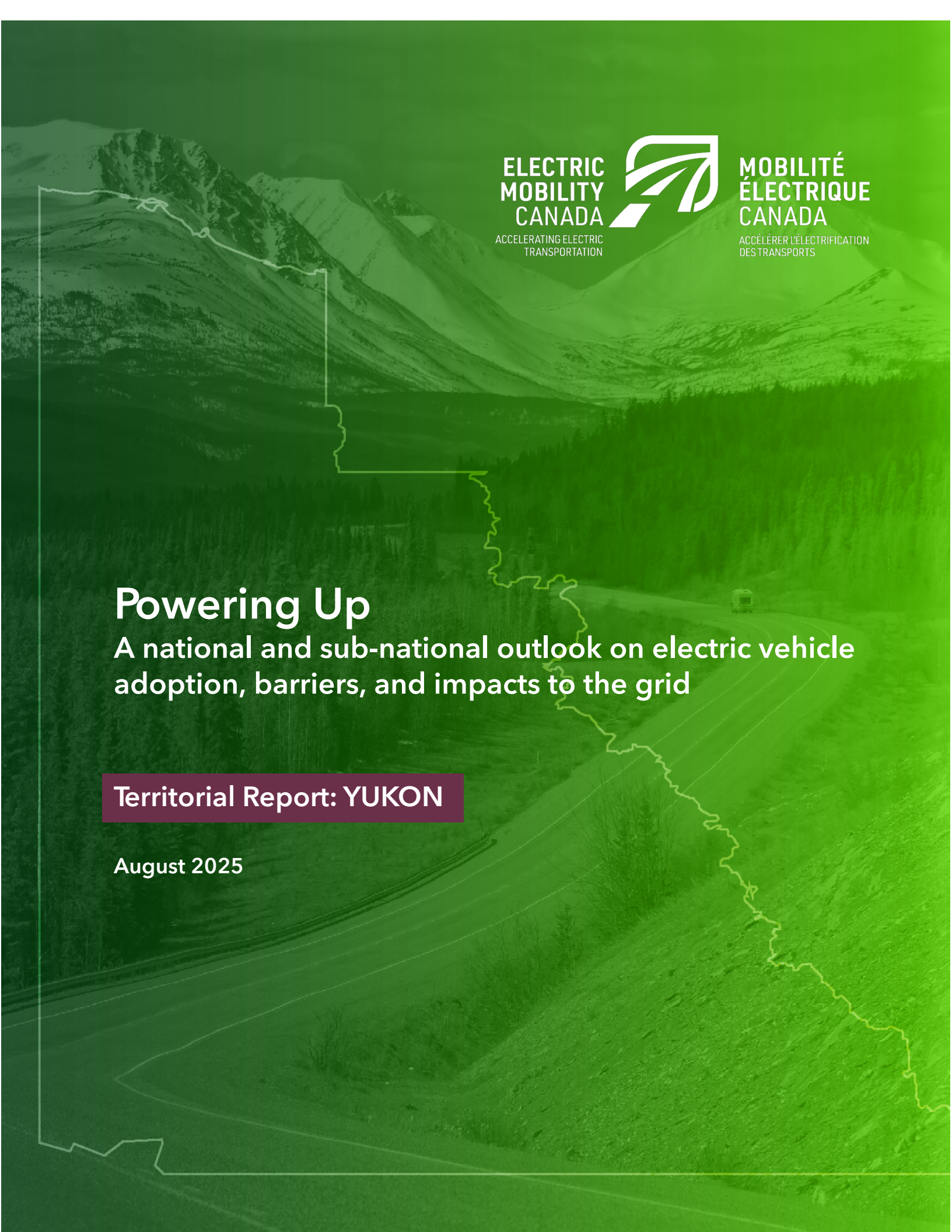

ELECTRIC MOBILITY CANADA
ACCELERATING ELECTRIC TRANSPORTATION

MOBILITÉ ÉLECTRIQUE CANADA
ACCÉLÉRER L'ÉLECTRIFICATION DES TRANSPORTS

Powering Up

A national and sub-national outlook on electric vehicle adoption, barriers, and impacts to the grid

Territorial Report: YUKON

August 2025

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"NO DISCLAIMERS" POLICY

This report was prepared by Dunsky Energy + Climate Advisors, an independent firm focused on the clean energy transition and committed to quality, integrity and unbiased analysis and counsel. Our findings and recommendations are based on the best information available at the time the work was conducted as well as our experts' professional judgment. **Dunsky is proud to stand by our work.**

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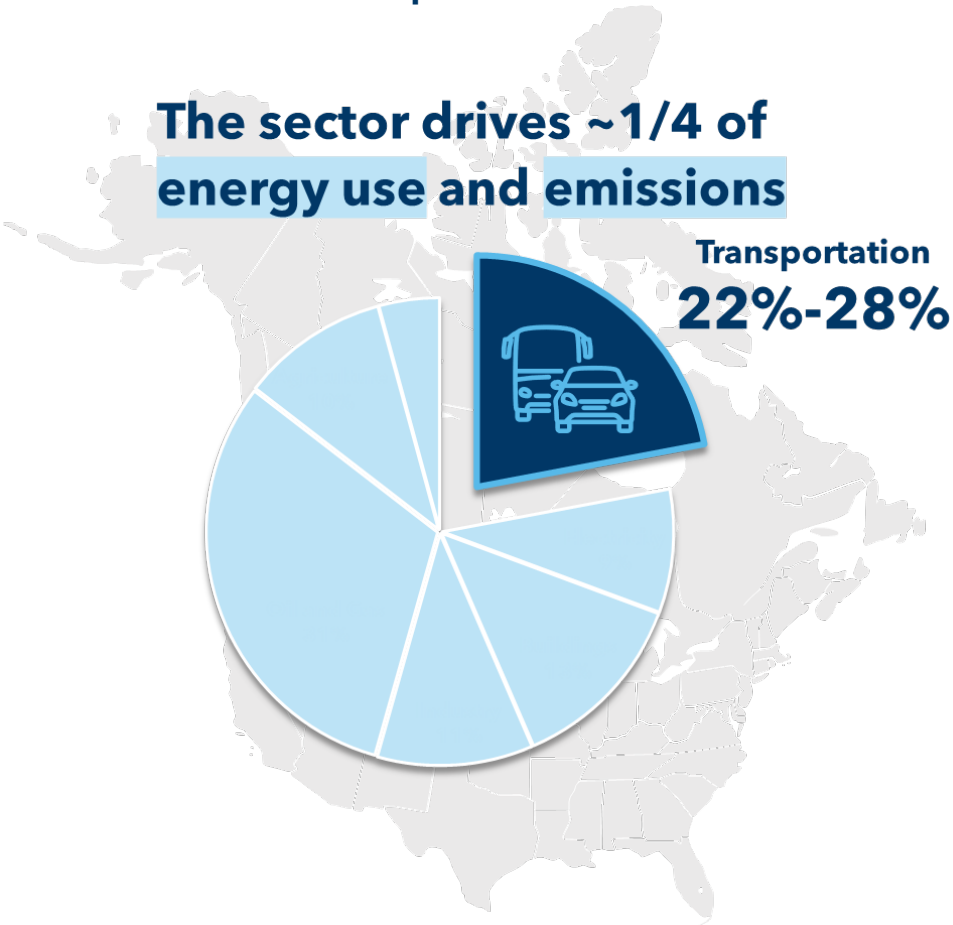
1. Background

1.1 Introduction

Powering Up: A national and sub-national outlook on electric vehicle adoption, barriers, and impacts to the grid, is a collaboration between Electric Mobility Canada and Dunsky Energy + Climate Advisors. Its goal is to provide robust data points for national and sub-national decision-making regarding the electrification of transportation. Light-duty vehicles (LDVs) were chosen as a focus because of their significant impact on total transportation greenhouse gas emissions (GHGs) in Canada.

Figure 1. Contribution of transportation to overall emissions in Canada



Addressing barriers to electric vehicle deployment is crucial to ensuring that Canada can meet its near-term climate targets (for 2030 and 2035) and maintain a realistic chance of achieving greater transportation decarbonization by 2050. By thoroughly examining key

barriers to Zero-emission Vehicle[1] (ZEV) adoption—including regionally tailored assessments of consumer affordability, customer economics, and electricity system impacts—our reports aim to identify policies and interventions that would enable the transition to electric mobility.

In this report, we outline the policy landscape and historical trajectory surrounding the adoption of light-duty ZEV and provide a forecast of ZEV adoption under multiple scenarios between 2025 and 2040. We then analyze the implications of this adoption on electricity demand and how utilities, policymakers, and private actors can support a transition to ZEVs that is reliable, affordable, and predictable.

The key will be to transition to electric transportation in a way that is reliable, affordable and predictable

Primary benefits of ZEV adoption for Canadians:

- **Cleaner air** due to reduced emissions as the transportation energy source shifts from fossil fuel to electricity, which is becoming greener, and from reduced tailpipe emissions, improves air quality and helps to reduce the effects of climate change.
- **Improved affordability** due to savings on a total-cost-of-ownership basis – electricity is much cheaper than gasoline across Canada, offering operational savings from fuel as well as from maintenance, which has lower costs for ZEVs than for internal combustion engine vehicles (ICEVs).
- **Downward pressure on electricity rates** due to beneficial electrification, which creates opportunities for utilities to increase revenues, invest in infrastructure, and manage peaks and valleys in demand across their systems to reduce costs over time.

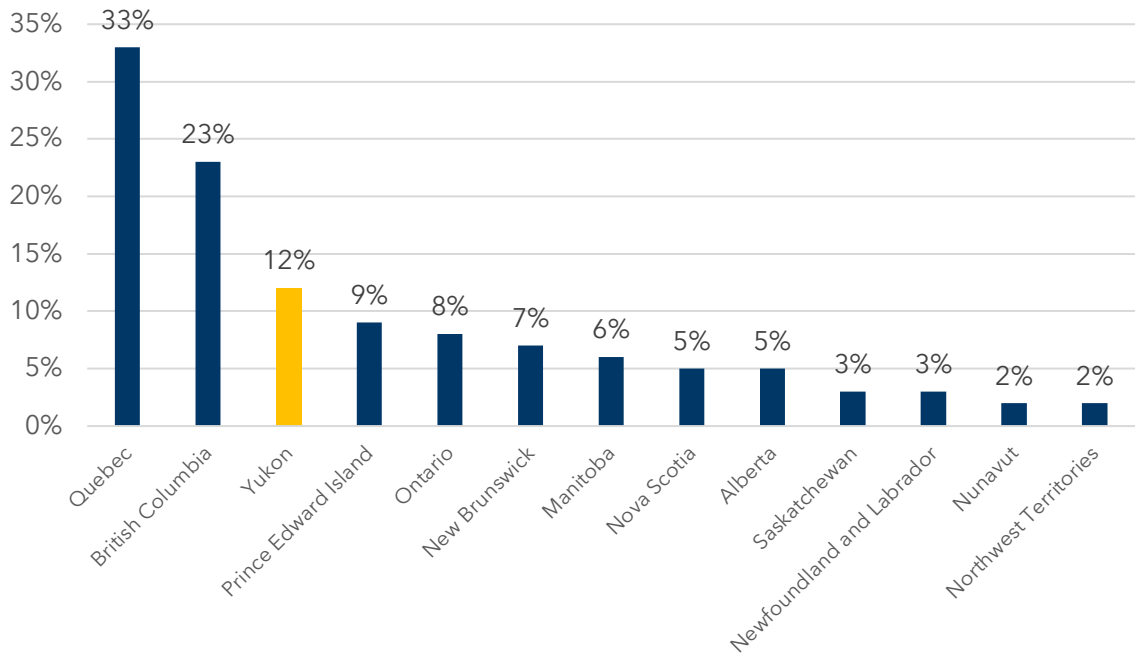
[1] Includes fully-electric or battery-electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs).

1.2 Historical ZEV Adoption

ZEV adoption in Yukon is the third highest of all provinces and territories in Canada. According to S&P Global, ZEV adoption in Yukon is close to the Canada-wide average of 15.4% of new vehicle sales in 2024, behind Québec and British Columbia. In the Yukon, ZEV adoption has increased significantly since 2018. BEVs have represented an increasing share over time, growing from 50-68% of all ZEV sales between 2018 and 2024.

Figure 2. 2024 ZEV share of new vehicle sales territory and registration by province[2]

ZEVs represented 12% of new vehicle sales in 2024.



ZEV adoption in Yukon is the third highest in the country.

[2] S&P Global. Q3 2024. *Automotive Insights: Q4 2024 Canadian EV Information and Analysis.*

Figure 3. Historical ZEV sales, Yukon

486 ZEVs have been sold in the province as of 2024.[3]

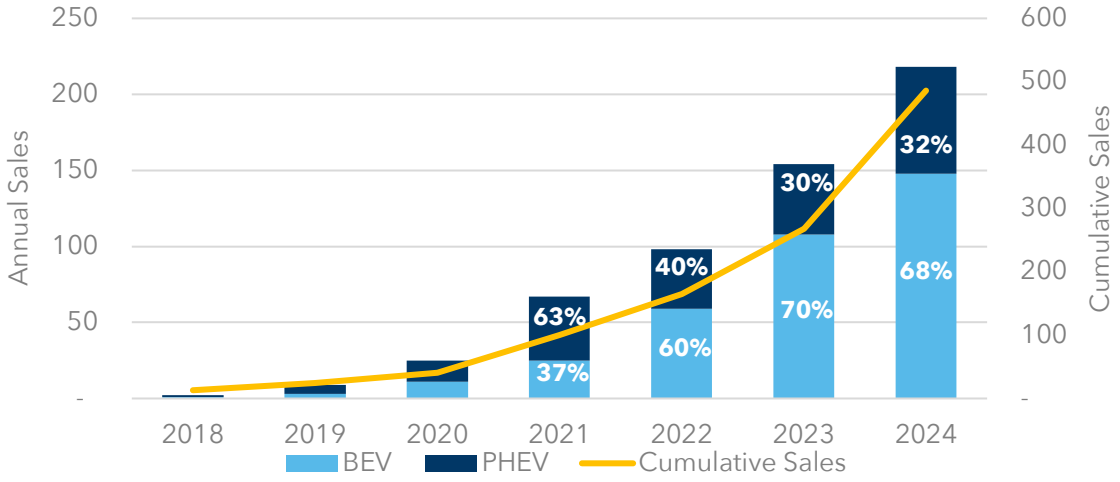
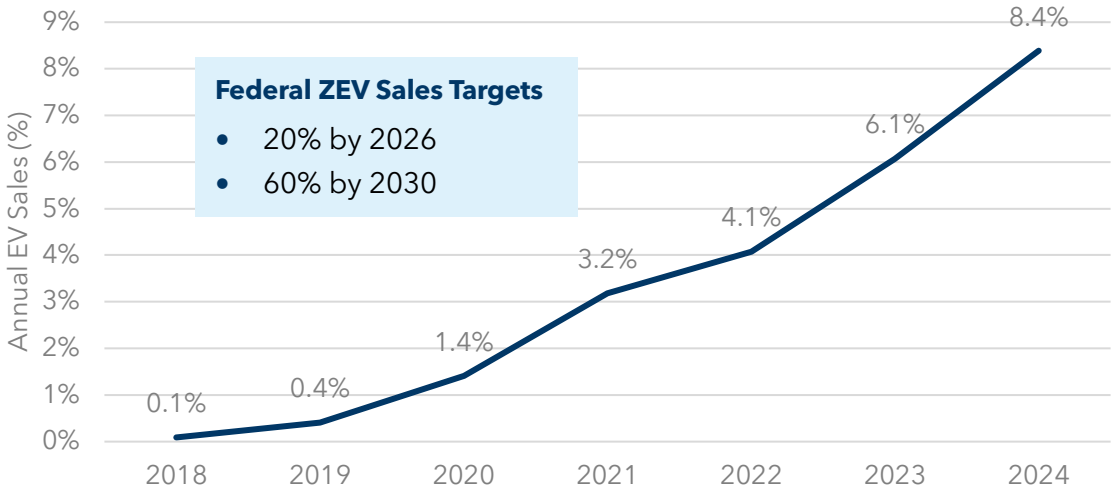


Figure 4. Historical ZEV sales %, Yukon[4]

Since 2018, ZEV market share has grown year-over-year by an average of 140% each year.



