

Evaluation of Electric Distribution  
Utilities Compliance with Renewable  
Energy Standard Tier III Obligations

# RES Tier III 2022 Verification Report

Vermont Department of Public Service

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June 1, 2023

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## Introduction

30 V.S.A. § 8005 requires Vermont electric Distribution Utilities (“DUs”) to acquire specified amounts of renewable energy, in the form of renewable attributes or Renewable Energy Credits (“RECs”), and to achieve fossil-fuel savings from energy transformation projects.

The structure of the RES is divided into three categories, or tiers.<sup>1</sup> The first tier (“Tier I”) requires DUs to procure an amount of renewable energy equivalent to 55% of their annual retail electric sales for the year 2017. This amount increases by 4% every third January 1 thereafter, eventually reaching 75% in 2032.<sup>2</sup>

The second tier (“Tier II”) requires DUs to procure an amount of renewable energy equivalent to 1% of their annual retail sales from distributed generation resources starting in 2017. This amount increases by three-fifths of a percent each year, eventually reaching 10% in 2032.<sup>3</sup> Tier II resources are also counted as part of a DU’s Tier I requirement.<sup>4</sup>

The third tier of the RES (“Tier III”) requires that DUs either procure additional renewable distributed generation eligible for Tier II or acquire fossil-fuel savings from energy transformation projects.<sup>5</sup> Energy transformation projects are those that reduce fossil fuel consumed by DU customers.<sup>6</sup> For Tier III, the RES establishes a required amount of 2% of a DU’s annual retail sales in 2017, increasing by two-thirds of a percent each year of each year’s sales until reaching 12% in 2032.<sup>7</sup> Energy Transformation projects implemented on or after January 1, 2015, are eligible to be counted towards a DU’s Tier III obligation.<sup>8</sup>

On April 1, 2020, the Vermont Public Utility Commission’s (“PUC” or “Commission”) administrative rule 4.400<sup>9</sup> became effective. This rule provides guidance on the implementation of the Renewable Energy Standard (“RES”).<sup>10</sup> Commission Rule 4.412 directs the Vermont Department of Public Service (“DPS” or “Department”) to carry out evaluations to determine

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<sup>1</sup> 30 V.S.A. § 8005(a).

<sup>2</sup> 30 V.S.A. § 8005(a)(1)(B).

<sup>3</sup> 30 V.S.A. § 8005(a)(2)(C).

<sup>4</sup> 30 V.S.A. § 8005(a)(1)(C).

<sup>5</sup> 30 V.S.A. § 8005(a)(3)(A).

<sup>6</sup> 30 V.S.A. § 8005(a)(3)(C)(ii).

<sup>7</sup> 30 V.S.A. § 8005(a)(3)(B). For municipal electric utilities serving less than 6,000 customers, the required amount is 2% of the providers’ annual retail sales beginning January 1, 2019, increasing by two-thirds of a percent each year until reaching 10% in 2032. *Id.*

<sup>8</sup> 30 V.S.A. § 8005(a)(3)(C).

<sup>9</sup> Vermont Public Utility Commission Rule 4.400, RENEWABLE ENERGY STANDARD RULE, *available at* [https://puc.vermont.gov/sites/psbnew/files/doc\\_library/4400-renewable-energy-standard.pdf](https://puc.vermont.gov/sites/psbnew/files/doc_library/4400-renewable-energy-standard.pdf).

<sup>10</sup> *See also*, 30 V.S.A. §§ 8004 and 8005.

whether a DU has met its annual RES obligations. Before Rule 4.400 came into effect, the Department reviewed RES compliance per Commission Order.<sup>11</sup>

This report provides the DPS's verification of each DU's 2022 Tier III claims submitted for their Tier III programs. This report also includes comments regarding the DUs' Tier III programs and reporting.

## Scope of Evaluation

The Department's evaluation activities consist of a thorough review of each DU's Tier III programs. For custom measures, this includes reviewing customer-specific energy usage data and operational information to verify the assumptions on which the engineering analysis was based. Once these assumptions are confirmed, the engineering analysis is reviewed for reasonableness, accuracy, and compliance with statute. For prescriptive measures, the DPS reviews documentation to verify that prescribed savings values and calculations have been applied correctly, and to calculate the evaluated savings that incorporate any necessary corrections. The evaluation did not include site visits to verify installations, operation of products, or to verify baseline conditions.

## Prescriptive Measure Development

As established in administrative rule 4.400,<sup>12</sup> a Technical Advisory Group ("TAG") was created with representatives from all the DUs impacted by Tier III requirements. The TAG creates a common approach to estimate savings for specific measures to create a unified and verifiable savings construct for all DUs to follow. The claim of prescriptive measure savings was verified as described below.

## Evaluation Methodology

Most of the DU claimed savings come from prescriptive projects which are based upon a methodology created in the TAG. The approach used for evaluating prescriptive savings is consistent with the verification process used to verify the Energy Efficiency Utilities ("EEUs") savings claims. The utilities' prescriptive projects were statistically sampled to determine the

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<sup>11</sup> *Investigation re: establishment of the Renewable Energy Standard Program*, Docket No. 8550, Order Implementing the Renewable Energy Standard of 6/28/2016 at 33 (directing Department to evaluate whether DUs are meeting the RES energy transformation requirements).

<sup>12</sup> See, [Vermont Public Utility Commission Rule 4.403 at 5,6; Rule 4.409 at 12, 13; Rule 4.410 at 13; and Rule 4.415 at 19, RENEWABLE ENERGY STANDARD RULE, available at https://puc.vermont.gov/sites/psbnew/files/doc\\_library/4400-renewable-energy-standard.pdf](https://puc.vermont.gov/sites/psbnew/files/doc_library/4400-renewable-energy-standard.pdf).

number of projects that were required to be reviewed to ensure statistically significant results for the specific populations. The samples were designed to ensure a minimum confidence level of 80% and that the margin of error was no more than  $\pm 10\%$  of the claimed savings value for the overall population. The savings claimed for these measures were then compared to values generated through a proper application of the Tier III Technical Resource Manual (“TRM”)<sup>13</sup> measure characterizations. To avoid double counting for those measures or services for which Efficiency Vermont (“EVT”) participates, savings were adjusted prior to the Department’s review, according to each DU’s Memorandum of Understanding (“MOU”) with EVT, which dictates how savings will be shared. In addition, for measures that increase electricity consumption, the overall non-fossil fuel generation percentage of each DU’s electrical portfolio was applied to account for any fossil fuel consumed to supply that electricity. For example, if a DU’s power supply portfolio is considered 100% renewable, there was deemed to be no penalty for increased electrical usage. If a utility’s generation mix is considered 75% non-fossil fuel generation, then 25% of the additional electrical load is subtracted from the electrical savings generated by the Tier III measure.

Through the TAG process, the “Tier III Planning Tool” was created for prescriptive measures that could be adjusted to the non-fossil percentage of each DU’s specific power supply portfolio. Any savings shared with Efficiency Vermont through an MOU was then applied to determine the Tier III savings value of each measure installed. This tool was also used by the DPS to confirm the accuracy of the calculations.

The Department is typically included early in the development of custom measures to determine if the project could appropriately be considered a Tier III project, and to establish reasonable assumptions for determining the savings attributable to that measure. This allowed the DPS to recommend improvements to the approaches, and refinements of the datasets used, to calculate savings that were ultimately claimed for the DU 2022 Tier III activities. It also increased the efficacy and speed of the evaluation and reduced the need for adjustments to savings claims.

The DPS continues to work with the DUs to make aspects of Tier III reporting more uniform to simplify review and improve understanding of the measures implemented by the DUs. This has included the development of common formatting for reporting tables and creating a common lexicon of definitions to avoid any confusion. These improvements have also increased the efficiency of the evaluation process.

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<sup>13</sup> 2022 TIER III TECHNICAL RESOURCE MANUAL, available at <https://publicservice.vermont.gov/document/2022-tier-iii-trm-characterizations>.

## Summary of Results

The table below provides a summary of the DUs claimed MWh equivalent (MWh<sub>e</sub>) savings and the recommended adjustments made by the DPS after the verification process.

**TABLE 1 - SUMMARY OF 2022 RESULTS<sup>14</sup>**

	Lifetime MWh <sub>e</sub> *	Percentage of Requirement	Verified Lifetime MWh <sub>e</sub>	Verified Percentage of Requirement
GMP	491,247	223.1%	487,566	221.4%
BED	22,889	135.1%	22,948	135.4%
WEC	10,809	279.2%	10,809	279.1%
VEC	50,910	206.6%	50,910	206.6%
VPPSA	29,811	210.3%	29,812	210.3%
Stowe	14,728	354.4%	14,730	354.4%
Hyde Park	516 <sup>+</sup>	100.0%		

\*MWh<sub>e</sub> = Megawatt hour equivalent

<sup>+</sup> Utilized banked Tier II RECs

Hyde Park Electric is satisfying its Tier III requirements entirely utilizing banked Tier II credits. The utilization of these credits will be confirmed against their Renewable Energy Standard compliance filing due in August 2023.

