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March 13, 2024

Via Electronic Filing

Rosemary Chiavetta, Secretary
PA Public Utility Commission
PO Box 3265
Harrisburg, PA 17105-3265

Re: Petition of Philadelphia Gas Works for Approval of Demand Side Management Plan for FY 2024-2026 and Philadelphia Gas Works Universal Service and Energy Conservation Plan for 2014-2016 52 Pa. Code § 62.4 – Request for Waivers – Docket No. P-2014-2459362

Dear Secretary Chiavetta:

Pursuant to Section 5.412a of the Commission’s regulations, 52 Pa. Code § 5.412a, which requires the electronic submission of admitted testimony, and Administrative Law Judge F. Josephs Brady’s March 11, 2024 Order Approving Joint Stipulation for Admission of Testimony and Exhibits and Closing the Record, enclosed for electronic filing please find the following testimony and exhibits on behalf of Philadelphia Gas Works (“PGW”) with regard to the above-referenced matter.

- (a) PGW Statement No. 1 – Direct Testimony of Denise Adamucci, and accompanying Exhibit DA-1;
- (b) PGW Statement No. 2 – Direct Testimony of Theodore M. Love, and accompanying Exhibit TML-1;
- (c) PGW Statement No. 1-R – Rebuttal Testimony of Denise Adamucci, and accompanying Exhibit DA-2;
- (d) PGW Statement No. 2-R – Rebuttal Testimony of Theodore M. Love;
- (e) PGW Statement No. 3-R – Rebuttal Testimony of Michel Farag, and accompanying Exhibit MF-1; and
- (f) PGW Statement No. 2-RJ – Rejoinder Testimony of Theodore M. Love.

All parties and the presiding officer have been served previously with the aforementioned testimony and exhibits. A copy of this letter is being served in accordance with the attached Certificate of Service. If you have any questions, please contact me.

Sincerely,

/s/ Lauren M. Burge

Lauren M. Burge

Enclosure

cc: Hon. F. Joseph Brady (w/o enc.)
Cert. of Service (w/o enc.)

CERTIFICATE OF SERVICE

I hereby certify that this day I served a copy of PGW's Letter filing Admitted Testimony 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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Dated: March 13, 2024

/s/ Lauren M. Burge
Lauren M. Burge, Esq.

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Petition of Philadelphia Gas Works for :
Approval of Demand-Side Management :
Plan for FY 2024-2026 : Docket No. P-2014-2459362
:
Philadelphia Gas Works Universal Service :
and Energy Conservation Plan for 2014- :
2016 52 Pa Code § 62.4 – Request for :
Waivers :

DIRECT TESTIMONY

OF

DENISE ADAMUCCI

On Behalf of

Philadelphia Gas Works

Topics Addressed:

Background of PGW’s DSM Programming
Overview of PGW’s Revised DSM Phase IV Implementation Plan
Revised DSM Review and Approval Process

September 27, 2023

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DA-1	PGW’s Revised Demand Side Management Implementation Plan Fiscal Years 2025-2029

1 **I. INTRODUCTION AND BACKGROUND**

2 **Q. PLEASE STATE YOUR NAME AND TITLE.**

3 A. My name is Denise Adamucci and I am Senior Vice President for Customer &
4 Regulatory Affairs at Philadelphia Gas Works (“PGW” or “Company”).

5 **Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND WORK**
6 **HISTORY.**

7 A. I have an MA in English Literature from Arizona State University and a JD from Boston
8 University School of Law. I assumed my current position in January 2023. Prior to my
9 current position, I was Vice President of Regulatory Compliance & Customer Programs.
10 I also previously worked as an attorney for approximately 14 years, both in private
11 practice and in PGW’s legal department as a senior attorney.

12 **Q. HAVE YOU EVER TESTIFIED BEFORE THIS COMMISSION?**

13 A. Yes. Most relevantly, I testified before the Pennsylvania Public Utility Commission
14 (“PUC” or “Commission”) in PGW’s previous Demand Side Management (“DSM”)
15 Phase II and Phase III proceedings at this docket, as well as in PGW’s most recent base
16 rate proceedings (Docket Nos. R-2017-2586783, R-2020-3017206, and R-2023-3037933)
17 and in various other proceedings before the Commission.

18 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

19 A. The purpose of my testimony is to provide background on PGW’s voluntary DSM
20 programs and explain why PGW elected to continue its DSM (also referred to as
21 “EnergySense”) programs in accordance with PUC Order at this Docket. I will provide an
22 overview of the existing programs and proposed modifications in PGW’s Demand Side
23 Management Implementation Plan (“DSM Phase IV”) which is being reviewed here.
24 Additionally, PGW has revised its Phase IV Plan to change the proposal from a three-

1 year plan to a five-year plan, and to propose a modified approval process going forward.
2 I will explain the reasons for the Revised Phase IV Plan, which is attached as Exhibit
3 DA-1.

4 **Q. WHAT TOPICS WILL BE COVERED BY PGW'S OTHER WITNESSES?**

5 A. Theo Love of Green Energy Economics Group will provide detail about the changes to
6 the DSM program for Phase IV.

7 **II. BACKGROUND OF PGW'S DSM PROGRAMMING**

8 **Q. PLEASE DESCRIBE THE HISTORY OF PGW'S DSM PROGRAMS.**

9 A. PGW's DSM portfolio, or EnergySense, is a program that PGW initiated voluntarily. It is
10 a portfolio of energy conservation programs that PGW first launched in Fiscal Year 2011,
11 which was initially approved by the Commission for a five-year term.

12 On December 23, 2014, PGW filed a Petition for Approval of Demand Side
13 Management Plan 2016-2020 ("DSM Phase II") at Docket No. P-2014-2459362. The
14 Commission subsequently approved a DSM Bridge Plan for an interim period effective
15 September 1, 2015, continuing through the earlier of the effective date of the DSM Phase
16 II Plan or August 31, 2016. On November 1, 2016, the Commission entered a final
17 Opinion and Order ("Final Order") approving the continuation of five market rate DSM
18 programs for FY 2017-2020.

19 On May 7, 2020, PGW filed its Implementation Plan for Fiscal Years 2021-2023
20 ("DSM Phase III" or "FY21-23 Plan") at Docket No. P-2014-2459362. On March 2,
21 2021, the parties filed a Joint Petition for Settlement, which was approved without
22 modification by the Commission Order entered May 6, 2021.

23 Most recently, on June 16, 2023, PGW filed its Implementation Plan for Fiscal
24 Years 2024-2026 ("DSM Phase IV" or "FY24-26 Plan") at Docket No. P-2014-2459362.

1 The Phase IV Plan is being reviewed in the current proceeding. A Revised version of the
2 Phase IV Plan is attached as Exhibit DA-1.

3 **Q. IS PGW REQUIRED TO PROVIDE A DSM PROGRAM?**

4 A. No. I am advised by counsel that PGW is not required under statute or PUC regulation to
5 provide a DSM program.

6 **Q. IS PGW PROPOSING A NEW DSM PROGRAM AT THIS TIME?**

7 A. No, PGW is not proposing a new DSM program. Rather, PGW is continuing its existing
8 DSM programming with certain modifications as described in the Revised Phase IV
9 Implementation Plan (Exhibit DA-1).

10 **Q. DID THE COMMISSION APPROVE A PROCESS FOR PGW TO CONTINUE
11 ITS DSM PROGRAMS WITH ANY NECESSARY MODIFICATIONS?**

12 A. Yes. In the DSM Phase II proceeding, the Commission's Final Order permitted PGW to
13 continue its DSM programming beyond FY 2020 through the filing of triennial
14 implementation plans, with an opportunity for parties to propose a termination on an
15 anniversary date by filing 180 days in advance of the close the of fiscal year. No parties
16 at this Docket, or otherwise, proposed a termination of the program. PGW's
17 Implementation Plan for the FY 2024-2026 period was filed on June 16, 2023 according
18 to this procedure.

19 **Q. HAS THE IMPLEMENTATION PLAN FOR FY 2024-2026 GONE INTO
20 EFFECT?**

21 A. No. Pursuant to the Commission's November 1, 2016 Order, the DSM Phase IV Plan
22 was originally scheduled to go into effect as of September 1, 2023. However, as
23 explained in PGW's letter filed on July 27, 2023, the new programming included in the
24 Phase IV Plan will require significant investment by PGW to implement, including
25 issuing RFPs, website development and other IT buildout, etc. Given that this plan has

1 been referred to Administrative Law Judge F. Joseph Brady (“ALJ”) for hearings, PGW
2 was concerned that it may spend significant resources to implement these plan changes
3 when further modifications may be required by a final PUC order in this proceeding. For
4 this reason, PGW proposed to continue its current DSM programming under the Phase III
5 Plan until a final order is issued approving implementation of the Phase IV Plan. PGW’s
6 request was granted by the ALJ in the August 18, 2023 Prehearing Order in this
7 proceeding. As such, the Phase III Plan continues to be in place at this time and will
8 remain in effect until the Company receives approval to implement the Phase IV Plan.

9 **Q. DID PGW MEET WITH INTERESTED PARTIES PRIOR TO SUBMITTING**
10 **THE PHASE IV PLAN?**

11 A. Yes. On March 15, 2023, PGW held a collaborative meeting with interested parties to
12 review its upcoming Phase IV Plan filing and solicit input, as required by the Phase III
13 settlement. Although PGW invited discussion and other proposals, the parties did not
14 provide any substantive comments at that time.

15 **Q. HOW DO THE ANNUAL BUDGETS FOR THE REVISED PHASE IV PLAN**
16 **COMPARE TO THE PREVIOUSLY APPROVED BUDGET LEVEL FOR THE**
17 **PORTFOLIO?**

18 A. The annual budgets for the Revised Phase IV Plan are very comparable to the annual
19 budgets for the Phase III Plan. For example, in the Phase III Plan, the budget for FY
20 2022 was \$2,415,144. In the Revised Phase IV Plan, the annual budgets for FY 2025
21 through 2029 range from \$2,489,494 to \$2,589,494. The projected budgets are described
22 in Exhibit DA-1 and in Mr. Love’s Direct Testimony.

23 **Q. PLEASE DISCUSS ADMINISTRATIVE COSTS OF THE REVISED PHASE IV**
24 **PLAN.**

25 A. Because the overall DSM program is a small spend program, the administrative costs can
26 be higher as a percentage of total program costs since there are not the efficiencies

1 associated with a larger program. However, PGW’s administrative costs are still
2 reasonable, and the programs are providing meaningful energy savings for PGW
3 customers. While PGW has worked to simplify several of the rebate programs to reduce
4 administrative costs, several of the programs that were added in Phase III and new
5 programs proposed in Phase IV inherently have higher administrative costs. Examples of
6 this include the EnergySense Kit and Smart Thermostat Marketplace programs, which
7 require PGW to set up an online portal and mail items to customers.

8 **Q. DOES PGW PROVIDE LOW-INCOME CUSTOMERS WITH A**
9 **CONSERVATION PROGRAM?**

10 A. Yes. In accordance with PUC regulations, PGW provides a very well-funded free Low
11 Income Usage Reduction Program (“LIURP”) to low-income customers that is not part of
12 PGW’s DSM Plan. PGW’s LIURP (which is also referred to as its Home Comfort
13 program) is subject to full Commission review and approval in its Universal Service and
14 Energy Conservation Plan (“USECP”) filings. The most recent approval of PGW’s
15 USECP for 2023-2027 was in the Order entered January 12, 2023 and the March 16,
16 2023 Order on Reconsideration at Docket No. M-2021-3029323. In its LIURP, PGW
17 provides various programs including Home Comfort weatherization program, Low
18 Income Multifamily Efficiency Pilot Program, Health and Safety Pilot Program, and
19 Repair and Renew Pilot Program. In 2021, PGW spent approximately \$9.2 million on its
20 LIURP.¹ This 2021 actual PGW LIURP spend far exceeded the spend of all but one
21 other utility in the Commonwealth (PPL).²

¹ See the Commission’s Universal Service Program & Collections Performance Report for 2021, at 55, available at https://www.puc.pa.gov/media/2188/2021_universal_service_report_rev122722.pdf.

² *Id.*

1 **Q. YOU INDICATED THAT PGW'S DSM PORTFOLIO IS SEPARATE FROM ITS**
2 **LIURP. PLEASE EXPLAIN.**

3 A. The DSM portfolio is separate from PGW's LIURP in several notable ways. For one, it is
4 not designed as a low-income, universal service program. Instead, PGW's DSM portfolio
5 is strictly voluntary, as there is no regulatory requirement for natural gas distribution
6 companies to offer energy efficiency programs. Any changes to PGW's DSM portfolio do
7 not lower the funding or impact the design of PGW's LIURP.

8 Starting in 2011, PGW moved its LIURP into the DSM portfolio. Prior to that
9 time, LIURP was included in PGW's USECP. However, the PUC decided that LIURP
10 should be moved back into the USECP filing starting in 2017. Thus, PGW's LIURP was
11 part of PGW's overall DSM portfolio only from 2011 to 2016. In accordance with PUC
12 Order, PGW began in 2017 to transition LIURP back to the USECP process. The
13 November 1, 2016 Final Opinion and Order at Docket No. P-2014-2459362 states:

14 Upon our review and consideration of the Comments on this issue,
15 we note that both PGW and I&E now support the transition of
16 PGW's LIURP back into the USECP process. We agree and
17 conclude that the issues related to PGW's mandatory LIURP are
18 more appropriately considered within a proceeding that reviews
19 other similar universal service type issues, not within the context
20 of a voluntary DSM plan. On that issue, we agree with I&E that
21 the inclusion of LIURP within its traditional purview in USECP
22 proceedings provides a more appropriate avenue for the analysis
23 and consideration that LIURP funding warrants. (Order at 26-27.)

24 As a result, PGW reintegrated LIURP into its Universal Service Plan and again filed
25 LIURP budgets and plans in its Universal Service Plans, beginning with the 2017-2020
26 USECP. Items relevant to PGW's LIURP, which is a regulated program required by PUC
27 regulation and already approved by the Commission through 2027, must be separately

1 addressed through future USECP proceedings. Thus, PGW already has a well-funded,
2 PUC-regulated and approved low-income weatherization program.

3 **Q. WHY IS PGW PROPOSING TO CONTINUE ITS DSM PROGRAMS?**

4 A. By continuing these programs, PGW will continue supporting the deployment of high
5 efficiency natural gas equipment in order to provide all PGW customers with the ability
6 to reduce gas usage and associated costs, as well as supporting conservation and load
7 management efforts in Philadelphia. PGW believes that extending these efforts will result
8 in continued financial and customer satisfaction benefits for PGW's customers, while
9 resulting in economic and environmental benefits for the City as a whole. In particular,
10 the new EnergySense Kit and Small Business Assessment programs will make energy
11 efficiency measures available to all customers, including low to moderate income
12 customers and small businesses.

13 Continuing PGW's DSM programs will also help customers to continue to benefit
14 from low natural gas prices by reducing the up-front costs of installing natural gas
15 equipment. High efficiency equipment adds costs to the incremental cost difference
16 between natural gas equipment and alternatives powered by other fuels, which is a
17 particular burden for customers of limited financial means. PGW's DSM programs can
18 also play an important part in making high-efficiency natural-gas equipment more
19 accessible to cost-conscious developers and building owners seeking to make the
20 transition to cleaner, cheaper fuel. Efficient use of gas is an important way to reduce
21 carbon emissions for customers, particularly those for whom it does not make economic
22 sense to utilize other energy sources.

23 Finally, PGW seeks to continue offering the increasingly cost-effective DSM
24 programming in order to protect and provide greater returns for PGW customers'

1 investments in the programs to date. EnergySense programs are expected to become
2 increasingly cost-effective for a number of reasons. First, the programs are operating at
3 scale with the requisite infrastructure already developed. Second, programs will operate
4 at a lower cost, given that initial start-up expenses were already incurred. Third, the
5 modifications in the Phase IV are adding programming that will make even more energy
6 efficiency measures accessible to various customers, including low- and moderate-
7 income customers and small businesses.

8 **Q. HAS PGW PROVIDED REPORTING TO THE COMMISSION AND THE**
9 **PARTIES REGARDING ITS DSM PROGRAMMING?**

10 A. Yes. PGW has continued to file Annual Reports on program activity four months after
11 the close of each program year. These reports have been provided to the Commission and
12 the parties to the DSM Phase III proceeding. The Revised Phase IV Plan provides that
13 PGW will continue to file these annual reports four months after the close of the fiscal
14 year.

15 **Q. WHAT INFORMATION IS INCLUDED IN PGW'S ANNUAL REPORTS?**

16 A. PGW's Annual Reports present and discuss the results from PGW's implementation of its
17 DSM programs during the most recently completed Fiscal Year, providing quantitative
18 tables of portfolio operations and outcomes. PGW filed its most recent Annual Report on
19 December 29, 2022, covering DSM activity from FY 2022.

20 **III. DSM PHASE IV IMPLEMENTATION PLAN**

21 **Q. WHAT PROGRAMMING WAS INCLUDED IN PGW'S DSM "PHASE III" AND**
22 **WHAT PROGRAMS ARE PROPOSED FOR PHASE IV?**

23 A. PGW's Phase III (2021-2023) programming included the following programs: Residential
24 Equipment Rebates ("RER") Program; the Residential Construction Grants ("RCG")
25 Program; the Commercial Equipment Rebates ("CER") Program; the Smart Thermostat

1 Marketplace; and the Low-Income Smart Thermostat Program. PGW is proposing to
2 continue these programs in the Phase IV plan. In addition, in the Phase IV Plan PGW is
3 proposing to add the EnergySense Kits and Small Business Assessments programs.
4 Please see the Direct Testimony of Mr. Love (PGW St. No. 2) and Exhibit DA-1 for
5 detailed descriptions of these programs.

6 **Q. WHAT MODIFICATIONS HAS PGW MADE TO ITS DSM PROGRAMS IN THE**
7 **PHASE IV PLAN?**

8 A. In the Phase IV plan, PGW has adjusted some incentive amounts for residential and
9 commercial rebates, and has increased efficiency requirements for some equipment.
10 These charges are a result of challenges encountered during Phase III, including
11 increased costs due to inflation and supply chain issues related to the COVID-19
12 pandemic. The Company has also proposed to launch a few new prescriptive offerings
13 for residential and commercial measures.

14 First, PGW has included incentives for Residential Roof Insulation and
15 Commercial Variable Refrigerant Flow (“VFR”) Natural Gas Heat Pumps.

16 Second, PGW will launch a new EnergySense Kit (“ESK”) program that will help
17 customers save energy and money by providing energy-saving measures that can be self-
18 installed. This program is free and available to all PGW customers (including low- and
19 moderate-income customers). The ESK program will fill a crucial gap by providing
20 energy savings to customers who may not qualify for LIURP (such as customers who, for
21 example, may be just above the low-income threshold), and may not be making large
22 purchases that would allow them to take advantage of the RER Program.

23 Third, PGW will launch a new Small Business Assessments program to
24 encourage small business customers to take advantage of the prescriptive rebates program

1 by providing free walkthrough energy assessments that recommend energy efficiency
2 upgrades. The free walkthrough energy assessments are provided by a PGW-contracted
3 technician and will identify savings opportunities. The technician will perform a limited
4 number of free and low-cost energy efficiency improvements, such as updating
5 temperature set-points, installing pipe wrap and low-flow devices, minor air sealing and
6 similar measures. Customers must agree to this set of measures as a condition of
7 receiving the assessment. The technician will provide the customer with a list of
8 recommended energy efficiency improvements with estimated savings, which will
9 include measures offered in PGW's EnergySense equipment rebate programs.

10 Finally, PGW is maintaining the tiered incentive caps for commercial and
11 multifamily projects that incorporate measures from different PGW-defined categories.
12 Projects that incorporate measures from multiple categories will have higher incentive
13 caps than projects with measures from just one category. This approach will incentivize
14 customers to pursue deep energy savings projects and address multiple gas end uses in
15 order to achieve higher rebates.

16 Please see the direct testimony of Mr. Love (PGW St. No. 2) for a further
17 description of program and portfolio updates in Phase IV.

18 **Q. DOES PGW'S DSM PLAN ALLOW FOR REALLOCATING INCENTIVE**
19 **BUDGETS BETWEEN PROGRAMS BASED ON PARTICIPATION AND**
20 **MARKET CONDITIONS?**

21 A. Yes, as was authorized by the PUC in Phase II, PGW will be able to reallocate incentive
22 budgets between programs based on participation and market conditions, while
23 maintaining overall portfolio budgets. This was approved in PGW's Phase II Plan.

1 **Q. DOES PGW PROPOSE A PROCESS FOR APPROVAL OF A NEW INITIATIVE**
2 **OR MEASURE DURING THE PHASE IV PROGRAM?**

3 A. If PGW wishes to implement a new initiative or measure while the Phase IV Plan is in
4 place, the Company would propose that such a change that increases the budget by no
5 more than 10% would be reviewed within three months of submission. The Company
6 would file a letter at this docket describing the proposed change and providing supporting
7 documentation. PGW would serve the filing on the parties to this proceeding. Interested
8 parties would have an opportunity to submit comments on the proposal within 15 days,
9 followed by a 15-day reply comment period. PGW would request that the Commission
10 consider any comments and act on the request within 90 days of the original submission.

11 **Q. DO THESE PROGRAMS MAKE MEANINGFUL ENERGY EFFICIENCY**
12 **MEASURES AVAILABLE TO VARIOUS CUSTOMER GROUPS?**

13 A. Yes. In particular, as discussed above, the EnergySense Kit program is available to all
14 PGW customers and provides simple, easy to install measures that will help customers
15 reduce usage and thus reduce their PGW bills, regardless of income level. PGW expects
16 that this will be particularly beneficial for low-income customers, as well as moderate-
17 income customers who will not meet the income qualification requirements for programs
18 such as LIURP, but who would benefit greatly from reduced energy bills. Similarly, the
19 new Small Business Assessments program also provides measures targeted to a customer
20 group that may not have the resources to take advantage of other DSM programs, but that
21 will receive a significant benefit from the reduced energy bills that can result from the
22 proposed measures.

1 **Q. DOES PGW PROVIDE ANNUAL REPORTING TO THE PARTIES AT THIS**
2 **DOCKET REGARDING PROGRAM RESULTS?**

3 A. Yes. PGW will continue to file an Annual Report on program results four months after
4 the close of each fiscal year.

5 **IV. DSM APPROVAL PROCESS**

6 **Q. DOES PGW PROPOSE ANY CHANGES TO THE PROCESS FOR APPROVING**
7 **THE DSM THROUGH TRIENNIAL IMPLEMENTATION PLANS?**

8 A. Yes. As discussed above, PGW has previously implemented changes to its DSM
9 programming through triennial implementation plans. Based on the Company's
10 experience with this process (which was approved in the Commission's November 1,
11 2016 Order), PGW believes it would be more beneficial and cost effective going forward
12 for the DSM plan to be approved for a five-year period, after which PGW will submit a
13 new plan for approval (assuming the Company chooses to continue offering the voluntary
14 DSM programs). My understanding is that this is consistent with the procedure used by
15 the Commission for approval of the Act 129 Energy Efficiency and Conservation Plans.

16 **Q. DO YOU HAVE A PROPOSAL REGARDING THE TIMELINE FOR**
17 **IMPLEMENTATION OF THE PHASE IV PLAN?**

18 A. Yes. PGW requests that the Commission approve the Phase IV plan a five-year period of
19 FY 2025 to FY 2029 (rather than FY 2024-2026, as originally proposed). This reflects the
20 fact that given the litigation schedule in this proceeding, the Phase IV plan likely will not
21 be approved and in place prior to the beginning of FY 2025. The Revised
22 Implementation Plan attached as Exhibit DA-1 reflects this change, including extended
23 budgetary projections. PGW requests that the Commission approve the Revised Phase
24 IV Plan to go into effect as of September 1, 2024, which is the beginning of FY 2025. If
25 PGW wishes to continue its DSM programming beyond the end of the Phase IV plan, the

1 Company proposes submit a plan for approval one year prior to the end of the Phase IV
2 plan, to provide adequate time for review and approval prior to implementation of the
3 next phase.

4 **Q. WERE ANY OTHER CHANGES MADE IN THE REVISED**
5 **IMPLEMENTATION PLAN (EXH. DA-1)?**

6 A. The Revised Plan no longer includes evaluation budgets at the portfolio level. Rather,
7 evaluation budgets have been allocated to individual programs to provide more clarity.
8 Additionally, PGW has slightly lowered projected participation in the Small Business
9 Assessments program and has allocated budget for administration of the program.

10 **V. CONCLUSION**

11 **Q. DOES THIS COMPLETE YOUR DIRECT TESTIMONY?**

12 A. Yes.

Exhibit DA-1

PHILADELPHIA GAS WORKS
ENERGYSENSE DEMAND SIDE MANAGEMENT PORTFOLIO

REVISED IMPLEMENTATION PLAN
FISCAL YEARS 2025-2029

SEPTEMBER 27, 2023

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I. DSM PORTFOLIO IMPLEMENTATION PLAN

A. *Introduction*

Philadelphia Gas Works' ("PGW" or the "Company") Demand Side Management ("DSM") portfolio, marketed as EnergySense, is a portfolio of conservation programs that PGW launched in fiscal year 2011 and was initially approved by the Pennsylvania Public Utility Commission ("PUC" or "Commission") for a 5-year term. On December 23, 2014, PGW filed a Petition for Approval of Demand Side Management Plan 2016-2020 ("DSM Phase II") with the PUC. The PUC subsequently approved a DSM Bridge Plan for an interim period effective September 1, 2015, through the earlier of the effective date of the Phase II Plan or August 31, 2016. On November 1, 2016 the PUC entered a final Opinion and Order at Docket No. P-2014-2459362 ("Final Order") that approved the continuation of five market rate DSM programs from FY 2017 – FY 2020.

Pursuant to that Final Order, DSM programming beyond FY 2020 was effectuated by PGW's filing 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. Accordingly, PGW filed a Petition for Approval of its DSM plan for Fiscal Years 2021-2023 ("DSM Phase III") on May 6, 2020. Following the filing of the Petition for Approval, several Notices of Intervention by interested parties were filed with the PUC. These interventions and subsequent administrative proceedings resulted in a Joint Petition for Settlement that was approved by the PUC on May 6, 2021. Pursuant to that approval, the Revised EnergySense DSM Portfolio Implementation Plan was filed on June 4, 2021. PGW has reserved 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 termination of the programs. Pursuant to the Prehearing Order dated August 18, 2023 at Docket No. P-2014-2459362, the Phase III plans remains in effect until implementation of the Phase IV Implementation Plan.

The following plan ("Implementation Plan") describes program budgets and implementation details that PGW will follow to implement its EnergySense Demand-Side Management Portfolio ("DSM Portfolio") in Fiscal Years 2025 through 2029 ("DSM Phase IV"). PGW's Fiscal Year is September through August.