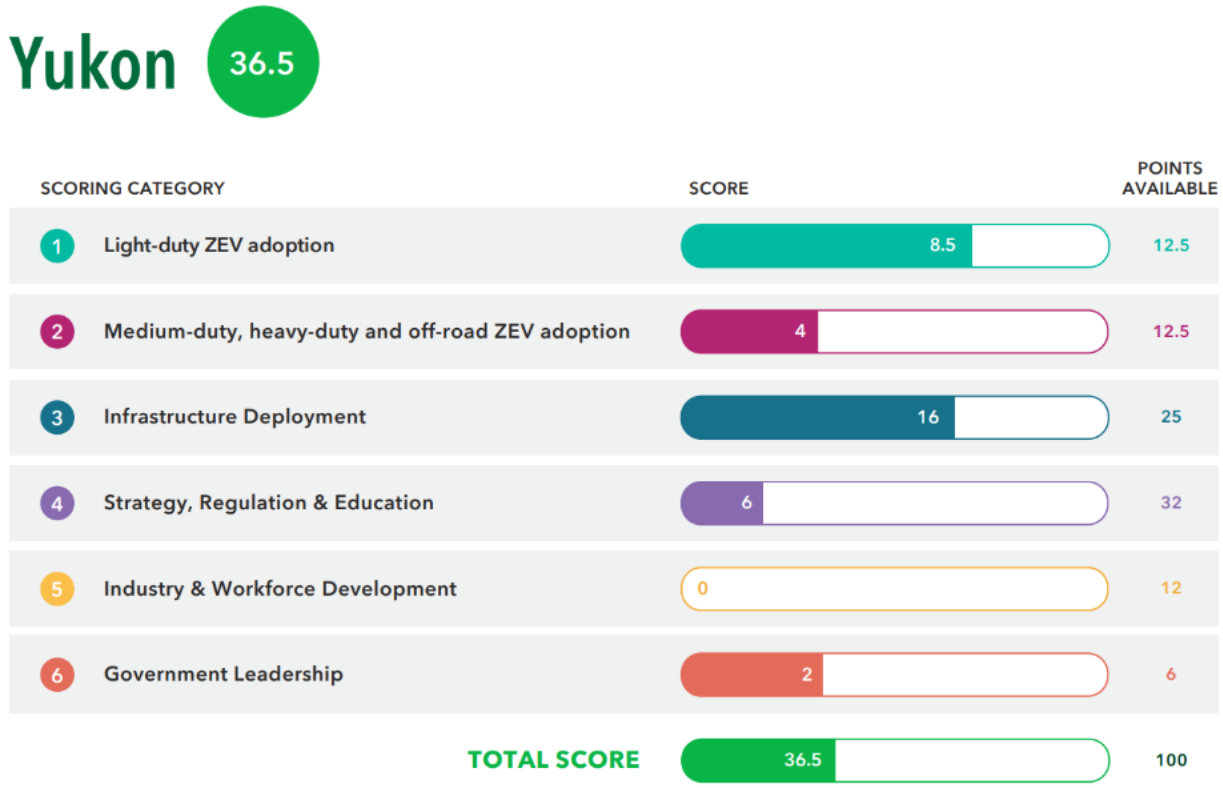
[3] Sources include Statistics Canada. *New motor vehicle registrations, quarterly, by geographic level*. Accessed January 2025 and Statistics Canada. *Vehicle registrations, by vehicle type and fuel type*. Accessed January 2025.

[4] Annual ZEV Sales percentage are calculated leveraging car and light truck new vehicle sales from Natural Resources Canada. *Comprehensive Energy Use Database: Transportation Sector.* Note that new vehicle sales are not available for 2023 and 2024 and forecasted new sales are leveraged for those years calculations. Varying methodologies or source for 2023 and 2024 light-duty new vehicle sales may result in different annual ZEV Sales percentages for those years. Natural Resources Canada data includes both stock and sales metrics for British Columbia and the Territories combined. Statistics Canada data was leveraged to determine the proportion of vehicles attributed to each Territory and those proportions were applied to NRCan absolute values to determine Territory specific annual sales and vehicles on the road.

1.3 Policy Landscape

In 2022, Dunsky developed a Provincial and Territory Zero-Emission Vehicle Scorecard for Electric Mobility Canada. At the time, Yukon had a ZEV purchase incentive, and the Yukon Government was one of only a few Canadian jurisdictions to have announced a formal ZEV infrastructure target, leading to the province having the highest ratio of fast chargers to registered vehicles among Canadian jurisdictions. Yukon placed fourth among all provinces and territories, sitting at 36.5 points in the "Building Momentum" category. [5]

Figure 5. Yukon ZEV Scorecard, 2021-22



In that scorecard, we also outlined several key opportunities for Yukon to improve its score and thereby encourage higher rates of ZEV adoption in the coming years, as shown in the table below. Since then, Yukon addressed one of the outlined opportunities by announcing the expansion of Yukon's clean transportation rebates to include medium- and heavy-duty vehicles (MHDVs).

[5] Electric Mobility Canada. 2021-22. *Provincial and Territory Zero-Emission Vehicle Scorecard.*

Table 1. Opportunities for ZEV policy and program improvement and updates since 2022, Yukon

Opportunities highlighted in ZEV Scorecard (2022)[6]	Major progress or updates in 2023-2024
The Yukon Government offers a pilot rebate for MHDV, covering up to 80% of costs with no upper limit, but with a limit of 1 rebate per organization. This program should be expanded in the coming years, building on the recently announced federal iMHZEV program	• In March 2024, the Government of Yukon expanded the clean transportation rebates to include commercial medium- and heavy-duty ZEVs as well as off-road vehicles, including boats, all-terrain vehicles, and other modes of electric transportation.[7] • Additionally, the Government is also doubling the rebate for Level 2 ZEV chargers to $1,500.
There is an opportunity to invest in technician training and ZEV-related workforce development in the territory to ensure that ZEVs can be serviced, and ZEV infrastructure can be installed using local labour.	N/A

Additional ZEV policy progress highlights in Yukon from 2023-2024 include:

- In August 2024, the Government of Yukon announced plans for six new government-run ZEV chargers to help eliminate charging infrastructure gaps between road-accessible communities in the territory.[8]
- In October 2024, the Yukon Utilities Board approved Yukon Energy's filing of its 2023-24 General Rate Application, which included a program for ZEV Charging Demand Response.[9]
  - This program seeks to mitigate the peak demand contributions from electric vehicle charging. If approved, Yukoners with Level 2 electric vehicle chargers will be incentivized to enroll and participate in this "bring-your-own-device" demand-response program.

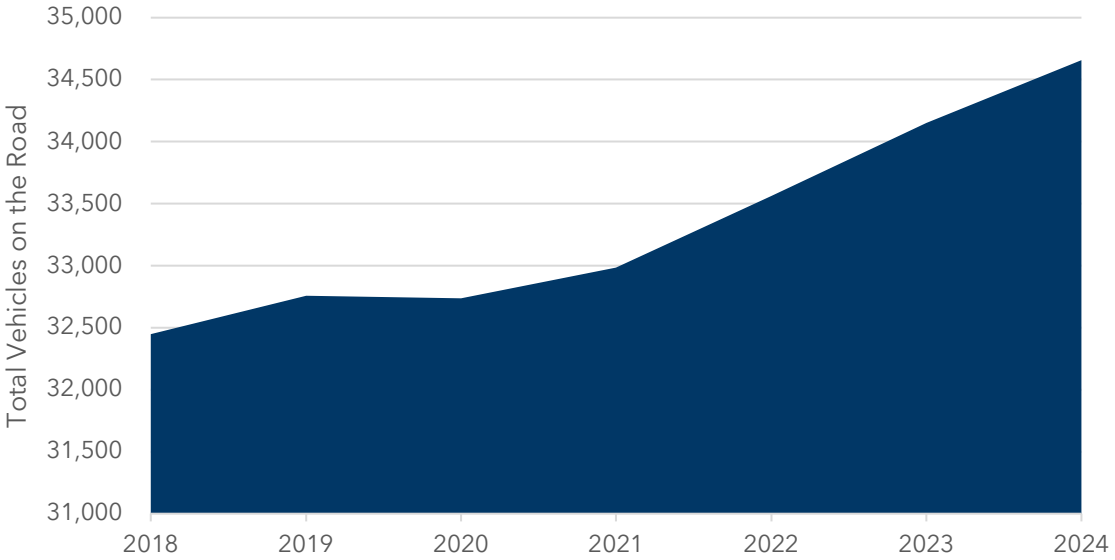
[6] Electric Mobility Canada. 2021-22. *Provincial and Territory Zero-Emission Vehicle Scorecard.*
[7] Government of Yukon. March 21, 2024. *The Government of Yukon expands Good Energy clean transportation incentives.*
[8] Dana Hatherly. August 3, 2024. *6 new Yukon government-run electric vehicle chargers will close travel gaps: director.*
[9] Yukon Utilities Board. *YEC 2023-24 General Rate Application.* Accessed March 2025.

1.4 Vehicle and Housing Market Overview

Apart from a plateau in the overall LDV fleet in 2020, sales in Yukon have been steadily increasing over the last seven years, reaching over 34,600 LDVs on the road in 2024. This market growth has implications for not only the potential for total ZEV sales but also the grid impact of an increasing number of electric vehicles.

Figure 6. Historical light-duty vehicle stock on the road, Yukon[10]

The vehicle market in Yukon is growing, reaching stock of over 34,600 in 2024.



Yukon's LDV market has been trending towards larger vehicles (SUVs, Trucks) between 2018 and 2024, with the car share reducing from 35% to 25%. It is essential to consider the vehicle segment mix when transitioning these vehicles to electric, as larger vehicles are heavier and tend to be less energy-efficient, thereby requiring more charging energy for the same amount of driving.

[10] Natural Resources Canada. *Comprehensive Energy Use Database: Transportation Sector, British Columbia and Territories.* Accessed January 2025. Statistics Canada. Table 23-10-0308-01 Vehicle registrations, by type of vehicle and fuel type. Accessed January 2025. Natural Resources Canada data includes both stock and sales metrics for British Columbia and the Territories combined. Statistics Canada data was leveraged to determine the proportion of vehicles attributed to each Territory and those proportions were applied to NRCan absolute values to determine Territory specific annual sales and vehicles on the road. Assume vehicle ownership remains constant and vehicles on the road align with population projections from Statistics Canada's M1 scenario. *Projected population, by projection scenario.* Accessed June 2024.

Figure 7. Historical light-duty vehicle segment mix, Yukon[11]

The current segment mix is 49% SUVs and 25% cars, the remaining 26% being light trucks.

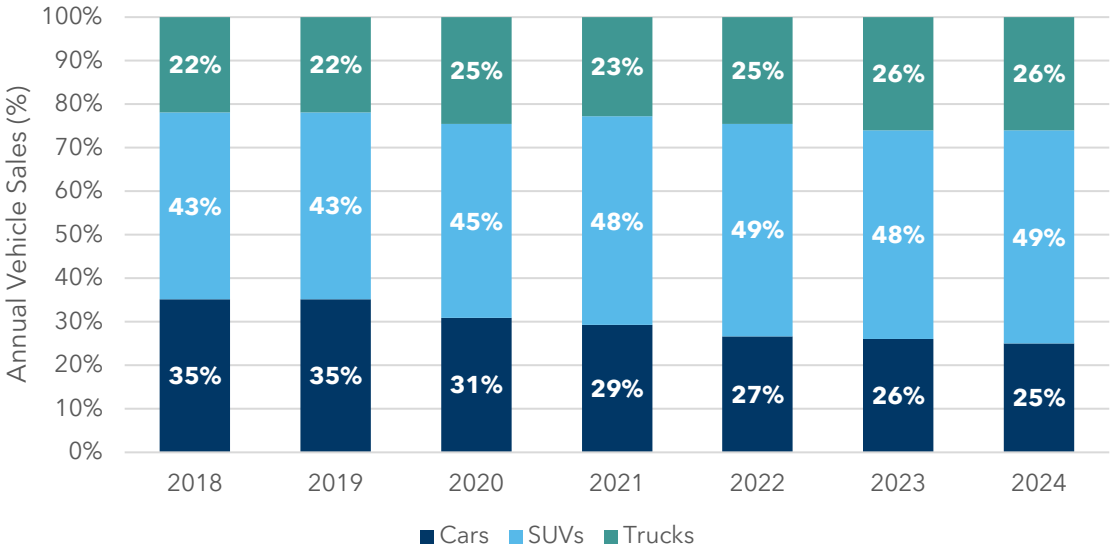
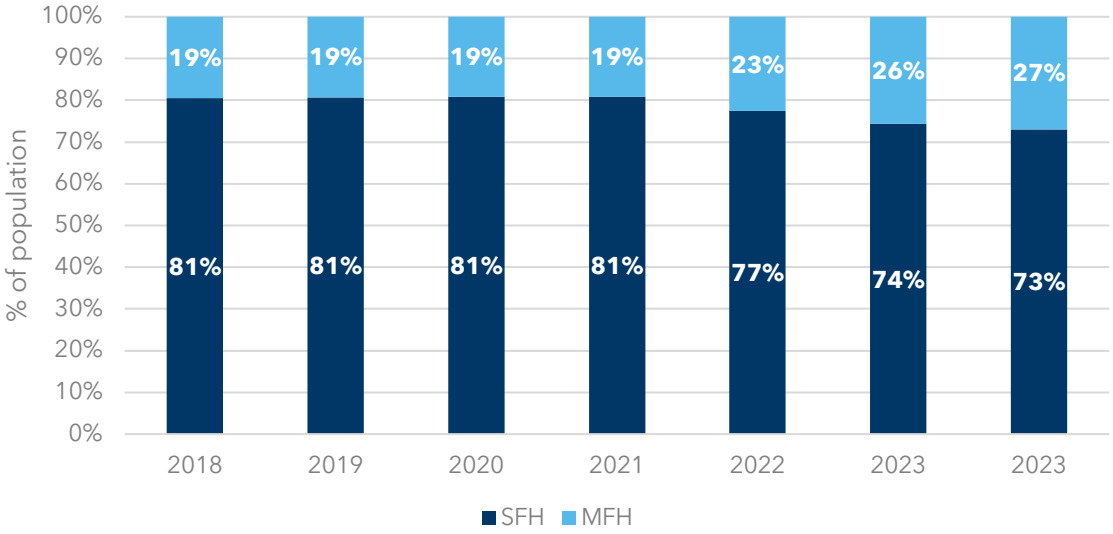


Figure 8. Historical percent of provincial population in single-family (SFH) versus multifamily homes (MFH), Yukon[12]

Most Yukoners live in SFH, and the proportion has been slowly decreasing over time.



