



**2017**

**Renewable Energy Standard**

**Tier III Annual Plan**



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## Introduction

On June 11<sup>th</sup>, 2015, Governor Shumlin signed Act 56. Known as the Renewable Energy Standard (RES), Act 56 created three categories of resources; total renewable energy (TRE), distributed renewable energy (DRE) and energy transformation (ET). This Annual Plan is being submitted in compliance with the Public Service Board’s (the ‘Board’) June 28<sup>th</sup>, 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. The content of this Annual Plan explains how GMP plans to meet the requirements of the Energy Transformation Category, also known as Tier III.

## 2017 Tier III Compliance & Process Schedule

This Annual Plan is the first of a three-step process that the Board established for Tier III planning & compliance. The following table summarizes these steps and the deadlines within each one.

**Table I.1: Tier III Planning & Compliance Cycle – 2017 Compliance Year**

Step	Milestone Deadline	Milestone Description
Annual Plan	November 1 <sup>st</sup> , 2016	DUs file their Tier III Annual Plans.
	TBD	Comments on the Annual Plan and/or a workshop if necessary or requested.
Savings Verification	January 31st, 2017	TAG files list of measures that it reviewed for the 2017 compliance year.
	March 15th, 2018	DUs file Tier III savings claims. Savings verification process begins.
	June 1 <sup>st</sup> , 2018	Department makes a recommendation to the Board regarding verified savings.
	June 15 <sup>th</sup> , 2018	Stakeholder comments on savings verification are due.
Compliance Filing	August 31 <sup>st</sup> , 2018	DUs file their compliance filings.
	September 30 <sup>th</sup> , 2018	Stakeholder comments on the compliance filings are due.

## 2017 Compliance Obligations

GMP must acquire specific amounts of each resource annually between 2017 and 2032. In calendar 2017, the RES requires GMP to obtain energy transformation credits (MWH) equal to two percent of its retail sales. This requirement is highlighted in the following table, and is presented in the context of the other RES resource requirements.

**Table I.2: RES Requirements (% of Retail Sales)**

RES Category	2017	2020	2023	2026	2029	2032
<b>Tier 1: Total Renewable Energy (%)</b>	55.0%	59.0%	63.0%	67.0%	71.0%	75.0%
<b>Tier 2: Distributed Renewable Energy (%)</b>	1.0%	2.8%	4.6%	6.4%	8.2%	10.0%
<b>Tier 3: Energy Transformation (%)</b>	2.0%	4.0%	6.0%	8.0%	10.0%	12.0%



GMP’s retail sales are approximately 4.2 million MWH per year, and are expected to remain at this level for the foreseeable future. As highlighted in the following table, the 2017 RES requirement for Energy Transformation is approximately 84,000 MWH. (2% \* 4.2 million MWH). Please note that the actual requirements will vary based on actual retail sales.

**Table I.3: RES Requirements (MWH)**

RES Category	2017	2020	2023	2026	2029	2032
<b>Tier 1: Total Renewable Energy</b>	2,268,000	2,360,400	2,452,800	2,545,200	2,637,600	2,730,000
<b>Tier 2: Distributed Renewable Energy</b>	42,000	117,600	193,200	268,800	344,400	420,000
<b>Tier 3: Energy Transformation</b>	<b>84,000</b>	168,000	252,000	336,000	420,000	504,000

Note: The values in this table are the product of the percentages in Table I.2 and 4.2 million MWHs.

### 2015 – 2016 Savings Claims

According to the RES statute, “Implementation of the [energy transformation] project shall have commenced on or after January 1, 2015.”<sup>1</sup> GMP has been operating its Cold Climate Heat Pump Lease Program since 2014, and the following table summarizes the number of leases GMP customers have signed between 1/1/2015 and 9/30/16. The table also shows the thermal savings that GMP is planning to claim<sup>2</sup> toward the 2017 requirements, which represents about 31% of GMP’s 84,000 MWH requirement in 2017.

