

REPORT TO THE VERMONT STATE LEGISLATURE

Act 55: 2023 Report on Electric Rates for Electric Vehicles

**Submitted by the Vermont Public Utility Commission to the
Senate Committees on Finance, on Natural Resources &
Energy, and on Transportation, and to the House Committees on
Energy & Technology and on Transportation**

January 15, 2023

I. Introduction and Statutory Basis

On June 3, 2021, Act 55, an act relating to the Transportation Program and miscellaneous changes to laws related to transportation, was signed into law. Among other things, Act 55 directs the Vermont Public Utility Commission (“Commission”) to file a report to the Legislature annually for four years regarding progress on rates related to electric vehicles (“EV”)¹ and electric vehicle supply equipment (“EVSE”). This is the second report filed by the Commission.

Section 33 of Act 55 directs distribution utilities to develop rates that manage loads for greater cost containment, while supporting greater customer participation in such efforts and promoting the adoption of electric vehicles. Utilities are required to offer rates to their customers by June 30, 2024. Five utilities have already put into place special EV and EVSE rates or load management programs. Section 33 also requires the Commission “in consultation with the Department of Public Service and State electric distribution utilities” to “file written reports...that address the goals delineated in subdivisions (c)(1)(A)–(F) of this section, as applicable, and any progress barriers towards the goals contained in subsections (a) and (b) of this section.”^{2,3}

¹ The definitions of 23 V.S.A. § 4(85) apply for EV subcategories “battery electric vehicle” (“BEV”) and “plug-in hybrid electric vehicle” (“PHEV”). A BEV is powered by only a battery and electric motor, while a PHEV includes a battery and electric motor as well as an onboard combustion motor. We use the term “EV” in this report to refer to both of these subcategories. Public Act No. 55 (2021 Vt., Bien. Sess.) hereinafter “Act 55”.

² Act 55, Section 33, (c)(1)(A)-(F): “(c) PEV rates approved by the Public Utility Commission under subdivisions (1) and (2) of this subsection comply with subsection (b) of this section. (1) The Public Utility Commission shall approve PEV rates that it finds, at a minimum: (A) support greater adoption of PEVs; (B) adequately compensate PEV operators and owners of EVSE available to the public for the value of grid-related services, including costs avoided through peak management; (C) adequately compensate the electric distribution utility and its customers for the additional costs that are directly attributable to the delivery of electricity through a PEV rate; (D) include a reasonable contribution to historic or embedded costs required to meet the overall cost of service; (E) do not discourage EVSE available to the public; and (F) do not have an adverse impact to ratepayers not utilizing the PEV rate.”

³ Act 55, 2021, Section 33, (a)-(b): “(a) This section serves to encourage efficient integration of PEVs and EVSE into the electric system and the timely adoption of PEVs and public charging through managed loads or time-differentiated price signals. (b) Unless an extension is granted pursuant to subsection (e) of this section, all State electric distribution utilities shall offer PEV rates, which may include rates for electricity sales to an entire customer premises, for public and private EVSE not later than June 30, 2024. These rates shall, pursuant to 30 V.S.A. § 225, be filed for review and approval by the Public Utility Commission and encourage: (1) efficient use of PEV loads consistent with objectives of least-cost integrated planning, set out in 30 V.S.A. § 218c, and 30 V.S.A. § 202(b) and (c); (2) participation in the PEV rates; (3) travel by PEV relative to available alternatives; and (4) greater adoption of PEVs.”

The Commission again requested comments from stakeholders and integrated those comments into this updated report.⁴ The Commission is, as always, grateful for the time and effort of stakeholders in preparing comments for this report. In addition to last year's Act 55 report, the Commission has previously submitted two reports that address electric vehicle deployment more generally.⁵ As with last year's report, this report specifically addresses the topics raised by Act 55.⁶

Consistent with Act 55, the Commission will continue to pursue all available means to promote the electrification of the transportation sector while managing costs and impact to the grid. We plan to address demand charges and the development of public charging infrastructure and continue to seek innovative solutions such as legislation, as we did during the passage of 30 V.S.A. § 203(7) exempting public charging stations from regulation as a utility.

The following sections of this report include an overview of state and federal funding for EV-related programs, an inventory of existing utility rates, a summary of other stakeholder comments, and a description of the barriers to implementing EV rates that were identified by stakeholders this year.

II. State and Federal Funding

The comments submitted by the Vermont Department of Public Service ("Department") provide an overview of Vermont's progress and continuing efforts toward increasing EV usage and EVSE availability. The Department notes that in 2022, Vermont led the nation in the number of EV charging ports per capita. The Department continues to work with utilities to develop EV and EVSE rates. In 2019 and 2020, the Department

⁴ See Commission case numbers 22-4869-INV and 21-5271-INV.

⁵ *Report to the Vermont State Legislature: Promoting the Ownership and Use of Electric Vehicles in the State of Vermont*, submitted to the Senate and House Committees on Transportation, the Senate Committee on Finance, the Senate Committee on Natural Resources & Energy, and the House Committee on Energy & Technology, on June 27, 2019; *Report to the Vermont State Legislature: Supplemental Electric Vehicle Report Submitted Pursuant to Section 35 of Act 59 of the 2019-2020 Vermont Legislative Session*, submitted to the Senate and House Committees on Transportation, the Senate Committee on Natural Resources & Energy, and the House Committee on Energy & Technology, on December 13, 2019.