[11] North American wide sub-segment vehicle sales trends are leveraged to make assumptions on new vehicle sales by subsegment for the Yukon with a lack of jurisdiction specific data. Vehicles on the road are calculated using historic annual new sales and vehicle lifetime assumptions.
[12] Based on population projections from Statistics Canada's M1 scenario (June 24, 2024. *Projected population, by projection scenario.*) and housing market data from the Canada Mortgage and Housing Corporation (June 25, 2023. *Housing market data.*).

73% of Yukoners live in single-family homes, and this proportion has been slowly decreasing over the last six years from 81% in 2018[13]. This means that 27% of Yukoners live in multifamily homes, which has implications for their access to home charging and barriers to ZEV adoption.

This breakdown in housing types has an impact on ZEV adoption because the barriers to home charging for those in single-family homes tend to be much lower than in multifamily homes. Single–family home residents typically have more control over installing a charger where they park, and the costs of doing so are also typically lower. Provinces and municipalities committed to supporting ZEV adoption must either enable home charging in multifamily buildings through supportive policies, such as ZEV-ready requirements, or provide equivalent charging access in public places, which is significantly more expensive.

[13] We use Statistics Canada definitions of housing types as follows: Multifamily buildings include "Apartments five stories and more", "Apartments 5 stories and less" and "Row houses", while single family homes include "Semi-detached", "Single detached", "Apartment or flat in a duplex" and "Other".

2. Methodology

To create a forecast of ZEV charging load in Yukon, we first leveraged results from our in-house **ZEV Adoption (EVA™) model** to produce a light-duty ZEV adoption forecast based on a market characterization that we produce for each jurisdiction.

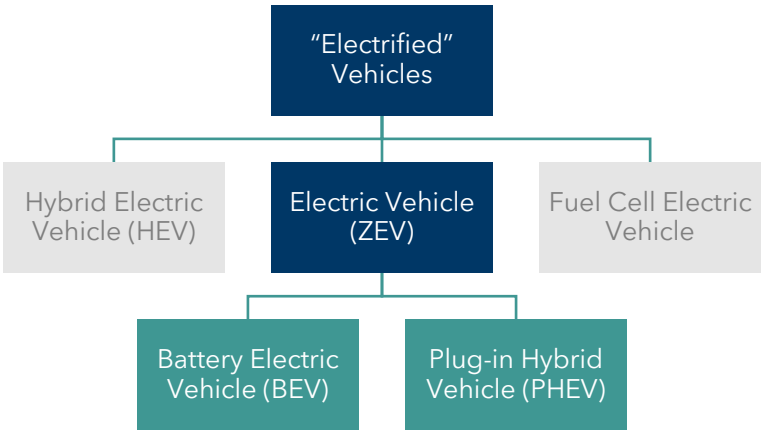
Figure 9. Overview of the EVA™ Model

Technical ▶	Economic ▶	Constraints ▶	Market
Assess the maximum theoretical potential for deployment	**Calculate unconstrained economic potential uptake**	**Account for jurisdiction-specific barriers and constraints, which vary by vehicle class, including:**	**Incorporate market dynamics and non-quantifiable market constraints**
• Market size and composition by vehicle class (e.g. cars, SUVs, pickups) • Forecasted availability of vehicle models in each class	• Forecasted incremental purchase cost of ZEVs over ICEVs • Total Cost of Ownership (TCO) based on operational and fuel costs	• Range anxiety or range requirements • Public charging coverage, capacity, and charging time • Home charging access	• Use of technology diffusion theory to determine rate of adoption • Market competition between vehicle powertrain types

Our ZEV analysis includes the following vehicle types:

- **Battery electric vehicles (BEV)** – "pure" electric vehicles that only have an electric powertrain and that must be plugged into an electric source to charge (e.g. Tesla Model 3, Volkswagen ID.4, Hyundai Kona Electric)
- **Plug-in hybrid electric vehicles (PHEV)** – vehicles that can plug in to charge and operate in electric mode for short distances (e.g. 30 to 80 km), but that also include a combustion powertrain for longer trips. (e.g. Mitsubishi Outlander PHEV, Toyota Prius Prime, Ford Escape PHEV)

Figure 10. Vehicle types in scope



The following vehicle types are **excluded** from the analysis:

- Hybrid electric vehicles that do not plug in are considered ICEVs.
- Fuel cell electric vehicles such as hydrogen vehicles where the market is assumed to be minimal in the timeframe of the study.

KEY ASSUMPTIONS FOR TERRITORIES JURISDICTION-SPECIFIC INPUTS

Due to a lack of available jurisdiction-specific data the following assumptions were made for inputs in the three Territories:

- **Driving distance**: We assumed the Territories vehicle usage aligns with a Canada-wide average of 15,000 km annually.
- **Vehicle Lifetime**: We assumed an average lifetime of 17 years.
- **Public Charging growth trends**: With very low historic public charging data available forecasted growth rate trends were assumed to remain low.
- **Local ZEV availability**: While the Yukon is more geographically isolated and there are limited dealerships, it also has a larger ZEV market size than the other territories. We assumed that local ZEV availability inputs would be moderate (starting at 45% of population being able to purchase an ZEV in the first forecast year).

2.1 Scenario Analysis

The adoption rate of electric vehicles was assessed under three scenarios that vary policy and program interventions which can significantly impact ZEV adoption. These include the following key policy and program levers:

1. **Public Charging Access**: Existing infrastructure deployed to date has jumped-started the ZEV market, however significant investments are required to alleviate range anxiety.
2. **Home Charging Access**: With most ZEV charging expected to take place at home, lack of access to home charging for some segments of the population could limit their ability to adopt ZEVs.
3. **Vehicle Incentives**: Government rebates can help to bridge the gap to cost-parity with ICEVs in the short-term as the up-front purchase costs of ZEVs decline over time.
4. **Federal Zero Emission Vehicle (ZEV) Availability Standard**: Under the current ZEV Availability Standard, auto manufacturers and importers must meet a 100% ZEV sales target by 2035. Our scenario analysis varies whether the standard is present as well as its enforcement year to show its potential impact on ZEV adoption.
5. **Provincial ZEV Mandate**: While some provinces have implemented their own ZEV sales requirements, those that have not may potentially experience lower availability in the next few years as manufacturers and importers focus supply on regions with the highest demand or requirements for ZEV sales, even if there are targets at the federal level.

In addition to the modeled policy and program interventions, the forecasted ZEV adoption is also sensitive to uncertainties around key market and technology factors such as electricity rates, fuel prices, battery costs, total vehicle sales, and ZEV model availability.

Our Low Growth scenario represents minimal efforts to support ZEV adoption, and in some cases, the removal of existing supportive policies. The Moderate Growth scenario provides some support for ZEV adoption and generally aligns with current commitments and policies, while the High Growth scenario represents a robust policy pathway to achieve the Federal ZEV sales target. The specific parameters for each scenario are outlined in **Table 2**.

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Table 2. Scenario assumptions for ZEV adoption

Parameter	Low Growth	Medium Growth	High Growth
Public Charging Infrastructure[14]	Limited 100 ports by 2030 700 ports by 2040	Moderate 200 ports by 2030 1,900 ports by 2040	Significant 400 ports by 2030 2,400 ports by 2040
Home Charging Access[15]	Limited Single-family homes are 84% ZEV-ready, 15% of multifamily homes are ZEV-ready by 2040	Moderate Single-family homes are 84% ZEV-ready, 35% of multifamily homes are ZEV-ready by 2040	Significant Single-family homes are 84% ZEV-ready, 55% of multifamily homes are ZEV-ready by 2040
Vehicle Incentives	Current incentives **Federal:** up to $5,000 **Provincial:** up to $5,000 (Both ramped down + phased-out by 2025)	Current incentives, extended **Federal:** up to $5,000 **Provincial:** up to $5,000 (Both ramped down + phased-out by 2030)	Expanded incentives **Federal:** up to $5,000 **Provincial:** up to $5,000 (Both ramped down + phased-out by 2035)
Federal ZEV Availability Standard	None	100% by 2040 Federal interim targets extended	100% by 2035 Aligned with Federal interim targets
Provincial ZEV Mandate	None	None	100% by 2035

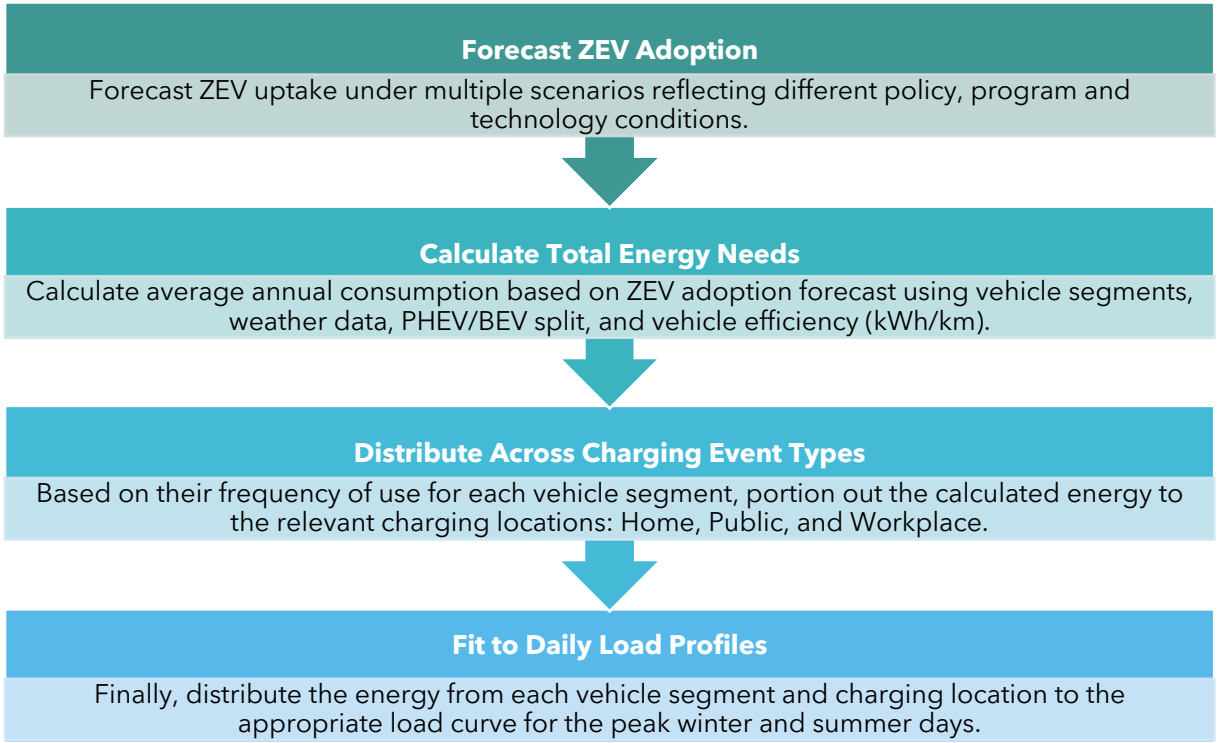
We refer to specific vehicle purchase incentive levels for simplicity; however, what matters for our modeling is the ZEV price relative to an ICEV. The same impact can be achieved through a $5,000 rebate, a $5,000 penalty on ICEVs, or a combination that is revenue-neutral, such as a "feebate" system. This approach would become important for the High Growth scenario to sustain ZEV incentives into the 2030s without high costs.

[14] Port numbers are for all three Territories combined. Charging infrastructure inputs in the High Growth scenario are aligned with the estimated charging needs developed in the 2024 Dunsky report *Electric Vehicle Charging Infrastructure for Canada*. In the Medium and Low growth scenarios, charging inputs are lower to align with lower levels of adoption and to reflect reduced charging availability, which contributes to constrained ZEV adoption in these scenarios. Note that these inputs are not the result of a detailed charging needs assessment, but rather high-level estimates based on Dunsky's 2024 analysis, which reflects alternative adoption scenarios.
[15] Assumptions for Home Charging Access were based on the methodology used in the 2024 Dunsky report, *Electric Vehicle Charging Infrastructure for Canada*.

2.2 Electric Grid Load Impacts

This study follows a four-step process to assess the potential for and impacts of ZEVs on Yukon's electric grid from increased demand for electricity for ZEV charging. The ZEV adoption forecast from EVA™ is used to calculate the potential grid load (demand for electricity) impacts from realistic charging behaviours. To create a forecast of ZEV charging load in Yukon, we first leveraged results from our in-house **ZEV adoption forecast from EVA™** to produce a light-duty ZEV adoption forecast based on a market characterization that we produce for each jurisdiction. Error! Reference source not found. outlines each of these four steps for determining peak demand from ZEVs.

Figure 11. Process for modelling ZEV adoption and load impacts



To determine the impacts of ZEV adoption on the electrical grid, we used typical 24-hour diversified charging distribution profiles established from the literature[16] for each vehicle segment and charging location, and the Dunsky EVA™ model results, with regional adjustments for vehicle consumption in Yukon (i.e. temperature and proportions of vehicle types). The resulting load curves represent the average charging behaviour of different ZEV segments on the road during summer and winter peak days.[17]

[16] The charging distribution profiles were developed by leveraging data sets from a range of government and utility-led pilot programs including the California Energy Commission (April 29, 2019. *California Investor-Owned Utility Electricity Load Shapes.*); ISO New England (*2020 Transportation Electrification Forecast.*); and Rocky Mountain Institute. (2019. *DCFC Rate Design Study.*)
[17] Refers to the day with the highest electricity demand in a single hour, for a given year and season.

Next, these curves are multiplied by the forecasted number of ZEVs on the road in each study year. The results of this load impact analysis produce the hypothetical daily load impact for peak days. The curves consider the use of all charging event types – home, workplace, and public charging.

Charging event types refer to the location where charging is taking place, which will change the power level, time of day, and flexibility of the charging load. Each ZEV will receive a proportion of its total charging energy from different event types. For example, a personal vehicle is likely to charge at home most of the time, but it will occasionally charge at a public charger while the driver is shopping or at their workplace. This breakdown of charging event types will vary based on the vehicle's purpose. Our assumptions for charging event type proportions by vehicle segment and origin can be found in Table 3.

