

BRIEFING NOTE

IMPACTS OF AN ELECTRIC VEHICLE REBATE IN MANITOBA

ISSUE

The Province of Manitoba is considering creating an Electric Vehicle (EV) Rebate program to provide a \$4,000 rebate for new electric vehicles and a \$2,500 rebate for used electric vehicles purchased and registered in Manitoba. Such a program will likely increase the adoption of EVs in Manitoba thereby impacting electricity demand and infrastructure requirements.

KEY MESSAGES

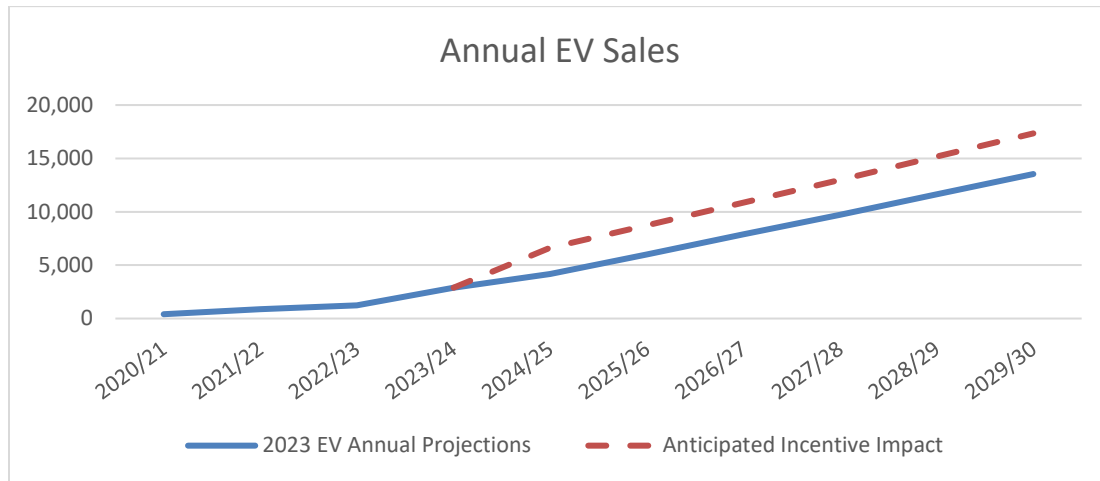
- Purchase incentives influence EV sales, with over 87% of EV owners identifying incentives as a key driver to their purchase. An EV rebate program running until 2030 would likely increase the number of projected new EVs in Manitoba by 18,750 above the current projected value of 55,580 EVs.
- An additional 18,750 EVs would translate to an approximate greenhouse gas (GHG) emission reduction of 61,000 tonnes of CO₂ equivalent in 2030, compared to an internal combustion engine. For reference, 61,000 tonnes are less than 1% of all Manitoba GHG emissions related to transportation.
- The total EV Rebate program cost for new vehicles is estimated to be more than \$280M by 2030 based on the proposed \$4,000 incentive for an estimated 75,000 new EVs. The used EV market is challenging to predict in Manitoba.
- The impact on the electric distribution system will be gradual. An increase in EV adoption will likely trigger distribution infrastructure and customer panel upgrades. Capital improvements on Manitoba Hydro's distribution system will be required to mitigate localized and station overloads. These impacts are anticipated to be most prevalent in areas and neighbourhoods where high concentrations of EVs occur, particularly on the lower capacity distribution systems within Winnipeg.

Upgrades to rural distribution systems will also be required at higher adoption rates.

OVERVIEW

Projections of Electric Vehicles Adoption and Energy Consumption

Manitoba Hydro’s 2023 Electric Load Forecast includes a projection of EV growth and associated electricity requirements due to charging based on the federal target of achieving 100% of new light duty vehicle sales being zero emission by 2035. A Manitoba incentive would increase the uptake of EVs in the short term, but ultimately result in the same long-term assumptions (as in the current forecast) where a significant portion of new vehicle sales are zero emitting. Assuming the rebate would stay in place until 2030, and using generally accepted industry estimation practice, the expectations are that the incentive would likely increase the number of EV sales in Manitoba, growing an additional 2,500 EVs in 2024/25 up to an additional 3,800 EVs by 2029/30.



In terms of impact to electrical energy consumption, the additional vehicles on the road in the short term would increase energy consumption by approximately 83 GWh (equivalent amount of energy to power 5,500 homes) thereby increasing the EV forecast impact from 313 GWh to 396 GWh by 2029/30. The additional vehicles would also increase Manitoba Hydro’s system peak requirements by an additional 10MW growing the EV forecast from 40 MW to 50MW.

