

UGI PENN NATURAL GAS, INC.

BEFORE

THE PENNSYLVANIA PUBLIC UTILITY COMMISSION

Information Submitted Pursuant to

Section 53.51 et seq of the Commission's Regulations

UGI PNG STATEMENT NO. 7 – DAVID E. LAHOFF

UGI PNG STATEMENT NO. 8 – ROBERT R. STOYKO

UGI PNG STATEMENT NO. 9 – CHRIS A. ROSSI

UGI PNG STATEMENT NO. 10 – HANS G. BELL

UGI PNG STATEMENT NO. 11 – NICOLE M. McKINNEY

UGI PNG STATEMENT NO. 12 – THEODORE M. LOVE

UGI PNG STATEMENT NO. 13 – ANGELINA M. BORELLI

ORIGINAL TARIFF

UGI PENN NATURAL GAS, INC. – PA P.U.C. NO. 9

DOCKET NO. R-2016-2580030

Issued: January 19, 2017

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UGI PNG STATEMENT NO. 7 – DAVID E. LAHOFF

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Docket No. R-2016-2580030

UGI Penn Natural Gas, Inc.

Statement No. 7

**Direct Testimony of
David E. Lahoff**

Topics Addressed: **Test Years Sales/Revenues
Rate Structure and New Riders
Revenue Allocation and Rate Design
GET Gas Reporting
Tariff Changes**

Dated: January 19, 2017

1 **I. INTRODUCTION**

2 **Q. Please state your name and business address.**

3 A. My name is David E. Lahoff. My current business address is 2525 N. 12th Street, Suite
4 360, Reading, Pennsylvania 19612.

5
6 **Q. By whom are you employed and in what capacity?**

7 A. I am employed as Manager, Tariff & Supplier Administration, by UGI Utilities, Inc.
8 (“UGI”), the parent company of UGI Penn Natural Gas, Inc. (“UGI PNG” or “the
9 Company”) and UGI Central Penn Gas, Inc. (“UGI CPG”).

10

11 **Q. Please provide your educational background.**

12 A. I received an undergraduate degree in business from The Pennsylvania State University
13 and a Masters Degree in Business Administration from The University of Connecticut.

14

15 **Q. Please provide your professional experience.**

16 A. In 2002, I was named Manager, Special Projects for UGI. In 2003, I became Manager,
17 Customer Accounting Services for UGI, where my responsibilities included the
18 administration of all customer accounting functions. Beginning in 2007, I returned to the
19 position of Manager, Special Projects to oversee a customer information system conversion
20 project. Following the completion of that project, in 2009, I was named Manager of Rates.
21 In 2014, I assumed the position of Manager, Tariff & Supplier Administration.

22

23

24

1 **Q. What are your current areas of responsibility?**

2 A. My current responsibilities include: (1) all aspects of tariff and rate administration for UGI
3 PNG, including interactions with natural gas suppliers under UGI PNG's natural gas
4 supplier tariffs; (2) revenue planning; and (3) oversight of UGI PNG's gas management
5 system.

6

7 **Q. Have you previously testified as a witness before the Pennsylvania Public Utility
8 Commission?**

9 A. Yes, I have testified in the following dockets: CPG 2009 Base Rate Case, Docket No. R-
10 2008-2079675; UGI PNG 2009 Base Rate Case, Docket No. R-2008-2079660; UGI
11 Utilities, Inc. – Gas Division (“UGI Gas”) 2009 Annual Gas Cost Filing, Docket No. R-
12 2009-2105911; UGI Gas Petition to Implement a Purchase of Receivables Program and
13 Merchant Function Charge, Docket No. P-2009-2145498; CPG 2011 Base Rate Case,
14 Docket No. R-2010-2214415; UGI Gas Procurement Charge Filing, Docket No. R-2012-
15 2314235; UGI PNG Gas Procurement Charge Filing, Docket No. R-2012-2314224; CPG
16 Gas Procurement Charge Filing, Docket No. R-2012-2314247; UGI Gas, UGI PNG and
17 CPG Growth Extension Tariff (“GET Gas”) Filing, Docket No. P-2013-2356232; UGI -
18 Electric Division Default Service Filing, Docket No. P-2013-2357013; and UGI Gas 2016
19 Base Rate Case, Docket No. R-2015-2518438.

20

21 **Q. Please describe the purpose of your testimony.**

22 A. I will address: (1) sales and revenue issues, including use-per-customer adjustments due
23 to energy savings from the proposed Energy Efficiency and Conservation (“EE&C”) Plan,

1 for the historic test year ended September 30, 2016 (“HTY”), future test year ending
2 September 30, 2017 (“FTY”), and fully projected future test year ending September 30,
3 2018 (“FPFTY”); (2) UGI PNG’s rate structure, including elimination of certain rate
4 schedules; and the addition of certain riders, such as the EE&C Rider, and the Technology
5 and Economic Development (“TED”) Rider; (3) revenue allocation and rate design; (4) the
6 recalculation of the GET Gas Pilot Program surcharge; (5) the reset of the Distribution
7 System Improvement Charge (“DSIC”) rate to zero; and (6) other proposed tariff
8 modifications.

9
10 **Q. Are you sponsoring any exhibits or filing requirements in this proceeding?**

11 A. Yes, I am sponsoring the following Exhibits: UGI PNG Exhibit DEL-1 (15 year normal
12 heating degree days); UGI PNG Exhibit DEL-2 (Normalized multi-year and Normalized
13 12-month ending trends of use per customer – residential and non-residential); UGI PNG
14 Exhibit DEL-3 (FPFTY Sales and Revenue Adjustments); UGI PNG Exhibit DEL-4 (FTY
15 Sales and Revenue Adjustments); UGI PNG Exhibit DEL-5 (HTY Sales and Revenue
16 Adjustments); UGI PNG Exhibit DEL-6 (Detail of Usage per Customer by Class as shown
17 on UGI PNG Exhibit DEL-3); UGI PNG Exhibit DEL-7 (Calculation of EE&C Rider);
18 UGI PNG DEL-8 (Calculation of the USP Rider and the Adjustment to Annual USP
19 Reconciliation); UGI PNG Exhibit DEL-9 (Rate NNS calculation); UGI PNG Exhibit
20 DEL-10 (Rate MBS calculation); UGI PNG Exhibit DEL-11 (Recalculation of GPC); UGI
21 PNG Exhibit DEL-12 (Recalculation of MFC percentages); UGI PNG Exhibit DEL-13
22 (Recalculation of GET Surcharge); UGI PNG Exhibit DEL-14 (Calculation of GET Gas
23 Revenues); and Schedules D-5A and D-5B of UGI PNG Exhibit A. I am also sponsoring

1 those responses to the Commission's filing requirements and standard data requests where
2 my name is indicated as the sponsoring witness.

3
4 **II. SALES AND REVENUES**

5 **A. Development of FPFTY Sales and Revenues**

6 **Q. Please explain how the Company's FPFTY sales and revenues were developed.**

7 A. FPFTY sales and revenues were developed by annualizing and normalizing the Company's
8 2018 fiscal year planned sales and revenue budget, adjusted to reflect the most recently
9 available customer growth forecast. Annualized sales were determined by developing sales
10 and revenue adjustments reflective of projected customer counts and annual expected use
11 per customer as of the end of the FPFTY, September 30, 2018, by reviewing historic usage
12 data and applying regression analysis techniques. Both the Company's 2018 fiscal year
13 planned sales and revenue budget and the Company's FPFTY reflect annual normal heating
14 degree days of 6,019. These normal heating degree days are based upon an average over
15 a fifteen year period and are updated every five years. The most recent five-year update
16 occurred on December 31, 2014. UGI PNG Exhibit DEL-1 provides the supporting
17 calculation of the annual normal degree days utilized.

18
19 **Q. Is the use of average temperature data for a fifteen-year period consistent with the
20 methodology used by UGI PNG, UGI Gas, and UGI CPG for calculating normal
21 heating degree days in previous base rate cases?**

22 A. Yes. UGI Gas used a fifteen-year period to develop normal heating degree days in its 2016
23 base rate case. UGI CPG used this methodology in its 2009 and 2011 base rate cases, and
24 UGI PNG used this methodology in its 2009 base rate case.

1 **Q. Please explain the process for developing the Company's fiscal year 2018 planned**
2 **sales and revenue budget.**

3 A. The planned sales and revenue budget is a joint effort of the Marketing and Rates
4 Departments, with Marketing providing customer growth and attrition information by
5 customer class along with specific large commercial and industrial sales and revenue
6 budget projections. The Rates Department develops normalized usage per customer for
7 core customer classes, annualized sales and total revenues. The complete budget process
8 is described in the direct testimony of Company witness Kindra S. Walker (UGI PNG
9 Statement No. 2).

10 In developing sales and revenues, the Vice President, Marketing and Customer
11 Relations, with input and assistance from other marketing employees, budgets the number
12 of customers by class. Various factors are considered in developing customer budgets,
13 including: the trend in losses and conversions to and from other energy sources; the level
14 of applications and inquiries for service, new construction activity; current and projected
15 economic factors; and the costs of competing fuels. The usage per customer reflected in
16 the planned 2018 budget was developed utilizing a multi-year regression methodology that
17 I will discuss in more detail below. Planned budgeted numbers of customers and usage per
18 customer for these customer classes are then combined to produce planned budgeted sales.
19 Sales are allocated by month, and appropriate rates or rate blocking are applied to derive
20 planned budgeted revenues. Sales and revenues related to large contract customer classes
21 are developed by the Marketing Department on a customer specific basis using customer
22 input where appropriate.

1 The derivation of the 2018 planned budget reflects a preliminary forecast that will
2 be subsequently updated during 2017 as part of the normal annual budget process, which
3 is conducted several months prior to the start of the new fiscal year. The methodology
4 applied to develop normalized FPFTY use per customer, FTY use per customer, and HTY
5 use per customer is the same for all three periods.

6
7 **Q. Please describe the adjustments made to FPFTY sales and revenues for the twelve**
8 **months ending September 30, 2018.**

9 A. A summary of all adjustments made to the 2018 planned budget in order to develop FPFTY
10 sales is shown on UGI PNG Exhibit DEL-3(a). In total, these adjustments reflect an
11 increase to sales of 43,467 MMcf and a reduction to revenue of \$ 1.17 million.

12
13 **Q. Please explain the “Adjustment for Customer Changes” shown on UGI PNG Exhibit**
14 **DEL-3(b).**

15 A. The “Adjustment for Customer Changes” annualizes customer counts to anticipated end of
16 test year levels based on the Company’s most recent forecast for the FPFTY. In particular,
17 this adjustment includes a net decrease of 892 residential heating customers and a net
18 decrease of 133 non-residential heating customers.

19
20 **Q. How is this adjustment quantified?**

21 A. UGI PNG Exhibit DEL-3(b) provides the calculation of the associated sales and revenue
22 adjustments for the stated customer count decreases. In total, as reflected on UGI PNG
23 Exhibit DEL-3(a), this adjustment decreases sales by 156 MMcf and decreases projected

1 revenues by \$1.2 million, inclusive of revenues for recovery of purchased gas costs
2 (“PGC”) and exclusive of transportation customer adjustments discussed separately below.

3
4 **Q. Please explain your next adjustment, “Adjustment for Normalized & Annualized
5 Use/Customer.”**

6 A. The “Adjustment for Normalized & Annualized Use/Customer” normalizes and annualizes
7 usage per customer to projected end of year test levels based on a multi-year regression
8 analysis of actual usage and degree day information. Specifically, in developing usage per
9 customer projections, the Company utilized an econometric regression model that
10 incorporates four independent variables: use per customer, heating degree days, lagged
11 heating degree days and time trend. While use per customer and heating degree days
12 capture weather related usage factors which can then be used to project normalized and
13 annualized customer usage under normal weather conditions, the time trend variable of this
14 regression captures non-weather trends underlying changes in usage per customer over
15 time, such as conservation items and measures. These trends can be varied, but as a
16 comprehensive variable, “trend” will capture the impacts of conservation items and
17 measures, including, but not limited to: (1) regular appliance replacements; (2) accelerated
18 appliance replacements; (3) high-efficiency appliance installations; (4) setback thermostat
19 installations; (5) modifications to new and existing buildings that are designed to decrease
20 energy consumption; and (6) changes in consumer usage behavior due to other economic
21 influences. Given the number of variables that can influence customer usage over time,
22 and the difficulty in identifying, quantifying and tracking all variables over time, the use

1 of a trend variable can be used to provide a comprehensive indicator of usages trends,
2 which can then be used to forecast for a future period.

3 The multi-year period utilized in the regression is a continuation and extension of
4 the multi-year period presented in UGI PNG's 2009 base rate case through most recently
5 available data, or the period inclusive of December 1, 2003 through October 31, 2016. The
6 forecasts of end of FPFTY use per customer are generated using the regression results
7 along with a projection of regression variable inputs including normal annual heating
8 degree days and a trend variable. The results are presented in summary on UGI PNG
9 Exhibit DEL-3(a) and in detail on UGI PNG Exhibit DEL-3(c) and in total result in a net
10 sales decrease, from fiscal 2018 budget, of 17 MMcf and a net revenue decrease, from
11 fiscal 2018 budget, of \$14,000, inclusive of revenues for recovery of PGC and exclusive
12 of transportation customer adjustments discussed separately below.

13
14 **Q. Why did UGI PNG utilize a multi-year regression period?**

15 A. The Company decided to use the multi-year period explained above as this approach
16 provides a large sample set of data to smooth out short-term variations and capture the
17 underlying long-term use per customer trends in order to more accurately project usage per
18 customer during the period rates are likely to be in effect. This methodology is the
19 consistent with that utilized in the last four UGI rate cases: 2009 UGI PNG, 2009 UGI
20 CPG, 2011 UGI CPG and 2016 UGI Gas.

1 **Q. Has UGI PNG compared the results of the multi-year regression method to develop**
2 **normalized usage with any other normalization method?**

3 A. Yes. Please see UGI PNG Exhibits DEL-2(a) and DEL-2(b), which contain graphs that
4 illustrate both the multi-year normalized (“Normalized (12 month ended)”) data used to
5 develop the normalized and annualized use per customer for use in this rate case, and
6 comparative short term normalized (“Normalized (12 months ended)”) data for the
7 Company’s core residential (Rate R/RT) and commercial (Rate N/NT) heating customers,
8 which is computed via a simple determination of temperature sensitive load each month.
9 As can be seen from these graphs, the short-term trend fluctuations evidenced by the
10 “Normalized (12 months ended)” line occur in certain periods but consistently revert to the
11 long-term “Normalized (Multi-year)” trend which has been used to forecast FPFTY use
12 per customer values. This provides clear support for the use of the multi-year regression
13 method the Company has utilized for the claim in this case.

14
15 **Q. Is the econometric model you described the same as the model utilized in the last UGI**
16 **PNG rate case in 2009?**

17 A. As noted above, yes. However, in the 2009 UGI PNG base rate case, UGI PNG only had
18 access to five years of historical data and therefore had to use a more abbreviated historical
19 period. For this case, UGI PNG has now been able to extend this period through October,
20 2016.

21
22

1 **Q. Do the adjustments to use per customer for the FPFTY include the impact of**
2 **Company’s proposed EE&C Plan?**

3 A. Yes. As part of its base rate filing, the Company is proposing to implement an EE&C Plan.
4 The energy savings associated with the program will primarily occur in residential and
5 small commercial customer rate classes. UGI PNG Exhibit DEL-3(k) shows the summary
6 energy savings by Rates R/RT and N/NT, based on the five-year average annual savings
7 for the program. The exhibit also contains the energy savings impact on a use per customer
8 basis. The incremental impact on use per customer for Rates R/RT is a decrease of 0.7
9 Mcf, the incremental impact on use per customer for Rates N/NT is a decrease of 2.2 Mcf.
10 These incremental reductions in use per customer for UGI PNG’s core market classes are
11 included in the calculation of adjusted use per customer for the FPFTY. There were no
12 adjustments for energy savings made for rate classes DS and LFD. The buildup for the
13 overall energy savings is addressed in the direct testimony of Company witness Theodore
14 M. Love (UGI PNG Statement No. 12). This adjustment decreases total sales by 137 MMcf
15 and reduces revenue by \$823,000.

16
17 **Q. Please explain the adjustment titled “Adjustment for Transport Changes” as shown**
18 **on UGI PNG Exhibit DEL-3(a), 3(b), 3(b)1, 3(c), and 3(c)1.**

19 A. The “Adjustment for Transport Changes” is the summation of several adjustments made
20 for the Company’s transportation customers for the FPFTY. This adjustment increases
21 projected sales by 43,778 MMcf and increases revenues by \$3.85 million, as shown in
22 summary on UGI PNG Exhibit DEL-3(a) and detailed on UGI PNG Exhibits DEL-3(b),
23 3(b)(1), 3(c) and 3(c)(1). The adjustment for large transportation customers was developed

1 by UGI PNG marketing personnel following their review of individual large customer
2 accounts and market segments. It reflects annualizing anticipated increases or reductions
3 from original fiscal year 2018 planned budget levels in the sales and revenues for these
4 accounts. Changes in customer counts for small transportation customer classes have been
5 developed from UGI PNG marketing forecasts for counts at the end of the FPFTY, and
6 associated usage per customer for the Rate DS small transportation customer classes were
7 determined based upon the application of a multi-year regression analysis. See UGI PNG
8 Exhibit DEL-6 for details on use per customer by class.

9
10 **Q. Please explain the “Adjustment for PGC” shown on UGI PNG Exhibit DEL-3(a).**

11 A. The “Adjustment for PGC” shown in summary on UGI PNG Exhibit DEL-3(a) represents
12 an annualization of the FPFTY PGC revenues using the PGC rate in effect as of December
13 1, 2016 for the FPFTY period. UGI PNG Exhibit DEL-3(d) provides the calculations for
14 this adjustment. This adjustment increases PGC revenues for the FPFTY by \$2.66 million.

15
16 **Q. Please explain the following three adjustments shown in summary on UGI PNG**
17 **Exhibit DEL-3(a): “Adjustment for MFC,” “Adjustment for USP,” and “Adjustment**
18 **for GPC”.**

19 A. The “Adjustment for MFC” annualizes the Company’s Merchant Function Charge
20 (“MFC”) revenues for the FPFTY based on the MFC surcharge rate in effect as of
21 December 1, 2016. The “Adjustment for USP” annualizes the Company’s USP surcharge
22 revenues for the FPFTY based on the USP Rider rate in effect as of December 1, 2016.
23 The “Adjustment for GPC” annualizes the Gas Procurement Cost (“GPC”) revenues to

1 reflect the volume variance to the original fiscal year 2018 planned budget. The MFC
2 Adjustment increases projected revenues by \$68,000; the USP adjustment decreases
3 revenues by \$274,000; and the GPC adjustment decreases revenues by \$12,000. Additional
4 details for these three adjustments are provided on UGI PNG Exhibits DEL-3(e), 3(f) and
5 3(g).

6
7 **Q Please explain the “Adjustment for Interruptible.”**

8 A. The “Adjustment for Interruptible” annualizes the Company’s interruptible revenues for
9 the FPFTY at the level of revenue based on a proxy cost of service of \$945,000. The
10 methodology for this proxy cost of service is discussed by UGI PNG witnesses Paul J.
11 Szykman (UGI PNG Statement No. 1) and supported by the cost of services studies
12 presented by Paul R. Herbert (UGI PNG Statement No. 5). In total, the Interruptible
13 Adjustment decreases revenues by \$1.56 million.

14
15 **Q. Please explain the adjustment shown on UGI PNG Exhibit DEL-3(a): “Adjustment
16 for Excess Take”.**

17 A. The “Adjustment for Excess Take,” detailed in UGI PNG Exhibit DEL-3(i), reflects the
18 assumption that customers will evaluate new service elections as part of the
19 implementation of new tariff rates, and will make the necessary adjustments to avoid
20 Excess Take penalties in the FPFTY year. The Excess Take adjustment reduces revenue
21 by \$400,000.

1 **Q Please explain the adjustment on UGI PNG Exhibit DEL-3(j) “Adjustment for**
2 **STAS.”**

3 A. The “Adjustment for STAS” annualizes the revenue from the UGI PNG State Tax
4 Adjustment Surcharge (“STAS”) based on its current level of negative (0.46%) versus its
5 budgeted level of negative (0.4%). This STAS adjustment decreases projected revenues
6 by \$192,000.

7
8 **Q Please explain the adjustment on UGI PNG Exhibit DEL-3(l) “Adjustment for GET**
9 **Gas.”**

10 A. The “Adjustment for GET Gas” reflects a variance in GET Gas revenues from 2018 budget
11 compared to annualized revenues. The revised revenues were developed by annualizing
12 the projected payments in September 2018. This adjustment increased revenues by
13 \$48,000.

14
15 **Q. Do the adjusted FPFTY revenues exclude revenues related to off-system sales and**
16 **non-jurisdictional revenue?**

17 A. Yes. “Other Gas Revenues” claimed by the Company represent a three year historic
18 average of only PA PUC jurisdictional revenue for continuing tariff charges.

19
20 **Q. Do the FPFTY revenues exclude revenues associated with the proposed discontinued**
21 **tariff fees?**

22 A. Yes. As discussed in the section on Tariff Changes, the Company is proposing to eliminate
23 the Turn On, Shut Off, Set Meter and Change of Customer tariff fees to improve customer

1 satisfaction and simplify its tariff administration, and has adjusted “Other Gas Revenues”
2 by the amount of the fees associated with the elimination of these tariff charges. This
3 adjustment of Other Gas Revenues reduces Other Gas Revenues by \$340,000, as shown on
4 UGI PNG Exhibit A (Fully Projected), Schedule D-5B

5 .
6 **Q. Do the FPFTY revenues include revenues currently recovered through the**
7 **Company’s DSIC mechanism?**

8 A. Yes. In this distribution base rate filing, the Company has reflected the roll-in of its current
9 Distribution System Improvement Charge into base rates, as required by Section 1358(b)
10 of the Public Utility Code. This includes the capital investment and associated depreciation
11 and tax effects for the DSIC in base rates. The Company will then reset its DSIC to 0%
12 upon implementation of new base rates, subject to reconciliation pursuant to Commission
13 rules and the Company’s tariff. The level of revenue currently recovered through the DSIC
14 mechanism is included in the presentation of FPFTY revenues found in UGI PNG Exhibit
15 E in both present and proposed revenues.

16
17 **B. Development of Sales and Revenue for the FTY and HTY**

18 **Q. How were normalized and annualized sales and revenue determined for the FTY**
19 **ending September 30, 2017?**

20 A. Budgeted sales and revenues serve as the starting point for the development of the
21 normalized and annualized FTY sales and revenues shown in UGI PNG Exhibit DEL-4(a).
22 All of the adjustments that were made in the development of the FPFTY, with the exception
23 of the adjustments related to the proposed EE&C program, DSIC and STAS were also
24 made in the development of the FTY. An EE&C adjustment is not included in the FTY

1 since there is no EE&C program in the FTY. In addition, the FTY adjustments for DSIC
2 and STAS were based on a complete removal of those revenues, compared to the
3 adjustments in the FPFTY which were based on adjustments to reflect the annualized levels
4 for those revenue categories.

5
6 **Q. How were normalized and annualized sales and revenue determined for the HTY**
7 **ended September 30, 2016?**

8 A. Historic sales and revenues serve as the starting point for the development of the
9 normalized and annualized HTY sales and revenues shown in UGI PNG Exhibit DEL-5(a).
10 All of the adjustments that were made in the development of the FPFTY, with the exception
11 of the adjustments related to the proposed EE&C program, DSIC and STAS were also
12 made in the development of the HTY. An EE&C adjustment is not included in the HTY
13 since there is no EE&C program in the HTY. In addition, the HTY adjustments for DSIC
14 and STAS were based on a complete removal of those revenues, compared to the
15 adjustments in the FPFTY which were based on adjustments to reflect the annualized levels
16 for those revenue categories.

17
18 **III. RATE STRUCTURE**

19 **Q. Please describe the changes in rate structure proposed by the Company in this**
20 **proceeding.**

21 A. In general, the Company seeks to update and more closely align its tariff and rate schedules
22 with those of UGI Gas and UGI CPG and to simplify its rate design by eliminating any
23 existing rate schedules that are no longer necessary or appropriate.

24

1 **Q. Please identify the rate schedules and rates the Company is proposing to eliminate**
2 **and its basis for doing so.**

3 A. The Company is proposing to eliminate the following rate schedules:

4 • Rate GBM (Gas Beyond the Mains Service) – Under this rate, the Company, at its
5 sole option, could provide service to customers requesting natural gas service in the
6 Company’s service territory utilizing propane where the extension of natural gas
7 facilities is currently uneconomic. Schedule GBM service was closed to new
8 customers as of December 31, 2009. The Company is proposing to eliminate this
9 rate because there are no customers currently using it and there is no prospect of
10 any future use.

11 • Rate S (Storage Service) – Under this rate schedule, the Company would provide
12 storage capacity on an agency basis when suitable gas or other fuel is supplied by
13 the customer. This rate schedule was developed and implemented before the
14 Federal Energy Regulatory Commission (“FERC”) established the capacity release
15 mechanism as the sole means, with certain limited exceptions, for making FERC-
16 jurisdictional pipeline and storage capacity available to third parties. The Company
17 is proposing to eliminate this rate because there currently are no customers served
18 under this rate, and it is not clear whether this service could be provided in any
19 event under current FERC rules.

20 • Rate CIAC (General Service – Commercial and Industrial Air Conditioning) – This
21 is a retail rate available to commercial or industrial customers using gas for air
22 conditioning purposes. The Company is proposing to eliminate this rate, which

1 was adopted at a time when it was thought that gas air-conditioning would develop
2 into a significant market. There are currently are no customers on this rate.

3
4 **Q. Is the Company proposing any additional rates or riders?**

5 **A** Yes, the Company is proposing a new rider to recover the costs associated with the
6 implementation of its proposed EE&C Plan, which is discussed in more detail in the direct
7 testimony of Theodore M. Love (UGI PNG Statement No. 12). The Company is also
8 proposing a new TED Rider to align UGI PNG’s tariff with that of UGI Gas, which recently
9 adopted a TED Rider as a three-year pilot program, pursuant to the Commission-approved
10 settlement in the 2016 UGI Gas Base Rate Case. The UGI PNG TED Rider proposal is
11 discussed in the direct testimony of Robert R. Stoyko (UGI PNG Statement No. 8).

12
13 **Q. Please describe the calculation of the proposed EE&C Rider.**

14 **A.** The Company is proposing to establish an EE&C Rider, which will appear as a separate
15 line item on customer bills, to recover program costs related to the Company’s proposed
16 EE&C Plan for fiscal years 2018-2022, as described in the testimony of Company witness
17 Theodore M. Love (UGI PNG Statement No. 12). The EE&C Rider will operate in the
18 same manner as the EE&C Rider recently adopted by UGI Gas as a result of the
19 Commission-approved settlement of its 2016 Base Rate Case. The EE&C Rider will be
20 computed separately for each of the following four customer classes: (i) Residential
21 customers served under Rate Schedules R and RT (ii) Non-Residential customers served
22 under Rate Schedules N, NT; (iii) Customers served under Rate DS; and (iv) Customers

1 Served under Rate LFD. The initial proposed EE&C Rider rates, as developed in UGI
2 PNG Exhibit DEL-7 are:

- 3 • Residential Rates R and RT: \$0.0760/Mcf.
- 4 • Non-Residential Rates N and NT: \$0.0339/Mcf.
- 5 • DS: \$0.0429/Mcf.
- 6 • LFD: \$0.0208/Mcf.

