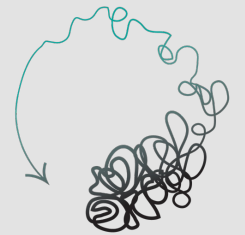


Municipal Fleet Electrification Study

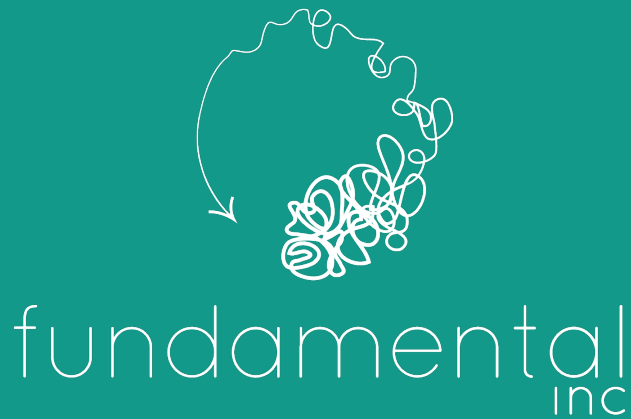
Town of Torbay

November 17th, 2025

Emma Power, P.Eng.
Fundamental Inc.

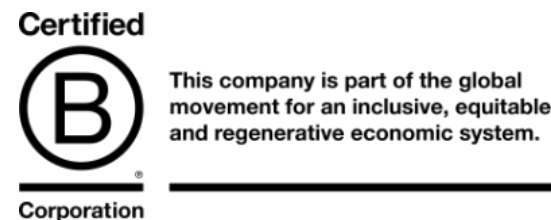


fundamental
inc

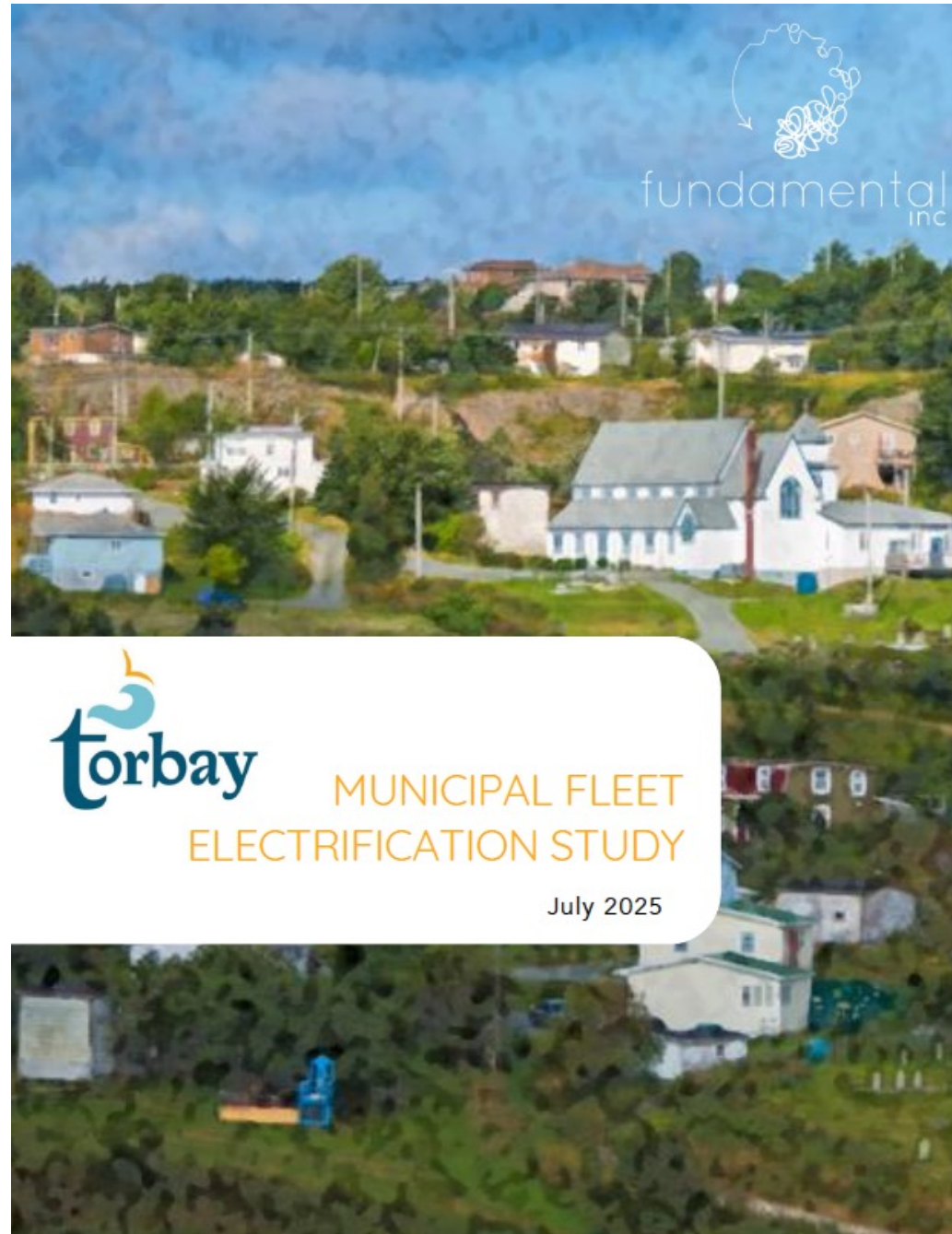


We're a climate action consulting firm

- ❖ **GHG Emissions Inventories**
- ❖ **Climate Change Vulnerability Assessments**
- ❖ **Climate Action Plans (Mitigation and Adaptation) & Feasibility Studies** – building energy efficiency and decarbonization, on-site renewable energy and energy storage, vehicle electrification, organic waste management, etc.
