CVP 3: CITY OF VERNON

COMMERCIAL VEHICLE PILOTS PROGRAM

RETROFITTED ICE RESURFACER PROJECT

FINAL REPORT

British Columbia | cleanBC GO ELECTRIC

Transport Canada | Transports Canada

Executive Summary

Project Overview

The City of Vernon project received funding from the CleanBC Go Electric Commercial Vehicle Pilots (CVP) program. It is the third project to complete a full year of telematics data collection, surveys, and interviews.

The project deployed two retrofitted Zamboni 525 ice resurfacers. Each retrofitted electric ice resurfacer (REIR) has a 28 kilowatt hour (kWh) battery and a manufacturer rated range of 7.5 kilometres (km). The data collection period ran from March 2024 to March 2025. CVP program funding of $37,665 supported the two retrofits and two Level 2 chargers.

Key Findings

RANGE AND OPERATIONAL PERFORMANCE

Implied range[1] most commonly fell between 100-130 percent of the manufacturer-stated 7.5 km range. This was enough to complete daily operations with charging between cleans.

Driving accounted for 97 percent of battery energy use, with 3 percent consumed while idling.

MAINTENANCE AND RELIABILITY

The REIRs experienced frequent fuse failures that were fixed by both upgrading from 3 amp to more resilient 5 amp fuses, and replacing the fuse holder. The failures were caused by jostling on the outside road when dumping snow.

Technicians required 2–3 months to improve their skills to be able to complete same day repairs. Repair periods were then comparable to ICE units.

DRIVER EXPERIENCE

Most drivers preferred the REIRs due to quieter operations and improved air quality.

The REIRs improved accessibility. Changing 50–60-pound (lb) propane tanks outdoors is not required with the REIRs.

FUEL COST AND EMISSIONS

Estimated annual fuel cost savings totaled $2,773 across the two REIRs.

An estimated 7,328 kilograms (kg) of operational CO_2 emissions were avoided across the two REIRs.

[1] The implied range is an estimate of the maximum potential distance the vehicle could have traveled on a full charge; this was calculated by taking the actual kilometres traveled on a given day and then dividing it by the percentage of actual charge used.

Part A: Introduction

About this Report

Through public consultations with industry organizations, businesses, and local and regional governments, the Province has consistently heard that there is not enough reliable real-world data relevant to British Columbia (BC) about commercial zero-emission vehicle (ZEV) use. The Province's clean transportation team (we) aims to fill this gap with a series of project summary and data packages. We create these from data collected on vehicles funded by the Commercial Vehicle Pilots (CVP) program.

All CVP program funded projects must collect one year of telematics data. They also complete a quarterly and final survey, and an exit interview. More information on the CVP program is in *Appendix A*.

The approach of this report is non-evaluative and data driven. It's designed to acknowledge the diversity of fleet operations and the need for context-specific interpretation. Objectivity and fact-based information are essential for decision making. This report provides tools for insight rather than prescribing outcomes. This is to support fleet managers in making decisions that are best suited to their unique circumstances. This report is not a scorecard or a verdict. It will not tell you whether this project was a 'success' or a 'failure'.

Every fleet is different. We want to encourage readers to ask questions about their own fleet to help determine if and how ZEVs may or may not fit into those operations.

Information presented in this report has been prioritized based on industry feedback. We have been told the most important things to consider when buying a ZEV are:

- **Range**
- **Reliability**
- **Costs/savings**

In this report we gave significant attention to range and reliability. We clearly identify fuel cost savings but estimates related to total cost of ownership (TCO) are not included. Although frequently requested, we cannot calculate an accurate TCO with one year of data. Providing this now would be misleading.

This report begins with an introduction to the project, followed by a discussion of quantitative and qualitative findings. Please refer to the project's interactive **dashboard** to explore this data yourself.

City of Vernon project

The City of Vernon project is the third project in the CVP Program to have completed its data collection requirements. The data was collected from March 2024 to March 2025 and includes one year of vehicle telematics data collection and qualitative data in the form of quarterly surveys, a final survey, and an exit interview.

The CVP Program funded **two Zamboni 525 Ice Resurfacers with retrofitted electric powertrains**. The retrofitted ice resurfacers (REIRs) have a battery capacity of 28 kWh, a manufacturer rated range of 7.5 km, and a Gross Vehicle Weight Rating of 3,040 kg (6,700 lbs.). All references to the manufacturer are to CAN EV, the company who carried out the retrofit. The project and ice resurfacer specifications are in Table 1.

Fleet Name (and size)	City of Vernon (2 Zamboni 525 Ice Resurfacers with retrofitted electric powertrains)
CVP program funding call	2
Project type (Procurement, Retrofit, New Design)	Retrofit
Make/Model	Zamboni 525 with electric powertrain retrofit (CAN EV)
Vehicle class	-
Use case	Ice resurfacing
Powertrain	Battery electric
Vehicle range	7.5 km
Battery capacity	28 kWh
Weight rating	3,040 kg (6,700 lbs.)
Chargers / Hydrogen filling stations (if funded)	2 chargers (Level 2), Clipper Creek HCS-80
Project start	March 2024
Project end	March 2025
Location	Thompson / Okanagan
CVP program approved funding	C$37,665

Table 1 *– Project and ice resurfacer specifications*

The City of Vernon has propane-powered ice resurfacers within their fleet, but **we could not collect telematics data from these ice resurfacers**. This means that our insights come from evaluating the performance of the REIRs in response to the duty-cycles of the fleet, without an explicit comparison as to how internal combustion engine (ICE) ice resurfacers would be used in the same fleet. We compare fuel cost savings and avoided greenhouse gas (GHG) emissions by using manufacturer specifications and commonly reported operating data from ice resurfacers with an ICE.

Disclaimer

This report is provided for informational purposes only. The analysis and findings presented herein are based on data consolidated and interpreted by the Province. They do not constitute an endorsement or recommendation of any specific technology, company, or service provider. The content has been prepared using neutral language and does not offer legal, financial, or professional advice. The Province accepts no liability for any direct or indirect consequences arising from the use or reliance on the information contained in this report.

Partners

The Province thanks our partners: Transport Canada for the generous funding support, the City of Vernon for deploying ZEVs under the CVP Program, Tecium as our telematics data collection provider, and MNP for their program administration expertise.