7 The EE&C Rider will apply to all customers served under the rate schedules identified
8 above and the EE&C Rider revenues shall be subject to the STAS.

9
10 **Q. Is the Company proposing any other Rider changes?**

11 A. The Company is proposing a modification to the annual reconciliation of the USP Rider.

12
13 **Q. Please describe the modifications to the USP Rider.**

14 A. The Company proposes to modify the annual reconciliation of the USP Rider to adjust for
15 the number of participants receiving Customer Assistance Program (“CAP”) credits and
16 preprogram arrearage in excess of 7,643. The adjustment related to CAP credits and
17 preprogram arrearage will be equal to 9.1%. The adjustment is based on the 2015
18 difference between the gross write-off percentage for low-income customers identified by
19 PNG’s system and the gross write off percentage for all other residential customers. See
20 PNG Exhibit DEL-8 for the calculation of the USP Rate based on these adjustments. See
21 PNG Exhibit F – Proposed Tariff for the proposed modifications to the USP Rider section
22 of the tariff. Further, see the direct testimony of Company witness Chris A. Rossi (PNG

1 Statement No. 9) for further information on CAP participation levels and the write-off
2 adjustment.

3
4 **IV. REVENUE ALLOCATION AND RATE DESIGN**

5 **Q. Please summarize the Company's rate design and allocation of the revenue increase**
6 **ratemaking philosophy.**

7 A. The Company's ratemaking goal is to implement reasonable rates that recover its cost of
8 doing business. Rate schedules are generally designed to reflect movement toward class
9 cost of service and to be competitive with prices of alternate energy sources, including
10 bypass. Our rates and rate design seek to promote and achieve efficient utilization of the
11 Company's facilities and natural gas supplies.

12
13 **Q. What factors has the Company considered in establishing its rate structure?**

14 A. The Company considered both cost of service and value of service as the primary factors
15 in determining revenue allocation and rate design. Other factors that were considered
16 include continuing to harmonize UGI PNG rate structures with those of UGI CPG and UGI
17 Gas, and elements related to ultimate customer impact and maximizing the benefits of the
18 distribution system for all customers.

19
20 **Q. Did the Company consider customer migration between rate classes in allocating the**
21 **proposed rate increase?**

22 A. Yes. The Company has conducted an analysis of customers in Rate Schedules N and NT
23 with annual volumes of 2,500 Mcf or more, and all Rate Schedule DS customers to
24 determine which rate schedule would be the most economical under proposed rates, and

1 has assigned these customers to their most economical rate schedule based on proposed
2 rates for the purposes of projecting anticipated revenues.

3
4 **Q. Please summarize how the proposed distribution revenue increase was allocated**
5 **among the customer classes.**

6 A UGI PNG is proposing to allocate the revenue increase in a manner that will move those
7 rate classes that are above the system average rate of return at present rates to cost of service
8 and to move those rate classes that are below the system average rate of return (Rates R/RT,
9 N/NT and DS) approximately two-thirds of the way toward cost of service. For the three
10 rate classes that are above the system average rate of return at present rates (Rates LFD,
11 XD, and IS), UGI PNG is proposing: (1) an allocation of revenue to Rate LFD that will
12 move Rate LFD to cost of service, reflecting the system average rate of return; (2) no
13 allocation of revenue to Rate XD, leaving all Rate XD rates unchanged as these rates are
14 competitive, fully negotiated rates contained in term contracts and providing a relative rate
15 of return to the UGI PNG system which is higher than the system average, and (3) making
16 an allocation of revenue to Rate IS equal to the proxy cost of service for this competitive
17 class. In measuring cost of service, the Company relied on the cost of service studies
18 prepare by Company witness Paul R. Herbert (UGI PNG Statement No. 5). In developing
19 the allocations for interruptible service, Mr. Herbert presented two cost of service studies
20 to establish a range of reasonableness. One study included an allocation of distribution
21 main costs to the interruptible rate class, and a second study did not allocate any distribution
22 main costs to the interruptible rate class. The Company then used an average of these two
23 methods as the basis for allocating the proposed revenue increase. Table 1 below provides

1 a summary of the proposed allocation of the increase and the relative class rates of return
 2 at present and proposed rates.

3
 4 **Table 1. – Comparison of Relative Rates of Return**

Rate	% increase (without gas costs)	Relative ROR- present rates	Relative ROR- proposed rates	Change in relative ROR	% Movement in relative ROR toward unity ROR
R/RT	16.9%	0.899	0.966	0.067	66.3%
N/NT	22.2%	0.835	0.948	0.113	68.5%
DS	20.7%	0.886	0.964	0.078	68.4%
LFD	5.9%	1.246	1.00	-0.246	-100.0%
XD	(0.8)%	1.93	1.36	-0.57	-61.3%
IS	(3.0)%	1.50	1.01	-0.49	-98.0%
Total	15.2%	1	1	0	

5
 6 **Q. Please describe the revenue allocation and rate design for the residential Rate R**
 7 **customer group.**

8 A. As evidenced by the cost of service study presented by Mr. Herbert, under present rates,
 9 the residential Rate R customer group (Rates R and RT) is producing a return of 5.53%, as
 10 compared to a system average return of 6.15%. This translates to a relative rate of return
 11 of 0.899 compared to the system average. In allocating revenues, the Company proposes
 12 to allocate \$15.0 million of the revenue increase to the Rate R customer group in order to
 13 move it closer toward cost of service. This increase will result in an overall return of 8.12%
 14 for the Rate R customer group, compared to the proposed system average of 8.4%, and a
 15 relative rate of return of 0.966.

16 As to rate design, the Company is proposing a Rate R customer charge of \$18.50
 17 per month, as compared to the current charge of \$13.17 per month, to better reflect the
 18 direct customer costs per bill of \$23.80 as identified within the cost of service studies

1 presented in UGI PNG Exhibit D. This approximate 50% movement toward the direct
2 customer cost per bill reflects the Company's consideration of customer bill impacts and
3 applies the ratemaking principal of gradualism. The Company also is proposing to replace
4 the current declining block structure with a single block volumetric charge of \$3.927 per
5 Mcf to simplify the rate structure and create an improved incentive to conserve energy.

6
7 **Q. Please describe the revenue allocation and rate design for the small commercial Rate**
8 **N customer group.**

9 A. For the small commercial Rate N customer group (Rates N and NT), current rates are
10 producing a return of 5.14% with a relative rate of return 0.835. UGI PNG proposes to
11 allocate \$4.77 million of the revenue increase to the Rate N customer group in order to
12 move the Rate N customer group closer toward cost of service. This increase will result in
13 an overall return of 7.96% or a relative rate of return of 0.948.

14 As to rate design, the Company is proposing a Rate N customer group customer
15 charge of \$37.50 per month, as compared to the current charge of \$32.41 per month, to
16 better reflect the direct customer costs per bill of \$38.49 as identified within the cost of
17 service studies presented in UGI PNG Exhibit D. This movement toward the direct
18 customer cost per bill increases the current customer charge by 15.7% and reflects the
19 Company's consideration of customer bill impacts and applies the ratemaking principal of
20 gradualism.

1 **Q. Please describe the revenue allocation and rate design for the Rate DS.**

2 A. For Rate DS, the applicable transportation rate for small to medium sized customers,
3 current rates are producing a return of 5.45%, with a relative rate of return of 0.886. The
4 Company proposes to allocate approximately \$1.6 million of the revenue increase to the
5 Rate DS customers in order to move the Rate DS class closer toward cost of service. This
6 increase will result in an overall class return of 8.09% or a relative rate of return of 0.964,
7 by moving Rate DS by 68.4% toward a unity relative rate of return value.

8 As to rate design, the Company is proposing to increase the current Rate DS
9 monthly customer charge of \$174.91 per month to \$290 per month. The Rate DS customer
10 charge for UGI PNG will then be the equivalent of the \$290 per month Rate DS customer
11 charge under the UGI Gas Rate DS tariff. The \$290 per month is also supported by the
12 direct customer costs per bill for Rate DS of \$291.71 as identified within the cost of service
13 studies presented in UGI PNG Exhibit D.

14

15 **Q. Please describe the revenue allocation and rate design for the Rate LFD.**

16 A. For Rate LFD, the applicable transportation rate for medium to large sized customers,
17 current rates are producing a return of 7.66%, with a relative rate of return of 1.246. The
18 Company proposes to allocate approximately \$0.42 million of the proposed revenue
19 increase to the Rate LFD customers in order to move this customer class to cost of service.
20 This increase will result in an overall return of 8.4% or a relative rate of return of 1.0,

21 As to rate design, the Company is proposing to increase the current Rate LFD
22 monthly customer charge of \$499.91 per month to \$700 per month. The \$700 per month is

1 also supported by the direct customer costs per bill for Rate LFD of \$942.64 as identified
2 within the cost of service studies presented in UGI PNG Exhibit D.

3
4 **Q. Please describe the revenue allocation and rate design for the Rate XD.**

5 A. For Rate XD, the rates for this class are based on current contracts as negotiated between
6 the Customer and the Company given competitive considerations, the Company is not
7 proposing any change to present rates.

8
9 **Q. Please describe the revenue allocation and rate design for the Rate IS.**

10 A. Rate IS, the applicable interruptible rate schedule for commercial and industrial customers,
11 is an opportunistic rate schedule that is based on the relative price of natural gas versus
12 alternative fuels or other customer alternatives. As such, the Company is at risk for those
13 revenues if circumstances change, and there is no guarantee that current revenue levels will
14 be achieved in the future.

15 As a result of the at-risk nature of the interruptible revenues, the Company is
16 reflecting, as a proxy, a level of interruptible revenue in its revenue allocation that is based
17 on an average of two cost of service allocation methodologies, equating to \$945,000. The
18 Company assigned to the interruptible class an amount based approximately on the
19 midpoint of the calculated results from these two separate cost of service studies, one which
20 allocated a portion of distribution mains to interruptible customers and one which did not
21 allocate any mains costs to interruptible customers. The implied overall rate of return under
22 these assumptions is 8.46% or a relative rate of return of 1.01. Please see the direct
23 testimony of Paul J. Szykman (UGI PNG Statement No. 1) for additional detail on the

1 Company's proposal on value of service pricing to the interruptible market and the
2 treatment of revenues received under its Interruptible Service rates. Also see the direct
3 testimony of Paul R. Herbert (UGI PNG Statement No. 5) for additional discussion of the
4 cost of service allocation methodology.

5
6 **Q. Please describe Rate NNS (No Notice Service) and any changes to this rate that the**
7 **Company is proposing.**

8 A. Rate NNS is a daily balancing service offered by the Company that is patterned after Rate
9 NNS as offered at UGI Gas and UGI CPG. It provides an alternate election of a daily
10 balancing tolerance for transportation customers, allowing a customer to optionally elect a
11 balancing tolerance greater than the standard basic balancing provided by the Company.
12 A customer is able to make a Rate NNS election up to its DFR (Daily Firm Requirement)
13 contract demand level and pay only for the level chosen. The Company is proposing to
14 update the tariffed NNS rate to reflect current cost elements, while retaining the
15 methodology used to develop the current rate.

16
17 **Q. How were the proposed NNS rates developed?**

18 A. The charge for providing service under Rate NNS is a monthly charge established using
19 the Company's cost of Transco GSS interstate storage that can be utilized for balancing
20 excess or shortfall requirements on the Company system. UGI PNG Exhibit DEL-9 shows
21 the calculation of the Rate NNS charges, which were developed based on the same
22 methodology used in the Company's last base rate case, as well as the methodology utilized
23 by UGI CPG and UGI Gas in their respective last base rate cases, updated to reflect current

1 costs and conditions. The proposed NNS rate is \$0.266 per Mcfd of an elected daily no
2 notice allowance (“NNA”) tolerance quantity. This compares to a current rate of \$2.42 per
3 Mcd of elected NNA.

4
5 **Q. Will the Company continue to credit the revenues received from Rate NNS to PGC**
6 **Rates?**

7 A. Yes, revenues from these rate schedules will continue to be credited to the PGC Rates.

8
9 **Q. Please describe Rate MBS (Monthly Balancing Service).**

10 A. Rate MBS is a monthly balancing service offered by the Company that mirrors Rate MBS
11 as offered at UGI Gas and UGI CPG. Service under Rate MBS allows transportation
12 imbalances of up to 10% for the month to be carried forward in the customer’s MBS
13 account for delivery of excess deliveries, or receipt of shortfalls, in subsequent months.

14
15 **Q. How were the proposed MBS rates developed?**

16 A. UGI PNG Exhibit DEL-10 provides the basis for the Rate MBS calculations, as well as the
17 proposed MBS rates under Rates DS, LFD, and XD. These rates were developed based
18 upon the Company’s costs to provide Rate MBS service and follow the same rate design
19 methodology utilized by UGI CPG and UGI Gas in their respective most recent base rate
20 cases, updated for current costs and conditions. The proposed rate for Rate DS is
21 \$0.0039/Mcf compared to the current rate of \$0.008/Mcf. The proposed rate for Rate LFD
22 is \$0.0024/Mcf compared to the current rate of \$0.006/Mcf. The proposed rate for Rate
23 XD is \$0.0013/Mcf compared to the current rate of \$0.005/Mcf.

1 **Q. Will the Company continue to credit the revenues received from Rate MBS to PGC**
2 **Rates?**

3 A. Yes, revenues from Rate MGS will continue to be credited to the PGC.
4

5 **Q. Is the Company proposing to update its GPC in this proceeding?**

6 A. Yes. The Company is proposing to revise its GPC to reflect cash working capital costs
7 related to purchased gas costs, current labor assumptions and current information
8 technology costs associated with the procurement function. The proposed rate is
9 \$0.042/Mcf compared to the current GPC rate of \$0.04/Mcf. Please see UGI PNG Exhibit
10 DEL-11 for additional details on the calculation of this rate
11

12 **Q. Is the Company proposing to update its MFC in this proceeding?**

13 A. Yes. The Company is updating the percentages for the MFCs to reflect the actual
14 uncollectible expense for the last three years. Based on this updated data, the residential
15 MFC will be 1.83%, and the MFC for the commercial class will be 0.25%. Please see UGI
16 PNG Exhibit DEL-12 for additional details.
17

18 **V. GET GAS PILOT PROGRAM**

19 **Q. Please briefly describe the Company's GET Gas Pilot Program.**

20 A. The Get Gas pilot is designed to help expand natural gas distribution facilities into under-
21 served and unserved areas of the Commonwealth by permitting customers connecting to
22 extended facilities to pay a surcharge on their rates for a defined period of time. The Get
23 Gas Pilot Program is the result of a comprehensive settlement approved in a Commission
24 Order entered on February 20, 2014, at Docket No. P-2013-2356232.

1 **Q. Did this settlement contain any provisions addressing future base rate proceedings?**

2 A. Yes, the GET Gas settlement provides, in pertinent part:

3 *In the event that any of the UGI Companies files a general base rate case during*
4 *the term of the pilot, such Company will provide information, as part of its initial*
5 *filing, showing how the GET Gas surcharge rates would be adjusted to reflect*
6 *changes in the following items: revenue from a base rate increase, annual sales*
7 *volumes, average usage per customer for GET Gas customers, depreciation rates,*
8 *weighted cost of debt, return on equity, tax rates, CAP component and*
9 *Uncollectibles component. Such UGI Company further agrees that if adjustments*
10 *for these items would result in a decrease in GET Gas surcharge amounts, it will*
11 *propose to implement such decreased surcharge rates prospectively for both new*
12 *GET Gas customers and to any remaining term of the GET Gas surcharge payment*
13 *for existing GET Gas customers. In the event the adjustment would suggest an*
14 *increase in GET Gas surcharges, the Signatory Parties agree not to propose any*
15 *prospective increase in GET Gas surcharges. In addition, and notwithstanding*
16 *any update of the GET Gas surcharge, the Signatory Parties agree not to oppose*
17 *the UGI Companies' full and timely recovery of and a return on reasonably*
18 *incurred capital investments in GET Gas facilities that are made consistent with*
19 *the terms of the pilot program approved in this proceeding or any future*
20 *modifications to the program approved by the Commission. Any Signatory Party*
21 *shall be free to propose how such recovery shall occur, and shall be free to propose*
22 *potential recovery, in part, from non-GET Gas customers.*
23

24 **Q. Has the Company presented the specified information concerning potential**
25 **adjustments to GET Gas Surcharge amounts?**

26 A. Yes, this information is shown in UGI PNG Exhibit DEL-13.

27

28 **Q. Does the updated information suggest a decrease in previously approved GET Gas**
29 **surcharge amounts?**

30 A. No.

31

32

33

1 **Q. Is the Company proposing any adjustments to GET Gas surcharge levels?**

2 A. No. The Company's GET Gas Pilot Program is still relatively new and, given the small
3 number of actual projects to date, additional information needs to be gathered over time
4 before adjustments to the approved surcharge rates should be made.

5
6 **Q. Has the Company included GET Gas related investment and GET Gas revenues in
7 its base rate claim?**

8 A. Yes. The Company has included GET Gas related investment in rate base, less deductions
9 for depreciation and the applicable principal portion of the GET Gas surcharge. The
10 Company is also including the annualized revenue associated with the return on investment
11 ("ROI") portion of the GET Gas surcharge and the adder for uncollectible and CAP
12 expenses. This amount was calculated by annualizing the projected ROI portion and adder
13 portion of the GET Gas surcharge payments for September 30, 2018, plus the adder portion
14 associated with those GET Gas customers who elected to pay the up-front amount of the
15 GET Gas contribution. The total annualized amount included as revenue from the GET
16 Gas surcharge is \$0.11 million and is reflected on UGI PNG Exhibit DEL-14.

17

18 **VI. OTHER TARIFF MODIFICATIONS**

19 **Q. Apart from the proposed rate schedule eliminations discussed above, has the
20 Company proposed any other changes to its tariff in this proceeding?**

21 A. Yes, a complete list of tariff modifications can be found in the List of Changes section in
22 UGI PNG Exhibit F, Proposed Tariff No. 9. As noted earlier in my testimony, the primary
23 intent of the proposed changes to the UGI PNG tariff is to standardize and harmonize,
24 where applicable, its tariff provisions with those contained in the UGI CPG and UGI Gas

1 tariffs, reflect best practices, add clarity, as well as update the UGI PNG tariff to reflect
2 certain proposed changes to the Company's business practices. Some of the more
3 significant changes to the current UGI PNG Tariff No. 8 are:

4 · **Section 9 Billing and Payment.** The Company is proposing to eliminate several
5 tariff charges as part of the effort of standardizing the tariff provisions of UGI Gas,
6 UGI PNG and UGI CPG. The revenues associated with these charges have been
7 removed from the FPFTY. The UGI CPG tariff does not contain these charges and
8 these charges were eliminated from the UGI Gas tariff as a result of the
9 Commission-approved settlement of the 2016 UGI Gas Base Rate Case. The
10 charges being eliminated include: Turn On Charge, Shut Off Charge, Set Meter
11 and Change of Customer Charge.

12 · **Elimination of the Standby Charge for Rate Schedules R, RT, N and NT.** The
13 Standby Charge applies to any customer receiving service under Rates R, RT, N,
14 or NT who utilizes natural gas as a backup, auxiliary or temporary fuel. Given the
15 relative popularity of natural gas as a heating fuel, the vast majority of customers
16 who use natural gas for heating do so as their primary heating fuel. So, there are
17 very few customers utilizing natural gas as a backup fuel. Currently there are only
18 eight customers receiving Standby Charges. As part of the simplification and
19 standardization of tariffs and rate schedules, the Company is proposing to eliminate
20 the Standby Charge from all applicable rate schedules. Although the UGI CPG
21 tariff currently contains provisions for a standby charge, UGI CPG intends to
22 eliminate that provision in a future base rate proceeding. UGI Gas eliminated its

1 Standby Charge pursuant to the Commission-approved settlement of its 2016 Base
2 Rate Case.

3 **The Company is eliminating the STAS charge for Rate Schedules XD and IS.**

4 Rates XD and IS are rate classes with negotiable rates due to the availability of
5 competitive alternatives. Eliminating the STAS charge will permit the Company
6 to provide for rate certainty with regard to the terms that were agreed to in XD and
7 IS contracts, which supports the ability to offer competitive rates to retain XD and
8 IS rate payers, which will in turn benefit all UGI PNG customers.

9
10 **Q. Is the Company proposing any changes to its Choice Supplier Tariff?**

11 A. Yes. The proposed changes to the Company's Choice Supplier Tariff have been
12 incorporated into Proposed Tariff No. 9-S. See UGI PNG Exhibit F. The key proposed
13 modifications to the Choice Supplier Tariff are summarized below.

14 **Section 9 Enrollment of Customers into Rate Schedules RT and NT.** The
15 number of days the customer has to respond to the letter of confirmation it receives
16 from the Company was updated from 10 days to 5 days to reflect current
17 regulations and current Company practice. Language on multiple enrollments that
18 was not consistent with current regulations was removed.

19 **Rate AG.** The Company proposes to eliminate the switching fees and redundant
20 definition language from this rate schedule.

21 **Aggregation Agreement (Pro Forma).** Redundant definitions found elsewhere
22 in the tariff were removed. Contact information for notices and correspondence
23 was updated. Selected sections of the Aggregation Agreement that were no longer

1 relevant were removed. The time frame for billing rate information submission
2 was changed from 10 days to 15 days.

3 **Billing and Payment.** The Application of Payments for Rates RT and NT Section
4 has been modified to reference the application of payments per Section 8.10 of the
5 main Tariff and the treatment of joint billing payments per Section 8.11 of the
6 main Tariff.

7
8 **Q. Is the Company proposing any changes to UGI Penn Natural Gas Tariff Pa. P.U.C.
9 No. 1?**

10 A. Yes. UGI PNG is proposing to withdraw this tariff. Historically, UGI PNG Tariff Gas No.
11 1 was applicable only to one customer at one location - The Procter and Gamble Paper
12 Products Company, taking service for its Mehoopany Station Plant of Washington
13 Township, Wyoming County, Pennsylvania. The Company proposes to withdraw this
14 tariff as Procter and Gamble is now served under a service agreement conforming to the
15 provisions of PNG's Rate XD under Tariff No. 8, which will continue to be served under
16 the Rate XD provisions of Proposed Tariff No. 9 in unchanged fashion.

17
18 **Q. Does this conclude your testimony?**

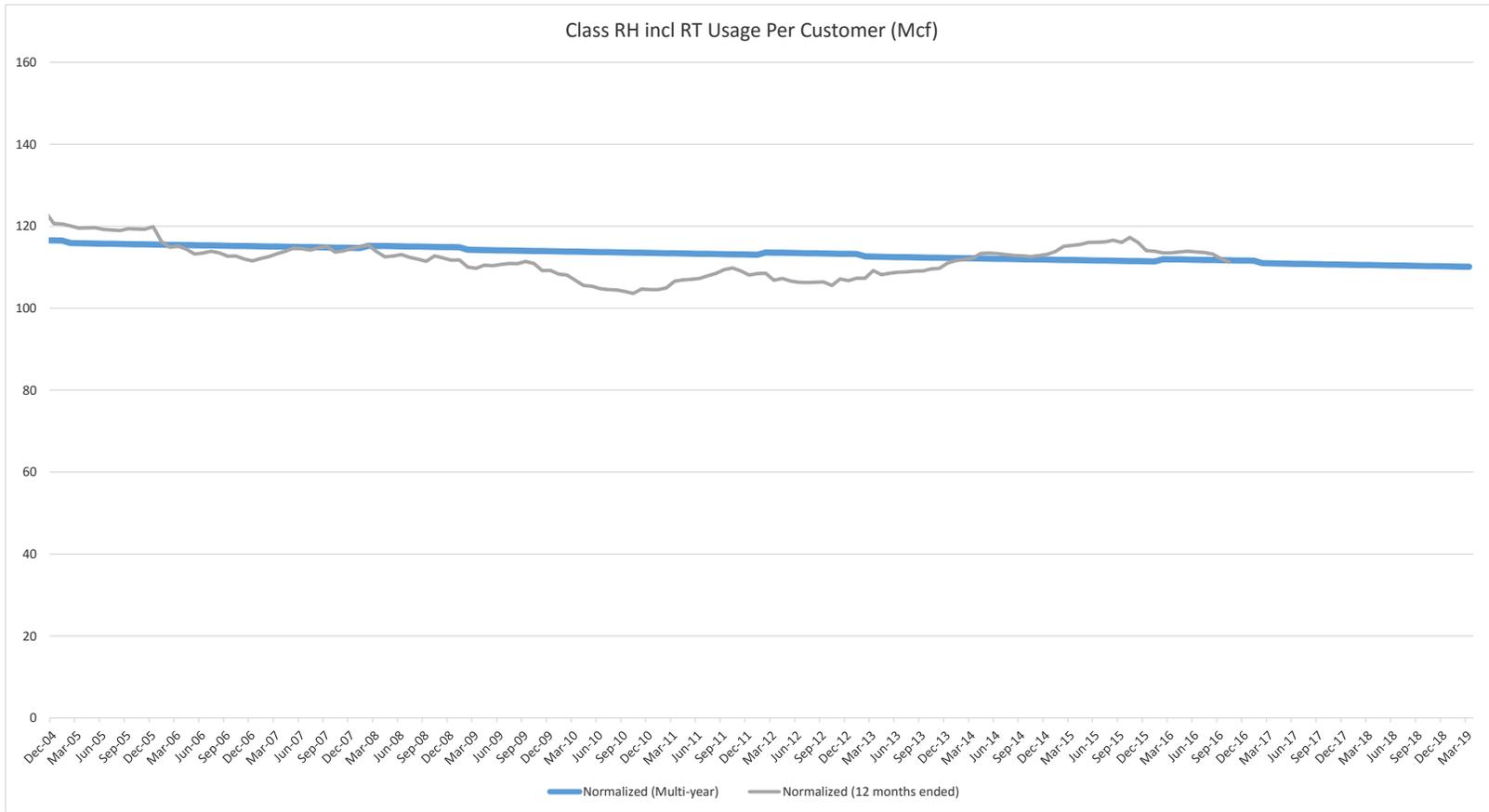
19 A. Yes.