**Table I.4: CCHP Leases & Energy Transformation Savings (MWH)**

Capacity (BTUH)	Single Head	Multi Head	Total Units	Single Head Lifetime MWH/Unit	Multi Head Lifetime MWH/Unit	Lifetime MWH
6,000			0	24.6		0
9,000	48		48	30.4		1,458
12,000	86		86	34.2		2,940
15,000	250		250	37.5		9,376
18,000	197	19	216	40.9	36.8	8,749
24,000	3	46	49	42.6	39.0	1,923
30,000		24	24		39.3	942
36,000		13	13		41.8	544
42,000		4	4		44.0	176
48,000		4	4		45.6	182
<b>Total</b>	<b>584</b>	<b>110</b>	<b>694</b>			<b>26,292</b>
				<b>Ave MWH/CCHP</b>		<b>37.9</b>

<sup>1</sup> Act 56 as Enacted, An act relating to establishing a renewable energy standard., Page 18

<sup>2</sup> The lifetime MWH/Unit numbers are based on the 8550 Planning Tool for a medium sized home and for units with no controls. Adjustments have been made to the electric penalty to reflect GMP’s expected fossil fuel percentage (20%).

Please note that EVT is claiming the electric savings through 9/30/16, and we have been in discussions with each other to avoid any potential double counting of the savings during this time. Also note that effective 10/1/16, EVT is offering higher rebates that enable it to claim the thermal savings as well as the electric savings. As a result, GMP is in discussions with EVT to share and allocate the thermal savings between EVT’s rebate program and GMP’s lease program during the 4<sup>th</sup> quarter of 2017. Finally, GMP also plans to claim savings for its Electric Vehicle Charging Network, and will estimate those savings before the savings verification process begins.

## Overall Strategy

### 1. Retail Sales and Number of Customers by Customer Class

The Board’s June 28<sup>th</sup> Order in Docket 8550 stated, “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 2017, but in practice we expect the savings to accrue more to residential and small commercial customers in the initial year of the RES program due to the eHome Transformation Bundle program and the still-nascent customer C&I program.

**Table I.5: GMP’s 2015 Customer Count, Retail Sales & 2017 RES Targets<sup>3</sup> by Customer Class**

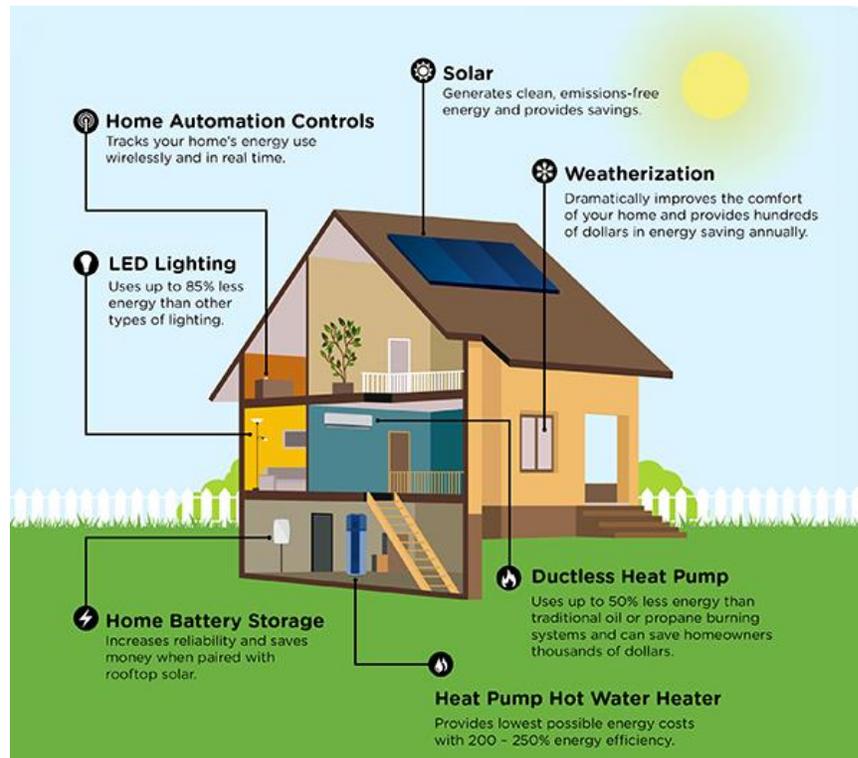
Class	MWH	%	RES MWH
Residential	1,241,785	29%	24,120
Low Income (80% of VT Median)	364,105	8%	7,072
Commercial	1,549,963	36%	30,106
Industrial	1,168,796	27%	22,702
<b>Total MWH</b>	<b>4,324,649</b>	<b>100%</b>	<b>84,000</b>

### 2. Residential and Small Commercial Customers

GMP’s approach to promoting energy transformation amongst its customers centers on the eHome. GMP’s eHome program is a holistic home energy makeover that helps customers save money, have greater comfort in their homes and use less energy. eHome customers may choose from products and services that presently include weatherization, LED lighting, cold climate heat pumps (CCHP), heat pump water heaters (HPWH), solar, batteries, water heater controls, smart thermostats, and other technologies that can track and control energy use.