- ❖ **Funding Application Writing**
- ❖ **Eco-Asset Management**
- ❖ **Climate Communication & Public Engagement**



Overview of what we did and the resulting recommendations



First we looked at the historical fuel and maintenance cost data

Table 2.4 Fleet Fuel & Maintenance Costs 2022-2024

Year	Fuel Costs	Maintenance Costs	Total Operating Cost
2022	\$129,925.78	\$214,225.50	\$344,151.28
2023	\$153,745.32	\$191,491.91	\$345,237.23
2024	\$120,323.74	\$224,487.97	\$344,811.71

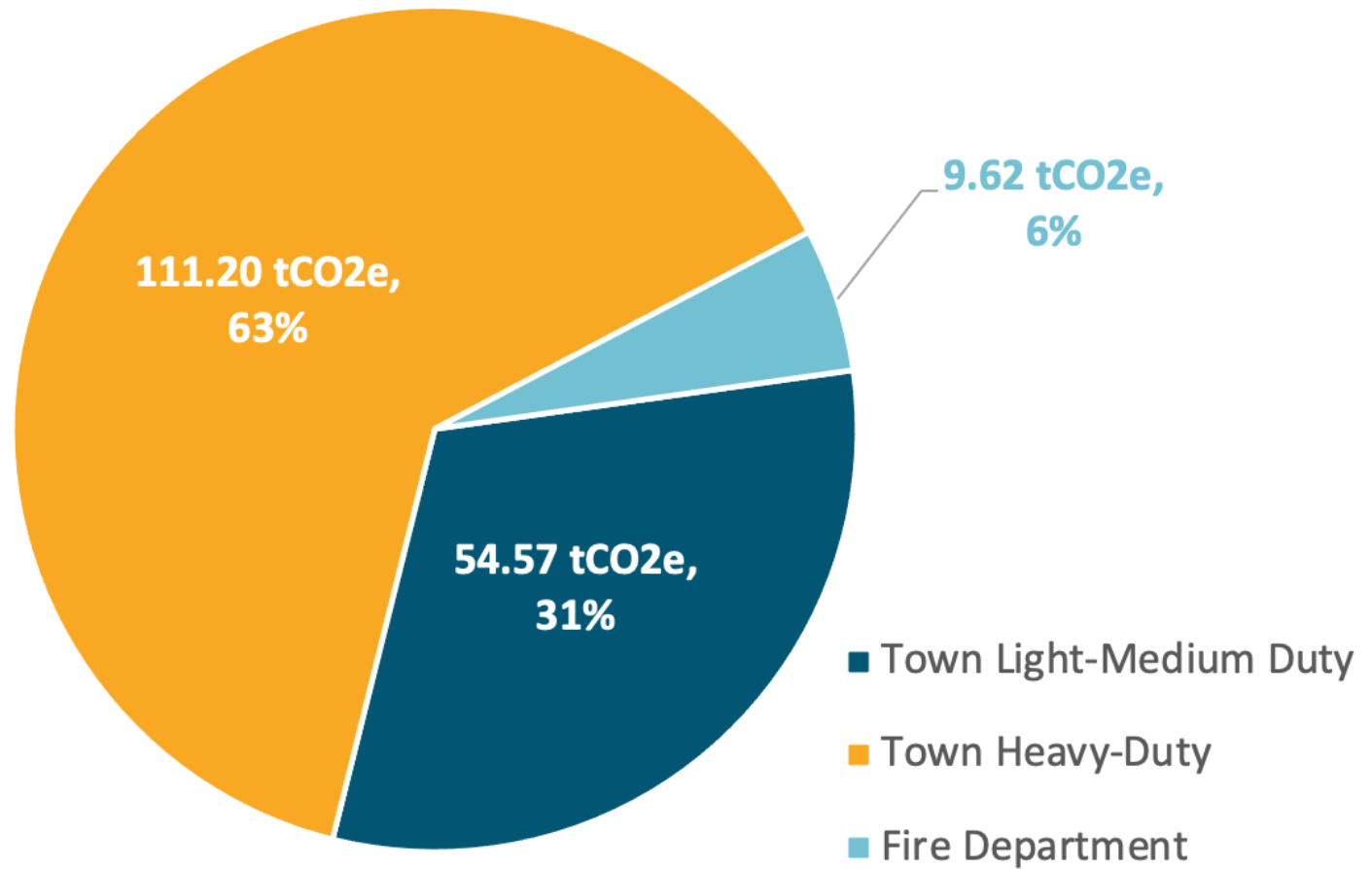
First we looked at the historical fuel and maintenance cost data