Transport Canada Transports Canada

CITY OF Vernon

TECIUM

MNP

Part B. Results

Below is a summary of high-level metrics collected during the project. Table 2 shows several key metrics such as the average daily distance driven, the end-of-day battery state of charge (SoC), and others.

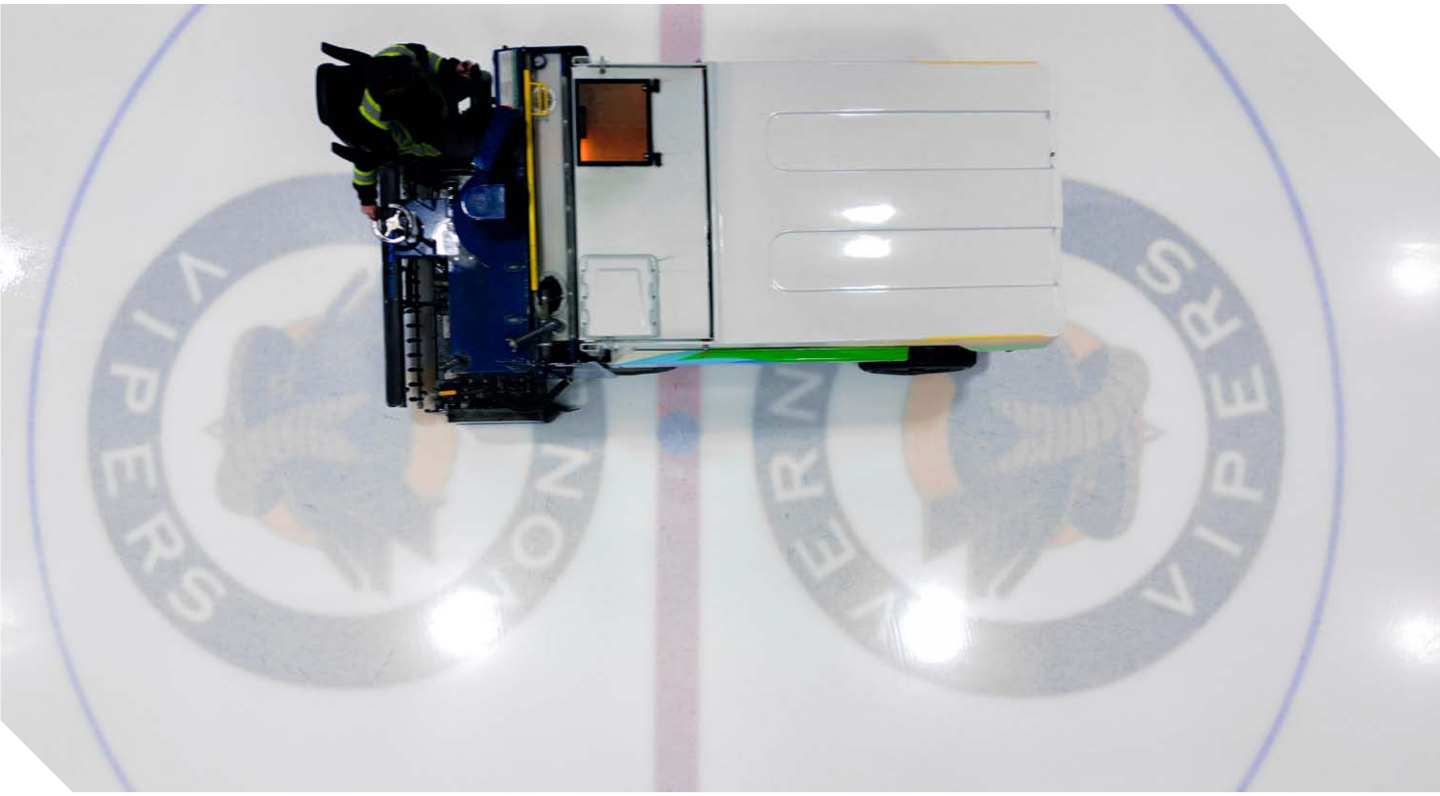
	Metric	Value
Emissions and Cost Savings	Avoided CO_2 (operational)	7,238 kg
	Average CO_2 emissions per km	43 g/km
	Fuel Cost Savings	C$ 2,773
Operation and Performance	Average Daily Distance	9.8 km
	Distance Driven	4,877 km
	Days Driven	495 days
	Max. Daily Distance	23.0 km
	Average Daily Implied Range	8.8 km
	Average Speed	6.5 km/h
	Average Daily Drive Time	1.4 h
	% Full Charge Days ending with SoC < 10%	0.4 %
Charging and Energy	Average End of Day SoC	79.0 %
	Average Start of Day SoC	96.0 %
	Average Daily Charge Time	11.7 h
	Average Daily Charged Energy	28 kWh
	Energy Consumption While Driving	264.0 kWh/100 km
	Energy Consumption While Driving + Idling	274.0 kWh/100 km
	Overall Energy Consumption	300.0 kWh/100 km
	Energy Regeneration while Driving	-

Table 2 *– City of Vernon project data – Key metrics*

KEY TERMS

The **implied range** is an estimate of the maximum potential distance the vehicle could have traveled on a full charge. We calculate this by taking the actual kilometres traveled on a given day and then divide it by the percentage of actual charge used. The equation for calculating implied range is:

$$\text{Implied Range} = \frac{\text{distance}}{\text{SoCdrop}} * 100$$



Range and use case

The REIRs often outperformed the manufacturer's stated range and met duty-cycle needs with charging during down time.

Figure 1 shows that the implied range of the REIRs most commonly fell between 100-130 percent of the manufacturer's stated range of 7.5 km. It was rare for the implied range of REIRs to go below 90 percent or above 140 percent.

