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December 23, 2014

Via Electronic Filing
Rosemary Chiavetta
PA Public Utility Commission
P.O. Box 3265
Harrisburg, PA 17105

Re: Petition of Philadelphia Gas Works for Approval of Demand-Side Management Plan for FY 2016-2020, Docket No. P-2009-2097639; and
Philadelphia Gas Works Universal Service and Energy Conservation Plan for 2014-2016
52 Pa. Code § 62.4 – Request for Waivers, Docket No. M-2013-2366301

Dear Secretary Chiavetta:

On behalf of Philadelphia Gas Works enclosed for filing please find the original of its Petition for Phase II Demand Side Management Plan. Copies to be served in accordance with the attached Certificate of Service.

PGW also respectfully requests that the Secretary's Bureau assign this petition to the Bureau of Technical Utility Services ("TUS") to be processed in accordance with the below proposed schedule:

- Answers/Interventions due: January 12, 2015
- PGW to convene 1st stakeholder collaborative meeting by January 16, 2015 (additional collaborative meetings scheduled as needed)
- PGW to submit collaborative report to PUC with recommendations: March 6, 2015
- Other parties to submit comments to PUC regarding PGW's collaborative report: March 21, 2015
- PUC Order: April 9, 2015

As explained more fully in the petition, PGW's proposed procedure will permit the Commission to consider the Phase II Plan after a workshop process has been conducted and approve the Phase II Plan – or those aspects of the Plan that it determines can be put into effect without an on-the-record investigation – in order to permit the Phase II Plan to deliver benefits to customers without interruption, starting September 2015. At that time, the PUC could assign to the Office

of Administrative Law Judge those aspects of the Phase II Plan (if any) for which the PUC determines evidentiary hearings are needed prior to final resolution.

Sincerely,

Daniel Clearfield

DC/lww
Enclosure

cc: Cert. of Service w/enc.

CERTIFICATE OF SERVICE

I hereby certify that this day I served a copy of PGW's Petition for Phase II Demand Side Management Plan upon the persons listed below in the manner indicated in accordance with the requirements of 52 Pa. Code Section 1.54.

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Date: December 23, 2014

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Petition of Philadelphia Gas Works for Approval of Demand-Side Management Plan for FY 2016-2020	:	Docket No. P-2009-2097639
and	:	
Philadelphia Gas Works Universal Service and Energy Conservation Plan for 2014-2016 52 Pa Code § 62.4 – Request for Waivers	:	Docket No. M-2013-2366301

PETITION OF PHILADELPHIA GAS WORKS FOR PHASE II DEMAND SIDE MANAGEMENT PLAN

Philadelphia Gas Works ("PGW" or "Company") requests that the Pennsylvania Public Utility Commission ("PUC" or "Commission") approve its second Demand-Side Management ("DSM") Plan for the five-year period FY (i.e., fiscal year ending August 31) 2016 through FY 2020 ("Phase II Plan"), and continuing thereafter. The Phase II Plan is intended to reduce energy consumption and help customers use energy more efficiently, resulting in reduced use of natural gas and electricity, more comfortable and energy efficient homes and working environments, reduced energy charges and carbon emissions and the stimulation of additional jobs in the region. For the reasons set forth below, PGW respectfully requests that the Commission approve its Phase II Plan as described herein and the appended attachments at the Commission's April 9, 2015 public meeting.

I. INTRODUCTION AND SUMMARY

On July 29, 2010, the Commission approved the settlement of a base rate filing made by PGW in December 2009 (Docket Nos. P-2009-2097639 and R-2009-2139884). As part of that

Settlement, the Parties agreed to the creation of a five-year DSM plan ("DSM Phase I Plan").[1] The DSM Phase I Plan provided high-level designs for six programs, including estimated costs, savings, and cost-effectiveness, as well as a framework for implementation and management of the programs. Since the filing and approval of the Phase I Plan, which was rebranded as "EnergySense," PGW has continued to provide updates on its portfolio of energy efficiency programs in the form of annual implementation plans and annual reports.

The DSM Phase I Plan, the five-year term of which will expire on August 31, 2015, has been successful and cost effective and has delivered significant benefits to customers. Over the full five years of the DSM Phase I Plan, PGW expects to spend approximately $44.1 million on its gas efficiency programs.[2] From inception through June 30, 2014, the EnergySense portfolio delivered $4.9 million in Total Resource Cost ("TRC") Net Benefits to customers (2009$), achieving a Benefit-Cost Ratio of 1.19 and providing support through over 8,500 natural gas efficiency projects, including many at the homes of low income CRP customers. The programs are projected to save 373 BBtus of natural gas during the first five years of the portfolio, and 7,802 BBtus of natural gas over the lifetime of the measures installed.[3] When the Plan is completed it is projected to result in the reduction of over 455 thousand short tons of CO_2, and to create some 234 to 390 jobs. It has also been viewed positively by the participants. Accordingly, PGW is proposing to continue to provide DSM programming, as detailed in the attached Phase II Plan Narrative (Appendix "B" hereto), in order to continue supporting the

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1 Philadelphia Gas Works' Revised Petition For Approval of Energy Conservation and Demand Side Management Plan, Opinion and Order entered July 29, 2010, Docket Nos. R-2009-2139884, P-2009-2097639.

2 PGW's Five-Year EnergySense Demand Side Management Portfolio, Fifth Year Implementation Plan, dated May 14, 2014, Docket Nos. R-2009-2139884; P-2009-2097639 at 6.

3 *Id.*

deployment of high efficiency natural gas equipment as well as conservation and load management efforts. PGW believes that extending these efforts will result in benefits to PGW's customers, the Company, and society as a whole. Additionally, as the EnergySense portfolio is now launched and operating at scale, the requisite infrastructure has been developed and initial start-up costs have already been incurred, allowing for the increasingly cost-effective continuation of programming. Through this filing, PGW seeks to realize the greatest returns for ratepayers' investments to date by avoiding eliminating or, as detailed in the Proposed Schedule section below, even temporarily shuttering PGW's DSM programming. Elimination or even temporary shuttering of PGW's DSM programs could have a harmful effect on the market, and cause customer frustration and confusion. As more fully explained in Appendix B ("Plan" or "Phase II Plan"), PGW proposes to continue the following five conservation programs:

1. *CRP Home Comfort* program (formerly referred to as ELIRP), providing weatherization treatments to the highest usage customers in PGW's Customer Assistance Program (CAP)[4];
2. *Residential Equipment Rebates* program, providing prescriptive residential-sized heating equipment rebates targeting the replacement of equipment at the end of its operational life;
3. *Commercial Equipment Rebates* program providing prescriptive commercial-sized heating and cooking equipment rebates targeting replacement at the end of its operational life;

[4] The Commission set forth specific requirements regarding information PGW is required to provide in support of its proposal to continue this program. *Philadelphia Gas Works Universal Service and Energy Conservation Plan for 2014-2016 Submitted in Compliance with 52 Pa. Code § 62.4*, Docket No. M-2013-2366301, Final Order August 22, 2014 at 74 (*"USECP 2014-2016 Order"*).

4. *Efficient Building Grants* program providing custom project grants for existing commercial and multifamily buildings; and
5. *Efficient Construction Grants* program providing custom project grants for new and gut rehabilitated commercial and multifamily buildings, and single family homes.

PGW is proposing a reduced level of spending for each of these programs due to concerns regarding the reduced revenues resulting from the conservation efforts facilitated by the Phase I Plan. However, as described below, if PGW is permitted to recover this cost of the program it could increase funding levels and reverse the phase out of the existing Home Rebates program.

In addition to these programs, PGW is also proposing two additional programs. First, PGW proposes to include a new Low-Income Multifamily Program as part of the CRP Home Comfort program consistent with the Commission's Final Order approving PGW's Universal Service and Energy Conservation Plan for 2014-2016.[5]

Second, consistent with the DSM Phase I goals of achieving cost-effective energy conservation, PGW proposes a new load management and conservation program, the DSM Efficient Fuel-Switching Program. This load management program will promote specific cost-effective energy efficiency and conservation projects, including micro-combined heat and power ("Micro-CHP") and other energy efficient natural gas appliances, for commercial and industrial end-uses currently utilizing other more expensive and less efficient fuel-types. To participate in this load management program, a particular project must both demonstrate a positive TRC cost/benefit and result in a net reduction in energy use. The result will be cost savings to

[5] *Id.* at 57 ("We direct PGW, to the extent that the ELIRP program continues beyond August 2015, either as part of the DSM or as part of the USECP, to develop a program and designate a portion of the ELIRP budget to specifically serve low-income multifamily properties.")

customers and net reductions in carbon emissions. The Phase II Plan (Appendix B) describes each program in greater detail.

PGW estimates it will spend approximately $25.0 million to implement this portfolio of programs in the Phase II Plan, including $22.7 million for the conservation programs and $2.3 million for the load management program. The program administrative, operational, and evaluation costs are calculated and proposed to be recovered in a manner identical to the DSM Phase I method which uses the Efficiency Cost Recovery Surcharge ("ECRS") applicable to all volumes of firm gas delivered to recover non-low income program costs, and the Universal Service and Energy Efficiency Surcharge ("USC") to recover the CRP Home Comfort program costs. The proposed Phase II programming is projected to save 227 BBtus of natural gas during the first five years of the Phase II Plan, and 4,390 BBtus of natural gas over the lifetime of the measures installed.

In addition to this portfolio of programs that PGW proposes to offer under the Phase II Plan, PGW proposes to add two new cost elements. First, PGW is proposing a "conservation adjustment mechanism" ("CAM"). The CAM would calculate the lost margin associated with reduced usage resulting from the programs and include that amount in the costs of the program recovered through PGW's ECRS surcharge. Such a recovery is supported from a policy standpoint, as it eliminates any disincentive associated with PGW's sponsoring of conservation efforts, and is supported from a legal standpoint since the lost margin is a cost of the program to PGW. Additionally, the PGW proposed CAM is based on well-established mechanisms that have been approved in other jurisdictions.[6] Significantly, because of the uncertainly surrounding the ability of PGW to employ a "CAM," this DSM Phase II proposal was crafted under the

[6] For a list of jurisdictions with similar mechanisms, see page 53 of the Plan.

assumption that the CAM cost element may not be approved. That being said, if the Commission approves the lost margin from the conservation programs as a cost of the program and thus properly recoverable in PGW's CAM surcharge, the conservation programs could be expanded beyond the program that PGW is proposing. This "expanded" program would produce even greater benefits to the Commonwealth and savings to customers.

Second, PGW is proposing that the costs of the program measures include performance incentives that would accrue to PGW based on achieving and surpassing targeted program goals. Performance incentives are not unusual in other industries, have been authorized for DSM programs in other jurisdictions[7] and, as they incent the most efficient and cost effective result, they are also properly viewed as a cost of the DSM program.

PGW believes that all elements of its proposed Phase II Plan – including the proposal to add a fuel switching load management program to the existing conservation programs that have already proven their value – are consistent with the clear policy of the Commonwealth to be on the forefront of energy efficiency and greenhouse gas reduction initiatives.

PGW submits that approval of all of the proposed elements of the Phase II Plan, including (a) the continuation of the CRP Home Comfort program, recovered through the Universal Service Charge ("USC"); (b) the continuation of the Efficiency Cost Recovery Surcharge ("ECRS"); (c) the new ECRS cost recovery elements (i.e., the CAM and the Performance Incentives); and (d) the new Efficient Fuel Switching program, should be approved by the Commission as soon as possible as in the public interest. Accordingly, PGW proposes the following procedural schedule:

- PGW Files Petition: December 23, 2014
- Answers/Interventions due: January 12, 2015

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7 For a list of jurisdictions with incentives, see page 68 of the Plan.

- PGW to convene 1st stakeholder collaborative meeting by January 16, 2015 (Additional collaborative meetings scheduled as needed)
- PGW to submit collaborative report to PUC with recommendations: March 6, 2015
- Other parties to submit comments to PUC regarding PGW's collaborative report: March 21, 2015
- PUC Order: April 9, 2015

PGW's proposed procedure will permit the Commission to consider the Phase II Plan after a workshop process has been conducted and approve the plan – or those aspects of the Plan that it determines can be put into effect without an on-the-record investigation – in order to permit the Phase II Plan to deliver benefits to customers without interruption starting September, 2015. At that time, the PUC could assign to the Office of Administrative Law Judge those aspects of the Phase II Plan (if any) for which the PUC determines evidentiary hearings are needed prior to final resolution. In support of approval of the relief requested, PGW states as follows:

II. BACKGROUND

1. PGW submitted its original Five-Year Gas DSM Plan to the Commission on December 18, 2009 (Docket Nos. P-2009-2097639 and R-2009-2139884). This plan was submitted to the Commission in May, 2010 as part of a Joint Petition for Settlement of PGW's 2009 base rate request.

2. As part of that Settlement, the Parties agreed to the creation of the DSM Phase I Plan. The DSM Phase I Plan provided high-level designs for six programs, including estimated costs, savings, and cost-effectiveness, as well as a framework for implementation and management of the programs.

3. By Order entered July 29, 2010, the Commission approved PGW's DSM Phase I Plan.[8] The approval included permitting PGW to rely on the Enhanced Low Income Retrofit Program ("ELIRP," now known as CRP Home Comfort) to satisfy the requirements of 52 Pa Code §§ 58.1-58.18, requiring utilities to establish usage reduction programs for their low income customers.[9] More recently, in its *USECP 2014-2016 Order*, the Commission specifically required PGW to request any waivers of Chapter 58 as may be necessary to continue to rely upon the low income usage reduction program of its DSM to satisfy these regulatory requirements.[10]

4. Since the filing and approval of the DSM Phase I Plan, which was rebranded as "EnergySense," PGW has continued to provide updates to its portfolio of energy efficiency programs in the form of annual implementation plans and annual reports.

5. The DSM Phase I Plan, the five-year term of which will expire on August 31, 2015, has been cost effective and has delivered significant benefits to customers. Over the full five years of the DSM Phase I Plan, PGW expects to spend approximately $44.1 million on its gas efficiency programs. PGW has filed five implementation plans since the Commission's approval of the DSM Phase I Plan. Most recently, PGW filed its Fifth Year Implementation Plan for Fiscal Year 2015 that included detailed updates of activities through February of 2014 and planned improvements to the programs. While the Fifth Year Implementation Plan did not

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8 Philadelphia Gas Works' Revised Petition For Approval of Energy Conservation and Demand Side Management Plan, Opinion and Order entered July 29, 2010, Docket Nos. R-2009-2139884, P-2009-2097639.

9 At the time PGW sought Commission approval for its request to permit ELIRP to replace and expand PGW's prior LIURP Conservation Works Program, PGW specifically asked for approval pursuant to 52 Pa. Code § 58.17. The Commission approved PGW's ELIRP pursuant to the Order entered July 29, 2010 at docket numbers R-2009-2139884 and P-2009-2097639. Therefore, by approving PGW's ELIRP, the Commission implicitly waived, to the extent necessary, 52 Pa Code §§ 58.5, 58.11(a) and any other Chapter 58 regulatory sections that may appear to be inconsistent with PGW's Commission approved ELIRP program.

10 *USECP 2014-2016 Order* at 74.

introduce any new programs, existing programs continued to be expanded, refined and improved. Remaining filings for the DSM Phase I period include the FY 2014 Annual Report in January, 2015 and the FY 2015 Annual Report in January, 2016.

6. All of PGW's DSM Phase I filings (as well as this filing) were prepared in coordination with Green Energy Economics Group, Inc. ("GEEG"), a nationally recognized consultancy specializing in utility demand side management and conservation.[11] GEEG's participation helped to insure that the programs undertaken in DSM Phase I were professionally crafted and reflected national "best practices" for utility conservation and load management programs. GEEG has provided similar assistance to PGW in fashioning its Phase II proposal.

7. PGW's DSM Phase I Plan was a success, with benefits to both the customers receiving DSM services as well as PGW customers in general. While the Plan Narrative of Appendix B presents the results of DSM Phase I in detail, some of the most important positive results are as follows:

a. From inception through June 30, 2014, the EnergySense portfolio delivered $4.9 million in TRC Net Benefits to customers (2009$), achieving a TRC Benefit-Cost Ratio of 1.19.

b. The EnergySense portfolio of programs provided support through 6,765 CRP Homes Weatherized, and 1,754 market-rate rebates and grants through June 30, 2014.

c. The programs are projected to save 373 BBtus of natural gas during the first five years of the portfolio, and 7,802 BBtus of natural gas over the lifetime of the measures installed.

d. The conservation programs directed at CRP customers in DSM Phase I will, when completed, result in a reduction in the support paid by non-CRP customers by $7.2 million.

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11 http://www.greenenergyeconomics.com/

e. The programs will result in the reduction of over 455,000 short tons of CO2.

f. The EnergySense portfolio created some 234 to 390 jobs.

g. The entire program was viewed positively by virtually all of the participants. Through its third-party evaluator, PGW found that 65% of residential heating equipment rebate recipients surveyed felt that rebates were important in their decision to purchase high efficiency equipment. Similarly, 70% of contractors reported that PGW's rebates were important to their sale of high efficiency equipment. The vast majority of customers (91%) reported that they were satisfied with the PGW EnergySense rebate program.

8. In addition to these concrete results, PGW submits that the DSM Phase I Plan provided a benefit to the Company as a means of enhancing its provision of safe, reasonable and adequate service at affordable rates. Part of that mandate for a regulated utility, PGW submits, is to help its customers use energy in the most efficient and cost-effective manner possible. The DSM Phase I Plan helped PGW meet this goal.

9. While DSM Phase I produced many benefits, the energy reductions due to PGW DSM Phase I programming activities (including all work to date and latest forecasts for remaining activity through the end of FY 2015), is projected to result in total non-gas revenue losses of $8.46 million (nominal) to the Company, as detailed in the Phase II Plan. This figure represents the total value of reduced volumetric distribution revenues, through which PGW recovers its fixed operational costs, from the DSM Phase I inception through the Company's next rate case, currently forecasted for FY 2018. These costs have been (or will be) incurred and the Company is not seeking cost recovery for these costs; however the proposed Phase II Plan has been sized assuming that there is a possibility that the Company may not be permitted to recover the reduced distribution revenue resulting from the conservation prompted by the Phase II Plan programs. The Company simply cannot afford to continue absorbing greater levels of DSM program costs.

III. PGW's PROPOSED PHASE II FIVE-YEAR PLAN

10. PGW submits that the results of DSM Phase I justify the continuation of PGW's DSM efforts. Accordingly, the Phase II Plan set forth here proposes a continuation of, and improvement in several respects of PGW's existing DSM portfolio plan. In addition, PGW is proposing new components that it believes will enhance the efficiency and fairness of the programs to all stakeholders and insure that maximum possible customer benefits will be delivered.

11. PGW's proposed Phase II Plan continues PGW's commitment to natural gas efficiency programming for the five year Phase II period covering PGW's FY 2016 through FY 2020 and continuing. The program would start on September 1, 2015 and end August 31, 2020. Furthermore, in order to ensure ongoing program continuity, PGW proposes continuation of all of the DSM Phase II programs beyond FY 2020; in order to do so, PGW would file with the Commission ongoing triennial implementation plans, as further described in the Plan.

12. The broad goals of the Phase II Plan, similar to its original filing in 2010, are to: (1) cost-effectively reduce customer bills; (2) maximize customer value; and (3) reduce harmful Greenhouse Gas Emissions. Additionally, through the new Efficient Fuel Switching program, PGW seeks to further support the goals above by attaining cost-effective net energy usage reductions, while also achieving an ancillary goal of seeding nascent markets for new natural gas applications.

13. PGW believes that continuation of its conservation and load management initiatives are appropriate for the following reasons:

a. PGW believes that maximizing customers' energy efficiency enhances its obligation as a regulated utility to provide safe, adequate and reasonable service. This support is particularly important for low income customers, who likely do not have the resources to engage in conservation or energy efficiency efforts on their own.

b. Promoting the efficient use of natural gas, including facilitating the conversion to natural gas from other energy sources where economically justified, will provide benefits to all PGW customers and to the Commonwealth in general.

c. As shown in the Plan, the net financial impact for consumers under the proposed Phase II Plan has a present value in 2014 of $9.4 million; significantly, the net CRP subsidy, recovered from non-CRP customers would be reduced by $1.4 million.

d. Utility-provided support for the purchase of high-efficiency appliances and equipment continues to be needed. Although natural gas prices remain at historically low levels, the up-front costs of installing natural gas equipment, and especially high efficiency equipment, are often higher than for other fuels. These high up-front costs can discourage builders and building owners from installing natural gas powered equipment even though such equipment is more efficient and environmentally beneficial than other fossil fuel heating sources. PGW's DSM programs make high efficiency natural gas equipment more accessible to cost-conscience developers and building owners in Philadelphia to support long-term "right-sized" natural gas use.

e. Additionally, the PGW DSM program has already been launched, start-up costs incurred, and cost-effectiveness achieved. As such, the continuation of the programming at this point protects the ratepayer investments to date, while continuing to add even greater returns through the ongoing cost-effective marginal benefits realized.

14. While PGW has determined that it would be in the best interests of its customers to propose an extension of its DSM Program, it has revised program spending downward in recognition of the effect that promoting energy conservation has had and will continue to have on PGW's revenues and margins and that it is uncertain whether PGW would be permitted to recover these amounts in the new program. Reduced sales mean reduced margin (the total charge to customers less gas revenues) recovery. While, as explained more fully below, PGW is proposing to address this potential margin reduction by including as a cost recovery element the amount of actual loses as a direct result of the conservation activities undertaken pursuant to this Plan, the Commission has not approved such a mechanism to date. Accordingly, PGW has constructed its Phase II conservation program with the assumption that such a cost recovery

mechanism (referred to as a "CAM" below) may not be approved. If it were approved, PGW could support a more robust program which could include such items as expanded program activity levels and a return of the Home Rebates Program to the portfolio, as well as a pathway to potential On-Bill Repayment.

A. Phase II Plan: Proposed DSM Programs

15. The Company's Phase II Plan proposes the continuation of five DSM programs, with improvements and updates, and the phase-out of one program from the DSM Phase I Plan. Below is a summary of those programs and proposed updates.

a. CRP Home Comfort – This program provides comprehensive weatherization services to low-income customers who participate in PGW's CAP, the Customer Responsibility Program ("CRP"). In Phase II, PGW will extend the pool of eligible high gas usage CRP customers to include those from the top 30% of CRP users and may scale eligibility up to the top 50%. PGW will also update quality assurance training protocols and explore new ways to leverage data and provide additional cost-effective treatment opportunities where full weatherization is prevented due to health, safety and/or structural issues at a home. As directed by the USECP 2014-2016 Order, PGW is requesting either a waiver from specific sections of the PUC's regulations dealing with low income usage reduction programs, or an exemption from those regulations, because of the significant benefits that PGW program recipients as well as non-low-income customers will receive from having the program provided as part of this highly efficient and effective suite of conservation programs.[12]

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12 As directed by the *USECP 2014-2016 Order*, PGW has identified sections of Chapter 58 which may be relevant and specifically requests that the Commission waive them as necessary to enable PGW to implement this program. The sections of Chapter 58 that PGW has specifically identified for which a waiver is requested, and the reasons that the waiver is justified are set forth in Appendix "A" to this petition. In addition, PGW requests the Commission waive any other rule that it determines is applicable to the Home Comfort program but which would not be consistent with the program PGW has been proposed.

In addition, PGW would note that Section 58.18 allows a utility alleging special circumstances to seek an exemption for its usage reduction program from the regulations. The Commission has already approved PGW's CRP Home Comfort program and relevant regulatory waivers, and therefore, granting whatever waivers are necessary to permit PGW to continue the program is appropriate. Notably, both the overall DSM program and the individual CRP Home Comfort program have proven to be cost effective. They also demonstrate that after an initial ramp-up period, PGW's programs show increased cost-effectiveness as the company completed additional projects. PGW submits that CRP Home Comfort – as it has operated in Phase I and as proposed in Phase II – is

b. Residential Equipment Rebate Program – This equipment rebate program is designed to encourage and assist customers in improving the energy efficiency of their properties through prescriptive rebates on premium efficiency, residential-sized gas appliances and heating equipment. For Phase II, PGW plans to eliminate programmable thermostat rebates since: (1) the effectiveness of the measure was unable to be clearly determined by the independent program evaluator; and, (2) the cost of processing thermostat rebates is relatively high compared to the measure cost and rebate amount. PGW will continue to review new technologies that provide additional cost-effective savings for its customers participating in the program. PGW will also seek to drive additional participation through new cost-effective marketing strategies, such as offering bonuses to contractors which submit multiple rebates or show improved performance.

c. Efficient Building Grants Program – This retrofit incentive program promotes natural gas energy efficiency retrofit investments by PGW's multifamily residential (including low income tenant projects), commercial, and industrial customers. For Phase II implementation, PGW plans to adopt new application procedures, technical services and incentives strategies to improve market uptake of energy retrofits.

d. Commercial Equipment Rebate Program – This equipment rebate program provides rebates on premium efficiency commercial-sized gas appliances and heating equipment to increase the penetration of these measures in the facilities of PGW's commercial, industrial and multifamily (including low income tenant projects) customers. PGW will also develop a more streamlined online application process so that customers may quickly submit rebate applications.

e. Efficient Construction Grants – This construction incentive program is available for both residential (including low income tenant projects) and non-residential new construction projects. It provides technical assistance and prescriptive financial incentives for projects that save natural gas compared to the building code baseline. During Phase II, PGW will seek new ways to engage builders and increase participation in the program. PGW will develop an online application tracking process that will allow customers to track their project throughout its lifecycle.

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consistent with the goals established by 52 Pa. Code § 58.1. Therefore, PGW submits that special circumstances exist pursuant to 52 Pa Code § 58.18 for the Commission to exempt CRP Home Comfort from Chapter 58.

Finally, the *USECP 2014-2016 Order* required PGW to reconsider its exclusion of CRP customers with program arrearages greater than two months from ELIRP eligibility. Consistent with the Commission's direction, PGW reconsidered this issue and has already eliminated it.

f. Home Rebates Program – This residential retrofit incentive program provides incentives to single-family residential customers for implementing comprehensive natural gas conservation projects in their home, including air sealing, insulation, and heating system replacements. This program has been launched at the beginning of FY 2014, and though program cost-effectiveness has not yet been achieved, latest data trends demonstrate improvement towards cost-effectiveness based on current activities rates. This program requires larger overhead costs, as compared to the other EnergySense programs, and therefore requires greater program scale to achieve cost-effectiveness. As such, it is more problematic to reduce funding for this program while protecting program viability. Given PGW's concerns regarding recovery for all program costs incurred, the primary Phase II Extension proposal involves winding down and eliminating this program in the first year of the new 5-year period. However, as described below, given appropriate cost recoveries, the company could reincorporate the Home Rebates program.

16. In order to further assist customers in achieving energy usage and utility bill reductions on their own, PGW intends to develop a more effective and user friendly e-audit tool in Phase II, based on actual gas usage and housing characteristics, to help residential customers understand energy use and savings potential.

17. Similarly, PGW also proposes to develop a tool for Commercial and Industrial customers in Phase II, allowing them online access to their properties' natural gas usage and functionality to automatically upload usage data to the EPA Portfolio Manager website to facilitate ongoing conservation goal tracking.

B. Phase II Plan: Proposed Enhanced ELIRP and Requested Waivers

18. PGW proposes to continue the CRP Home Comfort program and, in accordance with the *USECP 2014-2016 Order* directive, to include a new low income multifamily program. This program would be targeted to low-income multifamily housing building owners, providing similar direct install or comprehensive treatments currently provided to multifamily properties in PGW's existing Building Grants program. This proposal is consistent with the Commission's

requirement in PGW's recent USECP proceeding to "develop a program and designate a portion of the ELIRP budget to specifically serve low-income multifamily properties."[13] PGW is complying with Commission's direction to provide this additional programming within the Company's LIURP, although it is important to note that these activities will not provide the similar all around benefits of PGW's pre-existing single family weatherization programming. Due to the nature of the multifamily properties in Philadelphia, PGW expects that many of the program's targeted properties will be master-metered on commercial rates and therefore residents living in the multifamily housing would not be eligible for PGW's CRP. As such these low-income multifamily activities would be paid through the USC surcharge but not result in reductions to the PGW CRP subsidy borne by PGW's other rate-payers.

C. Phase II Plan: New Load Management Efficient Fuel Switching Program

19. In addition to the continuation of the above-mentioned conservation programs, PGW proposes to enhance its EnergySense DSM portfolio with a new load management and conservation program: the Efficient Fuel Switching program.

20. PGW proposes to launch an Efficient Fuel Switching Program to provide support for the installation of cost-effective energy conservation measures for small to medium commercial and industrial applications. This program will seek to further assist customers in managing their load by realizing the greatest on-site energy reductions through full fuel cycle usage analyses, including all fuel types, rather than strictly on-site natural gas reductions. In this way, PGW will continue to support the most efficient use of energy, including reductions and

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13 "USECP 2014-2016 Order" at 57.

conversions to natural gas from other energy sources, where economically justified, in order to provide even greater benefits to PGW customers and the Commonwealth in general.

21. Additionally, the Efficient Fuel Switching load management program will focus on seeding nascent technologies in under-served sectors, in order to facilitate swifter market adoptions for applications that, while effective and practical, have not yet gained traction. In this way, PGW aims to align the DSM conservation goals, as described above, with broader market goals of facilitating growth of natural gas demand markets in the Commonwealth.

22. Based on initial market research and analysis, PGW intends to initially focus on prescriptive rebates for Micro-CHP units of 30 kW and smaller. The Phase II Plan provides for a Micro-CHP incentive of $750 per kW capacity, capped at 50% of projects' incremental costs. The program will also offer custom rebates for other appliances that would be considered on a case-by-case basis, such as natural gas absorption chillers or heat pumps, with the goal of obtaining sufficient actual data to introduce additional prescriptive offerings in the future. These custom projects would be analyzed individually to verify that the project met the energy savings and cost-effectiveness requirements established for this program.

23. In either event, to qualify for this program the project must: (1) demonstrate positive TRC cost-effectiveness; and, (2) provide overall net energy savings.

24. PGW intends to spend approximately $2.3 million over the Phase II Plan period on the new Efficient Fuel Switching load management program.

25. PGW will limit participation in the Efficient Fuel Switching program to GS Firm customers, as they are the class that funds DSM programs through surcharges. This will allow PGW to target small to medium-sized commercial properties that are currently under-served and present the most viable opportunities for fuel-switching.

26. The anticipated benefits of the Efficient Fuel Switching load management program are several: (1) to help customers efficiently manage their energy load; (2) promote cost–effective net energy reductions; (3) increase market acceptance and penetration of cost-effective natural gas applications; and, (4) complement existing efforts, including further supporting PGW's DSM goals towards reducing harmful Greenhouse Gas Emissions to the extent that the fuel from which a customer has switched is generated by coal or oil.

27. Net primary energy savings resulting from the Efficient Fuel Switching load management program are anticipated to start at 1,297 MMBtus per year in FY 2016 and grow to 16,867 MMBtus per year in FY 2020, with total net energy savings of 639,267 MMBtus over the lifetime of all projects installed during the Phase II period.[14]

28. PGW's proposed Efficient Fuel Switching is comparable to programs implemented in Pennsylvania and other jurisdictions, as demonstrated in Appendix 6.4 of the Phase II Plan (Appendix B).

IV. COSTS OF DSM PHASE II

29. PGW anticipates spending a total of $25.0 million over the five years of the Phase II Plan. As proposed, the continuation of conservation programs will cost $22.7 million. The Efficient Fuel Switching load management program will cost about $2.3 million. Detailed budget projections are included in Tables 3 and 4 of the Phase II Plan.

30. The program administrative, operational, and evaluation costs are calculated, and proposed to be recovered in a manner identical to the DSM Phase I method. Recovery for the market-rate program expenses, CAM costs, and Performance Incentive costs will be via the Efficiency Cost Recovery Surcharge ("ECRS") applicable to all volumes of firm gas delivered.

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[14] Phase II: Five-Year Implementation Plan at 115.

Recovery for the CRP Home Comfort program expenses will be recovered through the Universal Services surcharge ("USC"), consistent with current Phase I recoveries for existing LIURP program cost recoveries.

31. The ECRS will be applied only to the bills of firm customers in the class for which the costs are incurred. The ECRS factors will be computed pursuant to Section 1307 of the Public Utility Code (66 Pa. C.S. § 1307). PGW plans to file the computation for approval in conjunction with the Company's annual Section 1307(f)-GCR filing. The surcharge will continue to be automatically adjusted effective March 1, June 1, September 1, and December 1 of each year in accordance with Section 1307(f) quarterly adjustment procedures.

32. The costs related to customers other than low income residential customers will be tracked and recovered separately from each of the following firm customer rate classes served by the energy efficiency program: (1) Residential on Rate GS; (2) Commercial on Rate GS; (3) Industrial Customers on Rate GS; and, (4) the Philadelphia Housing Authority on Rate PHA.

33. For the Phase II Plan, PGW proposes to include two components of cost that were not included in DSM Phase I: a Cost Adjustment Mechanism and Realized Performance Incentives.

A. Cost Adjustment Mechanism ("CAM")

34. A significant cost of the Phase I DSM program has been the lost margin associated with the reduced throughput by customers. These costs have been incurred and the Company is not seeking retroactive cost recovery. However, PGW respectfully requests that the Commission allow it to recover the expected lost margin cost associated with Phase II and ongoing DSM activities beyond via a "Conservation Adjustment Mechanism ("CAM")"

component.[15] The CAM will recover the cost to PGW of reduced contributions to fixed costs due exclusively to PGW's energy-efficiency activities under Phase II DSM natural gas conservation programs, which result in the reduction of on-site natural gas usage.

35. The justification for including the CAM as a cost of the Phase II program, as well the benefits resulting from allowing recovery by PGW are set forth in Section 3.1.1.1. of the Phase II plan. In summary they are as follows:

a. The proposed CAM will enable PGW to assist customers in pursuing energy-efficiency opportunities, without suffering reductions in margin from these activities. PGW's allowed distribution revenue level is established in a base rate case and is designed to permit it to cover all of its costs and other revenue requirement items. Consistent reductions in sales due to conservation reduces PGW's margin recovery and, in turn, reduces PGW's ability to cover its fixed costs, weakens key financial indicators, such as internally generated funds, and could hasten the need for a base rate case.

b. PGW's EnergySense DSM program stems directly from its attempt to enhance its provision of safe and reliable service at reasonable rates. It is well established that a utility's rates should permit it to recover all of its reasonable and prudently incurred costs of providing service. Assisting customers in conserving natural gas has two types of costs: 1) the direct costs of delivering the energy conservation programs as efficiently as possible; and 2) the indirect cost incurred by PGW as a result of reduced throughput due to the installed conservation measures. PGW's rates – like all distribution companies – are structured so that most of the fixed costs of providing service are recovered in the volumetric charges. When sales go down PGW collects less margin, and therefore realizes less contribution to its fixed costs. Thus the lost margins proposed to be recovered in the CAM are no different than any other cost incurred by PGW in delivering beneficial conservation services to customers.[16]

c. The non-recovery of these costs acts as a barrier preventing utilities from pursuing energy efficiency for their customers to the greatest extent

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15 This Phase II Plan has been developed on the assumption that PUC approval of a mechanism for recovery of these lost revenues is unlikely; the Company cannot afford to continue absorbing these DSM program costs at these levels going forward.

16 Notably, PGW's lost margin does not contain any return on investment, as PGW is a "cash flow method" regulated company. See, 66 Pa C.S. § 2212(e) and 52 Pa Code §§ 69.2701-2703.

possible, given the inability to afford reduced recoveries towards fixed costs. For instance, PGW's DSM Phase I activities are projected to cost the Company $7.963 million (Present Value) in non-recovered costs before the next forecasted rate case; an amount the company cannot continue to absorb.[17]

d. Any utility that encourages energy efficiency by its customers incurs a cost related to lost contribution to fixed-cost recovery, but that effect is more important for gas utilities like PGW than for electric utilities, for several reasons:

i. First, most electric utilities have continued to experience sales growth, certainly before taking energy-efficiency programs into account and in most cases even net of program effects. Thus, the lost contribution to fixed costs may be offset by increased contribution to fixed costs by increased sales. Like many gas utilities, PGW has been experiencing flat or negative sales growth and thus lacks that offset. As explained by NARUC in 2007, "While the gas industry generally faces declining average revenues per customer over time, the electric industry is experiencing increasing average revenues per customer. As a result, gas utilities tend to face revenue and profit erosion between rate cases, while electric utilities garner increasing revenue and profits between rate cases." [18]

ii. Almost all electric utilities have demand-related infrastructure expansion projects planned over the relatively near term. When conservation reduces peak loads EDCs can mitigate the effect of those lost sales by deferring some demand-related costs between rate cases. PGW, like many gas utilities serving older urban areas, has little or no planned load-growth-related infrastructure investment to defer. PGW hence has no opportunity to reduce demand-related costs to offset lost contribution to fixed costs.

iii. Electric utilities have some categories of equipment that wear out faster when loaded more heavily in their safe operating range. In contrast, EDCs have little (if any) equipment that wears out as a function of usage, so the lost

[17] Notably, while PGW could file a base rate case in order to mitigate this margin loss, any change in its rates would be prospective only, and would not compensate the Company for past lost margin.

[18] *Decoupling For Electric & Gas Utilities: Frequently Asked Questions*, National Association of Regulatory Utility Commissioners, September 2007 at 10.

contribution to fixed costs from energy-efficiency programs is not offset by reductions in load-related equipment failure.

36. One of the most compelling reasons justifying the CAM is that it would permit PGW to provide more robust conservation efforts which, in turn, would provide greater benefits to its customers and the Commonwealth. As stated above, the proposed DSM Phase II plan has been designed under the assumption that the CAM cost element may not be approved due to the uncertainty surrounding the ability of PGW to employ a "CAM." However, if the Commission approves the lost margin from the conservation programs as a cost of the program and thus properly recoverable in PGW's CAM surcharge, the conservation programs could be expanded beyond the program it has requested. An expanded program design could allow PGW to increase the five proposed conservation programs as well as to reincorporate the existing Home Rebates program, which is designed to be wound down and then eliminated early in the current Phase II Plan design, as described above. PGW would also be willing to consider an "on-bill repayment" program which could overcome one of the most significant hurdles to delivering program services for many customers. PGW's ideas for expansion are set forth in greater detail in Appendix B.[19] If the CAM were approved, PGW would propose that a workshop be conducted with the interested parties and the Commission in order to achieve a consensus on the specific programs and areas that would be added or expanded.

37. The proposed CAM will include the following steps: (1) an estimated forecast of CAM costs for the next fiscal year to be included in the annual implementation plan filing roughly four months prior to the start of a program year; (2) the CAM would initially be included in the ECRS and the CAM factor would be computed to be constant over the fiscal year; (3) the

[19] "PGW EnergySense Phase II: Five-Year Implementation Plan," at Section 3.1.2.1, December, 2014.

quarterly filings would correct for over- or under-collection; (4) each annual filing would include a reconciliation of the CAM projection for the twelve months ending February of that year to actual installations in that twelve-month period; and, (5) in subsequent years, the CAM would include the continuing revenue effects from measures installed in previous fiscal years. The framework for the proposed CAM is proposed in greater detail in Section 3.1 of the Phase II Plan (Appendix B).

B. Performance Incentives

38. PGW proposes that included as a cost of the Phase II Plan will be an additional amount that would be paid to PGW if it meets and exceeds certain goals in order to maximize its incentive to produce the greatest amount of energy efficiency possible.

39. Including performance incentives as a recoverable DSM program cost are supported for several reasons:

a. Performance incentives or payments are not unusual in construction or other industries. As they incent the most efficient and cost effective result, they are also properly viewed as a cost of the DSM program. Additionally, performance incentives have been recognized as accepted elements of DSM plans in other jurisdictions because they enhance the chances that program goals will be achieved and the resulting benefits for customer will be maximized.

b. Performance incentives cost recovery will align customer and Company financial benefits, allowing PGW to maximize economic and environmental impacts achieved through the programs.

c. Performance incentives constitute a sharing of benefits between the customers and the utility for running a successful DSM program. Customers continue to reap the majority of benefits from a program, but the utility is awarded a portion of the benefits it achieves as an incentive for continued high performance.

40. PGW proposes that the maximum annual incentive pool be calculated as 10% of proposed annual budgets, which is in the lower half of the range of existing caps in other jurisdictions, as demonstrated in Table 47 Energy-Efficiency Incentive Caps as Percent of

Spending of the Phase II Plan. The Company believes that an appropriate measure of overall portfolio effectiveness is the Total Resource Cost ("TRC") benefit-cost ratio ("BCR"). PGW proposes that it should only be eligible to receive a performance incentive if it achieves a TRC BCR of 1.0 or higher in a given year. This will ensure that the overall portfolio is providing a significant return on ratepayer investment before any incentives may be provided. If the portfolio meets the threshold TCR BCR of 1.0, PGW would be eligible for performance incentives for that year, but would not receive an incentive unless it achieves the performance targets listed in Table 49 Proposed Performance Incentive Targets of the Phase II Plan. PGW proposes the performance targets and weightings delineated in Table 48 Proposed Performance Incentive Pool By Year of the Phase II Plan.

41. In more concrete terms, the maximum incentive pool for Phase II as proposed would be $2.3 million over five years. However, this could only be achieved by 20% over-performance in both performance measures outlined in Table 49 of the Phase II Plan. If PGW meets its targets, as proposed in the Phase II Plan, the incentive pool is $1.7 million. PGW proposes to submit the incentive computations to the Commission in an annual report filed four months following the end of the fiscal year, based on actual installations in the previous year.

42. PGW submits that the performance incentive will protect the interests of ratepayers and incent desired portfolio outcomes, furthering the broad goals of the Company's DSM portfolio.

V. BENEFITS OF THE PHASE II DSM PROGRAMS

43. The primary benefit of gas energy-efficiency programs is the reduction of gas use and associated costs to customers. PGW calculates cost-effectiveness and financial impact based on the Company's approved Technical Reference Manual ("TRM") for energy saving calculations and on avoided costs for the forecasted monetary value of the reduced commodity.

Many of the key assumptions used for in Phase II are the same as those used in the Company's FY 2015 Implementation Plan. In its FY 2015 Implementation Plan, PGW updated its avoided costs for natural gas and electricity. Avoided costs represent the long-term benefits of PGW's energy efficiency initiatives over the lifetimes of the efficiency measures installed.

44. The cost-effectiveness of the programs in the Phase II Plan were calculated using the TRC and Gas Program Administrator tests.

45. PGW's Phase II Plan is projected to save 227 BBtus of natural gas during the first five years of the Phase II Plan, and 4,390 BBtus of natural gas over the lifetime of the measures installed.

46. From a total resource perspective, the projected present value of benefits, in 2014 dollars, is $36.7 million yielding net benefits of $10.8 million and nearly $1.42 in benefits for every $1 dollar spent.

47. For the natural gas system, the projected present value of benefits, in 2014 dollars, is expected to be $32.3 million leading to a present value of net benefits of $12.8 million and a BCR of 1.65.

48. Rates for non-CRP residential customers would be 0.6% to 0.7% higher (or an average annual bill impact of $5.80) in FY 2016 through FY 2020 than they would have been absent the Phase II energy efficiency portfolio investment. These rate increases are due to the fact that all program costs are borne upfront at the time of program delivery, whereas program benefits are realized over the lifetimes of the measures installed, which can last decades into the future. TRC cost-effectiveness methodologies involve discounting all costs and benefits to the same current year values in order to justify the investments. As all PGW DSM programming has been designed to exceed TRC cost-effectiveness, PGW submits that these modest rate increases

are an acceptable tradeoff in exchange for the substantial bill reductions that are expected over the remaining lifetime of the investment. Notably, the conservation programs directed at CRP customers in DSM Phase II will, when completed, result in a reduction in the support paid by non-CRP customers of $1.4 million.

49. The Phase II Plan will create jobs directly through the service and installation work needed to implement the programs, and indirectly through the increased economic activity that results from substitution of local capital and labor for natural gas delivered from afar, increasing household disposable income and business profitability. PGW estimates that its gas DSM portfolio will generate between 131 and 218[20] net additional jobs over the lifetime of the efficiency measures installed over the next five years, as further explained in section 2.1.8 of the Phase II Plan (Appendix B). Savings resulting from reduced electricity consumption will produce additional employment impact.

50. Finally, the PGW DSM program has already been launched, start-up costs incurred, and cost-effectiveness achieved. As such, the continuation of the programming at this point protects the rate-payers investments to date, while continuing to add even greater returns through the ongoing cost-effective marginal benefits realized.

VI. PROPOSED SCHEDULE/PROCEDURE

51. Rather than immediately forward the Petition to the Office of Administrative Law Judge in order to assign an ALJ for evidentiary hearings, PGW requests that the Commission provide PGW time to conduct a collaborative stakeholder process to discuss the Phase II Plan with interested stakeholders.

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20 "PGW EnergySense Phase II Five-Year Implementation Plan," at 40, December, 2014.

52. The goal of the collaborative process would be to identify those issues upon which agreement can be reached the Commission should approve expeditiously such as continuing the same programs in the same matter.

53. Accordingly, PGW proposes that the following procedural schedule be adopted:

PGW Files Petition: December 23, 2014

Answers/Interventions due: January 12, 2015

PGW to convene 1st stakeholder collaborative meeting by January 16, 2015 (Additional collaborative meetings scheduled as needed)

PGW to submit collaborative report to PUC with recommendations: March 6, 2015

Other parties to submit comments to PUC regarding PGW's collaborative report: March 21, 2015

PUC Order: April 9, 2015

PGW's proposed procedure will permit the Commission to consider the Phase II Plan after a workshop process has been conducted and approve the plan – or those aspects of the Plan that it determines can be put into effect without an on-the-record investigation – in order to permit the Phase II Plan to deliver benefits to customers without interruption, starting September, 2015. At that time, the PUC could assign to the Office of Administrative Law Judge those aspects of the Phase II Plan (if any) for which the PUC determines evidentiary hearings are needed prior to final resolution.

VII. APPROVALS REQUIRED FOR PHASE II PLAN

54. PGW requests approval of its Phase II Plan as just, reasonable, prudent, cost-effective and in the public interest in accordance with Chapter 22 of the Public Utility Code and Sections 1301, 1319, 1501, and 1505(b) of the Code, as well as the following specific approvals:

a. Approval of any and all waivers of Chapter 58 as necessary to permit the CRP Home Comfort program to satisfy these regulatory requirements or,

in the alternative an order exempting PGW's CRP Home Comfort program from the provisions of Chapter 58;

b. Pursuant to 66 Pa. C.S. § 1307, recovery of Phase II Plan administrative, incentive and evaluation costs, along with reduced contributions to fixed costs due exclusively to PGW's energy-efficiency activities through the ECRS;

VIII. CONCLUSION

Based upon the foregoing, including the attached Phase II Plan, PGW respectfully requests that the Commission grant this Petition and enter an Order:

1) Approving PGW's Phase II Plan as set forth herein with Efficient Fuel Switching Program, Conservation Adjustment Mechanism and Performance Incentives and find that the Plan is just and reasonable and in the public interest;

2) Granting the waivers from Chapter 58 of the PUC's Regulations as set forth on Appendix "A" to this Petition; or in the alternative, pursuant to 52 Pa Code § 58.18 exemption of CRP Home Comfort from Chapter 58;

3) Establishing a schedule for consideration of PGW's proposed Phase II Plan as follows:

PGW Files Petition: December 23, 2014

Answers/Interventions due: January 12, 2015

PGW to convene 1st stakeholder collaborative meeting by January 16, 2015 (Additional collaborative meetings scheduled as needed)

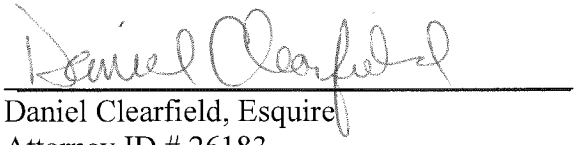
PGW to submit collaborative report to PUC with recommendations: March 6, 2015

Other parties to submit comments to PUC regarding PGW's collaborative report: March 21, 2015

PUC Order: April 9, 2015; and

4) Taking any other action deemed to be in the public interest.

Respectfully submitted,



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December 23, 2014

VERIFICATION

I, Denise Adamucci, hereby state that: (1) I am the Vice President for Regulatory Compliance and Customer Programs for Philadelphia Gas Works; (2) the facts above set forth in the foregoing Petition are true and correct (or are true and correct to the best of my knowledge, information and belief); and (3) I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa. C.S. § 4904 (relating to unsworn falsification to authorities).

Denise Adamucci
Vice President, Regulatory Compliance and
Customer Programs
Philadelphia Gas Works

Dated: December 23, 2014

APPENDIX A

PGW DSM Phase II Plan

List of Chapter 58 Sections For Which PGW Requests a Waiver

a. 52 Pa Code §58.4 requires that "[p]roposed funding revisions that would involve a reduction in program funding shall include public notice found acceptable by the Commission's Bureau of Consumer Services, and the opportunity for public input from affected persons or entities." CRP Home Comfort funding would continue to always be in excess §58.4(a) minimums and PGW will work with BCS regarding the appropriate public notice and public input process if any are required given that there is no currently approved FY2016-20 plan and thus no reduction in funding proposed for those years.

b. 52 Pa Code §58.5. requires: "For programs covered by §58.4 (relating to program funding), not more than 15% of a covered utility's annual budget for its usage reduction program may be spent on administrative costs, as defined in § 58.2 (relating to definitions). The costs associated with approved pilot programs are exempt from the 15% cap." PGW's CRP Home Comfort allows payment to conservation services providers for annual administrative expenses (costs not directly related to the provision of program services, such as office overhead) to not exceed fifteen percent (15%) of the budget category "Total Cost." (PGW allows its conservation service providers to charge up to (10%) of the ELIRP budget category "Total Cost" for variable Program Support expenses. These expenses are directly related to the provision of program services but may not be associated with a specific efficiency measure. Such costs include measure installation tools, mileage to participant homes, and scheduling costs. These costs are not "administrative costs").

In addition to the conservation service provider administrative charges, PGW also charges its own overhead and, therefore, exceeds the administrative costs cap. PGW specifically requests a waiver of this requirement. A waiver is warranted as the CRP Home Comfort program has been designed based on industry standard TRC cost-effectiveness targets that better serve the intent of this regulation (protection of rate-payer dollars) in a more effective manner than by strictly adhering to administrative cost caps. Separate from the fixed administrative expenses, 52 Pa Code §58.9. requires "…[t]he utility shall then provide a targeted mass mailing to each customer identified through this procedure so as to solicit applications for consideration of program services." PGW selects targeted CRP customers and does not solicit customers to apply to its

LIURP due to large number of eligible participants and the potential for high administrative costs, as well as a requirement to limit the program to the highest users (and in order to exclude customers for who treatment has previously found to be impossible due to health and/or safety conditions in the home). For this reasons, PGW requests a waiver of this regulation.

c. 52 Pa Code §58.10. requires: "[p]riority for receipt of program services shall be determined as follows:… Among customers with the same standing with respect to paragraph (1), those with the greatest arrearages shall receive services first… Among the customers with the same standing with respect to paragraph (2), those with incomes which place them farthest below the maximum eligibility level shall receive services first." PGW customers are targeted from the highest usage CRP customers. PGW does not prioritize selections based on the highest arrearage or for the lowest income customers since CPR customers pay a percentage of their income and are not financially impacted by the conservation measures provided. Given that PGW's CRP is a percentage of income program a waiver does not appear to be necessary but, to the extent it is, then PGW specifically requests that it be granted.

d. 52 Pa Code §58.11. Energy Survey requires "…[t]he installation of a program measure is considered appropriate if…the energy savings derived from the installation will result in a simple payback of 7 years or less. A 12-year simple payback criterion shall be utilized for the installation of side wall insulation, attic insulation, space heating system replacement, water heater replacements and refrigerator replacement when the expected lifetime of the measure exceeds the payback period." PGW uses TRC cost-effectiveness, not simple payback to determine what measure to include in a project. This is consistent with industry standards and has worked effectively in PGW's current Phase I program, therefore, PGW requests a waiver of this requirement.

e. 52 Pa Code § 58.14 requires "…When providing program services a covered gas utility shall address usage of electricity provided by a covered utility through the provision of electric usage reduction…" PGW is not addressing / identifying electric DSM treatments and requests a waiver of this section.

f. 52 Pa Code § 58.16 requires "…A covered utility shall create and maintain a Usage Reduction Program Advisory Panel to provide consultation and advice to the company regarding usage reduction services." PGW does not currently have an Advisory Panel but intends to establish one in Calendar Year 2015. PGW requests a waiver of this section until the Advisory Panel is established.

