



VINCENTRIC **2024 CANADIAN** **ELECTRIC VEHICLE** **COST OF OWNERSHIP** **ANALYSIS**

CANADIAN MARKET
DECEMBER 2024

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INTRODUCTION

Even with the proliferation of electric vehicles, consumer adoption remains slow.

Buyers often struggle with questions about whether an EV is the right choice for their lifestyle and budget, and wonder if the well-known fuel cost savings of an EV can actually save them money when the sticker price tends to be higher.

As an automotive research organization with over 20 years of experience in measuring the cost to own and operate vehicles in the US and Canada, Vincentric set out to update the 2023 Canadian Electric Vehicle Cost of Ownership Analysis it released last year to answer common questions that Canadian consumers may have about EVs:

- *How cost-effective are EVs compared to ICE vehicles in Canada?*
- *Can EV buyers in Canada expect ownership cost savings beyond the gas pump? If so, where?*
- *What is the environmental impact of powering a vehicle using electricity rather than gasoline in Canada?*

The vehicles analyzed in this study are fully electric vehicles (EVs), sometimes called Battery Electric Vehicles (BEVs), along with internal combustion engine (ICE) vehicles. Plug-in hybrid vehicles (PHEVs) and hybrid vehicles (HEVs) were not included.

The insights uncovered by this analysis can help Canadian car shoppers understand the cost benefits and detriments of switching to an EV and help them make an informed decision about whether an EV is the right choice for them.



EXECUTIVE SUMMARY

Vincentric used its Dynamic Cost to Own™ technology to analyze the total cost of ownership of 50 EVs in Canada versus comparable ICE alternatives and found that 49 of 50 EVs (98%) had lower total ownership costs than their gasoline alternatives. This is a 3 percentage-point increase from the 2023 Vincentric study in which 38 of 40 EVs (95%) had lower ownership costs.

This analysis focused on Battery Electric Vehicles (BEVs) and did not include plug-in hybrid (PHEV) or other hybrid electric vehicles (HEVs).

Fuel and Maintenance costs were the biggest strengths for EVs. *All 50 EVs analyzed had lower Fuel costs* than their ICE alternatives, and *41 of 50 EVs analyzed had lower Maintenance costs*.

Depreciation was a major detriment for EVs. Only 16 of 50 EVs analyzed had lower Depreciation costs than their ICE alternative. For the remaining 34 EVs with higher Depreciation, their costs were an average of \$6,445 higher than their ICE alternatives.

Results in the analysis incorporate the \$5,000 federal point-of-sale rebate for qualifying EVs in Canada. 27 of 50 EVs analyzed qualified, with the rebate applied as a reduction to the vehicle's Market Price (also known as the Purchase Price). Including the federal rebate, all 27 qualifying EVs had lower total cost of ownership than their ICE alternative. Without the federal rebate, 25 of the 27 qualifying EVs still had lower ownership costs.

For environmental impact, *all 50 EVs generated fewer greenhouse gas emissions than their ICE counterparts over five years*, with an average reduction in CO₂ eq emissions of approximately 6 metric tons for EVs. Because EVs do not produce tailpipe emissions, EV emissions were calculated based on the pollutants generated when producing the electricity needed to power the vehicle over the 125,000 kilometers on which the analysis was based.

Even though EVs had an average purchase price of approximately \$8,000 more than a comparable ICE vehicle, they had an average of over \$18,000 in ownership cost savings.

Overall, these results show that, in all but one case, there are considerable cost savings and substantial environmental benefits for EVs in Canada compared to gasoline-powered vehicles.



Vincentric Dynamic Cost to Own technology provides automotive cost of ownership insights to the new, used, and fleet markets in the US & Canada.

METHODOLOGY OVERVIEW

Only fully electric vehicles, sometimes called BEVs, were considered in this analysis.

Plug-in hybrid electric vehicles (PHEVs) and hybrid electric vehicles (HEVs) were not included.

To perform this study, Vincentric first matched 50 EVs currently available in the Vincentric Canadian new vehicle database to comparable ICE alternative vehicles. All but one of the EVs included in the analysis were model year 2024.

Vehicle pairs were matched based on similar specifications and the availability of key data points such as residual values and vehicle pricing.

When selecting EVs, the lowest MSRP/base trim for each model was chosen unless it was not available on the Vincentric database, in which case the next lowest price available trim was used. *The data analysts at Vincentric reviewed over 2,600 vehicle configurations* to identify similarly equipped ICE vehicles for comparison. When possible, the same make and similar body style were selected for the ICE comparison vehicle.

The analysis assumes that all vehicles will be driven 25,000 kilometers per year over the next five years to lay an equal groundwork for comparison. Canadian national averages are used for all cost inputs including labor rate, fuel (both gasoline and electricity), and fees & taxes. This analysis includes federal EV rebates as a reduction to market price for qualifying EVs, and does not consider any provincial or local EV incentives.

More detail on the methodology for this analysis can be found in Appendix A.



of **EVs** had **LOWER TOTAL COST OF OWNERSHIP** than their **ICE** alternative

TOTAL COST OF OWNERSHIP COMPARISON

Vincentric used its Dynamic Cost to Own™ technology to calculate the total ownership costs for all 100 vehicles in the study. The analysis found that 98% of EVs analyzed (49 of 50) had lower ownership costs than their comparable ICE alternative over five years.

The following chart ranks the Top 5 EVs in Canada with the greatest cost savings compared to their ICE counterpart.



TOP 5 COST-EFFECTIVE CANADIAN EVs COMPARED TO ICE VEHICLES

RANK	VEHICLE	FUEL TYPE	PURCHASE PRICE	TOTAL OWNERSHIP COSTS OVER 5 YEARS	EV COST OF OWNERSHIP SAVINGS vs ICE ALTERNATIVE
1ST	2024 Porsche Taycan 4S 4D Sedan	EV	\$127,965	\$119,431	\$55,509
	2024 BMW 8 Series M850i xDrive 4D Gran Coupe	ICE	\$120,938	\$174,940	
2ND	2024 Tesla Model X Long Range 4D Utility AWD	EV	\$111,870	\$117,224	\$41,092
	2024 BMW X7 xDrive40i 4D Utility	ICE	\$110,412	\$158,316	
3RD	2024 BMW i7 xDrive60 4D Sedan	EV	\$148,980	\$168,052	\$37,426
	2024 BMW 7 Series 760i xDrive 4D Sedan	ICE	\$149,056	\$205,478	
4TH	2024 Tesla Model Y Standard Range 4D Utility RWD	EV	\$56,870	\$65,972	\$37,232
	2024 BMW X3 xDrive30i 4D Utility	ICE	\$57,479	\$103,204	
5TH	2024 Ford F-150 Lightning Pro Supercrew SWB 4WD	EV	\$57,790	\$64,286	\$34,488
	2024 Ford F-150 XL Supercrew SWB 4WD	ICE	\$63,107	\$98,774	

A full list showing the Market Price (also known as the Purchase Price) and total cost of ownership results of all 50 analyzed EVs versus their ICE alternative is shown in **Appendix B**.

TOTAL COST OF OWNERSHIP COMPARISON

CONTINUED

For consumers looking to save on costs, Vincentric ranked the total ownership costs for all 50 EVs to determine which models cost the least to own over five years.

Below are the rankings of Top 10 EVs from model year 2024 with the lowest cost of ownership in Canada.



TOP 10 LOWEST COST TO OWN EVs IN CANADA

RANK	VEHICLE	TOTAL OWNERSHIP COSTS OVER 5 YEARS
1ST	2024 Mazda MX-30 GS 4D Utility FWD	\$49,363
2ND	2024 Mini Cooper EV SE 3D Hatchback	\$49,400
3RD	2024 Kia Niro EV Wind 4D Utility	\$51,414
4TH	2024 Fiat 500e 3D Hatchback	\$52,270
5TH	2024 Hyundai Kona EV Preferred 4D Utility	\$52,271
6TH	2024 Nissan LEAF SV 4D Hatchback	\$52,456
7TH	2024 Subaru Solterra Base 4D Utility AWD	\$55,627
8TH	2024 Volkswagen ID.4 Base 4D Utility RWD	\$57,714
9TH	2024 Toyota bZ4X LE 4D Utility FWD	\$57,958
10TH	2024 Hyundai Ioniq 5 Preferred Long Range 4D Utility RWD	\$59,329

A ranking of **all 50** EVs by their total five-year ownership cost results is shown in **Appendix C**.

