

Green Mountain Power

2018

Renewable Energy Standard

Tier III Annual Plan



Background

On June 11th, 2015, Act 56, the Renewable Energy Standard (RES), was signed into law. RES created three categories of resources that electric distribution utilities have to comply with: total renewable energy (TRE), distributed renewable energy (DRE) and energy transformation (ET). This Annual Plan is being submitted in compliance with the Public Utility Commission's (the 'PUC') June 28th, 2016 Order Implementing the Renewable Energy Standard in Docket 8550. Under this Order, Distribution Utilities (DUs) are required to submit written plans that describe how they plan to comply with the Energy Transformation requirements in the RES each year. The content of this Annual Plan explains how GMP plans to meet the requirements of the Energy Transformation Category, also known as Tier III, in calendar year 2018.

Schedule of 2018 Tier III Filings

This Annual Plan is part of a three-step process that the PUC established for 2018 Tier III planning & compliance reporting. The following table summarizes these steps and the deadlines for each in the process governing the 2018 Tier 3 year:

Tier III Planning & Compliance Cycle – 2018 Compliance Year

Step	Date
File 2018 Tier 3 Annual Plan	Nov 1, 2017
File 2018 Tier 3 Savings Claim	Mar 15, 2019
File 2018 Tier 3 Compliance Filing	Aug 31, 2019

2018 Tier 3 Targets

In calendar 2018, RES Tier 3 requires GMP to obtain energy transformation credits (MWH) equal to 2.67% of its retail sales. GMP's retail sales are approximately 4.2 million MWH per year, and are expected to remain at or slightly below this level for the foreseeable future. As highlighted in the following table, the 2018 RES requirement for Energy Transformation is approximately 112,140 MWH (2.67% * 4,200,000 MWH). Please note that the actual requirements will vary based on actual retail sales.

Forecasted 2017-2022 RES Tier 3 Requirements (MWH)

RES Category	2017	2018	2019	2020	2021	2022
Tier 3: Annual %	2.0%	2.67%	3.33%	4.0%	4.67%	5.33%
Tier 3: Annual MWHs	84,000	112,140	139,860	168,000	196,140	223,860
Tier 3: Cumulative MWHs	84,000	196,140	336,000	504,000	700,140	924,000

Summary of Tier 3 Observations from 2017 Experience:

As of this writing, GMP is ten months into its 2017 Tier 3 plan. Below are observations by GMP that have helped to shape changes to our Tier 3 plans from 2017 to 2018:

1. **Low Fossil Fuel Prices:** continued, low fossil fuel prices are a headwind to programs that promote fuel switching. While this is an obvious statement to make, it has been confirmed through many discussions with customers that the economics of thermal or process fuel switching is a primary driver of their decision-making. We understand that at the time of the drafting of the RES statute, policy makers did not expect fossil fuel prices to reach and sustain such low levels. Regardless, there are still customers deciding to fuel switch based on other factors than economics, including clean energy objectives, personal comfort and convenience. While we believe the majority of the market is driven by economic buying factors, there is still a reasonable market of non-economic consumers;
2. **Growing the Market:** GMP's Tier 3 programs are growing the market for thermal heating/cooling devices despite low fossil prices. Overall in GMP service territory, customers have adopted more cold climate heat pumps in 2017 than any prior year. We believe that GMP's outreach and awareness messaging, which has been pushed through our various marketing channels, has expanded customer awareness/interest and the overall market for this technology, even though our program participation numbers may not directly reflect this growth. Since 2014, approximately 16.5% of cold climate heat pumps installed in GMP service territory have been purchased through GMP's heat pump program;
3. **Up-front Purchase vs. Installment Purchase:** we have learned that more customers are deciding to purchase CCHP's through an up-front purchase than are using GMP's installment purchase program by a factor of approximately 5 to 1;
4. **Changing Measure Values & the TAG process:** the Tier 3 measure value of certain technologies, such as cold climate heat pumps, have eroded since GMP's original 2017 plan was developed. During the course of 2017, the TAG

group and then a DPS commissioned study have reduced the lifetime MWH value of the technology;

5. **Policy Alignment to TAG Work:** we believe the Technical Advisory Group (TAG) process risks becoming disconnected from the policy intent of Tier 3. We are concerned about the complexity of the TAG process and its year over year cost for Vermont customers. The TAG process was developed to characterize EEU efficiency measures and relies upon primary research in many cases. Most Tier 3 technologies being sponsored by DU's have had sufficient primary research published upon which credible characterization can be based from a concise and cost effective publication search;
6. **DU-EEU Partnership:** Tier 3 has not caused DU and EEU customer programming to become more aligned and coordinated. The issue of sharing Tier 3 savings with other partners, particularly the EEU, has resulted in a non-collaborative, competitive dynamic that is not in the best interest of Vermont customers. We attribute much of this non-collaborative dynamic to the separate (and competing) thermal savings targets that exist between GMP and EVT since EVT began tracking thermal savings targets associated with heat pumps and Tier 3 created fossil fuel savings targets for GMP;
7. **Heat Rate Requirement in Savings Conversion:** in working with a number of C+I customers on Tier 3 projects we have been able to assist them in completing projects that have resulted in pure fossil fuel elimination as opposed to fuel switching. Under these kinds of fuel elimination projects, the RES statute still requires the mechanism to calculate energy savings to include a heat rate conversion, just as it would for a fuel-switching project. The requirement that this calculation be used to calculate energy savings undervalues the reduction in fossil fuel savings.

2018 Tier 3 Programming Plan:

1. Retail Sales and Number of Customers by Customer Class

The PUC's Order in Docket 8550 states, "A DU shall endeavor to provide equitable opportunities to its customer sectors in rough proportion to each customer sector's annual retail sales." The following table shows what these proportions were in 2015, and the associated RES MWHs targets that are associated with them. Ideally, GMP will provide savings in rough proportion to these percentages in 2018, however based on our experience so far this is proving to be more difficult than anticipated. We have learned from our experience thus far in 2017, that custom projects delivered to the C+I segments are proving more effective at capturing fossil fuel reductions and Tier 3 savings than the prescriptive residential programming. While the fossil fuels savings are greatest with C & I customer the actual work and connections with residential customers is far greater than that for C & I customers. It takes many heat pump sales, for example to acquire the fossil fuel savings from the replacement of just one diesel by a business establishment. Thus we are serving many more residential customers relative to C & I customers but the latter yields far



Green Mountain Power: 2018 RES Tier 3 Plan
greater fossil fuel savings, at least so far. We expect that this dynamic may even out over the longer term; whether due to natural market alignments or through changes in program design remains to be seen. Further experience administering these programs will shed light on it.