Table 3. Proportion of daily charging energy for each event type and vehicle segment

Charging Event Type	Personal	Commercial
Home/Depot[18]	80%	100%
Workplace	10%	N/A
Public	10%	N/A

[18] Refers to where most vehicles are parked overnight, "Home" for personal vehicles and "Depot" for commercial vehicles.

3. Results

Key results highlights that we cover in this section include:

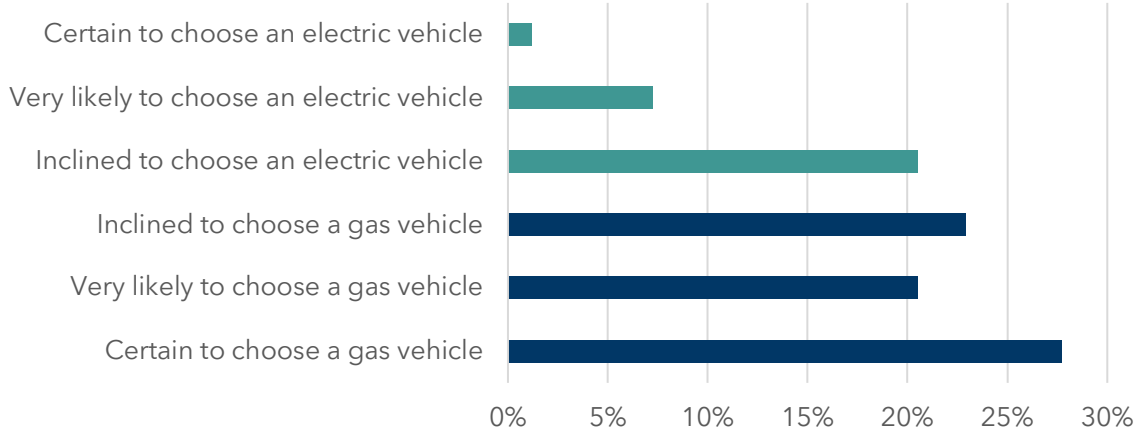
1. Over the long term, ZEV adoption in Yukon is forecasted to approach 100% of new sales, which would accumulate to 46% of total vehicles on the road by 2040, even in a low-growth scenario.
2. If effectively managed charging programs and technologies are employed, winter peak load from ZEV charging has the potential to be reduced by 26 MW (25%) in a medium growth scenario.
3. Without effective programs and policies in place over the next few years, Yukon will be on a slower path to electrification, resulting in lost benefits for Yukoners in both improved air quality and financial savings from reduced fuel and maintenance costs.

3.1 Results from the Survey of Canadians

As part of the *Powering Up* project, Electric Mobility Canada surveyed over 6,000 Canadians, including 150 residents of the Territories.[19] A portion of this survey aimed to confirm, update, or determine new assumptions that should be used in the EVA™ model to forecast ZEV adoption in Canada as accurately as possible. This section summarizes some of those key results.

Figure 12. When thinking about your next vehicle purchase, which will you choose? Territories only

Nearly a third of Territories residents (29%) plan to buy a ZEV as their next vehicle. This preference is lower than that of Canadian urban residents (49%) and individuals aged 30-44 (51%).



[19] The survey results presented in this section represent respondents from all three Territories because the sample size was too small to present each Territory's results in isolation. It should be noted that each Territory has a different energy and transportation landscape, and survey results should be interpreted with this in mind.

Although Territories residents have a willingness to pay a premium for a ZEV over an ICEV (see **Figure 13**), the EVA™ model assumes that the comparatively higher upfront costs will pose a barrier to the majority of potential ZEV buyers until ZEV prices reach parity with ICEVs across most segments.

Figure 13. When considering the upfront cost of an electric vehicle vs a traditional gas vehicle, how much more do you consider acceptable today? Territories only

80% of Territories residents would be willing to pay a premium for a ZEV versus an ICEV.

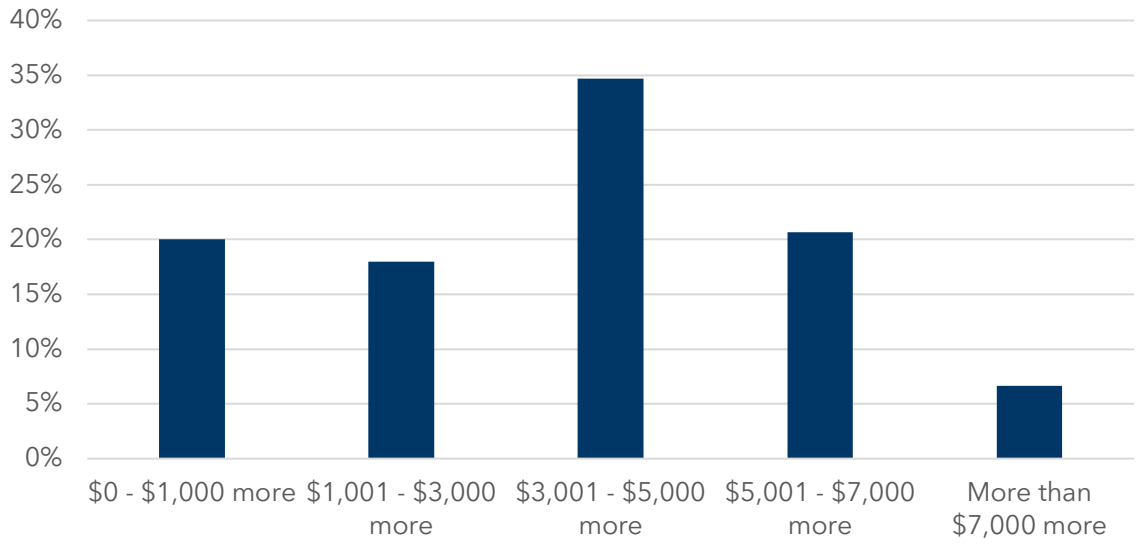


Figure 14. How many long distance (500 km or more) trips do you make in one year? Territories only

Nearly half of Territories residents take 1-2 long distance trips annually.

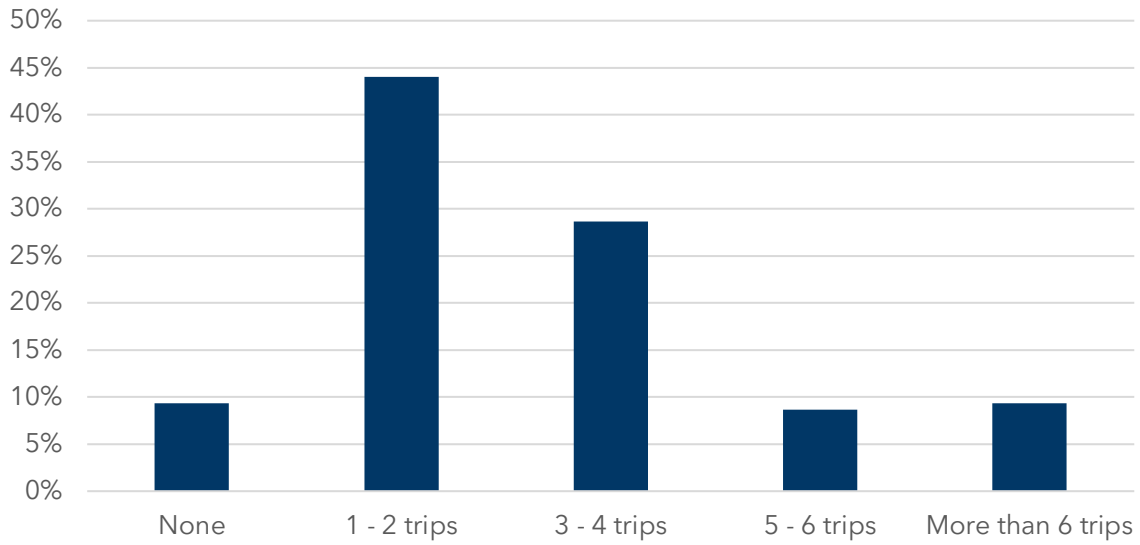
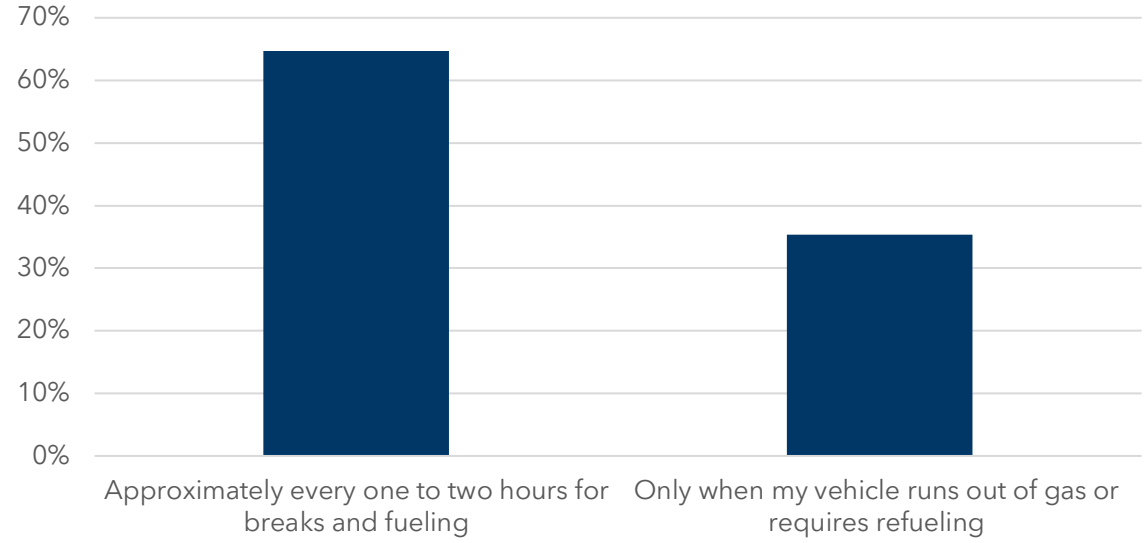


Figure 15. How frequently do you typically make stops during long-distance trips (500 km or more)? Territories only

35% of Territories residents stop more frequently on long trips than they would need to refuel, indicating that ZEV range might be a constraint or inconvenience on their ability to make long-distance trips so long as sufficient public charging is available.



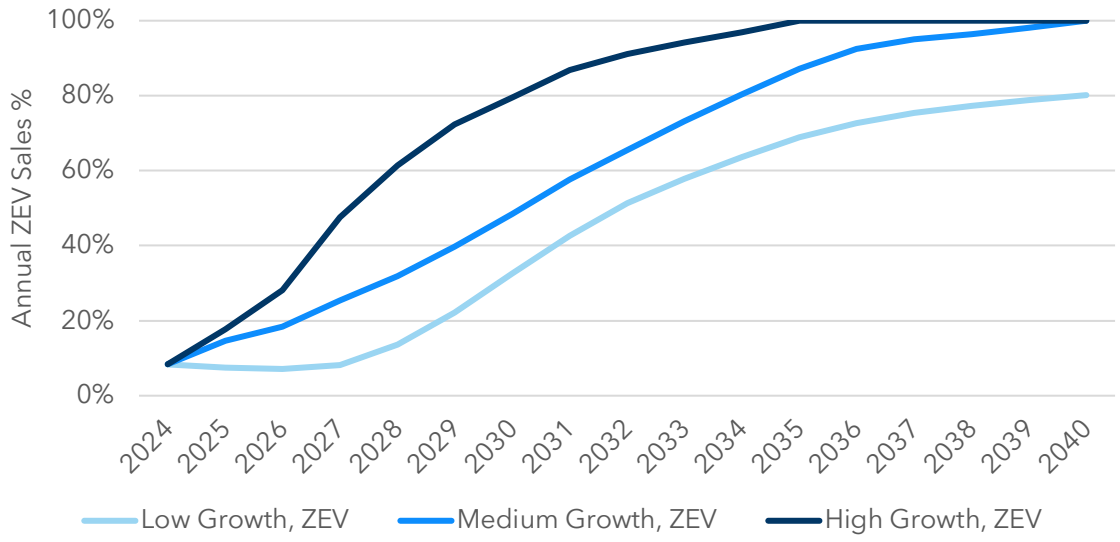
Nearly half of Territories residents (34%) drive less than 30km to get to work (60km round trip), which means that a large proportion of people would need to rely on top-up charging. This is notably different from the experience of most Canadians living in other provinces.

This survey also included questions pertaining to Canadians' knowledge about ZEVs, which can be indicative of some common misconceptions that result in perceived barriers to adoption. For instance, the majority of Territories residents are unaware of the average range of new ZEVs, with only 32% knowing that it falls between 400 and 500 kilometers. However, 68% of Territories residents are aware of the federal government rebates for ZEVs. A sample of additional questions that were asked in this knowledge section is included in the Appendix, Additional Results from Survey of Canadians.

3.2 ZEV Adoption Results

Policies and programs that support ZEV adoption in Yukon will be significant drivers of growth over the next 10 years.

Figure 16. Annual ZEV sales % by scenario, Yukon



Changes in charging availability, purchase incentives, and a ZEV standard in the near term will determine how quickly Yukon arrives at a complete transition to electric vehicles. If these factors are in place, they will reduce key barriers to adoption, including having enough charge when needed, bringing ZEVs to price parity with ICEVs, and ensuring adequate local supply.

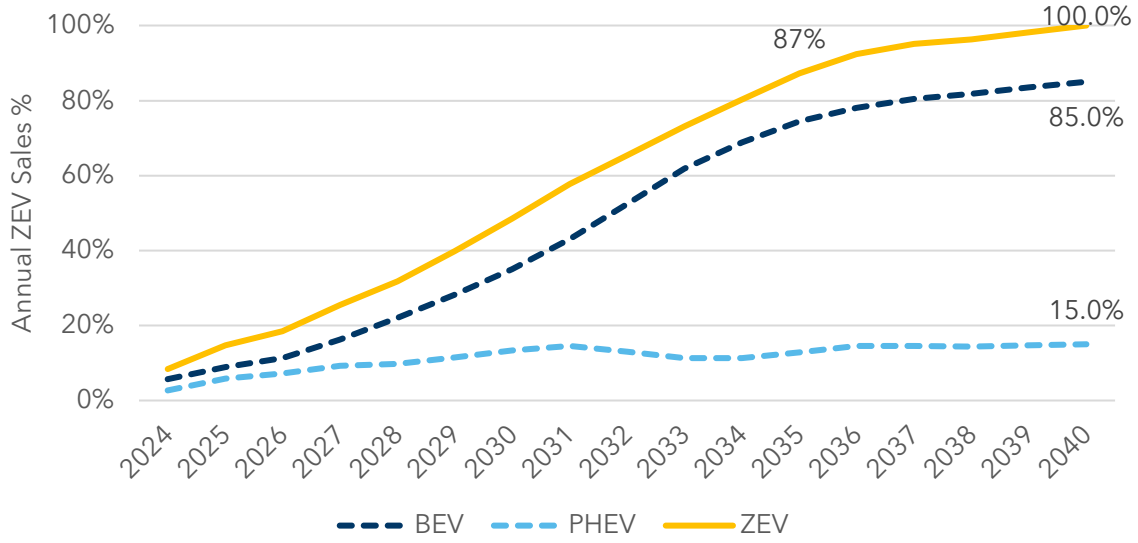
Policy makers have a critical opportunity in the next few years to put Canada on a strong path to vehicle electrification, enabling Canadians to reap the cost and environmental benefits over the following decades.