Table 2.5 Fleet Fuel & Maintenance Costs by Category, 2024

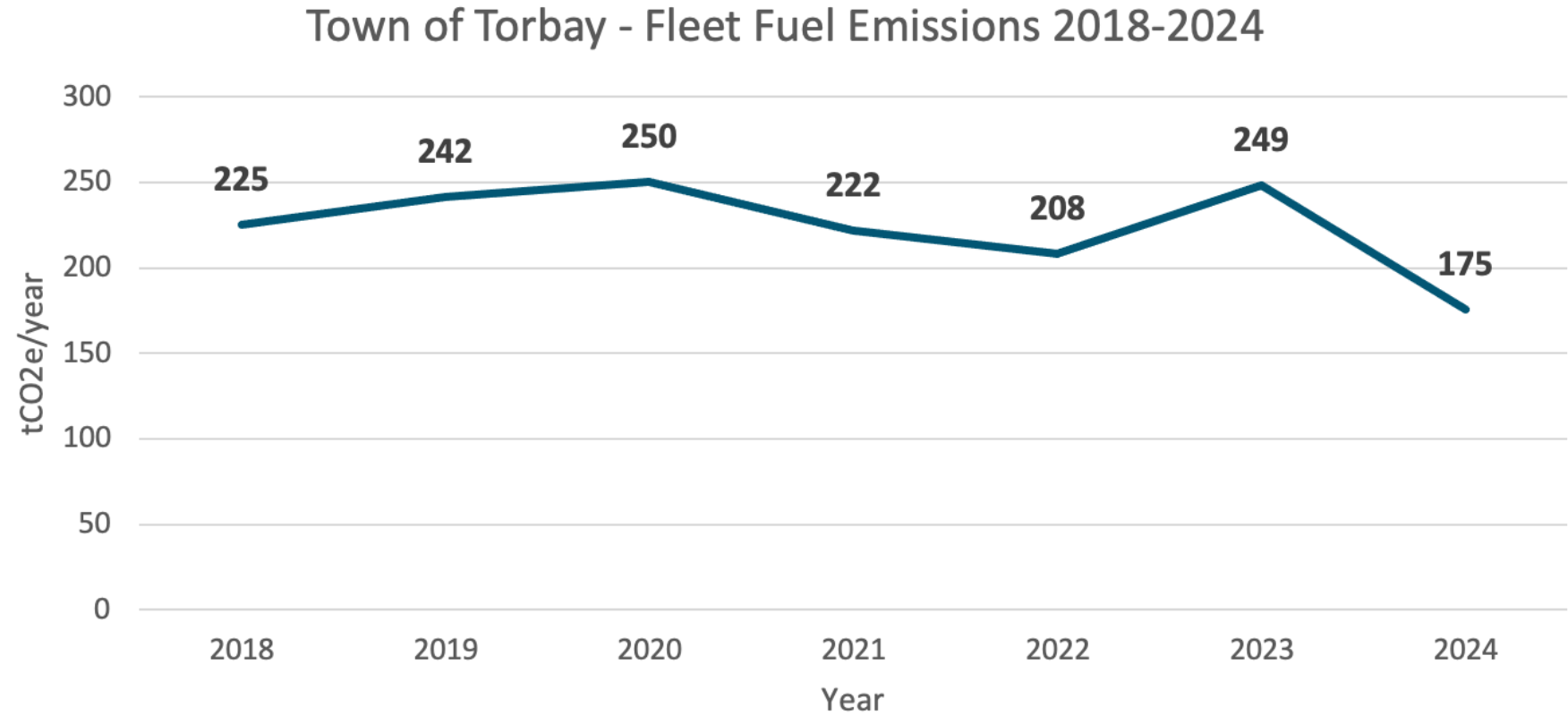
Fleet Category	Total Fuel Costs (2024)	Average Maintenance Costs (2022-2024)	% of Fuel Costs	% of Maintenance Costs
Town Light-Medium Duty	\$40,137.06	\$25,285.50	33%	12%
Town Heavy-Duty	\$73,638.80	\$159,782.96	61%	76%
Fire Department	\$6,547.88	\$25,000.00	5%	12%