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<sup>14</sup> Distribution Utilities savings claims filled in PUC case number 23-0773-INV.



**FIGURE 1: 2022 TIER III SAVINGS BY MEASURE**

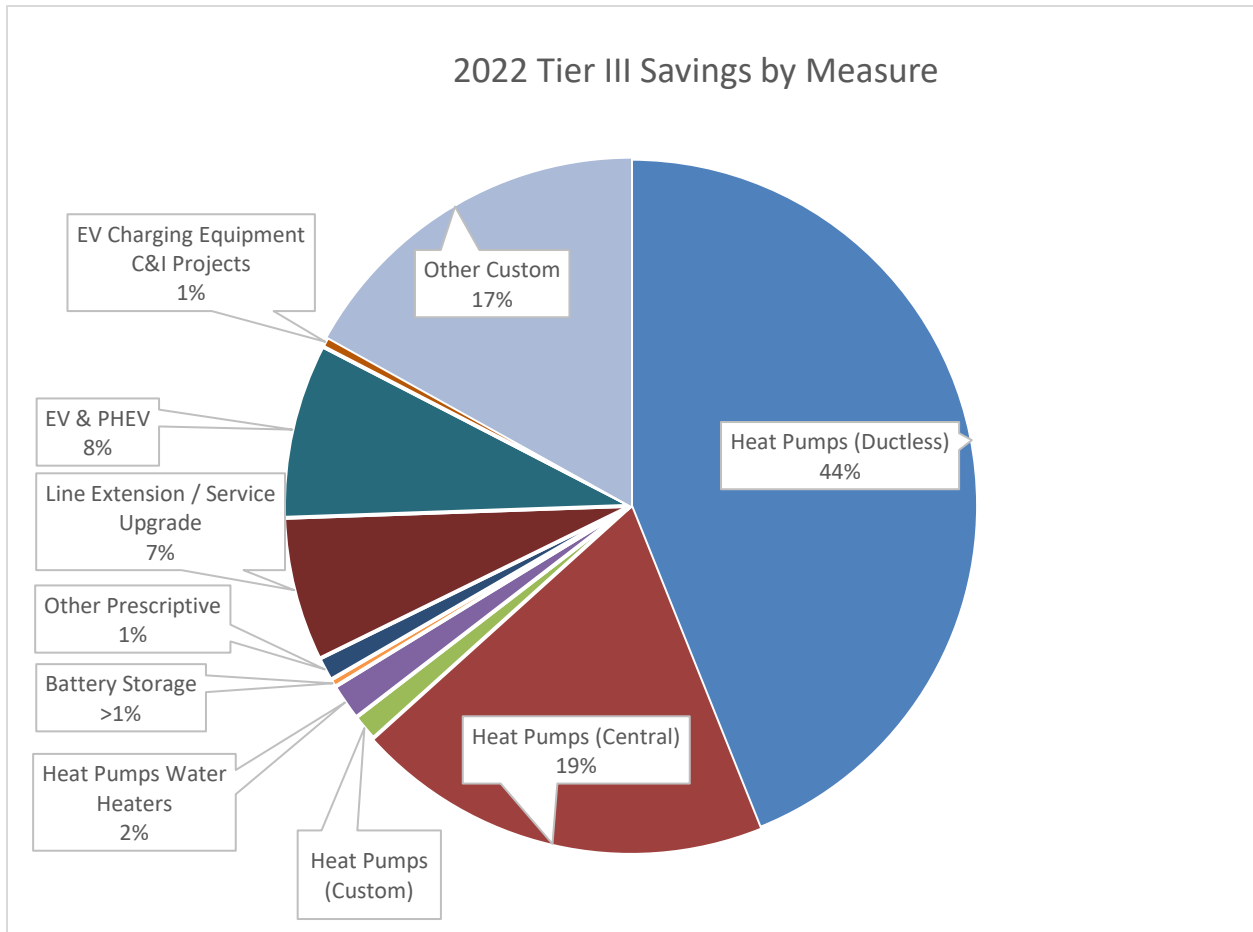


Figure 1, above, details the cumulative savings broken out by measure for all six DUs that actively support and promote Tier III measures within their territories. As in previous years, heat pumps make up most of these savings, but of note is that the contribution of line extensions and service upgrades increased from 3% to 7%. However, while the share of ductless heat pumps contribution is lower than last year (44% in 2022 versus 48% in 2021) it achieved over 80,000 MWh in additional savings than that category did in 2021.

Measures included in the “Other Custom” include glassblowing kilns, electric cattle feeders, reverse osmosis systems (for maple sugar production), variable refrigerant flow systems for HVAC, and electric excavators.

The following DU specific sub-reports contain information about each DU’s Tier III programs and savings claims as well as details of any savings claim adjustments recommended by the DPS.



Green Mountain Power  
2022 Tier III Savings Verification Report

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## GMP 2022 RES Tier III Savings Claim

Green Mountain Power Corporation’s (“GMP”) retail sales for 2022 resulted in a Tier II obligation of 220,236 MWh. As detailed below, GMP claimed Tier III savings of 491,247 MWh for 2022, which surpasses this requirement by 271,010 MWh. The Department has verified 487,566 MWh savings from GMP’s program in 2022 with an additional 267,329 carried over to 2023.

The 2022 Tier III savings claim was pre-reviewed prior to the March 15, 2023, GMP savings claim filing. This allowed for the identification and resolution of several areas where the report could be clarified. No verification or evaluation of prescriptive program activities was done prior to the filing of GMP’s Tier III savings claim. However, custom projects were often pre-reviewed before any incentive agreement was signed, to allow GMP the confidence that those savings would be allowed during this verification process.

GMP’s Tier III Report claims to have met and exceeded their requirement through a range of prescriptive Energy Transformation Projects and custom Commercial & Industrial (“C&I”) projects. Most of the program offerings rely on the measure characterizations developed for the Tier III TRM.<sup>15</sup> These measure characteristics were developed with the full input of the DUs and the Department. Such prescriptive measures use average values from empirical data to determine the expected average savings for common measures. A significant portion of the GMP claimed savings for 2022 result from the completion of 24 large custom C&I projects that were pre-screened through the DPS prior to being implemented.

Table 2, below, lists the components GMP used to meet its 2022 Tier III MWh requirement.

**TABLE 2: GMP 2022 TIER III SAVINGS CLAIM AND VERIFIED SAVINGS**

	Lifetime MWh Claimed	Percentage of Requirement	Verified Lifetime MWh	Verified Percentage of Requirement
GMP 2022 Tier III Requirement	220,236	100.0%	220,236	100.0%
2022 Tier III Prescriptive Energy Transformation Programs	370,011	168.0%	365,812	166.1%
2022 Tier III Custom Projects	121,236	55.0%	121,402	55.1%
Total 2022 Tier III Savings	491,247	223.1%	487,566	221.4%
Carryover to 2023	271,010		267,329	

Tables 3 and 4 provide a more detailed breakdown of GMP’s Tier III Savings claim and all subsequent adjustments. Table 3, below, summarizes the various Residential sector and other prescriptive measures implemented by GMP through either a shared savings MOU with EVT or through measures implemented by GMP directly.

<sup>15</sup> See, 2022 TIER III TECHNICAL RESOURCE MANUAL, *available at* <https://publicservice.vermont.gov/document/2022-tier-iii-trm-characterizations>.