3.2.1 Medium Growth Scenario

Although the Medium scenario models a delayed federal ZEV standard enforcement date, ZEV adoption is still expected to reach 87% of new sales by the current target date of 2035.

Figure 17. Annual ZEV sales % by powertrain, medium growth, Yukon

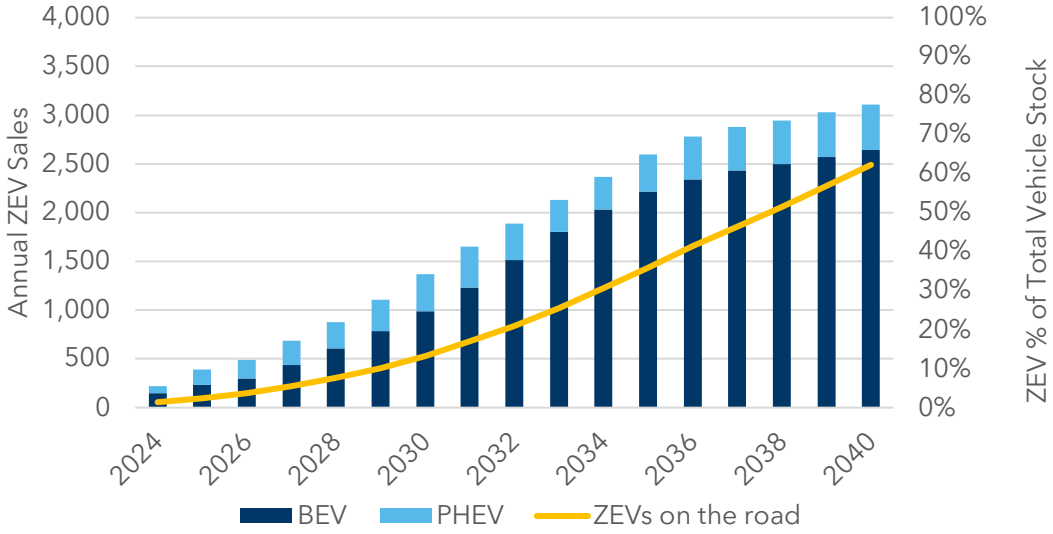
Yukon will experience significant growth in ZEV uptake, reaching 100% by 2040.



With the additional public and home charging access assumed in this scenario, reducing barriers to BEV adoption, BEVs out-compete PHEVs due to lower total cost of ownership.

Figure 18. Annual ZEV sales by powertrain and total ZEV stock, medium growth, Yukon

By 2040, over 30,000 of the 49,000 (62%) LDVs on the road are forecasted to be ZEVs.



3.2.2 High Growth Scenario

Under the High scenario, additional policy supports remove the primary barriers to ZEV adoption, including public charging, home charging access, and upfront cost reductions.

Figure 19. Annual ZEV sales % by powertrain, high growth, Yukon

The ZEV proportion of annual sales increases rapidly towards the 100% ZEV standard in 2035, reaching 80% by 2030.

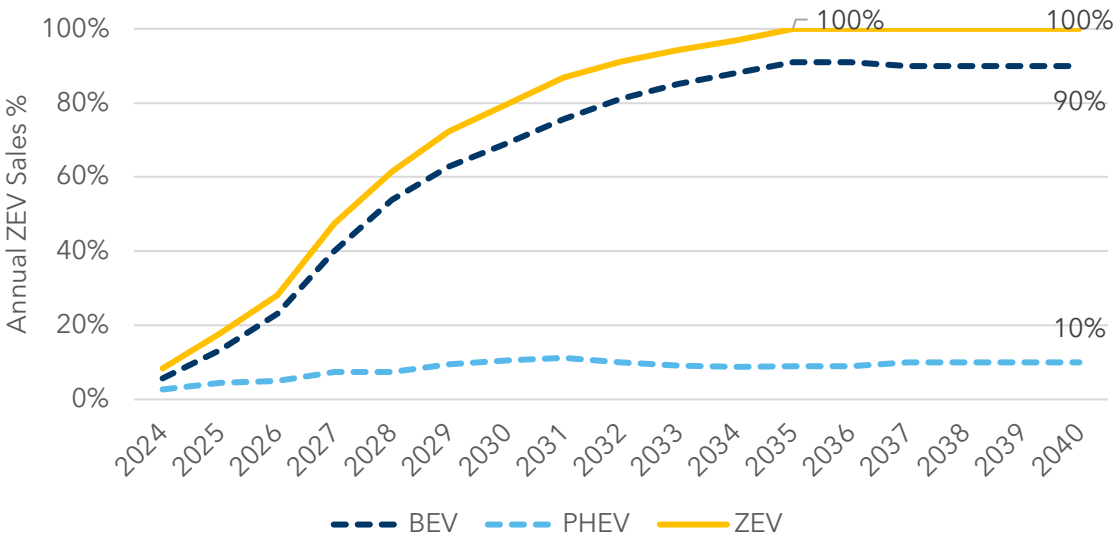
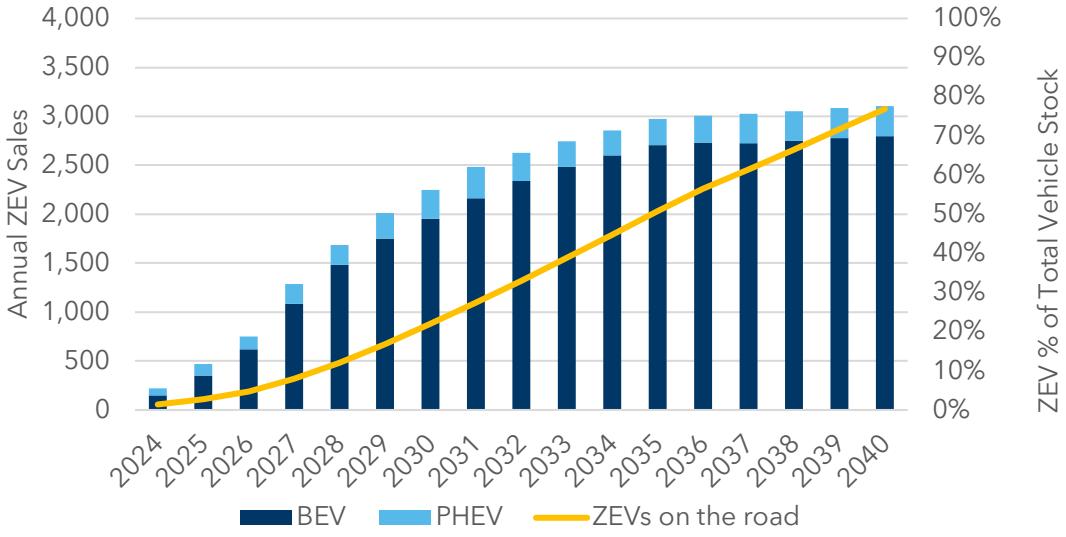


Figure 20. Annual ZEV sales by powertrain and total ZEV stock, high growth, Yukon

By 2040, over 37,000 of the 49,000 (77%) LDVs on the road are forecasted to be ZEVs.

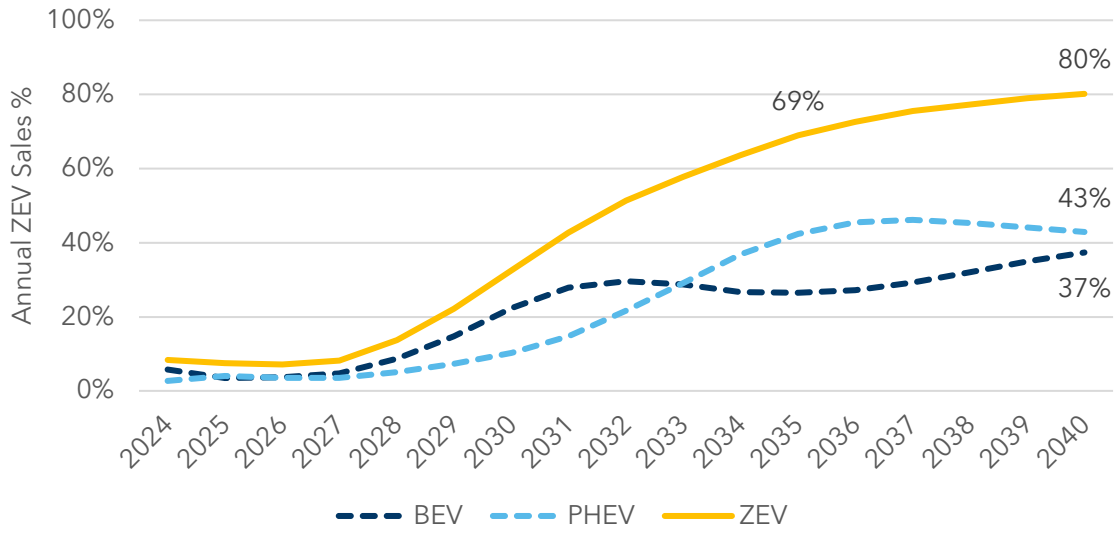


3.2.3 Low Growth Scenario

With few supportive policies in the Low scenario, ZEV adoption potential will be constrained.

Figure 21. Annual ZEV sales % by powertrain, low growth, Yukon

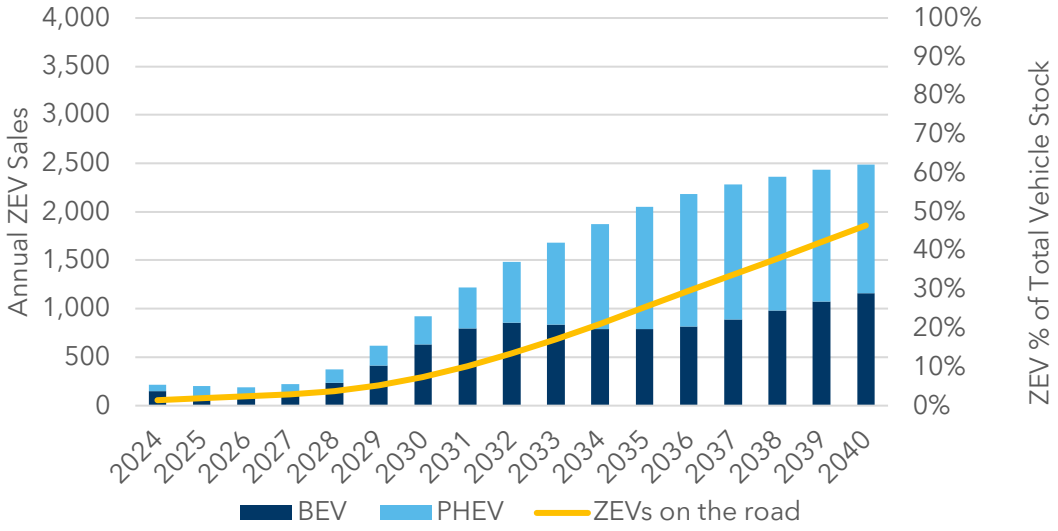
ZEV adoption is expected to fall short of the current federal 2035 ZEV target (100%), reaching only 69% of new sales by 2035 and 80% by 2040.



The market share shifts towards PHEVs in 2033 as public infrastructure deployment in this scenario is insufficient to meet the needs of BEV drivers. However, over the long term, the economics of BEVs are likely to continue to improve and result in increasing market share.

Figure 22. Annual ZEV sales by powertrain and total ZEV stock, low growth, Yukon

By 2040, nearly 23,000 of the 49,000 (46%) LDVs on the road are forecasted to be ZEVs.

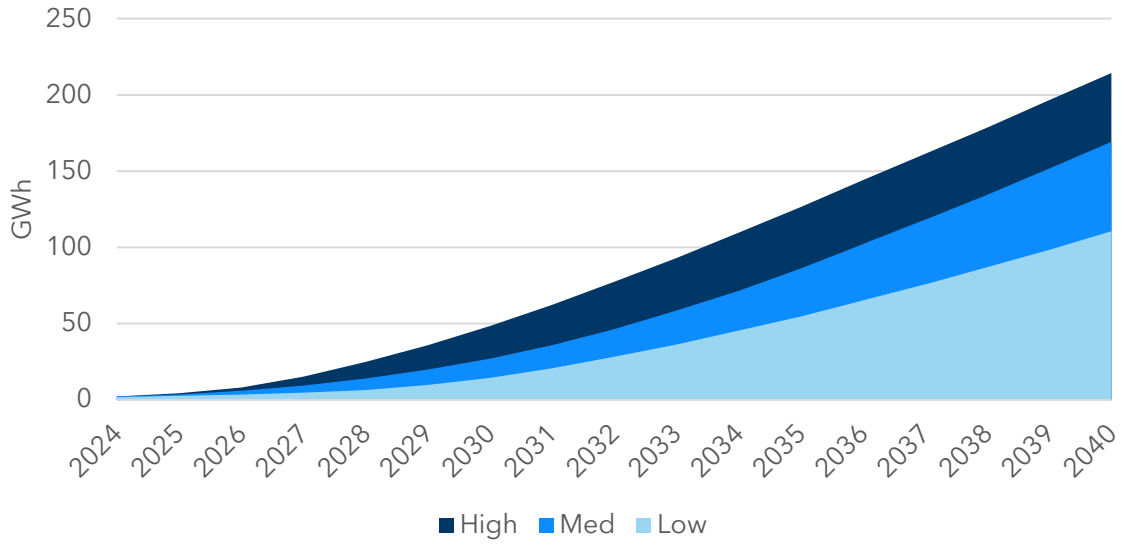


3.3 Electric Grid Load Impact Results

Total annual energy consumption from ZEVs will be higher in the Medium and High scenarios compared to the Low scenario, not only because there are more ZEVs overall, but also because there are more BEVs than PHEVs. Since PHEVs drive a proportion of their time on gas, whereas a BEV must always use electricity, a higher proportion of BEVs will result in higher energy consumption overall.

Figure 23. Annual energy impacts from ZEV charging, scenario comparison, Yukon

Total annual load impacts in Yukon could range from 110 to 210 GWh by 2040 under the Low and High Growth scenarios, respectively, mirroring the growth of cumulative ZEVs on the road.



Light-duty ZEVs will increase annual electricity consumption in Yukon by between 19% and 37% by 2040.[20]

[20] Based on our ZEV forecast (Figure 16) and data shared with Dunsky by Yukon Energy in February 2025.

3.3.1 ZEV Charging Load Growth Over Time

Outdoor air temperatures on the coldest day can increase vehicle energy needs, thereby tripling peak grid impacts[21] compared to summer requirements, mainly due to cabin heating needs.[22]

Figure 24. Peak ZEV Charging Load, summer, Yukon

ZEVs will contribute between **15 and 28 MW** of peak load by 2040 in **summer**.

