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: NUNAVUT

August 2025

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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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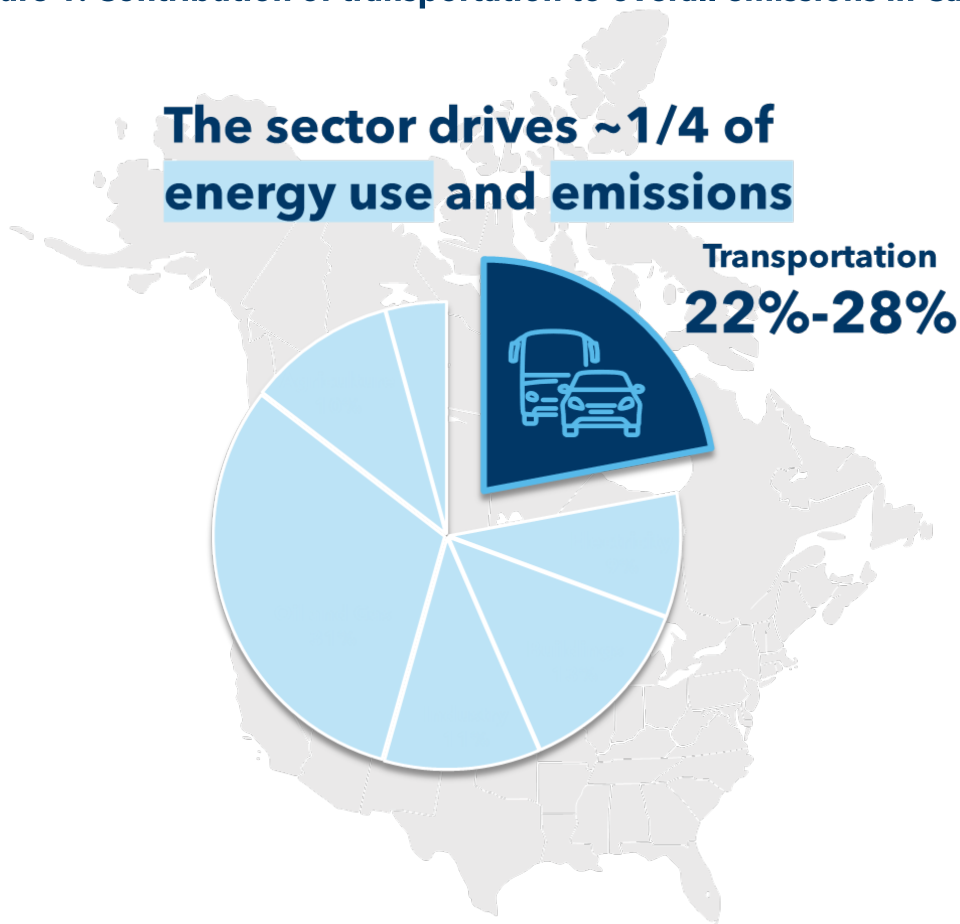
1. Background

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

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

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.

On-road vehicle transportation in Nunavut is different from other provinces and territories in Canada in several ways. Access to vehicles for purchase in Nunavut usually requires transporting them by boat,[2] which only happens at certain times of year.[3] Communities in Nunavut are also generally not connected by road, and so inter-community travel requires other forms of transportation.[4] To appropriately represent these differences, we present in this report the results of our analysis and forecast of ZEV adoption in Nunavut slightly differently than in the other provincial and territorial reports within the *Powering Up* project. We have noted where methodologies may have differed, or where key assumptions were made to allow us to complete the analysis with a reasonable degree of accuracy.

[2] Peter Worden. May 2015. By Air, By Sea, By Land.
[3] Government of Nunavut. Transportation: Sealift Services. Accessed March 2025.
[4] Travel Nunavut. Navigating the Beautiful North. Accessed March 2025.

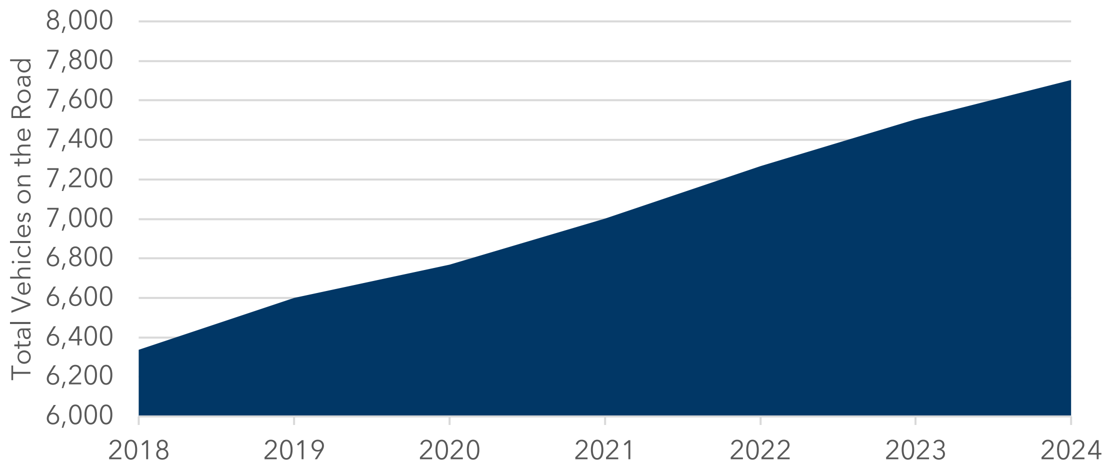
1.2 Vehicle and Housing Market Overview

LDV sales (and other road vehicles) in Nunavut largely arrive in the territory via boat. The market for road vehicles is relatively small due to the lack of roads in and between many communities in Nunavut – more common forms of local transportation within a community include ATVs and snowmobiles.

Based on our estimate, Nunavut has had a steady increase in total LDV stock over the last six years. This market change has implications on not only the potential for total ZEV sales but also the grid impact of an increasing number of electric vehicles. However, while our modeling of ZEV adoption focuses on the ZEV market share of new vehicle sales, this may not capture the full picture in a territory where we expect there is a strong flow of second-hand vehicles from out of territory. This may warrant further study for more precise forecasting of ZEV sales and impacts in Nunavut.

Figure 2. Historical light-duty vehicle stock on the road, NU[5]

The vehicle market in Nunavut is increasing, and the stock was approximately 7,700 in 2024.



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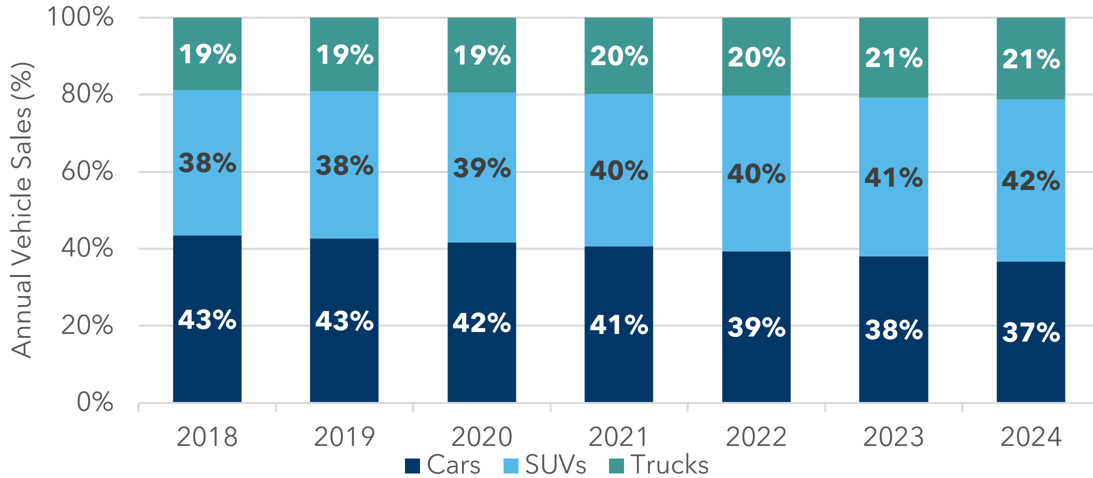
[5] Sources include Natural Resources Canada. *Comprehensive Energy Use Database: Transportation Sector, British Columbia and Territories.* Accessed January 2025. and Statistics Canada. Table 23-10-0308-01 Vehicle registrations, by type of vehicle and fuel type. Accessed January 2025. Natural Resources 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 3. Historical light-duty vehicle segment mix, NU[6]

The current segment mix is 42% SUVs and 37% cars, the remaining 21% being light trucks.