**TABLE 3: GMP 2022 RESIDENTIAL AND PRESCRIPTIVE TIER III ENERGY TRANSFORMATION PROGRAMS**

Measure	Units	Lifetime MWhe Claimed	Percentage of Requirement	Verified Lifetime MWhe	Verified Percentage of Requirement
<b>Cold Climate Heat Pumps</b>					
Heat Pumps (Ductless)	7,467	215,025	97.63%	214,142	97.23%
Heat Pumps (Central)	843	94,469	42.89%	94,469	42.89%
<b>Heat Pumps Subtotal</b>	<b>8,310</b>	<b>309,494</b>	<b>140.53%</b>	<b>308,611</b>	<b>140.13%</b>
<b>Heat Pump Water Heaters</b>					
Heat Pump Water Heater	<b>385</b>	<b>8,315</b>	<b>3.78%</b>	<b>8,315</b>	<b>3.78%</b>
<b>Transportation, Lawn Care and Other Programs</b>					
<b>Electric Vehicles Program</b>					
New All Electric Vehicles	712	27,823	12.63%	25,324	11.50%
Used All Electric Vehicles	107	2,091	0.95%	2,091	0.95%
New Plug-in Hybrid EV	415	12,097	5.49%	11,631	5.28%
Used Plug-in Hybrid EV	45	656	0.30%	656	0.30%
<b>EVs Subtotal</b>	<b>1,279</b>	<b>42,666</b>	<b>19.37%</b>	<b>39,701</b>	<b>18.03%</b>
Electric Bikes	706	3,906	1.77%	3,906	1.77%
Electric Motorcycles	1	9	0.00%	9	0.00%
Residential Lawnmowers	340	382	0.17%	382	0.17%
Commercial Lawnmowers	5	365	0.17%	365	0.17%
Electric Trimmers	173	215	0.10%	215	0.10%
Electric Leaf Blowers	81	101	0.05%	101	0.05%
Electric Chainsaws	82	102	0.05%	102	0.05%
Res Lawn & Garden Tractor	36	133	0.06%	133	0.06%
Induction Stovetops	33	118	0.05%	118	0.05%
<b>Other Electric Equipment Subtotal</b>	<b>1,457</b>	<b>5,331</b>	<b>21.79%</b>	<b>5,331</b>	<b>20.45%</b>
<b>Transportation, Lawn Care and Other Programs Total</b>	<b>2,736</b>	<b>47,997</b>	<b>0.75%</b>	<b>45,032</b>	<b>0.41%</b>
<b>Public &amp; Workplace EV Charging Stations</b>					
Level 3 - Public	5	762	0.35%	762	0.35%
Level 2 - Public	29	641	0.29%	641	0.29%
Level 2 - Workplace	9	256	0.12%	256	0.12%
<b>Public &amp; Workplace EVSE Totals</b>	<b>43</b>	<b>1,659</b>	<b>0.75%</b>	<b>1,659</b>	<b>0.41%</b>
<b>Charging Network Infrastructure</b>					
Level 2 - 90 ports	37	211	0.10%	211	0.10%
DC Fast Chargers - 14 ports	19	491	0.22%	491	0.22%
<b>Charging Network Infrastructure Totals</b>	<b>56</b>	<b>702</b>	<b>0.32%</b>	<b>702</b>	<b>0.32%</b>

<b>Transportation and Other Programs Overall Total</b>	<b>50,358</b>	<b>22.87%</b>	<b>47,393</b>	<b>21.52%</b>
<b>Residential Battery Storage</b>				
Tesla Powerwall 2019 Installations	478	1,797	0.82%	1,797
Tesla Powerwall - VLITE	11	41	0.02%	41
Enphase Pilot	9	6	0.00%	6
<b>Battery Storage Totals</b>	<b>498</b>	<b>1,844</b>	<b>0.84%</b>	<b>1,844</b>
<b>Residential and Prescriptive Totals</b>	<b>12,028</b>	<b>370,011</b>	<b>168.01%</b>	<b>366,163</b>

## GMP Tier III Program and Measure Descriptions

### Prescriptive Measures

The Tier III savings for these measures represent the fossil fuel that is displaced by the measure. The calculation of savings for these measures relies on the measure characterization developed for the Tier III TRM. These measure characteristics were developed with the input of the DUs.

### Cold Climate Heat Pumps

In program year 2022, GMP continued its collaboration with EVT by supporting cold climate heat pump (“cCHP”) installations that were claimed through the EVT mid-stream rebate program. GMP partnered with EVT to offer customers a \$250 mid-stream rebate to augment EVT’s existing mid-stream program for electric efficiency, and a standalone \$400 midstream rebate through a partnership with EVT. EVT now processes all of GMP’s prescribed heat pump incentives, including the low-to-moderate income (“LMI”) adders. The LMI adders are processed as a downstream incentive by EVT.

The Department reviewed a random, statistically significant sample of projects from the midstream rebate report provided by EVT. The GMP savings claim reported 7,467 ductless mini-split cCHPs incentivized through the Tier III program in 2022, 6,933 for residential customers and 534 for commercial customers. 437 installations for LMI participants were included in those totals, along with 31 other units in a low-income multifamily fuel switch project.

GMP claimed 754 whole building (centrally ducted) heat pumps, of which 20 were air to water heat pumps and 7 were ground source heat pumps.

The savings claim for both mini-split and whole building heat pumps are prescriptive, based on the size of the outdoor unit, as characterized in the Tier III TRM.

### Heat Pump Water Heaters

GMP leverages EVT Heat Pump Water Heater (“HPWH”) incentives in its Tier III HPWH program to reduce the cost to participating customers. GMP’s HPWH program is now administered by EVT to streamline the rebate application process. GMP claimed prescriptive Tier III savings for 263 HPWHs under this program in 2022.

## Transportation, Lawn and Garden and Induction Stove Programs

### Electric Vehicles

In 2022, GMP continued to offer incentives to GMP customers for purchasing new and used all-electric (“EV”) and plug-in hybrid electric vehicles (“PHEV”). All such purchasers of new and used EVs and PHEVs were eligible for a free Level 2 charger. Until August 2022, only new EVs under \$75,000 were eligible for a \$1,500 incentive. After that date, GMP lifted the MSRP cap due to the difficulty in determining the MSRP for many vehicles. New PHEVs were eligible for a \$1,000 incentive and GMP customers purchasing a used EV or PHEV received a \$750 incentive. Many of the EV and PHEV incentives were coordinated through partner dealerships which offered a point-of-sale rebate. For other customers, the rebates were applied for online. A total of 1,279 EVs and PHEVs were purchased through this program, with 1,127 of them new vehicles. GMP offered an additional \$1,000 rebate for low-income customers who purchased EVs or PHEVs in 2022, and 134 self-certified low-income customers received the incentive.

The TAG group has established a savings value for all-electric and plug-in electric vehicles and the numbers presented by GMP are consistent with these values.

### Electric Bikes

GMP continued offering a \$200 incentive for electric bicycles or ‘e-Bikes’ in 2022 through participating bike shops. Beginning in July 2022, GMP also allowed customers to submit a rebate application online. GMP claimed Tier III savings for 706 eBikes according to the Tier III TRM measure characterization of 5.53 MWh per bike.

### Electric Lawn and Garden Equipment

Beginning in 2021, GMP offered incentives for electric leaf blowers, chainsaws, trimmers and lawn and garden tractors again. Each of these measures has been characterized in the Tier III TRM, with savings based on the avoided fuel usage compared to gasoline-powered versions of each type of equipment. The uptake of these rebates was significant, with 372 incentives awarded for this group of measures.

### Electric Lawnmowers

GMP continued offering incentives for both residential and commercial electric lawnmowers in 2022. Customers received a \$50 incentive for a residential electric lawnmower, and \$2,500 for a



commercial lawnmower. In 2022, GMP issued incentives for 340 residential lawnmowers and 5 commercial lawnmowers. Savings are based on a prescriptive algorithm developed by the Tier III TAG.

### Electric Forklift Program

In 2022, GMP continued to offer a \$3,000 incentive for new electric forklifts and \$1,500 for used electric forklifts. No rebates for electric forklifts were paid in 2022.

### Induction Stovetops

GMP began offering a \$200 incentive for electric induction stovetops for customers switching from fossil fuel equivalents. Thirty-three GMP customers took advantage of this incentive in 2022.

### Public and Workplace EV Charging Stations

In 2022, GMP provided a \$750 per port incentive to customers who installed Level 2 EV charging stations for employee or public use, and a \$1,500 per port incentive to commercial customers who install Level 3 “DC fast” charging stations. GMP provided incentives for the installation of five public Level 3 DC Fast chargers, 29 public Level 2 chargers, and 9 Level 2 workplace charging stations. The Tier III savings for these charging stations is prescriptive as characterized in the Tier III TRM.

### Charging Network Infrastructure

GMP manages a network of 65 ports of Level 2 public and workplace chargers at 37 locations, and 22 ports of Level 3 DC Fast Chargers at 19 locations throughout the service territory. This is down from 90 Level 2 and 44 Level 3 chargers in 2021. GMP offered a \$750 incentive to the commercial customers that were serving as host sites for these chargers to take ownership of the charging hardware and management. Eleven ports at five sites were transferred to commercial customers in 2022. GMP claimed Tier III credits based on the metered kWh output of each charging station. GMP reported 211 MWhe of Tier III eligible charging at its Level 2 Charging stations, and 491 MWhe at its Level 3 DC Fast charging stations for 2022.