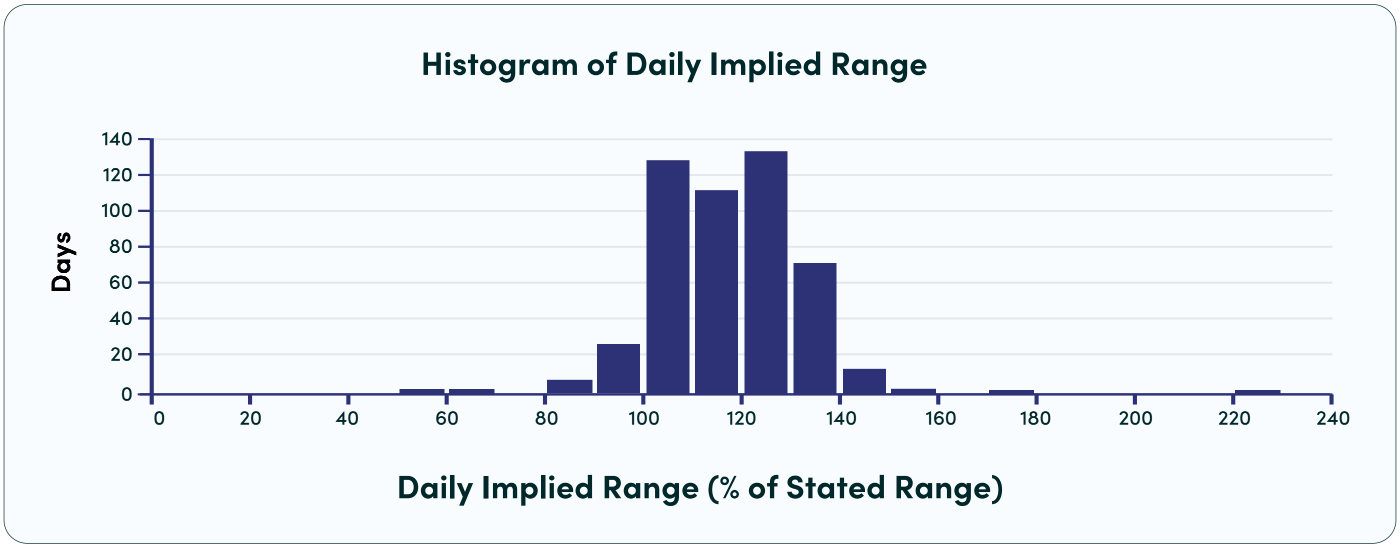


Figure 1 *– City of Vernon (CVP) – Daily implied range as % of stated range*

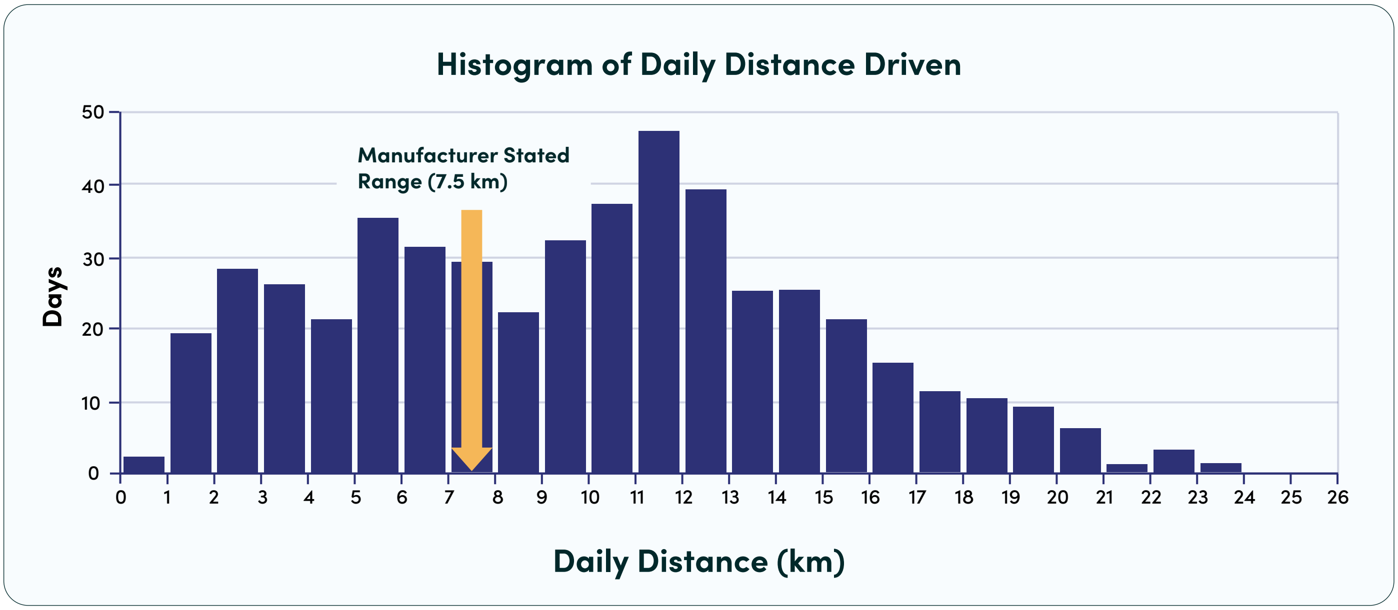


Figure 2 *– City of Vernon (CVP) – Daily distance driven*

An implied range of 140 percent would translate to 10.5 km of travel. The average daily distance traveled was below this, at 9.8 km, but as seen in Figure 2, the REIRs often traveled further than this in a day. At around 1.2 km per ice clean, the REIRs were usually on the rink around 8 times a day. This provided plenty of time for the REIRs to be charged between uses, with Figure 3 showing consistent daytime charging (in green) during a sample period taken from October 2024. On average, combined daily driving time was 1 hour and 24 minutes.