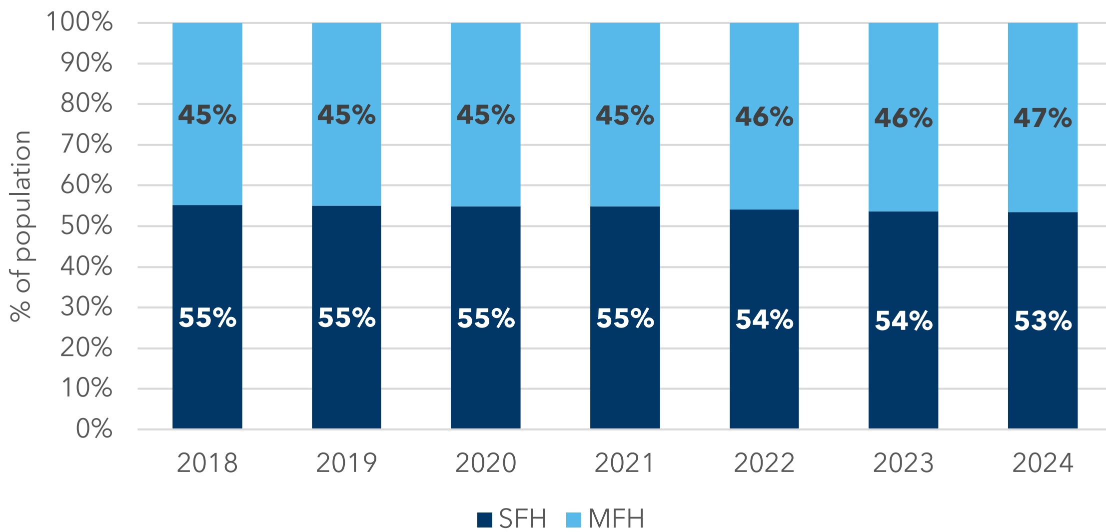
We estimate Nunavut's LDV segment mix to have a higher proportion of cars than many provinces, but we still see a trend towards larger vehicles over time, with cars representing 43% in 2018 and 37% in 2024. It is important to understand the vehicle segment mix for when these vehicles are transitioned to electric because larger vehicles are heavier and tend to be less energy efficient, therefore requiring more energy for the same amount of driving.

[6] Sources include Natural Resources Canada. *Comprehensive Energy Use Database: Transportation Sector, British Columbia and Territories.* Accessed January 2025. and Statistics Canada. Table 23-10-0308-01 Vehicle registrations, by type of vehicle and fuel type. Accessed January 2025.

About half of Nunavummiut live in single-family homes, and this proportion has been relatively stable over the last six years, from 55% in 2018 to 53% in 2024[7]. This means that about 47% of Nunavummiut live in multifamily homes, which has implications for their access to home charging and barriers to ZEV adoption

Figure 4. Historical percent of territorial population in single-family (SFH) versus multifamily homes (MFH), NU[8]

Over half of Nunavummiut live in SFH, and the proportion has been relatively stable over time.



This breakdown in housing types has impacts 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 much lower. Territories and municipalities that are committed to supporting ZEV adoption must either enable home charging in multifamily buildings through supportive policies like ZEV-ready requirements or provide the equivalent amount of charging access in public places, which is much more expensive.

[7] 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".
[8] 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.*).

1.3 Policy Landscape

In 2022, Dunsky developed a Provincial and Territorial Zero-Emission Vehicle Scorecard for Electric Mobility Canada. At the time, Nunavut had a net metering program and grants available to assist homeowners in installing a net metering system. Nunavut placed thirteenth among all provinces and territories, sitting at 2 points in the "Getting Started" category.[9]

Figure 5. Nunavut ZEV Scorecard, 2021-22

Nunavut 2

SCORING CATEGORY	SCORE	POINTS AVAILABLE
1 Light-duty ZEV adoption	0	12.5
2 Medium-duty, heavy-duty and off-road ZEV adoption	0	12.5
3 Infrastructure Deployment	0	25
4 Strategy, Regulation & Education	2	32
5 Industry & Workforce Development	0	12
6 Government Leadership	0	6
TOTAL SCORE	2	100

In that scorecard, we also outlined some key opportunities for Nunavut to improve its score and thereby encourage higher rates of ZEV adoption in the coming years, as shown in the table below.

[9] Electric Mobility Canada. 2021-22. *Territorial and Territorial Zero-Emission Vehicle Scorecard.*

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

Opportunities highlighted in ZEV Scorecard (2022) [10]	Major progress or updates in 2023-2024
As Nunavut's communities rely on diesel for electricity, renewable energy and distributed generation projects will be very important in laying the groundwork for transportation electrification, including of off-road vehicles.	The Government of Canada has been investing in renewable energy projects in Nunavut, [11] including: • As of November 2024, the Smart Renewables and Electrification Pathways Program (SREPs) has supported four projects with over $27 million in Nunavut. • In July 2024, it announced $19 million in investments for three clean energy projects that will increase renewable energy generation in Nunavut. • In March 2023, it invested $4.1 million to help five Nunavut communities build solar power projects. Qulliq Energy Corporation (QEC) offers both a net metering program and an independent power producer program, empowering residents to generate electricity and integrate or sell it to QEC.[12]
Most of Nunavut's transportation emissions are from airplanes, as the 25 communities are fly-in. Advances in low-carbon air travel will be important for electrifying transportation in the Territory.	N/A

[10] Electric Mobility Canada. 2021-22. Territorial and Territorial Zero-Emission Vehicle Scorecard.
[11] Government of Canada. Nunavut: Clean electricity snapshot. Accessed March 2025.
[12] Qulliq Energy Corporation. Renewable Energy. Accessed March 2025.

2. Methodology

To create a forecast of ZEV charging load in Nunavut, 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.

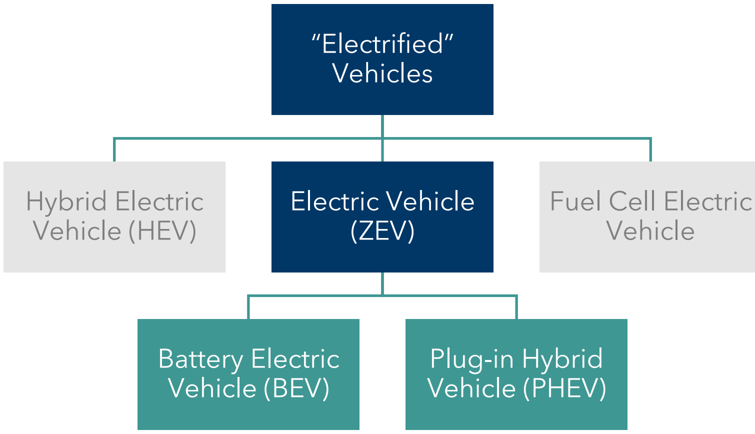
Figure 6. Overview of the EVA™ Model

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 7. 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 estimated 7,300 km annually based on an assumed round-trip distance of 10 km per day across Iqaluit, applied over 365 days. Distance assumption were informed by Iqaluit's area (52 km^2).
- **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**: As Nunavut has limited road access and all vehicles are brought in by ship we assumed that local ZEV availability inputs would be low (starting at 5% 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 modelled 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 represents some support to enable ZEV adoption and generally aligns with current commitments and policies, while the High Growth scenario represents a strong policy pathway to reach the Federal ZEV sales target. The specific parameters for each scenario are outlined in **Table 2**.

Table 2. Scenario assumptions for ZEV adoption

Parameter	Low Growth	Medium Growth	High Growth
Public Charging Infrastructure[13]	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[14]	Limited Single-family homes are 94% ZEV-ready, 15% of multifamily homes are ZEV-ready by 2040	Moderate Single-family homes are 94% ZEV-ready, 36% of multifamily homes are ZEV-ready by 2040	Significant Single-family homes are 94% ZEV-ready, 58% of multifamily homes are ZEV-ready by 2040
Vehicle Incentives	Current incentives **Federal:** up to $5,000 (Ramped down + phased-out by 2025)	Current incentives, extended **Federal:** up to $5,000 (Ramped down + phased-out by 2030)	Expanded incentives **Federal:** up to $5,000 **Territorial:** up to $2,500 (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
Territorial ZEV Mandate	None	None	100% by 2035

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

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[13] 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.
[14] 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 Nunavut'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 (electricity demand) impacts from realistic charging behaviours. **Figure 8** outlines each of these four steps for determining peak demand from ZEVs.

Figure 8. Process for modelling ZEV adoption and load impacts

Forecast ZEV Adoption
Forecast ZEV uptake under multiple scenarios reflecting different policy, program and technology conditions.

↓

Calculate Total Energy Needs
Calculate average annual consumption based on ZEV adoption forecast using vehicle segments, weather data, PHEV/BEV split, and vehicle efficiency (kWh/km).

↓

Distribute Across Charging Event Types
Based on their frequency of use for each vehicle segment, portion out the calculated energy to the relevant charging locations: Home, Public, and Workplace.

↓

Fit to Daily Load Profiles
Finally, distribute the energy from each vehicle segment and charging location to the appropriate load curve for the peak winter and summer days.

To determine the impacts of ZEV adoption on the electrical grid, we used typical 24-hour diversified charging distribution profiles established from the literature[15] for each vehicle segment and charging location, and the Dunsky EVA™ model results, with regional adjustments for vehicle consumption in Nunavut (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.[16]

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

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[15] 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.*)
[16] Refers to the day with the highest electricity demand in a single hour, for a given year and season.

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[17]	80%	100%
Workplace	10%	N/A
Public	10%	N/A

[17] 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:

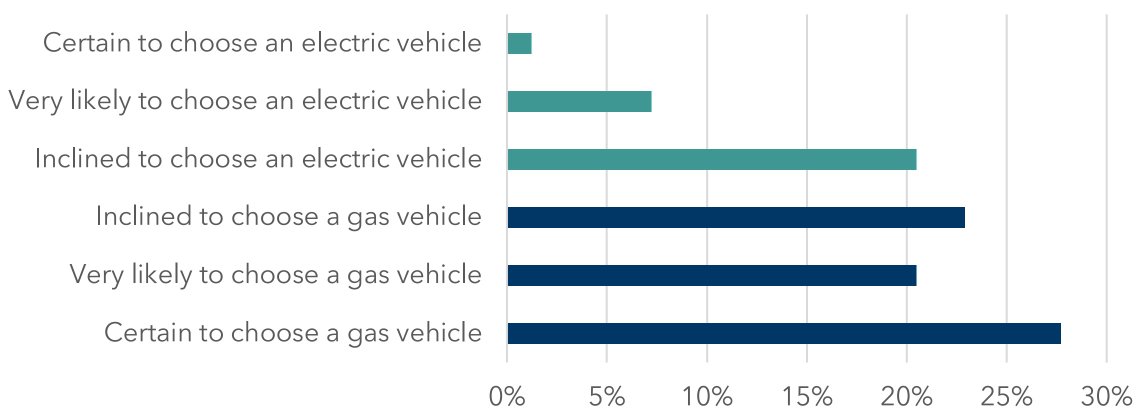
1. Over the long term, ZEV adoption in Nunavut is forecasted to approach 100% of new sales, which would accumulate to 16% of total vehicles on the road by 2040, even in a low-growth scenario.
2. Potential load impacts from ZEV charging during peak times could add 4 MW across Nunavut in a Medium Growth scenario, pushing existing power plants to 43% of their existing capacity by 2040 from less than 39% today.
3. 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.