### Battery Storage

In 2022, GMP continued to offer Tesla Powerwall battery systems as a resiliency improvement in customer homes. Under this program, participating customers have a two-battery Tesla Powerwall system installed, which provides backup power during outages. The Powerwall is an intelligent device which GMP can control to reduce demand during peak events by controlling the charging/discharging patterns of an aggregated group of Powerwalls. GMP began offering Enphase IQ 10 batteries as a pilot in 2022. The DPS has verified that 498 residential batteries including 489 Tesla Powerwalls and 9 Enphase batteries were installed in 2022 as claimed. The

Tier III savings for each battery are calculated using the algorithm approved by the Tier III TAG in 2019. Due to problems in implementing the demand response software for the Enphase battery system, these nine installations were only deployed a few times in 2022, so the claimed savings per Enphase battery installation was much smaller than the prescriptive savings from the Tesla Powerwalls.

## Custom Projects

GMP undertook 36 custom C&I projects in 2022. GMP engaged DPS staff from the inception for projects that were particularly complex or novel. For those projects, the DPS reviewed all relevant information, including savings calculations, and suggested changes to the assumptions and methodologies that were implemented where appropriate. These changes were negotiated to achieve what both parties deemed to be a reasonable and conservative estimation of the overall project savings. The Custom C&I projects are summarized in Table 4, below.

The DPS reviewed the files provided with GMP's Tier III draft filing for consistency with what had previously been reviewed and found only a few instances where it was necessary to adjust the claimed savings from these projects. Most of these adjustments were for air-source heat pump projects where the existing fossil fuel heating system was retained as back-up. A portion of the savings was deducted for these projects, based on the projection that the back-up system would inevitably be used to supply heat during peak heating load. Several projects used the 2021 heat rate rather than the 2022 heat rate in converting fossil fuel savings to MWh. These savings were recalculated with the 2022 heat rate which resulted in a small increase in savings. One heat pump project used improper bin data to calculate the annual heating load. Another project incorrectly deducted the portion of the heat load that was expected to be supplied by a backup electric resistance heating system, which resulted in a 26% increase in savings for that project. There was one heat pump project where the measure life was reduced to be consistent with other similar measures and the Tier III TRM. That same project also used an incorrect estimate of the existing heating system fuel use. A farm equipment replacement project incorrectly used a 10-year measure life when a 15-year measure life was supported by the documentation. Overall, these changes led to a 167 MWh increase in verified savings for custom projects, or 0.14% of claimed savings for that sector.

**TABLE 4. GMP CUSTOM 2022 COMMERCIAL AND INDUSTRIAL TIER III PROJECTS**

<b>Custom Commercial and Industrial Projects</b>					
	<b>Units</b>	<b>Lifetime MWH Claimed</b>	<b>Percentage of Requirement</b>	<b>Adjusted Lifetime MWH</b>	<b>Adjusted Percentage of Requirement</b>
Sugarhouse RO Upgrade	1	154.1	0.1%	154.1	0.1%
Electric Feed Pusher	1	253.7	0.1%	253.7	0.1%
Forestry Co Line Extension	1	5,280.7	2.4%	5,280.7	2.4%
Quarry Line Extension	1	21,396.3	9.7%	21,396.3	9.7%
E-Excavator	1	74.1	0.0%	74.1	0.0%
Electric Wheel Loader	1	172.3	0.1%	172.3	0.1%
Electric Oven	1	868.6	0.4%	868.6	0.4%
Hybrid RTU	1	170.9	0.1%	170.9	0.1%
College Campus VRF	1	227.4	0.1%	227.4	0.1%
Housing Trust Renovation - Part 2 of 2*	1	1,093.5	0.5%	1,380.4	0.6%
Police Dept E-Bikes	1	69.3	0.0%	69.3	0.0%
32-Unit Multifamily Heat Pumps	1	673.2	0.3%	673.2	0.3%
Line Extension for Grid Tie A - Part 2 of 2	1	1,453.5	0.7%	1,453.5	0.7%
E-Feed Pusher	1	457.1	0.2%	686.0	0.2%
Farm Line Extension - Part 2 of 2	1	169.2	0.1%	169.2	0.1%
Line Extension for Grid Tie B	1	465.2	0.2%	465.2	0.2%
Line Extension for Grid Tie C	1	542.5	0.2%	542.5	0.2%
Line Extension for Grid Tie D	1	434.5	0.2%	434.5	0.2%
Library Renovation	1	405.5	0.2%	380.0	0.2%
CCHPs at Beauty Supply Retailer	1	566.6	0.3%	510.3	0.2%
Plunge Pool Heater	1	25.3	0.0%	25.3	0.0%
Grocery Store VRF	1	427.4	0.2%	427.4	0.2%
Daycare CCHPs	1	865.0	0.4%	779.0	0.4%
Hotel CCHPs	1	671.2	0.3%	671.2	0.3%
Non-profit Retail Store CCHPs	1	232.1	0.1%	232.1	0.1%
College Campus HP Integration and FLM	1	1,085.5	0.5%	1,085.5	0.5%
Church CCHPs	1	425.2	0.2%	425.2	0.2%
Public Safety Building Heat Pumps	1	406.6	0.2%	406.6	0.2%
Glass Melting Kiln	1	73,224.1	33.2%	73,224.1	33.2%
Retail Showroom	1	154.9	0.1%	154.9	0.1%
Ski Resort CCHPs, VRF, HRV	1	339.5	0.2%	339.5	0.2%
Temporary Housing Center - Part 2 of 2*	1	1,181.0	0.5%	1,181.0	0.5%
Electric Transit Busses	1	2,838.6	1.3%	2,838.6	1.3%

Maple Sugaring Generator Offset	1	2,960.5	1.3%	2,960.5	1.3%
Restaurant Renovations	1	875.4	0.4%	700.3	0.3%
Commercial Heat Pump	1	595.5	0.3%	589.1	0.3%
<b>TOTALS</b>	36	121,236	55.0%	121,402	55.1%
<b>Overall Totals for All Sectors</b>	12,064	491,247	223.1%	487,566	221.4%

Burlington Electric Department  
2022 Tier III Savings Verification Report

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## Burlington Electric Department 2022 Tier III Savings Claim

The City of Burlington Electric Department (“BED”) retail sales for 2022 resulted in an obligation of 16,948 MWh. BED has claimed 22,522 MWh savings through its Tier III programs as detailed below. The Department has verified these savings by reviewing project documentation and proof of installation, confirming the correct application of TRM savings algorithms, and checking the usage records of EV charging stations and EV/PHEV proofs of purchase for a statistically significant sample of projects. As a utility with 100% renewable generation, there is no penalty applied to BED’s savings because of active measures that electrify fossil fuel loads.

**TABLE 5: BED 2022 TIER III SAVINGS CLAIM AND VERIFIED SAVINGS**

	Lifetime MWh Reported	Percentage of Requirement	Verified Lifetime MWh	Verified Percentage of Requirement
BED 2022 Tier III Requirement	16,948	100.00%	16,948	100.00%
2022 Tier III Prescriptive Energy Transformation Programs	22,889	135.10%	22,948	135.4%
Total 2022 Tier III Claimed Savings	22,889	135.10%	22,948	135.4%
Carryover to 2023	5,941		6,000	

Table 6 on the following page shows the various Tier III programs and measures implemented by BED for 2022.

