Evaluation of Electric Distribution Utilities compliance with Tier III Obligations

RES Tier III Verification Report - Revised

Public Service Department

July 9, 2019

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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. 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.[1]

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. Tier II resources are also counted as part of a DU's Tier I requirement.

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. Energy transformation projects are those that reduce fossil fuel consumed by DU customers. 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. Energy Transformation projects implemented on or after January 1, 2015 are eligible to be counted towards a DUs Tier III obligation.

The PUC issued a final order on docket 8550 titled "Order Implementing the Renewable Energy Standard" on 6/28/2016. This order directed the Public Service Department (PSD) to carry out evaluations to determine whether a DU was meeting its RES obligations.

This report provides recommendations regarding the DUs Tier III obligations.

[1] 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 10⅔% in 2032.

Scope of Evaluation

The PSD's evaluation activities consist of a thorough review of the Distribution Utilities (DU) Tier III activities. For custom measures, this includes reviewing customer specific energy usage data and operational information in order to verify the assumptions which the engineering analysis was based on. Once these assumptions were confirmed, the engineering analysis was reviewed for reasonableness, accuracy and compliance with the statute. For prescriptive measures the PSD visited the offices of the DU in order to review documentation s that could be used to verify that prescribed savings values and calculations had been applied correctly, and to calculate 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 by PUC order 8550, 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 in order to create a unified and verifiable savings construct that all DUs could follow. The claim of prescriptive measure savings was verified as described below.

Evaluation Methodology

The majority of savings for most DUs come from large custom commercial projects which were reviewed on an individual basis. Most residential related savings are based upon a prescriptive 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 claim. The savings claimed for these measures were compared to values generated through a review of the TRM measures. To avoid double counting, for those measures or services for which Efficiency Vermont participates, these savings were adjusted according to each DUs Memorandum of Understanding (MOU) with Efficiency Vermont that dictates how savings will be shared. In addition, for measures that increase electricity consumption, the overall renewability percentage of the DU electrical portfolio was applied to account for any fossil fuel consumed to supply that electricity. For example, if a DUs power supply portfolio is considered 100% renewable there was deemed to be no penalty for increased electrical usage. If a grid is considered 75% renewable, 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 customized to the renewability of each DUs specific power supply portfolio Efficiency Vermont MOU in order to determine the savings each measure installed would be

worth in Tier III credits. This tool was used by the PSD to confirm the accuracy of the calculations.

Where custom measures were deployed by DUs the PSD was usually included early in the development of assumptions and to determine if the project itself could be considered a Tier III project. This allowed the PSD to recommend improvements to the approaches and refinements of the datasets used to calculate the potential savings that were ultimately claimed for their 2018 Tier III activities. It increased the efficacy and speed of the evaluation, and reduced the need for adjustments to savings claims.

After the first year of the Tier III program, documentation and reporting standards varied greatly. The PSD continues to work with the DU's to make aspects of the reporting more uniform in nature to simplify reviews and improve comprehension of the measures implemented by the DU's. This includes development of common formatting of reporting tables and creating a common lexicon of definitions to avoid any confusion. These improvements have also increased efficacy of the evaluation process.

Summary of Results

The table below provides a summary of the claimed MWh equivalent (MWh*e*) savings and the recommended adjustments made by the PSD.

Table 1 - Summary of Results

	Lifetime MWh*e** Claimed	Percentage of Goal	Adjusted Lifetime MWh*e*	Adjusted Percentage of Goal
GMP	112,734	100.0%	110,640	98.1%
BED	8,911	100.0%	8,911	100.0%
WEC[2]	1,919	104.6%	1,922	100.2%
VEC	18,257	148.8%%	18,375	149.8%

*MWh*e* = Megawatt hour equivalent

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

[2] WEC mistakenly used the 2017 kWh sales figures to calculate their 2018 target resulting in a 45 MWh increase in their required savings target over what they reported in the savings claim. Thus, adjustments that increased savings resulted in a lower percentage of goal met.

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Green Mountain Power

2018 Tier III Savings Verification Report

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Green Mountain Power 2018 Tier III Savings Verification Report

In the Green Mountain Power (GMP) Annual Plan, filed November 1, 2017, the 2.67% savings target for 2018 was 112,700 MWh. Actual retail sales of 4,222,266 kWh resulted in a slightly higher target of 112,734 MWh.