TOTAL COST OF OWNERSHIP COMPARISON

CONCLUDED

Electric vehicle incentives can be a considerable factor in a consumer's decision to make the switch to electric. At the time this study was conducted, 27 of the 50 EVs analyzed qualified for a \$5,000 federal point-of-sales rebate in Canada that reduced the EV's market price. Including this rebate, all 27 qualifying EVs had lower ownership costs than their ICE alternatives.

To investigate whether qualifying for the federal rebate was a make-or-break factor of an EV having lower ownership costs, Vincentric also analyzed the results for all 27 qualifying EVs without the rebate applied and found that 25 of them still had lower ownership costs than their ICE alternatives. This demonstrates that *qualifying for the federal rebate is not a requirement for EVs to save consumers money.*

With an average purchase price

premium of \$8,079, only 12 of 50 EVs analyzed had a lower Market Price than their gasoline counterparts, and that's with the federal rebate included.

Overall, this analysis found that *while EVs in Canada typically cost more to purchase, 98% of the time they will cost their buyers less to own and operate over five years.*

Although **EVs**
typically **cost more to buy**,
in all but one case,
they **COST LESS**

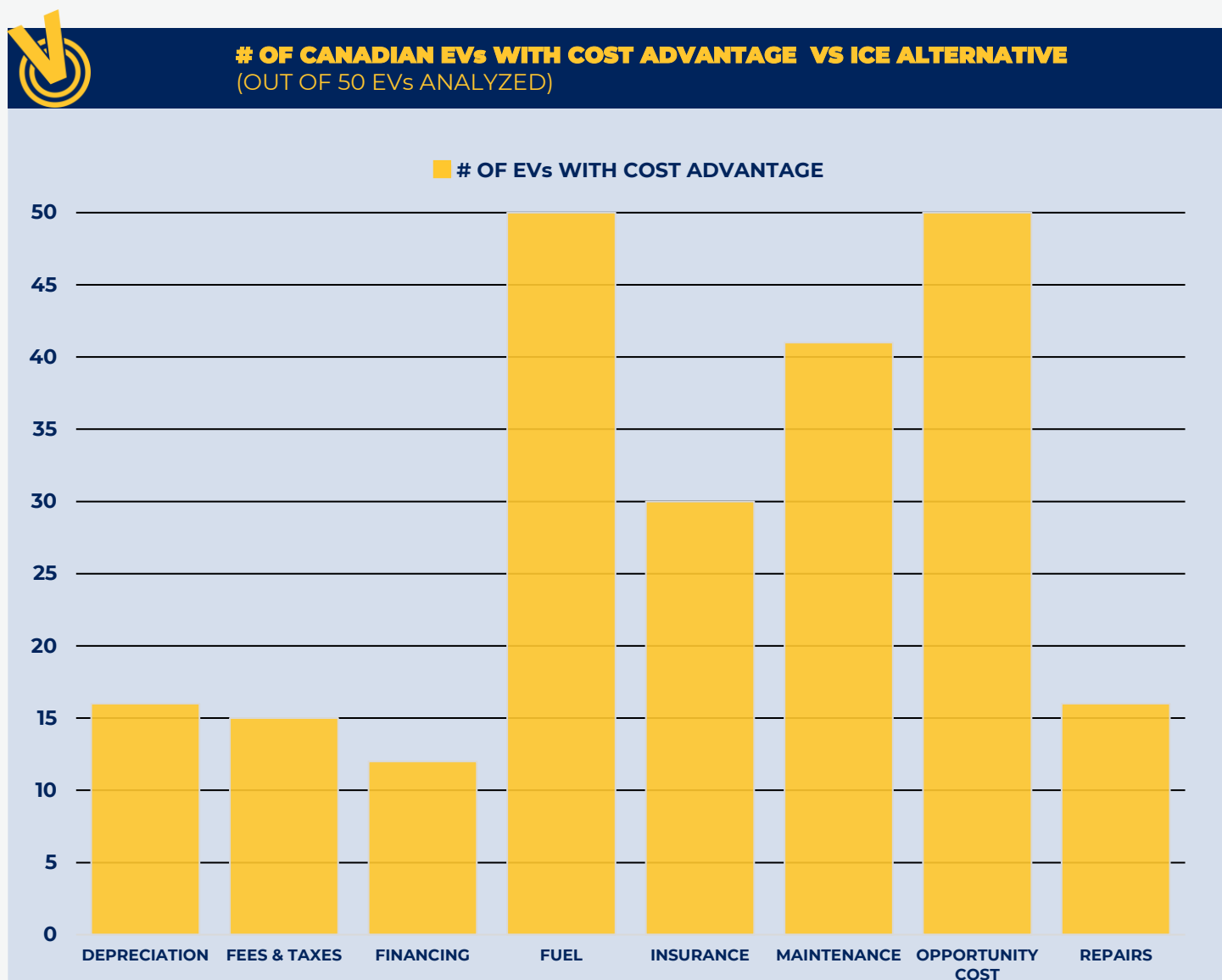
OWN

COST FACTORS

This analysis considered eight different factors of automotive ownership costs: depreciation, fees & taxes, financing, fuel, insurance, maintenance, opportunity cost, and repairs. To identify the strengths and

weaknesses of EVs, the study measured each of these factors in comparison to their ICE alternatives and tallied how often the EV had a cost advantage in each of the 50 vehicle comparisons.

The chart below shows the number of EVs with a cost advantage versus their ICE alternative for each of the eight cost factors.



The above chart shows that Fuel, Maintenance, and Opportunity Costs were the biggest advantages for EVs. Additionally, 32% of the EVs analyzed had an advantage for Depreciation. Detailed results for these cost factors are described in the following sections.

COST FACTORS

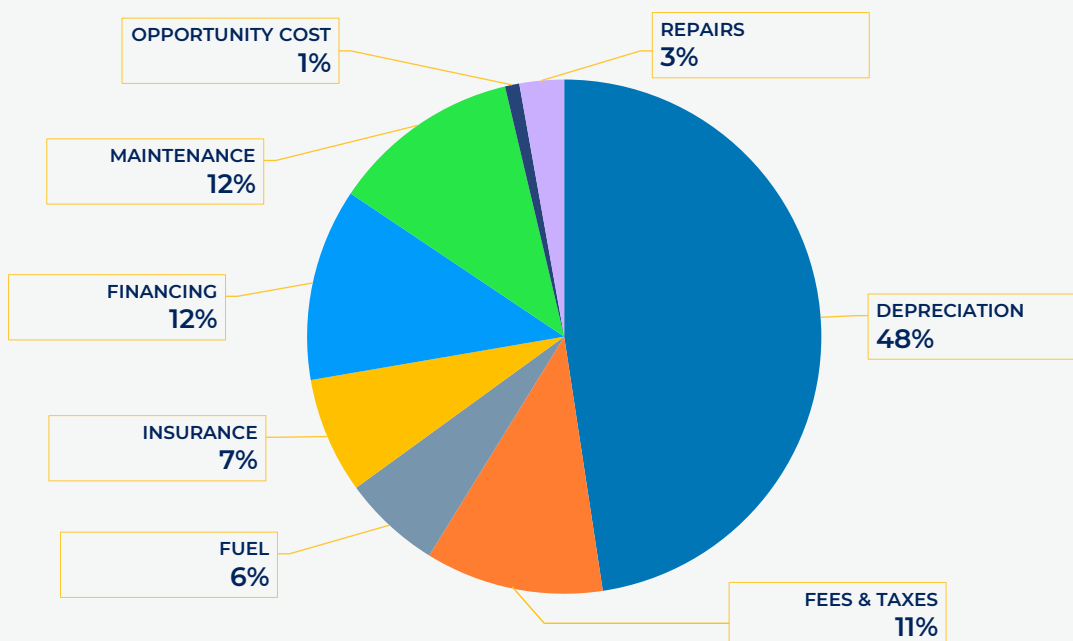
CONCLUDED

Depreciation is the most significant cost factor in a vehicle's cost of ownership, accounting for over 47% of costs