As well as the
GHG emissions
associated with
the fuel use

Total 2024 GHG Emissions by Fleet Category



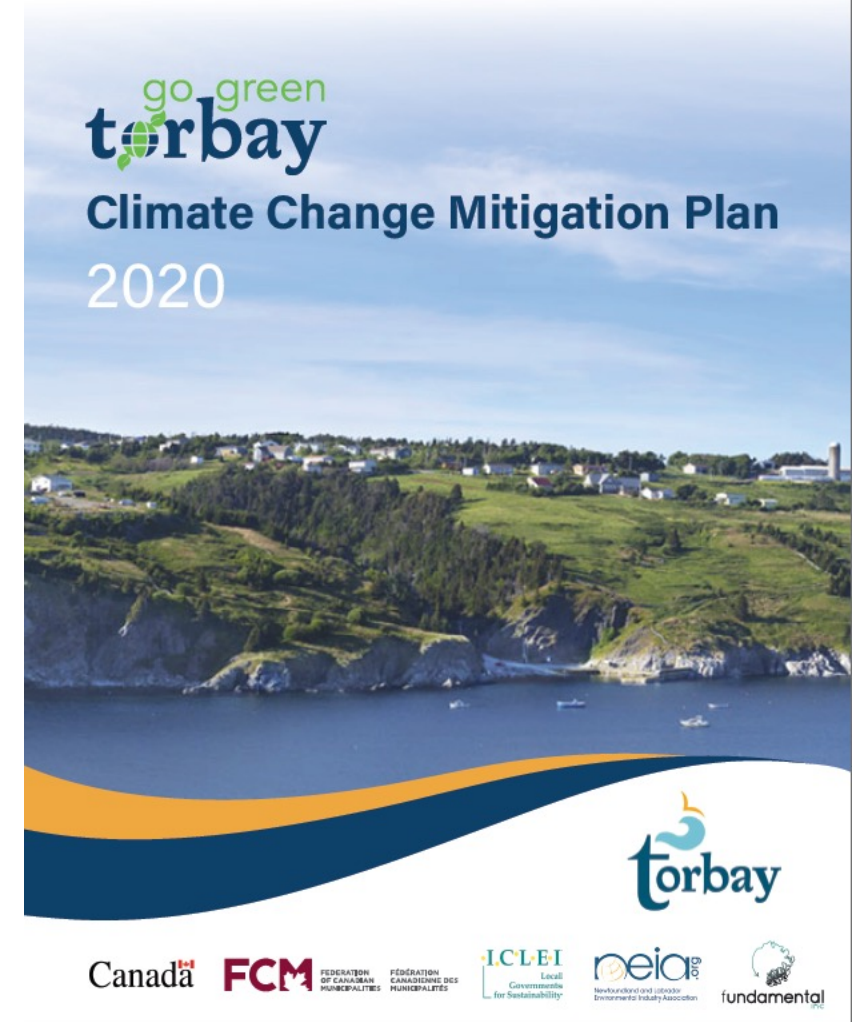
As well as the
GHG emissions
associated with
the fuel use



The Town has made GHG commitments

The 2020 Climate Change Mitigation Plan identified the following emission reduction targets:

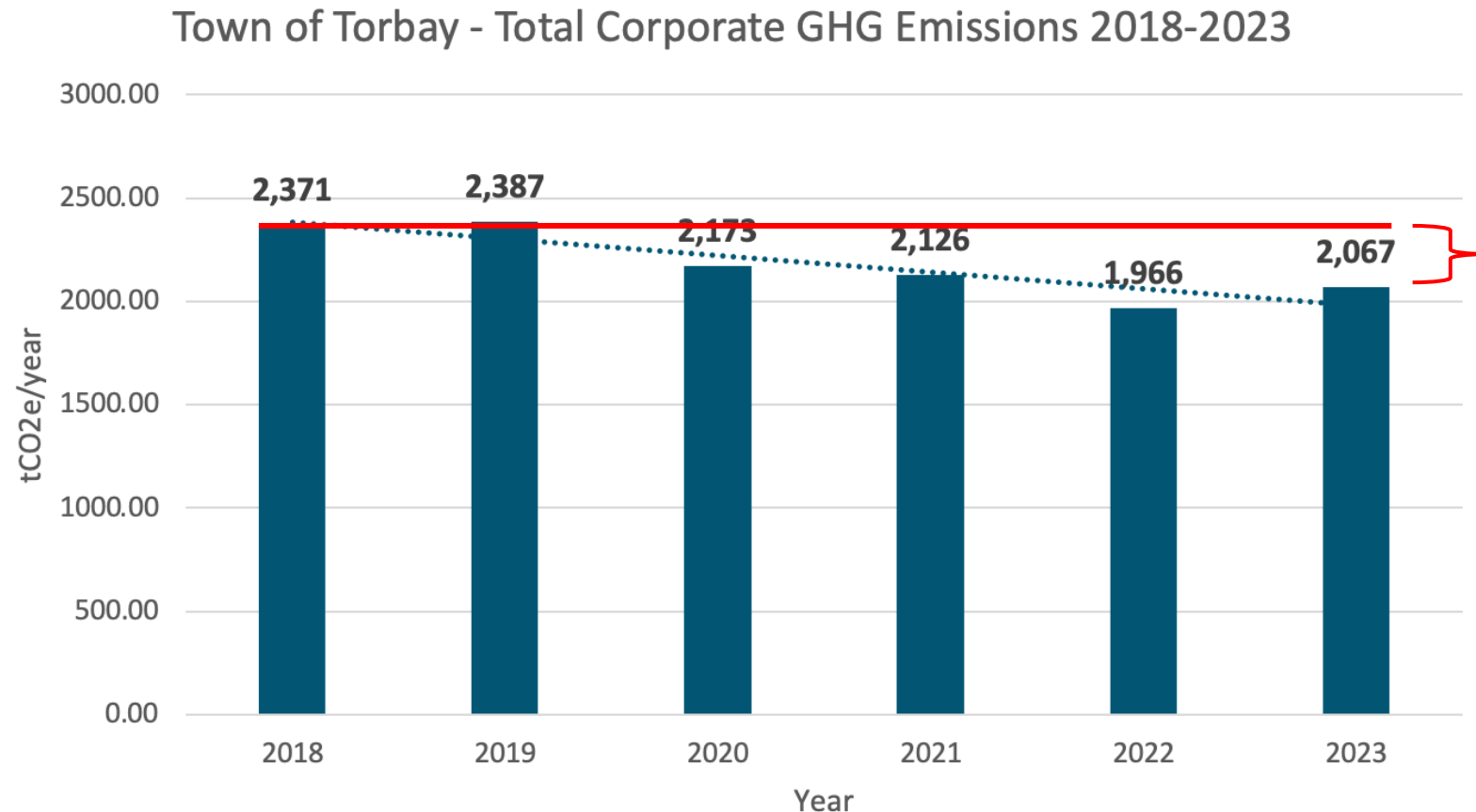
- 3-7% below 2018 levels by 2023
- 30-45% below 2018 levels by 2030
- Net-Zero by 2050