3.1 Results from Survey of Canadians

As part of the *Powering Up* project, Electric Mobility Canada conducted a survey of over 6,000 Canadians, including 150 residents of the Territories.[18] 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 9. 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%).



[18] 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 10), 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 10. 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.

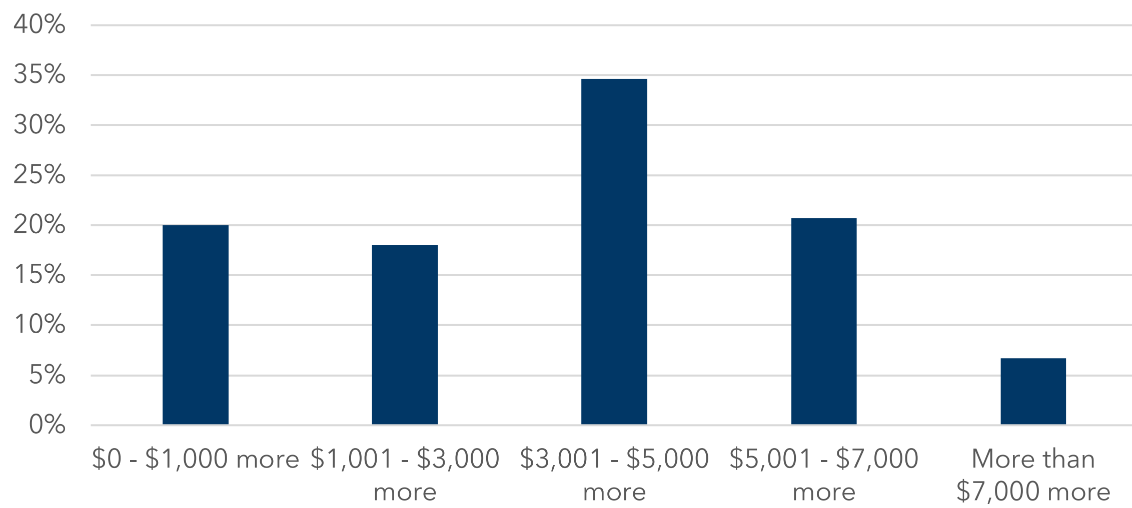


Figure 11. How many long distance (500 km or more) trips do you make in one year? Territories only

Nearly half of Territories residents take 1-2 long distance trips annually. We expect that residents of Nunavut make even fewer long-distance trips than neighbouring territories given the lack of road connectivity between communities.

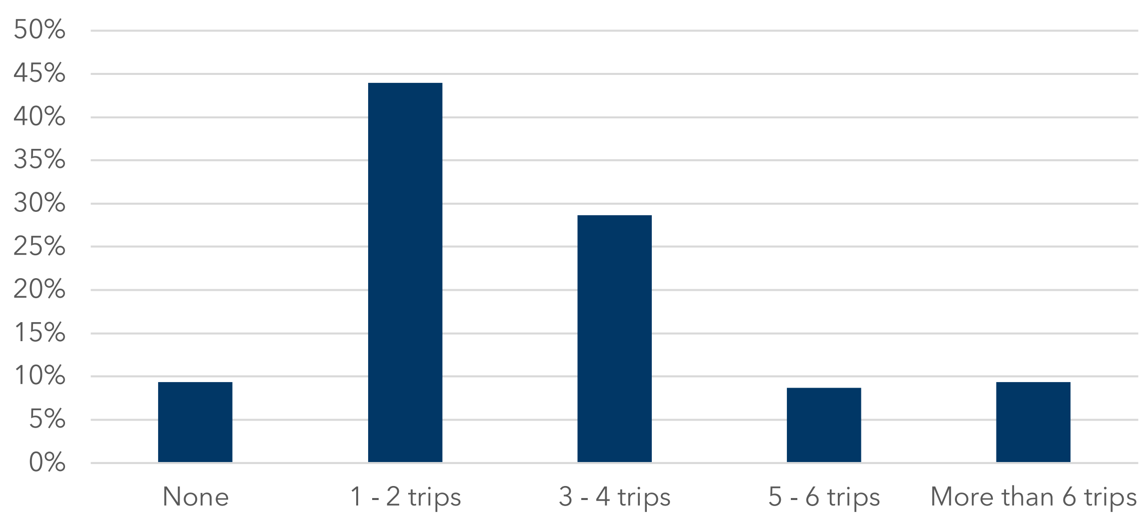
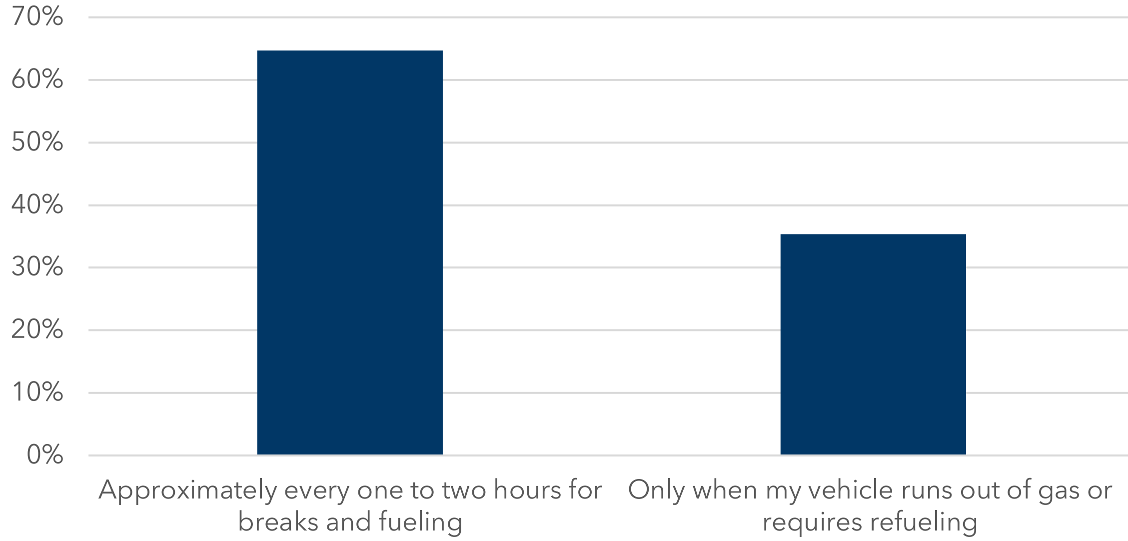


Figure 12. How frequently do you typically make stops during long-distance trips (500 km or more)? Territories only

▶ 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.



About one third of Territories residents (58%) drive less than 30km to get to work (60km round trip), which means that a large proportion of people may need to rely on top-up charging. This is notably different from most Canadians living in other provinces.

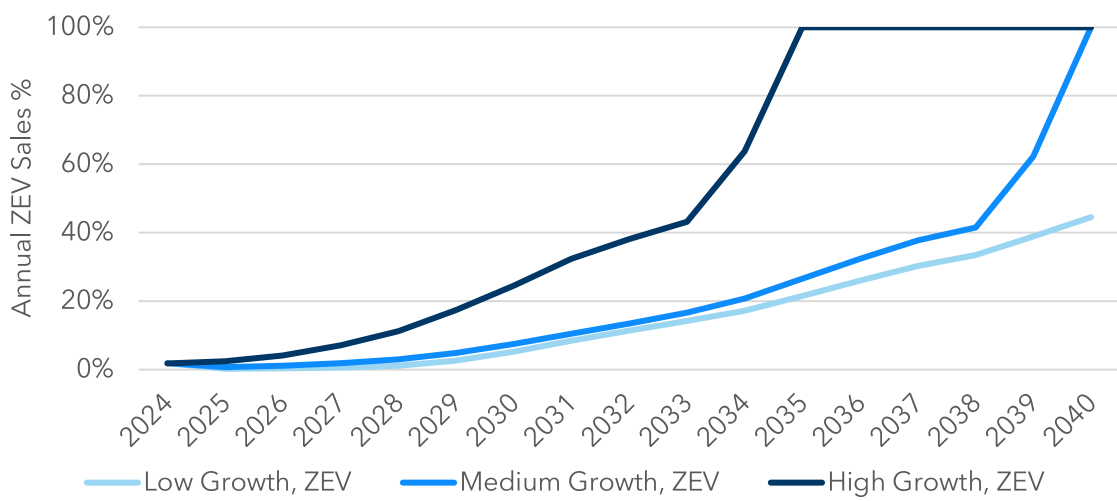
This survey also included questions pertaining to Canadians' knowledge about ZEVs, which can be indicative of some common misconceptions that result in perceived barriers to adoption. For instance, the majority of Territories residents are unaware of the average range of new ZEVs, with only 24% knowing that it falls between 400 and 500 kilometers. However, 65% 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

Nunavut has some barriers to vehicle electrification that affect LDV drivers in the territory differently than in other provinces and territories. Cold outdoor air temperatures can increase vehicle energy needs by up to a factor of three compared to requirements in warm weather, primarily due to cabin heating needs, which may require drivers to perform more top-up charging to complete their daily driving.[19] However, since daily distances travelled are mostly within communities, these typical usage patterns might mitigate the need for top-up charging that we might see in other Canadian communities.