Appendix B

Phase II: Five-Year Implementation Plan

December, 2014

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Prepared in coordination with: GreenEnergy EconomicsGroup

Executive Summary

Introduction

In 2011, Philadelphia Gas Works ("PGW" or "the Company") launched its demand-side management ("DSM") portfolio of energy efficiency programs to help its customers save energy and save money. As the original approval period is coming to an end on August 31, 2015, this document details PGW's proposal for the extension of DSM programming for a second five-year period and beyond. In Phase II, PGW proposes to modify and build upon its existing cost-effective conservation programs, in order to provide more comprehensive and impactful overall energy efficiency solutions recognizing the full benefits that efficient natural gas usage provides, and to implement recovery of additional program costs.

Phase II Extension Scenarios

Within this plan, PGW is proposing to extend DSM programming through FY 2016 – FY 2020, referred to as Phase II, based on the ability to expand programming levels and recover all costs incurred. In the proposed scenario (referred to as the "Proposed Program" herein), PGW has adjusted its DSM budget and participation levels to minimize the impact of currently unrecovered program costs, which must be addressed as they are a barrier to PGW continuing to offer programming. This Proposed Program provides a continuation of five DSM programs, and the elimination of one program that would no longer remain viable at substantially reduced funding levels. PGW has also included a proposal to add several new portfolio components including a Conservation Adjustment Mechanism ("CAM") to provide recovery of costs to the company incurred from Phase II activities, and which could allow for an increase in programming from the Proposed Program. The potential increased programming possible through implementation of the CAM is referred to throughout this document as the "Expanded Scenario."

Additionally, this Plan includes a proposal for continuation of PGW's DSM programming beyond FY 2020, through ongoing triennial update filings as described in greater detail below.

Significant Updates & Highlights

Enhanced Outreach

PGW will improve its outreach to increase market-uptake of its programs in several ways. First, the Company will deepen its current outreach activities through Trade Allies and program partners. PGW will also seek to identify new program partners for continued brand growth. PGW will also identify new methods to educate all customers on the benefits of energy efficiency through the use of new, more robust web-based tools.

Phase II Proposed Program Improvements

PGW will introduce several new program improvements to streamline implementation activities and improve the delivery of its core portfolio of DSM programs, as detailed below. Improved application processes, including the introduction of online applications, will make program participation easier and increase the efficiency of program delivery.

Low-Income Multifamily Programming

In accordance with the Commission's Final Order approving PGW's Universal Service and Energy Conservation Plan for 2014-2016[1] ("Universal Service Plan Order") PGW will begin to offer a pilot program to serve low-income multifamily properties within its low-income usage reduction program. The program will provide no-cost limited energy usage assessments for building owners, and will implement cost-effective direct install energy efficiency measures. Buildings will be identified through program partners and eligibility will be consistent with Federal standards for low-income housing.

Efficient Fuel Switching and Micro-CHP

In addition to achieving energy efficiency through the on-site conservation of natural gas, PGW is also expanding Phase II activities to include a more holistic approach to overall energy savings, by recognizing the benefits of natural gas generation. As opposed to other source-derived energy generation options, natural gas provides more efficient transmission, distribution, and on-site generation processes. By combining new natural gas applications with the right-sizing of on-site natural gas usage, PGW expects to help its customers achieve even greater overall energy savings and emissions reductions, all while supporting a growing industry in our Commonwealth.

Beginning in Phase II, PGW intends to launch a pilot Fuel-Switching program to help commercial customers to improve the overall net energy efficiency of their buildings by switching to cost-effective natural gas technologies. PGW will begin to offer new prescriptive incentives for customers to invest in micro-combined heat and power systems (CHP) applications that provide onsite generation of electricity and heat for hot water or space heating that combine to offer greater efficiencies than available from off-site generation. Additionally, a custom measure path will be offered for individual new gas load projects that meet program criteria.

This new pilot program will be held to the same standards of PGW's existing energy efficiency programs, namely maintaining overall TRC cost-effectiveness, recognizing all costs incurred and all benefits realized. However, because this program increases natural gas consumption while reducing net energy usage, it will be developed, tracked, and reported on separately from the six main DSM gas efficiency programs in Phase II. The summary of TRC costs and benefits for the Proposed Program or Expanded Scenario does not include the fuel-switching program; however the costs for this program are included in the full Portfolio-wide budget tables below.

Cost Recovery and Performance Incentives

Additionally, PGW is proposing to add two new cost elements to allow the company to recover all appropriate program costs. First, PGW is proposing a "conservation adjustment mechanism" ("CAM") to recover for the cost of reduced delivery charges directly resulting

[1] Final Order entered August 22, 2014, page 57, at Docket No. M-2013-2366301 ("We direct PGW, to the extent that the ELIRP program continues beyond August 2015, either as part of the DSM or as part of the USECP, to develop a program and designate a portion of the ELIRP budget to specifically serve low-income multifamily properties.")

from DSM activities. The second new feature PGW will implement is a Performance Incentive mechanism, regarded as a DSM industry best-practice for the sake of aligning the utility's business interests with the value of program impacts to customers.

Pathway to On-bill Repayment

Approval of the CAM would provide for the recovery of full program costs to PGW and could allow PGW to increase DSM programming levels to the Expanded design scenario. That scenario could also allow for the reincorporation of the comprehensive residential retrofit program, Home Rebates. In that event, residential efficiency financing, which has been a critical issue identified in Phase I, would become a primary focus for the sake of program efficacy. As such, PGW would propose to convene a working group of industry professionals and key stakeholders to identify the feasibility and implementation strategy for an on-bill repayment mechanism to support the Home Rebates program in the Expanded Phase II scenario.

Overview of Key Plan Attributes

Cost-Effectiveness, Energy Savings, and other Benefits

The Proposed Program natural gas energy efficiency programs in Phase II are expected to provide present value of net total resource benefits of $10.8 million (2014$), while the gas energy system test estimates present value of net benefits of $12.8 million (2014$). Table 1 summarizes these values.

TABLE 1. PHASE II PROPOSED PROGRAM PORTFOLIO COST-EFFECTIVENESS[2]

PV (2014$)	Total Resource Cost Test	Gas Energy System Test
Benefits	$36,680,148	$32,301,484
Costs	$25,896,467	$19,545,142
Net Benefits	**$10,783,681**	**$12,756,342**
BCR	1.42	1.65

The main benefits from Phase II are captured as reductions in natural gas usage, but there are significant other energy and non-energy benefits to PGW customers and society, as summarized in Table 2.

[2] PGW's cost-effectiveness test methodology and assumptions are discussed in-detail in section **Error! Reference source not found.** and **Error! Reference source not found.** (respectively). The figures shown here represent an updated avoided cost methodology. TRC Net Benefits and BCR utilizing the Phase I avoided costs methodology would be $4,964,619 and 1.19 respectively.

TABLE 2. PHASE II PROPOSED PROGRAM ENERGY SAVINGS AND OTHER BENEFITS

Metric	Total Lifetime
Gas Savings (MMBtu)	**4,389,925**
Electric Energy (MWh)	35,760
Electric Capacity (kW)	286
Water (Gallons)	22,523,992
CO2 Emission Reductions (Short Tons)	256,196
Jobs Created	131 - 218

Proposed Program Budgets

The natural gas energy efficiency programs in the EnergySense portfolio are proposed with a total nominal cost of $22.7 million over five-years. Spending starts at $4.5 million in FY 2016 and stays relatively steady until FY 2020. PGW's CRP Home Comfort program (rebranded from the Enhanced Low Income Retrofit Program in Phase I) has funding levels reduced and is designed to remain static in nominal terms, excluding evaluation costs. Due to pressure from unrecovered costs, the Home Rebates program is phased out in FY 2016 in favor of maintaining lost opportunity programs, which target equipment at the time of replacement or new construction as opposed to retrofitting existing equipment and thermal envelopes. Participation and budgets in the other four programs are projected to remain flat.

TABLE 3. PHASE II PROGRAM BUDGETS (NOMINAL THOUSANDS)

PROGRAM	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	TOTAL
CRP Home Comfort	$2,000	$2,075	$2,000	$2,080	$2,000	$10,155
Residential Equipment Rebates	777	727	782	727	787	3,800
Efficient Building Grants	284	395	366	488	451	1,986
Commercial Equipment Rebates	314	393	322	406	329	1,762
Efficient Construction Grants	181	232	182	242	182	1,019
Home Rebates	163	50	-	-	-	213
Portfolio-wide Costs	790	708	735	762	789	3,784
TOTAL PORTFOLIO	**$4,509**	**$4,580**	**$4,387**	**$4,705**	**$4,538**	**$22,719**

Efficient Fuel Switching Program Budgets and Impacts

Over the five-years of Phase II, the new fuel-switching program is expected to provide $6.17 million in present value of total resource benefits, at a cost of $5.3 million in present value of total resource costs and a $2.3 million (nominal) program budget. This translates to a present value of $4.1 million net total resource benefits (all in 2014$), with a BCR of 1.77.

TABLE 4. SUMMARY OF EFFICIENT FUEL SWITCHING PROGRAM COSTS AND IMPACTS

Metric	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	Total
Program Budgets (Nominal 000s)	$114	$244	$434	$620	$879	$2,291
Projects	7	18	35	52	67	179
Net Primary Energy Savings (MMBtu)	1,297	3,992	7,885	12,576	16,867	42,618
Net CO2 Emission Reductions (Tons)	161	495	978	1,560	2,092	5,285

Net Financial Impacts for Customers

The following tables provide a picture the net financial impacts to PGW's customers, including both the conservation programs and the Efficient Fuel Switching Program.

TABLE 5. NET FINANCIAL IMPACTS ON CUSTOMERS

PV in 2014$	Proposed Scenario
Conservation Programs	$10,783,681
TRC Benefits	$36,680,148
Delivery Charge Savings	$2,288,386
TRC Costs	$(25,896,467)
CAM Recovery	$(2,288,386)
Performance Incentive @ 100%	$(1,411,973)
Efficient Fuel Switching Program[3]	$856,829
TRC Benefits	$6,170,496
TRC Costs	$(5,313,668)
Net Financial Benefits to Customers	**$11,640,510**

Another important financial impact that is derived from the Phase II conservation programs is the net impact on the CRP subsidy, shown in Table 6, which affects non-participating ratepayers as well as participants in any programs.

TABLE 6. NET CRP SUBSIDY TO RATEPAYERS

PV in 2014$	Proposed Scenario
Gas Benefits	$8,895,077
Reduced Distribution Costs	$642,173
CAM Recovery	$(642,173)
Program Costs	$(7,484,999)
CRP Subsidy Reduction	**$1,410,078**

[3] Financial benefits for the Efficient Fuel Switching Program do not include net customer bill savings beyond avoided costs for natural gas and electricity, which would increase the net financial impacts to customers.

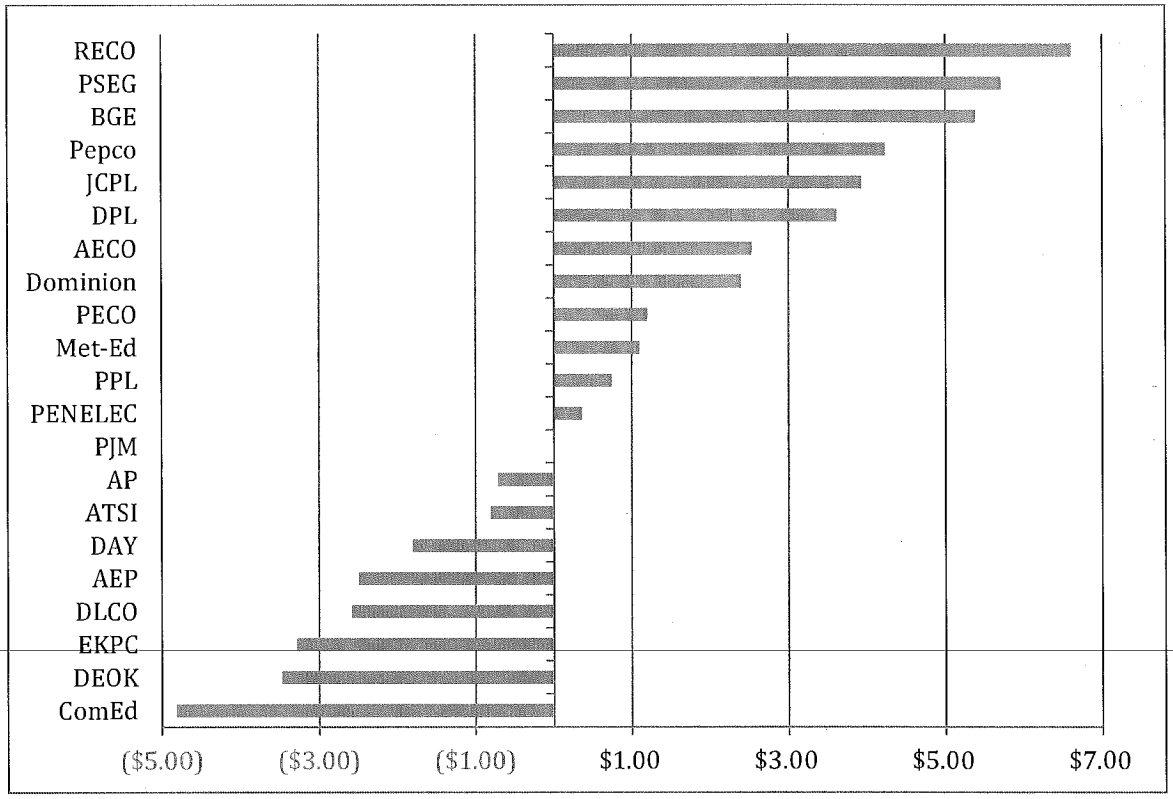
1. Plan Background

1.1. Natural Gas in the Region

Natural gas has many important advantages as an end-use fuel source. When compared to the use of electricity generated from natural gas or most other fuels, the direct end use of natural gas is more efficient and environmentally preferable.

In the 2013 PJM real-time market (the wholesale electricity regional transmission organization that serves Pennsylvania), natural gas fueled 32.4 percent of the marginal resources throughout PJM, 27.6 percent of the load-weighted real-time price was the result of gas costs, gas was the only fuel at the margin 21.4 percent of the time, and gas was at the margin in parts of PJM another 24.7 percent.[4] As illustrated by the price differentials in Figure 1, Philadelphia is east of the major transmission constraints and is on the gas side of the supply divide in many hours when different parts of PJM are supplied by different fuels on the marginal.

FIGURE 1. DIFFERENCE FROM PJM AVERAGE DAY-AHEAD PRICE



[4] 2013 State of the Market Report for PJM, Monitoring Analytics, Inc., pp. 58, 60, 65.

The PJM energy mix will tend to rely more on gas at the margin as many thousands of megawatts of PJM coal plants are expected to retire in the next several years.[5]

Turning natural gas into electricity at conventional power plants has an efficiency of roughly 30 percent for older combustion turbines, to about 35 percent for new combustion turbines and efficient steam plants, to nearly 50 percent for recent combined-cycle plants. The PJM analysis of the cost of new entry estimated a heat rate of about 10,300 Btu/kWh (33.1%) for new combustion turbines and 6,800–7,040 Btu/kWh (48.5%–50.2%), depending on location and operation.[6] Actual heat rates for operating plants will be higher, even for new units, when they cycle on and off and run at partial output to follow load. An analysis of some thirty combined-cycle plants in PJM found only one operated in the 6,800–7,040 Btu/kWh range.[7]

The 2013 heat rates for coal plants in PJM and adjacent areas (including Indiana and Illinois, but excluding Michigan and Kentucky) ranged from 9,100 Btu/kWh (37.5%) to 15,700 Btu/kWh (21.7%), with an output-weighted average of 10,270 Btu/kWh (33.2%).[8] A similar analysis for the half-dozen gas-fired steam plants indicates an average heat rate of 12,800 (26.6% efficiency), ranging from 12,100 Btu/kWh (28.3%) to over 28,500 Btu/kWh (11.9%). For combustion turbines, the range in heat rates was from 9,950 Btu /kWh to over 20,000 Btu/kWh, with an average heat rate of 11,760 Btu/kWh (29%). The engineering firm ABB reports "In a traditional coal plant, for example, only about 30-35% of the energy in the coal ends up as electricity on the other end of the generator."[9]

In contrast, the direct use of gas for space heating with modern equipment is about 94 percent efficient, as is water heating from combined boilers, while new free-standing storage water heaters are roughly 67 percent efficient. [10] For the same delivered energy, using gas at the end use consumes 50 percent–70 percent less gas and emits proportionately less carbon than natural-gas-fired electricity, as shown in

[5] Projected 2016–2020 Existing Generating Unit Retirements Under EPA 111(d) Proposal, Southern States Energy Board, www.sseb.org/wp-content/uploads/2010/05/Retirements-under-111d-8_14.pdf.

[6] Cost of New Entry Estimates for Combustion Turbine and Combined Cycle Plants in PJM with June 1, 2018 Online Date, Samuel A. Newell, J. Michael Hagerty, Kathleen Spees, Johannes P. Pfeifenberger, Quincy Liao, Christopher D. Ungate and John Wroble, May 15, 2014.

[7] Review based on data from EIA Form 923 data base for 2013, for the Reliability First region, other than Michigan and Wisconsin. Since Indiana and Illinois are split between PJM and MISO, this analysis includes all the Indiana and Illinois units.

[8] Data from EIA Form 923 data base for 2013.

[9] Energy Efficiency in the Power Grid, ABB Inc., https://www.nema.org/Products/Documents/TDEnergyEff.pdf.

[10] Natural gas storage water heaters must be at least 67% efficient to earn the Energy Star label (http://www.energystar.gov/index.cfm?c=water_heat.pr_crit_water_heaters).

TABLE 7, below.[11]

Line losses from electricity usage are another factor in favor of natural gas. Losses in the transmission and distribution system reduce delivered electrical efficiency further, to the 29 percent–40 percent range. Pushing additional electricity through existing lines increases line loses in absolute and percentage terms. A 10 percent increase in power flow increases losses in the wires by about 21 percent. In contrast, gas losses tend to be independent of throughput, so choosing gas over electricity reduces electric line losses without increasing gas losses. [12] PGW's current Retainage Rate percentage is 2.7 percent and the current Unaccounted for Gas percentage is 0.49 percent.[13]

End-use natural gas compares even better against coal-fired electricity, which operates at an efficiency of about 28 percent–38 percent at the plant exit, or roughly 24 percent–35 percent at the customer's meter. Coal also

- produces nearly twice the carbon emissions per MMBtu of heat input than does a gas-fired power plant, or roughly five times the carbon emissions of gas to deliver the same useful energy at the end use, as shown in

[11] Natural gas consumed in combined heat and power (CHP) applications is even more efficient than direct heating use, since local heating load can be met with the waste heat from the CHP unit, while the unit also produces electricity near the end use, avoiding line losses and delivery costs.
[12] For a more detailed discussion of line losses, see Valuing the Contribution of Energy Efficiency to Avoided Marginal Line Losses and Reserve Requirements, Jim Lazar and Xavier Baldwin, Regulatory Assistance Project, August 2011.
[13] Philadelphia Gas Works Gas Service Tariff, at 13, December 1, 2014; PGW September 30, 2014 UFG Report filed pursuant to 52 Pa. Code §59.11(c)(2).

- TABLE 7;
- produces air emissions of sulfur oxides, fine particulates, mercury and other air toxics;[14]
- leaves behind fly ash and bottom ash, which pose complex problems of toxic run-off and releases;[15]
- requires large amounts of water for cooling, some of which is evaporated and becomes unavailable for other uses, and damages marine life by entraining organisms in the cooling water, impinging them on trash screens, and raising the temperature of the rivers and lakes to which the water is returned.[16]

[14] AP 42, Fifth Edition, Volume I, US EPA, Section 1.1, Bituminous and Subbituminous Coal Combustion, Supplement E, September 1998, www.epa.gov/ttn/chief/ap42/ch01/final/c01s01.pdf
[15] "The constituents of most environmental concern in CCR are metals, such as antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, nickel, selenium, silver and thallium." Disposal of Coal Combustion Residuals from Electric Utilities Final Rule, US EPA, December 19, 2014.
[16] water.epa.gov/lawsregs/lawsguidance/cwa/316b/; water.usgs.gov/edu/wupt.html; iopscience.iop.org/1748-9326/7/4/045802/article

TABLE 7 summarizes the delivered efficiency of energy and the resulting carbon emissions per MMBtu of useful energy at the end use.

TABLE 7. ENERGY EFFICIENCY AT END USE AND CARBON EMISSIONS BY SUPPLY SOURCE PER-100 UNITS OF ENERGY[17]

Fuel Usage	End-Use Efficiency		Gas	Gas Used in Electric Generation			Coal
	Electric Resistance	Gas	Direct Use	Combined Cycle	CT or Steam	CHP	Steam Electric
Energy Units at Supply			100	100	100	100	100
Generation Efficiency				47%	34%	35%	34%
Energy at Busbar				47	34	35	34
Marginal Line Losses				15%	15%	3%	15%
Energy at Customer							
Electricity				40	29	34	29
Gas			100				
Heat						50	
End Use Efficiency			**Units of Energy From End Use**				
Space Heating High Eff.	100%	97%	97	40	29	84	29
Water Heating High Eff.	95%	95%	95	38	28	82	27
CO2 Emissions/MMBtu at Supply			117	117	117	117	206
CO2 Emissions/MMBtu Delivered							
Space Heating High Eff.			121	290	403	139	717
Water Heating High Eff.			123	306	425	142	754

When compared to heating oil, natural gas is a clear improvement in several ways. Natural gas is currently much less expensive than heating oil, so replacing oil use in buildings with gas will reduce customers' bills and the burden on the Pennsylvania economy. Gas also burns much cleaner than oil, in terms of emissions of NOx, particulates, sulfur, and carbon. Heating oil produces about 50 percent more carbon per MMBtu than gas; end-use gas combustion produces almost zero emissions of particulates, air toxics and sulfur oxides.[18]

Natural gas usage also provides benefits for the energy infrastructure in the United States. The crude oil from which home-heating oil is refined comes mostly from the Gulf Coast,

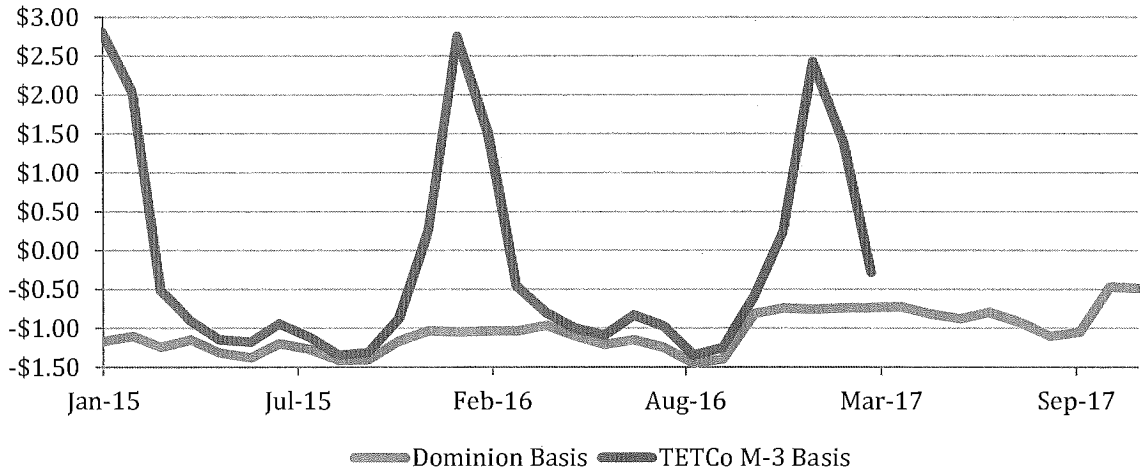
[17] SOURCES: Market Transformation Efforts for Water Heating Efficiency, Jacob Talbot, ACEEE Report Number A121, January 2012;
Generator efficiencies typical for new combined-cycle and combustion turbine, existing steam from Electric Power Annual, 2013, Table 8.2.;
Marginal line losses typical for generation to end use, equivalent to 7.5% average line losses.
Market Transformation Efforts for Water Heating Efficiency, Jacob Talbot, ACEEE Report Number A121, January 2012.
Furnaces and Boilers: energy.gov/energysaver/articles/furnaces-and-boilers
Combined Heat and Power and Clean Distributed Energy Policies, ACEEE, August 2009: www.aceee.org/files/pdf/fact-sheet/chp_policyposition0809.pdf
Emission rates: www.eia.gov/tools/faqs/faq.cfm?id=73&t=11

[18] www.epa.gov/ttnchie1/ap42/.

North Dakota, western Canada, and imports.[19] The US is a net oil importer, so reducing oil consumption reduces US dependence on oil imports, and contributes to reducing world oil price, which has historically depressed economic activity in the consuming countries.[20]

The natural gas that PGW delivers, whatever its nominal source, physically flows from the Appalachian region of western Pennsylvania and adjacent areas. In 2013, Pennsylvania's marketed gas production of 3,259,042 million ft^3 was over three times the 1,090,866 ft^3 natural gas than it consumed.[21] As shown in Figure 2, the Dominion Hub near Pittsburgh is consistently lower than the price at the Henry Hub in the Louisiana producing areas (i.e., the Dominion basis is negative), and the price in the Texas Eastern M-3 zone is consistently higher than the Appalachian price. These price relationships along the major pipeline routes to the Northeast imply that gas is flowing from Appalachia to the Gulf Coast and to the mid-Atlantic (including Philadelphia and all of eastern PJM).[22]

FIGURE 2. NATURAL GAS BASIS FROM HENRY HUB[23]



Using gas at the end-use level, rather than gas-fired electricity, reduces the demand on the sometimes overstretched gas pipelines from the Appalachians into the Philadelphia area and on into the Northeast.

[19] EIA 2013 Crude Oil Production: http://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbbl_m.htm
EIA 2013 US Imports by Country of Origin:
http://www.eia.gov/dnav/pet/pet_move_impcus_a2_nus_ep00_im0_mbbl_m.htm

[20] For world oil flows, see BP Statistical Review of World Energy, June 2014, bp.com/statisticalreview, pp. 11, 13, 18, 19. For a discussion of the effects of demand on oil prices, and the economic effects of oil prices, see www.iea.org/oilmarketreport/omrpublic/currentreport/#Overview

[21] EIA 2013 Forms 914 and 923

[22] For a discussion of the flows from Appalachia, see www.eia.gov/todayinenergy/detail.cfm?id=18391.

[23] Source: NYMEX Forwards, 11 December 2014.

The natural gas industry is also expected to provide other benefits to the economy in Pennsylvania. According to a Penn State review comparing the Pennsylvania natural gas development to similar activities in Texas, Pennsylvania can expect to benefit through three economic and employment activities from natural gas, exploration and extraction, leasing and royalties, and pipeline infrastructure development.[24]

Natural gas prices remain at historically low levels; however the up-front costs of installing natural gas equipment are often higher than for other fuels. High efficiency equipment adds even more to the incremental cost difference between natural gas equipment and alternatives powered by other fuels. DSM programs play an important part in making high-efficiency natural-gas equipment more accessible to cost-conscience developers and building owners seeking to make the transition to the cleaner, cheaper fuel source. Efficient use of gas stretches out the supply of low-cost gas, to provide a long-term low-emission energy source as carbon emissions are gradually reduced over the remainder of this century.

1.2. Growth in Energy Efficiency

Natural gas energy-efficiency programs have shown steady increases for many years. The ACEEE State Energy Scorecard shows that spending on natural gas energy-efficiency programs has grown both nationally and in the states surrounding Pennsylvania. Nationally the spending on natural gas energy-efficiency programs has grown from $0.6 billion per year in 2008 to $1.4 billion per year in 2013. [25]

IN STATES SURROUNDING PENNSYLVANIA THE TREND IN INCREASED NATURAL GAS ENERGY-EFFICIENCY SPENDING IS THE SAME, WITH NEW YORK INCREASING FROM $42.9 MILLION PER YEAR IN 2009 TO $174.9 MILLION PER YEAR IN 2013; MARYLAND INCREASING FROM $0.1 MILLION PER YEAR IN 2009 TO $15 MILLION PER YEAR IN 2013; DELAWARE INCREASING FROM $0 PER YEAR IN 2009 TO $0.8 MILLION PER YEAR IN 2013; MICHIGAN INCREASING FROM $30.8 MILLION PER YEAR IN 2009 TO $83.8 MILLION PER YEAR IN 2013; AND NEW JERSEY INCREASING FROM $57.7 MILLION PER YEAR IN 2009 TO $66.83 MILLION PER YEAR IN 2013. [26,27]

Figure 3 shows on a U.S. map where gas DSM programs are either active or planned in 2011. Since PGW's initial five-year filing in 2008, the number of active natural gas efficiency programs in the United States has grown from 61 active and 11 planned across 32 states and Canada, to 134 active programs across 39 states and Canada.

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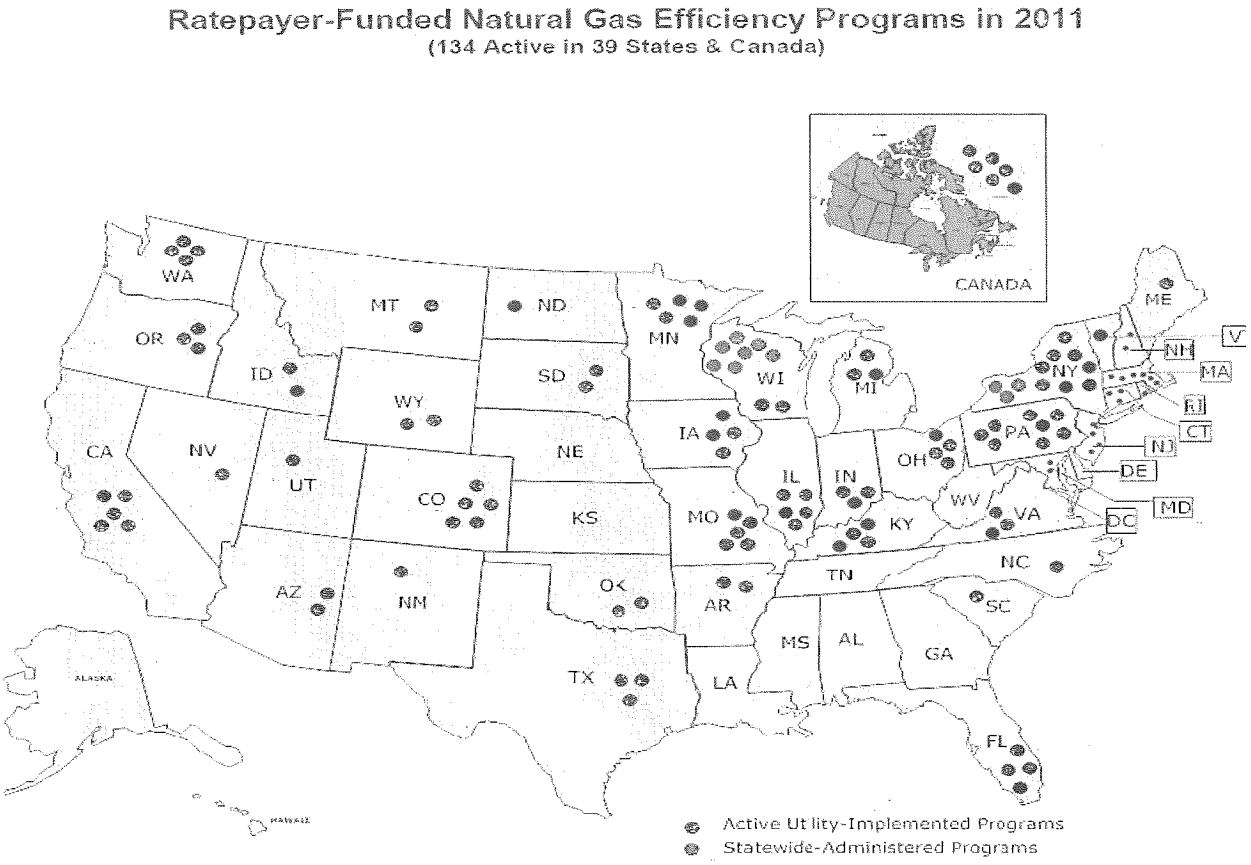
[24] Source: Penn State Extension. http://extension.psu.edu/natural-resources/natural-gas/issues/economic.

[25] ACEEE (American Council for an Energy-Efficient Economy), *The 2014 State Energy Efficiency Scorecard*, Annie Gilleo, et al, October 2014, p. 19.

[26] For 2013 state spending: ACEEE (American Council for an Energy-Efficient Economy), *The 2014 State Energy Efficiency Scorecard*, Annie Gilleo, et al, October 2014, p. 30.

[27] For 2009 state spending: ACEEE (American Council for an Energy-Efficient Economy), *The 2010 State Energy Efficiency Scorecard*, Maggie Molina, et al, October 2010, p. 13.

FIGURE 3. MAP OF GAS EFFICIENCY PROGRAMS IN THE UNITED STATES AND CANADA[28]



1.3. Original PGW DSM Five-Year Plan Filing and Framework

PGW submitted its original "Five-Year Gas Demand-Side Management Plan" ("Phase I Plan") to the Pennsylvania Public Utility Commission (the "PUC" or "Commission") on December 18, 2009. This plan was modified from an earlier PGW filing in order to comply with a Joint Petition for Settlement ("Settlement") submitted to the PUC on May 12, 2010, and approved by the Commission by order entered on July 29, 2010 at Docket Nos. P-2009-2097639 and R-2009-2139884. The Phase I Plan provided high-level designs for six programs, including estimated costs, savings, and cost-effectiveness, as well as a framework for implementation and management of the programs. Since the filing and approval of the Phase I Plan, PGW has continued to provide updates to its portfolio of energy efficiency programs in the form of annual implementation plans and annual reports.

[28] American Gas Association. "Natural Gas Efficiency Programs Report 2011 Program Year." 2012.

1.4. Implementation Plans

PGW has filed five implementation plans since the approval of the Phase I Plan. Each implementation plan provides detailed plans for programs in the coming fiscal year as well as updated information on activity to date. The implementation plan filings were timed to be four months prior to the start of a program year, in order to give notification for changes for the upcoming fiscal year to allow time for comments from parties and provide data on latest available activities to date.

The First Year Implementation Plan: FY 2011 ("FY 2011 IP") was filed in September of 2010 and provided the details requested by the Commission and other parties in the Settlement for the initial rollout and ramp up of PGW's portfolio of gas efficiency programs. The FY 2011 IP consolidated the portfolio to six programs and focused initial efforts on the expansion of PGW's existing Conservation Work Program ("CWP") into the Enhanced Low Income Retrofit Program ("ELIRP")[29], which offered deeper savings through more comprehensive projects to participants in PGW's Customer Responsibility Program ("CRP"). In addition to ELIRP, PGW provided plans to offer incentives for residential-sized heating equipment through its Residential Equipment Rebate Program.[30]

The Second Year Implementation Plan: Fiscal Year 2012 ("FY 2012 IP") was filed in April of 2011. The FY 2012 IP detailed the launch of the Efficient Building Grants program, which offers technical assistance and incentives for commercial and industrial gas energy efficiency projects.[31] The FY 2012 IP also provided details on activity in FY 2011 and the PGW's plans for the continuous improvement and ramp up of the existing programs and portfolio, now rebranded as "EnergySense" conservation.

The Third Year Implementation Plan: Fiscal Year 2013 ("FY 2013 IP") was filed in May of 2012. In addition to providing updates on activity through February 2012, the FY 2013 IP included the detailed plans for the final three programs in the EnergySense Portfolio: the Commercial Equipment Rebate Program[32], offering prescriptive incentives for high efficiency commercial sized gas equipment; the Efficient Construction Grants, offering incentives for going beyond code in construction of new buildings[33]; and the Home Rebates program, providing whole home retrofit incentives to the non-low income residential market.[34]

The Fourth Year Implementation Plan: Fiscal Year 2014 ("FY 2014 IP"), filed in May of 2013, and, most recently the "Fifth Year Implementation Plan: Fiscal Year 2015" (FY 2015 IP), filed in May of 2014, included detailed updates of activity through February of the given year and planned improvements to programs and the EnergySense portfolio. In these two

[29] As described later, this low income weatherization program will be renamed CRP Home Comfort program in DSM Phase II
[30] Originally called the Premium Efficiency Heating Equipment Program ("PEHEP")
[31] Originally called the Commercial and Industrial Retrofit Incentive Program ("CIRI")
[32] Originally called the Commercial and Industrial Equipment Rebates ("CIER") program
[33] Originally called the High Efficiency Construction Incentives ("HECI") program
[34] Originally called the Comprehensive Residential Retrofit Incentives ("CRRI") program

filings no new programs were added, but existing programs continued to be expanded, refined, and improved.

1.5. Annual Reports

In order to provide a regular accounting of program activity to the Stakeholders, PGW offered in the FY 2011 IP to provide an annual report four months after the close of each fiscal year. Since 2010, the Company has provided three such annual reports. The first report, titled EnergySense Program Annual Report: FY 2011 Results ("FY 2011 Annual Report"), was provided in January of 2012, and a subsequent report covering FY 2012 results was provided in January of 2013, while the latest of such reports was provided in January of 2014, and covered FY 2013 results. Remaining filings for the DSM Phase I period include the FY 2014 Annual Report in January, 2015 and the FY 2015 Annual Report in January, 2016.

1.6. Phase I Activity and Comparable Results

1.6.1. Results from FY 2011 – Date

In its first four years of implementation, PGW launched five market rate DSM programs and an expanded low-income usage reduction program. From inception through June 30, 2014 the EnergySense portfolio delivered $4.9 million in Total Resource Cost Net Benefits to customers (2009$), achieving a Benefit-Cost Ratio of 1.19 and providing support through 7,136 residential building retrofits, 1,643 equipment rebates, and 27 commercial projects. The impacts by sector and program are detailed in Table 8.

TABLE 8. PHASE I EXPENDITURES AND NET BENEFITS THROUGH JUNE 2014 (2009$)[35]

Program	Inception through June 30, 2014				Percent Of Total	
	PV of Benefits	PV of Costs	PV of Net Benefits	BCR	PV of Benefits	PV of Costs
ELIRP	$24,539,559	$19,527,733	$5,011,826	1.26	79%	74%
Residential Equipment Rebates	$4,453,987	$2,625,679	$1,828,309	1.70	14%	10%
Home Rebates	$600,248	$883,755	$(283,508)	0.68	2%	3%
Efficient Construction Grants	$200,413	$168,711	$31,703	1.19	1%	1%
Residential Total	**$29,794,207**	**$23,205,877**	**$6,588,330**	**1.28**	**95%**	**88%**
Efficient Building Grants	$691,713	$529,753	$161,960	1.31	2%	2%
Commercial Equipment Rebates	$755,535	$245,738	$509,797	3.07	2%	1%
Non-residential Total	**$1,447,247**	**$775,491**	**$671,756**	**1.87**	**5%**	**3%**
Portfolio-wide Costs	$-	$2,321,799	$(2,321,799)	-	0%	9%
PORTFOLIO TOTAL	**$31,241,454**	**$26,303,167**	**$4,938,287**	**1.19**	**100%**	**100%**

1.6.2. Comparison with PGW Results to Date and Other Jurisdictions

As shown earlier in this plan, PGW's DSM investment portfolio is not unique; it follows in the footsteps of leading gas DSM program administrators around the U.S. and Canada. Table 9 shows costs and savings by sector for the first three and three-quarter years of PGW's

[35] Throughout this report, PGW's Phase I activity figures use the "Low AC" avoided cost scenario consistent with Phase I activity reporting to-date. For more on the avoided cost assumptions, see section 2.2.3.1.

five-year portfolio. These values are accompanied by the cost per annual MMBtu and savings percentage, key ways to compare unit costs and savings depth between portfolios.

TABLE 9. PGW'S HISTORICAL PERFORMANCE BY SECTOR

Year	Spending (Nominal $M)	Installed Savings (Annual BBtu)	Savings as a Percent of Sales	$ / Annual MMBtu
		Residential		
2011	$3.09	33.35	0.09%	$92.75
2012	$7.06	50.68	0.17%	$139.30
2013	$9.33	82.22	0.28%	$113.54
2014*	$8.53	82.13	0.28%	$103.88
		Non-residential		
2011	$-	0.00	0.00%	$-
2012	$0.06	0.00	0.00%	$-
2013	$0.37	7.07	0.03%	$51.93
2014*	$0.20	4.46	0.02%	$45.75
		Total		
2011	$3.09	33.35	0.06%	$92.75
2012	$7.12	50.68	0.10%	$140.43
2013	$9.70	89.29	0.17%	$108.66
2014*	$8.74	86.59	0.17%	$100.88

** Through June 2014*

PGW continued to ramp up its programs over the first three years of its portfolio. Residential Savings have nearly doubled each year, while costs per-annual MMBtu of savings have fallen from an initial spike in FY 2012 caused by program development and onboarding activities. The non-residential side has ramped up more slowly, but has started to gain traction in FY 2013 and continues to grow in FY 2014.

Table 10 and Table 11 show unit costs and savings depth for a number of leading gas portfolio administrators in neighboring states and around the country from 2011 through 2013. On the residential side, costs per annual MMBtu ranged from $28.21 to $128.99, putting PGW in the high-end of the range. This is primarily due the fact that the majority of residential sector spending is for CRP Home Comfort, which, by design, covers the entire cost of equipment installation and has higher unit costs. As additional market-rate programs gain traction, PGW expects residential unit costs to fall in Phase II. For savings depth in the residential market, other jurisdictions have achieved savings as a percentage of sales ranging from 0.01 percent to 1.35 percent, with averages at around 0.50 percent. PGW has continued to increase its savings depths and is climbing towards savings of 0.30 percent of sales in the residential sector.

On the non-residential side, PGW's costs are slightly larger than average costs for other jurisdictions at around $52 per annual MMBtu, and are declining as the programs achieve increased market uptake. Savings percentages on the non-residential side for other jurisdictions approximately followed residential savings averaging around 0.50 percent of sales. PGW's savings depth on the non-residential side is still small, but grew quickly as programs ramped up in FY 2014 and FY 2015.

TABLE 10. UNIT COST OF GAS SAVINGS FOR ESTABLISHED PROGRAMS ($ /ANNUAL MMBTU)

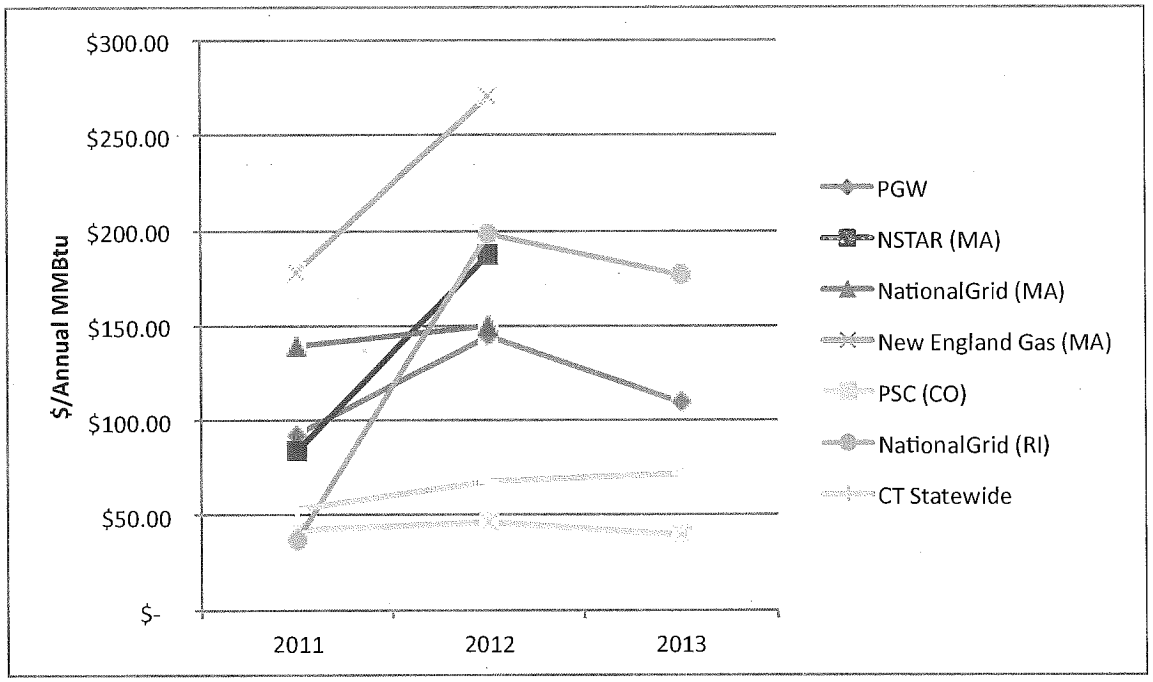
Administrator	Residential			Non-residential			Total		
	2011	2012	2013	2011	2012	2013	2011	2012	2013
Connecticut Statewide (CT)	$68.40	$65.86	$77.35	$24.99	$30.80	$33.81	$40.36	$45.41	$55.12
Consolidated Edison of New York (New York)	$44.63	$38.45		$50.47	$54.05		$48.64	$51.72	
National Grid (Massachusetts)	$62.59	$59.96		$43.51	$29.40		$58.58	$47.59	
National Grid (RI)	$100.02	$77.75	$97.27	$19.70	$34.89	$38.44	$37.13	$53.87	$62.35
New England Gas (Massachusetts)	$97.49	$88.91		$50.89	$51.41		$78.21	$74.65	
NSTAR (Massachusetts)	$81.64	$128.99		$27.59	$12.60		$58.58	$47.59	
Public Service Company of Colorado (CO)	$31.51	$32.65	$28.21	$54.42	$21.02	$15.26	$35.38	$28.88	$23.91
Public Service Electric and Gas (NJ)		$53.78			$286.34			$252.72	
South Jersey Gas (NJ)	$24.38			$55.95			$25.44		
Southern California Gas (California)	$35.65	$58.45		$18.52	$18.12		$24.53	$30.40	
Vermont Gas Systems, Inc. (Vermont)	$48.69	$54.12		$7.59	$16.44		$17.26	$30.83	
Mean	**$59.50**	**$65.89**	**$67.61**	**$35.36**	**$55.51**	**$29.17**	**$42.41**	**$66.37**	**$47.13**
Median	**$55.64**	**$59.21**	**$77.35**	**$35.55**	**$30.10**	**$33.81**	**$38.75**	**$47.59**	**$55.12**

TABLE 11. SAVINGS AS A PERCENTAGE OF SALES FOR ESTABLISHED PROGRAMS

Administrator	Residential			Non-residential			Total		
	2011	2012	2013	2011	2012	2013	2011	2012	2013
Connecticut Statewide (CT)	0.39%	0.38%	0.58%	0.45%	0.31%	0.36%	0.43%	0.34%	0.44%
Consolidated Edison of New York (New York)	0.27%	0.10%		0.74%	0.72%		0.48%	0.38%	
National Grid (Massachusetts)	0.90%	1.35%		0.77%	1.22%		0.61%	1.15%	
National Grid (RI)	0.16%	0.66%	0.82%	0.53%	0.74%	0.99%	0.35%	0.70%	0.91%
New England Gas (Massachusetts)	0.30%	0.40%		0.32%	0.37%		0.31%	0.39%	
NSTAR (Massachusetts)	0.71%	0.79%		0.52%	1.43%		0.61%	1.15%	
Public Service Company of Colorado (CO)	0.44%	0.36%	0.47%	0.10%	0.18%	0.25%	0.28%	0.27%	0.36%
Public Service Electric and Gas (NJ)		0.01%			0.07%			0.04%	
South Jersey Gas (NJ)	0.52%			0.02%			0.25%		
Southern California Gas (California)	0.28%	0.24%		0.34%	0.36%		0.31%	0.31%	
Vermont Gas Systems, Inc. (Vermont)	0.81%	0.78%		1.61%	0.76%		1.31%	0.77%	
Mean	**0.48%**	**0.51%**	**0.62%**	**0.54%**	**0.62%**	**0.53%**	**0.49%**	**0.55%**	**0.57%**
Median	**0.42%**	**0.39%**	**0.58%**	**0.49%**	**0.55%**	**0.36%**	**0.39%**	**0.39%**	**0.44%**

Since so much of PGW's Phase I portfolio spending was focused on ELIRP, it is important to compare implementation costs for this program to similar low-income programs. Figure 4 shows the cost per annual MMBtu for a subset of administrators for which low-income data was available and program design was similar. This shows that PGW is squarely in the middle of the pack, and had costs per-MMBtu of savings lower than four of the six administrators in 2012.

FIGURE 4. COMPARISON OF UNIT COSTS FOR LOW-INCOME PROGRAMS



1.6.2.1. Comparison of Administrative and Marketing Costs with Other Jurisdictions

An important benchmark when reviewing overall portfolio costs is the percentage of costs attributed to administrative and marketing expenses. PGW conducted a review of established natural gas DSM programs and identified six utility programs for comparison that listed administrative and marketing expenses separately in public filings, shown in Table 12. By comparison, PGW's FY 2013 expenditures included marketing costs that were 1 percent of total program spending, which was well below average among other utilities. During the same fiscal year, PGW's program administrative costs at 7 percent of total costs were average to comparable programs. These findings were a result of PGW's programs being new to market, compared with more established programs with longer market tenure. Now that PGW's core DSM programs are implemented, it plans to increase investments in marketing in order to meet participation goals. This will result in a higher marketing expenditure, though still below average.

During Phase II, PGW projects a slight increase in marketing expenses proportional to an increase in activity, and a relative decrease in administrative costs as the portfolio shifts from startup to a growth phase.

TABLE 12. UTILITY SPENDING ON ADMINISTRATIVE AND MARKETING COSTS (NOMINAL, IN MILLIONS)

Utility	Program Year	Total Utility Costs	Program Costs	Admin Costs		Marketing Costs	
				Cost	% of Total	Cost	% of Total
Centerpoint (MN)	2013	$23.11	$20.02	$0.98	4%	$2.16	9%
People's Gas (IL)	2012	$14.02	$13.32	$0.57	4%	$0.13	1%
Public Service	2011	$15.81	$12.24	$1.70	11%	$1.88	12%
Company (CO)	2012	$13.22	$11.28	$0.97	7%	$0.98	7%
North Shore Gas (IL)	2012	$2.48	$2.09	$0.37	15%	$0.02	1%
Southwest Gas (AZ)	2013	$5.20	$3.59	$0.72	14%	$0.77	15%
Xcel Energy (MN)	2012	$15.37	$13.86	$0.96	6%	$0.55	4%
Mean		**$12.74**	**$10.91**	**$0.89**	**7%**	**$0.93**	**7%**
Median		**$14.02**	**$12.24**	**$0.96**	**7%**	**$0.77**	**7%**
PGW	**FY 2013**	**$9.7**	**$8.88**	**$0.69**	**7%**	**$0.13**	**1%**

2. Phase II Five-Year Proposed Plan

2.1. Proposed Plan Scenario Overview

The Phase II Five-Year Plan Proposed Program describes the Proposed level of programmatic and portfolio activity that PGW plans to pursue in the next five-year period of its EnergySense portfolio. The scenario is presented as a continuation of PGW's existing natural gas efficiency programming, with budgets and programming reduced to alleviate the impact of currently unrecovered program costs on PGW's finances. The Proposed Program includes detailed descriptions of portfolio budgets and impacts, along with specifics on portfolio implementation, followed by detailed program plans. The following section presents a number of new components that PGW believes will enhance the EnergySense portfolio in the second phase of its existence.

Since it started in 2010, PGW's Demand-side Management (DSM) Portfolio has been implemented to achieve three broad goals:

- Cost-effectively reduce customer bills
- Maximize customer value
- Reduce harmful Greenhouse Gas Emissions

PGW intends to continue its commitment to this mission in the next five-years. In doing so, PGW plans a continuation of the following five DSM programs:

1. The current ELIRP program, rebranded as CRP Home Comfort, providing weatherization treatments to the highest usage customers in PGW's customer assistance program, the Customer Responsibility Program ("CRP");
2. Residential Equipment Rebates program, providing prescriptive heating equipment rebates targeting the end of life replacement market for residential and commercial customers;
3. Commercial Equipment Rebates program providing prescriptive heating and cooking equipment rebates targeting the end of life replacement market[36] for commercial and industrial customers;
4. Efficient Building Grants program providing comprehensive project grants for existing commercial and multifamily buildings; and
5. Efficient Construction Grants program providing comprehensive project grants for new and gut rehabilitated commercial and multifamily buildings, and single family homes.