⁶ Act 55, section 33(f): "The Public Utility Commission, in consultation with the Department of Public Service and State electric distribution utilities, shall file written reports with the House Committees on Energy and Technology and on Transportation and the Senate Committees on Finance, on Natural Resources and Energy, and on Transportation that address the goals delineated in subdivisions (c)(1)(A)–(F) of this section, as applicable, and any progress barriers towards the goals contained in subsections (a) and (b) of this section not later than January 15, 2022, January 15, 2023, January 15, 2024, and January 15, 2025.

convened Phase I of the Rate Design Initiative (“RDI”) to analyze innovative retail rate applications. In 2021, the Department commenced Phase II of the RDI to assist municipal and cooperative distribution utilities to develop and implement innovative rates and pilot projects.

The following two EV-focused projects proposed by utilities were selected in December 2021 to receive State Energy Program grant funds and are now under way.⁷

1. Vermont Public Power Supply Authority (“VPPSA”) EV Charging Rate

Development: The project consists of research, data acquisition, and implementation of innovative tariffs by deploying residential Level 2 EV chargers, developing customer load-management incentives, and understanding customer behavior and billing system capabilities. The project is in phase 1 of a three-phase process. Three of VPPSA’s members are involved in the project, but the methodology developed will be applicable to all eleven VPPSA member utilities.

2. Level 1 EV Charging by Vermont Electric Cooperative, Inc. (“VEC”), Washington Electric Cooperative, Inc. (“WEC”), and the City of Burlington Electric Department (“BED”)

VEC, WEC, and BED are working together on a combined project to use low-cost, web-connected “smart plugs” to monitor Level 1 residential EV charging and to promote off-peak charging through EV-specific rates. The project started in the summer of 2022 and will run for one year.

The Department also continues to work with other state agencies in the following programs:

- \$2.45 million awarded in 2020 and 2021 to support 17 DC fast charging locations along major travel corridors, with installations in progress;
- \$1 million awarded in 2022 to support charging station installations at affordable multifamily housing, making at-home charging access more equitable and affordable; and
- \$10 million appropriated by the Legislature in 2022, consisting of:
 - at least \$3 million to expand charging for residents of affordable multifamily housing, and
 - the remainder to support charging development at workplaces, downtowns, and public attractions, such as parks and museums.

⁷ Two other selected projects address rates for non-EV loads.

The Department also describes several other funding sources that have become available to support EV infrastructure in Vermont. The federal Infrastructure Investment and Jobs Act established the National Electric Vehicle Infrastructure (“NEVI”) Formula Program to provide funding to states for an expanded DC fast charging network. The Federal Highway Administration approved Vermont’s NEVI Plan in September 2022, and Vermont will receive \$21.2 million during federal fiscal years 2022-2026.

In addition, in 2022 the Vermont Legislature appropriated \$20 million of American Rescue Plan Act funding to the Department to support low- and moderate-income homes by upgrading home electrical systems, such as electric panels. In addition to other electrification benefits, these upgrades will remove a common barrier to Level 2 EV charging and enable more households to charge at home and participate in EV rates.

III. EV-Specific Utility Rates and Programs

There are two general categories of existing rates for both EVs and EVSE.⁸ (1) Time-varying rates allow customers to charge their vehicles during off-peak hours when the costs for energy and capacity are low, with the savings passed through to customers.⁹ (2) Direct load-control rates give customers financial incentives to allow the utility to disable charging during peak events. Both categories require customers to install a charging or metering device, approved by the utility, that can meter the kWh supplied to the vehicle separately from the kWh used generally at the site.

A. City of Burlington Electric Department

1. Rate Options

a) EV Rate

⁸ Rates adopted prior to the passage of Act 55 were evaluated using traditional ratemaking principles. In Act 55, the Legislature directs the Commission to approve rates if they meet certain conditions (Act 55, Section 33, (c)(1)(A)-(F)). See footnote 1 above. The rates described in this report may or may not meet each criterion identified in Act 55, as the Commission did not explicitly consider those criteria at the time the rates were adopted.

⁹ Some of the time-varying rates discussed in this report pertain to EVs in particular and apply only to the EV load. For these rates, EV electricity use is metered by the charging equipment; credits are then added to the customer’s bill. Other time-varying rates may instead apply to the usage of the whole house, not just the EV charging. Act 55 contemplates either approach. See Act 55, Section 33(b)(“[A]ll State electric distribution utilities shall offer PEV rates, which may include rates for electricity sales to an entire customer premises, for public and private EVSE....”).