In addition, access to vehicles for purchase in Nunavut usually requires transporting them by boat,[20] which only happens at certain times of year.[21] Communities in Nunavut are generally not connected by road, and so inter-community travel requires other forms of transportation.[22] As a result of these two factors, average vehicle lifetimes are long and vehicle-kilometres travelled per year are low compared to other provinces and territories. This may reduce the operational savings from driving on electricity rather than gas or diesel, making it harder to justify switching an existing gas vehicle to electric for Nunavummiut.

Figure 13. Annual ZEV sales % by scenario, Nunavut



Supportive ZEV policies have the potential to boost sales in Nunavut over 10-15 years, but policymakers must also address barriers for Nunavummiut to ensure a smooth shift to low-carbon transport alongside other GHG reduction efforts. As second-hand ZEV imports grow, factors like charging access, incentives, and ZEV standards will influence the speed of transition, helping overcome obstacles like charging access, affordability, and supply.

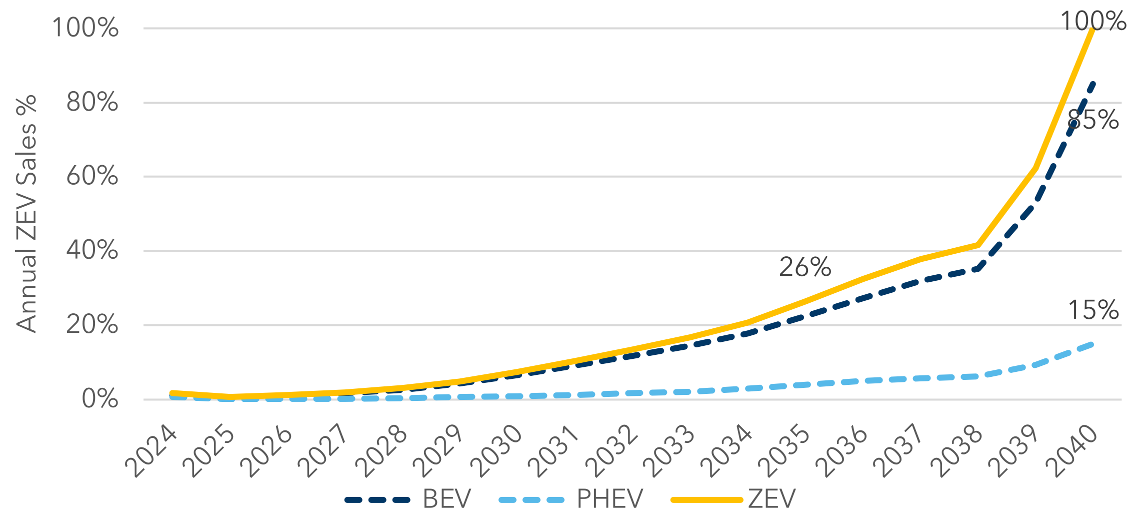
[19] Geotab. November 30, 2023. *To what degree does temperature impact ZEV range?*
[20] Peter Worden. May 2015. *By Air, By Sea, By Land.*
[21] Government of Nunavut. *Transportation: Sealift Services.* Accessed March 2025.
[22] Travel Nunavut. *Navigating the Beautiful North.* Accessed March 2025.

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 26% of new sales by the current target date of 2035.

Figure 14. Annual ZEV sales % by powertrain, medium growth, Nunavut

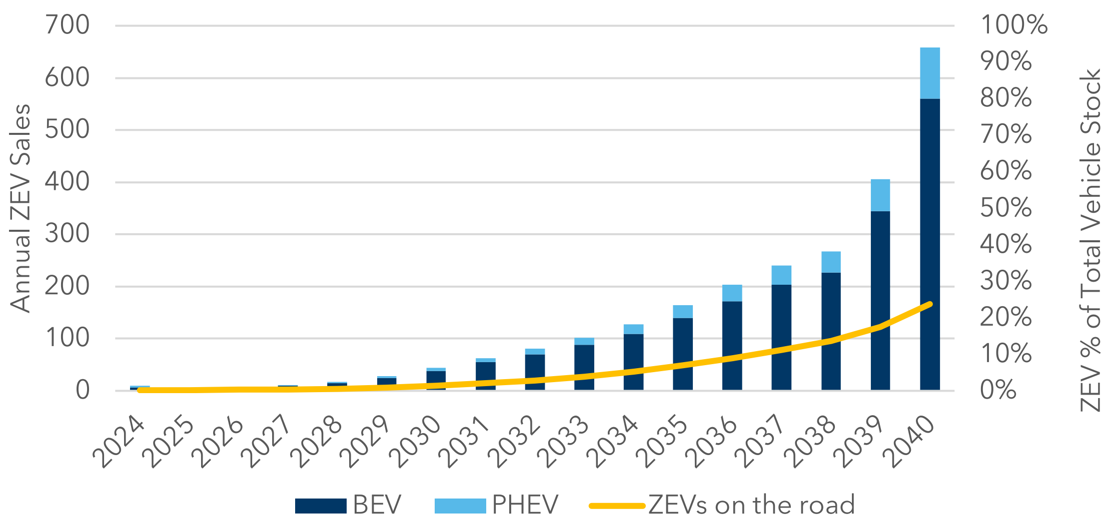
Nunavut will experience significant growth in ZEV uptake, reaching 100% by 2040.



With the additional public and home charging access assumed in this scenario, which reduces barriers to BEV adoption, BEVs outcompete PHEVs due to their lower total cost of ownership.

Figure 15. Annual ZEV sales by powertrain and total ZEV stock, medium growth, Nunavut

By 2040, over 2,400 of the 10,200 (24%) 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 16. Annual ZEV sales % by powertrain, high growth, Nunavut

The ZEV proportion of annual sales reaches 25% by 2030, then increases rapidly towards the 100% federal ZEV standard target in 2035.

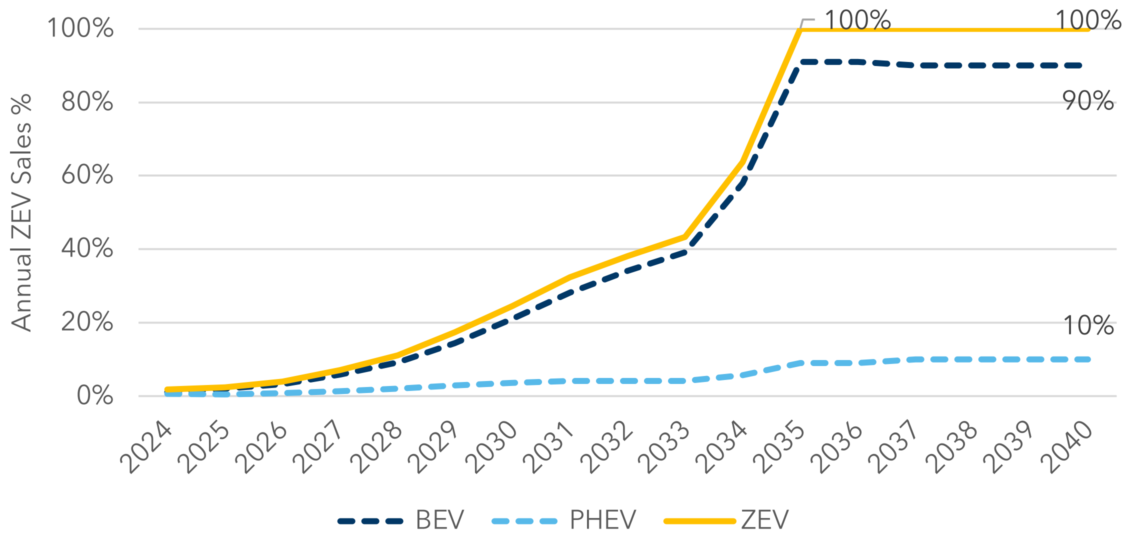
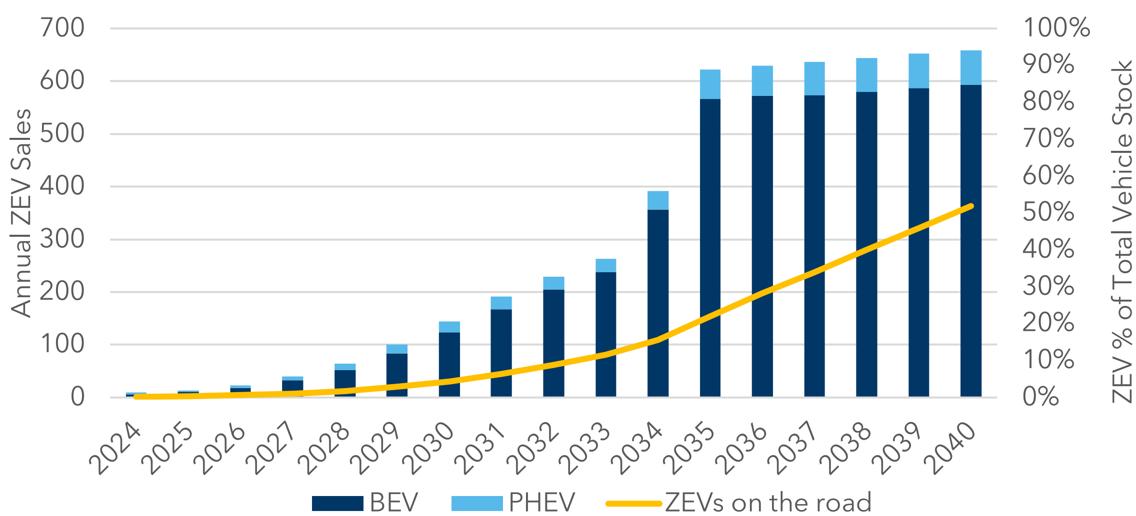


Figure 17. Annual ZEV sales by powertrain and total ZEV stock, high growth, Nunavut

By 2040, over 5,300 of the 10,200 (52%) LDVs on the road are forecasted to be ZEVs.