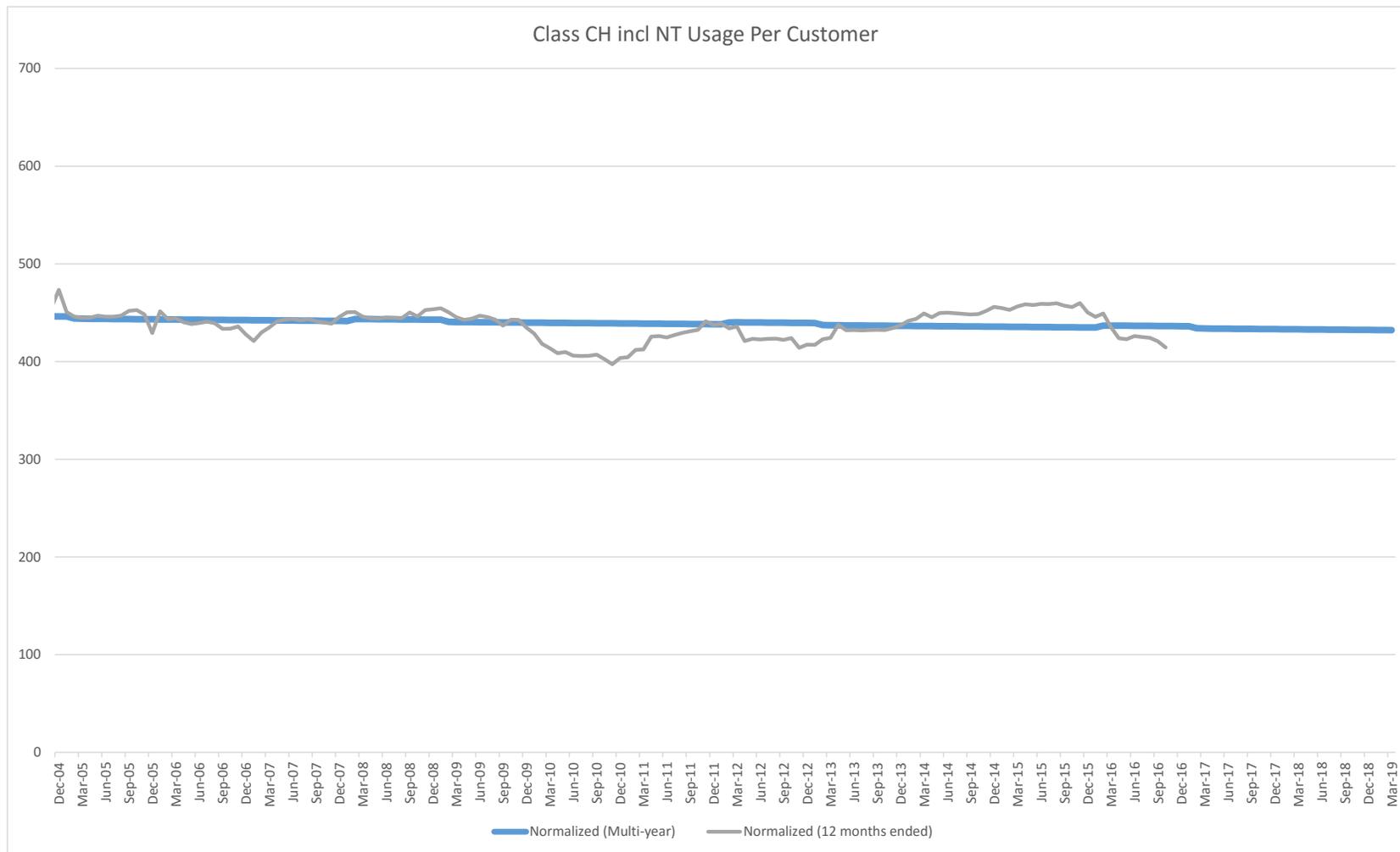
UGI PNG EXHIBIT DEL-1

UGI Penn Natural Gas, Inc.
15 Year Normal Heating Degree Days (2000-2014)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	15 Year Average
Jan	1,240	1,176	961	1,366	1,428	1,298	930	1,048	1,088	1,342	1,218	1,291	1,039	1,092	1,336	1,190
Feb	967	975	848	1,124	1,052	984	984	1,227	1,017	949	1,042	1,010	857	1,011	1,145	1,013
Mar	685	977	778	861	780	1,019	846	899	879	789	680	901	511	937	1,031	838
Apr	505	484	467	519	474	406	440	598	393	422	341	457	491	463	489	463
May	188	202	273	258	129	294	221	170	310	199	175	141	86	194	160	200
Jun	62	42	42	91	74	19	72	34	28	40	36	34	52	30	14	45
Jul	19	27	4	1	2	0	1	22	0	8	4	0	1	2	5	6
Aug	35	0	11	7	34	0	9	27	21	14	8	13	6	11	12	14
Sep	208	171	85	96	85	42	154	83	102	145	85	86	131	169	109	117
Oct	429	380	493	496	455	400	466	243	501	486	416	425	354	337	312	413
Nov	790	536	745	627	675	625	579	765	735	601	687	569	808	806	763	687
Dec	1,282	888	1,099	1,036	1,045	1,165	836	1,044	1,048	1,101	1,203	879	900	1,043	918	1,032
Totals	6,410	5,858	5,806	6,482	6,233	6,252	5,538	6,160	6,122	6,096	5,895	5,806	5,236	6,095	6,294	6,019

UGI PNG EXHIBIT DEL-2





UGI PNG EXHIBIT DEL-3

Fully Projected Future Test Year 2018 Sales and Revenues
Summary of Adjustments

	Sales (000's) MCF	Revenues (\$000's)	Reference
Budget 2018	122,712	207,459	
Adjustment for Customer Changes	(156)	(1,231)	PNG Exhibit DEL-3(b)
Adjustment for Normalized & Annualized Use/Customer	(17)	(14)	PNG Exhibit DEL-3(c)
Adjustment for Transport Changes	43,778	3,849	PNG Exhibit DEL-3(b)/(b)(1)/(c)/(c)(1)
Adjustment for PGC		2,655	PNG Exhibit DEL-3(d)
Adjustment for MFC		68	PNG Exhibit DEL-3(e)
Adjustment for USP		(274)	PNG Exhibit DEL-3(f)
Adjustment for GPC		(12)	PNG Exhibit DEL-3(g)
Adjustment for Interruptible		(1,558)	PNG Exhibit DEL-3(h)
Adjustment for Excess Take		(400)	PNG Exhibit DEL-3(i)
Adjustment for STAS		(192)	PNG Exhibit DEL-3(j)
Adjustment for EEC Conservation Impact	(137)	(823)	PNG Exhibit DEL-3(k)
Adjustment for Get Gas		48	PNG Exhibit DEL-3(l)
Adjustment for DSIC Revenues		(3,286)	PNG Exhibit DEL-3(m)
Fully Projected Future Test Year 2018	166,179	206,290	

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2018
(\$ in Thousands)

Adjustment for Customer Changes

Line #	Description	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
		Residential-Non Htg	Residential-Htg	RT	Commercial-Non Htg	Commercial-Htg	Industrial	NT	DS	Transport-Other	Grand Total
1	Total Test Year 2018 Revenues (Unadjusted)	\$ 2,050	\$ 135,601	\$ 2,122	\$ 1,324	\$ 27,839	\$ 309	\$ 7,585	\$ 8,284	\$ 22,347	\$ 207,459
2	PGC Revenues	(470)	(51,610)	(95)	(621)	(12,951)	(163)	-	-	-	(65,911)
3	Revenues net of PGC - Margin (Unadjusted)	\$ 1,580	\$ 83,991	\$ 2,027	\$ 703	\$ 14,887	\$ 145	\$ 7,585	\$ 8,284	\$ 22,347	\$ 141,549
4	Average Effective Customers in Test Year 2018 (Unadjusted)	6,069	143,369	3,716	546	11,937	49	3,815	498	157	170,157
5	Average Annual Margin Per Customer (L 3 / L 4)	\$ 0.260	\$ 0.586	\$ 0.545	\$ 1.287	\$ 1.247	\$ 2.982	\$ 1.988	\$ 16.620	\$ 142.339	\$ 0.832
6	Future Test Year 2018 Customers (Fully Adjusted)	5,991	142,477	3,716	538	11,804	44	3,815	514	153	169,052
7	Change in Customers during Future Test Year 2018 (L 6 - L 4)	(78)	(892)	-	(8)	(133)	(5)	-	16	(4)	(1,105)
8	Annualization of Margin (L 5 * L 7)	\$ (20)	\$ (523)	\$ -	\$ (11)	\$ (166)	\$ (14)	\$ -	\$ 259	\$ (688)	\$ (1,163)
9	Average Annual Revenue Per Customer (L 1 / L 4)	\$ 0.338	\$ 0.946	\$ 0.571	\$ 2.423	\$ 2.332	\$ 6.338	\$ 1.988	\$ 16.620	\$ 142.339	\$ 1.219
10	Annualization of Total Revenue (L 7 * L 9)	\$ (26)	\$ (844)	\$ -	\$ (21)	\$ (310)	\$ (30)	\$ -	\$ 259	\$ (688)	\$ (1,659)
11	Annualization of PGC Revenues (L 10 - L 8)	\$ (6)	\$ (321)	\$ -	\$ (10)	\$ (144)	\$ (16)	\$ -	\$ -	\$ -	\$ (497)
12	Total UPC (Unadjusted)-MCF	23.60	109.90	102.90	375.30	358.00	1,105.80	690.80	8,298.30		
13	Annualization Adjustment for Sales-MMCF (L12 * L7)/1000	(2)	(98)	-	(3)	(48)	(5)	-	129	(158)	(185)

Notes:

Column [9] further detailed on PNG Exhibit DEL-3(b)(1)

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2018
(\$ in Thousands)

Adjustment for Customer Changes
Large Transport and Interruptible Detail

Line #	Description	[1]	[2]	[3]	[4]	[5]
		LFD	XD-F	XD-I	IS	TOTAL
1	Total Test Year 2018 Revenues (Unadjusted)	\$ 6,597	\$ 13,168	\$ 0	\$ 2,583	\$ 22,347
2	PGC Revenues	-	-	-	-	-
3	Revenues net of PGC - Margin (Unadjusted)	\$ 6,597	\$ 13,168	\$ 0	\$ 2,583	\$ 22,347
4	Average Effective Customers in Test Year 2018 (Unadjusted)	106	17	14	20	157
5	Average Annual Margin Per Customer (L 3 / L 4)	\$ 62.234	\$ 774.560	\$ 0.009	\$ 129.141	\$ 142.339
6	Future Test Year 2018 Customers (Fully Adjusted)	105	15	14	19	153
7	Change in Customers during Future Test Year 2017 (L 6 - L 4)	(1)	(2)	-	(1)	(4)
8	Annualization of Margin	\$ (39)	\$ (630)	\$ -	\$ (19)	\$ (688)
9	Average Annual Revenue Per Customer (L 1 / L 4)	\$ 62.234	\$ 774.560	\$ 0.009	\$ 129.141	\$ 142.339
10	Annualization of Total Revenue	\$ (39)	\$ (630)	\$ -	\$ (19)	\$ (688)
11	Annualization of PGC Revenues (L 10 - L 8)	\$ -	\$ -	\$ -	\$ -	\$ -
12	Total Future Test Year 2017 UPC (Unadjusted)-MCF					
13	Annualization Adjustment for Sales-MMCF	(29)	(120)	0	(9)	(158)

UGI Penn Natural Gas, Inc.
 Future Period- 12 Months Ended September 30, 2018
 (\$ in Thousands)

Adjustment for Normalized & Annualized Use/Customer

Line #	Description	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
		Residential-Non Htg	Residential-Htg	RT	Commercial-Non Htg	Commercial-Htg	Industrial	NT	DS	Large Transp-Other	Reconciliation Adj.	Total
1	Total FY 18 (Unadjusted) UPC-MCF	23.60	109.90	102.90	375.30	358.00	1,105.80	690.80	8,298.30			
2	Future Test Year FY 18 UPC (Fully Adjusted)-MCF	23.10	110.10	104.00	330.40	357.70	1,170.40	667.90	8,171.10			
3	Change in UPC -MCF (L 2 - L1)	(0.50)	0.20	1.10	(44.90)	(0.30)	64.60	(22.90)	(127.20)			
4	Future Test Year 2018 Customers (Fully Adjusted)	5,991	142,477	3,716	538	11,804	44	3,815	514	153		169,052
5	Adjustment for Sales-MMCF (L3*L4)/1000	(3)	28	4	(24)	(4)	3	(87)	(65)	43,955	(18)	43,789
6	Total Revenue Adjustment (L8 + L10)	\$ (20)	\$ 187	\$ 14	\$ (128)	\$ (19)	\$ 15	\$ (186)	\$ (106)	\$ 4,572	\$ (67)	\$ 4,264
7	Total Unit Revenue Adjustment (L6/L5)	6.6582	6.5582	3.4036	5.2789	5.2789	5.2789	2.1243	1.6171	0.1040		
8	Margin Adjustment (L5 *L9)	\$ (10)	\$ 97	\$ 14	\$ (51)	\$ (8)	\$ 6	\$ (186)	\$ (106)	\$ 4,572	\$ 36	\$ 4,365
9	Unit Margin Rate	3.5036	3.4036	3.4036	2.1243	2.1243	2.1243	2.1243	1.6171	0.1040		
10	PGC Revenue (L5*L11)	\$ (9)	\$ 90	\$ -	\$ (76)	\$ (11)	\$ 9	\$ -	\$ -	\$ -	\$ (103)	\$ (101)
11	PGC Unit Rate	3.1546	3.1546		3.1546	3.1546	3.1546					

Notes:

Column (9) further detailed on PNG Exhibit DEL-3 (c)(1)

Column (10) Adjustment reflective of interdependent relationship of sequential adjustment impacts.

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2018
(\$ in Thousands)

Adjustment for Annualized Usage and Annualized Rates
Large Transport and Interruptible Detail

Line #	Description	[1]	[2]	[3]	[4]	[5]
		LFD	XD-F	XD-I	DSO IS/IL	TOTAL
1	Total FY 18 (Unadjusted) UPC-MCF					
2	Future Test Year FY 18 UPC (Fully Adjusted)-MCF					
3	Change in UPC -MCF	0.00	0.00	0.00	0.00	0.00
4	Future Test Year 2018 Customers (Fully Adjusted)	105	15	14	19	153
5	Annualization Adjustment for Sales-MMCF	-	43,955	-	-	43,955
6	Total Revenue Adjustment	\$	4,572		\$	4,572
7	Unit Revenue Adjustment (L6/*L5)	0.0000	0.1040	0.0000	0.0000	0.1040
8	Margin Adjustment	\$ -	\$ 4,572	\$ -	\$ -	\$ 4,572
9	Unit Margin (L8/*L5)	0.0000	0.1040	0.0000	0.0000	0.1040
10	PGC Revenue (L 6 - L 8)	\$ -	\$ -	\$ -	\$ -	\$ -

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2018
(\$ in Thousands)

Adjustment for PGC

	OCT 2017	NOV 2017	DEC 2017	JAN 2018	FEB 2018	MAR 2018	APR 2018	MAY 2018	JUN 2018	JUL 2018	AUG 2018	SEP 2018	TOTAL
Original Budget PGC Rate FY 18	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	
Future Test Year 2018 PGC Rate	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	
PGC Rate Variance	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	
Total PGC Volumes	1,168	2,193	3,307	4,011	3,353	2,534	1,408	761	440	418	378	481	20,452
PGC Revenue Adjustment	\$152	\$285	\$429	\$521	\$435	\$329	\$183	\$99	\$57	\$54	\$49	\$62	\$2,655

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2018
(\$ in Thousands)

Adjustment for MFC

	OCT 2017	NOV 2017	DEC 2017	JAN 2018	FEB 2018	MAR 2018	APR 2018	MAY 2018	JUN 2018	JUL 2018	AUG 2018	SEP 2018	TOTAL
Original Budget PGC Rate FY 18	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	
Future Test Year 2018 PGC Rate	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	
PGC Rate Variance	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	
Total PGC Volumes-Rate R	893	1,645	2,566	3,133	2,639	2,005	1,151	559	331	318	274	396	
Total PGC Volumes-Rate N	275	548	740	878	714	529	257	202	109	100	104	85	
Total PGC Volumes	1,168	2,193	3,307	4,011	3,353	2,534	1,408	761	440	418	378	481	20,452
Rate R %	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	
Rate N %	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	
MFC Rate R Adj Rate	\$0.0042	\$0.0042	\$0.0042	\$0.0042	\$0.0042	\$0.0042	\$0.0042	\$0.0042	\$0.0042	\$0.0042	\$0.0042	\$0.0042	
MFC Rate N Adj Rate	\$0.0005	\$0.0005	\$0.0005	\$0.0005	\$0.0005	\$0.0005	\$0.0005	\$0.0005	\$0.0005	\$0.0005	\$0.0005	\$0.0005	
Rate R Revenue Variance	\$4	\$7	\$11	\$13	\$11	\$8	\$5	\$2	\$1	\$1	\$1	\$2	
Rate N Revenue Variance	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Total Revenue Variance	\$4	\$7	\$11	\$13	\$11	\$9	\$5	\$2	\$1	\$1	\$1	\$2	\$68

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2018
(\$ in Thousands)

Adjustment for USP

	OCT 2017	NOV 2017	DEC 2017	JAN 2018	FEB 2018	MAR 2018	APR 2018	MAY 2018	JUN 2018	JUL 2018	AUG 2018	SEP 2018	TOTAL
Original Budget USP Rate FY 18	\$0.2602	\$0.2602	\$0.2602	\$0.2602	\$0.2602	\$0.2602	\$0.2602	\$0.2602	\$0.2602	\$0.2602	\$0.2602	\$0.2602	
Future Test Year 2018 USP Rate	\$0.2426	\$0.2426	\$0.2426	\$0.2426	\$0.2426	\$0.2426	\$0.2426	\$0.2426	\$0.2426	\$0.2426	\$0.2426	\$0.2426	
USP Rate Variance	(\$0.0176)	(\$0.0176)	(\$0.0176)	(\$0.0176)	(\$0.0176)	(\$0.0176)	(\$0.0176)	(\$0.0176)	(\$0.0176)	(\$0.0176)	(\$0.0176)	(\$0.0176)	
Total Rate R Volumes	911	1,682	2,624	3,206	2,702	2,052	1,181	569	344	330	284	408	16,293
Total Rate R excl CAP Volumes	870	1,606	2,506	3,062	2,581	1,959	1,128	544	329	315	272	389	15,560
Revenue Variance	(\$15)	(\$28)	(\$44)	(\$54)	(\$45)	(\$34)	(\$20)	(\$10)	(\$6)	(\$6)	(\$5)	(\$7)	(\$274)

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2018
(\$ in Thousands)

Adjustment for Interruptibles to Cost of Service

Total Future Year 2018 Revenues	2,503
Adjustment to Interruptible Revenues	(1,558)
Fully Projected Future Test Year 2018 Interruptible Revenues	945

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2018
(\$ in Thousands)

Adjustment for Excess Take Revenues

Excess Take (MCF)		(67)
\$/MCF	\$	6.00
Excess Take Revenue/Margin	\$	(400)

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2018
(\$ in Thousands)

Adjustment for STAS

	@ -0.40%	@ -0.46%	Revenue
	Unadjusted	Adjusted	Adjustment
	2018	2018	Total
	TOTAL	TOTAL	Total
RES. G	(8)	(9)	(2)
H	(496)	(620)	(124)
SUBTOTAL R	(504)	(629)	(126)
RT	(8)	(10)	(2)
TOTAL	(511)	(639)	(128)
COM. G	(5)	(5)	(0)
H	(107)	(127)	(20)
SUBTOTAL C-N	(112)	(133)	(21)
NT	(28)	(33)	(5)
DS	(23)	(28)	(5)
IS	(7)	(8)	(1)
XD-F	(2)	(3)	(0)
LFD	(12)	(13)	(1)
TOTAL	(184)	(218)	(34)
IND.	(1)	(1)	(0)
SUBTOTAL I-N	(1)	(1)	(0)
NT	(0)	(0)	(0)
DS	(8)	(10)	(2)
IS	(3)	(3)	(1)
XD-F	(48)	(74)	(26)
LFD	(13)	(15)	(2)
TOTAL	(73)	(104)	(30)
GRAND TOTAL	(769)	(961)	(192)

UGI Penn Natural Gas, Inc.
 Future Period- 12 Months Ended September 30, 2018
 (\$ in Thousands)

Adjustment for EE&C Conservation Impact

PNG EE&C Plan (Version 11/17/2016)

Yearly Gas Savings by Rate Class 2017 - 2045 (Cumulative MMBtus)

Rate Class Description	Fiscal Year				MMBTU		MCF	Customers FY18		EE&C UPC Conservation Adj
	2018	2019	2020	2021	2022 5 Year Average	BTU		5 Year Average	Retail Htg & Choice Htg	
Residential (R/RT)	12,367	77,805	111,799	147,048	182,298	106,263	1.029	103,269	145,980	(0.7)
Nonresidential (N/NT)	2,771	13,290	31,435	52,903	74,371	34,954	1.029	33,969	15,519	(2.2)
Total	15,138	91,095	143,234	199,952	256,669	141,218		137,238	161,499	

Line #	Description	[1] Residential-Htg	[2] Res Htg-RT	[3] Commercial-Htg	[4] Com Htg-NT	[5] Industrial	[6] Industrial -NT	[7] Total
1	Future Test Year FY 18 UPC (Fully Adjusted)-MCF	110.1	109.0	357.7	673.6	1,170.4	667.9	
2	Future Test Year FY 18 UPC (Fully Adjusted-Incl EE&C Impact)-MCF	109.4	108.3	355.5	671.4	1,168.2	665.7	
3	Change in UPC -MCF	(0.7)	(0.7)	(2.2)	(2.2)	(2.2)	(2.2)	
4	End of Year Customers-Total FY 18	142,477	3,503	11,804	3,642	44	29	161,499
5	Annualization Adjustment for Sales-MMCF (L3*L4)/1000	(101)	(2)	(26)	(8)	(0)	(0)	(137)
6	Total Revenue Adjustment (L8 + L10)	\$ (661)	\$ (8)	\$ (136)	\$ (17)	\$ (1)	\$ (0)	\$ (823)
7	Total Unit Revenue Adjustment (L6/L5)	6.5582	3.4036	5.2789	2.1243	5.2789	2.1243	5.9999
8	Margin Adjustment (L5 *L9)	\$ (343)	\$ (8)	\$ (55)	\$ (17)	\$ (0)	\$ (0)	\$ (424)
9	Unit Margin Rate	3.4036	3.4036	2.1243	2.1243	2.1243	2.1243	
10	PGC Revenue (L5*L11)	\$ (318)	\$ -	\$ (82)	\$ -	\$ (0)	\$ -	\$ (400)
11	PGC Unit Rate	3.1546		3.1546		3.1546		

UGI Utilities, Inc.
Future Period- 12 Months Ended September 30, 2018
(\$ in Thousands)

Adjustment for Get Gas Surcharge

Budget 2018	\$	64
Fully Projected Future Test Year 2018	\$	112
Get Gas Revenue Adjustment	\$	48

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2018
(\$ in Thousands)

Adjustment for DSIC

	@ 7.5% Level Unadjusted 2018 TOTAL	@ 5% Level Adjusted 2018 TOTAL	Revenue Adjustment Total
RES. G	111	74	(37)
H	5,897	4,081	(1,816)
SUBTOTAL R	6,008	4,155	(1,852)
RT	142	99	(43)
TOTAL	6,150	4,255	(1,895)
COM. G	49	30	(20)
H	1,046	686	(360)
SUBTOTAL C-N	1,096	716	(380)
NT	527	341	(186)
DS	432	294	(137)
IS	60	11	(48)
XD-F	34	23	(11)
LFD	218	136	(82)
TOTAL	2,367	1,522	(845)
IND.	10	6	(4)
SUBTOTAL I-N	10	6	(4)
NT	4	3	(1)
DS	148	99	(49)
IS	32	21	(11)
XD-F	576	189	(387)
LFD	244	150	(94)
TOTAL	1,015	469	(546)
GRAND TOTAL	9,531	6,245	(3,286)

UGI PNG EXHIBIT DEL-4

Future Test Year 2017 Sales and Revenues
Summary of Adjustments

	Sales (000's) MCF	Revenues (\$000's)	Reference
Budget 2017	89,810	201,526	
Adjustment for Customer Changes	(169)	(1,347)	PNG Exhibit DEL-4(b)
Adjustment for Normalized & Annualized Use/Customer	(38)	(68)	PNG Exhibit DEL-4(c)
Adjustment for Transport Changes	143	(119)	PNG Exhibit DEL-4(b)/(b)(1)/(c)/(c)(1)
Adjustment for PGC		2,652	PNG Exhibit DEL-4(d)
Adjustment for MFC		68	PNG Exhibit DEL-4(e)
Adjustment for USP		(273)	PNG Exhibit DEL-4(f)
Adjustment for GPC		(8)	PNG Exhibit DEL-4(g)
Adjustment for Interruptible		(1,594)	PNG Exhibit DEL-4(h)
Adjustment for Excess Take		(400)	PNG Exhibit DEL-4(i)
Adjustment for STAS		749	PNG Exhibit DEL-4(j)
Adjustment for Get Gas		20	PNG Exhibit DEL-4(k)
Adjustment for DSIC Revenues		(8,537)	PNG Exhibit DEL-4(l)
Future Test Year 2017	89,746	192,669	

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2017
(\$ in Thousands)

Adjustment for Customer Changes

Line #	Description	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
		Residential-Non Htg	Residential-Htg	RT	Commercial-Non Htg	Commercial-Htg	Industrial	NT	DS	Transport-Other	Grand Total
1	Total Test Year 2017 Revenues (Unadjusted)	\$ 2,090	\$ 134,628	\$ 2,194	\$ 1,323	\$ 27,751	\$ 418	\$ 7,404	\$ 7,729	\$ 17,988	\$ 201,526
2	PGC Revenues	(476)	(51,437)	(100)	(619)	(12,975)	(225)	-	-	-	(65,833)
3	Revenues net of PGC - Margin (Unadjusted)	\$ 1,614	\$ 83,191	\$ 2,094	\$ 704	\$ 14,776	\$ 193	\$ 7,404	\$ 7,729	\$ 17,988	\$ 135,693
4	Average Effective Customers in Test Year 2017 (Unadjusted)	6,264	142,388	3,716	558	11,802	53	3,815	476	155	169,227
5	Average Annual Margin Per Customer (L 3 / L 4)	\$ 0.258	\$ 0.584	\$ 0.563	\$ 1.262	\$ 1.252	\$ 3.641	\$ 1.941	\$ 16.240	\$ 116.051	\$ 0.802
6	Future Test Year 2017 Customers (Fully Adjusted)	6,182	141,355	3,716	549	11,678	49	3,815	487	153	167,984
7	Change in Customers during Future Test Year 2017 (L 6 - L 4)	(82)	(1,033)	-	(9)	(124)	(4)	-	11	(2)	(1,243)
8	Annualization of Margin (L 5 * L 7)	\$ (21)	\$ (604)	\$ -	\$ (11)	\$ (155)	\$ (15)	\$ -	\$ 180	\$ (58)	\$ (683)
9	Average Annual Revenue Per Customer (L 1 / L 4)	\$ 0.334	\$ 0.945	\$ 0.590	\$ 2.373	\$ 2.351	\$ 7.880	\$ 1.941	\$ 16.240	\$ 116.051	\$ 1.191
10	Annualization of Total Revenue (L 7 * L 9)	\$ (27)	\$ (977)	\$ -	\$ (20)	\$ (291)	\$ (32)	\$ -	\$ 180	\$ (58)	\$ (1,226)
11	Annualization of PGC Revenues (L 10 - L 8)	\$ (6)	\$ (373)	\$ -	\$ (9)	\$ (136)	\$ (17)	\$ -	\$ -	\$ -	\$ (542)
12	Total UPC (Unadjusted)-MCF	23.20	110.20	108.60	367.10	363.00	1,397.70	674.20	8,128.30		
13	Annualization Adjustment for Sales-MMCF (L12 * L7)/1000	(2)	(114)	-	(9)	(45)	(6)	-	90	(38)	(118)

Notes:

Column [9] further detailed on PNG Exhibit DEL-4(b)(1)

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2017
(\$ in Thousands)

Adjustment for Customer Changes
Large Transport and Interruptible Detail

Line #	Description	[1]	[2]	[3]	[4]	[5]
		LFD	XD-F	XD-I	IS	TOTAL
1	Total Test Year 2017 Revenues (Unadjusted)	\$ 6,567	\$ 8,783	\$ 0	\$ 2,638	\$ 17,988
2	PGC Revenues	-	-	-	-	-
3	Revenues net of PGC - Margin (Unadjusted)	\$ 6,567	\$ 8,783	\$ 0	\$ 2,638	\$ 17,988
4	Average Effective Customers in Test Year 2017 (Unadjusted)	106	15	14	20	155
5	Average Annual Margin Per Customer (L 3 / L 4)	\$ 61.951	\$ 585.513	\$ 0.009	\$ 131.914	\$ 116.051
6	Future Test Year 2017 Customers (Fully Adjusted)	105	15	14	19	153
7	Change in Customers during Future Test Year 2017 (L 6 - L 4)	(1)	-	-	(1)	(2)
8	Annualization of Margin	\$ (39)	\$ -	\$ -	\$ (19)	\$ (58)
9	Average Annual Revenue Per Customer (L 1 / L 4)	\$ 61.951	\$ 585.513	\$ 0.009	\$ 131.914	\$ 116.051
10	Annualization of Total Revenue	\$ (39)	\$ -	\$ -	\$ (19)	\$ (58)
11	Annualization of PGC Revenues (L 10 - L 8)	\$ -	\$ -	\$ -	\$ -	\$ -
12	Total Future Test Year 2017 UPC (Unadjusted)-MCF					
13	Annualization Adjustment for Sales-MMCF	(29)	0	0	(9)	(38)

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2017
(\$ in Thousands)

Adjustment for Normalized & Annualized Use/Customer

Line #	Description	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
		Residential-Non Htg	Residential-Htg	RT	Commercial-Non Htg	Commercial-Htg	Industrial	NT	DS	Large Transp-Other	Reconciliation Adj.	Total
1	Total FY 17 (Unadjusted) UPC-MCF	23.20	110.20	108.60	367.10	363.00	1,397.70	674.20	8,128.30			
2	Future Test Year FY 17 UPC (Fully Adjusted)-MCF	22.80	110.40	109.10	321.80	361.80	1,445.40	656.00	8,015.90			
3	Change in UPC -MCF (L2-L1)	(0.40)	0.20	0.50	(45.30)	(1.20)	47.70	(18.20)	(112.40)			
4	Future Test Year 2017 Customers (Fully Adjusted)	6,182	141,355	3,716	549	11,678	49	3,815	487	153		167,984
5	Adjustment for Sales-MMCF (L3*L4)/1000	(2)	28	2	(25)	(14)	2	(69)	(55)	214	(27)	54
6	Total Revenue Adjustment (L8 + L10)	\$ (16)	\$ 185	\$ 6	\$ (131)	\$ (74)	\$ 12	\$ (147)	\$ (89)	\$ -	\$ (54)	\$ (308)
7	Total Unit Revenue Adjustment (L6/L5)	6.6582	6.5582	3.4036	5.2789	5.2789	5.2789	2.1243	1.6171	0.0000		
8	Margin Adjustment (L5 *L9)	\$ (9)	\$ 96	\$ 6	\$ (53)	\$ (30)	\$ 5	\$ (147)	\$ (89)	\$ -	\$ 34	\$ (186)
9	Unit Margin Rate	3.5036	3.4036	3.4036	2.1243	2.1243	2.1243	2.1243	1.6171	0.0000		
10	PGC Revenue (L5*L11)	\$ (8)	\$ 89	\$ -	\$ (78)	\$ (44)	\$ 7	\$ -	\$ -	\$ -	\$ (88)	\$ (122)
11	PGC Unit Rate	3.1546	3.1546		3.1546	3.1546	3.1546					

Notes:

Column (9) further detailed on PNG Exhibit DEL-4 (c)(1)
Column (10) Adjustment reflective of interdependent relationship of sequential adjustment impacts.