GMP's 2015 Customer Count, Retail Sales & 2018 RES Tier 3 Targets by Customer Class

Class	MWH	%	2018 RES MWH
Residential	1,241,785	29%	32,521
Low Income (80% of VT Median)	364,105	8%	8,971
Commercial	1,549,963	36%	40,370
Industrial	1,168,796	27%	30,278
Total MWH	4,324,649	100%	112,140

2. Residential and Small Commercial Customer Programs

GMP's approach to promoting energy transformation among its residential and small commercial customers is based on offering an array of flexible, prescriptive programs that allow customers to select their specific steps and path toward energy transformation. Tier 3 is all about encouraging customers to take action in their energy transformation journey, be it a single, small step or a large transformation action. We are learning that fewer customers are prepared for a holistic, "one fell swoop" approach where a comprehensive transformation program, such as GMP's eHome, resonates with their desire for change. From our Tier 3 experience, more customers prefer an incremental, "one step at a time" approach where a series of smaller, individual transformation measures are undertaken over a longer period of time to achieve their goals. For these customers, GMP will continue to promote individual measure programs such our heat pump program and our heat pump water heater program among others. In 2018, GMP will continue to offer these Tier 3 programs to our residential and small commercial customers:

- **eHome Program:** GMP's most comprehensive energy transformation program delivers a whole home retrofit solution incorporating building performance improvements, thermal heating/cooling devices, water heating technologies, lighting system upgrades, fossil fuel bio-mix improvements as well as energy storage, EV charging and devices controls capabilities;
- **Transformation Bundle Program:** for GMP customers that want to combine several transformation measures into a single project, but do not want to undertake a full eHome transformation. Bundles are flexibly configurable and may include measures to transform thermal heating/cooling, water heating, device controls capabilities;

- **Individual Measure Programs:** for GMP customers that want to undertake a single transformation measure and access it through GMP's one-stop implementation service and on-bill financing. These programs include:
 - Cold Climate Heat Pump program
 - Heat Pump Water Heater program
 - Energy Storage program
 - EV Purchasing program
 - EV Home Charging program
 - Energy Storage program
 - Home Control programs
- **Low-Income:** all of these residential and small commercial programs are available to GMP's low-income customers. Qualified low-income customers will have additional program benefits in the form of:
 - Cold Climate Heat Pump program
 - GMP will provide an additional \$100 rebate to available EEU rebates via a GMP bill credit
 - Heat Pump Water Heater program
 - GMP will provide an additional \$100 rebate to available EEU rebates via a GMP bill credit
 - EV Purchasing program
 - GMP offers a \$600 rebate for customers at or below 80% of poverty for the purchase of an Electric Vehicle
 - EV Home Charging program
 - GMP will provide a \$100 bill credit toward the cost of installation
 - Energy Storage program
 - GMP will provide an additional \$1/mth discount the program's monthly participation fee

3. Custom Commercial & Industrial Transformation Program

In 2018, GMP will continue to partner with our larger commercial and industrial customers to develop energy transformation projects that can improve the performance of their operations while reducing fossil fuel usage. As has been the case in 2017, these customers come in all shapes and sizes and locations in Vermont and operate in business sectors such as manufacturing, grocery stores, large retailers, large office buildings, and hospitals, among others. Based on our 2017 experience, these projects require tight collaboration between GMP and the customer and are focused on reducing and switching specific operational processes from being fossil fuel powered to electric powered. Because of the variety of operational processes and potential technical solutions for reducing/switching fuel sources, these projects have not yet been able to be delivered through prescriptive programming, but as we work with more of these customers and identify common

opportunities among them we foresee a time when some of these programs may be able to be delivered via prescriptive programming.

- From our 2017 experience we are seeing opportunities for Tier 3 MWH savings among our C+I customers in a variety of operational processes. These include, but are not limited to:
 - Greenhouse operations
 - Ski area/snow making operations
 - Maple sugaring operations
 - Manufacturing operations
 - Air handling operations
- As we have found in 2017, we expect that a disproportionately higher amount of Tier 3 savings will come from our custom C&I programs than our other Tier 3 programs in 2018.

4. Tier II Credits

GMP is forecasting a Tier II surplus in 2018. However, the size of the surplus depends heavily on the pace of net-metered development. GMP does not believe it will be necessary to retire surplus net-metered Tier II credits for compliance with Tier 3, but Tier II does represent a supplemental source of Tier III compliant MWH, if necessary to meet annual targets.

5. 2017 Tier 3 MWH Surplus Savings Carry-Forward

After meeting our 2017 Tier 3 target, GMP expects to have a surplus carry-forward amount of Tier 3 savings to be applied toward our 2018 target. As of this filing, we estimate that GMP will carry forward 20,000 MWHs of Tier 3 savings into our 2018 plan. Since the timing of some projects is not directly within our control and is based on collaboration with our customers, specifically C&I customers, this amount may change as we move toward the end of the 2017 Tier 3 calendar year. Our strategy is to continue to deliver as many Tier 3 savings to customers as possible each year and to carry-forward as much excess savings into each, new Tier 3 year as we can.