**TABLE 6- DETAILED BED 2022 PROGRAM RESULTS**

Measure	Units	Lifetime MWH Claimed	Percentage of Requirement	Verified Lifetime MWH	Verified Percentage of Requirement
<b>Cold Climate Heat Pumps</b>					
Heat Pumps (Ductless single zone)	79	1,789.5	10.6%	1797.0	10.6%
Heat Pumps (Ductless single zone - LMI)	40	995.2	5.9%	999.4	5.9%
Heat Pumps (Ductless multi-zone)	93	3,648.7	21.5%	3,663.9	21.6%
Heat Pumps (Central Systems - Residential)	77	8,589.6	50.7%	8625.3	50.9%
Heat Pumps (Central Systems – Res - LI)	12	1236.7	7.3%	1,241.8	7.3%
Heat Pumps (Central Systems - Commercial)	1	122.1	0.7%	122.6	0.7%
<b>ccHP Total</b>	<b>302</b>	<b>16,381.8</b>	<b>96.7%</b>	<b>16,449.9</b>	<b>97.1%</b>
<b>Heat Pump Water Heaters</b>					
Heat Pump Water Heater	18	377.3	2.2%	377.3	2.2%
Heat Pump Water Heater - LMI	1	19.1	0.1%	19.1	0.1%
<b>HPWH Total</b>	<b>19</b>	<b>396.4</b>	<b>2.3%</b>	<b>396.4</b>	<b>2.3%</b>
<b>Transportation Programs</b>					
New All Electric Vehicles	57	2,226.6	13.1%	2,226.6	13.1%
New All Electric Vehicles - LMI	9	351.7	2.1%	351.7	2.1%
New Plug-in Hybrid EV	31	903.6	5.3%	903.6	5.3%
New Plug-in Hybrid EV - LMI	14	408.1	2.4%	408.1	2.4%
Used All Electric Vehicles	15	293.0	1.7%	293.0	1.7%
Used AEV LMI	5	78.2	0.5%	78.2	0.5%
Used Plug-in Hybrid EV	6	87.4	0.5%	87.4	0.5%
Pre-owned PHEV LMI	2	29.1	0.2%	29.1	0.2%
Home Level 2 EV Charger	57	0.0	0.0%	0.0	0.0%
Public EVSE - BED owned	10	174.3	1.0%	174.3	1.0%
Public EVSE - privately owned	5	47.6	0.3%	47.6	0.3%
Public EVSE - privately owned - LI	3	3.5	0.0%	3.5	0.0%
Workplace EVSE	4	113.8	0.7%	113.8	0.7%
Electric Bikes	148	818.9	4.8%	818.9	4.8%
Electric Motorcycles	1	8.9	0.1%	8.9	0.1%
Electric Forklift	1	123.4	0.7%	123.4	0.7%
<b>Transportation Programs Total</b>	<b>367</b>	<b>5,668.1</b>	<b>33.4%</b>	<b>5,668.1</b>	<b>33.4%</b>
<b>Miscellaneous Programs</b>					
Residential Lawnmowers	158	177.4	1.0%	177.4	1.0%
Commercial Lawnmowers	1	73.0	0.4%	73.0	0.4%
Electric Leaf Blowers	27	33.6	0.2%	33.6	0.2%
Electric Lawn Equipment	53	65.9	0.4%	65.9	0.4%



Electric Snow Blowers	13	3.5	0.0%	3.5	0.0%
Induction Stoves	25	89.2	0.5%	80.3	0.5%
<b>Misc. Programs Total</b>	<b>277</b>	<b>442.6</b>	<b>2.6%</b>	<b>433.7</b>	<b>2.6%</b>
<b>Custom and Prescriptive Totals</b>	<b>965</b>	<b>22,888.9</b>	<b>135.1%</b>	<b>22,948.1</b>	<b>135.4%</b>

\*MWhe = Megawatt hour equivalent

BED utilized social media promotions, e-newsletters, and press releases with links to its website to promote its Tier III offerings, particularly its EV and Electric Bike programs.

## BED Tier III Program and Measure Descriptions

### Prescriptive Measures

The Tier III savings for these measures represent the fossil fuel that is displaced by the measure and is calculated using the corresponding measure characterization in the Tier III TRM. These measure characteristics were developed with the input of the Department and the DUs.

#### Electric Vehicles and Plug-in Hybrid Electric Vehicles

BED offered incentives for the purchase or lease of new or used electric vehicles EVs and PHEVs in 2022. The incentive levels remained at \$1,800 for new EVs and \$1,500 for new PHEVs in 2022. Used EVs and PHEVs are eligible for an \$800 incentive. Self-identified low-income customers could also claim an additional \$500 incentive for new EVs, \$300 for new PHEVs and \$200 for used EVs or PHEVs. In 2022, these incentives were supplemented by \$500 per vehicle of Energy Efficiency Utility “Act 151” funds. All told, low-income purchasers could receive up to \$2,800 in incentives for new EVs and \$2,300 for new PHEVs.

BED paid incentives on a total of 139 electric vehicles, with 111 new and 28 used in 2022. Eighty-six were all-electric vehicles (20 of which were used) and 53 were PHEVs (20 used). The savings claims for these vehicles were determined using the Tier III TRM algorithm.

#### Electric Bikes

The electric bicycle or ‘e-Bike’ program is implemented for BED in part by Local Motion, a Burlington-based non-profit that advocates for walkable and bikeable communities. New in 2022, BED customers were also able to apply for eBike rebates online. A \$200 rebate is offered to BED customers who purchase an electric bike through any retailer. An additional \$50 fee is paid to Local Motion for each rebate processed. BED paid incentives for 148 electric bikes in 2022, as verified by invoices and incentive payment records.

#### Electric Motorcycles

BED offered a \$500 incentive for electric motorcycles in 2022 but provided just one incentive during the year.

## Cold Climate Heat Pumps

BED provided an incentive for the installation of 302 ccHPs in 2022. This total included 79 single zone heat pumps and 93 multizone units. There were also 77 residential and 1 commercial centrally ducted heat pumps incentivized in 2022. Each of these totals is a decrease from 2021 except for the low-income participation in the centrally ducted heat pump program, which increased from five to twelve in 2022. Incentive levels vary based on the size of the units. Forty of the single zone heat pumps received an additional \$400 rebate offered to self-certified low-income households (“LMI”). This LMI bonus rebate was increased from \$200 in 2021, in response to the pandemic and to help BED meet its Net Zero goals. No air-to-water heat pump systems were incentivized in 2022.

## Electric Vehicle (“EV”) Charging Stations

BED owns sixteen Level 2 public EV charging stations at various locations around the city, six of which were installed before the Tier III program began. The ten remaining charging stations receive Tier III credit. BED contracts with ChargePoint to manage the administrative details of the charging stations’ operation, including billing of EV customers. A prescriptive MWhe savings value for these EV charging stations was established through the Tier III TRM process. However, since electric vehicle supply equipment (“EVSE”) is monitored and metered, BED claimed Tier III credits based on the actual metered kWh output of each charging station and converted that amount to MWhe based on the TRM algorithm.

BED also provided incentives to install eight privately owned Level 2 charging stations in Burlington and claimed Tier III savings according to the Tier III TRM deemed savings. Three of those were installed at multifamily residential locations that had a substantial percentage of income-qualified residents, so the incentives for those three chargers were claimed as low-income spending toward the low-income equity benchmark.

## Residential & Commercial Electric Lawnmowers

BED continued to offer incentives for residential and commercial electric lawnmowers in 2022. Response to the residential lawnmower program continued to be strong and BED awarded incentives for 158 residential lawnmowers in 2022, after projecting 125. The commercial lawnmower program slowed considerably in 2022, as only one commercial lawnmower was incentivized.

## Electric Leaf Blowers, Snow Blowers, and Lawn Equipment

Continuing for a second year, BED offered incentives for electric leaf blowers. Participation in this program remained lackluster – only 27 customers received a leaf blower rebate in 2022. New in 2022, BED began offering incentives for electric snow blowers, chainsaws, and trimmers. BED provided incentives for 13 snow blowers, eight chainsaws, and 45 trimmers in 2022.

## Induction Stoves

Continuing in 2022, BED offered incentives for electric induction stoves, which substitute for natural gas or propane usage and are more efficient than electric resistance stovetops. Twenty-five BED customers availed themselves of this incentive in 2022. Induction stoves are characterized in the Tier III TRM.

## Heat Pump Water Heaters

BED provided incentives for 19 HPWH in 2022 and one of those received an additional incentive as self-identified low-income customer. The savings for these water heaters were determined using the Tier III TRM algorithm which has different deemed savings depending on the size and rated efficiency tier of the water heater.

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Washington Electric Cooperative  
2022 Tier III Savings Verification Report

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# Washington Electric Cooperative 2022 Tier III Savings Verification Report

Washington Electric Cooperative, Inc. (“WEC”) retail sales for 2022 resulted in an obligation of 3,872 MWh. As detailed below, WEC claimed Tier III savings of 10,809 MWh for 2022, which surpasses this requirement by 6,937 MWh. The DPS has verified 10,809 MWh savings from their program with a total carryover of Tier III credits of 6,937 MWh into 2023.

As a utility that is considered 100% renewable, there is no penalty applied to WEC Tier III savings for additional electrical loads resulting from active measures that electrify what were previously thermal loads.

The WEC Tier III program focused primarily on prescriptive measures as shown below in Table 7.

**TABLE 7: WEC 2022 TIER III SAVINGS CLAIM AND VERIFIED SAVINGS**

	Lifetime MWh Claimed	Percentage of Requirement	Verified Lifetime MWh	Verified Percentage of Requirement
WEC 2022 Tier III Requirement	3,872	100.00%	3,872	100.00%
2022 Tier III Energy Transformation Programs	10,809	279.18%	10,809	279.15%
Carryover to 2023	6,937		6,937	

As detailed in Table 8, there are relatively minor variances between the claimed savings and verified savings. These differences appear to be because of different methodologies as to the number of significant figures used to calculate the savings and when rounding to two significant figures to calculate the result.