The GMP Tier III compliance filing claims to have met this goal through a combination of Residential Program offerings, custom Commercial & Industrial (C&I) projects, carried-over 2017 Tier III savings and Tier II Renewable Energy Credits (RECs). The majority of the program offerings rely on the measure characterizations developed for the Tier III Technical Resource Manual (TRM). These measure characteristics were developed with the full input of the DUs via the TAG, as such these are considered prescriptive in nature. However, a greater portion of the overall savings are a result of several large custom C&I projects that were reviewed by the PSD prior to implementation.

Table 2- Summary of GMP Results

	Lifetime MWh*e** Claimed	Percentage of Goal	Adjusted Lifetime MWh*e**	Adjusted Percentage of Goal
2018 Tier III Programs	15,774	13.99%	13,843	12.28%
2018 Tier III C&I Custom Projects	43,922	38.96%	43,759	38.82%
2017 Tier III Savings Carryover	46,995	41.69%	46,995	41.69%
Tier II RECs	6,043	5.36%	6,043	5.36%
GMP 2018 Tier III Claim	112,734	100.0%	110,640	98.14%

*MWh*e* = Megawatt hour equivalent

Tables 3 and 4 on the following pages provide a more detailed breakdown of GMPs Tier III Savings claim and all subsequent adjustments.

Table 3- Detailed Residential/Prescriptive GMP Program Results

Measure	Units	Lifetime MWH Claimed	Percentage of Goal	Adjusted Lifetime MWH	Adjusted Percentage of Goal
Cold Climate Heat Pumps					
Heat Pumps (Shared savings)	**212**	**5,264**	**4.67%**	**4,618**	**4.10%**
Heat Pump Water Heaters					
Heat Pump Water Heater (Shared savings)	**29**	**475**	**0.42%**	**475**	**0.42%**
eWater Program					
Smart Thermostats	**102**	**481**	**0.43%**	**481**	**0.43%**
Electric Vehicles Program[3]					
All Electric Vehicles (GMP Employee)	3	105	0.09%	91	0.08%
Plug-in Hybrid EV (GMP Employee)	4	106	0.09%	68	0.06%
GMP Employee Total	7	211	0.19%	159	0.14%
All Electric Vehicles	43	1,507	1.34%	1,301	1.15%
Plug-in Hybrid EVs	2	53	0.05%	34	0.03%
Forklifts (C&I)[4]	2	214	0.19%	214	0.19%
GMP Customers Total	47	1,774	1.57%	1,549	1.37%
Electric Vehicles Total	**54**	**1,985**	**1.76%**	**1,707**	**1.51%**
EV Charging Stations[3]					
L2 Smart Charger (AEV)	91	3,189	2.83%	2,753	2.44%
L2 Smart Charger (PHEV)	54	1,434	1.27%	916	0.81%
L2 Smart Charger Low-Inc. (AEV)	3	105	0.09%	91	0.08%
L2 Smart Charger Low-Inc. (PHEV)	4	106	0.09%	68	0.06%
EV Charging Program AEV Total	94	3,294	2.92%	2,844	2.52%
EV Charging Program PHEV Total	58	1,540	1.37%	984	0.87%
EV Charging Program Overall Total	**152**	**4,834**	**4.29%**	**3,828**	**3.40%**
Public and Workplace EV Charging Stations					
Level 2	90	94.48	0.08%	94.46[5]	0.08%
DC Fast	14	68.86	0.06%	68.84[5]	0.06%
Totals	**104**	**163**	**0.14%**	**163**	**0.14%**

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[3] GMP's savings calculation for EVs, PHEVs and EV Charging Stations used 2019 values. These verified savings numbers use 2018 values to be consistent with the other DUs.

[4] Although Electric Forklifts and Public and Workplace EV Charging Stations are not Residential sector measures, they are included in Table 3 because they are prescriptive rather than custom measures.

[5] GMP's Tier III savings calculation used a heat rate of 9.31. This adjusted savings uses 9.312 heat rate.