6. 2018 Tier 3 Program Forecast:

GMP forecasts that our 2018 Tier 3 savings targets will be achieved through the delivery of the following customer programming. These forecast numbers are inclusive of low-income participation:



Green Mountain Power: 2018 RES Tier 3 Plan

Prescriptive Residential/Small Commercial Programs (including low-income)

Program	Unit MWH Value	2018 Forecasted Units	Forecasted Tier 3 MWH Equivalents*
eHome	24.0	40	960
Transformation Bundle	27.7	200	5,540
Cold Climate Heat Pump	19.0	750	14,250
Heat Pump Water Heater	6.4	300	1,920
All Electric Vehicle	27.7	50	1,360
Hybrid Electric Vehicle	19.5	150	2,925
Battery Storage	1.4	750	1,050
Nest Thermostat	8.7	500	4,350
eWater	8.7	350	3,045
SubTotal			35,130**

** estimate that ~8% of savings (~2,770 MWHs) will be delivered to low-income customers .

Custom Commercial & Industrial Projects

Program	Unit MWH Value (Average)	2018 Forecasted Units	Forecasted Tier 3 MWH Equivalents*
Custom C&I	5,000	18	90,000

* forecasted savings do not factor for potential partnership splits yet

2018 Forecast MWH Savings Summary

Program Segment	Forecasted Tier 3 MWH Equivalents
2017 Carry-Forward	20,000
Residential & Small Commercial	34,620
Commercial & Industrial	<u>90,000</u>
Total	144,620

7. 2018 Estimated Program Cost Forecast:

Based on GMP's ten-month experience in delivering Tier 3 savings to customers in 2017, we estimate that our overall per MWH equivalent cost will be below the \$15 range. In 2018, the second year of our Tier 3 experience, we have established an internal target of \$15/MWH cost for our blended portfolio of projects. Individual project may be delivered higher or lower than \$15/MWH, but blended we anticipate 2018 being similar to our experience in 2017. GMP will report its actual 2017 Tier 3 costs as part of its 2017 Tier 3 Saving Claim filing in March 2018.

Looking forward, we believe there will be a steady increase in Tier 3 cost/MWH saved over the fifteen years of the Tier 3 policy. We attribute this steady increase simply to the belief that we will deliver on projects in the early years that have easier returns on investment and that as the lower hanging fruit is harvested, later years will see the cost effectiveness of customer projects become more challenging thus possibly requiring more Tier 3 cost to complete.

8. Best Practices for Demand Management

Our programs are designed, where current equipment and technology support it, to deliver Tier 3 measures to customers with dynamic control capabilities in place so that we are able to incorporate any new load into our long-term grid choreography capabilities and strategies. Grid choreography connecting to devices behind the meter is a new and evolving capability for which many suppliers; devices and standards are fluidly evolving. Standards have yet to emerge and suppliers into this market have not aligned around common technologies yet. However, GMP has made progress in building a nascent capability around a few control platforms that we will be expanding going forward. Program delivery will default to customers opting in to grid control (with appropriate education and disclosure) so that an action will need to be taken to opt-out. We will watch customer sentiment to this model closely and adjust as needed while collaborating with the Department throughout.

Dynamic device control should always be a choice for customers to make for themselves. For customers who do not wish to participate in dynamic device control, GMP believes rate designs, such a time-of-use rates, should be the appropriate mechanism for demand management of new loads.

9. Customer Outreach, Education and Marketing

Our 2018 Tier 3 programming will be promoted with similar methods used in 2017. The channels through which our programs will be promoted include:

- GMP website
- GMP bill inserts
- GMP on-bill messaging



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- Direct mail to customers
- GMP push emails
- Social media sites including Facebook, Twitter and Front Porch Forum
- Presence at Vermont and local community forums such as town energy committees, town meetings, energy fairs, etc.
- GMP Call Center
- GMP's Energy Innovation Center staff and educational programming
- Partnering with like-minded organizations to promote common goals
- Partnering with our local contractors to promote our work



APPENDIX A

GMP Innovative Service Filings, which provide a summary of each Residential & Small Commercial Prescriptive Tier 3 Program.



VIA U.S. MAIL AND EMAIL

September 28, 2015

Mrs. Susan Hudson, Clerk
VERMONT PUBLIC SERVICE BOARD
Peoples United Bank Building, 4th Floor
112 State Street
Montpelier, VT 05620-2701

Re: GMP – eHome Innovative Pilot – First Update

Dear Mrs. Hudson:

On February 27, 2015, Green Mountain Power (“GMP”) filed a 15 day advance notice pursuant to Attachment 8 of GMP’s Alternative Regulation Plan regarding GMP’s eHome Innovative Pilot (“eHome Pilot”). The purpose of this letter is to provide the Public Service Board (“Board”) with a six-month status update regarding the eHome Pilot.

Updated Narrative Explanation of eHome Program

The eHome Innovative Pilot was initially envisioned as a holistic energy evaluation and efficiency retrofit of customers’ homes and businesses.¹ The eHome concept uses strategic partnerships to evaluate a customer’s home or business and identify opportunities for innovative and efficient energy improvements. The eHome was first thought of as a stand-alone offering of particular products customized for each participating customer based on their individual desire for improvements and energy saving opportunities within each home. As the Pilot was implemented, however, GMP quickly recognized that the eHome program is most effective as a means for customer engagement, providing both an opportunity to strengthen customer relationships and to share up-to-date information about new energy solutions that are delivered through other innovative pilots such as the GMP Heat Pump Pilot.

At this time, it is not necessary to continue eHome as stand-alone Innovative Service; however, GMP will continue to use the eHome concept as a platform to engage with our customers. The process starts with a GMP Assessor making a visit to the customer’s home to explore opportunities for energy efficiency improvements, including weatherization. Once the assessment is complete, the customer is presented with an estimate for proposed products and services, and if desired, an energy audit is scheduled to discover additional opportunities to

¹ GMP offers this service as “eBusiness” in the small to medium business market as well. Any reference to “eHome” or “home” in this letter also includes “eBusiness” or “business.”

tighten the thermal shell of the home. The customer is ultimately given an overall snapshot of what their energy profile could be if they were to move forward with the installation of additional equipment and services, including, for example, home energy audits & weatherization,² air sourced heat pumps, heat pump water heaters, and a mobile gateway that provides customers a real-time view of their home energy use. If a customer decides to move forward, GMP coordinates all necessary parties on behalf of the customer to ensure a smooth and seamless transformation of their energy use.