And is
achieving
them!

- 3-7% below 2018 levels by 2023 ✓
- 30-45% below 2018 levels by 2030
- Net-Zero by 2050

What we need to be
thinking about now



You already have a Fleet Replacement and Acquisition Strategy

Light / Medium Fleet Replacement Schedule

Unit No.	Vehicle	Classification	Hours/Km
02-09	2014 GMC 1500	Medium Duty	260405
02-11	2016 Ford F250	Medium Duty	123697
02-12	2017 Ford F250	Medium Duty	187128
02-13	2017 Ford Escape	Light Duty	47870
02-14	2020 Colorado	Light Duty	17104
02-15	2020 Colorado	Light Duty	38172
02-16	2022 Chev Silverado	Medium Duty	47106
02-17	2023 Canyon	Light Duty	14951
02-18	2023 Canyon	Light Duty	18455
02-19	2024 Chev Silverado 2500 HD	Medium Duty	9149
02-20	2025		

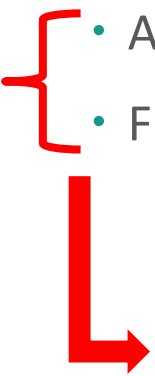
Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Unit Number to Replace	02-06 02-07 02-08		02-09 02-10	02-11 02-12	02-09 *	02-13	02-15	02-14* 02-16*	02-18*	02-17* 02-19*	02-20				

Light Duty Vehicle(Office and Admin Vehicles) Replacement span 7-9 years or 150,000 kms
 Medium Duty Vehicle(PW Work Trucks) Replacement span 5-7 year or 160,000 kms
 XX--XX Kept in Fleet for additional Years
 XX--XX Vehicles Disposed

We looked at what would happen if you stuck with the existing replacement schedule but replaced each vehicle with an electric equivalent

Which led us to this general electrification plan:

- 7 light/medium Town units replaced with EVs by 2030
- 2 light/medium Fire Dept. units replaced with EVs by 2030
- 3 remaining Light & Medium Duty Vehicles replaced with EVs by ~2032
- All Town Heavy-Duty Units replaced with EVs by 2050 (13 units)
- Fire Department Heavy Duty Units replaced with EVs by 2050 (4 units)



We treated heavy-duty vehicles differently because the market is still developing (more on that later)