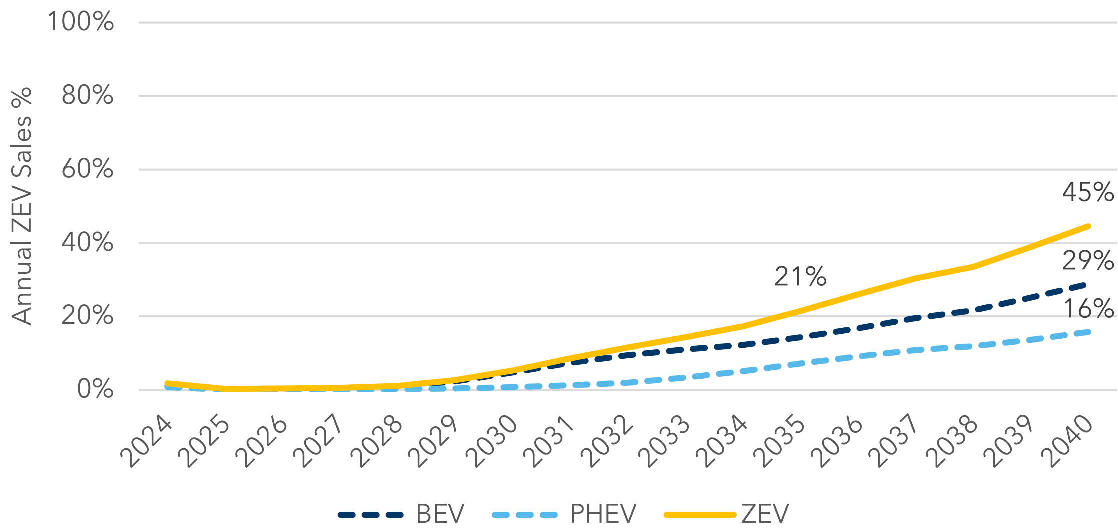


3.2.3 Low Growth Scenario

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

Figure 18. Annual ZEV sales % by powertrain, low growth, Nunavut

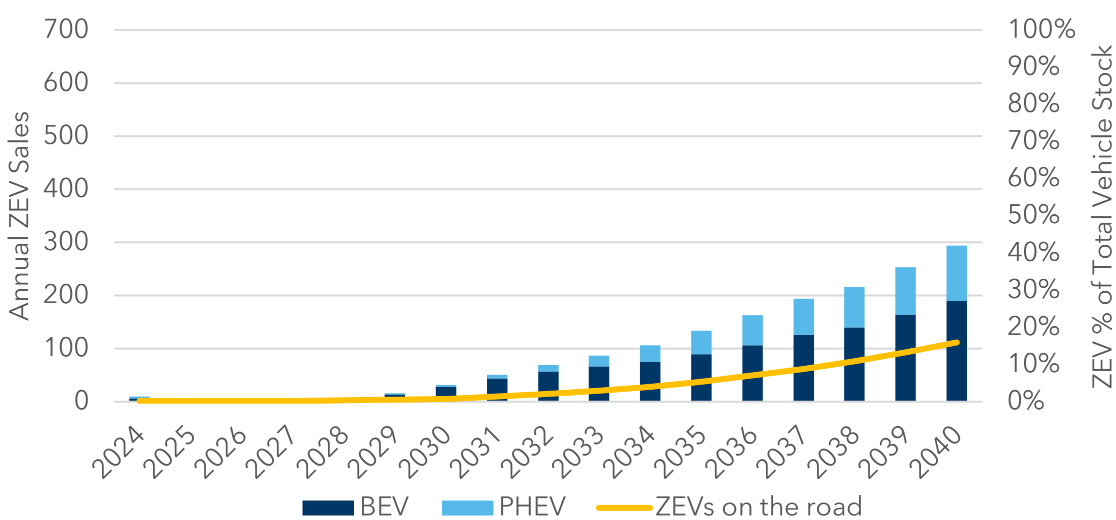
ZEV adoption is expected to fall short of the current federal 2035 ZEV target (100%), reaching only 21% of new sales by 2035 and 45% by 2040.



The market share shifts towards PHEVs in 2035 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 19. Annual ZEV sales by powertrain and total ZEV stock, low growth, Nunavut

By 2040, over 1,600 of the 10,200 (16%) LDVs on the road are forecasted to be ZEVs.



3.3 Potential Electricity Demand Impacts

Qulliq Energy Corporation (QEC) is the generator and distributor of all electricity in Nunavut, supporting approximately 15,000 customers. Electricity is delivered through 25 stand-alone diesel power plants in 25 communities, totalling approximately 76,000 kW of capacity.[23] This system relies heavily on fossil fuel brought in from outside the territory and has no regional transmission capability between communities. This situation is unique compared to other provinces and territories, meaning that the electrification of vehicles will have differing implications for local grid capacity and needs. Nunavut is looking to reduce its reliance on fossil fuels,[24] which should accompany efforts to electrify transportation to reduce emissions overall.

Iqaluit is the most populous city in Nunavut, with approximately 7,500 people and 5,500 vehicles on the road, accounting for 75% of vehicles on the road in Nunavut.[25,26] If 24% of those vehicles are electric by 2040 – as in our Medium Growth scenario – load impacts at an evening winter peak could be 1.3 MW. Nunavut's current electricity infrastructure already faces challenges due to its reliance on diesel-powered microgrids in isolated communities. As of 2017, Iqaluit had an approximately 25 MW capacity and was experiencing a peak load of 10 MW on certain days.[27] If 24% of vehicles on the road are electrified by 2040, their charging needs could add 14% to peak load, reaching about 43% of the current full capacity of the power plants.

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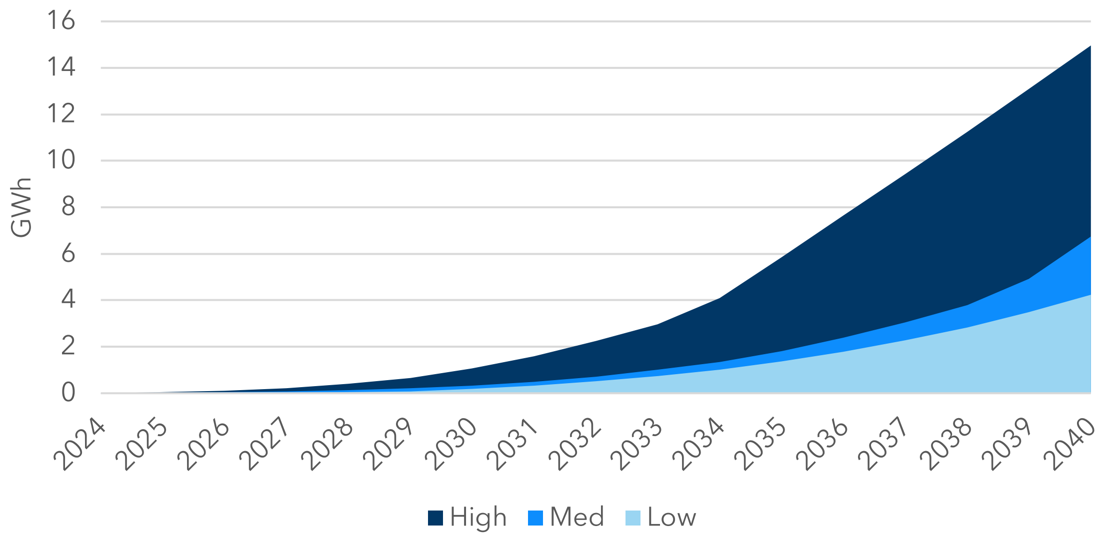
[23] Qulliq Energy Corporation. *About Us.* Accessed March 2025.
[24] Government of Canada. *Nunavut: Clean electricity snapshot.* Accessed March 2025.
[25] Statistics Canada. *Census Profile, 2021 Census of Population*. Accessed March 2025.
[26] CBC. *With 300 new cars a year, Iqaluit's streets get busier.* Posted August 2024. Accessed March 2025.
[27] QEC Power Plant Data. *Prospective IPP Application Guideline for Independent Power Producer*. Published 2018. Accessed March 2025.