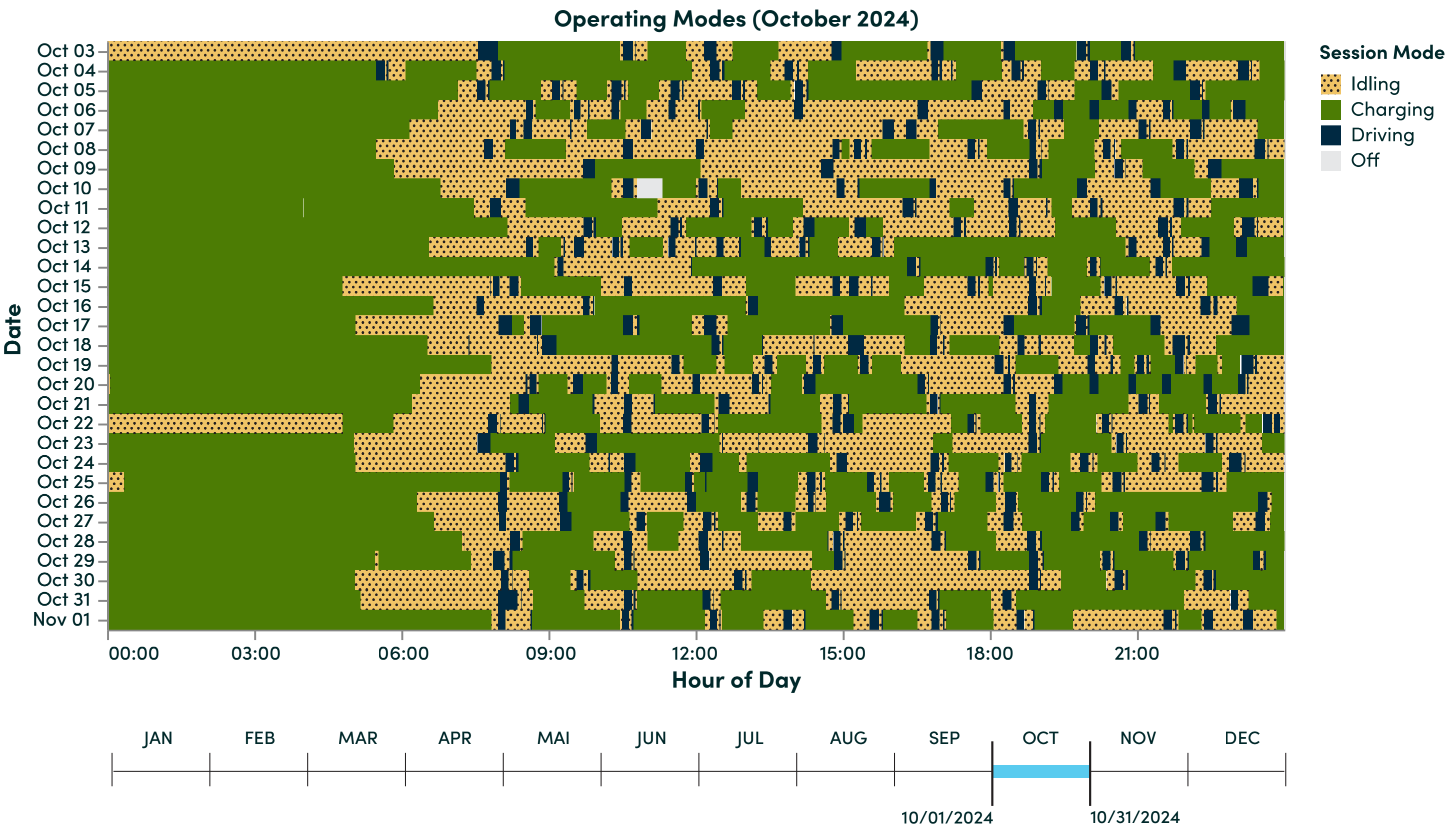


Figure 3 *- City of Vernon (CVP) – Operating modes October 2024*

The REIRs spent more than half of their operating time plugged in (55%). In Figure 4, there are a few days where the REIRs were charging for 24 hours. This is because the REIRs are recorded as charging while they are plugged in, even if the battery is fully charged. Figure 5 shows the batteries were never fully depleted and frequently ended the day with a SoC between 80-90 percent. We would expect to see this when the REIRs completed a clean on a nearly full battery, before being plugged back in. As we saw above in Figure 3 above, the REIRs were more often used in the evening, sometimes right up to or past midnight.