The City of Burlington Electric Department (“BED”) began offering EV charging rates in 2018. BED has since expanded its EV rate offering to all non-time-of-use rate classes and has included a real-time peak scheduling option.¹⁰ BED’s EV rate includes three options: (1) Under “fixed EV charging,” customers receive a bill credit for charging during off-peak hours. (2) Under the “flexible load” option, BED varies the level of EV charging according to market and load information, including the current wholesale price of energy and the probability of a peak, or due to local grid constraints. Customers are given advance notice of peak events. (3) Under the “flexible real-time load” option, BED dynamically varies charging levels, but without advance notice to customers. If customers override BED’s signal and charge during peaking hours, they will lose the bill credit for the month.

BED is also participating with VEC and WEC in the Level 1 EV charging pilot under a grant from the Department.

Details

EV Charging Hours	
Fixed EV Charging off-peak hours	10 p.m. – 12 p.m. (next day)
Flexible Load peak hours	Designated by BED in advance
Flexible Real-Time Load peak hours	Designated by BED
EV Charging Credit	
Energy credit – Residential Service	\$0.072815 per kWh
Energy credit – Small General Service	\$0.072815 per kWh
Demand credit – Large general service	\$21.53 per kW

b) Public EV Charging Station Rate

BED has had a tariff for public EV charging stations owned or maintained by BED in effect since April 1, 2015. BED is in the process of upgrading two of its legacy chargers with faster chargers rated at 60 kW. As part of this process, BED is developing new rates focused on cost recovery and discouraging vehicles from idling at stations after a charge is complete.

¹⁰ The Commission approved the eligibility expansion of BED’s EV rate to include small general and large general rate classes in addition to BED’s residential rate class on July 1, 2021, in Case Numbers 21-1832-TF, 21-1833-TF, and 21-1834-TF.

2. Enrollment

BED provides purchase incentives for EVs as part of its program implementing Tier III of the Renewable Energy Standard.¹¹ As shown in the graph below, 150 BED customers – approximately one-third of the BED customers who have received EV purchase incentives – are enrolled in BED’s EV rate.

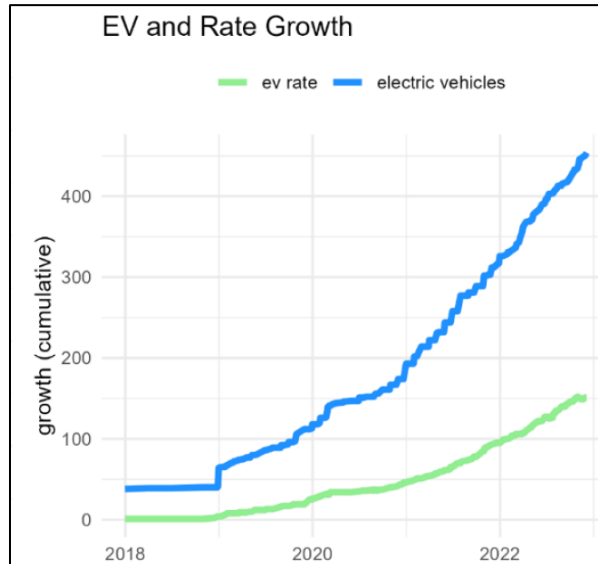


Figure 1: EV purchase incentives and EV rate enrollment for BED.

Participation in the EV rate requires a customer to purchase and install a BED-approved charger, which enables BED to submeter and control the customer’s EV charging as needed. The costs associated with installing a Level 2 charger can be a barrier to enrollment in the EV rate.¹² BED has also developed a multifamily charger rebate program to encourage owners of rental properties to expand charging opportunities for the 60% of BED customers who rent their homes.

3. Effectiveness

For customers enrolled in EV rates, the rates are highly effective at directing charging away from peak times. As shown in the graph below, 93% of BED charging at the EV

¹¹ 30 V.S.A. § 8005.

¹² A list of approved chargers can be found at www.burlingtonelectric.com/evrate. BED observes that a significant number of BED customers continue to purchase PHEVs and are less likely to participate in BED’s Level 2 charger program and EV rate due to the reduced charging demand relative to BEVs. BED’s participation in the “smart plug” Level 1 charging pilot may provide a solution for increasing PHEV owner participation in BED’s EV rate.

rate avoids peak hours. BED is not working on implementing any new or additional EV or EVSE rates at this time.

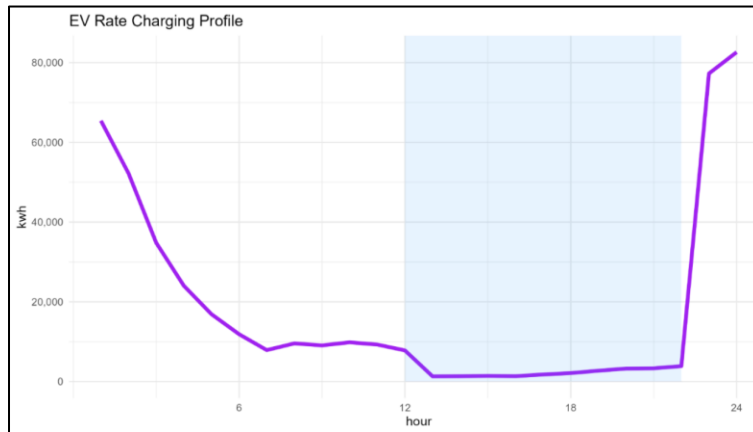


Figure 2: BED profile of charging times for customers enrolled in EV rates.