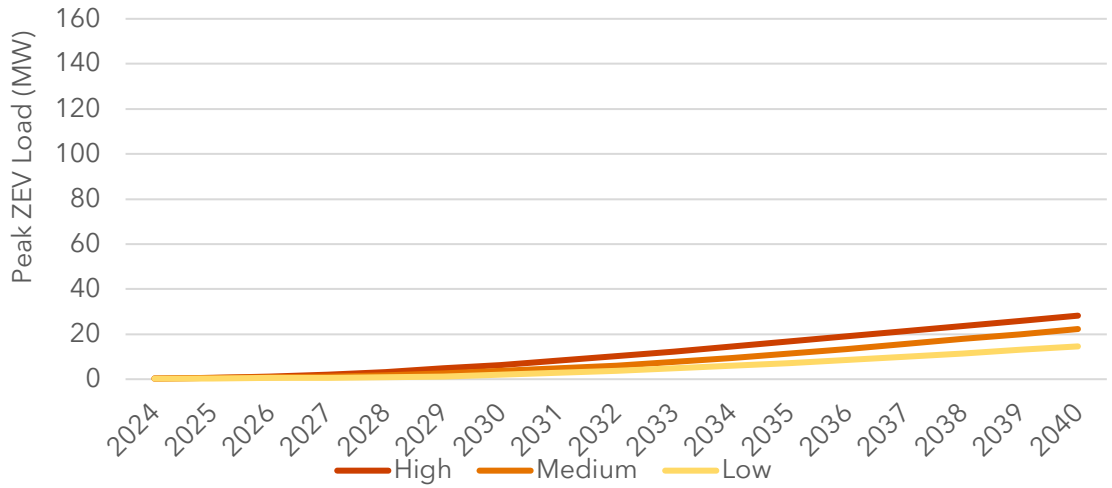
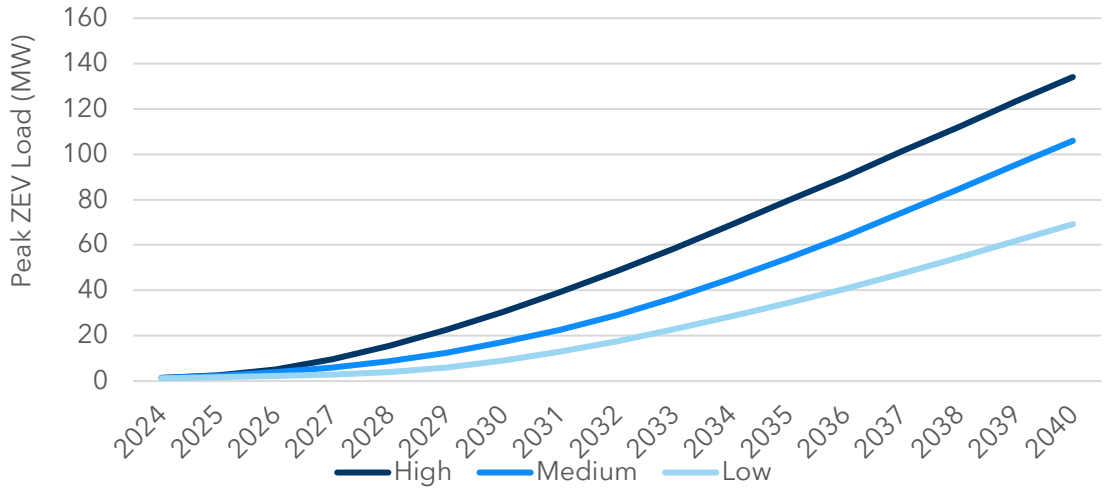


Figure 25. Peak ZEV Charging Load, winter, Yukon

ZEVs will contribute between **69 and 130 MW** of peak load by 2040 in **winter**.

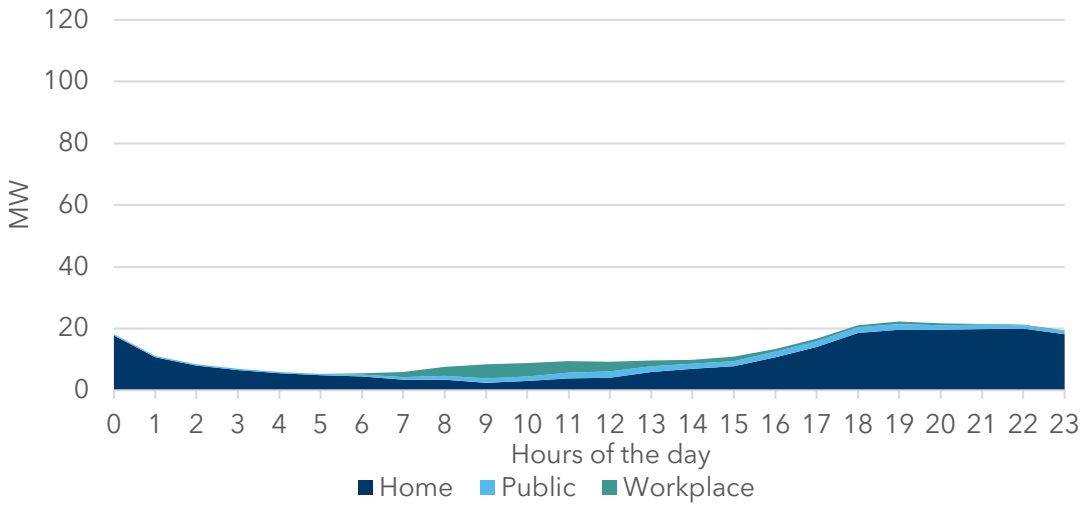


[21] Peak load refers to the hour with the highest electricity demand for a given year and season.
[22] Geotab. November 30, 2023. *To what degree does temperature impact EV range?*

3.3.2 Peak Day ZEV Load in 2040

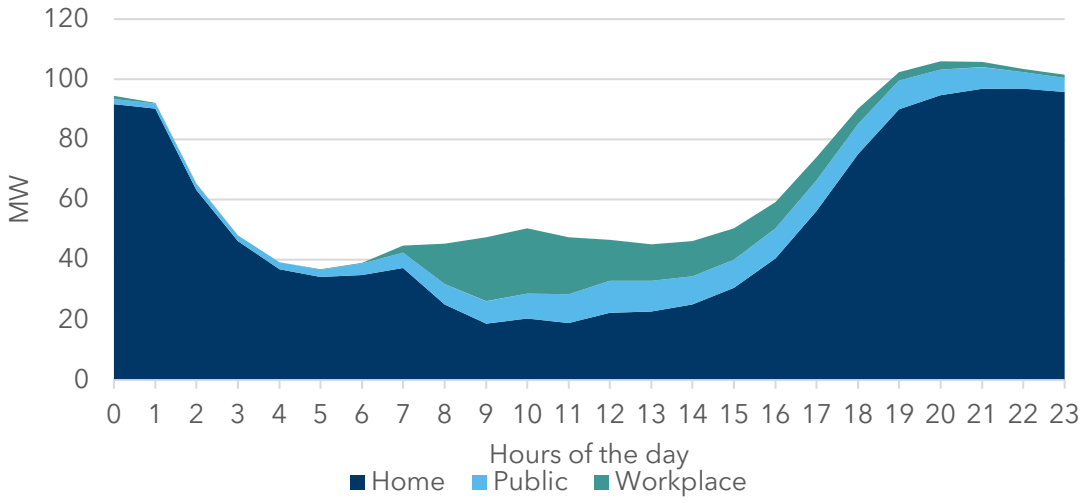
Most of the peak day[23] impact from ZEV charging will come from home charging, with the majority of this charging occurring in the evening and overnight.

Figure 26. Summer peak day ZEV load in 2040, medium growth, YK



Although the ZEV-peak typically occurs overnight, as a result, load impacts from ZEV charging are significant enough during Yukon's peak periods (7 am – 11 am and 5 pm – 7 pm)[24] to be impactful on the electrical system if the charging load is unmanaged.

Figure 27. Winter peak day ZEV load in 2040, medium growth, YK

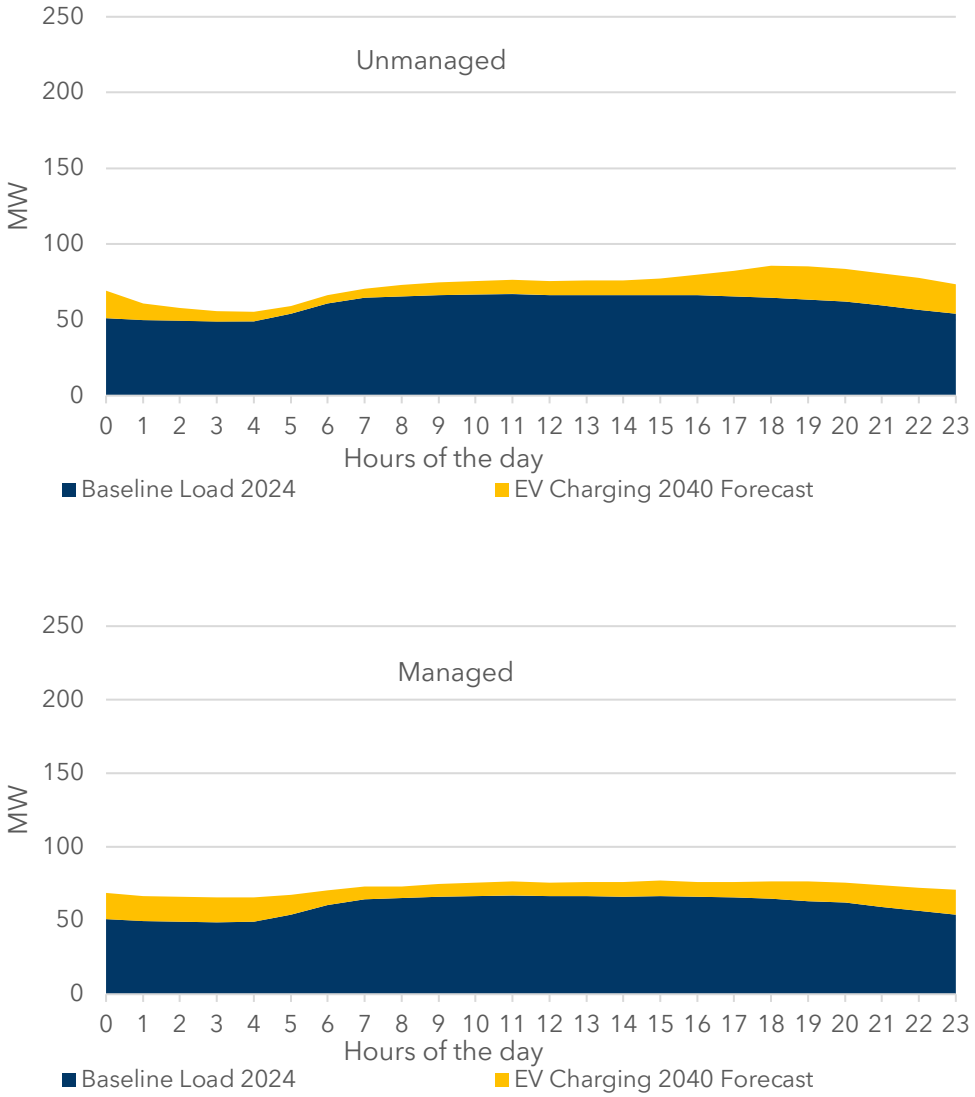


[23] Refers to the day with the highest electricity demand in a single hour, for a given year and season.
[24] Government of Yukon. *Small actions for individuals.* Accessed March 2025.

3.3.3 Managed ZEV Charging Load

To understand the impact of ZEV charging on the total system peak, we layer the ZEV load on top of the existing grid demand.[25] This also allows us to see opportunities to shift ZEV load to periods when other loads are low. When applied to a typical peak day, light-duty ZEVs typically increase peak demand and push the peak hour to later in the evening.

Figure 28. Managed charging potential, summer peak day, medium growth, YK

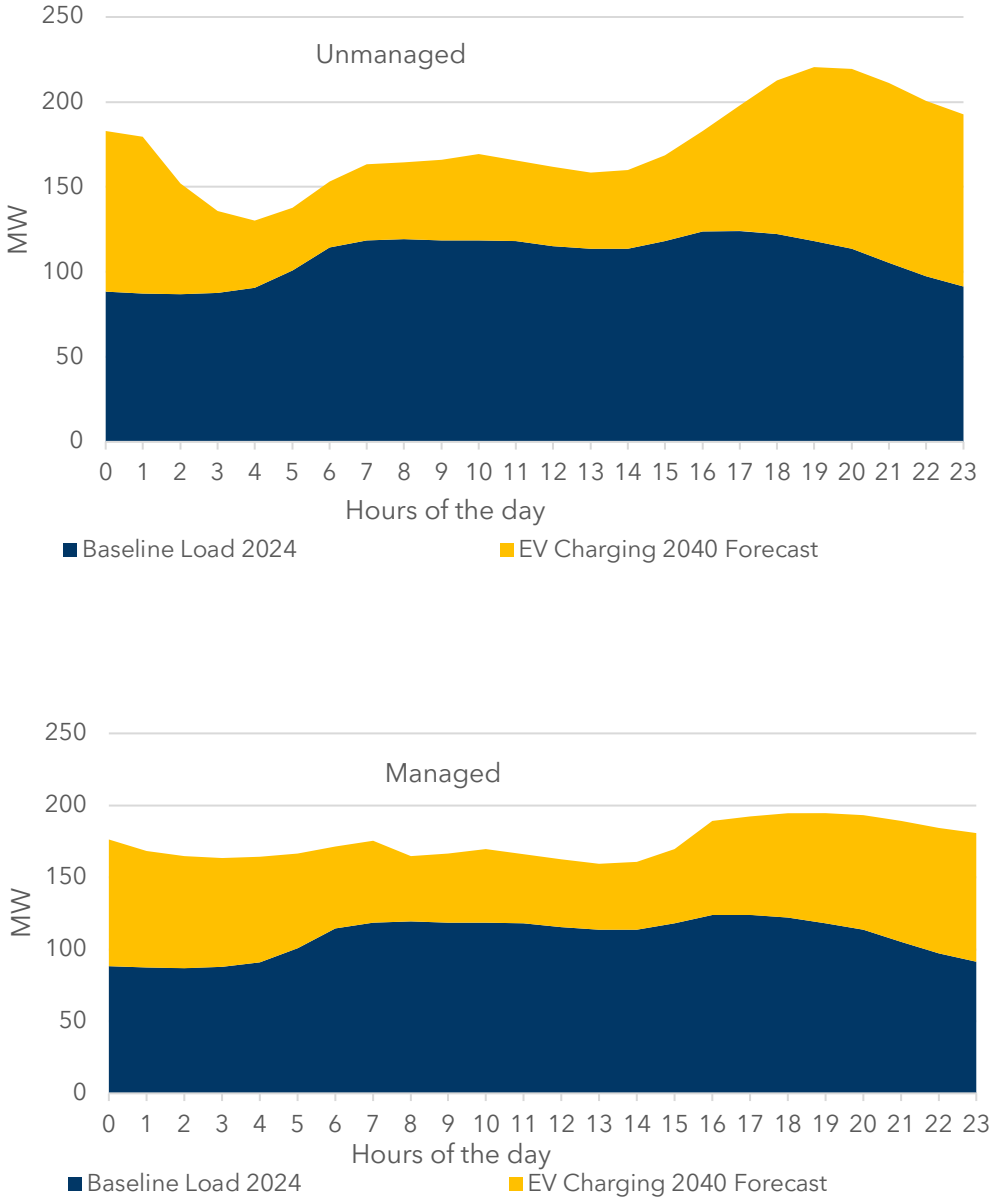


However, if this charging is effectively managed through active load management, winter peak impacts could be reduced by 26 MW (25%).[26] Note that this analysis uses sample peak days from Yukon in 2024, but peak day baseline load profiles can vary from year to year, and

[25] Source: Data shared with Dunsky by Yukon Energy in February 2025.
[26] We assume managed charging applies only to EVs charging at home on Level 2 chargers, and that 20% of those EVs are unmanaged with 80% participating in a utility program. Medium growth scenario.

grow over time from electrification of other loads like buildings. Yukon typically has its peak in winter evenings.

