

Whenever. Wherever.
We'll be there.



April 23, 2026

Board of Commissioners
of Public Utilities
P.O. Box 21040
120 Torbay Road
St. John's, NL A1A 5B2

Attention: Mike McNiven
Board Secretary

Dear Mr. McNiven:

Please find enclosed Newfoundland Power's *2025 Conservation, Demand Management and Electrification Report*, filed in compliance with Order No. P.U. 7 (1996-97).

If you have any questions, please contact the undersigned.

Yours truly,

A handwritten signature in blue ink, appearing to read "D. Foley".

Dominic Foley
Legal Counsel

Enclosure

cc. Shirley Walsh
Newfoundland and Labrador Hydro

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2025 Conservation, Demand Management and Electrification Report

April 23, 2026

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1.0 Introduction

In Order No. P.U. 7 (1996-97), the Newfoundland and Labrador Board of Commissioners of Public Utilities (the “Board”) ordered, in effect, that Newfoundland Power Inc. (“Newfoundland Power” or the “Company”) file annual progress reports on its demand side management activities, including conservation activities.

Since 2009, Newfoundland Power and Newfoundland and Labrador Hydro (“Hydro” and together with Newfoundland Power, the “Utilities”) have offered conservation and demand management (“CDM”) programs on a joint and coordinated basis under the TakeCharge brand. Customer CDM programs were implemented by the Utilities throughout 2025 in a manner consistent with past practice and existing Board orders.

While CDM programs and electrification initiatives under the TakeCharge partnership are available throughout the province, this report focuses on the results and evaluation of Newfoundland Power’s CDM programs and electrification initiatives.

2.0 CDM Programs

2.1 Program Delivery

Newfoundland Power’s CDM programs provide residential and commercial customers with incentives that result in quantifiable energy and demand savings.

In 2025, Newfoundland Power offered four CDM programs for residential customers. These programs targeted: (i) insulation and air sealing; (ii) heat recovery ventilators (“HRVs”); (iii) low-cost behavioural changes through the Benchmarking Program;¹ and (iv) the Energy Savers Kit Program, which provides free energy efficiency kits to income qualified customers. These programs reduce electrical energy consumption and peak demand.

In 2025, TakeCharge adapted the insulation and air sealing and HRV programs to improve customer participation. A 2024 customer barrier survey identified costs associated with a contractor installing insulation as a barrier to participation. As a result, TakeCharge now considers installer labour an eligible expense under the insulation rebate program, providing a rebate of up to \$500 to offset the cost of hiring a qualified contractor. This change increases the maximum potential rebate for both attic and basement insulation from \$1,000 per project to \$1,500 per project.

Following research that identified an approximate \$50 increase in the cost of qualifying units under the HRV Program, the HRV rebate was increased by \$50 per qualifying unit, from \$175 to \$225.

¹ Also referred to as the Home Energy Report program, the Benchmarking Program involves using social norms to encourage friendly competition to reduce electricity consumption by comparing customers’ energy usage with homes having similar attributes.

TakeCharge continued to offer the Business Efficiency Program (“BEP”) for commercial customers in 2025. The BEP has three components: (i) prescriptive rebates; (ii) custom energy rebates; and (iii) custom demand rebates. Prescriptive rebates provide money back when customers purchase and install eligible products. For custom energy rebates, a TakeCharge employee consults with the customer to develop an energy saving project that is customized to their individual circumstances.² Custom demand rebates are available to commercial customers who implement individualized demand reduction measures that are economically viable and provide measurable demand reduction during peak times.³

2.2 Program Results

Table 1 provides customer participation in Newfoundland Power’s CDM programs for 2025, as well as the estimated energy and peak demand savings achieved by new participants.⁴

**Table 1:
CDM Program Participation and Savings
(2025)**

| | Customer Participation | Annual Energy Savings (MWh) | Peak Demand Savings (kW) |
|------------------------------------|-----------------------------------|--|---|
| Residential Programs | | | |
| Insulation and Air Sealing Program | 853 | 2,340 | 1,625 |
| HRV Program | 567 | 310 | 96 |
| Benchmarking Program | 124,332 | 15,763 | 10,090 |
| Energy Savers Kit Program | 5,083 | 4,607 | 1,254 |
| Commercial Programs | | | |
| Business Efficiency Program | 142 | 3,118 | 499 |
| Total All Programs | 130,977 | 26,138 | 13,564 |

In 2025, the Company’s CDM programs achieved energy savings of 26.1 GWh and peak demand savings of 13.6 MW. The Benchmarking Program resulted in the highest contribution to energy and peak demand savings in 2025, comprising approximately 60% of total energy savings and 74% of total peak demand savings. In late 2025, a new wave of 50,000 customers was added to the Benchmarking program creating an increase in customer participation and more opportunities to make customers aware of how they use energy and potential ways to save. Energy savings

² Incentives are provided on an individualized basis for projects that are cost-effective from the customer and utility perspective. Rebates are paid on the energy savings the customer achieves in the first year of the project.

³ Under the BEP, customers can receive incentives for demand reduction based on the amount of demand they are able to reduce during peak times. This one-time incentive is based on project demand savings over the December to March period. To better align with marginal capacity costs and increase attractiveness for prospective customers, the incentive was increased from \$100 per kW to \$250 per kW in 2025. Eligible demand savings projects must achieve a minimum savings of 50 kW and must be maintained over five years.

⁴ Unless otherwise noted, estimated savings indicated in this report are provided on an annualized basis. Actual savings in the year of participation will be lower, as they depend on the actual timing of installation. Due to the nature of customer behavioural changes, Benchmarking Program savings are assumed for one year only.

from these customers will begin to ramp over a period of time. Therefore, there is no immediate increase in energy savings from the program to match the increase in participation.

While participation is growing for the Benchmarking and Energy Savers Kits programs, other programs have shown year over year inconsistencies with participation. To combat this, changes have been made to increase rebate amounts and enhance eligibility to address rising costs for energy saving technologies and projects. Additionally, TakeCharge is working to enhance its efforts around trade allies to create more trade ally driven opportunities in terms of contractors, distributors, retailers, and other program partners.

In addition to CDM programs, the Company continued to offer the Curtailable Service Option (“CSO”) to Rate 2.3 and 2.4 customers in 2025. Twenty-three General Service customers participated in the CSO during the 2024-2025 winter season, providing an average aggregate load reduction of approximately 10.7 MW.⁵

Appendix A of this report provides the detailed results for each CDM program for 2025 and over the life of the programs.

2.3 Program Planning

In the fall of 2025, Newfoundland Power launched the “Mysa Thermostat Pilot” for residential customers. The pilot is designed to test demand management for residential electric baseboard heating during electricity system peak hours using compatible Mysa smart thermostats. Demand response events will be conducted over a four-month pilot season spanning months from two winter periods.⁶

During demand response events, participant’s thermostat setpoints will automatically be reduced by 1–4°C for periods of up to three hours. To ensure customer comfort, events may include a pre-heat period, during which thermostat setpoints will automatically increase by 1°C for up to 60 minutes prior to the event.

The pilot results will be evaluated in 2027 to assess the potential role of demand response for electric baseboard heating in reducing Island Interconnected System (“IIS”) peak demand. The pilot is supported by \$258,400 in funding from the Government of Newfoundland and Labrador’s Green Transition Fund and is scheduled to conclude on December 31, 2026.

In 2025, an updated Conservation and Demand Management and Electrification Potential Study (“Potential Study”) for the IIS was completed.⁷ The Potential Study provides a framework, consistent with North American best practices, for assessing utility demand-side management programming. The findings will enable the Utilities to focus on cost-effective technologies and

⁵ This load reduction is exercised to reduce demand on the electrical system when generation reserves fall below normal operating levels. Newfoundland Power files an annual report with the Board on the Curtailable Service Option.

⁶ Demand Response events for the Pilot ran from January to March, 2026 and will run again in December, 2026.

⁷ The Potential Study was filed with the Board by Hydro on November 5, 2025 as part of its 2025 capital budget supplemental application for capital expenditures for the purchase and installation of Bay D’Espoir Unit 8 and the Avalon Combustion Turbine.

assess market characteristics to inform future program development as discussed in the outlook section of this report.

2.4 Program Evaluation

The cost-effectiveness of CDM programs is evaluated using the Total Resource Cost (“TRC”) test and Program Administrator Cost (“PAC”) test, as approved by the Board in Order No. P.U. 18 (2016). These tests are applied annually to assess the cost-effectiveness of the past implementation of CDM programs. Both tests provide a benefit-to-cost ratio whereby a result of 1.0 or greater indicates that a program is cost-effective.

Table 2 provides the TRC and PAC test results for Newfoundland Power’s CDM programs in 2025.⁸

**Table 2:
Newfoundland Power
CDM Program Cost-Effectiveness Results
(2025)**

| Program | TRC Test | PAC Test |
|------------------------------------|-----------------|-----------------|
| Insulation and Air Sealing Program | 3.2 | 3.2 |
| HRV Program | 1.4 | 1.8 |
| Energy Savers Kit Program | 4.7 | 4.7 |
| Benchmarking Program | 5.0 | 5.0 |
| Business Efficiency Program | 1.2 | 2.0 |
| Total Portfolio | 2.9 | 3.4 |

The TRC and PAC test results indicate that the customer benefits of Newfoundland Power’s CDM programs were at least 2.9 times the cost of implementing those programs in 2025.⁹

In addition to cost-effectiveness testing, Newfoundland Power evaluates changes in market factors that may impact its program delivery. This may include third-party evaluations of certain programs to assess changes in technologies, industry standards or customers’ behaviour. Third-party evaluations were conducted for the following programs and initiatives in 2025:

⁸ The TRC and PAC tests were conducted using marginal cost information provided by Hydro in the first quarter of 2025.

⁹ The primary difference in the TRC and the PAC is the TRC includes the customer costs to participate in a program, whereas the PAC includes only utility costs.

(i) *Business Efficiency Program*

Guidehouse completed an evaluation of the BEP in 2025.¹⁰ The impact evaluation verified estimated gross and net energy savings and peak demand savings attributable to the programs for the 2022, 2023 and 2024 program years. The evaluation concluded that Newfoundland Power’s calculations for energy efficiency projects were appropriate. The evaluation also recommended seeking additional information from applicants, such as the type of business applying for the rebate, and improving the quality of baseline data provided by applications, such as existing wattages, to support greater accuracy of future energy savings calculations.

(ii) *Benchmarking Program*

The Benchmarking Program promotes behavioural changes to improve customers’ energy efficiency. The 2025 evaluation completed by Guidehouse showed high levels of participant engagement with the program. Approximately 93% of users reported that they, or someone in their household, read their Home Energy Reports. Customers found the most value in the comparisons of energy usage in previous months and years.

(iii) *EV Load Management Pilot*

From 2023 to 2025, Newfoundland Power implemented the EV Load Management Pilot to assess the challenges and opportunities associated with managing electric vehicle (“EV”) load on the IIS. The results of the pilot were evaluated by Guidehouse in May 2025.

Despite challenges with technology compatibility for both EV chargers and EV telematics, 171 devices (EV telematics and EV Chargers) were enrolled at the end of the pilot period. Of these, 56 devices were assigned to the control group, 51 to the passive management group and 64 to the active management group.¹¹

The primary conclusions from the EV Load Management Pilot are:

- Both active and passive load management strategies demonstrated evidence of successful load curtailment. The passive treatment group curtailed their load during the evening peak period, with an average reduction in charging demand of 0.37 kW per device between 4:00 p.m. and 11:00 p.m. Active events resulted in an average reduction in charging demand of up to 0.46 kW per device during events called between 7:00 p.m. and 11:00 p.m.

¹⁰ Guidehouse is a global advisory, technology, and managed services firm which completes program evaluations for utility companies.

¹¹ The passive treatment group is influenced by simulated price signals intended to shift charging behaviour, but retains full control of their charging. Charging for the active treatment group is controlled by the utility, with customers having the ability to opt out of events. The control group is monitored only, with no intervention or attempted influence on their charging behaviour.

- Load was generally shifted from the evening period to overnight. The morning peak period (6:00 a.m. to 10:00 a.m.) showed less potential for load reduction, as participants typically do not charge their vehicles in the morning, even without any treatment.
- EV managed charging provides system benefits through avoided capacity costs. The magnitude of these potential benefits varies depending on how treatments are ultimately used to target system peak, and how the system peak coincides with the treatment period. Guidehouse estimated the potential range of benefits based on average curtailment during peak periods. For example, estimated benefits during the morning peak period (6:00 a.m. to 10:00 a.m.), were \$27.03 per device for peak events. During the evening peak period (4:00 p.m. to 11:00 p.m.), benefits were estimated to be \$131.76 per device for the passive treatment group, and \$114.81 per device for the active management group.
- The passive treatment group demonstrated persistent load shifting behaviour following the 2023/2024 Winter season. Data from September to November 2024 indicated that some savings persisted during shoulder-season months, suggesting the treatment remained effective in the off-season, in the absence of a direct monthly incentive.
- Technical and operational issues reduced impacts and may limit scale. Enrollment and event dispatch in the Uplight platform were challenging, particularly in the pilot's second year. Limited standardization for universal EV data access and control dispatch means third-party aggregators often lack manufacturer agreements, which can restrict utility control, customer participation, and predictability, stability and access to data. Passive treatment is typically less affected because it relies more on participant behaviour than a software solution, though data access issues for measurement and verification can still occur. These constraints can narrow the range of vehicle and charger types that can be reliably enrolled in programs unless utilities or aggregators secure stronger manufacturer partnerships, increasing administrative costs and program complexity.
- Participants were generally satisfied with the pilot charging platform and program communication. The frequency and method of communication were effective for respondents.
- Most participants expressed interest in participating in future EV load management programs, contingent on receiving financial incentives.

Table 3 outlines the minimum ongoing annual reward identified by survey respondents as necessary to participate in a future EV load management program.

**Table 3:
Minimum Ongoing Annual Reward to Participate in EV Load Management**

| Annual Reward | Percentage Interested |
|-------------------------------|------------------------------|
| \$20 | 5% |
| \$40 | 2% |
| \$60 | 14% |
| \$80 | 15% |
| \$100 | 41% |
| None of these are high enough | 22% |

Sixty-three percent of respondents would require an incentive of at least \$100 to participate in an EV Load Management Program.¹² If implemented, this incentive level would erode most of the value these customers contribute to the program in avoided costs, which was estimated to be between \$115 and \$132 per participant.

The full results of the EV Load Management Pilot can be found in Appendix B.

(iv) All-In Attic Insulation Pilot

Newfoundland Power evaluated the results of the All-In Attic Insulation Pilot, which was delivered from 2024 to 2025. During that time, 260 customers received a free attic insulation upgrade. The estimated annual energy and demand savings from these projects are 590 MWh and 0.4 MW, with savings expected to persist for 25 years. Based on current residential electricity rates, the estimated annual bill savings for participating customers total \$89,814, or approximately \$345 per customer. The total cost to deliver the pilot was \$919,234, averaging \$3,536 per project. Newfoundland Power evaluated the cost-effectiveness of this pilot using the PAC test.¹³ The PAC result was 1.8, indicating that the benefits of the program were 1.8 times greater than its cost.¹⁴

3.0 Education and Awareness

Newfoundland Power continues to focus on actions to help customers understand how weather impacts their energy bills and promoting tips and programs that can help customers save on their electricity bills.

¹² The maximum incentive a customer could receive during year one of the Pilot was \$115. The maximum incentive a customer could receive during year two of the Pilot was \$230.

¹³ Since there is no cost for the customer to participate, the PAC and TRC results are the same for this initiative.

¹⁴ In the 2026 Plan, the Utilities have outlined an enhanced program for income-qualified customers that will include attic insulation upgrades, but also a rebate on ductless mini-split heat pumps. The Utilities have applied for funding from Natural Resources Canada through the Canada Greener Homes Affordability Program to offset the costs of this offering, however it is anticipated that even without the funding, the offering will be cost-effective using the TRC and PAC tests.

3.1 *Media and Advertising*

Throughout 2025, TakeCharge used broadcast, print, online and social media advertising to enhance awareness for residential and commercial CDM programs.

The 2025 TakeCharge marketing survey conducted by Thinkwell Research + Strategy¹⁵ showed that customers continue to demonstrate high awareness of TakeCharge programs and initiatives. Seventy-one percent of participants recalled seeing energy-saving advertising, consistent with 2024 levels. Of those that were familiar with TakeCharge, 51% recalled the source being from television, 38% from social media and online channels and 30% from the Utilities' websites. Nearly 30% of homeowners reported making energy-efficient upgrades in 2025, up from 24% in 2024.

In the fall of 2025, the Home Heat Loss Estimator was launched on the TakeCharge website. This interactive tool allows customers to estimate how temperature and wind speed contribute to heat loss in their homes. By increasing awareness of these factors, the tool helps customers better understand the causes of higher winter energy bills and provides tips for how to reduce energy usage. The creation of this tool was in direct response to customer concerns about high winter bills.

Twelve TakeCharge inserts were included with electricity bills throughout the year. These inserts focused on energy-saving tips for homeowners and provided information on enhancements made to existing rebate programs. These inserts complemented promotion of other programs like Newfoundland Power's Equal Payment Plan to help customers manage seasonal increases in their bills.

The 17th annual *Energy Efficiency Week* ran from September 22 to 28, 2025, highlighting the importance of energy efficiency to utility customers. The week focused on giving customers the information they need to understand their electricity usage and to help save energy and money. Customers had the opportunity to connect with TakeCharge energy experts at retail locations island-wide and participate in an energy-efficiency webinar. Additionally, the week featured municipal proclamations of *Energy Efficiency Week* and three media spots including the NTV Evening News First Edition, VOCM, and Coast.

TakeCharge celebrated its 12th *Business Efficiency Week* from October 20 to 26, 2025. The week focused on opportunities for saving energy for non-residential customers such as businesses, municipalities and not for profit organizations. Customers had the opportunity to connect with TakeCharge energy experts at local electrical distributor pop-up events and business industry tradeshows.

Customers continued to rely on TakeChargeNL.ca as a resource for energy savings solutions and program details. The website received over 621,000 visits in 2025, an increase of more than 9% from the previous year.

¹⁵ Thinkwell Research + Strategy is an Atlantic Canadian firm specializing in market research.

Using a tool available through the Benchmarking program, Newfoundland Power launched usage alerts in December 2025. The alerts aim to make customers aware when weather will impact their next bill. The tool analyzes the customer's previous bill and based on weather forecasts, creates an estimate of the customer's next bill. If the estimate predicts a 30% or higher increase from one bill to the next, customers will receive an email alert advising them that weather is likely to increase the amount of their next bill. Customers can then click through areas of the alert to find energy saving tips to help them manage their energy usage.

TakeCharge was recognized with the Award of Merit in the "Special Events" category for its 15 Year Anniversary campaign at the 2025 Pinnacle International Association of Business Communicators ("IABC") awards ceremony. The IABC awards celebrate excellence in communicators across the province who demonstrate exceptional creativity and leadership in delivering work that will leave a lasting impact on communities and beyond.

TakeCharge received an ICE Award in 2025 for its marketing campaigns. Organized by Atlantic Business Magazine, the ICE Awards celebrate creative excellence across Atlantic Canada.

3.2 Community Outreach

The TakeCharge team raises awareness of energy conservation and CDM programs through a variety of community and outreach activities.

TakeCharge participated in 40 external events and completed 23 external presentations throughout 2025, providing an opportunity to connect directly with customers. Some of the key events included the Canadian Home Builders Association of Newfoundland and Labrador's *Home Show*, the *Downhome Expo*, the Municipalities Newfoundland and Labrador annual Conference and Municipal Symposium, City of St. John's annual *Senior's Day*, the econext Annual Conference and the Annual Hospitality Newfoundland and Labrador Conference. Presentations were delivered to a variety of audiences including customers at three *Business Energy Forums* hosted by Newfoundland Power in Paradise, Grand Falls-Windsor and Stephenville. Other presentations were delivered to groups such as the Building Owners and Managers Association of Newfoundland and Labrador, Association for New Canadians, Royal Bank of Canada clients, and at the Canadian Home Builders Association of Newfoundland and Labrador *Housing Forum*. TakeCharge continues to search for opportunities to meet customers where they are and focus where possible on groups potentially more vulnerable to cost increases like seniors, customers with low to moderate incomes and new Canadians.

Newfoundland Power educated students on energy conservation through the TakeCharge school program. The program offers presentations for Kindergarten to Grade 6 students and contests that promote energy-efficient behaviours for primary, elementary and high school students. In 2025, TakeCharge completed 51 presentations across 16 schools, reaching over 1,600 students.

The Energy Source, an e-mail newsletter aimed at providing customers and partners with the latest information on rebates, energy-saving tips and events, grew its subscriber base to 13,565 customers in 2025, a 69% increase compared to 2024. In 2025, four residential newsletters and

one business/partner newsletter were sent to customers. Open rates for these emails ranged from 26.5% to 33%, with average click rates well above industry average at 7.5%.¹⁶

The 2025 *TakeCharge of Your Town Challenge* received 37 proposals from municipalities for energy-efficient upgrades within their communities. The Town of Trinity Bay North was awarded \$10,000 to install mini-split heat pumps in the municipal hall, increasing energy efficiency while supporting the continued delivery of municipal services and providing residents with a comfortable meeting space.

As part of funding received from Natural Resources Canada, TakeCharge sponsored and participated in a webinar about electrifying medium- and heavy-duty vehicles. The webinar targeted fleet operators, municipal leaders, construction companies, and engineering firms seeking to navigate the complexities of electrifying both on-road and off-road equipment.

3.3 Trade Allies and Partners

In October 2025, TakeCharge hosted the seventh *Luminary Awards*. The *Luminary Awards* recognize companies, organizations, communities and individuals across Newfoundland and Labrador that are taking steps to use energy wisely, and inspiring others to do the same. This year, 13 awards were distributed in seven different categories.¹⁷

Newfoundland Power continued administering the Oil to Electric rebate program for its customers on behalf of the Federal and Provincial governments in 2025. The program aims to reduce greenhouse gas (“GHG”) emissions by removing oil heating sources from homes by providing rebates for various electric heating systems, including enhanced rebates for customers installing heat pumps and those with low to moderate incomes. Administering this program allows Newfoundland Power to obtain valuable information on where oil to electric heating conversions are happening on the grid, and more accurately forecast load impacts from fuel switching. Additionally, TakeCharge can identify participants of the Oil to Electric program who may now be eligible for other offerings, enabling cross-promotion of programs such as the TakeCharge Insulation and Air Sealing program. TakeCharge emails all customers after they have converted from oil to electric to make the customer aware of increases in their electricity bill due to the switch and to promote the Equal Payment Plan for better bill predictability. Participants that meet income eligibility requirements are automatically enrolled in the Energy Savers Kits Program.

¹⁶ The average click rate for other companies using the same e-mail platform, MailChimp, is 2.62%.

¹⁷ Awards were provided in the categories of “Community Impact Award”, “Leadership Award”, “Innovation Award”, “Partnership Award”, “Sustained Excellence Award”, “Electric Vehicle Awareness Award”, and the “BIG Award”. Award winners can be found on the [TakeCharge website](#).

4.0 Electric Vehicle Charging Network

In Order No. P.U. 30 (2021), Newfoundland Power’s proposed supplemental 2021 capital expenditure for the deployment of 10 EV charging stations was approved. Each of these stations contains a 62.5 kW direct current fast charger (“DCFC”) and a 7.2 kW Level 2 charger.

Table 4 shows the number of sessions, the energy usage and revenue from each Newfoundland Power owned public EV charging station for 2025, which experienced a growth in the number of charging station sessions of approximately 15%.¹⁸ The chargers listed in Table 4 had a reported uptime or availability of 99.4% in 2025.