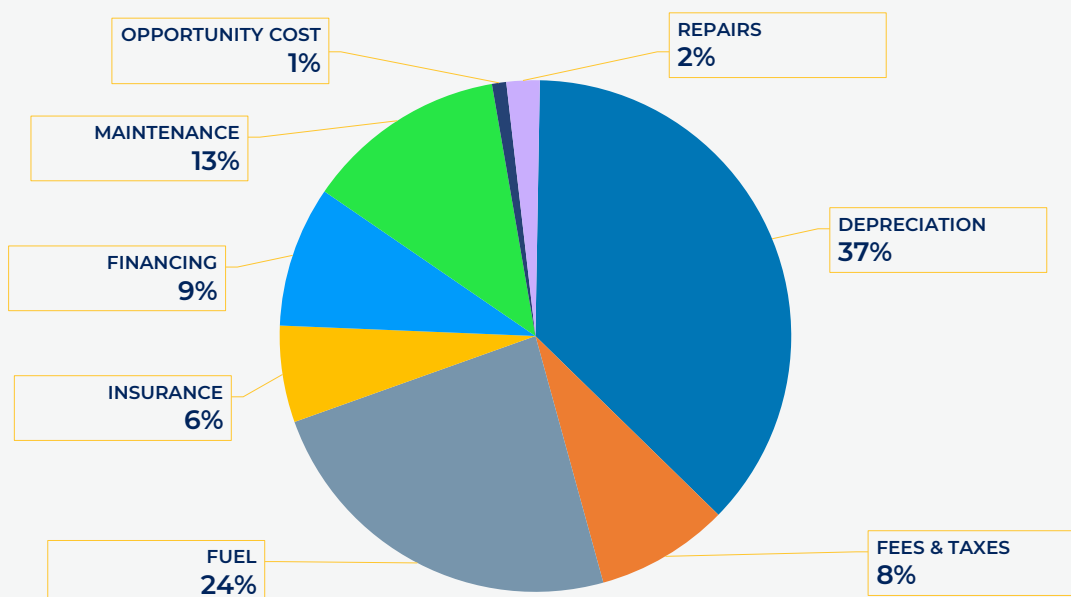
for EVs and over 37% of costs for ICE vehicles. The charts below show the average share of total cost represented by each of the

eight individual cost factors included in this analysis.

PERCENTAGE OF CANADIAN EV TOTAL OWNERSHIP COSTS



PERCENTAGE OF CANADIAN ICE TOTAL OWNERSHIP COSTS



FUEL COSTS

It's no surprise that one of the biggest areas for savings with an EV is in Fuel costs. On average, the EVs studied had Fuel cost savings of an outstanding \$19,471 compared to their ICE counterparts.

Fuel costs for EVs are based on the cost of the electricity required to drive the vehicle, rather than the cost of the gasoline required to drive ICE vehicles.

Over five years, EV Fuel cost savings ranged from \$12,328 for the Nissan Ariya Engage 4D Utility FWD, to \$30,714 for the Audi e-tron GT RS 4D Sedan Qtró. Of the 38 EVs with a higher Market Price than their ICE alternative,

31 of them had high enough Fuel cost savings to recoup their price premium in Fuel savings alone.

With all 50 EVs having such strong Fuel cost results, it's no wonder that Fuel cost savings can help ease the sticker shock of typically higher purchase prices for EVs and therefore can be a key motivator in a consumer's decision to go electric.



of the **EVs**
had **LOWER FUEL COSTS**
than their **ICE** alternative



MAINTENANCE COSTS

The analysis also found that a majority of EVs save money on Maintenance costs compared to their gasoline counterparts. Since the electric motors that power EVs have fewer components than internal combustion engines, this helps contribute to lower Maintenance costs.

This study found that **41 of 50 EVs had lower Maintenance costs than their ICE alternatives.** Maintenance cost savings ranged from \$390 for the Audi Q4 e-tron 50 4D Utility Qtro to \$9,654 for the Tesla Model X Long Range 4D Utility AWD. Vincentric Maintenance cost calculations are based on OEM recommended maintenance schedules, plus unscheduled maintenance items such as tires and batteries that need to be replaced for EVs and ICE vehicles alike due to normal wear-and-tear.

However, it's important to note that *Vincentric maintenance cost calculations do not take into account replacing the lithium-ion battery for EVs* because available data on EVs does not show that the lithium-ion battery needs to be replaced within the five-year timeframe covered in this analysis.

The 9 EVs that had higher Maintenance costs than their gasoline counterparts were: the BMW i4, the Jaguar I-Pace, the Lucid Air, the Mercedes-Benz EQS SUV Class, the Mercedes-Benz EQS Class, the Mercedes-Benz EQE SUV Class, the Mercedes-Benz EQE Class, the Mercedes-Benz EQB Class, and the Volkswagen ID.4.

For the BMW, Jaguar, Mercedes-Benz, and Volkswagen EVs, the primary cause of their higher costs was that the EV had more expensive unscheduled maintenance services than its ICE counterpart.

For the Lucid Air, this vehicle has a more frequent standard maintenance interval than the ICE model, which leads to services on the EV repeating more often. Additionally, the Lucid Air has higher costs in Year 5 related to it having more expensive unscheduled services than its gasoline alternative.



OPPORTUNITY COSTS

Opportunity Cost is one of the most overlooked costs of owning a car, largely because it isn't paid out-of-pocket by the vehicle owner like at a gas station or repair shop. Opportunity Cost accounts for the interest that could have been earned if a buyer had invested their out-of-pocket vehicle expenses into a savings account.

Essentially, Opportunity Cost is the interest earnings that consumers had the "opportunity" to earn but missed out on because they chose to purchase and operate a vehicle instead.

To calculate Opportunity Cost, Vincentric used the combined cost of "out-of-pocket" expenses, which are Fees & Taxes, Financing, Fuel, Insurance, Maintenance, and Repairs, over the five years of the analysis to determine the amount of interest savings that could have been earned.

While Opportunity Cost accounts for only about 1% of vehicle ownership costs for EVs and ICEs,

the average Opportunity Cost for the EVs analyzed was approximately \$776 while the average for the gasoline vehicles analyzed was approximately \$941, which many consumers wouldn't consider a negligible expense.

The EV with the lowest Opportunity Cost was the Mazda MX-30 at \$414, while the lowest ICE vehicle was the Mini Cooper at \$536.

of **EVs**
had **LOWER**
OPPORTUNITY
COSTS than their
ICE alternative

DEPRECIATION COSTS

Many new car shoppers are disheartened to realize that their newly purchased vehicle is often worth a fraction of its purchase price the moment it leaves the dealership. This study found that only 16 of 50 EVs (32%) had lower Depreciation costs than their ICE counterparts. The substantial cost associated with Depreciation makes it the

biggest strike against EVs. The 34 EVs with higher Depreciation than their ICE alternatives had costs that were approximately \$6,445 higher on average.

Despite how few of the EVs analyzed had lower Depreciation costs, the Depreciation results still fared better in Canada than the US. Comparatively, the 2024 US EV Cost of Ownership

Analysis conducted in April 2024 found that only 24% of the EVs analyzed (10 of 41) had lower Depreciation costs than their ICE alternative.

The table below shows the Top 10 EVs with the lowest Depreciation over five years regardless of how their overall ownership costs compared to their ICE counterpart.

 TOP 10 CANADIAN EVs WITH LOWEST DEPRECIATION COST		
RANK	VEHICLE	DEPRECIATION COST OVER 5 YEARS
1ST	2024 Mini Cooper EV SE 3D Hatchback	\$19,737
2ND	2024 Mazda MX-30 GS 4D Utility FWD	\$19,788
3RD	2024 Kia Niro EV Wind 4D Utility	\$20,017
4TH	2024 Hyundai Kona EV Preferred 4D Utility	\$21,609
5TH	2024 Nissan LEAF SV 4D Hatchback	\$21,688
6TH	2024 Subaru Solterra Base 4D Utility AWD	\$21,692
7TH	2024 Fiat 500e 3D Hatchback	\$22,370
8TH	2024 Volkswagen ID.4 Base 4D Utility RWD	\$22,723
9TH	2024 Toyota bZ4X LE 4D Utility FWD	\$22,759
10TH	2024 Chevrolet Equinox EV 2LT 4D Utility FWD	\$23,826

DEPRECIATION RATES

Despite the higher Depreciation cost for most EVs overall, the results did show that 38 of 50 EVs analyzed, or 76%, had a lower depreciation rate than their gasoline alternative. The depreciation rate indicates the percentage of the vehicle's Market Price that was lost over the five years in the study.