Residential Battery Storage					
Tesla Powerwall 2018 Installations	999	2358	2.09%	2358	2.09%
Tesla Powerwall 2017 Installations	90	212	0.19%	212	0.19%
Totals	**1,089**	**2,570**	**2.28%**	**2,570**	**2.28%**
Residential Sector Totals	**1,742**	**15,774**	**13.99%**	**13,843**	**12.28%**

Table 3, summarizes the various Residential sector/Prescriptive measures implemented by GMP through either a shared savings memorandum of understanding with Efficiency Vermont (EVT) or through measures implemented by GMP directly. The TAG has established a prescribed savings value for all non-custom measures excluding battery storage and the claims presented by GMP have been verified by the PSD to be applied consistent with these values. The reasons for discrepancies between the claimed and verified savings are footnoted below the table.

Shared Savings

Through an MOU, GMP and EVT reached an agreement in 2017 on how to share MMBtu savings for programs already in existence and operated by EVT. [This application of this MOU continued into 2018, although EVT discontinued its thermal ccHP incentive program in the middle of 2018.] The two shared measures were for Cold Climate Heat Pumps (ccHPs) and Heat Pump Water Heaters (HPWH) measures installed in 2018.

Cold Climate Heat Pumps

In 2018, GMP continued its 2017 program offering technical assistance with sizing and installation of qualifying ccHPs as well as a 7-year service contract and on-bill financing. GMP then modified the program in early 2018 to offer low interest loans through the Vermont State Employees Credit Union (VSECU) along with the 7-year service contract. Until EVT ended its thermal ccHP incentive program in mid-2018, the GMP program leveraged the thermal incentives from EVT's ccHP program and continues to leverage the electric incentives. The savings claim for this measure is prescriptive based on the size of the outdoor unit, as characterized in the Tier III TRM. GMP claims 212 ccHPs were installed through the program in 2018. Adjustments made to these savings are as a result of GMP not accounting for the shared savings described above.

Heat Pump Water Heaters

In 2018 GMP continued to offer on-bill financing and a service contract to GMP customers who purchased a qualifying heat pump water heater (HPWH). GMP leverages EVT HPWH thermal incentives to reduce the cost to participating customers. As in their ccHP program, in early 2018, GMP began offering customers the option to purchase HPWHs through the VSECU

financing option. GMP claimed prescriptive Tier III savings for 29 HPWHs under this program in 2018.

Electric Vehicles

GMP offered employee incentives for electric and plug-in hybrid electric vehicles in 2018 and promoted dealer discounts for GMP customers at Nissan dealerships and Alderman's Chevrolet. A total of 197 GMP customers and 7 GMP employees participated in this program. Over two thirds of those participants purchased all-electric vehicles, and the remaining third purchased PHEVs. GMP offered an additional incentive of $600 along with a level 2 charger to qualified low income customers who purchased an EV or PHEV.

Electric Forklift Program

GMP also provided incentives for the purchase of electric forklifts. While this is technically an Industrial measure, it is included in Table 3, because of the measure's similarity to electric vehicles and its prescriptive nature. GMP offers a $1,000 incentive for each electric forklift and claims savings based on an algorithm approved by Tier III TAG. Two electric forklifts were incentivized in 2018.

EV Charging Stations

GMP offered an eCharger program to customers purchasing a qualifying electric vehicle. GMP provided a Level 2 home charging station at no cost to the customer, as an incentive to promote electric vehicle ownership. Installation costs of the charger were not included as part of the incentive and would have to be paid for by the participating customer. As a result, not all customers took up the free charger program offer. The Department confirmed that there was no double-counting of vehicles or charging stations due to the overlap of the EV and EV Charging Stations programs.

Public and Workplace EV Charging Stations

GMP manages a network of 90 ports of Level 2 public and workplace chargers at 44 locations, and 14 ports of Level 3 DC Fast Chargers at customer locations throughout the service territory. GMP claimed Tier III credits based on the metered kWh output of each charging station. The Level 2 Charging stations averaged around 1.05 MWh usage for 2018, and the Level 3 DC Fast chargers averaged around 4.9 MWh for the year. These are based upon actual usage numbers reported by the chargers.

eWater Program

In 2018, GMP continued offering the eWater program, under which customers add GMP-provided control modules to their water heaters, enabling them to remotely manage the temperature setpoint, view the water heater consumption data on an app, and potentially save money as the device is designed to increase efficiency of tank operation. The water heater

control also allows GMP to curtail the loads associated with participating water heaters during peak events. The program is free for participating customers and includes the control module, installation of the module, and a NEST Thermostat. The Tier III savings claimed results from the installation of the smart thermostat, which is a measure that was characterized through the Tier III TAG process. GMP installed 102 of these units and claimed the prescribed amount of savings as per the Tier III TRM.