Figure 29. Managed charging potential, winter peak day, medium growth, YK



4. Key Takeaways

1

Over the long term, ZEV adoption in Yukon is forecasted to approach 100% of new sales, which would accumulate to 46% of total vehicles on the road by 2040, even in a low-growth scenario. The impact of policies and programs, as well as the deployment of charging infrastructure, has the potential to increase the rate of adoption significantly in earlier years.

2

If effectively managed, charging programs and technologies are employed, winter peak load from ZEV charging has the potential to be reduced by 26 MW (25%) in a medium growth scenario.

- While the actual load shift will depend on the techniques and technologies employed, as well as the incentives provided for ZEV drivers to participate, these results highlight the opportunity to avoid costly grid upgrades by leveraging the inherent flexibility of ZEV charging loads.
- By 2040, transportation electrification could be such an important driver of load that utilities may need to employ additional strategies in addition to shifting charging to overnight. These may include encouraging daytime charging at workplaces alongside increases in generation capacity.

3

Without effective programs and policies in place over the next few years, Yukon will be on a slower path to electrification, resulting in lost benefits for Yukoners in both improved air quality and financial savings from reduced fuel and maintenance costs.

The **most impactful tools** that local actors have to support the adoption of electric vehicles are **increasing charging access, increasing the local supply of ZEVs, and reducing vehicle purchase costs.** Critical actions to address these barriers include:

- Supportive ZEV-ready policies, standards, and programs to increase home charging availability, and deployment of sufficient public charging to supplement home charging
- Requiring and encouraging a sufficient supply of ZEVs at local dealerships
- Financial support for ZEV purchases as prices approach parity with ICEVs

Appendix

Key Inputs & Assumptions

Table 4. Federal and Provincial ZEV Incentives, Yukon[27]

Scenario	Powertrain	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036+
Lo	**PHEV**	$5,750	$5,750	-	-	-	-	-	-	-	-	-	-	-
Lo	**BEV**	$7,500	$7,500	-	-	-	-	-	-	-	-	-	-	-
Med	**PHEV**	$7,750	$7,750	$7,750	$7,750	$3,875	$2,875	$1,438	-	-	-	-	-	-
Med	**BEV**	$10,000	$10,000	$10,000	$10,000	$5,000	$3,750	$1,875	-	-	-	-	-	-
Hi	**PHEV**	$7,750	$7,750	$7,750	$9,625	$9,625	$9,625	$9,625	$9,625	$8,500	$5,100	$2,550	$1,275	-
Hi	**BEV**	$10,000	$10,000	$10,000	$12,500	$12,500	$12,500	$12,500	$12,500	$11,000	$6,600	$3,300	$1,650	-

[27] Based on a combination of professional judgement and currently available incentives and target phase-out dates from the Government of Canada: *Incentives for Zero-Emission Vehicles (iZEV).* and the Government of Yukon: *Apply for a rebate for a new light duty zero-emission vehicle.* Accessed December 2024.

Table 5. Fuel Costs, Yukon[28]

Variable	Units	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Electricity rate[29]	$/kWh	0.19	0.19	0.19	0.19	0.19	0.20	0.20	0.20	0.20	0.20	0.21	0.21	0.21	0.21	0.21	0.22	0.22
Gas rate[30]	$/L	1.83	1.85	1.87	1.89	1.91	1.93	1.95	1.97	1.99	2.01	2.03	2.05	2.07	2.09	2.11	2.13	2.15

[28] We assume an annual growth rate of 1% and no carbon tax.
[29] Dunsky's projected electricity rates by province in real dollars. These are blended $/kWh rates including energy, transmission, distribution and associated fees, but excluding taxes. Includes both residential and smaller commercial electricity rates.
[30] Statistics Canada. December 17, 2024. *Monthly average retail prices for gasoline and fuel oil, by geography.*

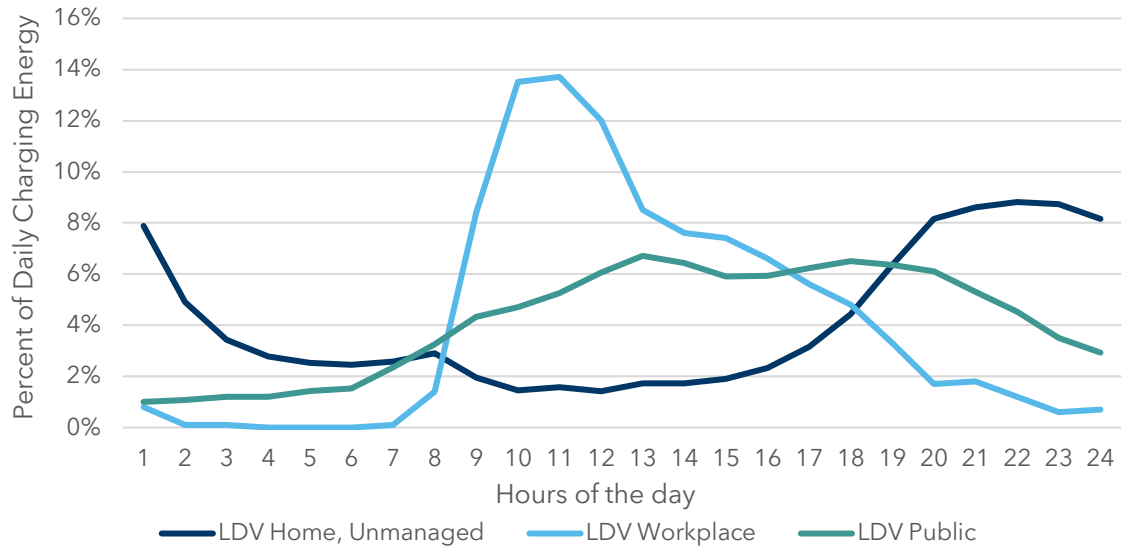
Table 6. Light-duty vehicle stock and sales, thousands of vehicles, Yukon[31]

Variable	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
LDV sales	2.6	2.6	2.7	2.7	2.7	2.8	2.8	2.9	2.9	2.9	2.9	3.0	3.0	3.0	3.1	3.1	3.1
LDV Stock	35	35	36	37	39	40	41	42	43	43	44	45	45	47	48	48	49

[31] Natural Resources Canada. *Comprehensive Energy Use Database: Transportation Sector, British Columbia and Territories.* Accessed January 2025. Statistics Canada. Table 23-10-0308-01 Vehicle registrations, by type of vehicle and fuel type. Accessed January 2025. Natural Resources Canada data includes both stock and sales metrics for British Columbia and the Territories combined. Statistics Canada data was leveraged to determine the proportion of vehicles attributed to each Territory and those proportions were applied to NRCan absolute values to determine Territory specific annual sales and vehicles on the road. Assume vehicle ownership remains constant and vehicles on the road align with population projections from Statistics Canada's M1 scenario. *Projected population, by projection scenario.* Accessed June 2024.

The unmanaged diversified charging distribution profiles were developed by leveraging data sets from a range of government and utility-led pilot programs including: California Energy Commission 2019 California Investor-Owned Utility Electricity Load Shapes; ISO New England 2020 Transportation Electrification Forecast; Rocky Mountain Institute 2019 Direct Current Fast Chargers (DCFC) Rate Design Study.

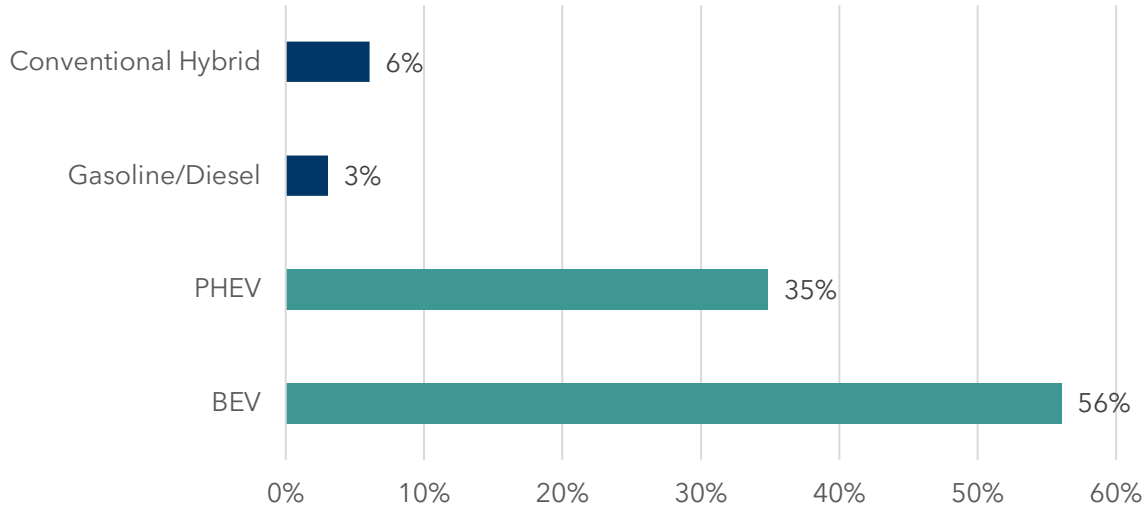
Figure 30. Diversified charging distribution profiles



The curves in the figure above represent the proportion of daily charging energy that the average vehicle would charge in each hour of the day. We calculate average daily energy needs per ZEV based on the average driving distance for vehicles in Yukon and use this in combination with the charging distribution profiles to determine how much charging energy is used every hour for our load impacts analysis.

Additional Results from Survey of Canadians

Figure 31. What type of vehicle do you intend to purchase or lease next? Territories only (Posed only to current ZEV owners)



After being presented with a series of knowledge testing questions about electric vehicles and their correct answers, survey respondents were asked again to select the type of vehicle they would buy next. The responses to Figure 32 should be compared to **Figure 12** to assess the potential impact of increased awareness of ZEV benefits on purchasing decisions.

Figure 32. Taking into consideration the information provided to you, when thinking about your next vehicle purchase, which will you choose? Territories only

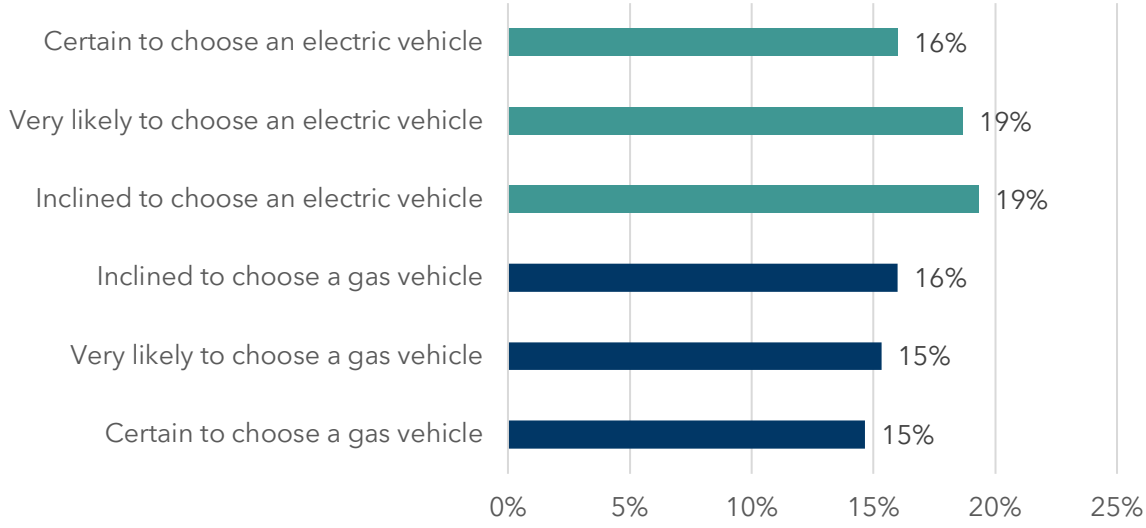


Figure 33. How influential were government incentives in your decision to purchase/lease an ZEV/PHEV? Territories only

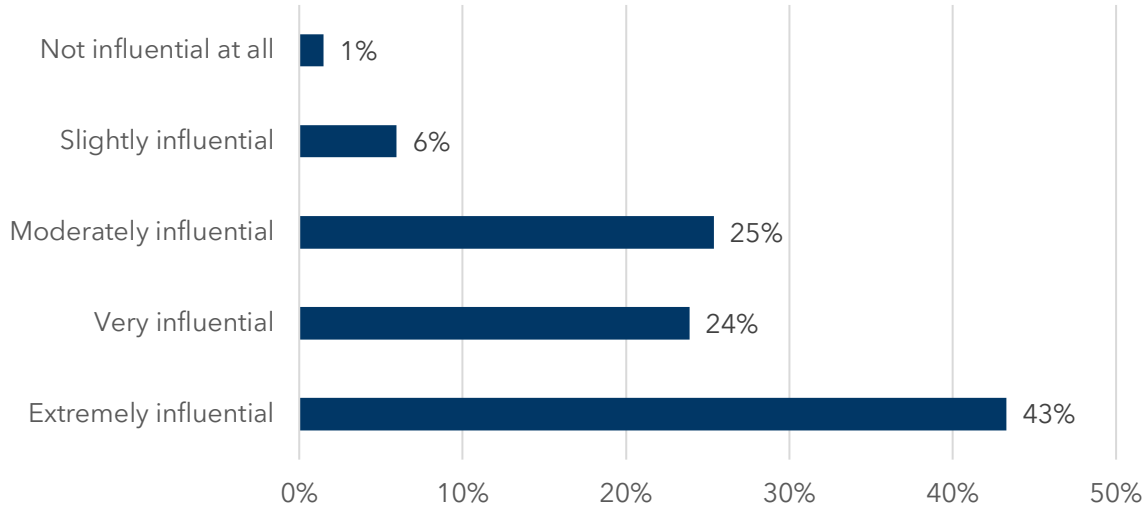


Figure 34. When you are selecting your next vehicle, do you expect you will buy/lease a fully electric vehicle (BEV) or a plug-in hybrid electric vehicle (PHEV)? Territories only