Although the depreciation rate is not directly used to measure total cost of ownership, it does provide insight that may help buyers understand which EVs best retain their value.

The table below shows the five EVs with the lowest depreciation rate over five years.

 TOP 5 CANADIAN EVs WITH LOWEST DEPRECIATION RATE		
RANK	VEHICLE	DEPRECIATION RATE OVER 5 YEARS
1ST	2024 Rivian R1T Adventure Dual-Motor Crew Cab AWD	39.94%
2ND	2024 Porsche Taycan 4S 4D Sedan	41.11%
3RD	2024 Ford F-150 Lightning Pro Supercrew SWB 4WD	41.83%
4TH	2024 Audi Q4 e-tron 50 4D Utility Qtro	44.69%
5TH	2024 Mercedes-Benz EQS SUV Class EQS450 4D Utility 4MATIC	45.34%

COMPARING 2024 vs 2023 RESULTS

The automotive marketplace is always changing and is never the same from year-to-year. It follows that the overall cost of ownership for EVs can change as economic and market factors change. This section provides some insight on how cost of ownership can fluctuate in just one year.

When looking at the percentage of Canadian EVs that had lower total ownership costs than their ICE competitors, the 2024 analysis saw a 3 percentage-point increase, from an already-impressive 95% of analyzed EVs in 2023, to an even higher majority of 98% in 2024.

All individual cost factors saw some level of positive or negative shift except for Fuel costs, which remained at 100% of EVs having a cost advantage compared to their gasoline alternatives. The other cost factors had increases or decreases in the range of 2.5 to 7.5 percentage points.

One noteworthy change from the 2023 analysis was a 7.5 percentage-point increase in EVs with lower Fees & Taxes costs, up to 30% in 2024 compared to 22.5% in 2023.

Despite a few decreases, such as a 3 percentage-point decrease in EVs with lower Depreciation costs and Maintenance costs, *EVs performed even better this year for overall ownership costs.*

For cost-conscious Canadian consumers who may be considering switching to an EV, there may be no better time than when approximately 98% of them are more cost-effective than ICE vehicles.

Since the **2023 STUDY**, the percentage of **EVs** with a **LOWER TCO** than their **ICE** alternative **INCREASED** from **95%**

TO

98%

ENVIRONMENTAL COST OF OWNERSHIP™ OVERVIEW

The environmental advantages of electric vehicles are a considerable benefit for many buyers. More and more consumers are putting similar importance on the question of “how much better is an EV for the environment?” as the question of “can an EV save me money?” Understanding the Environmental Cost of Ownership, or ECO™, of a vehicle is critical when analyzing EVs.

Tailpipe emissions from gasoline-powered vehicles are a major contributor to greenhouse gas emissions. Because EVs don't use gasoline, it's common for buyers to consider EVs “emissions free.”

Although it's true that EVs don't generate tailpipe emissions, their use of electricity means that driving an EV does typically result in greenhouse gas emissions because the process of generating the electricity that powers EVs creates greenhouse gas emissions.

ALL 50 EVs analyzed
GENERATED

LESS

**GREENHOUSE GAS
EMISSIONS** than
their ICE alternative

ENVIRONMENTAL COST OF OWNERSHIP™ OVERVIEW

CONCLUDED

Vincentric measures three types of greenhouse gas emissions to determine Environmental Cost of Ownership: Carbon Dioxide, Volatile Organic Compounds, and Nitrogen Oxide. The CO₂ equivalent metric (CO₂ eq), which enables a comparison of the emissions from various greenhouse gases on the basis of their global warming potential by converting amounts of other gases to the equivalent amount of CO₂ with the same global warming potential, is used to give a common metric for comparing these different gases.

The ECO measurements in this analysis are based solely on the amount of fuel/electricity necessary to operate the vehicle. The emissions produced by building vehicle components or any other part of the manufacturing process are not considered. The emissions created when generating electricity are also dependent on the type of electrical power plants used, which vary throughout Canada.

More details about the ECO methodology can be found in Appendix D.



ENVIRONMENTAL COST OF OWNERSHIP™ RESULTS

After measuring the emissions generated based on the fuel and electricity used to drive 125,000 kilometers over five years, Vincentric found that all 50 EVs analyzed had lower greenhouse gas emissions than their ICE alternative. As a result, all 50 EVs in this study are better for the environment than their ICE alternative when measuring the impact of operating the vehicle.

To help understand what a metric ton of CO₂ savings looks like, the EPA equates one metric ton of CO₂ to the CO₂ emissions from 1,111 pounds of coal burned, 45.9 propane canisters used for home barbeques, or 80,847 smartphones charged.¹

The following chart shows the Top 10 EVs with the greatest reduction in CO₂ eq emissions compared to their ICE counterpart over five years.

 TOP 10 CANADIAN EVs WITH GREATEST CO₂ eq EMISSIONS REDUCTION COMPARED TO ICE OVER 5 YEARS		
RANK	VEHICLE	REDUCTION IN CO ₂ eq EMISSIONS vs ICE ALTERNATIVE IN METRIC TONS
1ST	2024 Rivian R1T Adventure Dual-Motor Crew Cab AWD	-8.73
2ND	2024 Chevrolet Silverado EV 3WT Crew Cab e4WD	-8.55
3RD	2024 Audi e-tron GT RS 4D Sedan Qtro	-8.48
4TH	2023 Rivian R1S Adventure 4D Utility AWD	-8.40
5TH	2024 Audi SQ8 e-tron Base 4D Utility Qtro	-8.23
6TH	2024 Genesis Electrified G80 Base 4D Sedan AWD	-7.58
7TH	2024 Audi Q8 e-tron Base 4D Utility	-7.30
8TH	2024 Porsche Taycan 4S 4D Sedan	-7.22
9TH	2024 Kia EV9 Light 4D Utility RWD	-7.07
10TH	2024 Genesis Electrified GV70 Prestige 4D Utility	-7.02

ENVIRONMENTAL COST OF OWNERSHIP™ RESULTS

CONCLUDED

The lowest emissions ICE vehicle was the Mini Cooper Base 3D Hatchback with 4.9 metric tons of CO₂ emissions. Comparatively, the lowest emissions EV was the Hyundai Ioniq 6 Preferred 4D Sedan RWD with only approximately 0.6 metric tons. Such a drastic difference between gasoline and electric vehicles shows that the environmental impact between the two propulsion types can be substantial.

For buyers who want to go as green as possible, [the table below shows the Top 11 EVs with the lowest CO₂ eq emissions.](#)

 TOP 11 EVs WITH LOWEST EMISSIONS OVER 5 YEARS IN CANADA		
RANK	VEHICLE	CO ₂ eq EMISSIONS IN METRIC TONS
1ST	2024 Hyundai Ioniq 6 Preferred 4D Sedan RWD	0.58
1ST	2024 Lucid Air Pure 4D Sedan RWD	0.58
3RD	2024 Tesla Model 3 Standard Range Plus 4D Sedan RWD	0.6
4TH	2024 BMW i4 eDrive35 4D Gran Coupe RWD	0.65
4TH	2024 Tesla Model S Long Range 4D Sedan AWD	0.65
4TH	2024 Tesla Model Y Standard Range 4D Utility RWD	0.65
7TH	2024 Hyundai Ioniq 5 Preferred Long Range 4D Utility RWD	0.68
7TH	2024 Hyundai Kona EV Preferred 4D Utility	0.68
7TH	2024 Kia EV6 Wind 4D Utility RWD	0.68
7TH	2024 Polestar 2 Base 5D Hatchback RWD	0.68
7TH	2024 Toyota bZ4X LE 4D Utility FWD	0.68

CONCLUSION

The 2024 Vincentric Canadian EV Cost of Ownership Analysis set out to identify the financial and environmental pros and cons of choosing an EV over an ICE vehicle for Canadian shoppers. What can buyers learn from these results to guide their future vehicle purchase decisions and help them decide if one of the 50 EVs included in this study is right for them?