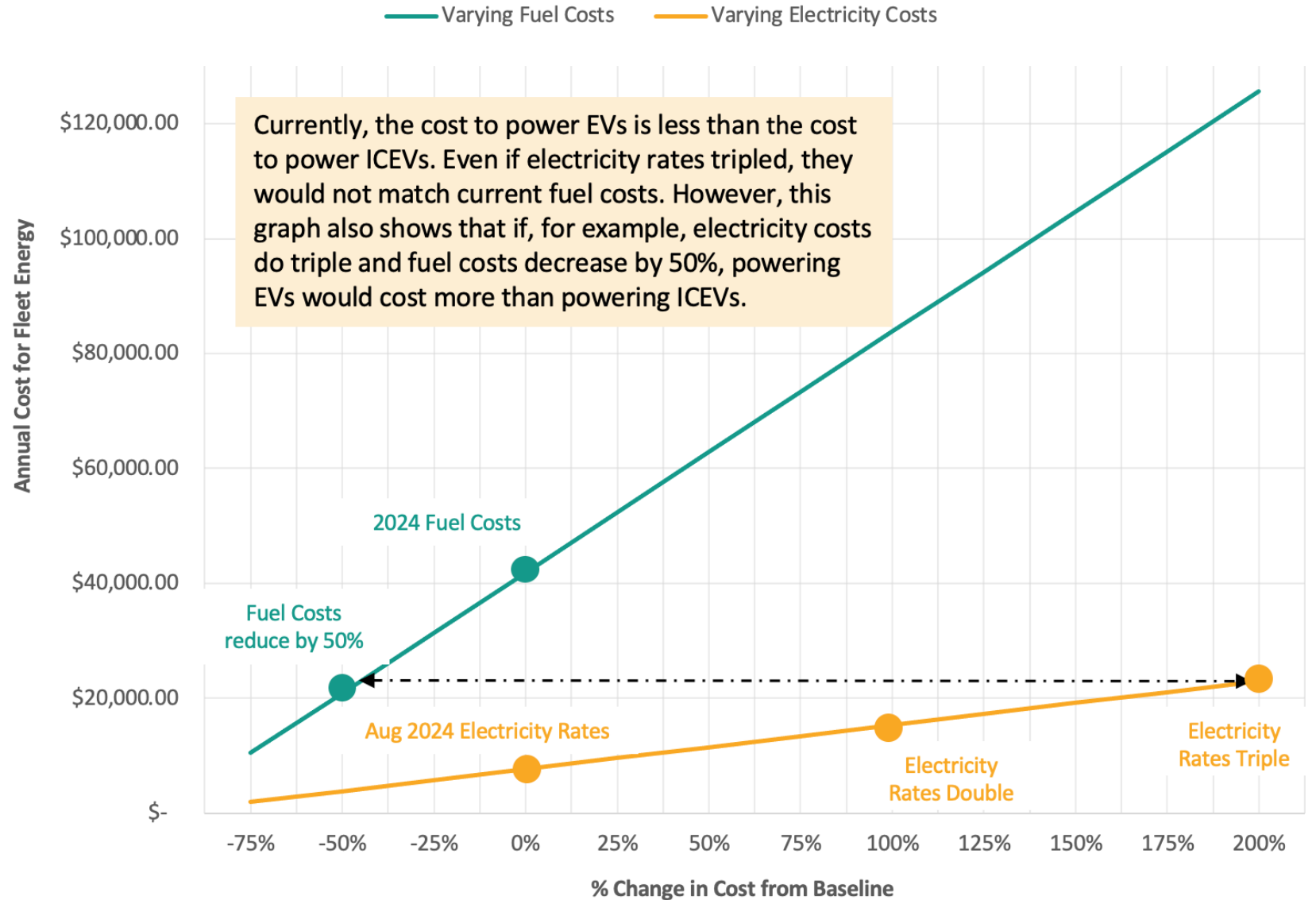
Projected Energy Cost Savings

Table 3.3 Projected Operational Energy Cost Savings

EV Transition Phase	2024 Annual Fuel Cost (gas or diesel)	Projected Annual EV Electricity Cost	Projected Annual Cost Savings with EVs
Town - Proposed EVs by 2030 (7 units replaced)	\$22,681.1	\$4,176.8	-\$18,504.2
Fire Dept. - Proposed EVs by 2030 (2 units replaced)	\$1,744.6	\$321.3	-\$1,423.3
Remaining Light & Medium Duty Vehicles by ~2032 (3 units replaced)	\$17,456.00	\$3,170.7	-\$14,285.3
All Town Heavy-Duty Units by 2050 (13 units replaced)	\$73,638.8	\$22,396.2	-\$51,242.6
Fire Department Heavy Duty Units by 2050 (4 units replaced)	\$4,803.3	\$1,656.2	-\$3,147.1
Full Electric Fleet	\$120,323.7	\$31,721.2	-\$88,602.5

Yes, there is
uncertainty...
but it still looks
good

Annual Cost of Energy for Light-Medium Duty ICE Fleet Vehicles vs. EV Replacements, Considering Potential Cost of Energy Variations



Maintenance
can never be
predicted
accurately,
but...

EV owners spend an average of
40-50% less on maintenance



No engine oil



No exhaust system



No spark plugs

plus the **brakes** typically last longer on EVs
because of the regenerative braking system

Sources: evbuyersguide.caa.ca ; takechargenl.ca/evs

Electric engine = **ONE** moving part

Gas/Diesel engine = **HUNDREDS** of moving parts

Hybrid/Plug-in-Hybrid = **BOTH** types of engines



less maintenance savings than 100% Electric



the Town only buys vehicles from local dealerships - if the
dealership sells EVs, they must be able to service them

Table 3.6 Projected Cumulative Emission Reductions vs. 2018 and 2024 Levels

EV Transition Phase	Cumulative % GHG Reduction (vs. 2024)	Cumulative % GHG Reduction (vs. 2018)
Town - Proposed EVs by 2030 (7 units replaced)	-17.3%	-35.6%
Fire Dept. - Proposed EVs by 2030 (2 units replaced)	-18.6%	-36.6%
Remaining Light & Medium Duty Vehicles by ~2032 (3 units replaced)	-31.9%	-47.0%
All Town Heavy-Duty Units by 2050 (13 units replaced)	-93.5%	-94.9%
Fire Department Heavy Duty Units by 2050 (4 units replaced)	-97.5%	-98.1%

What about emissions?