**Table 4:
Electric Vehicle Charging Stations Statistics
2025**

| Charger Locations | Number of Sessions | Energy Usage (kWh) | Revenue (\$) |
|--------------------------|---------------------------|---------------------------|---------------------|
| Paradise | 2,443 | 70,272 | \$22,383 |
| Carbonear | 715 | 18,389 | \$5,837 |
| Marystown | 363 | 10,604 | \$3,648 |
| Robinsons | 318 | 7,014 | \$2,127 |
| Port Rexton | 281 | 7,850 | \$2,535 |
| Lewisporte | 257 | 6,757 | \$2,223 |
| Bonavista | 238 | 6,803 | \$2,099 |
| Fermeuse | 106 | 1,847 | \$719 |
| Trepassey | 62 | 1,222 | \$449 |
| St. Mary’s | 55 | 967 | \$320 |
| Total | 4,838 | 131,724 | \$42,341 |

5.0 CDM Costs

Table 5 on the following page summarizes Newfoundland Power’s CDM related costs from 2021 to 2025.

¹⁸ There were 4,211 charging sessions in 2024. $(4,838-4,211)/4,211=14.9\%$.

**Table 5:
Newfoundland Power
CDME Costs
(\$000s)**

| | 2021 | 2022 | 2023 | 2024 | 2025 |
|--|---------------------|---------------------|---------------------|---------------------|---------------------|
| General Costs | | | | | |
| Customer Education and Support ¹⁹ | 489 | 527 | 639 | 537 | 678 |
| Planning ²⁰ | <u>262</u> | <u>331</u> | <u>804</u> | <u>734</u> | <u>413</u> |
| Total General Costs | 751 | 858 | 1,443 | 1,271 | 1,091 |
| Program Costs | | | | | |
| Insulation and Air Sealing Program ²¹ | 1,176 | 1,350 | 1,500 | 2,296 | 2,322 |
| Thermostat Program ²² | 294 | 146 | 57 | 0 | 0 |
| HRV Program | 205 | 229 | 214 | 271 | 266 |
| Benchmarking Program ²³ | 974 | 986 | 1,122 | 798 | 920 |
| Instant Rebates Program ²⁴ | 1,020 | 959 | 927 | 0 | 0 |
| Energy Savers Kit Program | 103 | 288 | 370 | 323 | 570 |
| Business Efficiency Program | <u>1,035</u> | <u>938</u> | <u>1,259</u> | <u>1,317</u> | <u>1,157</u> |
| Total Program Costs | 4,807 | 4,896 | 5,449 | 5,005 | 5,235 |
| Capital Costs | | | | | |
| CDM Capital Expenditures ²⁵ | 41 | 72 | 61 | 64 | 75 |
| EV Charging Network ²⁶ | = | <u>1,481</u> | = | = | = |
| Total Capital Costs | 41 | 1,553 | 61 | 64 | 75 |
| Other Costs | | | | | |
| EV Load Management Pilot | | | 242 | 423 | 232 |
| EV Charging Network ²⁷ | - | 28 | 99 | 49 | 84 |
| Curtaillable Service Option | <u>403</u> | <u>408</u> | <u>432</u> | <u>446</u> | <u>400</u> |
| Total Other Costs | 403 | 436 | 773 | 918 | 716 |
| Total Costs | <u>6,002</u> | <u>7,743</u> | <u>7,726</u> | <u>7,258</u> | <u>7,117</u> |

¹⁹ Costs are shown net of approximately \$48,000 in funding received from Natural Resources Canada in 2022, \$69,000 in 2023, \$105,000 in 2024 and \$48,290 in 2025 associated with EV education and awareness activities.

²⁰ Costs in 2023 reflect the completion of end use surveys, the start of the Potential Study, the Small Business Direct Install program and conclusion of the Heat Pump Study. Costs in 2024 are associated with the Potential Study and next CDME plan. Planning costs in 2025 are associated with the CDME plan and Mysa Thermostat Pilot.

²¹ Cost increases after 2023 reflect an increase in the attic insulation rebate amount and the All-In Attic Insulation Pilot.

²² Thermostat Program costs decreased in 2022 due to lower participation. Costs in 2023 reflect the close out of the program.

²³ Benchmarking expenses in 2023 include a one-time upgrade fee of \$250,000 for the vendors updated platform.

²⁴ Instant Rebates Program ended in 2023.

²⁵ Capital expenditures are associated with improvements to the TakeCharge website and the Company's tracking systems. Variations are based upon requirements for new and concluding programs.

²⁶ 2022 costs are shown net of \$550,000 in funding received from Natural Resources Canada for charging stations.

²⁷ Costs related to the operation and maintenance of the EV Charging Network. Costs in 2023 represent the first full year of Charging Network operation and include pre-paying of network fees for the next 5 years with a cost savings of \$11,000. Costs in 2025 represent warranty and parts agreement.

6.0 Outlook

Newfoundland Power understands the concerns customers have about their electricity bills, especially during colder months when energy bills are at their highest. Through the TakeCharge partnership, Newfoundland Power offers programs and education to help customers save energy and money. Programs and education are essential tools to help customers address their energy usage and reduce their energy bill. Newfoundland Power will continue to provide CDM programs and provide education to help customers in 2026 and beyond. The Company will continue to evaluate and monitor existing programs to ensure they continue to offer cost-effective energy savings for customers. The Company will continue to engage with customers, trade allies, stakeholders, and partners to modify TakeCharge programs and educational initiatives, making sure they continue to reliably lower both system demand and customer bills as needs evolve. This includes continuation of community outreach events, reviewing existing customer programs, and implementing new initiatives to help customers.

From the framework provided by the Potential Study, the Utilities developed a Conservation, Demand Management and Electrification Plan for the IIS for the years 2026 to 2030 (the “2026 Plan”). The 2026 Plan will continue to align TakeCharge offerings with demand side management best practices in Canada and the United States. All existing TakeCharge energy efficiency programs will continue throughout the 2026 Plan, and the Utilities will expand programming for income-qualified customers. All programs are forecast to pass the TRC and PAC tests.

In addition, the Utilities will continue to improve understanding of load flexibility potential on the IIS. This includes assessing the effectiveness of load management initiatives such as the Mysa Thermostat Pilot program for electric baseboard heaters and the recently concluded evaluation of the EV Load Management Pilot. The findings of these types of studies provide valuable information regarding the challenges and opportunities associated with managing load on the IIS. Recognizing that factors influencing EV adoption have recently changed significantly, the Utilities will continue to monitor EV adoption and load management technology into the future to identify potential and prepare for widespread adoption of EVs.

TakeCharge Program Descriptions and Results

1.0 Introduction

The tables in this Appendix provide details of customer participation levels, savings results achieved and the levelized utility cost (“LUC”) for each CDM program for 2025 and since implementation.¹ The TRC and PAC test results for 2025 are based upon forecast marginal costs of energy and capacity.²

The estimated annual energy and peak demand savings in each year represent the savings resulting from participants in that year. The estimated life to date energy and peak demand savings reflect the energy savings associated with energy-saving technologies that have been installed by all participants in the program. These savings will continue to occur each year for the life of the installed measures.

2.0 Residential Programs

2.1 *Insulation and Air Sealing Program*

The objective of the Insulation Program is to provide incentives to increase the insulation R-value in residential basements, crawl spaces and attics, thereby increasing the efficiency of the homes’ building envelope. Eligibility for the program is limited to electrically heated homes, determined based on annual energy usage and homes built before January 1, 2014. Home retrofit projects are eligible. Customers can receive an incentive of 75% of basement wall or ceiling insulation material costs up to \$1,000, and 75% of attic insulation material costs up to \$1,000. In 2025, the program expanded its rebate offering to include labour costs up to \$500 for basement wall or ceiling insulation installations and labour costs up to \$500 for attic insulation installation. The rebate expansion removes financial barriers for customers who may not have the knowledge or the ability to complete insulation upgrade projects on their own.

In 2022 the insulation program was expanded to include insulation for heating ducts in unconditioned spaces, as well as an air sealing component. Customers applying for duct insulation can receive an incentive of 50% of their material costs up to \$500, and air sealing customers can receive an incentive of up to \$500 depending on the results of their pre-and post-air sealing assessments.

¹ The LUC represents the economic cost to the utility (per kWh) to save energy considering only utility program costs (i.e. program development, marketing, incentives and administration costs), not customer costs.

² The TRC test accounts for customer costs and benefits, whereas the PAC test accounts for costs and benefits incurred by the utility only.

Table A-1 shows the customer participation levels, savings results achieved, and the LUC for the Insulation and Air Sealing Program for 2025 and since implementation.

**Table A-1:
Insulation and Air Sealing Program Results**

| | Customer Participation | Energy Savings (MWh) | Peak Demand Savings (kW) | LUC (¢/kWh) |
|---------------------------------|-------------------------------|-----------------------------|---------------------------------|--------------------|
| 2025 | 853 | 2,340 | 1,625 | 7.7 |
| Life to Date³ | 21,332 | 60,335 | 25,744 | 3.4 |

2025 TRC Result: 3.2

2025 PAC Result: 3.3

2.2 Heat Recovery Ventilator (“HRV”) Program

The HRV Program encourages customers to purchase a high efficiency HRV to improve the efficiency of their home. Eligible measures in this program include HRV models that have a sensible recovery efficiency of 70% or more. Customers who purchase a high efficiency HRV can receive a rebate of \$225.⁴ All customers are eligible for this program regardless of the age of their home or heat source.

Table A-2 shows the customer participation levels, savings results achieved, and the LUC for the HRV Program for 2025 and since implementation.

**Table A-2:
HRV Program Results**

| | Customer Participation | Energy Savings (MWh) | Peak Demand Savings (kW) | LUC (¢/kWh) |
|---------------------|-------------------------------|-----------------------------|---------------------------------|--------------------|
| 2025 | 567 | 310 | 96 | 8.3 |
| Life to Date | 5,744 | 3,167 | 986 | 7.7 |

2025 TRC Result: 1.4

2025 PAC Result: 1.8

³ “Life to Date” represents the program results since the launch of the program.

⁴ The rebate amount increased from \$175 in 2025 to address the increased cost of qualifying HRVs.

2.3 Benchmarking Program

The Benchmarking Program encourages customers to adopt energy-efficient behavioural changes. Participants receive home energy reports that provide insight into their home's electricity use. The reports help customers understand changes in their usage over time, as well as how they compare to similar homes. Reports also include practical tips on how to save energy moving forward. The program includes an online portal component that allows customers to engage even further through weekly challenges and personalized savings plans.

Customers were randomly selected as participants in this program. Program participants broadly reflect the composition of Newfoundland Power's customer base in heating type and geographic distribution. No financial incentive is offered for this program.

Table A-3 shows the customer participation levels, savings results achieved, and the LUC for the Benchmarking Program for 2025 and since implementation.

**Table A-3:
Benchmarking Program Results**

| | Customer Participation | Energy Savings (MWh) | Peak Demand Savings (kW) | LUC (¢/kWh) |
|---------------------------------|-----------------------------------|---------------------------------|---|------------------------|
| 2025 | 124,332 | 15,763 | 10,090 | 5.8 |
| Life to Date⁵ | 124,332 | 15,763 | 10,090 | 6.1 ⁶ |

2025 TRC Result: 5.0

2025 PAC Result: 5.0

⁵ Due to the nature of customer behavioural changes, benchmarking savings are assumed for one year only.

⁶ While Benchmarking Program savings are claimed for one year, the LUC for the life of program is derived considering the average of savings and program costs in all years the program has been offered.

2.4 Energy Savers Kit Program

The Energy Savers Kit Program provides free energy efficiency kits to income qualified customers. Customers are qualified based upon their net income and the number of people living in the household. Qualifying customers receive a kit with specific contents depending on whether they heat their home with electricity or not.⁷ Customers who install all products in their kit may see energy savings of up to \$100 per year.

Table A-4 shows the customer participation levels, savings results achieved, and the LUC for the Energy Savings Kit Program for 2025 and since implementation.

**Table A-4:
Energy Savers Kit Program Results**

| | Customer Participation | Energy Savings (MWh) | Peak Demand Savings (kW) | LUC (¢/kWh) |
|---------------------|-------------------------------|-----------------------------|---------------------------------|--------------------|
| 2025 | 5,083 | 4,607 | 1,254 | 2.6 |
| Life to Date | 12,568 | 9,904 | 1,964 | 3.1 |

2025 TRC Result: 4.7

2025 PAC Result: 4.7

⁷ Customers who do not have electric heat do not receive the kit contents such as weatherproofing items that will decrease their space heating costs. They do receive items such as LED bulbs and showerheads to reduce their electricity costs for these end uses.

3.0 Commercial TakeCharge Programs

3.1 Business Efficiency Program

The objective of the Business Efficiency Program is to improve electrical energy efficiency in a variety of commercial facilities and equipment types. Program components include financial incentives based on energy savings, and other financial and educational supports to enable commercial facility owners to identify and implement energy efficiency and demand reduction projects. This program is available for existing commercial facilities that can save energy or reduce demand by installing more efficient equipment and systems. The program includes custom project incentives and rebates for specific measures on a per unit basis.

Table A-5 shows the customer participation levels, savings results achieved, and the LUC for the Business Efficiency Program for 2025 and since implementation.

**Table A-5:
Business Efficiency Program Results**

| | Customer Participation | Energy Savings (MWh) | Peak Demand Savings (kW) | LUC (¢/kWh) |
|---------------------|-----------------------------------|---------------------------------|---|------------------------|
| 2025 | 142 | 3,118 | 499 | 4.9 |
| Life to Date | 4,032 | 58,606 | 10,288 | 3.1 |

2025 TRC Result: 1.2

2025 PAC Result: 2.0

4.0 Total Results of TakeCharge Programs

Table A-6 shows the participation levels, savings results achieved, and the LUC for all of the programs for 2025 and since implementation.⁸

**Table A-6:
TakeCharge Programs
Total Results**

| | Customer Participation | At-the-Cash Rebates | Energy Savings (MWh) | Peak Demand Savings (kW) | LUC (¢/kWh) | Provincial LUC (¢/kWh)⁹ |
|---------------------|-----------------------------------|--------------------------------|-------------------------------------|---|------------------------|---|
| 2025 | 130,977 | 0 | 26,138 | 13,564 | 5.3 | 5.7 |
| Life to Date | 204,106 ¹⁰ | 4,114,014 | 258,186 | 74,228 | 3.4 | 3.5 |

Table A-7 shows the TRC and PAC test results for Newfoundland Power's residential and commercial portfolios, along with the provincial portfolio, which includes Hydro's IIS costs and energy savings.

**Table A-7:
TakeCharge Programs
TRC and PAC Test Results
(2025)**

| | TRC Result | PAC Result |
|------------------------------|-------------------|-------------------|
| Residential Portfolio | 3.7 | 3.8 |
| Commercial Portfolio | 1.2 | 2.0 |
| Provincial Portfolio | 2.8 | 3.2 |

⁸ Life to date numbers reflect the impacts of programs that have previously ended but the savings from those programs continue. This includes the ENERGY STAR Windows program (8,905 participants, 9,934 MWh and 3,106 kW), the Thermostat Program (28,810 participants, 24,924 MWh and 3,400 kW), and the Small Technologies Program (7,288 participants, 75,553 MWh and 18,650 kW).

⁹ Provincial LUC represents the combined cost and energy savings of the Utilities' Island Interconnected CDM program offerings.

¹⁰ Prior years' participants in the Benchmarking Program are not included in this number.

TakeCharge Electric Vehicle Load Management Pilot Evaluation Report

Newfoundland Power takeCHARGE EV Load Management Pilot 2025 Evaluation Report

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Executive Summary

Newfoundland Power's takeCHARGE Electric Vehicle (EV) Load Management Pilot (the Pilot), implemented through Uplight's EV load management platform, seeks to understand the existing charging habits of local EV drivers and determine the potential for shifting charging loads to off-peak periods. Newfoundland Power engaged Guidehouse Inc. (Guidehouse) to evaluate the Year 2 demand impacts associated with different load management strategies, and to conduct analysis on the participant survey results.

Guidehouse's evaluation had the following objectives:

1. Characterize baseline charging behaviour for local EV drivers, i.e., develop charging load shapes in absence of any load management.
2. Quantify and compare the impacts of two different load management strategies – one active and one passive treatment.
3. Provide input and conduct analysis on a participation survey conducted by Newfoundland Power to understand participant satisfaction, charging behaviour, and future interest in a load management program.

Pilot Description

The takeCHARGE EV Load Management Pilot comprised 3 participant groups, developed by Newfoundland Power, to meet its research objectives:

- **Peak Events:** The active demand response (ADR) treatment, or active management treatment, involved discrete demand response (DR) events called during the winter season. Events were called between December 1, 2024 and March 31, 2025.
- **Off-Peak Charging:** The behavioural demand response (BDR) or passive management treatment, where participants were asked not to charge during peak hours. Participants were notified to modify their charging behaviour between December 1, 2024 and March 31, 2025.
- **Monitor:** The control group to inform baseline charging behaviour, where participants were not subject to any treatment. For the purposes of evaluation, data was collected between December 1, 2024 and March 31, 2025.

Methodology

Guidehouse provided recommendations to Newfoundland Power in Year 1 of the Pilot for randomized assignments for each participant group based on analysis of participant demographic data. In Year 2, the new enrollments for EVSE were assigned to the Peak Events group, and the new enrollments for vehicle telematics (VT) were randomly assigned to the 3 groups based on compatibility. The purpose of randomization was to minimize unobserved differences between groups and to enable the use of the Monitor group to develop baseline behaviour and estimate the impact of each treatment. The Year 1 guidelines continued to inform customer recruitment into the Pilot for Year 2.

To estimate impacts, Guidehouse performed an analysis of data provided by Uplight and Newfoundland Power, including: charging telemetry data; event dispatch data, and program enrollment. Our analysis included development of baseline charging load shapes (e.g. PHEV vs BEV) for the Monitor group, regression analysis to determine hourly demand impacts for each treatment, and estimation of program benefits based on average demand impacts during peak periods and the marginal avoided cost of capacity.

Results

A total of 171 devices (BEV + PHEV) with data were enrolled at the end of the Pilot period as of March 31, 2025, as shown in Table ES-1. Most participants had battery electric vehicles (BEVs), while 17 had plug-in hybrid vehicles (PHEVs). Six devices had data collected but were unenrolled at the end of the Pilot period. 11 devices were enrolled that did not have data collected in the Pilot. These enrollment numbers were close to the program target of 200 participants and were primarily driven by substantial increase in Year 2 enrollment in the Pilot.

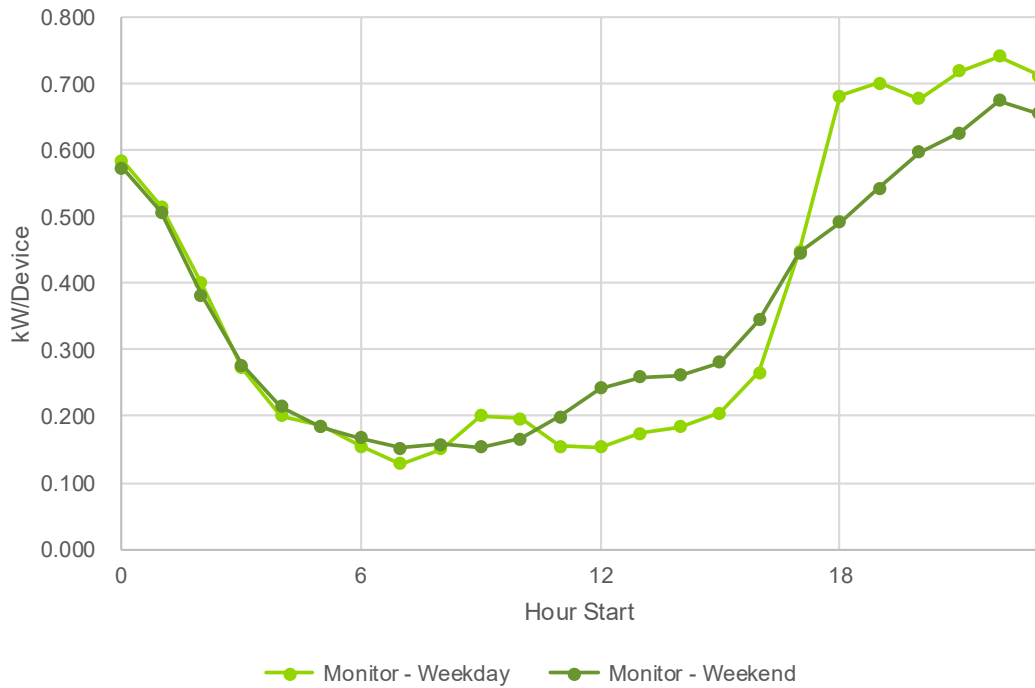
Table ES-1: Enrollment by Pilot Group

| Pilot Group | BEV | PHEV | Unenrolled |
|-------------------|------------|-----------|------------|
| Monitor – VT | 38 | 15 | 0 |
| Monitor – EVSE | 1 | 2 | 0 |
| Off-Peak Charging | 51 | 0 | 0 |
| Peak Events - VT | 16 | 0 | 0 |
| Peak Events- EVSE | 48 | 0 | 0 |
| Unenrolled | 0 | 0 | 6 |
| Total | 154 | 17 | 6 |

Source: Guidehouse

Guidehouse's analysis of the Monitor group shows that charging load ramps up when participants are expected to be arriving home from work. This pattern is illustrated in Figure ES-1, where there is clearly more observed daytime charging on weekends compared with weekdays. The average observed per device charging load was 0.159 kW from 6 AM to 10 AM, and 0.584 kW from 4 PM to 11 PM across all days, with a peak hourly load of approximately 0.73 kW in the evening. This result combined with the fact that many participants had Level 2 chargers, suggests that not all vehicles are expected to be charging every day.

Figure ES-1: Baseline Charging Load Shape for Weekdays and Weekends



Source: Guidehouse

Peak Events impacts, listed in Table ES-2, varied in event length and duration, but statistically significant impacts were estimated for most event times, producing results of up to 0.46 kW per device for an event called between 7 PM and 11 PM. Event times were grouped together by the start and end hour of the event. The variance in observed impacts is likely attributable to the high number of dispatch failures and technical and operational issues experienced during the season (e.g. events not being dispatched correctly).

Table ES-2: Peak Events (ADR) Impacts by Event Time

| Event Time | Number of Events | Savings Per Device (kW) | Margin of Error (kW) (90% Confidence Interval) | Relative Precision +/-% (90% Confidence) |
|--------------|------------------|-------------------------|--|--|
| 5 PM - 8 PM | 1 | 0.05 | 0.37 | 777% |
| 5 PM - 9 PM | 11 | 0.25 | 0.13 | 52% |
| 5 PM - 10 PM | 9 | 0.37 | 0.12 | 33% |
| 6 PM - 10 PM | 13 | 0.41 | 0.09 | 23% |
| 7 PM - 11 PM | 11 | 0.46 | 0.13 | 28% |
| 6 AM - 10 AM | 7 | 0.06 | 0.05 | 84% |
| 7 AM - 10 AM | 1 | 0.10 | 0.08 | 89% |

Note: A positive savings value indicates that average load was curtailed during the event. A margin of error greater in magnitude than the savings value indicates that the impact estimate is not statistically different than zero.

Source: Guidehouse

There were several technical and operational issues encountered in the second year of the Pilot that affected observed results, dispatch reliability, and participant satisfaction. The issues should be taken into account when interpreting the results of the Pilot. These issues included: difficulty enrolling customers; failed event dispatches (lack of reliability in pausing charging); and data collection issues from vehicles and chargers. Resolution of these issues would be necessary to support potential further development an EV load management program.