From a financial standpoint, current data shows that *EVs have significant potential for cost savings throughout their lifetimes despite typically costing more to purchase*. Fuel and Maintenance cost savings help offset commonly higher purchase prices and higher Depreciation.

From an environmental perspective, current data shows that *operating any of the 50 EVs included in the analysis will considerably reduce a motorist's emissions compared to a similar gasoline-powered vehicle*, even though EVs are not fully emissions-free. The EVs in the study had an average CO₂ emissions reduction of 6 metric tons.

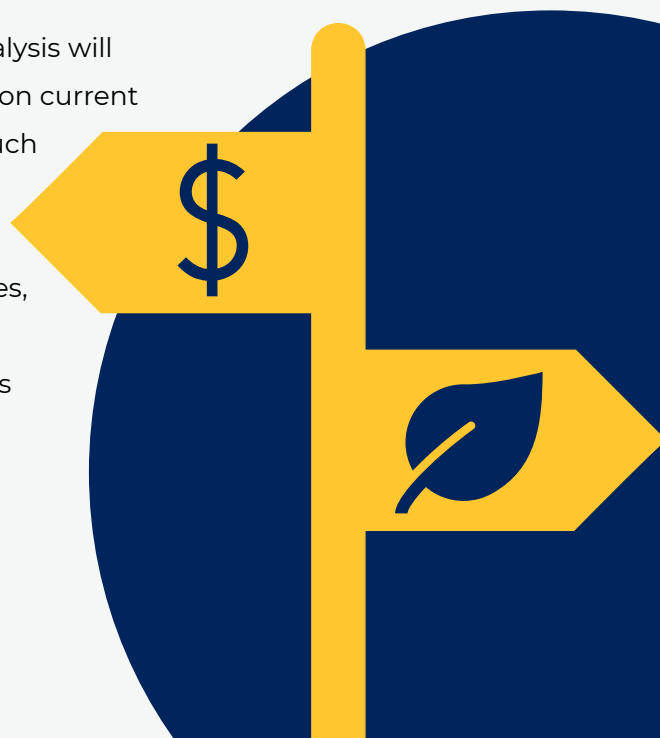
While the widespread adoption of EVs still face plenty of hurdles that often lead to consumer hesitancy, this latest analysis of

Canadian data from Vincentric shows that 98% of the EVs analyzed will help buyers reduce their overall cost of owning and operating a vehicle. In addition, every EV studied will reduce the buyer's environmental impact.

It will always be up to the individual consumer if an EV is a viable choice for their needs and lifestyle. However, with the financial and environmental benefits of EVs in Canada, the data from this study shows that choosing an EV over another gas-powered vehicle is often a smart choice for the cost-savvy consumer and for the planet.

The results of this analysis will fluctuate depending on current market conditions, such as changing labor rates, fuel prices, OEM pricing strategies, and governmental regulations/incentives

surrounding EVs. Because of these marketplace fluctuations, *this study is expected to be updated on a periodic basis* to provide guidance to the automotive industry, and to buyers and sellers in the Canadian consumer market, fleet and commercial market, and automotive rental market. To be notified of future Vincentric analyses, [*subscribe to Vincentric News Updates*](#).



ABOUT VINCENTRIC

For over 20 years, Vincentric has provided data, knowledge, and insight to the automotive industry by identifying and applying the many aspects of automotive value. Vincentric, LLC is a privately held automotive data research organization headquartered in Bloomfield Hills, Michigan.

Each month the organization measures cost of ownership, including depreciation, fees & taxes, financing, fuel, insurance, maintenance, opportunity cost, and repairs, for over 75,000 vehicle configurations for vehicles from 2008-2025 model years in the US and 2010-2025 model years in Canada. Vincentric data is used by a wide variety of OEMs and other automotive-industry organizations in the US and Canada.

Vincentric data is available to its client base through a variety of Application Program Interfaces (API) and SaaS (Software as a Service) tools, including the New Vehicle API, Used Vehicle API, Fleet Vehicle API, EV API, Cost of Leasing API, and Dynamic Cost to Own™. In addition, each year the company announces the Vincentric Best Value awards in the United States and Canada for both Fleet and Consumer markets to help buyers with their vehicle purchase decisions.

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APPENDICES

VINCENTRIC 2024 CANADIAN ELECTRIC VEHICLE COST OF OWNERSHIP ANALYSIS

CANADIAN MARKET
DECEMBER 2024

APPENDIX [A] ANALYSIS METHODOLOGY

To perform this study, Vincentric first matched 50 EVs currently available in the Vincentric Canadian new vehicle database to comparable ICE alternative vehicles. All but one of the EVs included in the analysis were model year 2024. The Rivian R1S was included as a model year 2023 because 2024 data for this vehicle was not available at the time the study was conducted. Vehicle pairs were matched based on similar specifications and the availability of key data points such as residual values and vehicle pricing.

Only fully electric vehicles (EVs), sometimes called Battery Electric Vehicles (BEVs), were considered in this analysis. Plug-in hybrid electric vehicles (PHEVs) and hybrid electric vehicles (HEVs) were not included.

When selecting EVs, the lowest MSRP/base trim for each model was chosen unless it was not available on the Vincentric database, in which case the next available trim was used.

Vincentric data analysts reviewed over 2,600 vehicle configurations from the 2024 model year to identify similarly equipped ICE vehicles for comparison. When possible, the same manufacturer and a similar body style were selected for the ICE comparison model. In some cases, the most similarly equipped ICE vehicle was not the base trim.

It's important to acknowledge that, in some cases, it may have been reasonable to choose an alternative ICE vehicle for comparison, which could have affected whether the EV it is compared to was cost-effective. However, Vincentric is confident that a fair and reasonable methodology was used to select the ICE comparison vehicles with the intent of creating an unbiased study.

APPENDIX [A] ANALYSIS METHODOLOGY

The results of this analysis assume that all vehicles will be driven 25,000 km per year over the next five years. Canadian averages are used for all cost inputs including labor rate, fuel (both gasoline and electricity), and fees & taxes. Because this analysis was conducted at the national level, it does not consider any provincial-level or local EV incentives, although federal EV rebates are considered as a reduction to market price for qualifying EVs.

When measuring automotive cost of ownership, ***Vincentric starts by estimating each vehicle's Market Price, also known as the Purchase Price,*** in an effort to determine the typical price a Canadian consumer pays for the vehicle in the current market. The Vincentric Market Price calculations factor in the invoice price, manufacturer's suggested retail price, and OEM national consumer rebates.

The eight cost factors are described on the following page and are broken out into Fixed and Variable Costs.

APPENDIX [A] ANALYSIS METHODOLOGY

FIXED COSTS: Fixed costs are the cost components that have minimal variance due to the distance driven, and typically consist of the following components:

1. DEPRECIATION The decrease in a vehicle's overall value over time, considering the vehicle's estimated Market Price and the future (residual) value of the vehicle.	electric vehicle tax credits are not considered in this analysis.	4. OPPORTUNITY COST The amount of interest that could have been earned if the out-of-pocket expenses incurred by owning and operating a vehicle had been invested in a savings account.	profile that assumes they are under 65 years of age, have 15 years of driving experience with no accidents, and live in a suburban/urban location. Standardized deductible and coverage amounts are also used.
2. FEES & TAXES The cost of sales tax, registration and title fees, and local and provincial taxes. Provincial and local	3. FINANCING The amount it costs to borrow money for a vehicle purchase, including down payment, loan term, and interest rate. This study assumed a 15% down payment.	5. INSURANCE The cost of keeping the vehicle insured using a standardized driver	

VARIABLE COSTS: Variable costs are the cost components that will change based on the distance driven:

1. FUEL The cost of the gasoline or electricity needed to power the vehicle.	and assuming replacement of normal wear-items such as tires and brakes. The cost of replacing the lithium-ion battery (or any other type of battery that charges the electric motor) in EVs was not included because current data does not show a need to replace	these batteries during the study's five-year timeframe. All manufacturer free-maintenance programs are also considered, as well as vehicle-specific parts pricing, service schedules, and labor times.	3. REPAIRS The estimated cost of repairing malfunctions to a vehicle, while taking into account manufacturer warranties. A zero deductible extended warranty is used as the foundation for repair cost estimates.
2. MAINTENANCE The cost of keeping the vehicle in driving condition, assuming the manufacturer's recommended maintenance is followed			

Together, **these cost factors combine into a vehicle's total cost of ownership**, often called TCO. The cost of adding a dedicated Home EV charging system, such as a Level 2 or Common Charging System, was not included in the study. Although many buyers may consider this a necessity, vehicle buyers living in rental homes or apartments, and those with a dedicated charging system at their work location, will not incur that expense.