3.3.1 Annual Energy Impacts

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 20. Annual energy impacts from ZEV charging, scenario comparison, Nunavut

▶ Total annual load impacts in Nunavut could range from 4 to 15 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 Nunavut by between 2% and 6% by 2040.[28]

[28] Based on our ZEV forecast (Figure 13) and per-capita energy usage for Nunavut in 2020. Canada Energy Regulator. 2020. *Provincial and Territorial Energy Profiles – Nunavut.*

3.3.2 Peak Day ZEV Load in 2040

Outdoor air temperatures on the coldest day can increase vehicle energy needs, thereby tripling peak grid impacts[29] compared to summer requirements, mainly due to cabin heating needs.[30]

Figure 21. Summer peak day ZEV load in 2040, medium growth, NU

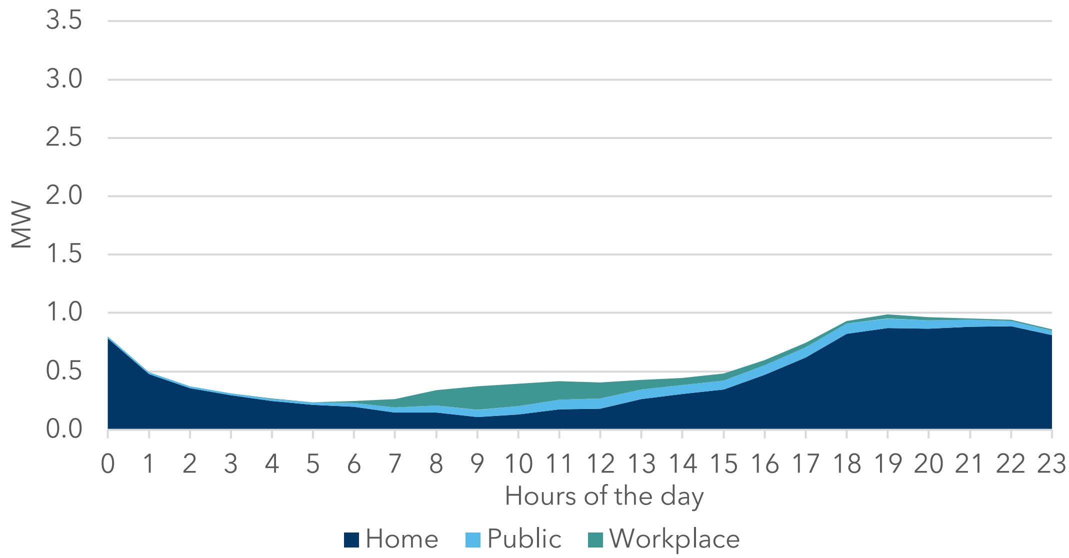
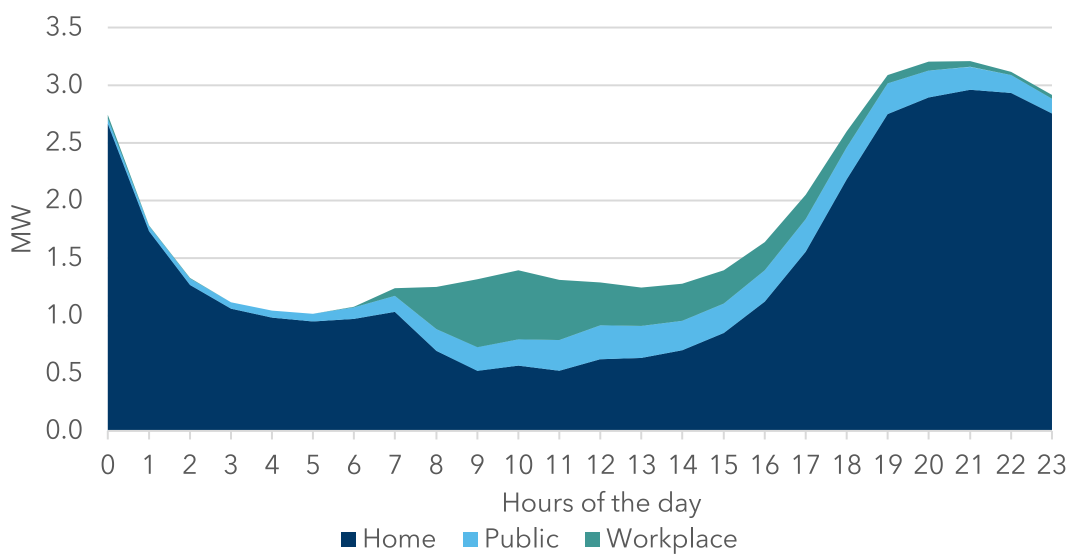


Figure 22. Winter peak day ZEV load in 2040, medium growth, NU



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

4. Key Takeaways

1

Over the long term, ZEV adoption in Nunavut is forecasted to approach 100% of new sales, which would accumulate to 16% of total vehicles on the road by 2040, even in a low-growth scenario.

- In particular, there is a significant potential for the adoption of PHEVs to reduce emissions from on-road vehicles as Nunavut's electricity generation moves towards lower-carbon sources.
- There is still a place for ZEVs in Nunavut's overall greenhouse gas reduction portfolio, but due to its unique circumstances with respect to the purchase and use of on-road vehicles, as well as local electricity generation, this role will likely be smaller than in other provinces and territories in Canada. However, the impact of policies and programs, and the deployment of charging, has the potential to significantly increase the rate of adoption in earlier years.

2

Potential load impacts from ZEV charging during peak times could add 4 MW across Nunavut in a Medium Growth scenario, pushing existing power plants to 43% of their existing capacity by 2040 from less than 39% today.

- It will be important to monitor growth in electricity demand from the transportation sector as Nunavut works to reduce its reliance on diesel generation.
- Given the inherent flexibility in ZEV charging load, implementing programs that shift charging to off-peak times could reduce these potential impacts on peak electricity demand.

3

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 Territorial ZEV Incentives, Nunavut[31]

Scenario	Powertrain	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036+
Lo	**PHEV**	$3,750	$3,750	-	-	-	-	-	-	-	-	-	-	-
Lo	**BEV**	$5,000	$5,000	-	-	-	-	-	-	-	-	-	-	-
Med	**PHEV**	$3,750	$3,750	$3,750	$3,750	$1,875	$1,875	$938	-	-	-	-	-	-
Med	**BEV**	$5,000	$5,000	$5,000	$5,000	$2,500	$2,500	$1,250	-	-	-	-	-	-
Hi	**PHEV**	$5,625	$5,626	$5,627	$7,502	$7,503	$7,504	$7,505	$7,505	$6,381	$3,829	$1,914	$957	-
Hi	**BEV**	$7,500	$7,501	$7,502	$10,003	$10,004	$10,005	$10,006	$10,007	$8,508	$5,105	$2,552	$1,276	-

[31] 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).* Accessed December 2024.

Table 5. Fuel Costs, Nunavut[32,33]

Variable	Units	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Electricity rate[34]	$/kWh	0.34	0.34	0.35	0.35	0.35	0.36	0.36	0.36	0.37	0.37	0.38	0.38	0.38	0.39	0.39	0.39	0.40
Gas rate[35]	$/L	1.74	1.76	1.77	1.79	1.81	1.83	1.85	1.87	1.88	1.90	1.92	1.94	1.96	1.98	2.00	2.02	2.04

[32] We assume an annual growth rate of 1% and no carbon tax. Minimal historic fuel costs were found for Nunavut.
[33] Dunsky's projected electricity rates by territory 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.
[34] Nunatsiaq News. Fuel prices are up in Nunavut. Published April 2024. Accessed January 2025.
[35] Statistics Canada. December 17, 2024. Monthly average retail prices for gasoline and fuel oil, by geography. Note that no data was available for Nunavut so historic trends of Yellowknife were leveraged to calculate historic fuel price trends in Nunavut.

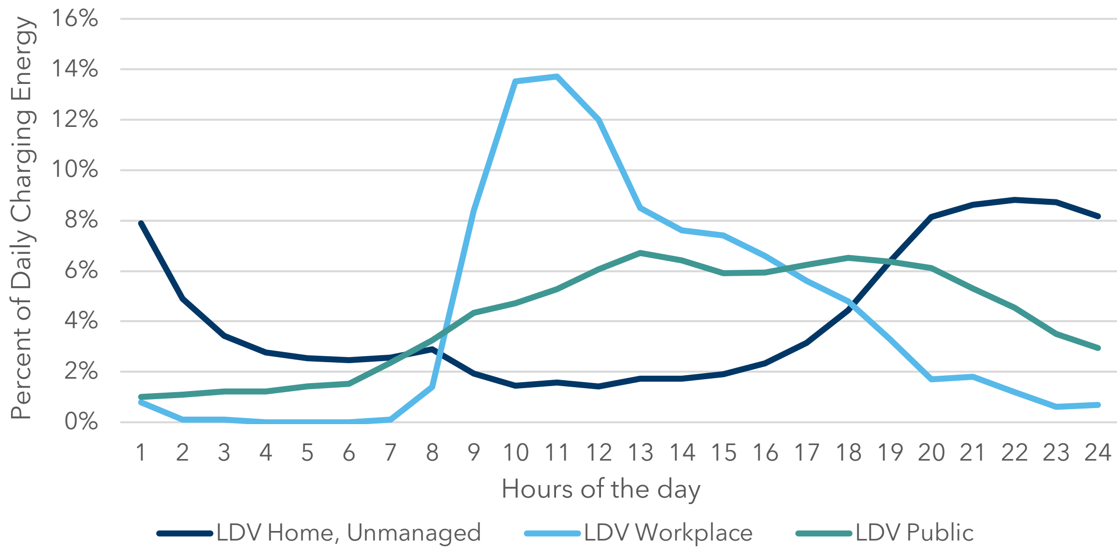
Table 6. Light-duty vehicle stock and sales, thousands of vehicles, Nunavut[36]

Variable	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
LDV sales	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7
LDV Stock	7.7	7.9	8.2	8.4	8.7	8.9	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.9	10.0	10.1	10.2

[36] Sources include Natural Resources Canada. *Comprehensive Energy Use Database: Transportation Sector, British Columbia and Territories.* Accessed January 2025. and 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 DCFC Rate Design Study.