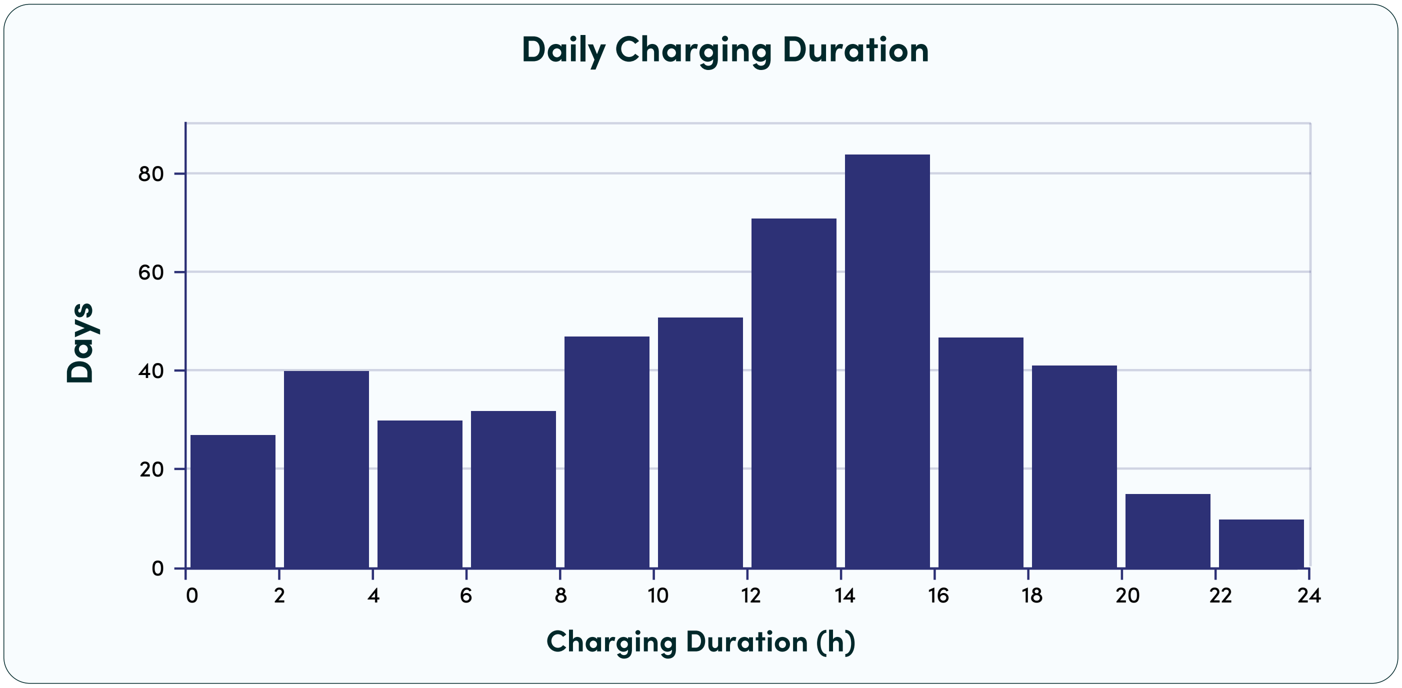


Figure 4 *– City of Vernon (CVP) – Daily charging duration*

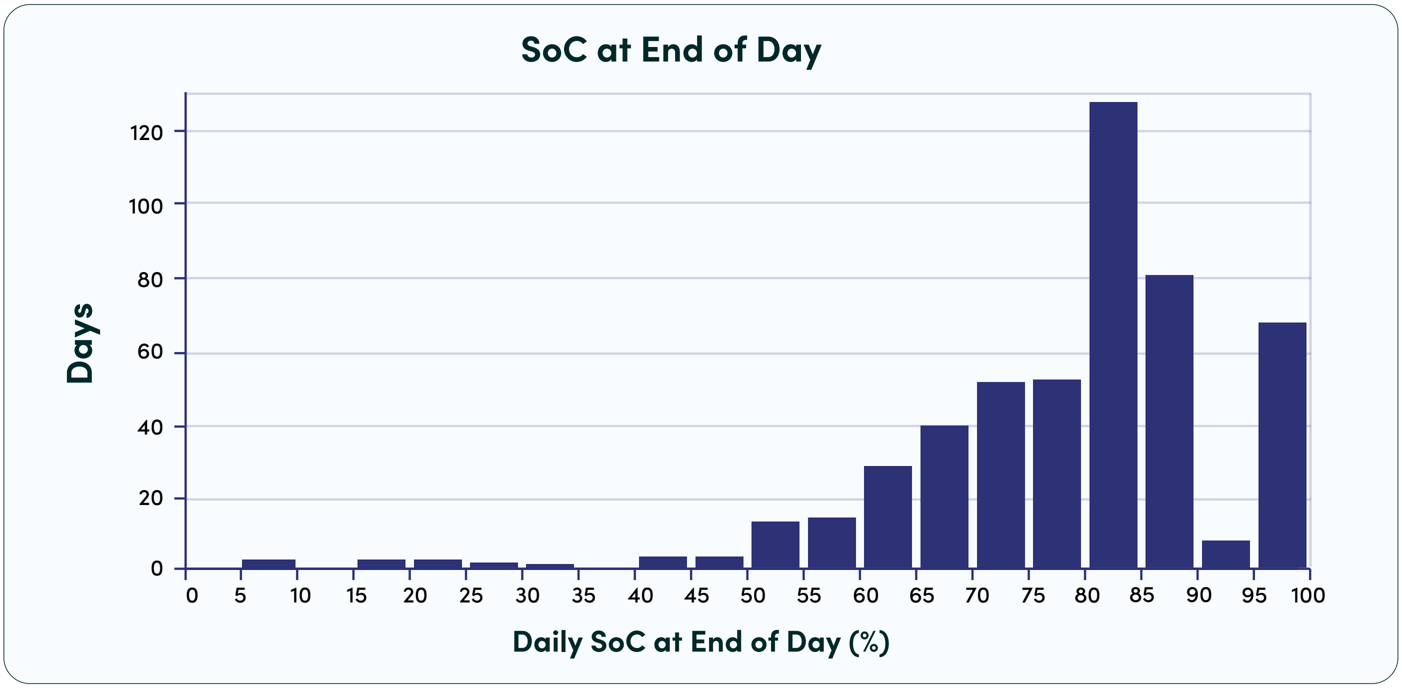


Figure 5 *– City of Vernon (CVP) – State of charge at the end of the day*[2]

[2] End of Day is defined as the end of the final session that began prior to 11:59pm. For more information please see Appendix B

Maintenance

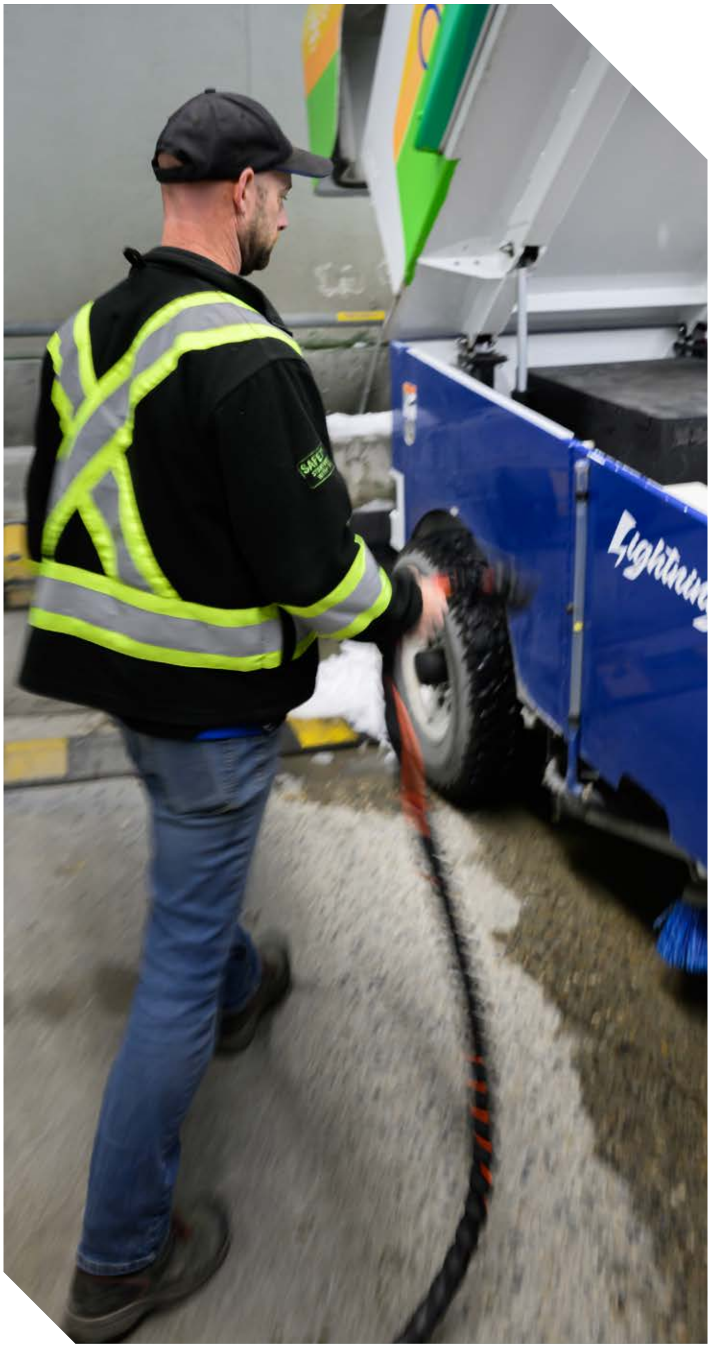
Maintenance issues have been reduced with time and experience.