APPENDIX [B] OWNERSHIP COST SAVINGS OF 50 CANADIAN EVs VS ICE VEHICLES

The following chart shows the Market Price and total cost of ownership differentials for all 50 studied EVs compared to their ICE alternative.

In the "EV Cost of Ownership vs ICE Alternative" column, a negative value indicates the dollar amount by which the EV's total cost of ownership was less

expensive. A positive value indicates the dollar amount by which the EV's total cost of ownership was more expensive than the ICE alternative.



OWNERSHIP COST SAVINGS OF 50 CANADIAN EVs VS ICE VEHICLES (PAGE 1 OF 4)

RANK	VEHICLE	FUEL TYPE	PURCHASE PRICE	TOTAL COST OF OWNERSHIP OVER 5 YEARS	EV TOTAL COST OF OWNERSHIP vs ICE ALTERNATIVE
1ST	2024 Porsche Taycan 4S 4D Sedan	EV	\$127,965	\$119,431	- \$55,509
	2024 BMW 8 Series M850i xDrive 4D Gran Coupe	ICE	\$120,938	\$174,940	
2ND	2024 Tesla Model X Long Range 4D Utility AWD	EV	\$111,870	\$117,224	- \$41,092
	2024 BMW X7 xDrive40i 4D Utility	ICE	\$110,412	\$158,316	
3RD	2024 BMW i7 xDrive60 4D Sedan	EV	\$148,980	\$168,052	- \$37,426
	2024 BMW 7 Series 760i xDrive 4D Sedan	ICE	\$149,056	\$205,478	
4TH	2024 Tesla Model Y Standard Range 4D Utility RWD	EV	\$56,870	\$65,972	- \$37,232
	2024 BMW X3 xDrive30i 4D Utility	ICE	\$57,479	\$103,204	
5TH	2024 Ford F-150 Lightning Pro Supercrew SWB 4WD	EV	\$57,790	\$64,286	- \$34,488
	2024 Ford F-150 XL Supercrew SWB 4WD	ICE	\$63,107	\$98,774	
6TH	2024 Audi SQ8 e-tron Base 4D Utility Qtró	EV	\$107,610	\$117,078	- \$33,950
	2024 Audi SQ8 Base 4D Utility Qtró	ICE	\$120,462	\$151,028	
7TH	2024 BMW iX xDrive40e 4D Utility AWD	EV	\$81,856	\$95,249	- \$33,801
	2024 BMW X5 xDrive40i 4D Utility	ICE	\$85,814	\$129,050	
8TH	2024 Audi Q4 e-tron 50 4D Utility Qtró	EV	\$56,002	\$69,626	- \$33,753
	2024 Audi Q5 Progressiv 45 4D Utility Qtró	ICE	\$60,337	\$103,379	
9TH	2024 Tesla Model 3 Standard Range Plus 4D Sedan RWD	EV	\$51,870	\$63,637	- \$33,226
	2024 Audi A4 Progressiv 45 4D Sedan Qtró	ICE	\$55,104	\$96,863	
10TH	2024 BMW i5 M60 xDrive 4D Sedan	EV	\$94,440	\$109,782	- \$30,272
	2024 Audi S6 Base 4D Sedan Qtró	ICE	\$96,664	\$140,054	
11TH	2024 Mercedes-Benz EQS Class EQS450 4D Sedan 4MATIC	EV	\$134,335	\$165,910	- \$27,960
	2024 Mercedes-Benz S Class S500 4D Sedan 4MATIC	ICE	\$143,574	\$193,870	
12TH	2024 Polestar 2 Base 5D Hatchback RWD	EV	\$52,450	\$66,666	- \$27,845
	2024 Audi A5 Komfort 45 4D Sportback Qtró	ICE	\$57,039	\$94,511	

APPENDIX [B] OWNERSHIP COST SAVINGS OF 50 CANADIAN EVs VS ICE VEHICLES



OWNERSHIP COST SAVINGS OF 50 CANADIAN EVs VS ICE VEHICLES (PAGE 2 OF 4)

RANK	VEHICLE	FUEL TYPE	ESTIMATED PURCHASE PRICE	TOTAL COST OF OWNERSHIP OVER 5 YEARS	EV TOTAL COST OF OWNERSHIP vs ICE ALTERNATIVE
13TH	2024 Audi Q8 e-tron Base 4D Utility	EV	\$92,575	\$104,907	- \$27,298
	2024 Audi Q8 Progressiv 55 4D Utility Qtro	ICE	\$92,090	\$132,205	
14TH	2024 Kia EV9 Light 4D Utility RWD	EV	\$56,845	\$64,312	- \$25,686
	2024 Kia Telluride SX 4D Utility AWD	ICE	\$56,098	\$89,998	
15TH	2024 BMW i4 eDrive35 4D Gran Coupe RWD	EV	\$50,820	\$70,779	- \$24,430
	2024 BMW 4 Series 430i xDrive 2D Coupe	ICE	\$58,012	\$95,209	
16TH	2024 Lexus RZ Series RZ450e Signature 4D Utility	EV	\$65,158	\$77,963	- \$22,524
	2024 Lexus NX Series NX350 Luxury 4D Utility AWD	ICE	\$58,271	\$100,487	
17TH	2024 Tesla Model S Long Range 4D Sedan AWD	EV	\$101,870	\$109,241	- \$21,848
	2024 Audi A7 Technik 55 4D Sportback Qtro	ICE	\$93,366	\$131,089	
18TH	2024 Genesis Electrified GV70 Prestige 4D Utility	EV	\$84,500	\$88,972	- \$21,456
	2024 Genesis GV70 Sport Plus 3.5T 4D Utility	ICE	\$76,050	\$110,428	
19TH	2024 Chevrolet Silverado EV 3WT Crew Cab e4WD	EV	\$77,199	\$90,408	- \$20,812
	2024 Chevrolet Silverado 1500 LTZ Crew Cab SWB 4WD	ICE	\$76,071	\$111,220	
20TH	2024 Honda Prologue EX 4D Utility AWD	EV	\$56,990	\$71,465	- \$18,685
	2024 Honda Pilot Sport 4D Utility AWD	ICE	\$52,307	\$90,150	
21ST	2024 Mercedes-Benz EQB Class EQB250+ 4D Utility	EV	\$55,415	\$73,663	- \$16,871
	2024 Mercedes-Benz GLB Class GLB250 4D Utility 4MATIC	ICE	\$55,465	\$90,534	
22ND	2024 Nissan LEAF SV 4D Hatchback	EV	\$37,757	\$52,456	- \$16,626
	2024 Nissan Altima S 4D Sedan AWD	ICE	\$32,364	\$69,082	
23RD	2024 Chevrolet Blazer EV 2LT 4D Utility AWD	EV	\$54,499	\$70,816	- \$16,500
	2024 Chevrolet Blazer True North 4D Utility AWD	ICE	\$47,869	\$87,316	
24TH	2024 Volkswagen ID.4 Base 4D Utility RWD	EV	\$44,600	\$57,714	- \$15,820
	2024 Volkswagen Tiguan Comfortline 4D Utility 4Motion	ICE	\$39,775	\$73,534	
25TH	2024 Mini Cooper EV SE 3D Hatchback	EV	\$39,309	\$49,400	- \$15,795
	2024 Mini Cooper S 3D Hatchback	ICE	\$32,135	\$65,195	
26TH	2024 Lucid Air Pure 4D Sedan RWD	EV	\$101,500	\$115,358	- \$15,731
	2024 Audi A7 Technik 55 4D Sportback Qtro	ICE	\$93,366	\$131,089	
27TH	2024 Volvo XC40 EV Recharge Core 4D Utility RWD	EV	\$56,950	\$67,395	- \$15,425
	2024 Volvo XC40 B5 Core 4D Utility AWD	ICE	\$47,105	\$82,820	