PGW's DSM Portfolio has been and will be implemented to achieve three broad goals:

1. Reduce customer bills.
2. Maximize customer value.
3. Help the Commonwealth and the City of Philadelphia reduce greenhouse gas emissions and reduce PGW's overall carbon footprint.

The period of time covered by this Implementation Plan is September 1, 2024 to August 31, 2029, spanning FY 2025, FY 2026, FY 2027, FY 2028 and FY 2029. PGW will continue to file its annual report four months after the close of the fiscal year. PGW will

file an amended implementation plan four months prior to the upcoming fiscal year, if necessary, to propose major program changes that would modify the portfolio budget caps from the plans documented herein.¹

PGW may perform periodic reviews 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; and may reallocate funds between programs.

B. New Features and DSM Portfolio Updates

1. Updated Rebates and Expanded Offerings

PGW will adjust some incentive amounts for residential and commercial rebates, and increase efficiency requirements for some equipment. This change is necessitated by challenges encountered in Phase III, including inflationary pressures/the COVID-19-induced supply chain crisis. PGW will institute a grandfathering policy for rebate programs to ensure that customers do not become ineligible between the time they purchase equipment and submit a rebate application. Eligibility and rebate amount will be based on equipment purchase date, following similar approaches used when changing rebate amounts in the past.

PGW will also launch new prescriptive offerings for residential and commercial measures. These include incentives for Residential Roof Insulation and Commercial Variable Refrigerant Flow (VRF) Natural Gas Heat Pumps. Additionally, PGW will launch a new EnergySense Kit (ESK) program, a Small Business Assessment (SBA) program and also an incentive for new residential multifamily construction projects as part of the Residential Construction Grants program.

PGW will maintain the tiered incentive caps for commercial and multifamily projects that incorporate measures from different PGW-defined categories. Projects that incorporate measures from numerous categories will have higher incentive caps than projects with measures drawn from just one category. This approach will incentivize customers to pursue deep energy-savings projects and address multiple gas end uses in order to achieve higher rebates. This design assures rebate predictability for the customer.

Measure Categories	Incentive Cap
1	\$25,000
2	\$35,000
3	\$50,000

¹ Program goals are subject to change based on market activity and deviation from the budgets documented herein.

2. EnergySense Kits

PGW will implement EnergySense Kits (“ESK”), a program that will help customers save energy and money by providing simple energy-saving measures that can be self-installed. Participation in ESK will be free for all PGW residential customers. The program fills a crucial gap by providing energy savings to the customers that do not qualify for PGW’s Home Comfort weatherization program (which is its PUC-required Low Income Usage Reduction Program (LIURP)), but may not be making large purchases that would allow them to take advantage of the Residential Equipment Rebates program.

3. Small Business Assessments

PGW will implement Small Business Assessments, a program to encourage PGW small business customers to take advantage of the prescriptive rebate programs by providing free walkthrough energy assessments that recommend energy efficiency upgrades. Customers will receive a free walk-through energy assessment from a PGW-contracted technician to identify energy savings opportunities. The technician will perform a limited number of free and low-cost energy efficiency improvements, such as updating temperature set-points, installing pipe wrap, low-flow devices, minor air sealing and similar measures. Customers must agree to this set of measures as a condition of receiving the assessment. The technician will provide the customer a list of recommended energy efficiency improvements with estimated savings, which will include measures offered in PGW’s EnergySense equipment rebate programs.

C. Portfolio Budgets, Savings, and Cost-Effectiveness

1. Budgets²

The following are PGW's budgets for the periods beginning in FY 2025 and running through FY 2029.

Table 1 – Projected Portfolio Budget by Program (Nominal)

Program	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	TOTAL
Portfolio-wide Costs	\$687,000	\$687,000	\$687,000	\$687,000	\$687,000	\$3,435,000
Residential Equipment Rebates	\$812,988	\$862,988	\$812,988	\$812,988	\$812,988	\$4,114,942
EnergySense Kits	\$183,376	\$166,632	\$196,632	\$166,632	\$166,632	\$879,904
Smart Thermostat Marketplace	\$94,975	\$119,975	\$94,975	\$94,975	\$94,975	\$499,874
Low Income Smart Thermostat	\$60,000	\$85,000	\$60,000	\$60,000	\$60,000	\$325,000
Residential Construction Grants	\$236,250	\$236,250	\$236,250	\$286,250	\$236,250	\$1,231,250
Commercial Equipment Rebates	\$329,649	\$329,649	\$329,649	\$379,649	\$329,649	\$1,698,244
Small Business Assessment	\$100,000	\$100,000	\$130,000	\$100,000	\$100,000	\$530,000
TOTAL PORTFOLIO	\$2,504,238	\$2,587,494	\$2,547,494	\$2,587,494	\$2,487,494	\$12,714,214

Table 2 – Projected Portfolio Budget by Cost Category (Nominal)

Category	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	TOTAL
Customer Incentives	\$1,485,737	\$1,510,217	\$1,510,217	\$1,510,217	\$1,510,217	\$7,526,604
Administration	\$703,716	\$661,786	\$661,786	\$661,786	\$661,786	\$3,350,862
Marketing	\$240,000	\$240,000	\$240,000	\$240,000	\$240,000	\$1,200,000
Inspections	\$74,785	\$75,491	\$75,491	\$75,491	\$75,491	\$376,749
Evaluation	-	\$100,000	\$60,000	\$100,000	-	\$260,000
Total	\$2,504,238	\$2,587,494	\$2,547,494	\$2,587,494	\$2,487,494	\$12,714,214

² Portfolio-wide costs only include costs for the EnergySense portfolio described herein. In the FY 2017 – FY 2020 DSM Phase II Compliance Plan, the Portfolio-wide costs budget category were partially attributed to the Home Comfort program, PGW's LIURP. Under that plan, costs were allocated proportionally between the EnergySense portfolio and Home Comfort.

2. Savings

a) Gas savings

Table 3 – Projected Annual Natural Gas Savings (MMBtu)

Program	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	TOTAL
Residential Equipment Rebates	14,227	14,227	14,227	14,227	14,227	71,136
EnergySense Kits	6,675	8,312	8,312	8,312	8,312	39,922
Smart Thermostat Marketplace	3,675	3,675	3,675	3,675	3,675	18,375
Low Income Smart Thermostat	866	866	866	866	866	4,328
Residential Construction Grants	2,572	2,572	2,572	2,572	2,572	12,858
Commercial Equipment Rebates	16,519	16,519	16,519	16,519	16,519	82,595
Small Business Assessment	545	545	545	545	545	2,725
Total	45,078	46,715	46,715	46,715	46,715	231,940

Table 4 – Projected Lifetime Natural Gas Savings (MMBtu)

Program	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	TOTAL
Residential Equipment Rebates	340,425	340,425	340,425	340,425	340,425	1,702,125
EnergySense Kits	100,558	125,260	125,260	125,260	125,260	601,597
Smart Thermostat Marketplace	40,425	40,425	40,425	40,425	40,425	202,125
Low Income Smart Thermostat	9,521	9,521	9,521	9,521	9,521	47,603
Residential Construction Grants	51,433	51,433	51,433	51,433	51,433	257,167
Commercial Equipment Rebates	319,699	319,699	319,699	319,699	319,699	1,598,493
Small Business Assessment	10,902	10,902	10,902	10,902	10,902	54,508
Total	872,962	897,664	897,664	897,664	897,664	4,463,618

b) Non-Gas Savings

Table 5 – Projected Incremental Annual Electricity Savings (MWh)

Program	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	TOTAL
Residential Equipment Rebates	-	-			-	-
EnergySense Kits	-	-			-	-
Smart Thermostat Marketplace	45	45	45	45	45	223
Low Income Smart Thermostat	19	19	19	19	19	96
Residential Construction Grants	1	1	1	1	1	3
Commercial Equipment Rebates ³	(5)	(5)	(5)	(5)	(5)	(27)
Small Business Assessment	4	4	4	4	4	19
Total	63	63	63	63	63	316

Table 6 – Projected Incremental Lifetime Electricity Savings (MWh)

Program	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	TOTAL
Residential Equipment Rebates	-			-	-	-
EnergySense Kits	-			-	-	-
Smart Thermostat Marketplace	492	492	492	492	492	2,458
Low Income Smart Thermostat	212	212	212	212	212	1,061
Residential Construction Grants	13	13	13	13	13	63
Commercial Equipment Rebates	(107)	(107)	(107)	(107)	(107)	(533)
Small Business Assessment	77	77	77	77	77	384
Total	687	687	687	687	687	3,434

Table 7 – Projected Incremental Annual Water Savings (Millions of Gallons)

Program	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	TOTAL
Residential Equipment Rebates	-		-		-	-
EnergySense Kits	2	2	2	2	2	12
Smart Thermostat Marketplace	-	-	-	-	-	-
Low Income Smart Thermostat	-	-	-	-	-	-
Residential Construction Grants	2	2	2	2	2	8
Commercial Equipment Rebates	6	6	6	6	6	28
Small Business Assessment	-	-	-	-	-	-
Total	9	10	10	10	10	48

³ Negative electric savings: Natural gas-fired heat pumps consume electricity during their operation and therefore result in increased site electric load for the Commercial Equipment Rebates Program.

3. Cost-Effectiveness

Table 8 presents PGW’s projected cost-effectiveness results. PGW estimates that under the Total Resource Cost (“TRC”) test, the programs have a combined present value (“PV”) of net benefits, in 2023 dollars, of \$25.22 million with a benefit cost ratio (“BCR”) of 2.35.

a) Projected Performance

Table 8 – Projected Cost-Effectiveness Results (2023\$)

Program	TRC PV Benefits	TRC PV Costs	TRC PV Net Benefits	TRC BCR
Portfolio-wide Costs	-	\$2,884,812	\$(2,884,812)	-
Residential Equipment Rebates	\$14,902,926	\$7,594,018	\$7,308,908	1.96
EnergySense Kits	\$6,019,584	\$773,500	\$5,246,084	7.78
Smart Thermostat Marketplace	\$3,253,493	\$609,467	\$2,644,025	5.34
Low Income Smart Thermostat	\$600,769	\$279,719	\$321,050	2.15
Residential Construction Grants	\$3,634,507	\$1,598,822	\$2,035,685	2.27
Commercial Equipment Rebates	\$14,910,008	\$4,545,870	\$10,364,138	3.28
Small Business Assessment	\$594,951	\$405,698	\$189,253	1.47
Total	\$43,916,237	\$18,691,907	\$25,224,330	2.35

D. Portfolio Implementation and Management

PGW staff will continue their strategic planning and management of the EnergySense portfolio. Day-to-day administration of the programs will continue to be conducted by a portfolio implementation consultant firm or firms. Vendors will fulfill the following roles:

- Market-rate Program Implementer – in this role, the vendor will be responsible for application intake and processing, verification of customer information and eligibility, issuance of rebates, and reporting of program activity to PGW.
- Technical Assistance Provider – in this role, the vendor will be responsible for engineering and project analysis and project inspections.
- Marketing and Outreach Support Provider – in this role, the vendor will work with PGW to develop and implement communications strategies to promote EnergySense programs and drive customer participation.
- Small Business Assessment Contractor – in this role, the vendor will perform walk-through energy assessments, install low-cost energy efficiency measures, and recommended energy efficiency improvements to customers.
- Low Income Smart Thermostat Installation Vendor – in this role, the vendor will provide and install ENERGY STAR certified smart thermostats in the homes of eligible low-income PGW customers, at no cost to the customer.

- EnergySense Kits Provider – in this role, the vendor will assemble and ship energy saving kits to PGW customers at no cost to PGW customers.

E. Coordination Activities

PGW continually seeks to coordinate EnergySense efforts as much as possible with other organizations and programs in order to leverage existing resources and avoid lost opportunities and duplication of services. PGW expects to continue the following coordination activities (subject to modification):

Program or Organization and Description of Coordination
<p>ENERGY STAR®</p> <p>PGW is an ENERGY STAR Energy Efficiency Program Sponsor, which has allowed it to be included in its national registries of rebates and incentives and get updates on ENERGY STAR equipment activities. The coordination has been useful to promote the CER commercial food service rebates for ENERGY STAR rated equipment, and is expected to be useful to promote the smart thermostat rebates for ENERGY STAR certified equipment.</p>
<p>Philadelphia Energy Authority (“PEA”)</p> <p>PEA is an independent municipal authority focused on issues of energy affordability and sustainability for Philadelphia’s government and its citizens. PGW coordinates with PEA to promote EnergySense rebate and grant programs to the commercial building owners, particularly multifamily, and small businesses.</p>
<p>Green Building United (“GBU”)</p> <p>GBU is the Philadelphia chapter of the U.S. Green Building Council, and dedicated to environmentally responsible practices in the building industry. PGW has partnered with GBU for events in the past and is exploring future opportunities for EnergySense programs to serve as a resource for building owners to achieve these reductions.</p>
<p>Housing Alliance of Pennsylvania</p> <p>The Housing Alliance of Pennsylvania is an organization that consists of affordable housing property owners, developers, advocates and related stakeholders. PGW has coordinated outreach efforts with Housing Alliance to promote EnergySense programs as a resource.</p>

F. Marketing

PGW will continue to focus its marketing activities on three main activities: consumer-focused market awareness, supply chain and trade ally engagement, and direct to customer marketing. These will be carried out by PGW and its marketing and outreach support vendor.

1. Consumer-Focused Market Awareness

PGW will rely on consumer-focused marketing activities to build awareness about the new rebate offerings. This approach has been successful in past marketing efforts for EnergySense, and will be used to support the launch of PGW's new EnergySense Kits program, among other new offerings. PGW will need to conduct mass marketing activities to generate awareness about this new offer among its residential customer base.

2. Supply Chain and Trade Ally 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 is to educate the individuals that supply and recommend natural gas equipment and project designs.

Supply chain and trade ally marketing has been the greatest source of rebate program referrals since the inception of the EnergySense portfolio. This is due to the fact that replacement of heating equipment is often reactionary, where customers replace equipment because it fails rather than through a planned retirement. In these instances, customer decisions are influenced most by equipment installers. By continuing to build and expand on PGW's relationship with these installers and suppliers, EnergySense will remain top of mind as an effective sales tool.

3. Direct to Customer Marketing

PGW will conduct targeted direct-to-customer marketing, which will focus on encouraging customers to act and make energy efficient purchases and upgrades. The new EnergySense Kits program will benefit from direct-to-customer marketing, as the measure is discretionary and PGW's marketing can influence customers who may not have otherwise considered pursuing energy efficiency upgrades. PGW will also maintain outreach to non-English speaking communities, and has worked with an outreach vendor in recent years to support translation and event tabling targeting non-English speaking customers.

G. Evaluation and Verification Inspections

PGW will perform on-site verifications on a portion of equipment to ensure the equipment installed qualifies for the program and matches the specifications listed on the rebate application. Inspection quotas are detailed in the individual program sections.

In addition to on-site in-person inspections, PGW may rely on virtual inspections using digital tools that allow for greater customer convenience and cost-savings, while still ensuring quality. For customers who prefer virtual inspections, they may be given an option to record and upload verification videos to a secure site at their convenience or conduct video-chats via a smartphone or tablet, rather than accept on-site visits. The video will need to show clear images of the rebated equipment with its nameplate model and serial numbers matching the application, and proof of their residence. This approach is used in other utility DSM programs.

PGW will continue to perform third party evaluations on its programs to evaluate the actualized measure savings. PGW uses the results of these independent evaluations to assess program impacts, update savings estimates, and redirect program activities.

H. Continuation and Reporting

This Implementation Plan provides implementation details for the next five years of the DSM program from FY 2025 – FY 2029. During this time, PGW will continue to file its annual implementation plan four months prior to the upcoming fiscal year, but only when proposing major program changes that would increase the portfolio budget caps. PGW will continue to file its annual report four months after the close of the fiscal year.

Table 9 below provides the anticipated continuation and reporting process from FY 2025 – FY 2029.

Table 9 – Timeline for Continuation & Reporting Process

Fiscal Year	Continuation or Reporting Activity
2025	<ul style="list-style-type: none"> • FY 2024 Annual Report (December/January) • FY 2026 Implementation Plan (May, if warranted)
2026	<ul style="list-style-type: none"> • FY 2025 Annual Report (December/January) • FY 2027 Implementation Plan (May, if warranted)
2027	<ul style="list-style-type: none"> • FY 2026 Annual Report (December/January) • FY 2028 Implementation Plan (May, if warranted)
2028	<ul style="list-style-type: none"> • FY 2028 Annual Report (December/January) • FY 2029 Implementation Plan (May, if warranted)
2029	<ul style="list-style-type: none"> • FY 2029 Annual Report (December/January) • Objection Deadline to Continued DSM Programming (February) • FY 2030 – 2034 Pentennial Implementation Plan (by September 1, if warranted)

I. Key Assumptions

1. Avoided Costs

PGW’s avoided costs are used to evaluate project and program cost-effectiveness. PGW will use avoided cost figures updated in February 2023 based on current commodity costs and charges for pipeline and storage capacity. The February 2023 avoided costs are presented in Appendix A.

Pursuant to the PUC’s Tentative Order on PGW’s Final Phase II Plan, PGW’s cost effectiveness calculations include the additional value estimated for Demand Reduction Induced Price Effect (“DRIPE”). DRIPE calculates the impact of reductions in future gas prices caused by DSM reductions in market demand, and reductions in gas supply and price risk as a result of lower PGW system gas demand. PGW began including DRIPE impacts on avoided costs in its cost effectiveness tests in FY 2017.

Avoided costs for electric and water benefits will be based on the Avoided Cost values used in Act 129 at docket M-2019-3006868 (2021 TRC Test Final Order).

2. Benefit-Cost Analysis

PGW will continue to apply the TRC test for determining cost-effectiveness. PGW targets a minimum TRC BCR cost effectiveness threshold of 1.0 for all programs and the portfolio as a whole.

3. Technical Reference Manual

PGW has filed an update to its PUC approved DSM Phase III Technical Reference Manual (“TRM”) as Appendix D to this plan. PGW evaluated the TRM calculations

based on the results of billing analyses and third-party evaluations conducted during DSM Phases I through III. In instances where an energy efficiency measure's actual savings repeatedly varied from calculated savings, PGW reviewed the savings calculation for potential improvements.

To ensure consistency and follow industry best practices when revising its TRM, PGW developed a methodology for sourcing gas savings formulas and assumptions (ex: operating hours, EFLH, etc...). It established a hierarchy based on the following sources:

- i. Previous PGW program activity with verified savings
- ii. The current Act 129 Phase IV TRM
- iii. Other Pennsylvania Natural Gas Energy Efficiency Programs' TRMs
- iv. Recently updated regional TRMs that have been comprehensively reviewed, including:
 - Northeast Energy Efficiency Partnerships' ("NEEP") Mid-Atlantic TRM
 - Illinois TRM
 - New York TRM
 - Massachusetts TRM
- v. Other reputable TRMs (e.g. California, Wisconsin, Vermont) or Federal agencies (e.g. U.S. Department of Energy, U.S. Environmental Protection Agency)

For each source, the calculations were examined and, where required, climate dependent or location specific variables replaced with appropriate local values. Priority was also placed on recency of data or assumptions.

In addition to updating existing measures, PGW also used the above methodology to add energy saving calculations to the PGW TRM for the following measures:

- i. VRF Natural Gas Heat Pump
- ii. Residential Building Roof Insulation
- iii. New measures for EnergySense Kits

The TRM now includes estimated incremental costs for each measure. The estimates are based on current market information and the available research, and may be updated if new or improved data becomes available. The costs included in PGW's TRM were obtained from a variety of sources determined by the order of importance outlined below, with priority placed on recent sources.

- i. Data from Pennsylvania specific studies conducted under Act 129 or using cost-estimating software such as RS-Means.
- ii. Data from Federal government studies, such as proceedings for calculating the effects of changing baselines, through ENERGY STAR, or through peer-review journals.

- iii. Data from well-regarded TRMs; specifically NEEP's Mid-Atlantic TRM, Illinois TRM, or California's DEER database. In such instances, costs were adjusted for regional differences and inflation.
- iv. Contractor quotes and aggregated cost data from previous EnergySense projects, when available.

PGW may add other measures and new technologies to its TRM and add or discontinue rebate offers based on the effects of new cost and savings data on cost-effectiveness assessments.

II. Program Plans

This section provides an overview of the implementation activities, planned for FY 2025-2029 for the seven DSM programs comprising PGW’s EnergySense Portfolio:

- Residential Equipment Rebates
- Commercial Equipment Rebates
- Residential Construction Grants
- Smart Thermostat Marketplace
- Low Income Smart Thermostats
- Small Business Assessments
- EnergySense Kits

A. Residential Equipment Rebates Program

1. Program Description

The Residential Equipment Rebates (“RER”) program issues prescriptive rebates on premium efficiency gas appliances and heating equipment to increase the penetration of these measures in the homes and buildings of PGW’s customers. Eligible customers use their own contractor to install the premium efficiency equipment and receive rebates to offset most of the incremental cost of the higher efficiency equipment and installation. Beginning in Phase IV, customers will be able to receive a rebate for increasing their roof insulation.

2. Costs, Savings, and Benefits

Projections

The program aims to issue rebates for 6,320 pieces of equipment from FY 2025 – FY 2029, with associated annualized gas savings of 71,136 MMBtu. The program is projected to cost \$4,114,942 from FY 2025 – FY 2029. The following table shows a detailed breakout of participation, costs, and savings.

Table 10 – Projected RER Impacts

Projected Budgets (Nominal)	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	TOTAL
Projected Budgets (Nominal)						
Customer Incentives	\$725,800	\$725,800	\$725,800	\$725,800	\$725,800	\$3,628,998
Administration	\$50,559	\$50,559	\$50,559	\$50,559	\$50,559	\$252,795
Inspections	\$36,630	\$36,630	\$36,630	\$36,630	\$36,630	\$183,150
Evaluation			\$50,000			
TOTAL:	\$812,988	\$862,988	\$812,988	\$812,988	\$812,988	\$4,114,942
Natural Gas Savings (MMBtus)						
Incremental Annual	14,227	14,227	14,227	14,227	14,227	71,136
Incremental Lifetime	340,425	340,425	340,425	340,425	340,425	1,702,125
Projected Participation						
Rebates Awarded	1,264	1,264	1,264	1,264	1,264	6,320

3. Program Eligibility and Incentives

RER is designed to persuade customers who are purchasing natural gas furnaces, boilers, combi boilers and tankless water heaters to choose high efficiency models. All PGW firm-rate customers are eligible. Existing and new construction homes and building are eligible to participate, including:

- Single-family homes
- Multifamily buildings
- Commercial facilities using residential-sized equipment

PGW will continue offering residential-sized equipment rebate offerings targeting high efficiency furnaces, boilers, combination boilers, and tankless water heaters. It will also launch rebate offerings for residential roof and attic insulation. Additionally, PGW will continue offering increased incentives to low-income customers that participate in the RER program. Customers will be considered low-income if they have been enrolled in PGW’s Customer Responsibility Program (“CRP”) within the last year, have received a Utility Emergency Services Fund (UESF) grant within the last year, or have received LIHEAP and assigned it to PGW within the last year. PGW will not perform income verification as part of its RER program. PGW will award this incentive tier for the first 400 pieces of equipment to be approved per fiscal year. PGW will report on low-income rebate participation in its Annual Reports filed in this docket, including the number of each type of equipment rebated, and also the housing agencies with which PGW coordinated and the number of measures coordinated. The following table shows the anticipated rebate schedule.

Table 11 – Residential Equipment Rebate Amounts

Measure	Eligibility	First Rebate Per-Project	First Rebate Per-Project (Low Income)	Additional Rebates Per-Project
Natural Gas Furnace	95% AFUE	\$400	\$800	\$250
Natural Gas Water Boiler	94% AFUE	\$1,000	\$1,400	\$700
Natural Gas Combination Boiler	94% AFUE	\$1,400	\$2,000	\$1,000
Tankless Water Heater	ENERGY STAR®	\$400	\$700	\$400
Residential Roof Insulation (Tier 1)	Finished R-Value \geq R-49	\$0.65/sf (+\$100 w/Air Sealing)	\$0.95/sf (+\$100 w/Air Sealing)	-
Residential Roof Insulation (Tier 2)	Finished R-Value \geq R-38	\$0.35/sf (+\$50 w/Air Sealing)	\$0.50/sf (+\$50 w/Air Sealing)	-

PGW rebates are designed to cover between 35-75% of the incremental cost between standard efficiency and high efficiency models. Given PGW's expanded prescriptive rebate structure, RER incentives per project will continue to be capped at different levels based on the project's installation tier as described in Section I.B.1

PGW is introducing a new prescriptive offering for residential roof and attic insulation. The rebates for this measure will be assessed on a tiered basis, depending on the finished R-Value of insulation installed. All PGW residential customers who use natural gas for space heating and install insulation in existing buildings will be eligible to receive this rebate. The insulation must be installed by a Building Performance Institute (BPI) certified contractor, and applicants will be required to submit documentation evidencing contractors' credentials in order to qualify for a rebate.

Projected Activity

PGW updated projections for rebates based on new incentive levels and market acceptance. Updated projections can be found in the following table:

Table 12 – Projected Rebates Participation by Equipment Type

Product	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	TOTAL
Natural Gas Furnace	616	616	616	616	616	3,080
Natural Gas Boiler	208	208	208	208	208	1,040
Combi Boiler	108	108	108	108	108	540
Tankless Water Heater	52	52	52	52	52	260
Roof/Attic Insulation	280	280	280	280	280	1,400
Total	1,264	1,264	1,264	1,264	1,264	6,320

4. Evaluation, Monitoring, and Verification

PGW will perform on-site verifications as outlined in section I.G. PGW has set a target to inspect at least ten percent of claims to ensure the equipment installed qualifies for the program and matches the equipment listed on the rebate application.

B. Residential Construction Grants Program

1. Program Description

The Residential Construction Grants (“RCG”) program 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 energy code. The program provides incentives for reaching a certain level of natural gas savings.

2. Costs, Savings, and Benefits

Projections

The program aims to issue grants for 500 single-family and 650 multifamily residential homes from FY 2025 – FY 2029, with associated annualized gas savings of 12,858 MMBtu. The program is projected to cost \$1,231,250.