Estimated impacts for the Off-Peak Charging treatment are listed in Table ES-3. This treatment showed a clear impact of shifting load from the evening to overnight periods. Guidehouse estimated savings of 0.37 kW per device during the evening peak period (4 PM to 11 PM) and an increase of 0.50 kW per device during the overnight off-peak period (11 PM to 6 AM). This represented a 75% decrease in peak load for the evening peak period, and a 123% increase in peak load for the overnight off-peak. No statistically significant impacts were observed between the period from 6 AM to 10 AM. This may be attributed to the similar demand load shape during the morning peak of the control and treatment groups, in part because most charging takes place in either the evening peak period or morning off-peak period.

Table ES-3: Off-Peak Charging (BDR) Event Impacts by Event Hours and Day Type

| Event | Event Hours | Day Type | Savings Per Device (kW) | Margin of Error (kW) (90% Confidence Interval) | Relative Precision +/-% (90% Confidence) |
|--------------------|--------------|----------|-------------------------|--|--|
| Morning Peak | 6 AM - 10 AM | All | -0.01 | 0.03 | 332% |
| Evening Peak | 4 PM - 11 PM | All | 0.37 | 0.02 | 6% |
| Morning Off-Peak | 11 PM - 6 AM | All | -0.50 | 0.02 | 4% |
| Afternoon Off-Peak | 10 AM - 4 PM | All | 0.07 | 0.02 | 31% |

Source: Guidehouse

Guidehouse estimated program benefits for the Pilot in terms of avoided cost of capacity associated with demand impacts, using a value provided by Newfoundland Power of \$356.07 / kW-year. This value includes the avoided cost of generation, transmission, and distribution. Impacts are reported for each treatment in each peak period (6 AM to 10 AM and 4 PM to 11 PM) in Table ES-4 and Table ES-5. These estimates represent the potential program benefits associated with each device (vehicle or EVSE) for different definitions of system peak, i.e., in different cases where system peak would coincide with the treatment period. The benefits estimated for the Peak Events group reflect the estimated impacts for all events that were called during peak periods, rather than a specific event time.

Table ES-4: Program Benefits for Peak Events (ADR)

| Peak Period | Savings Per Device (kW) | Avoided Cost of Capacity Per Device (\$/year) |
|--------------|-------------------------|---|
| 6 AM - 10 AM | 0.08 | \$27.03 |
| 4 PM - 11 PM | 0.32 | \$114.81 |

Note: These savings represent the average of hourly impacts for all events that were called during these time periods, and therefore do not represent the impact of any one type of event that was called.

Source: Guidehouse

Table ES-5: Program Benefits for Off-Peak Charging (BDR)

| Peak Period | Day Type | Savings Per Device (kW) | Avoided Cost of Capacity Per Device (\$/year) |
|--------------|----------|-------------------------|---|
| 6 AM – 10 AM | All | -0.01 | -\$3.07 |
| 4 PM - 11 PM | All | 0.37 | \$131.76 |

Source: Guidehouse

A participant survey was conducted by Newfoundland Power and the analysis was conducted by Guidehouse. The survey had a high response rate of 51%. Respondents of the survey were generally satisfied with the pilot charging platform and program communication. Dissatisfaction due to the charging platform was caused by Hyundai’s BlueLink issues and Optiwatt App incompatibility¹. The Pilot influenced respondents’ charging schedules to avoid peak periods but did not change whether they charged at home or at work. The majority of respondents indicated interest in participating in future EV load management programs and most respondents would participate in future programs for an annual incentive amount of \$75.

Conclusions

Guidehouse’s evaluation of the Pilot yielded evidence of load shifting for both treatments and demonstrated the potential benefits of an EV managed charging program. The development of the Pilot also provided Newfoundland Power with valuable information regarding the issues associated with implementation of different types of treatment (e.g. passive vs active, vehicle telemetry vs EVSE) to inform future program design. The key conclusions from Guidehouse’s evaluation are as follows:

- Both active and passive load management strategies show evidence of successful load curtailment.** The passive treatment group curtailed their load in the evening peak period, with an average reduction of charging demand between 4 PM and 11 PM of 0.37 ± 0.02 kW/device. Active events resulted in an average reduction of charging demand of up to 0.46 kW/device (events called between 7 PM and 11 PM).
- Load was generally shifted from the evening period to overnight.** This result aligns with the prediction that both treatments delay charging when participants return home and plug in their vehicles. The morning peak period (6 AM to 10 AM) shows less potential for load reduction, as participants do not typically charge their vehicles in the morning, even without any treatment.
- EV managed charging provides system benefits in the form of avoided cost of capacity.** The exact potential benefits will vary depending on how treatments are ultimately used to target system peak, and how the system peak coincides with the treatment period. Guidehouse estimated the potential range of benefits based on average curtailment during peak periods. For example, in the morning peak period (6 AM to 10 AM) Guidehouse estimated the benefit to be \$27.03 / device for Peak Events.

¹ Hyundai Bluelink forced users to update login credentials while users were participating in the pilot program, causing multiple unsuccessful login attempts by Optiwatt’s API causing users to be locked out of the Hyundai’s BlueLink App. App incompatibility was due to the vendor (Uplight’s Optiwatt) app not being compatible with the Tesla software, resulting in the Optiwatt app overriding the Tesla charging schedule. There were time variances between the charging session start and stop times for the OEM app and Optiwatt app.

For the evening peak period (4 PM to 11 PM), benefits were estimated to be \$131.76 / device for the Off-Peak Charging treatment, and \$114.81 / device for Peak Events.

- **The Off-Peak Charging group demonstrated persistent load shifting behaviour after the Winter 2023/2024 season.** The data from September 2024 to November 2024 showed persistence of some savings during the shoulder season months, which suggests the treatment is still effective in the off-season, absent a direct monthly incentive.
- **Technical and operational challenges reduced program impacts and may be a barrier to future scaling of the program.** For example, there were challenges with customer enrollment and successfully dispatching events with the Uplight platform in Year 2. These types of challenges appeared to have less effect on the passive treatment, which relies more on participants' own behavioural changes rather than the Uplight platform.
- **Year 2 of the Pilot provided additional data and improved certainty of impact estimates.** Increased enrollment in Year 2 of the Pilot provided more data and consolidating the event times for the Peak Events group provided more certain estimates for the Peak Events group compared to Year 1.
- **Survey results suggest that the Pilot was successful in influencing when participants charge, but likely not where they charge.** Survey respondents did not change whether they charge at home or at work, but they did change their charging schedules to avoid peak periods.
- **Participants were generally satisfied with the Pilot charging platform and program communication.** The frequency and method of communication were effective for respondents. Dissatisfaction related to the charging platform was due to Hyundai's BlueLink App issues and Optiwatt App incompatibility.
- **The majority of participants are interested in participating in future EV load management programs.** When respondents were asked for the minimum annual incentive amount that would make them interested in participating, a plurality of respondents said they would desire an annual incentive of up to \$100. However, respondents may be overstating their minimum requirement, and could be biased towards selecting the highest incentive amount provided in the survey. In another survey question, when asked if they would be interested in participating in future programs for a \$75 annual reward, 80% of respondents said they would be.

Guidehouse provides the following recommendations for Newfoundland Power to inform future program delivery and evaluation.

- **Consider the Off-Peak Charging treatment as a relatively lower complexity option to provide consistent load shift compared with other options.** Based on evaluation of the 2025 season, this passive treatment showed very clear load shifting potential, with fewer technical requirements (e.g. no discrete event dispatch, fewer platform challenges associated with failed events, equipment incompatibilities). Newfoundland Power may consider whether this strategy would meet their long-term demand side management needs, or whether active solutions provide enough incremental benefit to warrant their additional complexity. Newfoundland Power may want to consider using the strategy that presents fewer challenges in implementation.

- **A future program informed by the Pilot would need to consider the program benefits.** The results from Year 2 of the Pilot indicate that the Off-Peak Charging provides the highest potential program benefits if the system peak is in the evening, and the Off-Peak Charging treatment also has less operational challenges compared to the Peak Events treatment. The Peak Events program potential benefits are low due to high number of dispatch failures. The program benefits for the Peak Events may be higher than the Off-Peak Charging treatment if there was more successful participation in events. In addition, the Peak Events treatment can be more flexibly controlled to target specific system peak windows, to offer potentially more system benefits. However, this treatment would still have higher complexity than running a program based on passive treatment.
- **Consider addressing the technical challenges of the managed charging platform prior to further roll out of a full program.** The key challenges to address include: simplifying and improving the enrollment process to get more compatible drivers enrolled in the program; improving reliability in curtailing charging for the Peak Events group throughout the entire duration of the event; and addressing challenges in collecting reliable data.
- **Re-enroll the remaining Smartcar participants with Optiwatt.** The Smartcar data continues to have the data issue of being unable to isolate home charging data. By re-enrolling the remaining Smartcar participants with Optiwatt, this would provide both more granular vehicle telematics data, but also the ability to resolve the remaining issue of isolating home charging data. This would improve the quality of determining passive opt-outs, and improve the accuracy of the load shapes.
- **Clarify the opt-out and incentive process for participants.** During the Pilot, many survey respondents stated that they were unsure when to charge and not charge and when they would be eligible for incentives.
- **Address privacy and data security concerns and software malfunction/incompatibility issues prior to the next EV load management program.** Respondents still had concerns regarding their data security and software malfunction after the Pilot, Newfoundland Power could work to address these concerns to the extent feasible.

1. Introduction

Newfoundland Power designed the takeCHARGE Electric Vehicle (EV) Load Management Pilot (the Pilot), to understand the existing charging habits of local EV drivers and determine the potential for shifting charging loads to off-peak periods. Newfoundland Power also conducted a survey on participant satisfaction of the Pilot. The Pilot is implemented through Uplight's EV load management platform, which enables collection of charging telemetry data from both vehicles and electric vehicle supply equipment (EVSE), as well as control of charging to call demand response (DR) events. Newfoundland Power engaged Guidehouse Inc. (Guidehouse) to evaluate the Year 2 demand impacts associated with different load management strategies, and conduct analysis on the participant survey results. This report describes the methods and results of Guidehouse's evaluation.

1.1 Pilot Objectives

Newfoundland Power's goals for the Pilot were:

1. **Quantify Baseline Charging Behaviour.** Understand the potential energy and peak demand impacts of EV growth without active or passive load management.
2. **Test the Benefits of EV Load Management.** Estimate the demand reduction capability of one or more load management approaches, including active or passive techniques.
3. **Understand the Trade-Offs of Different Load Management Strategies.** Assess the challenges associated with different strategies, for example considering the costs of Level 2 smart charger or telematics device deployment.

Towards achieving these goals, Guidehouse's evaluation had the following objectives:

1. Characterize baseline charging behaviour for local EV drivers, i.e., develop charging load shapes in absence of any load management.
2. Quantify and compare the impacts of two different load management strategies – one active and one passive treatment.
3. Provide input and conduct analysis on a participation survey conducted by Newfoundland Power to understand participant satisfaction, charging behaviour, and future interest in a load management program.

1.2 Program Description

The takeCHARGE EV Load Management Pilot comprised 3 participant groups, developed by Newfoundland Power to meet its research objectives:

- **Peak Events:** The active demand response (ADR) treatment, involving discrete DR events. For the purposes of evaluation, this treatment took place with events between December 1, 2024 and March 31, 2025.
- **Off-Peak Charging:** The behavioural demand response (BDR) or Passive Management treatment, where participants were asked not to charge during peak hours. For the

purposes of evaluation, this treatment took place between December 1, 2024 and March 31, 2025 (i.e., when participants were asked to alter their charging behaviour).

- **Monitor:** The control group to inform baseline charging behaviour, where participants were not subject to any treatment. For the purposes of evaluation, data was collected between December 1, 2024 and March 31, 2025.

The participants received up to \$230 in incentives which included a \$150 enrollment incentive, and a \$20 monthly (December – March) participation incentive for the Peak Events and Off-Peak Charging groups, or a \$25 completion incentive for the Monitor group. The participants received an additional re-enrollment incentive to switch from Smartcar to Optiwatt.

1.2.1 Peak Events

Participants in the Peak Events group were monitored and controlled by either EVSE or vehicle telematics (VT), but not both simultaneously. This treatment involved demand response events during which participant charging was curtailed.

Newfoundland Power continuously monitored weather and system conditions to determine when to call events, within the following parameters:

- Between the hours of 6 AM to 10 AM or 4 PM to 11 PM including holidays; events were generally called on weekdays, with some events also called on holidays or weekends as needed.
- The event length varied between 3 to 5 hours.
- Up to 20 events could have been called per month, inclusive of any system load events. The maximum number of events called in a month was 16 in Year 2 of the Pilot.
- Participants received a notification 24 hours before event start (day-ahead notice), and another reminder an hour before the event; however, in the case of system load requirements, such events may have been called with less than 24 hours' notice, including on weekend days. 2 system load events were called in Year 2 of the Pilot.

Newfoundland Power executed events in the Uplight platform (Optiwatt, Flexsaver²), which works as follows:

1. At the start of the event, Uplight's API partners perform checks to confirm whether a vehicle's charging should be curtailed during the event (event eligibility).
 - a. The Smartcar platform performs a location ping to confirm if the participant's EV is within 1,000 ft of their residence and plugged in; the Optiwatt platform similarly checks that a participant's vehicle is within 200 ft of their residence and plugged in. In the case of an EVSE, the API partners check that a vehicle is plugged in.
 - b. The state of charge (SOC) of the vehicle's battery must be above 25% for Smartcar. For Optiwatt participants, the SOC must be above the minimum SOC that the participant selects in the app.

² Flexsaver is the app that participants used if their device had data collected via Smartcar, which only applied to participants enrolled in Year 1 of the Pilot and did not switch to Optiwatt in Year 2 of the Pilot.

2. If these conditions are true, the vehicle's charging is 100% curtailed and the vehicle is not allowed to charge during the event. Otherwise, vehicles (e.g. those below 25% SOC or not at home) are allowed to charge normally with no throttling.
 - a. For VT control, if a participant comes home and/or plugs in their vehicle after the event has started the EV is allowed to charge.
 - b. For VT control, if a participant unplugs their vehicle and plugs it in again during an event, the vehicle is allowed to charge.
 - c. For EVSE control, ChargePoint participants were unable to charge for the duration of the event, regardless of plug behaviour. Wallbox participants were able to charge if they plugged in after the event had started.
3. At the end of the event, all curtailed participants have their charging resume as normal.

These rules existed due to limitations in Uplight's Optiwatt application and was not the preferred behaviour. The preferred behaviour would be to check for event eligibility throughout the entire event, rather than only at the start of the event. It would have also allowed the participant to be able to charge to 25% SOC or their minimum desired SOC, and for the charging curtailment only to occur once that threshold SOC was reached.

Participants that chose to opt-out 3 or more times (3 "strikes") in a given month (including system load events) were not eligible for that month's participation incentive. Generally, opt-outs refer to a participant's decision to not participate when they otherwise could have (via email or text), meaning the following exclusions from events did not count as a strike:

1. Exclusion due to insufficient SOC (<25%) at the start of the event for smartcar participants, and below the drivers' preferred SOC for Optiwatt.
2. Exclusion due to not being at home and/or not plugged in.

1.2.2 Off-Peak Charging

These participants were monitored by VT and received enrollment and monthly participation incentives. For this treatment, participants were asked not to charge during peak hours, 6 AM to 10 AM and 4 PM to 11 PM, 7 days a week. Additional details for this treatment are as follows:

- Participants were reminded bi-weekly to not charge during peak hours, e.g. Monday afternoon at 3 PM.
- Participants were monitored to confirm whether or not a participant charged during peak hours. Charging during peak hours were counted as a "opt-out". Participants could accumulate 2 opt-outs during a month and still receive their monthly participation incentive, i.e., if a participant accumulated 3 or more opt-outs, they were not eligible to receive that month's incentive.

1.2.3 Monitor

These participants were monitored by VT and EVSE and informed baseline consumption used as a comparison for the Peak Events and Off-Peak Charging groups, i.e., were used as a control group. The participants received enrollment and annual completion incentives. Additional details are as follows:

- Participants were instructed to charge as they regularly do (no change in behaviour).
- For each participant, Uplight confirmed that they were connected and able to transmit data. If data was collected, the participant received a completion incentive when the Pilot was completed.

2. Methodology

2.1 Pilot Participation Groups

Guidehouse provided recommendations to Newfoundland Power in Year 1 of the Pilot on participant group selection. The details of this guidance can be found in Appendix A.4. The principles for assigning participants to groups were carried over from Year 1 to Year 2 of the Pilot. Newfoundland Power added new participants in Year 2 to groups, and the targets for the sizes of each group was similar as in Year 1.

Participants were assigned to participant groups based on the type of vehicle telematics. Group assignments were affected by compatibility considerations, as certain models of vehicle were not necessarily eligible for all groups (e.g. vehicles incompatible with VT were only compatible via EVSE). Participants monitored and controlled by an EVSE were assigned to the Peak Events group (45 were added in Year 2, and 3 EVSE participants were assigned to the Monitor group). PHEV participants were assigned to the Monitor group (13 were added in Year 2). All other EV participants controlled and/or monitored by VT were assigned randomly between the Peak Events, Off-Peak Charging and Monitor groups (54 were added in Year 2). There was also an optional re-enrollment to Optiwatt for the Smartcar participants from Year 1 (26 were re-enrolled from Smartcar to Optiwatt).

2.2 Data Collection

For this evaluation, Guidehouse used the following data, received from Uplight and Newfoundland Power.

2.2.1 Vehicle and EVSE Telematics Data

Uplight provided telematics data from different sources depending on the method of control. VT data was provided via the Smartcar and Optiwatt platforms, while EVSE telematics data was provided via the Wallbox and ChargePoint platforms.

- **Vehicle Telematics (Smartcar data):** Telematics data collected via polling participants' vehicles charging at regular (~1 hour) intervals. The data contains information about the state of the vehicle each time it is polled (e.g. whether it is plugged, charging, the vehicle state of charge, and battery capacity). Importantly, the Smartcar data does not capture the exact times associated with plug or charging sessions, e.g., a participant may start charging their vehicle, and the Smartcar platform will only capture data the next time it is scheduled to poll the vehicle. Since the polling frequency is at minimum ~1 hour, there is uncertainty in the exact start and stop time of charging sessions for these participants, as well as the average power delivered. In addition, the data provided by Uplight does not distinguish between home and away charging; therefore, Guidehouse was unable to verify that all charging was conducted at home for these participants.
- **Vehicle Telematics (Optiwatt data):** Telematics data was collected from participant's vehicles in 5 minute intervals, and contained information on the vehicle each time it was polled (e.g. whether it is plugged, charging, the vehicle state of charge, and battery capacity, whether it was at home or away). Unlike the Smartcar data, the Optiwatt data captured when the car was plugged in, to the closest 5 minute, which eliminated the

uncertainty. The charging and plug in sessions were determined based on the plug in and charging status for each 5-minute interval for the vehicle.

- **EVSE Telematics (Wallbox and ChargePoint data):** Telematics data collected via participants EVSE at regular intervals (every 30 seconds). The data contains information about plug in/out, charging start/stop, and energy delivered. Since the data collected from EVSEs is collected at a very granular time interval, this data does not exhibit the same uncertainty as the VT data.

Guidehouse processed this data to generate a standardized hourly interval data set for each vehicle that contains the average power delivered in each hour. These intervals were determined as follows:

1. Identify all charge sessions, including estimated start and stop time and total energy delivered.
2. Computed the average power delivered through the charge session as the total energy delivered divided by the length of the charge session.
3. Assign the average power to corresponding hours based on charge start and stop time. If a charging session only partially overlaps with an hourly interval (e.g. a participant started charging midway through the hour), the average power was adjusted based on the amount of the interval that was spent charging.

Guidehouse also performed a series of data cleaning steps to remove anomalous or not-relevant values (e.g. blank rows, non-charging data, data for dates not included in the analysis, data without all 24 hours present). More details are included in Appendix A.1.

2.2.2 Participant Data

Newfoundland Power provided a complete enrollment list with final assigned groups, as well as other participant characteristics (e.g. vehicle make and model).

2.2.3 Event Data

Newfoundland Power provided a list of called Peak Events details, including date; event type (i.e., system load vs regular); event start time; and event end time. This is detailed in Table 2-1.

Table 2-1: Peak Events (ADR) Event Date, Times, and Type

| Event Number | Event Date | Start Time (Prevailing) | End Time (Prevailing) | Event Type |
|--------------|------------|-------------------------|-----------------------|------------|
| 1 | 12/2/2024 | 6 AM | 10 AM | Regular |
| 2 | 12/4/2024 | 5 PM | 9 PM | Regular |
| 3 | 12/6/2024 | 6 PM | 10 PM | Regular |
| 4 | 12/8/2024 | 7 PM | 11 PM | Regular |
| 5 | 12/10/2024 | 5 PM | 9 PM | Regular |
| 6 | 12/12/2024 | 6 AM | 10 AM | Regular |

| Event Number | Event Date | Start Time (Prevailing) | End Time (Prevailing) | Event Type |
|--------------|------------|-------------------------|-----------------------|-------------|
| 7 | 12/14/2024 | 6 PM | 10 PM | Regular |
| 8 | 12/16/2024 | 7 PM | 11 PM | Regular |
| 9 | 12/20/2024 | 5 PM | 10 PM | Regular |
| 10 | 12/22/2024 | 5 PM | 10 PM | Regular |
| 11 | 12/28/2024 | 5 PM | 9 PM | Regular |
| 12 | 1/1/2025 | 7 PM | 11 PM | Regular |
| 13 | 1/2/2025 | 5 PM | 10 PM | Regular |
| 14 | 1/5/2025 | 5 PM | 9 PM | Regular |
| 15 | 1/7/2025 | 6 PM | 10 PM | Regular |
| 16 | 1/9/2025 | 7 PM | 11 PM | Regular |
| 17 | 1/10/2025 | 5 PM | 10 PM | Regular |
| 18 | 1/13/2025 | 5 PM | 10 PM | Regular |
| 19 | 1/16/2025 | 6 PM | 10 PM | Regular |
| 20 | 1/17/2025 | 7 PM | 11 PM | Regular |
| 21 | 1/18/2025 | 6 PM | 10 PM | Regular |
| 22 | 1/21/2025 | 5 PM | 9 PM | Regular |
| 23 | 1/23/2025 | 7 AM | 10 AM | System Load |
| 24 | 1/23/2025 | 5 PM | 8 PM | System Load |
| 25 | 1/27/2025 | 5 PM | 9 PM | Regular |
| 26 | 1/29/2025 | 6 PM | 10 PM | Regular |
| 27 | 1/31/2025 | 6 AM | 10 AM | Regular |
| 28 | 2/2/2025 | 6 AM | 10 AM | Regular |
| 29 | 2/6/2025 | 6 PM | 10 PM | Regular |
| 30 | 2/8/2025 | 7 PM | 11 PM | Regular |
| 31 | 2/10/2025 | 5 PM | 9 PM | Regular |
| 32 | 2/11/2025 | 6 AM | 10 AM | Regular |
| 33 | 2/14/2025 | 6 PM | 10 PM | Regular |
| 34 | 2/16/2025 | 7 PM | 11 PM | Regular |
| 35 | 2/18/2025 | 6 PM | 10 PM | Regular |
| 36 | 2/19/2025 | 5 PM | 9 PM | Regular |
| 37 | 2/22/2025 | 5 PM | 10 PM | Regular |
| 38 | 2/24/2025 | 7 PM | 11 PM | Regular |
| 39 | 2/26/2025 | 7 PM | 11 PM | Regular |
| 40 | 2/27/2025 | 5 PM | 9 PM | Regular |
| 41 | 3/2/2025 | 6 PM | 10 PM | Regular |

| Event Number | Event Date | Start Time (Prevailing) | End Time (Prevailing) | Event Type |
|--------------|------------|-------------------------|-----------------------|------------|
| 42 | 3/4/2025 | 5 PM | 10 PM | Regular |
| 43 | 3/6/2025 | 5 PM | 10 PM | Regular |
| 44 | 3/7/2025 | 5 PM | 9 PM | Regular |
| 45 | 3/10/2025 | 6 PM | 10 PM | Regular |
| 46 | 3/15/2025 | 6 AM | 10 AM | Regular |
| 47 | 3/18/2025 | 6 PM | 10 PM | Regular |
| 48 | 3/20/2025 | 7 PM | 11 PM | Regular |
| 49 | 3/22/2025 | 6 PM | 10 PM | Regular |
| 50 | 3/23/2025 | 5 PM | 9 PM | Regular |
| 51 | 3/24/2025 | 6 AM | 10 AM | Regular |
| 52 | 3/26/2025 | 7 PM | 11 PM | Regular |
| 53 | 3/30/2025 | 5 PM | 10 PM | Regular |

Source: Guidehouse

For each event for the Peak Events group, Uplight provided event dispatch results, which describe whether each participant was successfully curtailed, and if not, why (e.g. technical issues, not at home, opt-out). Guidehouse used this data to determine how many vehicles opted-out of each event, as well as how many vehicles successfully participated.