APPENDIX [B] OWNERSHIP COST SAVINGS OF 50 CANADIAN EVs VS ICE VEHICLES



OWNERSHIP COST SAVINGS OF 50 CANADIAN EVs VS ICE VEHICLES (PAGE 3 OF 4)

RANK	VEHICLE	FUEL TYPE	ESTIMATED PURCHASE PRICE	TOTAL COST OF OWNERSHIP OVER 5 YEARS	EV TOTAL COST OF OWNERSHIP vs ICE ALTERNATIVE
28TH	2024 Ford Mustang MACH-E Select 4D Utility RWD	EV	\$54,590	\$65,550	- \$14,528
	2024 Ford Edge SEL 4D Utility AWD	ICE	\$45,565	\$80,078	
29TH	2024 Genesis GV60 Advanced 4D Utility AWD	EV	\$72,500	\$82,571	- \$14,276
	2024 Genesis GV70 Advanced Plus 2.5T 4D Utility	ICE	\$62,400	\$96,847	
30TH	2024 Mazda MX-30 GS 4D Utility FWD	EV	\$33,408	\$49,363	- \$14,201
	2024 Mazda CX-30 GS 4D Utility AWD	ICE	\$33,105	\$63,564	
31ST	2024 Volvo C40 Recharge Core 4D Utility	EV	\$56,950	\$69,367	- \$13,453
	2024 Volvo XC40 B5 Core 4D Utility AWD	ICE	\$47,105	\$82,820	
32ND	2023 Rivian R1S Adventure 4D Utility AWD	EV	\$107,050	\$115,771	- \$13,409
	2023 Chevrolet Tahoe 1500 Premier 4D Utility 4WD	ICE	\$81,300	\$129,180	
33RD	2024 Rivian R1T Adventure Dual-Motor Crew Cab AWD	EV	\$111,600	\$97,869	- \$13,351
	2024 Chevrolet Silverado 1500 LTZ Crew Cab SWB 4WD	ICE	\$76,071	\$111,220	
34TH	2024 Subaru Solterra Base 4D Utility AWD	EV	\$47,560	\$55,627	- \$11,856
	2024 Subaru Forester Touring 4D Utility	ICE	\$37,817	\$67,483	
35TH	2024 Toyota bZ4X LE 4D Utility FWD	EV	\$45,729	\$57,958	- \$11,464
	2024 Toyota RAV4 XLE 4D Utility AWD	ICE	\$37,582	\$69,422	
36TH	2024 Genesis Electrified G80 Base 4D Sedan AWD	EV	\$105,000	\$113,965	- \$11,021
	2024 Genesis G80 Sport Plus 3.5T 4D Sedan AWD	ICE	\$81,496	\$124,986	
37TH	2024 Mercedes-Benz EQS SUV Class EQS450 4D Utility 4MATIC	EV	\$134,335	\$133,821	- \$10,409
	2024 Mercedes-Benz GLS Class GLS450 4D Utility	ICE	\$114,982	\$144,230	
38TH	2024 Mercedes-Benz EQE SUV Class EQE350 4D Utility 4MATIC	EV	\$94,365	\$110,379	- \$10,278
	2024 Mercedes-Benz GLE Class GLE350 4D Utility	ICE	\$82,598	\$120,657	
39TH	2024 Hyundai Ioniq 5 Preferred Long Range 4D Utility RWD	EV	\$51,649	\$59,329	- \$9,614
	2024 Hyundai Tucson Preferred 4D Utility AWD	ICE	\$35,440	\$68,943	
40TH	2024 Fiat 500e 3D Hatchback	EV	\$36,890	\$52,270	- \$9,576
	2024 Mini Cooper Base 3D Hatchback	ICE	\$27,711	\$61,846	
41ST	2024 Chevrolet Equinox EV 2LT 4D Utility FWD	EV	\$45,699	\$59,534	- \$8,862
	2024 Chevrolet Equinox LT 4D Utility FWD	ICE	\$33,699	\$68,396	

APPENDIX [B] OWNERSHIP COST SAVINGS OF 50 CANADIAN EVs VS ICE VEHICLES



OWNERSHIP COST SAVINGS OF 50 CANADIAN EVs VS ICE VEHICLES (PAGE 4 OF 4)

RANK	VEHICLE	FUEL TYPE	ESTIMATED PURCHASE PRICE	TOTAL COST OF OWNERSHIP OVER 5 YEARS	EV TOTAL COST OF OWNERSHIP vs ICE ALTERNATIVE
42ND	2024 Nissan Ariya Engage 4D Utility FWD	EV	\$50,093	\$61,471	- \$8,158
	2024 Nissan Rogue SV Moonroof 4D Utility AWD	ICE	\$38,381	\$69,629	
43RD	2024 Hyundai Kona EV Preferred 4D Utility	EV	\$42,628	\$52,271	- \$7,723
	2024 Hyundai Kona Preferred 4D Utility FWD	ICE	\$29,811	\$59,994	
44TH	2024 Kia Niro EV Wind 4D Utility	EV	\$41,989	\$51,414	- \$7,516
	2024 Kia Seltos EX 4D Utility FWD	ICE	\$29,700	\$58,930	
45TH	2024 Cadillac Lyriq Tech 4D Utility RWD	EV	\$66,332	\$77,651	- \$6,774
	2024 Cadillac XT5 Luxury 4D Utility FWD	ICE	\$48,489	\$84,425	
46TH	2024 Mercedes-Benz EQE Class EQE350 4D Sedan 4MATIC	EV	\$85,321	\$110,352	- \$5,763
	2024 Mercedes-Benz E Class E350 4D Sedan 4MATIC	ICE	\$73,943	\$116,115	
47TH	2024 Hyundai Ioniq 6 Preferred 4D Sedan RWD	EV	\$51,924	\$64,502	- \$5,311
	2024 Hyundai Sonata Preferred 2.5 4D Sedan FWD	ICE	\$33,905	\$69,813	
48TH	2024 Kia EV6 Wind 4D Utility RWD	EV	\$52,765	\$59,582	- \$4,341
	2024 Kia Sportage LX 4D Utility FWD	ICE	\$31,495	\$63,923	
49TH	2024 Jaguar I-Pace R-Dynamic HSE 4D Utility AWD	EV	\$103,994	\$116,188	- \$3,560
	2024 Jaguar F-Pace P400 R-Dynamic S 4D Utility	ICE	\$75,958	\$119,748	
50TH	2024 Audi e-tron GT RS 4D Sedan Qtro	EV	\$181,636	\$191,171	+ \$24,292
	2024 Audi RS 7 Base 4D Sportback Qtro	ICE	\$139,150	\$166,879	

APPENDIX [C] CANADIAN EV 5-YEAR TOTAL COST OF OWNERSHIP RANKINGS

The following chart shows the ranking of all 50 EVs studied from lowest to highest total ownership costs over five years of

ownership. The Canadian federal point-of-sales rebate for qualifying EVs is included in the calculations of these values.