Table 13 – Projected RCG Impacts

	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	TOTAL
Projected Budgets (Nominal)						
Customer Incentives	\$226,250	\$226,250	\$226,250	\$226,250	\$226,250	\$1,131,250
Administration	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$30,000
Inspections	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	\$20,000
Evaluation				\$50,000		\$50,000
TOTAL:	\$236,250	\$236,250	\$236,250	\$286,250	\$236,250	\$1,231,250
Natural Gas Savings (MMBtus)						
Incremental Annual	2,572	2,572	2,572	2,572	2,572	12,858
Incremental Lifetime	51,443	51,443	51,443	51,443	51,443	257,167
Projected Participation						
Single Family	100	100	100	100	100	500
Multifamily	130	130	130	130	130	650

3. Program Eligibility and Incentives

RCG’s target market is a new construction or gut rehabilitation single and multi-family homes that will use natural gas provided by PGW for both space heating and water heating. Gut rehabilitation is generally understood to be a project wherein at least two building systems are being replaced and these renovations require energy code compliance.

Under the Residential Construction Grants program, PGW will pay builders an incentive for achieving natural gas savings beyond energy code requirements. It will consist of two components:

Single family program: The single family new construction program will award incentives to builders who exceed the residential building code (2015 International Energy Conservation Code, or “IECC”) by at least 15%. The expected grant award is \$1,600. This is a continuation of the RCG program that PGW has implemented from 2021-2023. Builders must use natural gas for both space heat and domestic hot water.

Multifamily Program: PGW proposes to add a multifamily component of the New Construction Program. It will offer grants for builders who exceed the 2018 IECC by more than 15%. Adding this component allows PGW to claim significant cost-effective savings for air sealing and insulation and other measures, at minimal cost to the program. There will be two rebate tiers. Buildings that use natural gas for space heating and domestic hot water will earn \$550 per unit, and buildings that use natural gas solely for space heating will earn \$375 per unit. The program will be designed in coordination with other EnergySense programs in order to give the builder the most generous incentive. So if a builder submitted a project and would earn \$5,500 for a 10 unit building through

RCG, but would earn \$7,000 if they went through the prescriptive equipment rebate programs for a commercial boiler and water heaters, PGW would approve the \$7,000 incentive.

For both programs, applicants must demonstrate the savings by completing an energy model and also submitting a Home Energy Rating System (HERS) rating report. A HERS rating requires a certified third-party inspector to assess and verify the energy performance of the building, and submission of the model is one of the ways that builders can comply with the City of Philadelphia's energy code requirements. HERS is a common tool used for energy code compliance and other DSM new construction programs in the region, including the UGI and PECO programs. PGW seeks to align its process with Philadelphia's regulatory requirements in order to reduce the administrative burden on the customer.

4. Evaluation, Monitoring, and Verification

The program requirement for applicants to complete a HERS rating through a certified third-party rater, which is reviewed by PGW, helps to integrate an aspect of quality control / quality assurance even if PGW is not on-site. In addition to this requirement, PGW, through its program implementer, may perform additional HERS ratings and on-site visits as needed to validate savings claims.

C. Commercial Equipment Rebates Program

1. Program Description

The Commercial Equipment Rebates (“CER”) 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. Eligible customers will use their own contractor to install the premium efficiency equipment and receive rebates to offset most of the incremental cost of the higher efficiency equipment.

2. Costs, Savings, and Benefits

Projections

The program aims to issue rebates for 15,555 pieces of equipment⁴ from FY 2025 – FY 2029, with associated annualized gas savings of 82,595 MMBtu. The program is projected to cost \$1,698,244. The following table shows a detailed breakout of participation, costs, and savings.

Total PGW spending for the CER Program for the cumulative FY 2025 to FY 2029 period shall not exceed the budget shown in the table below (\$1,698,244) by more than 15 percent.

Table 14 – Projected CER Impacts

	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	TOTAL
Projected Budgets (Nominal)						
Customer Incentives	\$290,397	\$290,397	\$290,397	\$290,397	\$290,397	\$1,451,986
Administration	\$20,533	\$20,533	\$20,533	\$20,533	\$20,533	\$102,664
Inspections	\$18,719	\$18,719	\$18,719	\$18,719	\$18,719	\$93,594
Evaluation				\$50,000		\$50,000
TOTAL:	\$329,649	\$329,649	\$329,649	\$379,649	\$329,649	\$1,698,244
Natural Gas Savings (MMBtus)						
Incremental Annual	16,519	16,519	16,519	16,519	16,519	82,595
Incremental Lifetime	319,699	319,699	319,699	319,699	319,699	1,598,493
Projected Participation						
Rebates Awarded	3,111	3,111	3,111	3,111	3,111	15,555

⁴ High volume measures (i.e., low flow aerators, showerheads, steam traps) are projected at the individual-level.

3. Program Eligibility and Incentives

CER's target market includes PGW firm-rate customers seeking to purchase equipment that could be substituted with high-efficiency models incentivized through the program. Owners and renters, with the approval of the owner, are both eligible. Equipment must be purchased and installed within the applicable promotion period to be eligible.

PGW will continue offering rebates for commercial boilers and water heaters, steam traps, commercial cooking equipment, low-flow faucet aerators and showerheads, boiler reset controls, low-intensity infrared heaters, and roof insulation. A new addition to CER measures will be Variable Refrigerant Flow (VRF) natural gas heat pumps, an emerging technology that allows for different zones within a building to be heated and cooled simultaneously.

Incentives for CER measures range between 17% and 71% of measure incremental costs, with most measures ranging in the 40-50% range. Incentive spending for the Commercial Equipment Rebate Program shall be below 55% of the TRC costs for the 2025 – 2029 period. PGW will report on this statistic in the FY2029 Annual Report.

PGW will continue to endeavor to provide DSM plan benefits in the CER Program to small business customers that is reasonably commensurate to small businesses' share of GS-Commercial class load. PGW will provide separate reporting on actual small business participation in the Commercial Equipment Rebate Program with respect to number of participants, annual savings, incentive payments, customer costs, and TRC costs/benefits. Pursuant to PGW's tariff, a "small business" is "a person, sole proprietorship, partnership, corporation, association or other business whose annual gas consumption does not exceed 300 Mcf."

Table 15 – Commercial Equipment Rebate Amounts

Equipment	Efficiency Requirement	Rebate
Commercial Boiler	92 Et	\$2,700 - \$9,000
Steam Trap (<15 PSIG)	N/A	\$50
Steam Trap (≤ 15 PSIG < 75)	N/A	\$130
Steam Trap (≥ 75 PSIG)	N/A	\$150
Low-flow Faucet Aerator (per unit)	1.5 GPM	\$5 (minimum of 10)
Low-flow Showerhead (per unit)	1.75 GPM	\$18 (minimum of 10)
Commercial Water Heater (Storage)	96 Et	\$4.25 / MBH
Commercial Water Heater (Tankless)	96 Et	\$4.25 / MBH
Gas Fryer (Standard)	ENERGY STAR	\$425
Gas Fryer (Large)	ENERGY STAR	\$625
Steam Cooker (3 pans)	ENERGY STAR	\$175
Steam Cooker (4 pans)	ENERGY STAR	\$300
Steam Cooker (5 pans)	ENERGY STAR	\$400
Steam Cooker (6+ pans)	ENERGY STAR	\$510
Boiler Reset Controls	N/A	\$400
Low-intensity Infrared Heater	$\geq 80\%$ Et	\$300

Roof Insulation	R-49	\$0.60 / sf
VRF Natural Gas Heat Pump	>100% AFUE	\$450/ton

4. Evaluation and Verification

PGW will continue to implement evaluation and verification activities in accordance with the portfolio's current timeline. Moreover, PGW will also continue to schedule and conduct inspections on at least 10 percent of Commercial Equipment Rebates program projects and rebates over \$10,000.

D. EnergySense Kits

1. Program Description

The EnergySense Kits (“ESK”) program will offer free energy efficiency kits to all PGW residential customers. The kits will be shipped directly to customers for self-installation and will include installation instructions and contact information if further assistance is needed. ESK will provide two types of kits with a predetermined number of energy efficiency measures – one for customers with natural gas space heating and one for customers with natural gas water heating. Customers with natural gas water heating will receive equipment such as faucet aerators and low-flow showerheads, while customers with gas space heating will receive measures such as caulk and foam sealant. Customers who use natural gas for both purposes will receive a single kit with measures from both the space heating and water heating kits. Customers will complete a simple webform that will determine which kit they will receive. The program will be available to all residential customers at no cost.

2. Costs, Savings, and Benefits

Projections

The program aims to incentivize 10,350 kits over the next period, with associated annualized gas savings of 39,922 MMBtu. The program is projected to cost \$879,904.

Table 16 – Projected EnergySense Kits Impacts

	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	TOTAL
Projected Budgets (Nominal)						
Customer Incentives	\$85,540	\$110,020	\$110,020	\$110,020	\$110,020	\$525,620
Administration	\$94,749	\$52,819	\$52,819	\$52,819	\$52,819	\$306,025
Inspections	\$3,087	\$3,793	\$3,793	\$3,793	\$3,793	\$18,259
			\$30,000			\$30,000
TOTAL:	\$183,376	\$166,632	\$196,632	\$166,632	\$166,632	\$879,904
Natural Gas Savings (MMBtus)						
Incremental Annual	6,675	8,312	8,312	8,312	8,312	39,922
Incremental Lifetime	100,558	125,260	125,260	125,260	125,260	601,597
Projected Participation						
Kits	1,750	2,150	2,150	2,150	2,150	10,350

3. Program Eligibility and Incentives

The ESK program is open to all residential customers, but is designed to be particularly beneficial to low-income customers. It is a free program that fills a crucial gap in providing energy savings to the low-income customers that do not qualify for PGW's Home Comfort weatherization program, and lower income customers who may not have extra funds for the ESK components, but are not likely to be making large purchases that would allow them to take advantage of the Residential Equipment Rebates program.

4. Evaluation and Verification Inspections

PGW may perform on-site or virtual verifications as outlined in section I.G. PGW will primarily perform verifications in this program by fielding online surveys to all participants to ensure the measures included in the kits are installed in homes with natural gas heating and/or water heating equipment and that the properties have active PGW service.

The program will be evaluated when there is adequate program activity to review post-usage data.

E. Smart Thermostat Marketplace

1. Program Description

The Marketplace program offers direct sales of rebate-discounted ENERGY STAR certified smart thermostats to eligible PGW customers. PGW has relied on a third-party vendor to design the website and implement the program. The Marketplace website is available via PGW My Account and offers smart thermostats discounted by the amount of PGW’s rebate. This creates an “instant rebate” that obviates the need for the customer to take any action after the purchase to receive the rebate. This arrangement provides energy-saving equipment that is affordable and can easily be retrofit on most HVAC systems. Thermostats purchased through the Marketplace must be self-installed by the customer or by a hired contractor. PGW does not provide installation services for thermostats purchased through the Marketplace.

2. Costs, Savings, and Benefits

Projections

The program aims to incentivize 3,500 thermostats over the next period, with associated annualized gas savings of 18,375 MMBtu. The program is projected to cost \$499,874.

Table 17 – Projected Smart Thermostat Marketplace Impacts

	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	TOTAL
Projected Budgets (Nominal)						
Customer Incentives	\$49,000	\$49,000	\$49,000	\$49,000	\$49,000	\$245,000
Administration	\$33,626	\$33,626	\$33,626	\$33,626	\$33,626	\$168,129
Inspections	\$12,349	\$12,349	\$12,349	\$12,349	\$12,349	\$61,745
Evaluation	-	\$25,000				\$25,000
TOTAL:	\$94,975	\$119,975	\$94,975	\$94,975	\$94,975	\$499,874
Natural Gas Savings (MMBtus)						
Incremental Annual	3,675	3,675	3,675	3,675	3,675	18,375
Incremental Lifetime	40,425	40,425	40,425	40,425	40,425	202,125
Projected Participation						
Thermostats	700	700	700	700	700	3,500

3. Program Eligibility and Incentives

The program’s target market includes PGW firm-rate residential and commercial customers seeking to retrofit an existing natural gas heating system with a smart thermostat. Owners and renters, with the approval of the owner, are both eligible. Equipment must be purchased from PGW’s marketplace in order to be eligible. PGW limits the number of thermostats that may be purchased through the Marketplace to three

per customer, with the second and third purchases receiving smaller instant rebates. Building owners and builders that seek to install greater quantities may apply for rebates through the prescriptive RER program.

4. Evaluation and Verification Inspections

PGW will perform on-site verifications as outlined in section I.G. PGW has set a target to inspect five to ten percent of claims to ensure the equipment purchased from the marketplace are installed on natural gas heating equipment at addresses with active PGW service.

The program is undergoing evaluation at the time of the filing of this Plan. It will be further evaluated when there is additional adequate program activity to review post-usage data.

F. Low Income Smart Thermostats

1. Program Description

The Low-Income Smart Thermostat (“LIST”) program will provide ENERGY STAR certified smart thermostats in the homes of eligible low-income PGW customers, at no cost to the customer. PGW will rely on a vendor to perform outreach to low-income populations, qualify program participants for income and program eligibility, install smart thermostats, and provide customers with education regarding how to use the thermostat, including how to achieve savings. The vendor will perform installations in customer homes as the primary program delivery vehicle. PGW will also allow customers to apply for the program via a webform that can be accessed on the EnergySense website. They may also provide customers the thermostat for the customer to self-install when requested and deemed appropriate.

2. Costs, Savings, and Benefits

Projections

The program aims to incentivize 750 thermostats over the next period, with associated annualized gas savings of 4,328 MMBtu. The program is projected to cost \$325,000.

Table 18 – Projected Low Income Smart Thermostat Impacts

	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	TOTAL
Projected Budgets (Nominal)						
Customer Incentives ⁵	\$18,750	\$18,750	\$18,750	\$18,750	\$18,750	\$93,750
Administration ⁶	\$41,250	\$41,250	\$41,250	\$41,250	\$41,250	\$206,250
Evaluation	-	\$25,000	-			\$25,000
TOTAL:	\$60,000	\$85,000	\$60,000	\$60,000	\$60,000	\$325,000
Natural Gas Savings (MMBtus)						
Incremental Annual	866	866	866	866	866	4,328
Incremental Lifetime	9,521	9,521	9,521	9,521	9,521	47,603
Projected Participation						
Thermostats	150	150	150	150	150	750

3. Program Eligibility and Incentives

The program’s target market is low-income PGW customers on a residential firm-rate. Customers will be considered low income if they have been enrolled in CRP within the

⁵ Cost of equipment only.

⁶ Includes the cost of installing equipment plus the cost of scheduling site visit.

last year, have received a UESF grant within the last year, or have received LIHEAP and assigned it to PGW within the last year. Customers will also be considered low-income if their reported annual income is below 150% of the Federal Poverty Level for their household size. PGW will not perform income verification as part of the LIST program. Customers will not be required to have WiFi connectivity in their homes in order to participate in the program; however, PGW will advise participants about the benefits of having the device connected to the internet and provide general guidance on how customers can obtain free internet service through the Affordable Connectivity Program (ACP).

4. Evaluation and Verification Inspections

As deemed necessary, PGW will perform verification inspections to ensure that smart thermostats are installed in homes and businesses with active PGW service used for space heat. The program is undergoing evaluation at the time of the filing of this Plan. It will be further evaluated when there is additional adequate program activity to review post-usage data.

In its Annual Reports, PGW will report on the number of self-installed thermostats and vendor-installed thermostats.

G. *Small Business Assessments*

1. Program Description

The Small Business Assessments (“SBA”) program seeks to encourage PGW small business customers to take advantage of the prescriptive rebate programs by providing free walkthrough energy assessments that recommend energy efficiency upgrades. The free energy assessments may also include a limited number of no-cost or low-cost measures (i.e., Faucet aerators, temperature setbacks, etc.)

2. Costs, Savings, and Benefits

Projections

The program aims to perform assessments for 150 small business customers from FY 2025 – FY 2029, with associated annualized gas savings of 2,725 MMBtu. The program is projected to cost \$530,000.

Table 19 – Projected SBA Impacts

	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	TOTAL
Projected Budgets (Nominal)						
Customer Incentives	\$90,000	\$90,000	\$90,000	\$90,000	\$90,000	\$450,000
Administration	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$50,000
Evaluation			\$30,000			\$30,000
TOTAL	\$100,000	\$100,000	\$130,000	\$100,000	\$100,000	\$530,000
Natural Gas Savings (MMBtus)						
Incremental Annual	545	545	545	545	545	2,725
Incremental Lifetime	10,902	10,902	10,902	10,902	10,902	54,508
Projected Participation						
Assessments	30	30	30	30	30	150

3. Program Eligibility and Incentives

SBA’s target market includes PGW commercial customers whose annual gas usage is less than 300 Mcf and have buildings under 50,000 square feet. Buildings over 50,000 square feet will not be eligible for SBA because they are already mandated to participate in energy benchmarking and “Building Tune-ups” due to the City of Philadelphia’s requirements for commercial properties. As such, there is an existing incentive and pathway for these large commercial customers to pursue energy efficiency. SBA will seek to serve commercial customers whose size does not trigger compliance with the City’s programs, and who may not have resources available to purchase this type of work.

PGW will establish a list of vendors who are preapproved to perform the energy assessments. The incentive for each customer will be limited to \$2,500 for the energy assessment and associated report, with an additional \$500 available for direct-installation measures, for a total maximum incentive of \$3,000 per customer. This incentive cap will help to control costs and serve as many customers as possible.

SBA will serve as a lead generator to direct customers towards PGW's prescriptive rebate programs, namely CER, while also achieving energy savings through no-cost and low-cost opportunities. Customers will receive a free walk-through energy assessment from a PGW-contracted technician to identify energy savings opportunities. The technician will perform free and low-cost energy efficiency improvements, such as updating temperature set-points, installing pipe wrap, low-flow devices, minor air sealing and similar measures. Customers must agree to this set of measures as a condition of receiving the free assessment. The technician will provide the customer a list of recommended energy efficiency improvements with estimated savings, which will include measures offered in PGW's EnergySense equipment rebate programs.

4. Evaluation, Monitoring, and Verification

PGW will not perform on-site or virtual verifications as outlined in section I.G. This is because the assessments will be performed by licensed professionals and an accompanying assessment report will be provided for each project, therefore, PGW opines that inspections would be redundant and an inefficient use of program funding. Should there be a need to inspect a project for a specific reason, PGW will perform inspections using in-house staff, which will be included within the internal administrative costs for the program.

The program will be evaluated when there is adequate program activity to review post-usage data.

III. Appendices

A. PGW Natural Gas Avoided Costs, including DRIPE (2023\$)

Calendar Year	Baseload \$ / MMBtu	Space Heating \$ / MMBtu	DHW \$ / MMBtu
2023	\$5.01	\$13.52	\$7.13
2024	\$5.11	\$13.63	\$7.24
2025	\$5.19	\$13.74	\$7.33
2026	\$5.18	\$13.76	\$7.32
2027	\$5.19	\$13.79	\$7.34
2028	\$5.23	\$13.86	\$7.39
2029	\$5.34	\$13.99	\$7.50
2030	\$5.42	\$14.11	\$7.59
2031	\$5.53	\$14.22	\$7.70
2032	\$5.53	\$14.22	\$7.70
2033	\$5.53	\$14.22	\$7.70
2034	\$5.53	\$14.22	\$7.70
2035	\$5.53	\$14.22	\$7.70
2036	\$5.53	\$14.22	\$7.70
2037	\$5.53	\$14.22	\$7.70
2038	\$5.53	\$14.22	\$7.70
2039	\$5.53	\$14.22	\$7.70
2040	\$5.53	\$14.22	\$7.70
2041	\$5.53	\$14.22	\$7.70
2042	\$5.53	\$14.22	\$7.70
2043	\$5.53	\$14.22	\$7.70
2044	\$5.53	\$14.22	\$7.70
2045	\$5.53	\$14.22	\$7.70
2046	\$5.53	\$14.22	\$7.70
2047	\$5.53	\$14.22	\$7.70
2048	\$5.53	\$14.22	\$7.70
2049	\$5.53	\$14.22	\$7.70
2050	\$5.53	\$14.22	\$7.70

B. List of Acronyms

Acronym	Meaning
BCR	Benefit-cost ratio
CER	Commercial Equipment Rebates Program
CMCG	Commercial/Multifamily Efficient Construction Grant Program
CY	Calendar Year
DRIPE	Demand-Reduction-Induced Price Effect
DSM	Demand-Side Management
EBG	Efficient Building Grants Program
ESK	EnergySense Kits Program
FY	Fiscal Year (PGW's fiscal year goes from September 1 to August 31)
LIST	Low Income Smart Thermostat Program
PA	Pennsylvania
PV	Present Value
PGW	Philadelphia Gas Works
RCG	Residential Construction Grant Program
RER	Residential Equipment Rebates Program
SBA	Small Business Assessments
TRC	Total Resource Cost
TRM	Technical Reference Manual

C. Units

Dth = 10 therms

MDth = 10,000 therms

MMDth = 10,000,000 therms

Ccf = 100 cubic feet

Mcf = 1,000 cubic feet

MMcf = 1,000,000 cubic feet

Bcf = 1,000,000,000 cubic feet

MMBtu = 1,000,000 Btu

BBtu = 1,000,000,000 Btu

kW = 1,000 watts

MW = 1,000,000 watts

GW = 1,000,000,000 watts

1 MMBtu = 1 Dth

1.03 therm = 1 ccf

D. Technical Reference Manual

The technical reference manual has been provided as a separate document.

VERIFICATION

I, Denise Adamucci, hereby state that: (1) I am Senior Vice President for Customer & Regulatory Affairs for Philadelphia Gas Works; (2) the facts set forth in my testimony 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).

September 27, 2023

Dated

/s/ Denise Adamucci

Denise Adamucci, Senior Vice President
Customer & Regulatory Affairs
Philadelphia Gas Works

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Petition of Philadelphia Gas Works for :
Approval of Demand-Side Management :
Plan for FY 2024-2026 : Docket No. P-2014-2459362
:
Philadelphia Gas Works Universal Service :
and Energy Conservation Plan for 2014- :
2016 52 Pa Code § 62.4 – Request for :
Waivers :

DIRECT TESTIMONY

OF

**THEODORE M. LOVE
Green Energy Economics Group, Inc.**

On Behalf of

Philadelphia Gas Works

Topics Addressed:

**Historical Performance of PGW’s DSM Phase III Plan
Phase IV Plan Design and Cost-effectiveness
Modifications to Residential Program
Modifications to Nonresidential Program**

September 27, 2023

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TABLE OF EXHIBITS

Exhibit	Description
TML-1	Resume of Theodore M. Love

1 **I. INTRODUCTION AND BACKGROUND**

2 **Q. PLEASE STATE YOUR NAME, OCCUPATION AND BUSINESS ADDRESS.**

3 A. My name is Theodore M. Love and I am a partner at Green Energy Economics Group,
4 Inc. (“GEEG”), an energy consultancy founded in 2005. My office address is 2534
5 Downingsville Road, Lincoln, VT 05443.

6 **Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?**

7 A. My testimony is submitted on behalf of Philadelphia Gas Works (“PGW”).

8 **Q. PLEASE BRIEFLY SUMMARIZE YOUR QUALIFICATIONS.**

9 A. I have been involved in the review and preparation of electric and natural gas energy
10 efficiency and conservation (“EE&C”) plans, as well as potential studies and cost-
11 effectiveness analyses, in nearly a dozen states, three Canadian Provinces, and China,
12 since I began working with GEEG in 2007. Most relevant to this proceeding, I have been
13 advising PGW on its natural gas energy efficiency activities since 2008, advising UGI
14 Utilities, Inc. on its Voluntary Gas and Electric Energy Efficiency and Conservation Plan
15 (“EE&C Plan”) since 2015, and I have worked with Columbia Gas of Pennsylvania on its
16 voluntary EE&C plan since 2022.

17 **Q. HAVE YOU TESTIFIED PREVIOUSLY IN UTILITY REGULATORY**
18 **PROCEEDINGS?**

19 A. Yes, I have provided written testimony in California, Ontario, Nova Scotia and
20 Pennsylvania and participated in the preparation and development of testimony or
21 evidence in British Columbia, Vermont, Connecticut, Maryland, Oklahoma, Texas,
22 Illinois, and Louisiana.

1 **Q. HAVE YOU TESTIFIED PREVIOUSLY BEFORE THE PENNSYLVANIA**
2 **PUBLIC UTILITY COMMISSION (“COMMISSION” OR “PA PUC”)?**

3 A. Yes. I have provided testimony in eight previous dockets before the Commission. Please
4 see Exhibit TML-1 for a complete list of the proceedings in which I have testified and
5 their docket numbers.

6 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

7 A. My testimony will address PGW’s Phase III performance to date and its Phase IV
8 Demand Side Management Implementation Plan (“Phase IV Plan”) filed by PGW on
9 September 27, 2023 under Docket No. P-2014-2459362.¹

10 **Q. ARE YOU SPONSORING ANY EXHIBITS IN THIS PROCEEDING?**

11 A. Yes, I am sponsoring the following exhibits:

- 12 • Exhibit TML-1 – Resume of Theodore M. Love

13 **Q. PLEASE SUMMARIZE YOUR TESTIMONY.**

14 A. First, I describe the residential programs and any updates that are proposed to these
15 programs. This is followed by a description of the nonresidential programs and any
16 updates to programs in that sector. Second, I provide an overview of the historical
17 performance of PGW’s Phase III DSM Plan and my interpretation of these results. Next, I
18 provide an overview of the proposed Phase IV Plan. Finally, I provide an overview of my
19 recommendations and findings as related to PGW’s Phase IV Plan filing.

20

21

22

¹ A copy of the Phase IV Plan is included with Denise Adamucci’s Direct Testimony, PGW St. No. 1, as PGW Exh. DA-1.

1 **II. RESIDENTIAL PROGRAMS IN PHASE IV**

2 **Q. WHAT UPDATES HAS PGW MADE TO RESIDENTIAL PROGRAMS FOR**
3 **PHASE IV?**

4 A. PGW has proposed three main updates to its residential program offerings. First, PGW
5 will provide new incentives for insulation and air sealing through its RER program.
6 Second, PGW will provide grants for new multifamily buildings that go beyond code for
7 saving energy. Third, PGW is proposing a new EnergySense Kits program to provide at
8 no cost space and water heating kits to its customers.

9 **Q. PLEASE DESCRIBE THE RESIDENTIAL EQUIPMENT REBATES (RER)**
10 **PROGRAM.**

11 A. The Residential Equipment Rebates program offers prescriptive rebates to customers who
12 pursue energy efficiency measures that save natural gas in residential buildings. Eligible
13 customers use their own contractor to install the efficiency measure and receive cash
14 rebates to offset most of the incremental cost of the higher efficiency installation. The
15 program is also open to commercial customers and multifamily buildings that utilize
16 residential sized equipment. Rebates are designed to cover between 35% and 75% of the
17 incremental cost between the baseline and efficiency conditions.

18 The RER program is expected to cost \$4.1 million over five years with savings of
19 1,702,125 MMBtus over the lifetime of the measures installed. The program is projected
20 to be cost effective under the TRC test, providing \$7.3 million in net benefits with a BCR
21 of 1.96.