In conjunction with the innovative products, the eHome Pilot has helped advance Vermont's Comprehensive Energy Plan by contributing to the goal of reducing greenhouse gas emissions to 75% below 1990 levels by 2050. Customers engaged through GMP's eHome process contribute to this goal by implementing weatherization and use of products such as heat pumps and heat pump water heaters. In addition, the eHome engagement is an opportunity to identify customer locations that are suitable for solar installations, which increase Vermont's renewable energy supply.

Customer Participation in eHome and Method of Selection

eHome evaluations are available to all customers who are advised of how to achieve the weatherization and installation of more efficient equipment to reduce energy costs, increase comfort and reduce reliance on fossil fuels.

To date, GMP has conducted 43 eHome evaluations.

Summary of Projected Costs and Revenues

All revenues related to the GMP eHome Pilot are currently being allocated to the appropriate individual programs, for example, GMP's Heat Pump Lease Pilot or Heat Pump Water Heater Innovative Pilot. Accordingly, the eHome Pilot does not have its own unique revenue stream, and it did not generate any revenue. The eHome Pilot did incur some initial expenses when the program was rolled out, a total of \$37,990, but expenses were later allocated to appropriate individual programs as the eHome Pilot evolved from a stand-alone offering of products to one of general customer engagement as described above.

GMP does not expect the eHome Pilot will accrue any further expenses or revenues. All future expenses will be allocated to other individual programs. This change will also effect the initial expense and revenue projections for the heat pump and heat pump water heater pilots.

² Energy Audit & Weatherization is completed through a third party. Neighborworks of Western Vermont performs energy audits and contracts weatherization work out to various contractors in Rutland County. Montpelier Energy Action Committee identifies auditors and contractors in the Montpelier area. There is no GMP cost to customers for the audit or weatherization.

Mrs. Susan Hudson, Clerk
September 28, 2015
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The Innovative Pilot updates for both the Heat Pump and the Heat Pump Water Heater Pilot will explain changes to expenses and revenues that result from the eHome Pilot's integration into those programs.

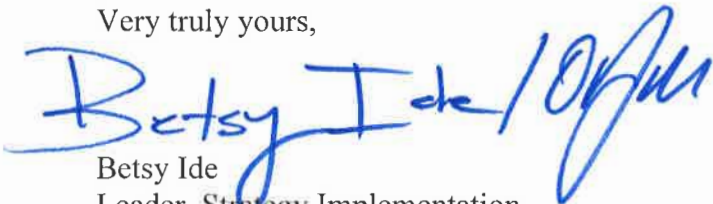
Evaluation of Innovative Pilot's Progress

GMP's eHome Pilot has evolved from its initial conception as a single product to a method of customer engagement providing valuable information about energy saving products and services available from GMP and other strategic partners. The GMP eHome engagement provides a valuable framework for the implementation of heat pumps, heat pump water heaters, and other future innovative energy programs.

At this time, however, it is not necessary to continue eHome as an Innovative Service. GMP will continue to use the eHome program as a way to engage with our customers. In the future, if GMP decides to evolve the eHome program into an actual standalone service, we will file a separate Innovative Pilot request.

If you should have any questions, please contact me at (802) 274-8634.

Very truly yours,


Betsy Ide
Leader, Strategy Implementation

Enclosure

cc: Geoff Commons, Esq., Vermont Department of Public Service
Elizabeth Gamache, Efficiency Vermont



Besty Ide Bloomer
Director, Energy Innovation Center

Phone: (802)274-8634
betsy.bloomer@greenmountainpower.com

VIA HAND DELIVERY

January 31, 2017

Ms. Judith Whitney, Clerk
VERMONT PUBLIC SERVICE BOARD
Peoples United Bank Building, 4th Floor
112 State Street
Montpelier, VT 05620-2701

Re: Revisions to GMP's Cold Climate Heat Pump Innovative Pilot

Dear Ms. Whitney:

Green Mountain Power ("GMP") provides this notice pursuant to Attachment 8 of its Alternative Regulation Plan and GMP's December 7, 2016 Memorandum Detailing Changes to Innovative Pilots filed in Docket 8794. By this filing, GMP incorporates revisions to the new Cold Climate Heat Pump Innovative Pilot ("CCHP" or the "Pilot") through which GMP will be administering innovative services that are the subject of Docket 8794 through September 30, 2017.

Narrative Explanation of Cold Climate Heat Pump Innovative Pilot

GMP will offer hyper-efficient CCHPs to customers who own their own homes through a retail installment contract. The Heat Pump technology allows GMP Customers to heat and cool their homes more efficiently and reduce their reliance on traditional fossil fuel heating systems.

1. Detail Around The Retail Installment Contract

Agreements with CCHP customers have been revised to include disclosures under the Truth in Lending Act ("TILA") and additional disclosures suggested by the Department. The revisions to the Retail Installment Contracts for both the CCHP and Heat Pump Water Heater Pilots clarify that they are retail installment contracts, making clear that while GMP owns the equipment until the final payment of the term, the customer is the owner of the Heat Pump or Heat Pump Water Heater at the end of the term. Because they are retail installment contracts, GMP has included the appropriate consumer disclosures required by state and federal law, including TILA. These disclosures relate most particularly to the financial terms and are disclosed in a manner to assist the customer in comparing products in the marketplace. GMP also has added a number of provisions suggested by the Department designed to highlight how use of a heat pump might change a customer's energy usage, including possible savings. Finally,

GMP has added language clarifying that a customer may cancel this agreement prior to installation of the heat pump without financial obligation.

Enclosed with this filing as **Exhibit 1** is a copy of the GMP Heat Pump Program Retail Installment Contract.

2. Open Access Billing Tariff For Third Parties

GMP offers on-bill services for low interest energy improvement loans provided by the Vermont Economic Development Authority (“VEDA”) and Neighborworks of Western Vermont (“NWWVT”), enabling GMP customers to attain the benefits of heat pumps and heat pump water heaters, weatherization, and other opportunities to reduce their carbon footprint and be more comfortable in their homes. If a GMP customer requests it, the customer’s VEDA or NWWVT loan may be billed on his or her GMP energy statement.

GMP will file an Open Access Billing Tariff for third parties that will provide specific criteria in the tariff as to the types of services and providers, as well as describing particulars of the billing arrangements. For example, the tariff will provide that customer payments will first be allocated to electric service and then to the loans and that disconnection of electric service will not occur for failure to pay for third party charges.