B. VPPSA Utilities

VPPSA filed comments on behalf of 11 small municipal utilities in the state. VPPSA members continue to investigate options for implementing EV-specific and time-of-use rates that will encourage customers to charge their vehicles during off-peak periods.

In 2022, VPPSA participated in two pilot programs related to rate design, innovative projects, and data analytics to inform rates for EVs and EVSE.

VPPSA received a project grant from the Department (#02240-FY22-SEP-02) to support development of innovative EV rates for its member utilities. The project is structured in three phases and is focused on research and acquisition of data that will be used to implement EV rates. Currently in Phase I, VPPSA is developing a menu of potential rate alternatives for direct-current fast chargers and residential EVSE for consideration by member utilities. Current research is focused on EV adoption rates, customer load management incentives and customer behavior, billing system capabilities, and anticipated load factors and peak load hours.

VPPSA and Efficiency Vermont are also collaborating on the Powershift Pilot Program for qualifying residential customers across VPPSA member utility service territories. The goal of the Powershift Program is to install up to 40 Open Charge Point Protocol level 2 chargers in 11 VPPSA utility service territories to collect data on the impact of EV charging load profiles and customer behavior on peak load avoidance, with data collection to occur in 2023.

As of December 12, 2022, VPPSA has issued 49 Tier III rebate incentives for the purchase or lease of BEVs or PHEVs and three public EVSE incentives in two member-utility territories. VPPSA currently has three participants in the Powershift Pilot Program and is discussing participation with 25 additional residential customers.

Finally, VPPSA continues to move forward with development of a centralized advanced metering infrastructure (“AMI”) system for its members and is in the final stages before launching implementation over the next several years. This technology will further facilitate VPPSA member utilities’ ability to develop and implement time-varying rates.

C. Green Mountain Power Corporation

Green Mountain Power Corporation (“GMP”) continues to offer two EV rates to residential customers: a direct load-control off-peak rate (Rate 72) and a time-of-use rate (Rate 74). GMP also offers an exemption from retail demand charges for EVSE, and it is offering a limited special contract for electric school bus charging.

1. Rate Options

GMP offers two EV-specific rate options to its customers.¹³

a) Direct Load-Control Off-Peak EV Residential Rate 72

GMP’s off-peak electric vehicle residential service rate is available throughout GMP’s service territory for EV charging using specific equipment. Rate 72 requires customers to have a GMP-approved Level 2 or compatible charger, reliable Internet access, and residual electric service under GMP’s Residential Rate Schedule 1. To calculate usage under Rate 72, GMP measures electric use by the charging equipment and subtracts it from the household billing meter.

Rate 72 requires customers to enroll their EVSE in GMP’s energy management platform, which provides GMP the ability to control the EV charging, including turning the customer’s EVSE off, during times of peak demand (“Peak Events”). Customers are notified of Peak Events anywhere from 4 to 24 hours in advance of the Peak Event. At any time after the receipt of a Peak Event notification from GMP, customers may override the Peak Event and continue charging at the on-peak EV rate. If a customer

¹³ GMP also offers non-EV-specific rates with critical peak pricing rate design. These rate schedules (Residential Critical Peak Pricing Rate Schedule 9 and Residential TOU & Critical Peak Pricing Rate Schedule 14) could also serve as default service offerings for customers with EVSE that do not elect to take service on Rate 72 or Rate 74.

does not override the Peak Event, GMP will control the EVSE during the Peak Event period.

Details

Off-peak EV rate	\$0.13969 per kWh
Peak Event EV rate	\$0.71822 per kWh

b) [Time-of-Use EV Residential Rate 74](#)

GMP’s time-of-use electric vehicle residential service rate is available throughout GMP’s service territory for EV charging using specific equipment. The rate requires customers to have a GMP-approved Level 2 or compatible charger, reliable Internet access, and residual electric service under GMP’s Residential Rate 1. To calculate usage under Rate 74, GMP measures electric use by the charging equipment and subtracts it from the household billing meter.

The rate requires customers to enroll their EVSE in GMP’s Energy Management Platform, which provides GMP with access to the EVSE for the purpose of measuring electricity use. Customers are also required to provide information to the third-party manufacturers of the EVSE for use by GMP to assist in the energy efficiency programming of the EVSE.

Details

Hours	
Peak	1:00 p.m. to 9:00 p.m., Monday through Friday
Off-peak	All other times
Rates	
Off-peak EV rate	\$0.13433 per kWh
Peak hours EV rate	\$0.17650 per kWh

c) [General Service Rate 6 EVSE Exemption](#)

GMP also offers non-residential customers service under General Service Rate Schedule 6, which has a daily customer charge and a flat kWh rate. Wherever the usage under this rate is restricted to public EVSE, the 200 kW demand and 7,600 kWh/month consumption service limitations are not enforced. Without this exemption, the default rate schedule for usage above the service limitations would be Commercial and

Industrial Time-of-Use Rate Schedule 63/65, which consists of a customer charge and time-of-use kW and kWh rates.