22 **Q. WHAT CHANGES HAVE BEEN PROPOSED TO THE RER PROGRAM FOR**
23 **PHASE IV?**

24 A. PGW will go beyond space and water heating equipment in the next phase by offering
25 prescriptive rebates for roof insulation and air sealing. Customers who install at least R-

1 38 insulation in their roof or attic will be eligible for incentives based on the square
 2 footage of the area insulated. Customers that go beyond R-49 will receive an even higher
 3 incentive per square foot. A bonus incentive will be provided for customers that perform
 4 air sealing along with insulation. Insulation must be installed by a Building Performance
 5 Institute (“BPI”) certified contractor.

6 **Q. HOW DOES THE RESIDENTIAL EQUIPMENT REBATE PROGRAM**
 7 **ADDRESS LOW INCOME CUSTOMERS?**

8 A. PGW will continue to offer rebates that are generally 40% to 100% higher for low-
 9 income customers in the RER program. Customers can qualify for this increased rebate
 10 based on enrollment in a variety of programs like PGW’s Customer Responsibility
 11 Program (“CRP”). Additional details on eligibility can be found in section II.A.3 of the
 12 Plan.

13 **Q. PLEASE DESCRIBE THE RESIDENTIAL CONSTRUCTION GRANTS (“RCG”)**
 14 **PROGRAM.**

15 A. The Residential Construction Grants program provides incentives for homebuilders,
 16 building owners, engineers, architects, and contractors to incorporate natural gas energy
 17 efficiency into the design of their projects and go beyond standards dictated by building
 18 energy codes. This program provides incentives for reaching a certain level of natural
 19 gas savings.

20 The RCG program is expected to cost \$1.2 million over five years with savings of
 21 257,167 MMBtus over the lifetime of the measures installed. The program is projected to
 22 be cost-effective under the TRC test, providing \$2.0 million in net benefits with a BCR of
 23 2.27.

1 **Q. WHAT UPDATES WERE MADE TO THE RCG FOR PHASE IV?**

2 A. PGW is proposing to add a new multifamily component to the RCG. New construction
3 multifamily buildings that exceed the 2018 International Energy Conservation Code
4 (“IECC 2018”) by more than 15% will receive rebates of \$550 per unit for buildings
5 using natural gas for space heat and hot water, or \$375 per unit for buildings with only
6 natural gas space heating.

7 **Q. WHAT INCENTIVES ARE OFFERED FOR SINGLE FAMILY HOMES**
8 **THROUGH THE RCG PROGRAM?**

9 A. PGW will continue to offer \$1,600 grants for new homes that go at least 15% beyond
10 IECC 2015 and that utilize natural gas for space and water heating. Both single family
11 and multifamily rebates require a Home Energy Rating System (“HERS”) rating to verify
12 savings beyond code levels.

13 **Q. PLEASE DESCRIBE THE SMART THERMOSTAT MARKETPLACE.**

14 A. The Smart Thermostat Marketplace program offers direct sales of discounted ENERGY
15 STAR certified smart thermostats to PGW customers. The Marketplace website is
16 available through PGW’s My Account portal and offers smart thermostats discounted by
17 the amount of PGW’s rebate with a limit of three rebates per customer². This “instant
18 rebate” eliminates the need for customers to determine whether a thermostat would
19 qualify for rebate, then fill out a rebate application and wait for payment. Thermostats
20 purchased through the Marketplace must be self-installed by the customer or by a hired
21 contractor, as PGW does not provide installation services. This program is a continuation
22 of the program currently offered in PGW’s Phase III Portfolio.

² The rebate applied for the second and third thermostat will be lower than the rebate for the purchase of the first thermostat.

1 The Smart Thermostat Marketplace program is expected to cost \$499,874 over
2 five years with savings of 202,125 MMBtus over the lifetime of the measures installed.
3 The program is projected to be cost-effective under the TRC test, providing \$2.6 million
4 in net benefits with a BCR of 5.34.

5 **Q. PLEASE DESCRIBE THE LOW-INCOME SMART THERMOSTAT PROGRAM.**

6 A. The Low-Income Smart Thermostat (“LIST”) program will provide ENERGY STAR
7 certified smart thermostats in the homes of eligible low-income PGW customers, at no
8 cost to the customer. PGW’s vendor performs outreach to low-income populations,
9 determines eligibility for the program, installs smart thermostats, and provides customers
10 with education regarding how to use the thermostat and how to achieve savings. The
11 vendor also installs the smart thermostat in customer homes. Customers can apply for the
12 program via a webform that can be accessed on the EnergySense website. In certain
13 situations, the vendor may also provide the thermostat for the customer to self-install
14 when requested and deemed appropriate. Customers will be considered low income if
15 they have enrolled in CRP within the last year, have received a Utility Emergency
16 Services Fund (“UESF”) grant within the last year, or are in the Low Income Home
17 Energy Assistance Program (“LIHEAP”) and their reported annual income is below
18 150% of the Federal Poverty Level for their household size.

19 The LIST program is expected to cost \$325,000 over five years with savings of
20 47,603 MMBtus over the lifetime of the measures installed. The program is projected to
21 be cost-effective under the TRC test, providing \$321,050 in net benefits with a BCR of
22 2.15.

1 **Q. PLEASE DESCRIBE THE NEWLY PROPOSED ENERGYSENSE KITS**
2 **PROGRAM.**

3 A. The proposed EnergySense Kits program provides a crucial way for customers to be
4 introduced to PGW's EnergySense program by receiving free kits with measures that
5 address space heating, water heating, or both. Customers complete a simple web form
6 that will determine which kit they receive and PGW will mail the kits to the customer at
7 no cost. This program is a common component of energy efficiency portfolios across the
8 country and will provide a way for customers to save energy without investing significant
9 time or cost. PGW will also use the EnergySense kits to drive referrals to its other
10 program offerings for customers who may be considering other actions such as installing
11 insulation or replacing their furnace.

12 The EnergySense Kits program is expected to cost \$879,904 over five years with
13 savings of 601,597 MMBtus over the lifetime of the measures installed. The program is
14 projected to be cost effective under the TRC test, providing \$5.2 million in net benefits
15 with a BCR of 7.78.

16 **Q. ARE PGW'S UPDATES TO ITS RESIDENTIAL PROGRAMS REASONABLE?**

17 A. Yes. The proposed residential programs cover a wide variety of measures, savings
18 opportunities and customers, including low income and multifamily customers. They are
19 projected to save customers 2,810,617 MMBtus over the lifetime of the installed
20 measures and provide \$17.6 million in net benefits with a TRC BCR of 2.62.

21
22
23
24

1 **III. NONRESIDENTIAL PROGRAMS IN PHASE IV**

2 **Q. WHAT UPDATES ARE PROPOSED FOR NONRESIDENTIAL PROGRAMS**
3 **FOR PHASE IV?**

4 A. PGW has made some adjustments to incentive levels and equipment offerings in its
5 Commercial Equipment Rebates (“CER”) Program and has proposed a new program for
6 Phase IV, the Small Business Assessment (“SBA”) Program.

7 **Q. WHY IS PGW PROPOSING A PROGRAM SPECIFICALLY TARGETING**
8 **SMALL BUSINESS CUSTOMERS?**

9 A. Small business makes up over 99% of all businesses in Pennsylvania and employ 47% of
10 Pennsylvania’s workforce,³ but face many barriers to participation in energy efficiency
11 programs. These barriers include not having the time, expertise, or financial means to
12 evaluate and pursue energy savings. The SBA Program will address these barriers by
13 providing a no-cost way for small businesses to learn about and to save energy.

14 **Q. PLEASE DESCRIBE THE PROPOSED SMALL BUSINESS ASSESSMENT**
15 **PROGRAM.**

16 A. PGW will provide a walkthrough assessment for small business customers that will be
17 accompanied by the installation of up to \$500 of low-cost measures, such as faucet
18 aerators, pipe insulation, and minor air sealing opportunities, at no cost to the customer.
19 PGW will contract with a technician to perform the assessment and measure installation
20 and then provide the customer with a report detailing the additional energy savings
21 opportunities identified during the walkthrough. The assessment and report will also
22 serve to refer customers to PGW’s additional energy efficiency program offerings.

³ <https://advocacy.sba.gov/wp-content/uploads/2019/04/2019-Small-Business-Profiles-PA.pdf>

1 The program is expected to cost \$540,000 over five years with savings of 61,775
2 MMBtus over the lifetime of the measures installed. The program is projected to be cost-
3 effective under the TRC test, providing \$214,486 in net benefits with a BCR of 1.47.

4 **Q. WHAT CUSTOMERS ARE ELGIBILE TO PARTCIPATE IN THE SBA**
5 **PROGRAM?**

6 A. To participate in the SBA Program, customers must be on a commercial rate, use less
7 than 300 MCF per year, and have a building under 50,000 square feet. These are in place
8 to address customers that would not be pursuing energy audits on their own, since the
9 City of Philadelphia has requirements for buildings over 50,000 square feet to
10 participating in its energy benchmarking and usage reduction program, sometimes
11 referred to as the “Building Tune-ups” program.⁴ By targeting customers not otherwise
12 required to participate in the City’s program, PGW will fill a gap in program services for
13 a cornerstone of Philadelphia’s economy.

14 **Q. PLEASE DESCRIBE THE COMMERCIAL EQUIPMENT REBATE (CER)**
15 **PROGRAM.**

16 A. The Commercial Equipment Rebate program issues prescriptive rebates to customers
17 who pursue measures for saving natural gas in commercial, industrial and multifamily
18 buildings – including buildings that serve low-income tenants. Eligible customers use
19 their own contractor to pursue the energy saving opportunity and receive cash rebates to
20 offset approximately half of the incremental cost of the higher efficiency option.
21 Measures include commercial boilers, controls, roof insulation, water heaters, steam
22 traps, and commercial kitchen equipment. A full list of proposed measures, efficiency
23 requirements, and rebate levels can be found in Table 15 of the Plan.

⁴ <https://www.phila.gov/programs/building-energy-performance-program/>

1 The CER program is expected to cost \$1.0 million over five years with savings of
2 1,598,493 MMBtus over the lifetime of the measures installed. The program is projected
3 to be cost effective under the TRC test, providing \$10.4 million in net benefits with a
4 BCR of 3.28.

5 **Q. WHAT UPDATES WERE MADE TO THE CER PROGRAM?**

6 A. PGW has updated some incentive levels for measures and included a new measure, VRF
7 natural gas heat pumps. VRF natural gas heat pumps are an emerging technology that
8 allows customers who utilize natural gas for heating to achieve efficiencies greater than
9 100%. While this technology is relatively new to the market, PGW has calculated that it
10 will pass the TRC test with a BCR of 1.12 and will help provide significant energy
11 savings to PGW's customers.

12 **Q. WILL SMALL BUSINESSES PARTICIPATE IN THE CER PROGRAM?**

13 A. Yes. PGW hopes to increase small business participation in the CER program by
14 referring customers who go through the Small Business Assessment program and have
15 savings opportunities that could be addressed by the CER Program. PGW also plans to
16 continue reporting on any participation by small business customers, defined as using less
17 than 300 MCF per year, that receive a rebate through the CER program.

18 **Q. ARE THE COMMERCIAL PROGRAM UPDATES REASONABLE?**

19 A. Yes. They continue to build on the foundation of the existing CER while providing new
20 ways to address small business customers. The nonresidential programs will benefit
21 PGW's commercial, industrial, and multifamily ratepayers by saving 1,660,268 MMBtus
22 over the lifetime of measures installed and providing \$10.6 million in TRC net benefits
23 with a BCR of 1.47.

24

1 **IV. PGW’S PHASE III HISTORICAL PERFORMANCE**

2 **Q. HOW HAS THE ENERGYSENSE PORTFOLIO PERFORMED SO FAR IN**
 3 **PHASE III?**

4 A. PGW has provided significant benefits to ratepayers over the past two years through the
 5 Phase III Plan. PGW’s EnergySense DSM portfolio delivered total resource cost (“TRC”)
 6 net benefits of \$3.85 million, in 2020 dollars, with a benefit-cost ratio (“BCR”) of 2.17,
 7 as shown in the following table.

8 *Table 1. PGW Phase III TRC Test Results for FY 2021 and FY 2022 (Source: PGW Annual*
 9 *Report Filings)*

Program	Benefits	Costs	Net	BCR
Residential Equipment Rebates	\$2,171,005	\$1,354,025	\$816,980	1.60
Residential Construction Grants	\$611,941	\$214,256	\$397,685	2.86
Commercial Equipment Rebates	\$3,860,779	\$729,367	\$3,131,412	5.29
ECG and EBG Wind-down	\$185,128	\$27,847	\$157,281	6.65
Smart Thermostat Marketplace	\$173,910	\$50,151	\$123,759	3.47
Low Income Smart Thermostat	\$135,848	\$51,078	\$84,770	2.66
Portfolio Wide	\$0	\$860,980	-\$860,980	0.00
Total	\$7,138,611	\$3,287,704	\$3,850,907	2.17

10 The portfolio also had energy savings of 113,183 incremental annual MMBtus for fiscal
 11 year (“FY”) 2021 and FY 2022. The following table shows PGW’s reported incremental
 12 annual savings against annual saving goals for these years.

13 *Table 2. PGW Phase III Incremental Annual MMBtus Saved vs. Goals (Source: PGW Annual*
 14 *Report Filings)*

Fiscal Year	Reported	Goal	% of Goal
2021	26,243	58,564	45%
2022	23,871	54,619	44%
Total	50,114	113,183	44%
Annual Average	25,057	56,592	44%

15
 16 **Q. HOW MUCH DID IT COST PGW TO ACQUIRE THESE SAVINGS?**

17 A. The following table shows PGW’s portfolio spending against projected budgets for FY
 18 2020 through FY 2021.

1 **Table 3. PGW Phase III Nominal Spending vs. Budget (Source: PGW Annual Report Filings)**

Fiscal Year	Reported	Goal	% of Goal
2021	\$438,634	\$715,000	61%
2022	\$469,146	\$710,130	66%
Total	\$907,780	\$1,425,130	64%
Annual Average	\$453,890	\$712,565	64%

2 PGW spent around 64% of its budget for FY 2021 through FY 2022, with a small
3 increase between the two years.

4 Taking these spending and savings values together along with the projected
5 lifetime of energy savings provides a picture of what it cost PGW to acquire energy
6 savings levelized over the life of installed measures, also referred to as the cost of saved
7 energy (“CSE”). The following table compares this levelized cost in 2023 dollars per
8 annual therm⁵ compared to the projected cost to acquire savings. PGW’s cost to acquire
9 energy savings have been near to or lower than its projected goal. Over FY 2021 and FY
10 2022 PGW had a CSE of \$0.45, which was 98% of its projected costs of \$0.47.

11 **Table 4. PGW Phase III CSE in 2023\$/Annual Therm**

Fiscal Year	Reported	Goal	% of Goal
Combined Total	\$0.45	\$0.47	96%
Combined Residential	\$0.43	\$0.41	105%
Combined C&I	\$0.12	\$0.22	53%
FY 2022 Total	\$0.55	\$0.51	108%
FY 2021 - Residential	\$0.48	\$0.51	94%
FY 2021 - C&I	\$0.16	\$0.18	87%
FY 2021 Total	\$0.37	\$0.44	84%
FY 2021 - Residential	\$0.37	\$0.34	111%
FY 2021 - C&I	\$0.09	\$0.26	35%

⁵ Values have been presented in 2023 dollars per therm in order compare more accurately across years and to other jurisdictions. A discount rate of 6% was used for the CSE calculation.

1 **Q. BASED ON THESE RESULTS, WHAT DO YOU CONCLUDE ABOUT THE**
 2 **PORTFOLIO'S IMPLEMENTATION SO FAR IN PHASE III?**

3 A. PGW has delivered a very cost-effective portfolio of market-rate natural gas energy
 4 efficiency programs for the first two years of its Phase III plan. While the programs have
 5 not fully ramped up to projected levels, PGW has been able to acquire savings at or
 6 below its projected CSE. As discussed further below, the proposed EnergySense Kit and
 7 Small Business Assessments will help further ramp up these programs and bring various
 8 customer groups into PGW's DSM programming.

9 **V. DSM PHASE IV PLAN**

10 **Q. PLEASE PROVIDE AN OVERVIEW OF PGW'S PHASE IV DSM PORTFOLIO.**

11 A. PGW has submitted a Revised Phase IV Implementation Plan that projects annual savings
 12 of 232,303 MMBtus for a total cost of \$12.7 million in nominal terms. The Phase IV
 13 portfolio is projected to provide \$25.2 million in net benefits, in 2023 dollars, under the
 14 TRC test, with a BCR of 2.35. In other words, for every dollar spent in Phase IV,
 15 ratepayers will achieve over two dollars in benefits. The portfolio consists of seven
 16 programs that address low income, residential, commercial, and industrial customers. The
 17 following table provides projected budgets by program.

18 *Table 5. PGW Phase IV Projected Budgets for FY 2025 to FY 2029*

Program	2025	2026	2027	2028	2029	TOTAL
Portfolio-wide Costs	\$687,000	\$687,000	\$687,000	\$687,000	\$687,000	\$3,435,000
Residential Equipment Rebates (RER)	\$812,988	\$862,988	\$812,988	\$812,988	\$812,988	\$4,114,942
EnergySense Kit (ESK)	\$183,376	\$166,632	\$196,632	\$166,632	\$166,632	\$879,904
Smart Thermostat (TSTAT)	\$94,975	\$119,975	\$94,975	\$94,975	\$94,975	\$499,874
Low-income Smart Thermostat (LI TSTAT)	\$60,000	\$85,000	\$60,000	\$60,000	\$60,000	\$325,000
Efficient Construction Grants (ECG)	\$236,250	\$236,250	\$236,250	\$286,250	\$236,250	\$1,231,250
Commercial Equipment Rebates (CER)	\$329,649	\$329,649	\$329,649	\$379,649	\$329,649	\$1,698,244
Small Business Assessment (SBA)	\$102,000	\$102,000	\$132,000	\$102,000	\$102,000	\$540,000
TOTAL PORTFOLIO	\$2,506,238	\$2,589,494	\$2,549,494	\$2,589,494	\$2,489,494	\$12,724,215

The following table provides projected energy savings for the proposed portfolio.

Table 6. PGW Phase IV Projected Energy Savings for FY 2025 to FY 2029

Fiscal Year	2025	2026	2027	2028	2029	TOTAL
Incremental Savings						
First Year	45,151	46,788	46,788	46,788	46,788	232,303
Lifetime	874,416	899,117	899,117	899,117	899,117	4,470,885
Cumulative Savings						
First Year	45,151	91,939	138,727	185,515	232,303	232,303
Lifetime	874,416	1,773,533	2,672,651	3,571,768	4,470,885	4,470,885

Q. HOW HAS THIS PHASE IV PLAN BEEN UPDATED FROM WHAT WAS FILED ON JUNE 16, 2023 IN THE SAME DOCKET?

A. The Phase IV Plan has been updated since it was originally filed to align with the new proposed schedule. Specifically, the first year of the Phase IV Plan was moved to FY 2025 and the plan was expanded out to five years, with years four and five using the same projections as the final year of the originally filed 3-year plan. The only change to budgets from the originally filed plan, was an updated evaluation schedule to ensure that each program in the portfolio would be evaluated at least once in the five-year planning cycle. The Revised Phase IV Plan was provided with Ms. Adamucci's Direct Testimony as Exhibit DA-1.

Q. WHY IS THE NEW PHASE IV PLAN FIVE YEARS INSTEAD OF THREE?

A. The longer planning cycle would allow PGW to fully implement their proposed plan and learn from its successes, and failures, before going through another time consuming and costly plan filing process. A five year cycle is also an industry standard for many DSM portfolios, including the UGI Gas voluntary gas energy efficiency portfolio and Act 129 EDC energy efficiency portfolios in Pennsylvania.

1 **Q. WHAT UPDATES WERE MADE TO OVERALL PORTFOLIO ASSUMPTIONS?**

2 A. PGW updated its avoided costs and other financial projection assumptions to more
3 accurately account for current market values. PGW also updated the Technical Reference
4 Manual (“TRM”) used to calculate estimated savings.

5 **Q. PLEASE DESCRIBE THE UPDATES MADE TO AVOIDED COSTS.**

6 A. PGW updated natural gas avoided costs with new commodity prices and charges for
7 pipeline and storage capacity from February of 2023, during its initial planning process.
8 Avoided costs for electricity and water were updated to align with the Commission’s
9 2021 TRC Test Final Order (Docket No. M-2019-3006868) with electric avoided cost
10 being derived from the PECO territory.

11 **Q. WERE THE CHANGES MADE TO THE AVOIDED COSTS REASONABLE?**

12 A. Yes. These changes are largely updates to time dependent price data, such as commodity
13 futures, and do not represent a substantive change in methodology compared to previous
14 phase filings.

15 **Q. PLEASE DESCRIBE THE UPDATES MADE TO THE TRM.**

16 A. PGW added a few measures to the TRM, including entries for variable refrigerant flow
17 (“VRF”) natural gas heat pumps, residential building roof insulation, and the measures
18 used in the EnergySense kits.

19 **Q. WERE THE CHANGES MADE TO THE TRM REASONABLE?**

20 A. Yes. The updates PGW made to its TRM are generally in-line with other approved TRMs
21 in the region including the Pennsylvania Act 129 TRM, Illinois TRM, New York TRM,

1 and Northeast Energy Efficiency Partnerships (NEEP) Mid-Atlantic TRM, and follow the
2 methodology for TRM updates established in PGW’s Phase III DSM Plan filing.

3 **Q. WHAT PORTFOLIO-WIDE COSTS ARE PROJECTED FOR THE PLAN?**

4 A. PGW is projecting portfolio-wide costs for the plan of \$3.4 million over the five years of
5 the plan, which is approximately 27% of the plan’s projected costs.

6 **Q. WHAT IS INCLUDED IN THESE PORTFOLIO-WIDE COSTS?**

7 A. PGW has consolidated several line items into its portfolio-wide costs. This includes items
8 that are traditionally counted at the portfolio level, like internal management of the
9 portfolio as well as ongoing regulatory reporting and planning activities. PGW has also
10 consolidated program management and marketing activities through a single vendor and
11 has allocated those costs to the portfolio-wide program.

12 **Q. ARE THE PORTFOLIO-WIDE COSTS REASONABLE?**

13 A. Yes, when taken into context for the portfolio as whole. The following table provides a
14 comparison of the Phase IV Plan costs to the 2022 Act 129 EDC reported spending using
15 two metrics. First it takes the total non-incentive spending and divides it by total
16 spending to get the percentage of non-incentive spending. Second, it shows the other
17 portfolio costs; in the instance of PGW this would be the “Portfolio-wide” costs, divided
18 by the total spending for the portfolio to get the percentage of other portfolio costs.

19 *Table 7. Comparison of Non-incentive Cost Percentages in Pennsylvania*

Administrator	Program Year	% Non-incentive	% Other Portfolio Cost
PPL	2022	57%	20%
FirstEnergy	2022	48%	2%
Duquesne	2022	74%	2%
PECO	2022	52%	19%
PGW	2025-2029 Plan	40%	27%

1 The table shows that there is not consistency across the program administrator on how
2 portfolio-level costs are allocated, with PPL, PECO, and PGW clearly bundling different
3 costs than FirstEnergy and Duquesne into the other portfolio cost category. However, a
4 more direct comparison can be made when looking at overall non-incentive costs for a
5 portfolio, since this shows the portion of spending that does not flow directly back to
6 ratepayers. By this metric, PGW's projections are significantly lower than the other Act
7 129 EDCs, with only 40% of costs going to overhead, while the Act 129 EDCs had 48%
8 to 74% of costs going to overhead.

9 **Q. HOW WILL PGW MARKET THE PORTFOLIO?**

10 A. PGW will utilize three main channels for marketing the Phase IV DSM Portfolio. First,
11 they will raise general awareness of the portfolio through mass marketing activities, such
12 as email and bill inserts. Second, PGW will continue to emphasize engagement with trade
13 allies, such as equipment suppliers, installers, and manufacturers, to drive customer
14 participation at the time a decision is being made to purchase equipment. Finally, PGW
15 will utilize more direct-to-customer marketing through its new EnergySense Kits and
16 Small Business Assessment programs. These programs will be low/no cost gateways for
17 customers to learn about all the offerings PGW has for saving energy. PGW will also
18 continue to work on outreach to its non-English speaking communities through a vendor
19 to support translation and event tabling targeting non-English speaking customers. This
20 marketing strategy is further discussed in Section 1.F of the Plan.

21 **Q. DOES THE PORTFOLIO PROVIDE OPPORTUNITIES FOR UNDERSERVED**
22 **COMMUNITIES TO PARTICIPATE?**

23 A. Yes. There are a number of avenues for underserved communities, such as low-income
24 customers, small businesses, and multifamily buildings to participate in the Phase IV

1 offerings. The Low-income Smart Thermostat, EnergySense Kits, and Small Business
2 Assessments programs are all provided to customers at no cost. The Residential
3 Equipment Rebate program provides significantly higher rebates for verified low-income
4 customers. Finally, there is a new multifamily construction grant offerings proposed in
5 the Residential Construction Grant program.

6 **VI. CONCLUSIONS AND RECOMMENDATIONS**

7 **Q. WHAT CONCLUSIONS DO YOU REACH?**

8 A. I conclude that the Phase IV Plan is reasonable and includes significant improvements to
9 existing program design that will help PGW reach more customers and save more energy.
10 The portfolio also includes many program components designed to serve traditionally
11 underserved markets, such as low-income customers, small businesses, and multifamily
12 buildings.

13 **Q. ON THE BASIS OF THESE CONCLUSIONS, WHAT ARE YOUR**
14 **RECOMMENDATIONS TO THE COMMISSION?**

15 A. I recommend that the Commission should approve PGW's Revised Phase IV
16 Implementation Plan thus allowing it to continue its DSM programming as modified for
17 the FY 2025-2029 period. These programs align the goals of PGW with those of its
18 customers, support the continued drive towards a more efficient Philadelphia, and
19 maximize net benefits.