RANKED CANADIAN EV TOTAL COST OF OWNERSHIP RESULTS (PAGE 1 OF 4)

RANK	VEHICLE	TOTAL OWNERSHIP COSTS OVER 5 YEARS
1ST	2024 Mazda MX-30 GS 4D Utility FWD	\$49,363
2ND	2024 Mini Cooper EV SE 3D Hatchback	\$49,400
3RD	2024 Kia Niro EV Wind 4D Utility	\$51,414
4TH	2024 Fiat 500e 3D Hatchback	\$52,270
5TH	2024 Hyundai Kona EV Preferred 4D Utility	\$52,271
6TH	2024 Nissan LEAF SV 4D Hatchback	\$52,456
7TH	2024 Subaru Solterra Base 4D Utility AWD	\$55,627
8TH	2024 Volkswagen ID.4 Base 4D Utility RWD	\$57,714
9TH	2024 Toyota bZ4X LE 4D Utility FWD	\$57,958
10TH	2024 Hyundai Ioniq 5 Preferred Long Range 4D Utility RWD	\$59,329
11TH	2024 Chevrolet Equinox EV 2LT 4D Utility FWD	\$59,534
12TH	2024 Kia EV6 Wind 4D Utility RWD	\$59,582
13TH	2024 Nissan Ariya Engage 4D Utility FWD	\$61,471
14TH	2024 Tesla Model 3 Standard Range Plus 4D Sedan RWD	\$63,637

APPENDIX [C] CANADIAN EV 5-YEAR TOTAL COST OF OWNERSHIP RANKINGS**RANKED CANADIAN EV TOTAL COST OF OWNERSHIP RESULTS (PAGE 2 OF 4)**

RANK	VEHICLE	TOTAL OWNERSHIP COSTS OVER 5 YEARS
15TH	2024 Ford F-150 Lightning Pro Supercrew SWB 4WD	\$64,286
16TH	2024 Kia EV9 Light 4D Utility RWD	\$64,312
17TH	2024 Hyundai Ioniq 6 Preferred 4D Sedan RWD	\$64,502
18TH	2024 Ford Mustang MACH-E Select 4D Utility RWD	\$65,550
19TH	2024 Tesla Model Y Standard Range 4D Utility RWD	\$65,972
20TH	2024 Polestar 2 Base 5D Hatchback RWD	\$66,666
21ST	2024 Volvo XC40 EV Recharge Core 4D Utility RWD	\$67,395
22ND	2024 Volvo C40 Recharge Core 4D Utility	\$69,367
23RD	2024 Audi Q4 e-tron 50 4D Utility Qtro	\$69,626
24TH	2024 BMW i4 eDrive35 4D Gran Coupe RWD	\$70,779
25TH	2024 Chevrolet Blazer EV 2LT 4D Utility AWD	\$70,816
26TH	2024 Honda Prologue EX 4D Utility AWD	\$71,465
27TH	2024 Mercedes-Benz EQB Class EQB250+ 4D Utility	\$73,663

APPENDIX [C] CANADIAN EV 5-YEAR TOTAL COST OF OWNERSHIP RANKINGS**RANKED CANADIAN EV TOTAL COST OF OWNERSHIP RESULTS (PAGE 3 OF 4)**

RANK	VEHICLE	TOTAL OWNERSHIP COSTS OVER 5 YEARS
28TH	2024 Cadillac Lyriq Tech 4D Utility RWD	\$77,651
29TH	2024 Lexus RZ Series RZ450e Signature 4D Utility	\$77,963
30TH	2024 Genesis GV60 Advanced 4D Utility AWD	\$82,571
31ST	2024 Genesis Electrified GV70 Prestige 4D Utility	\$88,972
32ND	2024 Chevrolet Silverado EV 3WT Crew Cab e4WD	\$90,408
33RD	2024 BMW iX xDrive40e 4D Utility AWD	\$95,249
34TH	2024 Rivian R1T Adventure Dual-Motor Crew Cab AWD	\$97,869
35TH	2024 Audi Q8 e-tron Base 4D Utility	\$104,907
36TH	2024 Tesla Model S Long Range 4D Sedan AWD	\$109,241
37TH	2024 BMW i5 M60 xDrive 4D Sedan	\$109,782
38TH	2024 Mercedes-Benz EQE Class EQE350 4D Sedan 4MATIC	\$110,352
39TH	2024 Mercedes-Benz EQE SUV Class EQE350 4D Utility 4MATIC	\$110,379
40TH	2024 Genesis Electrified G80 Base 4D Sedan AWD	\$113,965
41ST	2024 Lucid Air Pure 4D Sedan RWD	\$115,358

APPENDIX [C] CANADIAN EV 5-YEAR TOTAL COST OF OWNERSHIP RANKINGS**RANKED CANADIAN EV TOTAL COST OF OWNERSHIP RESULTS (PAGE 4 OF 4)**

RANK	VEHICLE	TOTAL OWNERSHIP COSTS OVER 5 YEARS
42ND	2023 Rivian R1S Adventure 4D Utility AWD	\$115,771
43RD	2024 Jaguar I-Pace R-Dynamic HSE 4D Utility AWD	\$116,188
44TH	2024 Audi SQ8 e-tron Base 4D Utility Qtro	\$117,078
45TH	2024 Tesla Model X Long Range 4D Utility AWD	\$117,224
46TH	2024 Porsche Taycan 4S 4D Sedan	\$119,431
47TH	2024 Mercedes-Benz EQS SUV Class EQS450 4D Utility 4MATIC	\$133,821
48TH	2024 Mercedes-Benz EQS Class EQS450 4D Sedan 4MATIC	\$165,910
49TH	2024 BMW i7 xDrive60 4D Sedan	\$168,052
50TH	2024 Audi e-tron GT RS 4D Sedan Qtro	\$191,171

APPENDIX [D] ENVIRONMENTAL COST OF OWNERSHIP™ METHODOLOGY

To determine the Environmental Cost of Ownership (ECO), Vincentric calculates three types of greenhouse gas emissions: Carbon Dioxide (CO₂), Volatile Organic Compounds (VOC), and Nitrogen Oxide (NO_x). These measurements are based strictly on the amount of fuel and/or electricity that is used to operate the vehicle. They do not take into account the emissions produced by building an internal combustion engine, creating a lithium-ion battery, manufacturing tires, or any other component of the vehicle manufacturing process. Details on each type of greenhouse gas are found below.

1. Carbon Dioxide (CO₂): This is the most commonly known of the three greenhouse gases. Just as each person reading this analysis emits CO₂ through breathing, a portion of what cars emit through the exhaust pipe is also CO₂. Vincentric measures the CO₂ equivalent (CO₂ eq), which is a measurement used to compare the emissions from various greenhouse gases based on their global-warming potential by converting amounts of other gases to the equivalent amount of CO₂ with the same global warming potential.

According to the United States Environmental Protection Agency (EPA), a typical passenger vehicle emits about 4.6 metric tons of CO₂ per year². This study's results

found that, on average, the EVs in the study indirectly emitted approximately 0.82 metric tons of CO₂ eq, while ICE vehicles emitted over 6.8 metric tons of CO₂ on average over the five-year period of the analysis.

2. Volatile Organic Compounds (VOC): Many VOCs are human-made chemicals that are used and produced in the manufacture and use of paints, pharmaceuticals, and refrigerants, according to the EPA³.

Automobiles give off two different types of VOC emissions: tailpipe emissions, and evaporative components that vaporize into the atmosphere. Because this analysis only measured the impact of driving a vehicle,

evaporative components of VOC emissions were not included.

VOCs are also produced by electrical power plants.

3. Nitrogen Oxide (NO_x): This is a highly reactive gas that, when it combines with the chemicals in the air, can create acid rain. Vehicle emissions are the primary source of NO_x in the air⁴.

REFERENCES

¹ <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

² <https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle>

³ <https://www.epa.gov/indoor-air-quality-iaq/what-are-volatile-organic-compounds-vocs>

⁴ <https://www.epa.gov/no2-pollution/basic-information-about-no2>

APPENDIX [D] ENVIRONMENTAL COST OF OWNERSHIP™ METHODOLOGY

To measure emissions, Vincentric used the following types of measurements for these greenhouse gases.

FOR ICE VEHICLES

- **Well-to-Tank Emissions:** The emissions resulting from the production and distribution of a fuel, from the extraction of the raw resources from the ground to processing, production, and transport to gas stations. The fuel amount is based on the gallons of gasoline burned during 25,000 kilometers of driving over five years for each ICE vehicle in the study.
- **Tank-to-Wheel Emissions:** The emissions resulting from the process of a vehicle consuming the fuel, which, for this study, is based on the gallons of gasoline burned during 25,000 kilometers of driving over five years for each ICE vehicle in the study. This measurement is only calculated for CO₂ emissions.

FOR ELECTRIC VEHICLES

- **Electric Generation Emissions:** The emissions resulting from the generation of electricity used to power the EV. Vincentric used data in 11 regions across Canada to calculate the number of kilowatt hours of electricity required to drive 25,000 kilometers over five years for each EV in the study.