This scenario involves winding down and eventually eliminating the sixth current EnergySense program, Home Rebates. This decision was made for two reasons. First, in accordance with DSM best practices in program design, PGW has focused the much of its Phase II program activity on end of life replacement measures in order to influence equipment purchase and facility design decisions already taking place, which would otherwise become missed opportunities. As a retrofit program, Home Rebates savings opportunities can be deferred because there is no immediate necessity to replace the

[36] The end of life replacement market consists of customers replacing equipment that has become inoperable, or has otherwise reached the end of its serviceable life.

equipment or upgrade the home. Second, this program requires larger overhead costs, as compared to the other EnergySense programs, and therefore requires greater program scale to achieve cost-effectiveness. As such, it is more problematic to reduce funding for this program while protecting program viability. Given PGW's concerns regarding recovery for all program costs incurred, the primary Phase II Extension proposal involves winding down and eliminating this program in the first year of the new 5-year period. However, as described below, given appropriate cost recoveries, PGW could reincorporate the Home Rebates program.

2.1.1. Summary of Budgets and Impacts

This report provides projections for the five-year period after EnergySense's current approval period ends in Fiscal Year 2015 ("FY 2015").[37] This five-year Phase II period covers PGW's FY 2016 through FY 2020, starting September 1, 2015 and ending August 31, 2020, with rolling extension terms thereafter and an opportunity for parties to propose a termination on an anniversary date by filing 180 days in advance.

Unless stated otherwise, cost-effectiveness results are indicated as present values calculated at a real discount rate of 2.92 percent, expressed in 2014 dollars. All budget and spending amounts are stated in nominal (current-year) dollars. Gas savings are stated in millions of British Thermal Units ("MMBtu") and billions of British Thermal units ("BBtu"), both annually and over the expected lifetimes of efficiency measures installed as a result of program activity. Levelized costs of gas savings and avoided gas costs and prices are stated in constant 2014 dollars.

In the Proposed Program for Phase II, PGW expects to spend approximately $22.7 million on five programs. The programs are projected to save a total 227 BBtu per-year of natural gas by the end of the first five-years of the Phase II portfolio, and 4,389 BBtu of natural gas over the lifetime of the measures installed. PGW's primary screen of portfolio performance is the Total Resource Cost (TRC) test, which considers all resources impacted by the energy efficiency investments. From this perspective, the present value of benefits, in 2014 dollars, is $36.7 million yielding net benefits of $10.8 million and $1.42 in benefits for every $1 dollar spent. The secondary cost effectiveness screening test that PGW uses is the Natural Gas Administrator test, which considers only the natural gas savings and costs of the energy efficiency investments. From this perspective the present value of benefits, in 2014 dollars, is expected to be $32.3 million leading to a present value of net benefits of $12.8 million and a benefit-cost ratio ("BCR") of 1.65. The results of both cost-effectiveness tests show that the DSM Portfolio is cost-effective.[38]

In addition to gas savings, PGW anticipates additional environmental and other impacts for Phase II including:

- Reduction of 35,760 MWh of electricity[39]

[37] PGW's Fiscal Year 2015 begins September 1, 2014 and runs through August 31, 2015
[38] See Section 2.2.3.2 for more information about the cost effectiveness screening protocols.
[39] Electric savings are ancillary resulting from direct gas saving measures, such as air-conditioning savings from insulation treatments.

- Avoiding 286 kW per year of summer peak demand
- Saving 22.5 million gallons of water per year
- Reducing the emissions of CO_2 by over 277 thousand tons per year
- Creating new jobs in Pennsylvania

2.1.2. Budget Details

PGW plans to decrease budgets for FY 2016 from the FY 2015 budget, based on the results of trending actuals to date and to reduce the impact of currently unrecovered program costs. The budgets were reduced beginning with the largest program and greatest contributor to the reduced delivery charges, the CRP Home Comfort program, while still continuing to exceed PGW's PUC Low Income Usage Reduction Program ("LIURP") regulatory requirements by a projected $2.48 million (nominal) over the five year period. Additional reductions were applied to the market rate programs while seeking to maintain a sustainable level of programming available to all customer classes.

PGW plans to reduce portfolio spending to $4.5 million in FY 2016 and generally maintain nominal budget levels as Home Rebates is phased out and other programs grow slightly. The portfolio budgets will be split with approximately 45 percent supporting CRP Home Comfort activities and 55 percent supporting market rate programs, which is a decrease in CRP Home Comfort portions from the nearly even budget split in the original Phase I design between the two customer segments. In general, the Phase II budgets are designed to maintain spending levels for market-rate programs currently being achieved, with some slight growth, with the exceptions being CRP Home Comfort and Home Rebates. CRP Home Comfort funding has been reduced to approximately $2 million per year. The Home Rebates program is scheduled to close by the end of FY 2016, with full administrative wrap up stretching into FY 2017. Both of these reductions are being put in place in order to reduce unrecovered costs from gas savings while still maintaining a LIURP that exceeds regulatory minimum requirements[40] and preserving programs that address lost opportunities.

Additionally, incentive spending within the individual programs depends in part on market conditions over which PGW has no control. As such, PGW reserves the flexibility to shift funding across the EnergySense conservation programs, including CRP Home Comfort, based on the programs' relative effectiveness and market reception, while maintaining overall portfolio budgets.

In FY 2016, PGW plans to spend $790,000 on total delivery costs, including Administration and Management, and Marketing and Business Development of all six DSM programs, or 17.5 percent of the portfolio's budget. This figure is the continuation of plans slated for FY 2015 to roll up individual program marketing and outreach activities to the portfolio-level, in order to streamline delivery and help leverage existing efforts. PGW is planning a marketing push for FY 2015 and FY 2016, and portfolio-wide costs are projected to stay the same or fall slightly in nominal terms over the remaining years in Phase II. By FY 2020,

[40] Based on PGW's August 19, 2014 Five-Year Forecast for the fiscal periods of 2016 – 2020, the regulatory minimum LIURP budget for the period is $7.67 million. Under the DSM Phase II proposal, PGW will exceed this amount by $2.49 million over the five year period.

portfolio-wide budget of $789 thousand represents 17.4 percent of the EnergySense portfolio

The next four tables show detailed budget projections at the portfolio level, including costs by spending category, as well as by program.

TABLE 13. PORTFOLIO BUDGETS BY CATEGORY (NOMINAL)

CATEGORY	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	TOTAL
Customer Incentives & Measure Installation Costs	$2,869,369	$2,814,150	$2,839,150	$2,861,350	$2,883,550	$14,267,569
Administration and Management	570,000	588,000	605,000	622,000	639,000	3,024,000
Marketing and Business Development	250,000	150,000	160,000	170,000	180,000	910,000
Contractor Costs	655,600	609,700	626,000	645,100	664,700	3,201,100
Inspection and Verification	114,300	97,650	101,800	106,750	111,000	531,500
Evaluation	50,000	320,000	55,000	300,000	60,000	785,000
TOTAL PORTFOLIO:	$4,509,268	$4,579,500	$4,386,950	$4,705,200	$4,538,250	$22,719,169

TABLE 14. PORTFOLIO BUDGETS BY CATEGORY (2014$)

CATEGORY	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	TOTAL
Customer Incentives & Measure Installation Costs	$2,776,214	$2,669,392	$2,640,300	$2,608,758	$2,577,476	$13,272,140
Administration and Management	551,519	557,779	562,653	567,120	571,196	2,810,268
Marketing and Business Development	241,894	142,291	148,801	155,001	160,900	848,887
Contractor Costs	634,314	578,333	582,152	588,149	594,143	2,977,091
Inspection and Verification	110,594	92,631	94,674	97,331	99,222	494,453
Evaluation	48,379	304,182	51,150	273,531	53,633	730,875
TOTAL PORTFOLIO:	$4,362,914	$4,344,607	$4,079,730	$4,289,890	$4,056,572	$21,133,713

TABLE 15. PORTFOLIO BUDGETS BY PROGRAM (NOMINAL)

PROGRAM	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	TOTAL
CRP Home Comfort[41]	$2,000,000	$2,075,000	$2,000,000	$2,080,000	$2,000,000	$10,155,000
Residential Equipment Rebates	777,000	727,000	782,000	727,000	787,000	3,800,000
Efficient Building Grants	284,200	394,850	366,300	488,550	451,600	1,985,500
Commercial Equipment Rebates	313,650	392,650	321,650	405,650	328,650	1,762,250
Efficient Construction Grants	181,000	232,000	182,000	242,000	182,000	1,019,000
Home Rebates	163,419	50,000	-	-	-	213,419
Portfolio-wide Costs	790,000	708,000	735,000	762,000	789,000	3,784,000
TOTAL PORTFOLIO	**$4,509,268**	**$4,579,500**	**$4,386,950**	**$4,705,200**	**$4,538,250**	**$22,719,169**

TABLE 16. PORTFOLIO BUDGETS BY PROGRAM, WITH PORTFOLIO-WIDE COSTS ALLOCATED TO PROGRAMS (NOMINAL)

PROGRAM	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	TOTAL
CRP Home Comfort	$2,424,526	$2,454,408	$2,400,376	$2,482,478	$2,420,869	$12,182,657
Residential Equipment Rebates	940,423	861,849	937,242	869,843	952,625	4,561,981
Efficient Building Grants	350,100	468,755	442,732	582,647	546,639	2,390,874
Commercial Equipment Rebates	381,993	463,360	387,309	482,645	397,814	2,113,121
Efficient Construction Grants	220,463	273,574	219,291	287,588	220,302	1,221,218
Home Rebates	191,764	57,555	-	-	-	249,319
TOTAL PORTFOLIO	**$4,509,268**	**$4,579,500**	**$4,386,950**	**$4,705,200**	**$4,538,250**	**$22,719,169**

[41] The nominal budget for CRP Home Comfort will remain flat over the five-year program horizon, excluding the addition of biennial third-party evaluation budgets.

2.1.3. Energy Savings

This section provides projections for natural gas and electricity savings at the portfolio level for Phase II activities. Incremental installed lifetime gas savings are projected to fall 3 percent between FY 2016 and FY 2020 due to the portfolio budget reductions discussed above, with 4,390 BBtu of natural gas savings projected over the lifetime of measures installed during Phase II.

TABLE 17. PROJECTED PORTFOLIO NATURAL GAS SAVINGS (MMBTU)

Fiscal Year	2016	2017	2018	2019	2020	2016 - 2020
Incremental Savings						
First Year	46,275	44,953	45,268	45,408	45,555	227,458
Lifetime	903,141	866,129	871,977	873,508	875,169	4,389,925
Cumulative Savings						
First Year	46,275	91,228	136,495	181,903	227,458	227,458
Lifetime	903,141	1,769,270	2,641,247	3,514,756	4,389,925	4,389,925

Incremental electric savings are projected to grow, rising 7 percent by FY 2020, with 1,627 MWh per year of annual savings accumulating in the final year of Phase II.

TABLE 18. PROJECTED PORTFOLIO ELECTRIC SAVINGS

Fiscal Year	2016	2017	2018	2019	2020	2016 - 2020
Energy Savings (kWh/yr.)						
Incremental	320,102	313,107	320,520	331,172	341,902	1,626,803
Cumulative	320,102	633,208	953,729	1,284,901	1,626,803	1,626,803
Summer Peak Demand (kW)						
Incremental	62	59	58	55	52	286
Cumulative	62	121	179	234	286	286

2.1.4. Other Resource Savings

Water savings are an important side ancillary benefit from many natural gas efficiency measures. PGW projects cumulative annual savings of water to reach 22.5 million gallons by FY 2020.

TABLE 19. PROJECTED WATER SAVINGS (MILLION GALLONS)

Fiscal Year	2016	2017	2018	2019	2020	2016 - 2020
Incremental Annual	4.2	4.4	4.5	4.7	4.8	22.5
Cumulative Annual	4.2	8.6	13.0	17.7	22.5	22.5

2.1.5. Emissions Reductions

The burning of natural gas and the generation of electricity have significant carbon emissions associated with them. PGW projects that the Proposed Program will avoid the emission of 278 thousand tons of CO_2 over the lifetime of installed measures. Table 20 shows portfolio-level emissions reductions from both natural gas and electric savings.

TABLE 20. CUMULATIVE ANNUAL CO2 EMISSION REDUCTIONS (SHORT TONS)

Calendar Year	2015	2016	2017	2018	2019	2020	Lifetime
Gas and Electric	**1,014**	**4,028**	**6,994**	**9,984**	**12,995**	**15,006**	**277,542**
Gas	900	3,575	6,204	8,849	11,502	13,269	256,196
Electric	114	453	790	1,135	1,493	1,736	21,346

2.1.6. Cost Effectiveness

This section provides cost-effectiveness projections for the Proposed Program under a few different cost-effectiveness tests. The main test used is the Total Resource Cost (TRC) test, and is the primary metric by which PGW judges the portfolio and is similar to the metric used by the electric industry under Act 129 of 2008. PGW also presents cost-effectiveness results from the gas and electric system perspective, also called the Gas Administrator Cost and the Electric Administrator Cost test.

For Phase II projections, PGW has used two sets of avoided costs.[42] The main avoided cost scenario ("Full Internal AC"), counts the benefits of demand reduction induced price effect ("DRIPE") along with internalized cost of carbon for both gas and electric avoided costs. Although an additional externalized cost of carbon to society can be quantified through the use of alternate avoided costs (see Appendix 6.1) PGW has determined that Full Internal AC is the most appropriate assumption to use for the Company's primary cost effectiveness tests and based on industry precedence.[43] Unless otherwise stated, the Full Internal AC is used for the TRC test, Gas and Electric Administrator Cost test, along with the rate and bill analysis.

The lowest avoided cost scenario ("Low AC") does not include DRIPE or carbon. While PGW has previously included an avoided cost scenario with the DRIPE and CO2 benefits as secondary assumptions in previous EnergySense portfolio plans and reports, the Low AC is comparable to the primary avoided cost scenario used by PGW in Phase I.

Figure 5 breaks down total net benefits between residential and non-residential sectors[44], while Figure 6 shows TRC BCRs by sector. It is important to note that the majority of TRC net benefits come from the non-residential sector, since the non-residential sector has a higher BCR. This is due to nearly half of the Phase II budget going to CRP Home Comfort, which targets comprehensive savings in low-income households that may have factors complicating the installations resulting in a lower BCR. PGW continues to invest resources in growing its commercial and industrial base to maximize portfolio net benefits, but non-residential projects often have long lead times and a market acceptance takes longer than for residential programs.

[42] See "Key Assumptions", Section 2.2.3.1, for further details

[43] Under a modified TRC test expanded to include the "Full External" avoided costs provide in Appendix 6.1, the Phase II Proposed Program will provide a present value of net benefits of $16.4 million, with a BCR of 1.63.

[44] The residential sector includes the CRP Home Comfort, Residential Equipment Rebates, HECI (residential) and CRRI programs. The non-residential sector includes the Efficient Building Grants, Commercial Equipment Rebates Program and HECI (non-residential) programs.

FIGURE 5. PRESENT VALUE OF TRC NET BENEFITS BY SECTOR

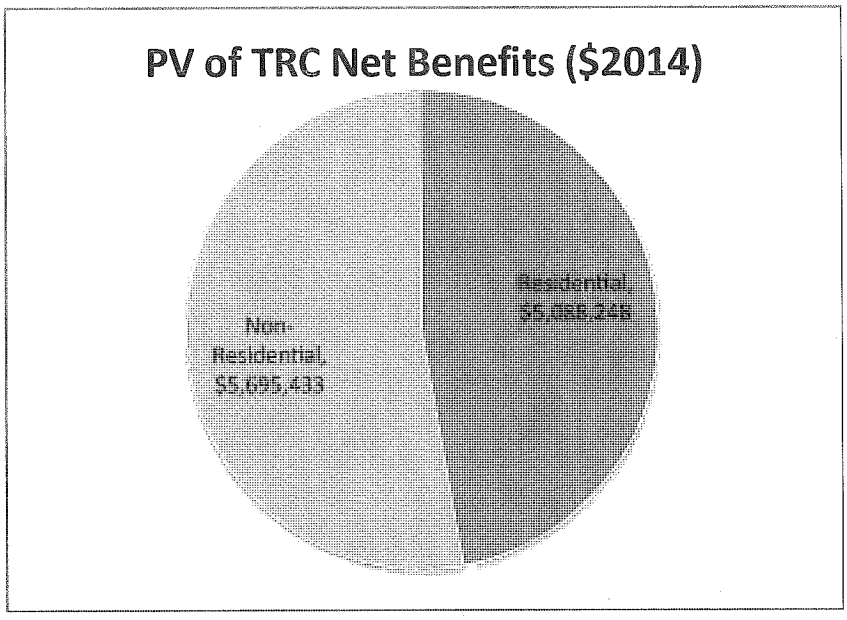


FIGURE 6. TRC BENEFIT-COST RATIO BY SECTOR

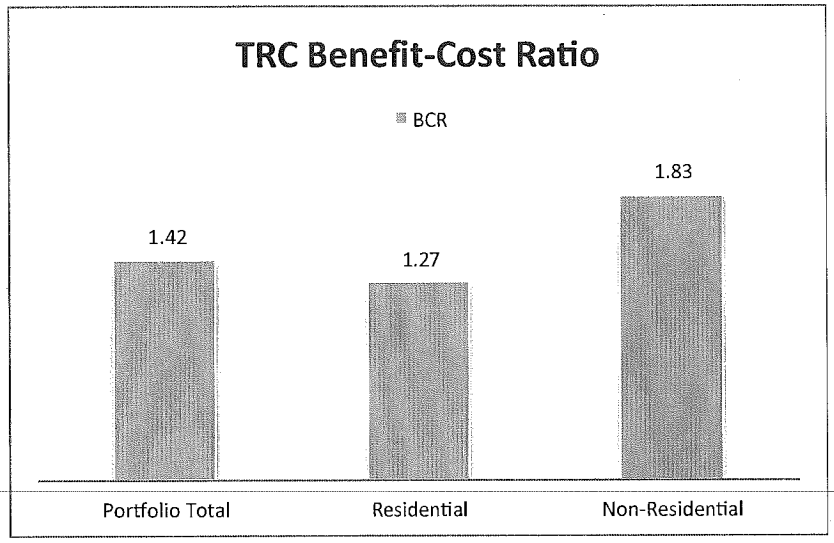


TABLE 21. SUMMARY OF PHASE II PROPOSED PROGRAM TOTAL RESOURCE COST-EFFECTIVENESS BY PROGRAM (PV 2014$)[45]

Program	PV Benefits	PV Costs	PGW PV Costs	PV Net Benefits	B/C Ratio
CRP Home Comfort	$11,533,902	$8,518,919	$8,518,919	$3,014,983	1.35
Residential Equipment Rebates	$11,740,831	$7,964,082	$3,187,849	$3,776,749	1.47
Efficient Building Grants	$5,253,304	$2,678,396	$1,648,426	$2,574,907	1.96
Commercial Equipment Rebates	$5,638,386	$1,949,416	$1,476,779	$3,688,970	2.89
Efficient Construction Grants	$2,189,251	$1,272,048	$1,343,845	$917,202	1.72
Home Rebates[46]	$324,476	$340,393	$196,110	$(15,917)	0.95
Portfolio-wide Costs	$-	$3,173,213	$3,173,213	$(3,173,213)	-
Total Portfolio	**$36,680,148**	**$25,896,467**	**$19,545,142**	**$10,783,681**	**1.42**

Table 22 provides a more detailed view of cost-effectiveness projections by program, including results for the TRC, gas and electric administrator cost tests.

[45] Under a "Low AC" TRC, using similar avoided cost assumptions as Phase I, the Phase II Proposed Program will provide a present value of net benefits of $4.96 million, with a BCR of 1.19.

[46] In the Proposed Program the Home Rebates program will be ramped-down, all costs and benefits will occur during the first half of FY 2016. See Section 5.2.6.3 for more about the ramp-down.

TABLE 22. DETAILED COST-EFFECTIVENESS OF ENERGYSENSE PHASE II PORTFOLIO (PV 2014$)

(all PV values in $000s of 2014$)	Total Resource					Gas Energy System					Electric Energy System				Electric & Gas Energy System			
Program	Present Value Benefit	Present Value Cost	PV of Net Benefits	Benefit-Cost Ratio	Levelized Cost $/MMBTU	Present Value Benefit	Present Value Cost	PV of Net Benefits	Benefit-Cost Ratio	Levelized Cost $/MCF	Present Value Benefit	Present Value Cost	PV of Net Benefits	Benefit-Cost Ratio	Present Value Benefit	Present Value Cost	PV of Net Benefits	Benefit-Cost Ratio
[1]	[2]	[3]	[4]	[5]	[6]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
PORTFOLIO TOTAL	**$36,680**	**$25,896**	**$10,784**	**1.42**	**8.70**	**$32,301**	**$19,545**	**$12,756**	**1.65**	**6.57**	**$2,775**	**-**	**$2,775**	**-**	**$35,077**	**$19,545**	**$15,531**	**1.79**
Non-Measure Costs		$7,088					$7,088					-				$7,088		
Total Measure Costs	$36,680	$18,808	$17,872	1.95	6.32	$32,301	$12,457	$19,845	2.59	4.19	$2,775	-	$2,775	-	$35,077	$12,457	$22,620	2.82
CRP Home Comfort																		
Program Total	$11,534	$8,519	$3,015	1.35	9.97	$9,563	$8,519	$1,044	1.12	9.97	$1,652	-	$1,652	-	$11,215	$8,519	$2,696	1.32
Non-Measure Costs		$2,149					$2,149					-				$2,149		
Total Measure Costs	$11,534	$6,370	$5,164	1.81	7.46	$9,563	$6,370	$3,193	1.50	7.46	$1,652	-	$1,652	-	$11,215	$6,370	$4,844	1.76
Residential Equipment Rebates																		
Program Total	$11,741	$7,964	$3,777	1.47	8.06	$11,335	$3,188	$8,147	3.56	3.23	$406	-	$406	-	$11,741	$3,188	$8,553	3.68
Non-Measure Costs		$373					$373					-				$373		
Total Measure Costs	$11,741	$7,591	$4,149	1.55	7.69	$11,335	$2,815	$8,519	4.03	2.85	$406	-	$406	-	$11,741	$2,815	$8,926	4.17
Efficient Building Grants																		
Program Total	$5,253	$2,678	$2,575	1.96	6.97	$4,062	$1,648	$2,414	2.46	4.29	$615	-	$615	-	$4,677	$1,648	$3,029	2.84
Non-Measure Costs		$598					$598					-				$598		
Total Measure Costs	$5,253	$2,081	$3,172	2.52	5.42	$4,062	$1,051	$3,011	3.87	2.74	$615	-	$615	-	$4,677	$1,051	$3,626	4.45
Commercial Equipment Rebates																		
Program Total	$5,638	$1,949	$3,689	2.89	3.53	$5,345	$1,477	$3,868	3.62	2.67	-	-	-	-	$5,345	$1,477	$3,868	3.62
Non-Measure Costs		$476					$476					-				$476		
Total Measure Costs	$5,638	$1,474	$4,165	3.83	2.67	$5,345	$1,001	$4,344	5.34	1.81	-	-	-	-	$5,345	$1,001	$4,344	5.34
Efficient Construction Grants																		
Program Total	$2,189	$1,272	$917	1.72	7.38	$1,706	$1,344	$362	1.27	7.79	$70	-	$70	-	$1,775	$1,344	$431	1.32
Non-Measure Costs		$196					$196					-				$196		
Total Measure Costs	$2,189	$1,076	$1,113	2.03	6.24	$1,706	$1,148	$558	1.49	6.66	$70	-	$70	-	$1,775	$1,148	$627	1.55
Home Rebates																		
Program Total	$324	$340	$(16)	0.95	13.36	$291	$196	$95	1.48	7.70	$33	-	$33	-	$324	$196	$128	1.65
Non-Measure Costs		$125					$125					-				$125		
Total Measure Costs	$324	$216	$109	1.50	8.47	$291	$71	$219	4.07	2.80	$33	-	$33	-	$324	$71	$252	4.54
Portfolio-wide Costs																		
Program Total	-	$3,173	$(3,173)	-	-	-	$3,173	$(3,173)	-	-	-	-	-	-	-	$3,173	$(3,173)	-
Non-Measure Costs		$3,173					$3,173					-				$3,173		
Total Measure Costs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

2.1.7. Rate and Bill Impacts

PGW analyzed the near-term impact on rates and bills from its gas DSM plan. The impact on average bills for all customers combined (participants and nonparticipants) will be higher in the early years and then generally decline thereafter. This is because the net benefits of PGW DSM investment are realized over the entire life expectancy of the efficiency measures installed, which averages around 20 years. The costs are incurred during the five-years of the Phase II program. Recovering the portfolio costs over a smaller sales base puts upward pressure on bills and rates in the early years; after that, the benefits of the gas savings continue for the next 15 years in the form of lower bills.

In the Proposed Program for Phase II, average annual bills for non-CRP residential customers will be approximately $7 higher in FY 2016, or $0.60 per month. In FY 2020, these same customers should have an average annual bill impact of less than $4. Rates for non-CRP residential customers will be 0.5 percent to 0.7 percent higher in FY 2016 through FY 2020 than they would have been absent the DSM portfolio investment. Not shown in the 5-year rate/bill analysis are the substantial bill reductions realized after 2020. As all PGW DSM programming has been designed to exceed TRC cost-effectiveness, these rate increases are a modest tradeoff in exchange for the substantial bill reductions that are expected over the remaining lifetime of the investment.

The next few tables show the pre and post DSM effects on bills as well as rate impacts broken out by customer classes.

TABLE 23. RATE AND BILL ANALYSIS: WITHOUT PHASE II DSM

Pre-DSM	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Gas Revenues ($000)					
Non-CRP Residential	$448,267	$447,295	$448,491	$450,243	$454,138
Commercial	$119,533	$121,490	$124,319	$127,486	$131,415
Industrial	$8,948	$8,896	$8,894	$8,912	$8,976
Municipal	$10,668	$10,799	$10,992	$11,201	$11,474
Housing Authority - GS	$2,347	$2,351	$2,367	$2,387	$2,418
Housing Authority - PHA	$6,711	$6,682	$6,702	$6,732	$6,801
Number of Customers					
Non-CRP Residential	390,481	387,631	384,793	381,963	379,143
Commercial	24,737	25,136	25,535	25,933	26,325
Industrial	647	645	643	641	639
Municipal	898	899	900	901	902
Housing Authority - GS	1,665	1,665	1,665	1,665	1,665
Housing Authority - PHA	814	809	805	801	797
Average Monthly Bill					
Non-CRP Residential	$95.67	$96.16	$97.13	$98.23	$99.82
Commercial	$402.68	$402.77	$405.72	$409.67	$416.00
Industrial	$1,152.54	$1,149.37	$1,152.63	$1,157.96	$1,170.62
Municipal	$989.93	$1,001.06	$1,017.79	$1,036.01	$1,060.06
Housing Authority - GS	$117.47	$117.67	$118.47	$119.45	$121.02
Housing Authority - PHA	$687.09	$688.31	$693.48	$700.36	$710.76
Sales Volume (Mcf)					
Non-CRP Residential	28,277	28,127	27,993	27,861	27,745
Commercial	11,071	11,279	11,490	11,703	11,919
Industrial	926	924	923	922	922
Municipal	1,232	1,242	1,253	1,264	1,275
Housing Authority - GS	167	167	167	167	167
Housing Authority - PHA	552	548	546	543	540
Average Rate ($/Ccf)					
Non-CRP Residential	1.59	1.59	1.60	1.62	1.64
Commercial	1.08	1.08	1.08	1.09	1.10
Industrial	0.97	0.96	0.96	0.97	0.97
Municipal	0.87	0.87	0.88	0.89	0.90
Housing Authority - GS	1.40	1.41	1.42	1.43	1.45
Housing Authority - PHA	1.22	1.22	1.23	1.24	1.26

TABLE 24. RATE AND BILL ANALYSIS: PHASE II DSM IMPACTS

DSM Impacts	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
DSM Benefit ($000)					
Non-CRP Residential	($141)	($276)	($419)	($588)	($819)
Commercial	($120)	($250)	($396)	($561)	($834)
Industrial	($6)	($12)	($20)	($28)	($42)
Municipal	$0	$0	$0	$0	$0
Housing Authority - GS	($0)	($0)	($0)	($0)	($0)
Housing Authority - PHA	$0	$0	$0	$0	$0
DSM Spending ($000)					
Non-CRP Residential	$1,310	$1,120	$1,109	$1,077	$1,124
Commercial	$937	$1,160	$1,032	$1,297	$1,146
Industrial	$39	$50	$45	$57	$51
Municipal	$0	$0	$0	$0	$0
Housing Authority - GS	$2	$0	$0	$0	$0
Housing Authority - PHA	$0	$0	$0	$0	$0
Conservation Adjustment Mechanism ($000)					
Non-CRP Residential	$59	$202	$54	$193	$334
Commercial	$41	$135	$43	$144	$252
Industrial	$2	$8	$2	$8	$14
Municipal	$1	$3	$1	$3	$5
Housing Authority - GS	$0	$0	$0	$0	$1
Housing Authority - PHA	$0	$1	$0	$1	$2
Performance Incentive ($000)					
Non-CRP Residential	$233	$235	$224	$239	$229
Commercial	$91	$94	$92	$100	$98
Industrial	$8	$8	$7	$8	$8
Municipal	$0	$0	$0	$0	$0
Housing Authority - GS	$1	$1	$1	$1	$1
Housing Authority - PHA	$5	$5	$4	$5	$4
Universal Services Energy Efficiency Surcharge Credit ($000)[47]					
Non-CRP Residential	$1,397	$1,286	$1,126	$1,041	$831
Commercial	$547	$516	$462	$437	$357
Industrial	$46	$42	$37	$34	$28
Municipal	$61	$57	$50	$47	$38
Housing Authority - GS	$8	$8	$7	$6	$5
Housing Authority - PHA	$27	$25	$22	$20	$16

[47] Universal Services Energy Efficiency Surcharge Credit consists of the CRP Home Comfort gas benefits net of the utility's spending.

TABLE 25. RATE AND BILL ANALYSIS: PHASE II REVENUE AND BILLS

Post-DSM	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Gas Revenues ($000)					
Non-CRP Residential	$451,110	$449,848	$450,571	$452,191	$455,825
Commercial	$121,023	$123,139	$125,546	$128,899	$132,429
Industrial	$9,037	$8,991	$8,965	$8,991	$9,034
Municipal	$10,728	$10,858	$11,042	$11,251	$11,516
Housing Authority - GS	$2,358	$2,361	$2,375	$2,394	$2,425
Housing Authority - PHA	$6,743	$6,713	$6,728	$6,758	$6,823
Average Monthly Bill					
Non-CRP Residential	$96.28	$96.71	$97.58	$98.66	$100.19
Commercial	$407.72	$408.26	$409.75	$414.23	$419.22
Industrial	$1,164.02	$1,161.73	$1,161.92	$1,168.31	$1,178.15
Municipal	$995.66	$1,006.61	$1,022.53	$1,040.65	$1,064.06
Housing Authority - GS	$118.03	$118.16	$118.88	$119.84	$121.37
Housing Authority - PHA	$690.39	$691.50	$696.24	$703.09	$713.15
Average Annual Bill Impact ($)					
Non-CRP Residential	$7.32	$6.62	$5.44	$5.13	$4.48
Commercial	$60.48	$65.85	$48.30	$54.69	$38.71
Industrial	$137.76	$148.24	$111.49	$124.27	$90.40
Municipal	$68.74	$66.55	$56.93	$55.70	$48.02
Housing Authority - GS	$6.71	$5.91	$4.85	$4.78	$4.17
Housing Authority - PHA	$39.56	$38.31	$33.12	$32.72	$28.61
Average Annual Bill Impact (%)					
Non-CRP Residential	0.6%	0.6%	0.5%	0.4%	0.4%
Commercial	1.3%	1.4%	1.0%	1.1%	0.8%
Industrial	1.0%	1.1%	0.8%	0.9%	0.6%
Municipal	0.6%	0.6%	0.5%	0.4%	0.4%
Housing Authority - GS	0.5%	0.4%	0.3%	0.3%	0.3%
Housing Authority - PHA	0.5%	0.5%	0.4%	0.4%	0.3%

TABLE 26. RATE AND BILL ANALYSIS: RATE IMPACTS FROM PHASE II DSM

Rate Impact	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
DSM Savings (Mcf)					
Non-CRP Residential	(7)	(23)	(38)	(53)	(68)
Commercial	(7)	(24)	(41)	(59)	(77)
Industrial	(0)	(1)	(2)	(3)	(4)
Municipal	0	0	0	0	0
Housing Authority - GS	(0)	(0)	(0)	(0)	(0)
Housing Authority - PHA	0	0	0	0	0
Average Rate ($/Ccf)					
Non-CRP Residential	1.60	1.60	1.61	1.63	1.65
Commercial	1.09	1.09	1.10	1.11	1.12
Industrial	0.98	0.97	0.97	0.98	0.98
Municipal	0.87	0.87	0.88	0.89	0.90
Housing Authority - GS	1.41	1.41	1.42	1.43	1.45
Housing Authority - PHA	1.22	1.22	1.23	1.24	1.26
Average Rate Impact					
Non-CRP Residential	0.7%	0.7%	0.6%	0.6%	0.6%
Commercial	1.3%	1.6%	1.4%	1.6%	1.4%
Industrial	1.0%	1.2%	1.0%	1.2%	1.1%
Municipal	0.6%	0.6%	0.5%	0.4%	0.4%
Housing Authority - GS	0.5%	0.4%	0.3%	0.3%	0.3%
Housing Authority - PHA	0.5%	0.5%	0.4%	0.4%	0.3%

The following table shows the different bill impacts for participants in the Phase II programs compared to customers who did not participate in the Phase II programs. Since there are so many more non-participants than participants, the average bill impact to non-participants is very close to that of the average customer bill impact found in Table 23. Participants in the Phase II program, however, are projected to have savings of over 10 percent on bills in most classes.

TABLE 27. RATE AND BILL ANALYSIS: COMPARISON OF PARTICIPANTS AND NON-PARTICIPANTS

	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Number of Participants (Cumulative)					
Non-CRP Residential	1,094	2,137	3,181	4,223	5,265
Commercial	210	420	632	845	1,059
Industrial	9	18	27	37	46
Municipal	0	0	0	0	0
Housing Authority - GS	0	0	0	0	0
Housing Authority - PHA	0	0	0	0	0
Average Annual Bill Impact - Participant ($)					
Non-CRP Residential	($121.65)	($121.82)	($125.27)	($132.64)	($148.86)
Commercial	($507.42)	($519.09)	($561.89)	($587.15)	($717.38)
Industrial	($517.75)	($521.59)	($582.31)	($599.20)	($755.42)
Municipal	$0.00	$0.00	$0.00	$0.00	$0.00
Housing Authority - GS	($243.15)	($249.15)	($257.34)	($266.55)	($306.63)
Housing Authority - PHA	$0.00	$0.00	$0.00	$0.00	$0.00
Average Annual Bill Impact - Non Participant ($)					
Non-CRP Residential	$7.68	$7.34	$6.53	$6.67	$6.64
Commercial	$65.34	$75.80	$63.79	$76.31	$70.39
Industrial	$147.01	$167.59	$142.27	$168.08	$156.04
Municipal	$68.74	$66.55	$56.93	$55.70	$48.02
Housing Authority - GS	$6.77	$5.96	$4.91	$4.85	$4.24
Housing Authority - PHA	$39.56	$38.31	$33.12	$32.72	$28.61
Average Annual Bill Impact - Participant (%)					
Non-CRP Residential	-10.6%	-10.6%	-10.7%	-11.3%	-12.4%
Commercial	-10.5%	-10.7%	-11.5%	-11.9%	-14.4%
Industrial	-3.7%	-3.8%	-4.2%	-4.3%	-5.4%
Municipal	0.0%	0.0%	0.0%	0.0%	0.0%
Housing Authority - GS	-17.2%	-17.6%	-18.1%	-18.6%	-21.1%
Housing Authority - PHA	0.0%	0.0%	0.0%	0.0%	0.0%
Average Annual Bill Impact - Non Participant (%)					
Non-CRP Residential	0.7%	0.6%	0.6%	0.6%	0.6%
Commercial	1.4%	1.6%	1.3%	1.6%	1.4%
Industrial	1.1%	1.2%	1.0%	1.2%	1.1%
Municipal	0.6%	0.6%	0.5%	0.4%	0.4%
Housing Authority - GS	0.5%	0.4%	0.3%	0.3%	0.3%
Housing Authority - PHA	0.5%	0.5%	0.4%	0.4%	0.3%

2.1.7.1. Rate and Bill Impacts from CAM recoveries

The following table shows the incremental post- Phase II impacts on customer bills from the CAM. These charges are included in the total rate and bill impacts for the Proposed scenario listed above, but are being shown in Table 28 to demonstrate the incremental impact.

TABLE 28. AVERAGE INCREMENTAL BILL IMPACTS FROM CAM

Post-DSM	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Average Monthly Bill Impact ($)					
Non-CRP Residential	$0.01	$0.04	$0.01	$0.04	$0.07
Commercial	$0.14	$0.45	$0.14	$0.46	$0.80
Industrial	$0.30	$0.99	$0.31	$1.04	$1.82
Municipal	$0.08	$0.28	$0.08	$0.27	$0.47
Housing Authority - GS	$0.01	$0.02	$0.01	$0.02	$0.03
Housing Authority - PHA	$0.04	$0.14	$0.04	$0.13	$0.23
Average Annual Bill Impact ($)					
Non-CRP Residential	$0.15	$0.52	$0.14	$0.50	$0.88
Commercial	$1.67	$5.38	$1.69	$5.57	$9.57
Industrial	$3.60	$11.84	$3.74	$12.51	$21.82
Municipal	$0.96	$3.35	$0.93	$3.28	$5.67
Housing Authority - GS	$0.08	$0.27	$0.07	$0.23	$0.40
Housing Authority - PHA	$0.48	$1.65	$0.45	$1.58	$2.72
Average Annual Bill Impact (%)					
Non-CRP Residential	0.01%	0.05%	0.01%	0.04%	0.07%
Commercial	0.03%	0.11%	0.03%	0.11%	0.19%
Industrial	0.03%	0.09%	0.03%	0.09%	0.16%
Municipal	0.01%	0.03%	0.01%	0.03%	0.04%
Housing Authority - GS	0.01%	0.02%	0.00%	0.02%	0.03%
Housing Authority - PHA	0.01%	0.02%	0.01%	0.02%	0.03%
Average Rate Impact ($/Ccf)					
Non-CRP Residential	0.0002	0.0007	0.0002	0.0007	0.0012
Commercial	0.0004	0.0012	0.0004	0.0012	0.0021
Industrial	0.0003	0.0008	0.0003	0.0009	0.0015
Municipal	0.0001	0.0002	0.0001	0.0002	0.0004
Housing Authority - GS	0.0001	0.0003	0.0001	0.0002	0.0004
Housing Authority - PHA	0.0001	0.0002	0.0001	0.0002	0.0004
Average Rate Impact (%)					
Non-CRP Residential	0.01%	0.05%	0.01%	0.04%	0.07%
Commercial	0.03%	0.11%	0.03%	0.11%	0.19%
Industrial	0.03%	0.09%	0.03%	0.09%	0.16%
Municipal	0.01%	0.03%	0.01%	0.03%	0.04%
Housing Authority - GS	0.01%	0.02%	0.00%	0.02%	0.03%
Housing Authority - PHA	0.01%	0.02%	0.01%	0.02%	0.03%

2.1.8. Contribution to Economic Growth and Job Creation

Investing in cost-effective energy-efficiency creates jobs in two ways, one direct and the other indirect, as discussed in a 2012 white paper from the American Council for an Energy

Efficient Economy (ACEEE).[48] As detailed in this white paper, direct job creation results from hiring related to implementing the programs created. Indirect job creation results from the substitution of local capital spent in the local economy rather than for natural gas. Several times more jobs are created by the indirect or income effect from cost-effective energy-efficiency investment. Further, the net economic benefits from efficiency investment reduce household and business gas bills and raise household disposable incomes and business profitability. Customers will tend to spend most of this additional money and save the rest. This additional spending creates a "multiplier" effect through the cycle of re-spending of the initial cost savings, which stimulates aggregate demand for goods and services. Satisfying increased demand for goods and services requires more labor. While some of the jobs created leak into the broader U.S. and global economy, a good portion (possibly higher than 80 percent) of jobs created due to energy efficiency stay within the local region.[49] The approach of looking at net job creation through both direct means and with economic multiplier effects is endorsed in the 2012 white paper from ACEEE.

The number of jobs created from investments in energy efficiency directly relates to the total resource value of the energy that these measures save. Studies of employment impacts of DSM use energy savings as a surrogate for total resource value. A recent meta-study of U.S. data found that estimates for the number of jobs created range from 9 to 125 for every one trillion Btu ("TBtu") saved. Most studies estimate that between 30 and 60 net jobs are created by saving one TBtu (Laitner and McKinney 2008). In New York, New Jersey, and Pennsylvania, the American Council for an Energy Efficient Economy (ACEEE) projected that 164,320 jobs, or 59 for every TBtu saved, could be attributed to EE in 1997 through 2010 (Nadel et al 1997).

As shown in the following table, PGW estimates that its gas DSM portfolio will generate between 131 and 218 net additional jobs over the lifetime of the efficiency measures installed over the next five-years.[50] This range is based on assuming that each TBTU of gas savings creates between 30 and 50 full-time equivalent jobs in the local region.

[48] "Energy Efficiency Job Creation: Real World Experiences" Bell, Casey J. American Council for an Energy-Efficiency Economy. October 2012.

[49] The number of jobs that would be created within the Philadelphia metro area cannot be stated with precision; however the direct labor requirements for installing the efficiency measures are almost entirely local. The efficiency technologies have significant but unknown local value added. The indirect employment effects depend on the amount of extra spending money generated by gas cost savings spent within the local economy. Such issues would require significant additional research and analysis to quantify the range of likely local job creation.

[50] These estimates do not include the additional jobs created from the electric savings that result from the PGW proposed programs.

TABLE 29. ESTIMATED JOB CREATION FROM PHASE II

	JOB CREATION IMPACTS OF GAS EFFICIENCY PORTFOLIO		
	30 Jobs/TBtu	40 Jobs/TBtu	50 Jobs/TBtu
RESIDENTIAL PROGRAMS			
FY 2016	18	24	29
FY 2017	17	23	29
FY 2018	17	23	29
FY 2019	17	23	28
FY 2020	17	22	28
TOTAL	86	114	143
NON-RESIDENTIAL PROGRAMS			
FY 2016	8	11	14
FY 2017	9	12	14
FY 2018	9	12	15
FY 2019	9	12	16
FY 2020	10	13	16
TOTAL	45	60	75
TOTAL PORTFOLIO			
FY 2016	26	35	43
FY 2017	26	35	43
FY 2018	26	35	44
FY 2019	26	35	44
FY 2020	26	35	44
TOTAL	**131**	**174**	**218**

2.1.9. Implementation Planning and Reporting Updates

PGW's Phase I plan proposed a five-year program horizon, with program plans updated through annual implementation plan and program activity reported in annual reports. This Phase II proposal provides implementation details for the next five-years of the DSM program. During Phase II, PGW will continue to file its annual implementation plan four months prior to the upcoming fiscal year, but only when proposing major program changes to budgets or goals that deviate from the plans documented herein. PGW will continue to file its annual report four months after the close of the fiscal year.

In order to ensure program continuity, PGW proposes continuation of DSM programming beyond FY 2020; in order to do so, PGW would file with the Commission ongoing triennial implementation plans, with an opportunity for parties to propose a termination on an anniversary date by filing 180 days in advance of the close of the fiscal year – as set forth in the timeline below. The triennial plans will provide proposed program implementation details and modifications and recent program activities. Program activity details would continue to be filed with the Commission in annual reports filed four months following the close of PGW's fiscal year. PGW reserves the right to re-evaluate the appropriateness and

effectiveness of maintaining the ongoing DSM programs based on future developments, and respond accordingly, including possibly announcing a planned termination of the programs. Figure 7 provides the anticipated continuation and reporting process for Phase II.

FIGURE 7. TIMELINE FOR CONTINUATION & REPORTING PROCESS

Fiscal Year	Continuation or Reporting Activity
2015	• DSM Phase II Extension Filing (December) • FY 2014 Annual Report (December) • DSM Phase II Extension Review Period (January – April) • FY 2016 Implementation Plan (May)
2016	• FY 2015 Annual Report (December) • FY 2017 Implementation Plan (May, if warranted)
2017	• FY 2016 Annual Report (December) • FY 2018 Implementation Plan (May, if warranted)
2018	• FY 2017 Annual Report (December) • FY 2019 Implementation Plan (May, if warranted)
2019	• FY 2018 Annual Report (December) • FY 2020 Implementation Plan (May, if warranted)
2020	• FY 2019 Annual Report (December) • Objection Deadline to Continued DSM Programming (February) • FY 2021 – 2024 Triennial Implementation Plan (May, if warranted)

2.1.10. Performance Incentive

While program cost recovery mechanisms reduce the burden on PGW of investing in energy efficiency and reducing sales, they do not provide a positive incentive for such investment. PGW proposes that a performance incentive, based on existing mechanisms in other jurisdictions, be included in the Phase II period in order to help provide support for its long-term investment in natural gas energy efficiency and align the Company's success with the success of the EnergySense portfolio and its customers.

While this section provides a broad overview of the performance incentive, Section 4 provides additional details including the specific incentives targets and amounts that PGW is proposing.

2.1.10.1. Principles of Performance Incentive Design

Performance incentives constitute a sharing of benefits between the customers and the utility for running a successful DSM program. Customers continue to reap the majority of benefits from a program, but the utility is awarded a portion of the benefits it achieves as an incentive for continued high performance.

In designing the performance incentive framework, PGW has been guided by the following fundamental principles:

TABLE 30. PRINCIPLES FOR PERFORMANCE INCENTIVE

1	The performance incentive should be small by industry standards, compared to the level of energy-efficiency expenditures and consumer benefits. a) The performance incentive should be capped at a percentage of annual budgets; b) The performance incentive should not impair the cost-effectiveness of the energy-efficiency portfolio.
2	Performance incentives should be paid only for high performance levels and will exclude PGW's activities in the CRP Home Comfort program.
3	Performance incentives should reward progress toward objectives of concern to the Commission and ratepayers, such as: a) Saving energy, b) Reducing costs,
4	Performance incentives should ***not*** reward such activities as: a) Spending funds, b) Average program performance, c) Targeting easy savings opportunities while making deeper savings more difficult or impossible to achieve ("cream-skimming").

2.1.10.2. Incentive Framework

Building on the principles proposed in the performance incentive framework is a "portfolio target" approach, based on best practices from Vermont and Rhode Island, where similar mechanisms have been applied to three-year performance periods since 2000 and 2005, respectively. Additional features have been included to protect the best interests of ratepayers and incent desired portfolio outcomes.[51]

TABLE 31. PROPOSED PERFORMANCE INCENTIVE FRAMEWORK COMPONENTS

1	A total incentive pool is calculated, as and capped at, a percentage of annual budgets.
2	A minimum portfolio performance threshold must be met before any incentives are paid.
3	Individual performance targets are selected and weighted to encourage multiple desired outcomes.
4	The annual award for each outcome is scaled so that: a) A minimum threshold must be exceeded before any incentive is awarded. b) Above the threshold, the incentive rises linearly with performance. c) The maximum incentive is awarded only when performance exceeds the target level by a pre-specified percentage.

The first component of the framework establishes the total amount of money that may be awarded as an incentive. Tying the incentive pool to the budget ensures that the total potential incentive is reasonable compared to the expenditures, providing a simple way to scale incentives with changing future plans.

[51] See Section 4.3for details

The second component of the framework establishes an aggregate performance threshold to protect ratepayers from paying any incentives if the overall performance of the portfolio is not acceptable. As long as the portfolio threshold is exceeded, a performance incentive *may* be awarded for the given year. However, whether any incentive is paid depends on performance compared to targets set in the third component, as scaled in the third and fourth components.

The third component of the framework establishes the individual performance targets. These performance targets may be selected and weighted to encourage a range of outcomes, such as natural gas savings, total resource benefits, distribution of participation among programs and groups of customers, and depth of savings.

The fourth and final component establishes the methodology for computing the specific incentives for the various performance targets. Including a minimum threshold protects ratepayers from paying incentives for modest outcomes. Scaling the incentive linearly with the percentage of the performance target achieved above the threshold encourages the portfolio administrator to exceed the threshold and even the initial performance targets and ensures that only exceptional results receive the highest possible rewards. Further details on PGW's proposed Performance Incentive mechanism are provided in section 4.4. below.

2.1.11. Efficient Fuel Switching Program

2.1.11.1. Description and Goals

The DSM Fuel-Switching Program pilot will promote cost-effective energy efficiency and conservation projects through new natural gas applications as opposed to more expensive and less efficient fuel-types, with the goal of cost-effectively reducing net energy consumption.[52] The Efficient Fuel Switching program will be held to the same Energy Efficiency cost-effectiveness standards as the rest of the PGW DSM Portfolio. However, since the program will increase natural gas usage, the program will be tracked and reported on separately from the main energy efficiency programs in the Proposed and Expanded Scenarios. All the figures for budgets, savings, participation, and cost-effectiveness presented elsewhere in this report for the Proposed and Expanded scenarios do not include this fuel-switching program, except for the combined financial impact overview in Table 5.

The pilot program will launch by targeting carefully screened technologies for specific building types to ensure effective attainment of program goals. The program will provide education, technical assistance, and financial incentives for cost-effective energy-saving investments for small to medium sized commercial and industrial properties. The program will also assist participants in arranging financing for the balance of project costs through collaboration with third-party lenders. The program has the following objectives:

- Promote cost-effective net energy reduction

[52] In 2009 the National Academies issued a study recommending that the DOE and EERE consider moving over time to the use of a full-fuel-cycle measure of energy consumption. ("Review of Site (Point-of-Use) and Full-Fuel-Cycle Measurement Approaches to DOE/EERE Building Appliance Energy-Efficiency Standards." National Academies. 2009.) This measure would align with the efficiency review of PGW's Efficient Fuel Switching program.

- Increase market acceptance and penetration of targeted fuel-switching projects[53]
- Complement existing efforts

PGW applied two primary criteria in selecting viable technologies: First, the proposed measure must demonstrate TRC cost-effectiveness; Second, total energy usage must be reduced by the proposed measure.

The first criterion maintains conceptual consistency with existing DSM protocols, but provides a more stringent guideline by requiring cost-effectiveness at the measure level. The second criterion is a higher bar than any currently in place in the existing programs which only require TRC cost-effectiveness. Due to the significant differences across fuel-type avoided costs, fuel-switching projects could result in TRC cost-effectiveness with no impact or even a slight increase in net energy usage. By requiring both criteria above, PGW will ensure projects achieve cost-effectiveness and provide overall net energy savings.

PGW performed market and industry research in developing the Fuel-Switching program (See Appendix 6.4). A number of similar programs nationally and within Pennsylvania provided templates for effective program design and appropriate target measures. Pennsylvania Act 129 precedence for savings and cost-effectiveness protocols were utilized, as addressed in the Calculating Benefits and Cost-Effectiveness section below. Additionally, existing EDC Act 129 programs were incorporated into the PGW DSM Fuel-Switching program design process. The 2010 PUC Fuel-Switching Working Group also provided a useful starting point in considering viable projects and potential issues to be addressed. Further detail on PGW's proposed Fuel Switching program is provided in section 4.5. below.

2.2. Plan Development

2.2.1. Continuation of FY 2011 – FY 2015 Activity

The Phase II Proposed Program was developed as an extension of PGW's existing programs. Current program activity, third-party evaluations, and experience were used to do a complete a bottom up rework of PGW's programs, including characterizing and analyzing each measure and project type for every program. Individual projects and measures were screened for cost-effectiveness and then combined with estimated budget values to determine a base level of activity for each program.

2.2.2. Additional Programmatic Updates

PGW has included a number of improvements and additions to its current programs, some of which have already been made. The changes are intended to increase program economic benefits while providing better customer service. This section highlights the main

[53] The proposed Efficient Fuel Switching program is designed to support innovation in natural gas use in addition to overall energy efficiency. PGW believes that its program design supports the intent of the Pennsylvania Public Utility Commission. As Commissioner Pamela Whitmer has stated, Pennsylvania residential and industrial consumers, "should have every reasonable opportunity to take advantage of this efficient and clean burning natural resource." ("Statement of Pamela A. Whitmer." Pennsylvania Public Utility Commission. Docket Number R-2014-2407345. October 23, 2014.)

programmatic updates, which are discussed in greater detail in the respective program implementation sections below, that have been made for each program.