20 **Q. DOES THIS COMPLETE YOUR DIRECT TESTIMONY?**

21 A. Yes.

Exhibit TML-1

Theodore Love

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Professional Experience

Green Energy Economics Group, Inc. – Cuttingsville, VT

<i>Partner</i>	2017 to Present
<i>Senior Associate and Data Scientist</i>	2013 to 2017
<i>Associate</i>	2010 to 2013
<i>Analyst</i>	2007 to 2010

For over 15 years, Theodore “Theo” Love has been providing insights into the design, analysis, and implementation of energy efficiency and distributed energy resource programs and portfolios in twelve states, three Canadian provinces, and China. He has a particular focus on EE/DER policy analysis, program design and implementation, cost-effectiveness testing, financing, and building scalable tools to analyze everything from individual projects to programs to portfolios. Some recent project experience includes:

- Providing regulatory and policy analysis assistance to the Small business Utility Advocate in California and Ontario on various energy efficiency dockets.
- Ongoing review and analysis of EfficiencyOne’s energy efficiency portfolio in Nova Scotia on behalf of the Consumer Advocate of Nova Scotia.
- Design, regulatory, and implementation support for voluntary electric and gas energy efficiency programs in Pennsylvania for UGI, PGW, and Columbia Gas.
- Working with PSE&G in New Jersey on forecasting and scaling their internally managed commercial and industrial programs.

2007 – 2010

Consultant, Alter & Rosen, LLP, New York, NY

2006 – 2007

Client Reporting Analyst, AllianceBernstein LP, White Plains, NY

Affiliations

Association of Energy Service Professionals (AESP) - Business Issues and Regulatory Models Topic Committee Co-Chair 2023 - present

AESP Gas Topic Committee Co-Chair 2019-2023

AESP National Conference Planning Committee 2021, 2022, 2023

Energy Efficiency Alliance (EEA) of Pennsylvania / New Jersey - Policy Conference Planning Committee 2022, 2023

Recent Project Experience

Green Energy Economics Group, Inc.

Economic and Policy Analysis

Small Business Utility Advocate - California

(June 2020 – Present)

- Reviewed plans and provided testimony on codes and standards, program budgets, and non-energy benefits (Docket No. A22-02-005)
- Provided assistance on comments and testimony regarding phase out of gas incentives (Docket No. A22-02-005)
- Reviewed plans and provided testimony on cost-effectiveness test and application of Automated Response Technology (ART) Program. (Docket No. A22-05-002)
- Assisted SBUA with analysis of claims and provided feedback on potential areas of mismanagement of funds (Docket No. A22-06-003)
- Reviewed plan and worked with SBUA to draft advice letter on program design related to small business, measures selection, and reporting requirements. (Docket No. R08-16-021)
- Participated in working group to examine the definition of underserved customers. Authored report on participation rates for small and microbusinesses in CA energy efficiency programs. (Docket No. R13-11-005)
- Provided comments on cost-effectiveness tools and reporting databases for Energy Efficiency programs (Docket No. R13-11-005)
- Reviewed third-party evaluation plans (Docket No. R13-11-005)
- Participated in workshops and developed comments and testimony supporting small business access to clean energy financing (Docket No. R20-08-022).

Economic and Policy Analysis

Small Business Utility Alliance – Ontario, CA

(June 2021 – Present)

- Reviewed plan and participated in fully litigated proceeding, including providing testimony on best practices and program design, coordination with electric programs, cost-effectiveness, shareholder incentives, and stakeholder engagement. (Matter No. EB-2021-0002)

Economic and Policy Analysis

Consumer Advocate – Nova Scotia

(March 2019 – Present)

- Member of DSM Advisory Group (DSMAG) on behalf of the Consumer Advocate of Nova Scotia to provide ongoing support for design and implementation of programs.
- Provided analysis and written testimony on Efficiency One's (E1) 2023 – 2025 DSM Plan (Matter No. M10473) as it relates to historical spending, affordability, underserved communities, and avoided costs.

- Provided analysis and written testimony on Efficiency One's (E1) 2020 – 2022 DSM Plan (Matter No. M09096) as it relates to spending and savings levels, affordability, and allocation of funds.
- Provided comments on the 2019 DSM Potential Study's economic analysis and projection assumptions and approach

Program Management and Benefit Cost Analysis Expert

Public Service Enterprise Group (PSE&G) – New Jersey (October 2021 – April 2023)

- Consulted on forecasting and management of PSE&G's internally run commercial Engineered Solutions and Direct Install programs.
- Assisted with rollout of tracking system for PSE&G DSM portfolio.
- Provided assistance with calculation of six economic tests for PSE&G's energy efficiency and conservation portfolio, including development of calculation engine and launch as a subcontractor to ANB Enterprises.

Development and Regulatory Support for DSM Portfolio

Columbia Gas of Pennsylvania - Pittsburgh, Pennsylvania (February 2022 – Present)

- Successfully developed, provided regulatory support for, and got approval of a three-year voluntary gas energy efficiency plan and provided supporting testimony under Docket No. P-2014-2459362.
- Ongoing assistance with the launch and implementation of the first three-year voluntary gas energy efficiency plan.

Development and Implementation of Energy Efficiency and Conservation Plans

UGI Utilities, Inc. – Pennsylvania (June 2015 – Present)

Assist UGI Utilities, Inc. and PNG with the development and approval of Energy Efficiency and Conservation (EE&C) Plans for their UGI Gas PNG Gas, and UGI Electric divisions, including:

- Ongoing evaluation and portfolio planning activities for both UGI Gas and UGI Electric energy efficiency portfolios.
- Developing an achievable efficiency scenarios for UGI Gas and PNG Gas.
- Designing a five-year, \$27 million energy efficiency and conservation plan for UGI Gas. Submitting direct testimony on behalf of UGI Gas, Inc. on the design and implementation of the proposed plan (Docket No. R-2015-2518438)
- Designing a five-year \$15 million energy efficiency and conservation plan for PNG Gas. Submitting direct testimony on behalf of PNG Gas, Inc. on the design and implementation of the proposed plan (Docket No. R-2016-2580030)
- Assisting with the design and implementation and reporting of the UGI Electric's voluntary EE programs. Designing and assisting with approval for a five-year \$7.2 million electric energy efficiency and conservation plan (Docket No. M-2018-3004144)

Strategic Planning and Implementation of DSM Portfolio

Philadelphia Gas Work's (PGW) - Philadelphia, Pennsylvania (August 2008 – Present)

- Assisting with ongoing program planning and implementation of both the Low-Income Usage Reduction Plan (LIURP) and the market-rate DSM portfolio.

- Provided supporting testimony and analysis for the Phase III market-rate DSM plan under Docket No. P-2014-2459362.
- Designed Phase II plan with PGW and submitted direct testimony supporting the plan on behalf of PGW (Docket No. P-2014-2459362)
- Member of lead consulting team that aided in the design and approval of PGW's five-year, \$54 million portfolio of DSM programs;
- Providing ongoing technical assistance in the development of PGW's \$35 million Phase II five year plan.
- Providing ongoing technical support in program design and implementation, including the roll-out of six programs that, combined since inception, have saved 120,000 MMBtus at a cost of approximately \$17 million;
- Developed specifications for and currently collaborating with internal PGW staff on database system to track weatherization projects, rebate applications, and other information pertaining to PGW's DSM portfolio;
- Developed multiple Excel-based tools used by contractors to perform field audits, provide QA/QC, and track ongoing progress for contractors, programs, and the portfolio as a whole;
- Provided research and analysis support for multiple rounds of expert testimony before the Pennsylvania Public Utility Commission (Docket R-2009—2149884);
- Aided in the issuance of RFPs and selection of candidates for over \$40 million in contracts;
- Major contributor to PGW's ongoing formal reporting and evaluation process, including the issuance of five implementation plans, three annual reports, and two impact evaluations.

DSM Potential Studies in New York, New Jersey, and Pennsylvania

Optimal Energy, Inc. - Vermont

(December 2018 – December 2019)

- Assisted Optimal Energy, Inc. with the development of measure assumptions and characterizations for statewide, electric and gas DSM potential studies.

Natural Gas Efficiency Options and EE&C Plan for Peoples Natural Gas

Peoples Natural Gas, Inc. – Pennsylvania

(September 2017 – February 2019)

- Prepared report on program, sector, and portfolio-level cost and savings for 29 natural gas administrators in 11 States, and provided recommendations for potential natural gas DSM opportunities for Peoples Natural Gas
- Assist with stakeholder review process
- Developed five year \$42 million Energy Efficiency and Conservation (EE&C) Plan, and provided testimony to support the adoption of the Plan (ongoing).

Research on Leading Energy Efficiency Portfolios

Green Energy Economics Group - Vermont

(November 2007 – Present)

- Maintain research and proprietary analysis on actual and projected results from over a dozen electric and natural gas demand side management (DSM) portfolios throughout North America;

Analytic and Technical Support for DSM Tracking Systems

PECO Energy Company – Pennsylvania (September 2016 – December 2017)

Commonwealth Edison Company – Illinois (August 2017 – August 2018)

Companywide (September 2020 – present)

- Subcontractor to ANB Systems Inc. to provide domain expertise and analytic support to rollout of enhanced tracking system.
- Developed dashboards and internal reports used by PECO's EM&V team, business planning, and various program and portfolio managers.
- Guided automation of PECO's six-month and annual reporting process.
- Provided expert guidance on the development of cost effectiveness calculation modules for clients in Pennsylvania and New Jersey
- Oversaw project development of audit tool for ComEd's Carbon Free School Assessment Program.

Technical Assistance for Energy Efficiency Program Planning

Green Mountain Power - Vermont

(August 2012 – July 2017)

- Developed multivariable regression model and framework to estimate the cost per kW to address a reliability gap in the St. Albans region with targeted energy efficiency.
- Reviewed and analyzed program proposals for the \$20 million Community Energy & Efficiency Development Fund (CEED Fund), including the development of scoring and rebalancing mechanisms;
- Analyzed dataset of 5,000 custom business projects to establish models used for future planning exercises.
- Prepared report on uncounted benefits of renewable generation sources for Vermont.

Analysis of Energy Efficiency in British Columbia

BC Sustainable Energy Association & Sierra Club BC, British Columbia (May 2011 – June 2014)

- Provided comments and energy efficiency opportunities report for proceedings on FortisBC Gas and Electric's long-term DSM plans in December of 2013.
- Assisted on research for direct testimony on reasonableness of gas DSM Plan by Fortis Energy Utilities before the British Columbia Utilities Commission, BCUC Project No. 3698627;
- Technical support on assessment of FortisBC Electric's long-term DSM plan and corresponding expert testimony;
- Assistance with direct testimony and technical support on assessment of BC Hydro's long-term DSM plan, before the BCUC.

Energy Efficiency Potential in Oklahoma

Sierra Club, Oklahoma (April 2011 – November 2011, December 2013 – January 2014)

- Provided updated report for energy efficiency in Oklahoma and additional comments on PUC rulemaking for electric and gas utility programs.
- Preparation of report on energy efficiency potential for Oklahoma;
- Assistance with research and drafting comments on the US regional haze Federal Implementation Plan for the State of Oklahoma;

- Research and formulation of energy efficiency potential projections provided as part of expert testimony for Oklahoma Gas & Electric's rate case before the Corporation Commission of Oklahoma, Cause No. PUD 201100087.

Technical Assistance for Energy Efficiency Programs

Focus on Energy - *Wisconsin*

(June 2011 – August 2013)

- Developed and customized cost-effectiveness calculators for Wisconsin's Focus on Energy portfolio of energy efficiency programs;
- Trained staff and other consultants on usage of tools and general economic analysis of energy efficiency programs;
- Provided QA/QC on cost-effectiveness analysis of 14 programs spending over \$160 million in two years.

Chicagoland Energy Efficiency Portfolio

People's Gas - *Chicago, Illinois*

(September 2008 – January 2013)

- Providing ongoing regulatory support;
- Provided cost-benefit analysis of various program scenarios and aided in the analysis of contractor bids;
- Customized excel-based portfolio and project cost-effectiveness tools to client's specifications.

Testimony Support for Expanding Gas Energy Efficiency in Pennsylvania

Citizens for Pennsylvania's Future, *Pennsylvania*

(July 2013 – September 2013)

- Provided support on preparation of testimony regarding Peoples Gas of Pennsylvania's DSM plans, including preparation of benchmarking report and alternative scenario projections.

Energy Efficiency Potential in Texas

Sierra Club, *Texas*

(May 2012 – August 2012)

- Research and development of alternative energy efficiency potential scenarios for the ten investor owned utilities (IOUs) in Texas;
- Development of comments for the Public Utility Commission of Texas;
- Development of presentation before the Energy Efficiency Incentive Program Committee.

Austin Energy's Energy Efficiency Potential

Austin City Council Consumer Advocate, *Austin, Texas*

(April 2012)

- Research and development of alternative energy efficiency potential scenarios for Austin Energy.

Nevada Power's Energy Efficiency Potential

Sierra Club, *Nevada*

(November 2011 – June 2012)

- Research on Nevada Power's Integrated Resource Plan (IRP) and development of alternative energy efficiency potential projections.

Comments on EmPower Maryland Programs

Sierra Club, *Maryland*

(September 2011 – October 2011)

- Research for and development of comments on EmPower Maryland's energy efficiency programs, including the development of alternative energy efficiency potential projections.

Ontario Power Authority Field Audit Support Tool

Green Communities Canada - *Ontario, Canada*

(January 2011 – May 2011)

- Collected and implemented specifications for updating the tool used by Ontario Power Authority's low-income program field agents to collect data and determine project net present values;
- Added custom features including customer input forms, saving and closing routines, and database file importing.

Energy Efficiency Potential in Arkansas

Sierra Club/Audubon Society, *Arkansas*

(September 2009 – March 2010)

- Research and drafting assistance for expert testimony on energy efficiency' as an alternative to the White Bluff Steam Electric Station before the Public Service Commission of Arkansas, Docket No. 09-024-U.

Training for NGOs Working on Energy Efficiency Projects in China

ISC and NRDC – *United States and China*

(August 2008 – September 2010)

- Developed training materials and provided remote and in-person training sessions on the economic and financial analysis of industrial retrofit projects for structuring and negotiating financial incentive offers to customers;
 - o Worked with the Institute for Sustainable Communities (ISC) to aid its efforts to promote energy efficiency in the Guangdong and Jiangsu Provinces (February 2009 – September 2010);
 - o Worked with the National Resource Defense Council (NRDC) to aid in its efforts in China, especially in conjunction with a \$100 million revolving loan fund from the Asia Development Bank (August 2008- January 2009).

Incentive Calculations for the Project Cost-effectiveness Analysis Tool (CAT)

Efficiency Vermont – *Burlington, Vermont*

(November 2008 – June 2010)

- Aided in the design of a new approach to calculating incentives for custom energy efficiency projects based on financing and reaching a desired rate of return;
- Modified CAT's cash-flow projection engine, an Excel VBA system, to accommodate the new approach to incentives.

Vermont's 20-year Forecast of Electricity Savings from Sustained Investment

Efficiency Vermont – *Burlington, Vermont*

(December 2008 – October 2009)

- Provided components of final report relating to long-term trends for the environment (climate change, land-use, and water-use), population growth, and governmental regulation;

- Provided additional technical support on electric demand-side savings potential.

Connecticut's Long Term Acquisition Plan

Connecticut Office of the Consumer Council – Connecticut (August – October 2008)

- Provided research and support for expert testimony regarding long-range energy-efficiency procurement plan of the Energy Conservation Management Board, on behalf of the Connecticut Office of Consumer Counsel.

Energy Efficiency Plans of BC Hydro and Terasen Gas

BC Sustainable Energy Association and

The Sierra Club - British Columbia, Canada

(October 2008 – March 2009)

- Provided research and support for expert testimony and technical support on assessment of BC Hydro's long-term DSM plan, before the BCUC, on behalf of the BC Sustainable Energy Association and Sierra Club Canada (November 2008 – March 2009);
- Provided research and support for expert testimony on assessment of Terasen Gas conservation plans before the BCUC, on behalf of the BC Sustainable Energy Association and Sierra Club Canada (October 2008).

Testimony and Proceeding Participation

Forum	On Behalf Of	Docket/Matter	Date	Issues Addressed
California Public Utility Commission	Small Business Utility Advocates	R. 22-02-005. Application of Pacific Gas and Electric Company for Approval of 2024-2031 Energy Efficiency Business Plan and 2024-2027 Portfolio Plan (U 39 M) and associated Matters.	October-22	Issues related to 3-year Energy Efficiency Business Plan
California Public Utility Commission	Small Business Utility Advocates	R. 22-02-005. Application of Pacific Gas and Electric Company for Approval of 2024-2031 Energy Efficiency Business Plan and 2024-2027 Portfolio Plan (U 39 M) and associated Matters.	September-22	Comments on the phase out of gas incentives.
Nova Scotia Utility and Review Board	The Consumer Advocate of Nova Scotia	Matter No. M10473 An Application by EfficiencyOne for Approval of a 2023 – 2025 Demand Side Management ("DSM") Resource Plan	May-22	Historical performance of portfolio, proposed scenarios, affordability, addressing underserved communities, program design, and avoided costs.

Forum	On Behalf Of	Docket/Matter	Date	Issues Addressed
Pennsylvania Public Utility Commission	UGI Utilites Inc. - Electric Division	Docket No.M-2023-____ . Petition of UGI Utilities, Inc. – Electric Division for Approval of Phase IV of its Energy Efficiency and Conservation Plan	September-23	Energy efficiency plan proposal, including projections for costs, savings, and cost-effectiveness.
Pennsylvania Public Utility Commission	Columbia Gas of Pennsylvania	Docket No. R-2022-3031211. Columbia Gas of Pennsylvania, Inc. 2022 Rate Case Proceeding	March-22	Three-year energy efficiency plan proposal, including projections for costs, savings, and cost-effectiveness.
Ontario Energy Board	Small Business utility Alliance	EB-2021-0002. Enbridge Gas Inc. – Multi Year Demand Side Management Plan (2022 – 2027)	December-21	Analysis of commercial program goals and program design
California Public Utility Commission	Small Business Utility Advocates	R. 21-02-014. Rulemaking to Address Energy Utility Customer Bill Debt Accumulated During the COVID-19 Pandemic.	April-21	Report on Analysis of Small Business Utility Bill Arrearages in California during COVID-19
Pennsylvania Public Utility Commission	Philadelphia Gas Works	P-2014-2459362, Petition of Philadelphia Gas Works for Approval of Demand-Side Management Plan for FY 2016-2020	October-20	Historical performance of PGW’s DSM Phase II Plan and modifications to program design.
California Public Utility Commission	Small Business Utility Advocates	R. 20-08-022 to Investigate and Design Clean Energy Financing Options for Electricity and Natural Gas Customers	July-20	Comments to address options for small business customer
Nova Scotia Utility and Review Board	The Consumer Advocate of Nova Scotia	Matter No. M09096, Efficiency 1 (E1) Application for Approval of 2020 – 2022 Demand Side Management (DSM) Resource Plan	May-19	DSM Investment Levels and Affordability, Usage of Unspent Ratepayer Funding, Rate and Bill Impacts, Target Setting.
Pennsylvania Public Utility Commission	UGI Gas Utilities Inc. – Gas Division	R-2018-3006814, UGI Gas Utilities Inc. – Gas Division, Rate Case	January-19	Energy Efficiency & Conservation Plan and Total Resource Cost Implementation.
Pennsylvania Public Utility Commission	UGI Utilities, Inc. – Electric Division	M-2018-3004144, Petition of UGI Utilities, Inc. – Electric Division for Approval of Phase III of Its Energy Efficiency and Conservation Plan	August-18	Electric energy efficiency and conservation plan development, projections, implementation, and EM&V.

Forum	On Behalf Of	Docket/Matter	Date	Issues Addressed
Pennsylvania Public Utility Commission	Peoples Natural Gas Company	M-2017-2640306, Petition of Peoples Natural Gas Company LLC for Approval of its Energy Efficiency and Conservation Plan	January-18	Energy efficiency study, energy efficiency & conservation plan, and total resource cost implementation.
Pennsylvania Public Utility Commission	UGI Penn Natural Gas, Inc	P-2016-2580030, UGI Penn Natural Gas, Inc. Rate Case	January-17	Energy efficiency & conservation plan and total resource cost implementation.
Pennsylvania Public Utility Commission	UGI Utilities, Inc.	P-2015-2518438, UGI Utilities, Inc.- Gas Division Rate Case	January-16	Energy efficiency & conservation plan and total resource cost implementation.
Pennsylvania Public Utility Commission	Philadelphia Gas Works	P-2014-2459362, Philadelphia Gas Works Demand-Side Management Plan for FY 2016-2021	May-15	Analysis of Phase I DSM Plan and design of Phase II DSM Plan.

Publications

Love, Theodore. J. Nunley. "Using Smart Thermostats to Engage Residential Customers and Drive Comprehensive Retrofit Projects" In *Proceedings of the ACEEE 2020 Summer Study on Energy Efficiency in Buildings*, Washington, D.C.: American Council for an Energy Efficient Economy.

Love, Theodore. "The Future for Residential Gas Efficiency is Combined". *Strategies*. Association of Energy Service Professionals. January 11, 2019.

Love, Theodore. "Using Open Data to Predict Energy Usage: What tax lot data can tell us about energy usage intensity in New York City". *Behavior Energy, and Climate Change Conference 2015*. Sacramento, CA

Plunkett, John, Theodore Love, Francis Wyatt. "An Empirical Model for Predicting Electric Energy Efficiency Acquisition Costs in North America: Analysis and Application". In *Proceedings of the ACEEE 2012 Summer Study on Energy Efficiency in Buildings*, #906, Washington, D.C.: American Council for an Energy Efficient Economy.

Gold, Elliott, Marie-Claire Munnely, Theodore Love, John Plunkett, Francis Wyatt. "Comprehensive and Cost-Effective: A Natural Gas Utility's Approach to Deep Natural Gas Retrofits for Low Income Customers." In *Proceedings of the ACEEE 2012 Summer*

Study on Energy Efficiency in Buildings, #442, Washington, D.C.: American Council for an Energy Efficient Economy.

Education

Clark University – Worcester, MA

B.A. Magna cum Laude, *Mathematics and Computer Science*, 2006.

Study Abroad Program, Spring Semester 2005 (Kansai Gaidai University: Osaka Japan)

General Assembly: New York City, NY

Data Science Intensive Course, 2015

VERIFICATION

I, Theodore M. Love, hereby state that: (1) I am a partner at Green Energy Economics Group, Inc.; (2) I have been retained by Philadelphia Gas Works (“PGW”) for purposes of this proceeding.; (3) the facts set forth in my testimony are true and correct to the best of my knowledge, information and belief; and (4) 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).

September 27, 2023

Dated _____



Theodore M. Love

Green Energy Economics Group, Inc.

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Petition of Philadelphia Gas Works for :
Approval of Demand-Side :
Management Plan for FY 2024-2026 : Docket No. P-2014-2459362
:
Philadelphia Gas Works Universal :
Service and Energy Conservation Plan :
for 2014-2016 52 Pa Code § 62.4 – :
Request for Waivers :

REBUTTAL TESTIMONY

OF

DENISE ADAMUCCI

On Behalf of

Philadelphia Gas Works

Topics Addressed:

**Response to OCA witness Geoffrey Crandall
Response to OSBA witness Angela Vitulli
Response to CAUSE-PA Witness Jim Grevatt**

December 14, 2023

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Table of Exhibits

Exhibit	Description
DA-2	CAUSE-PA Responses to PGW Set I, Nos. 1-5, 9, and 13

1 **I. INTRODUCTION**

2 **Q. PLEASE STATE YOUR NAME AND POSITION FOR THE RECORD**

3 A. My name is Denise Adamucci and I am Senior Vice President for Customer and
4 Regulatory Affairs at Philadelphia Gas Works (“PGW” or “Company”).

5 **Q. HAVE YOU PREVIOUSLY PROVIDED TESTIMONY IN THIS PROCEEDING**
6 **ON BEHALF OF PGW?**

7 A. Yes, I prepared written Direct Testimony (PGW St. No. 1) which was served on
8 September 27, 2023. The purpose of my Direct Testimony was to provide background
9 regarding PGW’s Demand Side Management (“DSM”) programs, explain why PGW has
10 elected to continue the Company’s voluntary DSM efforts, and explain the proposed
11 modifications to the programs, the length of the plan and the approval process for any
12 future DSM plans.

13 **Q. DID OTHER WITNESSES PRESENT DIRECT TESTIMONY ON BEHALF OF**
14 **PGW?**

15 A. Yes, the written Direct Testimony of Theodore M. Love (PGW St. No. 2) was also
16 presented in support of PGW and served on September 27, 2023.

17 **Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?**

18 A. The purpose of my rebuttal testimony is to respond to the Direct Testimonies of Geoffrey
19 Crandall submitted on behalf of the Office of Consumer Advocate (“OCA”); Angela
20 Vitulli submitted on behalf of the Office of Small Business Advocate (“OSBA”); and Jim
21 Grevatt submitted on behalf of the Coalition for Affordable Utility Services and Energy
22 Efficiency in Pennsylvania (“CAUSE-PA”).

1 **Q. ARE YOU SPONSORING ANY EXHIBITS?**

2 A. Yes, I am sponsoring PGW Exhibit DA-2, which includes selected discovery responses
3 provided by CAUSE-PA in response to PGW's Set I interrogatories.

4 **Q. ARE ANY OTHER PGW WITNESSES PROVIDING REBUTTAL TESTIMONY?**

5 A. Yes. Theodore M. Love will be responding to OCA witness Crandall regarding his
6 federal funding recommendation, OSBA witness Vitulli regarding the inclusion of
7 emerging technologies in the DSM plan, small business participation and administrative
8 costs, and CAUSE-PA witness Grevatt regarding insulation retrofits and rebates (PGW
9 St. No. 2-R). Additionally, PGW witness Michel Farag will be responding to OSBA
10 witness Vitulli regarding VRF natural gas heat pumps (PGW St. No. 3-R).

11 **II. RESPONSE TO OCA WITNESS GEOFFREY CRANDALL**

12 **Q. PLEASE SUMMARIZE OCA WITNESS CRANDALL'S RECOMMENDATIONS**
13 **REGARDING THE PROPOSED DSM PLAN.**

14 A. Mr. Crandall testified that, overall, the DSM programs are reasonable, cost effective, and
15 provide access to a broad range of customers.¹ He recommended that the plan be
16 approved with certain modifications, including that PGW: (1) resubmit budget
17 information to provide more detailed information;² (2) seek federal funding to leverage
18 and improve the effectiveness of the DSM programs, report annually on these efforts and
19 perform outreach to educate customers about other rebate opportunities;³ and (3)
20 implement the plan as a three-year plan (as opposed to the proposed five-year plan), and

¹ OCA St. 1 at 4.

² OCA St. 1 at 6-9.

³ OCA St. 1 at 9-11.

1 provide for annual performance reporting, stakeholder input, and monitoring of any
2 circumstances that would require plan modifications.⁴

3 **Q. IS PGW WILLING TO PROVIDE ADDITIONAL BUDGETARY**
4 **INFORMATION AS MR. CRANDALL REQUESTED?**

5 A. Yes, PGW is willing to provide additional budgetary information as requested with the
6 compliance filing to be submitted after PUC approval of the Phase IV Plan.