**TABLE 8 - DETAILED 2022 WEC TIER III RESULTS**

Measure	Units	Lifetime MWhe Claimed	Percentage of Requirement	Verified Lifetime MWhe	Verified Percentage of Requirement
<b>Cold Climate Heat Pumps</b>					
Heat Pumps (Ductless)	186	7,177	185.36%	7,176	185.33%
Heat Pumps (Central)	18	1,308	33.78%	1,308	33.79%
<b>ccHP Total</b>	<b>204</b>	<b>8,485</b>	<b>219.14%</b>	<b>8,484</b>	<b>219.12%</b>
<b>Heat Pump Water Heaters</b>					
Heat Pump Water Heater	24	526	13.58%	526	13.57%
<b>HPWH Total</b>	<b>24</b>	<b>526</b>	<b>13.58%</b>	<b>526</b>	<b>13.57%</b>
<b>Transportation Programs</b>					
All Electric Vehicles	26	858	22.16%	858	22.16%
Plug-in Hybrid EV	9	225	5.81%	225	5.81%
Electric Bikes	20	161	4.16%	161	4.15%
<b>Transportation Programs Total</b>	<b>55</b>	<b>1,244</b>	<b>32.13%</b>	<b>1,244</b>	<b>32.12%</b>
<b>Misc. Programs</b>					
Residential Lawnmowers	15	24	0.62%	24	0.61%
Commercial Lawnmowers	1	68	1.76%	68	1.76%
Advanced Wood Heating	3	3	0.08%	3	0.08%
Income Eligible Weatherization	10	460	11.88%	460	11.88%
<b>Misc. Electrification Programs Total</b>	<b>29</b>	<b>555</b>	<b>14.33%</b>	<b>555</b>	<b>14.33%</b>
<b>Prescriptive Totals</b>	<b>312</b>	<b>10,809</b>	<b>279.18%</b>	<b>10,809</b>	<b>279.15%</b>

\*MWhe = Megawatt hour equivalent

The above table shows the various measures implemented by WEC through either a shared savings MOU with EVT or through measures implemented by WEC directly or through partner organizations.

## WEC Tier III Program and Measure Descriptions

### Prescriptive Projects

The Tier III savings for these measures represents the fossil fuel that is displaced by the measure. The calculation of savings for these measures relies on the measure characterization developed for the Tier III TRM. These measure characterizations were developed with the input of the DUs.



## Cold Climate Heat Pumps

WEC partnered with EVT to offer a mid-stream incentive at the point of purchase to its members. In total, 204 cCHPs were provided an incentive within a WEC's territory. These measures are considered prescriptive and were verified through the review of the appropriate records and claim forms provided by the DU.

## Heat Pump Water Heaters

WEC partnered with EVT to offer a mid-stream incentive at the point of purchase to units installed in WEC territory that were displacing fossil fuels. These measures are considered prescriptive and verified through the review of the appropriate records provided by the DU.

## Electric Vehicles

WEC provided incentives for the purchase or lease of 26 EVs and 9 PHEVs. These measures are considered prescriptive and verified through the review of the appropriate records provided by the DU.

## Electric Bikes

WEC provided an incentive of up to \$200 for the purchase of 30 electric bikes or 'e-Bikes'. These measures are considered prescriptive and verified through the review of the appropriate records provided by the DU.

## Residential Lawnmowers

WEC provided an incentive of up to \$100 each for 15 electric residential mowers. These measure characterizations were developed with the input of the DUs. These measures are considered prescriptive and verified through the review of the appropriate records provided by the DU.

## Advanced Wood Heating

WEC provided an incentive of \$1,000 for pellet boilers. Through a MOU, WEC and EVT reached an agreement on how to share MMBtu savings for programs already in existence and operated by EVT. The goal of the MOU was to create an agreed upon methodology that would determine the savings split relative to the number of additional or incremental units that enter the program through WEC's involvement.

## Income Eligible Weatherization

The Department reviewed the savings claimed by WEC for its income eligible weatherization program per PUC Rule 4.416 (2):

*If proposing a low-income weatherization energy transformation project, a retail electricity provider may:*

(2) pay a rate per MWh of lifetime energy savings to a low-income weatherization provider that shall be used by the low-income weatherization provider to fund low-income weatherization projects anywhere within the state, so long as the low-income weatherization provider provides low-income weatherization services within the Retail Electricity Provider's service territory and the Retail Electricity Provider contemporaneously advertises the low-income weatherization services to its Customers or members. The MWh Rate shall be updated annually, and the lesser of the calculated rate or the Alternative Compliance Payment shall be established as the rate per MWh of lifetime energy savings to be used for the calendar year. By October 1 of each year, the Vermont Office of Economic Opportunity shall file the updated MWh Rate with the Commission.

For 2022, the rate calculated by the Vermont Office of Economic Opportunity was \$66.94 per MWh. The Department finds that the WEC offering is consistent with the PUC rule for low-income weatherization eligibility as a Tier III energy transformation project.

WEC's partner for their low-income weatherization program, Capstone Community Action, provided confirmation of the payment to its program.

Vermont Electric Cooperative  
2022 Tier III Savings Verification Report

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## Vermont Electric Cooperative 2022 Tier III Savings Verification Report

Vermont Electric Cooperative, Inc. (“VEC”) retail sales for 2022 resulted in an obligation of 24,639 MWh. As detailed below, VEC claimed Tier III savings of 50,910 MWh for 2022, which surpasses this requirement by 26,271 MWh. The Department has verified 50,910 MWh savings from their program, with a total carryover of Tier III credits of 26,271 MWh into 2023.

**TABLE 9: VEC 2022 TIER III SAVINGS CLAIM AND VERIFIED SAVINGS**

	Lifetime MWh Claimed	Percentage of Requirement	Verified Lifetime MWh	Verified Percentage of Requirement
VEC 2022 Tier III Requirement	24,639	100.00%	24,639	100.00%
2022 Tier III Energy Transformation Programs	44,671	181.30%	44,672	181.31%
2022 Tier III C&I Custom Projects	6,239	25.32%	6,239	25.32%
Total 2022 Tier III Savings	50,910	206.62%	50,910	206.63%
Carryover to 2023	26,271		26,271	

As detailed in Table 10 there are relatively minor variances between the claimed savings and verified savings. These differences appear to be because of different methodologies as to the number of significant figures used to calculate the savings and when rounding to two significant figures to calculate the result.

**TABLE 10 - DETAILED 2022 VEC PROGRAM RESULTS**

Measure	Units	Lifetime MWh Claimed	Percentage of Requirement	Verified Lifetime MWh	Verified Percentage of Requirement
<b>Cold Climate Heat Pumps</b>					
Heat Pumps (Ductless)	890	27,400	111.21%	27,400	111.21%
Heat Pumps (Central)	78	8,159	33.11%	8,159	33.11%
Ground Source	1	182	0.74%	182	0.74%
<b>ccHP Total</b>	<b>969</b>	<b>35,741</b>	<b>145.06%</b>	<b>35,740</b>	<b>145.06%</b>
<b>Heat Pump Water Heaters</b>					
Heat Pump Water Heater	68	716	2.91%	716	2.91%
<b>HPWH Total</b>	<b>68</b>	<b>716</b>	<b>2.91%</b>	<b>716</b>	<b>2.91%</b>
<b>Transportation Programs</b>					
All Electric Vehicles	84	3,123	12.68%	3,123	12.68%
Plug-in Hybrid EV	44	1,204	4.89%	1,206	4.90%
<b>Transportation Programs Total</b>	<b>128</b>	<b>4,327</b>	<b>17.56%</b>	<b>4,329</b>	<b>17.57%</b>
<b>Misc. Programs</b>					
Residential Lawnmowers	44	49	0.20%	49	0.20%
Induction Stovetop	3	11	0.04%	11	0.04%
Advanced Wood Heating	40	3,604	14.63%	3,604	14.63%
Home Batteries	13	223	0.91%	223	0.90%
<b>Misc. Electrification Programs Total</b>	<b>100</b>	<b>3,887</b>	<b>15.78%</b>	<b>3,886</b>	<b>15.77%</b>
<b>Custom Measures</b>					
Clean Air Program (Load Electrification)	4	6,214	25.22%	6,214	25.22%
Level 2 EV Charger (Flexible Load Management)	42	25	0.10%	25	0.10%
<b>Custom Measures Totals</b>	<b>46</b>	<b>6,239</b>	<b>25.32%</b>	<b>6,239</b>	<b>25.32%</b>
<b>Custom and Prescriptive Totals</b>	<b>1,311</b>	<b>50,910</b>	<b>206.62%</b>	<b>50,910</b>	<b>206.63%</b>

\*MWh = Megawatt hour equivalent

The above table shows the various measures implemented by VEC through either a shared savings MOU with EVT, or through measures implemented by VEC directly or through partner organizations.