Battery Storage

The PSD has reviewed the GMP Battery Storage program and has verified that 90 residential batteries were installed in 2017 and a further 999 batteries were installed in 2018 as claimed. The PUC April 12, 2019 Order in 17-4632 qualified these batteries as eligible Tier III measures. Battery storage installations can reduce fossil fuel usage (and carbon emissions) from the region's grid; storage programs accrue at least some savings that can be attributable to GMP for compliance with Tier III of the RES.

The Department reviewed GMP's methodology to calculate the quantity of savings from the batteries. GMP's proposed approach assumes reductions in carbon emissions using the marginal ISO-NE emissions at peak times (when the batteries are expected to be operated), offset by carbon emissions associated with charging the batteries with a carbon profile of the GMP portfolio. GMP and the PSD have had several discussions regarding the approach, however at the time of writing the PSD continues to have several questions. The PUC's April 12 Order directed that parties "work together via the [TAG] process to determine an agreed-upon process for measuring and verifying the savings of the battery storage program." The TAG schedule has not yet allowed for this discussion, and the PSD is hesitant to verify savings from this "custom" measure without the benefit of these discussions. Therefore, the PSD recommends the PUC take the following approach to the battery storage program savings claimed by GMP:

- Allow the savings for battery storage programs to be provisionally counted toward GMP's 2018 obligation.
- Require the Department and GMP to make a supplemental filing as to the appropriate approach for claiming credits from battery storage.
- If there are disagreements in approach, resolution from the PUC will be requested.
- If the approach accepted by the PUC results in downward changes to the savings claimed toward the 2018 obligation, then GMP should be required to secure these savings in 2019, in addition to its 2019 obligation.

The PSD proposes this approach to ensure that Tier III targets are fully met at the lowest feasible cost. If the savings from battery storage programs are not included in GMP's 2018 savings claim, the only options for GMP are to either (1) purchase Tier II RECs by June 15 to

retire to meet its 2018 obligation, or (2) pay the Alternative Compliance Payment. Both options would increase costs to ratepayers. Instead, the PSD recommendation would provide the opportunity for GMP to increase program activity in 2019 to meet its obligations with additional programs, as needed. Alternatively, it provides the flexibility for GMP to do this at a lower cost to ratepayers through providing more opportunity to choose the best time to purchase Tier II RECs for compliance, if that is a lower cost solution.

Custom Projects

GMP undertook sixteen custom C&I projects in 2018. GMP involved PSD staff from the inception of these projects and the PSD reviewed all relevant project information, including historical fuel delivery records, hours of operation, and engineering estimates of savings. Changes were suggested to the assumptions and methodologies that were proposed where appropriate. These changes were at times negotiated to achieve what both parties deemed to be a reasonable and conservative estimation of the overall project savings. The PSD reviewed the files provided with GMPs Tier III filing to ensure the project hadn't changed and for consistency with assumptions and methodology that had previously been reviewed and found them to be uniform. The Custom C&I projects are summarized in Table 4, below. The verified savings claim is 163 MWh*e* less than the claimed savings due to a math error (see table 4 on next page).

Table 4- Detailed C&I GMP Program Results

Commercial and Industrial Programs					
Custom Projects	Units	Lifetime MWh*e** Claimed	Percentage of Goal	Adjusted Lifetime MWh*e**	Adjusted Percentage of Goal
Level 2 Charging - 1 port	1	15	0.01%	15	0.01%
Snow Making Compressors	3	16,166	14.34%	16,166	14.34%
Generator Line Extensions	2	19,409	17.22%	19,409	17.22%
HID Lighting	1	2,410	2.14%	2,410	2.14%
Water to Water Heat Pump	1	1,164	1.03%	1,164	1.03%
Ice Rink Heat Pump	1	2,118	1.88%	2,118	1.88%
Coffee Roaster fuel switch	1	66	0.06%	66	0.06%
Public Building Heat Pumps	1	579	0.51%	579	0.51%
Office Building Heat Pumps	2	881	0.78%	881	0.78%
Dishwasher Fuel Switch	1	518	0.46%	518	0.46%
Hotel Heat Pump	1	248	0.22%	248	0.22%
Restaurant Heat Pump	1	185	0.16%	185	0.16%
Totals	**16**	**43,922****	**38.96%**	**43,759****	**38.82%**