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<sup>3</sup> Source: FERC Form 1, page 304, 2015 and the Low Income Ratio from the 2018-2020 Demand Resource Plan

**Figure I.1: GMP's eHome Products & Services**


The eHome program is available to all GMP residential customers, and starts with a free home energy assessment. Based on the customer's individual needs, they may choose to invest in a professional energy audit from one of our partners or to install any one of the available products and services offered. In every case, the goal of the program is to identify a combination of investments that save customers money on Day One. This is frequently possible with investments in weatherization and/or investments in more efficient heating, cooling, lighting, and hot water systems. Customers who invest in eHome products and services benefit from our partnership with Efficiency Vermont and seamlessly receive the benefit of EVT programs and rebates. Experienced, local contractors are used to install the products, either through GMP's own installer network or through contractors who are affiliated with NeighborWorks of Western Vermont (NW-WVT).

Partnerships like these are central to the GMP's energy transformation strategy, and we expect to expand on them in the future. For example, GMP has partnered with Efficiency Vermont (EVT), NW-WVT and the Town of Panton to bring the eHome products and services to Panton's residential customers, and to transform the Town's farms and municipal buildings as well. This community-wide approach to energy transformation is something that GMP is planning to extend to other communities during 2017.

GMP's approach to developing innovative products and services continues to evolve and expand. For example, GMP is planning to offer "transformation bundles" to our customers as part of the eHome program in 2017. Table I.6 shows four different bundles that are in development, and each one offers customers a choice of four to six different technologies that together can transform their energy use.

**Table I.6: GMP’s eHome Transformation Bundles**

Bundle Name	Heat Pump	Tesla Battery	Water Heater Control	HP Water Heater	Nest Thermostat	Nest Protect	10 LED Light Bulbs
Energy Saver	X		X		X	X	X
Energy Saver Plus	X			X	X	X	X
Reliability	X	X	X		X	X	X
Reliability Plus	X	X		X	X	X	X

Over 80% of GMP’s customers are residential, which is why the eHome program is focused on them. However, the same products and services are also available to GMP’s small commercial customers. Any residential or small commercial customer may request a free energy assessment, subsequent energy audit, and any of the products and services that are available through the eHome program.

**3. Commercial and Industrial Customers**

In 2017, GMP plans to offer custom energy transformation projects to its larger commercial and industrial customers. Such customers may include, but are not limited to, manufacturers, grocery stores, large retailers, large office buildings, and hospitals. While the custom offering will be marketed to these larger C&I customers, we expect to make custom projects available to small C&I customers where opportunities exist.

The nature and size of these projects is expected to vary from premium commercial scale heat pump systems<sup>4</sup> to line extensions that electrify processes that are currently fueled by diesel or other fossil fuels. We expect to learn what technologies are most cost-effective and appealing to our customers in 2017, and to partner with Efficiency Vermont when such technologies are being offered by both organizations. Based on this experience, we plan to refine and expand the program further in 2018.

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<sup>4</sup> These systems are also known as Variable Refrigerant Flow (VRF) heat pump systems, and they can typically meet 100% of the customer’s heating and cooling requirements.

#### 4. Low Income Customers

GMP estimates that it will need to serve approximately 300 low income customers with its eHome Transformation Bundle program in 2017. To promote the bundles to low income customers, we are planning to share some of the value of the incremental electric sales by making the NEST smart thermostat free, for instance.

**Table I.7: Targeted Tier III Savings from Low Income Transformation Bundles**

<b>Bundle</b>	<b>Lifetime MWH of Bundle</b>	<b>Estimated 2017 Bundle Sales</b>	<b>Lifetime MWH for Tier 3</b>
Energy Saver	23.3	200	4,669
Energy Saver Plus	24.6	100	2,462
<b>Total</b>		<b>300</b>	<b>7,131</b>

#### 5. Tier II Credits

GMP is forecasting a Tier II surplus in 2017. However, the size of the surplus depends heavily on the pace of net metered development. GMP is not planning to retire surplus net-metered Tier II credits for compliance with Tier III, but Tier II does represent a supplemental source of Tier III compliant MWH.