The most common maintenance issue faced by the REIRs were faulty fuses. The City of Vernon determined this was caused by jostling when driving on damaged roads outside the rink facility to dump snow. As a result, they upgraded the fuse holder from a 3-amp fuse to a 5-amp fuse to improve tensile strength. Extra fuses are also now kept in stock to allow for onsite replacement.

Maintenance downtime decreased steadily as operational and mechanical knowledge of the REIRs increased. Both the retrofitted electric and the propane-powered ice resurfacers can usually get repaired the same day they have an issue, though access to parts can still sometimes be a problem for the REIRs. The City of Vernon said it took 2-3 months to close the maintenance knowledge gap between the REIRs and the propane powered ice resurfacers.

The City of Vernon discovered that staff were rushing through the startup procedure for the REIRs due to their comfortability with the routine for the propane powered ice resurfacers. The REIRs' computer requires initialization time before starting the REIRs electric motor. Explaining to staff why it is important to go through the startup procedure slowly helped to consistently allow time for the computers to start. This solved the "majority" of the problems the City of Vernon faced with the REIRs.

Near the end of the project, one of the REIRs was failing to start, though still useable. The issue appears to be with the draining of the 12-volt battery but diagnostics to uncover why this happens were ongoing. The other REIR was not facing this problem.



Part C: Lessons Learned and Conclusions

PROJECT IMPACTS

The City of Vernon has expanded their zero-emission fleet. They reported that they are satisfied with the performance and reliability of the REIRs. The deployment of the REIRs gave them confidence to buy a new battery-electric ice resurfacer which is now operating without issue.

FUEL COST AND CO2 SAVINGS

Fuel cost savings can be achieved. Annual fuel cost savings were estimated to be $2,773 across the two REIRs, or $0.57/km traveled. Over the duration of the project, it is estimated that 7,238 kg of CO_2 were displaced when compared to common propane powered ice resurfacers. Details on metric calculations can be found in *Appendix B.*

DRIVER PREFERENCES

Drivers appreciate the benefits offered by the REIRs. The City of Vernon reported that the drivers were hesitant about using electric ice resurfacers at first, due to negative past experiences. Most drivers now appreciate the REIRs despite observing that they have less torque compared to the propane powered ice resurfacers. Better features, improved air quality in the rink and quieter operations were given as reasons by those that prefer the REIRs. Another benefit is improved accessibility. The REIRs do not require changing heavy 50–60-pound propane tanks, which must be replaced outdoors including in the winter.

DOWNTIME DECREASES WITH TIME AND EXPERIENCE

Most maintenance issues on the REIRs are now fixed within the same day. The City of Vernon reported it took about 2-3 months to gain the maintenance experience to reduce downtime to similar levels as the propane powered ice resurfacers. This includes learning which replacement parts to keep in stock.

RANGE SUFFICIENT WITH APPROPRIATE CHARGING TIME

The REIRs can be used beyond their range with daytime charging. The REIRs were driven on average 1 hour and 24 minutes a day, allowing time for charging between cleans. The REIRs were able to travel over double the implied range in a day when necessary.

Appendix A: The Commercial Vehicle Pilots Program

The CleanBC Go Electric Commercial Vehicle Pilots (CVP) Program, launched in 2021, intends to encourage and accelerate the adoption of commercial on- and off-road ZEVs. It is for BC-based businesses, non-profits, local governments, Indigenous communities, and eligible public entities looking to deploy ZEV technology in commercial applications along with supporting infrastructure. The CVP Program is one of a suite of programs offered under the Province's CleanBC Go Electric Program, designed to reduce barriers to the adoption of ZEVs to realize both their environmental and economic benefits.

The focus on in-depth data collection, commitment to reporting, and inclusion of off-road marine, rail, and aviation ZEVs makes the CVP Program unique amongst similar programs in North America. BC's place as a world leader in the transition to ZEV technology has been reinforced by the innovative projects supported by the CVP Program.

As of December of 2025, the CVP Program has committed $53 million to 24 projects with a total estimated value of $197 million. These projects include the first ever commercial electric aircraft in Canada, the second electric tugboat in Canada, a hybrid locomotive, and Island-Class electric ferries. A full list of supported projects can be found here: **https://cvpbc.ca/funded-projects/**

Appendix B: Details on Metrics Calculations

Emissions and Cost Savings

AVOIDED CO_2

Calculated by using hypothetical emissions from an ICE equivalent Zamboni subtracted by the grid emissions from electricity used in charging the electric fleet. The following values were used in the calculation:

CO_2 intensity of burning LPG in I.C.E.: **3.0 kg Co_2/kg**.
Source: **https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/output-based-pricing-system/federal-green-house-gas-offset-system/emission-factors-reference-values.html?utm_source=chatgpt.com#toc6**

CO_2 intensity of grid electricity in B.C.: **15 g/kWh.**
Source: **https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/output-based-pricing-system/federal-green-house-gas-offset-system/emission-factors-reference-values.html**

FUEL COST SAVINGS

Calculated by subtracting the cost of electricity used to the charge the fleet from the estimated fuel cost for a Class 6 internal combustion engine (I.C.E) driven fleet covering the equivalent distance. The following values were used in the calculation:

Average fuel cost in the area where the Zamboni was operated for 2024: **$1.00/liter**.
Source: **https://natural-resources.canada.ca/domestic-international-markets/propane-prices**

Average fuel efficiency of a Zamboni is **3.29 kg/h.**
Source: **Commonly reported operating data from the City of Vernon**

Operation and Performance

DAYS DRIVEN

Includes days where more than 0.5 km were driven (indication of service day)

IMPLIED RANGE

Calculated by dividing the distance driven by the % drop in state of charge (SoC) and multiplying by 100.