Updates and improvements to the CRP Home Comfort Program include:

- Increased collaboration activities for addressing serious health and safety issues in homes.
- Expansion of program eligibility to extend targeted CRP customers beyond the top 20 percent of CRP high users, and allow customers with arrearage to participate.
- Pursuant to the Universal Service Plan Order, launch of a multifamily pilot program that provides weatherization treatments at low-income multifamily buildings.
- Improvements to quality assurance and training protocols, including ramping up inspector shadowing of audits and production work.
- Improved customer education and communication provided prior to and during CRP Home Comfort work, which will lead to greater acceptance of measures and further savings.
- PGW has changed the program name from Enhanced Low Income Retrofit Program (ELIRP) to CRP Home Comfort. PGW feels this term will be more effective in communicating the program to targeted customers, and hopefully encourage greater participation rates.

Updates and improvements to the Residential Equipment Rebate Program include:

- Improved application process including the potential development of an online rebate application
- Increasing marketing activities and expanding incentives to contractors to drive engagement

Updates and improvements to the Commercial and Industrial Retrofit Incentive Program include:

- Development of online application and status tracking system for customers
- Increased project technical assessment activities will be explored, such as offering no-obligation building walkthroughs by PGW's technical assistance team for eligible customers with intensive energy use.
- Updates to incentive strategies, including the exploration of higher incentives.

Updates and improvements to the Commercial and Industrial Equipment Rebate Program include:

- Improved application process including the potential development of an online rebate application
- Exploration of offering upstream incentives for commercial food service equipment

Updates and improvements to the High Efficiency Construction Incentive program include:

- A revised application process, including online tracking of application and payment status
- Additional building engagement efforts, such as participation certificates and additional on-site assistance

Additionally, as part of the Phase II extension PGW proposes to add two additional customer service components to improve residential and commercial customer's ability to understand and perform energy efficiency improvements:

- Residential: Development of an e-audit tool to help customers understand energy use and savings potential, informed by their actual gas usage and housing characteristics
- Commercial: Improved online access to usage data, combined with a platform for automatically uploading usage data to the EPA Portfolio Manager system in order to facilitate convenient ongoing tracking towards conversation goals.

2.2.3. Key Assumptions

Many of the key assumptions used for the analysis of the Phase II Proposed program scenario were the same as those used in PGW's recent FY 2015 IP filed on May 14, 2014.

2.2.3.1. Avoided Costs

The economic evaluation of an energy-efficiency measure requires an estimate of the measure's benefits. The major benefit of gas energy-efficiency programs is the reduction of gas use and associated costs to customers. Those avoided costs would have been passed on to customers by the utility, third-party suppliers, or both, but customers all eventually pay them.

PGW updated its avoided costs for natural gas and electricity for its FY 2015 IP in May of 2014. The avoided costs from the FY 2015 IP, listed in Table 32, are used as the Low AC scenario.

TABLE 32. AVOIDED COSTS FOR NATURAL GAS, ELECTRICITY, AND WATER (EXCLUDING DRIPE AND CARBON, 2014$)

Year	Natural Gas Avoided Costs			Electric Avoided Costs including losses		Water Avoided Costs
	NG Base	NG Space Heat	NG DHW	All-Year Energy	Summer Gen. Capacity	
	$/MMBtu	$/MMBtu	$/MMBtu	$/kWh	$/kW-yr.	$/gal
2015	$5.50	$7.71	$6.06	$0.1014	$56.70	$0.00786
2016	$5.45	$7.60	$5.99	$0.0988	$72.61	$0.00789
2017	$5.47	$7.61	$6.01	$0.0979	$72.61	$0.00789
2018	$5.66	$7.79	$6.19	$0.0993	$72.61	$0.00789
2019	$5.91	$8.03	$6.44	$0.1004	$72.61	$0.00789
2020	$6.15	$8.28	$6.68	$0.1015	$72.61	$0.00789
2021	$6.34	$8.48	$6.88	$0.1023	$72.61	$0.00789
2022	$6.52	$8.67	$7.05	$0.1027	$72.61	$0.00789
2023	$6.62	$8.78	$7.16	$0.1025	$72.61	$0.00789
2024	$6.72	$8.87	$7.26	$0.1023	$72.61	$0.00789
2025	$6.87	$9.01	$7.40	$0.1024	$72.61	$0.00789
2026	$6.99	$9.13	$7.52	$0.1024	$72.61	$0.00789
2027	$7.09	$9.23	$7.62	$0.1031	$72.61	$0.00789
2028	$7.27	$9.41	$7.81	$0.1047	$72.61	$0.00789
2029	$7.54	$9.69	$8.08	$0.1050	$72.61	$0.00789
2030	$7.67	$9.82	$8.21	$0.1060	$72.61	$0.00789
2031	$7.87	$10.02	$8.41	$0.1074	$72.61	$0.00789
2032	$8.10	$10.27	$8.64	$0.1080	$72.61	$0.00789
2033	$8.25	$10.42	$8.80	$0.1091	$72.61	$0.00789
2034	$8.45	$10.62	$8.99	$0.1109	$72.61	$0.00789
2035	$8.72	$10.91	$9.27	$0.1106	$72.61	$0.00789
2036	$8.75	$10.93	$9.30	$0.1103	$72.61	$0.00789
2037	$8.78	$10.94	$9.32	$0.1112	$72.61	$0.00789
2038	$8.94	$11.11	$9.48	$0.1128	$72.61	$0.00789
2039	$9.18	$11.36	$9.72	$0.1140	$72.61	$0.00789
2040	$9.38	$11.57	$9.93	$0.1153	$72.61	$0.00789
2041	$9.60	$11.79	$10.14	$0.1166	$72.61	$0.00789
2042	$9.81	$12.02	$10.36	$0.1181	$72.61	$0.00789
2043	$10.04	$12.25	$10.59	$0.1195	$72.61	$0.00789
2044	$10.26	$12.50	$10.82	$0.1211	$72.61	$0.00789
2045	$10.50	$12.74	$11.06	$0.1227	$72.61	$0.00789
2046	$10.74	$13.00	$11.31	$0.1244	$72.61	$0.00789
2047	$10.99	$13.26	$11.56	$0.1261	$72.61	$0.00789
2048	$11.25	$13.54	$11.82	$0.1280	$72.61	$0.00789
2049	$11.51	$13.82	$12.09	$0.1299	$72.61	$0.00789
2050	$11.78	$14.10	$12.36	$0.1319	$72.61	$0.00789

The additional benefits for Demand-Reduction Induced Price Effects (DRIPE) and carbon emissions can be found in Table 33 and Table 34. The derivation of PGW's avoided costs, including details on DRIPE and carbon costs are discussed further in Appendix 6.1. PGW is using the internalized cost of carbon for the "Full Internal" avoided cost scenario, presented as the primary cost-effectiveness result.

TABLE 33. IMPACT OF DRIPE ON GAS AVOIDED COSTS (2014$)

Year	DRIPE for Natural Gas Avoided Costs		
	NG Base $/MMBtu	NG Space Heat $/MMBtu	NG DHW $/MMBtu
2015	$0.244	$0.376	$0.277
2016	$0.244	$0.376	$0.277
2017	$0.244	$0.376	$0.277
2018	$0.213	$0.315	$0.239
2019	$0.183	$0.254	$0.200
2020	$0.162	$0.193	$0.170
2021	$0.132	$0.132	$0.132
2022	$0.244	$0.376	$0.277
≥2023	$0.244	$0.376	$0.277

TABLE 34. IMPACT OF CARBON AND OTHER POLLUTANTS ON AVOIDED COSTS (2014$)

Year	CO2 impact on Gas Avoided Costs			CO2, SO2, NOx Impact on Electric Avoided Costs
	Internalized	Externalized	Full Cost (Internal & External)	All-Year Energy
	$/MMBtu	$/MMBtu	$/MMBtu	$/kWh
2015	$-	$2.61	$2.61	$0.1273
2016	$-	$2.68	$2.68	$0.0980
2017	$-	$2.74	$2.74	$0.0693
2018	$-	$2.81	$2.81	$0.0412
2019	$-	$2.88	$2.88	$0.0405
2020	$0.92	$2.03	$2.95	$0.0398
2021	$1.06	$1.96	$3.02	$0.0396
2022	$1.20	$1.89	$3.09	$0.0394
2023	$1.34	$1.82	$3.16	$0.0391
2024	$1.47	$1.75	$3.22	$0.0387
2025	$1.61	$1.68	$3.29	$0.0383
2026	$1.75	$1.60	$3.35	$0.0378
2027	$1.89	$1.52	$3.40	$0.0386
2028	$2.03	$1.43	$3.46	$0.0395
2029	$2.16	$1.35	$3.51	$0.0403
2030	$2.30	$1.27	$3.57	$0.0412
2031	$2.44	$1.20	$3.64	$0.0421
2032	$2.58	$1.13	$3.70	$0.0430
2033	$2.72	$1.06	$3.77	$0.0440
2034	$2.85	$0.99	$3.84	$0.0449
2035	$2.99	$0.92	$3.91	$0.0459
2036	$3.13	$0.85	$3.98	$0.0468
2037	$3.27	$0.78	$4.05	$0.0477
2038	$3.41	$0.71	$4.12	$0.0487
2039	$3.54	$0.64	$4.18	$0.0496
2040	$3.68	$0.57	$4.25	$0.0505
2041	$3.82	$0.50	$4.32	$0.0515
≥2042	$3.96	$0.43	$4.39	$0.0524

2.2.3.2. Benefit-Cost Analysis

The cost-effectiveness results reported in this plan were calculated within the range of standard industry practice for conducting TRC and Gas Program Administrator tests for cost-effectiveness. The first and primary test of cost-effectiveness is the TRC perspective. It measures the gain in economic welfare from making the investment by comparing the present worth of resource benefits with the present worth of resource costs of the DSM plan.

Total resource costs consist of PGW's expenditures on program measures and on "non-measure," i.e., administration costs. They also include the customers' direct contribution to the efficiency investments, that is, the portion of efficiency measure costs not covered by PGW program expenditures. Total resource benefits are the avoided costs to consumers of gas, electric, and water costs. These benefits do not include other customer bill savings resulting from decreased volumetric PGW delivery charges.

Different jurisdictions interpret the group of customers covered by the TRC somewhat differently, ranging from the customers of a single utility (such as PGW), the entire state (i.e., Pennsylvania), or a larger region.[54] Where gas, electricity and/or water are provided by separate utilities, the benefits are usually computed to include at least the service areas of all three utilities, for the services they provide.

PGW's natural gas avoided costs include commodity costs and charges for pipeline and storage capacity. Using less gas reduces the amount that PGW must purchase and deliver, and also reduces the price per unit of the gas PGW purchases. This second component of avoided costs is DRIPE, the reduction of price by reduction of consumption, and is included in the two levels of Full avoided costs.[55] The electric costs avoided by PGW are those that PGW's customers would pay their electric utility for energy and capacity through the PJM markets, including both the reduction in quantity and the reduction in price.[56]

The benefits of energy efficiency also include the avoided cost of carbon emissions. At the least, the avoided cost is the cost borne directly by the gas and electric consumers in their utility bills, as a result of the requirements of the EPA Clean Power Plan (which will likely result in interstate traded emissions allowances for electric generation) and future expanded compliance plans. More broadly, PGW's customers will experience the effects of climate change along with the rest of the nation (e.g., heat waves, storms, drought, instability in food prices), and a broader measure of the costs of carbon emissions may be more relevant than the emissions costs that appear in utility bills. The Full Internal avoided costs include a carbon price from a widely-used analysis, starting in 2020.[57] The Full External avoided costs include a carbon cost developed by a Federal inter-agency task force, starting immediately, as well as estimated health benefits from reduced power-plant emissions, and are only shown to provide context for the wider benefits from avoiding carbon emissions.

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[54] For example, some New England states recognize benefits to all New England customers; the Northwest Power and Conservation Council recognizes benefits to all the customers in its territory, covering four states.

[55] The PGW avoided costs include gas DRIPE benefits for PGW customers.

[56] In its avoided-cost computations, PGW included only two DRIPE effects for electricity: the reduced annual gas-supply price and the reduced winter delivery basis to mid-Atlantic gas-fired generation. In addition, the electricity saved by PGW's programs will reduce the clearing prices of both electric energy and capacity in the PJM markets. The Maryland Energy Administration has estimated that these effects amount to a cent or two per kWh saved over the first several years of a measure's operation.

[57] Since PGW prepared its avoided cost, the EPA has proposed that the requirements of Clean Power Plan take effect in 2020, so at least electric avoided costs should reflect carbon pricing by that date.

PGW also analyzes benefits and costs from the perspective of the utility system through the Gas Administrator test. This calculation ignores the costs not borne by PGW or flowing through its rates (e.g., the costs participants pay themselves). While not a full indicator of economic merit, the Gas Administrator test provides a test of the reasonableness of the use of gas ratepayer funds for programs that also produce benefits to electric and water utilities and to participating customers. We provide results for the gas system alone and for the electricity system from electric efficiency measures. The electric system analysis does not reflect any electric utility contributions toward the administrative costs of the programs, as there are currently are none that are anticipated. Nor does the analysis reflect any total resource benefits or costs of other electric efficiency measures besides air conditioning in the residential retrofit programs resulting from measures that primarily save natural gas, or any electric efficiency measures in the commercial and industrial programs.

Both analyses used a real discount rate ("RDR") of 2.92 percent. The RDR was calculated using assumptions of a nominal discount rate ("NDR") of 4.98 percent, based on PGW's true average weighted cost of capital, and a future inflation rate of 2.0 percent, consistent with past analysis and current market forecasts. These assumptions were the same as those used in the FY 2015 IP.

Although the primary concern is on the cost-effectiveness of the portfolio as a whole, PGW conducts its own Benefit-Cost analyses at the measure, program and portfolio levels, utilizing formulas detailed in the Technical Reference Manual and assumptions listed in the annual Implementation Plan. The deemed savings utilized within the benefit-cost analysis are calculated using the best formulas and assumptions available. PGW conducts regular third-party evaluations of its programs to assess the actual savings and review program assumptions. If the evaluation determines that a variance exists between deemed savings and actual savings, PGW will utilize the results to identify improvements to its benefit-cost analysis in subsequent future implementation plans.

2.2.3.3. Technical Reference Manual

In order to establish a consistent framework for measuring the energy savings and cost effectiveness of the DSM program efficiency measures, PGW developed a technical reference manual ("TRM") based on industry best practices, including the Pennsylvania Act 129 TRM, and informed by the results of third party evaluations. Similar to the Pennsylvania Act 129 TRM, the PGW TRM includes efficiency measure characterizations for measures that are commonly encountered and can be determined based on easily obtainable input variables, such as equipment size, efficiency levels, and measure lifetimes. More complex custom efficiency measures based on site-specific conditions or custom analysis are not calculated using exact formulas in the TRM, but the TRM serves as guidance for characterizing savings from these measures.

PGW uses the TRM measure characterizations for determining energy savings and cost effectiveness both at the customer and program levels. Measures characterizations were developed separately for residential and non-residential applications to recognize the inherent differences between the different customer types and their usage patterns.

The information in the TRM is based on the best information available. The majority of characteristics originated from other utilities' gas DSM programs with regional adjustments, where appropriate. The following is a list of characteristics that were developed for each gas measure included in the TRM:

- Efficiency measure description, including the applicable market (new construction, at time of natural equipment replacement, early replacement of existing functioning equipment)
- Gas energy saving algorithms based on variables such as equipment size and efficiency level
- Pattern of gas savings (space heating, water heating, baseload)
- Annual hours of equipment usage
- Efficient equipment efficiency level
- Baseline equipment efficiency level
- Lifetime of measure savings, including persistence
- Electricity savings – energy and coincident peak
- Water savings
- Net-to-Gross (NTG) ratios. The NTG ratio takes into account free-riders (customers that would have installed the measure absent a DSM program) and spillover (non-participants in the DSM program that are influenced by the DSM program and install the efficient measure – also known as free-drivers)

The TRM is considered a living document and is, and will continue to be, updated as new information becomes available. Since the first TRM was filed with the FY 2011 Implementation Plan, measure characterizations have been revised based on PGW program experience, evaluations and evolving standards. Sources for all measure characteristics are documented in the TRM. PGW has filed the latest TRM as an appendix to the annual Implementation Plans and, as necessary, through special notice for immediate changes.

PGW calculates TRM savings based on actual program activities through Microsoft Excel based tools that are developed by the program development consultants. These tools utilize the formulas set forth in the TRM to calculate savings and cost-effectiveness. The design of the tools as utilized at the portfolio and program levels are explained in greater detail in the respective Data Management sections below.

PGW has not made any changes to the Technical Reference Manual (TRM) since it was filed as part of the FY 2015 IP.

3. Conservation Adjustment Mechanism Cost Recovery

3.1. Cost Recovery Mechanism

3.1.1. Overview of Program Costs

The full cost to PGW of the energy-efficiency programs includes administrative costs incurred from running the programs, incentive awards, program evaluation, and reduced fixed utility costs that customers avoid paying due to the reduction in their consumption of natural gas. In Phase II, the program administrative, incentive and evaluation costs will be recovered identical to the Phase I method by the Efficiency Cost Recovery surcharge ("ECRS") applicable to all volumes of gas delivered. In Phase II, PGW seeks to include in the ECRS a Conservation Adjustment Mechanism ("CAM") component, to recover the cost to PGW of reduced contributions to fixed costs strictly due to PGW's energy-efficiency activities, as detailed below. The ECRS will continue to be applied only to the bills of firm customers in the class for which the costs are incurred. Interruptible customers are not eligible for energy-efficiency incentives, and will not be charged the ECRS.

The Company will continue to compute the ECRS surcharge factors in accordance with the automatic adjustment procedures utilized under Section 1307(f) of the Public Utility Code and will file the computation for approval in conjunction with the Company's annual Section 1307(f)-GCR filing.

In Phase II, the surcharge will continue to be aligned with the company's GCR adjustments effective March 1, June 1, September 1, and December 1 of each year in accordance with Section 1307(f) quarterly adjustment procedures. No interest will be included in such surcharge computations. The basic component of the surcharge will be determined by dividing the total energy efficiency program costs incurred within the approved annual budget caps for annual recovery plus (or minus) any over (or under) recovery from the prior period by the estimated applicable throughput in Mcf. The costs related to customers other than low income residential customers are tracked and recovered separately from each of the following firm customer rate classes served by the energy efficiency programs:

a) Residential on Rate GS and Rate PHA/GS;
b) Commercial on Rate GS;
c) Industrial Customers on Rate GS; and
d) The Philadelphia Housing Authority on Rate PHA.

The surcharge shall be a cents per Ccf charge calculated to the nearest one-thousandth of a cent ($0.00001/Ccf), which shall be added to the distribution rates for billing purposes for all customers in each of the above rate classes. The rate shall be calculated separately for each rate class.

3.1.1.1. The Rationale for Recovery of All PGW Costs

Implementing energy efficiency programs imposes several different costs upon a utility which serve as barriers to further or increased program activities unless these costs can be recovered. These costs include the direct cost of program delivery as well as the cost incurred through reduced volumetric delivery charges for fixed cost recovery.

The existing USC and ECRS surcharges allow PGW to adequately recover the direct costs of program delivery; however there is currently no conservation adjustment for the cost to PGW of reduced volumetric delivery charge recoveries towards the company's fixed costs.

The reduction in PGW's recovery of delivery charges is an additional benefit to participating customers that is not included in either the TRC or utility cost test. Unfortunately, that benefit to participants comes out of PGW's agreed upon and forecasted revenue requirements, which the Commission approves to allow PGW to recover its costs. This reduction is particularly impactful to PGW as, unlike an investor own utility, it is a cash-flow operation and does not have the ability to absorb these costs. This concern does not apply to the Cost of Gas Adjustment, since both the participating customers and PGW avoid the costs of gas that is not needed due to energy-efficiency installations. Nor does it apply to the various reconciling surcharges. But the costs in the base delivery charge are essentially fixed in the near-term.

Lower sales may eventually allow PGW to avoid adding new load-related mains but will not reduce PGW's costs of debt and maintenance on the existing system. The lack of a conservation adjustment mechanism constrains PGW's ability to continue to assist its customers in pursuing energy-efficiency opportunities. Numerous studies and reports have identified the importance of a CAM, including a 2007 EPA study[58] which stated that:

> All else being equal, if an energy efficiency program reduces sales, it reduces revenues proportionately, but fixed costs do not change. Less revenue, therefore, means that the utility is at some risk for not recovering all of its fixed costs. Ultimately, the drop in revenue will impact the utility's earnings for an investor-owned utility, or net operating margin for publicly and cooperatively owned utilities....
>
> Many observers would agree that significant and sustained investment in energy efficiency by utilities, beyond that required under statute or order, will not occur without implementation of some type of mechanism to ensure recovery of lost margins....
>
> [Adjustment mechanisms] have been designed to estimate and collect the margin revenues that might be lost due to a successful energy efficiency program. These mechanisms compensate utilities for the effect of reduced sales due to efficiency, but they do not change the linkage between sales and profit.... (pp. ES2–ES3)
>
> The objective of an energy efficiency program is to cost-effectively reduce consumption of electricity or natural gas. However, reducing consumption also reduces utility revenues and...lower revenues often lead to under-recovery of a utility's fixed costs. This, in turn, can lead to lower net

[58] United States Environmental Protection Agency. "Aligning Utility Incentives with Investment in Energy Efficiency." (December 2007)

operating margins and profits and what is termed the *"lost margin"* effect. (p. 2–3)

3.1.2. Cost Recovery Precedence

All utilities that pursue energy-efficiency programs, and the regulators that encourage them, face the problem of lost contribution to fixed costs. Most jurisdictions have dealt with this issue, using one of the following policy options:

- Nineteen of the fifty states and three of the ten Canadian provinces avoid this problem for gas utilities by fully or partially disassociating utility revenues from sales, so that reductions in sales from energy-efficiency or any other cause do not reduce the utility's ability to cover its costs and increases in sales do not result in increased earnings for the utility.[59] At least 44 utilities are covered by these ratemaking structures.
- Of the remaining states, six have mechanisms for gas utilities similar to PGW's proposed mechanism.[60] At least 22 gas utilities are subject to CAM mechanisms.

The table below lists those jurisdictions, along with the smaller number of jurisdictions that have similar treatment for electric utilities.

TABLE 35. UTILITIES COVERED BY CAM, BY STATE

	Number of Companies Covered		
State	Electric	Gas	Gas & Electric
AR	3	3	0
AZ	1	1	1
CT	0	3	0
IN	4	0	0
KS	2	0	0
KY	3	4	4
LA	1	0	1
MA	2	2	2
MT	1	2	1
NC	3	0	0
NH	1	0	1
NV	2	0	0
NY	2	3	3
OH	4	0	0
OK	3	0	3
ON	1	2	1
OR	1	2	1
SC	3	0	3
WY	1	0	1

[59] Some jurisdictions (e.g., Hawaii, Nova Scotia, New Brunswick, Prince Edward Island) have very limited gas service territories.

[60] Four states and one province use a mix of decoupling and CAM mechanisms, for different utilities and/or customer classes.

Jurisdictions	18	9	12
Companies	38	22	22

In approving the conservation adjustment mechanism for Northwest Energy, the Montana Public Service Commission found that, "the lost revenue disincentive is real and puts at risk a full and complete ramp-up of cost-effective energy efficiency resource acquisition programs in the near-term." (Docket No. D2004.6.90, Order No. 6574e, December 16, 2005, ¶156)

3.1.2.1. Impact of Utility Type on Cost Recovery

Any utility that encourages energy efficiency by its customers incurs a cost related to lost contribution to fixed-cost recovery, but that effect is more important for gas utilities than for electric utilities, for four reasons:

1) Most electric utilities have continued to experience sales growth, certainly before taking energy-efficiency programs into account and in most cases even net of program effects. For example, the 2014 PJM Load Forecast Report projects that each of the entirely Pennsylvania utility zones (PECO, Penn Electric, Met Ed, PPL, DQE and UGI) will experience energy load growth of 0.9 percent to 1.7 percent annually through 2024. Thus, the lost contribution to fixed costs may be offset by increased contribution to fixed costs by increased sales. Like many gas utilities, PGW has been experiencing flat firm heating and non-heating sales growth and thus lacks that offset. As the NARUC publication "Decoupling For Electric & Gas Utilities: Frequently Asked Questions" (September 2007) explained in the context of decoupling:

> Decoupling is fundamentally the same for both gas and electric utilities. They both share similar cost structures which are dominated by high fixed costs. However, the two industries are facing different underlying trends in customer revenues. While the gas industry generally faces declining average revenues per customer over time, the electric industry is experiencing increasing average revenues per customer. As a result, gas utilities tend to face revenue and profit erosion between rate cases, while electric utilities garner increasing revenue and profits between rate cases.

2) Almost all electric utilities have demand-related infrastructure expansion projects planned over the relatively near term. The PJM Forecast shows peak load growing 0.9 percent to 1.5 percent annually in the summer and 0.6 percent to 1.4 percent in the winter through 2024, for the various Pennsylvania utility zones. Even EDCs that have no growth in total load generally have some areas that are experiencing load growth (due to new construction, redevelopment or increased penetration of air conditioning, computer equipment, or other uses), requiring upgrades of transmission and distribution equipment. PGW, like many gas utilities serving older urban areas, has little or no planned load-growth-related infrastructure investment to defer. Even if some load-related investments were deferrable, the long lead-times for underground gas-main expansion would result in PGW having less opportunity to avoid distribution investments in the short term than the EDCs, with their overhead electric lines. PGW

hence has no opportunity for offsetting lost contribution to fixed costs by reducing the growth in fixed costs, especially over the few years between rate cases.

3) Electric utilities have some categories of equipment, especially substation transformers, underground cables, and line transformers, that wear out faster when loaded more heavily in their safe operating range. High load results in a higher operating temperature, which degrades insulation more quickly. In contrast, LDCs have little (if any) equipment that wears out as a function of usage, so the lost contribution to fixed costs from energy-efficiency programs is not offset by reductions in load-related equipment failure.

4) Lastly, gas distribution equipment tends to have longer useful lives than electric distribution equipment, so gas rate base (in the absence of additions and replacements) declines more slowly between rate cases than electric rate base. For example, while PGW's average depreciation rate is about 2.3 percent, including meters and associated plant at 2.5 percent, services at 2.6 percent, and mains at 1.6 percent, sample EDC distribution plant depreciation are at 3.2 percent annually, including conventional meters at 9.5 percent, smart meters at 6.9 percent, services at 3.2 percent, and distribution lines at about 2.5 percent, substations at 3.6 percent and line transformers at 3.3 percent, reducing rate base and the need for supporting capital one-third faster than PGW. [61]

The four reasons above clearly illustrate that natural gas utilities face a greater disincentive to offering energy efficiency programs compared with electric utilities. Unlike electric utilities, there is little benefit to the natural gas utility for offering DSM programs. For this reason, the disincentive must be reduced through mechanisms such as the CAM which reduces the financial burden allowing for a broadening of DSM program offerings.

3.1.3. History of PGW Unrecovered Costs from its DSM Efforts

PGW'S CURRENT SUITE OF DEMAND-SIDE MANAGEMENT PROGRAMS HAS OPERATED SINCE FY 2011[62], REDUCING CUSTOMER CONSUMPTION AND BILLS, AND HENCE PGW BASE REVENUES, WITHOUT ANY OFFSETTING MECHANISM.

Table 36 provides a rough estimate of the reduction in PGW's revenues due to its energy-efficiency efforts, including actual installations through June FY 2014, estimates for the rest of FY2014, and projections for FY2015, based on the FY2015 Implementation Plan. For simplicity, this rough computation assumes that the average measure saves half a year of savings in the year it is installed.[63]

[61] For PGW depreciation rates, see Philadelphia Gas Works Depreciation by PUC Code, Year Ended August 31, 2009, Response to Filing Requirement 53.52 (c)(4), December 2009 .
[62] PGW has operated a low income usage reduction program for several decades prior.
[63] In the CAM, PGW would compute the efficiency savings by month.

TABLE 36. REDUCTION IN PGW BASE REVENUES, FY2011 TO FY2015 (NOMINAL)

Fiscal Year of Installation	2011	2012	2013	2014	2015	2016	2017	Total
2011	$73,708	$147,384	$147,289	$140,665	$140,665	$140,665	$140,665	$931,042
2012	-	$161,180	$322,284	$306,368	$304,864	$304,864	$304,864	$1,704,424
2013	-	-	$271,566	$520,126	$514,072	$508,066	$508,066	$2,321,895
2014	-	-	-	$269,113	$538,227	$534,008	$529,789	$1,871,136
2015	-	-	-	-	$325,776	$651,552	$651,552	$1,628,879
Annual Total	$73,708	$308,564	$741,139	$1,236,272	$1,823,604	$2,139,154	$2,134,935	
Cumulative Total	$73,708	$382,272	$1,123,411	$2,359,683	$4,183,287	$6,322,441	$8,457,376	

Through the end of FY 2015, estimated unrecovered delivery revenues would amount to about $4.2 million. Furthermore, ongoing annual losses from DSM Phase I activities will continue to accrue until the next base rate case proceeding. Assuming new rates go into effect in FY 2018, for instance, PGW will have incurred approximately $8.5 million (Nominal) in unrecovered delivery revenues.

3.1.4. Conservation Adjustment Mechanism Implementation

PGW's proposed CAM has been designed to establish a simple process that provides a thorough and unbiased accounting of PGW's costs. PGW has researched "simple" mechanisms at other utilities to draw on for the CAM design. The CAM mechanism the PGW proposes is based largely on the design of the mechanism currently utilized by natural gas utilities in Connecticut.

PGW's CAM will be included in and consistent with existing filings for program plans and budgets, and rely on known rate components and the assumptions used in other energy-efficiency programs nationwide. The CAM would also include reconciliation to ensure that the ECRSS reflects actual program achievements.

The CAM proposed by PGW would include four steps, as follows:

1. In the annual implementation plan filing roughly four months prior to the start of a program year, PGW would include an estimated forecast of CAM costs for the next fiscal year. If no significant program changes warrant an implementation plan to be filed, PGW will file a standalone estimate forecast of CAM costs for the next fiscal year.

2. The CAM, computed as described below, would initially be included in the Efficiency Cost Recovery surcharge starting September 1, 2015. The CAM factor would be computed to be constant over the fiscal year, although the quarterly filings may correct for over- or under-collection.

3. Each annual filing would include an over/under reconciliation of the CAM projection for the twelve months ending February of that year based on actual installations in that twelve-month period, as described below. The February to May period allows for verification of the actual installation count and characteristics.

4. In subsequent years, the CAM would include the continuing revenue effects from measures installed in previous fiscal years. The conservation adjustment would be reset to zero on the effective date for new rates after each base-rate proceeding. While PGW incurred margin losses from the programs in Phase 1, PGW will not include those reduced sales for the Phase 2 ECRSs.

The forecast conservation adjustments for each class will be computed from the product of (1) the class's delivery charge times (2) the projected Ccf savings by that class in the fiscal year, divided by the forecast sales to the class. The projected savings for the class will be the summation over measures to be installed of the following four factors:

1. The estimated annual weather-normalized Ccf reduction per unit installed.

   To the extent feasible, the savings would be calculated based on approved and third-party evaluated TRM savings. The latest TRM updates will continue to be used for all savings calculations, including for conservation adjustment calculations. PGW employs state-of-the-art third-party evaluation processes for confirming the savings from its programs, as well as providing continual program improvement in terms of delivery effectiveness and computational accuracy. The latest evaluation results available, as reflected in the TRM, will be used in each quarterly adjustment.

2. The estimated net-to-gross ratio for the measure.

   The net-to-gross ratio for each program is currently assumed to be 1.0. This estimate will be updated as data become available through the third-party program evaluations.

3. The number of units planned for installation in the program year.

4. The fraction of the year for which the average savings unit would be effective.

   The savings would be assumed to start in the middle of the month of measure installation, or for new construction, the month the building starts using gas, if that is later than the installation date. Savings in the fiscal year would be prorated from the date the installation became effective to the end of the fiscal year. The savings would be prorated as follows:

   - 100 percent of annual savings for measures installed before September 1, but after the later of (1) September 1, 2015 and (2) the effective date of the latest rate case.

   - For non-heating measures, in proportion to days from the middle of the installation month to the end of August, divided by 365,

- For heating measures, in proportion to normal heating degree-days (HDD), from the middle of the installation month to the end of the fiscal year, or

$$\frac{50\% \times HDD_i + \sum_{j=i+1}^{12} \text{HDDj}}{HDD}$$

The proration factors are summarized in Table 37 below.

TABLE 37. PORTION OF SAVINGS FROM MIDDLE OF INSTALLATION TO END OF FISCAL YEAR

	Non-heating	Heating
Month	Days	HDD
9	95.9%	99.6%
10	87.5%	96.4%
11	79.2%	88.0%
12	70.8%	73.1%
1	62.3%	53.1%
2	54.2%	33.4%
3	46.2%	17.3%
4	37.8%	6.4%
5	29.5%	1.5%
6	21.1%	0.1%
7	12.7%	0.0%
8	4.2%	0.0%

If the effective date of a new base rate case is expected to fall in the fiscal year, the lost-revenue computation would end at that date.

If the computation of rates in a future base rate case reflects the reduction in sales due to forecast energy-efficiency installations after the effective date of the new base rates, those sales reductions will be netted from the projected Ccf savings by class in the CAM computation, to prevent double-counting.

3.1.4.1. Reconciliation of CAM to Tracked Installations

The CAM reconciliation in each annual filing, from FY 2016 on, would closely follow the projection methodology, using all available actual installation information. The CAM reconciliation would be computed from the product of (1) the class's delivery charge times (2) the difference between that class' tracked and projected savings for the previous March to February, divided by (3) currently forecast class sales in the coming fiscal year. The tracked savings will be computed similarly to the previously projected Ccf savings, as the product of the following:

1. The estimated weather-normalized Ccf reduction per unit installed, adjusting for the mix of installation sizes and types recorded through February.
2. The estimated net-to-gross ratio for the measure, as specified in the implementation plan.

3. The number of units installed through February.
4. The fraction of the year for which the average new savings unit was effective, based on actual installations dates and the proration factors in the reconciliation year.

The number, size and effective dates for installations prior to the March to February reconciliation year would not change, unless some reporting error were to be found in the prior data.

3.1.4.2. Customer Financial Impact

Implementation of the CAM will have no negative effect on the TRC cost-effectiveness of the EnergySense portfolio because the payments are a transfer of financial benefits from customers to PGW for the cost of administering the program. However, the CAM will result in a reduced net financial benefit accrued to customers. Table 39 shows the impact on overall financial benefits from the CAM recovery, while Table 38 shows the projected annual recoveries under the Phase II Proposed scenario.

TABLE 38. TOTAL AND ANNUAL PHASE II PROPOSED SCENARIO CAM RECOVERIES

	Fiscal year	Total
Annual Nominal CAM Recoveries	2016	$103,935
	2017	$349,831
	2018	$101,161
	2019	$349,749
	2020	$608,277
	2021	$769,161
	2022	$784,544
TOTALS	Nominal	$3,066,657
	Real (2014$)	$2,719,122
	PV (2014$)	$2,288,386

TABLE 39. PROPOSED PROGRAM NET FINANCIAL IMPACTS ON CUSTOMERS

PV in 2014$	Proposed Program
TRC Benefits	$36,680,148
Delivery Charge Savings	$2,288,386
CAM Recovery	$(2,288,386)
TRC Costs	$(25,896,467)
Performance Incentive @ 100 percent	$(1,411,973)
Net Financial Benefits to Customers	**$9,371,709**

3.2. Expanded DSM Portfolio Scenario Overview

3.2.1. Scenario Overview

If PGW is granted the ability to recover fixed costs as described above, the Company would be willing to increase its DSM programming under an "Expanded Scenario." Under this scenario, PGW would be able to reach more customers through a 42 percent increase in program budgets, add programming that would not be viable under the more limited Proposed Program, lower overhead as a percentage of the portfolio spending, and significantly increase economic and financial benefits to PGW's customers and Philadelphia, including increasing TRC net benefits by $6.8 million, or 42 percent.

The higher Expanded Scenario would have a number of key differences from the Proposed Program, including:

- Maintaining the Home Rebates program as designed under Phase I, continuing the program momentum and providing significant benefits to PGW's largest customer base, instead of closing the program in FY 2016.
- Increasing the CRP Home Comfort spending by $3.8 million over the five-year period, thereby serving over 850 more low-income customers in the CRP program, and further reducing the CRP Subsidy by $3.9 million in present value of 2014$.
- Growing participation in the Residential Equipment Rebates, Commercial Equipment Rebates, and Efficient Construction Grants programs, compared to maintaining static participation levels in the Proposed Program.
- Introducing a process for developing a potential On-Bill Repayment mechanism for residential retrofit projects.
- Increasing portfolio-wide spending and marketing to support additional program activities and customer participation, while reducing the percentage of total spending going to overhead.

3.2.2. Summary of Budgets and Impacts

This section compares the projections for the main Expanded Scenario to the Proposed Program.

3.2.2.1. Comparison of Cost-effectiveness and Financial Impacts

Table 40 compares results for the TRC test for the two scenarios in the three avoided cost scenarios. In all three avoided cost methodologies, net benefits are significantly increased in the Expanded Scenario, by between 30 percent and 42 percent. In the main avoided cost scenario, this represents a nearly $4.4 million increase in net benefits.

TABLE 40. COST-EFFECTIVENESS COMPARISON BETWEEN SCENARIOS (PV 2014$)

Metric	Proposed Program	Expanded Scenario	Difference $	Difference %
Full Avoided Costs - Internalized				
PV TRC Benefits	$36,680,148	$53,728,010	$17,047,861	46%
PV TRC Costs	$25,896,467	$38,531,392	$12,634,925	49%
PV TRC Net	$10,783,681	$15,196,618	$4,412,937	41%
TRC BCR	1.42	1.39	(0.02)	-2%
Low Avoided Costs				
PV TRC Benefits	$30,861,086	$45,007,208	$14,146,121	46%
PV TRC Costs	$25,896,467	$38,531,392	$12,634,925	49%
PV TRC Net	$4,964,619	$6,475,815	$1,511,197	30%
TRC BCR	1.19	1.17	(0.02)	-2%

Table 41 compares the net financial impacts to customers from the two scenarios, using the full internal avoided cost. This analysis does not include any impacts from the stand-alone Efficient Fuel Switching Program.

TABLE 41. NET FINANCIAL IMPACTS ON CUSTOMERS SCENARIO COMPARISON

PV in 2014$	Proposed Program	Expanded Scenario
TRC Benefits	$36,680,148	$53,728,010
Delivery Charge Savings	$2,288,386	$3,363,126
CAM Recovery	$(2,288,386)	$(3,363,126)
TRC Costs	$(25,896,467)	$(38,531,392)
Performance Incentive @ 100%	$(1,411,973)	$(1,990,667)
Net Financial Benefits to Customers	$9,371,709	$13,205,951

It is also worth examining the reduction in the CRP subsidy due to CRP Home Comfort activity. The CRP Home Comfort program provides weatherization services to participants in the CRP program at no cost to the participant. However, as a CRP participant, the customer's bill is not affected by energy usage. Instead, the cost of any gas used beyond the CRP participant's asked-to-pay amount is passed on to the rest of PGW's non-CRP

ratepayers. This means that any savings realized by CRP Home Comfort are directly passed on to non-CRP ratepayers, whether they participate in any other EnergySense programs or not. Under the Proposed Program, the CRP subsidy is reduced by $8.6 million. If the Expanded Scenario is approved with the CAM, then PGW's non-CRP customers will realize an even larger CRP subsidy reduction.

3.2.2.2. Comparison of Budgets, Savings, and Participation

As shown in Table 42, the Expanded Scenario increases total portfolio spending by $9.5 million (nominal), which represents a 42 percent increase in spending over the five-year period. The largest increase is in Home Rebates, which continues to operate in FY 2017 through FY 2020 in the Expanded Scenario. Commercial Equipment Rebates sees a nearly 50 percent budget increase due to the large value of incentives provided per customer. CRP Home Comfort's budget increases 38 percent, while Residential Equipment Rebates and Efficient Construction Grants receive more modest increases. While portfolio-wide costs also rise to account for additional marketing to support market-rate program expansion, portfolio-wide costs drop from 17 percent of the total budget in the Proposed Program to 14 percent in the Expanded Scenario due to economies of scale.

TABLE 42. BUDGET COMPARISON BETWEEN SCENARIOS (NOMINAL)

Program	Proposed Program	Expanded Scenario	Difference	
			Dollars	Percent
CRP Home Comfort	$10,155,000	$13,963,376	$3,808,376	38%
Residential Equipment Rebates	3,800,000	4,167,500	367,500	10%
Efficient Building Grants	1,985,500	1,985,500	-	0%
Commercial Equipment Rebates	1,762,250	2,630,000	867,750	49%
Efficient Construction Grants	1,019,000	1,082,000	63,000	6%
Home Rebates	213,419	3,820,606	3,607,188	1690%
Portfolio-wide Costs	3,784,000	4,530,000	746,000	20%
Total	$22,719,169	$32,178,982	$9,459,814	42%

In terms of savings, first year gas savings increase by 95,754 MMBtu, or 42 percent, and lifetime gas savings rise 47 percent, as shown in Table 43. This also corresponds with a 36 percent increase in the number of participants in the EnergySense portfolio, as shown in Table 44.

TABLE 43. SAVINGS COMPARISON BETWEEN SCENARIOS

Program	Proposed Program	Expanded Scenario	Difference	
			Units	Percent
First Year Gas (MMBtu)	227,458	323,212	95,754	42%
Lifetime Gas (MMBtu)	4,389,925	6,461,028	2,071,103	47%

First Year Energy (MWh)	1,627	2,452	825	51%
Lifetime Energy (MWh)	35,760	56,480	20,720	58%

TABLE 44. PARTICIPATION COMPARISON BETWEEN SCENARIOS

Program	Proposed Program	Expanded Scenario	Difference	
			Units	Percent
CRP Home Comfort	1,909	2,767	858	45%
Residential Equipment Rebates	5,150	5,697	547	11%
Efficient Building Grants	80	80	-	0%
Commercial Equipment Rebates	720	860	140	19%
Efficient Construction Grants	210	225	15	7%
Home Rebates	50	1,386	1,336	2672%
Total	8,119	11,015	2,896	36%

3.2.2.3. Rate and Bill Impacts

Table 45 shows the incremental annual bill impacts for the Expanded Scenario. Bill impacts are still minimal, with most customers seeing less than a 1 percent rise in total bills. For residential, the Expanded Scenario represents an average monthly bill increase of only $0.27 over the Proposed Program. For Commercial customers the average monthly bill would increase approximately $1.08 over the Proposed Scenario.

TABLE 45. INCREMENTAL BILL IMPACTS FOR EXPANDED OVER PROPOSED SCENARIO

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Average Monthly Bill Impact ($)					
Non-CRP Residential	$0.21	$0.28	$0.26	$0.30	$0.29
Commercial	$0.51	$0.92	$1.09	$1.35	$1.51
Industrial	$1.86	$2.84	$3.21	$3.90	$4.27
Municipal	$1.64	$1.85	$1.68	$1.84	$1.90
Housing Authority - GS	$0.35	$0.44	$0.41	$0.44	$0.40
Housing Authority - PHA	$0.93	$1.08	$1.01	$1.12	$1.17
Average Annual Bill Impact (Percent)					
Non-CRP Residential	0.2%	0.3%	0.3%	0.3%	0.3%
Commercial	0.1%	0.2%	0.3%	0.3%	0.4%
Industrial	0.2%	0.2%	0.3%	0.3%	0.4%
Municipal	0.2%	0.2%	0.2%	0.2%	0.2%
Housing Authority - GS	0.3%	0.4%	0.3%	0.4%	0.3%

Housing Authority - PHA	0.1%	0.2%	0.1%	0.2%	0.2%

3.2.2.4. Comparison of Annual Incentive Amounts

Table 46 shows the change in annual nominal performance incentive amounts. The potential performance incentive increases 42%, the same percentage amount as the Expanded Scenario budget, since the performance incentive is calculated as a percentage of the budget.

TABLE 46. COMPARISON OF PERFORMANCE INCENTIVES BETWEEN SCENARIOS

Year	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2016 - FY 2020
@100 Percent of Target						
Base	$338,195	$343,463	$329,021	$352,890	$340,369	$1,703,938
Expanded	$426,223	$468,694	$470,606	$521,158	$526,742	$2,413,424
Maximum Award						
Base	$450,927	$457,950	$438,695	$470,520	$453,825	$2,271,917
Expanded	$568,297	$624,926	$627,474	$694,878	$702,323	$3,217,898

3.2.3. On Bill Recovery

3.2.3.1. Proposed Process and Goals

Financing for energy efficiency projects has been a critical issue facing PGW's EnergySense programs. Through its CIRI and Home Rebates programs, PGW has provided customers with general assistance to obtain financing, but the offerings have remained independent of the programs as currently designed. Under the Expanded Scenario, PGW would propose to develop a working group of stakeholders and industry experts to research and propose an on-bill recovery ("OBR") mechanism that would offer PGW customers a simple and accessible financing option for EnergySense projects.

The goal of the working group would be similar to that of the Commission's On Bill Financing Working Group ("OBFWG"). PGW would task the group with investigating best practices and working models of OBR that address the design constraints and meet the needs of customers. PGW would chair the OBFWG to guide the working group discussions, as well as to present the Company's interests and concerns in ensuring an effective and viable OBR model. PGW would then be interested in implementing a final model developed through the discussions, so long as all critical PGW criteria are met.

3.2.3.2. Working Group Design

To explore the design and implementation of OBR, PGW will assemble a working group of stakeholders from the industry to identify the appropriate model for PGW's customers. This approach offers parallels to OBFWG. Similar to OBFWG, the PGW OBR working group would include representatives from consumer advocacy groups, business and industry trade groups, and interested stakeholders in Philadelphia. PGW would seek members that could characterize the needs of its customers likely to utilize OBR. The working group would also

include industry experts to provide background on successes and failures from other similar comparable programs at natural gas utilities elsewhere in the country.

The OBFWG report identified two potential models to consider for implementation in Pennsylvania. The models outlined in the OBFWG report and the research conducted by the group, provide strong background materials that PGW's working group will reference in its research of a viable OBR model for PGW.

3.2.3.3. Key Considerations

PGW has engaged in a preliminary analysis in determining whether any OBR mechanism could be viable, given applicable legal, regulatory, and business considerations. Initial findings justify the proposed external working group process for further exploration. However, at minimum, the following issues would need to be addressed:

- Legal restrictions and requirements: All appropriate lending laws and regulations would need to be addressed; relevant local and state requirements regarding financing limitations must be adhered to; in general, all compliance must be ensured without introducing undue burden to the Company;
- PGW bond covenant requirements: Program protocols regarding the application of customer payments would be required to observe relevant requirements in PGW's bond covenants;
- PGW tariff and rate impacts: Further modifications needed would be addressed in any forthcoming OBR proposal program filing;
- Lending product requirements and criteria: The financing would have to be designed to strike a balance between attractiveness and ease for customers while still providing adequate security and assurance for participating lenders
- PGW billing system capabilities, and upgrade costs and recoveries: Initial scoping demonstrates that any OBR mechanism would necessitate a considerable upgrade to PGW's current billing and collections IT infrastructure. As identified in the PUC OBFWG, appropriate recovery of these upfront costs must be ensured in order to allow the Company to proceed with the build. PGW would address this in any forthcoming OBR proposal program filing.

3.2.3.4. Costs

OBR development costs would be accounted for at the DSM portfolio level. The OBR working group will be a pilot program not associated with any direct benefits that can be accounted for within the TRC. As such, costs incurred by the working group will be reported on outside of the TRC cost-effectiveness for the DSM portfolio.

4. Performance Incentive

4.1. Proposed Incentive Model

This section provides the proposed implementation of the proposed Performance Incentive mechanism introduced in the Proposed Plan Scenario Overview section 2.1.10. As discussed in that section, PGW's proposed model includes four major components: total cap; a minimum threshold to trigger incentives; individual performance targets to calculate incentives; and a scaled design to encourage meeting & surpassing targeted goals

For national comparisons regarding the first component Table 47 lists the maximum incentive as a percentage of energy-efficiency spending, for nineteen jurisdictions.[64] The various jurisdictions compute the incentives in different ways, but the incentive cannot be greater than the listed percentage of spending.

TABLE 47. ENERGY-EFFICIENCY INCENTIVE CAPS AS PERCENT OF SPENDING

Jurisdiction	Covered Program Administrators	Fuels	Incentive as % of Program Costs	
			Cap	Recent Actual or Expected
Arizona	APS	Electric	20%	11%
Arkansas	All	Electric & Gas	7%	
California	All Major IOUs	Electric & Gas	10.9%	
Colorado	Xcel, Black Hills	Electric	20%	
		Gas	25%	
Connecticut	All IOUs	Electric & Gas	8%	
District of Columbia	DC Efficiency Utility*	Electric & Gas	4.2%	
Georgia	Georgia Power	Electric	No cap	10%
Hawaii	Hawaii Energy*	E&G	2.4%	
Kentucky	All IOUs	Electric	10%–15%	
Massachusetts	All IOUs	Electric & Gas	5.5%	
Michigan	All Major IOUs	Electric & Gas	25%	15%
Minnesota	All Major IOUs	Electric & Gas	30%	
Nevada	NV Energy	Electric	5%	
New Hampshire	All IOUs	Electric & Gas	12%	8% for Gas
North Carolina	Duke, Dominion	Electric	Set by case	26%
Ohio	FirstEnergy, AEP, Duke	Electric & Gas	15%	
Oklahoma	PSO, OG&E	Electric	15%	
Rhode Island	National Grid	Electric	4.4%	
Texas	Electric & Gas	Electric	20%	

[64] The source for incentive cap data is Toronto Atmospheric Fund. *2014 OEB Gas DSM Framework Issue Paper: Savings Goal and Budget Settings.* August 11, 2014. Page 37.
The source for recent actual or expected values is Navigant. "Show Me The Money: A Review of Recent Utility Energy Efficiency Performance Incentive Design." 2013 (http://aceee.org/files/pdf/conferences/eer/2013/2C-Galvin_0.pdf)

Vermont	Efficiency VT*	Electric & Gas	4.1%
*** Program administrator is non-utility third party, without incentive to prefer load growth.**			

The incentive cap as a percentage of expenditures ranges from 4 percent–4.4 percent in Vermont, DC and Rhode Island, to 30 percent in Minnesota and no cap in Georgia or North Carolina. For the first framework component (setting the potential total incentive), PGW proposes that the maximum annual incentive pool be calculated as 10 percent of proposed annual budgets.[65] The 10 percent proposed by PGW is in the lower half of the range.

The maximum incentive would represent $2.1 million over the Phase II five-year period in real 2014$ ($2.3 million in nominal terms), with an incentive pool of 75 percent of the maximum if targets are met, as shown in Table 48.

TABLE 48. PROPOSED PERFORMANCE INCENTIVE POOL BY YEAR FOR THE PROPOSED PROGRAM

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2016 - FY 2020
Incentive @ 100 Percent of Target						
Nominal	$338,195	$343,463	$329,021	$352,890	$340,369	**$1,703,938**
2014$	$327,219	$325,846	$305,980	$321,742	$304,243	**$1,585,029**
Maximum Incentive						
Nominal	$450,927	$457,950	$438,695	$470,520	$453,825	**$2,271,917**
2014$	$436,291	$434,461	$407,973	$428,989	$405,657	**$2,113,371**

The maximum incentive pool for each year is set at 10 percent of the proposed budget.

For the second component, PGW believes that an appropriate measure of overall portfolio effectiveness is the portfolio TRC BCR, which shows the ratio of benefits to society for every dollar of cost incurred by society. PGW proposes that it should only be eligible to receive a performance incentive if it achieves a TRC BCR of 1.0 or higher in a given year. This level is designed to ensure that the overall portfolio is providing a return on ratepayer investment before any incentives may be provided. If the portfolio delivers the required ratio of benefits to costs, PGW would be eligible for performance incentives for that year, but would not receive any incentive unless it achieves the performance targets listed below.

For the third component, PGW proposes the performance targets and weightings presented in Table 49. Each of the target levels is based on the Phase II Proposed Program as presented in this plan.