ANALYSIS

Greenhouse Gas Emission Reduction Impacts and Associated Costs

The addition of over 18,750 new EVs in Manitoba from 2024/25 to 2029/30 would reduce 2029/30 GHG emissions an additional 61,000 tonnes of CO₂ equivalent¹ above the reference forecast of EVs, less than 1% of all Manitoba GHG emissions related to transportation. Using simplifying assumptions and optimistically assuming a 6-year persistence of the proposed EV Rebate program, emission reductions would cost of \$460/tonne. This is a relatively high cost for GHG emissions reductions: for comparison, the GHG price in Manitoba is currently \$65/tonne.

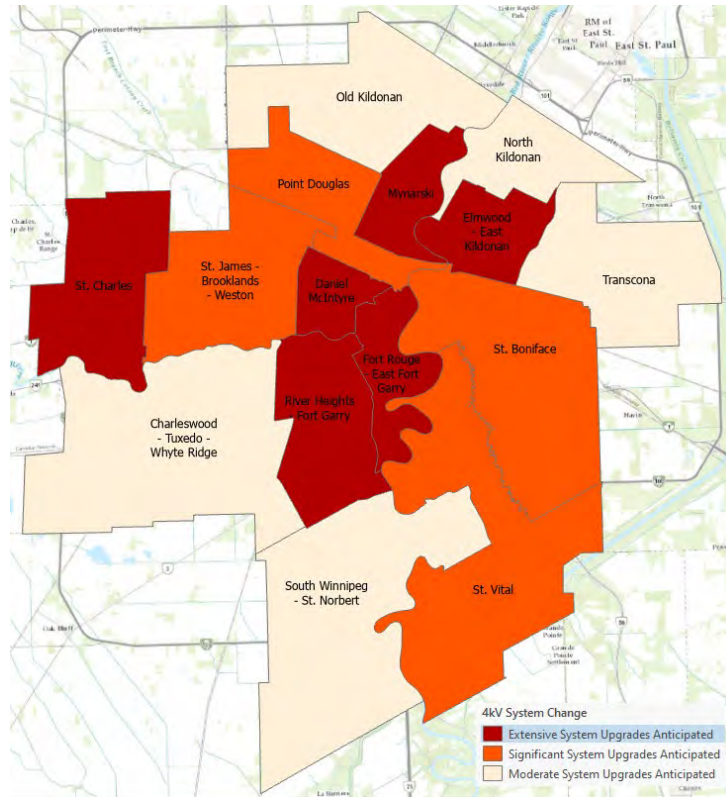
Distribution Grid Implications

The impact of increased EVs on the electric distribution system will be gradual and will likely start with an increased number of requests to upgrade services as EV homeowners seek to install a Level 2 fast charger at home. Depending on the size of their service, this may trigger some residences to upgrade their electrical panels and electric service cables, especially in areas where there is a high prevalence of 100A panels in natural gas heated homes (e.g., Winnipeg).

With high adoption levels of EVs on a specific distribution feeder or substation, larger capital improvements to Manitoba Hydro's system may be required. The risk is most acute on the lower voltage distribution system which has the lowest capacity and least capability to handle significant load growth. More concentrated loads, particularly larger fleet chargers or concentrations of multiple Level 3 chargers at a future service station could also trigger significant capital improvements regardless of the supply voltage.

The distribution system in the City of Winnipeg is anticipated to have some of the most challenges handling load growth from electric vehicles. This is due to both the likelihood of clustering of EV chargers in specific neighbourhoods and prevalence of low capacity (4kV) systems supplying customers. The following figure provides an indication of the neighborhoods with the highest concentration of these systems.

¹ [Greenhouse Gases Equivalencies Calculator - Calculations and References | Natural Resources Canada \(nrcan.gc.ca\)](#)



The distribution system in rural Manitoba typically operates at a higher voltage and has lower customer density than the City of Winnipeg. Those two factors should initially mitigate the impacts of high adoption rates. When EVs become prevalent in those areas, significant upgrades to feeders and substations will occur when the load growth triggers localized asset overloads. Large EV charging stations requiring three-phase supply may require significant line extensions, particularly in areas where there is limited existing distribution infrastructure, particularly in less populated areas.

Manitoba Hydro product offerings could be implemented to minimize the impact of EV adoption on Manitoba Hydro’s system peak and to defer capital investments on the distribution system. With technology such as advanced meter infrastructure (“smart meters”), time of use rates could be utilized to provide a price signal to EV owners to charge their vehicles during the middle of the night, when demand for electricity in Manitoba is the lowest. A low overnight rate could also help all customers with energy affordability, by choosing to use energy during the off-peak hours. Low overnight rates are common practice in many jurisdictions throughout North America who have smart meters.

BACKGROUND

Current Status:

As of March 31, 2023, there are over 960,000 vehicles registered in Manitoba which includes:

- 3,349 EVs
 - of which 2,167 are Battery Electric Vehicles (BEVs), and
 - 1,181 are Plug in Hybrid Electric Vehicles (PHEVs).