END OF DAY

The End of Day is defined as the end of the last driving session to begin prior to 11:59pm. This means that if the Ice Resurfacer finished driving for the night at 9:00pm this would be the end of day. Alternatively, if a driving session began at 11:48pm, and finished at 12:05am then 12:05am would be calculated as the end of day. Any driving sessions begun after midnight would be counted in the next day's metrics. The first driving session begun after 12:00am is the 'Start of Day'.

Charging and Energy

ENERGY CONSUMPTION WHILE DRIVING + IDLING

Calculated based on the energy discharged from the battery during driving and idling s essions, divided by the total distance driven.

ENERGY CONSUMPTION WHILE DRIVING

Calculated based on the net energy discharged from the battery during driving (includes stops up to two minutes), divided by the total distance driven.

OVERALL ENERGY CONSUMPTION

Calculated based on the energy charged to the battery divided by the total distance driven.

Appendix C: Qualitative Data and Survey Results

After preliminary analysis of the acquired qualitative data and surveys from the CVP Program's **City of Vernon** Project, the qualitative data analysis results are classified as follows:

1. **Technica**l results (results related to EV technology)
2. **Project/Fleet management and communicatio**n results
3. **Human factors** related results (results related to how people interact with EV technology)
4. **Other** results

The qualitative data and survey analysis results are presented in **Tables 3-6** below. Quotes provided by the proponent have not been edited except where it was deemed necessary to improve comprehension. These instances are clearly marked with square brackets.

Table 3 *- Technical Results from Qualitative Data Analysis*

Technical Results - Categories	Survey results, lessons learned, and recommendations
Safety	**City of Vernon:** "Fleet Services requires safety training on electric vehicle maintenance and work."
Breakdowns, maintenance, warranty	**City of Vernon:** "Fleet Services requires safety training on electric vehicle maintenance and work. Currently contracting to existing contracted electricians for work on electrical components—only until completion of training for Fleet Services." "One breakdown due to programming issues, covered under warranty" "Weekly maintenance includes but not limited to, greasing all moving components, changing blades on Zambonis ($50 per sharpening)" "Electric conversion unit did require a mini-SD card to connect to Wi-Fi. Had to source a laptop that did not connect to our city networks (firewalls) in order to use a mini-SD card."

Continuation of Table 3 *– Technical Results from Qualitative Data Analysis*

Technical Results - Categories	Survey results, lessons learned, and recommendations
Breakdowns, maintenance, warranty	"Onboard charger failed. Replaced once under warranty by Canadian Electric Vehicle and once outside of warranty." "Machine stopped running on startup. Found to be faulty fuses on the equipment. Fuse holder upgraded to withstand jostling/impact." "The City currently use ZEV in their fleet; however, it became apparent in-house technicians were uncomfortable with the safety associated with working on ZEVs. Lesson learned is to assess the readiness of in-house Fleet Services to ensure efficient and smooth adoption and maintenance of ZEVs prior to commencing with electrification of fleets." "Fuses were damaged because of faulty fuse. Keep extra fuse in stock on site to do a swap out to continue operating the Zamboni. Our ice resurfacers do drive outside the facility to dump snow. Unfortunately, the roadways are not in good condition, and this created significant jostling of the machine damaging the fuse. We have upgraded from a 3amp fuse to a 5amp fuse for better tensile strength." "Fleet is capable of servicing our equipment to troubleshoot issues and works with Canadian Electric Vehicle to troubleshoot." "The only breakdown, to my knowledge, is the draining of the 12v battery necessary to start the Zamboni. We are currently working with Fleet Servies and Canadian Electric Vehicle to understand how to address this during our slow time of the season as we are not operating the ice resurfacers as frequently during the summer months." "We have an in-house fleet services within our organization that have been responsive. They are growing their level of competencies with ZEVs as the City of Vernon continues to expand their fleet." "The Altran Magnetics AEV250-GE DC Contactor was replaced under warranty. Labour was in-house. Approximately $137 for the part. The 100225 – 6600W 108V/60A G4 Fan Cooled onboard charger failed. One was replaced under warranty. Baffle plates were added to the installation by recommendation of the charger manufacturer. $2,898.10 after tax and shipping. Labour was in-house." "ICE Zambonis usually fixed on the same day. The electric ones took longer to start as they were waiting on parts and needed knowledge to build."

Continuation of Table 3 *– Technical Results from Qualitative Data Analysis*

Technical Results – Categories	Survey results, lessons learned, and recommendations
Telematics	**City of Vernon:** "We were not able to collect data on the propane ice resurfacer due to proprietary data from Zambonis."

Table 4 *– Project Management and Communication Results from Qualitative Data Analysis*

Project Management and Communication Results – Categories	Survey results, lessons learned, and recommendations
Stretched time-lines and related risks	**City of Vernon:** "The unit has performed to our expectation. Despite the breakdowns, it has continued to be a reliable piece of equipment and complete the ice cleans in a timely manner."
Battery degradation	Within the CVP Program, **battery degradation** is not expected, or will be negligible, since the program incorporates tracking of only one full year of operation of the MHD ZEVs involved.
Fleet integration	**City of Vernon:** "The converted electric ice resurfacers have met our expectation to keep up with the current demand of the facility with ice cleans and charging time." "This project has aligned our department's short-term and long-term goals with the Vernon Climate Action Plan to reduce greenhouse gas emission, eliminate the use of fossil fuel and carbon monoxide emission, and find energy savings switching from propane to clean hydroelectric energy within our facility."