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2017
(\$ in Thousands)

Adjustment for Annualized Usage and Annualized Rates
Large Transport and Interruptible Detail

Line #	Description	[1]	[2]	[3]	[4]	[5]
		LFD	XD-F	XD-I	DSO IS/IL	TOTAL
1	Total FY 17 (Unadjusted) UPC-MCF					
2	Future Test Year FY 17 UPC (Fully Adjusted)-MCF					
3	Change in UPC -MCF	0.00	0.00	0.00	0.00	0.00
4	Future Test Year 2017 Customers (Fully Adjusted)	105	15	14	19	153
5	Annualization Adjustment for Sales-MMCF	-	214	-	-	214
6	Total Revenue Adjustment	\$ -	\$ -	\$ -	\$ -	\$ -
7	Unit Revenue Adjustment (L6/*L5)	0.0000	0.0000	0.0000	0.0000	0.0000
8	Margin Adjustment	\$ -	\$ -	\$ -	\$ -	\$ -
9	Unit Margin (L8/*L5)	0.0000	0.0000	0.0000	0.0000	0.0000
10	PGC Revenue (L 6 - L 8)	\$ -	\$ -	\$ -	\$ -	\$ -

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2017
(\$ in Thousands)

Adjustment for PGC

	OCT 2016	NOV 2016	DEC 2016	JAN 2017	FEB 2017	MAR 2017	APR 2017	MAY 2017	JUN 2017	JUL 2017	AUG 2017	SEP 2017	TOTAL
Original Budget PGC Rate FY 17	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	
Future Test Year 2017 PGC Rate	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	
PGC Rate Variance	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	
Total PGC Volumes	1,154	2,197	3,290	3,927	3,347	2,583	1,400	781	447	410	376	516	20,428
PGC Revenue Adjustment	\$150	\$285	\$427	\$510	\$434	\$335	\$182	\$101	\$58	\$53	\$49	\$67	\$2,652

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2017
(\$ in Thousands)

Adjustment for MFC

	OCT 2016	NOV 2016	DEC 2016	JAN 2017	FEB 2017	MAR 2017	APR 2017	MAY 2017	JUN 2017	JUL 2017	AUG 2017	SEP 2017	TOTAL
Original Budget PGC Rate FY 17	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	\$3.0248	
Future Test Year 2017 PGC Rate	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	\$3.1546	
PGC Rate Variance	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	\$0.1298	
Total PGC Volumes-Rate R	877	1,644	2,564	3,044	2,622	2,049	1,140	580	332	313	272	422	
Total PGC Volumes-Rate N	278	552	726	883	725	534	261	202	114	97	103	93	
Total PGC Volumes	1,154	2,197	3,290	3,927	3,347	2,583	1,400	781	447	410	376	516	20,428
Rate R %	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	
Rate N %	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	
MFC Rate R Adj Rate	\$0.0042	\$0.0042	\$0.0042	\$0.0042	\$0.0042	\$0.0042	\$0.0042	\$0.0042	\$0.0042	\$0.0042	\$0.0042	\$0.0042	
MFC Rate N Adj Rate	\$0.0005	\$0.0005	\$0.0005	\$0.0005	\$0.0005	\$0.0005	\$0.0005	\$0.0005	\$0.0005	\$0.0005	\$0.0005	\$0.0005	
Rate R Revenue Variance	\$4	\$7	\$11	\$13	\$11	\$9	\$5	\$2	\$1	\$1	\$1	\$2	
Rate N Revenue Variance	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Revenue Variance	\$4	\$7	\$11	\$13	\$11	\$9	\$5	\$3	\$1	\$1	\$1	\$2	\$68

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2017
(\$ in Thousands)

Adjustment for USP

	OCT 2016	NOV 2016	DEC 2016	JAN 2017	FEB 2017	MAR 2017	APR 2017	MAY 2017	JUN 2017	JUL 2017	AUG 2017	SEP 2017	TOTAL
Original Budget USP Rate FY 17	\$0.2602	\$0.2602	\$0.2602	\$0.2602	\$0.2602	\$0.2602	\$0.2602	\$0.2602	\$0.2602	\$0.2602	\$0.2602	\$0.2602	
Future Test Year 2017 USP Rate	\$0.2426	\$0.2426	\$0.2426	\$0.2426	\$0.2426	\$0.2426	\$0.2426	\$0.2426	\$0.2426	\$0.2426	\$0.2426	\$0.2426	
USP Rate Variance	(\$0.0176)	(\$0.0176)	(\$0.0176)	(\$0.0176)	(\$0.0176)	(\$0.0176)	(\$0.0176)	(\$0.0176)	(\$0.0176)	(\$0.0176)	(\$0.0176)	(\$0.0176)	
Total Rate R Volumes	895	1,684	2,626	3,121	2,689	2,098	1,171	591	345	325	282	436	16,263
Total Rate R excl CAP Volumes	854	1,608	2,508	2,981	2,568	2,004	1,118	564	330	311	269	416	15,531
Revenue Variance	(\$15)	(\$28)	(\$44)	(\$52)	(\$45)	(\$35)	(\$20)	(\$10)	(\$6)	(\$5)	(\$5)	(\$7)	(\$273)

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2017
(\$ in Thousands)

Adjustment for GPC

	OCT 2016	NOV 2016	DEC 2016	JAN 2017	FEB 2017	MAR 2017	APR 2017	MAY 2017	JUN 2017	JUL 2017	AUG 2017	SEP 2017	TOTAL
GPC Rate	\$0.0400	\$0.0400	\$0.0400	\$0.0400	\$0.0400	\$0.0400	\$0.0400	\$0.0400	\$0.0400	\$0.0400	\$0.0400	\$0.0400	
Volume Variance to Original FY17 Budget	2	(17)	(38)	(55)	(50)	(38)	(11)	(2)	(4)	5	(1)	(1)	(210)
Revenue Variance	\$0	(\$1)	(\$2)	(\$2)	(\$2)	(\$2)	(\$0)	(\$0)	(\$0)	\$0	(\$0)	(\$0)	(\$8)

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2017
(\$ in Thousands)

Adjustment for Interruptibles to Cost of Service

Total Future Year 2017 Revenues	2,539
Adjustment to Interruptible Revenues	(1,594)
Fully Projected Future Test Year 2017 Interruptible Revenues	945

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2017
(\$ in Thousands)

Adjustment for Excess Take Revenues

Excess Take (MCF)		(67)
\$/MCF	\$	6.00
Excess Take Revenue/Margin	\$	(400)

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2017
(\$ in Thousands)

Adjustment for STAS

	OCT 2016	NOV 2016	DEC 2016	JAN 2017	FEB 2017	MAR 2017	APR 2017	MAY 2017	JUN 2017	JUL 2017	AUG 2017	SEP 2017	TOTAL 2017
RES. G	1	1	1	1	1	1	1	1	1	0	0	0	8
H	30	50	73	85	74	60	37	22	16	15	14	18	494
SUBTOTAL R	31	50	74	86	75	61	37	23	16	16	15	19	502
RT	0	1	1	1	1	1	1	0	0	0	0	0	8
TOTAL	31	51	75	87	76	61	38	23	17	16	15	19	510
COM. G	0	0	1	1	1	0	0	0	0	0	0	0	5
H	7	12	16	19	16	12	7	5	4	3	3	3	107
SUBTOTAL C-N	7	13	16	20	16	12	7	6	4	4	4	3	112
NT	2	3	4	4	4	3	2	1	1	1	1	1	28
DS	1	2	3	4	3	3	2	1	1	1	1	1	22
IS	1	1	1	1	1	1	1	1	1	1	0	1	7
XD-F	0	0	0	0	0	0	0	0	0	0	0	0	2
LFD	1	1	1	1	1	1	1	1	1	1	1	1	12
TOTAL	12	19	25	30	25	20	12	10	7	7	7	7	182
IND.	0	0	0	0	0	0	0	0	0	0	0	0	2
SUBTOTAL I-N	0	0	0	0	0	0	0	0	0	0	0	0	2
NT	0	0	0	0	0	0	0	0	0	0	0	0	0
DS	1	1	1	1	1	1	1	0	0	0	0	0	7
IS	0	0	0	0	0	0	0	0	0	0	0	0	3
XD-F	3	3	3	3	3	3	3	2	3	3	3	3	32
LFD	1	1	1	1	1	1	1	1	1	1	1	1	13
TOTAL	5	5	5	6	5	5	4	4	4	4	5	4	57
GRAND TOTAL	48	76	105	123	107	87	55	37	28	27	27	31	749

UGI Utilities, Inc.
Future Period- 12 Months Ended September 30, 2017
(\$ in Thousands)

Adjustment for Get Gas Surcharge

Budget 2017	\$	55
Fully Projected Future Test Year 2017	\$	75
Get Gas Revenue Adjustment	\$	20

UGI Penn Natural Gas, Inc.
Future Period- 12 Months Ended September 30, 2017
(\$ in Thousands)

Adjustment for DSIC

	OCT 2016	NOV 2016	DEC 2016	JAN 2017	FEB 2017	MAR 2017	APR 2017	MAY 2017	JUN 2017	JUL 2017	AUG 2017	SEP 2017	2017 TOTAL
RES. G	(7)	(8)	(9)	(11)	(11)	(11)	(10)	(9)	(8)	(8)	(8)	(8)	(107)
H	(260)	(408)	(610)	(836)	(838)	(703)	(529)	(345)	(255)	(227)	(207)	(237)	(5,456)
SUBTOTAL R	(267)	(416)	(619)	(847)	(848)	(714)	(539)	(354)	(264)	(235)	(215)	(245)	(5,563)
RT	(6)	(10)	(14)	(20)	(21)	(17)	(13)	(8)	(7)	(7)	(6)	(7)	(138)
TOTAL	(273)	(426)	(633)	(867)	(869)	(731)	(552)	(362)	(271)	(242)	(221)	(252)	(5,701)
COM. G	(3)	(4)	(4)	(5)	(5)	(5)	(4)	(4)	(3)	(3)	(3)	(4)	(47)
H	(48)	(79)	(109)	(149)	(145)	(117)	(83)	(64)	(50)	(43)	(42)	(42)	(970)
SUBTOTAL C-N	(51)	(82)	(113)	(154)	(150)	(121)	(87)	(68)	(53)	(46)	(45)	(45)	(1,017)
NT	(21)	(36)	(54)	(73)	(74)	(63)	(48)	(31)	(23)	(19)	(18)	(22)	(481)
DS	(23)	(33)	(46)	(62)	(51)	(44)	(31)	(21)	(16)	(15)	(15)	(16)	(374)
IS	(3)	(4)	(6)	(7)	(7)	(7)	(6)	(5)	(4)	(4)	(3)	(4)	(60)
XD-F	(2)	(3)	(3)	(3)	(3)	(3)	(3)	(2)	(2)	(2)	(3)	(3)	(31)
LFD	(16)	(15)	(18)	(26)	(23)	(20)	(18)	(15)	(14)	(13)	(14)	(13)	(204)
TOTAL	(116)	(173)	(239)	(326)	(308)	(257)	(193)	(142)	(113)	(99)	(97)	(103)	(2,167)
IND.	(1)	(1)	(2)	(2)	(2)	(2)	(1)	(1)	(1)	(0)	(1)	(1)	(13)
SUBTOTAL I-N	(1)	(1)	(2)	(2)	(2)	(2)	(1)	(1)	(1)	(0)	(1)	(1)	(13)
NT	(0)	(0)	(0)	(1)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(4)
DS	(9)	(12)	(14)	(19)	(16)	(12)	(11)	(7)	(7)	(6)	(8)	(9)	(130)
IS	(3)	(2)	(1)	(1)	(1)	(1)	(2)	(3)	(3)	(3)	(5)	(4)	(31)
XD-F	(19)	(25)	(20)	(23)	(23)	(22)	(23)	(21)	(21)	(21)	(24)	(21)	(263)
LFD	(15)	(17)	(19)	(26)	(23)	(22)	(19)	(18)	(17)	(17)	(20)	(17)	(229)
TOTAL	(48)	(57)	(55)	(71)	(65)	(59)	(56)	(50)	(49)	(49)	(58)	(52)	(669)
GRAND TOTAL	(437)	(656)	(928)	(1,264)	(1,242)	(1,047)	(801)	(554)	(433)	(390)	(376)	(407)	(8,537)

UGI PNG EXHIBIT DEL-5

Historic Year 2016 Sales and Revenues
Summary of Adjustments

	Sales (000's) MCF	Revenues (\$000's)	Reference
Actual 2016	64,163	181,403	
Adjustment for Customer Changes	(104)	(1,011)	PNG Exhibit DEL-5(b)
Adjustment for Normalized & Annualized Use/Customer	2,305	15,644	PNG Exhibit DEL-5(c)
Adjustment for Transport Changes	16,265	3,358	PNG Exhibit DEL-5(b)/(b)(1)/(c)/(c)(1)
Adjustment for PGC		8,962	PNG Exhibit DEL-5(d)
Adjustment for MFC		234	PNG Exhibit DEL-5(e)
Adjustment for USP		1,078	PNG Exhibit DEL-5(f)
Adjustment for GPC		88	PNG Exhibit DEL-5(g)
Adjustment for Interruptible		(1,621)	PNG Exhibit DEL-5(h)
Adjustment for Excess Take		(301)	PNG Exhibit DEL-5(i)
Adjustment for STAS		679	PNG Exhibit DEL-5(j)
Adjustment for Get Gas		1	PNG Exhibit DEL-5(k)
Adjustment for DSIC Revenues		(4,933)	PNG Exhibit DEL-5(l)
Historic Year 2016	82,629	203,582	

UGI Penn Natural Gas, Inc.
Historic Period- 12 Months Ended September 30, 2016
(\$ in Thousands)

Adjustment for Customer Changes

Line #	Description	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
		Residential-Non Htg	Residential-Htg	RT	Commercial-Non Htg	Commercial-Htg	Industrial	NT	DS	Transport-Other	Grand Total
1	Total Historic Year Revenues	\$ 1,991	\$ 122,988	\$ 1,930	\$ 1,115	\$ 25,185	\$ 453	\$ 6,000	\$ 6,236	\$ 15,506	\$ 181,403
2	PGC Revenues	(443)	(47,960)	(42)	(518)	(12,010)	(253)	76	(317)	976	(60,491)
3	Revenues net of PGC - Margin	\$ 1,549	\$ 75,027	\$ 1,888	\$ 597	\$ 13,175	\$ 200	\$ 6,075	\$ 5,919	\$ 16,481	\$ 120,911
4	Average Effective Customers in Historic Year	6,449	141,310	3,635	565	11,639	57	3,869	448	152	168,125
5	Average Annual Margin Per Customer (L 3 / L 4)	\$ 0.240	\$ 0.531	\$ 0.519	\$ 1.057	\$ 1.132	\$ 3.482	\$ 1.570	\$ 13.207	\$ 108.536	\$ 0.719
6	Number of Customers at End of Year	5,986	140,182	3,721	574	11,685	57	3,703	454	151	166,513
7	Change in Customers during Historic Year (L 6 - L 4)	(463)	(1,128)	86	9	46	(0)	(166)	6	(1)	(1,612)
8	Annualization of Margin (L 5 * L 7)	\$ (111)	\$ (599)	\$ 45	\$ 10	\$ 52	\$ (1)	\$ (261)	\$ 77	\$ 1,265	\$ 476
9	Average Annual Revenue Per Customer (L 1 / L 4)	\$ 0.309	\$ 0.870	\$ 0.531	\$ 1.974	\$ 2.164	\$ 7.887	\$ 1.551	\$ 13.915	\$ 102.111	\$ 1.079
10	Annualization of Total Revenue (L 7 * L 9)	\$ (143)	\$ (982)	\$ 46	\$ 18	\$ 99	\$ (3)	\$ (258)	\$ 81	\$ 1,265	\$ 123
11	Annualization of PGC Revenues (L 10 - L 8)	\$ (32)	\$ (383)	\$ 1	\$ 9	\$ 47	\$ (2)	\$ 3	\$ 4	\$ -	\$ (352)
12	Total Actual (Unadjusted)-MCF	19.88	98.63	100.22	282.35	320.81	1,373.33	528.18	6,538.08		
13	Annualization Adjustment for Sales-MMCF (L12 * L7)/1000	(9)	(111)	9	3	15	(1)	(88)	38	15,004	14,859

Notes:
Column [9] further detailed on PNG Exhibit DEL-5(b)(1)

UGI Penn Natural Gas, Inc.
Historic Period- 12 Months Ended September 30, 2016
(\$ in Thousands)

Adjustment for Customer Changes
Large Transport and Interruptible Detail

Line #	Description	[1]	[2]	[3]	[4]	[5]
		LFD	XD-F	XD-I	IS	TOTAL
1	Historic 2016 Revenues	\$ 6,662	\$ 6,207	\$ 5	\$ 2,632	\$ 15,506
2	PGC Revenues	(249)	1,282	(0)	(58)	976
3	Revenues net of PGC - Margin	\$ 6,413	\$ 7,489	\$ 5	\$ 2,574	\$ 16,481
4	Average Effective Customers in Historic Year 2016	106	14	13	19	152
5	Average Annual Margin Per Customer (L 3 / L 4)	\$ 60.359	\$ 548.796	\$ 0.364	\$ 136.612	\$ 108.536
6	Year End 2016 Customers	105	14	14	18	151
7	Change in Customers during Future Test Year 2016 (L 6 - L 4)	(1)	0	1	(1)	(1)
8	Annualization of Margin	\$ (16)	\$ 1,264	\$ -	\$ 17	\$ 1,265
9	Average Annual Revenue Per Customer (L 1 / L 4)	\$ 62.700	\$ 454.829	\$ 0.368	\$ 139.690	\$ 102.111
10	Annualization of Total Revenue	\$ (16)	\$ 1,264	\$ -	\$ 17	\$ 1,265
11	Annualization of PGC Revenues (L 10 - L 8)	\$ -	\$ -	\$ -	\$ -	\$ -
12	Total Future Test Year 2016 UPC (Unadjusted)-MCF					
13	Annualization Adjustment for Sales-MMCF	(2)	15,000	0	6	15,004

UGI Penn Natural Gas, Inc.
Historic Period- 12 Months Ended September 30, 2016
(\$ in Thousands)

Adjustment for Normalized & Annualized Use/Customer

Line #	Description	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
		Residential-Non Htg	Residential-Htg	RT	Commercial-Non Htg	Commercial-Htg	Industrial	NT	DS	Large Transp-Other	Total
1	Total FY 16 Actual UPC-MCF	19.88	98.63	100.22	282.35	320.81	1,373.33	528.18	6,538.08		
2	Fully Adjusted FY 16 UPC-MCF	22.40	110.70	114.30	316.70	368.80	1,671.40	644.10	7,936.10		
3	Change in UPC -MCF (L 2 - L1)	2.52	12.07	14.08	34.35	47.99	298.07	115.92	1,398.02		
4	End of Year Customers-Total FY 16	5,986	140,182	3,721	574	11,685	57	3,703	454	151	166,513
5	Adjustment for Sales-MMCF (L3*L4)/1000	15	1,692	52	20	561	17	429	635	186	3,607
6	Total Revenue Adjustment (L8 + L10)	\$ 109	\$ 12,046	\$ 178	\$ 115	\$ 3,274	\$ 99	\$ 912	\$ 1,026	\$ 107	\$ 17,868
7	Total Unit Revenue Adjustment (L6/L5)	7.2190	7.1190	3.4036	5.8397	5.8397	5.8397	2.1243	1.6171	0.5765	
8	Margin Adjustment (L5 *L9)	\$ 53	\$ 5,759	\$ 178	\$ 42	\$ 1,191	\$ 36	\$ 912	\$ 1,026	\$ 107	\$ 9,305
9	Unit Margin Rate	3.5036	3.4036	3.4036	2.1243	2.1243	2.1243	2.1243	1.6171	0.5765	
10	PGC Revenue (L5*L11)	\$ 56	\$ 6,287	\$ -	\$ 73	\$ 2,083	\$ 63	\$ -	\$ -	\$ -	\$ 8,563
11	PGC Unit Rate	3.7154	3.7154		3.7154	3.7154	3.7154				

Notes:

Column (9) further detailed on PNG Exhibit DEL-5 (c)(1)

UGI Penn Natural Gas, Inc.
Historic Period- 12 Months Ended September 30, 2016
(\$ in Thousands)

Adjustment for Annualized Usage and Annualized Rates
Large Transport and Interruptible Detail

Line #	Description	[1]	[2]	[3]	[4]	[5]
		LFD	XD-F	XD-I	DSO IS/IL	TOTAL
1	Total FY 16 Actual UPC-MCF					
2	Fully Adjusted FY 16 UPC-MCF					
3	Change in UPC -MCF	0.00	0.00	0.00	0.00	0.00
4	End of Year Customers-Total FY 16	105	14	14	18	151
5	Annualization Adjustment for Sales-MMCF	13	173	-	-	186
6	Total Revenue Adjustment	\$ 11	\$ 96			\$ 107
7	Unit Revenue Adjustment (L6/*L5)	0.8510	0.5561	0.0000	0.0000	0.5765
8	Margin Adjustment	\$ 11	\$ 96	\$ -	\$ -	\$ 107
9	Unit Margin (L8/*L5)	0.8510	0.5561	0.0000	0.0000	0.5765
10	PGC Revenue (L 6 - L 8)	\$ -	\$ -	\$ -	\$ -	\$ -

UGI Penn Natural Gas, Inc.
Historic Period- 12 Months Ended September 30, 2016
(\$ in Thousands)

Adjustment for PGC

	OCT 2015	NOV 2015	DEC 2015	JAN 2016	FEB 2016	MAR 2016	APR 2016	MAY 2016	JUN 2016	JUL 2016	AUG 2016	SEP 2016	TOTAL
PGC Rate FY 16	\$4.2187	\$4.2187	\$3.1640	\$3.1640	\$3.1640	\$2.7202	\$2.7202	\$2.7202	\$3.0248	\$3.0248	\$3.0248	\$3.7154	
Sept 16 PGC Rate	\$3.7154	\$3.7154	\$3.7154	\$3.7154	\$3.7154	\$3.7154	\$3.7154	\$3.7154	\$3.7154	\$3.7154	\$3.7154	\$3.7154	
PGC Rate Variance	(\$0.5033)	(\$0.5033)	\$0.5514	\$0.5514	\$0.5514	\$0.9952	\$0.9952	\$0.9952	\$0.6906	\$0.6906	\$0.6906	\$0.0000	
Total PGC Volumes	1,171	1,700	2,062	3,949	3,258	2,096	1,505	884	468	364	372	230	18,061
PGC Revenue Adjustment	(\$589)	(\$856)	\$1,137	\$2,178	\$1,797	\$2,086	\$1,498	\$880	\$323	\$252	\$257	\$0	\$8,962

UGI Penn Natural Gas, Inc.
Historic Period- 12 Months Ended September 30, 2016
(\$ in Thousands)

