyses, including attrition, right-sizing for model and type of vehicle, technology and model applicability, and pilots.

**SCENARIO 1**

Based on a strategy of adopting new technologies as soon as they become available without retiring existing assets before the end of their useful life.

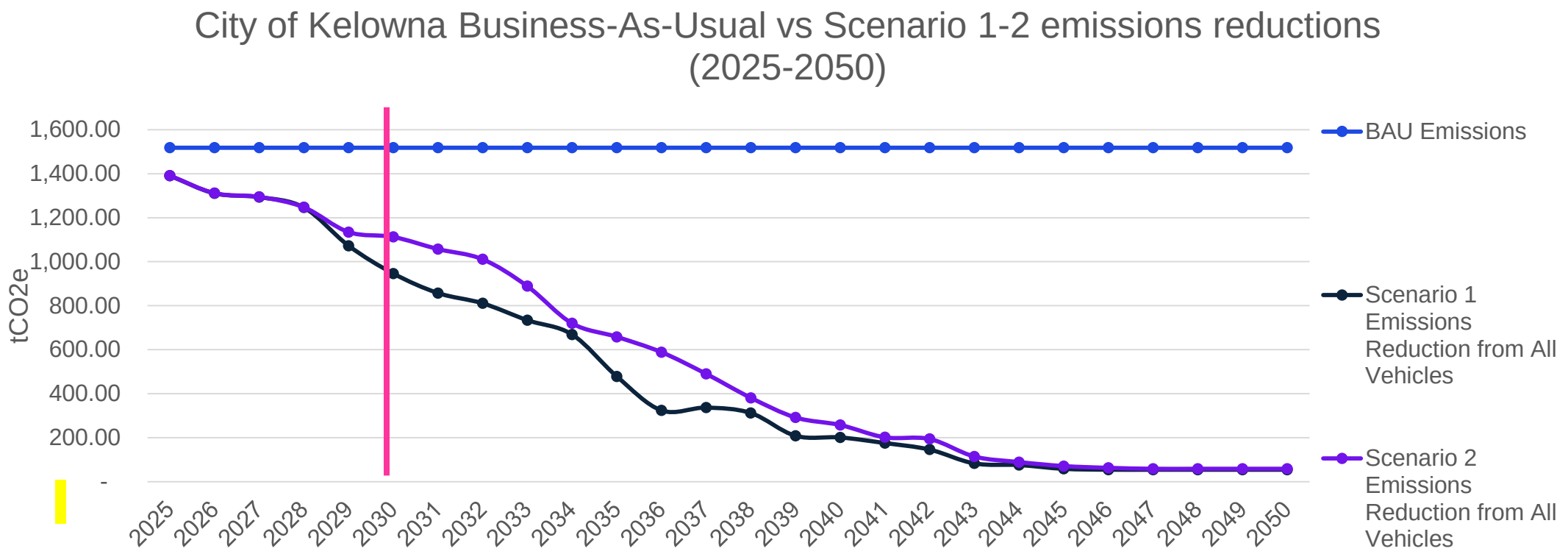
- 2029 X15 $H_2$ ICE availability
- 2033 B6.7 $H_2$ ICE availability

**SCENARIO 2**

Based on an assumed delay in the release of new technologies to market, resulting in extending the duration of temporary alternatives like co-combustion and hybrid range extenders.

- 2033 X15 $H_2$ ICE availability
- 2037 B6.7 $H_2$ ICE availability

# Fleet Decarbonization Scenarios



# Technology Adoption Strategy

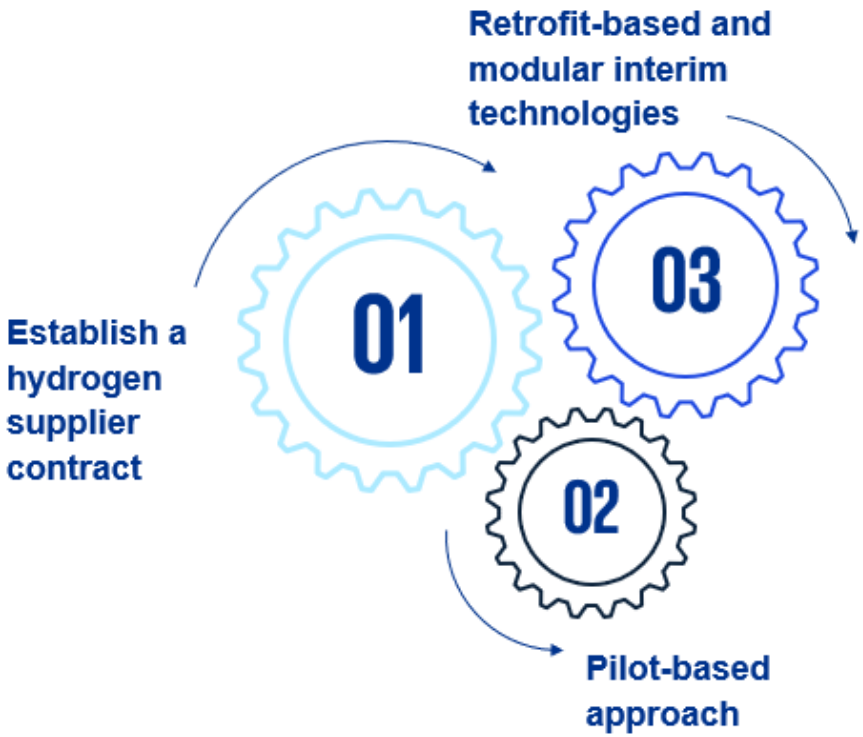
**SCENARIO 1**

Cost savings achieved by being an early adopter of new technologies, such as access to grants and improved likelihood of securing favorable supplier contracts with suppliers (or securing contracts altogether – supply may not be available in the future as demand increases).

**SCENARIO 2**

Cost savings from waiting to implement these technologies, such as reduced costs and risks.

# Building a Strategy around Adaptability




Due to the uncertainty around the future costs and availability of low-carbon fleet technologies, **this fleet strategy is built around adaptability.**

Establishing a scalable hydrogen supplier partnership early-on allows for **fuel availability and demand flexibility**.

Demonstrate the benefits to the community at large early on and share our progress and challenges along the way while inviting others in the valley to join in

These are ultimately new technologies – **we have to pilot them and iterate**. A 1-year piloting period is built into the strategy for all new technologies. The interim solutions are also modular and based on retrofit, allowing them to be easily transferred between vehicles.

# Conclusion

**The Sustainable Fleet 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.**

**01** **Optimization**

Fleet rightsizing exercise enables emissions reductions and allows City to demonstrate commitment to operational efficiency, climate change, and fiscal responsibility.

**02** **First-Mover**

Kelowna is set up as a leader in emerging clean technologies, including co-combustion retrofits and H2 ICE, and can share its experiences with its neighbours and community partners.

**03** **Aligned with Objectives**

The Sustainable Fleet Strategy is a roadmap to alignment with a 95% reduction in fleet emissions by 2050.

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# Recommendation

- As part of our ongoing commitment to sustainability and reducing corporate emissions, it is recommended that we pursue fleet decarbonization according to Scenario 1 as outlined in the Sustainable Fleet Strategy.

- This approach involves adopting new technologies as soon as they become available, without retiring existing assets before the end of their useful life and to pilot new technologies and gather data for informed decision making.

- By adopting Scenario 1, we position ourselves as leaders in emerging clean technologies and demonstrate our commitment to operational efficiency, climate change mitigation, and fiscal responsibility.

City of Kelowna

# Questions/Discussion