- 3-7% below 2018 levels by 2023
- 30-45% below 2018 levels by 2030
- Net-Zero by 2050



Table 3.6 Projected Cumulative Emission Reductions vs. 2018 and 2024 Levels

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Town - Proposed EVs by 2030 (7 units replaced)	-17.3%	-35.6%
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Remaining Light & Medium Duty Vehicles by ~2032 (3 units replaced)	-31.9%	-47.0%
All Town Heavy-Duty Units by 2050 (13 units replaced)	-93.5%	-94.9%
Fire Department Heavy Duty Units by 2050 (4 units replaced)	-97.5%	-98.1%

What about emissions?

- 3-7% below 2018 levels by 2023
- 30-45% below 2018 levels by 2030
- Net-Zero by 2050

We also looked at other options...

- Focusing on “heavy hitters” – the vehicles that use the most fuel
 - 4 of the 12 light/medium duty vehicles are responsible for 76% of the light/medium duty emissions
- Reduce idling
 - Never a bad idea, but won't result in significant enough cost or emission reductions (in 2024, idling accounted for about 12% of light/medium duty emissions)
- Plug-in Hybrids or Hybrids
 - We don't recommend – don't maximum cost, emissions, or maintenance cost savings
- Fleet Optimization (right-sizing)
 - Helps to reduce costs and emissions, but still better to just electrify

Guidance on how to assess lifecycle cost of different vehicle options

Table 5.2 ICEV vs. EV Trucks: Upfront + Fuel Costs

Factor	2025 Ford F-150 XLT 4x4 (ICEV) (2.7/6)	2025 Ford F-150 Lightning LXT Standard Range (EV)	2025 Chevrolet Silverado EV WT Standard Range
Price	\$64,840.00	\$74,010.00	\$67,616.00
Provincial Rebate	\$0.00	-\$2,500.00	-\$2,500.00
Federal Rebate	\$0.00	-\$5,000.00	-\$5,000.00
Net Price	\$64,840.00	\$66,510.00	\$60,116.00
Estimated Energy Cost for 160,000 km	\$32,190.40	\$5,394.99	\$5,553.67
Upfront + Fuel Cost	\$97,030.40	\$71,904.99	\$65,669.67

Excel template provided!

Review of one heavy-duty EV option showed it's not quite there

Table 5.4 Volvo Electric vs. Diesel Loader Cost Comparison

	Volvo L120H Diesel	Volvo L120H Electric (no rebates)	Volvo L120H Electric (w/ rebates)
Unit Price	\$463,400.00	\$652,500.00	\$552,500.00 (-\$100,000, pending)
Extended Warranty (6 years, 3000 hrs) - full machine	\$14,300.00	\$14,300.00	\$14,300.00
Total Upfront Cost	\$477,700.00	\$666,800.00	\$566,800.00
Upfront Cost Difference		+\$189,100.00	+\$89,100.00
% Difference		+40%	+19%
Estimated fuel cost over 6 years (considering 2024 diesel consumption of Unit 05-05 and 2024 fuel and electricity rates)	\$44,535.32	\$12,875.52	\$12,875.52
Estimated 3 years of maintenance costs (considering 2022-2024 record of Unit 05-05 and 50% reduction assumption for EV)	\$94,463.29	\$47,231.65	\$47,231.65
Level 3 EV Charger estimate		\$75,000	\$37,500 (-50%, pending)
Estimated Total Lifecycle Cost	\$616,698.61	\$801,907.16	\$664,407.16
Overall Cost Difference Estimate		+\$185,208.56	+\$47,708.56
% Difference		+30%	+8%

Overall, we
found that:

1. suitable electric alternatives exist for the types of light- and medium-duty vehicles used by the Town (less so for heavy-duty vehicles)
2. the total lifecycle cost for light/medium-duty EVs is undeniably less than their ICEV counterparts (less so for heavy-duty)
3. fleet electrification is required to reach the Town's GHG reduction targets as outlined in the council-adopted Climate Change Mitigation Plan

Therefore, we
recommend
that:

- the Town of Torbay **adopt a procurement policy which stipulates that all light- and medium-duty vehicle purchases be electric going forward**
 - With this policy in place, electrification of the light- and medium-duty fleet would proceed according to the existing fleet replacement schedule, without the need for deliberation each time a replacement approaches.
- heavy-duty vehicles and equipment be excluded from the overarching EV policy at this stage because the market is still maturing
 - Heavy-duty EVs will have to be assessed on a case-by-case basis
 - Keep an eye out for funding opportunities and rebates

The Full Feasibility Study Report also includes...