The Off-Peak Charging treatment took place between December 1, 2024 and March 31, 2025, when participants were asked to alter their charging behaviour to not charge during peak hours. Guidehouse used collected telematics data to determine which participants “opted-out”, or charged during peak hours. However, due to the uncertainty in charge start and stop time associated with the VT data, there is uncertainty in the exact number of opt-outs that occurred throughout this treatment.

2.3 Impact Evaluation

2.3.1 Baseline Charging Behaviour

To characterize baseline charging behaviour, Guidehouse calculated average hourly load shapes for participants in the Monitor (control) group. These load shapes were calculated for different segments of participants and of charging periods, including by vehicle type and by day type (weekday vs weekend).

The comparison of load shapes on non-event days also served the purpose of verifying similarities or potential differences between different participant groups in terms of charging behaviour (e.g. since participants could not be selected truly randomly due to compatibility reasons, they may exhibit some differences). The results informed Guidehouse’s evaluation approach to mitigate the effect of these differences.

2.3.2 Demand Impacts

Guidehouse used regression analysis to estimate average hourly impacts for each treatment group, i.e., Peak Events and Off-Peak Charging, as well as event specific impacts as applicable. For the Peak Events group, Guidehouse estimated average impacts for different event times, where events were grouped by start and end time. Start times were rounded down to the nearest hour, and end times were rounded up to the nearest hour. For the Off-Peak Charging group, Guidehouse estimated impacts over all days, as well as by weekend vs weekday. Guidehouse leveraged the Monitor group to establish baseline behaviour for both treatments; note that PHEVs were not included for this purpose, as all vehicles in the treatment groups were BEVs.

Additional details including the model specifications for each treatment are included in Appendices A.2 and A.3.

2.3.3 Program Benefits

To estimate system benefits associated with the managed charging treatments for the program, Newfoundland Power provided Guidehouse with values for marginal avoided cost of capacity, including the avoided cost of generation, transmission, and distribution, \$356.07 / kW-year, and represents the benefit of avoiding demand during the coincident system peak, which Guidehouse understands will likely occur over a short window of hours during the winter (e.g. in the morning or evening peak periods).

Guidehouse multiplied this avoided cost by the average hourly demand impact per device. These results represent potential benefits associated with program impacts, when estimated impacts coincide with system peak. The potential benefits provide an estimate of when the program will provide the most grid value depending on when the system peak occurs.

Impacts are reported for each treatment in each peak period (6 AM to 10 AM and 4 PM and 11 PM), as well as by hour of day included in the Appendix B spreadsheet.

Evaluations of demand-side management programs typically estimate both net and gross savings, and often present a net-to-gross (NTG) ratio based on the evaluated percentage of energy reductions that may be attributed to one or both of:

- Free ridership: Defined as the percentage of savings that would have occurred absent the presence of the program. This effect decreases the NTG ratio.
- Program spillover: Typically defined as incremental savings actions undertaken by a program's participants not directly incented by the program. This effect increases the NTG ratio.

In this analysis, demand reductions are estimated relative to an estimated baseline, determined using the behaviour of the Monitor group, which captures expected participant behaviour absent an event. Absent the Pilot, none of the observed demand reductions associated with the Peak Events program would have taken place, as the events themselves would not have taken place. With respect to the Off-Peak Charging treatment, the Monitor group used to estimate baseline behaviour captures any tendency for participants to manage their own charging absent the program. Therefore, Guidehouse can state that the free ridership is 0.

There may have been some spillover resulting from the program (from participants becoming more aware of their EVs consumption profiles, for example). However, it is impractical to estimate such an effect in a sufficiently robust manner and the assessment of such impacts is beyond the scope of this report.

Therefore, all demand presented in this report should be considered net, with an NTG ratio of 1.

2.4 Participant Survey

Guidehouse developed the participation survey instrument in collaboration with Newfoundland Power along with feedback from MQO Research, who fielded the survey itself. Appendix C contains the full survey instrument, which addressed the following topics:

- Feedback on use of the managed charging platform.
- Satisfaction with program incentives.
- Satisfaction with the override process.
- Satisfaction with program communications.
- Satisfaction with program overall.
- Opportunities for improving program satisfaction.

MQO fielded the survey which was sent to the 180 program participants, which achieved 95 total responses (53%). There were three screen outs (no longer had the vehicle or were not the primary driver) resulting in 92 valid completes (51%).

3. Technical Challenges

There were a number of technical operational and data challenges encountered during the second year of the Pilot that affected observed results, in terms of reliability of the program, participant satisfaction, and impact evaluation results (estimated load shapes and demand impacts). These issues are summarized to provide context when interpreting the results of this evaluation and include:

Operational Issues

- **Event dispatches only at beginning of the event:** Participants controlled via vehicle telematics and Wallbox EVSE in the Peak Events group that were not plugged in at the beginning of the event did not have their charging curtailed. Participants that plugged in after the start of the event could charge without having charging curtailed.
- **Lack of EVSE and EV compatibility:** Lack of EVSE and EV compatibility with the platform made it difficult for participants to continue using their regular charging system. Some interested participants were not able to enroll into the Pilot due to the limitations around compatibility with the Uplight platform.
- **Cumbersome enrollment process:** This process resulted in participants not being able to get their compatible vehicle enrolled citing incompatibility errors. Other issues included: verification code expiry; errors indicating connect service is not set up; experiencing blank screens during the enrollment process; and errors during enrollment connecting to OEMs connected service stating “something went wrong, please try again”. Many survey participants also indicated that the enrollment process was too complicated.
- **Lack of reliability of 3rd party API integration vendors:** This issue was due to lack of permissions from OEMs. For example, in year 1, Ford forced all participants to unenroll citing 3rd party access as unauthorized and a cybersecurity threat. Hyundai and Kia charging could not be paused temporarily, and those devices were eventually moved to the passive (BDR) group. In year 2, Hyundai forced all BlueLink users to reset their passwords citing a cybersecurity threat and revoked 3rd party access to the app. Data collection could not be reinstated until participants re-connected their vehicles to the Optiwatt app. There was no fix given for participants enrolled through Smartcar.
- **EVSE connectivity issues:** Some EVSE connectivity issues could not be rectified even though ChargePoint participants’ network had no issues. The EVSE telemetry data also was not transmitting data early on in Year 2 of the Pilot. This issue was found to be due to Uplight accessing the US ChargePoint portal rather than the Canada ChargePoint portal.
- **Lack of reliability in ability to pause charging:** There were technology limitations for all VT and for the Wallbox EVSE participants in their unreliability and ability to pause charging sessions. For example, vehicles would not retain information that an event/dispatch had started if the vehicle was not plugged in/charging. This issue resulted in late plug-ins not being curtailed during the event, i.e., the vehicles charged as it normally would if it is plugged in just after an event starts.

- **12 V battery drain due to participation in the Pilot:** Some Hyundai participants experienced 12 V battery drain while participating in the Pilot. Although this has not been confirmed that it is due to the Pilot program, it occurred during times that participants were having difficulty with their Hyundai's BlueLink app and received daily app error messages advising of several invalid access attempts.
- **Time variances in charging start and stop:** The charging session start and stop times between OEM app and vendor app were found to be inconsistent for some participants.
- **Many dispatch failures impacting Peak Events group impacts:** About 60% of Peak Events participants had dispatch failures during events throughout the Pilot. This would result in lower impacts than if all participants had successful dispatches. There were also 53 partial participant-events in the Pilot, where an event started with a successful dispatch, but ended with a dispatch failure. This is likely due to the car being unplugged but can also mean that some people are able to charge after the start of the event, which would affect the level of participation in the event.

Data Issues

- **Mixing of home and away charging data:** For the Smartcar data, Uplight was unable to differentiate between home and away charging sessions. As a result, although Guidehouse was able to analyze this data, the results may include some away from home charging. This was partially mitigated in Year 2, due to many of the Smartcar participants migrating to the Optiwatt platform.
- **The Optiwatt data had issues with incorrect data or missing charging data:** There was incorrect data such as charging data over 20 kW which would indicate away from home charging, or under 0 kW. These values were set to 0 kW and removed from the analysis. In addition, data was often incomplete – there were 52 participants with long periods of no charging (0 kW), as well as 13 Optiwatt participants that showed no charging (0 kW) data for the entire Pilot. There were also charging sessions where there was no change in state of charge. In all of these cases, Guidehouse deemed this data to be incomplete and these charging sessions were removed from the analysis.
- **No Optiwatt data was available prior to December 2024:** There were challenges in collecting Optiwatt data prior to the start of the Pilot, which means that only participants enrolled in Year 1 had data in the pre-period leading up to the Pilot. This made the pre-period data less useful since it was not representative of the Pilot period which included the Optiwatt data.
- **The Optiwatt state of charge data was not consistent with the power data:** This is reflected in the data in the form of unrealistically high energy delivered during charging sessions, e.g. much greater than approximately 150 kWh. These charging sessions were removed as the largest battery capacity of any vehicles in the Pilot would likely be less than 150 kWh – the maximum capacity of a Ford F150 Lightning, for example, is approximately 130 kWh.
- **Hyundai BlueLink Issue:** This resulted in no charging data being available for most Hyundai vehicles from January 14 to March 12, 2025. For participants with only 0 kW charging data in this period had the 0 kW data removed from January 14 to March 12, 2025.

- **Some devices had both Smartcar and Optiwatt simultaneously:** This is from participants who were previously enrolled in Smartcar, and were later enrolled in Optiwatt in Year 2 of the Pilot. The Smartcar data continued to be collected even after the Optiwatt data collection began. Guidehouse used the Optiwatt data that was available instead of the Smartcar data starting on December 1, 2024, as the data from Optiwatt was more granular.

4. Impact Evaluation Results

4.1 Enrollment

A total of 171 devices (BEV + PHEV) with data were enrolled at the end of the Pilot period, as of March 31, 2025, as shown in Table 4-1. Most participants had battery electric vehicles (BEVs), while 17 had plug-in hybrid vehicles (PHEVs). Six devices had data collected but were unenrolled at the end of the Pilot period. These enrollment numbers are close to the targets for the program of 200 participants and were driven by substantial increases in Year 2 enrollment of the Pilot. A total of 11 devices were enrolled in the Pilot, but did not have any data. Table 4-2 below shows how the vehicle telematics group enrollment was split by Pilot group for Optiwatt and Smartcar.

Table 4-1: Enrollment by Pilot Group

| Pilot Group | BEV | PHEV | Unenrolled |
|--------------------|------------|-----------|------------|
| Monitor – VT | 38 | 15 | 0 |
| Monitor – EVSE | 1 | 2 | 0 |
| Off-Peak Charging | 51 | 0 | 0 |
| Peak Events - VT | 16 | 0 | 0 |
| Peak Events - EVSE | 48 | 0 | 0 |
| Unenrolled | 0 | 0 | 6 |
| Total | 154 | 17 | 6 |

Source: Guidehouse

Table 4-2: Enrollment by Pilot Group for Vehicle Telematics

| Pilot Group | Optiwatt | Smartcar |
|-------------------|-----------|-----------|
| Monitor – VT | 32 | 21 |
| Off-Peak Charging | 30 | 21 |
| Peak Events – VT | 11 | 5 |
| Unenrolled | 0 | 6 |
| Total | 73 | 53 |

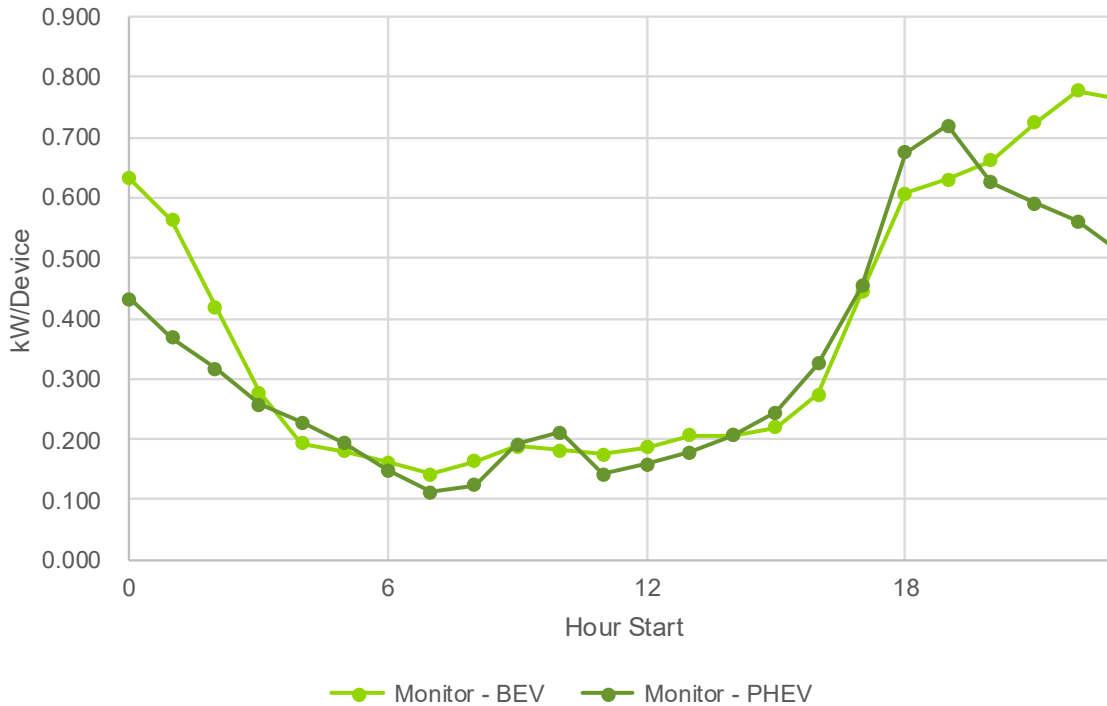
Source: Guidehouse

4.2 Baseline Charging Behaviour (Monitor group)

Figure 4-1 below compares average hourly load shapes between BEV and PHEV vehicles. The BEV group demonstrated a higher average peak per device with a peak of 0.78 kW between 10 PM and 11 PM, compared to the PHEV group which had a peak of 0.72 kW between 7 PM and 8PM. Both groups show that charging load ramp up towards the evening hours, when people would be expected to arrive home from work. The similarity in peak daily load may be influenced by the fact that participants with BEVs likely do not charge every day, which brings down the

overall average charging load among participants. The BEV group had more energy delivered per day than the PHEV group, with 9.0 kWh of charging for the BEV group compared to 8.0 kWh for the PHEV group.

Figure 4-1: Baseline Charging Load Shape by Vehicle Type

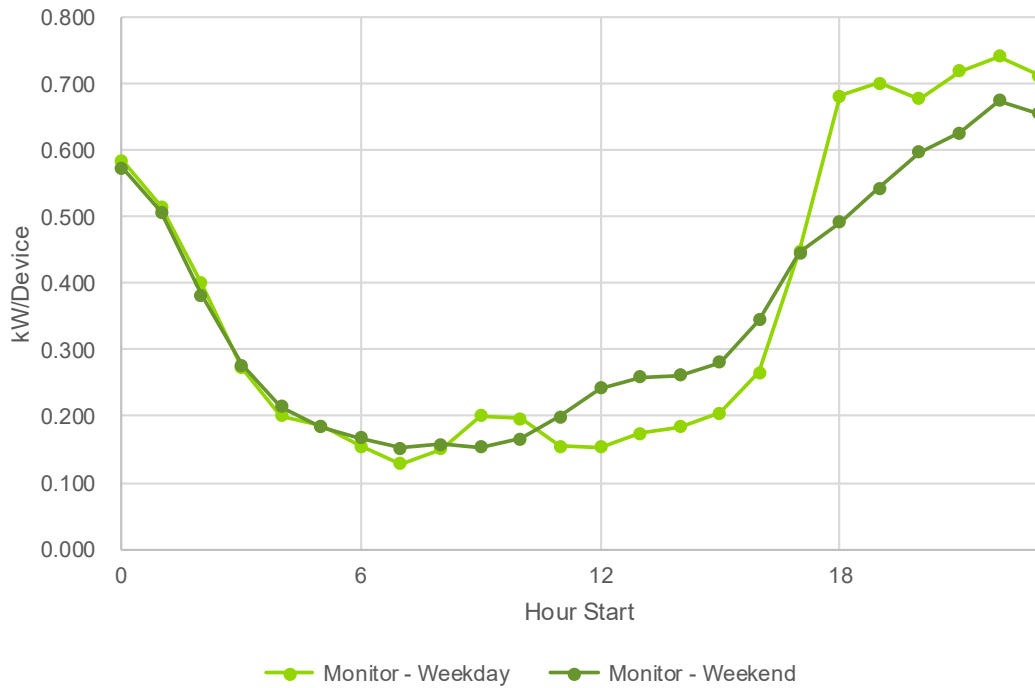


Source: Guidehouse

Figure 4-2 compares average hourly load shapes by day type, between weekdays and weekends. The weekday load shape had more charging between 6 PM and 12 AM than the weekend load shape, which had more charging that took place between 11 AM and 4 PM. This reflects the fact that participants are more likely to be at home and charging on weekends. The weekday had slightly more energy from charging than the weekend, with 8.8 kWh for the weekday compared to 8.6 kWh for the weekend. The peak was slightly higher per device for the weekday than the weekend, with 0.74 kW for the weekday between 10 PM and 11 PM compared to 0.68 kW for the weekend between 10 PM and 11 PM. The higher load on weekday nights than weekend nights means there may be more opportunity for load to be curtailed on weekdays during the evening than on weekends.

The average observed per device charging load was 0.159 kW from 6 AM to 10 AM, and 0.584 kW from 4 PM to 11 PM across all days, with a peak hourly load of approximately 0.73 kW in the evening. This result combined with the fact that many participants had Level 2 chargers, suggests that not all vehicles are expected to be charging every day.

Figure 4-2: Baseline Charging Load Shape for Weekdays and Weekends



Source: Guidehouse

4.2.1 Charging Metrics

Guidehouse computed a variety of charging metrics for the Monitor group. A selection of these metrics are reported here – refer to the Appendix B spreadsheet for more details and additional metrics. Note that these metrics were computed for all vehicle types and therefore primarily reflect the BEVs that are in the Monitor group.³ Table 4-3 below shows participant time plugged in (percentage of each day). January saw highest average time plugged in, but all months showed that the participants generally do not leave their vehicles plugged in most of the time, i.e., the vehicles are used for travel away from home and may not be plugged in all the time even when at home.

Table 4-3: Monitor group Percentage of Time Plugged In

| % Time Plugged In | Min | Mean | Median | Max |
|-------------------|------|-------|--------|--------|
| All | 0.1% | 27.0% | 20.1% | 79.8% |
| Dec | 0.0% | 28.1% | 21.7% | 100.0% |
| Jan | 0.0% | 29.6% | 23.9% | 89.0% |
| Feb | 0.0% | 24.3% | 19.1% | 88.9% |

³ The relatively small sample of PHEVs (17 vehicles) means that computed metrics for this group alone may not produce meaningful metrics.

| % Time Plugged In | Min | Mean | Median | Max |
|-------------------|------|-------|--------|-------|
| Mar | 0.0% | 25.7% | 15.6% | 86.3% |

Source: Guidehouse

Table 4-4 below shows the hourly distribution of plug start and stop. The most frequent times for plug in was between 4 PM and 10 PM. The most frequent plug out time was between 7 AM and 9 AM. This result shows that the participants' plug behaviour is likely correlated with their work schedules.

Table 4-4: Monitor group Distribution of Hourly Plug Start and Stop Times

| Hour Start | Plug In Start | Plug In End |
|------------|---------------|-------------|
| 12 AM | 1.2% | 0.9% |
| 1 AM | 1.0% | 0.6% |
| 2 AM | 1.1% | 0.2% |
| 3 AM | 0.5% | 0.9% |
| 4 AM | 0.4% | 0.7% |
| 5 AM | 0.3% | 1.8% |
| 6 AM | 1.0% | 3.9% |
| 7 AM | 2.4% | 10.5% |
| 8 AM | 2.0% | 11.6% |
| 9 AM | 2.2% | 7.9% |
| 10 AM | 3.1% | 6.3% |
| 11 AM | 3.5% | 6.6% |
| 12 PM | 3.1% | 6.4% |
| 1 PM | 4.3% | 4.9% |
| 2 PM | 4.2% | 6.4% |
| 3 PM | 6.8% | 4.9% |
| 4 PM | 8.0% | 3.5% |
| 5 PM | 10.2% | 4.0% |
| 6 PM | 7.8% | 4.0% |
| 7 PM | 7.8% | 2.2% |
| 8 PM | 12.3% | 6.1% |
| 9 PM | 8.6% | 2.8% |
| 10 PM | 4.6% | 1.7% |
| 11 PM | 3.6% | 1.2% |

Source: Guidehouse

Table 4-5 shows number of charge sessions per day per vehicle; Table 4-6 shows the average energy delivered (in kWh) per charging session per vehicle; and Table 4-7 shows the distribution of state of charge (SOC) at charging start and stop among all charge sessions. These metrics show the frequency of charging each day, how much energy is typically delivered to vehicles, and what SOC participants typically charge between. Note that these numbers include all sessions between December 1, 2024 and March 31, 2025. These results show a pattern of charging behaviour where participants generally plug in their vehicle at whatever SOC their vehicle is at when they return home, and charge to full, or near full, depending on their vehicle settings. Specifically, the SOC at charging start was somewhat evenly distributed between 20% and 100%, while the majority of charging sessions stopped between 70 and 100%. January had the most charging sessions, and also the highest average total kWh per charging session of all months in the Pilot. The metrics suggests that overall charge sessions per day remains fairly steady in each month, but the energy delivered per charging session can vary depending on the month.