* MWh*e* = Megawatt hour equivalent

** GMP's claimed total is 163 MWh*e* greater than the sum of the individual projects due to a mathematical error.

Burlington Electric Department
2018 Tier III Savings Verification Report

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Burlington Electric Department 2018 Tier III Savings Verification Report

The Burlington Electric Department (BED) Tier III Annual Plan, filed November 1, 2017, estimated the 2.67% RES Tier III savings requirement for 2018 at 9,658 MWh*e*, based on projected sales of 361,723 MWh. However, as reported in BED's 2018 Tier III compliance filing, the actual retail sales of 333,764 MWh for 2018 resulted in a lower Tier III obligation of 8,911 MWh*e*. BED has claimed 1,058 MWh*e* savings through its Tier III programs as detailed below. The Department has verified these savings by reviewing project documentation, confirming the correct application of TRM savings algorithms, and spot-checking installations of EV charging stations and EV proof of purchase.

As a utility with 100% renewable generation, there is no penalty applied to their savings as a result of additional electrical loads resulting from active measures that electrify what were previously thermal loads. Although the Tier III savings reported for 2018 fall well short of the target, BED is expected to satisfy its Tier III obligations by retiring Tier II Renewable Energy Credits (RECs). These Tier II conversions will be included in the RES report due in August 2019. The TAG group has established a prescribed savings values for all measures presented in Table 5 and the claims numbers presented by BED are consistent with these values.

Table 5- Detailed BED Program Results

Measure	Count	Lifetime MWh*e** Claimed	Percentage of Goal	Adjusted Lifetime MWh*e**	Adjusted Percentage of Goal
Electric Bikes	65	331	3.7%	331	3.7%
Cold Climate Heat Pump	1	25	0.3%	25	0.3%
EV Charging Stations	7	42	0.5%	42	0.5%
All Electric Vehicles	12	399	4.5%	399	4.5%
Plug-in Hybrid Vehicles	14	262	2.9%	262	2.9%
Total Program Claimed Savings		**1,058**	11.9%	**1,058**	11.9%
Tier II RECs (2018 PV production)		3,885	43.6%	3,885	43.6%
Tier II Banked RECs (from 2017 and 2018)		3,932	44.1%	3,932	44.1%
Add'l Tier II REC purchases (in 2018)		37	0.4%	37	0.4%
Total Claimed Savings		**8,911**	100.0%	**8,911**	100.0%
2018 Target		**8,911**	100.0%	**8,911**	100.0%

*MWh*e* = Megawatt hour equivalent

Table 5 shows the various Tier III programs and measures implemented by BED for 2018. None of the savings claimed by BED in 2018 received adjustments. However, the PSD identified a potential issue relating to savings claimed for measures installed in another program year. Specifically, the one cold climate heat pump (CCHP) claimed in 2018 was installed in 2017, as verified by the invoice and rebate forms (see Cold Climate Heat Pumps, below). The savings for

this CCHP was allowed after confirming that this installation was not claimed in program year 2017.

BED's 2018 Tier III programs created verified savings of 1,058 MWh*e*, which accounts for 12% of the 2018 Tier III obligation. The remainder of the 2018 Tier III credits were made up of Tier II production from one BED-owned solar array and one solar power purchase agreement, (totaling 3,885 MWH), Tier II Banked Renewable Energy Credits (RECs) from 2017 and 2018 (3,932 MWh*e*) and additional REC purchases (37 MWh).

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

Electric Bikes

The electric bicycle program is implemented for BED by Local Motion, a Burlington-based non-profit that advocates for walkable and bikeable communities. A $200 rebate is offered to BED customers who purchase an electric bike through one of five local retailers. An additional $50 fee is paid to Local Motion for each rebate processed. BED paid incentives for 65 electric bikes in 2018, as verified by invoices from Local Motion.

Cold Climate Heat Pumps

BED provided an incentive for one installation of a cold climate heat pump in 2018. Because most of BED's service territory is served by Vermont Gas Systems, and regulated fuels are exempt from Tier III, BED cannot claim Tier III credit for installing CCHPs for most of their customers. The one project that was incentivized was for a 15,000 Btu/hr single head heat pump installed in a private residence heated by propane. As noted above, this CCHP was installed in 2017 but the incentive was not paid and the savings not claimed until 2018. The Department recommends allowing this savings claim to be applied to 2018.