[65] While the maximum incentive pool will be set at 10%, PGW will need to significantly over perform against current targets to achieve this amount. As discussed further below, achieving targets set in the plan will translate to an incentive pool of slightly less than 6% of annual budgets.

TABLE 49. PROPOSED PERFORMANCE INCENTIVE TARGETS FOR PROPOSED PROGRAM

Target Number	Performance Target ("PT")	Description	Policy Goal Advanced	Incentive Weight	Threshold Percent of Target Required	Percent of Incentive Achieved at Target	Percent of Target required for Maximum Incentive	FY16 - FY20 Target	FY16 - FY20 Max Incentive Amount (Nominal)
1	Natural Gas Savings	Lifetime Incremental reduction in gas consumption (MMBtu/yr.).	Meeting or exceeding the portfolio's main goal of natural gas savings.	50%	70%	75%	120%	4,389,925	$1,135,958
2	Net TRC Resource Benefits	Present worth of projected natural gas, electricity, and water resource savings net of program and customer costs.	Equity for society by assuring that the total benefits are greater than the costs incurred to implement and evaluate DSM Plan.	50%	70%	75%	120%	$10,287,670	$1,135,958
TOTAL				**100%**					**$2,271,917**

While the maximum incentive pool would be $2.3 million over five-years, this could only be achieved by 20 percent over-performance in all performance measures, compared to targets. If PGW just met each of the performance targets in Table 49 the incentive pool for the Phase II Proposed Program period would be $1.4 million in Present Value (2014$) or $1.7 million dollars (in nominal terms), 75 percent of the maximum incentive, or $340,788 per year.

4.2. Examples

Since the proposed performance target payouts differ by minimum and maximum percentage thresholds, it is helpful to understand how this model looks in practice, and how different performance targets compare to each other. The following figures show how payouts for two different performance targets vary based on the percentage of the targets achieved. These examples are for the Proposed Program, and simplified to cover the entire Phase II period, instead of individual program years. The figures show no incentive until the threshold percentage is reached, after which the incentive increases linearly until 100 percent of the target is met, then the slope of the incentive increase is reduced until the incentive reaches the maximum value, after which the incentive stays the same.

FIGURE 8. EXAMPLE OF INCENTIVE AWARD FOR NATURAL GAS SAVINGS (TARGET #1)

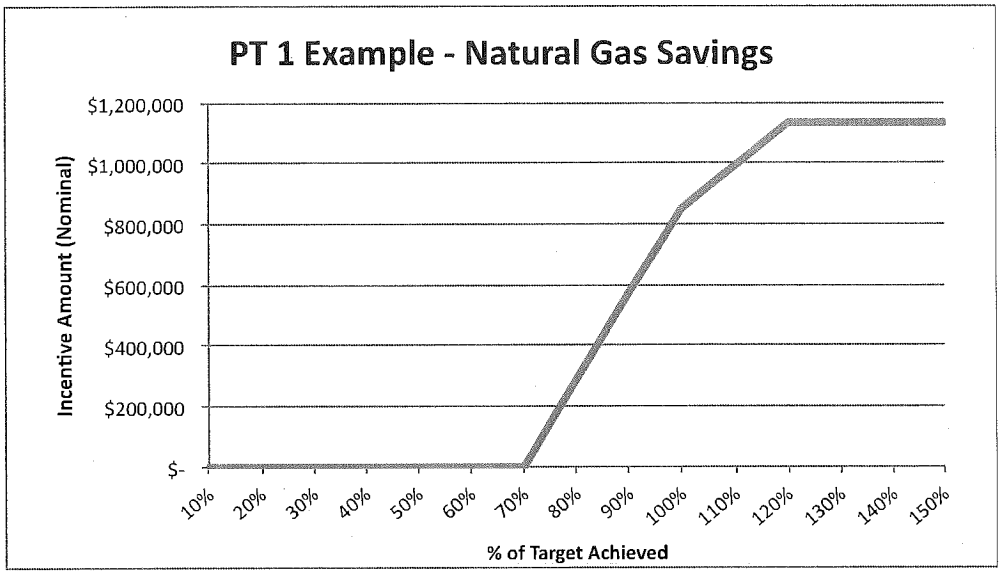
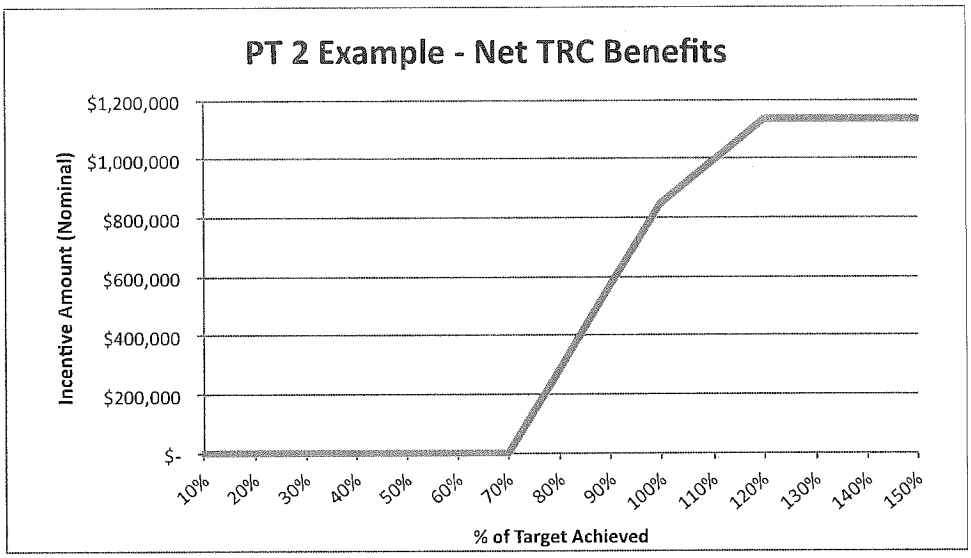


FIGURE 9. EXAMPLE OF INCENTIVE AWARD FOR NET TRC BENEFITS (TARGET#2)



4.3. Reconciliation and Updating of Incentive Computations

PGW would submit the incentive computations to the Commission in the annual report filed four months following the end of the fiscal year, based on actual installations in the previous year. Incentive computations should use the best information available at the time the utility is implementing the program. The purpose of the incentive is to encourage PGW to most effectively meet the EnergySense objectives approved by the Commission.

Five categories of inputs to the incentive computation may be updated between the Commission's approval of this plan and the final incentive payment following the final recovery filing:

1. annual MMBtu savings per measure or installation
2. net-to-gross ratio
3. measure lifetime
4. participant cost
5. avoided costs

For computing incentives, these inputs should be updated only for estimating the effects of future installations, not retroactively for measures that have already been implemented. If a particular measure is calculated as having net benefits of $500 per installation at the time that the utility is committing to the installations, PGW would be able to count on that value in estimating the incentive it will earn from prudently implementing the approved program.[66] Increasing the estimated savings or benefits from actions already undertaken will not provide any incentive for PGW to do a better job. Indeed, changing the assumptions after the fact is likely to give inconsistent signals and undermine the relationship between

[66] PGW would remain at risk for imprudence in administration of the DSM program.

achievements and rewards.[67] If the changes in assumptions are large enough, PGW would file for a revision of the incentive formulas going forward to reflect the new input data.[68]

Third-party evaluations conducted in all programs, as currently deployed in Phase I, will be used to confirm or dispute assumptions used in the calculation of the incentives. PGW will review the evaluation findings and determine and whether to change its assumptions.

[67] The one exception to this rule is that, to the extent that the *a priori* average savings estimate per participant is based about assumptions about the types or sizes of customers participating in the program, and the actual participant mix is much different from those assumptions, the average savings estimate should be updated to reflect the actual customer mix.

[68] The only input assumption likely to have large effects on the overall portfolio incentive would be the avoided costs. If gas-price projections rise dramatically from those in the current filing, PGW would be able to exceed performance target two (net TRC benefits) with relative ease, undermining the purpose of the incentive. In order to maintain balance in the incentive structure, the performance target for the remaining years would need to be increased, to make the incentive more difficult to achieve.

5. Phase II Portfolio and Program Plans

5.1. Portfolio Implementation and Management

5.1.1. Program Administration and Management

Program administration and management refers to the set of functions associated with designing, developing, planning program services and activities; contractor selection and management; data management and reporting; and inspection, verifications, and evaluations across the various DSM programs. The scope of PGW's implementation management responsibilities under Phase I encompassed:

- Vendor and CSP management
- Marketing and business development activities
- Customer recruitment and intake
- Inspection and verification administration
- Data management and assessment

During Phase II, PGW will continue to assume portfolio administration and management roles. In addition to the general design, management and implementation activities, PGW will continue the following program-specific activities:

1. In CRP Home Comfort PGW will continue to manage all conservation service providers ("CSPs") responsible for installations, manage customer selection activities and data management, and oversee program coordination activity.
2. In both Equipment Rebate programs, PGW will oversee vendors conducting administrative program activities, and will administer all program marketing and business development activities. PGW will also perform all application intake, cost-effectiveness screening and rebate calculation activities for custom equipment rebates.
3. In Efficient Building Grants and Efficient Construction Grants PGW will continue to perform most of program administration, cost-effectiveness and grant calculation and processing, and all marketing and business development activities.

PGW will continue to hire and oversee consultants to provide various program implementation and technical review tasks. Although the specific activities will vary between programs, the following are the general roles and responsibilities of the program implementation, installation and technical review vendors.

Program Development Consultants

In Phase I, PGW engaged a Program Development Consultant that provided program design, analysis, reporting and other technical support services. Under Phase II PGW may seek to expand this role to seek additional opportunities for streamlined program delivery through increased vendor administrative roles within the programs. Activities for this vendor include:

- providing project financial and economic analysis tools, training PGW staff and vendors on the use of the tools;

- reviewing applicable measures for economic cost-effectiveness and recommending incentive strategies;
- providing analysis assistance on individual projects as needed, reviewing project cost and savings calculations; and
- conducting analysis on portfolio and program-level results.

Program Administrator

In the Home Rebates program, the Program Administrator ("PA") is responsible for contractor oversight, including training, mentoring, reporting, and inspections; rebate processing; and programmatic communications and marketing activities.

Certified CSPs

In the Home Rebates program, certified CSPs are responsible for selling projects, performing audits, and installing measures. Approved Home Rebates contractors are required to have Building Performance Institute (BPI) Building Energy Analyst or Energy Auditor certification for those developing and selling work scopes, and Crew Leader certification for those supervising crews' installations.

Program Evaluator

In Phase I, PGW contracted with a firm to conduct third-party evaluations for all EnergySense programs. The evaluator was responsible for analyzing pre and post usage data of participants, analyzing program tracking data, conducting follow-up interviews with customers, if necessary, and reporting findings to program administrators. PGW will utilize the same process in Phase II, hiring a single third-party vendor to conduct biennial evaluations on all EnergySense programs.

Quality Control Inspector

In FY 2015, PGW selected a single vendor to provide verification inspections of 5 percent to 10 percent of installations in the residential rebate program and 10 percent to 25 percent of installations in the commercial rebate program. The firm also conducted quality control inspections, and contractor mentoring services for the ELIRP program. PGW intends to continue these inspection and verification functions into Phase II.

Rebate Processor

In FY 2015 PGW conducted an RFP process to hire a single Rebate Processor to setup and manage the system for providing rebate payments to customers for all EnergySense programs. The Rebate Processor will be responsible for the processing of rebate applications from start to finish for the equipment rebate programs, including collecting applications, checking eligibility, and either sending a rebate check or notifying the applicant with the reason for rejection. For the Efficient Building Grants and Efficient Construction Grants programs the rebate processor will be responsible for issuing payments for upstream incentives as the program is developed.

Outreach Consultants

An outreach firm, under PGW direction, will perform outreach to customers, contractors, supply houses, manufacturers and others among the supply chain to promote PGW's Equipment Rebate programs. The firm will participate in trade expos on PGW's behalf, and conduct trainings for trade allies to learn about the benefits of high efficiency equipment and of participating in PGW's EnergySense programs.

Trade Allies

Trade Allies are critical to the success of the Residential Equipment Rebates program due to their role as chief influencers of residential customers' purchasing decisions. Although the relationship with the program will remain informal during Phase II, PGW will seek to provide additional support and marketing resources to support increased participation from this group.

Technical Assistance Provider

In Phase I, PGW engaged Technical Assistance Providers ("TAP") to provide project review, and costs and savings analysis for the Efficient Building Grants and Efficient Construction Grants programs. PGW will continue to utilize the services of a TAP for both of these programs, and may expand the roles to task the vendor(s) with the additional following responsibilities during Phase II:

- Lead development: PGW will provide incentives to the TAP for generating project leads that result in completed projects
- Application screening and review: process new applications and screen for eligible measures.
- Site walkthroughs: the TAP may offer qualified customers an initial walkthrough to identify potential upgrade opportunities. Customers will be provided with a list of potential retrofit opportunities that can be used in conversations with contractors.
- Project review activities will continue to include analysis of the costs and savings conducted during Phase I, and will be expanded to include cost-effectiveness review of the projects.
- Project verification inspection: the TAP will provide a verification inspection to confirm installation of the efficiency measures.

5.1.2. Marketing

PGW's marketing plans for the DSM portfolio have evolved significantly over the portfolio's five-year implementation. As a new-to-market brand, PGW's initial marketing activities focused on individual program's lead generation and portfolio-wide brand building under the EnergySense name to build awareness in the market. Due to the staged program launches, PGW did not have programs that universally applied to all customer classes until the fourth year of implementation. This created challenges because the broad marketing campaigns that were necessary to build brand awareness would not have been cost-

effective methods to generate leads. As a result, in Phase I PGW staged its marketing activities along with the programs.

By the end of Phase I, PGW began to expand marketing activities to the portfolio-level. This provided greater flexibility in developing broader customer awareness about the EnergySense programs. PGW's marketing activities comprised of three primary categories:

5.1.2.1. General Awareness and Brand Building

To promote its DSM portfolio and other customer programs, PGW developed the EnergySense brand, which launched in 2011[69]. The new brand was promoted, along with other customer programs, through a new website, www.PGWenergysense.com, which provides easily accessible information about rebates and incentives available from all company departments.

As new programs came to market, PGW had to build general awareness among customers to make it a recognizable source for energy efficiency solutions. PGW developed the EnergySense brand as a resource for energy efficiency through broad marketing campaigns including:

- Broadcast radio and television campaigns;
- Newspaper, magazine and billboard advertisements;
- Online advertisements[70];
- Event sponsorships; and
- Earned media activities through press releases and media events;

PGW's general awareness and brand building increased significantly in FY 2014 to mark the launch of the Home Rebates program. With the launch of this program, PGW had a full portfolio of offerings that could serve any firm customer class. PGW's general awareness marketing led with the Home Rebates program beginning in FY 2014 as the program was identified as having the greatest market potential among PGW's customer base.

Although the impact of these activities is difficult to quantify, PGW has found a direct correlation with increases in its brand building activities to increased traffic to its EnergySense website as well as a growth in the number of participating trade allies, discussed below.

During Phase II, PGW will continue to increase market general awareness and brand building activities. This increase will include similar tactics as in Phase I. Program-specific plans and impacts are described in greater detail in the program plan sections that follow.

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[69] The DSM program was originally branded as "EnergySense" in FY 2011 for customer marketing purposes. The EnergySense brand now covers additional PGW customer programming beyond DSM. Only approved DSM program activities are funded through the DSM surcharge.

[70] For example of video advertisements and testimonial videos visit www.youtube.com/user/PhillyGasWorks and click on "PGW EnergySense" labeled links.

5.1.2.2. Equipment Supply Chain Engagement

PGW's supply chain engagement encompasses all activities targeting equipment suppliers, project designers, installers, manufacturers, and an assortment of related categories. The goal of outreach project intermediaries and influencers was to educate the individuals that supplied and recommended equipment and project designs. PGW's decision to engage supply chain actors as primary marketing targets was informed by industry best-practices. Outreach to supply chain actors included:

- Training sessions;
- Outreach at points of sale;
- Development of a trade ally e-newsletter with over 800 subscribers, providing monthly EnergySense program updates and industry news;
- Presentations at trade associations, seminars, conferences and individual company sessions.

In reactionary programs, where customers replace equipment because it fails rather than through a planned retirement, customer decisions are influenced most by equipment installers. EnergySense Equipment Rebates is one example of a reactionary program. Customers rely on the expertise of their service provider to recommend suitable equipment. By targeting supply chain actors on the benefits of high efficiency equipment and the financial incentives available, PGW's marketing expenditures had a broader impact than just targeting individual customers. This was confirmed through customer feedback collected on program applications. Nearly 48 percent of customers that applied to the commercial and residential Equipment Rebates programs since the programs' launch indicated that they learned of the program through their HVAC installer or plumber.

During Phase II, PGW will continue its supply chain outreach activities as a primary driver of program participation. Proposed increases to build on these activities are described in greater detail in the program plan sections that follow.

5.1.2.3. Direct to Customer Marketing

PGW's direct to customer marketing tactics were secondary to the Supply Chain engagement during the portfolio's first several implementation years. However, as the portfolio grew to include programs that focused on less of a reactionary market, such as the retrofit programs, PGW increased its marketing activities accordingly. The direct to customer marketing was focused primarily on the comprehensive programs, which are intended on influencing discretionary actions. The messages for these marketing activities were focused primarily on the end-use benefits. Messaging to business owners or property managers was focused on energy and operating cost savings that could result from whole-building improvements through the Building Grants program. Messaging to homeowners focused on improvements to home performance affecting comfort, health, safety and finances, which could benefit from the Home Rebates program.

Direct to customer marketing activities included the following tactics:

- Communications in PGW's bill newsletter, which was the referral source for 14 percent of Equipment Rebate applicants;

- Direct mailers based on customer type and usage patterns;
- Participation in consumer-focused events and trade shows; and
- In-person direct outreach

Direct to customer marketing proved to be effective when informed by the customers' specific needs, particularly for business customers. In PGW's comprehensive commercial programs, the majority of customers participating in the comprehensive programs were leads developed through direct-to-customer outreach. Although time consuming and more expensive than other methods, these activities can have a higher conversion rate than other marketing activities.

During Phase II, PGW will plan to increase direct-to-customer marketing activities. These communications will be informed by past participation, interest, and usage. The proposed increase will include the same tactics as Phase I but with greater targeting and frequency. Program-specific plans and impacts are described in greater detail in the program plan sections that follow.

PGW will also launch two new tools providing customized energy guidance and improved online data access. An E-Audit tool will be developed for residential customers to analyze their natural gas usage in comparison to baselines, and identify easy steps to conserve energy. Commercial customers will gain access to their data through an online usage upload tool that will allow for direct integration with ENERGY STAR® Portfolio Manager, so they can analyze usage patterns and identify energy saving opportunities.

5.1.3. Coordination Activities

During Phase II, PGW will continue many of its current collaborations listed in Figure 10, with updates to improve service deliver. PGW will also seek new opportunities to improve its service delivery through increased collaboration with local and regional organizations.

FIGURE 10 CURRENT ENERGYSENSE COORDINATION ACTIVITIES

Program/Organization & Description of Coordination
Clean Air Council PGW has collaborated with the Clean Air Council in applying for grants in order to prepare certain housing stock in some of the poorest neighborhoods of Philadelphia to allow installation of free weatherization services provided the Philadelphia Gas Works (PGW). The collaboration sought external grants to fund the pre-treatment of existing structural, health, and safety issues in order to qualify households to participate in PGW's CRP Home Comfort program. Additionally, the collaboration sought to provide ongoing education services to ensure the lasting impact of PGW's weatherization services for Philadelphia's low-income households. Unfortunately, no grant funding has been awarded to date, however PGW will continue seeking this collaboration opportunity.

Program/Organization & Description of Coordination
ENERGY STAR® In an effort to promote the Commercial Equipment Rebates Program commercial food service rebates for ENERGY STAR rated equipment, PGW became an ENERGY STAR Energy Efficiency Program Sponsor in FY 2012. This collaboration has allowed PGW to stay up-to-date with ENERGY STAR activities, and will allow it to be included in its national registries of rebates and incentives.
EnergyWorks The EnergyWorks Commercial program, providing low-interest financing for larger commercial energy efficiency projects is still available. PGW will continue to identify opportunities to collaborate with EnergyWorks on individual projects in combining PGW's rebates and grants with the attractive EnergyWorks financing.
Habitat for Humanity PGW and Habitat for Humanity coordinate services through Habitat's Home Repair and Weatherization Program. Habitat's program focuses on individual neighborhoods and provides weatherization and structural repairs to support housing revitalization. Under this arrangement, PGW and Habitat share data as appropriate and identify customers who are enrolled or eligible for both Habitat's Home Repair and Weatherization Program and CRP Home Comfort. Habitat and PGW contractors identify pre-treatment and structural issues for Habitat to address, and PGW contractors focus on weatherization. Two projects have been coordinated to date and there are six additional homes identified as assigned in both programs that are currently in process of being treated by CSPs and Habitat.
National Nursing Center Consortium PGW developed collaboration with National Nursing Center Consortium's Lead and Healthy Homes Program. NNCC provides home visits, consultations and home hazard remediation services for homes that have children under seven with asthma conditions, or have the presence of lead paint, pests, or other environmental hazards. PGW will share data to identify homes in both programs, give referrals and coordinate treatment when possible. PGW will begin coordinating cases with NNCC in FY 2015.
Pennsylvania CareerLink Philadelphia PGW has collaborated with the Philadelphia Workforce Investment Board and the Philadelphia Workforce Development Corporation through PA CareerLink Philadelphia to connect local unemployed workers with weatherization training programs and then onto employment with our CRP Home Comfort CSPs. To date, PGW CSPs have hired 21 local, unemployed entry-level workers through this collaboration.

Program/Organization & Description of Coordination
Pennsylvania Housing Finance Authority ("PHFA") PHFA currently provides funding assistance for multifamily residential energy-efficiency projects through their Smart Rehab program. The overlap between PHFA's Smart Rehab and PGW's CIRI presents a significant coordination opportunity. PHFA also administers federal funding through the Low Income Housing Tax Credit program. Many affordable housing facilities use this funding for building upgrades, including energy efficiency measures. PHFA also manages the Homeowner Energy Efficiency Loan Program (HEELP), which provides low interest loans for weatherization and critical repairs. PGW is exploring the opportunity of coordinating so that customers with pre-treatment health and safety issues preventing weatherization can have this work financed through HEELP.
Philadelphia Department of Public Health Green & Healthy Homes and Lead Poison Prevention Programs Through this collaboration, PGW and Healthy Homes share data on customers who are assigned in both programs. Healthy Homes is able to treat many health, safety and structural issues, which then allows CRP Home Comfort CSPs to comprehensively treat homes otherwise not feasible. In total, seven homes have been treated through both programs, resulting in a savings of 4,800 MMbtu. PGW spent a total of $20,000 in these properties and Healthy Homes spent over $25,000 to remediate issues such as the presence of moisture, mold, lead, carbon monoxide and other major pollutants. PGW identified 23 additional matching cases that are either in assigned or open status. These are in various stages of progress. Additionally, through this Green and Healthy Home Initiative collaboration, PDPH has offered to provide free trainings and certifications in identifying relevant health and safety issues to PGW's CRP Home Comfort CSPs. The hope is that this exposure to the relevant issues can be a potential first step in developing a more coordinated in-home collaboration that can achieve significant programmatic savings for all.
Keystone HELP PGW's ongoing collaboration with Keystone HELP will continue to provide PGW Home Rebates customers with financing terms for residential energy efficiency projects, at least over the duration of their remaining subsidized financing program. All CSPs in the Home Rebates program are Keystone HELP approved contractors. Keystone HELP was a major component, since its 0.99 percent interest loans for weatherization projects helped serve many Home Rebates customers. Since Keystone HELP loan interest rates rose to 9.99 percent and is comparable with many other loan products on the market, PGW expects that there will be fewer customers that finance Home Rebates projects through Keystone HELP.

5.1.4. Data Management

PGW has constructed an Excel-based workbook that is the central repository for all program-level and portfolio-level data relating to the DSM Portfolio. The workbook

performs cost-effectiveness testing at the program and portfolio levels based on inputs from various program sources. Assumptions in the workbook are updated with the annual Implementation Plans and include:

- Avoided Costs
- TRM Savings Calculations
- Discount Rate
- Program Projections

The workbook requires monthly manual updates to track Key Performance Indicators, and inputs data from several program-level tools, described in the respective program sections. PGW will seek to further streamline its data management system used to track portfolio performance and key program-level data during Phase II.

5.1.5. Evaluation, Monitoring, and Verification

PGW will build upon the same approach to evaluation, measurement, and verification employed in DSM Phase I. Further targeted activities will also be employed based on lessons learned through third-party evaluations and program experience to date.

PGW will continue using the TRM savings characterizations to calculate and track the economic benefits and costs of both prescriptive and customized efficiency projects. PGW will also verify that measures are actually installed as recommended and analyzed.

PGW has already completed third-party evaluations for the first two DSM Phase I programs launched, the low-income program and residential rebate program. Similar third-party evaluations are either currently underway or planned (based on sufficient program activity and post-usage data) for the remaining programs. PGW will continue to use the results of these independent evaluations to update savings estimates and redirect program activities. PGW will continue performing third-party evaluations of all DSM programs going forward in to Phase II, to be addressed with detailed implementation plans following Commission approval of this DSM Phase II plan.

Primary evaluation issues addressed in these evaluations include:

- Costs and actual gas savings from DSM programs activities
- Effectiveness of PGW's proposed financial strategies in attracting participants
- Effectiveness of PGW's end-user and upstream financial strategies in raising the market penetration of and lowering the price premium for the highest-efficiency heating equipment
- Customer service issues and challenges

5.2. Energy Efficiency Program Plans

The following section includes detailed program plans for each of the six energy efficiency programs in the EnergySense portfolio.

5.2.1. CRP Home Comfort / Enhanced Low Income Retrofit program

5.2.1.1. Description and Goals

The CRP Home Comfort program (previously ELIRP in DSM Phase I) seeks to provide cost-effective energy savings to low-income customers who participate in PGW's CRP. An equally important goal of the program is to reduce the overall long-term cost of CRP as paid by all firm customers. The program seeks to achieve these goals and make customers' homes more energy efficient and comfortable by:

- Repairing or replacing older and less energy efficient heating systems as feasible;
- Providing comprehensive weatherization services, such as thermal envelope and domestic hot water heating improvements, as feasible;
- Educating customers on ways to reduce their energy use along with basic health and safety information;
- Raising awareness of energy conservation and encouraging the incorporation of energy saving behavior;
- Targeting high-use customers to maximize impact, increase cost-effectiveness, and optimize total savings;
- Streamlining the delivery mechanism through the use of implementation contractors ;
- Engaging landlords and building owners as partners in energy efficiency;
- Serving customer segments that cannot naturally afford to utilize other PGW programs;
- Achieving greater cost-effectiveness through quantities of scale.

The program replaced the Conservation Works Program ("CWP") as the Company's Low-Income Usage Reduction Program ("LIURP") and was launched in January of 2011.

In Phase II, PGW has changed the program name from ELIRP to CRP Home Comfort. PGW feels this term is easier to understand. It also serves as a linkage and a reminder that participation in the program if selected is required because of their CRP status. It also helps provide distinction between the low-income program and market rate weatherization.

5.2.1.2. Phase I Summary

Program Costs

PGW spent 98 percent of its ELIRP budget for FY 2013, and expects to achieve 99 percent spending in FY 2014. PGW believes that the program is now operating at planned levels

Program Savings

ELIRP continues to perform comprehensive weatherization projects on high users enrolled in CRP. On average, ELIRP projects are saving 27 MMBtu in the first year, an average of 15 percent savings per home.

PGW has created two categories for homes that receive treatments, based on the scope of the work possible given site conditions. Homes that receive a comprehensive treatment – which consists of more than two-thirds of ELIRP participants – are referred to as "Closed"

cases and are achieving average savings of 33 MMBtu, or 17 percent of usage. Homes that receive a more limited or "core measure" treatment are referred to as "Close Limited" cases (discussed in greater detail below) and result in an average savings of 11MMBtu and 6 percent of usage.

The ELIRP third-party program evaluation on calendar year 2011 activities found that PGW's realized savings were 130 percent greater than projected savings. According to the evaluation, "Close Limited" homes achieved savings 262 percent greater than projected, while "Closed" cases achieved savings 108 percent greater than projected. PGW utilized this information to inform the FY 2014 TRM updates discussed below.

Participant Example

Although ELIRP projects vary considerably based on site-specific conditions, the example below illustrates how individual site opportunities can be exploited to optimize cost-effective savings through the program. The following is just one example of the 6,765 ELIRP cases closed from inception through June 2014.

The customer who received services had an annual usage of 220 MMBtu. The conservation service provider ("CSP") was able to reduce the customer's overall gas usage by 56 MMBtu, or 25 percent. The job included air sealing and better defining the thermal envelope to lower the high building leakage rate by 17 percent. The customer's boiler had a measured efficiency of only 64 percent and was replaced with a higher 84 percent efficient model. The previous analog manual thermostat was replaced with a digital programmable version.

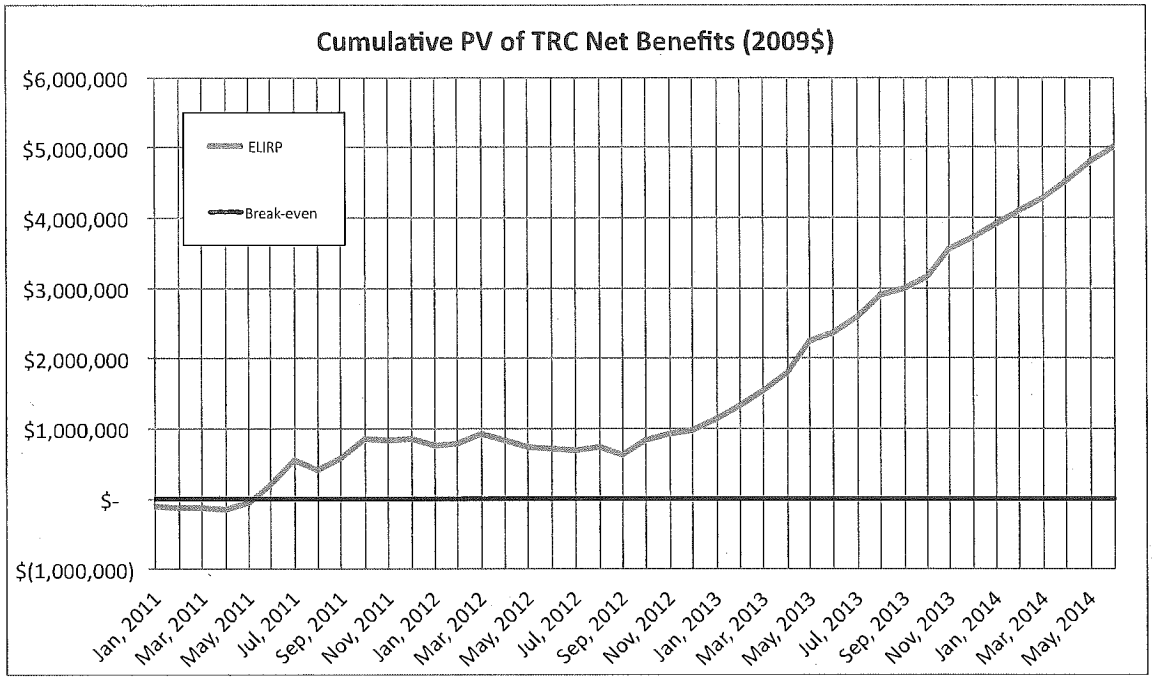
In addition to the energy saving measures, work was done to improve health and safety conditions in the home. The chimney was lined to prevent back-drafting the exhaust gases from the water heater due to installation of the directly-vented high efficiency boiler. The clothes dryer was vented properly to the outdoors to minimize the potential for mold and mildew growth, and a carbon monoxide detector was installed since the home did not previously have one. This comprehensive job package cost $3,954 and its measures averaged $3.02 per lifetime MMBtu, resulting in an estimated $360 CRP subsidy reduction and $18,700 in lifetime savings.

Program Cost-Effectiveness to Date

ELIRP cost-effectiveness has continued to improve since inception. Currently, ELIRP has generated TRC benefits with a present value of $24.5 million (2009 dollars) as of June 2014, against the present value costs PGW incurred of $19.5 million (2009 dollars), for a present value of net benefits of $5.0 million (2009 dollars) and a BCR of 1.26. Figure 11 shows how the cumulative net benefits have amassed since implementation inception.

By the end of the five-year Phase II program plan, PGW expects ELIRP to generate $6.9 million in PV net benefits, for a cumulative BCR of 1.26. This figure is approximately $1.3 more than goals established in the FY 2014 IP, due mainly to properly re-characterizing average project estimates going forward based on actual results achieved so far in FY 2014. Figure 11 shows the program cumulative net TRC benefits since inception.

FIGURE 11. ELIRP COST-EFFECTIVENESS OVER TIME



Lessons Learned

Since its inception, PGW has continually worked to refine and improve ELIRP. The first program evaluation was performed analyzing billing data for homes treated in 2011 and found that the program had a BCR of 1.08, a positive outcome for a program in its growing initial stage. Since that time, the CSPs have improved their protocols and technical abilities to develop cost-effective and comprehensive job scopes. PGW has also taken positive steps to improve the quality of weatherization treatments through its training and mentoring.

One unique design element of ELIRP is its competitive CSP model. Bi-annually, contractors are evaluated on the primary metrics of total energy savings and total cost-effectiveness, and budgets are reallocated to reward the highest performing CSPs. This approach has been effective for PGW to drive results and improve CSP performance over time.

Over the course of implementation, one issue that has complicated program delivery has been the amount of homes with health, safety and structural issues preventing full weatherization. This discouraged CSPs from performing any work whatsoever on a home since they were to be evaluated based on the average depth of savings achieved in homes. As a result, PGW revised its evaluation metrics to review CSPs based on total savings and cost-effectiveness, therefore encouraging CSPs to take advantage of all opportunities in homes even if they could not air seal or insulate to maximize program savings.

The prevalence of health, safety and structural issues led to the Close Limited status. This designation is used for homes that are unable to receive comprehensive and cost-effective weatherization. These homes may receive pipe wrap, thermostat replacement, aerators, domestic hot water tank turn-downs, and other low cost measures that can be performed at

the time of audit. The Close Limited projects have caused PGW to identify other solutions to address the issues in these homes in order to drive deep energy savings, such as the various coordination attempts explained above.

PGW continues to analyze existing measure savings calculations and new savings opportunities identified through its third-party evaluation. To this effect, PGW updated savings calculations in the FY 2015 TRM for hot water heating pipe insulation and space heating pipe insulation to more conservative values so as not to overestimate savings in a few outlying instances. These two measures were relatively minor, representing approximately 3 percent of installed savings since inception, and the reduced savings are expected to have a minimal impact on program savings going forwards.

5.2.1.3. Updates and Improvements

In Phase II, PGW will make several updates to the CRP Home Comfort program design to improve overall delivery and cost effectiveness. These were identified through careful analysis, discussions with contractors and stakeholders, and based on the findings of our CY 2011 program evaluation. The largest change is the reduction of the CRP Home Comfort budget to address the currently unrecovered program costs addressed above, while still continuing to exceed PGW's LIURP regulatory minimum requirements. The current program is by far the largest driver of and contributor to PGW's currently unrecovered costs discussed in the CAM section.

While PGW is committed to providing excellent service to its CRP customers and value to the rest of its rate base, it must also address the long-term costs incurred by doing so. Since the goal of CRP Home Comfort is to perform energy efficiency retrofits, or doing repairs or replacements before they would otherwise have occurred, reducing funding will not increase lost opportunities like reductions to other natural replacement programs, such as Residential Equipment Rebates. Even though funding levels will decrease, CRP Home Comfort still makes up nearly half of the portfolio's Phase II budget, and PGW considers it a cornerstone of the future EnergySense portfolio and one of the greatest successes from Phase I.

The final aspect to the transition is that the new CRP Home Comfort program will be split into two tracks. The first track is a continuation of the current single-family weatherization services as provided in Phase I. A second track will extend weatherization services to low-income multifamily buildings, as required by Commission Order.

By and large, the first track is a continuation of the current CRP Home Comfort design with a few improvements, including:

- Under Phase I, program eligibility targeted the top 20 percent of CRP users. In Phase II, PGW may extend the pool of eligible customers beyond the top 20 percent to potentially include customers with up to the top 50 percent of usage, and will remove current arrearage related participation criteria.
- Updated quality assurance and training protocols, to include inspector shadowing of audits and production work, in addition to random post-job completion inspections.

- PGW will continue to explore new ways to leverage its data collected from Closed Limited cases to provide additional cost-effective treatment opportunities.

During Phase II, PGW will continue to utilize Conservation Service Providers ("CSPs") to perform the in-home weatherization work for the CRP Home Comfort single-family programming, including audits and measure installations. Three firms were selected to perform work during the final year of Phase I, and PGW has the option to continue contracts with these vendors into Phase II if desired. This ensures that the CSPs are able to continue providing services seamlessly at the start of Phase II.

The Low-Income Multifamily Efficiency ("LIME") program will provide cost-effective energy savings to publicly subsidized, low-income multifamily housing. The program seeks to achieve these goals and make customers' homes more energy efficient and comfortable by:

- Installing high-impact, low-cost core measures.
- Providing comprehensive, cost-effective weatherization services as feasible.
- Raising awareness of energy conservation and encouraging the incorporation of energy saving behavior.
- Addressing an unmet market need in both individually metered low-income multifamily buildings, and master metered buildings.
- Streamlining the delivery mechanism through the use of implementation contractors and collaboration with public and private agencies that finance or manage publicly subsidized housing.

Implementation and administrative costs for the LIME program track will be recovered through the Universal Services and Energy Efficiency Surcharge, consistent with the current practice for ELIRP. Due to the nature of the multifamily properties in Philadelphia, PGW expects that many of the program's targeted properties will be master-metered and therefore residents within would not be eligible for PGW's CRP. As such these low-income multifamily activities would not result in reductions to the PGW CRP subsidy borne by PGW's other rate-payers.

The LIME program would be offered on a limited scale and basis until such time that sufficient evaluation data is available to determine the effectiveness of the program going forward. PGW will select a conservation service provider to implement the LIME sub-program. The firm will be required to be credentialed similar to the CSPs used for the single family track program, and will have the following responsibilities:

- Lead development: PGW will provide a list of targeted properties, which the CSP will be required to use to identify weatherization candidates.
- Energy assessment: the CSP will provide an energy assessment to identify potential upgrade opportunities.
- Weatherization treatment: the CSP itself or through subcontractors will conduct the weatherization treatment.

5.2.1.4. Projected Budgets, Savings, and Participation

The following tables show projected budget, savings, and participation for the entire program and then break out projections between the single-family and multifamily sub-programs.

TABLE 50. PROPOSED PROGRAM: PROGRAM PROJECTIONS FOR CRP HOME COMFORT

Fiscal Year	2016	2017	2018	2019	2020	2016 - 2020
Projected Budgets (Nominal)						
Measure Installation Costs	$1,522,400	$1,519,600	$1,519,600	$1,516,800	$1,514,000	$7,592,400
PGW Admin	30,000	30,000	30,000	30,000	30,000	150,000
Contractor Costs	396,600	398,900	398,900	401,200	403,500	1,999,100
Inspection and Verification	51,000	51,500	51,500	52,000	52,500	258,500
Evaluation	-	75,000	-	80,000	-	155,000
TOTAL:	**$2,000,000**	**$2,075,000**	**$2,000,000**	**$2,080,000**	**$2,000,000**	**$10,155,000**
Projected Natural Gas Savings (MMBtu)						
Incremental Annual	13,617	13,163	12,896	12,454	12,019	64,147
Incremental Lifetime	272,249	262,315	256,940	247,249	237,687	1,276,439
Projected Participation						
Projects	420	396	388	364	341	1,909

TABLE 51. PROPOSED PROGRAM: PROJECTIONS FOR CRP HOME COMFORT SINGLE-FAMILY

Fiscal Year	2016	2017	2018	2019	2020	2016 - 2020
Projected Budgets (Nominal)						
Measure Installation Costs	$1,419,351	$1,361,915	$1,358,762	$1,298,045	$1,235,120	$6,673,194
PGW Admin	30,000	30,000	30,000	30,000	30,000	150,000
Contractor Costs	380,600	379,900	379,900	379,200	378,500	1,898,100
Inspection and Verification	50,000	50,000	50,000	50,000	50,000	250,000
Evaluation	-	75,000	-	80,000	-	155,000
TOTAL:	**$1,879,951**	**$1,896,816**	**$1,818,662**	**$1,837,245**	**$1,693,620**	**$9,126,294**
Projected Natural Gas Savings (MMBtu)						
Incremental Annual	12,985	12,215	11,948	11,190	10,439	58,776
Incremental Lifetime	261,154	245,672	240,297	225,058	209,949	1,182,131
Projected Participation						
Projects	418	393	385	360	336	1,892

TABLE 52. PROPOSED PROGRAM: PROJECTIONS FOR CRP HOME COMFORT LIME

Fiscal Year	2016	2017	2018	2019	2020	2016 - 2020
Projected Budgets (Nominal)						
Measure Installation Costs	$103,048	$157,685	$160,839	$218,755	$278,879	$919,206
PGW Admin	-	-	-	-	-	-
Contractor Costs	16,000	19,000	19,000	22,000	25,000	101,000
Inspection and Verification	1,000	1,500	1,500	2,000	2,500	8,500
Evaluation	-	-	-	-	-	-
TOTAL:	**$120,048**	**$178,185**	**$181,339**	**$242,755**	**$306,379**	**$1,028,706**
Projected Natural Gas Savings (MMBtu)						
Incremental Annual	632	948	948	1,264	1,580	5,371
Incremental Lifetime	11,095	16,643	16,643	22,190	27,738	94,308
Projected Participation						
Projects	2	3	3	4	5	17

5.2.1.5. Target Market and Program Eligibility

5.2.1.5.1. Single Family Program

To be eligible for CRP Home Comfort single-family, customers must be currently enrolled in CRP. Additionally, PGW has targeted customers in the highest gas usage tiers. PGW initially selected the top 20 percent of CRP users for CRP Home Comfort eligibility. In Phase II PGW plans to select cases from the top 30 percent and may scale up to the top 50 percent if needed to expand CRP Home Comfort benefits to a broader range of CRP customers.

PGW will develop a permanent re-treatment policy for the 2016 year. To date in Phase I, PGW has not reassigned homes that have already been treated and are in Closed or Closed Limited status. In the upcoming months, PGW will analyze billing usage data, customer surveys, and inspections of homes for customers who were treated in previous years. This data will give PGW clear guidance on what cost-effective opportunities for re-treatment are present based on the number of years passing, measures installed and property conditions.

The number of eligible homes has decreased from when ELIRP began in 2011. From inception through June, 2014 6,765 homes have been treated, though many of the highest usage homes had health and safety issues that prevented comprehensive weatherization. At the moment there are over 35,000 CRP customers eligible for CRP Home Comfort under its current usage requirements. This figure, which represents half of the total CRP customer base of roughly 75,000 is obtained by applying PGW's CRP Home Comfort selection criteria. Filtering points are applied by removing customers who have received treatments within the last two years, lack enough billing months for proper energy usage analysis, and have other usage analysis outlier factors.

Based on historical activity, PGW estimates that approximately 30 percent of the selected homes will receive only core measures (discussed below) or will be rejected due to health and safety conditions that make the property unsuitable for weatherization. Including more homes that meet CRP Home Comfort usage eligibility requirements have health and safety issues will allow properties to be treated by other organizations through collaborations, a key priority of PGW.

5.2.1.5.2. Multifamily Program

LIME will target low-income multifamily buildings with at least 50 percent of residents at or below 150 percent of the Federal Poverty Level. The buildings will draw primarily from publicly subsidized housing such as Low Income Housing Tax Credits (LIHTC) or Section 8 housing as a primary source of building referrals. By qualifying buildings based on the receipt of public funds, PGW will reduce administrative review to qualify residents' income. Within this pool of buildings, PGW will further target facilities in the top-third tier of usage at the outset of the program.

The Pennsylvania agency that allocates LIHTC in the state is the Pennsylvania Housing Finance Agency (PHFA). The agency reports that it has funded or is the Section 8 contract administrator for over 26,600 low-income housing units in Philadelphia.[71] This pool of multifamily units will be a significant source of potential program participants.

5.2.1.6. Target Measures

CRP Home Comfort single-family programming will continue to install customized, comprehensive packages of weatherization treatments in selected homes to maximize cost-effectiveness and total energy savings.

The CRP Home Comfort treatment process begins with an energy audit for all selected homes, which informs a treatment plan. Based on the energy audit recommendations, homes receive core measures that are performed within one visit at the time of audit, typically with a cost below $250 on average. The core measures may include:

- Water heater and pipe wrapping
- Installation of low-flow faucet aerators and showerheads
- Hot water leak repairs and water heater tank temperature turndowns
- Set back thermostats with intensive education
- Installation of carbon monoxide detector and other measures to improve health and safety

In some instances, homes will only receive the core measures. These homes enter a "Closed Limited" status that accounts for homes where health, safety, structural or cost-ineffectiveness reasons prevented comprehensive weatherization. Homes without these issues proceed to a full comprehensive treatment.

Comprehensive treatments are identified through the energy audit and build on the core measures implemented for "Closed Limited" homes. Comprehensive treatments seek to provide an average savings of 20 percent per-home and include one or more of the following measures: air sealing and insulation in attic or basement, duct sealing, heater replacement. Only one third of comprehensively treated homes received heater replacements through February 28, 2014, as ongoing analysis has found this measure to be cost-ineffective in many situations.

[71] Source: Pennsylvania Housing Finance Agency. "Inventory of Multifamily Housing." http://www.phfa.org/applications/multifamily_inventory.aspx. Accessed on July 11, 2014.

Health, safety and customer education are major components of the CRP Home Comfort program. As part of the audit, CSPs provide:

- Information about the CRP Home Comfort and its goals and objectives;
- Literature on savings tips and the potential benefits to the customer's health, comfort, safety, and quality of life;
- Information on other energy efficiency programs and home repair programs that customers may be eligible for and can address health, safety or structural issues beyond the reach of CRP Home Comfort.

The LIME program will follow a similar target measure design as Efficient Building Grants, discussed in that program section below, which combines comprehensive energy efficiency measures into cost-effective projects. PGW expects that the majority of installations will include low cost measures such as low flow faucet aerators, low flow showerheads, programmable thermostats, hot water heater turndowns and pipe wrap. Additional measures for comprehensive savings may include air-sealing, insulation and heater or domestic hot water heater replacements where cost-effective.

The measures selected for each building will be identified through an energy assessment conducted by the program CSP. Prior to conducting the energy assessment, the building owner will be asked to provide a background on the facility's maintenance history and equipment replacement schedules so the CSP can prepare adequately for each assessment prior to the on-site visit.

5.2.1.7. Incentive Strategy

PGW will continue to fund the full cost of all program implementation and delivery for the continued CRP Home Comfort program as well as all costs for the delivery of energy efficiency services under the LIME sub-program. For heating or hot water measures that are determined not to be cost-effective as retrofit measures, PGW will refer the building owner to participate in the Equipment Rebate programs to receive incentives for the end-of-life replacement of the equipment.

5.2.1.8. Marketing and Outreach

Since the single-family program is for low-income customers that are selected by PGW to participate, PGW has not planned a traditional mass marketing effort. PGW has, however, taken multiple steps to improve customer communication to increase the participation rate. These include better informing customers about the CRP Home Comfort program requirements and process at the time they sign up for CRP, continuing to mail selection letters to assigned customers, and exploring new communication tools to reach customers about CRP Home Comfort requirements and appointments, such as through the use of email and text messages.

PGW will also conduct business development activities to cultivate participation from owners of LIME-eligible properties. Through coordination with other programs and partners, PGW will identify eligible properties and building owners. The LIME CSP will be required to conduct initial outreach to building owners, while PGW will provide some

assistance where it has pre-existing relationships. Additionally, PGW will conduct outreach to the building residents to inform them of the improvements that are being made and the impact it will have on their quality of life and bills.

PGW may also consider using LIME as a vehicle to monitor and evaluate the effectiveness of behavioral energy efficiency measures and emerging technologies, coupled with customer education best practices. These could include smart thermostats, building controls and sensors, utility bill analysis and customer reminders, and other features that may accomplish usage goals of the program and the building owner/resident stakeholders.

5.2.1.9. Quality Control and Verification

PGW has continued performing and monitoring third-party quality assurance (QA) inspections of CRP Home Comfort homes, along with mentoring sessions for the CSP staff on specific issues. Additionally, PGW, along with program implementation consultants, occasionally shadows field inspections with each of the three CSPs to observe the QA inspector's performance and understanding of the PGW program design.

The following table shows the number of on-site inspections and hours of mentoring performed by PGW's third-party inspector for all CSPs through Phase I. Overall, PGW inspected 7 percent of comprehensive closed cases. PGW had directed the program inspector to inspect a set percentage of Closed Limited cases as well; however these inspections have offered a lack of useful data-points due to the verified presence of pre-existing conditions limiting the amount of weatherization work able to be performed. During Phase II, PGW will continue to perform random inspections of Closed Limited cases to confirm findings to date, but at a reduced rate than previously performed.

TABLE 53. ELIRP INSPECTIONS AND ON-SITE MENTORING (INCEPTION-TO-DATE)

Fiscal Year	Inspections	Mentoring Hours
2011	44	22.5
2012	82	28.5
2013	131	23
2014 (through June 2014)	164	5.25
Inception-to-Date	**421**	**79.25**

As part of the inspection process, PGW collects a scorecard for each inspection. These scorecards were used in the funding reallocation process, and to determine whether a contractor needed additional inspections or mentoring. PGW has seen improvement in contractor inspections, with the average inspection score rising from an average of 84 percent in FY 2012 to 97 percent for FY 2014. PGW has also re-focused inspections in a more targeted manner to gather specific data and identify trends in CSP work. In addition to randomly selected cases, the inspector now performs inspections on cases that are classified by certain criteria (though still selected at random). These include cases with:

high and low air leakage rate reductions; high and low energy savings; cases that receive air sealing but where the air leakage rate indicates additional air sealing opportunities; cases that receive heater replacements but no air sealing and insulation; and other measure combinations. PGW has not yet received enough data on these cases to offer any takeaways, but as this data is analyzed it may impact the design of future trainings, and inspection scorecards.

PGW's goal is to perform inspections on ten percent of comprehensively Closed cases. In addition to post-job completion inspections, PGW will apply new protocols to effectively evaluate and mentor its contractors. This includes having an inspector shadow each energy auditor on at least one energy audit, as well as attending a number of production days while CSP staff insulate, air seal, replace heaters, perform other work and conduct test-outs. Through this process, inspectors will be able to evaluate CSP staff's abilities for communicating with and educating customers and job scope development, mentor when necessary, and have a clearer picture of pre and post conditions and ensure work is performed properly and comprehensively before walls are patched up and the case closed.

PGW will continue evaluating CSP performance twice annually using the program scorecard. CSPs are evaluated primarily on total energy savings and cost effectiveness based on measures entered in the database. Other metrics include inspection scores, data entry, and customer service and collaboration cases. The scorecards are used to determine funding allocation levels for upcoming program years. CSPs are evaluated against each other as well as program goals. The model has led to continual improvement in CSP performance as evident by the program's rising energy savings and cost effectiveness.

5.2.1.10. Data Management

Savings for measures are initially calculated using an Excel tool developed by the Program Development Consultants. The tool accepts field inputs from the CSPs based on initial site visits including measure-level cost-data, pre-conditions for each measure, and the proposed installation details. Based on the inputs, the tool calculates projected savings and cost-effectiveness through PGW TRM formulas. The tool provides guidance about what measures justify installation based on the projected energy savings and cost-effectiveness.

CSPs provide PGW with field visit data by entering information through a web-based interface that is stored in PGW's DSM database. The database interface mirrors the CRP Home Comfort contractor tool entries, prompting for costs, pre-conditions and post-installation details. Savings and cost-effectiveness are calculated through PGW TRM formulas that are coded into the system.

PGW systematically reviews the data entered by CSPs and works with them to improve collection quality and reduce opportunities for error. Through regular meetings with the internal IT team and implementation consultants, PGW has improved data quality by additional field level validation, improving default values, and streamlining data entry screens. PGW develops reports based on CSP activity and regularly performs quality assurance to verify that energy savings calculations are accurate and based off CSP activity,

and duplicate data is not present. PGW will continue to perform quality assurance to maintain the integrity of CRP Home Comfort program data during Phase II.