Table 4-5: Monitor group Charge Sessions Per Day per Vehicle

| Charge Sessions Per Day (per Vehicle) | Min | Mean | Median | Max |
|---------------------------------------|------|------|--------|------|
| All | 0.04 | 0.56 | 0.30 | 1.73 |
| Dec | 0.00 | 0.59 | 0.42 | 1.87 |
| Jan | 0.00 | 0.64 | 0.32 | 2.19 |
| Feb | 0.00 | 0.51 | 0.36 | 2.11 |
| Mar | 0.00 | 0.50 | 0.35 | 1.87 |

Source: Guidehouse

Table 4-6: Monitor group Average kWh per Charging Session

| Avg kWh per Charge Session | Min | Mean | Median | Max |
|----------------------------|------|-------|--------|-------|
| All | 3.08 | 17.54 | 12.68 | 75.02 |
| Dec | 3.14 | 16.43 | 13.26 | 79.58 |
| Jan | 2.76 | 17.47 | 11.11 | 83.02 |
| Feb | 2.82 | 12.01 | 10.60 | 37.65 |
| Mar | 2.89 | 16.32 | 10.10 | 72.34 |

Source: Guidehouse

Table 4-7: Monitor group State of Charge Distribution

| SOC Group (%) | SOC Start | SOC Stop |
|---------------|-----------|----------|
| 0-9 | 1.8% | 0.1% |
| 10-19 | 4.5% | 0.2% |
| 20-29 | 12.1% | 1.2% |
| 30-39 | 8.6% | 1.9% |
| 40-49 | 10.9% | 3.6% |
| 50-59 | 10.8% | 4.3% |
| 60-69 | 11.5% | 5.6% |
| 70-79 | 15.6% | 22.3% |
| 80-89 | 10.1% | 14.2% |
| 90-100 | 14.2% | 46.5% |

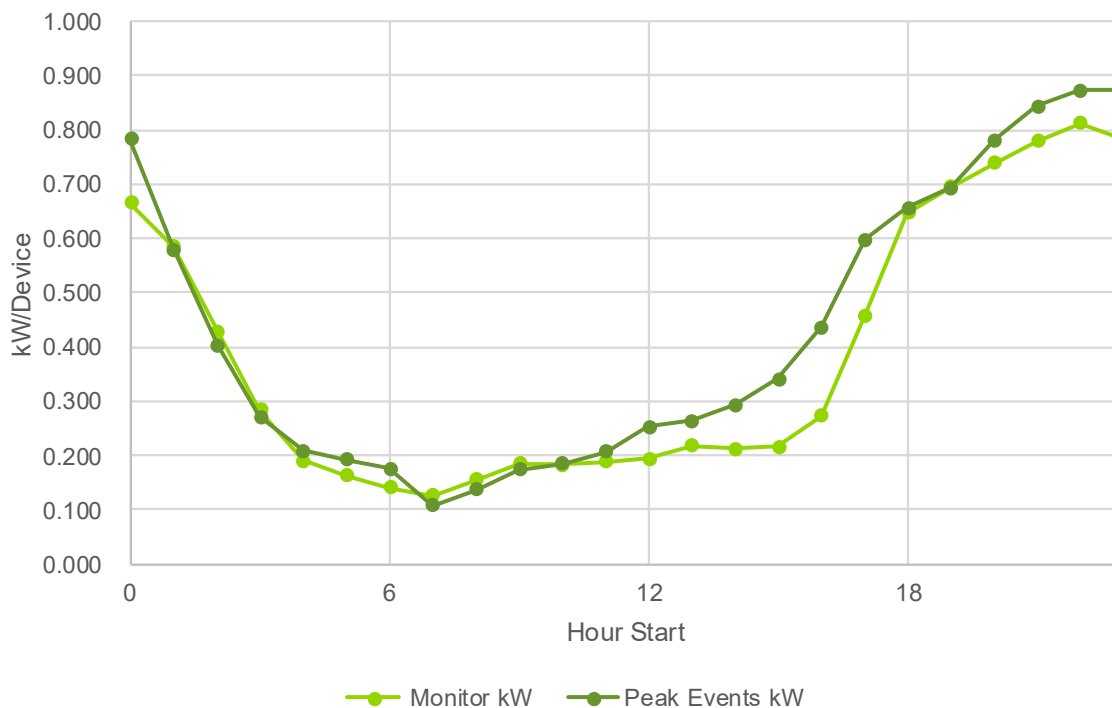
Source: Guidehouse

4.3 Demand Impacts - Peak Events

4.3.1 Randomization Verification

Figure 4-3 shows a comparison of hourly load shapes on non-event days for all months (September 1, 2024 to March 31, 2025) for BEVs between Monitor and Peak Events groups. The randomization control trial (RCT) check demonstrates that the Monitor and Peak Events group are generally similar in terms of charging behaviour, but they do exhibit some differences in behaviour later in the day.

Figure 4-3: Comparison of Average Charging Demand for All Months (Sep 2024 – Mar 2025)



Source: Guidehouse

Specifically, the average demand for the Monitor group closely resembles demand for the Peak Events group on non-event days during the morning, and closely during the evening. There is a gap between the Monitor and Peak Events group demand from 12 PM to 6 PM and 7 PM to 1 AM. The differences between the two groups may be due to the small size and the influence of individual charging patterns on average load, as well as the fact that the groups were not truly randomized, due to small sample size and compatibility issues affecting group assignments. Compatibility with the platform led to the control and treatment groups having different distributions of vehicle make and models.

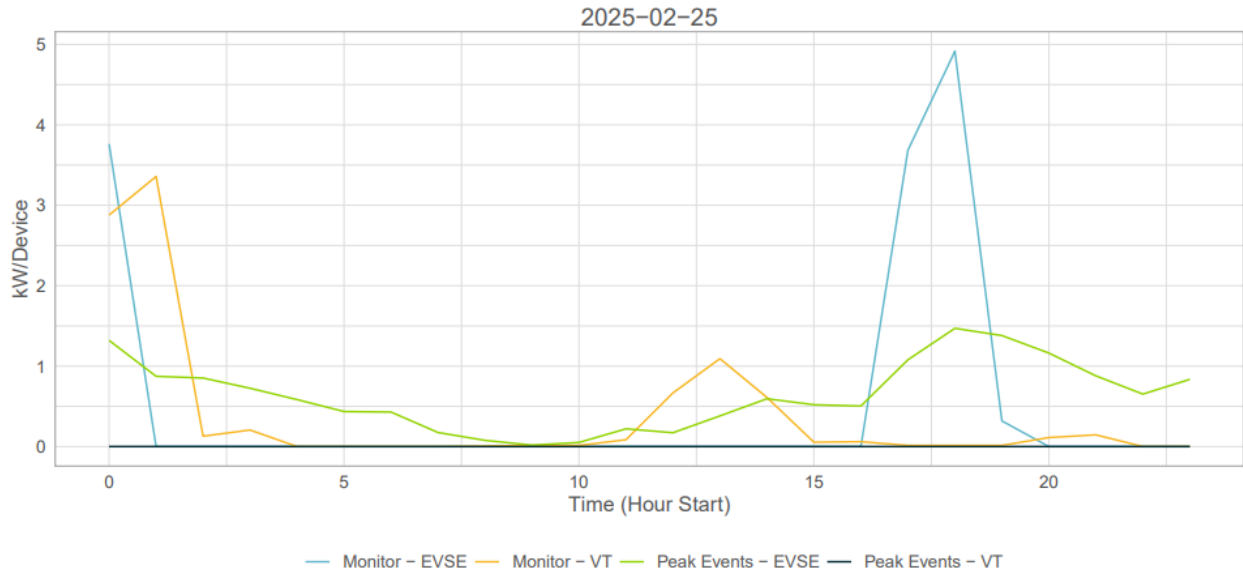
Ultimately, in absence of a better quality Monitor group, Guidehouse concluded that the Monitor group would serve as an appropriate comparison group with which to estimate impacts for both treatments – Peak Events and Off-Peak Charging. For the Peak Events group, Guidehouse concluded that the Monitor group, non-event charging data, and regression analysis approach would be sufficient to produce a robust estimate of savings.

4.3.2 Comparison of Event Load Shapes

Figure 4-4, Figure 4-5, and Figure 4-6 show three representative days that demonstrate the curtailment of the Peak Events treatment. On February 25, 2025, there was a notification sent to the Peak Events group a day ahead of the event. Charging can be seen the day before the event in the Active Management – EVSE group. On February 26, 2025 an event was called between 7 PM and 11 PM. During the 4-hour event, the load was curtailed for the Active Management groups compared to the Monitor group. Guidehouse observed that on the February 26, 2025 event day, very little charging was observed throughout the day, which

suggests that participants may intentionally not charge for the whole day in anticipation of the DR event. The Active Management load was increased starting at 11 PM until 4 AM the following day on February 27, 2025. This load increase on the following day shows load shifting behaviour due to the event.

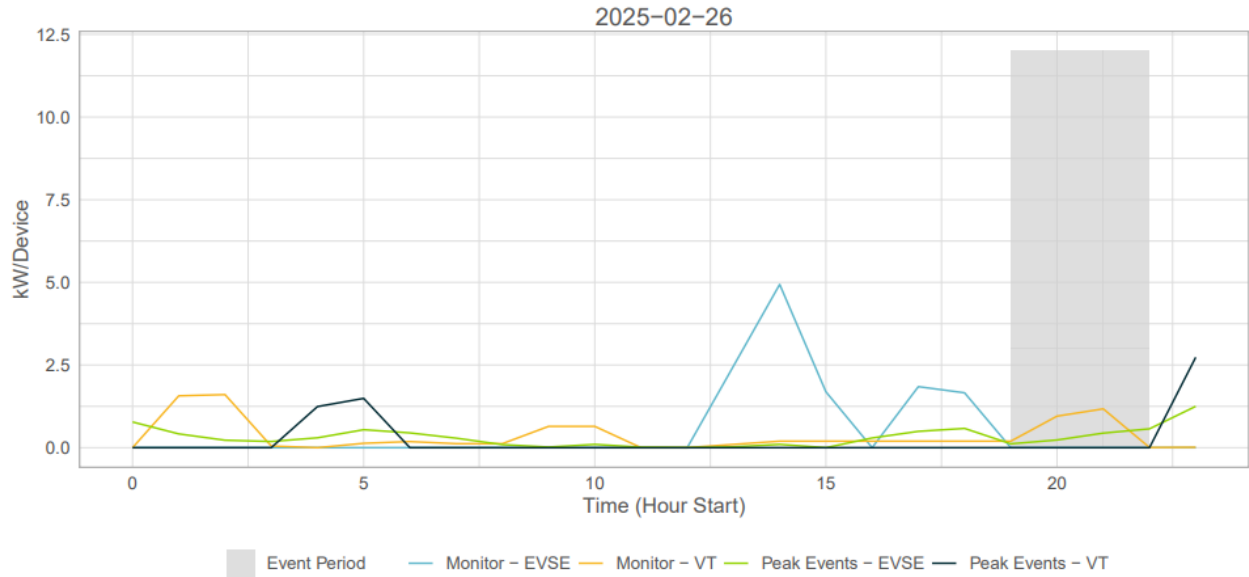
Figure 4-4: Peak Events (ADR) Representative Day for February 25, 2025



Note: This plot reflects an hourly time series, so the values represent the average power in increments of one hour, for each hour start (e.g. the value for hour start 10 represents the average power between 10 AM to 11 AM)

Source: Guidehouse

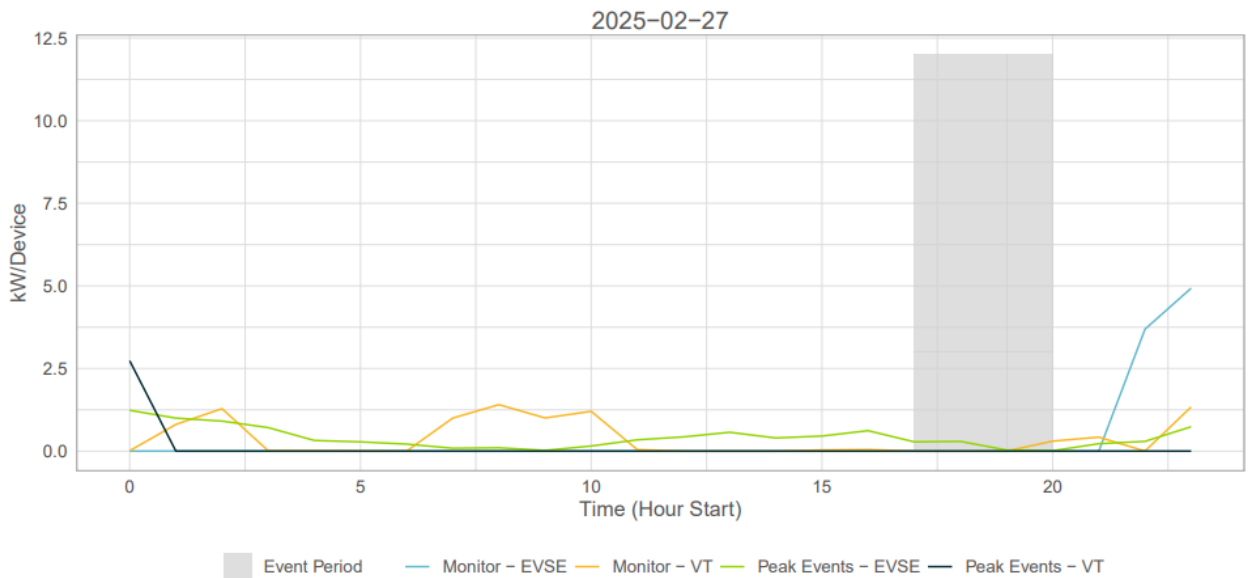
Figure 4-5: Peak Events (ADR) Representative Day for February 26, 2025



Note: This plot reflects an hourly time series, so the values represent the average power in increments of one hour, for each hour start (e.g. the value for hour start 10 represents the average power between 10 AM to 11 AM)

Source: Guidehouse

Figure 4-6: Peak Events (ADR) Representative Day for February 27, 2025



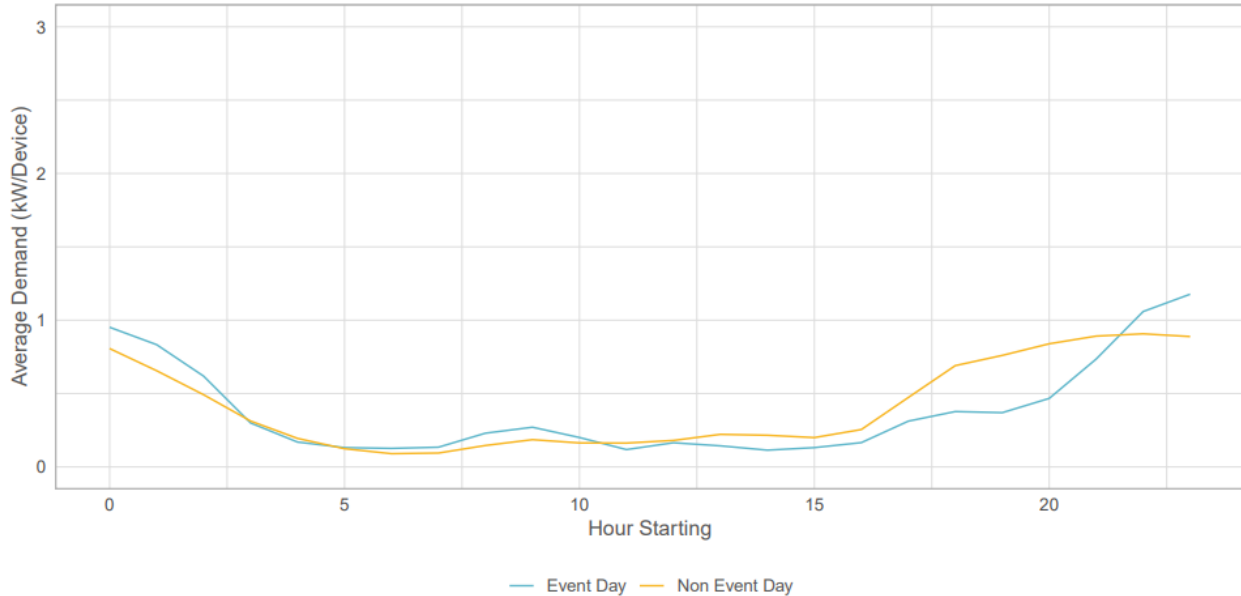
Note: This plot reflects an hourly time series, so the values represent the average power in increments of one hour, for each hour start (e.g. the value for hour start 10 represents the average power between 10 AM to 11 AM)

Source: Guidehouse

Figure 4-7 compares the Monitor group load shape on event and non-event days for the Peak Events group. The Monitor group appears to be changing their behaviour as the Monitor group was slightly lower during the evening peak event times and higher in the overnight period, which

indicates that some in the Monitor group may have been somewhat aware of the peak event times. However, 90% of respondents in the survey for the Monitor group indicated that the Pilot did not affect their charging behaviour, so the reason for this difference in load shape is inconclusive.

Figure 4-7: Monitor Load Shape by Peak Events Event Day vs. Non-Event Day



Source: Guidehouse

4.3.3 Event Opt-Outs and Dispatch Failures

Table 4-8 below shows a summary of the opt-outs, dispatch failures, number of participants (i.e. successfully dispatched events), partial participants (i.e. successfully started the event but ended the event in a dispatch failure), and unsure (i.e. where there is no dispatch or opt-out data available) by Peak Events number (see Table 2-1 for definitions). There were a total of 10 opt-outs from participants in the Peak Events group. The number of dispatch failures were steady throughout the Pilot. The number of participants increased over the Pilot as the number of unsure decreased. This pattern demonstrates an improvement in Newfoundland Power’s capability to successfully dispatch events over the course of the Pilot.

Table 4-8: Peak Events (ADR) Opt-Outs, Dispatch Failures, Participants, Partial Participants, and Unsure by Event

| Event Number | Opt-Outs | Dispatches Failures | Number of Participants | Number of Partial Participants | Unsure |
|--------------|----------|---------------------|------------------------|--------------------------------|--------|
| 1 | 0 | 49 | 6 | 0 | 25 |
| 2 | 0 | 47 | 14 | 2 | 17 |
| 3 | 0 | 46 | 18 | 1 | 15 |
| 4 | 0 | 48 | 17 | 1 | 14 |
| 5 | 0 | 47 | 17 | 1 | 15 |

| Event Number | Opt-Outs | Dispatches Failures | Number of Participants | Number of Partial Participants | Unsure |
|--------------|----------|---------------------|------------------------|--------------------------------|--------|
| 6 | 0 | 50 | 16 | 0 | 14 |
| 7 | 0 | 44 | 20 | 0 | 16 |
| 8 | 0 | 47 | 18 | 1 | 14 |
| 9 | 0 | 46 | 23 | 1 | 10 |
| 10 | 0 | 48 | 21 | 1 | 10 |
| 11 | 0 | 50 | 20 | 1 | 9 |
| 12 | 0 | 50 | 22 | 0 | 8 |
| 13 | 1 | 51 | 19 | 0 | 9 |
| 14 | 0 | 50 | 22 | 0 | 8 |
| 15 | 0 | 49 | 23 | 0 | 8 |
| 16 | 0 | 49 | 24 | 0 | 7 |
| 17 | 0 | 50 | 20 | 1 | 9 |
| 18 | 0 | 50 | 21 | 0 | 9 |
| 19 | 1 | 50 | 20 | 0 | 9 |
| 20 | 0 | 47 | 25 | 0 | 8 |
| 21 | 2 | 46 | 25 | 0 | 7 |
| 22 | 0 | 51 | 22 | 1 | 6 |
| 23 | 0 | 52 | 20 | 0 | 8 |
| 24 | 0 | 49 | 24 | 1 | 6 |
| 25 | 0 | 49 | 22 | 2 | 7 |
| 26 | 0 | 52 | 21 | 1 | 6 |
| 27 | 1 | 50 | 22 | 0 | 7 |
| 28 | 0 | 51 | 23 | 0 | 6 |
| 29 | 0 | 48 | 25 | 0 | 7 |
| 30 | 2 | 48 | 24 | 0 | 6 |
| 31 | 0 | 50 | 22 | 0 | 8 |
| 32 | 0 | 53 | 20 | 0 | 7 |
| 33 | 0 | 49 | 22 | 3 | 6 |
| 34 | 1 | 50 | 22 | 1 | 6 |
| 35 | 0 | 42 | 28 | 3 | 7 |
| 36 | 0 | 49 | 20 | 1 | 10 |
| 37 | 0 | 45 | 25 | 2 | 8 |
| 38 | 1 | 49 | 22 | 1 | 7 |
| 39 | 1 | 51 | 21 | 0 | 7 |
| 40 | 0 | 49 | 22 | 1 | 8 |

| Event Number | Opt-Outs | Dispatches Failures | Number of Participants | Number of Partial Participants | Unsure |
|--------------|----------|---------------------|------------------------|--------------------------------|--------|
| 41 | 0 | 51 | 22 | 1 | 6 |
| 42 | 0 | 48 | 22 | 3 | 7 |
| 43 | 0 | 51 | 21 | 0 | 8 |
| 44 | 0 | 53 | 20 | 0 | 7 |
| 45 | 0 | 50 | 22 | 0 | 8 |
| 46 | 0 | 52 | 21 | 0 | 7 |
| 47 | 0 | 50 | 21 | 0 | 9 |
| 48 | 0 | 50 | 23 | 0 | 7 |
| 49 | 0 | 51 | 22 | 0 | 7 |
| 50 | 0 | 53 | 21 | 0 | 6 |
| 51 | 0 | 54 | 20 | 0 | 6 |
| 52 | 0 | 49 | 23 | 2 | 6 |
| 53 | 0 | 49 | 24 | 0 | 7 |

Source: Guidehouse

4.3.4 Estimated Demand Impacts

As described in Section 2.3.2, Guidehouse grouped events by start and end time (“event time”) for the purposes of evaluation. Table 4-9 below shows the Peak Events impacts for each event time. Reported impacts reflect the impact of the treatment, inclusive of any opt-outs.

Guidehouse estimated statistically significant savings for events that occurred from 5 PM – 9 PM, 5 PM – 10 PM, 6 PM – 10 PM, 7 PM – 11 PM, 6 AM – 10 AM, and 7 AM – 10 AM. Of the 7 event times, savings were estimated ranging from 0.05 kW to 0.46 kW per device. A statistically insignificant increase in demand was observed in the remaining event periods. See the Appendix B spreadsheet for the impacts by hour for each event time.

Variance in observed impacts is likely attributable to the high number of dispatch failures and the technical and operational issues experienced during the season (e.g. events not being dispatched correctly). This can be observed via inspection of event load shapes, which are provided in Appendix B. Estimated impacts will likely be more consistent if events are dispatched more successfully; however overall, the evaluation results show evidence of the intended load shift attributable to the program.