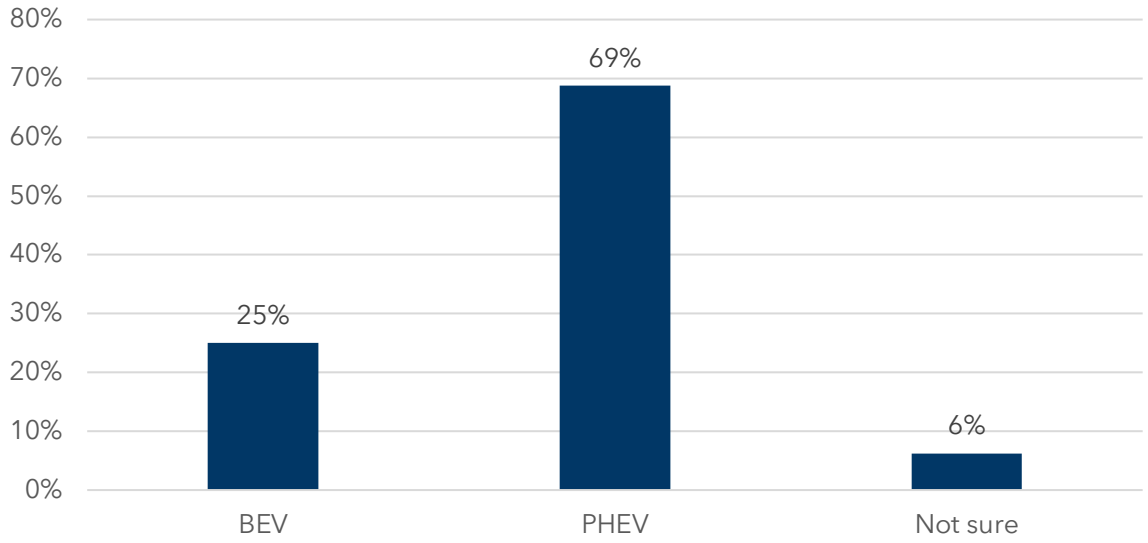


Figure 35. Are you aware of the federal government rebate of up to $5,000 for purchasing an electric vehicle? Territories only

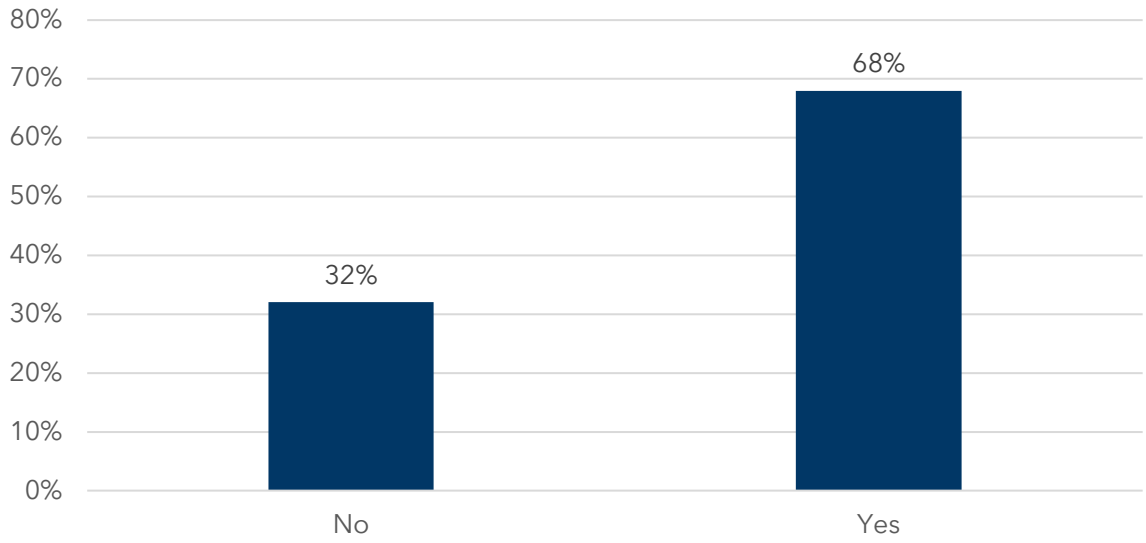


Figure 36. Are you aware that the government of Yukon offers a rebate of up to $4,000 for purchasing an electric vehicle? Yukon only

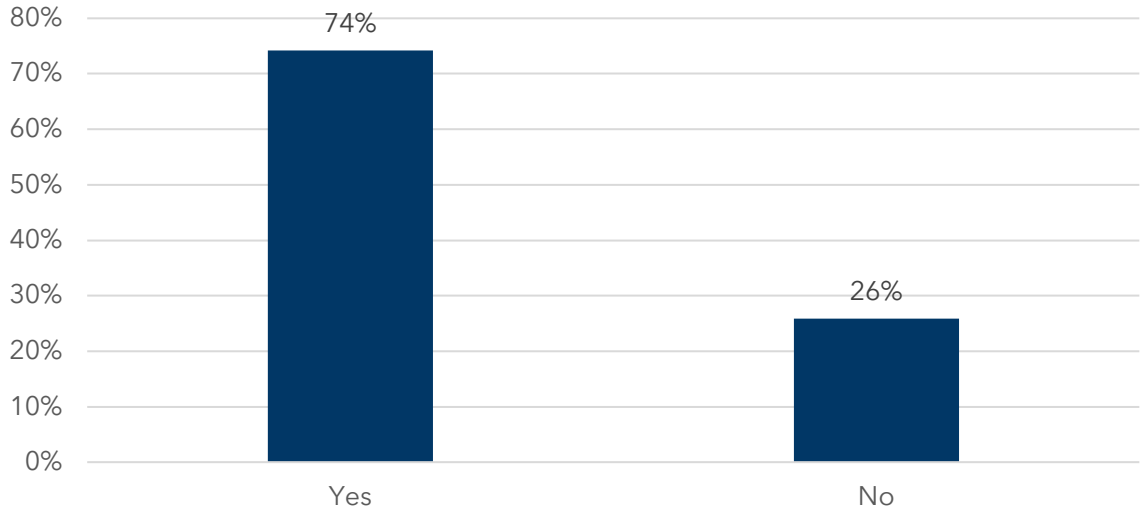


Figure 37. Are you aware that you may be eligible for a federal tax deduction specifically for the purchase of an electric vehicle if you are self-employed or own a company? Territories only

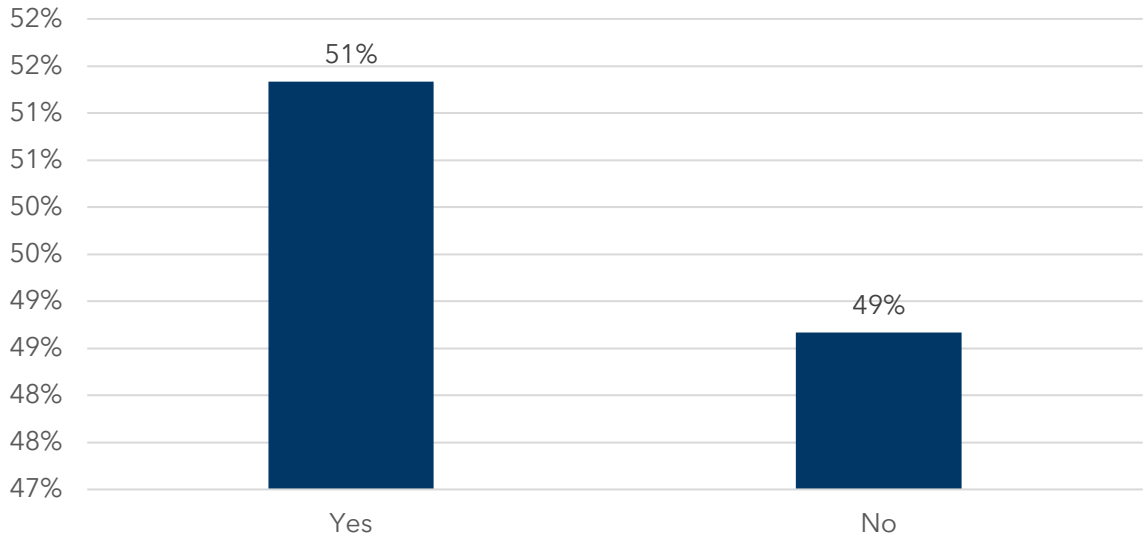


Figure 38. Are you familiar with other incentives available to ZEVs (e.g., ferries, dedicated lanes on highways, dedicated parking spots closer to the entrance, etc)? Territories only

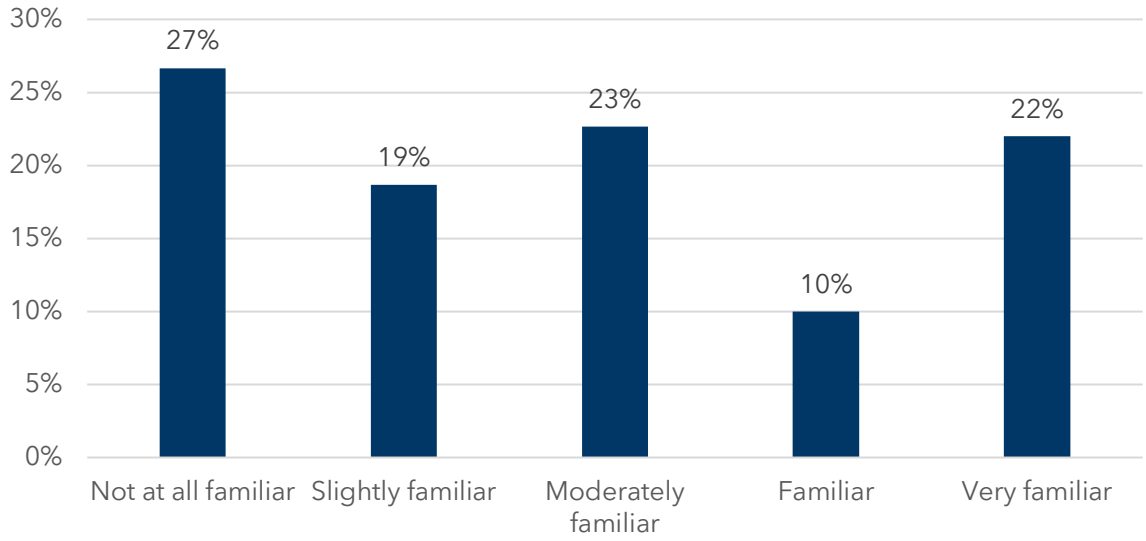


Figure 39. What is the average price of a new light duty vehicle (car, SUV, pickup truck) in Canada? Territories only

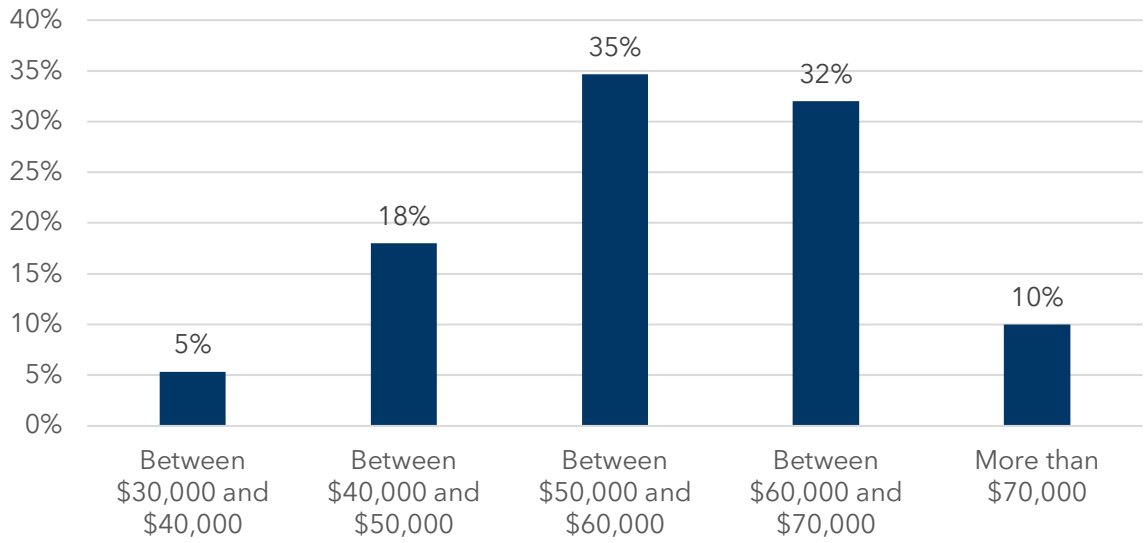
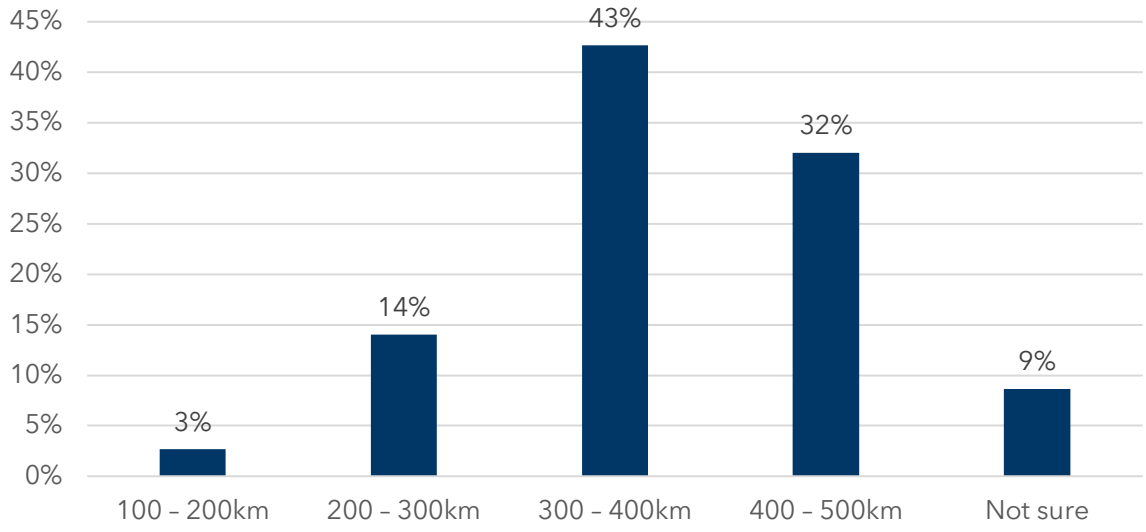


Figure 40. What is the average range of most new electric vehicles? Territories only



About Dunsky

Dunsky supports leading governments, utilities, corporations and others across North America in their efforts to accelerate the clean energy transition, effectively and responsibly.

With deep expertise across the Buildings, Mobility, Industry and Energy sectors, we support our clients in two ways: through rigorous Analysis (of technical, economic and market opportunities) and by designing or assessing Strategies (plans, programs and policies) to achieve success.

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