Details

Rate 6	
Customer charge	\$0.641 per day
Per kWh charge	\$0.17945 per kWh

d) [Generic Special Contract for Electric Bus Charging](#)

GMP also has a generic special contract for electric bus charging.¹⁴ Similar to the EVSE Exemption for General Service Rate 6, contract participants are not subject to the 200 kW demand or 7,600 kWh/month consumption limitations of Rate 6. This contract has been used by four GMP customers participating in the Vermont Agency of Natural Resources Electric School and Transit Bus Pilot Program. The default rate classes for these customers would otherwise be General Service Rate Schedule 6 and Commercial and Industrial Time-of-Use Rate Schedule 63/65, depending on usage levels.

GMP plans to analyze the data from the pilot program and work with the four customers to determine future rate options as the initial term contracts come to an end in the spring of 2023.

e) [Flexible Load Management Pilot](#)

The South Burlington School District is participating in GMP’s Flexible Load Management 2.0 for the four charging stations for its electric school buses. Through this pilot program, the school district works with GMP and the customer’s equipment provider on load management and vehicle-to-grid applications. The pilot also allows the school district to share in the benefits of the peak shaving and grid services that its charging equipment provides to GMP. The default rate class otherwise is General Service Rate Schedule 6.

2. [Enrollment](#)

GMP has 2,020 customers enrolled in its EV-specific rate programs. Of those customers, 36% are enrolled in Rate 72’s managed charging program, and 64% are enrolled in Rate 74 (time-of-use).

¹⁴ This generic special contract was approved by the Commission on December 8, 2021, in Case No. 21-4593-SC and is in effect through July 31, 2023.

Of all the GMP customers who received one of GMP's EV-related incentives,¹⁵ 47% are enrolled in one of GMP's EV rates. The enrollment rate increases to 75% when considering only customers who received a charger from GMP. GMP customers who receive a free Level 2 charger are required to enroll in one of GMP's two EV rates within 60 days, but there have been delays due to the pandemic and electrician shortages. GMP states that delays remain, but these are improving as it continues its outreach efforts.

3. Effectiveness

GMP has found that its managed charging Rate 72 and time-of-use Rate 74 are effective at directing load away from peak times. In 2022, approximately 0.6% of Rate 72 customers opted out of managed charging during a Peak Event (compared to 2% in 2021). For customers using GMP's time-of-use Rate 74, 92% of EV charging has occurred during off-peak hours (compared to 95% in 2021).

GMP continues to evaluate load-management opportunities through its customers' use of EV rates. GMP has observed an EV charging spike at the beginning of off-peak hours and at the end of a Peak Event. Although these charging spikes do not currently contribute to system peak demand, GMP is considering options to avoid creating new peaks as EV adoption increases, such as staggering off-peak hours among customers. GMP has already implemented a staggered reintroduction of Rate 72 chargers after Peak Events by modifying start and end times so that the duration of the Peak Event is the same for all Rate 72 customers.

GMP states that providing a customer with a Level 2 charging solution at the point of EV sale continues to be the best way to increase enrollment in EV rates. GMP customers complete GMP's EV rebate form at the EV dealership, and the form includes a checkbox for a free Level 2 charger.¹⁶ A condition of receiving the free charger is enrollment in one of GMP's EV-specific rates.

GMP also states that it has identified a need for a new EV rate for commercial- and industrial-class customers for workplace and fleet charging. GMP is in the early stages

¹⁵ GMP explains that the incentives include an EV-purchase incentive and a free Level 2 charger. Among customers who have received a Tier III EV purchase incentive since September 2020, 78% received a free smart Level 2 charger. (Tesla currently does not have a charger that communicates with GMP's platform, but that is expected to change in the coming months.)

¹⁶ GMP also offers an online option for a free charger for customers who decide to enroll after purchasing their EV.

of exploring solutions and various rate designs to allow these larger customers to enroll in a commercial time-of-use rate for Level 2 and Level 3 charging.

D. Town of Stowe Electric Department

1. Rate Option

Most of the Town of Stowe Electric Department’s (“Stowe Electric”) residential customers rely on Level 1 home charging or Level 2 or Level 3 public charging at a station owned by Stowe Electric. Although Stowe Electric has not yet adopted a residential EV charging rate, Stowe Electric informs customers who received an EV or EVSE rebate that best practices for EV charging are to charge vehicles between 7 p.m. and 5 a.m. and avoid charging during daytime hours.

Stowe Electric has an EV charging rate under Tariff Rate 35 that applies at each of the utility’s 11 public charging stations. Stowe Electric does not have a commercial, residential, or multi-family EV charging rate.

Details

Rates	
Flat fee regardless of actual charging time	\$2.29
Hourly fee for first 4 hours	\$0.58
Hourly fee thereafter	\$1.14

2. Enrollment

Stowe Electric has 11 stations (20 ports) enrolled in Rate 35 and publicly available to any EV user.