Table 4-9: Peak Events (ADR) Impacts by Event Time

| Event Time | Number of Events | Savings Per Device (kW) | Margin of Error (kW) (90% Confidence Interval) | Relative Precision +/--% (90% Confidence) |
|--------------|------------------|-------------------------|--|---|
| 5 PM - 8 PM | 1 | 0.05 | 0.37 | 777% |
| 5 PM - 9 PM | 11 | 0.25 | 0.13 | 52% |
| 5 PM - 10 PM | 9 | 0.37 | 0.12 | 33% |
| 6 PM - 10 PM | 13 | 0.41 | 0.09 | 23% |
| 7 PM - 11 PM | 11 | 0.46 | 0.13 | 28% |
| 6 AM - 10 AM | 7 | 0.06 | 0.05 | 84% |
| 7 AM - 10 AM | 1 | 0.10 | 0.08 | 89% |

Source: Guidehouse

4.4 Demand Impacts - Off-Peak Charging

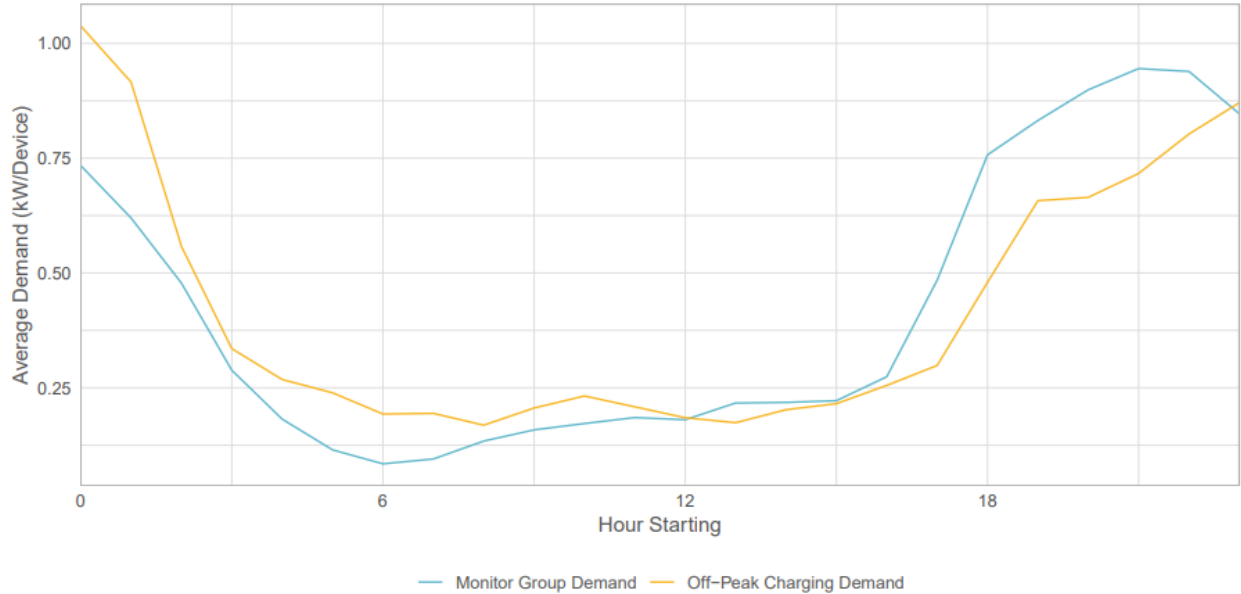
4.4.1 Randomization and Non-Treatment Period Comparison

For the Off-Peak Charging treatment, Guidehouse could not directly verify the randomization of the Monitor and Off-Peak Charging groups, as in Year 1, there were no non-event periods to compare. In general, since VT participants were generally randomly assigned among all groups (assuming compatibility), and nearly all EVSE participants were assigned to the Peak Events group (except for 3 EVSE participants that were assigned to the Monitor group), Guidehouse expects the randomization to be robust for the Off-Peak Charging treatment.

Guidehouse compared charging behaviour between the Off-Peak Charging and Monitor (control) groups during the pre-period (non-treatment period), from September 1, 2024 to November 30, 2024. Due to technical issues (e.g. with Optiwatt), data was only available for the pre-period for participants enrolled in Year 1 of the Pilot, and did not have participants that were enrolled after Year 1 of the Pilot.

Figure 4-8 shows the pre-period load shape comparison, which shows that the Off-Peak Charging group appears to demonstrate modified charging behaviour during the pre-period relative to the Monitor group. This result suggests that behavioural changes that lead to demand impacts during Winter 2024 persisted throughout the year, even without continuing monthly incentives. However, the difference in charging behaviour between the control and treatment group means that the pre-period cannot be used as a counterfactual for the Pilot period, as it does not truly represent an “untreated” period. Therefore, Guidehouse performed our analysis based the 2025 winter pilot season only, under the assumption that the Monitor group would serve as a sufficient comparison group during the Pilot, when including the Year 2 enrolled participants, based on the randomization of assignment as well as the comparison of non-event day loads with the Peak Events group as shown in Section 4.3.1.

Figure 4-8: Off-Peak Charging (BDR) Hourly Load Shape for Pre-Period Before the Pilot



Note: This plot reflects an hourly time series, so the values represent the average power in increments of one hour, for each hour start (e.g. the value for hour start 10 represents the average power between 10 AM to 11 AM)

Source: Guidehouse

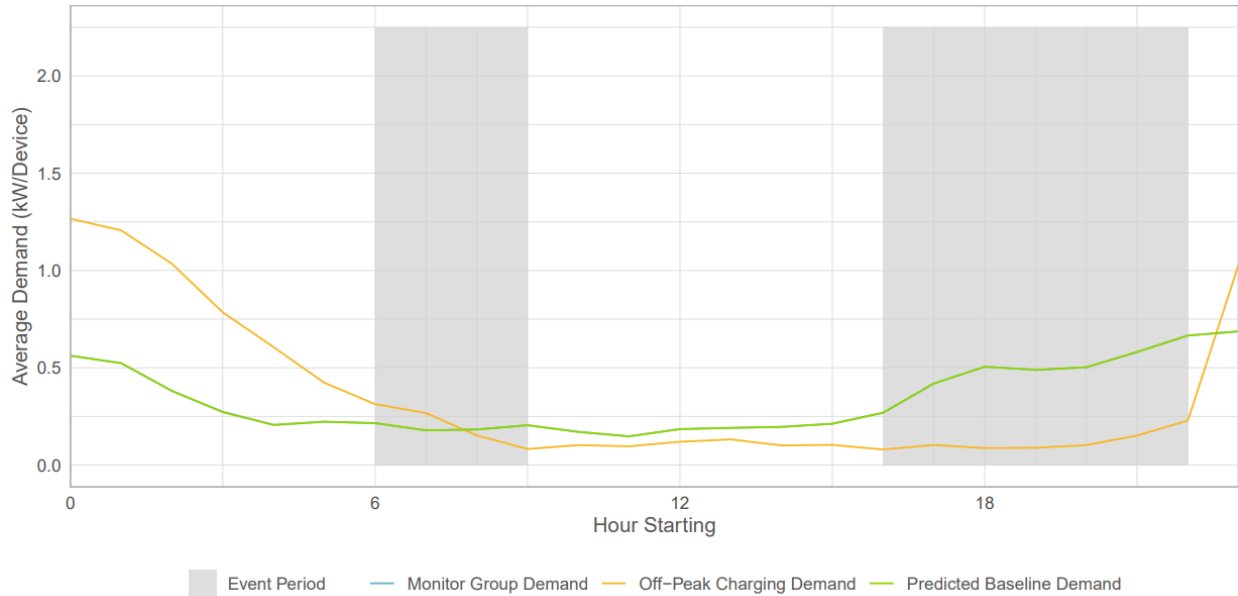
4.4.2 Comparison of Load Shapes

Figure 4-9, Figure 4-10, and Figure 4-11 show comparisons of hourly load shapes overall, for weekdays, and for weekends, respectively, for the Monitor (control) group and the Off-Peak Charging group, as well as the estimated baseline based on regression modeling. These results show a clear response of the Off-Peak Charging group as their charging behaviour is reduced during the evening peak period.

The average demand for the Off-Peak Charging group is highest from approximately 11 PM to 6 AM. Demand for the Monitor group is steady earlier in the day, increasing throughout the late afternoon and evening. No significant reduction in demand was estimated during the morning peak period, but observed demand for both the Passive Management and Monitor groups is around the same level.

The average daily consumption is very similar between the Monitor group demand (in blue) and Off-Peak Charging treatment (in green). There is a slight difference still between the control and treatment group consumption (difference of 0.50 kWh / day), and this difference may be due to differences in the composition of the two groups. For example, Guidehouse noted different proportions of vehicle makes, which may be associated with different battery capacities and charging power. Specifically, the Monitor group had more Chevrolet and other vehicle makes, while the treatment group had more Tesla and Hyundai.

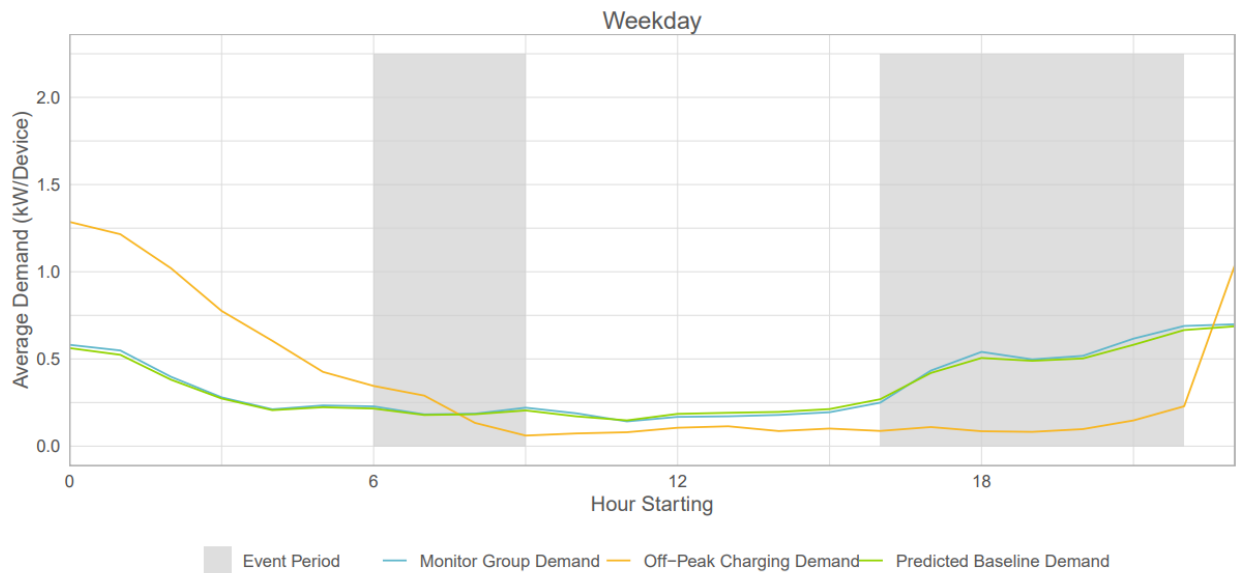
Figure 4-9: Off-Peak Charging (BDR) Hourly Load Shape Overall



Note: This plot reflects an hourly time series, so the values represent the average power in increments of one hour, for each hour start (e.g. the value for hour start 10 represents the average power between 10 AM to 11 AM). The Monitor (control) group (blue) is overlapping with the predicted baseline demand (green), as the Monitor (control) group was used as the predicted baseline demand.

Source: Guidehouse

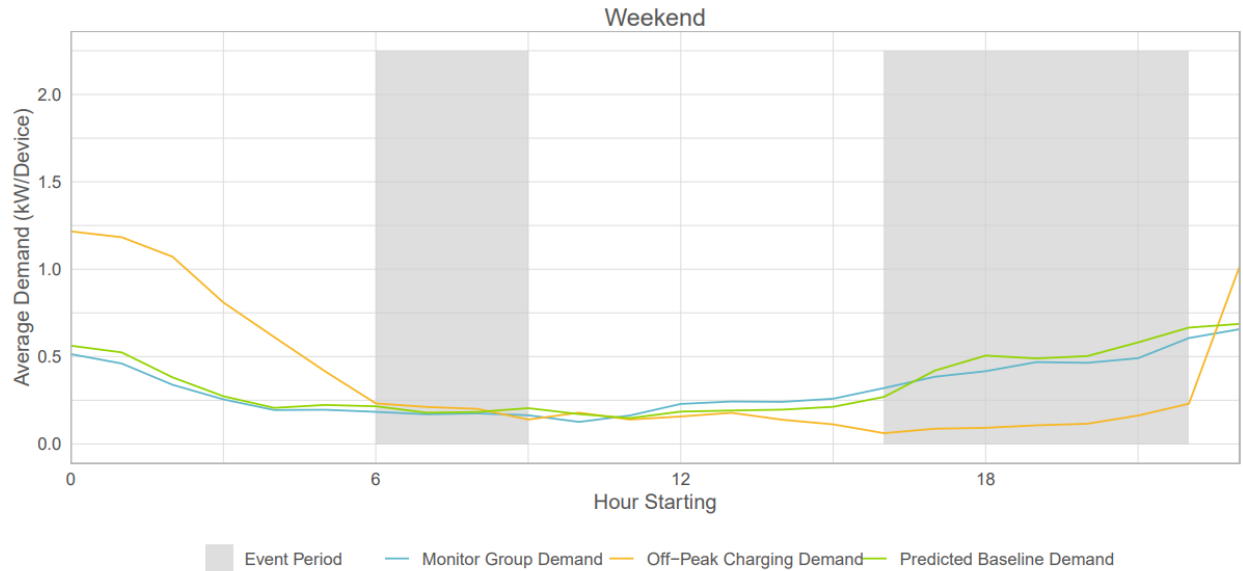
Figure 4-10: Off-Peak Charging (BDR) Hourly Load Shape for Weekdays



Note: This plot reflects an hourly time series, so the values represent the average power in increments of one hour, for each hour start (e.g. the value for hour start 10 represents the average power between 10 AM to 11 AM).

Source: Guidehouse

Figure 4-11: Off-Peak Charging (BDR) Hourly Load Shape for Weekends



Note: This plot reflects an hourly time series, so the values represent the average power in increments of one hour, for each hour start (e.g. the value for hour start 10 represents the average power between 10 AM to 11 AM).

Source: Guidehouse

4.4.3 Opt-Outs

Table 4-10 summarizes opt-outs by device in the Off-Peak Charging group (i.e. those that charged during a peak period). Note that there is uncertainty in start and end times of charging due to the frequency of data polling for the Smartcar data, as described previously in Section 2.2.1. This results in uncertainty regarding which devices truly opted-out during the peak times, as estimated charging start and stop times are uncertain by as much as 1 hour.

The All group summarizes opt-outs based on all potential overlap between peak hours and charging, while the Filtered group uses more lenient criteria to remove some opt-outs relative to the All group. These leniency criteria included reasons such as:

- When one observation was in the off-peak period and the subsequent or preceding observation was in the on-peak period,
- The SOC was below a threshold of 25%, there was a gap of more than 6 hours between charging observations,
- The average on-peak kW was more than 1.5 kW for participants that did not have a L2 charger at home (assumed that charging was away from home).

Note that these opt-outs ultimately do not affect estimated impacts, as all device data is included regardless of apparent participation in Off-Peak Charging. Reported impacts reflect the impact of the treatment, inclusive of any opt-outs.

Table 4-10: Off-Peak Charging (BDR) Opt-Outs

| Opt-Outs by Device | Min | Mean | Median | Max |
|--------------------|-----|------|--------|------|
| All - Dec | 0.0 | 8.9 | 5.5 | 35.0 |
| All - Jan | 0.0 | 7.3 | 3.5 | 39.0 |
| All - Feb | 0.0 | 6.1 | 2.0 | 56.0 |
| All - Mar | 0.0 | 7.0 | 4.5 | 41.0 |
| Filtered - Dec | 0.0 | 5.5 | 2.5 | 29.0 |
| Filtered - Jan | 0.0 | 3.9 | 2.0 | 24.0 |
| Filtered - Feb | 0.0 | 3.0 | 1.0 | 22.0 |
| Filtered - Mar | 0.0 | 4.5 | 3.5 | 21.0 |

Source: Guidehouse

4.4.4 Estimated Demand Impacts

Table 4-11 below lists the impacts by the event hours and day type (weekday vs weekend) for the Off-Peak Charging group. See Appendix B for impacts by hour. One Off-Peak Charging period had statistically significant impacts, specifically the evening peak period from 4 PM to 11 PM. Although the morning off-peak period between 11 PM to 6 AM did not show statistically significant impacts, the point estimate is consistent with the expected load shift of evening to overnight charging. Guidehouse estimated savings of 0.37 kW per device during the evening peak period. This represented a 75% decrease in peak load for the evening peak period, and a 123% increase in peak load for the morning off-peak.

No statistically significant impacts were observed between the period from 6 AM to 10 AM. This may be attributed to the similar demand load shape during the morning peak of the control and treatment groups, in part because most charging takes place in either the evening peak period or morning off-peak period. The saving impacts on weekdays are larger than on weekends. This result can be attributed to the fact that more concentrated charging on weekday evenings (due to work schedules) that can be shifted.

Table 4-11: Off-Peak Charging (BDR) Event Impacts by Event Hours and Day Type

| Event | Event Hours | Day Type | Savings Per Device (kW) | Margin of Error (kW) (90% Confidence Interval) | Relative Precision +/-% (90% Confidence) |
|--------------------|--------------|----------|-------------------------|--|--|
| Morning Peak | 6 AM - 10 AM | All | -0.01 | 0.03 | 332% |
| Evening Peak | 4 PM - 11 PM | All | 0.37 | 0.02 | 6% |
| Morning Off-Peak | 11 PM - 6 AM | All | -0.50 | 0.02 | 4% |
| Afternoon Off-Peak | 10 AM - 4 PM | All | 0.07 | 0.02 | 31% |
| Morning Peak | 6 AM - 10 AM | Weekday | -0.00 | 0.03 | 1096% |
| Evening Peak | 4 PM - 11 PM | Weekday | 0.39 | 0.03 | 7% |
| Morning Off-Peak | 11 PM - 6 AM | Weekday | -0.49 | 0.03 | 5% |
| Afternoon Off-Peak | 10 AM - 4 PM | Weekday | 0.08 | 0.03 | 34% |
| Morning Peak | 6 AM - 10 AM | Weekend | -0.02 | 0.05 | 236% |
| Evening Peak | 4 PM - 11 PM | Weekend | 0.33 | 0.04 | 12% |
| Morning Off-Peak | 11 PM - 6 AM | Weekend | -0.53 | 0.04 | 8% |
| Afternoon Off-Peak | 10 AM - 4 PM | Weekend | 0.06 | 0.04 | 74% |

Source: Guidehouse

4.5 Program Benefits

Guidehouse estimated system benefits for on-peak periods (6 AM to 10 AM and 4 PM to 11 PM) based on average impacts for each treatment and avoided cost of capacity values provided by Newfoundland Power as described in Section 2.3.3 (\$356.07 / kW-year) Table 4-12 and Table 4-13 show program benefits for the Off-Peak Charging (BDR) and Peak Events (ADR) groups, respectively. These estimates represent the potential program benefits associated with each device (vehicle or EVSE) for different definitions of system peak, i.e., in different cases where system peak would coincide with the treatment period. The Appendix B spreadsheet provides more granular hourly program benefit estimates, which may be used to estimate potential benefits for other system peak definitions.

Note that since estimated impacts for some periods were not statistically significant, there is uncertainty in potential benefits. Guidehouse did not remove any estimates when estimating program benefits.

Both the Off-Peak Charging and Peak Events groups were estimated to deliver system benefits, particularly during the evening periods. Off-Peak Charging delivered a benefit of approximately \$131.76 per device during the 4 PM to 11 PM event window. During the 6 AM to 10 AM event window, Off-Peak Charging did not have any potential benefits. The benefits estimated for the Peak Events group reflect the estimated impacts for all events that were called during peak periods, rather than a specific event time. The benefits from the Peak Events were less than the Off-Peak Charging group during evening peak but delivered a statistically significant benefit in the morning on-peak and was higher than that of the Off-Peak Charging group, which did not have statistically significant savings during the morning on-peak.

Table 4-12: Program Benefits for Off-Peak Charging Events (BDR)

| Peak Period | Day Type | Savings Per Device (kW) | Avoided Cost of Capacity Per Device (\$/year) |
|--------------|----------|-------------------------|---|
| 6 AM - 10 AM | All | -0.01 | -\$3.07 |
| 4 PM - 11 PM | All | 0.37 | \$131.76 |
| 6 AM - 10 AM | Weekday | -0.00 | -\$1.10 |
| 4 PM - 11 PM | Weekday | 0.40 | \$143.82 |
| 6 AM - 10 AM | Weekend | -0.02 | -\$8.15 |
| 4 PM - 11 PM | Weekend | 0.32 | \$113.25 |

Source: Guidehouse

Table 4-13: Program Benefits for Peak Events (ADR)

| Peak Period | Savings Per Device (kW) | Avoided Cost of Capacity Per Device (\$/year) |
|--------------|-------------------------|---|
| 6 AM - 10 AM | 0.08 | \$27.03 |
| 4 PM - 11 PM | 0.32 | \$114.81 |

Source: Guidehouse

4.6 Comparison of Year 1 and Year 2 Impact Results

Table 4-14 compares impacts between the Year 1 evaluation and the Year 2 evaluation for the Peak Events group. The Peak Events evening savings increased in Year 2 compared to Year 1, for the event times of: 5 PM – 9 PM, 6 PM – 10 PM and 7 PM – 11 PM. Additionally, the estimated savings are more certain in Year 2 than in Year 1 due to the larger sample of participants. The morning Peak Events had about the same savings in Year 2 as in Year 1, but were similarly more certain in Year 2 than in Year 1.

Table 4-14: Peak Events (ADR) Year 1 to Year 2 Comparison

| Event Time | Year 1 Savings Per Device (kW) | Year 1 Relative Precision +/-% (90% Confidence) | Year 2 Savings Per Device (kW) | Year 2 Relative Precision +/-% (90% Confidence) |
|--------------|--------------------------------|---|--------------------------------|---|
| 5 PM - 8 PM | N/A | N/A | 0.05 | 777% |
| 5 PM - 9 PM | -0.31 | 287% | 0.25 | 52% |
| 5 PM - 10 PM | N/A | N/A | 0.37 | 33% |
| 6 PM - 10 PM | -0.08 | 698% | 0.41 | 23% |
| 6 PM - 11 PM | 1.03 | 48% | N/A | N/A |
| 7 PM - 11 PM | -0.66 | 233% | 0.46 | 28% |
| 6 AM - 10 AM | 0.10 | 306% | 0.06 | 84% |
| 7 AM - 10 AM | -0.01 | 3287% | 0.10 | 89% |

Note: N/A means there were no applicable event times in that evaluation year.

Source: Guidehouse

Table 4-15 shows a comparison of estimated impacts for the Year 1 evaluation and Year 2 evaluation for the Off-Peak Charging group. Estimated evening peak savings decreased slightly in Year 2 to 0.37 kW compared to 0.48 kW in Year 1, and were also more certain from 79% relative precision in Year 1 to 6% in Year 2. The morning off-peak impacts were lower in Year 2 with -0.50 kW from -0.67 kW in Year 1, and become more certain from 60% relative precision to 4% in Year 2.

Table 4-15: Off-Peak Charging (BDR) Year 1 to Year 2 Comparison

| Event | Event Hours | Year 1 Savings Per Participant (kW) | Year 1 Relative Precision +/-% (90% Confidence) | Year 2 Savings Per Device (kW) | Year 2 Relative Precision +/-% (90% Confidence) |
|--------------------|--------------|-------------------------------------|---|--------------------------------|---|
| Morning Peak | 6 AM - 10 AM | -0.17 | 294% | -0.01 | 332% |
| Evening Peak | 4 PM - 11 PM | 0.48 | 79% | 0.37 | 6% |
| Morning Off-Peak | 11 PM - 6 AM | -0.67 | 60% | -0.50 | 4% |
| Afternoon Off-Peak | 10 AM - 4 PM | -0.16 | 309% | 0.07 | 31% |

Source: Guidehouse

5. Participant Survey Results

5.1 Participant Survey Characteristics

The participant survey achieved a relatively high response rate of 51% (based on 92 completes), with a low screen-out percentage of 2%. See Table 5-1 for the participant survey response rate for each group.

Table 5-1: Participant Survey Response Rate

| Group | Number of Participants | Number of valid respondents | Survey Response Rate |
|-------------------|------------------------|-----------------------------|----------------------|
| Peak Events | 79 | 41 | 52% |
| Off-Peak Charging | 47 | 21 | 45% |
| Monitor | 54 | 30 | 56% |
| All | 180 | 92 | 51% |

Source: Guidehouse

Respondents had the following characteristics based on survey responses:

- 91% own L2 charging equipment at home.
- 65% reported working full-time, part-time or attending school outside their home.
- 72% reported that their household's approximate 2024 total income (before taxes) was \$100K or more.