This represents a growth of 1,222 EVs and 2.6% of new vehicle sales for the fiscal year ending March 31, 2023. The 3,349 EVs in Manitoba includes: 1,701 passenger cars; 1,623 light trucks (including mini-vans, SUV's and pickup trucks); 22 medium duty; 2 heavy duty; and 1 Bus.

A survey² conducted by CAA across Canada looked to understand the preferences and experiences of Canadians with their electric vehicle. Over 16,000 EV drivers were sampled across the country including 330 participants in Manitoba to understand behaviors, driving factors and demographics of EV owners. Several key findings are available from the study:

- Over 88% of EV owners surveyed own their home of which 77% are within single detached homes.
- 1 in 5 Canadian EV drivers who live in multi-unit homes do not have access to home charging.
- Among all provinces, incentives as an adoption catalyst were strong in all provinces (87% of Manitobans identified it as extremely important or somewhat important to their purchase decision).
- On average 83% of Canadians bought a new EV compared to 17% who bought used.
- EV owners are skewed towards male ownership (74%) and skewed to an older demographic as males over 45 years old make up 74% of the EVs owner.

² [CAA-Canadian-EV-Driver-Study_FINAL_EN.pdf](#)

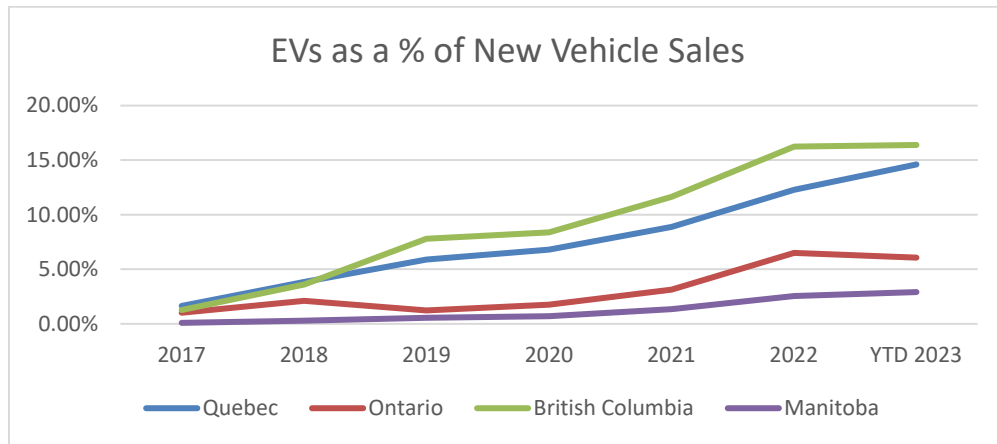
Another study³ conducted by the Fuels Institute in 2021 identified that over 57% of EV owners have earnings greater than \$100,000 annually.

Manitoba Hydro’s customer research found that about 15% of Manitobans would replace their current vehicles with an electric vehicle when the time comes. This is especially true for younger (aged 18-34) Manitobans. Of those who hesitate to buy, “too expensive to purchase” is most often cited as the main reason.

OTHER PROVINCES/TERRITORIES

Purchase Incentives Impacts on EV Supply and Sales

Purchase incentives can result in increased sales because they encourage adoption and supply. Some automakers have disclosed that EV supplies are prioritized for the jurisdictions that have incentives. Therefore, if regional incentives were added in Manitoba, the supply availability for Manitobans would likely increase. Also, regionalized rebates in Canada have historically resulted in increased EV sales, especially in Quebec and British Columbia. The following chart breaks down the percentage of new vehicle sales that were EVs for the period 2017 to 2023. Quebec and British Columbia have provincial incentives; however, Ontario removed their rebate in 2018, which sharply reduced the number of EVs bought the following year, falling from 2.1% in 2018 to 1.3% in 2019.



Source: Stats Canada

³ [Who Owns EVs Today? EV Ownership Trends and Changes 2021 EV Consumer Behavior Report Rundown - Inspire: Advanced Transportation \(inspireadvancedtransportation.com\)](https://www.inspireadvancedtransportation.com/who-owns-evs-today-ev-ownership-trends-and-changes-2021-ev-consumer-behavior-report-roundup)

NEXT STEPS/RECOMMENDATIONS

In support of an EV Rebate in Manitoba, Manitoba Hydro, in collaboration with Manitoba Public Insurance, can assist in monitoring the uptake of EVs in Manitoba and subsequent implications to the Manitoba Hydro infrastructure. Also recognizing the potential implications of EVs triggering service upgrades for Manitoba Hydro customers, Manitoba Hydro will evaluate product offerings and potential opportunities with Efficiency Manitoba in order to assist customers in the transition from internal combustion engines to EVs.

MEDIA INTEREST/CAUTIONARY NOTES

N/A

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