As discussed in the coordination section, PGW has spoken with multiple nonprofits and community development corporations about joint opportunities to address health and safety issues. As PGW develops new collaborations, it is identifying updates to its database that will allow CSPs and partner organizations to better share case data.

On-site verification inspections will be performed on every completed project under LIME. The inspection may be performed both during and after the installation, since some larger projects may require oversight at different stages of the project. Inspections allow PGW to validate that the correct equipment was installed and that it is in working order. The results of the verification inspections will be reported to PGW and tracked in the program database.

5.2.1.11. Evaluations

PGW plans to continue performing biennial third-party program impact evaluations. This will serve to identify improvements to program designs and confirmation of savings calculation techniques.

PGW made several program improvements prompted by its last program evaluation. Lower than expected realization rates and inconsistencies among CSPs for air sealing and insulation were found, which prompted PGW to further inspect and review these measures to improve future installations. PGW has also changed its equivalent full-load hours ("EFLH") assumptions in the TRM based on findings that necessitated the change.

5.2.2. Residential Equipment Rebates

5.2.2.1. Description and Goals

The Residential Equipment Rebates program, previously referred to as the Residential Heating Equipment Rebates program, issues prescriptive rebates on premium efficiency gas appliances and heating equipment to increase the penetration of these measures in the homes of PGW's customers. The program has the following objectives:

- Promote the selection of premium efficiency residential models at the time of purchase of residential-sized gas heating equipment;
- Increase consumers' awareness of the breadth of energy efficiency opportunities in their homes;
- Strengthen PGW's relationship with customers as a partner in energy efficiency;
- Encourage market actors throughout the supply chain to provide and promote high efficiency options;
- Align incentives with other programs;
- Aid in market transformation towards highest-efficiency options.

Eligible customers use their own contractor to install the premium efficiency equipment and receive cash rebates to offset most of the incremental cost of the higher efficiency equipment and installation.

5.2.2.2. Phase I Summary

Since program launch in April, 2011 through June 30, 2014, PGW has provided 453 boiler rebates and 1,112 furnace rebates for a total of 1,565 heating units rebated. PGW also provided 811 thermostat rebates, which are only available with the purchase of a premium-efficiency furnace or boiler.

FIGURE 12. RESIDENTIAL EQUIPMENT REBATES BY MONTH

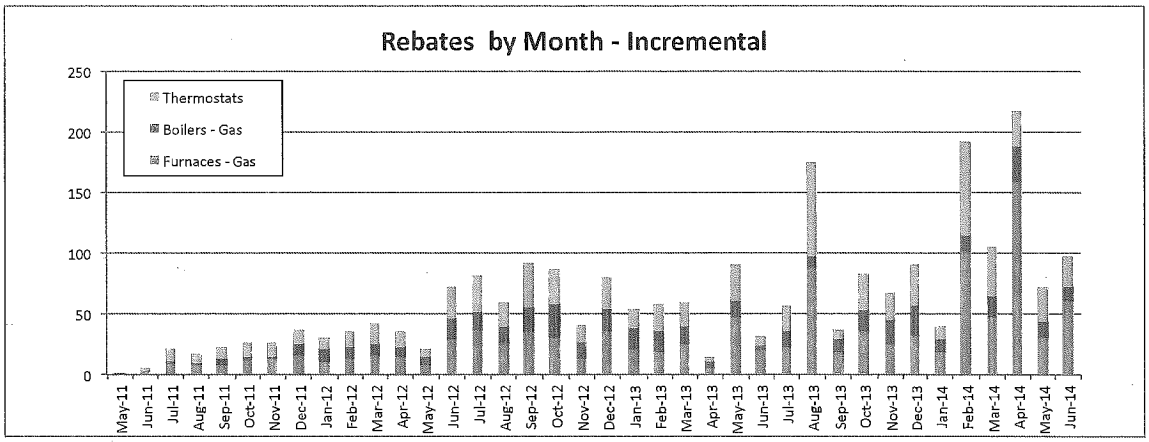


Figure 12 learly shows an increasing trend in rebates issued, with spikes in August 2013, and February and April due to large multifamily projects. Seasonality can also be seen in the data with lulls in program activity throughout the summer months. The amount of heating systems rebated in the first six months of FY 2014 (September 1, 2013 through February 28, 2014) was 25 percent greater than the same period a year before, while 72 percent more rebates were issued in FY 2013 than FY 2012, and 63 percent more rebates were issued in FY 2014 than FY 2013. Two-thirds of heater rebates are provided for furnaces, and one-third are provided for boilers.

In the past year, PGW has experienced a greater number of applications for large multifamily facilities. PGW attributes this to multiple factors:

- Developers who were initially interested in Efficient Construction Grants and Efficient Building Grants programs, but chose not to pursue comprehensive projects, sought Residential Equipment Rebates for just heater installations.
- PGW has been promoting Residential Equipment Rebates opportunities to developers seeking to establish new service.
- Construction of multifamily properties in Philadelphia has increased after a lull during the recession, according to the National Association of Home Builders' compilation of building permit data.

Program Costs

From inception through June, 2014 PGW spent $1.8 million on Residential Equipment Rebates, with around $835,000 of the total from activity in the preceding 12 months.

Together, fixed costs for Administration and Management as well as additional Contractor Costs were slightly under budget.

Program Savings

Residential Equipment Rebates achieved net annual gas savings of 38.9 BBtu and net lifetime gas savings of 849.2 BBtu from inception through June 2014. The program is expected to achieve net annual gas savings of 20.1 BBtu and net lifetime saving of 431.7 BBtu in FY 2015.

Participant Profile

There is great diversity among Residential Equipment Rebates applicants. The majority of rebate activity is driven by customers replacing heaters in their home. Anecdotally, some of the applicants participate in the program at a time of crisis when their existing heater breaks down during the winter. As one example, a church received a rebate for installing a 286 kBtu boiler, which is predicted to save 78 MMBtu yearly. PGW's rebate covered over 20 percent of the full project cost. There has been an increase in applications from churches and nonprofits. Another notable customer is a landlord that installed two high efficiency 70 kBtu furnaces for both units of a duplex, which will save each tenant 19 MMBtu per year.

Program Cost-Effectiveness to Date

Residential Equipment Rebates achieved positive TRC net benefits with a present value of $1.8 million (in 2009 dollars) and a TRC BCR of 1.70, in activity through June 2014. The Gas Administrator test shows net benefits with a present value of $2.8 million, and a BCR of 2.89, which is higher than the TRC cost-effectiveness due to the fact that PGW only pays for a portion of the incremental cost. Updates to the TRM based on evaluated results went into effect starting in June of 2014 and should reduce gas benefits by nearly 40 percent, as discussed further in the Lessons Learned section below. While this will decrease cost-effectiveness results, individual measures, as well as the entire Residential Equipment Rebates program, are expected to remain cost-effective.

Lessons Learned

The Residential Equipment Rebates improved annually since program launch in April, 2011. Though there were challenges with participation due to low market awareness in early years, PGW attributes increased participation in recent years to numerous reasons.

- Outreach to contractors and others in the supply chain has achieved results. It has taken time and resources to educate contractors about rebate offerings and encourage them to incorporate messaging about efficiency and savings into their sales pitches to customers. PGW continues to perform this engagement and seek additional opportunities and audiences.

- It's important to recognize Residential Equipment Rebates's role in the whole DSM portfolio since it was difficult to promote Residential Equipment Rebates before the

whole portfolio was launched. The launch of Home Rebates, Efficient Building Grants and Efficient Construction Grants strengthened Residential Equipment Rebates. As PGW developed offerings to benefit other types of customers, there was greater market awareness. Engagement with more developers also led to more multifamily and new construction projects seeking Residential Equipment Rebates rebates.

PGW has also learned many important lessons about customer communication and ease of application through its own interactions, surveys and the independent program evaluation. In early years of the program, the rejection rate was above 25 percent. PGW took proactive steps to effectively communicate requirements, update application forms, look up information from PGW's database to complete applications, and direct the rebate processor to follow up with customers and contractors to find missing or invalid information. Rejections for FY2014 were below 15 percent. PGW identifies reducing rebate rejections as an important customer service goal, and seeks to build on these results and make the process even more customer-friendly.

PGW has made changes to program design based on responses from the marketplace and savings data. Examples of this include increasing rebate amounts in 2012 to encourage more participation. In response to the independent evaluation performed in 2014, PGW later decreased savings assumptions and therefore rebate amounts for boilers. A revised multifamily policy was also developed that is easily communicated and consistent with other programs (Home Rebates, Efficient Building Grants, and Efficient Construction Grants). PGW mounted an extensive outreach campaign to trade allies, supply houses, manufacturers, developers and customers to inform them of the program design changes that went into place September 1, 2014. Moving forward, PGW seeks to maintain many of the elements of Residential Equipment Rebates, while continuing to target customer service improvements.

PGW made several program updates after its evaluation found that actual gas savings for the high-efficiency gas furnaces and boilers were less than the initial TRM projections, with boilers replacements averaging 202 Ccf and furnace replacements averaging 112 Ccf in annual savings. These results were approximately 60 percent PGW's initial estimates. The disparity has been diagnosed as resulting from over-estimating average equipment sizes and the EFLH. PGW filed a TRM update with the FY 2015 Implementation Plan to revise EFLH assumptions downwards for Residential Equipment Rebates, which will make projections much closer to the actual gas savings found through this Impact Evaluation.

5.2.2.3. Updates and Improvements

For Phase II, PGW plans to continue implementation of Residential Equipment Rebates largely as designed in FY 2015, with annual budgets maintained $727,000 per year (excluding evaluation costs) in nominal dollars. The primary change in implementation will be the elimination of programmable thermostat rebates in Phase II. This change will be made for two reasons. First, PGW's independent program evaluation was unable to clearly determine the effectiveness of the measure. Second, the cost of processing thermostat

rebates is relatively high compared with the measure cost and rebate amount. Due to the complexity of these issues, and the limited benefits possible from the measure, PGW will strike the offering from its Phase II equipment rebate plans. PGW will continue to review new technologies that provide additional cost-effective savings for its customers participating in the Residential Equipment Rebates for future program years.

5.2.2.4. Projected Budgets, Savings, and Participation

Under the Proposed Program, PGW plans to maintain flat participation and budgets over the five-years. Table 54 shows the proposed participation, budget and spending levels under this scenario.

TABLE 54. PROPOSED PROGRAM: PROJECTIONS FOR RESIDENTIAL EQUIPMENT REBATES

Fiscal Year	2016	2017	2018	2019	2020	2016 - 2020
Projected Budgets (Nominal)						
Customer Incentives	$671,000	$671,000	$671,000	$671,000	$671,000	$3,355,000
Contractor Costs	48,000	48,000	48,000	48,000	48,000	240,000
Inspection and Verification	8,000	8,000	8,000	8,000	8,000	40,000
Evaluation	50,000	-	55,000	-	60,000	165,000
TOTAL:	**$777,000**	**$727,000**	**$782,000**	**$727,000**	**$787,000**	**$3,800,000**
Natural Gas Savings (MMBtu)						
Incremental Annual	13,558	13,558	13,558	13,558	13,558	67,788
Incremental Lifetime	296,175	296,175	296,175	296,175	296,175	1,480,873
Projected Participation						
Rebates	1,030	1,030	1,030	1,030	1,030	5,150

5.2.2.5. Target Market and Program Eligibility

Residential Equipment Rebates is designed to influence customers who are purchasing natural gas furnaces or boilers to choose high efficiency models through incentives to cover incremental costs between standard and high efficiency units. All PGW firm-rate customers are eligible. Projects can be characterized in several different types:

- Residential owner-occupied buildings
- Multifamily buildings – building owners, landlords and facility managers may seek rebates for multiple heaters installed in apartments, condominiums or townhome blocks. These may be replacements in existing buildings or new construction, and can range from two units to potentially several hundred.
- Businesses – Businesses and other institutions using residential-sized units are eligible for rebates.

5.2.2.6. Target Measures

During Phase II, PGW will continue its residential-sized equipment rebate offerings targeting high efficiency furnaces, boilers and combination boilers. To qualify, furnaces, boilers and combination boilers must be AHRI certified as at least 94 percent AFUE.

In addition to the current prescriptive offerings, PGW will continue to monitor promising natural gas technologies that could provide efficient, cost-effective alternatives for PGW's residential customer base to consider for new rebate opportunities. To spur market interest

in bringing new measures to PGW for consideration, new equipment will be eligible for custom equipment rebates after demonstrating cost-effectiveness. As additional opportunities are identified PGW will update program plans and projections to accommodate these new measures.

5.2.2.7. Incentive Strategy

The following table outlines the incentives that PGW will offer at the start of Phase II, as a continuation from FY 2015 of Phase I. These incentives are subject to change based on market conditions.

PGW revised its incentive structure for projects that have multiple installations in one building, effective September 1, 2014. Rebate levels were revised to account for the growing number of multifamily rebate projects that have smaller capacities, typically of 40-50 kBtu, and therefore offer less savings and are less cost-effective compared with larger units installed in single family residences. This revised incentive structure has also been adopted in Efficient Construction Grants, Efficient Building Grants and CRP Home Comfort.

TABLE 55. PLANNED RESIDENTIAL EQUIPMENT REBATES INCENTIVES

Measure	First Rebate Per-Project	Additional Rebates Per-Project[72]
Natural Gas Furnace 94% AFUE	$500	$250
Natural Gas Furnace 94% AFUE, BFM Fan[73]	$500	$250
Natural Gas Water Boiler 94% AFUE	$1,500	$800
Natural Gas Combi Boiler 94% AFUE	$1,700	$900

PGW's combination boiler ("combi boiler" incentive is designed to recognize and promote the additional savings customers can receive from a high efficiency boiler that provides both heating and hot water from the same unit without the use of separate hot water storage tanks or using tankless coils. PGW will develop a qualified product list based on efficiency and performance based on PGW's gas pressure standards. The additional $200 incentive is designed to meet the additional incremental cost found for combination boilers compared to non-combi boilers of the same size and efficiency.

PGW will perform a periodic review of the rebates being offered and may change the types of measures covered, the minimum efficiency level required, or the rebate amount based on changing market conditions.

5.2.2.8. Marketing and Outreach

PGW has maintained the ongoing trade ally marketing plan directed towards equipment manufacturers, distributors, installation contractors and retailers/vendors to make the high-efficiency equipment available for purchase. Existing program data to date has

[72] Projects are defined as one individual/entity receiving a rebate for one building address.

[73] Furnaces that have fans driven by Brushless Fan Motors (BFMs) provide significant electricity savings. However, as a natural gas utility, PGW is unable to provide any additional incentives for measures that only save electricity.

confirmed the experience of other gas utility rebate programs that contractor outreach is the most effective strategy for increasing customer demand for high efficiency gas equipment rebates. This approach has also been validated through the third-party Impact Evaluation. PGW has engaged with trade allies in the following ways:

- Through tabling at HVAC supply houses and displaying literature at the counter, PGW can inform HVAC contractors of its rebates and impact them at the time of purchase.
- PGW sends its monthly e-newsletter to trade allies and interested contacts, informing them of program updates and relevant HVAC and energy efficiency news.
- By coordinating activities with manufacturers and others in the supply chain, PGW is able to market to a greater audience. Many manufacturers see benefit in promoting PGW rebates in coordination with their high efficiency products in order to increase sales. PGW has participated in trainings sessions, presentations, product expos and other venues.

During Phase II, PGW will expand its outreach to realtors, developers, owners, and managers of larger multifamily properties through more frequent direct communications and events. Participation from property managers and landlords increased during FY 2014, and the scale of the properties made it a cost-effective market for direct outreach.

In Phase II, PGW will also increase direct communications with customers to build general program awareness. Customers requiring heater replacements is a niche market that has proven difficult to reach directly through traditional communication activities. PGW will seek to target customers more likely to make purchasing decisions during Phase II through new strategies including the use of targeted online advertising. PGW will also continue its general awareness tactics of tabling events, broadcast advertisements and outreach through the bill insert "Good Gas News."

5.2.2.9. Quality Control and Verification

PGW performs on-site verifications on at least five percent of completed incentive claims to ensure the equipment installed qualifies for the program and matches the equipment listed on the rebate application. Through the end of August, 200 verifications have been performed, accounting for 10% of all heaters rebated. Likewise, in Phase II, PGW plans to verify 10% of units.

In addition to random selections, PGW may request on-site verifications in circumstances where a landlord has submitted multiple claims for a multifamily property. During Phase I, PGW updated QA protocols to perform verifications ahead of rebate submissions for applications covering five or more rebates. PGW plans to continue this updated protocol in Phase II. PGW also will continue coordinating internally with staff on-site to schedule and conduct inspections to reduce customer intrusions and improve program efficiencies.

5.2.2.10. Data Management

PGW's rebate processor maintains a real-time database of rebate activity. PGW collects program activity from its rebate processor and reviews it for accuracy. Savings calculations are conducted using Excel-based tools developed by PGW's Program Development Consultant. As designed and implemented under Phase I, the workbooks will accept inputs from the Rebate Processor's database providing the equipment make and model and customer application information. Based on this information, the Excel-based workbook will calculate the savings according to savings algorithms documented in the TRM. At the outset of Phase II, PGW will continue to utilize the existing data management structure to calculate and track savings, and will seek to streamline current processes through the RFP process for program services.

5.2.2.11. Evaluations

PGW will continue to perform bi-annual third party evaluations on Residential Equipment Rebates. Evaluations are scheduled for FY 2017 and FY 2019. PGW's first Residential Equipment Rebates evaluation resulted in a number of program updates providing improved program delivery and savings calculations. These include our TRM's assumptions on average EFLH and capacity in order to more accurately align projected savings with actual savings. Because the evaluation showed that PGW had overestimated savings for boilers, PGW also chose to reduce boiler rebates to $1,500 so that they would be cost-effective under the updated TRM. The responses given by customers and contractors in the survey also gave useful information on improving communications and marketing to actors throughout the supply chain, which PGW is implementing.

5.2.3. Efficient Building Grants

5.2.3.1. Description and Goals

The Efficient Building Grants program, previously referred to as the Commercial and Industrial Retrofit Incentives program, promotes natural gas energy efficiency retrofit investments by PGW's multifamily residential, commercial, and industrial customers. The program provides technical assistance and customized financial incentives for cost-effective gas-saving investments including high-efficiency heating system replacements, improved system controls, and building thermal performance enhancements. The program also assists participants in arranging financing for the balance of project costs through collaboration with third-party lenders. The program has the following objectives:

- Save natural gas through cost-effective energy efficiency retrofit projects;
- Make comprehensive energy-efficiency retrofit affordable by combining customized financial incentives with third-party financing to provide participating customers with immediate positive cash flow;
- Promote a better understanding of energy efficiency options available to PGW's nonresidential customers.

Efficient Building Grants seeks to convince facility managers, department heads, and financial officers to identify and install cost-effective energy saving retrofit opportunities.

PGW then provides an incentive for completing the installation of the identified savings measures. The program targets energy efficiency opportunities in multifamily, commercial and industrial buildings.

5.2.3.2. Phase I Summary

Since program launch in September, 2011 through June 2014, PGW has issued 15 Efficient Building Grants totaling $234,415. In FY 2014 through June 2014, PGW has issued eight grants for a total of $63,816. This rise in completed projects is a direct result of increased communications conducted during the second half of FY2013.

Program Costs

From inception to June 2014 PGW spent $409,150 (Nominal) on implementation of Efficient Building Grants. The program is budgeted for $536,558 (Nominal) in FY 2015.

Program Savings

Efficient Building Grants achieved net annual gas savings of 5.3 BBtu and net lifetime gas savings of 95.9 BBtu from inception through June 2014. The program is expected to achieve net annual gas savings of 8.2 BBtu and net lifetime saving of 151 BBtu in FY 2015.

Participant Profile

Many of the Efficient Building Grants participants to-date were small multifamily buildings with low-income residents. One exemplar project was a 20-unit facility located in the Holmesburg neighborhood of Philadelphia. The facility was built in 1967 and was last renovated approximately two decades prior to the Efficient Building Grants project.

For its Efficient Building Grants grant, the customer proposed a comprehensive project guided by the results of an energy audit. Measures included furnace and hot water heater replacements, duct sealing, programmable thermostats, low-flow fixtures, attic insulation and high efficiency laundry equipment. PGW awarded the customer a $20,227 grant for the project, which achieved a 1.78 BCR, net economic benefits of $35,817 and resulted in estimated annual operating savings of $6,051 in gas costs and total operating cost savings of $10,111.

Cost-Effectiveness

As of June 2014, Efficient Building Grants achieved positive TRC net benefits with a present value of $161,960 (in 2009 dollars), and a TRC BCR of 1. 31. The Gas Energy System saw net benefits with a present value of $97,832 (in 2009 dollars), and a BCR of 1.29.

Efficient Building Grants is expected to achieve TRC cost effectiveness with $582,495 (in 2009 dollars) in PV net benefits and a 1.46 BCR over the initial five-year period of the program. The program is also expected to achieve Gas Administrator cost effectiveness, with $488,109 (in 2009 dollars) in PV net benefits and a 1.58 BCR.

Lessons Learned

PGW experienced several barriers to success in the implementation and ramp-up of Efficient Building Grants, which were documented in Annual Reports and Implementation Plans filed with the Commission.

PGW's initial focus on the multifamily sector presented several challenges that are not unique to PGW's EnergySense program. A significant issue is the "split-incentive" that exists when tenants pay the energy costs but have no control over the capital investments in the building. This issue is not new to the industry, but required creative efforts to work around in Efficient Building Grants. PGW addressed this issue by targeting multifamily property owners with recently acquired properties, which were more likely to be scheduled for capital upgrades. Additionally, PGW targeted owners with an interest in energy efficiency but with a need for additional funding.

The multifamily targeting also resulted in a greater number of relatively small projects compared to the targeted average project savings and incentive sizes, resulting in a decreased amount of incentive funds issued and savings achieved as compared with initial projections. Although these projects were comprehensive and cost-effective, the net benefits were relatively low due to the relatively low natural gas consumption at the properties. In its Phase II projections, PGW has revised its estimates to accommodate a larger number of smaller-sized projects.

Efficient Building Grants launched in FY 2012 intent on motivating customers with energy audits in-hand to implement recommended measures. While some customers applied with significant pre-project scoping and design, many project leads did not apply to PGW with energy audits available. As a result, PGW provided more technical assessment than originally estimated through the program design. Ultimately, many of the applications that proceeded to projects did have energy audits available, and owners were able to use the information to more effectively target capital upgrades. In instances where this was not available, PGW leveraged its technical team to provide additional assistance in scoping the projects.

One final challenge that PGW faced was the long lifecycle that many Efficient Building Grants projects faced. From inception through February 2014, the Efficient Building Grants project lifecycle from time of application to time of grant payment ranged from 4.5 months to 22 months, with the average project taking about 7 months. Additional time was required prior to the application for business development to generate new leads. This timeframe meant that projects could take many months or even years to cultivate before ultimately being completed. As a result, PGW's marketing activities had to ramp-up with results not apparent for many months or even years before the grant payout would occur.

5.2.3.3. Updates and Improvements

For the Phase II Efficient Building Grants implementation, PGW will seek to implement new application workflows, technical services and incentive strategies to improve the market uptake of energy retrofits. The updates that PGW plans will be informed by customer feedback provided over the course of program implementation from FY 2012 – FY 2014 and from the third-party impact evaluation conducted in FY 2014.

PGW will update its application protocols by implementing a user-friendly online screening application. The screening application will be the first step for customers to participate in Efficient Building Grants, and will be easy to locate and submit through PGW's website. In future program years, PGW will seek to develop an online application tracking and management system for customers to easily check-in on the status of grant applications and submit required documentation.

Through implementation of Efficient Building Grants in Phase I, PGW found that many customers needed additional technical assistance in order to identify potential savings opportunities. This initial project scoping was frequently a significant hurdle to successful projects. In Phase II, PGW will explore ways to help customers overcome this barrier, such as offering no-obligation building walkthroughs by its technical assessment team to targeted energy intensive customers. This offering could provide building owners with a one-page report listing potential gas-saving measures that should be explored for an energy retrofit. PGW could use the report to qualify Efficient Building Grants leads and bolster its data on market needs.

Lastly, PGW may revise its incentive strategy during Phase II, based on the recommendations of its third-party evaluation of Efficient Building Grants taking place during FY 2014. PGW will explore whether higher incentives are needed to motivate a broader range of customers to undergo comprehensive retrofits, and whether incentives for engineering or energy assessments are needed to support the development of comprehensive projects.

5.2.3.4. Projected Budgets, Savings, and Participation

TABLE 56. PROPOSED PROGRAM: PROJECTIONS FOR EFFICIENT BUILDING GRANTS

Fiscal Year	2016	2017	2018	2019	2020	2016 - 2020
Projected Budgets (Nominal)						
Customer Incentives	$202,900	$227,900	$252,900	$277,900	$302,900	$1,264,500
Contractor Costs	70,000	82,800	96,100	109,900	124,200	483,000
Inspection and Verification	11,300	14,150	17,300	20,750	24,500	88,000
Evaluation	-	70,000	-	80,000	-	150,000
TOTAL:	**$284,200**	**$394,850**	**$366,300**	**$488,550**	**$451,600**	**$1,985,500**
Natural Gas Savings (MMBtu)						
Incremental Annual	4,817	5,399	5,981	6,563	7,145	29,905
Incremental Lifetime	89,405	100,628	111,850	123,073	134,296	559,252
Projected Participation						
Projects	12	14	16	18	20	80

5.2.3.5. Target Market and Program Eligibility

Commercial, industrial and multifamily firm-rate customers of PGW will be eligible for the program.

5.2.3.6. Target Measures

The measures will be customized for each project. Typical examples include heating system retrofits, domestic hot water system retrofits, and shell improvements; however Efficient

Building Grants can accommodate any technologies that can be documented to conserve natural gas. Past Efficient Building Grants project applications have included custom measures ranging from installation of a vestibule, to commercial laundry equipment, to solar thermal hot water heating. As a result, Efficient Building Grants provides a strong testing ground for custom efficiency measures.

5.2.3.7. Incentive Strategy

Incentives will be based on providing up to 33 percent of incremental cost for retrofit measures and 80 percent of incremental cost for replacement measures. Efficient Building Grants project grants will be capped at $75,000 per building, but may be combined with prescriptive rebates to exceed the cap.

PGW is currently undergoing a third-party evaluation of Efficient Building Grants, including a review of the incentive strategy. The evaluation may result in a revision to the incentive strategy in subsequent program years.

5.2.3.8. Marketing and Outreach

In prior filings, PGW noted that Efficient Building Grants marketing and communications activities would result in a "slow-burn" of projects. This statement continues to hold true, as marketing and business development activities conducted under Phase I are expected to serve as a base for lead development under Phase II.

PGW will continue its parallel paths of driving participation in Phase II. The first path is to utilize broad awareness campaigns to high-usage building owners and service companies that work with building owners to reduce energy usage. The second path narrowly targets outreach to promising leads for retrofit projects that are already planned and are already partially or wholly funded.

PGW's EnergySense C&I Trade Ally Network, is designed to assist customers with two main hurdles in implementing an energy efficiency retrofit project – identifying energy conservation service providers to perform upgrades, and identifying commercial lenders to finance the work. It further connects customers with energy conservation firms that can design and build retrofit projects. The network will also provide a directory of private lenders interested in financing commercial, industrial or multifamily energy efficiency projects.

PGW will expand its direct to customer outreach by delivering personalized messaging and targeted outreach to commercial and industrial property owners. This outreach will utilize PGW's customer information database to target customers based on usage.

5.2.3.9. Quality Control and Verification

On-site verification inspections are performed on every completed project. The inspection may be performed both during and after the installation, since some larger projects may require oversight at different stages of the project. Inspections allow PGW to validate that the correct equipment was installed and that it is in proper working order.

The majority of project inspections show no change in equipment; however PGW has identified several projects with inconsistencies that resulted in modified grant awards. These ranged from changes to equipment size and type to installations not being fully completed. In one instance, PGW's inspectors identified inefficient equipment that the general contractor had installed unbeknownst to the customer; as a result of the verification, the customer was able to correct the issue.

5.2.3.10. Data Management

PGW utilizes Excel workbooks to collect, analyze and report on Efficient Building Grants projects. Project data, including all efficiency measure costs, customer usage data, specifications for existing equipment, proposed high efficiency and new baseline equipment is collected from customer submittals and entered into a data collection workbook by PGW and the TAP. The specifications feed formulas to calculate savings that are located within the workbook and based on the PGW TRM or other sources for custom measures.

Measure details including lifetimes, costs and savings stored in the data collection workbook are transferred to the PGW project tool, which calculates the financial and economic impact of the projects. This tool, developed by the Program Development Consultants, calculates the financial and economic impact of each measure to inform measure selection for cost-effective projects. The PGW project tool accepts measure and project details as inputs, and calculates cost-effectiveness and financial impact based on current rates and avoided costs reported in the program year's implementation plan.

All project costs, savings and economic impact reports are stored in an Excel-based workbook used to track all commercial program activities, and which feeds the portfolio-level key performance indicator tracking database.

At the outset of Phase II, PGW will continue to utilize the existing data management structure to calculate and track savings, and will seek to streamline current processes through the RFP process for program services.

5.2.3.11. Evaluations

PGW began its third-party Efficient Building Grants program impact evaluation in FY 2014. Although the full evaluation will not be complete until the end of FY 2014, PGW has conducted an initial market study with participant customers, non-participant applicants, and non-participant customers. The market study found that participants reported satisfaction with the program, and two of the three surveyed reported that the program helped them identify measures that may not have otherwise been considered. Non-participants identified several areas for improvement, including updates to the programs communications strategy, improvements to increase ease-of-use of the application; and new resources to help customers identify strategies for efficiency improvements. PGW began implementing program improvements based on this feedback in FY 2014, illustrating the importance of evaluation for continual improvement of programs.

PGW will complete its third-party Efficient Building Grants program impact evaluation in FY 2014. Recommendations and updates based on lessons learned through this evaluation will

be implemented during FY 2015 and FY 2016. During Phase II, PGW will conduct biennial third-party impact evaluations.

5.2.4. Commercial Equipment Rebates

5.2.4.1. Description and Goals

The Commercial Equipment Rebates program, previously referred to as the Commercial and Industrial Equipment Rebates Program, issues prescriptive rebates on premium efficiency gas appliances and heating equipment to increase the penetration of these measures in the facilities of PGW's commercial, industrial, and multifamily customers. The program has the following objectives:

- Promote the selection of premium efficiency models at the time of purchase of commercial and industrial sized gas heating equipment;
- Increase consumers' awareness of the breadth of energy efficiency opportunities;
- Strengthen PGW's relationship with customers as a partner in energy efficiency;
- Encourage market actors throughout the supply chain to provide and promote high efficiency options;
- Align incentives with other programs;
- Aid in market transformation towards highest-efficiency options.

Eligible customers will use their own contractor to install the premium efficiency equipment and receive cash rebates to offset most of the incremental cost of the higher efficiency equipment.

5.2.4.2. Phase I Summary

Program Costs

Since program launch in September, 2012 through June 2014, PGW has spent $244,541 on the Commercial Equipment Rebates Program. Variable costs for marketing and customer incentives were much lower than budgeted.

Program Savings

Commercial Equipment Rebates Program achieved net annual gas savings of 6.3 BBtu and net lifetime gas savings of 145.4 BBtu from inception through June 2014. The program is expected to achieve net annual gas savings of 10.1 BBtu and net lifetime saving of 156.4 BBtu in FY 2015.

Participant Profile

Commercial Equipment Rebates Program has served a broad range of customers from multifamily building owners, to churches, to restaurants. The Commercial Equipment Rebates Program boiler rebates have most frequently gone to multifamily building owners, typically installing multiple staged units. In one example, a small non-profit personal care home for women received $5,800 for installing two high efficiency boilers, estimated to save the organization $2,511 in annual gas costs at current rates. In another project, a large multifamily facility in west Philadelphia received a combined rebate of $25,200 for

installing three large high efficiency boilers, estimated to save the tenants $23,222 in annual gas costs at current rates.

Although slower to start-up, the food service program has experienced a rise in interest from a range of commercial kitchens including catering halls, commissaries, and restaurants. In just one example, a restaurant in Center City Philadelphia received a combined rebate of $2,000 for installing two high-efficiency gas fryers, estimated to save the business owner $1,485 in annual gas costs at current rates.

Program Cost-Effectiveness to Date

As of June 2014, Commercial Equipment Rebates Program achieved positive TRC net benefits with a present value of $509,797 (in 2009 dollars), and a TRC BCR of 3.07. The Gas Energy System saw net benefits with a present value of $529,417 (in 2009 dollars), a BCR of 3.64.

Commercial Equipment Rebates Program is expected to achieve TRC cost effectiveness with $940,597 in PV net benefits and a 2.56 BCR over the initial five-year period of the program. The program is also expected to achieve Gas Administrator cost effectiveness, with $1 million in PV net benefits and a 3.03 BCR.

Lessons Learned

PGW experienced several barriers to success in the implementation of the Commercial Equipment Rebates Program, which it has addressed in previous filings. The following is an overview of the barriers and the steps that PGW has taken to overcome the issues.

Through its applications and other data sources, PGW learned how it should modify its communications strategy to more effectively motivate customers to upgrade equipment. While early communications were targeted on the network of trade allies that sell and install eligible equipment, a strategy that drew on lessons from Residential Equipment Rebates, PGW also experienced strong results by targeting commercial customers directly. This was because commercial customers, especially those that opened the bills, were more sophisticated in their understanding of heating equipment and planning for upgrades. As a result, PGW shifted to a more customer-focused outreach strategy in FY 2014.

In FY 2013, amid low participation from restaurants installing commercial food service equipment, PGW sought to more effectively target the supply chain. It conducted extensive outreach to distributors and manufacturers that sold eligible equipment, in order to better understand why participation lacked. PGW discovered that many supply houses did not stock eligible equipment, which could be easily purchased by walk-in customers. Additionally, PGW learned that many smaller restaurants could not overcome the up-front cost premium of high efficiency models. To overcome the challenges, PGW sought closer alignment with supply houses to update stocking procedures of high efficiency equipment. PGW also revised its incentive strategy for FY 2015 to address affordability concerns amid the latest available prices.

5.2.4.3. Updates and Improvements

In Phase II, PGW will seek to implement lessons learned from the FY 2013 – FY 2015 activities, including recommendations identified by the third party evaluator. At the outset of Phase II, PGW will begin an RFP process to reselect a portfolio-wide grant and rebate processor. In concert with the hiring of a new rebate processor, PGW will develop a streamlined online application process that allows customers to quickly submit rebate applications through its website.

PGW will also look for new methods of incentivizing the purchase of targeted high efficiency equipment. One opportunity that will be explored for implementation in Phase II will be upstream incentives to supply houses for eligible commercial food service equipment purchased and installed by PGW customers.

5.2.4.4. Projected Budgets, Savings, and Participation

TABLE 57. PROPOSED PROGRAM: PROJECTIONS FOR COMMERCIAL EQUIPMENT REBATES PROGRAM

Fiscal Year	2016	2017	2018	2019	2020	2016 - 2020
Projected Budgets (Nominal)						
Customer Incentives	$238,650	$238,650	$238,650	$238,650	$238,650	$1,193,250
Contractor Costs	60,000	63,000	66,000	69,000	72,000	330,000
Inspection and Verification	15,000	16,000	17,000	18,000	18,000	84,000
Evaluation	-	75,000	-	80,000	-	155,000
TOTAL:	**$313,650**	**$392,650**	**$321,650**	**$405,650**	**$328,650**	**$1,762,250**
Natural Gas Savings (MMBtu)						
Incremental Annual	10,056	10,056	10,056	10,056	10,056	50,279
Incremental Lifetime	156,427	156,427	156,427	156,427	156,427	782,133
Projected Participation						
Rebates	144	144	144	144	144	720

5.2.4.5. Target Market and Program Eligibility

The program's target market includes PGW firm-rate customers who initially wish to purchase equipment that may be substituted with a high-efficiency model incentivized through Commercial Equipment Rebates Program. Owners and renters, with the approval of the owner, are both eligible. Equipment must be purchased within the applicable promotion period to be eligible

5.2.4.6. Target Measures

Initially, measures in the program included high-efficiency boilers and cooking equipment. For FY 2015, the program has been expanded to include commercial-sized natural gas water heating equipment and steam traps. The following table shows a list of efficient measures and their incentives that will be provided at the outset of Phase II.

TABLE 58. EFFICIENT EQUIPMENT MEASURES OFFERED IN COMMERCIAL EQUIPMENT REBATES PROGRAM

Measure Name	Minimum Efficiency	Rebate Amount
Boiler, Hot Water (300 ≤ MBH ≤ 2,500)	90% Thermal Efficiency (Et)	$2,900 - $8,400
Boiler, Hot Water (300 ≤ MBH ≤ 2,500)	85% Thermal Efficiency (Et)	$800-$6,300
Commercial Gas Large Vat Fryer (Per-Frypot)	ENERGY STAR®	$1,900
Commercial Gas Standard Vat Fryer (Per-Frypot)	ENERGY STAR®	$1,400
Commercial Gas Steam Cooker (Per Pan)	ENERGY STAR®	$600
High-Efficiency Pre-Rinse Spray Valve	1.28 Gallons per Minute (GPM) maximum	$25
CI Domestic Hot Water Heaters	ENERGY STAR® (≥94% Et)	$4/MBH of rated input capacity
Low Pressure Steam Trap	PSIG < 15	$50
Medium Pressure Steam Trap	15 ≤ PSIG < 75	$150
High Pressure Steam Trap	75 ≤ PSIG	$250

PGW continues to perform periodic reviews of the rebates offered and may change the types of measures covered, the minimum efficiency level required, or the rebate amount based on changing market conditions.

5.2.4.7. Incentive Strategy

Fixed rebates will be used to streamline program delivery and increase customer participation. Rebates are designed to be in line with other leading program administrators. Where possible, PGW will attempt to cover up to 80 percent of the incremental cost of premium-efficiency equipment in order to help offset the barriers that the higher costs of the more efficient equipment often pose.

5.2.4.8. Marketing and Outreach

PGW is implementing a Commercial Equipment Rebates Program marketing plan with many similarities to the Residential Equipment Rebates strategy targeting supply chain and trade allies. However, the Commercial Equipment Rebates Program marketing activities will also consist of customer outreach to promote the benefits of high efficiency equipment directly to business owners. PGW conducts regular outreach to a network of over 800 trade allies that perform energy efficiency upgrades in Philadelphia. Through a monthly newsletter, PGW updates these firms and individuals about grant and rebate opportunities available to their customers. PGW will continue to work more closely with its trade allies and supply chain partners to encourage greater market up-take of Commercial Equipment Rebates Program eligible equipment. As new, rebate-eligible, equipment enters the market through Phase II, PGW will seek to establish new supply chain collaboration and outreach opportunities to promote the equipment.

To promote the steam trap program, PGW may issue an incentive for steam trap surveys in order to identify replacement opportunities. This incentive will be issued to building

owners that replace a minimum percentage of steam traps as recommended by the survey, and will be capped at a percentage of the survey cost.

5.2.4.9. Quality Control and Verification

PGW will monitor the ongoing progress of the program and work closely with CSPs to provide the highest possible service to its customers. PGW will track rebate application data and provide regular impact evaluations that that are supplemented by more in-depth, biennial process evaluations performed by a third-party evaluator. To insure that measures are installed correctly, rebates must be signed by certified contractors. A third-party firm will perform on-site verifications on a random selection of projects.

The Rebate Processor will provide PGW with program activity data for populating the DSM Tracking System. Program data will be collected from rebate application forms, receipts for equipment, site visits, and surveys of participants and non-participants. PGW's tracking system supports program evaluation through the collection of all relevant data pertaining to customer rebates and installed equipment. Application data and status, customer details and installation contractor information will be captured by the system as well as measure level data.

As part of the Annual Reporting process, PGW will provide regular reports of the programs impacts. Deemed savings will be calculated using PGW's Excel-based program tracking workbooks developed by the Program Development Consultant, utilizing algorithms established in the TRM, and formulas will be updated as the TRM changes. Only rebates for which payment has been issued will impact saving amounts. Figures showing the pipeline of applications as well as the number of rejected applications will be provided along with realized costs. PGW may also report additional information on characteristics of customers, contractors, and efficiency measure details. Findings from on-site inspections may be presented in impact evaluations although the results will be primarily used in the program's process evaluations.

Pursuant to an RFP process, PGW will select a CSP to conduct verification inspections for all programs in the EnergySense portfolio. The inspector will confirm the installation of at least ten percent of all measures installed through the Commercial Equipment Rebates program.

5.2.4.10. Data Management

PGW's rebate processor maintains a real-time database of rebate activity. PGW collects program activity from its rebate processor and reviews it for accuracy. Savings calculations are conducted using Excel-based tools developed by PGW's Program Development Consultant. As designed and implemented under Phase I, the workbooks accept inputs from the Rebate Processor's database providing the equipment make and model, and customer application information. Based on this information, the Excel-based workbook will calculate the savings according to savings algorithms documented in the TRM.

All project costs, savings and economic impact reports are stored in an Excel-based workbook used to track all commercial program activities, and which feeds the portfolio-level key performance indicator tracking database.

At the outset of Phase II, PGW will continue to utilize the existing data management structure to calculate and track savings, and will seek to streamline current processes through the RFP process for program services.

5.2.4.11. Evaluations

PGW will complete its third-party Commercial Equipment Rebates program impact evaluation in FY 2015. As part of the initial program development, PGW will work with the evaluator to establish the methodology and goals of the process evaluation. Initial objectives include:

- Verifying energy savings and associated costs
- Assessing market attitudes towards the program, including contractors, customers, and efficient equipment suppliers
- Measuring the effectiveness of current program design, marketing, and service delivery

Recommendations and updates based on lessons learned through this evaluation will be implemented during FY 2015 and FY 2016. During Phase II, PGW will conduct biennial third-party impact evaluations.

5.2.5. Efficient Construction Grants

5.2.5.1. Description and Goals

The Efficient Construction Grants program, previously referred to as the High Efficiency Construction Incentives program, promotes natural gas energy efficiency in the new construction and gut rehabilitation markets, both for residential and non-residential new construction projects. The program provides technical assistance and prescriptive financial incentives for projects that go beyond building code in reducing energy usage. A prescriptive incentive path has been developed for residential projects to streamline program delivery given the limited savings available. For commercial projects, incentives increase for projects the more a project saves natural gas compared to the code baseline, due to the greater opportunity for energy savings. The program has the following objectives:

- Save natural gas through cost-effective energy efficiency new construction and gut rehabilitation projects;
- Promote a better understanding of energy efficiency options available in the new construction and gut rehabilitation markets.

Efficient Construction Grants seeks to convince homebuilders, building owners, engineers, architects, and contractors to incorporate natural gas energy efficiency into the design of their projects and go beyond standards dictated by the building code. The program provides technical assistance and incentives for reaching a certain level of efficiency. PGW has engaged a technical assessment provider to assess the project plans and verify that each project meets program eligibility requirements, helping the customer along the way to

reaching the program requirements and go further if possible. PGW provides the financial incentive to the customer upon the completion of the project.

5.2.5.2. Phase I Summary

Program Costs

Since program launch in September, 2012 through June, 2014, PGW spent slightly under $200,000 (Nominal) on Efficient Construction Grants. The program is expected to cost $297,791 (Nominal) through FY 2015.

Program Savings

Efficient Construction Grants achieved net annual gas savings of 1.9 BBtu and net lifetime gas savings of 32.7 BBtu from inception through June 2014. The program is expected to achieve net annual gas savings of 3.7 BBtu and net lifetime saving of 68.5 BBtu in FY 2015.

Participant Profile

Efficient Construction Grants' participants to-date have included mid-sized multifamily properties and single family homes. One recent project was a 55-unit low income multifamily building in Philadelphia's Fairmount neighborhood. The designs were upgraded to include highly efficient hot water heaters, furnaces and low-flow fixtures. Through these designs the customer achieved a savings of 43.57 percent over energy code minimums, which resulted in estimated annual gas cost savings of $16,486 and net resource savings of $18,766. PGW paid the building developer a grant of $61,260 for the project's ambitious designs.

Program Cost-Effectiveness to Date

As of June 2014, Efficient Construction Grants has completed 12 projects worth $96,590 in PGW incentives, achieving TRC Net Benefits of $31,703 (2009$) and a BCR of 1.19, after accounting for program implementation costs.

PGW believes the Efficient Construction Grants program is integral within the overall DSM portfolio in providing additional energy-efficiency programming for commercial and industrial customers. PGW is continuing to develop a pipeline of new projects. Efficient Construction Grants program is expected to achieve TRC cost effectiveness with $60,909 PV net benefits and 1.20 BCR over the initial five-year period of the program. The program is also expected to achieve Gas Administrator cost effectiveness, with $33,632 in PV net benefits and a 1.15 BCR.

Lessons Learned

Since launching the Efficient Construction Grants program in the beginning of FY 2013, PGW has experienced slow program uptake, long project lead times, and volatility in program participation levels. PGW continues to apply data and lessons learned to date in identifying further program improvement opportunities, including a redesign of the Efficient Construction Grants residential program protocols and application processes, which is detailed below. This update resulted in a limited increase in short-term project

activity during the first half of FY 2014, and is expected to result in stronger program performance over the remainder of FY 2014 and 2015.

Due to the complexity and long-planning process required for new construction projects, Efficient Construction Grants projects were found to take eight months or more from initial engagement to project completion. As a result, business development activities conducted in FY 2013 and FY 2014 may not result in grant payments until late FY 2014 and into FY 2015. PGW will continue to see benefits of the prior marketing activities into Phase II as customers proceed with projects under consideration for Efficient Construction Grants incentives from prior PGW fiscal years.

Unlike the Commercial Equipment Rebates Program and Efficient Building Grants, where program participants will directly reap the benefits of lower operating savings, Efficient Construction Grants requires developers to make a higher investment in high efficiency equipment without a guarantee of future cash flow. Although sophisticated developers understand the return on investment and know how to build high efficiency properties, many others aren't certain of the price premium the properties will yield. Nor are they aware of the upgrades necessary to achieve cost-effective energy savings. PGW will continue its communication activities to further engage the developer community to showcase the financial benefit of participating in Efficient Construction Grants.

One early barrier to success with single-family and small multifamily residential applicants was the application requirements to provide an energy model or otherwise provide a detailed list of building characteristics so PGW could create a model. PGW found that most developers did not have energy models, and when confronted with the data collection requirements of Efficient Construction Grants, chose not to participate. In response, PGW developed a new application in FY 2014 that made Efficient Construction Grants even more prescriptive for residential and small multifamily customers. The redesigned application was a success, and resulted in an immediate conversion of long-standing leads into projects. PGW will seek to further build on this success through additional marketing activities focusing on the ease of participation.

5.2.5.3. Updates and Improvements

PGW will continue to review and revise its program participation procedures based on customer feedback and in response to the planned third-party program evaluation, taking place in FY 2015.

During Phase II, PGW will seek new ways for engaging builders and overcoming barriers to participation. These activities may include offering a PGW EnergySense participation certificate for homes or buildings that receive grants. PGW will also continue its practice of providing application guidance for larger projects. For projects that exceed 50,000 square feet, PGW's TAP will offer on-site assistance with the program application in order to develop an energy model.

PGW will also develop an online application tracking process that allows customers to track their project applications throughout the project lifecycle. Currently, customers apply to the

program through an online screening application. In Phase II, PGW will develop an online tool for customers and administrative staff to use for project and payment tracking. The rebate processor selected through the RFP process may develop this tool.

5.2.5.4. Projected Budgets, Savings, and Participation

TABLE 59. PROPOSED PROGRAM: PROJECTIONS FOR EFFICIENT CONSTRUCTION GRANTS

Fiscal Year	2016	2017	2018	2019	2020	2016 - 2020
Projected Budgets (Nominal)						
Customer Incentives	$157,000	$161,500	$166,000	$170,500	$175,000	$830,000
Contractor Costs	16,000	18,000	19,000	20,000	22,000	95,000
Inspection and Verification	8,000	9,000	9,000	10,000	11,000	47,000
Evaluation	-	50,000	-	60,000	-	110,000
TOTAL:	**$181,000**	**$238,500**	**$194,000**	**$260,500**	**$208,000**	**$1,082,000**
Natural Gas Savings (MMBtu)						
Incremental Annual	2,778	2,826	2,874	2,922	2,970	14,369
Incremental Lifetime	50,586	51,981	53,376	54,771	56,166	266,880
Projected Participation						
Projects	42	44	45	47	48	225

5.2.5.5. Target Market and Program Eligibility

The program's target market is a new construction or gut rehabilitation project that will use natural gas provided by PGW. Gut rehabilitation is generally understood to be a project where the interior space of the building is "taken down to the studs" or two or more of the mechanical systems are being replaced and are required to meet current energy code standards. The project must meet the savings criteria outlined in the Target Measures section below. As long as a project meets the savings criteria it will be eligible to receive a rebate.

5.2.5.6. Target Measures

Efficient Construction Grants takes a "performance-based", whole-building approach. Projects must save a certain amount of gas compared to a similar project that merely meets building code. Through the new single family and small multifamily applications, there are several cost-effective measures that are the center of recommended Efficient Construction Grants projects. The measures included in the new applications include thermal envelope insulation, heating equipment, and water heating equipment and fixtures.

Larger commercial facilities and apartment buildings that do not qualify to use the new application will continue to proceed through the original application design requiring a customized full energy model for each building. There will be no specific measures required, but most measures are expected to be either part of the HVAC system (new equipment, tighter ducts, controls, etc.) or the building envelope (insulation, high-efficiency windows, etc.).

5.2.5.7. Incentive Strategy

Fixed and variable rebates will be used to streamline program delivery and increase customer participation. Single-family residential projects will be eligible for a construction

grant of up to $750 for achieving at least 20 percent savings. If equipment is included in the project that is eligible for a prescriptive rebate, the customer will receive a minimum grant equal to the value of the prescriptive rebate for all eligible heating equipment aligned with Residential Equipment Rebates. In these instances, the construction grant will be scaled down based on the percentage of savings attributed to equipment not covered by the prescriptive rebate.

Commercial, industrial and multifamily projects will receive a scaled incentive up to $60,000 based on the percentage and quantity of gas saved. Commercial construction grants will not be calculated for the savings from equipment covered by the prescriptive rebate. The awards may exceed the $60,000 construction grant limit for commercial properties, when combined with Residential Equipment Rebates or Commercial Equipment Rebates Program incentive levels.

When the program launched, the incentive tiers began at 5 percent savings. In FY 2014 PGW increased the minimum savings to 15 percent to drive increased savings and ensure project cost-effectiveness. Although the incentive tiers may be adjusted to achieve program goals, Efficient Construction Grants will launch in Phase II with the following grant schedule:

TABLE 60. EFFICIENT CONSTRUCTION GRANTS COMMERCIAL INCENTIVE TIERS

Efficient Construction Grants Incentive - Commercial & Industrial	Incentives to Owner (Per-First Year MMbtu Saved)
≥ 15% to < 20% more efficient than energy code minimum	$13.00
≥ 20% to < 30% more efficient than energy code minimum	$24.00
≥ 30% more efficient than energy code minimum	$40.00

5.2.5.8. Marketing and Outreach

In the Efficient Construction Grants program, unlike the Commercial Equipment Rebates Program or Efficient Building Grants programs, the property's end-user is often not the entity responsible for the project. As a result, PGW has experienced an even greater challenge in marketing the program because some developers may not be able to justify additional investment in high-efficiency measures even when incentives are available. PGW has focused its marketing on influencers that can help to educate developers about the benefits of investing in additional energy efficiency measures.

The chief influencers in this process are the project architects and engineers. PGW's marketing plans emphasize outreach to architects and engineers, through direct communications, presentations at firms, and outreach through organizations. PGW will continue conducting expanded outreach to these groups through relevant trade organizations. PGW will seek to expand its collaborations with trade organizations, accrediting organizations and associations of professional service providers in the buildings industries.

In addition to outreach to service providers, PGW also began targeting residential and commercial developers directly. This outreach included targeted outreach based on projects identified through PGW's collaboration with PHFA, or through news articles. Additional outreach was conducted through the real-estate industry network, including realtors, appraisers and inspectors. This outreach is expected to forge deeper ties with real estate and developer industry organizations. PGW plans to further focus outreach activities on this market to identify additional projects and help PGW better gauge the end-user demand for high-efficiency homes and buildings.