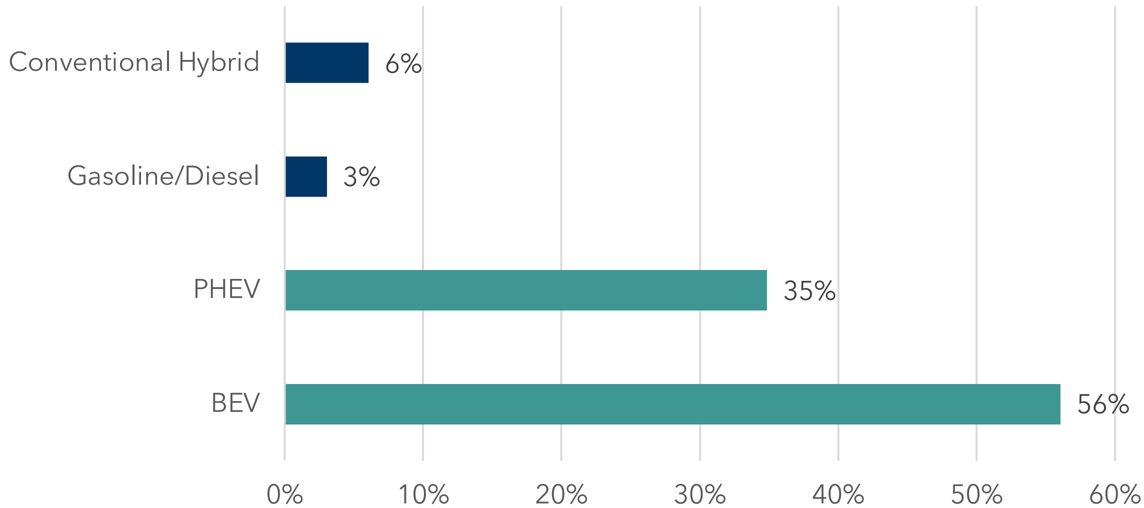
Figure 23. Diversified charging distribution profiles



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 Nunavut 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 24. 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 25** should be compared to Figure 12 to assess the potential impact of increased awareness of ZEV benefits on purchasing decisions.

Figure 25. Taking into consideration the information provided to you, when thinking about your next vehicle purchase, which will you choose? Territories only

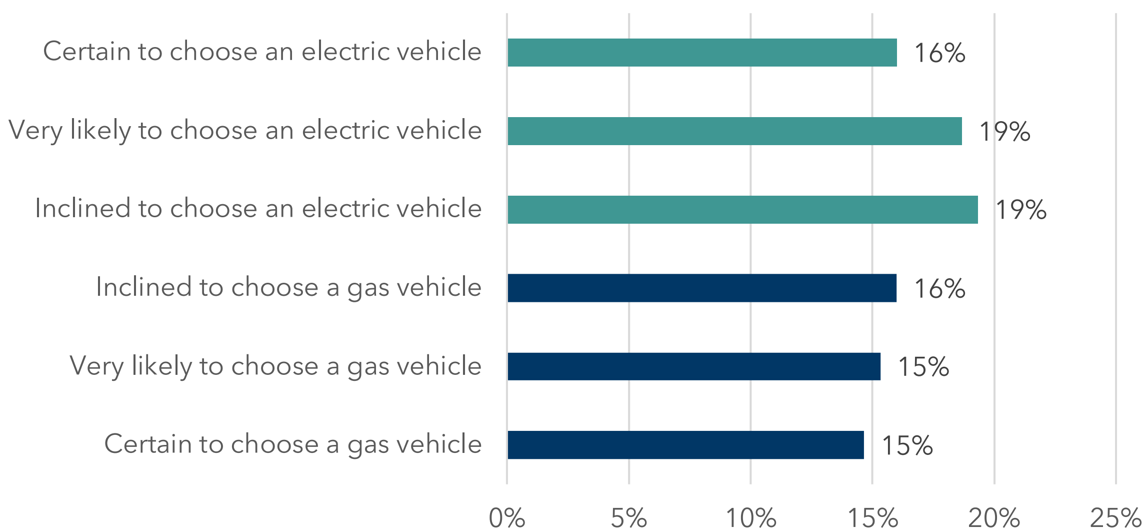


Figure 26. How influential were government incentives in your decision to purchase/lease an ZEV/PHEV? Territories only

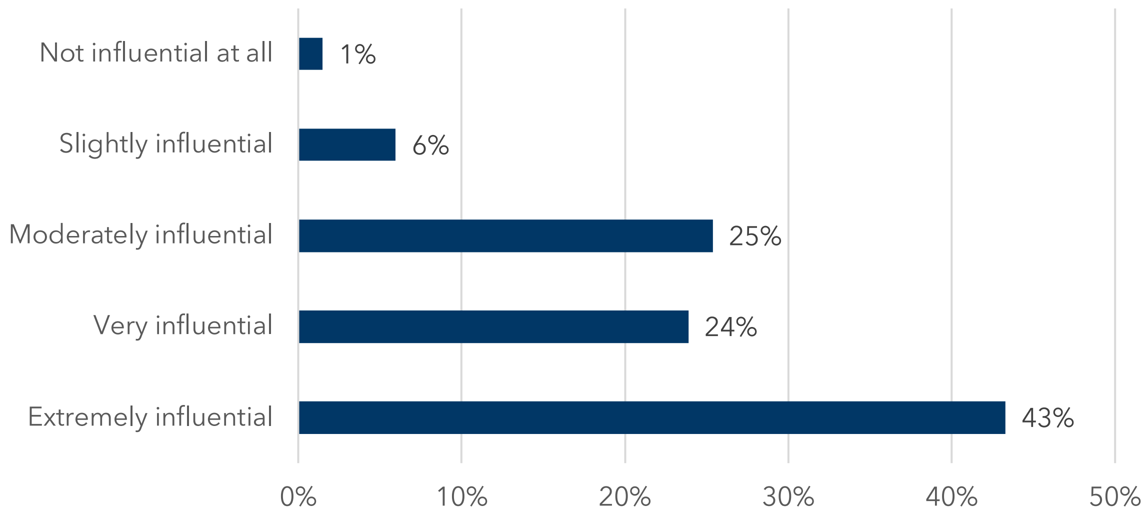


Figure 27. When you are selecting your next vehicle, do you expect you will buy/lease a fully electric vehicle (BEV) or a plug-in hybrid electric vehicle (PHEV)? Territories only

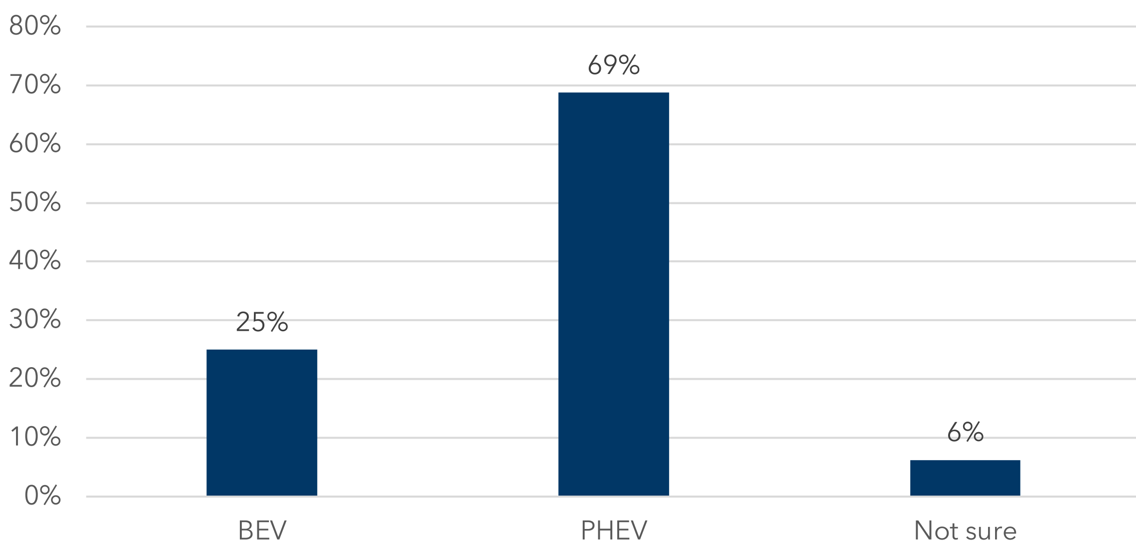


Figure 28. Are you aware of the federal government rebate of up to $5,000 for purchasing an electric vehicle? Territories only