7 **Q. PLEASE RESPOND TO MR. CRANDALL'S RECOMMENDATION THAT PGW**
8 **SEEK FEDERAL FUNDING TO ENHANCE ITS DSM PROGRAM.**

9 A. PGW does not necessarily oppose seeking available and relevant federal funding to
10 advance its DSM programs. However, as discussed in Mr. Love's rebuttal testimony,⁵
11 PGW's understanding is that the funding referenced by Mr. Crandall will be administered
12 by the states, and there is currently significant uncertainty about exactly how and when
13 these funds will be spent and whether it will be applicable to PGW's program. Given this
14 uncertainty, I do not believe it is appropriate for PGW to be *required* by the PUC to seek
15 such funding and report annually on its efforts as Mr. Crandall recommends. But PGW
16 will certainly consider seeking such funding as any applicable opportunities become
17 available.

18 **Q. SIMILARLY, DO YOU AGREE THAT PGW SHOULD BE REQUIRED TO**
19 **PROMOTE REBATE OPPORTUNITIES OR OTHER AVAILABLE FEDERAL**
20 **FUNDING TO ITS CUSTOMERS?**

21 A. Again, I do not necessarily oppose sharing relevant rebate opportunities (that exist
22 separately from PGW's DSM program) with PGW's customers to help decrease their
23 natural gas usage, but I do not believe PGW should be *required* to do so given the

⁴ OCA St. 1 at 12-15.

⁵ PGW St. No. 2-R at 2.

1 uncertainty about the funding at this time, as well as the fact that these are not PGW or
2 regulated utility programs. Further, I would note that some of the programs Mr. Crandall
3 referenced (such as the High-Efficiency Electric Home Rebate Act (“HEEHRA”)) are
4 focused specifically on electrification projects. PGW’s DSM program is focused on
5 helping natural gas customers reduce natural gas usage, not on promoting electrification
6 or fuel switching. As such, I do not agree that PGW should be required to promote
7 electrification projects and funding to its customers.

8 **Q. DO YOU AGREE WITH MR. CRANDALL THAT THE PLAN SHOULD ONLY**
9 **BE IN PLACE FOR THREE YEARS, AS OPPOSED TO A FIVE-YEAR PLAN AS**
10 **PGW HAS PROPOSED?**

11 A. No, I do not. As I explained in my direct testimony, I believe it will be more cost
12 effective and provide greater consistency for customers for the plan to be in place for the
13 five-year period of FY25-FY29 as PGW has proposed.⁶ It will also be a more efficient
14 use of PUC resources, as the plan will not need to be relitigated unnecessarily. During the
15 plan term, PGW will continue to monitor whether any changes to the plan are necessary
16 and will make any such proposals at the appropriate time. The parties will also have the
17 same opportunity, as PGW files annual reports on the plan’s progress and results.

18 Regardless of the length of the plan, the plan’s term should not start with FY24 as
19 Mr. Crandall states,⁷ since PGW’s FY24 started September 1, 2023 and will have ended
20 or be nearly over by the time a final PUC order is issued in this proceeding.⁸ Rather, the

⁶ PGW St. No. 1 at 12.

⁷ OCA St. 1 at 13.

⁸ PGW’s FY24 began on September 1, 2023 and ends August 31, 2024. FY25 begins on September 1, 2024.
See PGW St. No. 1 at 12.

1 plan term should start with FY25, regardless of the plan term that is ultimately approved,
 2 as long as the plan is approved by this time.

3 **Q. PLEASE RESPOND TO MR. CRANDALL’S RECOMMENDATIONS**
 4 **REGARDING REPORTING REQUIREMENTS AND OPPORTUNITIES FOR**
 5 **STAKEHOLDER INPUT.**

6 A. PGW currently submits annual reports on the DSM programs – which are filed with the
 7 Commission and served on the parties – and will continue to do so. PGW has not
 8 received any feedback from the parties on these annual reports in approximately 12 years,
 9 since PGW began filing such annual reports in 2011. The Company remains willing to
 10 consider any comments the parties may have in the future.

11 Additionally, prior to filing the Phase IV Plan, PGW held a collaborative meeting
 12 with the parties but did not receive any substantive comments at that time or after
 13 subsequently following up with the parties.⁹ The Company is similarly willing to hold a
 14 collaborative meeting prior to filing a new plan. However, I do not agree that PGW
 15 should be required to hold additional stakeholder meetings, particularly given the lack of
 16 any substantive comments from the parties in previous meetings.

17 **III. RESPONSE TO OSBA WITNESS ANGELA VITULLI**

18 **Q. PLEASE SUMMARIZE OSBA WITNESS VITULLI’S TESTIMONY**
 19 **REGARDING THE PROPOSED DSM PLAN.**

20 A. Ms. Vitulli recognized that the proposed Phase IV plan is cost effective and that small
 21 businesses can benefit from both the Commercial Equipment Rebates (“CER”) and Small
 22 Business Assessments (“SBA”) programs.¹⁰ However, she testified that the proposed

⁹ PGW St. No. 1 at 4.

¹⁰ OSBA St. No. 1 at 6-8.

1 rebates for natural gas boilers and furnaces for new commercial construction, as well as
 2 for natural gas heat pumps, should be rejected. Additionally, she argued that the
 3 Commission should require PGW to cap its administrative spending for the DSM
 4 programs, and require the Company to provide specific reporting on plan implementation
 5 related to small business customers.

6 **Q. WHY DOES MS. VITULLI BELIEVE THAT PGW’S PROPOSED REBATES**
 7 **FOR NATURAL GAS BOILERS AND FURNACES FOR NEW COMMERCIAL**
 8 **CONSTRUCTION SHOULD BE REJECTED?**

9 A. Ms. Vitulli advocates that “[t]he future of natural gas as a fuel to heat residential and
 10 commercial buildings is highly uncertain.”¹¹ She describes how some states and cities
 11 have adopted electrification requirements for new construction, climate legislation and
 12 decarbonization policies, and even gas hookup bans.¹² She alleges that gas utilities may
 13 attempt to “lock-in existing customers by subsidizing new gas heating equipment, as
 14 heating equipment typically lasts fifteen years or more.”¹³ She implies that PGW is
 15 doing something nefarious by offering these programs, apparently – in her mind – by
 16 seeking to force customers to stay on natural gas for the life of these appliances.¹⁴ In
 17 particular, she asserts that anything encouraging natural gas heating hurts small
 18 businesses, as well as building owners and the entire City of Philadelphia.¹⁵ For these
 19 reasons, she believes that PGW should not continue offering rebates for natural gas
 20 boilers and furnaces for new construction.¹⁶

¹¹ OSBA St. No. 1 at 4.

¹² OSBA St. No. 1 at 4-5.

¹³ OSBA St. No. 1 at 5.

¹⁴ OSBA St. No. 1 at 5.

¹⁵ OSBA St. No. 1 at 20.

¹⁶ OSBA St. No. 1 at 19-20.

1 **Q. HOW DO YOU RESPOND?**

2 A. I strongly disagree. First, the purpose of the DSM program is to help PGW's *natural gas*
3 customers conserve energy and reduce their *natural gas* bills. The purpose is not to
4 encourage electrification or the phasing out of natural gas heating or other uses. As will
5 be discussed further below, if OSBA seeks to achieve these results, it should instead
6 pursue legislation or other broad Pennsylvania policy changes to this effect. I am advised
7 by counsel that there is no basis for Ms. Vitulli's argument in the Public Utility Code,
8 PUC regulations, or other Pennsylvania statutes, and she has pointed to none.

9 Ms. Vitulli also states that the model building energy code is slated to move
10 toward an all-electric code for new construction, and that the code will be net zero by
11 2031.¹⁷ First, a potential model code change that would happen in approximately seven
12 years is much too far in the future and too uncertain to support significant changes to the
13 DSM program at this time. Further, it is entirely speculative whether Philadelphia or
14 Pennsylvania would adopt this model code, and even if it was adopted, it is unknown
15 when such a change may take effect. And importantly, "net zero" does not necessarily
16 exclude the use of natural gas altogether.

17 OSBA also ignores the fact that customers do not have to choose natural gas
18 equipment. A customer can choose to install electric equipment if they wish to do so, and
19 presumably their EDC offers an Act 129 program encouraging the installation of efficient
20 electric equipment. Customers have the ability to determine whether to install electric or
21 natural gas equipment in their home/property; if they choose natural gas, PGW's DSM
22 provides incentives to install a high efficiency model with the help of a rebate. Instead of

¹⁷ OSBA St. No. 1 at 19.

1 allowing the customer to choose between electric and natural gas equipment, OSBA is
 2 effectively asking the Commission to make this choice on the customer's behalf and push
 3 the customer to electric equipment. I am not aware of any statutory provision or other
 4 policy that would require or even enable the PUC to push electrification in this way.

5 I also strongly object to any implication that PGW has ill intent in offering rebates
 6 to customers through its DSM programs. These programs have been approved by the
 7 Commission as being in the public interest and have been in place since 2011. The
 8 purpose of these programs is to help customers to install efficient equipment, thus
 9 reducing their natural gas usage and their bills, and the idea that PGW is using these
 10 programs to "lock-in" gas customers to their detriment is simply wrong. OSBA's
 11 proposal has nothing to do with the interests and protection of customers.

12 **Q. MS. VITULLI PROPOSES THAT ADMINISTRATIVE COSTS BE CAPPED AT**
 13 **41% OF INCENTIVE SPENDING.¹⁸ HOW DO YOU RESPOND?**

14 A. I disagree with this proposal. My direct testimony explained that the overall DSM
 15 program is fairly small, resulting in administrative costs being higher as a percentage of
 16 total program costs since there are not the efficiencies that may exist in a larger program;
 17 however, the administrative costs are still reasonable.¹⁹ As discussed in Mr. Love's
 18 direct testimony, PGW's proposed level of administrative costs is well within the range
 19 of Act 129 programs implemented by EDCs in Pennsylvania.²⁰

20 Additionally, Ms. Vitulli's proposed cap on administrative costs on a percentage
 21 basis is not workable here. OSBA's proposed 41% cap is based on the ratio from the

¹⁸ OSBA St. No. 2 at 12-14.

¹⁹ PGW St. No. 1 at 4-5.

²⁰ PGW St. No. 2 at 17.

1 existing Phase III plan, not the proposed Phase IV plan, so this proposal is based on an
 2 outdated standard. Further, given that Ms. Vitulli wants PGW to increase small business
 3 participation (as does PGW), the Company will require the necessary funding to increase
 4 its marketing and other efforts to encourage greater participation. In addition to
 5 implementing the new Small Business Assessments (“SBA”) program, PGW also expects
 6 significant startup costs in the first year of the new phase related to the launch of the ESK
 7 program. OSBA’s proposed cap on administrative costs is neither necessary nor
 8 practicable and must be rejected.

9 **Q. MS. VITULLI CRITICIZES THE LEVEL OF SMALL BUSINESS**
 10 **PARTICIPATION IN PGW’S DSM PROGRAMS.²¹ HOW DO YOU RESPOND?**

11 A. As Mr. Love explains, PGW’s proposals for the Phase IV plan – including adding the
 12 SBA program and providing for additional direct marketing to customers – are intended
 13 to address the barriers to small business participation and work to increase small business
 14 participation.²²

15 **Q. DOES MS. VITULLI RECOMMEND ANY CONCRETE STEPS TO INCREASE**
 16 **SMALL BUSINESS PARTICIPATION?**

17 A. No, she does not. If she has specific proposals for what additional steps PGW could take,
 18 we would be willing to consider them. In addition, I note that efforts by OSBA to engage
 19 small business customers regarding these programs may be beneficial in increasing their
 20 participation. I would strongly encourage OSBA to help promote these programs and
 21 their benefits to small business customers. PGW would welcome the opportunity to work

²¹ OSBA St. No. 1 at 8-12.

²² PGW St. No. 2-R at 3-4.

1 with OSBA on outreach opportunities, and we believe OSBA's support would be
2 meaningful to help increase small business participation.

3 **Q. WHAT REPORTING REQUIREMENTS DOES MS. VITULLI RECOMMEND**
4 **REGARDING SMALL BUSINESS PARTICIPATION?**

5 A. Ms. Vitulli argues that PGW should be required to submit specific annual reporting on
6 small business participation in the SBA and CER programs, including the number of
7 participants, annual savings, incentive payments, customer costs and TRC costs/benefits.
8 She also states that PGW should report on the split between small businesses and other
9 customers when reporting GS-commercial activity. Additionally, Ms. Vitulli argues that
10 PGW should be required to report on marketing activities for the SBA and CER programs
11 on an annual basis.²³

12 **Q. HOW DO YOU RESPOND TO THE PROPOSED REPORTING**
13 **REQUIREMENTS?**

14 A. First, PGW already reports to the PUC and the interested parties (including OSBA)
15 annually on small business participation in the CER program. As part of the Phase IV
16 Plan, PGW proposed to continue this annual reporting through the term of the Phase IV
17 plan, with the addition of the SBA program.

18 To the extent Ms. Vitulli wants PGW to submit reports on a monthly basis
19 describing SBA and CER participation by small businesses, I do not agree with this
20 recommendation. Monthly reporting on small programs is overly burdensome on PGW;
21 rather, the annual reporting provided currently is sufficient.

²³ OSBA St. No. 1 at 9-12.

1 **IV. RESPONSE TO CAUSE-PA WITNESS JIM GREVATT**

2 **Q. PLEASE SUMMARIZE CAUSE-PA WITNESS JIM GREVATT’S TESTIMONY**
 3 **REGARDING THE PROPOSED PHASE IV DSM PLAN.**

4 A. Mr. Grevatt argues that PGW should: (1) stop providing all gas combustion equipment
 5 rebate measures and incentives by January 1, 2025; (2) revise its roof insulation measure
 6 budgets by allocating the gas combustion budgets to roof insulation and sealing to cover
 7 the full cost for installed measures in households with income below 200% of the Federal
 8 Poverty Level (“FPL”); (3) retire the Residential Construction Grants (“RCG”) program
 9 as of January 1, 2025; (4) reject the proposed Energy Sense Kits (“ESK”) program; and
 10 (5) continue the Smart Thermostat Marketplace and Low Income Smart Thermostat
 11 (“LIST”) programs.²⁴

12 **Q. WHAT INITIAL OBSERVATIONS DO YOU MAKE REGARDING MR.**
 13 **GREVATT’S TESTIMONY?**

14 A. I strongly disagree with vast majority of Mr. Gravatt’s recommendations. If accepted, his
 15 proposals would entirely change the structure of PGW’s DSM plan, shifting from
 16 providing rebates encouraging customers to install efficient natural gas equipment, to
 17 instead focus almost entirely on roof sealing and insulation and smart thermostats – home
 18 improvements meant to accommodate electrification it appears. Mr. Grevatt has
 19 provided no actual evidence in support of his arguments, let alone any applicable legal
 20 basis. Further, if CAUSE-PA wants the PUC to order PGW to phase out natural gas
 21 equipment in its service territory, they are in the wrong forum. CAUSE-PA should be
 22 seeking broader legislative and policy changes, not attempting to undermine PGW’s

²⁴ See CAUSE-PA St. 1 at 4-5.

1 voluntary DSM that provides meaningful benefits to the Company's customers (including
2 its low-income customers). As such, Mr. Grevatt's arguments should be wholly rejected.

3 **Q. AS BACKGROUND, IS PGW UNDER ANY OBLIGATION TO OFFER A DSM**
4 **PROGRAM?**

5 A. No. PGW's DSM program is offered on a voluntary basis. I am advised by counsel that
6 there is no legal basis on which the Commission could impose a mandatory obligation on
7 PGW to provide a DSM. I am further advised that there is no provision of the Public
8 Utility Code or the Commission's regulations that mandates such programs and the
9 Commission could only direct specific elements after a finding that such a program is
10 necessary to ameliorate unreasonable or inadequate service (required by Section 1501 of
11 the Public Utility Code) or rates (required by Section 1301 of the Public Utility Code)
12 being provided by PGW. No such allegations – let alone findings – have been made
13 regarding PGW's service that would support these proposed modifications to the
14 Company's voluntary DSM.

15 **Q. IS PGW REQUIRED TO OFFER PROGRAMS TARGETED AT LOW-INCOME**
16 **CUSTOMERS AS PART OF ITS DSM PROGRAM?**

17 A. No, it is not. Mr. Grevatt argues that PGW's DSM program must include targeted low-
18 income programming for customers that aren't served by PGW's Low Income Usage
19 Reduction Program ("LIURP"). He points to the requirements applicable to electric
20 utilities under Act 129 as the basis for this argument, including the requirement that
21 EDCs obtain 5.8% of total portfolio savings from customers whose income is at or below
22 150% of FPL.²⁵

²⁵ CAUSE-PA St. 1 at 6, 9-11.

1 First, it is undisputed that Act 129 does not apply to NGDCs. As such, I am
2 advised by counsel that the Act 129 requirements do not apply to PGW, and those
3 requirements cannot be used as a basis to claim that PGW's DSM must be revised or
4 rejected. Moreover, and to state the obvious, NGDCs and EDCs are two different types
5 of utilities with differing processes and operations. I am advised by counsel that the
6 Commission has very clearly outlined this position in the Act 129 Phase IV TRC Final
7 Order from December 19, 2019 stating that:

8 (T)here are several key distinctions between EDC EE&C plans and NGDC
9 EE&C plans. Most notably, there are no statutory requirements for
10 NGDCs to achieve specific savings targets.²⁶

11 In response to a discovery request, Mr. Grevatt acknowledged that there is no legal basis
12 for his argument, but rather that these statements were based on his own opinion rather
13 than any actual requirement or Pennsylvania policy.²⁷

14 Further, as explained in my direct testimony, PGW's LIURP is approved as part
15 of its USECP, and is no longer considered as part of the DSM proceeding.²⁸ Mr. Grevatt
16 faults PGW for "[n]ot including in its Plan weatherization services for customer just
17 above income eligibility for LIURP and for low-income customers that do not meet the
18 LIURP minimum usage threshold."²⁹ With this statement, Mr. Grevatt appears to
19 conflate PGW's DSM and LIURP programs. He also ignores the fact that in recent
20 months, the Commission has twice rejected CAUSE-PA's argument that PGW should be
21 required to create a special category to serve customers just above income eligibility for

²⁶ 2021 Total Resource Cost (TRC) Test, Docket No. M-2019-3006868, Final Order entered Dec. 19, 2019 at 10.

²⁷ PGW Exh. DA-2, CAUSE-PA Responses to PGW-I-3 and 13.

²⁸ PGW St. No. 1 at 5-7.

²⁹ CAUSE-PA St. 1 at 4.

1 LIURP.³⁰ LIURP is appropriately addressed (and recently was) in PGW’s USECP
 2 proceeding, not this DSM proceeding.

3 **Q. ALTHOUGH PGW IS NOT REQUIRED TO PROVIDE PROGRAMS**
 4 **TARGETED AT LOW-INCOME CUSTOMERS AS PART OF ITS DSM**
 5 **PROGRAM, DOES THE COMPANY IN FACT OFFER SUCH PROGRAMS?**

6 A. Yes, PGW does, in fact, offer programs targeted to low-income customers. First, I would
 7 note that the DSM program is open to all customers regardless of their income, including
 8 low-income customers. It is a program designed to provide an opportunity for
 9 participation by a broad range of customers.

10 More specifically, PGW’s proposed Phase IV plan includes a low-income rebate
 11 tier that provides higher incentives to low-income customers. It also continues to offer
 12 the free Low Income Smart Thermostat (“LIST”) program. These offerings are
 13 specifically targeted to low-income customers and originally were included in the
 14 program as a result of the settlement in PGW’s Phase III DSM proceeding (which was
 15 supported by CAUSE-PA). PGW has proposed to continue these offerings in the Phase
 16 IV plan.

17 Additionally, the proposed EnergySense Kit program would provide free
 18 measures that can be self-installed, and was developed for the purpose of helping low or
 19 moderate-income customers who may not qualify for LIURP or other programs.³¹
 20 Unfortunately, other than the LIST program, Mr. Grevatt opposes the DSM plan’s
 21 offerings that directly benefit low-income customers. He cannot (incorrectly) criticize

³⁰ *Pa. PUC v. Philadelphia Gas Works*, Docket No. R-2023-3037933, Opinion and Order entered Nov. 9, 2022, at 231 (“We also agree with the ALJs that it is not advisable to expand LIURP eligibility to customers in the 150% to 200% FPL range.”); *Philadelphia Gas Works Universal Service and Energy Conservation Plan for 2023-2027 Submitted in Compliance with 52 Pa. Code § 62.4*, Docket No. M-2021-3029323, Order entered Jan. 12, 2023, at 62.

³¹ *See* PGW St. No. 1 at 9.

1 PGW for not offering programs targeted to low-income customers, while also opposing
2 those same programs.

3 **Q. MR. GREVATT CRITICIZES PGW BECAUSE IT “HAS NOT ANALYZED**
4 **WHETHER HIGH EFFICIENCY ELECTRIC END USE OPTIONS, SUCH AS**
5 **HEAT PUMPS, WOULD BE FINANCIALLY ADVANTAGEOUS FOR**
6 **PARTICIPATING CUSTOMERS COMPARED TO CONTINUING TO USE**
7 **GAS.”³² HOW DO YOU RESPOND?**

8 A. As I previously stated, PGW’s DSM program is funded by the Company’s *natural gas*
9 ratepayers to help customers manage their *natural gas* usage. The program is not
10 intended to encourage fuel switching or otherwise determine whether customers should
11 install natural gas versus electric equipment. PGW is under no obligation to examine
12 electric options. Mr. Grevatt has pointed to no such requirement, and in response to
13 discovery requests, he acknowledged that no such requirement exists.³³

14 Mr. Grevatt ignores the fact that a customer can choose to install electric
15 equipment if they wish to do so, and can take advantage of EDC Act 129 programs
16 encouraging the installation of efficient electric equipment. Customers can choose for
17 themselves whether to install electric or natural gas equipment; if they choose natural gas,
18 PGW’s DSM provides incentives to install a high efficiency model with the help of a
19 rebate. CAUSE-PA should seek legislative change if they want the Commission to
20 mandate fuel switching as part of this type of program.

³² CAUSE-PA St. 1 at 3.

³³ PGW Exh. DA-2, CAUSE-PA Responses to PGW-I-1 and 2.

1 **A. Rebates for Natural Gas Combustion Equipment**

2 **Q. PLEASE DISCUSS MR. GREVATT’S RECOMMENDATION THAT PGW STOP**
 3 **PROVIDING ALL GAS COMBUSTION EQUIPMENT REBATE MEASURES**
 4 **AND INCENTIVES BY JANUARY 1, 2025.³⁴**

5 A. Mr. Grevatt argues that PGW should no longer offer gas combustion equipment rebates
 6 measures as of January 1, 2025. In support of this position, he claims that: (1) these
 7 rebates are no longer necessary as this equipment already has most of the market share;
 8 (2) the “trend” is toward electrification and electric heat pumps or heat pump water
 9 heaters are “better long run solutions” for low-income customers than staying on gas; and
 10 (3) low-income customers have other options for emergency furnace repair and
 11 replacements.

12 **Q. MR. GREVATT ARGUES THAT REBATES ARE NOT APPROPRIATE AS HE**
 13 **BELIEVES THE TREND IS TOWARD ELECTRIFICATION.³⁵ HOW DO YOU**
 14 **RESPOND?**

15 A. As discussed above, any alleged “trend” toward electrification is irrelevant to this
 16 voluntary DSM program. I am not aware of any legal requirement or applicable
 17 Pennsylvania or PUC policy requiring natural gas equipment and/or rebates to be phased
 18 out, or requiring PGW to shape its DSM program in a way that encourages, justifies,
 19 accommodates, and forces gas ratepayers to pay for electrification. Mr. Grevatt has
 20 offered no current Pennsylvania statutory mandate that would support requiring PGW
 21 ratepayers to subsidize longer term electrification or other low carbon strategies that
 22 could exist in the future; this is because there is currently none. This appears to be a
 23 Commonwealth legislative issue that Mr. Grevatt is trying to make into a Commission

³⁴ CAUSE-PA St. 1 at 17-18.

³⁵ CAUSE-PA St. 1 at 18.

1 issue. PGW's rebates operate within current law and policies in Pennsylvania and serve
2 to assist customers by incenting the purchase of higher efficiency gas equipment. Mr.
3 Grevatt does not seem concerned with customers and the financial burdens they are
4 facing. The high efficiency models that are made more affordable with EnergySense
5 rebates will significantly reduce carbon emissions compared with their standard
6 efficiency natural gas alternatives. PGW's DSM programs also make these high
7 efficiency options more accessible for low-income customers. Mr. Grevatt provides no
8 actual support for his position, and it therefore must be rejected.

9 **Q. PLEASE RESPOND TO MR. GREVATT'S ASSERTION THAT LOW-INCOME**
10 **CUSTOMERS HAVE OTHER FURNACE REPAIR AND REPLACEMENT**
11 **OPTIONS AVAILABLE.³⁶**

12 A. Mr. Grevatt states that low-income customers have emergency furnace repair and
13 replacement programs available, such as the LIHEAP Crisis Interface Program and the
14 "Heater Hotline" that can cover the full cost of low-income furnace replacement and that
15 require the installation of high efficiency furnaces. However, many low income
16 customers may not qualify for emergency heater repair or replacement programs if their
17 heaters are functional, regardless of the efficiency of the heater. Although these
18 customers may not qualify for emergency programs (which may or may not having
19 funding available even if they do qualify), they stand to benefit from PGW's DSM by
20 reducing their energy burden via the early retirement of old, inefficient, functional heaters
21 with the replacement of efficient heaters.

³⁶ CAUSE-PA St. 1 at 17-18.

1 When asked in discovery, Mr. Grevatt admitted that he was not aware of whether
2 there is a waitlist for these programs.³⁷ He further was not able to provide information on
3 how many low-income customers these programs are able to serve relative to the needs of
4 all low-income customers in PGW's service territory.³⁸ Thus, Mr. Grevatt is more
5 focused on achieving certain policy objectives through a non-legislative process, rather
6 than considering the practical realities of his recommendations and how those will affect
7 low-income PGW customers.

8 **Q. DO YOU HAVE ANY ADDITIONAL RESPONSE TO MR. GREVATT**
9 **REGARDING THE REBATES FOR GAS EQUIPMENT?**

10 **A.** I would add that, even accepting for argument's sake Mr. Grevatt's position that low-
11 income customers would be better off installing electric equipment (which I do not
12 accept), he fails to consider the practical implications of his position. In my experience,
13 many customers – and particularly low-income customers – replace their heating
14 equipment when the equipment breaks down, rather than planning out their heater
15 purchase. Many customers need to purchase heaters quickly, and may not be able to go
16 without heat in winter months while they wait for an electric heat pump to be installed
17 and the necessary upgrades to their electrical system to be completed.