3. Tariff for Sharing Peak Savings

GMP will file a tariff for sharing savings for peak shaving¹ when GMP completes testing of technology to control heat pump and heat pump water heaters and fully implements this technology in the field.

GMP is actively investigating controlling heat pumps, using Sensibo and Tado controllers², to explore the potential for shared stacked benefits of electric savings with customers, more convenient temperature adjustments, and reduced grid stress during peak times.

GMP is currently working with approximately 30 heat pump customers to test the functionality of a third party heat pump control system, in order to determine if it can be used effectively for reducing load. GMP has also deployed approximately 70 additional heat pump control units and will have a total of approximately 100 heat pumps with shared controls during the upcoming heating season.

In addition, GMP will be gathering consumption data on selected heat pumps throughout the winter to determine savings due to load control.

The tariff will specify, among other things, the terms and conditions for controlling the heat pumps and heat pump water heaters and the methodology for sharing savings.

In addition, the tariff will be available to all owners of heat pumps and heat pump water heaters, regardless of whether the customer purchased the product from GMP or another seller. GMP intends to work closely with the Department as it develops this tariff.

¹ GMP will be targeting the ISO NE summer peak and/or the monthly peak on which the RNS charges are based.

² information about Sensibo and Tado, see the following websites: <https://www.tado.com/us/> and <https://sensibo.com/>.

The Heat Pump Innovative Pilot Advances the Goals of the Vermont Comprehensive Energy Plan

These offerings are what our customers tell us they want—a transformative energy future that will reduce cost, reduce carbon, and make them more comfortable. The innovative offerings are necessary to satisfy Tier 3 of the recently enacted Renewable Energy Standard (“RES”), which requires Vermont Distribution Utilities to deliver customer-facing transformative energy projects that decrease fossil fuel consumption and greenhouse gas emissions.³ The offerings also advance the renewable energy and greenhouse gas reduction goals contemplated in Vermont’s Comprehensive Energy Plan (“CEP”). The RES mandates are significant. They require us to deliver transformative energy projects representing 2% of our retail sales in 2017 and increase to 12% by 2032 (representing a net reduction in fossil fuel consumption resulting from each project to a MWH equivalent). The RES also emphasizes the importance of partnership in the utilities’ offerings of these programs. These innovative programs provide clear and compelling benefits to our customers and the State as they place more energy efficient products into customers’ homes increasing their comfort, reducing their carbon footprint and advancing Vermont’s RES goals. These offerings are a core part of GMP’s future and our customers: one that creates new revenue streams whose net benefits accrue to the benefit of customers. In the long haul, these services will help offset lost revenue (and corresponding upward rate pressure) caused by net metering for GMP’s customers. As more of these products are placed in customers’ homes, there are potential peak shaving savings that will also accrue to the benefit of our customers. These offerings are essential for an energy future that is low cost, low carbon, and highly reliable.

Number Of Customers Expected To Participate In Pilot And Method Of Selection

The Heat Pump Innovative Pilot is currently available to all GMP customers on a first come, first serve basis who own the premises on which the heat pump will be installed. To date, GMP has approximately 1019 customers participating in the existing Pilot. GMP is targeting 500 customer sales total for this Pilot between February 2017 through September 2017. The Pilot will terminate on September 30, 2017 and during that time period, GMP will work with the Department and other stakeholders to assess how best to design these programs to offer these products and services to our customers.

Summary of GMP’s Projected Costs and Revenues and Tracking of Cost Associated with Innovative Programs

1. Summary of Projected Costs and Revenues

An estimate of projected costs and revenues from the Pilot are attached as **Exhibit 2**.

³ GMP continues to work with VEIC regarding the savings to be attributed to each of our organizations.

2. Tracking Of Costs Associated With Innovative Programs

GMP uses separate project numbers for each product. Tasks can be assigned within each project number. Each type of expense will be assigned a Task so that all direct project expenses can be tracked accordingly. Please see the example in the table below.

PROJECT TYPE	PROJECT NAME	PROJECT NUMBER	PROJECT TASK	DESCRIPTION
Capital	Heat Pumps	152044	ADD	External labor costs and equipment costs associated with new installations
Capital	Heat Pumps	152044	RET	External labor costs associated with retiring units
Expense	Heat Pumps	142831	MAINT	External labor costs associated with annual maintenance
Expense	Heat Pumps	142831	SERV	External labor costs and equipment costs associated with servicing units
Expense	Heat Pump	142831	PAYROLL	GMP labor costs associated with operating the program
Capital	Heat Pump Water Heaters	152046	ADD	External labor costs and equipment costs associated with new installations
Capital	Heat Pump Water Heaters	152046	RET	External labor costs associated with retiring units
Expense	Heat Pump Water Heaters	142832	MAINT	External labor costs associated with annual maintenance
Expense	Heat Pump Water Heaters	142832	SERV	External labor costs and equipment costs associated with servicing units
Expense	Heat Pump Water Heaters	142832	PAYROLL	GMP labor costs associated with operating the program
Expense	Heat Pump Water Heaters and Heat Pumps	142831 and 142832	MKTG	Costs for advertising and marketing

For customer default expenses, GMP is assessing how to restructure the accounting for bad debt in the current billing system so that bad debt associated with CCHP and Heat Pump Water Heaters are separate from traditional bad debt from non-payment for electric service.

Efficiency Vermont Non-Conflict Explanation and Collaboration Certification

The Pilot will utilize the work that Efficiency Vermont has done in defining equipment minimum performance criteria (“eligible equipment list”) for the Vermont climate and setting up a statewide supply and distribution channel,. The Pilot will further promote EVT efforts through new channels.

The Pilot does not conflict with Efficiency Vermont heat pump initiatives due to the following GMP practices:

- The equipment purchased by GMP for deployment in the pilot will meet the minimum performance standards as defined by Efficiency Vermont’s Cold Climate Heat Pump specification. This will ensure the heat pumps installed are adequate and appropriate for Vermont’s climate region and are of high efficiency.
- The equipment generally will be initially purchased by GMP through the supply chain which partners with Efficiency Vermont.
- GMP and Efficiency Vermont continue to work out the savings for Tier 3.