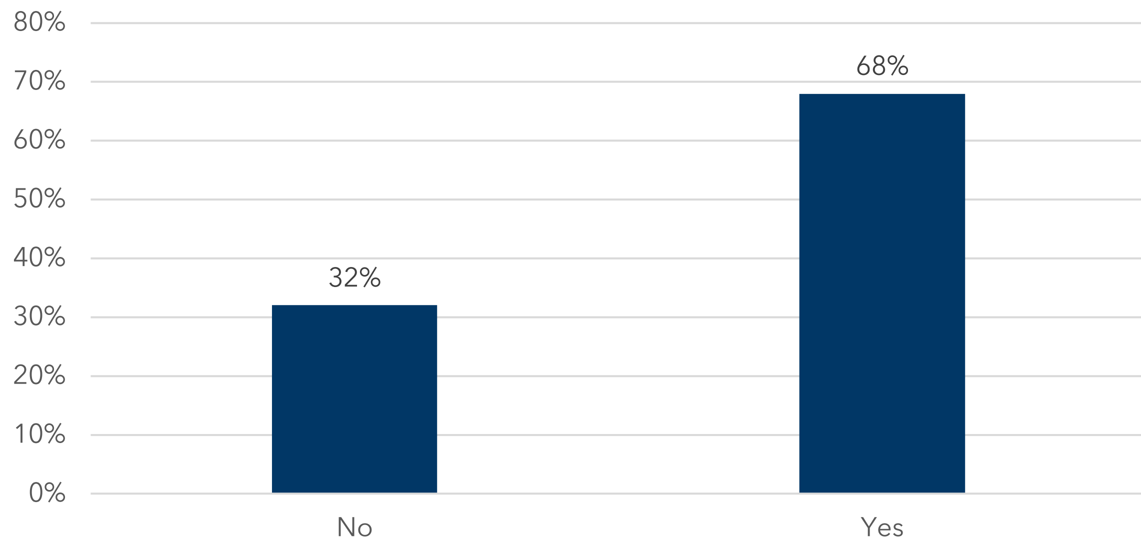


Figure 29. Are you aware that you may be eligible for a federal tax deduction specifically for the purchase of an electric vehicle if you are self-employed or own a company? Territories only

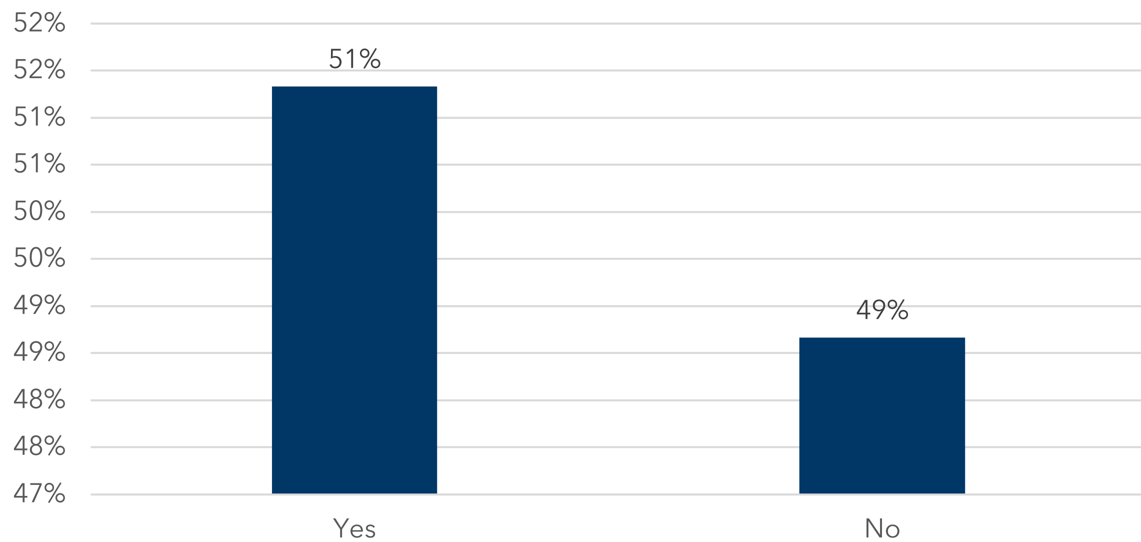


Figure 30. Are you familiar with other incentives available to ZEVs (e.g. ferries, dedicated lanes on highways, dedicated parking spots closer to the entrance, etc.)? Territories only

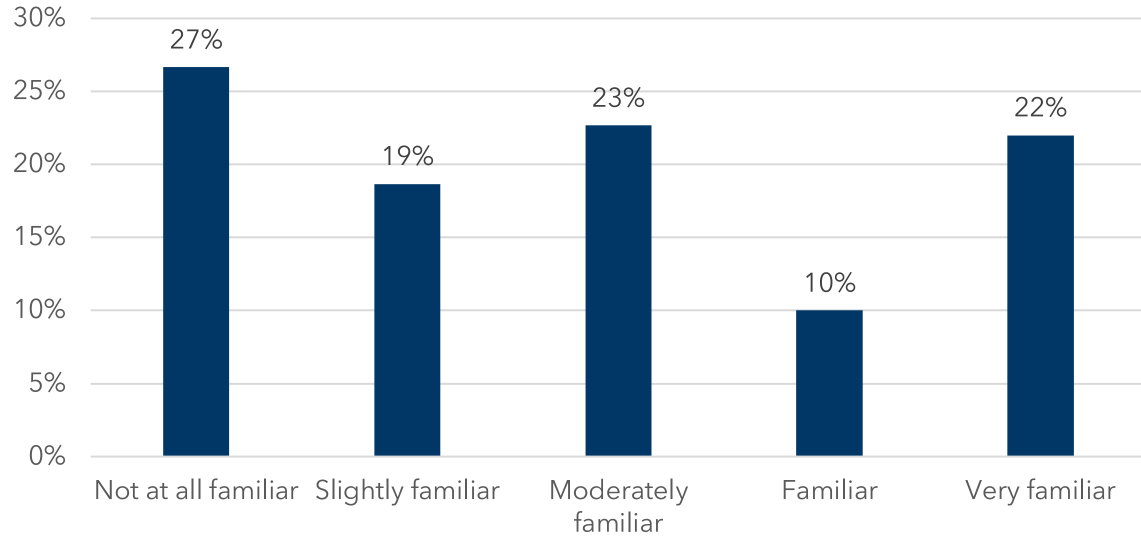


Figure 31. What is the average price of a new light duty vehicle (car, SUV, pickup truck) in Canada? Territories only

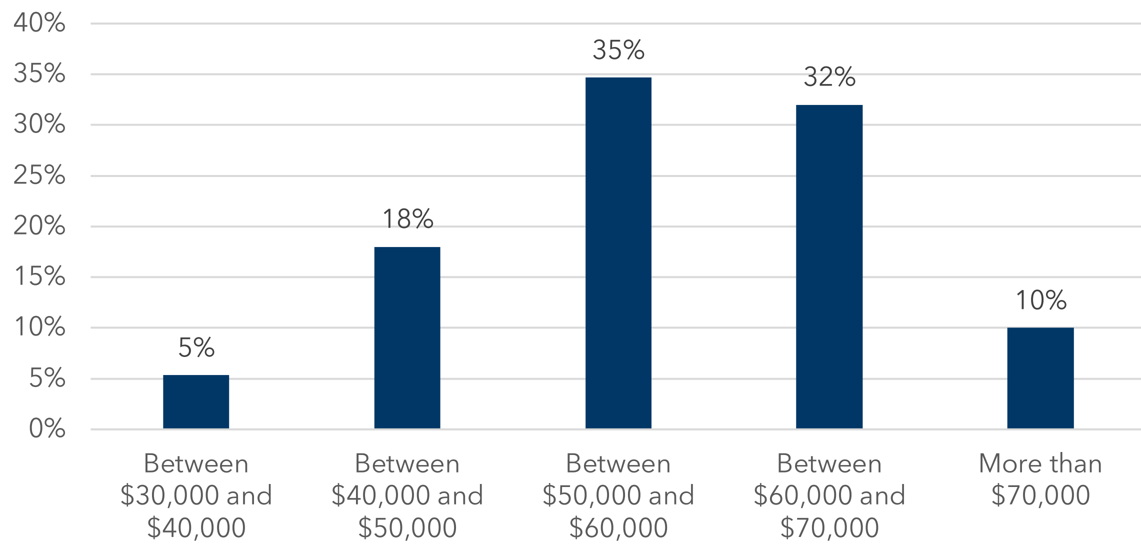
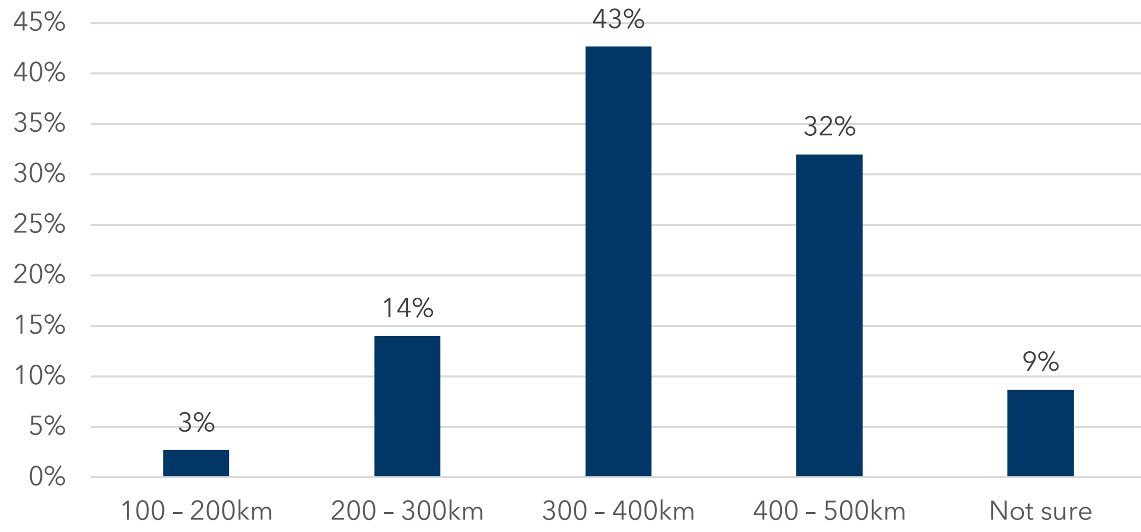


Figure 32. What is the average range of most new electric vehicles? Territories only



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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