18 This is without even considering a customer's ability to afford electric upgrades
19 and electric heating equipment, which can be quite costly. In response to a discovery
20 request, Mr. Grevatt admitted that he had not done any research on what capacity
21 electrical system is needed to operate an electric heat pump, what percentage of
22 Philadelphia homes have the necessary electrical capacity, or the average cost of

³⁷ PGW Exh. DA-2, CAUSE-PA Response to PGW-I-4.

³⁸ *Id.*

1 electrical upgrades that may be needed for an electric heat pump.³⁹ Again, Mr. Grevatt
2 fails to consider the practical implications of his recommendations for low-income
3 customers in Philadelphia.

4 PGW's DSM offers incentives for customers to install high efficiency gas
5 equipment if they choose to do so, thus providing an important benefit for customers that
6 should be continued.

7 **B. Roof Insulation and Sealing**

8 **Q. DID PGW PROPOSE TO ADD REBATES FOR ROOF INSULATION TO THE**
9 **RER PROGRAM?**

10 A. Yes. The Revised Phase IV Plan adds a roof insulation measure to the RER program.

11 **Q. DOES MR. GREVATT SUPPORT THE ROOF INSULATION PROPOSAL?**

12 A. Yes. However, he goes far beyond the Company's proposal and argues that PGW should
13 reallocate the funding for all gas combustion equipment rebates to be used for roof
14 insulation instead. He recommends that PGW significantly increase its targets for both
15 the roof insulation measures and the proposed air sealing bonus.⁴⁰

16 **Q. HOW DO YOU RESPOND?**

17 A. I do not agree. Mr. Grevatt's recommendation again disserves customers and does not
18 take into consideration the fact that many Philadelphians face significant barriers to
19 installing insulation and air sealing, and without alternative opportunities to save energy
20 via rebates on gas combustion equipment, these customers would have fewer options to
21 pursue energy efficiency if this recommendation were implemented. These potential
22 barriers to installing insulation and air sealing are detailed in Mr. Love's testimony.

³⁹ PGW Exh. DA-2, CAUSE-PA Response to PGW-I-5.

⁴⁰ CAUSE-PA St. 1 at 19.

1 **Q. WHAT ELSE DOES MR. GREVATT RECOMMEND REGARDING ROOF**
 2 **SEALING AND INSULATION?**

3 A. He argues that PGW should be directed to incorporate air sealing by default wherever
 4 feasible and to increase the proposed rebate. Further, roof insulation rebates without air
 5 sealing should only be provided when a qualified professional has determined that there
 6 is no risk of air leakage causing rot in structural components of the roof.⁴¹

7 **Q. DO YOU AGREE?**

8 A. No. Mr. Grevatt has not proposed any criteria that could be used for a qualified
 9 professional to make that determination. Also, Mr. Grevatt disregards the notion that air
 10 sealing may be cost prohibitive in Philadelphia rowhomes due to the confined space that
 11 exists between the top floor ceiling and the roof. In some homes, the lack of physical
 12 access to attic spaces may be a barrier to air sealing the attic plane. This is further
 13 detailed in Mr. Love’s testimony. PGW opines that this recommendation would be unfair
 14 to customers who live in homes with these conditions.

15 **Q. DOES MR. GREVATT HAVE SPECIFIC RECOMMENDATIONS FOR**
 16 **CUSTOMERS AT OR BELOW 200% OF FPL?**

17 A. Yes. He argues that PGW should be directed to focus on supporting participation by
 18 customers between 150% and 200% of FPL or low-income customers who do not meet
 19 the LIURP high usage threshold by providing rebates for more than the proposed 60% of
 20 installed costs of roof insulation and air seal. He recommends that instead of offering
 21 enhanced equipment rebates for customers at or below 150% of FPL, PGW should
 22 provide roof insulation and air sealing at no cost to customers at or below 200% of FPL.
 23 Additionally, he states that PGW should coordinate with the Basic Systems Repair

⁴¹ CAUSE-PA St. 1 at 19-20.

1 Program and Build to Last to combine with installation of new roof and home repairs
2 where needed.⁴²

3 **Q. HOW DO YOU RESPOND?**

4 A. Again, I disagree. The challenges with installing insulation and air sealing have been
5 detailed in my earlier testimony, and in the testimony of Mr. Love. Additionally,
6 identifying customers that are between 151-200% of FPL poses an administrative
7 challenge to PGW. The program currently determines customer eligibility for Affordable
8 EnergySense rebates based on their enrollment in PGW's Customer Responsibility
9 Program ("CRP") or if they have received LIHEAP or UESF funding in the past year.
10 Since all three of these programs are based on eligibility at 150% of FPL or below, and
11 up to 175% of FPL for USEF, it provides PGW a quick and straightforward method to
12 determine eligibility. PGW is not aware of a comparable eligibility qualification method
13 that could be used for customers in the 151-200% of FPL range.

14 **C. Other Programs**

15 **Q. WHAT DOES MR. GREVATT RECOMMEND REGARDING THE RCG**
16 **PROGRAM?**

17 A. Similar to the discussion above, Mr. Grevatt argues that the RCG program also should
18 not continue. He believes it is not beneficial to continue providing new construction
19 incentives for homes that use gas, as opposed to new construction that relies on electric.⁴³

20 **Q. WHAT IS YOUR RESPONSE?**

21 A. As I stated above, there are no Pennsylvania statutory requirements, PUC regulations or
22 orders that require electrification of new construction at this time. It is entirely

⁴² CAUSE-PA St. 1 at 20-22.

⁴³ CAUSE-PA St. 1 at 23-25.

1 speculative if or when such a requirement would apply to PGW. Unless or until such a
2 requirement is in place that will impact new construction activities in PGW's service
3 territory, ending RCG would be premature and inadvisable. There are still significant
4 opportunities for developers and builders in Philadelphia to exceed minimum code
5 requirements by pursuing energy efficient construction practices; as such, the RCG
6 program continues to provide valuable incentives for new construction projects to be built
7 more efficiently.

8 Further, Mr. Grevatt is essentially asking the PUC to incentivize electric
9 equipment over natural gas. As I previously stated, I am not aware of any statutory
10 provision or other policy that would require or even enable the PUC to prioritize
11 electrification in this way. This recommendation is baseless and must be rejected.

12 **Q. DOES MR. GREVATT SUPPORT THE PROPOSED ENERGYSENSE KITS**
13 **("ESK") PROGRAM?**

14 A. No, he does not. He reiterates that PGW should instead help customers who do not
15 qualify for LIURP by shifting funding from combustion equipment rebates to roof
16 insulation as described above.

17 **Q. DO YOU BELIEVE THAT THE ESK PROGRAM SHOULD BE APPROVED?**

18 A. Yes, I do. As discussed in my direct testimony, the proposed ESK program would
19 provide tangible benefits to all customers, but particularly to low- and moderate-income
20 customers who may not qualify for other programs. These kits are not tied to the
21 purchase of any appliance but rather provide simple, easy to install measures that can
22 provide meaningful reductions in usage for a broad range of customers.

23 In response to a discovery request, Mr. Grevatt stated that he does not believe
24 these measures "will themselves save an appreciable amount of energy for most

1 customers,” and that PGW’s estimates also show that the energy savings will not be
2 significant.⁴⁴ However, he ignores the fact that PGW has shown that this program will be
3 cost effective. Given that this program would particularly help the customer group that
4 Mr. Grevatt is concerned about, his opposition to this proposal is particularly illogical
5 and unsupported and should be disregarded. Again, Mr. Grevatt’s proposal is contrary to
6 customer benefit.

7 **Q. DOES MR. GREVATT SUPPORT THE CONTINUATION OF THE SMART**
8 **THERMOSTAT MARKETPLACE AND LOW INCOME SMART**
9 **THERMOSTAT (“LIST”) PROGRAMS?**

10 A. Yes. However, he argues that PGW needs to improve the performance of these programs
11 compared with its FY22 results.

12 **Q. DO YOU AGREE THAT PGW’S SMART THERMOSTAT MARKETPLACE**
13 **AND LIST PROGRAM PERFORMANCE NEEDS TO BE IMPROVED?**

14 A. No, because PGW has already made improvements to these programs in FY23. Although
15 PGW’s FY23 results have not been filed publicly at the time of this testimony, PGW is
16 confident that these results will show that significant improvements were made to both
17 programs in FY23. For example, in FY23, PGW’s Smart Thermostat Marketplace issued
18 more than twice as many rebates than it did in FY22 (333 in FY22, 702 in FY23). For
19 LIST, PGW made a change in FY23 with the implementation contractor, which has led to
20 shorter wait times for customers to receive installations. To increase recruitment, PGW
21 developed an informational flyer to distribute to customers (which was provided as an
22 attachment with PGW’s previous interrogatory responses for this proceeding). PGW also

⁴⁴ PGW Exh. DA-2, CAUSE-PA Response to PGW-I-9.

1 increased the LIST budget in FY23 due to demand for the program, and exceeded 100%
2 of spending relative to the originally budgeted amount.

3 PGW's annual report for FY23 will be filed in late December 2023 and will show
4 that PGW has already made significant improvements to the Smart Thermostat
5 Marketplace and LIST programs. Based on this data, which will be served on the parties
6 later this month, further improvements are not necessary.

7 **Q. WHAT IS MR. GREVATT'S POSITION REGARDING THE TERM OF THE**
8 **PHASE IV PLAN?**

9 A. He argues that the Phase IV plan should not be approved as a five-year plan, but rather
10 should only be approved as a three-year plan with his recommended changes.

11 As discussed above and in my direct testimony, I maintain that it will be more
12 cost effective and provide greater consistency for customers for the plan to be in place for
13 the five-year period of FY25-FY29 as PGW has proposed.⁴⁵

14 **V. CONCLUSION**

15 **Q. DOES THAT COMPLETE YOUR REBUTTAL TESTIMONY?**

16 A. Yes.

⁴⁵ PGW St. No. 1 at 12.

Exhibit DA-2

- 1. Reference CAUSE-PA St. 1 at page 3, lines 17-19. Is Mr. Grevatt aware of any statutory or regulatory provision or PUC order that requires voluntary natural gas DSM programs in Pennsylvania to compare non-gas alternatives for the equipment that is rebated? If yes, please identify any such provision or order.**

No.

Response Provided By:

James Grevatt

Witness for CAUSE-PA

Date: December 11, 2023

- 2. To Mr. Grevatt’s knowledge, are electric utilities’ programs under Act 129 required to compare cost savings for non-electric alternatives?**

No.

Response Provided By:

James Grevatt

Witness for CAUSE-PA

Date: December 11, 2023

- 3. Reference CAUSE-PA St. 1 at page 6. Mr. Grevatt states that "PGW's voluntary DSM program must also include targeted low income programming for customers that aren't served under LIURP – consistent with the requirements of electric utilities under Act 129." Please identify the statute, regulation or PUC order that provides the basis for this statement.**

Mr. Grevatt's statement was based upon his professional experience and opinion about best practices for equitably designed DSM programs. Mr. Grevatt is not a lawyer and was not offering a legal opinion.

Response Provided By:

James Grevatt

Witness for CAUSE-PA

Date: December 11, 2023

- 4. Reference CAUSE-PA St. 1 at page 18. As justification for his argument that PGW should discontinue offering furnace or water heater rebates to low-income customers, Mr. Grevatt states that these customers can obtain heater replacements elsewhere.**
- a. Is Mr. Grevatt aware of the current wait list for the Heater Hotline and LIHEAP Crisis Interface Program?**

Mr. Grevatt is unaware of the current wait list for the Heater Hotline. Mr. Grevatt understands from CAUSE-PA's counsel that funding for LIHEAP Crisis Interface program continues to be available in the current LIHEAP program year, and that spending has not exceeded available funding for emergency furnace repair or replacement through the LIHEAP Crisis Interface Program in past program years.

- b. Has Mr. Grevatt done any research on the percentage of low-income customers that these programs are able to serve relative to the needs of all low-income customers? If so, please summarize this research and provide documentation.**

No.

Response Provided By:
James Grevatt
Witness for CAUSE-PA

Date: December 11, 2023

- 5. Reference CAUSE-PA St. 1 at 18. In making this argument in favor of electric heat pumps, has Mr. Grevatt done research on the following? If so, please describe the results of this research and provide supporting documentation.**
- a. What capacity electrical system is needed for installing a heat pump.**
 - b. What percentage of Philadelphia homes have this electrical capacity that would allow them to install an electric heat pump without a significant electrical upgrade.**
 - c. The average cost of such an electrical upgrade.**
 - d. Average wait times to have this work performed by a certified electrician.**
 - e. How customers' average electrical capacity needs will evolve over time as more electric appliances like induction cooktops and electric dryers are added to homes to replace gas appliances, and how this may impact the feasibility of installing electric heat pumps.**

No.

Response Provided By:

James Grevatt

Witness for CAUSE-PA

Date: December 11, 2023

- 9. Reference CAUSE-PA St. 1 at page 27, lines 1 through 7.**
- a. Please provide copies of any reports, evaluations or workpapers supporting Mr. [Grevatt’s] claim that the air sealing kits do not provide any savings.**
 - b. Please provide copies of any reports, evaluations, or workpapers supporting Mr. [Grevatt’s] claim that low-flow device kits do not provide any savings.**

The Company misrepresents Mr. Grevatt’s testimony in the cited reference. Mr. Grevatt does not state that “air sealing kits do not provide any savings” or that “low-flow device kits do not provide any savings.” Rather, Mr. Grevatt states that “there is little reason to think that the air sealing materials provided in the kits (a tube of caulk, one set of weatherstripping, and an outlet gasket) will themselves save an appreciable amount of energy for most customers, as the energy savings benefits that could result will be highly dependent on customers knowing how and where to install the measures.” [underline added]

Indeed, PGW itself assumes these measures will achieve trivial savings for customers. For example, PGW estimates that approximately one in three showerheads that are provided will be installed, and only a little more than one in four aerators will be installed [PGW response to OCA to PGW II-7] with the result that a low-flow showerhead will save 0.35 Mcf per year [Attachment A to PGW Response to CAUSE-PA-II-21 – Market Rate (5yr) 2023_0926 (used in Revised Plan)(114277159), tab “Measure Inputs” cell G39] while a tube of caulk will save only 0.25 Mcf per year [cell G42] – a trivial amount considering the typical residential customer uses approximately 71Mcf per year. *See Pa. PUC v. PGW*, R-2023-3037933, Residential Notice of Proposed Rate Increase (typical PGW residential heating customer uses 71 Mcf per year.).

Mr. Grevatt’s conclusion is further based on his personal experience conducting energy audits and inspections including the use of blower door testing for hundreds of residential energy efficiency retrofit projects.

Response Provided By:

James Grevatt
Witness for CAUSE-PA

Date: December 11, 2023

13. Reference CAUSE-PA St. 1 at page 9, lines 14-15. Mr. Grevatt references the Act 129 Phase IV Order’s requirement that EDCs obtain 5.8% of their total portfolio savings for customers whose income is equal to or less than 150% FPL. Please identify any specific regulatory provision(s) or PUC Order(s) that require voluntary natural-gas DSM programs to achieve the same.

Mr. Grevatt is not a lawyer and does not offer a legal opinion on this matter. Rather, his recommendation that PGW model its program based on Act 129 requirements is a result of his professional judgment regarding best practice utility program design.

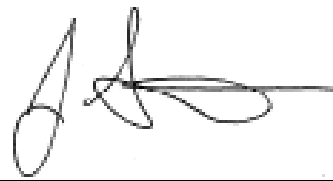
Response Provided By:

James Grevatt
Witness for CAUSE-PA

Date: December 11, 2023

VERIFICATION

I, Jim Grevatt, hereby state that the facts set forth in my response to PGW to CAUSE-PA Interrogatories, Set I, are true and correct to the best of my knowledge, information, and belief, and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements made herein are subject to the penalties of 18 Pa. C.S. § 4904 (relating to unsworn falsifications to authorities.)

A handwritten signature in black ink, appearing to read 'Jim Grevatt', written over a horizontal line.

December 11, 2023
Date

Jim Grevatt, Energy Futures Group
Expert Witness for CAUSE-PA

VERIFICATION

I, Denise Adamucci, hereby state that: (1) I am Senior Vice President for Customer & Regulatory Affairs for Philadelphia Gas Works; (2) the facts set forth in my testimony 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).

December 14, 2023

Dated

/s/ Denise Adamucci

Denise Adamucci, Senior Vice President
Customer & Regulatory Affairs
Philadelphia Gas Works

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Petition of Philadelphia Gas Works for :
Approval of Demand-Side Management :
Plan for FY 2024-2026; : Docket No. P-2014-2459362
:
Philadelphia Gas Works Universal Service :
and Energy Conservation Plan for 2014- :
2016 52 Pa Code § 62.4 – Request for
Waivers

REBUTTAL TESTIMONY

OF

**Theodore M. Love
GREEN ENERGY ECONOMICS GROUP, INC.**

On Behalf of

Philadelphia Gas Works

Topics Addressed:

**Availability of Federal Funding
Inclusion of Emerging Technologies
Small Business Participation
Administrative Costs
Insulation Retrofits and Rebates**

December 14, 2023

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1 **I. INTRODUCTION AND BACKGROUND**

2 **Q. PLEASE STATE YOUR NAME, OCCUPATION AND BUSINESS ADDRESS.**

3 A. My name is Theodore M. Love and I am a partner at Green Energy Economics Group,
4 Inc. (“GEEG”), an energy consultancy founded in 2005. My office address is 2534
5 Downsville Rd, Lincoln VT, 05443.

6 **Q. HAVE YOU PREVIOUSLY PROVIDED TESTIMONY IN THIS PROCEEDING?**

7 A. Yes, I prepared and submitted written direct testimony on behalf of Philadelphia Gas
8 Works (“PGW”), which was served on September 27, 2023 (PGW St. No. 2).

9 **Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?**

10 A. My rebuttal testimony will address the Direct Testimony of OCA Witness Geoffrey
11 Crandall, OSBA Witness Angela Vitulli, and CAUSE-PA Witness Jim Grevatt.
12 Specifically I will address Mr. Crandall's recommendation for a Commission directive to
13 PGW to seek federal funding. More specifically, I will also address Ms. Vitulli's assertion
14 that DSM programs are only for "proven" technology, as well as her critique of small
15 business participation rates and administrative costs. Finally, I discuss some of the
16 barriers to performing insulation work in PGW's territory in regard to Mr. Grevatt's
17 recommendation to shift significant funding towards insulation rebates.

18 **Q. ARE YOU SPONSORING ANY EXHIBITS IN THIS PROCEEDING?**

19 A. No.

20 **II. RESPONSE TO OCA WITNESS GEOFFREY CRANDALL**

21

22 **Q. WHAT DID MR. CRANDALL RECOMMEND REGARDING FEDERAL**
23 **FUNDING?**

1 A. OCA witness Crandall recommended that PGW seek federal funding to leverage and
2 improve the effectiveness of the DSM programs, report annually on these efforts and
3 perform outreach to educate customers about other rebate opportunities.¹

4 **Q. PLEASE DISCUSS YOUR UNDERSTANDING OF THE FEDERAL FUNDING**
5 **MR. CRANDALL IS REFERRING TO AND HOW THAT FUNDING IS BEING**
6 **ADMINISTERED.**

7 A. I believe Mr. Crandall is referencing the funds made available under the Inflation
8 Reduction Act (“IRA”). Specifically, funding available under Section 50121 for Home
9 Efficiency Rebates (“HOMES”) and Section 50122 for High-Efficiency Electric Home
10 Rebates (“HEERHA”). The United States Department of Energy (“US DOE”) has
11 allocated approximately \$259 million to Pennsylvania for these two programs.² However,
12 these funds need to be applied for by a state energy office, which, in Pennsylvania, is
13 under the Department of Environmental Protection (“PA DEP”). It is my understanding
14 that the PA DEP has begun work on applying for these funds, but that it is not something
15 that PGW can apply to on its own.

16 **Q. BASED ON THIS UNDERSTANDING, WHAT DO YOU CONCLUDE**
17 **REGARDING MR. CRANDALL’S RECOMMENDATIONS ON PGW SEEKING**
18 **FEDERAL FUNDING?**

19 A. I conclude that, until there is more clarity from the PA DEP on how these programs will
20 be designed and implemented, there is not much that PGW can do to access these federal
21 funds. If the PA DEP were to reach out to PGW for input on the design and
22 implementation of the HOMES and HEERHA programs, I would encourage PGW to
23 engage with DEP to determine ways to leverage program offerings.

24

¹ OCA St. 1 at 9-11.

² <https://www.energy.gov/sites/default/files/2023-07/IRA%2050121%20%26%2050122%20Home%20Energy%20Rebates%20State%20Allocations.pdf>.

1 **III. RESPONSE TO OSBA WITNESS ANGELA VITULLI**

2
3 **Q. MS. VITULLI ARGUES THAT VRF HEAT PUMPS ARE NOT A PROVEN**
4 **TECHNOLOGY, AND IT IS NOT APPROPRIATE TO INCLUDE SUCH AN**
5 **EMERGING TECHNOLOGY IN A DEPLOYMENT PROGRAM LIKE THE**
6 **DSM PROGRAM.³ DO YOU AGREE WITH THIS ASSESSMENT?**

7 A. No, I do not. DSM programs are not just for “proven” technologies. Many ratepayer
8 funded DSM portfolios fund emerging technologies, such as Massachusetts’ Mass Save
9 and the New York State Energy Research and Development Authority (“NYSERDA”),
10 and a common goal for energy efficiency portfolios is “market transformation.” The
11 industry as a whole is looking for new solutions, and VRF heat pumps – which PGW’s
12 plan filing shows to be cost effective– should not be excluded just because the technology
13 is not yet widely used in the United States. In addition, VRF heat pumps are recognized
14 in multiple utility DSM programs and technical reference manuals (“TRMs”) throughout
15 the United States, from Colorado to Iowa and Illinois. The cost of the system is the
16 primary barrier to widespread adoption of this technology, which PGW aims to reduce
17 with this rebate offering.

18 Mr. Farag responds to OSBA further in his rebuttal testimony (PGW St. No. 3-R).

19 **Q. MS. VITULLI CRITICIZES THE RATE OF PARTICIPATION BY SMALL**
20 **BUSINESSES IN PGW’S DSM PROGRAMS. HOW DO YOU RESPOND?**

21 A. As I explained in my direct testimony, small businesses face many barriers to
22 participation in energy efficiency programs, including lack of time, expertise, or financial
23 means to pursue energy savings. The proposed new Small Business Assessments
24 (“SBA”) program is, in part, specifically intended to address these barriers by providing a
25 walkthrough assessment, installation of certain low-cost measures, and referrals to

³ OSBA St. No. 1 at 14-19.

1 PGW's energy efficiency program offerings.⁴ The proposed SBA program, as well as
2 planned additional direct marketing to small business customers, are focused on
3 increasing participation by small businesses.⁵

4 **Q. PGW WITNESS ADAMUCCI RESPONDS TO MS. VITULLI'S CRITICISMS OF**
5 **THE ADMINISTRATIVE COSTS ASSOCIATED WITH THE DSM PROGRAMS.**
6 **DO YOU HAVE ANY FURTHER RESPONSE?**

7 A. Yes. I would note that it is especially difficult to project participation levels for the DSM
8 program in Philadelphia, particularly given the relatively high poverty rate in PGW's
9 service territory. Administering the DSM programs has fixed costs regardless of the
10 number of customers who participate, and PGW has been able to historically maintain a
11 cost-effective portfolio even given participation challenges.

12 In any event, the proposed Phase IV plan is still cost effective. Further, PGW
13 needs adequate funds to make the efforts necessary to increase participation, such as
14 increasing its marketing efforts. As I explained in my direct testimony, the
15 administrative costs of the proposed plan are reasonable and well within the range of
16 similar Act 129 programs in Pennsylvania and should be approved.

17 **IV. RESPONSE TO CAUSE-PA WITNESS JIM GREVATT**

18 **Q. HOW TO YOU RESPOND TO MR. GREVATT'S ARGUMENT THAT HIGH**
19 **EFFICIENCY GAS EQUIPMENT ALREADY HAS MOST OF THE MARKET**
20 **SHARE SO REBATES ARE NO LONGER NECESSARY?⁶**

21 A. I disagree. To support this argument, Mr. Grevatt cites a white paper from the
22 Consortium for Energy Efficiency ("CEE") which, according to Mr. Grevatt, "reports that
23 of the different furnace models that were available nationally in 2019, over 70% had an

4 PGW St. No. 2 at 8.

5 PGW St. No. 2 at 10, 17.

6 CAUSE-PA St. 1 at 16-18.

1 Annual Fuel Utilization Efficiency (“AFUE”) of at least 90%.”⁷ This statement is
2 misleading for a few reasons. First, it ignores the efficiency requirement for furnace
3 rebates in PGW’s DSM program. In doing so, it combines and inflates the market
4 penetration of furnaces that would qualify for PGW rebates. That is because the
5 minimum efficiency requirement for a furnace rebate in the PGW program is 95%,
6 which, in the CEE report, constituted 31% of the available models. Even if we include the
7 market concentration of higher efficiency models ($\geq 97\%$ AFUE) the overall percentage
8 would sum up to 35%, because the CEE report notes that such models constituted just 4%
9 of what was available. Additionally, Mr. Grevatt makes a faulty assertion that the number
10 of models of furnaces that are available for customers to purchase is a strong indicator of
11 how customers will make purchasing decisions. Without data supporting the actual
12 market penetration of high efficiency furnaces, examining the total number of furnace
13 models available is largely imprecise as related to whether customers will decide to
14 purchase high efficiency furnaces.

15 Mr. Grevatt also states that “PGW has not conducted or obtained any studies that
16 characterize the efficiency of any types of gas combustion equipment sold in its service
17 territory.” However, Mr. Grevatt ignores the methodology and source of baseline
18 equipment that PGW cites in its proposed TRM, which is consistent with the approach
19 taken by the Act 129 TRM.

20 **Q. WHAT BARRIERS EXIST FOR OFFERING INSULATION REBATES IN**
21 **PGW’S TERRITORY?**

22 A. Installing insulation is challenging in PGW’s service territory primarily due to rowhomes
23 being the primary housing type in Philadelphia. This makes the comparison against

⁷ CAUSE-PA St. 1 at 16.

1 programs in suburban or rural areas that have more single-family detached homes less
2 relevant. I would emphasize that limited access will exist for attic spaces. Many rowhome
3 attics lack permanent access to this space. This means that fewer contractors are equipped
4 to install insulation in these spaces, it is more challenging for the program to verify work
5 quality, as well as to assess and quote a job, all of which increases the cost of projects and
6 uncertainty of savings.