PGW has also leveraged the data collected to better inform its marketing activities. PGW has increasingly educated developers about the benefits of EnergySense at the time they first engage PGW for service, whether it's for new service turn-ons, or to request an estimate to develop a project site with natural gas. When developers have made the choice to install natural gas, PGW has provided them with information about the benefits of high-efficiency equipment.

In Phase II, PGW will seek to overcome the split incentive of building high efficiency homes to sell by offering certificates of participation or 3rd party certificate identifying the building as high efficiency. Homebuilders can use the certificate to publicize that the home met the efficient equipment requirements to participate in PGW EnergySense. Implementation of this tool will provide builders with an incentive to participate, and will help PGW grow brand awareness for EnergySense.

5.2.5.9. Quality Control and Verification

PGW will collect and store information provided by potential customers on applications. Information that will be collected through applications and stored in the DSM database includes:

- Customer information such as name, organization, and contact information.
- An overview of the potential project. For commercial buildings the overview will include detailed building designs, cut sheets and energy model files. For small multifamily projects and single-family residential buildings, the data collected will include equipment efficiency tiers, and equipment model information when needed to confirm efficiency levels.

PGW will work with the TAP to collect additional details on the premise and potential measures that make up the project in order to confirm and expand on the information submitted by applicants. The TAP will use this information to estimate the amount of energy the finished building will use compared to a baseline building.

After a project is completed, an inspector may perform on-site verification. The data collected during this inspection and stored by PGW will include:

- Certificate of Occupancy to prove project completion
- Visual confirmation and documentation through photographs or invoices proving the purchase and installation of required measures

Post-construction verification inspections are performed on all commercial, industrial and multifamily properties, and 10% of all single-family residential properties that participate in Efficient Construction Grants. The inspections will allow PGW to validate that the correct equipment was installed.

5.2.5.10. Data Management

Efficient Construction Grants savings information is calculated using a modeled home and building performance, in accordance with the PGW TRM-established criteria for custom new construction projects. For single-family residential and multifamily buildings smaller than 15 units, savings are calculated in an Excel-based building model that was developed through extensive modeling scenario analysis conducted by the Technical Assessment Provider. Commercial and large multifamily properties are modeled using industry-standard building energy modeling software based on the eQUEST DOE2 program, and utilizing assumptions documented in the PGW TRM.

Measure details including lifetimes, costs and savings from the PGW TRM and modeling report are transferred to the PGW project tool, which calculates the financial and economic impact of the projects. This tool, developed by the Program Development Consultants, calculates the financial and economic impact of each measure to inform measure selection for cost-effective projects. The PGW project tool accepts measure and project details as inputs, and calculates cost-effectiveness and financial impact based on current rates and avoided costs reported in the program year's implementation plan.

All project costs, savings and economic impact reports are stored in an Excel-based workbook used to track all commercial program activities, and which feeds the portfolio-level key performance indicator tracking database.

5.2.5.11. Evaluations

PGW will complete its third-party Efficient Construction Grants program impact evaluation in FY 2015. As part of the initial program development, PGW will work with the evaluator to establish the methodology and goals of the process evaluation. Initial objectives include:

- Verifying energy savings and associated costs
- Assessing market attitudes towards the program, including contractors, customers, and efficient equipment suppliers
- Measuring the effectiveness of current program design, marketing, and service delivery

Recommendations and updates based on lessons learned through this evaluation will be implemented during FY 2015 and FY 2016. During Phase II, PGW will conduct biennial third-party impact evaluations.

5.2.6. Home Rebates

5.2.6.1. Description and Goals

The Home Rebates program provides incentives to customers and contractors that perform comprehensive natural gas energy efficiency retrofits. The Home Rebates program has the following goals:

- Save natural gas through cost-effective residential retrofits;
- Achieve an average reduction of at least 20 percent in annual gas heating consumption among all participants;
- Promote better understanding of energy efficiency options available for the residential market;
- Provide solutions and increase customer satisfaction among PGW residential customers.

Home Rebates provides incentives to single-family residential customers for implementing comprehensive natural gas saving projects in their homes, including air sealing, insulation, and heating system replacements. Customers are eligible for a subsidized energy assessment and can earn rebates based on the calculated first-year MMBtu savings of their completed measures. PGW, through a third-party administrator, oversees a network of contractors approved to perform work under Home Rebates. The program builds on the lessons learned from implementing ELIRP, which promotes similar energy efficiency packages among PGW's low-income population through use of approved conservation service providers (CSPs). The following steps outline the customer participation process in Home Rebates:

- A customer enters Home Rebates either through direct CSP enrollment or through application via the main program website or hotline managed by the Program Administrator. Customers that enter through the latter method have the option of selecting a preferred CSP or being assigned a CSP.
- The CSP then contacts the customer to schedule and perform the initial energy audit, enter data into the in-home Contractor Tool; and provide the customer with the recommended job scope that includes costs, projected energy savings, and PGW Home Rebates incentive, and any financing options available. PGW has developed an audit subsidy model in which PGW, the CSP, and the customer all absorb a portion of the upfront audit costs so as to lower the customer's initial barrier to entry while still requiring a manageable level of program buy-in.
- The CSP will then install all measures approved by the customer, bill the customer, complete the PGW Home Rebates application, and submit it with supporting information to the Program Administrator.
- Once the work has been completed, the contractor sends the test-out results to the implementation contractor, who does a bench review and, in some instances, an onsite inspection.
- As soon as all the proper post-installation documentation has been completed satisfactorily, PGW will pay incentives to the customer through the Program Administrator. CSPs that implement measures which exceed gas savings minimums will also receive an incentive.

5.2.6.2. Phase I Summary

Program Participants

PGW saw an uptick in program activity due to new marketing activities beginning in January, 2014, as the average number of audits completed per month has increased from 25 to 31, while the average number of jobs completed per month stands at 11. While increasing program leads in the short-term, these grass-roots activities have been designed and implemented to include the CSPs and instill the experiential knowledge into their businesses. The hope is to eventually transfer these activities entirely to the CSPs and revert to a limited PGW marketing footprint, as initially envisioned.

As of June 2014, the Home Rebates program conversion rate of audits resulting in completed projects was 40 percent. This rate steadily increased in the preceding months due to the lead time for projects often being over two months. PGW established a conversion rate goal of 35 percent for FY 2015. Recent activity and trends are suggesting that PGW will continue to beat its targeted conversion rate amid increased FY 2014 activity.

Program Costs

From program launch in September, 2013 through June, 2014, PGW spent slightly over $720,000 on Home Rebates. The difference between budgeted and actual costs is mainly due to slower than anticipated start-up.

Program Savings

Home Rebates projects have net annual gas savings of 3.9 BBtu and net lifetime savings of 109.4 BBtu from inception through June 2014.

Program Cost-Effectiveness to Date

As of June 2014, Home Rebates has completed 134 projects worth nearly $245,000 in PGW incentives, achieving TRC Net Benefits of $106,456 and a BCR of 1.19 for the projects alone. However, taking into account program implementation and start-up costs, and costs for audits with no completed projects, net benefits drop to -$283,508 or a BCR of 0.68. The large fixed start-up costs and slower than anticipated program ramp-up have negatively impacted the program's TRC results. However, based on project level cost-effectiveness and increasing activity levels, PGW is projecting that were the program to have continued it would achieve cost-effectiveness shortly into FY16.

Participant Profile

Customers have relied on the Home Rebates Program to help uncover both efficiency and health and safety issues to provide solutions for their home. Through the Home Energy Assessment one customer learned that their boiler was exhausting dangerous levels of CO (950 ppm) which is an indicator of poor efficiency. The CSP fixed both problems by installing a new 95 percent AFUE high efficiency heating system. The CSP also performed air sealing, roof insulation, and installed low-flow faucet aerators and domestic hot water pipe insulation. As a result, the homeowner received $2750.68 in rebates and saved 26.86

MMBtu, achieving overall gas savings of 35 percent. At the time of test-out, CO levels in the heating and DHW systems had been reduced to non-harmful levels.

Lessons Learned

After a full year of activity, PGW is able to fully evaluate the impact of its Home Rebates Program. One of the main challenges has been marketing the program. Home energy efficiency improvement is not always a tangible item or a service that homeowners adequately understand, particularly as affecting home comfort and occupant health and safety. Also, the upfront costs deter customers who have other priorities for spending funds. PGW has adapted its marketing strategy, communicating the additional comfort benefits, educating about the value of its services, and conducting proactive lead generation.

The Home Rebates Program maintains strong oversight of program CSPs and offers mentoring and extensive quality assurance protocols, intended to result in higher work quality standards and customer service. It also focuses on serving the CSP's best interests, so that CSPs are fully engaged in the program since they use rebates as a resource to further their own businesses. PGW relies on program data and monthly meetings with CSPs to consider new marketing approaches and program improvements. Some examples of recent activities include blower door technical training, and marketing and lead generation training sessions. PGW has also penalized CSPs when necessary, such as through the project submission policy that withholds CSP bonuses for projects submitted late or that have outstanding work deficiencies. PGW launched the Home Rebates Program with five CSPs and has added two additional firms. The current roster of CSPs represents firms of varying sizes with different business and lead acquisition models.

Although the Home Rebates program has experienced a slow start, not unlike the other EnergySense programs, customer demand for the program is building. Customers are frequently unaware of home performance issues entirely or the extent to which their homes are affected by the issues. The Home Rebates implementation team has heard several anecdotes from customers about health and safety issues that were uncovered through the Home Rebates program that otherwise may have been left hidden. The program has also provided an opportunity for customers in need of a heating equipment upgrade to expand the project into a broader scope achieving greater efficiencies. These benefits, in addition to the financial and economic customer benefits addressed above, support PGW's decision to support the program through its startup difficulties, into a mature offering.

5.2.6.3. Program Ramp Down in Proposed Program

Under the Proposed Program, starting in FY 2016, PGW will stop accepting new applications, discontinue its support of outstanding project scopes for Home Rebates and begin to ramp down program activity. The Home Rebates Program has gained market acceptance as it has grown and served many customers through CSPs that have ramped up their capacities. PGW has decided it is unable to continue the program at the current level due to the currently unrecovered program costs imposed. And given high program overhead and ongoing cost-effectiveness trending, the program could not be reduced in a way to address the PGW costs while still maintaining program viability.

Home Rebates is one of the most complicated and overhead intensive in the EnergySense portfolio, making it very difficult to operate cost-effectively at lower volumes. This decision is also in accord with best practices to avoid lost opportunities, which the equipment replacement programs represent, rather than prioritizing retrofits which can be deferred. Taken together, PGW believes that the wind down of the Home Rebates program is a good way to reduce non-recovered cost pressure in the Phase II Proposed Program while still capturing available savings and honoring commitments made to customer.

The first six months of FY 2016 will be spent closing projects in the Home Rebates pipeline for customers who have already received assessments during FY2015. Rebates will continue to be paid out for projects until funds are exhausted or until six months after the start of FY 2016. PGW expects there to be approximately 50 projects completed during this term.

PGW will use the remainder of FY2016 to perform final data clean up, migration, and closing interviews with contractors. PGW will work closely with the program's contractors to find alternative opportunities to continue providing some portion of services after the program closes, including ways to utilize tools developed for the program and other existing programs at PGW. A final evaluation will be performed in FY 2017 in order to provide a full analysis of the program's impacts and document lessons learned and best practices for the future.

The program is projected to have positive net TRC Benefits of $35,950 and a BCR of 1.11, derived from the completion of existing projects in the Home Rebates pipeline. Table 61 provides budget, savings, and participation projections for Home Rebates in the Proposed Program ramp down.

TABLE 61. PROPOSED PROGRAM: PROJECTIONS FOR HOME REBATES

Fiscal Year	2016	2017	2018	2019	2020	2016 - 2020
Projected Budgets (Nominal)						
Customer Incentives	$77,419	$-	$-	$-	$-	$77,419
Contractor Costs	65,000	-	-	-	-	65,000
Inspection and Verification	21,000	-	-	-	-	21,000
Evaluation	-	50,000	-	-	-	50,000
TOTAL:	**$163,419**	**$50,000**	**$-**	**$-**	**$-**	**$213,419**
Natural Gas Savings (MMBtu)						
Incremental Annual	1,450	-	-	-	-	1,450
Incremental Lifetime	38,300	-	-	-	-	38,300
Projected Participation						
Projects	50	-	-	-	-	50

5.3. Efficient Fuel Switching Program Plan

5.3.1.1. Program schedule and ramp-up

PGW's proposed DSM Efficient Fuel Switching program will expand the portfolio by promoting a new type of energy efficiency project to reduce net energy consumption, primarily by promoting Micro-CHP projects. Unlike the other programs in PGW's DSM

portfolio, the Efficient Fuel Switching program will increase natural gas consumption for the sake of reducing overall net energy usage. To clearly and prudently account for the impacts of this program's costs and benefits, activity in the Efficient Fuel Switching program will be tracked and reported on separate from the other energy efficiency programs. This separate tracking is due to the program resulting in increased natural gas consumption, while decreasing net energy usage. As a result, the TRC cost-effectiveness, and energy savings metrics will be reported separately. Outside of this section, figures for the Proposed Program and Expanded Scenarios do not include this program, and this section shows values only for the fuel switching program.

The proposed Fuel-Switching program will launch no sooner than six-months into FY2016, in order to provide adequate time to develop the program's market presence and administrative functions. As a new program, Fuel-Switching will require time to train PGW's sales and technical staff responsible for working with customers on projects. Additionally, PGW will need to perform market research and outreach activities to generate and qualify leads. PGW will budget additional resources in the first year of implementation for market development activities.

Commercial efficiency projects generally take several months of planning before initiating. Due to the complexity of projects expected in the Efficient Fuel Switching program, even greater lead-times must be anticipated. Micro-CHP projects are still uncommon in the market, so customers will likely require longer lead-times for project review and planning activities. To accommodate the delayed start-up, PGW has designed the projected budgets and activity levels to start small and gradually scale-up more activity levels.

5.3.1.2. Projected Program Costs and Impacts

PGW proposes spending approximately $2.3 million over the next five-years on the new fuel-switching program. Program budgets would start at around $113,550 in FY 2016 and rise to $879,050 by FY 2020 as the program ramps up. Table 62 shows program budgets by category and year for the proposed program.

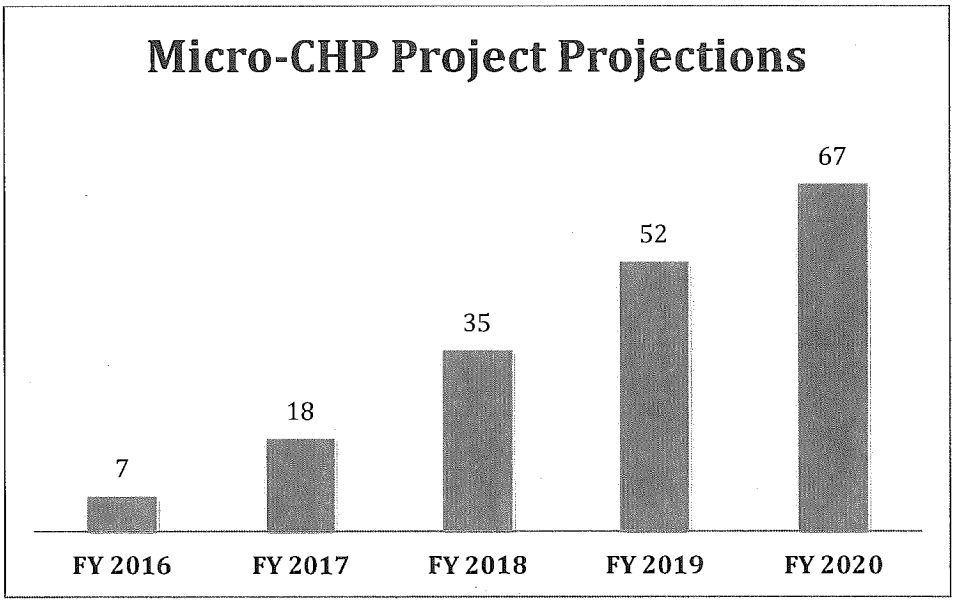
TABLE 62. PROPOSED PHASE II BUDGETS FOR EFFICIENT FUEL SWITCHING PROGRAM (NOMINAL)

Category	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	Total
Incentives	$48,750	$150,000	$296,250	$472,500	$633,750	$1,601,250
Administration	40,000	44,000	48,400	53,200	58,500	244,100
Marketing	24,800	30,000	59,300	94,500	126,800	335,400
Evaluations		20,000	30,000		60,000	110,000
Total	$113,550	$244,000	$433,950	$620,200	$879,050	$2,290,750

Spending levels are based on achieving program participation as shown in the following figure. In line with budgets, program participation is anticipated to approximately grow annually by 80 percent on-average over the Phase II period. While the proposed program

does include a path for custom project applications, activity data in these tables are only based on the forecasted Micro-CHP measure since that is the only prescriptive rebate included at this time. Future updates to the program may expand the program to additional measures and include a wider group of participants.

FIGURE 13. PROJECTED ANNUAL PARTICIPATION IN THE EFFICIENT FUEL SWITCHING PROGRAM



Since the program promotes fuel switching, it will deliver a net increase in gas usage, but an overall net decrease in total energy usage on a Btu basis

Figure 14 shows both the increase in annual gas usage installed each year, the electric grid gas usage impact from reduced grid generation, as well as the net energy savings due to switching to natural gas on-site generation. Incremental net gas usage is anticipated to grow 2,290 MMBtu per year in FY 2016, to 29,772 MMBtu per year in FY 2020. Net primary energy savings are anticipated to start at 1,297 MMBtu per year in FY 2016 and grow to 16,867 MMBtu per year in FY 2020, with total net energy savings of 623,891 MMBtu over the lifetime of all projects installed during the Phase II period.

FIGURE 14. PROJECTED ENERGY IMPACTS FROM EFFICIENT FUEL SWITCHING

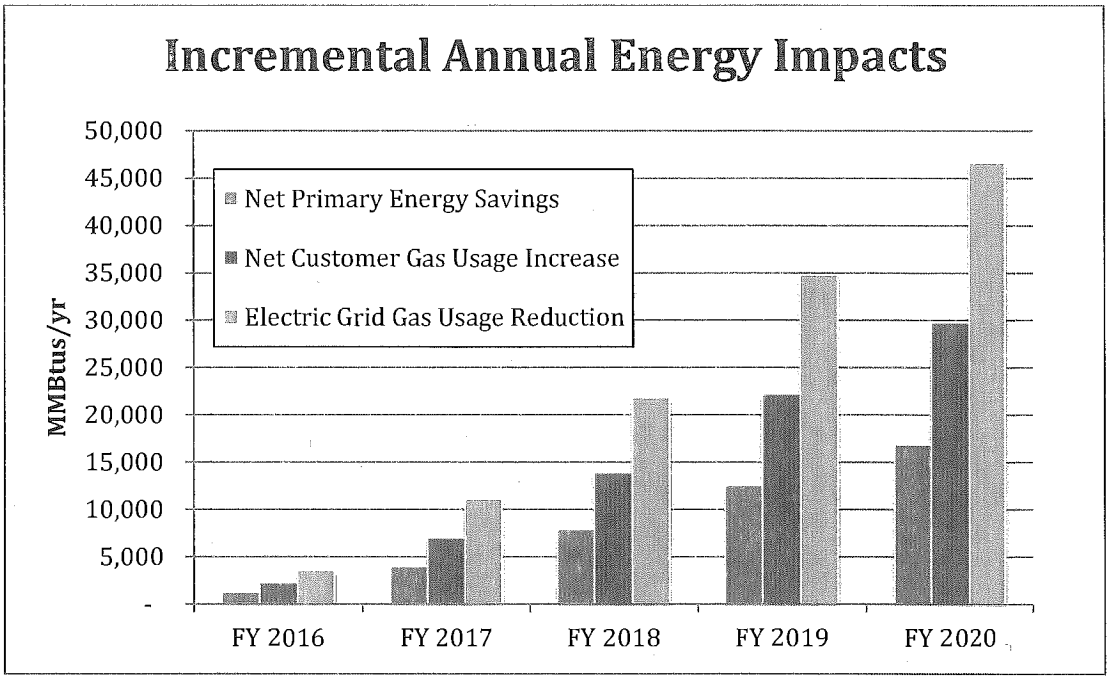


Table 63 provides the TRC test results for the Efficient Fuel Switching program over the five-year Phase II period, using the same sets of avoided costs and discount rates assumptions in the Phase II Proposed and Expanded Scenarios. The program is expected to provide $9.4 million in benefits, at a cost of $5.3 million dollars, leaving $4.1 million in net benefits with a BCR of 1.77 (in 2014 dollars). The calculation of TRC test results is discussed further in the next section.

TABLE 63. TRC TEST RESULTS FOR EFFICIENT FUEL SWITCHING PROGRAM (FY 2016 – FY 2020)

TRC Test	Low AC (PV 2014$)	Full Internal AC (PV 2014$)	Full External AC (PV 2014$)
TRC Benefits	$7,288,561	$6,170,496	$9,408,500
TRC Costs	5,313,668	5,313,668	5,313,668
TRC Net Benefits	**$1,974,893**	**$856,829**	**$4,094,832**
TRC BCR	1.37	1.16	1.77

5.3.1.3. Calculating Benefits and Cost-effectiveness

The Commission's Technical Reference Manual for Act 129 ("Act 129 TRM") directs program administrators on how to calculate savings for different energy efficiency measures. The current draft version contains multiple fuel switching measures, including switching from electric DHW, heat pumps, and heating to natural gas in both residential and commercial applications. Each entry contains a statement similar to the following:

> "Natural gas, propane and oil water heaters generally offer the customer lower costs compared to standard electric water heaters. Additionally, they typically see an overall energy savings when looking at the source energy of the electric unit versus the fossil fuel-fired unit." (p 84)

The Act 129 TRM then takes the following approach when calculating savings:

> "Although there is a significant electric savings, there is also an associated increase in natural gas energy consumption. While this gas consumption does not count against PA Act 129 energy savings, it is expected to be used in the program TRC test." (p 95)

The savings are then modeled using current electric consumption and a standard baseline for the natural gas equipment, typically Philadelphia Building Code. This approach would suggest that installing any equipment with efficiencies higher than baseline would result in natural gas savings to the gas administrator (for usage below the baseline), electric savings to the electric administrator, and a TRC test that takes in to account the difference between electric consumption and the lower gas consumption of the high efficiency unit.

Consistent with Act 129, PGW's DSM Fuel-Switching program will incorporate all energy increases and decreases in TRM calculations to determine overall net energy usage reductions and in TRC tests to determine cost-effectiveness. Efficiency projects that demonstrate TRM cost-effectiveness and provide an overall net reduction in total energy usage would be eligible for DSM Fuel-Switching incentives, despite the increase in natural gas usage specifically. Furthermore, savings would also be claimed for high-efficiency natural gas equipment included in a fuel-switching project as compared against baseline efficiencies.

In calculating Fuel-Switching savings and cost-effectiveness, PGW will maintain current approved TRM calculations and TRC methodologies. Further energy savings calculations, including additional Fuel-Switching components such as generation efficiencies and transmission and distribution efficiencies are included in Appendix 6.5.

5.3.1.4. Target Market and Program Eligibility

PGW began development of the Fuel-Switching program by first examining data on commercial property types in the City of Philadelphia and under-utilized natural gas technologies that would best serve these markets. Small-to medium-sized commercial and industrial properties were identified as the most viable market in terms of fuel-switching opportunities and a lack of current assistance programs as compared to other markets.

PGW rate implications also served as a useful defining criterion. As currently structured, only PGW GS firm sales supply customers are eligible for DSM programming as they are the customers who fund the DSM programs through the USC and ECRS surcharges. All GS Residential customers fund a surcharge dedicated strictly for residential DSM activity, as is the case for GS Commercials and GS Industrials.

By continuing to limit DSM eligibility to GS Firm customers for the Fuel-Switching program as well, PGW will ensure equity by only providing programming to customers funding the surcharge, a practice consistent with the broader DSM portfolio. PGW will also ensure sufficient rate class participation to justify the class-wide surcharge recovery mechanism, by drawing the surcharge from a broader pool of customers.

5.3.1.5. Target Measures

As stated above, the program's two primary criteria of TRC cost-effectiveness and net energy savings were applied in screening individual technologies at the measure level. Additionally, the PGW rate implications above served as a further defining consideration at the measure level as well. Project energy usage, measure costs, and rate comparison against existing fuel costs are essential data-points in determining project viability. Even the most energy efficient projects with greatest overall energy savings will not proceed unless sufficient rate savings are provided at the per MMBtu level.

Based on these analyses, PGW is launching the DSM Fuel-Switching program with one prescriptive measure incentive for Micro-Combined Heat and Power units ("CHP") and a specifically targeted custom measure path. Micro-CHPs provide the best examples for meeting the programs two primary criteria of net energy savings and TRC cost-effectiveness against baselines. Larger CHP projects provide similar opportunities, however units above 30 kW qualify for PGW Interruptible rates (providing significantly more attractive per Ccf rates) or other non-DSM incentives and assistance programs intended for high-volume customers.

Micro-CHPs under 30 kW provide similar benefits in terms of energy savings and cost-effectiveness. However, upfront costs and the spark spread[74] difference between gas and electric rates present hurdles to current projects. PGW's Fuel-Switching prescriptive incentives for CHPs have been designed to cover 30 to 40 percent of projects' upfront costs.

Additional Fuel-Switching technologies for the program's targeted market were also examined, including natural gas heat pumps and absorption chillers. PGW expects that individual project analyses will likely present attractive and eligible applications based on the program criteria, as addressed above. However, based on PGW's initial general market research performed, these measures did not exceed the program criteria across the board. As such, PGW will offer a Fuel-Switching custom measure path to analyze individual project's energy savings and TRC cost-effectiveness and offer customized incentives as warranted. This analysis of real project data will inform the ability to develop additional prescriptive incentives in the future.

5.3.1.6. Incentive Strategy

Incentive strategies were informed through market and industry research. Existing CHP incentive programs, including those already offered by Pennsylvania EDCs' Act 129

[74] "Spark spread" is the difference in cost between onsite electricity generation and off-site electricity generation

programs[75], are typically structured on a dollar per-kW capacity basis. Using these existing program designs as a template, PGW worked to derive a per-kW amount that would cover 30-40 percent of project upfront costs based on cost and savings data analyzed. Through these analyses PGW has designed a Micro-CHP incentive of $750 per-kW capacity, capped at 50 percent of projects' incremental costs. This figure is in the middle range of comparable programs identified.

The custom measure incentives will be based on existing DSM Efficient Building Grants and Commercial Equipment Rebates Program incentive strategies, calculated to cover 33 percent of projects' incremental costs, so long as primary program criteria are met. The custom incentives will be capped at $75,000 per-building to maintain the target of small and medium-sized businesses and to allow broader customer participation.

5.3.1.7. Roles and Responsibilities

PGW

Initially, PGW will perform all Fuel-Switching tasks in-house, including program administration, project analysis and QA/QC, grant calculation and processing, and all marketing and business development activities. PGW will likely continue program administration and marketing activities, but may shift project intake, analysis, and QA/QC to a technical assistance provider.

Program Development Consultants

Program Development Consultants will assist PGW in providing economic and financial analysis of the program and its projects. This will include providing project financial and economic analysis tools, training PGW staff and vendors on the use of the provided tools and providing analysis assistance on individual projects as needed, reviewing project cost and savings calculations, and helping analyze program-level results.

Technical Assistance Providers

Pursuant to an RFP process, PGW may select engineering firms with a local and regional presence to provide technical assistance on projects, including:

- Lead development: generating project leads that result in completed projects;
- Project intake and review: analysis of project costs, savings, and cost-effectiveness;
- Site walkthroughs: initial walkthrough to identify potential upgrade opportunities;
- QA/QC: site inspections during and after project construction.

[75] In Pennsylvania, PECO and UGI offer programs specifically designed for incentivizing CHP; PPL offers CHP incentives through its custom rebates program.

Quality Control Inspector

Pursuant to an RFP process, PGW will select a third-party CSP to conduct verification inspections for all programs in the EnergySense portfolio. The inspector will confirm the installation of measures reviewed by PGW and the Technical Assistance Provider.

Rebate Processor

Pursuant to an RFP process, PGW may select an implementation CSP to setup and manage the system for providing rebate payments to customers for all EnergySense programs, including Fuel-Switching incentives.

Evaluator

Pursuant to an RFP process, PGW will select a firm to conduct third-party evaluations for all EnergySense programs. The evaluator will be responsible for analyzing pre-and-post usage data of participants, analyzing program tracking data, conducting follow-up interviews with customers, if necessary, and reporting findings to program administrators

5.3.1.8. Marketing and Outreach

In general, PGW will launch a similar marketing strategy as currently utilized for the other commercial and industrial DSM programs, including a mass market awareness campaign through general ad-buys, supported with outreach through the existing DSM Trade Ally Network of industry architects, engineers, and contractors. Direct customer outreach initiatives will be employed in reaching the specifically targeted properties identified through market research as the most viable candidates for the eligible Fuel-Switching measures.

Additionally, as identified in a May, 2014 PUC en banc hearing on promoting CHP within the Commonwealth, a dearth of firsthand experience and knowledge is also limiting technology adoption. To these ends, PGW will also develop educational components, to be incorporated into each of the marketing vehicles addressed above; examples could include specific trainings for the Trade Ally Network, and educational resources and presentations for property facility managers. Collaboration opportunities with local academic and vocational educational institutions may also be pursued.

5.3.1.9. Coordination with Other Programs

Program/Organization	Description of Coordination
EnergyWorks	The EnergyWorks Commercial program, providing low-interest financing for larger commercial energy efficiency projects is still available. To the extent that the program remains available, PGW will continue to identify opportunities to partner with EnergyWorks on individual projects in combining PGW's rebates and grants with the attractive EnergyWorks financing.

5.3.1.10. Quality Control and Verification

Initially, on-site verification inspections will be performed on every completed project. The inspection may be performed both during and after the installation, since some larger projects may require oversight at different stages of the project. Inspections allow PGW to validate that the correct equipment was installed and that it is in working order.

In the future, based on actual program experience, PGW may reduce Fuel-Switching inspections to a randomly selected percentage of completed projects below a certain size or cost threshold.

5.3.1.11. Evaluations

Similar to other DSM programs, a third-party Impact Evaluation will be performed on the Fuel-Switching program every other year, beginning on year after completed projects in order to analyze sufficient actual energy usage reduction data.

5.4. Expanded Scenarios

With the introduction of the Conservation Adjustment Mechanism, described above, PGW would be able to expand funding and participation levels throughout its portfolio while mitigating the company's financial losses. Although marginal changes would be made in many of the programs, the greatest change under the Expanded Scenario would be the continuation of the Home Rebates program, which offers whole-home weatherization treatments to any PGW residential customer.

5.4.1. CRP Home Comfort Expanded Scenario

PGW would be able to expand funding for CRP Home Comfort by 37.5 percent under the Expanded Scenario, delivering an additional $2.3 million in present value of net TRC benefits, a 45 percent increase over the Proposed Program.

The Expanded Scenario budget would be approximately $2.5 million in 2014$ and maintained at that level in real terms, allowing funding to rise to around $3 million in nominal terms by FY 2020. Program design will remain the same, with the additional funding directed towards the single-family side of the program, since the LIME sub-program is being run as a pilot. The following table provides projections for the full CRP Home Comfort program under the Expanded Scenario.

TABLE 64. EXPANDED SCENARIO: PROJECTIONS FOR CRP HOME COMFORT

Fiscal Year	2016	2017	2018	2019	2020	2016 - 2020
Projected Budgets (Nominal)						
Measure Installation Costs	$1,970,808	$2,062,799	$2,104,055	$2,200,836	$2,300,602	$10,639,101
PGW Admin	30,000	30,000	30,000	30,000	30,000	150,000
Contractor Costs	508,702	534,700	545,014	572,209	600,151	2,760,775
Inspection and Verification	51,000	51,500	51,500	52,000	52,500	258,500
Evaluation	-	75,000	-	80,000	-	155,000
TOTAL:	**$2,560,510**	**$2,753,999**	**$2,730,569**	**$2,935,045**	**$2,983,253**	**$13,963,376**
Projected Natural Gas Savings (MMBtu)						
Incremental Annual	17,719	18,035	18,035	18,351	18,667	90,805
Incremental Lifetime	354,753	360,301	360,301	365,848	371,396	1,812,600
Projected Participation						
Projects	552	553	553	554	555	2,767

5.4.2. Residential Equipment Rebates Expanded Scenario

The Residential Equipment Rebates program is one of PGW's most popular programs, and continues to see significant growth as it enters its fourth year of existence. In the Expanded Scenario, PGW will be able to continue current annual program increases, building participation by 5 percent each year. Even with this increase in participation, PGW believes that there are still large single and multifamily residential heating equipment markets to still be reached.

Under the Expanded Scenario, the Residential Equipment Rebates budget is expanded by 10 percent and is projected to provide $6.0 million in net TRC benefits which is, $613,000 more than the Proposed Program, with a BCR of 1.68. Table 65 shows the projected budgets, savings, and participation for the Residential Equipment Rebate Program in the Expanded Scenario.

TABLE 65. EXPANDED SCENARIO: PROJECTIONS FOR RESIDENTIAL EQUIPMENT REBATES

Fiscal Year	2016	2017	2018	2019	2020	2016 - 2020
Projected Budgets (Nominal 000s)						
Customer Incentives	$671,000	$705,400	$742,050	$779,450	$818,600	$3,716,500
Contractor Costs	48,000	48,000	48,000	48,000	48,000	240,000
Inspection and Verification	8,000	9,000	9,000	10,000	10,000	46,000
Evaluation	50,000	-	55,000	-	60,000	165,000
TOTAL:	**$777,000**	**$762,400**	**$854,050**	**$837,450**	**$936,600**	**$4,167,500**
Natural Gas Savings (MMBtu)						
Incremental Annual	13,558	14,247	14,978	15,729	16,526	75,039
Incremental Lifetime	296,175	311,219	327,189	343,569	360,966	1,639,118
Projected Participation						
Rebates	1,030	1,082	1,137	1,194	1,254	5,697

5.4.3. Efficient Building Grants Expanded Scenario

There are no changes to the Efficient Building Grants program in the Expanded Scenario, as the Proposed Program provided for funding levels weighted to exceed program viability given the importance of serving the non-residential building market.

5.4.4. Commercial Equipment Rebates Expanded Scenario

Similar to Residential Equipment Rebates, PGW will expand participation in Commercial Equipment Rebates under the Expanded Scenario. The Commercial Equipment Rebates program has not been in existence as long as Residential Equipment Rebates, and serves a number of smaller and harder to reach markets, such as commercial kitchen equipment As such, activity levels are still low for many of the measures. As market awareness increases during Phase II, PGW anticipates annual participation growth under the Expanded Scenario starting near 10 percent in FY 2016 and falling slightly to 7.5 percent by FY 2020.

Higher participation rates combined with larger incentives per participant translate to a budget that is 40 percent higher in the Expanded Scenario compared to the Proposed Program. The program is projected to provide $6.3 million in net TRC benefits in the Expanded Scenario, which is $1.7 million more than the Proposed Program. The BCR of 3.11

for the program in the Expanded Scenario is also greatly improved over the 2.27 BCR under the Proposed Program, since much of the overhead for the program is fixed. Table 66 provides budgets, savings, and participation projections for the expanded Commercial Equipment Rebates program.

TABLE 66. EXPANDED SCENARIO: PROJECTIONS FOR COMMERCIAL EQUIPMENT REBATES

Fiscal Year	2016	2017	2018	2019	2020	2016 - 2020
Projected Budgets (Nominal)						
Customer Incentives	$238,650	$323,825	$409,000	$494,175	$579,350	$2,045,000
Contractor Costs	60,000	63,000	66,000	69,000	72,000	330,000
Inspection and Verification	15,000	17,000	20,000	23,000	25,000	100,000
Evaluation	-	75,000	-	80,000	-	155,000
TOTAL:	**$313,650**	$478,825	$495,000	$666,175	$676,350	$2,630,000
Natural Gas Savings (MMBtu)						
Incremental Annual	10,056	12,318	14,580	16,842	19,104	72,899
Incremental Lifetime	156,427	190,364	224,301	258,238	292,175	1,121,503
Projected Participation						
Rebates	144	158	172	186	200	860

5.4.5. Efficient Construction Grants Expanded Scenario

In the Expanded Scenario, the Efficient Construction Grants program is increased slightly with annual participation growing by about 5 percent per year, a modest rate that PGW projects based on past program experience of long lead times and slow market acceptance in the past. This increase in participation leads to a 6 percent increase in budget compared to the Proposed Program.

The program is projected to achieve $1.3 million in net TRC benefits with a BCR of 1.94, $50,000 more in net benefits than the Proposed Program. Table 67 provides budget, savings, and participation projections for the Efficient Building Grand program under the Expanded Scenario.

TABLE 67. EXPANDED SCENARIO: PROJECTIONS FOR EFFICIENT CONSTRUCTION GRANTS

Fiscal Year	2016	2017	2018	2019	2020	2016 - 2020
Projected Budgets (Nominal)						
Customer Incentives	$157,000	$161,500	$166,000	$170,500	$175,000	$830,000
Contractor Costs	16,000	18,000	19,000	20,000	22,000	95,000
Inspection and Verification	8,000	9,000	9,000	10,000	11,000	47,000
Evaluation	-	50,000	-	60,000	-	110,000
TOTAL:	$181,000	$238,500	$194,000	$260,500	$208,000	$1,082,000
Natural Gas Savings (MMBtu)						
Incremental Annual	2,778	2,826	2,874	2,922	2,970	14,369
Incremental Lifetime	50,586	51,981	53,376	54,771	56,166	266,880
Projected Participation						
Projects	42	44	45	47	48	225

5.4.1. Efficient Building Grants Expanded Scenario

In the Expanded Scenario, there will be no changes to the Efficient Building Grants program. Because this program represents an underserved market in the DSM portfolio, and because the overall program size is comparably small, PGW has chosen to adopt a growth rate under the Proposed Program and maintain the same growth rater under the Expanded Scenario.

5.4.2. Home Rebates Expanded Scenario

Of all the EnergySense programs, Home Rebates has the greatest opportunity to serve the broadest array of PGW customers, as many of PGW's 390,000 non-CRP residential customers may be eligible. This establishes Home Rebates as a unique program with far-reaching customer service opportunities.

Under the Expanded Scenario, PGW will continue to implement Home Rebates largely as designed under Phase I implementation. The program will continue to utilize CSPs selected through a competitive RFP process to weatherize customers' homes. Under the current structure and use of seven CSPs allows close CSP oversight while encouraging customer choice and providing an adequate pipeline of potential participant leads. During Phase II, PGW will continue its regular reviews of its seven current CSPs to ensure quality and achieve program goals, and may decide to re-enter the RFP process to hire additional CSP firms as necessary.

To provide additional value to customers and improve cost-effectiveness, PGW will increase its support of CSPs installing no or low-cost "core" measures at the time of the audit. These "direct install" measures allow CSPs to demonstrate the value of the audit and allow PGW to claim savings for projects that may not proceed to comprehensive jobs. In Phase I, these measures include hot water heater temperature turndowns, faucet aerators and programming of existing thermostats. During Phase II, PGW plans to allow for core measures that have labor and material costs but may be performed quickly. These include pipe insulation and installation of a programmable thermostat, as well as repairs to combustion appliances that result in safer environments. PGW will also consider changes to its rebate design that will further encourage deeper long-term savings.

Similarly, PGW is evaluating opportunities to add limited partner CSPs into the program to encourage deeper savings for customers seeking individual measures. The goal will be to upsell customers to energy audits and comprehensive work scopes. For example, an HVAC contractor may be able to enter a project into the program by performing duct insulation in addition to a heater replacement.

During Phase II, PGW will also seek to improve its direct to customer marketing activities. One method is through the development of an advanced e-audit tool to help customers understand their energy use and the savings potential in their homes. This type of tool has proven successful at engaging customers at many utilities, and may provide significant opportunities to generate strong leads under Phase II.

Lastly, PGW will assemble a working group to evaluate the possibility of an On Bill Recovery mechanism for customer wishing to finance their project. The working group, discussed

above in section 3.2.3, would help customers overcome what is often a significant hurdle to proceeding with a Home Rebates project - finding easy financing.

5.4.2.1. Projected Budgets, Savings, and Participation

TABLE 68. EXPANDED SCENARIO: PROJECTIONS FOR HOME REBATES

Fiscal Year	2016	2017	2018	2019	2020	2016 - 2020
Projected Budgets (Nominal)						
Customer Incentives	$437,614	$468,685	$500,823	$534,059	$568,425	$2,509,606
Contractor Costs	178,000	182,000	186,000	190,000	194,000	930,000
Inspection and Verification	51,000	53,000	54,000	56,000	57,000	271,000
Evaluation	-	50,000	-	60,000	-	110,000
TOTAL:	**$666,614**	**$753,685**	**$740,823**	**$840,059**	**$819,425**	**$3,820,606**
Natural Gas Savings (MMBtu)						
Incremental Annual	7,308	7,673	8,039	8,404	8,770	40,194
Incremental Lifetime	193,032	202,684	212,335	221,987	231,638	1,061,676
Projected Participation						
Projects	252	265	277	290	302	1,386

6. Appendices

The following appendices are included with this plan and are attached as separate documents.

6.1. Additional Avoided Costs for PGW

Paul Chernick
Resource Insight, Inc.
April 11, 2013, updated April 25, 2014

Wholesale Gas Market Effects

Supply Market Effects on PGW Gas Bills

Reducing gas usage reduces the price of natural gas on a continental basis, this effect is known as demand reduction induced price effect ("DRIPE"). Table B-1 summarizes the results of a number of analyses in the period 1998–2007 that estimated the effect on continental gas prices of reducing gas use with gas or electric energy-efficiency programs and/or renewable energy.[76] Most of these studies used EIA's National Energy Modeling System (NEMS), which is also used in the Annual Energy Outlook.[77] Table B-1 shows results for 2020, except for the ACEEE study, which estimated results in 2008.

Most of these analyses estimated that a 1 percent reduction in US gas consumption would reduce gas prices by about 1 percent–3 percent. For the gas supply prices that we are projecting for 2014–2020, a price reduction of 1 percent–3 percent would be about $0.05–$0.20/MMBtu. For that same time period, EIA forecasts that total US consumption of natural gas will be about 25 quads (or billion MMBtu). In more practical terms, the reduction of PGW gas consumption by 1 percent (about 780,000 MMBtu) would reduce continental gas prices by about $0.0002–$0.0006/MMBtu.

[76] While there are regional differences in gas prices due to pipeline congestion, most of the natural-gas price in most locations at most times is determined by the total balance of load and supply across the US and Canada.

[77] The ACEEE study used the proprietary model of Energy and Environmental Analysis, Inc.

Table B-1: Estimates of Gas Price Suppression from Reduced Usage

Author	Reduction in U.S. Gas Consumption quads	Gas Wellhead Price Reduction $/MMBtu (2000$)	$/MMBtu per quad (2000$)
EIA (1998)	1.12	$0.34	$0.30
EIA (1999)	0.41	$0.19	$0.46
EIA (2001)	1.45	$0.27	$0.19
EIA (2001)	3.89	$0.56	$0.14
EIA (2002a)	0.72	$0.12	$0.17
EIA (2002a)	1.32	$0.22	$0.17
EIA (2003)	0.48	$0.00	$0.00
UCS (2001)	10.54	$1.58	$0.15
UCS (2002a)	1.28	$0.32	$0.25
UCS (2002a)	3.21	$0.55	$0.17
UCS (2002b)	0.72	$0.05	$0.07
UCS (2003)	0.10	$0.14	$1.40
UCS (2004a)	0.49	$0.12	$0.24
UCS (2004a)	1.80	$0.07	$0.04
UCS (2004b)	0.62	$0.11	$0.18
UCS (2004b)	1.45	$0.27	$0.19
Tellus (2002)	0.13	$0.00	$0.00
Tellus (2002)	0.23	$0.01	$0.04
Tellus (2002)	0.28	$0.02	$0.07
ACEEE (2003)	1.35	$0.76	$0.56

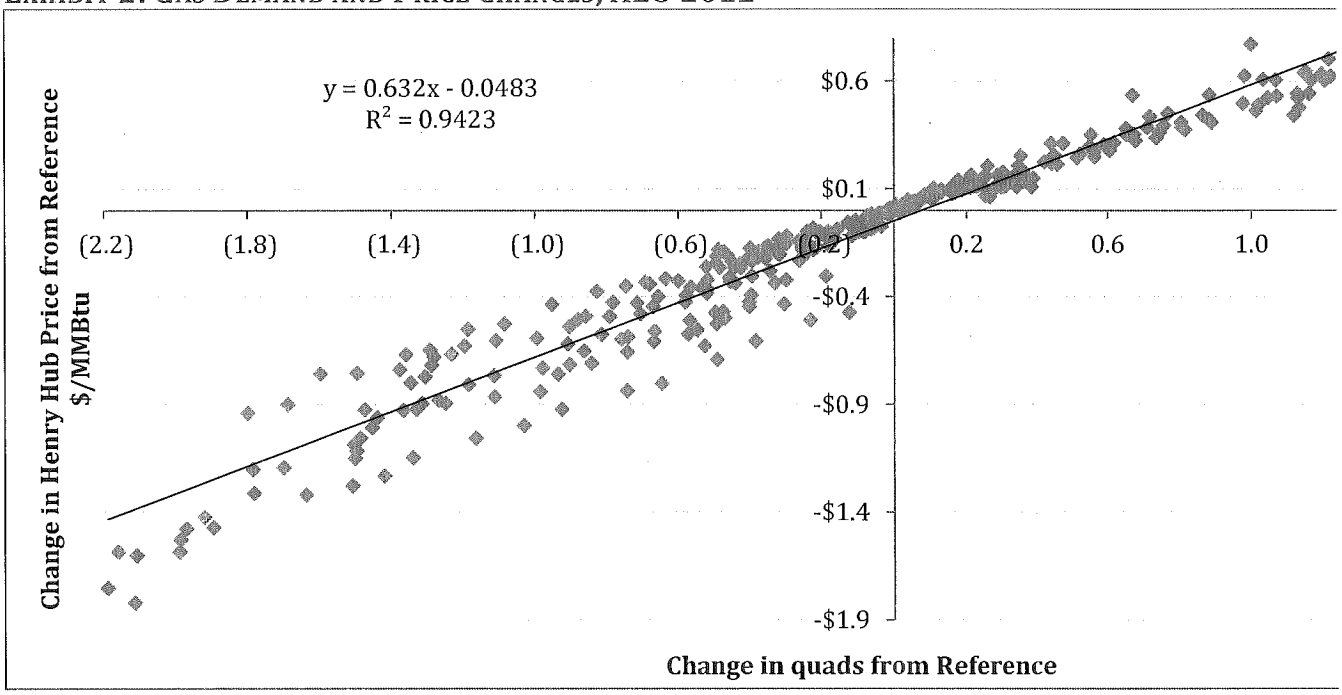
The structure of natural gas supply has changed considerably since 2007, with the growing importance of shale gas and the transition from forecasts of large LNG imports to forecasts of significant LNG exports. As a result, we have not used these older analyses to estimate gas-supply DRIPE. Instead, we have used EIA's most recent set of sensitivity analyses, from the 2012 AEO. Exhibit 1 lists the cases we identified as changing natural gas demand without affecting the gas supply curve, along with EIA's projection of the changes in gas consumption (in quads or billion Btu or trillion cubic feet), and Henry Hub price (in 2010$/MMBtu) from the AEO reference case in 2020.

EXHIBIT 1: AEO 2012 GAS-DEMAND SENSITIVITY CASES

	Change from 2020 Reference Case	
Forecast Case	**Consumption (quads)**	**Henry Hub Price (2010$/MMBtu)**
High economic growth	0.48	0.31
Low economic growth	(0.53)	(0.35)
Low nuclear uprates, lives and additions	0.07	0.05
High nuclear uprates, lives and additions	0.00	0.01
Low coal cost	(0.32)	(0.20)
High coal cost	0.45	0.26
2011 residential & commercial demand technology	0.37	0.17
High residential & commercial demand technology	(0.49)	(0.47)
Best residential & commercial demand technology	(0.74)	(0.83)
High coal retirement (Reference 05 case)	0.36	0.17
Low demand and supply technology	0.35	0.18
High demand and supply technology	(0.55)	(0.55)
Low renewable technology cost	(0.08)	(0.10)
Extended taxes and standards for efficiency & renewables	(0.15)	(0.08)
No sunset on tax policies for efficiency & renewables	(0.06)	(0.02)

Exhibit 2 plots those changes from the reference case, over all the years reported in AEO 2012. The results are remarkably linear, with the small changes in the early years clustered near the origin and the large changes in later years closer to the ends of the trend line.

EXHIBIT 2: GAS DEMAND AND PRICE CHANGES, AEO 2012



We will use the linear trend line in Exhibit 2, which implies a $0.632/MMBtu decrease in Henry Hub gas price for every billion MMBtu decrease in annual gas consumption.
To convert this slope of the supply curve to cents of gas-bill reduction per MMBtu saved, we multiply the coefficient times PGW's end-use gas consumption of about 78 million MMBtu. The potential effect on PGW gas end users' gas supply bill of one MMBtu reduction in gas consumption is

$$(\$0.632 \times 10^{-9}/\text{MMBtu}) \times (0.078 \times 10^{9}\ \text{MMBtu}) = \$0.05.$$

We do not expect to see any significant decay in these price-reduction values. The AEO gas prices (at least after the first few years) reflect the full long-term costs of gas development, not just the operation of existing wells. In addition, gas supply price reduction measures the effect of demand on the marginal cost of extraction for a finite resource.[78] If anything, lower gas usage in 2014 will leave more low-cost gas in the ground to meet demand in 2015, causing the effect to accumulate over time. A program that saves 100 MMBtu annually from 2015 onward would have kept another 500 BBtu in the ground by 2020, in addition to reducing 2020 demand by 100 BBtu. The shape of the scatter plot in Exhibit 2 does not suggest strong effects of either decay (which would produce an S curve, with the out years leveling off) or accumulation (which would result in rising effects in the out years, more extreme than the trend line).

Effect of Supply Gas Prices on Electric Prices

Natural gas set the market price in PJM about 33 percent of the time in the last twelve months.[79] That number is likely to rise over the next several years, as coal plants retire. The PJM data on marginal fuels reflect the generators that are at the margin in various zones of the sprawling PJM footprint, which stretches from Virginia to Chicago. In some hours, different fuels set the prices in different zones. Considering the large amount of coal-fired generation in the western parts of PJM, the percent of hours in which gas sets PECO's price is likely to be higher than the average.

When gas sets the market electric price, every $1/MMBtu change in gas price would change the market price by $7/MWh for the most efficient combined-cycle plants, $10/MWh for modern combustion turbines and older steam plants, and up to $15/MWh for older peakers. In 2012, PECO delivered about 39.7 million MWh. Assuming the average heat rate for the marginal gas generators is 9.5 MMBtu/MWh, the electric utility bill savings to impacted customers from an MMBtu reduction in gas use would be

$$(\$0.632\times10^{-9}/\text{MMBtu}) \times (9.5\ \text{MMBtu/MWh}) \times 39.7\times10^{6}\ \text{MWh} \times 33\% = \$0.08$$

[78] As technology changes, the size of the resource changes, but once gas is removed from the ground, it is gone forever. Less gas will be available from that play in the future, forcing the marginal supply to more expensive plays.
[79] Data from http://www.monitoringanalytics.com/data/marginal_fuel.shtml.

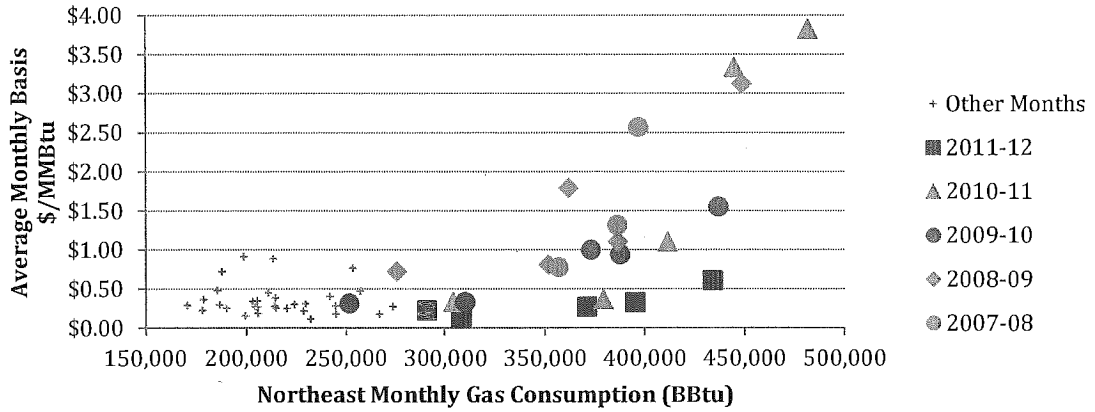
Effect of Gas Conservation on Pipeline Charges

Just as reducing gas consumption reduces gas prices at the wellhead and Henry Hub, reducing gas consumption also reduces the difference (or basis) between the market prices at Henry Hub and the Philadelphia citygate. This reduction in market price has no effect on the costs to PGW gas customers, because PGW purchases its gas transportation services under long-term contracts at tariff rates. For third-party marketers setting prices for their customers, and for power plants setting their bid prices, the market prices represent the cost of acquiring capacity or the opportunity cost of not selling the capacity into the market.