Adjustment for MFC

	OCT 2015	NOV 2015	DEC 2015	JAN 2016	FEB 2016	MAR 2016	APR 2016	MAY 2016	JUN 2016	JUL 2016	AUG 2016	SEP 2016	TOTAL
PGC Rate FY 16	\$4.2187	\$4.2187	\$3.1640	\$3.1640	\$3.1640	\$2.7202	\$2.7202	\$2.7202	\$3.0248	\$3.0248	\$3.0248	\$3.7154	
Sept 16 PGC Rate	\$3.7154	\$3.7154	\$3.7154	\$3.7154	\$3.7154	\$3.7154	\$3.7154	\$3.7154	\$3.7154	\$3.7154	\$3.7154	\$3.7154	
PGC Rate Variance	(\$0.5033)	(\$0.5033)	\$0.5514	\$0.5514	\$0.5514	\$0.9952	\$0.9952	\$0.9952	\$0.6906	\$0.6906	\$0.6906	\$0.0000	
Total PGC Volumes-Rate R	938	1,255	1,558	3,117	2,523	1,707	1,285	679	260	271	281	216	
Total PGC Volumes-Rate N	233	445	504	832	735	390	220	205	208	93	91	14	
Total PGC Volumes	1,171	1,700	2,062	3,949	3,258	2,096	1,505	884	468	364	372	230	18,061
Rate R %	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	3.20%	
Rate N %	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%	
MFC Rate R Adj Rate	(\$0.0161)	(\$0.0161)	\$0.0176	\$0.0176	\$0.0176	\$0.0318	\$0.0318	\$0.0318	\$0.0221	\$0.0221	\$0.0221	\$0.0000	
MFC Rate N Adj Rate	(\$0.0020)	(\$0.0020)	\$0.0022	\$0.0022	\$0.0022	\$0.0040	\$0.0040	\$0.0040	\$0.0028	\$0.0028	\$0.0028	\$0.0000	
Rate R Revenue Variance	(\$15)	(\$20)	\$27	\$55	\$45	\$54	\$41	\$22	\$6	\$6	\$6	\$0	
Rate N Revenue Variance	(\$0)	(\$1)	\$1	\$2	\$2	\$2	\$1	\$1	\$1	\$0	\$0	\$0	
Revenue Variance	(\$16)	(\$21)	\$29	\$57	\$46	\$56	\$42	\$22	\$6	\$6	\$6	\$0	\$234

UGI Penn Natural Gas, Inc.
Historic Period- 12 Months Ended September 30, 2016
(\$ in Thousands)

Adjustment for USP

	OCT 2015	NOV 2015	DEC 2015	JAN 2016	FEB 2016	MAR 2016	APR 2016	MAY 2016	JUN 2016	JUL 2016	AUG 2016	SEP 2016	TOTAL
Historic USP Rate FY 16	\$0.1530	\$0.1530	\$0.2427	\$0.2427	\$0.2427	\$0.2174	\$0.2174	\$0.2174	\$0.2602	\$0.2602	\$0.2602	\$0.3077	
Sept 2016 USP Rate	\$0.3077	\$0.3077	\$0.3077	\$0.3077	\$0.3077	\$0.3077	\$0.3077	\$0.3077	\$0.3077	\$0.3077	\$0.3077	\$0.3077	
USP Rate Variance	\$0.1547	\$0.1547	\$0.0650	\$0.0650	\$0.0650	\$0.0903	\$0.0903	\$0.0903	\$0.0475	\$0.0475	\$0.0475	\$0.0000	
Total Rate R Volumes excl CAP	456	970	1,613	2,327	2,583	2,162	1,409	770	376	268	222	242	13,399
Revenue Variance	\$71	\$150	\$105	\$151	\$168	\$195	\$127	\$70	\$18	\$13	\$11	\$0	\$1,078

UGI Penn Natural Gas, Inc.
Historic Period- 12 Months Ended September 30, 2016
(\$ in Thousands)

Adjustment for GPC

Historic Year 2016 Sales Adjustment		2,201
GPC Rate	\$	0.04
Historic Year 2016 GPC Revenue Adjustment	\$	88

UGI Penn Natural Gas, Inc.
Historic Period- 12 Months Ended September 30, 2016
(\$ in Thousands)

Adjustment for Interruptibles to Cost of Service

Historic Year 2016 Margin	2,579
Interruptible DSIC Adjustment-PNG Exhibit DEL-5(h)	(41)
STAS Adjustment-PNG Exhibit DEL-5(j)	10
Customer Adjustment-PNG Exhibit DEL-5(b)(1)	17
Adjusted Historic Year 2016 Margin	2,566
Adjustment to Interruptible Margin	(1,621)
Adjusted Historic Year 2016 Interruptible Margin	945

UGI Utilities, Inc.
Historic Period- 12 Months Ended September 30, 2016
(\$ in Thousands)

Adjustment for Excess Take Revenues

Excess Take (MCF)		(50)
\$/MCF	\$	6.00
Excess Take Revenue/Margin	\$	(301)

UGI Penn Natural Gas, Inc.
Historic Period- 12 Months Ended September 30, 2016
(\$ in Thousands)

Adjustment for STAS

	OCT 2015	NOV 2015	DEC 2015	JAN 2016	FEB 2016	MAR 2016	APR 2016	MAY 2016	JUN 2016	JUL 2016	AUG 2016	SEP 2016	TOTAL 2016
RES. G	1	1	1	1	1	1	1	1	1	1	1	0	8
H	31	42	47	84	75	52	42	23	15	15	14	17	457
SUBTOTAL R	31	43	48	85	76	53	42	24	15	15	15	18	464
RT	0	1	1	1	1	1	1	0	0	0	0	0	7
TOTAL	32	43	49	86	77	53	43	25	15	16	15	18	472
COM. G	0	0	0	0	0	0	0	0	0	0	0	0	4
H	6	10	11	17	16	9	7	5	3	3	3	4	94
SUBTOTAL C-N	6	11	11	17	17	9	7	5	4	3	3	4	98
NT	1	2	2	4	3	2	2	1	1	1	1	1	22
DS	1	1	2	3	2	2	2	1	1	1	1	1	17
IS	0	0	1	1	1	1	1	1	1	1	1	0	7
XD-I	0	0	0	0	0	0	0	0	0	0	0	0	0
XD-F	0	0	0	0	0	0	0	0	0	0	0	0	2
LFD	1	1	1	2	1	1	1	1	1	1	1	1	12
TOTAL	10	16	17	26	25	16	13	9	7	6	7	7	159
IND.	0	0	0	0	0	0	0	0	0	0	0	0	2
SUBTOTAL I-N	0	0	0	0	0	0	0	0	0	0	0	0	2
NT	0	0	0	0	0	0	0	0	0	0	0	0	0
DS	0	1	1	1	1	1	1	0	0	0	0	0	6
IS	0	0	0	0	0	0	0	0	0	0	0	0	3
XD-I	0	0	0	0	0	0	0	0	0	0	0	0	0
XD-F	1	1	2	2	2	2	2	2	2	3	3	2	24
LFD	1	1	1	1	1	1	1	1	1	1	1	1	13
TOTAL	3	3	4	5	4	4	4	4	4	4	5	4	48
GRAND TOTAL	45	62	69	117	106	73	60	38	26	26	27	29	679

UGI Utilities, Inc.
Historic Period- 12 Months Ended September 30, 2016
(\$ in Thousands)

Adjustment for Get Gas Surcharge

Historic Year 2016	\$	5
Historic Year 2016 Annualized	\$	6
Get Gas Revenue Adjustment	\$	1

UGI Penn Natural Gas, Inc.
Historic Period- 12 Months Ended September 30, 2016
(\$ in Thousands)

Adjustment for DSIC

	OCT 2015	NOV 2015	DEC 2015	JAN 2016	FEB 2016	MAR 2016	APR 2016	MAY 2016	JUN 2016	JUL 2016	AUG 2016	SEP 2016	2016 TOTAL
RES. G	(6)	(5)	(4)	(4)	(4)	(5)	(5)	(6)	(8)	(11)	(11)	(10)	(78)
H	(194)	(212)	(216)	(281)	(288)	(301)	(269)	(258)	(230)	(295)	(273)	(285)	(3,103)
SUBTOTAL R	(200)	(216)	(220)	(285)	(292)	(305)	(273)	(265)	(238)	(307)	(283)	(296)	(3,181)
RT	(4)	(5)	(5)	(7)	(7)	(8)	(7)	(7)	(6)	(8)	(7)	(8)	(80)
TOTAL	(205)	(222)	(225)	(293)	(299)	(313)	(280)	(271)	(244)	(314)	(291)	(303)	(3,261)
COM. G	(2)	(2)	(1)	(2)	(1)	(2)	(2)	(2)	(3)	(4)	(4)	(4)	(28)
H	(37)	(36)	(36)	(48)	(49)	(45)	(43)	(42)	(41)	(55)	(55)	(56)	(541)
SUBTOTAL C-N	(39)	(37)	(37)	(50)	(51)	(46)	(44)	(44)	(44)	(59)	(58)	(60)	(569)
NT	(16)	(16)	(16)	(23)	(23)	(21)	(19)	(19)	(18)	(24)	(23)	(25)	(244)
DS	(15)	(14)	(14)	(18)	(15)	(12)	(14)	(14)	(16)	(18)	(18)	(21)	(189)
IS	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(2)	(2)	(3)	(2)	(14)
XD-I	0	0	0	0	(0)	0	0	0	0	(0)	0	0	(0)
XD-F	(2)	(1)	(1)	(1)	(1)	(1)	(1)	(2)	(3)	(4)	(4)	(4)	(26)
LFD	(13)	(9)	(8)	(10)	(8)	(7)	(9)	(11)	(16)	(18)	(23)	(19)	(152)
TOTAL	(86)	(79)	(78)	(103)	(99)	(87)	(89)	(91)	(98)	(124)	(129)	(131)	(1,193)
IND.	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(0)	(1)	(1)	(1)	(8)
SUBTOTAL I-N	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(0)	(1)	(1)	(1)	(8)
NT	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(5)
DS	(5)	(5)	(5)	(6)	(5)	(3)	(4)	(4)	(6)	(9)	(11)	(9)	(72)
IS	(3)	(1)	(0)	(0)	(0)	(0)	(1)	(2)	(4)	(3)	(6)	(6)	(27)
XD-I	(0)	(0)	(0)	(0)	(0)	(0)	(0)	0	0	(0)	(0)	0	(0)
XD-F	(16)	(11)	(10)	(9)	(8)	(8)	(11)	(14)	(24)	(28)	(28)	(29)	(196)
LFD	(13)	(9)	(9)	(9)	(8)	(7)	(9)	(12)	(18)	(20)	(34)	(22)	(171)
TOTAL	(38)	(28)	(25)	(25)	(22)	(21)	(26)	(33)	(53)	(61)	(80)	(66)	(479)
GRAND TOTAL	(328)	(328)	(328)	(421)	(421)	(421)	(395)	(395)	(395)	(500)	(500)	(500)	(4,933)

UGI PNG EXHIBIT DEL-6

Detail for Usage per Customer by Class as shown on PNG Exhibit DEL-3(c)

Residential Non-Heating

	(1)	(2)	(3)
	UPC	Fully Adj Cust	Sales
Total	23.1	6,204	143,312
Rate R	23.1	5,991	138,563
Rate RT	22.3	213	4,750

Residential Heating

	(1)	(2)	(3)
	UPC	Fully Adj Cust	Sales
Total	110.1	145,980	16,072,398
Rate R	110.1	142,477	15,690,684
Rate RT	109.0	3,503	381,714

Rate RT Total	104.0	3,716	386,464
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Commercial Non-Heating

	(1)	(2)	(3)
	UPC	Fully Adj Cust	Sales
Total	371.1	682	253,090
Rate N	330.4	538	177,778
Rate NT	523.0	144	75,312

Commercial Heating

	(1)	(2)	(3)
	UPC	Fully Adj Cust	Sales
Total	432.2	15,446	6,675,761
Rate N	357.7	11,804	4,222,404
Rate NT	673.6	3,642	2,453,357

Industrial

	(1)	(2)	(3)
	UPC	Fully Adj Cust	Sales
Total	970.8	73	70,868
Rate N	1,170.4	44	51,499
Rate NT	667.9	29	19,369

Rate NT Total	667.9	3,815	2,548,039
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	(1)	(2)	(3)
	UPC	Fully Adj Cust	Sales
Commercial Non-Heating Rate DS	4,463.5	11	49,099
Commercial Heating Rate DS	6,708.0	447	2,998,476
Industrial Rate DS	20,577.8	56	1,152,357
Rate DS Total	8,171.1	514	4,199,931

Detail for Usage per Customer by Class as shown on PNG Exhibit DEL-4(c)

Residential Non-Heating

	(1)	(2)	(3)
	UPC	Fully Adj Cust	Sales
Total	22.8	6,395	145,806
Rate R	22.8	6,182	141,056
Rate RT	22.3	213	4,750

Residential Heating

	(1)	(2)	(3)
	UPC	Fully Adj Cust	Sales
Total	110.5	144,858	16,006,809
Rate R	110.4	141,355	15,606,143
Rate RT	114.4	3,503	400,666

Rate RT Total	109.1	3,716	405,416
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Commercial Non-Heating

	(1)	(2)	(3)
	UPC	Fully Adj Cust	Sales
Total	363.6	693	251,975
Rate N	321.8	549	176,663
Rate NT	523.0	144	75,312

Commercial Heating

	(1)	(2)	(3)
	UPC	Fully Adj Cust	Sales
Total	433.0	15,320	6,633,560
Rate N	361.8	11,678	4,225,256
Rate NT	661.3	3,642	2,408,304

Industrial

	(1)	(2)	(3)
	UPC	Fully Adj Cust	Sales
Total	1,151.9	78	89,848
Rate N	1,445.4	49	70,824
Rate NT	656.0	29	19,024

Rate NT Total	656.0	3,815	2,502,640
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	(1)	(2)	(3)
	UPC	Fully Adj Cust	Sales
Commercial Non-Heating Rate DS	4,548.2	10	45,482
Commercial Heating Rate DS	6,580.5	423	2,783,552
Industrial Rate DS	19,902.0	54	1,074,708
Rate DS Total	8,015.9	487	3,903,742

Detail for Usage per Customer by Class as shown on PNG Exhibit DEL-5(c)

Residential Non-Heating

	(1)	(2)	(3)
	UPC	Fully Adj Cust	Sales
Total	22.4	6,193	138,723
Rate R	22.4	5,986	134,107
Rate RT	22.3	207	4,616

Residential Heating

	(1)	(2)	(3)
	UPC	Fully Adj Cust	Sales
Total	110.9	143,696	15,935,886
Rate R	110.7	140,182	15,515,192
Rate RT	119.7	3,514	420,694

Rate RT Total	114.3	3,721	425,310
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Commercial Non-Heating

	(1)	(2)	(3)
	UPC	Fully Adj Cust	Sales
Total	356.2	710	252,902
Rate N	316.7	574	181,774
Rate NT	523.0	136	71,128

Commercial Heating

	(1)	(2)	(3)
	UPC	Fully Adj Cust	Sales
Total	433.9	15,224	6,605,694
Rate N	368.8	11,685	4,309,754
Rate NT	648.8	3,539	2,295,940

Industrial

	(1)	(2)	(3)
	UPC	Fully Adj Cust	Sales
Total	1,333.0	85	113,305
Rate N	1,671.4	57	95,270
Rate NT	644.1	28	18,035

Rate NT Total	644.1	3,703	2,385,102
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	(1)	(2)	(3)
	UPC	Fully Adj Cust	Sales
Commercial Non-Heating Rate DS	4,632.9	9	41,696
Commercial Heating Rate DS	6,452.9	391	2,523,084
Industrial Rate DS	19,226.2	54	1,038,215
Rate DS Total	7,936.1	454	3,602,995

UGI PNG EXHIBIT DEL-7

UGI Penn Natural Gas, Inc.
Energy Efficiency & Conservation (EEC) Rider Calculation

Program Category	Rates R/RT	Rates N/NT	Rate DS	Rate LFD	Total
Customer Incentives	\$ 524,800	\$ 63,450	\$ 150,000	\$ 100,000	\$ 838,250
Administration	\$ 566,532	\$ 101,468	\$ 6,000	\$ 4,000	\$ 678,000
Marketing	\$ 114,915	\$ 51,085	\$ 9,000	\$ 6,000	\$ 181,000
Inspections	\$ 18,000	\$ 7,000	\$ 1,500	\$ 1,000	\$ 27,500
Evaluation	\$ -	\$ -	\$ 3,000	\$ 2,000	\$ 5,000
Total Expenses	\$ 1,224,247	\$ 223,003	\$ 169,500	\$ 113,000	\$ 1,729,750

Billing Determinants (Mcf)	16,108,797	6,583,326	3,955,641	5,422,994
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Proposed EEC Rider	\$ 0.0760	\$ 0.0339	\$ 0.0429	\$ 0.0208
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UGI PNG EXHIBIT DEL-8

	FY 2018
Shortfall (CAP Credits)	\$ 1,337,650
CAP Admin	\$ 348,000
LIURP	\$ 850,000
Hardship	\$ 9,000
Pre-Program Arrearage (PPA)	\$ 1,187,484
Total Expenses	\$ 3,732,134
Billing Determinanats	15,383,901
Proposed USP Rider	0.2426

Calculation of Annual Reconciliation Adjustment related to CAP Credits and PPA

PNG	2015
Residential Low Income Write Offs	11.80%
Residential Write Offs	2.70%
Adjustment	9.10%

UGI PNG EXHIBIT DEL-9

NNS Rate Calculation -- UGI PNG 2017 Base Rate Case

Storage Trip Cost (\$/mcf)	0.1666	Calculated via the 'Storage Capacity for MBS and NNS calculation' file Note: The Storage Trip Cost is using Transco GSS
Weekend Load Reduction Factor (%)	19.6%	Aggregate factor calculated for DS, LFD, and XD Firm customers

WELF = Weekend Load Factor

WD = Weekday Day Use = WE x (1 - WELF)

WE = Weekend Day Use

AVERAGE = Average Daily Use = [(5 x WD) + (2 x WE)] / 7

$$\begin{aligned} \text{EQ \#1 } \quad \mathbf{WD} &= \mathbf{(1/(1 - WELF)) * WE} \\ &= \mathbf{(1/(1 - 0.196)) * WE} \\ \mathbf{WD} &= \mathbf{1.2400 * WE} \end{aligned}$$

$$\begin{aligned} \text{EQ \#2 } \quad \mathbf{AVERAGE} &= \mathbf{[(5 * WD) + (2 * WE)] / 7} \\ \text{Step 1 } \mathbf{AVERAGE} &= \mathbf{[5 * ((1/(1 - WELF)) * WE)) + (2 * WE)] / 7} \\ &= \mathbf{[5 * (1/(1 - WELF)) + 2] * WE} / 7 \\ &= \mathbf{[5 * (1/(1 - 0.196)) + 2] * WE} / 7 \\ &= \mathbf{8.20 * WE} / 7 \\ \text{Step 2 } \mathbf{WE} &= \mathbf{0.85 * AVERAGE} \end{aligned}$$

$$\begin{aligned} \text{EQ \#3 } \quad \mathbf{Wkly Imbalance} &= \mathbf{5 * (WD - AVERAGE) + 2 * (AVERAGE - WE)} \\ &= \mathbf{(5 * WD) - (3 * AVERAGE) - (2 * WE)} \\ &= \mathbf{(5 * (1/(1 - WELF)) * WE) - (3 * AVERAGE) - (2 * WE)} \\ &= \mathbf{[(5 * (1/(1 - WELF)) + 2) * WE] - (3 * AVERAGE)} \\ &= \mathbf{[(5 * (1/(1 - 0.196)) + 2) * WE] - (3 * AVERAGE)} \\ &= \mathbf{4.20 * WE - (3 * AVERAGE)} \\ &= \mathbf{0.57 * AVERAGE} \end{aligned}$$

$$\begin{aligned} \text{EQ \#4 } \quad \mathbf{Unit Cost Calculation (\$/mcf)} &= \mathbf{[(Wkly Imbalance) / (7 * AVERAGE)] * STORAGE TRIP COST} \\ &= \mathbf{[(0.57 * Average) / (7 * AVERAGE)] * 0.1666} \\ &= \mathbf{0.08 * 0.1666} \\ &= \mathbf{0.0133} \end{aligned}$$

EQ #5 Per Unit of Demand Calculation (\$/mcf per month)

= Unit Cost Calculation x 20 days

= 0.0133 x 20

\$	0.2660 per Mcfd
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UGI PNG EXHIBIT DEL-10

MBS Rate Calculation - UGI PNG 2017 BRC

Average Capacity Charge for Storage (\$/mcf)	0.2066	(A)
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Anticipated Average Monthly Imbalance %	1.8231%	(B)
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Load Factors & MBS Rate Calculation

Rate	Load Factor	
DS	27.9%	(C)
LFD	56.2%	(C)
XD Firm	76.1%	(C)
Transportation System Average	69.4%	(D)

MBS Rate Formula

$$E = [(A / D) - ((A / D) * C)] * B$$

Rate	MBS Rate	
DS	\$ 0.0039 per Mcf	(E)
LFD	\$ 0.0024 per Mcf	(E)
XD Firm	\$ 0.0013 per Mcf	(E)

UGI PNG EXHIBIT DEL-11

UGI Penn Natural Gas, Inc.
Development of the Gas Procurement Charge

<u>Line</u>	<u>Labor and Benefits</u>		<u>UGIP Total</u>
(1)	Gas Supply		\$ 93,057
(2)	Accounting Support		\$ 104,057
(3)	Regulatory Support		\$ 31,674
(4)	Management Support		\$ 274,980
(5)	Total Labor and Benefits Costs	(5) = (1)+(2)+(3)+(4)	\$ 503,769
	<u>Non-Labor Costs</u>		
(6)	IT O&M Expenses		\$ 4,441
(7)	Working Capital		\$ 337,820
(8)	Costs to be recovered by GPC	(8) = (5)+(6)+(7)	<u>\$ 846,031</u>
(9)	Sales Volumes For rates R and N (Mcf)		20,148,924
(10)	GPC rate	(10) = (8)/(9)	<u>\$ 0.0420</u>

UGI PNG EXHIBIT DEL-12

UGI Penn Natural Gas, Inc.
Merchant Function Charge (MFC) Calculation

		<u>Rate R/RT</u>	<u>Rate N/NT</u>
Total Uncollectible Revenue Requirement	\$ 2,903,827		
Allocator 1/		96.38%	3.27%
Uncollectible Revenue Requirement	\$ 2,798,708		\$ 94,955
Total Proposed Revenue		\$ 153,286,519	\$ 38,654,137
MFC % 2/		1.83%	0.25%

1/ The allocator is based on a 5-year average of uncollectible expenses.

2/ The MFC will be applied to bills of customers in Rate Schedules R & N only.

UGI PNG EXHIBIT DEL-13

Recalculation of GET Gas Charge

	PNG
GET Investment Total	\$5,191,442
Services Cost per Customer	\$2,758
Mains Cost per Customer	\$7,904
Number of Customers	657
Residential Customers	644
Commercial Customers	13
Residential Load per Customer	95.3
Commercial Load per Customer	341.1
Residential Base Revenues per Customer	\$663
Commercial Base Revenues per Customer	\$1,466
Base Rate Revenues	\$445,993
Supported Investment	\$2,780,960
GET Investment Recovery Need	\$2,410,482
Residential Base Revenue Share	95.7%
Commercial Base Revenue Share	4.3%
Base Residential GET Monthly Customer Charge	\$56.41
Annual Commercial GET Charge Needed	\$1,497
Base Commercial GET Monthly Customer Charge	\$29.92
Base Commercial GET Volumetric Charge	\$3.34
Settlement PT WACC	14.36%
Depreciation Rate	1.68%
Residential Gross Up for CAP and Uncollectible Exp	\$0.76
Commercial Gross Up for Uncollectible Exp	\$0.40
Total Residential GET Monthly Customer Charge	\$57.17
Total Commercial GET Monthly Customer Charge	\$30.32
Total Commercial GET Volumetric Charge	\$3.34
After Tax Weighted Average Cost of Capital	8.40%
Tax rate	41.49%

UGI PNG EXHIBIT DEL-14

PNG Exhibit DEL-14

GET Revenues	Sep-18	Annualized Amount (Sept x 12)
ROI Component of Monthly Surcharge GET Payments (interest)	\$ 7,970	\$ 95,640
Uncollectible & Adder Component of Monthly Surcharge GET Payments	\$ 211	\$ 2,526
Uncollectible & Add Component of Lump Sum Upfront GET Payments	\$ 1,149	\$ 13,789
Total	\$ 9,330	\$ 111,956

UGI PNG STATEMENT NO. 8 – ROBERT R. STOYKO

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Docket No. R-2016-2580030

UGI Penn Natural Gas, Inc.

Statement No. 8

**Direct Testimony of
Robert R. Stoyko**

Topics Addressed: **Technology & Economic Development Rider**
 Large Customer Usage Projections
 Bypass Risk
 Customer Service
 Energy Efficiency & Conservation Plan

Dated: January 19, 2017

1 **I. INTRODUCTION**

2 **Q. Please state your name and business address.**

3 A. My name is Robert R. Stoyko and my business address is 2525 North 12th Street,
4 Reading, PA 19612-2677.

5
6 **Q. By whom are you employed and in what capacity?**

7 A. I am employed by UGI Utilities, Inc., (“UGI”) as Vice President – Marketing and
8 Customer Relations. UGI has two separate operating divisions: UGI Utilities, Inc. - Gas
9 Division (“UGI Gas”), a natural gas distribution company (“NGDC”), and UGI Utilities,
10 Inc. - Electric Division (“UGI Electric”), an electric distribution company (“EDC”).
11 UGI’s subsidiaries also include two wholly-owned NGDCs, UGI Central Penn Gas, Inc.
12 (“UGI CPG”) and UGI Penn Natural Gas, Inc. (“UGI PNG” or the “Company”). In my
13 testimony, UGI Gas, UGI Electric, UGI PNG, and UGI CPG will be referred to
14 collectively as the “UGI Distribution Companies.”

15
16 **Q. What are your responsibilities as Vice President – Marketing and Customer
17 Relations?**

18 A. In this position, I have overall responsibility for Marketing, Sales and Customer Service
19 for UGI, including UGI Gas, UGI Electric, UGI PNG, and UGI CPG.

20
21 **Q. Please describe your educational background and work experience.**

22 A. They are set forth in my resume attached as UGI PNG Exhibit RRS-1 to my testimony.

23

1 **Q. Have you presented testimony in proceedings before a regulatory agency?**

2 A. Yes. In 2013, I presented testimony in a proceeding before the Pennsylvania Public
3 Utility Commission (“Commission) in support of the Joint Petition of the UGI
4 Distribution Companies for approval to implement the Growth Extension Tariff (“GET
5 Gas”) Pilot Programs, at Docket No. P-2013-2356232. I also presented testimony in UGI
6 Gas’s base rate proceeding at Docket No. R-2015-2518438.

7
8 **Q. What is the purpose of your testimony?**

9 A. In my testimony, I will address UGI PNG’s (1) proposed Technology and Economic
10 Development (“TED”) Rider, (2) changes to its Large Customer/Industrial Sales Budget,
11 (3) customer service performance, and (4) proposed implementation activities for its
12 Energy Efficiency and Conservation (“EE&C”) Plan, which is proposed with this filing.

13
14 **Q. Are you sponsoring any exhibits in this proceeding?**

15 A. Yes, I am sponsoring the following exhibits: UGI PNG Exhibits RRS-1 and RRS-2. I
16 am also sponsoring certain responses to the Commission’s standard filing requirements
17 where my name is indicated as the sponsoring witness.