***Continuation of Table 4** – Project Management and Communication Results from Qualitative Data Analysis*

Project Management and Communication Results - Categories	Survey results, lessons learned, and recommendations
Fleet integration	"The daily payloads vary based on the amount of ice they remove from the ice surface in the arenas. Typically, empty is 6930 lbs. Full of water/snow will be upward to 9350 lb. Expect up to 2,420lb of payload per ice clean, 20-28x."
Role of data dashboards	The Province's Engineering and Data Science teams created a comprehensive **data analysis and visualization dashboard** to analyze and present program participant data. The results are provided in the previous section of this report.
Company culture	**City of Vernon:** "Previously held biases from past experience with early adoption of ZEV ice resurfacers where the battery failed within a single season of use. This resulted in significant money replacing the battery at the time and the ZEV was abandoned shortly afterward. One operator is a seasoned veteran in the business and begrudgingly operates the electric Zamboni. I determined that this operator is a "never-adopter" despite all rationale and reasons. The current ZEVs are fairly reliable, notwithstanding programming challenges with the onboard hardware. Drivers have indicated that the converted ZEV has more power than the full ZEV ice resurfacer in comparison. Overall, the perception is positive, and majority of staff continue to be open to learning how to work with the units as we have demonstrated our efforts to ensure this is a successful project by acting on emerging challenges. It also helps that we have a supervisor on site who is supportive of energy conservation initiatives and reduction of GHG."

Table 5 *- Human Factors related Results from Qualitative Data Analysis*

Human factors related results - Categories	Survey results, lessons learned, and recommendations
Training needs	Training operators on charging batteries, frequency of charging, and monitoring battery charge. **Later in the project, City of Vernon:** "Fleet is currently training and capable of servicing our equipment to troubleshoot issues." "Staff prefer to drive the electric ice resurfacers. They are slowly being trained to troubleshoot issues on their owns." "Cables were damaged from staff not putting them away properly. Drove over them with studded winter tires. We purchased a second cable to keep as a backup." "Driver/Operator tend to rush quickly through the startup procedure of the ZEV due to their regular routine with the ICE versions. We explained they had to go through the steps slowly to allow the computer to start up before initiative starting of the ZEV battery and electric motor. Solved the majority of our problems. Updated our procedures and training for other staff members."
Feelings (Joy, frustration, anxiety) related with vehicle attributes (performance, comfort, reliability, etc.)	**City of Vernon:** "Staff were highly accustomed to propane and/or natural gas ice resurfacers and were not used to electric ice resurfacers. Some staff had experience with older ice resurfacers with nickel batteries with poor life cycle. Staff were initially uneasy with the adoption of converted electric ice resurfacers. After driving electric ice resurfacers, they found the units to be quieter and ease to drive."

Continuation of Table 5 *– Human Factors related Results from Qualitative Data Analysis*

Human factors related results - Categories	Survey results, lessons learned, and recommendations
Feelings (Joy, frustration, anxiety) related with vehicle attributes (performance, comfort, reliability, etc.)	**Later in the project, City of Vernon:** “Staff prefer to drive the electric ice resurfacers. They have noted a difference in power delivery between the propane ice resurfacer, electrical converted ice resurfacer, and a recently brand-new ice resurfacer. Staff indicated the electrical converted ice resurfacer had less “torque and power” than the propane ice resurfacer but still more than the new electric ice resurfacer. We have not been able to determine if this is perception or based on hard data.” “Improved air quality in the arenas, rinks”
Image	**City of Vernon:** “Ongoing communication with driver/operator and fleet services manager + technicians were effective. Responding to issues promptly encourage staff to report issues in a timely manner. Sharing our findings on the challenges that have arises helps increase team morale and buy-in of the initiative.”

Please refer to the **Appendix D** for quotes and anecdotes from the fleet.

Appendix D: Quotes and Anecdotes from the City of Vernon project

This appendix of the project report is intended to summarize distinct quotes and anecdotes from the project

Excerpts from Exit Surveys

> "Our barriers for the adoption of electric ice resurfacers were high capital costs and vehicle availability."

> "Overall, positive experience. The ice resurfacer electric conversion was a good transition for operators to shift from internal combustion engine to electric motors. As a result of our experience with the vehicles funded through CVP, we plan to purchase more ZEVs in the future."

> "I think asking question about the readiness of the organization to adopt ZEV in terms of in-house technicians to perform necessary maintenance, repair, and troubleshooting work on the ZEV prior to awarding the grant would be helpful. This was a pain point for our onboarding with the ZEV when we initially experienced challenges with the programming."

Excerpts from Exit Interviews

> "We don't think we could have been able to implement (without the funding from the CVP Program) the Ice Resurfacers so quickly. We would have been a 5–7-year plan to put money aside. We may deploy maybe one, not two (if we were not supported)."

> "Our council directive was part of it (the reason why we electrify). Many communities are looking at ways to lower GHG emissions. We want to be more efficient. We have electric forklifts and floor machines."

> "We decided to go ICE on a forklift as the range wasn't there yet. For a Zamboni, it doesn't matter because there is a lot of downtime for charging.'

“We can use solar systems to power our electrified machinery.”

“We will probably be replacing old Zambonis with ZEVs when retired. 20-30 years is how long we will generally be able to keep ice resurfacers. As long as we can. We also sell our used ones before end of life to get a new one.”

Team member anecdotes from the project:

ANECDOTE 1:

“Not needing to change propane bottles is nice especially for older employees. The bottles are heavy and are stored outside, problem in colder months.”

ANECDOTE 2:

“Improved air quality indoors.”

ANECDOTE 3:

“We prefer propane (ICE) to converted EV ones for the extra power.
But everyone loves the new electric ice resurfacer (not the retrofit supported by the CVP Program, we bought recently a new electric ice resurfacer directly from the OEM). It’s a Cadillac, we haven’t had any issues with it”

Appendix E: Costs (Proponent submitted)

- Supply (Canadian Electric Vehicle) and installation (ATS Electric) of Sun Country Level 2 Charger in Priest Valley Arena and Kal Tire Place – **$10,025.46**
- Canadian Electric Vehicle Electric Conversion package for conversion of 2008 and 2012 Zamboni 525 Ice Resurfacers, $4,725.00 for cost of transportation from Vernon to Parksville, $6,202.86 for cost of transportation from Parksville to Vernon – **$116,556**
- Energy cost Zamboni 555 (PV) from April 1, 2024 – June 30, 2024 - **$146.37**
- Energy cost Zamboni 556 (KTP) from April 1, 2024 – June 30, 2024 - **$77.61**
- Preventive Maintenance Unit 555 (quarterly) - **$3,174**
- Preventive Maintenance Unit 556 (quarterly) - **$2,666**
- Insurance Unit 555 (quarterly) - **$550**

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