By this filing, GMP certifies that GMP has collaborated with Efficiency Vermont in advance of this filing.

Revisions GMP Will Make To Its CCHP Savings Estimation Tools

GMP is making three revisions to its savings estimation tools (both online and in the field) to align its tools with the October 2016 measure characterization from the Technical Advisory Group (“TAG”).

1. Heating season estimate.
2. Cooling season estimate.
3. Net dollar saving estimate.

GMP is basing the increased kWh/year during the heating season on the customer’s reported fossil fuel usage and the TAG’s “fossil fuel offset limit.” Specifically, GMP is no longer using subjective assessments of the home’s layout, square footage, and air leakage rates to determine the potential savings. Instead, GMP is basing the energy savings estimate on the customer’s reported fossil fuel usage, the size of the CCHP that is being installed, and the same fossil “fuel offset limit” (85%) that TAG used in its measure characterizations for the technology. Enclosed with this filing is an example of GMP’s revisions to its spreadsheet-based estimation tool, which was filed as **Exhibit GMP-3** in Docket 8794.

GMP is basing the increased kWh/year during the cooling season on the TAG’s estimate of summer kWh usage. Since many customers are already using window air-conditioners, GMP considers these estimates to be conservative; most customers will likely use less than this amount. These estimates are shown in **Exhibit GMP-3**.

GMP is basing its dollar savings estimate not only on the fossil fuel savings that are expected during the heating season, but also on the increased cost of electricity during the cooling season and the customer’s payment.

Other

GMP also has committed to work with the Department and VEIC to develop educational material identifying the various options available for the purchase of a heat pump or heat pump water heater.

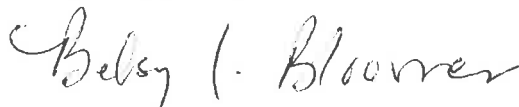
Additionally, GMP will be sending reminders to its heat pump and heat pump water heater customers regarding their obligations when selling a house and periodic messages on optimal use of the heat pump.

Status Updates

GMP proposes to provide status updates to the Board regarding the Pilot's progress in six months and then upon completion of the Pilot. In the event GMP decides to terminate the Pilot prior to the September 30, 2017, it will provide prompt notice to the Board, the Department, and Efficiency Vermont.

If you should have any questions, please contact me at 802-274-8634.

Very truly yours,

A handwritten signature in cursive script that reads "Betsy I. Bloomer".

Betsy Ide Bloomer
Director, Energy Innovation Center

cc: 8794 Service List

PSB Docket No. 8794 – Service List

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Besty Ide Bloomer
Director, Energy Innovation Center

Phone: (802)274-8634
betsy.bloomer@greenmountainpower.com

VIA HAND DELIVERY

January 31, 2017

Ms. Judith Whitney, Clerk
VERMONT PUBLIC SERVICE BOARD
Peoples United Bank Building, 4th Floor
112 State Street
Montpelier, VT 05620-2701

Re: Revisions to GMP's Heat Pump Water Heater Pilot

Dear Ms. Whitney:

Green Mountain Power ("GMP") provides this notice pursuant to Attachment 8 of its Alternative Regulation Plan and GMP's December 7, 2016 Memorandum Detailing Changes to Innovative Pilots filed in Docket 8794. By this filing, GMP incorporates revisions to the new Heat Pump Water Heater Pilot ("HPWH" or the "Pilot") through which GMP will be administering innovative services that are the subject of Docket 8794 through September 30, 2017.

Narrative Explanation of Heat Pump Water Heater Innovative Pilot

1. Detail Around The Retail Installment Contract

Agreements with HPWH customers have been revised to include disclosures under the Truth in Lending Act ("TILA") and additional disclosures suggested by the Department. The revisions to the Retail Installment Contracts for both the CCHP and Heat Pump Water Heater Pilots clarify that they are retail installment contracts, making clear that while GMP owns the equipment until the final payment of the term, the customer is the owner of the Heat Pump or Heat Pump Water Heater at the end of the term. Because they are retail installment contracts, GMP has included the appropriate consumer disclosures required by state and federal law, including TILA. These disclosures relate most particularly to the financial terms and are disclosed in a manner to assist the customer in comparing products in the marketplace. GMP also has added a number of provisions suggested by the Department designed to highlight how use of a heat pump might change a customer's energy usage, including possible savings. Finally, GMP has added language clarifying that a customer may cancel this agreement prior to installation of the heat pump without financial obligation.

Enclosed with this filing as **Exhibit 1** is a copy of the GMP Heat Pump Water Heater Retail Installment Contract.

2. Open Access Billing Tariff For Third Parties

GMP offers on-bill services for low interest energy improvement loans provided by the Vermont Economic Development Authority (“VEDA”) and Neighborworks of Western Vermont (“NWWVT”), enabling GMP customers to attain the benefits of heat pumps and heat pump water heaters, weatherization, and other opportunities to reduce their carbon footprint and be more comfortable in their homes. If a GMP customer requests it, the customer’s VEDA or NWWVT loan may be billed on his or her GMP energy statement.

GMP will file an Open Access Billing Tariff for third parties that will provide specific criteria in the tariff as to the types of services and providers, as well as describing particulars of the billing arrangements. For example, the tariff will provide that customer payments will first be allocated to electric service and then to the loans and that disconnection of electric service will not occur for failure to pay for third party charges.

3. Tariff for Sharing Peak Savings

GMP will file a tariff for sharing savings for peak shaving¹ when GMP completes testing of technology to control heat pump and heat pump water heaters and fully implements this technology in the field. To date, while GMP has been testing controlling heat pumps, we do not have technology to control heat pump water heaters, but we continue to research potential options.

The tariff will specify, among other things, the terms and conditions for controlling the heat pumps and heat pump water heaters and the methodology for sharing savings.

In addition, the tariff will be available to all owners of heat pumps and heat pump water heaters, regardless of whether the customer purchased the product from GMP or another seller. GMP intends to work closely with the Department as it develops this tariff.