## VEC Tier III Program and Measure Descriptions

### Prescriptive Measures

The Tier III savings for these measures represents the fossil fuel that is displaced by the measure. The calculation of savings for these measures relies on the measure characterization developed for the Tier III TRM. These measure characterizations were developed with the input of the DUs.

#### Heat Pumps

VEC Partnered with EVT to offer an instant mid-stream incentive at point of purchase to its members in 2022. An additional \$150 was offered directly to homeowners who could prove their buildings met the requirements for the enhanced incentive. In total, 969 HPs were provided an incentive within VEC's territory, with 44 of those qualifying for the enhanced incentive. These measures are considered prescriptive and were verified through the review of the appropriate records and claim forms provided by the DU.

#### Heat Pump Water Heater

VEC Partnered with EVT to offer an instant mid-stream incentive at point of purchase to its members who installed heat pump water heaters ("HPWH") which replaced fossil-fuel fired water heaters through EVT's mid-stream program. These measures are considered prescriptive and are verified through the review of the appropriate records and claim forms provided by the DU.

#### Electric Vehicles

VEC provided incentives for the purchase or lease of 84 EVs and 44 PHEVs. These measures are considered prescriptive and are verified through the review of the appropriate records and claim forms provided by the DU.

#### Residential Lawnmowers

VEC provided a \$50 on-bill credit for 58 residential electric lawnmowers. These measures are considered prescriptive and are verified through the review of the appropriate records and claim forms provided by the DU.

#### Induction Stovetop

VEC provided a \$100 on-bill credit for three induction stovetops. Induction stovetops are considered prescriptive and are verified through the review of the appropriate records and claim forms provided by the DU.

## Advanced Wood Heating

VEC provided a \$150 incentive for the purchase of 40 pellet stoves. These measures are considered prescriptive and verified through the review of the appropriate records and claim forms provided by the DU.

## Home Battery

VEC provided incentives for 13 home battery storage systems in 2022. VEC customers receive either an upfront incentive or a monthly credit for providing access to the energy stored in the battery during peak times. These measures are considered prescriptive and verified through the review of the appropriate records and claim forms provided by the DU.

## Custom Projects

### Clean Air Program

VEC undertook four custom projects under its Clean Air Program in 2022. Measures in this category undertook to reduce or replace fossil fuel use through the provision of new or upgraded electrical service and the upgrade of existing transformers. The DPS reviewed all relevant information and savings assumptions to ensure the savings estimates were reasonable and met statutory requirements. The DPS found these project savings to be reasonable, and overall, a conservative estimate of potential project savings.

### Residential EV Charger

VEC implemented a flexible load EV charging program by incentivizing controllable EV chargers that allowed these units to be controlled to avoid energy use during peak periods. The Department reviewed all relevant information and savings assumptions to ensure the savings estimates were reasonable and met statutory requirements. The Department found these project savings to be reasonable.



Vermont Public Power Supply Authority  
2022 Tier III Savings Verification Report

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## VPPSA 2022 Tier III Savings Verification Report

Given that the Vermont Public Power Supply (“VPPSA”)<sup>16</sup> is a consortium of municipal electric utilities that individually do not serve more than 6,000 customers, their requirements for Tier III began on January 1, 2019, per statute.<sup>17</sup> The RES Tier III requirements for such utilities are 2% of the provider’s annual retail sales beginning on January 1, 2019, increasing by an additional two-thirds of a percent each subsequent January 1 – until reaching 10 and two-thirds percent on and after January 1, 2032.

VPPSA retail sales for 2022 resulted in an obligation of 14,178 MWh. As detailed below, VPPSA claimed Tier III savings of 29,811 MWh for 2022, which surpasses this requirement by 15,633 MWh. The Department has verified 29,812 MWh of savings from their program, with a carryover of Tier III credits of 15,634 MWh.

**TABLE 21: VPPSA 2022 TIER III SAVINGS CLAIM AND VERIFIED SAVINGS**

	Lifetime MWh Claimed	Percentage of Requirement	Verified Lifetime MWh	Verified Percentage of Requirement
VPPSA 2022 Tier III Requirement	14,178	100.00%	14,178	100.00%
2022 Tier III Energy Transformation Programs	16,506	116.42%	16,507	116.43%
2022 Tier III C&I Custom Projects	13,305	93.84%	13,305	93.84%
Total 2022 Tier III Savings	29,811	210.26%	29,812	210.27%
Carryover to 2023	15,633		15,634	

As detailed in Table 12, on the following page, the carryover credits are mostly due to the custom electrification projects undertaken by VPPSA.

<sup>16</sup> As of November 17, 2019, VPPSA, is made up of 11 utilities that participated in their Tier III programs. See generally, 30 V.S.A. §§ 5001 -5041.

<sup>17</sup> 30 V.S.A. § 8005(a)(3)(B).

**TABLE 12 - DETAILED 2022 VPPSA PROGRAM RESULTS**

Measure	Units	Lifetime MWhe Claimed	Percentage of Requirement	Verified Lifetime MWhe	Verified Percentage of Requirement
<b>Cold Climate Heat Pumps</b>					
Heat Pumps (Ductless)	455	10,555	74.45%	10,556	74.45%
Heat Pumps (Central)	37	2,867	20.22%	2,867	20.22%
<b>ccHP Total</b>	<b>492</b>	<b>13,422</b>	<b>94.67%</b>	<b>13,423</b>	<b>94.67%</b>
<b>Heat Pump Water Heaters</b>					
Heat Pump Water Heater	37	688	4.85%	688	4.86%
<b>HPWH Total</b>	<b>37</b>	<b>688</b>	<b>4.85%</b>	<b>688</b>	<b>4.86%</b>
<b>Transportation Programs</b>					
All Electric Vehicles	45	1,381	9.74%	1,381	9.74%
Plug-in Hybrid EV	13	308	2.17%	308	2.17%
Level 2 EV Charger (Commercial)	5	112	0.79%	112	0.79%
Electric Bikes	19	104	0.73%	104	0.73%
<b>Transportation Programs Total</b>	<b>82</b>	<b>1,905</b>	<b>13.44%</b>	<b>1,905</b>	<b>13.44%</b>
<b>Misc. Electrification Programs</b>					
Residential Lawnmowers	10	11	0.08%	11	0.08%
Commercial Lawnmowers	5	168	1.18%	168	1.18%
Electric Golf Cart	75	259	1.83%	259	1.83%
Yard Tools	43	53	0.37%	53	0.38%
<b>Misc. Electrification Programs Total</b>	<b>133</b>	<b>491</b>	<b>3.46%</b>	<b>491</b>	<b>3.46%</b>
<b>Custom Measures</b>					
Custom Energy Transformation Projects	2	13,305	93.84%	13,305	93.84%
<b>Custom Measures Totals</b>	<b>2</b>	<b>13,305</b>	<b>93.84%</b>	<b>13,305</b>	<b>93.84%</b>
<b>Custom and Prescriptive Totals</b>	<b>746</b>	<b>29,811</b>	<b>210.26%</b>	<b>29,812</b>	<b>210.27%</b>

\*MWhe = Megawatt hour equivalent.

The preceding table shows the various measures implemented by VPPSA through either a shared savings MOU with EVT, or through measures implemented by VPPSA directly or through partner organizations.

## VPPSA Tier III Program and Measure Descriptions

### Prescriptive Measures

The Tier III savings for these measures represents the fossil fuel that is displaced by the measure. The calculation of savings for these measures relies on the measure characterization developed for the Tier III TRM. These measure characterizations were developed with the input of the DUs.

#### Cold Climate Heat Pumps

VPPSA partnered with EVT to offer an instant mid-stream incentive at point of purchase to its members' customers. An additional \$200 was offered to homeowners and businesses whose buildings met the requirements for an enhanced incentive. In total, 492 cCHPs were provided with an incentive within a VPPSA member's territory, with 24 of those qualifying for the enhanced incentive. These measures are considered prescriptive and were verified through the review of the appropriate records and claim forms provided by VPPSA.

#### Heat Pump Water Heaters

VPPSA Partnered with EVT to offer an instant \$600 mid-stream incentive at point of purchase to its members' customers who installed HPWHs to replace fossil-fuel fired water heaters through EVT's mid-stream program. These measures are considered prescriptive and are verified through the review of the appropriate records and claim forms provided by VPPSA.

#### Electric Vehicles

VPPSA offered incentives for the purchase or lease of 45 EVs, including 5 used EVs, and 13 PHEVs, 2 of which were used. These measures are considered prescriptive and are verified through the review of the appropriate records and claim forms provided by the VPPSA.