#### 6. Summary of 2017 Energy Transformation MWH

About 31% of GMP’s 2017 savings have already been captured through its lease program in 2015 and 2016, and these MWH are shown in the first line in the following table. In 2017, GMP anticipates leasing 1,800 Transformation Bundles, which would result in 43,153 MWH of savings. To encourage these customers to invest in weatherization measures, GMP is planning to offer \$200 to each lease customer who completes a Home Performance with ENERGYSTAR measure with EVT, and we expect that one quarter of all customers will receive this incentive. In addition, we anticipate leasing Transformation Bundles to 300 low-income customers (7,131 MWH), and serving approximately 50 C&I customers with custom projects (10,000 MWH). We are in discussions with EVT to allocate these savings, and for planning purposes the following table assumes a 50/50 sharing allocation. If all of these targets are reached, the outcome would be that GMP would bank about a 2,576 MWH (3%) surplus toward 2018 RES compliance.

**Table I.7: Targeted Tier III MWH for 2017 by Customer Class**

<b>Program</b>	<b># Units</b>	<b>GMP Share</b>	<b>Tier 3 MWH</b>
2015 - 2016 CCHP Lease Program	694	100%	26,292
Residential Transformation Bundles	1,800	50%	43,153
- Weatherization Incentive	450	0%	0
Low Income Program	300	50%	7,131
C&I Custom Program	50	50%	10,000
<b>Total</b>	<b>3,294</b>		<b>86,576</b>
		Required MWH	84,000
		Surplus/(Deficit)	2,576
		% Surplus/(Deficit)	3%

These planned allocations are only for 2017, and GMP is mindful of the fact that it must increase its efforts to reach each customer class equitably over the course of the RES program. As we learn what technologies and incentives are desired by each customer class, we will scale up programs to meet the RES requirements in rough proportion to their share of retail sales.

# 1. Energy Transformation Projects & Programs

## 1.1 eHome Transformation Bundle Program

### 1.1.1 Program Description, Number of Participants, Exclusive Implementation and Coordination

GMP is planning to offer four lease products to our customers in 2017. Known as transformation bundles, they combine different energy savings technologies into one, fixed price package. Four of the bundled products are expected to result in Tier III savings; Cold Climate Heat Pumps (CCHP), Heat Pump Water Heaters (HPWH), the NEST thermostat, and the Tesla battery. The left-hand table below shows the estimated lifetime MWH from each of these products, as well as GMP’s planned-for share of the total lifetime MWH. The right-hand table shows the lifetime MWH of each bundle and the planned-for number of sales in 2017.

**Table 1.1.1: Estimated MWH Savings from 1,800 Transformation Bundles**

Product	Total Lifetime MWH	GMP Share of MWH	Shared Lifetime MWH
CCHP	38.0	50%	19.0
HPWH	12.8	10%	1.3
NEST	8.7	50%	4.3
Tesla	1.4	100%	1.4

Source: TAG Act 56 Planning Tool

Bundle	Lifetime MWH of Bundle	Estimated 2017 Bundle Sales	Lifetime MWH for Tier 3
Energy Saver	23.3	1,000	23,344
Energy Saver Plus	24.6	500	12,310
Reliability	24.8	250	6,196
Reliability Plus	26.1	50	1,303
<b>Total</b>		<b>1,800</b>	<b>43,153</b>

Based on estimates from the Technical Advisory Group (TAG), we estimate that 1,800 bundled leases would need to be placed in 2017. GMP is not aware of any comparable lease products on the market, and will be implementing the program exclusively. However, we expect to take full advantage of EVT’s existing rebates, and will coordinate with them to track and share the savings. In addition, GMP is planning to promote the bundles by sharing some of the value that is generated by incremental electric sales with the participating customer. For example, we have contemplated giving customers a free NEST smart thermostat as a way to share value. As described in more detail in Section 1.1.9 - Customer Outreach, Education and Marketing, customer engagement will continue to follow a multi-channel strategy of in-home engagement using our Home Energy Advisors, telephone engagement through our call centers, and general (internet, print and radio) advertising.

### 1.1.2 Customer & Product Eligibility

All lease customers must have at least a 12 month history of being current on their electric bills, and as applicable, all products must meet EVT’s current standards for rebate eligibility.

### 1.1.3 Equitable Opportunity & Low Income Customers

This program is available to all customers regardless of their rate class or income level, and we anticipate offering more shared value to our low income customers to adopt the bundled technologies.

#### **1.1.4 Collaborative Efforts, Cost and Savings Allocation Methodology**

GMP and EVT are collaborating to offer our customers this program, and are in discussions to decide on a savings allocation methodology. We do not anticipate sharing costs.