The Heat Pump Water Innovative Pilot Advances the Goals of the Vermont Comprehensive Energy Plan

These offerings are what our customers tell us they want—a transformative energy future that will reduce cost, reduce carbon, and make them more comfortable. The innovative offerings are necessary to satisfy Tier 3 of the recently enacted Renewable Energy Standard (“RES”), which requires Vermont Distribution Utilities to deliver customer-facing transformative energy projects that decrease fossil fuel consumption and greenhouse gas emissions.² The offerings also advance the renewable energy and greenhouse gas reduction goals contemplated in Vermont’s Comprehensive Energy Plan (“CEP”). The RES mandates are significant. They require us to deliver transformative energy projects representing 2% of our retail sales in 2017 and increase to 12% by 2032 (representing a net reduction in fossil fuel consumption resulting from each project to a MWH equivalent). The RES also emphasizes the importance of partnership in the utilities’ offerings of these programs. These innovative programs provide clear and compelling benefits to our customers and the State as they place more energy efficient products into customers’ homes

¹ GMP will be targeting the ISO NE summer peak and/or the monthly peak on which the RNS charges are based.

² GMP continues to work with VEIC regarding the savings to be attributed to each of our organizations.

increasing their comfort, reducing their carbon footprint and advancing Vermont's RES goals. These offerings are a core part of GMP's future and our customers: one that creates new revenue streams whose net benefits accrue to the benefit of customers. In the long haul, these services will help offset lost revenue (and corresponding upward rate pressure) caused by net metering for GMP's customers. As more of these products are placed in customers' homes, there are potential peak shaving savings that will also accrue to the benefit of our customers. These offerings are essential for an energy future that is low cost, low carbon, and highly reliable.

Number Of Customers Expected To Participate In Pilot And Method Of Selection

The Heat Pump Innovative Pilot is currently available to all GMP customers on a first come, first serve basis who own the premises on which the heat pump water heater will be installed. To date, GMP has approximately 276 customers participating in the existing Pilot. GMP is targeting 200 customers total for this Pilot for the period February 2017 through September 2017. The Pilot will terminate on September 30, 2017 and during that time period, GMP will work with the Department and other stakeholders to assess how best to design these programs to offer these products and services to our customers.

Summary of GMP's Projected Costs and Revenues and Tracking of Cost Associated with Innovative Programs

1. Summary of Projected Costs and Revenues

An estimate of projected costs and revenues from the Pilot are attached as **Exhibit 2**.

2. Tracking Of Costs Associated With Innovative Programs

GMP uses separate project numbers for each product. Tasks can be assigned within each project number. Each type of expense will be assigned a Task so that all direct project expenses can be tracked accordingly. Please see the example in the table below.

PROJECT TYPE	PROJECT NAME	PROJECT NUMBER	PROJECT TASK	DESCRIPTION
Capital	Heat Pumps	152044	ADD	External labor costs and equipment costs associated with new installations
Capital	Heat Pumps	152044	RET	External labor costs associated with retiring units
Expense	Heat Pumps	142831	MAINT	External labor costs associated with annual maintenance
Expense	Heat Pumps	142831	SERV	External labor costs and equipment costs associated with servicing units

Expense	Heat Pump	142831	PAYROLL	GMP labor costs associated with operating the program
Capital	Heat Pump Water Heaters	152046	ADD	External labor costs and equipment costs associated with new installations
Capital	Heat Pump Water Heaters	152046	RET	External labor costs associated with retiring units
Expense	Heat Pump Water Heaters	142832	MAINT	External labor costs associated with annual maintenance
Expense	Heat Pump Water Heaters	142832	SERV	External labor costs and equipment costs associated with servicing units
Expense	Heat Pump Water Heaters	142832	PAYROLL	GMP labor costs associated with operating the program
Expense	Heat Pump Water Heaters and Heat Pumps	142831 and 142832	MKTG	Costs for advertising and marketing

For customer default expenses, GMP is assessing how to restructure the accounting for bad debt in the current billing system so that bad debt associated with CCHP and Heat Pump Water Heaters are separate from traditional bad debt from non-payment for electric service.

Efficiency Vermont Non-Conflict Explanation and Collaboration Certification

The GMP Heat Pump Water Heater Pilot will utilize the work that Efficiency Vermont has done in defining equipment minimum performance criteria for the Vermont climate and setting up a statewide supply and distribution channel. The pilot program will further promote Efficiency Vermont efficiency efforts through new channels.

The GMP Heat Pump Water Heater Pilot does not conflict with Efficiency Vermont initiatives due to the following GMP practices:

- The equipment purchased by GMP for deployment in the pilot will meet the minimum performance standards as defined by Efficiency Vermont's Heat Pump Water Heater specification.
- The equipment will be purchased through a wholesale distributor who is participating in Efficiency Vermont's Climate Heat Pump Program to prevent disintermediation and the resulting disruption of the supply chain.
- GMP and VEIC will continually monitor program activity and make adjustments, if needed, based upon technology adoption participation rates.
- GMP and Efficiency Vermont continue to work out the savings for Tier 3.

By this filing, GMP certifies that GMP has collaborated with Efficiency Vermont in advance of this filing.

Other

GMP also has committed to work with the Department and VEIC to develop educational material identifying the various options available for the purchase of a heat pump or heat pump water heater.

Additionally, GMP will be sending reminders to its heat pump and heat pump water heater customers regarding their obligations when selling a house and periodic messages on optimal use of the heat pump.

Status Updates

GMP proposes to provide status updates to the Board regarding the Pilot's progress in six months and upon completion of the Pilot. In the event GMP decides to terminate the Pilot prior to September 30, 2017, it will provide prompt notice to the Board, the Department, and Efficiency Vermont.

If you should have any questions, please contact me at 802-274-8634.

Very truly yours,

A handwritten signature in dark ink that reads "Betsy H. Bloomer / DLB". The signature is written in a cursive, flowing style.