Electric Vehicle Charging Stations

BED paid the full cost to install seven Level 2 electric vehicle (EV) charging stations in various locations around the city. BED contracts with Chargepoint to manage the administrative details of the charging stations' operation including billing of EV customers. The prescriptive MWh*e* value of these EV charging stations was established through the Tier III TRM process, however since each EVSE is monitored and metered through Chargepoint, BED claimed Tier III credits based on the actual metered kWh output of each charging station, which averaged around 5.4 MWh, and converted that amount to MWh*e* based on the TRM algorithm.

Electric Vehicles and Plugin Hybrid Electric Vehicles

BED offered incentives for the purchase or lease of electric vehicles (EVs) and plug-in hybrid electric vehicles (PHEVs) in 2018. A $1,200 incentive was offered for all-electric vehicles, and a $600 incentive was offered for PHEVs purchased or leased by BED customers. Self-identified

moderate-income customers could also claim an additional $600 incentive; however, this incentive is not tracked in the program database and it should be. In 2018, the Department confirmed that BED paid incentives on 12 all-electric vehicles and 14 PHEVs. The savings for these vehicles were determined using the Tier III TRM algorithm.

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Washington Electric Cooperative
2018 Tier III Savings Verification Report

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Washington Electric Cooperative 2018 Tier III Savings Verification Report

In the Washington Electric Cooperative (WEC) Annual Plan, filed November 1, 2017, the 2.67% savings requirement for 2018 was estimated to be 1,851 MWh*e*. Actual retail sales of 70,493,884 kWh resulted in a slightly higher obligation of 1,880 MWh*e*.

As a utility that is considered 100% renewable, there is no penalty applied to their savings as a result of additional electrical loads resulting from active measures that electrify what were previously thermal loads.

Table 6 - Detailed WEC Tier III Results

Measure	Count	Lifetime MWh*e** Claimed	Percentage of Goal	Adjusted Lifetime MWh*e*	Adjusted Percentage of Goal
Heat Pump Water Heater (Shared)	7	37	2.02%	37	1.98%
Weatherization (shared)	15	146	7.96%	147	7.80%
Pellet Boiler (shared)	1	17	0.93%	17	0.90%
Charging Stations		35	1.91%	35	1.87%
CAPSTONE (LI Weatherization)		1683	91.72%	1687	89.71%
2018 Total Savings		1919	104.58%	1922	102.23%
2018 Target		1835		1880	
2018 Savings in Excess of Goal		84		42	
Total MWh*e* carryover		114		72	

*MWh*e* = Megawatt hour equivalent

The above table shows the various measures implemented by WEC through either a shared savings memorandum of understanding with Efficiency Vermont (EVT) or through measures implemented by WEC directly or through partner organizations. There were several adjustments that were made to both the savings claimed by WEC and the 2018 Tier III obligation. WEC used the wrong years kWh sales figures to calculate their 2018 target resulting in a 45 MWh increase in their required savings target over what they reported in the savings claim. However, they also used the incorrect heat rate conversion factor of 9.232 instead of 9.213 which resulted in a modest increase to their overall savings claimed.

WEC utilized its “Button Up” program along with reaching out to its members through its newsletter in order to promote its Tier III offerings.

Heat Pump Water Heaters, Pellet Boilers and Market Rate Weatherization

Through a Memorandum of Understanding (MOU) WEC and EVT reached an agreement upon 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. The measures were (as shown in the table above) Heat Pump Water Heaters (HPWH), Weatherization (WX), and Pellet Boilers (PB).

EV Charging Stations

WEC used funding secured through VLITE to install electric Vehicle (EV) charging stations. The value of these EV charging stations was established through the Tier III TRM process and is considered prescriptive. These savings were reviewed and verified by the PSD.