18
19 **II. TECHNOLOGY AND ECONOMIC DEVELOPMENT RIDER**

20 **Q. What is the core function of UGI PNG’s distribution system?**

21 A. The core function is to transport and distribute natural gas from sources of supply to end-
22 use customers. In the case of UGI PNG, these sources of supply have primarily been
23 delivery points, or the so-called “city gates”, of interstate pipeline systems that connect
24 UGI PNG’s distribution system to upstream sources of supply, such as gathering systems

1 connecting gas wells to interstate pipeline systems or gas storage facilities. Other sources
2 of supply include gathering systems and propane air peaking facilities connected to UGI
3 PNG's system. Certain natural gas pipeline systems are or may be constructed through or
4 in close proximity to the UGI PNG distribution system and also be potential sources of
5 future supply. These sources of supply can also serve as sources of supply to current or
6 potential UGI PNG customers, some of whom who may elect to bypass UGI PNG's
7 distribution system and receive gas directly from these sources.

8
9 **Q. What are some of the core characteristics of the natural gas distribution business?**

10 A. Two important features of the business are (1) it is very capital intensive, which is to say
11 that it requires substantial capital costs to provide service to customers, and (2) unlike
12 some other utility services, there are no uses for natural gas for which there are not
13 alternative substitute forms of energy.

14
15 **Q. What are some of the consequences of these characteristics?**

16 A. As a result of the capital intensive nature of the business, it has been recognized since the
17 early days of the industry that the public interest is often best served if NGDCs are
18 granted exclusive service territories so that system costs can be shared by the widest
19 possible customer base in a geographic area. In return for being the sole service provider
20 within a geographic area, however, NGDC rates and services are subject to substantial
21 regulation by the Commission.

22 Also, as a result of the capital intensive nature of the business, as well as the
23 general nature of rate regulation, Pennsylvania NGDCs, in accordance with Commission

1 policies, have established provisions in their tariffs incorporating economic tests for the
2 extension of NGDC facilities. Under these tariff provisions, applicants for utility service
3 must pay for the costs of line extensions deemed not to be economic primarily to prevent
4 undue cost shifting to existing customers under traditional ratemaking policies. For some
5 customers, these line extension rules may result in a requirement to make a large up-front
6 payment, or a contribution in aid of construction (“CIAC”), for the extension of facilities.
7 Since some customers may not be willing or able to pay a large up-front CIAC in return
8 for potential long-term savings, a barrier to the expansion of NGDC systems and loads is
9 created. UGI PNG’s GET Gas pilot program was designed to try to address this problem
10 for some of the applicants for UGI PNG distribution service, while also protecting the
11 interests of existing customers.

12
13 **Q. Does the fact that UGI PNG is the sole entity authorized by the Commission to**
14 **provide natural gas distribution service in most of its service territories mean that it**
15 **can dictate the costs under which it will extend its facilities or provide distribution**
16 **service to customers?**

17 A. No. UGI PNG is subject to Commission oversight and regulation, but is also subject to
18 competitive market forces to a larger degree than other public utilities, such as water or
19 electric utilities. Potential applicants for UGI PNG services and UGI PNG customers
20 have alternative options to natural gas. Businesses may choose to locate new or
21 expanding operations elsewhere if the energy costs are attractive enough. Customer
22 characteristics and circumstances, such as tolerance for large up-front CIACs, can also
23 vary considerably. UGI PNG will lose an applicant’s or customer’s business, and the

1 associated potential for long-term contributions towards system fixed costs, if it does not
2 have the flexibility to adjust contribution and/or distribution rates to reflect the
3 applicant's or customer's competitive alternatives.

4
5 **Q. How has the Commission historically recognized and made provision in its rate-**
6 **making policies for the competitive forces UGI PNG faces?**

7 A. The Commission has, amongst other things, afforded UGI PNG substantial latitude in
8 negotiating contributions for extensions costing over \$10,000 for non-residential
9 applicants and customers, and has permitted the negotiating of firm Rate XD and all
10 interruptible rates within certain parameters. UGI PNG also has the right to discount
11 Rate LFD rates below a stated rate cap, but has no ability to temporarily go above the
12 stated cap as an alternative to requiring a higher CIAC. UGI PNG also does not currently
13 have rate flexibility for firm Rate DS and Rate NT rates.

14
15 **Q. Has UGI PNG's existing rate flexibility served the public interest and the interests**
16 **of its customers?**

17 A. Yes. UGI PNG has had an excellent track record of providing natural gas service to
18 support regional growth. This growth is attributable in part to UGI PNG's ability to
19 adjust its rates within tariff-specified boundaries to meet changing competitive conditions
20 and customer preferences. This flexibility has contributed to the expansion of UGI
21 PNG's distribution system and the recovery of fixed costs from a larger customer base.
22 The expansion of UGI PNG's distribution system also benefits the environment, and thus
23 the general public, since customer conversion to natural gas generally displaces the use of

1 less environmentally friendly energy sources. Such conversions also promote the use of
2 an increasingly locally produced fuel that provides many benefits to Pennsylvania's
3 economy.

4
5 **Q. Looking forward, do you see the need for additional rate flexibility to attract new**
6 **customers?**

7 A. Yes. For example, UGI PNG is beginning to see an increased demand for service to
8 compressed natural gas ("CNG") vehicle refueling stations. These stations may start out
9 as low volume customers, but carry the prospect for steady incremental growth as
10 vehicles are replaced. Often, the applicant or customer will be making a significant
11 capital investment in vehicles and refueling equipment, and may have a low tolerance for
12 large up-front contributions for line extensions, but would be willing to pay a higher
13 distribution rate over time. It is also possible that UGI PNG will see the spread of
14 smaller scale fuel cell, cogeneration facilities or gas-fired heat pump technologies that
15 will require rate flexibility to meet competitive conditions, or may need rate flexibility to
16 accommodate customer needs in making facility location or relocation decisions.

17
18 **Q. How does UGI PNG propose to provide this flexibility?**

19 A. UGI PNG is proposing to implement a five-year pilot "Technology & Economic
20 Development" or "TED" Rider identical to one recently proposed in UGI Gas's most
21 recent base rate case at Docket No. R-2015-2518438, and approved as three-year pilot
22 under a Commission-approved settlement in that proceeding. A Joint Motion of
23 Chairman Brown and Commissioner Sweet accompanying this approval stated:

1 *Lastly, included in the Settlement is a three-year Technology and Development*
2 *(TED) Rider pilot program. The TED Rider allows UGI commercial customers to*
3 *negotiate a mutually acceptable contribution in aid of construction amount and*
4 *distribution rate, so long as, in tandem, they achieve a positive projected net-*
5 *present value for the utility's investment. This novel pilot proposal should*
6 *increase access and expand the use of natural gas. We commend UGI for*
7 *including a mechanism which avails larger customers more options to obtain*
8 *natural gas.*
9

10 **Q. Please describe the TED Rider and associated line extension rule changes.**

11 A. The TED Rider will be applicable by request of the applicant and with approval by the
12 Company, and would be subject to the following criteria:

13 1. The Rider is applicable to usage associated with new gas load at competitive
14 risk only.

15 2. The Rider will be applicable for a defined period outlined in the customer's
16 TED Rider service agreement.

17 3. The Rider will be determined and applied using an economic test consistent
18 with UGI PNG's new business extension tariff.

19 The TED Rider would permit UGI PNG and an applicant or customer to negotiate a
20 mutually acceptable rider, which could either be (1) an incremental rate over the
21 otherwise applicable NT or DS firm service rates or an incremental rate to Rate LFD
22 maximum rates, or (2) a rate discount from otherwise applicable Rate NT, DS firm
23 service or maximum LFD rates. The flexibility within the TED Rider will allow for
24 either (i) a larger up-front customer contribution combined with lower negotiated rates, or
25 (ii) a lower up-front customer contribution combined with higher negotiated rates.
26
27

1 **Q. Can you provide an example of how the TED Rider might be applied?**

2 A. Yes. Say a company plans to convert its fleet of vehicles to CNG vehicles over time, but
3 initially only plans to install compression facilities sufficient to serve a small number of
4 vehicles. This service location initially would be best served under Rate NT, which does
5 not offer rate flexibility. If the company wants a line extension constructed that will be
6 capable of serving its future needs, but does not have the budget to make a large up-front
7 payment for the line extension, the project may not proceed. Under the proposed TED
8 Rider, UGI PNG and the applicant could agree to a mutually acceptable incremental rate
9 on top of the NT rate and a reduced CIAC to accommodate the applicant's planned CNG
10 project.

11 In another instance, a transit agency qualifying for service under Rate DS might
12 receive a grant for the conversion of its fleet to CNG, but might need a temporary
13 discount off of the fixed Rate DS rate to help finance the construction of a re-fueling
14 station under its budgetary constraints. Under the proposed TED rider, UGI PNG and the
15 applicant could agree to a higher CIAC with an incremental reduction of the Rate DS rate
16 to accommodate the applicant's short-term budgetary constraints.

17 In both of these examples, the overall combination of CIAC payments and
18 distribution rates will still have to justify a UGI PNG investment in distribution facilities
19 consistent with the economic test UGI PNG applies to line extension requests. The
20 proposed TED Rider thereby reasonably protects the interests of existing customers by
21 minimizing the possibility of uneconomic investments that could place upward pressure
22 on future distribution rates, while promoting profitable system growth that holds the

1 promise of placing downward pressure on future distribution rates by spreading fixed
2 costs over a larger system throughput.

3
4 **Q. Is UGI PNG proposing the TED Rider as a pilot program?**

5 A. Yes. UGI PNG is proposing a five-year pilot, as opposed to the three-year pilot program
6 it agreed to in the UGI Gas base rate case settlement. I believe five years is appropriate
7 because the negotiation of commercial agreements involving customer decisions
8 concerning the adoption and financing of new technologies, or facility location or
9 relocation decisions, can take some time to negotiate, and are often followed by a
10 facilities construction phase before natural gas distribution service under the negotiated
11 rate can begin. A five year, at a minimum, pilot phase should provide sufficient time to
12 gather meaningful data concerning the economic benefits of projects made possible by
13 the existence of the TED Rider, while still providing a future opportunity for the
14 Commission to decide if the TED Rider should be continued or continued with
15 modifications.

16
17 **Q. Has UGI PNG decided to incorporate any other terms from the UGI Gas base rate
18 case into its TED Rider proposal?**

19 A. Yes. UGI Gas proposed a permanent TED Rider in its base rate case filing, but agreed in
20 settlement to convert its proposal into a pilot program with associated information
21 gathering and reporting requirements. Consistent with the settlement terms of UGI Gas's
22 base rate case, UGI PNG is proposing here to: (a) maintain records of all TED Rider
23 investments and TED Rider negotiated rates; (b) file with the Commission six months

1 before the end of the five-year pilot program a report on the economics of the TED Rider
2 investments, and to contemporaneously provide copies of this report to the Office of
3 Consumer Advocate, the Office of Small Business Advocate and the Bureau of
4 Investigations and Enforcement; and (c) show the *pro forma* rate of return on incremental
5 investment for TED Rider customers as a sub-class in its filed cost of service study when
6 it files its next base rate case.

7
8 **III. LARGE CUSTOMER BUDGET ADJUSTMENTS**

9 **Q. Has UGI PNG made any adjustments to its large customer budget numbers in
10 developing its revenue requirement in this proceeding?**

11 A. Yes, the budgeted revenue numbers have been adjusted to reflect the annualization of
12 mid-year customer additions and deletions, as well as customer data unknown at the time
13 the 2018 budget was prepared. These adjustments are reflected in the sales and revenue
14 exhibits included in the direct testimony of David E. Lahoff (UGI PNG Statement No. 7).

15
16 **IV. QUALITY OF SERVICE PERFORMANCE**

17 **Q. How does UGI PNG evaluate its customer service performance?**

18 A. UGI PNG evaluates its customer service performance in several ways. One way is
19 through the collection of data on performance goals set by the Commission's Bureau of
20 Consumer Services ("BCS"), which are reported annually to the Commission and
21 published in a comprehensive report. Based on these metrics, over the past three years
22 UGI PNG's quality of customer service has met or exceeded the Commission's
23 requirements and, based on our information to date, 2016 metrics are also expected to
24 meet or exceed the Commission's requirements.

1 **Q. Are there any surveys by which UGI PNG measures its customer service**
2 **performance?**

3 A. Yes. UGI PNG participates in the JD Power Gas Utility Residential Customer
4 Satisfaction Study.

5
6 **Q. Please explain the JD Power Gas Utility Residential Customer Satisfaction Study.**

7 A. JD Power is a global market research company. 2016 marks the fifteenth year of its Gas
8 Utility Residential Customer Satisfaction Study, an online survey that measures
9 residential customer satisfaction with gas utility brands across the following six factors,
10 in order of importance: billing and payment; price; corporate citizenship;
11 communications; customer service; and field service. Satisfaction is calculated on a
12 1,000-point scale.

13
14 **Q. How does JD Power evaluate customer satisfaction with gas utility brands?**

15 A. JD Power contracts with several consumer survey panels to complete the survey, with
16 online interviews conducted for 83 gas utilities across four quarterly fielding periods for
17 four US regions (East, Midwest, South and West), each consisting of large and mid-sized
18 utility categories. UGI PNG is in the “Large East” region for the study. This region
19 consists of 11 gas utilities with more than 400,000 households.

20
21 **Q. How is UGI PNG judged in comparison to similarly-situated gas utilities?**

22 A. UGI PNG is considered together with its affiliates UGI Gas and UGI CPG so customer
23 satisfaction is reported on a collective basis. The collective UGI NGDCs were the

1 highest ranked in their region in 2013 and 2014 and were named the JD Power Award
2 winner for these years. The UGI NGDCs came in second place in 2015 and 2016. UGI
3 PNG Exhibit RRS-2 consists of charts that depict the 2013, 2014, 2015 and 2016
4 customer satisfaction rankings for the 11 natural gas utilities that make up the Large East
5 region.

6
7 **Q. Are there any other ways that UGI PNG evaluates its customer service**
8 **performance?**

9 A. Yes. UGI PNG is required to report to the Commission the results of telephone
10 transaction surveys of residential and small business customers that have recently
11 contacted the company. The purpose of these surveys is to assess the customer's
12 perception of the interaction with UGI PNG and fulfill reporting requirements for quality
13 of service benchmarks and standards pursuant to Commission regulations. All EDCs and
14 major NGDCs utilize a common survey which was developed collaboratively with the
15 Commission. Metrix Matrix, a research firm used by all EDCs and major NGDCs for
16 this purpose, contacts individual consumers until it meets a monthly quota of completed
17 surveys for each company. Each year Metrix Matrix completes approximately 700
18 surveys for each participating utility, including UGI PNG.

19 In addition, each month UGI PNG randomly selects a sample of transaction
20 records for consumers who have contacted them within the past 30 days. The following
21 chart represents UGI PNG survey results since 2012, using a scale of 1 to 10:
22
23

Customer Satisfaction Survey Results

Calendar Year		Overall Satisfaction	Call Rep Satisfaction	Field Rep Satisfaction
2012		8.48	9.21	9.16
2013		8.82	9.43	9.69
2014		8.61	9.28	9.38
2015		8.81	9.31	9.78
2016 to date		8.97	9.44	9.50

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Our customer satisfaction survey results demonstrate excellent performance on the part of our call center and field staff, which is consistent with our high marks from JD Power.

Q. Is UGI PNG engaged in any programs anticipated to further improve its customer service performance?

A. Yes. UGI PNG has undertaken UGI’s Next Information Technology Enterprise (“UNITE”) Project. The UNITE Project is a multi-year, multi-phased information system modernization project. Phase 1 of the Project entails the development and implementation of a new customer information system (“CIS”) to replace our two legacy mainframe CIS systems. This new CIS will harmonize the two systems and provide increased functionality and improved customer service.

V. ENERGY EFFICIENCY AND CONSERVATION PLAN IMPLEMENTATION

Q. Has UGI PNG proposed an Energy Efficiency and Conservation (“EE&C”) Plan in this filing?

A. Yes.

1 **Q. Please describe the Plan.**

2 A. The full contents of the EE&C Plan are described in detail in the direct testimony of
3 Theodore M. Love (UGI PNG Statement No. 12), senior analyst with Green Energy
4 Economics Group, Inc. The EE&C Plan is a comprehensive portfolio of energy
5 efficiency and conservation programs that was designed to assist customers in saving
6 energy through various cost-effective measures. The EE&C Plan Rider is discussed in
7 the direct testimony of David E. Lahoff (UGI PNG Statement No. 7).

8 The following six natural gas energy efficiency programs are proposed for the
9 five-year timeframe that will run from Fiscal Year 2018 through Fiscal Year 2022:

- 10 • Residential Prescriptive (RP)
- 11 • Nonresidential Prescriptive (NP)
- 12 • New Construction (NC)
- 13 • Residential Retrofit (RR)
- 14 • Nonresidential Retrofit (NR)
- 15 • Behavior and Education (BE)

16 An additional Combined Heat and Power (“CHP”) program is also being proposed as a
17 separate fuel-switching program in addition to the six programs that comprise the EE&C
18 Plan.

19

20 **Q. How will the EE&C Plan be marketed to customers?**

21 A. The EE&C Plan will be marketed to current and prospective customers with the intent of
22 providing relevant, cost-effective communications that will drive awareness and
23 education regarding the UGI PNG EE&C Plan. The marketing efforts will be

1 implemented and managed by both UGI PNG Staff and qualified Conservation Service
2 Providers (“CSPs”). The EE&C Plan will be marketed in various ways, which may
3 include the following:

4 1) Company website - Utilize UGI.com to inform customers of energy efficiency
5 and conservation tips, along with applicable programs and associated customer
6 rebates. In addition to web content, UGI PNG may decide to leverage “how to”
7 videos through mediums such as YouTube, etc.

8 2) Social media - Leverage social media (e.g. Twitter, Facebook, etc.) to
9 communicate energy efficiency and conservation messages.

10 3) Media advertising - Broadcast within the UGI PNG service territory to inform
11 customers of the benefits of energy efficiency and conservation. Advertising
12 may include the following tactics:

13 a. Television

14 b. Radio

15 c. Newspaper/Billboards

16 d. Event sponsorship and trade shows

17 4) Bill inserts/Newsletters - Distribute energy efficiency and conservation tips to
18 customers at a minimum on a quarterly basis. Topics may include:

19 a. Seasonal energy conservation tips

20 b. Information on low-income assistance programs

21 c. Specific rebates available to Residential, Commercial, and Industrial
22 customers

1 5) CSPs - Once the request for proposal (“RFP”) process is finalized, UGI PNG
2 will partner with hired CSPs that specialize in promoting and administering
3 energy efficiency programs. The CSPs will help identify market opportunities,
4 promote applicable customer programs and rebates, and assist with developing
5 relationships with various trade allies.

6

7 **Q. Does that conclude your testimony?**

8 A. Yes, it does.

UGI PNG EXHIBIT RRS-1

UGI CORPORATION

LEADERSHIP BACKGROUND PROFILE

Name Robert Stoyko

Date 1/5/17

DOB 4/11/60

DOE 8/15/83

Current Position – Vice President Marketing and Customer Relations

Tenure Current Position – 4 ½ years

PROFILE

- Diverse background in Marketing, Operations and general management within the ED, PNG, CPG & GUD.
- Managerial leadership experience in both Area Operations, Marketing and other functional departments
- Strong analytical, team building and interpersonal skills

EXPERIENCE

UGI Utilities

<i>Vice President – Marketing and Customer Relations</i>	2012 - Present
<i>Vice President – Northern Region/Northern Operations</i>	2007-2012

UGI Utilities – Electric Division

<i>Vice President – Electric Distribution</i>	2004-2007
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UGI Utilities – Gas Division

<i>Marketing Manager</i>	2002-2004
<i>Manager – Customer Accounting Services</i>	2001-2002
<i>Lancaster Area Manager</i>	1998-2001
<i>Customer Relations Manager - Lehigh</i>	1991-1998
<i>Residential Supervisor – Reading Area</i>	1988-1991
<i>Financial and Cost Analyst - Rates</i>	1984-1988
<i>Industrial/Commercial Marketing Representative - Lancaster</i>	1983-1984

EDUCATION

St. Joseph’s University: MBA - Finance	1986-1990
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Received Graduate Business Award for finishing first in the graduating class with a 4.0 GPA

Kutztown University: B.S. Business Administration	1981-1983
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Graduated Cum Laude

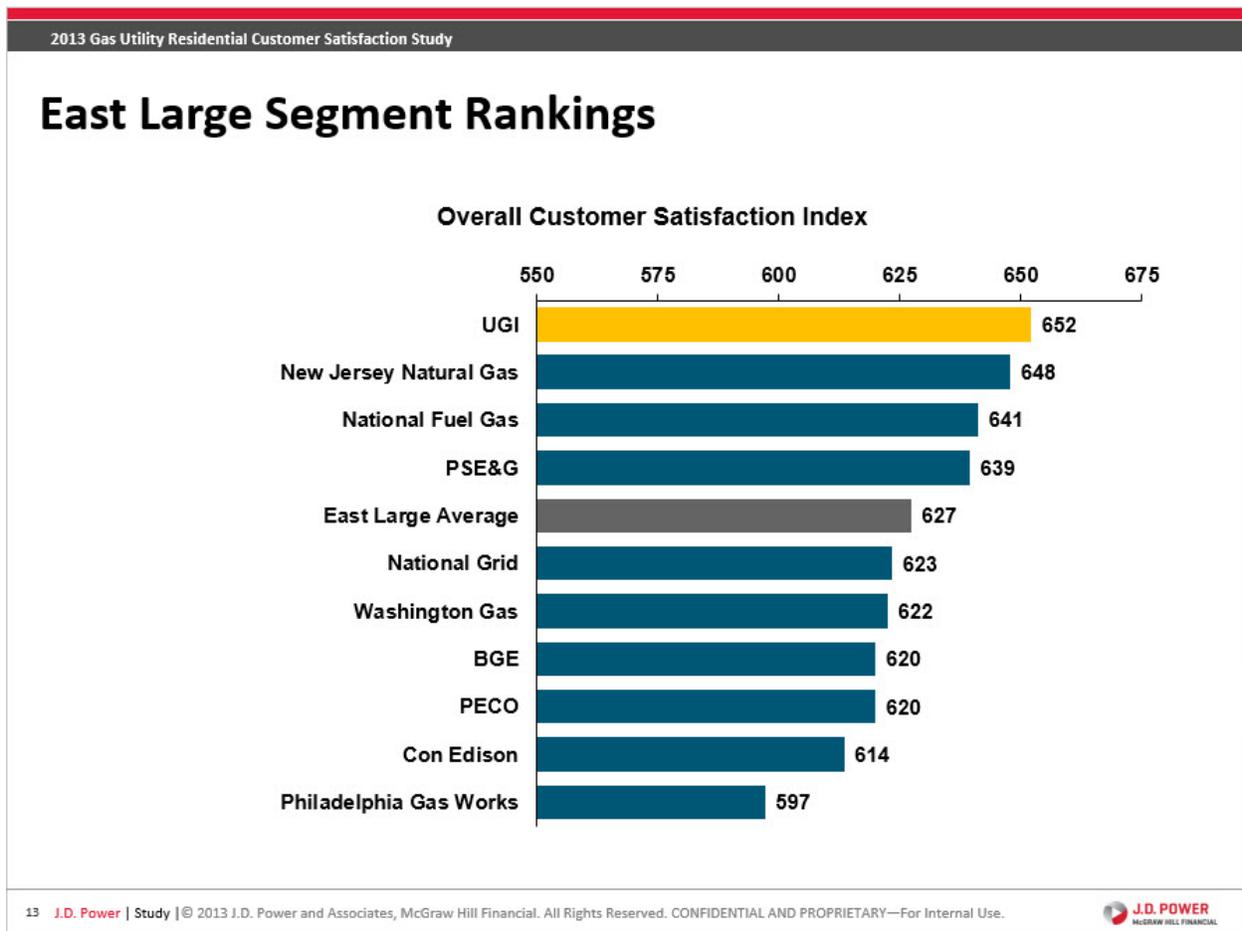
Other :	Various
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AGA Sustainable Growth Committee ; Energy Solutions Center Board of Directors ; United Way Ready, Set, Read Board of Directors

UGI PNG EXHIBIT RRS-2

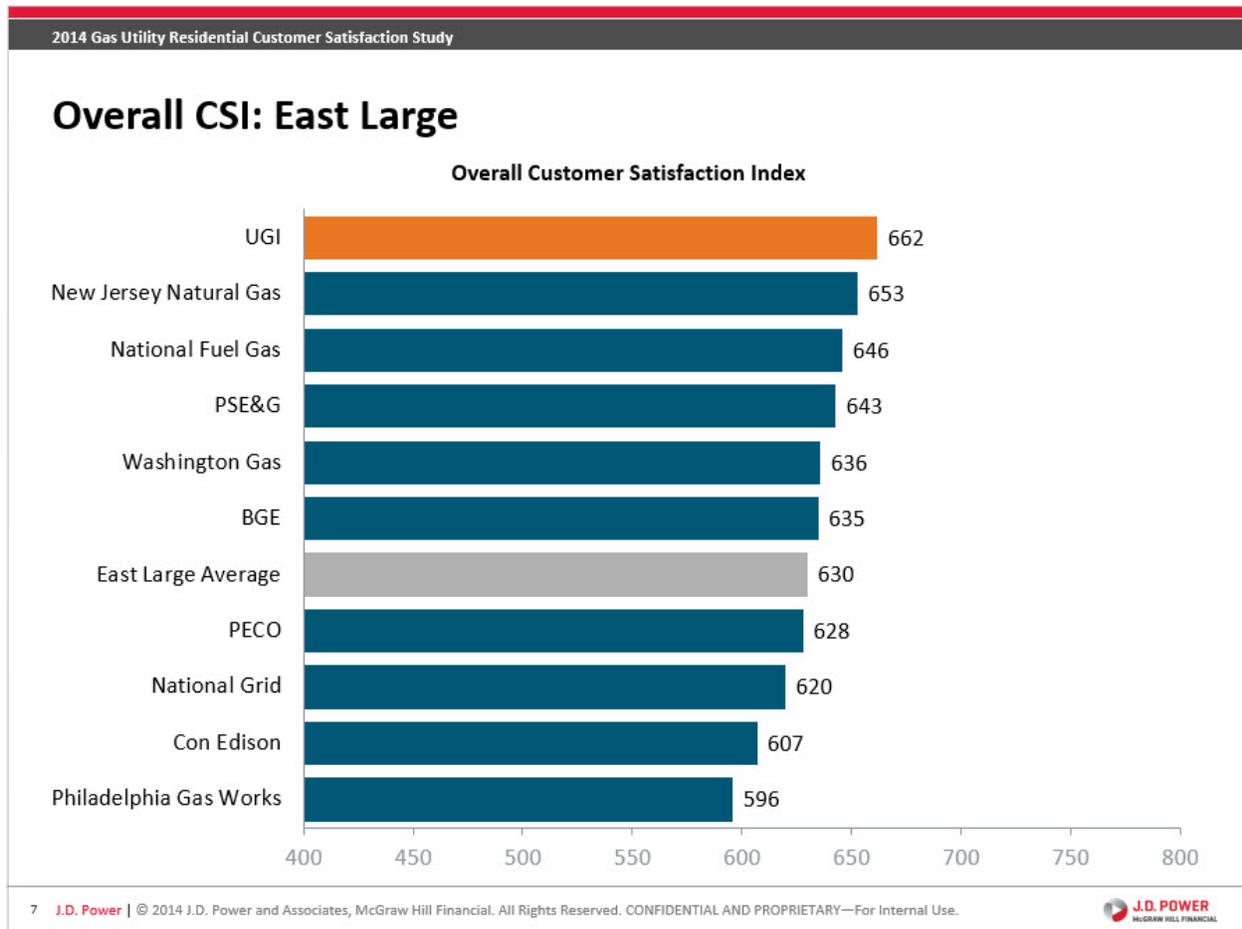
JD Power Gas Utility Residential Customer Satisfaction Study Results 2013-2016