3. Effectiveness

Stowe Electric’s rate does not reflect the different costs associated with peak or off-peak times, so Stowe Electric has not analyzed whether Tariff Rate 35 shifts load away from peak times.

Stowe Electric is implementing a new billing and enterprise software solution that will allow for the adoption of new EV charging rates for all rate classes. Stowe Electric will also review its time-of-use rate design to see how to encourage the adoption of EV charging infrastructure and capture the impacts of increased EV charging on power supply costs.

E. Vermont Electric Cooperative, Inc.

1. Rate Options

Vermont Electric Cooperative, Inc. (“VEC”) offers several whole-premises time-of-use rates to customers as well as a load-management program for members who use Level 2 EV chargers, home batteries, or flexible-load water heaters. VEC is also participating with BED and WEC in the Level 1 EV charging pilot under a grant from the Department.

a) Residential Time-of-Use Rate

VEC’s Service Classification 1.2 is a pilot time-of-use optional rate available to residential customers participating in VEC’s Energy Transformation Program, which is its program for implementing Tier III of the Renewable Energy Standard. VEC’s whole-house Service Classification 1.2 provides an incentive for customers to shift their electric usage, including EV charging, away from high-cost hours and does not require submetering. This rate has very low enrollment. Only 4.7% of members who received an EV or PHEV purchase incentive enrolled in a whole-house time-of-use rate.

Details

Hours	
On peak	5:01 p.m. to 9:00 p.m., weekdays
Mid peak	7:01 a.m. to 5:00 p.m., weekdays
Off peak	9:01 p.m. to 7:00 a.m., weekdays; all day weekends and holidays
Rates	
On peak	\$0.33716 per kWh
Mid peak	\$0.17947 per kWh
Off peak	\$0.12426 per kWh

b) Commercial Time-of-Use Rates

VEC also offers Service Classification 2.2 for Small Commercial members and 2.3 for Large Commercial members that participate in VEC’s Energy Transformation projects, which include EV incentives and public charging EVSE. The Service Classification 2.2 and 2.3 rates are non-demand time-of-use rates, provided that the customer remains under certain usage thresholds. This rate is available for public EVSE. VEC’s default commercial time-of-use rates do include a demand charge.

c) VEC Flexible Load Home Charger Program

VEC offers an opt-in load-management program for members who use Level 2 EVSE.¹⁷ VEC offers a \$250 bill credit when the charger is purchased and the member either enrolls in the load-management program or otherwise avoids charging during peak times.¹⁸

Members who enroll in the load-management platform receive an additional \$50 incentive and an \$8/month bill credit if they participate in load reduction during peak events, which VEC estimates occur 5-6 times per month, for up to 3-4 hours per event. VEC can request that chargers enrolled in the load-management program not operate during peak events. In 2023, VEC will begin offering free Level 2 chargers to members who enroll in the load-management platform. VEC expects that this will increase the amount of managed charging on the platform.

Using the funding provided by the Department described in the introduction of this report, VEC is also developing a load-management pilot program to target the 38% of VEC electric vehicle drivers who do not use Level 2 chargers, but instead charge at home using a regular wall outlet (Level 1 charging). The primary reasons given by these members for not using Level 2 chargers were that plugging into a regular outlet is sufficient and that setting up a Level 2 charger is too expensive. VEC plans to offer smart plugs, which will provide a load-management option for all VEC members who own EVs.

2. Enrollment

A total of 381 VEC residential customers (up from 173 in last year's report) have received EV purchase incentives from VEC, and 18 (4.7%) of those customers participate in VEC's Service Classification 1.2 whole-home time-of-use rate (up from 11 customers last year).

None of VEC's commercial accounts participates in its Service Classification 2.2 or 2.3 non-demand time-of-use rates through EV-related incentives.

Forty VEC customers are enrolled in VEC's load-management program (up from 22 last year) and allow VEC to manage load during potential peak periods. Another 60

¹⁷ VEC also offers this program to members who use home batteries and flexible-load water heaters.

¹⁸ The load management platform is an integrated software and hardware system that allows VEC to remotely activate or deactivate charging of a customer's vehicle with prior notice and consent from the customer. Remote load management platforms allow the utility to charge customer vehicles during times when costs to the utility are relatively low.

customers who have received VEC's EVSE incentives participate in load management by setting a charging schedule that avoids charging from 5:00 to 9:00 p.m. on weekdays.

3. Effectiveness

Enrollment in the whole-premises time-of-use rate is very low due to lack of customer interest, and as a result are generally less effective than rates that allow for dynamic utility-managed charging.

VEC customers who are enrolled in VEC's load-management program rarely opt out of participation during peak events. For chargers enrolled in VEC's Flexible Load Home Charger Program, VEC can disable EV charging during peak events. Members can opt out of individual events if necessary. This program has confirmed the flexibility of EV charging, demonstrating that EV owners can and will shift load away from peak times if given the proper price signals and an automated method.

F. Washington Electric Cooperative

1. Rate Options

Washington Electric Cooperative ("WEC") has been providing no-cost Level 2 chargers to members who participate in a Powershift Pilot Program and charge outside of peak hours (3 p.m. to 10 p.m.). There is no penalty or incentive for customers to avoid charging during peaks. However, the enrolled chargers are set to avoid peak times and these settings are rarely overridden by the customer. WEC works with Efficiency Vermont to administer the program.