#### **1.1.5 Best Practices for Demand Management**

Two of the bundled technologies increase the customer's electric use CCHPs and HPWHs. As a result, GMP offers them the option to install a wireless controller. This enables the customer to control the unit remotely, and it also enables GMP to control the unit using its demand management software. This represents a best practice for demand management.

The program is designed to make the wireless controller an *opt-in* option to the customer, as it adds approximately \$125 to the installed cost. In the event that the customer chooses to install the technology, the default is that GMP would have control of the unit through its demand management software. However, the customer may also *override* GMP's control of the unit at any time. Why would a customer opt into a wireless controller for their heat pump? The answer is for convenience and for remote control of the equipment.

The TAG has agreed to decrease the energy savings that are attributable to CCHP installations by 5% unless permanent thermostatic control is installed separate from the indoor head itself. As a result, GMP is investigating the options for providing such controls, and like the wireless controller, we will make such controls available to the customer on an opt-in basis. In any event, GMP will track the installation of such controls for the purposes of savings verification, and anticipates that manufacturers may soon offer an integrated control that addresses the underlying concern that led TAG to develop the 5% adjuster.

### 1.1.6 Strategies for Encouraging Minimum Building Performance Standards

GMP will offer its lease customers up to \$200 toward the completion of a qualifying Home Performance with ENERGYSTAR™ (HPwES) improvement(s). Efficiency Vermont’s current list of improvements and incentives is in the following table, and they are subject to change in the coming year. In any event, a customer may install the improvement at any time after the installation of the CCHP, as long as it is completed by the end of the calendar year. GMP will issue a check to the customer after they have provided the contractor’s invoice and HERO report for the completed HPwES improvement.

**Table 1.1.7.1: Efficiency Vermont Home Performance 2016 Incentives & Improvements**

#### Air Sealing and Insulation Incentive

Energy Efficiency Home Improvement	Qualifying Criteria	Customer Incentive	
Minimum Overall Requirement	Install all recommended health and safety improvements including mechanical ventilation, carbon monoxide detectors, or other essential improvements.	\$500	
	Reduce air leakage by a minimum of 10% (as measured by a pre- and post- blower door test).		
Air Sealing	Reduce air leakage as measured by a pre- and post- blower door test.	20–35% reduction	≥ 35% reduction
		\$250	\$500
Insulation	Install insulation meeting the following R-value criteria:		\$0.40 per sq. ft. of new insulation
	Location	New Insulation <sup>2</sup>	
	Attic Flat Ceilings	R-value ≥ R-49	
	Vaulted Ceilings and Floors	R-value ≥ R-30	
	Walls	R-value ≥ R-12	
Foundation and Rim-joists	R-value ≥ R-15		
Heat Distribution Improvement	Install at least \$200 of duct sealing, leak repairs, boiler pipe insulation, and similar measures.	\$75	
Comprehensive Retrofit Bonus Package (for whole-house projects that substantially improve air tightness and insulation)	Reduce air leakage ≥ 35% as measured by a pre- and post- blower door test.	\$250	
	Install insulation in areas equivalent to at least 75% of the home’s finished floor area (example: a 2,000 sq. ft. home could qualify by installing 1,000 sq. ft. of insulation in the attic and 500 sq. ft. of insulation in the walls). Insulation must meet the above criteria for R-value.		
Maximum incentive for air sealing and insulation improvements		\$2,000	

#### Heating System Incentive

Energy Efficiency Home Improvement	Qualifying Criteria	Customer Incentive		
Heating System Replacement	Replace existing heating system with a new ENERGY STAR certified system. Boilers must be installed with a high performance circulator pump. Minimum AFUE requirements are as follows:	\$500		
	Oil Boiler: 87% AFUE			LP Boiler: 95% AFUE
	Oil Furnace: 87% AFUE			LP Furnace: 95% AFUE
Maximum incentive for heating system improvements		\$500		
Maximum incentive for air sealing, insulation and heating system improvements		\$2,500		

**1.1.7 Advising Customers on Alternatives that Do No Increase Electric Consumption**

Weatherization investments represent an alternative to CCHPs, and all customers are encouraged to make these investments as part of the eHome program. In addition, the Technical Advisory Group (TAG) has characterized two other alternatives to CCHPs that do not increase electric consumption; biodiesel and pellets. TAG has estimated the installed costs of both of these technologies to the participating customer, and the following table shows the estimated cost and energy savings. The Vermont Fuel Price Report also offers a comparison of the operating costs of each of these alternatives.