2013



JD Power Gas Utility Residential Customer Satisfaction Study Results 2013-2016

2014

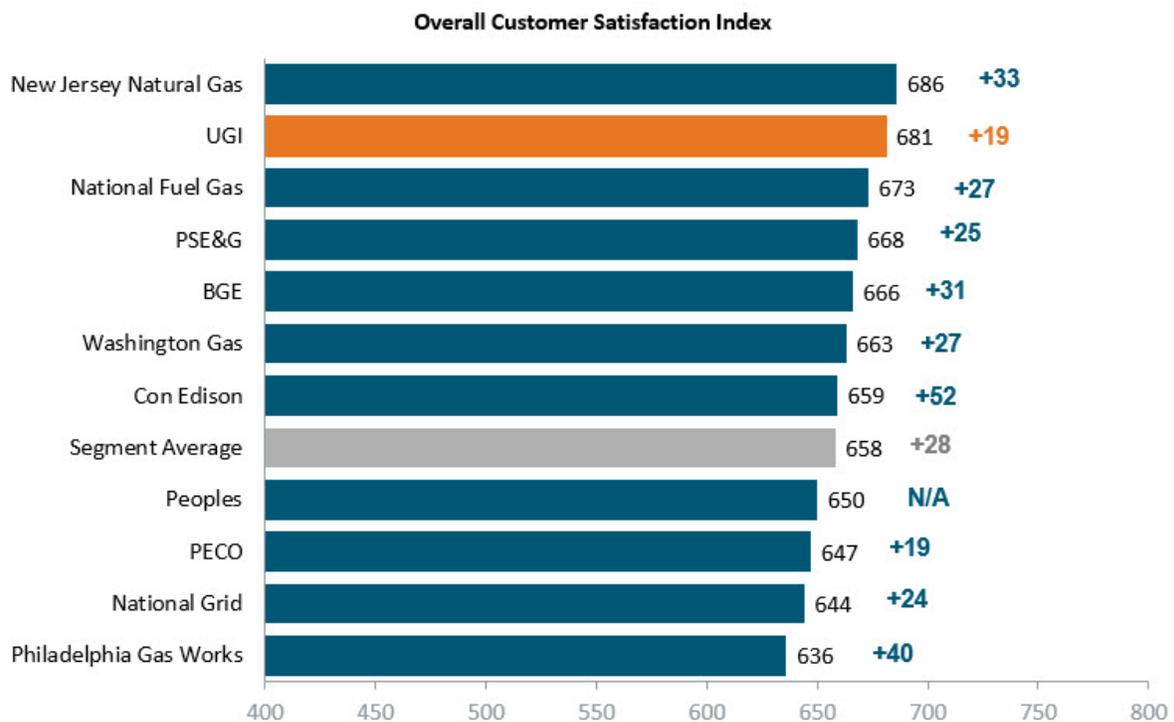


JD Power Gas Utility Residential Customer Satisfaction Study Results 2013-2016

2015

2015 Gas Utility Residential Customer Satisfaction Study

Overall CSI: East Large



JD Power Gas Utility Residential Customer Satisfaction Study Results 2013-2016

2016



Overall CSI: East Large



UGI PNG STATEMENT NO. 9 – CHRIS A. ROSSI

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Docket No. R-2016-2580030

UGI Utilities, Inc. – Gas Division

Statement No. 9

**Direct Testimony of
Chris Ann Rossi**

**Topics Addressed: Universal Service and Energy Conservation
Plan
Universal Service Plan Rider
Customer Service Policies and Procedures**

Dated: January 19, 2017

1 **I. INTRODUCTION**

2 **Q. Please state your name and business address.**

3 A. My name is Chris Ann Rossi. My current business address is 225 Morgantown Road,
4 Reading, Pennsylvania 19611.

5
6 **Q. By whom and in what capacity are you employed?**

7 A. I am employed by UGI Utilities, Inc. (“UGI”), as Director – Customer Services. In this
8 position, I am responsible for managing the customer information center for UGI
9 Utilities, Inc. – Gas Division (“UGI Gas”), UGI Utilities, Inc. – Electric Division (“UGI-
10 ED”), UGI Penn Natural Gas, Inc. (“UGI PNG” or “the Company”) and UGI Central
11 Penn Gas, Inc. (“UGI CPG”) (collectively “the UGI Distribution Companies”). I also
12 manage the customer accounting, credit and collections, customer outreach, and
13 compliance departments, which includes the administration of all universal service
14 programs. In this role I oversee regulatory compliance with Chapter 14 of the Public
15 Utility Code, 66 Pa.C.S. §§ 1401, *et seq.*, related consumer regulations and compliance
16 with generally applicable consumer protection, collection, and consumer bankruptcy
17 regulations.

18
19 **Q. What is your educational and professional background?**

20 A. I received my undergraduate degree from Pennsylvania State University. I have been
21 employed by UGI since August 2000. I have held various positions in Customer
22 Accounting, Credit and Collections and Gas Supply. I was promoted to the position of
23 Director of Customer Services in October 2015 after spending nearly six years managing
24 the teams mentioned above. Prior to my employment at UGI, I served in the

1 Pennsylvania Army National Guard from the years 1984 through 1986. I held various
2 positions in customer service in both the banking industry and in distribution. From 1985
3 through 1991, I was employed by Miners National Bank, working in many of the local
4 branch offices. From 1991 through 2000, I was employed by Schoeneman Corporation.
5 During most of my time at Schoeneman, I was in the position of Customer Service
6 Manager. I was responsible for the call center, quality assurance, and metrics
7 performance reporting.

8
9 **Q. Have you been involved in other proceedings before the Pennsylvania Public Utility**
10 **Commission (“Commission”)?**

11 A. Yes. I testified in formal customer complaint proceedings several years ago, and more
12 recently at the following dockets: the 2011 CPG Base Rate Case, Docket No. R-2010-
13 2214415, and the 2016 UGI Gas Base Rate Case, Docket No. R-2015-2518438.

14
15 **Q. On whose behalf are you testifying in this proceeding?**

16 A. I am submitting this direct testimony on behalf of UGI PNG.

17
18 **Q. What is the purpose of your testimony?**

19 A. My testimony will: (1) provide an overview of UGI PNG’s Universal Service and
20 Energy Conservation Plan (“USECP”); (2) identify the customer service changes that
21 were voluntarily adopted and have been implemented by UGI PNG to align UGI PNG’s
22 USECP administration with that of UGI Gas; and (3) address the Company’s Universal
23 Service Plan Rider (“USP Rider”).

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II. OVERVIEW OF COMPANY’S USECP

Q. Please describe the administration of UGI PNG’s USECP?

A. Each of the UGI Distribution Companies has its own USECP with separate budgets that are developed based on customer needs within that company’s service territory. However, to realize efficiencies in administration, the four USECPs are collectively managed with shared administrative and information technology resources.

Q. What universal service and low-income energy conservation programs does UGI PNG currently offer to its customers?

A. Each of the UGI Distribution Companies offers the following universal service programs to its customers: (1) the Customer Assistance Program (“CAP”); (2) the Low-Income Usage Reduction Program (“LIURP”); (3) Operation Share Energy Fund (hardship fund); and (4) the Customer Assistance and Referral Evaluation Services (“CARES”) program, which includes outreach for the Low Income Home Energy Assistance Program (“LIHEAP”).

Q. When was UGI PNG’s current Universal Service Plan approved by the Commission?

A. The UGI Distribution Companies made their collectively-managed January 1, 2014 through December 31, 2017 USECP filing at Docket No. M-2013-2371824.¹ The

¹ The Company’s USECP was originally filed on July 1, 2013, and was re-filed on August 1, 2014, for an additional plan year per the Commission’s June 27, 2014 Secretarial Letter establishing a new USECP filing schedule and independent evaluation schedule and providing a partial, one time Commission waiver of the three year requirement established by the Commission’s regulations, 52 Pa Code §§ 54.74 and 62.4.

1 USECP was approved by the Commission in three related orders entered on January 15,
2 2015, June 11, 2015, and September 3, 2015. The next combined USECP filing for the
3 UGI Distribution Companies is targeted for July of 2017 for the USECP period of 2018-
4 2020.

5
6 **Q. Have any of UGI PNG's USECP programmatic offerings been modified since its**
7 **approval at Docket No. M-2013-2371824?**

8 A. No. None of the four programmatic offerings (CAP, LIRUP, Operation Share, or
9 CARES) has been modified since the USECP's approval. However, PNG has voluntarily
10 incorporated certain customer service-focused practices and procedures – some of which
11 impact its administration of the USECP – that were agreed to by UGI Gas as part of a
12 Commission-approved settlement (“Settlement”) of the UGI Gas 2016 base rate
13 proceeding at Docket No. R-2015-2518438 (Final Order entered October 14, 2016)
14 (“*UGI 2016 Rate Case Order*”). UGI PNG implemented these changes because its
15 customer service group and its USECP are collectively administered with that of the
16 other UGI Distribution Companies.

17
18 **III. PNG'S VOLUNTARY ADOPTION OF UGI-GAS SETTLEMENT ITEMS**

19 **Q. Please provide an overview of those customer-service focused UGI Gas 2016 base**
20 **rate settlement items that were adopted by PNG.**

21 A. PNG, as well as CPG and UGI-ED, adopted and incorporated the following UGI- Gas
22 settlement items:

- 23 • Revise proposed Tariff Rule 9.1(b) to state that “UGI Gas will use financial
24 information from the customer provided within the most recent 12-month period to

1 determine if a customer exceeds the 250% federal poverty level threshold.” UGI Gas
2 will not require customer information to verify income if the customer has established
3 income verification through receipt of LIHEAP within the past 12 months or if the
4 customer is currently participating in CAP. *See UGI 2016 Rate Case Order*, at
5 Ordering Paragraph 35.

6 • Encourage Community Based Organizations (“CBOs”) to conduct additional outreach
7 to CAP customers. *See UGI 2016 Rate Case Order*, at Ordering Paragraph 36.

8 • Inform applicants and customers of the opportunity for security deposit waivers for
9 income-qualified households, and requesting income information on the initial call to
10 establish new service or restore previously terminated service. *See UGI 2016 Rate*
11 *Case Order*, at Ordering Paragraph 37, 38.

12 • Include the number of customers in default of their payment arrangements, but are
13 still active customers, in applicable reports to the Commission. *See UGI 2016 Rate*
14 *Case Order*, at Ordering Paragraph 39.

15 • Revise training materials to clarify the Companies do not require a low-income
16 customer to enroll in a Universal Service program to qualify for waiver of a security
17 deposit, and that the only requirement is income verification. *See UGI 2016 Rate*
18 *Case Order*, at Ordering Paragraph 40.

19 • Clarify tariff language to reflect that annual income verifications are not required to
20 establish eligibility for cold weather shutoff protection, and that annualized income is

1 an acceptable method to establish winter shutoff protections. *See UGI 2016 Rate*
2 *Case Order*, at Ordering Paragraph 41.

- 3 • Consult with CBOs and investigate the feasibility of using alternative communication
4 means to process applications and verify income for purposes of security deposit
5 waive and Universal Service programs enrollment. *See UGI 2016 Rate Case Order*,
6 at Ordering Paragraph 42.

- 7 • Enhance Spanish speaking customers' ability to understand the availability of
8 programs by translating two, un-translated program documents into Spanish, and
9 requiring the companies' CBOs to have access to Spanish language interpretation
10 services if 5% or more of the residents in the portion of the service territory serviced
11 by the CBO speak Spanish based on US census data. *See UGI 2016 Rate Case*
12 *Order*, at Ordering Paragraph 43.

- 13
14 • Revise the form of identification policy to provide that before initiating service, an
15 applicant must provide: (1) one valid government issued photo identification; (2) two
16 valid alternative forms of identification (one of which must include a photo of the
17 individual) if a government issued photo identification is unavailable; or (3) the
18 applicant's Social Security Number. The term "government issued photo
19 identification" includes photo identifications issued by foreign governments. *See*
20 *UGI 2016 Rate Case Order*, at Ordering Paragraph 44.

- 21 • Clarify medical certificate procedures to reflect its current practice of faxing the
22 medical certificate form directly to a physician's office when provided the fax

1 number by the customer. *See UGI 2016 Rate Case Order*, at Ordering Paragraph 45.
2 The Companies also agreed to clarify that the medical certificate form is not the only
3 means of obtaining a medical certificate and that they will accept any writing that
4 contains the information required by 66 Pa. C.S. Chapter 14 and 52 Pa. Code Chapter
5 56. *See UGI 2016 Rate Case Order*, at Ordering Paragraph 46.

- 6 • Improve Protection From Abuse (“PFA”) procedures. These modifications included
7 clarifying its procedures, generally updating policy language, instituting the use of
8 externally-sourced domestic violence training, updating certain billing procedures
9 where a PFA holder is named on an account, and modifying the Companies’ access
10 and handling procedures for PFAs. These changes are fully discussed in the
11 Commission’s *UGI 2016 Rate Case Order* entered October 14, 2016. *See UGI 2016*
12 *Rate Case Order*, at Ordering Paragraphs 47-53.

13 **Q. Have all of the above items been implemented?**

14 A. Yes. The UGI Gas Settlement required all of these changes to be fully implemented by
15 January 17, 2017. *See UGI 2016 Rate Case Order*, at Ordering Paragraph 32. These
16 changes have been implemented for UGI Gas, as well as the other UGI Distribution
17 Companies.

18
19 **Q. Has UGI PNG consulted with stakeholders on these changes to its USECP?**

20 A. Yes. Pursuant to the UGI Gas 2016 base rate case settlement, UGI Gas was required to
21 hold a stakeholder meeting with the parties to the proceeding to discuss the above
22 changes. The UGI Distribution Companies normally hold two collaborative meetings
23 annually to discuss their USECP. The UGI Distribution Companies addressed the above-

1 described USECP programmatic changes at its December 7th and 12th collaborative
2 meetings, to which all parties to the UGI Gas rate case, along with the Commission
3 Bureau of Consumer Services leadership, were invited.

4
5 **Q. Is UGI PNG proposing any changes to its Commission-approved Universal Services**
6 **Programs in this proceeding?**

7 A. No. UGI PNG is not proposing any changes to policies or procedures that would impact
8 its Commission-approved Universal Service Programs.

9
10 **IV. UNIVERSAL SERVICE PLAN RIDER**

11 **Q. Please explain how UGI PNG recovers the costs of its universal service programs.**

12 A. Pursuant to the Commission-approved settlement in UGI PNG's last base rate proceeding
13 at Docket No. R-2008-2079660, UGI PNG is permitted to recover costs for the following
14 programs under its USP Rider with an annual reconciliation for costs and recoveries: (1)
15 CAP shortfall, pre-program arrearages and external administrative costs; (2) LIURP in an
16 annual amount of \$850,000; and (3) Hardship funds in an annual amount of \$5,000 (for
17 administrative costs). There is an offset for CAP credits and pre-program arrearages for
18 customers receiving shortfall credits above the enrollment projected in UGI PNG's last
19 base rate case. UGI PNG is proposing to continue this cost recovery mechanism.

20
21 **Q. Do you have a projection for UGI PNG's CAP enrollment for the end of the fully-**
22 **projected future test year?**

23 A. Yes. I project that UGI PNG's CAP enrollment at September 30, 2018 will be 7,643, as
24 shown on UGI PNG Exhibit CAR-1. This projection is based on a steady increase in

1 enrollment that we have observed since the CAP program change in September 2014
2 provided customers with the option to set their CAP payment at their average bill in lieu
3 of a percentage of income, which has resulted in a trending increase in CAP enrollment.
4

5 **Q. Is UGI PNG proposing an offset to CAP credits and pre-program arrearages for**
6 **customers receiving shortfall credits above the projected enrollment of 7,643?**

7 A. Yes. UGI PNG is proposing to calculate an offset to CAP credits and pre-program
8 arrearages of 9.1%. This offset reduces the Company's recovery of CAP spending above
9 projected enrollment to account for write-offs of bad debt that would have arguably
10 occurred if not for CAP, as set forth in UGI PNG Exhibit CAR-2. This offset is
11 calculated using the most recent 2015 write-off data, in accordance with the methodology
12 used by the Office of Consumer Advocates in the 2016 UGI Gas Base Rate Case, at
13 Docket No. R-2015-2518438.
14

15 **Q. What are the projected costs of the UGI PNG's USECP at the end of the FPFTY**
16 **that must be accounted for in the USP Rider surcharge?**

17 A. These are reflected in UGI PNG Exhibit CAR-1. The direct testimony of David E.
18 Lahoff (UGI PNG Statement No. 7) explains in greater detail how these costs will be
19 incorporated in the surcharge applicable to non-CAP customers through the USP Rider.
20

21 **Q. Does this conclude your direct testimony?**

22 A. Yes, it does.

UGI PNG EXHIBIT CAR-1

**UGI PNG USECP
Budgets and Enrollment**

	FY 16	FY 17	FY 17 BRC	FY 18 BRC
	ACTUAL	BUDGET	Forecast	Forecast
SHORTFALL	\$ 766,111	\$ 2,075,360	\$ 1,215,872	\$ 1,337,650
CAP ADMIN	\$ 246,706	\$ 348,000	\$ 348,000	\$ 348,000
LIURP	\$ 716,270	\$ 850,000	\$ 850,000	\$ 850,000
HARDSHIP	\$ 6,145	\$ 9,000	\$ 9,000	\$ 9,000
PPA	\$ 793,734	\$ 800,000	\$ 1,079,531	\$ 1,187,484
Total	\$ 2,528,966	\$ 4,082,360	\$ 3,502,403	\$ 3,732,134
Cust Count	5,888		6,948	7,643
PPA	\$ 155.38			
S/F	\$ 175.00			3732134
				\$ (0)

FY16 decrease enrollment of 18% due to warmer winter
 FY17 growth at 18% - normal to colder winter expected and improved outreach efforts (income verification process and ask for remote enrolls- UGI BRC settlements)
 FY 18 growth at 10% due to improved outreach efforts

UGI PNG EXHIBIT CAR-2

**UGI PNG CAP Adjustment for
Low-Income Bad Debt Write-Off**

	2013	2014	2015
Res LI W/O	8.30%	10.00%	11.80%
Res W/O	1.60%	2.20%	2.70%
Adjustment	6.70%	7.80%	9.10%

UGI PNG STATEMENT NO. 10 – HANS G. BELL

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Docket No. R-2016-2580030

UGI Penn Natural Gas, Inc.

Statement No. 10

**Direct Testimony of
Hans G. Bell**

**Topics Addressed: System Operations
 Capital Planning
 System Reliability and Safety
 Environmental Program and
 Remediation Costs**

Dated January 19, 2017

1 **I. INTRODUCTION**

2 **Q. Please state your name and business address.**

3 A. My name is Hans G. Bell. My business address is 2525 N. 12th Street, Reading,
4 Pennsylvania, 19612.

5
6 **Q. By whom are you employed and in what capacity?**

7 A. I am employed as Vice President of Engineering and Operations Support, by UGI
8 Utilities, Inc. (“UGI”), the parent company of UGI Penn Natural Gas, Inc. (“UGI PNG”
9 or “the Company”) and UGI Central Penn Gas, Inc. (“UGI CPG”).

10

11 **Q. Please describe your educational background and work experience.**

12 A. They are set forth in my resume attached as UGI PNG Exhibit HGB-1 to my testimony.

13

14 **Q. What are your responsibilities as Vice President of Engineering and Operations
15 Support?**

16 A. As Vice President of Engineering and Operations Support, I am UGI’s senior executive
17 accountable for providing technical leadership and strategic direction to all gas utility
18 engineering and gas technical services functions for UGI and its wholly-owned
19 subsidiaries UGI PNG and UGI CPG, each of which is a certificated natural gas
20 distribution company (“NGDC”). UGI has both a Gas Division (“UGI Gas”), which is a
21 certificated NGDC, and an Electric Division (“UGI Electric”), a certificated electric
22 distribution company (“EDC”) (collectively with UGI CPG and UGI PNG the “UGI
23 Distribution Companies”). For UGI Gas, UGI CPG, and UGI PNG (collectively the
24 “UGI NGDCs”), I am responsible for establishing long-term strategic infrastructure

1 investment plans. For all of the UGI Distribution Companies I am responsible for
2 developing and managing corresponding annual capital budgets. Under my direction is
3 the engineering staff, which is accountable for engineering design, engineering standards,
4 corrosion control, Distribution Integrity Management Program (“DIMP”), Transmission
5 Integrity Management Program (“TIMP”), leak survey, mapping and records, safety,
6 damage prevention, operator qualification, training, and environmental programs.

7
8 **Q. Have you presented testimony in proceedings before a regulatory agency?**

9 A. Yes, I have testified in the following dockets: UGI PNG Petition for Approval of a
10 Distribution System Improvement Charge (“DSIC”), Docket Nos. P-2013-2397056; UGI
11 CPG Petition for Approval of a DSIC, Docket No. P-2013-2398835; UGI PNG Petition
12 for a DSIC Waiver, Docket No. P-2016-2537594; UGI CPG Petition for a DSIC Waiver,
13 Docket No. P-2016-2537609; UGI Gas Petition for Approval of a DSIC, Docket No. P-
14 2013-2398833; and the UGI Gas 2016 base rate case, Docket No. R-2015-2518438.

15
16 **Q. What is the purpose of your testimony?**

17 A. I am providing testimony on behalf of UGI PNG. In my testimony, I will address the
18 following topics: (1) UGI PNG’s system operations; (2) UGI PNG’s system reliability
19 and safety record; and (3) UGI PNG’s environmental program.

1 **Q. Are you sponsoring any exhibits in this proceeding?**

2 A. Yes, I am sponsoring the following UGI PNG Exhibits: HGB-1 through HGB-5. I am
3 also sponsoring certain responses to the Commission's standard filing requirements as
4 indicated on the master list accompanying this filing.

5
6 **II. SYSTEM OPERATIONS**

7 **Q. Please provide an overview of UGI PNG's operations.**

8 A. UGI PNG provides natural gas service to approximately 166,500 customers in
9 northeastern Pennsylvania through a system consisting of approximately 2,562 miles of
10 gas distribution mains and 50 miles of natural gas transmission mains as of December 31,
11 2015.¹ The UGI PNG service territory is largely made up of rural communities with
12 Wilkes-Barre, Scranton, and Williamsport and the surrounding communities constituting
13 the primary urban areas within the service territory.

14
15 **Q. Is the UGI PNG service territory supplied by an interstate pipeline?**

16 A. Yes. UGI PNG's service territory is supplied by Transco, Tennessee, and Columbia.

17
18 **Q. How many operations centers support the UGI PNG service territory?**

19 A. UGI PNG maintains seven reporting centers in Archbald, Bloomsburg, Honesdale,
20 Milford, South Point (Northumberland), Wilkes-Barre, and Williamsport, Pennsylvania.

21

¹ Per 2015 U.S. Department of Transportation Report reflecting mileage on December 31, 2015.

1 **Q. How does UGI PNG staff its operations?**

2 A. UGI PNG is a wholly-owned subsidiary of UGI. As of September 30, 2016, UGI PNG
3 had a total of 256 full-time employees. These employees are mainly operations
4 employees and some administrative staff, UGI PNG also receives executive, managerial,
5 administrative, technical and field operations support from personnel employed by UGI.
6 More than half of these employees are involved in the physical operation and
7 maintenance of the transmission and distribution facilities, which includes the
8 construction, operation and maintenance of mains, services and other facilities, damage
9 prevention and safety, and pipeline regulatory compliance. The remaining employees are
10 responsible for administrative duties, marketing, customer service, and credit and
11 collections. UGI provides various management and support services to its wholly-owned
12 NGDC subsidiaries, UGI CPG and UGI PNG (*e.g.*, finance and accounting, payroll, gas
13 supply, engineering, rates, purchasing, fleet, and information technology). UGI and its
14 subsidiaries also benefit from management and support services provided by the parent
15 company of UGI Corporation (*e.g.*, insurance, legal, treasury operations, and corporate
16 governance).

17

18 **III. CAPITAL PLANNING**

19 **Q. Please describe the categories of projects included in the capital budget for UGI**
20 **PNG.**

21 A. The main areas for which UGI PNG develops capital budgets are: (1) replacement and
22 betterment infrastructure; (2) new business; (3) facilities; (4) information technology; and
23 (5) supply. The budgeting process is further described in the direct testimony of Kindra
24 S. Walker (UGI PNG Statement No. 2).

1 **Q. How are projects chosen for inclusion in UGI PNG’s capital budget?**

2 A. Replacement and betterment infrastructure is chosen for inclusion in the capital budget
3 using a risk-based prioritization process. New business projects are chosen based on
4 projections that in turn are informed by large known customers, and forecasts of new
5 business, customer conversions, customer counts, and construction and development in
6 the UGI PNG service territory. Facilities projects are a prioritized set of building-related
7 projects. Information Technology (“IT”) projects are selected based on need for
8 investment in new systems and hardware, and replacement of old systems and hardware.
9 Supply projects are selected for inclusion in capital planning based on their ability to
10 maximize the utilization of upstream interstate supply capacity and react to cost of supply
11 (e.g., our attempt to optimize low-cost Marcellus supply). Capital projects of general
12 application to the UGI Distribution Companies are budgeted by UGI and costs are
13 generally allocated to UGI PNG in accordance with the Modified Wisconsin formula
14 (“MWF”).

15
16 **Q. Please describe the risk-based prioritization process used to evaluate replacement
17 and betterment infrastructure projects.**

18 A. UGI PNG’s risk-based prioritization process prioritizes the replacement of cast iron and
19 bare steel pipe, which are most susceptible to failure from corrosion, cracks and leakage.
20 Where other facilities that are located near projects are determined to be prone to failure,
21 they will also be prioritized for replacement. As part of its infrastructure upgrade, UGI
22 PNG replaces associated distribution equipment and installs additional safety and
23 monitoring equipment that is compatible with the upgraded design. UGI PNG installs

1 excess flow valves, replaces and potentially relocates meters, and replaces risers, meter
2 bars, regulator stations and service regulators. UGI PNG's prioritization of projects for
3 its capital budgets is consistent with its recently modified Long Term Infrastructure
4 Improvement Plan ("LTIP") for 2014-2019, as approved by the Commission at Docket
5 No. P-2013-2397056 (Opinion and Order entered June 30, 2016).

6
7 **Q. How does UGI PNG's actual capital spend compare to budgeted capital spend?**

8 A. With respect to replacement and betterment spending, UGI PNG's spending is generally
9 aligned with or slightly higher than budgeted capital. As shown on UGI PNG Exhibit
10 HGB-2, in 2014 and 2016 UGI PNG's replacement and betterment spending was greater
11 than budgeted capital, and in 2015, UGI PNG's spending was aligned with budgeted
12 capital.