WEC is also participating with BED and VEC in the Level 1 EV charging pilot under a grant from the Department.

2. Enrollment

Of the 66 members who have received WEC incentives to purchase EVs, 36 are enrolled in the Powershift Pilot Program (55%).

3. Effectiveness

Although there are no economic incentives to avoid charging during peak hours, customers who are enrolled in the Powershift Pilot Program only rarely charge during peak hours and the program has been effective in directing loads away from peak times.

IV. Additional Comments

A. Department of Public Service

In addition to the comments from the Department that we have integrated throughout this report, the Department raised two novel issues that the Commission looks forward to exploring further. First, electric aircrafts tested in Vermont use DC fast charging of 350 kW with Combined Charging System (“CCS”) connectors similar to those used for on-road vehicles. The Department argues that they are, in effect, EV loads.

Second, a handful of EVSE developers have asked the Department for guidance related to battery electric storage systems that are co-located with public-serving charging infrastructure. These operators offer various energy services beyond charging load management, such as real-time market arbitrage for energy, capacity, and ancillary services.

The Department also noted that in 2022, applicants for state EVSE funding expressed concern that existing rates discourage EVSE investment by making demand charges unpredictable or by forcing the operator to subscribe to expensive, fee-based technology platforms that track and allocate costs based on usage. The Department stated that these factors contribute to higher costs.

B. eVolocity Systems

eVolocity Systems, a company focused on providing the convenience-store and gas-station response to electrification, filed comments requesting that the Commission exempt public EVSE from regulation as a utility. We note that under Vermont statute public charging equipment is already exempt from regulation as a public utility.¹⁹

eVolocity Systems also asked that the Commission consider measures to encourage the use of demand stabilization mechanisms such as energy storage co-located with EVSE. Energy storage can potentially mitigate the impact of demand charges on the profitability of public EVSE.

¹⁹ 30 V.S.A. § 203(7) exempts public EVSE from regulation as a utility: “(7) Notwithstanding subdivisions (1) and (2) of this section, the Commission and Department shall not have jurisdiction over persons otherwise not regulated by the Commission that are engaged in the siting, construction, ownership, operation, or control of a facility that sells or supplies electricity to the public exclusively for charging a plug-in electric vehicle, as defined in 23 V.S.A. § 4(85). These persons may charge by the kWh for owned or operated electric vehicle supply equipment, as defined in section 201 of this title, but shall not be treated as an electric distribution utility just because electric vehicle supply equipment charges by the kWh.”

C. Electrify America

Electrify America, a private company that develops and operates public fast charging EVSE stations, commented that GMP's General Service Rate 6 demand charge exemption enables EV charging stations with low load factors to remain on a volumetric rate. In its comments, Electrify America encouraged the Commission to address the issue of demand charges in service territories where they remain in place for fast-charging stations. Act 55 requires the Commission to consider whether rates proposed by utilities will discourage the development of public charging stations, which could include the consideration of demand charges for EVSE stations.²⁰

V. Challenges and Barriers

Vermont utilities cited several challenges and barriers to implementation of EV rates, discussed below.

A. Metering

Electric rates that apply only to a single use, such as EV charging, require a way to separately measure the energy use that qualifies for the single-use rate. Many of the current utility EV rates require customers to install a Level 2 charger that can be used as a meter to measure EV load.²¹ The cost of purchasing and installing designated equipment can be a barrier to some utility customers, but several utilities offer incentives such as rebates or free Level 2 chargers to customers who enroll in EV rates and agree to avoid charging during peak events.

The lack of advanced metering infrastructure ("AMI") in VPPSA member utility service territories is also an obstacle to VPPSA's collection and analysis of customers' time-based usage data for use in developing EV rates. VPPSA will be installing AMI in its member service territories over the next several years, which will allow it to obtain the necessary data and develop appropriate price signals to be included in an EV rate.

²⁰ Electrify America also refers to the Federal Infrastructure Investment and Jobs Act ("IIJA") of 2021, Pub. L. No. 117-58, 135 Stat 429. According to the IIJA Section 111(d), state utility regulatory bodies must consider measures to promote greater electrification of the transportation sector by November 2023. The requirements of Act 55 largely, if not completely, satisfy the requirements of IIJA Section 111(d). Rates approved under the requirements of Act 55 must at a minimum "not discourage EVSE available to the public" (among other minimum requirements). Act 55, Section 33, (c)(1)(E).

²¹ Using a Level 2 charger to meter the energy used to charge an EV is currently the most common approach. However, many other types of equipment may be used to meter that energy, including a secondary meter, a collar on an existing meter, the telematics of the EV, or devices plugged into Level 1 chargers.