This section summarizes the main findings related to participant charging behaviour, participant satisfaction, concerns, and other feedback. Refer to Appendix D for the full survey analysis.

5.2 Feedback on Pilot Program Implementation

5.2.1 Respondent Satisfaction with the Pilot

When asked about their satisfaction with the overall Pilot, 84% of respondents gave an interest rating of 6 or more (with 10 being "Very satisfied"), indicating a high rate of overall satisfaction. Table 5-2 shows the respondents' satisfaction ratings per group when asked about their overall experience with the Pilot. The Off-Peak Charging group reported the lowest rate of satisfaction, which may suggest that more participants in this group had to change their charging behaviour more drastically or encountered more issues. Some Off-Peak Charging group respondents had complaints about having to wait until 11 PM to charge their vehicles, which may have increased dissatisfaction.

Table 5-2: Satisfaction with Overall Program

| Satisfaction Rating ¹ | Peak Events group | Off-Peak Charging group | Monitor group | All Respondents |
|----------------------------------|-------------------|-------------------------|---------------|-----------------|
| Dissatisfied (1 – 5) | 17% | 24% | 10% | 16% |
| Satisfied (6 – 10) | 83% | 76% | 90% | 84% |

Source: Guidehouse

¹Respondents were asked to rate their satisfaction level from 1 to 10 with 10 being “Very satisfied”

Table 5-3 shows the respondents’ satisfaction with various aspects of the Pilot along with the main reasons for why respondents were dissatisfied. Comments related to dissatisfaction represent potential areas for improvement in the delivery of future EV load management programs. In particular, the results indicate that resolving Hyundai’s BlueLink and Optiwatt app incompatibility⁴ issues could improve participant satisfaction.

Table 5-3: Satisfaction with Varying Aspects of the Pilot

| How satisfied were respondents with the: | Percentage of all respondents generally satisfied ¹ | Main reasons for dissatisfaction |
|---|--|--|
| Charging platform? | 60% | Hyundai’s BlueLink and Optiwatt app incompatibility issues. |
| Ability to opt-out? ² | 73% | Lack of understanding for when they can opt-out. |
| Frequency and relevance of the communication? | 78% | Too many notifications, especially in the early morning and overnight. |
| Enrollment process? ³ | 78% | Too many steps involved. |

Source: Guidehouse

¹Respondents gave a rating of 6 or higher when asked about satisfaction level with 10 being “Very satisfied”

²Ability to opt-out only applies to the Peak Events group and the Off-Peak Charging group

³Respondents gave a difficulty rating from 1 – 10 with 10 being “Very easy”

The majority of respondents were satisfied with the communication of the program. The top 3 preferred methods of receiving information were Email, Text message and Mobile App notifications. The top 2 preferred frequencies to hear from the Pilot were once a month and once a week. Newfoundland Power could consider implementing Email and Text message as their main method of communication in future EV load management programs.

⁴ Hyundai Bluelink forced users to update login credentials while users were participating in the pilot program causing multiple unsuccessful login attempts by Optiwatt’s API causing users to be locked out of the Hyundai’s Bluelink App. App incompatibility was due to the vendor (Uplight’s Optiwatt) app not being compatible with the Tesla software, resulting in the Optiwatt app overriding the Tesla charging schedule. There were time variances between the charging session start and stop times for the OEM app and Optiwatt app.

5.2.2 Concerns and Issues

The lack of understanding regarding the opt-out process and program mechanics was prevalent when identifying the respondents' concerns and issues. Some respondents did not understand the opt-out process, which led them to charge their vehicle less than they would like.

Newfoundland Power could consider revisions to communication of the following program mechanics with more clarity in future EV load management programs to improve satisfaction levels and facilitate easier participation:

- How many times a participant can opt-out in a month and still be eligible for the monthly incentive.
- The incentive amounts for taking part in the Pilot.

Table 5-4 lists different categories of concerns that participants may have had, as well as: (1) the percentage of participants that had these concerns before enrolling; and (2) the percentage that still have these concerns. Participants were not generally initially concerned about the Pilot – 43% of respondents did not have any concerns. For those participants that had some initial concerns, the survey shows that the percentage of respondents who still had concerns has decreased.

Table 5-4: Participant Concerns with the Pilot

| Concern | Percentage of all respondents (%) | |
|--|--|---|
| | Who had the concern prior to enrolling | Who are still "Very concerned" ¹ |
| Concern about privacy, data security or their location being shared | 34% | 3% |
| Concern that their vehicle would not always be charged when they wanted to use | 31% | 0% |
| Concern if their vehicle or charging equipment would be eligible for the Pilot | 21% | 1% |
| Concern over the effort needed to work or manage their EV's charging schedule | 16% | 2% |

Source: Guidehouse

¹Respondents were asked if they were "No longer concerned", "Somewhat concerned" or "Very concerned" at the time of the survey. The table identified the respondents who are still "Very concerned".

As seen in the table above, 34% of all respondents noted that they were concerned about their privacy, data security or location being shared prior to enrolling to the program. Currently, 3% of respondents are still "Very concerned" about this, 17% are still "Slightly concerned" and 13% are "No longer concerned". Newfoundland Power could consider reassuring participants that their data will not be shared with external parties to continue to bring down participants' concerns with data security.

When asked how takeCHARGE NL can address participant’s concerns, the following answers were provided:

- Respondents would like to receive updates on how the program worked and what action will be taken as a result of this program.
- Respondents would like more EV chargers to be eligible to participate.
- Respondents request that issues that were seen with the OptiWatt App and regarding wear on the car battery (possibly linked to charging control - Hyundai’s BlueLink) be solved.
- Respondents in the Off-Peak Group found that 11 PM was too late a time to be expected to charge their car and would like the period to start earlier.
- Respondents found there was a lack of information at the start of the Pilot about the data collection agency.

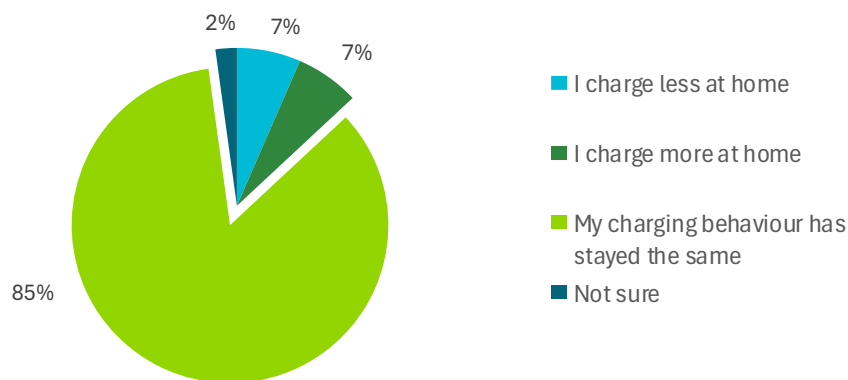
To ensure participants are well informed and to reassure their confidence in the Pilot, Newfoundland Power may consider additional communication around the effect the Pilot will have on a participant’s vehicle and the level of effort required from the participant. If possible given platform limitations, expanding the number of vehicles eligible for the Pilot and solving the Hyundai’s BlueLink and Optiwatt App issues would also improve participant satisfaction.

5.3 Participant Behaviour Analysis

5.3.1 Change in Charging Behaviour

Most respondents stated that their charging behaviour did not change with respect to where they charge. Figure 5-1 shows the response of all respondents when asked if their charging behaviour has changed.

Figure 5-1: Change in Charging Behaviour of All Respondents



Source: Guidehouse

The Peak Events group had the greatest change in their charging behaviour with 22% of Peak Events respondents indicating they changed where they charge since enrolling with the Pilot (refer to Appendix D for the full survey results analysis). This may indicate that the Peak Events group is the most effective in having participants reconsider their current charging habits and in

participants understanding the benefit in changing them. When asked if their charging behaviour changed as a result of the Pilot, 60% of respondents stated it did. Respondents adjusted their charging behaviours by avoiding peak periods, and some respondents noted that the Optiwatt app aided in the change as they were able to program their charging schedule.

The load shape data shows that there was load shifting for both the Peak Events group and the Off-Peak Charging group. The load shifting aligns with the respondents' comments that their behaviour was changed because of the Pilot, both in when they charge and sometimes where they charge. The survey results and load shifting data suggests that the Pilot was successful in changing participants' charging behaviour, and specifically, the Peak Events group saw the greatest change.

5.3.2 Use of the Override Process

Most respondents reported opting out less than three times a month, which some stated was due to technical issues with the charging system and their lack of understanding of when they can opt-out (three Peak Events respondents reported these reasons). The Off-Peak Charging group tended to opt-out more frequently than the Peak Events group and had less comments about their lack of understanding for when they can opt-out. This may indicate that the Off-Peak Charging group found that the Pilot disrupted their regular charging schedule more than the Peak Events group as they chose to opt-out more frequently. Newfoundland Power could consider that the Peak Events group may require less effort from participants, yet load shifting is still seen. Table 5-5 shows the frequency which respondents opted-out according to the survey.

Table 5-5: Number of Opt-Outs per Month

| | Peak Events group | Off-Peak Charging group |
|---------------------------|-------------------|-------------------------|
| Less than 3 times a month | 83% | 57% |
| 3 or more times a month | 0% | 10% |
| Not sure | 17% | 33% |

Source: Guidehouse

The actual number of opt-outs (according to load data) indicate that only one participant from the Peak Events group opted-out three or more times in a month (for only one month). The interval data shows that around 40% of Off-Peak Charging group participants opted-out in any month. This roughly aligns with the number of respondents that indicated either three or more times a month or not sure for the survey question.

5.4 Participant Interest in Future Programs

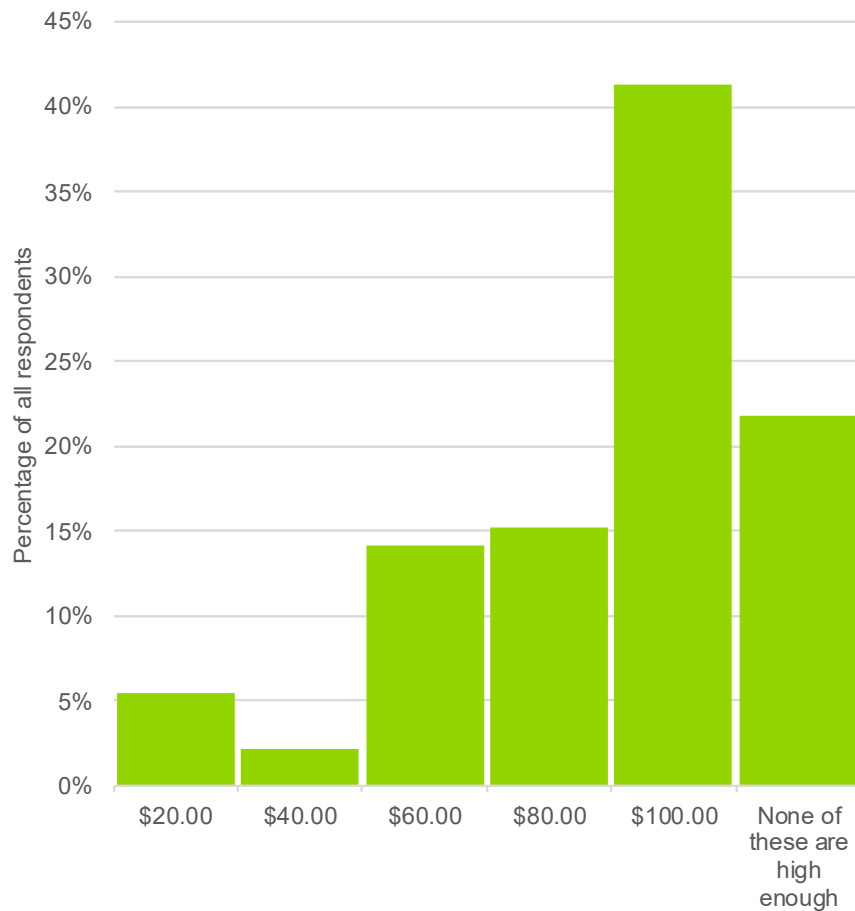
The survey results show that most respondents would be interested in participating in a future EV load management program (all respondents gave a rating of 5 or higher when asked about their future interest, with a rating of 10 being "Very interested").

5.4.1 Annual Incentive

The annual incentive that would motivate participants to join a future EV load management program ranges with 41% of respondents stating that an annual incentive of \$100 would be sufficient. Figure 5-2 shows the respondents' answers when asked about their minimum ongoing annual incentive required to make them interested in participating in future programs.

However, respondents may be overstating the minimum amount they would require to participate in future programs. Newfoundland Power could benchmark incentives against other similar programs or conduct a more formal willingness to pay study if desired. Ultimately, program incentive will need to be aligned with the potential benefits, to cost-effectively deliver the program.

Figure 5-2: Minimum Ongoing Annual Incentive Respondents Would Require to Participate in Future Programs



Source: Guidehouse

The Pilot's current incentive is up to \$230, and respondents were generally satisfied. In another survey question, when asked if they would be interested in participating in future programs for a \$75 annual incentive, 80% of respondents said they would be (giving a rating of 6 or higher

when asked about their interest, with 10 being “Very interested”). A few respondents stated that they would prefer cash or credit on their power bill instead of a store purchase card.

Newfoundland Power could consider an annual incentive of \$75 to \$100 and providing the incentive as a bill credit rather than a store purchase card in future EV load management programs, which may increase satisfaction.

5.4.2 Motivating Factors

Most respondents heard about the Pilot from social media, the takeCHARGE NL website and word of mouth. After being connected to the Pilot, respondents said the most motivating factors for participating in the Pilot were the following:

- The enrollment and additional incentives throughout the Pilot.
- The opportunity to contribute to research on smart EV charging and its possible economic and environmental benefits.

When advertising future EV load management programs, Newfoundland Power can utilize their social media and website to promote the program. Newfoundland Power could consider reaching out to past participants to encourage them to talk about the Pilot with their social connections. When promoting the program, Newfoundland Power could consider focusing on the incentives available and why the opportunity to participate in the program is meaningful and what benefits will be seen because of the program.

6. Conclusions

For the 2025 season, Guidehouse's evaluation of the Pilot showed clear evidence of the desired load shifting impact of both tested treatments, and provides initial quantification of the potential benefits of an EV managed charging program. The development of the Pilot also provided Newfoundland Power with valuable information regarding the issues associated with implementation of different types of treatment (e.g. passive vs active, vehicle telemetry vs EVSE) to inform future program design. Conclusions from Guidehouse's evaluation are:

- **Both active and passive load management strategies show evidence of successful load curtailment.** The passive treatment group curtailed their load in the evening peak period, with an average reduction of charging demand between 4 PM and 11 PM of 0.37 ± 0.02 kW/device. Active events resulted in an average reduction of charging demand of up to 0.46 kW/device (events called between 7 PM and 11 PM).
- **Load was generally shifted from the evening period to overnight.** This result aligns with the prediction that both treatments delay charging when participants return home and plug in their vehicles. The morning peak period (6 AM to 10 AM) shows less potential for load reduction, as participants do not typically charge their vehicles in the morning, even without any treatment.
- **EV managed charging provides system benefit in the form of avoided cost of capacity.** The exact potential benefits will vary depending on how treatments are ultimately used to target system peak, and how the system peak coincides with the treatment period. Guidehouse estimated the potential range of benefits based on average curtailment during peak periods. For example, in the morning peak period (6 AM to 10 AM) Guidehouse estimated the benefit to be \$27.03 / device for Peak Events. For the evening peak period (4 PM to 11 PM), benefits were estimated to be \$131.76 / device for the Off-Peak Charging treatment, and \$114.81 / device for Peak Events.
- **The Off-Peak Charging group demonstrated persistent load shifting behaviour after the Winter 2023/2024 season.** The data from September 2024 to November 2024 showed persistence of some savings during the shoulder season months, which suggests the treatment is still effective in the off-season, absent a direct monthly incentive.
- **Technical and operational challenges reduced program impacts and may be a barrier to future scaling of the program.** For example, there were challenges with customer enrollment and successfully dispatching events with the Uplight platform in Year 2. These types of challenges appeared to have less effect on the passive treatment, which relies more on participants' own behavioural changes rather than the Uplight platform.
- **Year 2 of the Pilot provided additional data and improved certainty of impact estimates.** Increased enrollment in Year 2 of the Pilot provided more data and consolidating the event times for the Peak Events group provided more certain estimates for the Peak Events group compared to Year 1.
- **Survey results suggest that the Pilot was successful in influencing when participants charge, but likely not where they charge.** Survey respondents did not change whether they charge at home or at work, but they did change their charging schedules to avoid peak periods.

- **Participants were generally satisfied with the Pilot charging platform and program communication.** The frequency and method of communication were effective for respondents. Dissatisfaction related to the charging platform was due to Hyundai's BlueLink App issues and Optiwatt App incompatibility.
- **The majority of participants are interested in participating in future EV load management programs.** When respondents were asked for the minimum annual incentive amount that would make them interested in participating, a plurality of respondents said they would desire an annual incentive of up to \$100. However, respondents may be overstating their minimum requirement, and could be biased towards selecting the highest incentive amount provided in the survey. In another survey question, when asked if they would be interested in participating in future programs for a \$75 annual reward, 80% of respondents said they would be.

Guidehouse provides the following recommendations for Newfoundland Power to inform future program delivery and evaluation.

- **Consider the Off-Peak Charging treatment as a relatively lower complexity option to provide consistent load shift compared with other options.** Based on evaluation of the 2025 season, this passive treatment showed very clear load shifting potential, with fewer technical requirements (e.g. no discrete event dispatch, fewer platform challenges associated with failed events, equipment incompatibilities). Newfoundland Power may consider whether this strategy would meet their long-term demand side management needs, or whether active solutions provide enough incremental benefit to warrant their additional complexity. Newfoundland Power may want to consider using the strategy that presents fewer challenges in implementation.
- **A future program informed by the Pilot would need to consider the program benefits.** The results from Year 2 of the Pilot indicate that the Off-Peak Charging provides the highest potential program benefits if the system peak is in the evening, and the Off-Peak Charging treatment also has less operational challenges compared to the Peak Events treatment. The Peak Events program potential benefits are low due to high number of dispatch failures. The program benefits for the Peak Events may be higher than the Off-Peak Charging treatment if there was more successful participation in events. In addition, the Peak Events treatment can be more flexibly controlled to target specific system peak windows, to offer potentially more system benefits. However, this treatment would still have higher complexity than running a program based on passive treatment.
- **Consider addressing the technical challenges of the managed charging platform prior to further roll out of a full program.** The key challenges to address include: simplifying and improving the enrollment process to get more compatible drivers enrolled in the program; improving reliability in curtailing charging for the Peak Events group throughout the entire duration of the event; and addressing challenges in collecting reliable data.
- **Re-enroll the remaining Smartcar participants with Optiwatt.** The Smartcar data continues to have the data issue of being unable to isolate home charging data. By re-enrolling the remaining Smartcar participants with Optiwatt, this would provide both more granular vehicle telematics data, but also the ability to resolve the remaining issue of isolating home charging data. This would improve the quality of determining passive opt-outs, and improve the accuracy of the load shapes.

- **Clarify the opt-out and incentive process for participants.** During the Pilot, many survey respondents stated that they were unsure when to charge and not charge and when they would be eligible for incentives.
- **Address privacy and data security concerns and software malfunction/incompatibility issues prior to the next EV load management program.** Respondents still had concerns regarding their data security and software malfunction after the Pilot, Newfoundland Power could work to address these concerns to the extent feasible.

Appendix A. Impact Evaluation Approach

Guidehouse’s impact evaluation focused on characterizing baseline charging behaviour and quantifying the demand impacts of the two treatments in the Pilot. This section provides additional details regarding data cleaning of charging telemetry data, as well as regression analysis to develop estimated impacts for the Off-Peak Charging and Peak Events treatments.

A.1 Data Cleaning

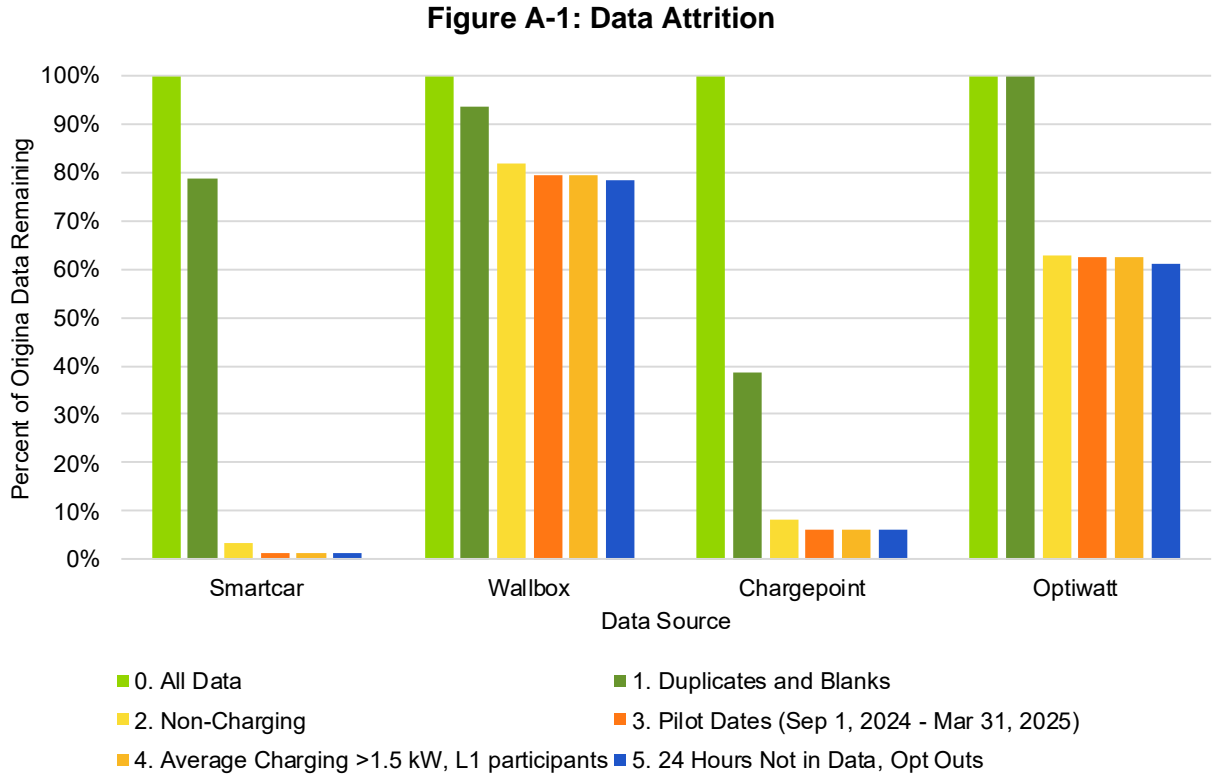
Table A-1 below summarizes the main data cleaning steps taken for the four sources of data used for this evaluation – Smartcar vehicle telematics, Wallbox EVSE telematics, ChargePoint EVSE telematics, and Optiwatt vehicle telematics.