Low-Income Weatherization

The Department reviewed the savings claimed by WEC for their low-income weatherization program per the PUC Proposal for Decision on docket 18-3810 issued 5/2/19 which states:

> *If proposing a low-income weatherization energy transformation project, a retail electricity provider may:*
>
> *(1) purchase previously created verifiable energy savings from a low-income weatherization provider, authorized under Vermont statute, so long as the energy savings were created during the compliance year within the retail electricity provider's service territory and the retail electricity provider advertised the low-income weatherization provider's services to its customers or members. For purposes of 30 V.S.A. § 8005(a)(3)(E), the previously created savings shall be treated as the incremental energy savings and the additional revenue paid for the savings should be used by the low-income weatherization provider, like any other grant funds it receives from the Office of Economic Opportunity, to complete low-income weatherization work in any retail electricity provider's service territory.*

The Department finds that the WEC offering is consistent with these PUC guidelines for low-income weatherization eligibility as a Tier II energy transformation project.

WEC's partner for their low-income weatherization program, CAPSTONE, uses Hancock Software and DOE approved values and lifetimes to determine the overall depth of savings for a project. The PSD accepted the values developed by the software model as a proxy for determining the value of the lifetime MWH being claimed by WEC. CAPSTONE is able to provide limited data as it is required to shield the identities of the low-income clients they serve. This makes verification of specific savings more difficult. The Department did however visit the CAPSTONE offices and reviewed the details of the 13 projects included in the WEC Tier III claim. These projects included a variety of weatherization services including air sealing, weather stripping and insulation of basements, wall and attic spaces. Pre and post blower door testing was carried out on all projects with an average air leakage reduction of 60% (range of 39% to 84%). Additional project review was also carried out that included the review of before and after pictures to substantiate the work done.

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Vermont Electric Cooperative

2018 Tier III Savings Verification Report

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Vermont Electric Cooperative 2018 Tier III Savings Verification Report

The VEC Tier III Annual Plan, filed November 15, 2017 estimated the 2.66% savings requirement for 2018 at 11,878 MWh*e*. Actual retail sales of 459,994,853 kWh for 2018 resulted in a target of 12,267 MWh*e*. As detailed below, VEC claimed Tier III savings of 18,257 MWh*e* for 2018, which surpasses the target by 5,990 MWh*e*. The PSD has verified 18,375 MWh savings from their program with a carryover of Tier III credits of 6,108 MWh.

Table 7 - Detailed VEC Program Results

Measure	Count	Lifetime MWh*e** Claimed	Percentage of Goal	Adjusted Lifetime MWh*e**	Adjusted Percentage of Goal
Cold Climate Heat Pump (Partially Shared)	215	2,724	22.21%	2,818	22.97%
Charging Stations	18	179	1.46%	188	1.53%
Electric Vehicles	33	811	6.61%	829	6.76%
Plugin Hybrid Electric Vehicles	25	352	2.87%	360	2.93%
Heat Pump Water Heater (Shared)	35	108	0.88%	111	0.90%
Pellet Stoves (shared)	37	2,277	18.56%	2,309	18.82%
Clean Air Program	4	11,806	96.24%	11,813	96.30%
Total Savings		18,257	148.83%	18,427	150.22%
2018 Target		12,267		12,267	
Savings in Excess of Goal		5,990		6,160	
Total MWh*e* Carryover		8,574		8,744	

*MWh*e* = Megawatt hour equivalent

The above table shows the various measures implemented by VEC through either a shared savings Memorandum of Understanding with Efficiency Vermont (EVT), or through measures implemented by VEC directly or through partner organizations. All the savings claimed by VEC in 2018 received adjustments as the PSD identified the following issues relating to their savings claim:

- The conversion factor from MMBtu to MWh used for the savings claim was different from the 9.213 MMBtu/MWh conversion factor for 2018 as published by the EIA. Program savings were adjusted accordingly.
- VEC incorrectly used the 2017 non-Fossil Fuel value instead of the 2018 value.

VEC utilized a variety of media to promote its Tier III initiatives, including:

- Social media postings

- Bill stuffers in customer mailings
- Press releases

Cold Climate Heat Pumps

VEC offered its customers a $150 incentive in addition to the thermal and electric incentives already offered by EVT for the purchase and installation of cold climate heat pumps (ccHPs) prior to 6/1/18. After June 1st EVT ceased offering a thermal incentive for ccHP allowing VEC to claim 100% of the prescriptive thermal savings previously shared with EVT through a Memorandum of Understanding (MOU). The MOU created an agreed upon methodology to determine the savings split relative to the number of additional or incremental units sold in VEC territory as a result of VEC's involvement.