Betsy Ide Bloomer
Director, Energy Innovation Center

cc: 8794 Service list

PSB Docket No. 8794 – Service List

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JOSH CASTONGUAY
VP, Chief Innovation Executive

Direct Dial Number: (802) 655.8754
Josh.Castonguay@GreenMountainPower.com

October 3, 2017

Electronic and Hand Delivery

Mrs. Judith C. Whitney, Clerk
Vermont Public Utility Commission
112 State Street
Montpelier, VT 05620-2701

Re: GMP – Residential EV Charging Service Innovative Pilot – Amendment

Dear Mrs. Whitney:

Please accept this notice of amendment to Green Mountain Power's ("GMP") Innovative Pilot filing for EV Charging Service, filed on June 30, 2017, and amended August 31, 2017 ("Pilot"). GMP is proposing additional changes to the Pilot, designed to offer the most transformative solution possible.

The Pilot as first amended, includes a Level 2 home charger and unlimited off-peak charging for \$39.99 and \$44.99 per month, with the monthly cost depending on whether or not the customer purchased a new electric vehicle. The amendment proposed here continues to include a hardware component and an electric consumption component, however, the structure of the Pilot offering is different than previously defined.

Proposed Amendment

GMP will decouple the charging equipment component and the charging consumption component to allow customers to opt-in for one, or for both, depending on which option best suits the customer. A major difference resulting from this amendment to the Pilot, is that GMP will provide a Level 2 home charger at no cost to customers purchasing a new EV (with GMP shared access to the charger) as an incentive for customers to purchase a new EV. The customer will be responsible for the cost of installation and commissioning of the charging equipment. If the customer later disables GMP access, or decides that they no longer want to share access with GMP, the customer will have the option of returning the charging equipment to GMP, or incurring a one-time charge on their next GMP bill for cancellation. This fee will be pro-rated, depending on the point at which the customer decides to leave the program, and will be clearly defined in customer agreements.

GMP customers who already own an electric vehicle can opt-in to the Level 2 home charging program for \$9.99 per month. These customers will also be responsible for the cost of installation and commissioning of the equipment, and will be subject to the same terms if shared access is later disabled or they no longer wish to participate.

The unlimited off-peak, flat-rate electricity for charging will remain as an opt-in option for customers as described below.

- Off-peak hours are defined as all hours outside of any GMP triggered demand response event.
- Customers will be sent notification of an event 8-24 hours in advance, and will still have the option to opt-out of the event in order to continue charging during those peak hours.
- If opting out however, Customers will be charged \$0.60 per kWh for electricity consumed through the charger during this time.
- Peak events occur an average of 5-10 times per month for an average of 2-6 hours at a time. As a result, the vast majority of the time throughout a given month will be considered off-peak.

Amended Option Pricing

All prices in table below require shared access with GMP to the Level-2 home charger.

	New EV Purchasers	Existing EV Owners
Level-2 Residential Charger	Free	\$9.99/month
Unlimited Off-Peak Charging	\$29.99/month	\$29.99/month

Note: Customers will have the option to add a second electric vehicle to the unlimited off-peak charging plan for an additional \$29.99 per month.

Amended Summary of Projected Costs and Revenues

	Year	1	2	3	4	5	6	7
New EV Quantities		20	80					
Retrofit Quantities		25	25					
New EV Cumulative Quantities		20	100	100	100	100	100	100
Retrofit Cumulative Quantities		25	50	50	50	50	50	50
Revenues								
Monthly Service Revenue		\$2,997	\$5,994	\$5,994	\$5,994	\$5,994	\$5,994	\$5,994
Total Tier III Value @\$30/MWH		\$11,051	\$44,202					
Marginal kWh Revenue		\$2,887	\$14,437	\$14,437	\$14,437	\$14,437	\$14,437	\$14,437
Total Power Supply Benefit		\$6,698	\$22,326	\$22,326	\$22,326	\$22,326	\$22,326	\$22,326
Total Revenues		\$23,633	\$86,959	\$42,757	\$42,757	\$42,757	\$42,757	\$42,757
Costs								
Equipment +Sales Tax (Expense)		(\$15,874)	(\$15,874)					
Equipment +Sales Tax (Tier III Funds)		(\$12,699)	(\$50,795)					
Additional O&M (Backoffice, software)		(\$1,205)	(\$4,016)	(\$4,016)	(\$9,416)	(\$9,416)	(\$9,416)	(\$9,416)
Total Costs		(\$29,777)	(\$70,684)	(\$4,016)	(\$9,416)	(\$9,416)	(\$9,416)	(\$9,416)
		(\$6,144)	\$16,275	\$38,742	\$33,342	\$33,342	\$33,342	\$33,342
Net Benefit to GMP Customers		(\$6,206)	\$16,439	\$39,133	\$33,679	\$33,679	\$33,679	\$33,679
							NPV:	\$139,492.91

Mrs. Judith Whitney, Clerk

Page 3 of 3

October 3, 2017

GMP will also see revenues from a portion of customers choosing to opt-in to the Unlimited Off-Peak portion of the Pilot. For every customer that opts in, GMP expects to see an additional \$56 per year in revenue. The following table shows the impacts of a 10% opt-in rate:

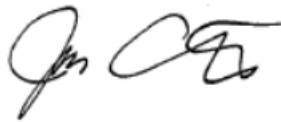
	Year	1	2	3	4	5	6	7
Total Participants		4.5	15	15	15	15	15	15
Flat Rate Revenue		\$1,619	\$5,398	\$5,398	\$5,398	\$5,398	\$5,398	\$5,398
kWh Margin based on Assumed Surplus EV Miles		\$251	\$837	\$837	\$837	\$837	\$837	\$837
		\$1,871	\$6,236	\$6,236	\$6,236	\$6,236	\$6,236	\$6,236
							NPV:	\$30,667.94

Status Updates

GMP will provide status updates to the Commission regarding the EV Charging Pilot's progress at 12 months and upon completion of the pilot at 18 months. In the event GMP decides to terminate the Pilot prior to the passage of 18 months, GMP will provide prompt notice to the Commission, the Department, and Efficiency Vermont.

If you should have any questions, please contact me at 802-655-8754.

Sincerely,



Josh Castonguay
VP, Chief Innovation Executive

Enclosure

cc: Stephanie Hoffman, Vermont Department of Public Service
Karen Glitman, Efficiency Vermont