#### EV Charger

VPPSA provided \$500 incentives for the purchase of 5 level 2 EV chargers for workplace and public use. This measure is considered prescriptive and is verified through the review of the appropriate records and claim forms provided by VPPSA.

#### Electric Bike

VPPSA provided a \$100 incentive each for the purchase of 26 electric bikes or electric bike retrofit kits. This measure is considered prescriptive and is verified through the review of the appropriate records and claim forms provided by VPPSA.

## Residential and Commercial Lawnmowers and Yard Equipment

VPPSA provided \$50 and \$1,000 incentives, respectively, for 10 residential electric lawnmowers and 5 commercial lawnmowers. An additional 43 incentives of \$25 were offered towards the purchase of electric chainsaws, trimmers, or leaf blowers. These measures are considered prescriptive and are verified through the review of the appropriate records and claim forms provided by the DU.

## Custom Projects

### Service Upgrade

This is a custom incentive offered by a VPPSA member in 2022. This consisted of a three-phase transformer change out to an industrial customer replacing on-site diesel power generation. This measure was documented by VPPSA, including establishing typical fuel use. This information and the resulting calculations were reviewed and found to be reasonable by the Department.

### Line Extension

This is a custom measure providing an incentive towards a line extension to allow for a service upgrade for a commercial customer replacing on-site diesel power generation. This equipment installation was documented by VPPSA, including establishing typical fuel use offset by the new line extension. This information and the resulting calculations were reviewed and found to be reasonable by the Department.

Stowe Electric  
2022 Tier III Savings Verification Report

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## Stowe Electric 2022 Tier III Savings Verification Report

Given that the Town of Stowe Electric Department (“Stowe”) is a municipal electric utility serving not more than 6,000 customers, its requirement for Tier III began on January 1, 2019, per statute.<sup>18</sup> The Tier III RES requirements for such utilities are 2% of the provider’s annual retail sales beginning on January 1, 2019, increasing by an additional two-thirds of a percent each subsequent January 1 – until reaching 10 and two-thirds percent on and after January 1, 2032.

Stowe retail sales for 2022 resulted in an obligation of 4,156 MWh. In their claim filed in Docket 23-0773-INV, on 3/15/2023, Stowe indicated a claimed savings of 14,320. However, during the Department’s review it was found that the claimed savings should have been 14,728, based upon the measures listed. As a result, the Department has corrected the original error and will use the value of 14,728 as Stowe’s claim.

As detailed below, Stowe’s corrected claimed Tier III savings of 14,728 MWh for 2022 surpasses their requirement of 4,156 MWh by 10,572 MWh. The Department has verified 14,730 MWh savings from Stowe Electric’s program for Tier III, with a carryover of 10,574 MWh.

The Stowe Tier III program focused on prescriptive measures as shown below in Table 13.

**TABLE 33: STOWE 2022 TIER III SAVINGS CLAIM AND VERIFIED SAVINGS**

	Lifetime MWh Claimed	Percentage of Requirement	Verified Lifetime MWh	Verified Percentage of Requirement
Stowe Electric 2022 Tier III Requirement	4,156	100.00%	4,156	100.00%
2022 Tier III Energy Transformation Programs	14,728	354.38%	14,730	354.42%
Carryover to 2023	10,572		10,574	

As detailed in Table 14, there are relatively minor variances between the claimed savings and verified savings. These differences appear to be because of different methodologies as to the number of significant figures used to calculate the savings and when rounding to two significant figures to calculate the result.

<sup>18</sup> 30 V.S.A. § 8005(a)(3)(B).

**TABLE 14 - DETAILED 2022 STOWE ELECTRIC PROGRAM RESULTS**

Measure	Units	Lifetime MWH Claimed	Percentage of Requirement	Verified Lifetime MWH	Verified Percentage of Requirement
<b>Cold Climate Heat Pumps</b>					
Heat Pumps (Ductless)	241	9,100	218.96%	9,100	218.96%
Heat Pumps (Central)	43	4,297	103.39%	4,297	103.39%
<b>ccHP Total</b>	<b>284</b>	<b>13,397</b>	<b>322.35%</b>	<b>13,397</b>	<b>322.36%</b>
<b>Heat Pump Water Heaters</b>					
Heat Pump Water Heater	2	39	0.94%	39	0.93%
<b>HPWH Total</b>	<b>2</b>	<b>39</b>	<b>0.94%</b>	<b>39</b>	<b>0.93%</b>
<b>Transportation Programs</b>					
All Electric Vehicles	22	709	17.06%	710	17.08%
Plug-in Hybrid EV	14	394	9.48%	394	9.48%
Electric Bikes	17	95	2.29%	95	2.29%
<b>Transportation Programs Total</b>	<b>53</b>	<b>1,198</b>	<b>28.83%</b>	<b>1,199</b>	<b>28.85%</b>
<b>Misc. Electrification Programs</b>					
Residential Lawnmowers	2	2	0.05%	2	0.05%
Advanced Wood Heating	1	92	2.21%	92	2.23%
<b>Misc. Electrification Programs Total</b>	<b>3</b>	<b>94</b>	<b>2.26%</b>	<b>94.74</b>	<b>2.28%</b>
<b>Prescriptive Totals</b>	<b>342</b>	<b>14,728</b>	<b>354.38%</b>	<b>14,730</b>	<b>354.42%</b>

\*MWh = Megawatt hour equivalent

The above table shows the various measures implemented by Stowe through either a shared savings MOU with EVT, or through measures implemented by Stowe directly or through partner organizations.

## Stowe Electric Tier III Program and Measure Descriptions

### Prescriptive Projects

The Tier III savings for these measures represents the fossil fuel that is displaced by the measure. The calculation of savings for these measures relies on the measure characterization developed for the Tier III TRM. These measure characteristics were developed with the input of the DUs.

#### Cold Climate Heat Pumps

Stowe partnered with EVT to offer an instant mid-stream incentive at point of purchase to its customers. In total, 284 ccHPs were provided incentives in 2022. These measures are considered

prescriptive and were verified through the review of the appropriate records and claim forms provided by the DU.

### Heat Pump Water Heaters

Stowe partnered with EVT to offer an instant mid-stream incentive at point of purchase to its customers who installed HPWHs which replaced fossil-fuel fired water heaters through EVT's mid-stream program. These measures are considered prescriptive and are verified through the review of the appropriate records and claim forms provided by the DU.

### Electric Vehicles

Stowe offered incentives for the purchase or lease of 22 EVs in 2022, including 2 used vehicles, and 14 PHEVs, of which 2 were used. These measures are considered prescriptive and are verified through the review of the appropriate records and claim forms provided by the DU.

### Electric Bike

Stowe provided a \$200 incentive, each, for the purchase of five electric bikes. This measure is considered prescriptive and is verified through the review of the appropriate records and claim forms provided by the DU.

### Residential Lawnmower

Stowe provided two \$25 incentives for residential electric lawnmowers in 2022. These measures are considered prescriptive and are verified through the review of the appropriate records and claim forms provided by the DU.

### Advanced Wood Heating

Stowe provided an incentive for the purchase of a pellet stove in 2022. This measure is considered prescriptive and is verified through the review of the appropriate records and claim forms provided by the DU.

## General RES Tier III Program Comment

The Department would like to stress the importance of the accurate tracking and documenting of measures, especially related to the low-income spending target metric. As reported for PY 2022, only VPPSA achieved their low-income spending target. Where a DU has not managed to achieve this low-income spending target, the Department will expect to see an outline within their Tier III Annual Plan for 2024 describing how they are planning on increasing low-income participation and spending in their programs.

The Department would also like to continue to request that the DUs share their filings with the Department prior to filing, to allow the Department to review them for completeness to avoid unnecessary additional process.

## Appendix A – Low Income Spending Targets

A DU's Low Income spending target is based upon a percentage of the incentive amounts provided to the residential sector. In most cases, this is based upon the statewide low-income percentage of 33%. Table 15 details the DUs' 2022 achievement towards spending equity for low-income populations in the program.

**TABLE 15 – LOW INCOME TARGET RESULTS**

	Stowe	VPPSA	VEC	WEC	GMP	BED
Total Residential Incentive	\$ 122,100	\$ 210,359	\$ 509,868	\$ 258,289	\$ 8,583,753	\$ 885,475
LI Spending Target	\$ 40,293	\$ 69,419	\$ 168,256	\$ 85,235	\$ 2,660,963	\$ 346,214
LI Spending Achieved	\$ 3,223	\$ 70,371	\$ 154,092	\$ 36,500	\$ 931,253	\$ 157,050
LI Percentage of Total Res. Incentive	3%	33%	30%	14%	11%	18%
Percentage of LI Target	8%	101%	92%	43%	35%	45%