B. Billing

Utilities continue to work on efficient billing of specialized EV rates. BED is working to automate its monthly EV-rate credit billing process by upgrading its Customer Information System (“CIS”) and Meter Data Management System (“MDMS”). Currently, BED manually enters EV rate bill credits monthly for each of the 150 customers on BED’s EV rate. One goal for the CIS and MDMS upgrades is to increase the system rate and billing capabilities of BED’s systems. Once the upgrades are completed, BED expects to have the ability to fully automate the billing of its EV rate and will have greater latitude to develop further rate options.

Stowe Electric also identifies the cost of upgrades to its billing and enterprise software infrastructure as the most significant barrier to adopting new EV and EVSE rates.

C. Changing Technology

EV charger control platforms have expanded rapidly over the past decade, and EVSE companies continued to change their products during 2022. Several Vermont utilities noted the importance of flexible integration of specific companies’ hardware and software offerings to minimize exposure to a sole vendor and maintain longevity of their programs. With rapidly changing technology, utilities must remain aware of new developments in chargers, software platforms, and billing systems.

In their comments to the Commission, several utilities provided examples of technology problems encountered in 2022. VEC explained that it has offered EV programs using specific devices and third-party communication platforms that have been subsequently sold and discontinued. GMP also described connectivity issues with the EVSE from one of its manufacturers that required remote repairs and, in some cases, equipment replacement. To avoid future EVSE-manufacturer-specific issues, GMP plans to offer additional EVSE-manufacturer options and implement billing based on EV telematics where possible, which will enable additional participation without the need for customers to install a GMP-compatible charger (and would enable Tesla owners to participate in GMP’s EV rates).

To avoid reliance on a specific manufacturer, VPPSA’s upcoming Powershift Pilot Program in VPPSA-member utilities’ service territories will use the Open Charge Point Protocol technology, which relies on open-source standards that can integrate with multiple control platforms to mitigate the risk of changing technologies or lock-in costs.

D. Cost

Several utilities continue to identify cost to the utility as a significant barrier to implementing EV rates. For example, VPPSA explains that costs associated with technology integrations and effective metering continue to be a significant barrier. As noted above, Stowe Electric also identifies the cost of upgrades to its billing and enterprise software infrastructure as a significant barrier.

E. Broadband Access

To transmit data about charging back to utilities and to enable utility control, a customer must have access to broadband or relatively reliable cellular service. The lack of universal broadband and cellular service coverage in Vermont continues to limit the technologies that can be used to implement EV charging rates in some locations.

Efforts are underway to increase broadband Internet availability in underserved utility service territories. WEC explains that it is working with three communications union districts (“CUDs”) that are building out broadband infrastructure in its service territory. VPPSA member utilities are also collaborating with CUDs to improve broadband access.

F. Multi-Family Residences

Several utilities identified multi-family residences as a continuing barrier to adoption of EV-specific rates. The Department notes that multi-unit dwellings, such as apartment complexes, condo buildings, and senior housing, face unique EVSE-related challenges that are different from single-family residences. The Department explains that meter configuration and customer class designation can prohibit access to EV rates for master-metered buildings or parking areas. For example, an EV rate only available to residential customers would not be available for a commercial account that covers an apartment-complex parking lot. Applicants for state EVSE funding have also expressed concerns to the Department that existing rates discourage EVSE investment for residents by making demand charges unpredictable or by forcing the operator to subscribe to expensive, fee-based technology platforms that track and allocate costs based on usage.

BED has developed a multifamily charger rebate program for owners of multifamily property to increase charging opportunities for its customers who rent and are not able to install the Level 2 chargers required to participate in BED’s EV Rate. BED has expanded eligibility for its EV Rate to include the Small General rate class, which is

typically used for a house-meter controlled by the owner of multifamily property, and the Large General rate class.

BED is also working with VEC and WEC under the state pilot projects grant (# 02240-FY22-SEP-03) to test metering and control technologies that would provide an Internet-connected “smart plug” Level 1 charging option that customers, including renters, could use instead of Level 2 chargers to participate in EV rates.

Stowe Electric is also investigating options for managing Level 2 and Level 3 charging infrastructure for multi-family properties, workplaces, and single-family residential ratepayers through demand-side management software.

G. Low EV Adoption Rates in Rural Areas

VPPSA notes that EV adoption rates in the rural service territories of its member utilities remain gradual due to socio-economic barriers. These rural service territories are also frequently outside the scope of or low priority for federal funding programs.

H. Demand Charges

The Department notes that demand charges are an ongoing concern for various customer classes, discouraging the implementation of DC fast charging EVSE due to their high instantaneous loads and currently low overall load factors. EVSE operators selected for state funding have identified demand charges as a major financial barrier to station deployment, especially in rural areas with low public EVSE utilization. EVSE operators report that they have no alternative but to pass the cost of high demand charges through to consumers in higher per-kWh charging fees.

Other types of EVSE can also incur high demand charges, especially as heavy-duty EVs increase in number. Although medium and large commercial customers benefit from the lower operating costs of EVs, electric fleets can also increase financial risk to fleet owners if charging coincides with on-peak periods.

VI. Conclusion

This interim report is the second of four reports on this topic that the Commission will provide to the Legislature. The Commission looks forward to continuing to monitor this developing field and to updating the Legislature as utilities continue to develop EV and EVSE rates.