Table A-1: Data Cleaning Steps

| Step | Step Description | Details |
|------|--|--|
| 1 | Remove Duplicate and Blanks | Smartcar: Assumed charging happens whenever there was an increase in vehicle state of charge (SOC). Removed duplicates, blanks and missing data where SOC was missing and calculated kWh and hours between observations. Wallbox, ChargePoint, Optiwatt: Removed duplicates, blanks in charging data. |
| 2 | Remove non-charging data | Smartcar: Remove the non-charging data. Wallbox and ChargePoint: Remove data where the kW between observations was negative. Optiwatt: Remove away from home plug in sessions, data where Hyundai vehicles had 0 charging from January 14 – March 12, 2025 due to the Hyundai’s BlueLink issue, and remove data for months where there was only 0 charging data. |
| 3 | Remove data before Sep 1, 2024 and after Mar 31, 2025 | The Pilot and pre-period only applied for data between Sep 1, 2024 and March 31, 2025. For Smartcar, removed data Dec 1, 2024 and later where there was Optiwatt data that could be used instead. |
| 4 | Remove high power charging for participants with L1 charger at home | Sessions with average demand more than 1.5 kW for participants in the Off-Peak Charging group with an L1 charger at home were removed from the data. For Smartcar, removed charging sessions with more than 20 kW of average session charging. This was assumed to indicate fast charging which took place away from home. |
| 5 | Remove data where not all 24 hours are in the data for a given day, Opt-outs | Any days with fewer than 24 hours of data in a day were removed from the data. For Smartcar and Chargepoint, removed any data associated with known active group opt-outs. |

Source: Guidehouse

Figure A-1 below shows a summary of the data attrition (i.e. how much of the original data was removed via cleaning).



Source: Guidehouse

The majority of data that was removed from analysis was due to blank state of charge or non-charging observations (e.g. for the Smartcar data, there were records for polling events when no charging is occurring). As a result, the remainder of the data after cleaning contains the majority of data related to energy delivered, which is the information of interest for Guidehouse’s analysis.

A.2 Impact Evaluation Approach – Peak Events

For the active management, Peak Events group, demand impacts (kW per device) were estimated in each hour on event days, before, during, and after events. The analysis estimated the average treatment effect (ATE), in which impacts are estimated for all enrolled participants, regardless of participation. Therefore, the reported impacts include the effect of participants who were enrolled in the program, but may not have curtailed during events. Due to sample size for the Peak Events group, Guidehouse reports only the ATE. Guidehouse has provided average load shapes by event and for EVSE vs VT in Appendix B, to provide additional context into the difference in response between event dates and control equipment.

Guidehouse used a regression model to estimate impacts described in Equation 1, leveraging the Monitor group.

Equation 1. Peak Events Model Specification

$$kW_{it} = \alpha_i + \lambda_t + \sum_k \beta_{1kt} Pre_{kt} Treat_i + \sum_j \beta_{2jt} Event_{jt} Treat_i + \sum_m \beta_{3mt} Post_{mt} Treat_i + \varepsilon_{it}$$

Where:

- kW_{it} is charging demand for participant i during period t (i.e., hours 1-24)
- α_i is a device-specific fixed effect for participant i ; this picks up all device-specific characteristics that do not change through time
- λ_t is a series of time-specific fixed effects for period t ; these pick up temporal differences, specifically hour of day and day of week (i.e., Monday, Tuesday, etc.)
- Pre_{kt} is a set of binary variables taking a value of 1 when t is in the k^{th} period preceding an event (in the same day) and 0 otherwise
- $Event_{jt}$ is a set of binary variables taking a value of 1 when t is in the j^{th} period of an event and 0 otherwise
- $Post_{mt}$ is a set of binary variables taking a value of 1 when t is in the m^{th} period following an event (in the same day) and 0 otherwise
- $Treat_i$ is a binary variable taking a value of 1 when participant i is in the Peak Events group and 0 if they are in the Monitor group
- ε_{it} is the error term for participant i during period t

A.3 Impact Evaluation Approach – Off-Peak Charging

For the passive management, Off-Peak Charging group, since there were no true events, Guidehouse estimated hourly demand impacts to show the difference in average charging behaviour between treatment and control groups. The analysis estimated the ATE, in which impacts are estimated for all enrolled participants, regardless of participation. Therefore, the reported impacts include the effect of participants who are enrolled in the program, but may have charged during peak hours on some days. Due to uncertainty around opt-outs for this program, Guidehouse reports only the overall ATE.

Guidehouse used the regression model specifications described in Equation 2 and Equation 3, leveraging the Monitor group, to estimate overall impacts as well as impacts by weekend vs weekday.

Equation 2. Off-Peak Charging Model Specification (All Day Types)

$$kW_{it} = \sum_{k=1}^{24} \beta_{1kt} hour_{kt} + \sum_{k=1}^{24} \beta_{2kt} hour_{kt} Treat_i + \varepsilon_{it}$$

Equation 3. Off-Peak Charging Model Specification (Weekend vs Weekday)

$$kW_{it} = \sum_{k=1}^{24} \sum_{\substack{j=Weekday, \\ Weekend}} \beta_{1kt} hour_{kt} DayType_{jt} \\ + \sum_{k=1}^{24} \sum_{\substack{j=Weekday, \\ Weekend}} \beta_{2kt} hour_{kt} DayType_{jt} Treat_i + \varepsilon_{it}$$

Where:

kW_{it} is charging demand for participant i during period t (i.e., hours 1-24)

$hour_{kt}$ is a set of binary variables taking a value of 1 when t is in the k^{th} hour of the day and 0 otherwise

$DayType_{jt}$ is a set of binary variables taking a value of 1 when t is in the j^{th} day type (i.e., weekday or weekend) and 0 otherwise

$Treat_i$ is a binary variable taking a value of 1 when participant i is in the Off-Peak Charging group and 0 if they are in the Monitor group

ε_{it} is the error term for participant i during period t

A.4 Pilot Participation Groups

Guidehouse provided recommendations to Newfoundland Power regarding how to assign interested drivers to participant groups for the Pilot, in Year 1 of the Pilot. Due to compatibility with Uplight's platform, not all potential participants were eligible for all groups. For example, some participants may only be able to be monitored via vehicle telematics but not controlled, and only certain EVSE are compatible with Active Management. Participant groups were recommended considering compatibility, Pilot study objectives, and expected robustness of estimated impacts.

The following Newfoundland Power objectives informed Guidehouse's recommendations:

- Newfoundland Power targeted a total of 200 participants for the Pilot.
- Understanding the relative performance of Active Management via EVSE vs VT was a priority.

- Understanding baseline EV charging load shapes, including PHEVs, was a priority.

Based on these objectives, Guidehouse provided the following recommendations:

- Assign an equal amount of participants controlled via EVSE and VT, to enable comparison of impacts.
- Prioritize the size of the Monitor group to maximize the usefulness of baseline load profiles.
- Include PHEVs in the Monitor group, to maximize the sample and prioritize understanding their baseline charging behaviour.

A key assumption of Guidehouse’s recommendations is that we assume the set of interested drivers for the Pilot is representative of the wider population of EVs in Newfoundland. A caveat of this assumption is that the universe of EVs and drivers (e.g. earlier vs later adopters) is likely to evolve over time.

Guidehouse developed recommended participant groups as follows:

1. Develop recommended group sizes, listed in Table A-2.
2. Assign Active Management group – all compatible EVSE participants and a random selection of compatible VT participants.
 - A random selection of 30 participants from those interested in swapping their EVSE for a compatible EVSE were reserved to ensure that enough participants were available for the EVSE group. 20 participants had a compatible EVSE, therefore up to 50 potential participants will be eligible for the EVSE Active Management group.
3. Assign Passive and Monitor groups – random selection among remaining compatible participants (VT Monitor + control or VT Monitor only).

Table A-2: Recommended Participant Group Sizes

| Group | Method of Control | Notes |
|-------------------------|-------------------|---|
| Peak Events (ADR) | 30 EVSE and 30 VT | Enable comparison of EVSE vs VT for Active Management; BEV only |
| Off-Peak Charging (BDR) | VT Only | BEV only |
| Monitor | VT Only | 20 PHEV and 60 BEV |

Source: Guidehouse

Potential participants that own multiple EVs that charge at the same household were counted as a single participant.

Due to the random selection of participants for each participant group, baseline charging behaviour is expected to be similar across groups. As a further robustness check, after selecting

participant groups, Guidehouse checked the similarity of these groups across key variables that are likely to be correlated with charging behaviour, specifically vehicle make, and average vehicle kilometers traveled (weekdays and weekends). Newfoundland Power used Guidehouse's recommended participant groups to inform customer recruitment; actual enrolled group sizes are provided in Guidehouse's evaluation results.

Appendix B. Detailed Results Spreadsheet

Provided Separately as “NFP EV LM Appendix B - Detailed Results 2025-05-23.xlsx”

Appendix C. Survey Instrument

takeCHARGE EV Load Management Pilot Program Newfoundland Power

1. SURVEY OBJECTIVES

The survey will be fielded in March 2025. The primary objectives of the survey are to assess:

- Feedback on use of the managed charging platform (Section E, F)
- Satisfaction with program incentives (Sections B and E)
- Satisfaction with the override process (Sections D and G)
- Satisfaction with program communications (Section H)
- Satisfaction with program overall (Section I)
- Opportunities for improving program satisfaction (Section C, E, and I)
- Customer interest in future program participation (Section E)

2. SAMPLE VARIABLES

The survey uses the following sample variables, denoted with the <> symbols and highlighted in yellow.

- First name
- Last name
- Make
- Model
- Year
- Home Address
- Pilot Group:
 - 1 = Peak Events
 - 2 = Off-peak charging
 - 3 = Monitor

3. ONLINE INVITE

Dear <fname> <lname>,

MQO Research is conducting a survey on behalf of Newfoundland Power to obtain feedback and insights on the takeCHARGE EV Load Management Pilot Program. We ask that the person who is the primary driver of the EV to complete the survey.

Survey Length: 12-15 minutes

If you require assistance in completing the survey, please reply to this email, and the survey administrator will respond to any technical issues or concerns you may have.

When you are ready to begin, please click on the link below:

<Add Link>

Thank you in advance for your participation in this research.

4. ONLINE INTRODUCTORY SCREEN

Thank you in advance for your participation in this research. We appreciate your responses. The survey should take about 12-15 minutes to complete.

Your individual responses will remain anonymous and confidential.

This study is managed by MQO Research and is registered with the Canadian Research Insights Council (CRIC) Research Verification Service (RVS).

You can verify the details of this study using the CRIC RVS portal:

<https://www.canadianresearchinsightscouncil.ca/rvs/>

Project code: <Add>

Please click to continue.

5. SECTION A: SCREENING AND QUOTA MANAGEMENT

A1. Are you the primary driver of the <Year> <Make> <Model>?

SINGLE-SELECT

1. Yes, I am the primary driver
2. Another member of my household and I use the vehicle equally often
3. No, another member of my household is the primary driver of the vehicle
4. We no longer have that vehicle [TERMINATE]

A2. **If A1 = 3:** What is the email address of the primary driver of the vehicle?

[NAME] [EMAIL ADDRESS] [TERMINATE]

A3. What type of charging equipment do you have in your home?

SINGLE-SELECT

1. Level 1 (standard, around 1.2 kW)
2. Level 2 (faster charging, typically recharge a fully depleted battery overnight, and 6.2 to 19.2 kW)
3. Both types
98. Not sure

TERMINATE MESSAGE: Thank you for your time. Have a great day.

6. SECTION B: MOTIVATIONS AND EXPECTATIONS

B1. How did you first hear about the takeCHARGE EV Load Management Pilot Program?
Select all that apply. [Randomize 1-6]

MULTI-SELECT

1. Social media post from takeCHARGE NL
2. Email from takeCHARGE NL
3. takeCHARGE NL website
4. Newfoundland Power customer service representative
5. Word of mouth (family, friends, colleagues)
6. EVSE (charger) In-App notification or message
7. Other; please describe: [OPEN ENDED]

B2. How motivating were the following factors in your decision to enroll in this EV pilot?
Matrix style question; 1-10 rating, end points labelled “Not at all motivating (1)” and “Extremely motivating (10).” Randomize 1-4.

7. The enrollment and additional rewards throughout the pilot program
8. Opportunity to reduce negative environmental impact of EV charging
9. Opportunity to reduce demand on the electricity grid to reduce outages and lower overall bills
10. Opportunity to contribute to research on smart EV charging and its possible economic and environmental benefits

11. SECTION C: BARRIERS AND CONCERNS

C1. If **<group>** = 1 or 2: Prior to your decision to enroll in this pilot, what types of concerns did you have about participating in the pilot, if any? Select all that apply. [Randomize 1-4]

MULTI-SELECT

1. I was concerned that it would take too much effort or work to manage my EV’s charging schedule

2. I was worried that my vehicle would not always be charged when I wanted to use it
3. I was unsure whether my vehicle or charging equipment would be eligible for the pilot
4. I was concerned about privacy, data security, or my location being shared
5. I did not have any concerns about participating in the pilot
6. Other; please describe: [OPEN ENDED]

C2. If **<group> = 3**: Prior to your decision to enroll in this pilot, what types of concerns did you have about participating in the pilot, if any? Select all that apply. [Randomize 1-2]

MULTI-SELECT

1. I was unsure whether my vehicle or charging equipment would be eligible for the pilot
2. I was concerned about privacy, data security, or my location being shared
3. I did not have any concerns about participating in the pilot
4. Other; please describe: [OPEN ENDED]

C3. If (C1 = 1, 2, 3, 4, or 6) and **<group> = 1 or 2**: Is there any additional information that takeCHARGE NL could provide to you to help mitigate these concerns?

SINGLE-SELECT

1. Yes; please describe: [OPEN ENDED]
2. No
3. Not sure

C4. If (C1 = 1, 2, 3, 4) and **<group> = 1 or 2**: To what extent do you still have these concerns?

Matrix style question, limit rows to responses selected in C1

| | No longer concerned | Somewhat concerned | Very concerned |
|---|---------------------|--------------------|----------------|
| C4a. I was concerned that it would take too much effort or work to manage my EV's charging schedule | | | |
| C4b. I was worried that my vehicle would not always be charged when I wanted to use it | | | |
| C4c. I was unsure whether my vehicle or charging equipment would be eligible for the pilot | | | |
| C4d. I was concerned about privacy, data security, or my location being shared | | | |

C5. If (C2 = 1, 2, or 4) and <group> = 3: Is there any additional information that takeCHARGE NL could provide to you to help mitigate these concerns?

SINGLE-SELECT

1. Yes; please describe: [OPEN ENDED]
2. No
3. Not sure

C6. If (C2 = 1, 2) and <group> = 3: To what extent do you still have these concerns?

Matrix style question, limit rows to responses selected in C1

| | No longer concerned | Somewhat concerned | Very concerned |
|--|---------------------|--------------------|----------------|
| C6a. I was unsure whether my vehicle or charging equipment would be eligible for the pilot | | | |
| C6b. I was concerned about privacy, data security, or my location being shared | | | |

12. SECTION D: KNOWLEDGE

The next set of questions is designed to assess how effective the messaging from the takeCHARGE EV Load Management Pilot Program pilot has been at explaining the purpose of the pilot, its possible benefits, and how the pilot works.

D1. If <group> = 1: How well do you understand the following aspects of your participation in the pilot? Please use a 1-10 scale in which 1 means “No understanding” and 10 means “Full understanding.” [Randomize 1-10]

Matrix style question, 1-10 rating

1. Know when peak events are happening
2. How you can opt out of events if necessary
3. How many times you can opt out in a month and still be eligible for the monthly reward
4. Know the reward amounts for taking part in the pilot
5. Know which months the peak events apply (i.e. December to March)

D2. If <group> = 2: How well do you understand the following aspects of your participation in the pilot? Please use a 1-10 scale in which 1 means “No understanding” and 10 means “Full understanding.” [Randomize 1-4]

Matrix style question, 1-10 rating

1. Know when to charge and not to charge (on peak vs. off peak times)
2. How many times you can opt out in a month and still be eligible for the monthly reward
3. Know the reward amounts for taking part in the pilot
4. Know which months the off-peak hours apply (i.e. December to March)

D3. If **<group> = 3**: How well do you understand the following aspects of your participation in the pilot? Please use a 1-10 scale in which 1 means “No understanding” and 10 means “Full understanding.”

Matrix style question, 1-10 rating

1. Know the reward amounts for taking part in the pilot

13. SECTION E: PILOT EXPERIENCES

The next set of questions is about your experiences with the pilot so far and your preferences for communication.

E1. How easy or difficult was it to enroll in the pilot? Please rate on a 1-10 scale where 1 means “very difficult” and 10 means “very easy.”

[1-10 RATING]

E2. If **<group> 1 or 2**: How satisfied were you with using the managed charging platform (i.e. FlexSaver and/or OptiWatt)? Please rate on a 1-10 scale where 1 means “very dissatisfied” and 10 means “very satisfied.”

[1-10 RATING]

E3. If **<group> 3**: How satisfied were you with using the managed charging platform (i.e. FlexSaver)? Please rate on a 1-10 scale where 1 means “very dissatisfied” and 10 means “very satisfied.”

[1-10 RATING]

E4. How interested would you be to participate in a future EV load management program? Please rate on a 1-10 scale where 1 means “not interested” and 10 means “very interested.”

[1-10 RATING]

E5. If you were offered a \$75 annual participation reward, how interested would you be to participate in a future EV load management program? Please rate on a 1-10 scale where 1 means “not interested” and 10 means “very interested.”

[1-10 RATING]

E6. What is the minimum ongoing annual reward that would make you interested in participating in a future EV load management program?

1. \$20
2. \$40
3. \$60
4. \$80
5. \$100
6. None of these are high enough

14. SECTION F: CHARGING BEHAVIOURS

F1. If **<group> = 1 or 2:** How much impact did participation in the program have on your ability to use your car? (e.g. less range than desired on your vehicle when you wanted to use it, or it changed the times you used your vehicle) Please rate on a 1-10 scale where 1 means “no impact” and 10 means “very impacted.”

[1-10 RATING]

F2. How often do you charge at home?

SINGLE-SELECT

1. 0-25% of the time
2. 25-50% of the time
3. 50-75% of the time
4. 75-100% of the time

F3. Do you have access to workplace charging?

SINGLE-SELECT

1. Yes
2. No
98. I'm not sure or N/A

F4. If **F3 = 1:** How often do you charge at work?

SINGLE-SELECT

1. 0-25% of the time
2. 25-50% of the time
3. 50-75% of the time

4. 75-100% of the time

F5. Since enrolling in this program, has your charging behaviour changed?

SINGLE-SELECT

1. My charging behaviour has stayed the same
2. I charge more at home
3. I charge less at home
4. I'm not sure

F6. If **F5 = 2 or 3** and **<group> = 1**: If your charging behaviour has changed, did it change as a result of the takeCHARGE EV Load Management Pilot Program? (e.g. leaving your vehicle plugged in and letting the program control your charging schedule)

SINGLE-SELECT

1. Yes
2. No
98. I'm not sure

F7. If **F5 = 2 or 3** and **<group> = 2**: If your charging behaviour has changed, did it change as a result of the takeCHARGE EV Load Management Pilot Program? (e.g. setting a schedule to avoid peak charging)

SINGLE-SELECT

1. Yes
2. No
98. I'm not sure

F8. If (**F6 = 1 or F7 = 1**) and **<group> = 1 or 2**: How and why has your charging behaviour changed as a result of the takeCHARGE EV Load Management Pilot Program?

[OPEN ENDED]

15. SECTION G: OPT OUT BEHAVIOURS

G1. If **<group> = 1**: How often did you opt out of peak events by charging?

SINGLE-SELECT

1. Less than 3 times per month
2. 3 or more times per month
98. I'm not sure

G2. If **<group> = 2**: How often did you opt out by charging during peak hours?

SINGLE-SELECT

1. Less than 3 times per month
2. 3 or more times per month
99. I'm not sure

G3. If (G1 = 2) and <group> = 1: What were your primary reasons for opting out? Select all that apply. [Randomize 1-3]

MULTI-SELECT

1. Something unexpected came up
2. I forgot and charged during the peak events
3. I was concerned my vehicle would not be fully charged when I needed it
97. Other; please describe: [OPEN ENDED]

G4. If (G2 = 2) and <group> = 2: What were your primary reasons for opting out? Select all that apply. [Randomize 1-3]

MULTI-SELECT

1. Something unexpected came up
2. I forgot and charged during the peak hours
3. I was concerned my vehicle would not be fully charged when I needed it
97. Other; please describe: [OPEN ENDED]

G5. If <group> = 1 or 2: How satisfied are you with your ability to opt out of the charging schedule if necessary? Please rate on a 1-10 scale where 1 means "very dissatisfied" and 10 means "very satisfied."

[1-10 RATING]

16. SECTION H: COMMUNICATION PREFERENCES

H1. If <group> = 1 or 2: How satisfied are you with the frequency of the notifications for the pilot? Please rate on a 1-10 scale where 1 means "very dissatisfied" and 10 means "very satisfied."

[1-10 RATING]

H2. If <group> = 1 or 2: How helpful were the notifications for the pilot? Please rate on a 1-10 scale where 1 means "not helpful" and 10 means "very helpful."

[1-10 RATING]

H3. How do you prefer to receive information about your participation in the pilot? Select all that apply. [Randomize 1-6]

MULTI-SELECT

1. Email
2. Phone call
3. Text message
4. Website
5. Mobile app notifications
6. Mobile app without notifications
97. Other [OPEN ENDED]

H4. How frequently would you like to hear from the pilot?

SINGLE-SELECT

1. Daily
2. Several times a week
3. Once a week
4. More than once a month
5. Once a month
6. Less frequently than that

H5. How satisfied are you with the communication that you've received from takeCHARGE NL, and the pilot delivery partners regarding your participation in the pilot so far? Please rate on a 1-10 scale where 1 means "very dissatisfied" and 10 means "very satisfied."

[1-10 RATING]

17. SECTION I: OVERALL SATISFACTION

I1. How satisfied are you with your overall experience in the pilot so far? Please rate on a 1-10 scale where 1 means "very dissatisfied" and 10 means "very satisfied."

[1-10 RATING]

I2. Do you have any other feedback that you'd like to share about the takeCHARGE EV Load Management Pilot Program before the end of the survey?

1. Yes; please specify: [OPEN ENDED]
2. No additional comments

18. SECTION J: DEMOGRAPHICS

The last few questions are about you and your household. As a reminder, your responses are confidential and anonymous.

J1. Do you own or rent this home at <HomeAddress>?

SINGLE-SELECT

1. Own
2. Rent
3. Prefer not to answer

J2. What was the highest level of education that you completed?

SINGLE-SELECT

1. Less than high school graduate
2. High school
3. Some University or trade school
4. University graduate
5. Post-graduate
6. Prefer not to answer

J3. Which of the following descriptions most closely matches your current Employment/caregiving status?

SINGLE-SELECT

1. Working full-time outside of the home
2. Working part-time outside of the home
3. Working at home
4. Stay at home parent/caregiver
5. Attending school outside of the home
6. Attending school virtually at home
7. Retired
8. Not currently working or attending school
97. Other; please describe: [OPEN ENDED]
9. Prefer not to answer

J4. What was your household's approximate total income (before taxes) in 2024?

SINGLE-SELECT

1. Less than \$25,000
2. \$25,000 to less than \$50,000
3. \$50,000 to less than \$75,000
4. \$75,000 to less than \$100,000
5. \$100,000 to less than \$125,000
6. \$125,000 to less than \$150,000
7. \$150,000 to less than \$175,000
8. \$175,00 to less than \$200,000
9. \$200,000 or more

10. Prefer not to answer

Thank you for your time. Have a great day.

Appendix D. Survey Analysis Spreadsheet

Provided Separately as “NFP EV LM Appendix D - Survey Analysis 2025-05-23.xlsx”

[guidehouse.com](https://www.guidehouse.com)