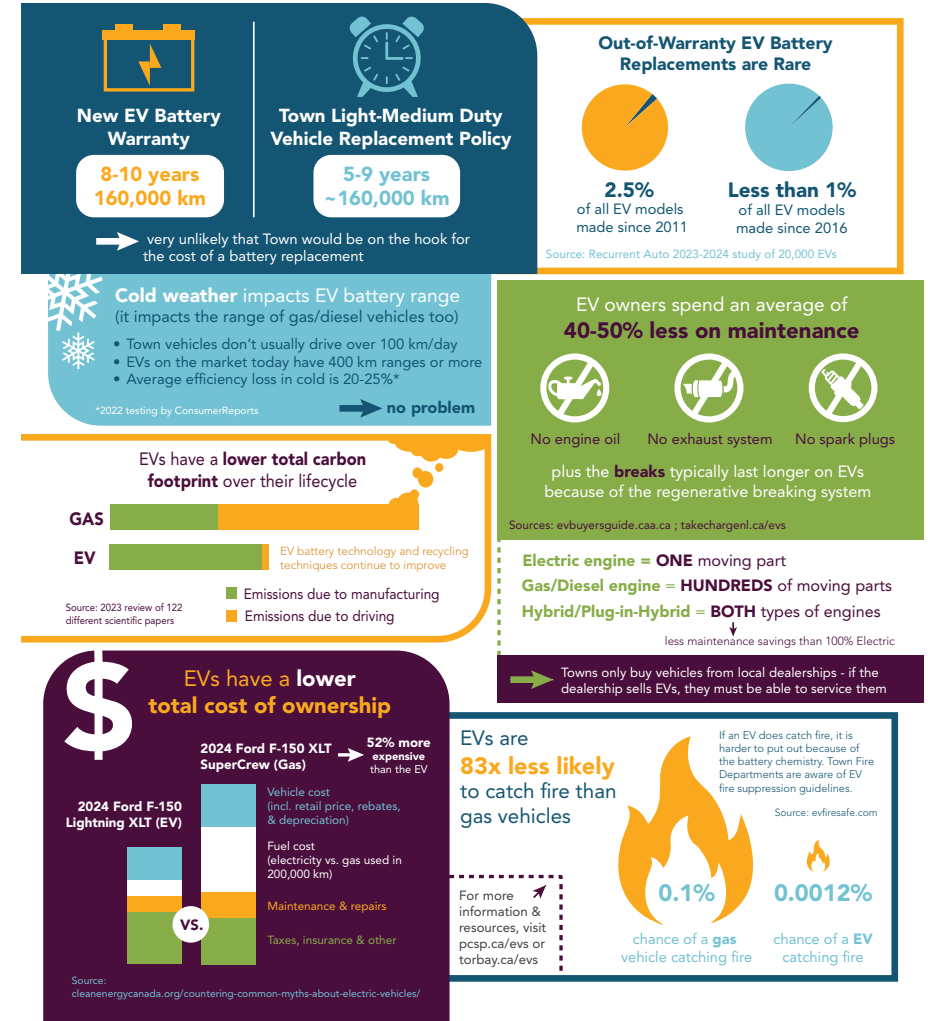
- Guidance on how to interpret EV specifications and terminology
- Tips about EV operation and charging
- Information about cold climate performance, battery maintenance, insurance, lifecycle environmental impacts, EV fire trucks, and EV fire risk and response strategies
- Municipal case studies (including learnings from PCSP)

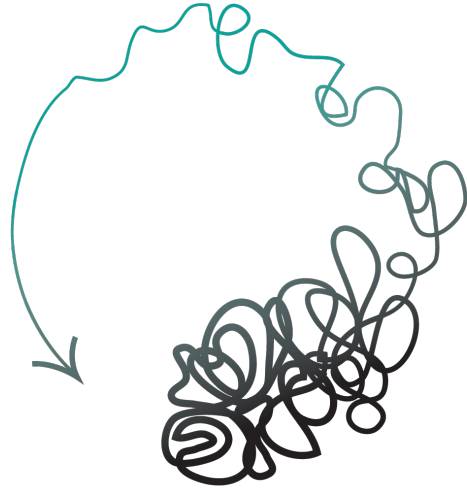
Next/Ongoing Step: Public Education

- Public survey showed there is a lot of misinformation about EVs circulating
 - Full survey results analysis provided in a separate report (112 responses)
- We used the survey results to develop the EV Facts flyer and content on the Town webpage
- Council and Staff having a good understanding of the content of the Feasibility Study will equip you to answer the questions you are likely to get

ELECTRIC VEHICLE (EV) FACTS

A lot of research has been done as part of the feasibility studies for both the Town of Portugal Cove-St. Philip's and the Town of Torbay fleet electrification projects. Here are some of the key points we've learned:





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inc

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