The Tier III savings for this measure represents the fossil fuel heating load that is displaced by the ccHP. The calculation of savings for ccHPs relies on the measure characterization developed for the Tier III Technical Resource Manual (TRM). These measure characteristics were developed with the input of the Distribution Utilities (DU). These measures are considered prescriptive and verified through the review of the appropriate records and claim forms provided by the DU.

As stated in the previous year's Tier III VEC report, without an in-depth market analysis of VECs territory to determine the uplift to the ccHP program as a result of VEC's intervention, the PSD believes that the MOU is adequate to address the issue of shared savings for the ccHP measure for the six months prior to EVTs termination of the thermal component of their program.

Electric Vehicles

VEC offered incentives for the purchase or lease of 33 all-electric vehicles (EVs) and 25 plug-in hybrid electric vehicles (PHEVs). Their claim also includes 7 used EV/PHEV for which VEC pro-rated their savings based upon the measure lifetime minus the number of years since new. The Department believes this is an appropriate way to deal with these vehicles as, except for one vehicle, they are older than the Tier III program, thus the potential for double counting is minimal. It does raise the issue of how to deal with used EVs and PHEVs going forward that may have previously received a Tier III incentive from a DU. The Department recommends this issue be addressed in the TAG. It should be noted that during the review of these records that there were several vehicles with MSRPs higher than $50,000 and two with MSRPs of $100,000 or higher that received the VEC incentive.

Clean Air Program

VEC undertook 4 custom projects under its Clean Air Program in 2018. The PSD reviewed all relevant information, including fuel delivery records, generator service records, load profiles, project costs and savings assumptions to ensure the savings estimates were reasonable and

met statutory requirements. The PSD found these project savings to be reasonable and overall a conservative estimate of potential project savings.

General RES Tier III Program Recommendations

During the verification, the PSD unearthed several issues that have broad applicability. The PSD has the following general RES Tier III program recommendations for consideration by the PUC and stakeholders.

Used Electric Vehicles

The PSD recommends a mechanism be developed to address potential double counting of savings for used Electric Vehicles and Plugin Hybrid Electric Vehicles that have been previously registered in Vermont and received a Tier III incentive from a participating DU. Since Tier III EV and PHEV incentives only began in 2017 it is unlikely, though possible, that a previously incentivized vehicle has had its savings counted twice within the program. However, as the program years advance that likelihood increases. The PSD recommends this issue be considered by the TAG.

Electric Vehicles Incentive Cap

The PSD recommends that DUs that do not already have a cap on the eligibility of electric vehicles based upon its MSRP consider instituting one.

Electric Vehicle Chargers

The PSD recommends that when an incentivized electric vehicle charger uses a proprietary plug type that can only be used on one vehicle brand, a DU should confirm that other vehicles without the propriety plug socket would also have the means to charge at these stations if required. If this would not be possible the DUs should consider mechanisms to encourage universal plugs, in order to ensure the charger remains useful beyond any one particular vehicle type that an owner might have.

Reporting

The PSD requests that the following be included in future reports;

- Evidence to substantiate a DU's actual annual sales for the PSD to verify the correct annual obligation has been stated in their savings claim.
- All reports should contain an aggregate measure level cost to compare to the Alternative Compliance Payment.
- Reports should include low- or moderate-income customer services offered and incentives paid as part of Tier III programs and these incentives should be included in the cost of the measure.
- Installation date should be used to determine the year a measure should be claimed, if a measure is claimed out with its installed year a brief description as to why it was not claimed in the appropriate year should be provided.

Other

The PUC should issue an order that makes documentation that contains customer personal identifying information, account numbers, serial numbers confidential when transmitted by the DUs to the PSD for the purposes of verification of Tier III savings confidential. This would greatly speed up the review time and enable the PSD to be more proactive in reviewing prospective custom projects for the DUs.

Currently, circumstances limit the information that a DU can provide to the PSD for its review of complex custom measures. Once information is received by the PSD it becomes a matter of public record. The information required to do a thorough review of measures can include customer and business specific information that should be protected - records such as names, addresses, electrical consumption, fuel use, account numbers, maintenance records, etc. PSD staff is thus required to travel and spend significant amounts of time at a DUs office to review records onsite. If this information provided to the PSD was protected by PUC Order, it would allow for a more thoughtful review of a proposed project as well as providing ready access to a project's information if changes or updates to savings need to be calculated and confirmed.