**Table 1.1.8: Installed Costs of Biodiesel and Pellet Technologies Compared to a CCHP<sup>5</sup>**

Measure	Assumptions	Measure Cost	Lifetime MWh Saved	Measure Cost / Lifetime MWh Saved
<b>Biodiesel</b>	B5, per gallon	\$0.03	0.0004	\$69
	B10, per gallon	\$0.08	0.0012	\$69
	B20, per gallon	\$0.18	0.0026	\$69
	B100, per gallon	\$0.98	0.0143	\$69
<b>Pellet Heating</b>	Residential Pellet boilers or furnaces, Existing Boiler	\$20,000	207	\$97
	Residential Pellet boilers or furnaces, Existing Furnace	\$20,000	151	\$132
	Residential Pellet stoves, Existing Boiler	\$4,700	70	\$67
	Residential Pellet stoves, Existing Furnace	\$4,700	51	\$92

Customers may become aware of these alternatives through a variety of sources and outlets, and GMP’s staff advises each customer based on their unique needs and circumstances. Specifically, the resources that are available to customers include but are not limited to the following.

- Efficiency Vermont’s programs, staff and website, and the HPwES program,
- GMP’s lease program, web site, and home energy advisor staff,
- Vermont’s weatherization agencies,
- Thermal Energy Clearinghouse, and
- The Vermont Fuel Price Report.

Finally, GMP will be seeking partners to develop and implement complimentary product and service offerings that can enable our customers to take even more control of their fossil fuel use. For example, GMP would welcome partnerships with fuel dealers who could offer biodiesel blends. This would enable to customers who use heating oil to use a renewable fuel in their existing heating system while they use supplemental technologies like pellet stoves and heat pumps.

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<sup>5</sup> Source: Act 56 Tier III Planning Tool 10-28-16.xls, Technical Advisory Group

### **1.1.8 Customer Education, Outreach and Marketing**

GMP primarily uses three channels to reach out to customers and educate them about the program. First, GMP's website includes information on the program and related products and services such as weatherization, cold climate heat pumps, and heat pump water heaters. The website includes a home assessment tool that estimates the potential savings that a particular home owner can expect when they engage the program.

Second, GMP's Energy Innovation Center and Call Center staff are trained to respond to customer inquiries about the program, and to route customers to appropriate programs either within GMP or with EVT or the weatherization agencies. Finally, GMP's Home Energy Assessors are in the field meeting customers in their homes to assess which programs, products and services are right for them. Our field staff use a spreadsheet-based tool that compliments the website-based tool to estimate the energy savings, and our desire is to develop both tools in collaboration with EVT staff to ensure consistent customer messaging.

### **1.1.9 Prior Approval**

The energy savings that result from this program will be claimed using the Technical Reference Manual (TRM) estimates that have been adopted by the Technical Advisory Group (TAG). As a result, GMP expects that the energy savings are pre-approved subject to the outcome of the savings verification process.

## 1.2 Tier III Program Budget and Cost-Effectiveness

The following program budget is based on the program design that has been described in the previous subsections, and some shared value per project as indicated. The programs are expected to cost GMP \$840,000, including program support costs, which would average \$13.93/MWH on a lifetime basis. In 2017, we expect to serve;

- 1,800 residential customers
  - 450 of which are expected to complete weatherization measures with EVT,
- 300 low-income customers
- 50 larger C&I customers.

**Table 1.2.1: Illustrative 2017 Program Budget**

<b>Program</b>	<b># Units</b>	<b>Shared Value / Project</b>	<b>Total \$</b>	<b>\$/MWH Lifetime</b>
2015 - 2016 CCHP Lease Program	694	\$ -	\$ -	
2017 eHome Bundles	1,800	\$ 250	\$ 450,000	\$ 10.43
- Weatherization Incentive	450	\$ 200	\$ 90,000	N/A
Low Income Bundles	300	\$ 500	\$ 150,000	\$ 21.04
C&I Custom Projects	50	\$ 1,000	\$ 50,000	\$ 5.00
<b>Total</b>	<b>3,294</b>		<b>\$ 740,000</b>	<b>\$ 12.28</b>
Program Support Costs*			\$ 100,000	
<b>Total Program Costs</b>			<b>\$ 840,000</b>	<b>\$ 13.93</b>
* Includes TAG, EM&V & Consulting Services Costs.				