7 Additionally, both the average age of homes in Philadelphia and the
8 demographics of PGW's customer base increase the barriers to installing insulation
9 measures. Philadelphia's poverty rate is 22.8%⁸ and PGW has a higher low-income
10 population than any other natural gas distribution company in Pennsylvania.⁹ In
11 Philadelphia, the median age of a house is 93 years old.¹⁰ With these figures in mind,
12 Philadelphians are far less likely to be able to afford high efficiency equipment without
13 rebates; and far more likely to live in homes where there are cost prohibitive barriers to
14 performing comprehensive retrofits.

15 **Q. DOES PHILADELPHIA'S BUILDING STOCK PROVIDE ADDITIONAL**
16 **BARRIERS TO INSULATION RETROFITS?**

17 A. Yes. Since Philadelphia's housing stock is considerably older, a portion of homes contain
18 active knob and tube wiring in attics, which can be a safety hazard if insulation is
19 installed over it. This creates further challenges and costs. In a two-story row house,
20 replacing wiring could potentially cost upwards of \$12,000.¹¹ In addition, the tools

⁸ <https://www.census.gov/quickfacts/fact/table/philadelphiacitypennsylvania/PST045222>.

⁹ See PA PUC Universal Service Programs & Collections Performance, 2022 Report at 8, available at <https://www.puc.pa.gov/media/2573/2022-universal-service-report-final.pdf>.

¹⁰ <https://why.org/articles/old-homes-high-poverty-make-philadelphia-housing-less-than-affordable-for-some/#:~:text=The%20median%20age%20of%20a,are%20older%2C%20half%20newer.>

¹¹ <https://www.angi.com/articles/knob-and-tube-replacement-cost.htm>.

1 required to evaluate if a home with limited attic access contains live knob and tube wiring
2 adds additional cost to the estimation and completion of such projects.

3 **V. CONCLUSION**

4 **Q. DOES THIS COMPLETE YOUR REBUTTAL TESTIMONY?**


5 **A. Yes.**

VERIFICATION

I, Theodore M. Love, hereby state that: (1) I am a partner at Green Energy Economics Group, Inc.; (2) I have been retained by Philadelphia Gas Works (“PGW”) for purposes of this proceeding.; (3) the facts set forth in my testimony are true and correct to the best of my knowledge, information and belief; and (4) 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).

December 14, 2023

Dated


Theodore M. Love
Green Energy Economics Group, Inc.

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Petition of Philadelphia Gas Works for :
Approval of Demand-Side :
Management Plan for FY 2024-2026 : Docket No. P-2014-2459362
:
Philadelphia Gas Works Universal :
Service and Energy Conservation Plan :
for 2014-2016 52 Pa Code § 62.4 – :
Request for Waivers :

REBUTTAL TESTIMONY

OF

Michel Farag

On Behalf of

Philadelphia Gas Works

Topics Addressed:

VRF Natural Gas Heat Pumps

December 14, 2023

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Table of Exhibits

Exhibit	Description
MF-1	PGW Responses to OSBA-I-13 and OSBA-II-4

1 **I. INTRODUCTION**

2 **Q. PLEASE STATE YOUR NAME AND POSITION FOR THE RECORD**

3 A. My name is Michel Farag and I am Director of Business Development and Technical
4 Support at Philadelphia Gas Works (“PGW” or “Company”).

5 **Q. HOW LONG HAVE YOU BEEN EMPLOYED WITH PGW?**

6 A. I have been employed by PGW for 14 years.

7 **Q. WHAT ARE YOUR CURRENT JOB RESPONSIBILITIES?**

8 A. I am a certified Energy Auditor, certified Energy Manager, and LEED Accredited
9 Professional. I also hold a BSc in Mechanical Engineering, and MSc in Environmental
10 Engineering. I provide Technical Engineering support to multiple PGW departments and
11 PGW customers as needed. I also oversee a team that manages contract compliance,
12 Customer Relation Management software, gas installations workflow software, IT-rate
13 customers enrollment.

14 **Q. HAVE YOU PREVIOUSLY PROVIDED TESTIMONY IN THIS PROCEEDING**
15 **ON BEHALF OF PGW?**

16 A. No.

17 **Q. HAVE YOU EVER PROVIDED TESTIMONY BEFORE THE PENNSYLVANIA**
18 **PUBLIC UTILITY COMMISSION (“COMMISSION” OR “PUC”)?**

19 A. No, I have not.

20 **Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?**

21 A. The purpose of my Rebuttal Testimony is to respond to the Direct Testimony of Angela
22 Vitulli submitted on behalf of the Office of Small Business Advocate (“OSBA”), in
23 which Ms. Vitulli opposes PGW’s proposed rebates for variable refrigerant flow (“VRF”)
24 natural gas heat pumps.

1 **Q. ARE YOU SPONSORING ANY EXHIBITS?**

2 A. Yes, I am sponsoring the attached Exhibit MF-1.

3 **II. RESPONSE TO OSBA WITNESS ANGELA VITULLI**

4 **Q. PLEASE SUMMARIZE OSBA WITNESS VITULLI'S TESTIMONY**
5 **REGARDING VRF HEAT PUMPS.**

6 A. Ms. Vitulli testified that the proposed rebates for natural gas heat pumps as part of the
7 Commercial Equipment Rebates ("CER") program should be rejected.

8 **Q. WHY DOES MS. VITULLI OPPOSE PGW'S PROPOSAL TO INCLUDE VRF**
9 **NATURAL GAS HEAT PUMPS AS AN ADDITIONAL MEASURE IN THE CER**
10 **PROGRAM?**

11 A. Ms. Vitulli claims that VRF heat pumps are not a proven technology that has been
12 demonstrated to be efficient and cost effective. She also argues that such an "emerging
13 technology" is not appropriate to include in a DSM program. For these reasons, she
14 believes the VRF heat pump measure should be rejected.¹

15 **Q. DO YOU AGREE WITH OSBA'S CONCERNS ABOUT VRF HEAT PUMPS?**

16 A. No, I do not agree. While VRF heat pumps are a newer technology, they are more
17 commonly used in other countries and are a proven, cost-effective technology that are
18 appropriately included in the DSM program. Exhibit MF-1 includes studies that PGW
19 provided in discovery responses to OSBA demonstrating examples of how VRF heat
20 pumps have been used.² This proposal will provide additional efficient, and cost-
21 effective options for commercial customers and should be approved.

¹ OSBA St. No. 1 at 14-19.

² PGW Exh. MF-1, PGW Responses to OSBA-I-13 and OSBA-II-4.

1 In his rebuttal testimony, PGW witness Love discusses further why it is
2 appropriate to include this type of technology in the DSM program.³

3 **III. CONCLUSION**

4 **Q. DOES THAT COMPLETE YOUR REBUTTAL TESTIMONY?**

5 **A. Yes.**

³ PGW St. No. 2-R at 3.

Exhibit MF-1

OSBA to PGW I-13.

(Reference: Proposed DSM Implementation Plan FY 24-26): A PGW’s proposed DSM plan also describes VRF heat pumps as “an emerging technology.” There appear to be no available statistics on the market penetration of gas VRF heat pumps because they are so new.

- (a) What is the rationale for including a technology in the proposed plan that unproven in the marketplace?
- (b) What evidence does PGW have that these gas VRF heat pumps will achieve sustainable market penetration?
- (c) Does PGW have a list of contractors in the service area that currently service VRFs?
- (d) Why would a small business customer be better served by a gas VRF than an electric one?

Response:

- (a) Though the VRF heat pump is new to the EnergySense portfolio, it is not unproven in the marketplace. When making the recommendation to include VRF natural gas heat pumps in its Plan, PGW’s energy efficiency team collaborated with the PGW Marketing Department, who have received positive feedback on the measure from both industry colleagues and PGW customers. PGW reviewed several case studies on projects throughout North America where the measure was installed and achieved significant savings. Locally, PGW worked with the owners of the Bok Building, a former trade school in South Philadelphia that currently functions as a multi-use commercial property with over 200 artists, entrepreneurs, small businesses, and community services operating out of the building. The PGW Marketing team proposed the installation of (2) 10-ton Yanmar natural gas heat pumps which are located on the building’s rooftop. The project was very well received by the owners of the Bok, and a case study was completed on the project, which is included in PGW’s response as Attachment A.

Cutting-edge technological measures like the VRF heat pump are precisely the type of measures that should be part of demand-side management programs. Utility rebate programs can play a significant role in promoting market transformation. since these measures are relatively new and have a significant incremental cost,

- (b) Sustainable marketing penetration is a holistic approach whose aim is to ensure that PGW is providing the consumer with alternative reliable solutions and affordable alternative solutions; hence, PGW is seeking incentives. The VRF natural gas heat pump technology

itself shows promise for market penetration due to its convenience because the features and benefits lower the total customer operating cost to ensure business sustainability. Furthermore, PGW has evidence that the VRF heat pump technology works, from local examples like the Bok Building referenced above, and other utility programs and manufacturer case studies. The popularity and market penetration of the measure is difficult to predict, as for any other newer measure.

- (c) PGW has a list of contractors who have installed this measure. Two companies that PGW has worked with directly are TriStar Companies and CoolSys.
- (d) Although this measure is not specifically intended for small businesses, businesses operating out of small or older buildings may not have electric service capable of handling additional electric load to run electric cooling or heating. For these businesses, the cost of enlarging existing electric service may be prohibitive. Additionally, high electric demand charges during peak business hours can be costly for small businesses who rely on electric heat pumps for heating and cooling. PGW does not apply demand charges for buildings that use natural gas to primarily heat or cool their building. VRF natural gas heat pumps are similarly well suited for retrofitting multifamily buildings.

Response Provided By: Steven Jerue, Director of Customer Programs

Dated: October 2, 2023

The Bok Building – Out with the Old and in with the New

In the heart of South Philadelphia at 9th and Mifflin Streets, the Bok Building is a 340,000 square foot former trade school built in the 1930s. In 2015, when parent company Scout and their managing partner, Lindsey Scannapieco took over the space, the team did a light renovation instead of destroying the old vocational school that has stood there for more than 75 years. The approach of reusing the existing infrastructure within the building creates an affordable workspace for a diversified end user. Matching tenants with spaces that can accommodate their needs; while offering amenity and economic opportunity to the neighborhood.

The tenants in the current building are home to over 200 Philadelphia artists, entrepreneurs, small businesses and community services including ceramic designers to glass blowers to architecture offices to a daycare and a soccer sports center.

THE CHALLENGE:

Various businesses within the Bok building require different demands for energy. The question was how to deliver it to each tenant area of the building most effectively. Some of the challenges faced were ordering and waiting for early morning fuel deliveries, adding in the cost of labor to assist with these efforts. Scout made updates to the space by advancing their energy use from oil to natural gas.

THE SOLUTION:

In 2017, the Scout team worked with PGW to incorporate a new high pressure gas service. The reasons to convert to natural gas include affordability, cleaner burning fuel which results in less maintenance, and a better working environment for their team in the boiler room.

Scannapieco said, “We were looking for a more efficient and affordable way to heat our building. Our boilers are now gas-fired and extremely efficient.” Incorporating natural gas has resulted in an annual savings of over \$20,000 per year.



Photographer Sam Oberter courtesy of the Bok Building

About The Bok Building

Through transformation and new ownership innovation, the BOK is now owned and operated by Scout, a multi-disciplinary design and development firm with a mission in transforming vacant and underutilized spaces in creative ways.

Scout reduced the building greenhouse gas emissions by transforming the heating system from oil to natural gas. Converting to affordable natural gas also reduced the Bok annual O&M cost by over \$20,000. The gas heat pump units are 50% more efficient than conventional heating equipment in the heating mode.

The Bok Building

In 2020, the Bok was in need of additional cooling capacity; however, the building's electrical service couldn't handle any additional electrical loads. While seeking a feasible solution, the Bok was in communication with PGW. The PGW Marketing team proposed the installation of (2) 10-ton Yanmar natural gas heat pumps (GHP) which are located on the building's rooftop. The natural gas heat pumps helped reduce Bok's electric demand, especially in the summer. This demand can cause a significant increase in the total cost of electricity for the building. The GHP units are 50% more efficient than conventional heating equipment in the heating mode. Scout also thinks about their overall impact on the environment. As an old building, they are committed to reusing as much as possible within the building and invest in the existing infrastructure to make it more efficient.

The Bok team has worked hard to make a block-long aging building with a scale and scope come back to life in many ways through their overall energy use and through their creative vendors who occupy the space. Overall, the Bok building's energy updates are all part of transforming the space into the future.



△ 10-ton Yanmar natural gas VRF heat pump located on the Bok Building rooftop.



△ Exterior of the Bok Building entrance near 8th and Mifflin Streets.

CUSTOMER SUCCESSES:

The Philadelphia Gas Works has helped these customers evaluate their energy challenges with natural gas energy solutions that fit their need:

LUXURY MIXED-USE SKYSCRAPER

FMC TOWER installed two rooftop 65 kW Capstone CHP microturbines to cover the cost to heat water throughout the entire building with zero byproduct.

CORPORATE OFFICE/OPERATIONS CENTER **PHILADELPHIA GAS WORKS NORTH OPERATIONS CENTER HEADQUARTERS**

Installed two 65 kW Capstone microturbines with on-board heat exchangers that produce 865,000 BTU's an hour in the form of hot water. Also, home to two outdoor Yanmar 10-ton units for heating and cooling.

BLOOD/PLASMA DONATION CENTER AND CORPORATE OFFICE

THE AMERICAN RED CROSS OF SOUTHEASTERN PENNSYLVANIA installed all-new natural gas-fired boilers; three condensing boilers to keep the HVAC and mechanical systems running through a combination of building automation and pneumatic control system; a fourth boiler for steam generation was installed to control humidity in the labs.

CORPORATE BUILDING

PGW HEADQUARTERS integrates a state-of-the-art 200kW microturbine CHP technology into its existing Philadelphia facility at 800 West Montgomery Avenue.

CS-0523-BOK

OSBA to PGW II-4

(Reference: PGW Response to OSBA Interrogatories I-13, Attachment A): PGW provides a case study detailing the installation of two natural gas VRF heat pumps on a large building housing over 200 tenants. The building's owner and operator made the initial investment in the heat pumps. Has PGW conducted or reviewed any case studies where the small business itself made the investment in the natural gas heat pump? If so, what were the results?

Response: Please refer to the attached case Study of a small business restaurant that installed natural gas VRF with economic analysis.

Response provided by: Steven Jerue, Director of Customer Programs

Dated: October 26, 2023



EARLS FIR STREET RESTAURANT VANCOUVER, BRITISH COLUMBIA

“The Yanmar gas-driven heat pumps were ideal when it came time to add air-conditioning to our busy restaurant. They only require single-phase power to operate and use significantly less electricity than any other electrical heat pumps! Using natural-gas our operating costs is also much less and we understand that by using renewable natural gas, they would easily be carbon-neutral.”



PROJECT OVERVIEW

Earls Fir Street Restaurant in Vancouver is a member of the Earls Restaurant Group, which was founded more than 30 years ago by a father and son team. This restaurant worked with Yanmar's dealer LSM Energy Solutions (Div. of Lee's Sheet

Metal), to install a pair of Yanmar 12-ton natural gas-powered Variable Refrigerant Flow (VRF) outdoor units on the roof along with interior ducted round flow and wall mounted indoor units for heating and cooling.

REASON FOR CHOOSING YANMAR

As a restaurant, guest comfort while dining is of high importance, but equally important is worker comfort in a hot kitchen environment. Having air conditioning allows for better productivity and less worker fatigue.

When it came time to select a new HVAC system for the restaurant, the customer found out they would have to upgrade the power connection service, which was very expensive and would take a significant amount of time. LSM Energy Solutions, the local Yanmar dealer, presented Yanmar's natural gas-powered system as an alternative; this system reduced power consumption by 90 percent for the same tonnage of

heating and cooling, which allowed the customer to avoid costly electrical infrastructure upgrades and installation delays (including upgrades from the local utility provider).

Since Yanmar's system is VRF, the customer was able to select multiple indoor unit types to best serve the building's needs, as well as create multiple zones for maximum comfort.

Additionally, Vancouver can get very cold during the winter months, and Yanmar's system is effortlessly able to provide heat even in freezing cold temperatures due to engine heat recovery technology built in.

ABOUT YANMAR AMERICA ENERGY SYSTEMS

Yanmar America Energy Systems is the North, Central and South American headquarters for the company's Variable Refrigerant Flow and Combined Heat and Power systems. Yanmar Energy Systems Canada is located in

Hamilton, Ontario, and supports variable refrigerant flow and combined heat and power systems sales and service for Canadian customers. Our team and products are focused on sustainability, reliability, and efficiency.





EARLS FIR STREET RESTAURANT VANCOUVER, BRITISH COLUMBIA

QUICK FACTS

APPLICATION: Restaurant
LOCATION: Vancouver, BC
COMMISSIONING DATE: August 2018
PRODUCT INSTALLED: NNCP144J x 2

OVERVIEW

Reduced operation costs
 Reduced installation costs
 Zone control
 Efficient heating capability



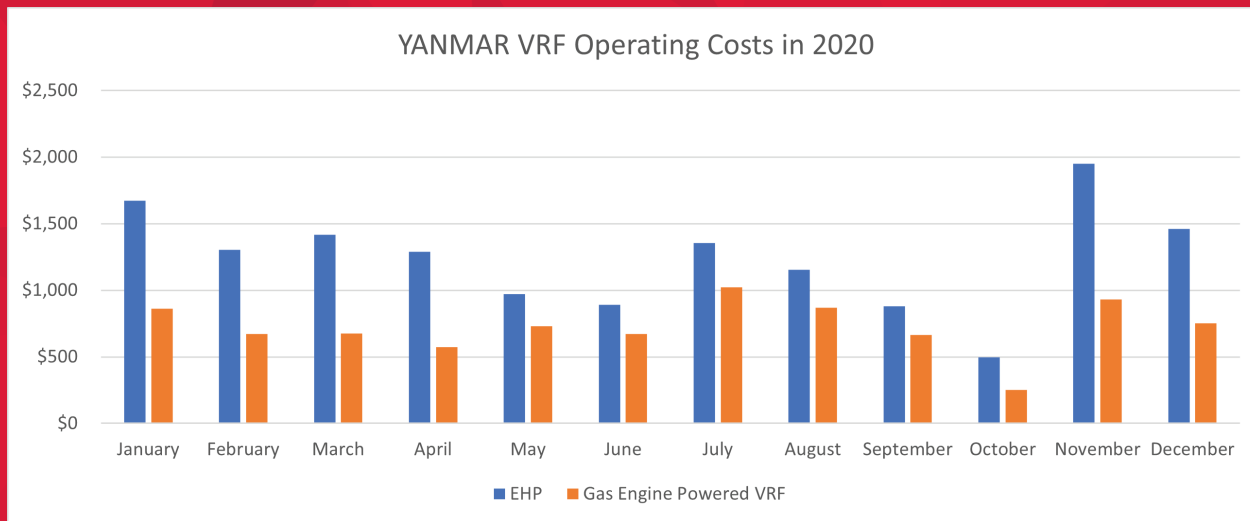
RESULTS

By installing a pair of whisper-quiet Yanmar 12-ton (cooling capacity) natural gas-powered Variable Refrigerant Flow (VRF) outdoor units, Earls Fir Street Restaurant was able to reduce operation and installation costs from an electric-based system.

By using natural gas as an energy source, the building produces lower amounts of harmful emissions than traditional heating and cooling equipment. Earls Fir Street Restaurant now enjoys more control over guest comfort with zone control and

efficient heating and air conditioning.

The restaurant was able to avoid costly electrical system upgrades by switching to Yanmar VRF units.



Operating costs data is a calculated estimate based only on remote monitoring data and local average utility costs or bills.



VERIFICATION

I, Michel Farag, hereby state that: (1) I am Director of Business Development and Technical Support for Philadelphia Gas Works; (2) the facts set forth in my testimony 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).

December 14, 2023

Dated

/s/ Michel Farag

Michel Farag, Director of Business Development
and Technical Support
Philadelphia Gas Works

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Petition of Philadelphia Gas Works for :
Approval of Demand-Side Management :
Plan for FY 2024-2026; : Docket No. P-2014-2459362
:
Philadelphia Gas Works Universal Service :
and Energy Conservation Plan for 2014- :
2016 52 Pa Code § 62.4 – Request for
Waivers

REJOINDER TESTIMONY

OF

**Theodore M. Love
GREEN ENERGY ECONOMICS GROUP, INC.**

On Behalf of

Philadelphia Gas Works

Topics Addressed:

VRF Natural Gas Heat Pumps

January 16, 2024

1 **I. INTRODUCTION AND BACKGROUND**

2 **Q. PLEASE STATE YOUR NAME, OCCUPATION AND BUSINESS ADDRESS.**

3 A. My name is Theodore M. Love and I am a partner at Green Energy Economics Group,
4 Inc. (“GEEG”), an energy consultancy founded in 2005. My office address is 2534
5 Downingsville Rd, Lincoln VT, 05443.

6 **Q. HAVE YOU PREVIOUSLY PROVIDED TESTIMONY IN THIS PROCEEDING?**

7 A. Yes, I prepared and submitted written direct testimony on behalf of Philadelphia Gas
8 Works (“PGW”), which was served on September 27, 2023 (PGW St. No. 2), as well as
9 rebuttal testimony that was served on December 14, 2023 (PGW St. No. 2-R).

10 **Q. WHAT IS THE PURPOSE OF YOUR REJOINDER TESTIMONY?**

11 A. My rejoinder testimony responds to OSBA Witness Angela Vitulli’s surrebuttal
12 testimony regarding natural gas heat pumps.

13 **III. RESPONSE TO OSBA WITNESS ANGELA VITULLI**

14
15 **Q. PLEASE SUMMARIZE THE ISSUES RAISED BY MS. VITULLI REGARDING**
16 **GAS HEAT PUMPS IN SECTION IV OF HER SURREBUTTAL TESTIMONY**
17 **(OSBA ST. NO. 1-S).**

18 A. Ms. Vitulli raises three issues. First, she is unable to find rebates for gas heat pumps in
19 Colorado, Illinois, and Iowa. OSBA St. No. 1-SR at 5-7. Second, she speculates that I
20 meant “electric VRF heat pumps” when referring to the availability of incentives for
21 variable refrigerant flow (“VRF”) heat pumps. OSBA St. No. 1-SR at 7. Third, she states
22 that the “inclusion in a TRM [technical reference manual] [of a measure] is not evidence
23 that the technology is proven or widely incentivized.” OSBA St. No. 1-SR at 7.

1 **Q. ARE GAS HEAT PUMP REBATES AVAILABLE IN ILLINOIS, COLORADO,**
2 **AND IOWA?**

3 A. Yes. In Illinois, Nicor Gas’s Energy Efficiency Plan filing for 2022-2025¹ included
4 multiple avenues of acceptance for gas heat pumps, including:

- 5 1. Residential gas heat pumps were incentives under the emerging technology
6 initiatives in Residential Prescriptive rebates and Residential New
7 Construction.
- 8 2. Commercial gas heat pumps were added as an accepted measure in the
9 Business Custom Efficiency Program.
- 10 3. A pilot was announced to further study gas heat pump water heaters in both
11 residential and commercial settings.
- 12 4. A pilot was included to further study gas heat pumps and water heater
13 combination units in both residential and commercial settings.

14 People’s Gas of Illinois also offers commercial and industrial (“C&I”) Custom Efficiency
15 incentives that cover equipment that does not have a prescriptive rebate. The presence of

¹ See <https://www.ilsag.info/wp-content/uploads/Nicor-Gas-EEP-Proposed-2022-2025-Plan-SAG-Presentation-Final.pdf>.

1 gas heat pumps in the Illinois TRM means that these measures are likely to be eligible to
2 receive incentives within that program.

3 In Colorado, Black Hills Colorado Gas offers incentives for residential gas heat
4 pumps of \$1,500 per qualifying unit² and Xcel Colorado also has a C&I Custom
5 Efficiency incentive program that may allow a gas heat pump.

6 In Iowa, Black Hills Energy offers a commercial custom program that would
7 presumably cover gas-fired heat pumps³ given their inclusion in the Iowa TRM.
8 Similarly, MidAmerican Energy Company offers a small business and direct project
9 assistance programs⁴ in both Iowa and Illinois that may cover gas-fired heat pumps given
10 their inclusion in the respective TRMs.

11 In addition to the utilities listed above in the United States, Fortis BC in British
12 Columbia, Canada also offers incentives for Commercial Gas Heat Pumps. Their
13 program provides up to 75% of the project cost, capped at \$200,000, and even helps the
14 customer pay for the required feasibility study to verifying savings potential.⁵

15 **Q. PLEASE CLARIFY WHAT YOU MEANT REGARDING VRF HEAT PUMP**
16 **AVAILABILITY.**

17 A. I agree with Ms. Vitulli that VRF heat pump technology can be either powered by natural
18 gas or electricity. Within the context of my rebuttal testimony, I am referring to the

² https://www.blackhillsenergy.com/sites/blackhillsenergy.com/files/cog_residential_rebate_app.pdf.

³ https://www.blackhillsenergy.com/sites/blackhillsenergy.com/files/iag_custom_rebate_app.pdf.

⁴ <https://www.midamericanenergy.com/nes>.

⁵ <https://www.fortisbc.com/rebates/business/gas-absorption-heat-pump-rebates>.

1 natural gas-powered version of the technology. This rejoinder testimony has provided
2 additional clarification regarding the availability of rebates for gas-fired heat pumps.

3 **Q. DO YOU AGREE WITH MS. VITULLI THAT THE INCLUSION OF A**
4 **MEASURE IN A TRM “DOES NOT MEAN THAT THE TECHNOLOGY IS**
5 **PROVEN OR WIDELY INCENTIVIZED”?**

6 A. Not entirely. It is correct that the inclusion of a measure in a TRM does not mean that a
7 measure is widely incentivized. However, it does mean that the technology has savings
8 calculation and methodology proven to be acceptable to a state energy regulator, as
9 pointed out on page 1 of the guide referenced by Ms. Vitulli.⁶

10 **V. CONCLUSION**

11 **Q. DOES THIS COMPLETE YOUR REJOINDER TESTIMONY?**

12 A. Yes.

⁶ <https://www.energy.gov/sites/default/files/2021-09/emv-trm-report-summary.pdf>.

VERIFICATION

I, Theodore M. Love, hereby state that: (1) I am a partner at Green Energy Economics Group, Inc.; (2) I have been retained by Philadelphia Gas Works (“PGW”) for purposes of this proceeding.; (3) the facts set forth in my testimony are true and correct to the best of my knowledge, information and belief; and (4) 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).

January 16, 2024

Dated _____



Theodore M. Love

Green Energy Economics Group, Inc.