Exhibit 3 plots the basis from Henry Hub to Texas Eastern Zone M-3 against monthly gas consumption in the Northeast (Pennsylvania, New Jersey, New York, Massachusetts, Rhode Island, Connecticut and New Hampshire) for each month from January 2008 through June 2012, the last month for which EIA has reported complete state consumption data.[80] The solid markers identify the data for November through March for each of the indicated winters.

Basis has mostly been under $0.50/MMBtu (reflecting pipeline commodity and fuel charges) for consumption under 350,000 BBtu/month. The four non-winter months with basis over $0.50/MMBtu were April–July 2008, when gas prices were in the range of $12–$13/MMBtu, which would have substantially increased the fuel charges and hence the total variable pipeline charge. Over 350,000 BBtu/month, basis has risen fairly steadily for higher consumption levels, with lower prices in the unusually mild winter of 2011/12.

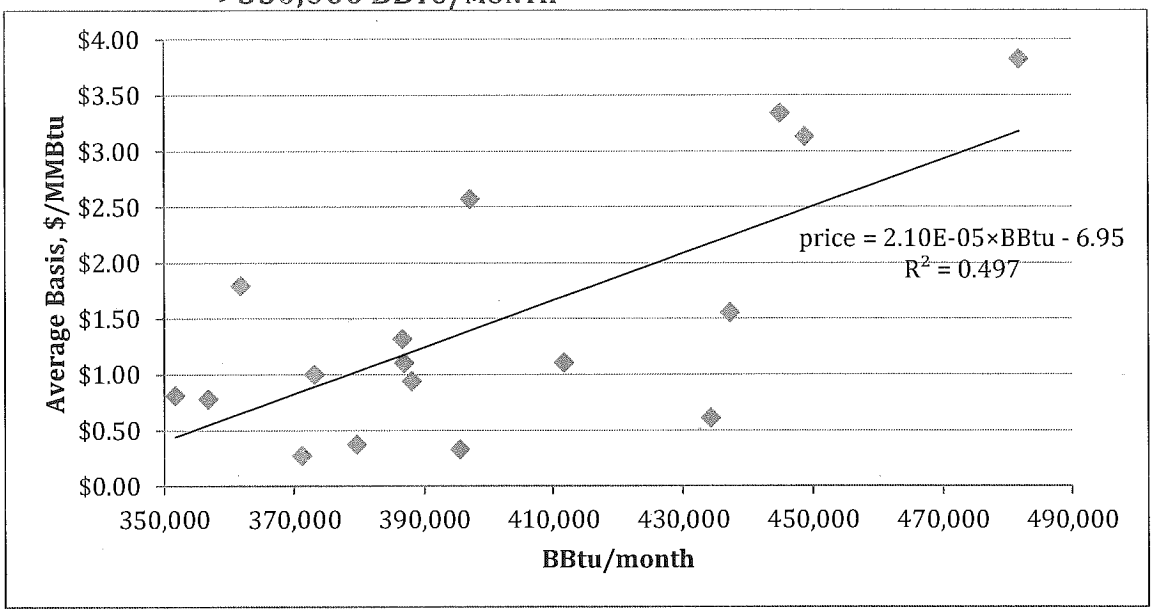
EXHIBIT 3: TETCO M-3 BASIS VERSUS NORTHEAST GAS CONSUMPTION



As shown in Exhibit 4, every BBtu of monthly consumption over 350,000 has increased the monthly basis by an average of $0.021/TBtu. The load range includes every December, January and February in our data, three of the five Marchs, and no other months.

[80] Vermont and Maine have been served entirely or primarily from Canada, and are not included in this analysis.

EXHIBIT 4: TETCO M-3 BASIS VERSUS NORTHEAST GAS CONSUMPTION, >350,000 BBTU/MONTH



Multiplying the $0.021/TBtu price-suppression by PGW's transportation deliveries forecast for December 2013 to February 2014, plus 60 percent of March 2014 (reflecting the probability of March being a high-demand month), weighted by the fraction of an annual space-heating MMBtu used the various months (58 percent in December–February and 14 percent in March) gives a price-suppression benefit of about $0.042/MMBtu of saved gas. Assuming that contract durations average three years, the price effect passed on to PGW customers would be about $0.014/MMBtu in the first year (e.g., 2014 for 2013/14 installation), $0.028/MMBtu in the second year, and $0.042/MMBtu thereafter. A MMBtu reduction in baseload gas usage would reduce winter load less than half as much, about $0.006/MMBtu in the first year, $0.013/MMBtu in the second year, and $0.019/MMBtu thereafter.

Similarly, the price effect on electricity prices for impacted electric customers would be $0.021/TBtu, times the percentage of hours with gas at the margin (about 40 percent), times a 9.5 heat rate, times monthly electric sales in the winter (averaging about 3,600 GWh in this territory), weighted by the percentage of the heating load in each month, would result in total electric price effects of about $0.20/MMBtu for space-heating savings and $0.09/MMBtu for baseload savings. Since both electric utilities and competitive marketers lock in prices for a year or so, the price effect would be delayed by a year.

Since the lower winter prices in the mid-Atlantic would tend to discourage construction of new pipeline supply, the price benefit is likely to decline after several years. In addition, the addition of shale gas in the mid-Atlantic is likely to reduce the TETCo M-3 basis over time. It seems reasonable to phase out the price effects from 2017 through 2020 or so.

Summary of Gas Price Effects

Each MMBtu of gas conservation would be expected to save PGW and electric utility customers about $0.13 in reduced gas and electric prices due to wellhead gas prices, with up to $0.39 of additional savings from reduced basis for space-heating load reductions B-2 summarizes the results discussed above.

TABLE B-2: SUMMARY OF PRICE EFFECTS PER MMBTU OF SAVINGS (2013$)

Year starting	Wellhead Price Effect		Basis Effect for deliveries by				Total Effect	
			Space Heat		Baseload		Heating	Base
	PGW	Electric	PGW	Electric	PGW	Electric		
2013	$0.05	$0.08	$0.01		$0.01		$0.14	$0.14
2014	$0.05	$0.08	$0.03	$0.20	$0.01	$0.09	$0.36	$0.23
2015	$0.05	$0.08	$0.04	$0.20	$0.02	$0.09	$0.37	$0.24
2016	$0.05	$0.08	$0.04	$0.20	$0.02	$0.09	$0.37	$0.24
2017	$0.05	$0.08	$0.04	$0.20	$0.02	$0.09	$0.37	$0.24
2018	$0.05	$0.08	$0.03	$0.15	$0.01	$0.07	$0.31	$0.21
2019	$0.05	$0.08	$0.02	$0.10	$0.01	$0.05	$0.25	$0.18
2020	$0.05	$0.08	$0.01	$0.05	$0.00	$0.02	$0.19	$0.16
2021+	$0.05	$0.08	-	-	-	-	$0.13	$0.13

If the perspective were broadened to include all Pennsylvania energy consumers (which would be a reasonable perspective for the Pennsylvania PUC), the price-suppression benefits would be much larger. Pennsylvania end-use consumers use about 600 million MMBtu (about eight times PGW's use) and electric customers use about 162 million. The benefit of wellhead gas price suppression for all Pennsylvania customers would be about $0.68/MMBtu of gas consumption, not counting the basis price effect, which varies by year (and by location).

Environmental Costs

Carbon Allowance Price

We based our estimate on the latest allowance price forecast of Synapse Energy Economics. The Synapse externality values have been widely used by utilities and other entities.

TABLE B-3: SYNAPSE 2012 CO_2 ALLOWANCE PRICE PROJECTIONS (MID CASE)

	2012$/ton CO_2	2013$/MMBtu
2020	$15.00	$0.92
2021	$17.25	$1.06
2022	$19.50	$1.20
2023	$21.75	$1.34
2024	$24.00	$1.47
2025	$26.25	$1.61
2026	$28.50	$1.75

2027	$30.75	$1.89
2028	$33.00	$2.03
2029	$35.25	$2.16
2030	$37.50	$2.30
2031	$39.75	$2.44
2032	$42.00	$2.58
2033	$44.25	$2.72
2034	$46.50	$2.85
2035	$48.75	$2.99
2036	$51.00	$3.13
2037	$53.25	$3.27
2038	$55.50	$3.41
2039	$57.75	$3.54
2040	$60.00	$3.68

Sources:

"2013 Carbon Dioxide Price Forecast," P. Luckow, E. Stanton, B. Biewald, J. Fisher, F. Ackerman, and E. Hausman, Synapse Energy Economics, 11/1/2013, Table 1

118 lb CO_2/MMBtu

Social Cost of Carbon

The Synapse forecast is a projection of the costs of carbon that are likely to be incorporated in market costs for fuels. It is not an estimate of the total cost to society of carbon emissions. The Federal government has developed estimates of the cost social cost of carbon (SCC).[81]

The Interagency Working Group found that "the average SCC from three integrated assessment models (IAMs), at [real] discount rates of 2.5, 3, and 5 percent," with a 95th percentile estimate at a 3 percent rate, would be as shown in Table B-4.

TABLE B-4. FEDERAL ESTIMATES OF THE SOCIAL COST OF CARBON (2007$/T)

Discount Rate	5.0%	3.0%	2.5%	3.0%
Damage Estimate	**Avg**	**Avg**	**Avg**	**95th**
Year				
2015	12	38	58	109
2020	12	43	65	129
2025	14	48	70	144
2030	16	52	76	159
2035	19	57	81	176
2040	21	62	87	192
2045	24	66	92	206
2050	27	71	98	221

[81] Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866; Interagency Working Group on Social Cost of Carbon, United States Government, May 2013.

Table B-5 compares the average results with a 3 percent discount rate to the Synapse expected market price.

TABLE B-5. MID-RANGE COST OF CARBON

	Federal Mid Case Damages	Synapse Mid Case Market Price	
	2007$/T	2014$/MMBtu	
2015	$38.00	$2.61	
2016	$39.00	$2.68	
2017	$40.00	$2.74	
2018	$41.00	$2.81	
2019	$42.00	$2.88	
2020	$43.00	$2.95	$0.92
2021	$44.00	$3.02	$1.06
2022	$45.00	$3.09	$1.20
2023	$46.00	$3.16	$1.34
2024	$47.00	$3.22	$1.47
2025	$48.00	$3.29	$1.61
2026	$48.80	$3.35	$1.75
2027	$49.60	$3.40	$1.89
2028	$50.40	$3.46	$2.03
2029	$51.20	$3.51	$2.16
2030	$52.00	$3.57	$2.30
2031	$53.00	$3.64	$2.44
2032	$54.00	$3.70	$2.58
2033	$55.00	$3.77	$2.72
2034	$56.00	$3.84	$2.85
2035	$57.00	$3.91	$2.99
2036	$58.00	$3.98	$3.13
2037	$59.00	$4.05	$3.27
2038	$60.00	$4.12	$3.41
2039	$61.00	$4.18	$3.54
2040	$62.00	$4.25	$3.68

DAMAGE COSTS FROM PRECURSORS TO PARTICULATE MATTER

While CO_2 is the major air pollutant emitted by end-use gas combustion, burning fossil fuels to produce electricity produces additional pollutants, including SO_2 and NOx, both of which have adverse effects on health, welfare, visibility and ecosystems.[82] One major effect of the particular pollutants is the damage to human respiratory systems when the gaseous pollutants convert to fine particles in the atmosphere. For the Philadelphia-New York area, EPA estimates the health-related damages of particulate matter resulting from releases of SO_2 and NOx by electric generators at the levels in Table B-6.[83]

[82] Depending on the type of generation, it may also emit significant quantities of particulates and toxic metals, and also have multiple effects on water quality and aquatic organisms.

[83] Fann, N., C.M. Fulcher, B.J. Hubbell. 2009. The influence of location, source, and emission type in estimates of the human health benefits of reducing a ton of air pollution. Air Qual Atmos Health 2:169–176. Updated at http://www.epa.gov/airquality/benmap/bpt.html.

TABLE B-6. HEALTH DAMAGES OF SO_2 AND NOX (2006$/TON)

	SO_2	NOx
2015	85,000	1,700
2020	80,000	1,700
2030	110,000	2,500

These estimates of damage costs do not include any costs for acid deposition, smog, pollution of waterways, or any other effects of these pollutants.

Avoided Environmental Costs of Saved Electricity

The emissions avoided by reducing electric use depend on the nature of the marginal units and their emission rates, which depends on their fuel, efficiency, design (for NOx) and controls. Table B-7 shows the mix of marginal units in the PJM real-time market, from Table 3-6 of the 2013 State of the Market Report for PJM (Monitoring Analytics, March 13, 2014).

TABLE B-7. FUEL USED BY MARGINAL UNITS IN PJM (2012 AND 2013)

Fuel Type	2012	2013
Coal	58.84%	57.75%
Gas	30.35%	32.39%
Oil	6.00%	4.79%
Other	4.81%	5.07%

Using data on actual emission in 2007 through 2009, Zivin, et. al., estimated the marginal emissions by time of day for each NERC region.[84] Table B-8 presents the simple average marginal emission rate for each pollutant in the ReliabilityFirst (RFC) region, which roughly corresponds to PJM and closely connected portions of MISO.

TABLE B-8. MARGINAL EMISSION RATES IN RFC, FROM ZIVIN ET. AL.

	CO_2	SO_2	Nox
lb/MWh	1,285	5.89	1.53

The Regional Greenhouse Gas Initiative (RGGI) estimated the emission rates of fossil-fueled imports from non-RGGI areas (including Pennsylvania) to the PJM portion of RGGI at about 2,000 lb/MWh in 2008 and 2009.[85] Using a historical dispatch model, Resource Systems Group estimated marginal CO_2 emission in Eastern PHM of 1,888 lb/MWh.[86] Those estimates are all for recent conditions. Over time, the marginal SO_2 and NOx (and to some extent the marginal CO_2) emissions are likely to decline as older units are retired, emission controls are added, coal and oil units are converted to burn gas, and rising gas prices result

[84] Joshua Graff Zivin, Matthew J. Kotchen and Erin T. Mansur, Spatial and Temporal Heterogeneity of Marginal Emissions: Implications for Electric Cars and Other Electricity-Shifting Policies, June 7, 2013.
[85] CO2 Emissions from Electricity Generation and Imports in the 10-State Regional Greenhouse Gas Initiative: 2009 Monitoring Report, RGGI, September 14, 2011, Table 7.
[86] Jeff King and Colin High, EPA Webinar on Quantifying Emission Impacts of Clean Energy Initiatives, Using a Time-Matched Hourly Marginal Emissions Tool in Metropolitan Washington, June 14, 2011.

in coal being dispatched lower to the loading order and gas being on the margin more often. On the other hand, additions of renewables may push more coal onto the margin. Synapse Energy Economics estimated the emissions avoided in 2026 by an incremental of wind energy in PJM, as shown in Table B-9.[87]

TABLE B-9 SYNAPSE ESTIMATE OF 2026 EMISSIONS AVOIDED BY MORE PJM WIND

	CO_2	SO_2	NOx
lb/MWh	904	0.27	0.18

Table B-10 combines the emission rates and values above, interpolating from 2008 values equal to the SO_2 and NOx emissions estimated by Zivin, et al, and 1,600 lb CO_2 per MWh (splitting the difference between Zivin and RSG), to the values estimated by Synapse for 2026.

[87] Bob Fagan, Patrick Luckow, David White, Rachel Wilson, "Net Benefits of Increased Wind Power in PJM: Final Report," May 9, 2013, Tables 2 and A.1.

TABLE B-10. SUMMARY OF AVOIDED EMISSIONS VALUES FOR ELECTRICITY

	2014$/Ton			Avoided Emissions lb/MWh			2014$/MWh			
	CO_2	SO_2	NOx	CO_2	SO_2	NOx	CO_2	SO_2	NOx	Total
2015	38	99,620	1,992	1,542	1.96	0.58	29.3	97.4	0.6	127.3
2016	39	98,448	1,992	1,484	1.39	0.45	28.9	68.6	0.4	98.0
2017	40	97,276	1,992	1,426	0.83	0.31	28.5	40.5	0.3	69.3
2018	41	96,104	1,992	1,368	0.27	0.18	28.0	13.0	0.2	41.2
2019	42	94,932	1,992	1,310	0.27	0.18	27.5	12.8	0.2	40.5
2020	43	93,760	1,992	1,252	0.27	0.18	26.9	12.7	0.2	39.8
2021	44	97,276	2,086	1,194	0.27	0.18	26.3	13.1	0.2	39.6
2022	45	100,792	2,180	1,136	0.27	0.18	25.6	13.6	0.2	39.4
2023	46	104,308	2,274	1,078	0.27	0.18	24.8	14.1	0.2	39.1
2024	47	107,824	2,367	1,020	0.27	0.18	24.0	14.6	0.2	38.7
2025	48	111,340	2,461	962	0.27	0.18	23.1	15.0	0.2	38.3
2026	48.8	114,856	2,555	904	0.27	0.18	22.1	15.5	0.2	37.8
2027	49.6	118,372	2,649	904	0.27	0.18	22.4	16.0	0.2	38.6
2028	50.4	121,888	2,742	904	0.27	0.18	22.8	16.5	0.2	39.5
2029	51.2	125,404	2,836	904	0.27	0.18	23.2	16.9	0.3	40.3
2030	52	128,920	2,930	904	0.27	0.18	23.5	17.4	0.3	41.2
2031	53	132,436	3,024	904	0.27	0.18	24.0	17.9	0.3	42.1
2032	54	135,952	3,118	904	0.27	0.18	24.4	18.4	0.3	43.0
2033	55	139,468	3,211	904	0.27	0.18	24.9	18.8	0.3	44.0
2034	56	142,984	3,305	904	0.27	0.18	25.3	19.3	0.3	44.9
2035	57	146,500	3,399	904	0.27	0.18	25.8	19.8	0.3	45.9
2036	58	150,016	3,493	904	0.27	0.18	26.2	20.3	0.3	46.8
2037	59	153,532	3,586	904	0.27	0.18	26.7	20.7	0.3	47.7
2038	60	157,048	3,680	904	0.27	0.18	27.1	21.2	0.3	48.7
2039	61	160,564	3,774	904	0.27	0.18	27.6	21.7	0.3	49.6
2040	62	164,080	3,868	904	0.27	0.18	28.0	22.1	0.3	50.5

Table B-11 combines the marginal carbon emission rates from Table B-10 with the Synapse 2013 carbon allowance price from Table B-3, to estimate the costs of carbon emissions that are likely to be reflected in market prices for electricity after 2019.

TABLE B-11. AVOIDED CARBON ALLOWANCES, $/MWH

	2012$/ton CO_2	lb CO_2/MWh	2014$/MWh
2020	$15.00	1,252	$9.7
2021	$17.25	1,194	$10.6
2022	$19.50	1,136	$11.4
2023	$21.75	1,078	$12.1
2024	$24.00	1,020	$12.6
2025	$26.25	962	$13.0

2026	$28.50	904	$13.3
2027	$30.75	904	$14.3
2028	$33.00	904	$15.4
2029	$35.25	904	$16.4
2030	$37.50	904	$17.5
2031	$39.75	904	$18.5
2032	$42.00	904	$19.5
2033	$44.25	904	$20.6
2034	$46.50	904	$21.6
2035	$48.75	904	$22.7
2036	$51.00	904	$23.7
2037	$53.25	904	$24.8
2038	$55.50	904	$25.8
2039	$57.75	904	$26.9
2040	$60.00	904	$27.9

6.2. Sample CAM Calculation Workbook

The following image provides the sample workbook that PGW will use to calculate the CAM. Please contact PGW to request an electronic copy of this workbook.

Philadelphia Gas Works
FY 2016 - Conservation Adjustment Mechanism Filing
CAM-1. Conservation Adjustment Amount Calculation

					PROJECTED				
	Customer Class	Total Savings for FY 2016 (MCF)	Average Annual Distribution Charge ($/MCF)	Conservation Adjustment Amount (CRP Unallocated)	Sales Volume (MCF)	Percentage of Eligible Sales	CRP Allocation Amount	Conservation Adjustment Amount (CRP Allocated)	$ per CCF
1	Residential (CRP)	4,858	$ 6.1016	$ 29,642.43					
2	Residential (Non-CRP)	6,408	$ 6.1016	$ 39,101.27	28,277	66.97%	$ 19,851.28	$ 58,952.55	$ 0.0208
4	Commercial	7,262	$ 4.6121	$ 33,494.31	11,071	26.22%	$ 7,771.85	$ 41,266.17	$ 0.0373
5	Industrial	370	$ 4.5464	$ 1,682.56	926	2.19%	$ 649.77	$ 2,332.33	$ 0.0252
6	Municipal	-	$ 4.1196	$ -	1,232	2.92%	$ 864.77	$ 864.77	$ 0.0070
7	Housing Authority (GS)	4	$ 3.3756	$ 14.20	167	0.40%	$ 117.36	$ 131.56	$ 0.0079
8	Housing Authority (PHA)	-	$ 4.9536	$ -	552	1.31%	$ 387.39	$ 387.39	$ 0.0070
9	**Total**	**18,903**		**$ 103,934.77**	**42,224**	**100%**	**$ 29,642.43**	**$ 103,934.77**	**$ 0.0246**

		PROJECTED		
	Customer Class	Customers	Average Annual Charge per Customer	Average Monthly Charge Per Customer
10	Residential (Non-CRP)	390,481	$ 0.15	$ 0.0126
11	Commercial	24,737	$ 1.67	$ 0.1390
12	Industrial	647	$ 3.60	$ 0.3004
13	Municipal	898	$ 0.96	$ 0.0802
14	Housing Authority (GS)	1,665	$ 0.08	$ 0.0066
15	Housing Authority (PHA)	814	$ 0.48	$ 0.0397
16	**Total**	**419,242**	**$ 0.25**	**$ 0.0207**

6.3. Sample Performance Incentive Calculation Workbook

The following image provides the sample workbook that PGW will use to calculate the Performance Incentive. Please contact PGW to request an electronic copy of this workbook.

Philadelphia Gas Works
FY 2016 - Performance incentive Filing
PI-1. Performance Incentive Allocation by Class

Fiscal Year 2016

	Eligible Classes	Sales Volume (Mcf)*	% of Eligible Sales	Annual Performance Incentive Allocation**
1	Non-CRP Residential	28,277	69.0%	$ 233,292.36
2	Commercial	11,071	27.0%	$ 91,334.86
3	Industrial	926	2.3%	$ 7,636.07
4	Housing Authority - GS	167	0.4%	$ 1,379.18
5	Housing Authority - PHA	552	1.3%	$ 4,552.62
6	**TOTAL**	**40,992**	**100%**	$ **338,195.10**

** PGW Projections*
*** Total performance incentive multiplied by % of eligible sales*

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PI-1. Performance incentive Allocation by Class
PI-2. Performance Incentive Calculation
PI-2. Annual Portfolio Performance

6.4. Efficient Fuel Switching Comparable Programs

	Company	Size	Incentive*	Minimum Efficiency	Requirements & Performance Incentives
Combined Heat & Power	MassSave (MA)	All	$750 per-kW	None	Other efficiency opportunities must be determined prior to sizing
		≤ 150 kW	$1,000 per-kW	Annual estimated efficiency > 60%	ASHRAE Level 1 Audit
		> 150 kW	$950 per-kW		All cost-effective EE with <3 year payback implemented within 18 months
		≤ 150 kW	$1,200 per-kW	Annual estimated efficiency > 65%	ASHRAE Level 2 Audit
		> 150 kW	$1,100 per-kW		All cost-effective EE to achieve 10% reduction to be implemented within 36 months.
	PECO	First 500 kW	$250-$300 per-kW	Steam turbine: 80% Reciprocating engine: 70% Gas turbine: 70% Microturbine: 65%	$.02 per-kWh generated in first year
		Between 500 kW & 1.5 MW	$100-$150 per-kW	Fuel cell: 55%	
		Over 1.5 MW	$50-$75 per-kW	Other: 60%	
	Southwest Gas (AZ)		$400 per-kW	60% total fuel efficiency	
			$450 per-kW	65% total fuel efficiency	

			$500 per-kW	70% total fuel efficiency	
	UGI		$1,500 per-kW		
Natural Gas Heat Pump	Yankee Gas	GAX Heat Pump	$500 per ton of cooling	Must be > 100%	
* MassSave and Southwest Gas incentives not to exceed 50% of cost PECO incentive not exceed 50% of cost or $1mm total UGI incentive not to exceed $100,000					

6.5. Efficient Fuel Switching Savings Calculations and Assumptions

6.5.1. Combined Heat and Power Systems

Unique Measure Code(s): TBD
Draft date: 7/29/14
Effective date: TBD
End date: TBD

Measure Description
This measure applies to combined heat and power (CHP) systems.

Definition of Baseline Condition
The baseline represents electricity purchased from the grid and heat requirements provided by burning natural gas.

Definition of Efficient Condition
The efficient measure is the installation of a CHP system that produces electricity and the waste heat from the production of the electricity is utilized for meeting onsite heat requirements.

Gas Savings Algorithms
The following equation accounts for the net change in the customer's natural gas usage. The production of electricity will require an increase in the customer's gas usage, but that will be partially offset by the reduction in gas usage from a thermal load at least partially met with the waste heat recovered from the CHP.

$$Annual\ Gas\ Savings\ (MMBtu) = RecMMBtu - CHPMMBtu$$

$$CHPMMBtu = \frac{\Delta kWh \times 3412}{\eta_{CHP} \times 10^6}$$

$$RecMMBtu = \frac{CHPMMBtu \times Rec\%}{\eta_b}$$

Where:

$Annual\ Gas\ Savings\ (MMBtu)$	=	The net annual customer gas savings of the CHP compared to the existing equipment meeting a thermal load. In the case of a CHP this will likely be a net increase in gas usage, so it will be negative.
$CHPMMBtu$	=	The annual natural gas used to run the CHP.

$RecMMBtu$	=	The annual natural gas saved by using the waste heat recovered from the CHP (MMBtu).
ΔkWh	=	Annual kWh produced from the CHP and displacing grid kWh. See calculation below.
3412	=	Btu per-kWh conversion.
η_{CHP}	=	The efficiency of the CHP electricity production (electricity Btu per natural gas Btu input).
$Rec\%$	=	Percentage of waste heat recovered and utilized to meet a thermal load.
η_b	=	Thermal efficiency of baseline equipment used to meet an onsite thermal load (e.g., boiler efficiency).

Electric Savings Algorithms

Energy Savings

$$\Delta kWh = CHPcap \times RunHours$$

Demand Savings

$$\Delta kW = CHPcap \times CF$$

Where:

ΔkWh	=	Annual kWh produced from the CHP and displacing grid kWh.
ΔkW	=	CHP grid coincident peak summer kW produced.
$CHPcap$	=	CHP output capacity in kW.
$RunHours$	=	The annual hours that the CHP is producing electricity.
CF	=	Grid summer peak coincident factor.

Net Primary Energy Savings

$$NetPrimaryMMBtu = GridMMBtu + RecMMBtu - CHPMMBtu$$

$$GridMMBtu = \frac{\Delta kWh \times (1 + ML) \times HeatRate}{10^6}$$

Where:

$NetPrimaryMMBtu$	=	The net primary energy savings from the CHP versus the baseline of grid electricity and thermal loads separately met by natural gas combustion.
$GridMMBtu$	=	The primary MMBtu required to produce the grid electricity for the baseline condition that is displaced by the CHP electricity production.
ML	=	Marginal losses from the grid produced electricity to the customer meter (expressed as percentage of customer

meter usage).

$HeatRate$ = The efficiency of producing electricity for the grid, expressed as Btu input per-kWh output.

Freeridership/Spillover

Until studies have been performed to determine the free ridership and spillover, the values are assumed to be zero.

Equipment Type	Free Ridership	Spillover
CHP	0%	0%

Persistence

The persistence factor is assumed to be one.

Measure Lifetimes

Equipment Type	Measure Lifetime
CHP	15

Source: Assumption used by PUC Fuel-Switching Working Group.

Water Savings

The water savings are the difference, if any, between the baseline before the CHP and after the CHP annual water usage in gallons per year.

6.5.2. Custom Fuel-Switching Measures

Unique Measure Code(s): TBD
Draft date: 7/29/14
Effective date: TBD
End date: TBD

Measure Description

This measure applies to all custom fuel-switching measures, not otherwise specified in this TRM.

Definition of Baseline Condition

The baseline represents the existing equipment that is currently installed. The efficiency level is based on measurements or nameplate information.

Definition of Efficient Condition

The efficient measure is any equipment that uses less primary energy than the baseline equipment.

Gas Savings Algorithms

The generalized equation for a custom measure compares the baseline usage to the efficient usage.

$$Annual\ Gas\ Savings\ (MMBtu) = BaselineUse - EfficientUse$$

Where:

BaselineUse = The gas usage of baseline equipment or building.

EfficientUse = The gas usage of efficient equipment or building.

Electric Savings Algorithms

Energy Savings

ΔkWh = *BaselinekWh - EfficientkWh*

Demand Savings

ΔkW = *BaselinekW - EfficientkW*

Where:

ΔkWh = Gross customer annual kWh savings for the measure.

ΔkW = Gross customer summer load kW savings for the measure.

BaselinekWh = The electric kWh usage of baseline equipment or building.

EfficientkWh = The electric kWh usage of efficient equipment or building.

BaselinekW = The electric kW usage of baseline equipment or building.

EfficientkW = The electric kW usage of efficient equipment or building.

Net Primary Energy Savings

$$NetPrimaryMMBtu = GridMMBtu + Annual\ Gas\ Savings\ (MMBtu)$$

$$GridMMBtu = \frac{\Delta kWh \times (1 + ML) \times HeatRate}{10^6}$$

Where:

NetPrimaryMMBtu = The net primary energy savings from the CHP versus the baseline of grid electricity and thermal loads separately met by natural gas combustion.

GridMMBtu = The primary MMBtu required to produce the grid electricity for the baseline condition that is displaced by

the CHP electricity production.

ML = Marginal losses from the grid produced electricity to the customer meter (expressed as percentage of customer meter usage).

$HeatRate$ = The efficiency of producing electricity for the grid, expressed as Btu input per-kWh output.

Freeridership/Spillover

Until studies have been performed to determine the free ridership and spillover, the values are assumed to be zero.

Equipment Type	Free Ridership	Spillover
Custom Measure	0%	0%

Persistence

The persistence factor is assumed to be one.

Measure Lifetimes

Where available, custom measure lifetimes should be based on similar measures defined elsewhere in this TRM.

Water Savings

The water savings are the difference between the baseline and efficient equipment annual water usage in gallons.

Philadelphia Gas Works
FY 2016 - Performance incentive Filing
PI-1. Performance Incentive Allocation by Class

Fiscal Year 2016

	Eligible Classes	Sales Volume (Mcf)*	% of Eligible Sales	Annual Performance Incentive Allocation**
1	Non-CRP Residential	28,277	69.0%	$ 233,292.36
2	Commercial	11,071	27.0%	$ 91,334.86
3	Industrial	926	2.3%	$ 7,636.07
4	Housing Authority - GS	167	0.4%	$ 1,379.18
5	Housing Authority - PHA	552	1.3%	$ 4,552.62
6	**TOTAL**	**40,992**	**100%**	$ **338,195.10**

** PGW Projections*

*** Total performance incentive multiplied by % of eligible sales*

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PI-1. Performance incentive Allocation by Class
PI-2. Performance Incentive Calculation
PI-2. Annual Portfolio Performance

Philadelphia Gas Works
FY 2016 - Performance incentive Filing
PI-2. Performance Incentive Calculation

		Performance Target 1	Performance Target 2	TOTAL	*Source*
1	FY 2016 Portfolio Budget (excluding Fuel Switching)	$4,509,268			*Phase II Plan*
2	Performance Incentive Maximum Percentage of Budget	10%			*Phase II Plan*
	Performance Target	**Natural Gas Savings**	**Net TRC Resource Benefits**		
	Description	Lifetime Incremental reduction in gas consumption (MMBtus)	Present worth of projected natural gas, electricity, and water resource savings net of program and customer costs (2014$)		
	Performance Incentive Assumptions				
3	Incentive Weight	50%	50%	100%	*Phase II Plan*
4	Threshold % of Target Required	70%	70%		*Phase II Plan*
5	% of Incentive Achieved at Target	75%	75%		*Phase II Plan*
6	% of Target required for Maximum Incentive	120%	120%		*Phase II Plan*
7	**Incentive @ 100% of Target**	**$169,098**	**$169,098**	**$338,195**	
8	**Maximum Incentive**	**$225,463**	**$225,463**	**$450,927**	
	Performance Incentive Results				
9	FY 2016 Target	903,141	$1,930,423		*PI-3*
10	FY 2016 Achieved Results	903,141	$1,930,423		*PI-3*
11	% of Target Achieved	100%	100%		
12	Minimum Threshold Met?	Yes	Yes		
13	Maximum Threshold Met?	No	No		
14	**Performance Incentive Amount**	**$169,097.55**	**$169,097.55**	**$338,195.10**	
15	% of Max Performance Incentive	75%	75%	75%	

Philadelphia Gas Works
FY 2016 - Performance incentive Filing
PI-3. Annual Portfolio Results

All results from FY Annual Report

Total Resource Cost (2014$)

	Actual Results				Goal				% of Goal Achieved			
Program	PV of Benefits	PV of Costs	PV of Net Benefits	BCR	PV of Benefits	PV of Costs	PV of Net Benefits	BCR	PV of Benefits	PV of Costs	PV of Net Benefits	BCR
CRP Home Comfort	$ 2,467,064	$ 1,844,653	$ 622,411	1.34	$ 2,467,064	$ 1,844,653	$ 622,411	1.34	100%	100%	100%	100%
Residential Equipment Rebates	$ 2,361,758	$ 1,704,622	$ 657,135	1.39	$ 2,361,758	$ 1,704,622	$ 657,135	1.39	100%	100%	100%	100%
Efficient Building Grants	$ 844,956	$ 426,107	$ 418,849	1.98	$ 844,956	$ 426,107	$ 418,849	1.98	100%	100%	100%	100%
Commercial Equipment Rebates	$ 1,120,893	$ 381,157	$ 739,736	2.94	$ 1,120,893	$ 381,157	$ 739,736	2.94	100%	100%	100%	100%
Efficient Construction Grants	$ 441,563	$ 249,956	$ 191,607	1.77	$ 441,563	$ 249,956	$ 191,607	1.77	100%	100%	100%	100%
Home Rebates	$ 324,476	$ 295,020	$ 29,455	1.10	$ 324,476	$ 295,020	$ 29,455	1.10	100%	100%	100%	100%
Portfolio-wide Costs	$ -	$ 728,772	$ (728,772)	-	$ -	$ 728,772	$ (728,772)	-		100%	100%	
PORTFOLIO TOTAL	**$ 7,560,711**	**$ 5,630,288**	**$ 1,930,423**	**1.34**	**$ 7,560,711**	**$ 5,630,288**	**$ 1,930,423**	**1.34**	**100%**	**100%**	**100%**	**100%**

Lifetime Savings Installed (MMBtus)

Program	Actual	Goal	%
CRP Home Comfort	272,248.6	272,248.6	100%
Residential Equipment Rebates	296,174.5	296,174.5	100%
Efficient Building Grants	89,405.2	89,405.2	100%
Commercial Equipment Rebates	156,426.5	156,426.5	100%
Efficient Construction Grants	50,585.9	50,585.9	100%
Home Rebates	38,300.0	38,300.0	100%
Portfolio-wide Costs	-	-	
PORTFOLIO TOTAL	**903,140.7**	**903,140.7**	**100%**

Philadelphia Gas Works
FY 2016 - Conservation Adjustment Mechanism Filing
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Philadelphia Gas Works
FY 2016 - Conservation Adjustment Mechanism Filing
CAM-1. Conservation Adjustment Amount Calculation

	Customer Class	Total Savings for FY 2016 (MCF)	Average Annual Distribution Charge ($/MCF)	Conservation Adjustment Amount (CRP Unallocated)	PROJECTED Sales Volume (MCF)	Percentage of Eligible Sales	CRP Allocation Amount	Conservation Adjustment Amount (CRP Allocated)
1	Residential (CRP)	4,858	$ 6.1016	$ 29,642.43				
2	Residential (Non-CRP)	6,408	$ 6.1016	$ 39,101.27	28,277	66.97%	$ 19,851.28	**$ 58,952.55**
4	Commercial	7,262	$ 4.6121	$ 33,494.31	11,071	26.22%	$ 7,771.85	**$ 41,266.17**
5	Industrial	370	$ 4.5464	$ 1,682.56	926	2.19%	$ 649.77	**$ 2,332.33**
6	Municipal	-	$ 4.1196	$ -	1,232	2.92%	$ 864.77	**$ 864.77**
7	Housing Authority (GS)	4	$ 3.3756	$ 14.20	167	0.40%	$ 117.36	**$ 131.56**
8	Housing Authority (PHA)	-	$ 4.9536	$ -	552	1.31%	$ 387.39	**$ 387.39**
9	**Total**	**18,903**		**$ 103,934.77**	**42,224**	**100%**	**$ 29,642.43**	**$ 103,934.77**

Philadelphia Gas Works
FY 2016 - Conservation Adjustment Mechanism Filing
CAM-2. Residential (CRP) Savings Projections

		Annual Savings (MCF)	
			FY 2016
	Measure Category	Prior Year	Projection
1	Heating Measures	-	10,981
2	Non-Heating Measures	-	1,132

	Fiscal Year	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	
	Calendar Year	2015	2015	2015	2015	2015	2016	2016	2016	2016	2016	2016	2016	*APPLIED TO*
		5eptember	October	November	December	January	February	March	April	May	June	July	August	*NEXT FY*
	Heating Measures													
3	Incremental Installed Annual Savings (MCF)	915	915	915	915	915	915	915	915	915	915	915	915	
4	Heating Allocation Factor	99.6%	96.4%	88.0%	73.1%	53.1%	33.4%	17.3%	6.4%	1.5%	0.1%	0.0%	0.0%	
5	With Allocation Factor Applied	911	882	805	669	486	306	158	59	14	1	-	-	
6	Cumulative Heat Savings (MCF)	911	1,794	2,599	3,268	3,754	4,059	4,218	4,276	4,290	4,291	4,291	4,291	10,981
	Non-Heating Measures													
7	Incremental Installed Annual Savings (MCF)	94	94	94	94	94	94	94	94	94	94	94	94	
8	Non-Heating Allocation Factor	95.9%	87.5%	79.2%	70.8%	62.3%	54.2%	46.2%	37.8%	29.5%	21.1%	12.7%	4.2%	
9	With Allocation Factor Applied	90	83	75	67	59	51	44	36	28	20	12	4	
10	Cumulative Non-Heat Savings (MCF)	90	173	248	314	373	424	468	504	531	551	563	567	1,132
11	**TOTAL CUMULATIVE SAVINGS (MCF)**	**1,002**	**1,967**	**2,847**	**3,582**	**4,127**	**4,484**	**4,686**	**4,780**	**4,821**	**4,842**	**4,854**	**4,858**	**12,113**

Philadelphia Gas Works
FY 2016 - Conservation Adjustment Mechanism Filing
CAM-3. Residential (Non-CRP) Savings Projections

		Annual Savings (MCF)	
	Measure Category	Prior Year	FY 2016 Projection
1	Heating Measures	-	14,958
2	Non-Heating Measures	-	1,124

	Fiscal Year	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	
	Calendar Year	2015	2015	2015	2015	2015	2016	2016	2016	2016	2016	2016	2016	*APPLIED TO*
		September	October	November	December	January	February	March	April	May	June	July	August	*NEXT FY*
	Heating Measures													
3	Incremental Installed Annual Savings (MCF)	1,247	1,247	1,247	1,247	1,247	1,247	1,247	1,247	1,247	1,247	1,247	1,247	
4	Heating Allocation Factor	99.6%	96.4%	88.0%	73.1%	53.1%	33.4%	17.3%	6.4%	1.5%	0.1%	0.0%	0.0%	
5	With Allocation Factor Applied	1,242	1,202	1,097	911	662	416	216	80	19	1	-	-	
6	Cumulative Heat Savings (MCF)	1,242	2,443	3,540	4,451	5,113	5,530	5,745	5,825	5,844	5,845	5,845	5,845	14,958
	Non-Heating Measures													
7	Incremental Installed Annual Savings (MCF)	94	94	94	94	94	94	94	94	94	94	94	94	
8	Non-Heating Allocation Factor	95.9%	87.5%	79.2%	70.8%	62.3%	54.2%	46.2%	37.8%	29.5%	21.1%	12.7%	4.2%	
9	With Allocation Factor Applied	90	82	74	66	58	51	43	35	28	20	12	4	
10	Cumulative Non-Heat Savings (MCF)	90	172	246	312	371	421	465	500	528	548	559	563	1,124
11	**TOTAL CUMULATIVE SAVINGS (MCF)**	**1,331**	**2,615**	**3,786**	**4,764**	**5,484**	**5,951**	**6,210**	**6,325**	**6,372**	**6,393**	**6,404**	**6,408**	**16,082**

Philadelphia Gas Works
FY 2016 - Conservation Adjustment Mechanism Filing
CAM-4. Commercial Savings Projections

	Measure Category	Annual Savings (MCF) Prior Year	FY 2016 Projection
1	Heating Measures	-	6,474
2	Non-Heating Measures	-	9,443

	Fiscal Year	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	
	Calendar Year	2015	2015	2015	2015	2015	2016	2016	2016	2016	2016	2016	2016	*APPLIED TO*
		September	October	November	December	January	February	March	April	May	June	July	August	*NEXT FY*
	Heating Measures													
3	Incremental Installed Annual Savings (MCF)	539	539	539	539	539	539	539	539	539	539	539	539	
4	Heating Allocation Factor	99.6%	96.4%	88.0%	73.1%	53.1%	33.4%	17.3%	6.4%	1.5%	0.1%	0.0%	0.0%	
5	With Allocation Factor Applied	537	520	475	394	286	180	93	35	8	1	-	-	
6	Cumulative Heat Savings (MCF)	537	1,057	1,532	1,927	2,213	2,393	2,487	2,521	2,529	2,530	2,530	2,530	6,474
	Non-Heating Measures													
7	Incremental Installed Annual Savings (MCF)	787	787	787	787	787	787	787	787	787	787	787	787	
8	Non-Heating Allocation Factor	95.9%	87.5%	79.2%	70.8%	62.3%	54.2%	46.2%	37.8%	29.5%	21.1%	12.7%	4.2%	
9	With Allocation Factor Applied	755	689	623	557	490	427	364	297	232	166	100	33	
10	Cumulative Non-Heat Savings (MCF)	755	1,443	2,066	2,624	3,114	3,540	3,904	4,201	4,434	4,600	4,700	4,733	9,443
11	**TOTAL CUMULATIVE SAVINGS (MCF)**	**1,292**	**2,501**	**3,599**	**4,550**	**5,327**	**5,934**	**6,391**	**6,723**	**6,963**	**7,129**	**7,229**	**7,262**	**15,917**

Philadelphia Gas Works
FY 2016 - Conservation Adjustment Mechanism Filing
CAM-5. Industrial Savings Projections

		Annual Savings (MCF)	
	Measure Category	Prior Year	FY 2016 Projection
1	Heating Measures	-	296
2	Non-Heating Measures	-	508

	Fiscal Year	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	
	Calendar Year	2015	2015	2015	2015	2015	2016	2016	2016	2016	2016	2016	2016	*APPLIED TO*
		September	October	November	December	January	February	March	April	May	June	July	August	*NEXT FY*
	Heating Measures													
3	Incremental Installed Annual Savings (MCF)	25	25	25	25	25	25	25	25	25	25	25	25	
4	Heating Allocation Factor	99.6%	96.4%	88.0%	73.1%	53.1%	33.4%	17.3%	6.4%	1.5%	0.1%	0.0%	0.0%	
5	With Allocation Factor Applied	25	24	22	18	13	8	4	2	0	0	-	-	
6	Cumulative Heat Savings (MCF)	25	48	70	88	101	109	114	115	115	115	115	115	296
	Non-Heating Measures													
7	Incremental Installed Annual Savings (MCF)	42	42	42	42	42	42	42	42	42	42	42	42	
8	Non-Heating Allocation Factor	95.9%	87.5%	79.2%	70.8%	62.3%	54.2%	46.2%	37.8%	29.5%	21.1%	12.7%	4.2%	
9	With Allocation Factor Applied	41	37	34	30	26	23	20	16	12	9	5	2	
10	Cumulative Non-Heat Savings (MCF)	41	78	111	141	168	190	210	226	239	247	253	255	508
11	**TOTAL CUMULATIVE SAVINGS (MCF)**	**65**	**126**	**181**	**229**	**269**	**300**	**324**	**341**	**354**	**363**	**368**	**370**	**804**

Philadelphia Gas Works
FY 2016 - Conservation Adjustment Mechanism Filing
CAM-6. Municipal Savings Projections

	Measure Category	Annual Savings (MCF) Prior Year	FY 2016 Projection
1	Heating Measures	-	-
2	Non-Heating Measures	-	-

	Fiscal Year	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	
	Calendar Year	2015	2015	2015	2015	2015	2016	2016	2016	2016	2016	2016	2016	*APPLIED TO*
		September	October	November	December	January	February	March	April	May	June	July	August	*NEXT FY*
	Heating Measures													
3	Incremental Installed Annual Savings (MCF)	-	-	-	-	-	-	-	-	-	-	-	-	
4	Heating Allocation Factor	99.6%	96.4%	88.0%	73.1%	53.1%	33.4%	17.3%	6.4%	1.5%	0.1%	0.0%	0.0%	
5	With Allocation Factor Applied	-	-	-	-	-	-	-	-	-	-	-	-	
6	Cumulative Heat Savings (MCF)	-	-	-	-	-	-	-	-	-	-	-	-	-
	Non-Heating Measures													
7	Incremental Installed Annual Savings (MCF)	-	-	-	-	-	-	-	-	-	-	-	-	
8	Non-Heating Allocation Factor	95.9%	87.5%	79.2%	70.8%	62.3%	54.2%	46.2%	37.8%	29.5%	21.1%	12.7%	4.2%	
9	With Allocation Factor Applied	-	-	-	-	-	-	-	-	-	-	-	-	
10	Cumulative Non-Heat Savings (MCF)	-	-	-	-	-	-	-	-	-	-	-	-	-
11	**TOTAL CUMULATIVE SAVINGS (MCF)**	-	-	-	-	-	-	-	-	-	-	-	-	-

Philadelphia Gas Works
FY 2016 - Conservation Adjustment Mechanism Filing
CAM-7. Housing Authority (GS) Savings Projections

	Measure Category	Annual Savings (MCF) Prior Year	FY 2016 Projection
1	Heating Measures	-	10
2	Non-Heating Measures	-	0

	Fiscal Year	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	
	Calendar Year	2015	2015	2015	2015	2015	2016	2016	2016	2016	2016	2016	2016	*APPLIED TO*
		September	October	November	December	January	February	March	April	May	June	July	August	*NEXT FY*
	Heating Measures													
3	Incremental Installed Annual Savings (MCF)	1	1	1	1	1	1	1	1	1	1	1	1	
4	Heating Allocation Factor	99.6%	96.4%	88.0%	73.1%	53.1%	33.4%	17.3%	6.4%	1.5%	0.1%	0.0%	0.0%	
5	With Allocation Factor Applied	1	1	1	1	0	0	0	0	0	0	-	-	
6	Cumulative Heat Savings (MCF)	1	2	2	3	4	4	4	4	4	4	4	4	10
	Non-Heating Measures													
7	Incremental Installed Annual Savings (MCF)	0	0	0	0	0	0	0	0	0	0	0	0	
8	Non-Heating Allocation Factor	95.9%	87.5%	79.2%	70.8%	62.3%	54.2%	46.2%	37.8%	29.5%	21.1%	12.7%	4.2%	
9	With Allocation Factor Applied	0	0	0	0	0	0	0	0	0	0	0	0	
10	Cumulative Non-Heat Savings (MCF)	0	0	0	0	0	0	0	0	0	0	0	0	0
11	**TOTAL CUMULATIVE SAVINGS (MCF)**	**1**	**2**	**3**	**3**	**4**	4	**4**	4	**4**	**4**	4	**4**	11

Philadelphia Gas Works
FY 2016 - Conservation Adjustment Mechanism Filing
CAM-8. Housing Authority (PHA) Savings Projections

	Measure Category	Annual Savings (MCF) Prior Year	FY 2016 Projection
1	Heating Measures	-	-
2	Non-Heating Measures	-	-

	Fiscal Year	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	
	Calendar Year	2015	2015	2015	2015	2015	2016	2016	2016	2016	2016	2016	2016	*APPLIED TO*
		September	October	November	December	January	February	March	April	May	June	July	August	*NEXT FY*
	Heating Measures													
3	Incremental Installed Annual Savings (MCF)	-	-	-	-	-	-	-	-	-	-	-	-	
4	Heating Allocation Factor	99.6%	96.4%	88.0%	73.1%	53.1%	33.4%	17.3%	6.4%	1.5%	0.1%	0.0%	0.0%	
5	With Allocation Factor Applied	-	-	-	-	-	-	-	-	-	-	-	-	
6	Cumulative Heat Savings (MCF)	-	-	-	-	-	-	-	-	-	-	-	-	-
	Non-Heating Measures													
7	Incremental Installed Annual Savings (MCF)	-	-	-	-	-	-	-	-	-	-	-	-	
8	Non-Heating Allocation Factor	95.9%	87.5%	79.2%	70.8%	62.3%	54.2%	46.2%	37.8%	29.5%	21.1%	12.7%	4.2%	
9	With Allocation Factor Applied	-	-	-	-	-	-	-	-	-	-	-	-	
10	Cumulative Non-Heat Savings (MCF)	-	-	-	-	-	-	-	-	-	-	-	-	-
11	**TOTAL CUMULATIVE SAVINGS (MCF)**	-	-	-	-	-	-	-	-	-	-	-	-	-

Philadelphia Gas Works

FY 2016 - Conservation Adjustment Mechanism Filing

CAM-9. Savings Allocation Factors from Middle of Month of Installation to End of Fiscal Year

	Fiscal Year	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016
	Calendar Year	2015	2015	2015	2015	2015	2016	2016	2016	2016	2016	2016	2016
	Measure Category	September	October	November	December	January	February	March	April	May	June	July	August
1	Heating	99.60%	96.40%	88.00%	73.10%	53.10%	33.40%	17.30%	6.40%	1.50%	0.10%	0.00%	0.00%
2	Non Heating	95.90%	87.50%	79.20%	70.80%	62.30%	54.20%	46.20%	37.80%	29.50%	21.10%	12.70%	4.20%

VERIFICATION

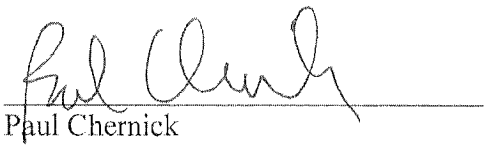
I, Francis Wyatt, hereby state that: (1) I am Partner for Green Energy Economics Group, Inc.; (2) the facts above set forth in the EnergySense Phase II Plan, other than those sections relating to the development of avoided costs, and used in the foregoing document are true and correct (or are true and correct to the best of my knowledge, information and belief); and (3) I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa. C.S. § 4904 (relating to unsworn falsification to authorities).

Francis Wyatt
Partner
Green Energy Economics Group

Dated: December 23, 2014

VERIFICATION

I, Paul Chernick, hereby state that: (1) I am the President of Resource Insight, Incorporated; (2) the facts above set forth in the sections of the EnergySense Phase II Plan relating to the development of the avoided costs, conservation adjustment mechanism and natural gas in the region are true and correct (or are true and correct to the best of my knowledge, information and belief); and (3) I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa. C.S. § 4904 (relating to unsworn falsification to authorities).



Paul Chernick
President
Resource Insight, Incorporated

Dated: December 23, 2014