13
14 **IV. SYSTEM RELIABILITY AND SAFETY**

15 **Q. Please describe the physical composition of UGI PNG's distribution system.**

16 A. Due to its long-term operation, the UGI PNG distribution system is comprised of pipeline
17 facilities composed of a mixture of materials indicative of the industry's technological
18 advancement over time. Cast iron mains can be found in the oldest parts of the system.
19 The industry then transitioned to bare steel and wrought iron piping, which were
20 prevalent until the 1960s. The first generation of plastic piping was introduced in the
21 early 1970s. Materials installed since the 1970s include polyethylene (PE) and coated
22 steel piping. Overall, the UGI PNG system is composed of approximately 84.8%
23 contemporary, post-1970s, materials.

24

1 **Q. Please discuss UGI PNG’s main replacement program.**

2 A. UGI PNG’s main replacement program constitutes a large part of its capital budget. UGI
3 PNG has been identifying and repairing, improving, or replacing its distribution
4 infrastructure on an accelerated basis. As I stated above, UGI PNG has a Commission-
5 approved LTIP. The LTIP commits UGI PNG to the replacement of all of its cast iron
6 pipelines over a 13-year period ending in February 2027, and all of its bare steel and
7 wrought iron pipelines over a 28-year period ending September 2041. UGI PNG also
8 committed to replacing gas service lines and moving inside regulators and, where
9 applicable, meters to outside on a planned basis in conjunction with the replacement of
10 the mains to which they are connected. These projects are “DSIC-eligible,” meaning that
11 they meet the requirements for recovery in a DSIC. As of December 31, 2015, the
12 remaining mileage of UGI PNG cast iron and wrought iron main declined to 102 miles,
13 and bare steel main declined to 134 miles. The 2016 Calendar year figures will be
14 available March 15, 2017, in UGI PNG’s annual distribution report.

15

16 **Q. Does UGI PNG track capital investment associated with these DSIC-eligible main**
17 **replacements?**

18 A. Yes. UGI PNG tracks DSIC-eligible capital placed in service per calendar year and
19 reports that information to the Commission in its Annual Asset Optimization Plan
20 (“AAOP”).

21

22

23

1 **Q. Has UGI PNG met its DSIC-eligible main replacement goals set by its LTIP?**

2 A. Yes. As described in UGI PNG’s LTIP, the UGI NGDCs have a combined total annual
3 goal of 62 miles of cast iron and bare steel replacement, which the UGI NGDCs have
4 exceeded for 2014, 2015, and which they are forecasted to meet in 2016. The initial
5 individual replacement goals for the UGI NGDCs are set out in the LTIP with
6 subsequent annual goals stated in the companies’ AAOPs. These planned mileage
7 replacements are subject to annual re-assessment of risk and may vary from forecasted
8 replacement figures. For UGI PNG, its LTIP set out the first annual individual
9 replacement goal at 12 miles. The 2014-2015 UGI PNG AAOP forecasted 14 miles of
10 replaced main, and the 2015-2016 UGI PNG AAOP forecasted 14 miles of replaced
11 main. Table 1, below, shows the forecasted and actual replacement figures for each of
12 the first two years of the LTIP. Calendar year 2016 data will be available in March of
13 2017.

Table 1.

	2014 (in miles)	2015 (in miles)
UGI PNG Forecast	12	14
UGI PNG Actual	9.2	17.6
UGI Combined Forecast	62	62
UGI Combined Actual	62.6	67.4

14
15 UGI PNG’s replacement program was deemed to be in compliance with its LTIP for
16 2014 and 2015, and was approved by the Commission’s Bureau of Technical Utility
17 Services (“TUS”) in letters dated April 1, 2015, at Docket No. M-2015-2469649 and May
18 18, 2016, at Docket No. M-2016-2531527.

19

1 **Q. What is UGI PNG’s capital investment associated with these main replacements for**
2 **2014, 2015, and 2016?**

3 A. In calendar year 2014, DSIC-eligible capital investment for UGI PNG was \$59 million,
4 which significantly exceeded UGI PNG’s initial planned capital spend of \$51.2 million
5 set out in its initial LTIIP. In calendar year 2015, DSIC-eligible capital investment for
6 UGI PNG was \$27.1 million, which exceeded UGI PNG’s minimum target of \$24.8 set
7 forth in its 2014-2015 AAOP. Actual 2016 investment placed into service will be
8 provided in the 2017 annual update to the AAOP.

9
10 **Q. Does UGI PNG have a projection of its Capital spend and DSIC-eligible capital**
11 **spend for the Future Test Year and the Fully-Projected Future Test Year?**

12 A. Yes. Fiscal year 2018 Capital Spending is currently projected at approximately \$63.2
13 million. The FY 2018 capital budget is subject to increase in the course of the budget
14 approval process. The DSIC-eligible component of projected capital spending,
15 approximately \$45.4 million, is far in excess of the \$24.8 million FY 2018 commitment
16 in PNG’s modified LTIIP. See UGI PNG Exhibit HGB-3.

17
18 **Q. How are leaks classified on the UGI PNG System?**

19 A. UGI PNG classifies underground leaks as “A”, “B”, and “C”, with “C” being the most
20 severe. An “A” leak is an underground leak that is non-hazardous at the time of detection
21 and can be reasonably expected to remain non-hazardous. “B” leaks are underground
22 leaks that are recognized as being non-hazardous at the time of detection, but justify a
23 scheduled repair based on a probable hazard. “C” leaks are underground leaks that

1 represent an existing or probable hazard to persons or property, and require immediate
2 repair or continuous action until the conditions are no longer hazardous.

3
4 **Q. Has UGI PNG undertaken efforts to reduce leaks on its system?**

5 A. Yes.

6
7 **Q. Please discuss UGI PNG's efforts to reduce system leaks.**

8 A. UGI PNG has developed consistent specifications for standardized leak classification
9 criteria based on ANSI Z380.1, the Guide for Gas Transmission, Distribution and
10 Gathering Piping Systems, produced by the Accredited Standards Committee ("ASC")
11 Z380 Gas Piping Technology Committee ("GPTC"). The adoption of the GPTC based
12 leak standard made classification criteria more stringent and resulted in an increase in the
13 number of leaks repaired. As of October 31, 2016, the total number of pending leaks on
14 the UGI PNG system has decreased by 15.8% as compared to the prior four-year period.
15 Given the severe colder than normal winters of 2013-2014 and 2014-2015, the reductions
16 in leak inventory over this time period is a significant accomplishment. By having a
17 stricter leak standard and fewer leaks, overall system safety and reliability has improved.

18 Another metric indicative of UGI PNG's system integrity is the number of
19 repaired leaks per mile of distribution main. In 2015, UGI PNG had 0.44 repaired leaks
20 per mile of distribution main compared to 0.24 repaired leaks per mile in 2014, which
21 constitutes an 83% increase in repaired leaks per mile.

1 As a part of its DIMP, UGI PNG will regularly re-assess all system risks and
2 leakage trends to determine if additional or accelerated actions are required to further
3 reduce system leaks.

4
5 **Q. Are there any new system-wide initiatives that UGI PNG is undertaking to reduce**
6 **risk?**

7 A. Yes. UGI-PNG is including a 10 year program to identify and remediate the approximate
8 1736 mechanical tees estimated to be in service. Mechanical tees are a formerly-
9 employed method for attaching plastic service lines to plastic mains. Over time, the bolts
10 affixing the tee to the main have a tendency to fracture which may result in a hazardous
11 leak. In the remediation process, tees are excavated, evaluated, and remediated by
12 replacing the original plastic bolts with new non-corrosive stainless steel bolts.

13
14 **Q. How is UGI PNG's performance in the area of emergency response rate?**

15 A. UGI PNG performs very well in the timeliness of emergency response to gas odor
16 complaints. For the year ended September 30, 2016, 98.3% of the time a first responder
17 arrived on premise within 45 minutes of receipt of an odor call. UGI PNG's performance
18 is better than industry averages and is attributable to factors such as staffing levels and
19 after-hours coverage. It also should be noted that UGI PNG sets performance goals on a
20 45-minute response whereas most other distribution companies' goals are based on a one
21 hour response target.

1 **Q. What actions has UGI PNG undertaken to improve employee safety?**

2 A. The safety program is collectively managed. The UGI Distribution Companies have
3 undertaken significant efforts to build a safety-centric culture to better support and
4 enhance employee safety. Encouraging a safety culture is fundamental to driving safety
5 performance. Some of the strategies implemented to build safety culture include
6 performing detailed accident reviews, holding an annual Employee Safety Summit, and
7 implementing enhancements to the employee safety incentive program. Additionally, the
8 UGI Distribution Companies have recently taken steps to join the Voluntary Protection
9 Plan (“VPP”) program of the United States Occupational Health and Safety
10 Administration (“OSHA”). The UGI NGDCs would be the first NGDCs in the nation to
11 participate in this program.

12
13 **Q. Please describe the UGI Distribution Companies’ accident review process.**

14 A. Supervisory engagement in post-accident reviews ensures consistency in assessing causal
15 factor trends and in implementing enterprise wide process improvements. Following
16 each accident or injury, supervisors review and document the circumstances of the
17 accident with the employee noting any contributing factors. On a monthly basis,
18 supervisors of employees involved in an accident or personal injury participate in a
19 conference call to review the circumstances surrounding each instance. The calls help
20 drive supervisor accountability for safety performance and provide visibility to any
21 underlying trends. Additionally, metrics on work group safety performance are
22 incorporated into each supervisor’s annual performance review.

23

1 **Q. Please discuss the UGI Employee Safety Summit.**

2 A. In April 2016, just prior to the seasonal ramp up in construction activity, a broad cross-
3 functional group of over 520 employees from across the UGI Distribution Companies
4 participated in our second annual full day safety summit. The event included a wide
5 variety of safety education sessions covering topics such as safety culture, excavation
6 safety, dog bite prevention, and distracted driving. Employee feedback was
7 overwhelmingly positive. In fiscal years 2017 and 2018, new groups of employees will
8 be invited, such that the full employee population will have attended the summit over a 3
9 year period. Going forward, additional employee-developed content will be emphasized
10 to further cultivate employee ownership of and responsibility for safety.

11

12 **Q. Please describe the UGI Safety Incentive Program.**

13 A. In 2015, the collective UGI Safety Incentive Program was re-designed to emphasize
14 individual employee engagement in safety. Known as “Making a Difference,” the
15 enhanced program rewards employees for supporting safety culture through actions such
16 as demonstrating positive safety behaviors, leading safety meetings, reporting safety
17 issues, or participating in safety education. The advantages of the incentive program
18 include simplicity of administration, customization of reward redemptions, visibility of
19 acknowledgement, and creation of constructive competition around advancing safety. In
20 fiscal year 2016, the second year of the program, 6,438 individual recognition cards were
21 redeemed, which is a 17% increase from the 5,490 cards redeemed the year prior. In
22 fiscal year 2016, 702 peer-nominated safety award nominations were made, which is a
23 74% increase over the 406 nominations made the year prior. The increases in these

1 figures signal that employees are “buying in” to this incentive program and that UGI
2 PNG is moving to the kind of end-state safety culture that we want to see implemented.

3
4 **Q. Please discuss the OSHA Voluntary Protection Plan program.**

5 A. For fiscal year 2017 the UGI Distribution Companies are collectively implementing the
6 OSHA VPP process. Adopting the VPP process will help UGI PNG and its affiliates
7 focus on continuous improvement of work-site-based safety and health. The structure of
8 the program focuses on developing: (1) an effective safety and health program: (2) injury
9 and illness rates below industry average; and (3) management and labor working together
10 to prevent and eliminate hazards. UGI PNG’s goal is to assess 37 of the UGI
11 Distribution Companies’ facilities in fiscal year 2017. Seven (7) of the sites to be
12 assessed in fiscal year 2017 are dedicated UGI PNG sites. After assessments are
13 completed, the UGI NGDCs will begin to implement facility improvements and work
14 toward VPP certification over the next 2-5 years. As shown on UGI PNG Exhibit HGB-
15 4, initial facility audits of UGI PNG reporting centers have identified various facility
16 improvements that would require a capital investment of approximately \$1.4 million.
17 This figure has been incorporated into future capital budgets.

18
19 **V. ENVIRONMENTAL**

20 **Q. Please discuss environmental management at UGI PNG.**

21 A. The environmental group at UGI PNG is focused on both environmental compliance and
22 permitting for current operations and on addressing historical environmental liabilities.
23 With respect to ongoing compliance activities, UGI PNG has a program that changes out
24 heater fluid from ethylene glycol to an environmentally-friendly, biodegradable

1 propylene glycol. UGI PNG has also been a partner in the United States Environmental
2 Protection Agency's ("EPA") voluntary Natural Gas STAR program since 2011. Natural
3 Gas STAR provides a framework to encourage partner companies to implement methane
4 emissions reducing technologies and practices, and document their voluntary emission
5 reduction activities. On March 30, 2016, the UGI NGDCs, including UGI PNG, joined
6 with thirty-two other natural gas utilities to launch the U.S. Environmental Protection
7 Agency's Natural Gas STAR Methane Challenge Program. As a founding member of the
8 STAR Methane Challenge, UGI PNG has committed to making and tracking emissions
9 reductions. Furthermore, as discussed earlier in my testimony, UGI PNG also places
10 significant emphasis on reducing system leaks for safety reasons.

11
12 **Q. Are there any other significant environmental programs at UGI PNG?**

13 A. Yes, there is also our manufactured gas plant ("MGP") program. As a company with a
14 history of providing gas service for more than 100 years, UGI PNG has some sites in its
15 service territory that were formerly used for the purpose of producing manufactured gas
16 from coal for distribution to utility customers. UGI PNG works to remediate these MGP
17 sites to address any environmental site conditions due to the former manufactured gas
18 operations. UGI PNG been addressing these environmental site conditions in accordance
19 with a Consent Order and Agreement ("COA") with the Pennsylvania Department of
20 Environmental Protection ("PADEP"). The COA was executed on March 31, 2004, by
21 PG Energy, the predecessor of UGI PNG, then a division of the Southern Union
22 Company. Of the eleven sites initially listed under the COA, seven have been "closed
23 out" by PADEP with notices that no further work is required under the COA.

1 **Q. What types of costs does UGI PNG incur with respect to addressing MGP site**
2 **conditions?**

3 A. UGI PNG incurs costs attributed to site investigations, remediation, and site restoration.
4 There also may be costs incurred to obtain an environmental covenant at the site to
5 prevent certain uses of the site, and miscellaneous costs, as applicable, associated with
6 transferring the site to a third party (such as with a dedication for public use) once the site
7 has been restored.

8

9 **Q. What is UGI PNG’s projected spending on the MGP program?**

10 A. Under the COA, UGI PNG is required to either obtain a certain number of points per
11 calendar year based on defined eligible remedial activities or make expenditures in an
12 amount equal to an annual “Environmental Cost Cap” of \$1.1 million. However, over the
13 last several years UGI PNG has spent more than this \$1.1 million level. UGI PNG’s
14 average spend over the past three (3) years is over \$1.4 million, which is discussed in the
15 direct testimony of Kindra S. Walker, UGI PNG Statement No. 2 and as shown below in
16 Table 2. The additional spend for UGI PNG remedial expenses is due to the nature of the
17 work required for closure of sites per current environmental standards as approved by
18 PADEP in the site work plans.

Table 2

Year	Environmental Spend
2016	\$963,000.00
2015	\$1,392,000.00
2014	\$1,972,000.00
Average	\$1,442,333.33

19

20

1 **Q. What is UGI PNG’s goal for restoration of the MGP sites?**

2 A. UGI PNG strives to restore each site so that it constitutes a beneficial reuse and becomes
3 an asset to the community.

4

5 **Q. Has UGI PNG been recognized for its environmental stewardship?**

6 A. Yes. A 2015 survey by Cogent Reports™, a division of Market Strategies International,
7 included UGI among 36 utility companies nationwide that were named “Environmental
8 Champions.” Cogent surveyed more than 25,000 residential electric, natural gas, and
9 combination utility customers of the 125 largest U.S. companies. Our high ranking in
10 this survey demonstrates that our customers recognize our commitment to the
11 environment.

12 Additionally, UGI and UGI PNG’s current Environmental Manager, Anthony
13 Rymar, received the Pennsylvania Environmental Council’s Governor’s Award for
14 Environmental Excellence in 2012. We were nominated for the award by PADEP staff.
15 In bestowing the award, the Pennsylvania Environmental Council recognized Mr. Rymar
16 and UGI as consistently exhibiting a management philosophy that assures former
17 manufactured gas plants are remediated to a level that protects human health and the
18 environment while ensuring sites are beneficially re-used.

19

20

21

22

1 **Q. Are there any operational initiatives that UGI PNG is undertaking that will have a**
2 **favorable environmental impact?**

3 A. Yes, UGI PNG is undertaking an initiative to increase its natural gas vehicle (“NGV”)
4 fleet and will construct a new NGV fill station in fiscal year 2018 (October 1, 2017
5 through September 30, 2018).

6

7 **Q. Please describe the natural gas vehicle fleet program.**

8 A. The UGI PNG NGV fleet program will include the construction of an NGV fill station
9 and the purchase of NGV vehicles. UGI PNG will be adding 30 natural gas vehicles to
10 its fleet during 2018. These vehicles will run on compressed natural gas (“CNG”). It is
11 expected that all 30 vehicles will be put into service by the end of the fully projected
12 future test year ending September 30, 2018. The cost of the CNG vehicle fleet additions
13 is forecasted at \$1,955,700. The vehicles will all be located at the Archbald,
14 Pennsylvania location. The proposed fleet additions are set forth in Table 2, below.

Table 3. NGV Fleet Additions

Class	Quantity
5 Yard Freightliner Dump Trucks	3
Ford F-250 Utility Bodies.	7
Ford Transit 250 Cargo Vans	5
Chevrolet Equinox SUV	15

15

16 UGI PNG also plans a five year fleet refreshment for the Ford F-250s, cargo vans, and
17 Chevrolet Equinox CNG vehicles, and a seven year fleet refreshment for the Freightliner
18 trucks.

19 In addition to the CNG vehicles, UGI PNG will construct a CNG fill station at the
20 Archbald location that will supply the new CNG vehicles with natural gas. The Archbald

1 station will be UGI PNG's second CNG station and will complement the existing CNG
2 station in Wilkes-Barre. The Archbald station will be of sufficient capacity to fuel the
3 vehicles in a reasonable amount of time, similar to a gasoline pump, and will include
4 storage cylinders, compressors and a canopy. The forecasted cost to construct the
5 Archbald CNG station is \$744,623. The construction of the station will ultimately allow
6 the company to continue the expansion of the CNG program at the Archbald location.
7 There are no revenues anticipated with the UGI PNG NGV program.

8
9 **Q. What are the anticipated environmental benefits of the UGI PNG NGV program?**

10 A. The program is designed to promote the benefits of using the low-carbon, indigenous
11 natural gas produced in Pennsylvania as an alternative, cleaner, transportation fuel.
12 Based on the miles/gallon for the make and model, annual mileage and the anticipated
13 fleet refreshment, these NGV fleet additions are anticipated to reduce CO₂ emissions by
14 32% as compare to petroleum based vehicles. To put it another way, these fleet changes
15 are the equivalent of taking eighteen passenger cars off the road. Detailed calculations of
16 CO₂ reductions are set forth on UGI PNG Exhibit HGB-5.

17
18 **Q. Does this conclude your direct testimony?**

19 A. Yes, it does.

UGI PNG EXHIBIT HGB-1

Hans G. Bell, P.E.
hbell@ugi.com

Summary

Engineering executive with 20 years of broad experience in gas transmission and distribution operations including engineering design, asset integrity management, regulatory compliance, capital budgeting, and project management.

Education

Keller Graduate School of Management, Chicago, Illinois

Masters of Business Administration, Graduated with Distinction, 2000
Concentration in Finance

University of Illinois, Champaign, Illinois

Bachelor of Science in Civil Engineering, 1996
Concentration in Construction Management

Experience

UGI Utilities, Reading, Pennsylvania

Vice President, Engineering and Operations Support *2013- Present*

Senior engineering leader responsible for establishing technical strategy and executing infrastructure programs to ensure safe, reliable, and cost effective natural gas service for a utility serving more than 600,000 customers in Pennsylvania and Maryland.

- Accountable for accelerated infrastructure replacement programs, capital budgeting (~\$300M), contractor management, corrosion control, damage prevention, employee safety, engineering design, transmission & distribution integrity, regulatory compliance, training, and all related technical support functions.
- Accountable for planning and execution of annual cast iron / bare steel replacement program covering > 62 miles per year
- Primary regulatory witness and author for Long Term Infrastructure Improvement Plans
- Responsible for management and development of professional and technical support staff of over 110 employees.

AGL Resources, Naperville, Illinois

Over 17 years at AGL Resources (Nicor Gas) I advanced through positions of increasing responsibility beginning at entry level and concluding as Managing Director of Engineering.

Managing Director, Engineering

2012-2013

- Accountable for Engineering Design, Land Management, and System Planning supporting gas transmission, storage, and distribution operations spanning 11 states serving over 4.5 million customers
- Managed capital budgets of >\$200M including budget development, variance reporting, and project prioritization
- Accountable for oversight of right of way acquisitions in advance of major pipeline projects
- Developed long term investment plans for infrastructure replacement, optimization, and growth

Assistant Vice President Engineering & Chief Engineer *2011- 2012*

- Accountable for all gas utility engineering support departments with over 50 professional and technical staff including Engineering Design, Transmission Integrity, Distribution Integrity, System Planning, Geographic Information Systems, Measurement, and Technical Services (Lab)
- Accountable for Transmission & Distribution Integrity Management compliance, audits, plans, program management, and project portfolio optimization.

- Accountable for Engineering Design and project management for distribution, storage, and transmission projects from initial scope, detailed design, cost estimates, sourcing, and contract negotiation
- Managed multiple interdisciplinary project teams executing complex multi-million-dollar storage and transmission projects
- Managed regulatory relationships with State (ICC) and Federal Pipeline Safety Agencies (PHMSA). Provided technical support to incident investigations
- Developed strategic approaches to addressing pipeline safety legislation including MAOP affirmation
- Developed engineering integration plans for AGL Resources– Nicor Gas merger including, organizational design, critical process mapping, accountabilities, budgeting, and staffing

General Manager System Integrity & Chief Engineer 2007 - 2011

- Responsible for management of multiple departments including Engineering, Transmission Integrity, Distribution Integrity, System Planning, and Geographic Information Systems
- Responsible for development and management of infrastructure capital budgets of approximately \$65 million
- Managed contracts with engineering consulting firms for pipeline design, construction, survey, and professional services
- Implemented a Distribution Geographic Information System including database design, data conversion of over 34,000 miles of distribution pipe, and deployment of a mobile GIS application to all front line workers

Manager Engineering Design 2004- 2007

- Responsible for managing departmental capital budget in excess of \$20 million annually
- Provided project management oversight to pipeline projects from concept, feasibility, budgeting, approval, planning, design and implementation
- Maintained engineering consultant relationships and negotiated service contracts
- Implemented process improvements including development of Geographic Information System (GIS) based map distribution application
- Managed pipeline construction projects, negotiated construction contracts, resolved permitting issues, and delivered project approval presentations

Project Manager – Transmission Pipeline Integrity 2003 –2004

- Responsible for development and implementation of pipeline integrity management program to maintain regulatory compliance with the Pipeline Safety Act of 2002
- Managed GIS conversion project for 1150-mile natural gas transmission system.
- Developed risk management program for prioritization of pipeline integrity assessments in high consequence areas
- Determined pipeline assessment project schedules including long term operating expense and capital budgets

Region Manager – Distribution 2001 – 2003

- Manager responsible for construction and maintenance activities of gas distribution utility
- Managed projects involving main installations, service installations, and leak repairs
- Measured and tracked performance of 50 personnel against productivity and safety benchmarks
- Coordinated response to emergencies including gas leaks and pipeline breaks

Supervisor of Distribution Planning 2000 - 2001

- Supervised staff of six engineers in distribution planning department
- Coordinated hydraulic modeling studies of 34,000 mile natural gas distribution system serving over 2 million customers
- Recommended capital improvement projects required to maintain uninterrupted reliable peak day service throughout entire natural gas distribution network
- Coordinated long range planning studies and forecasts used to develop capital budgets

Project Engineer 1996 –2000

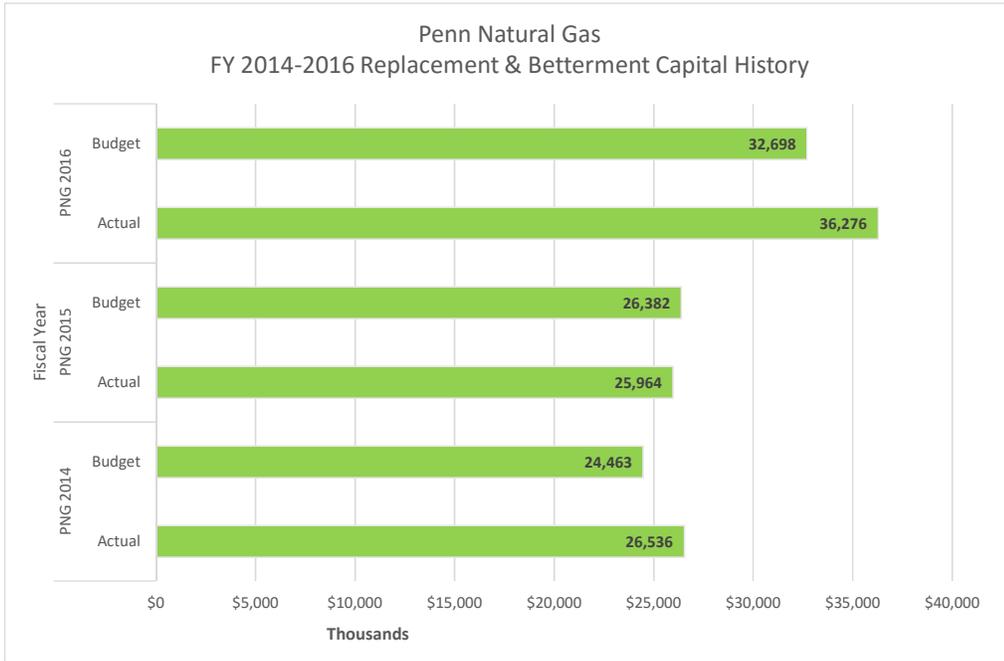
- Managed pipeline construction and maintenance projects, supervised inspectors and company maintenance crews
- Designed plans for installation and revision of gas distribution facilities
- Reviewed highway improvement plans and worked with state transportation engineers to resolve utility conflicts

Professional Affiliations

- Licensed Professional Engineer, State of Illinois, License # 62054443
- Member Society of Gas Operators – 2015 to present
- American Gas Association Bronze Award of Merit 2012
- Member American Gas Association Leadership Council
- Chair American Gas Association Distribution & Transmission Engineering Committee 2012 - 2013
- Speaker at PHMSA Distribution Integrity Management Workshop 2011
- Co-chair of Southern Gas Association Distribution Engineering Committee 2007-2010

UGI PNG EXHIBIT HGB-2

PNG 2014		PNG 2015		PNG 2016	
Actual	Budget	Actual	Budget	Actual	Budget
26,536,054	24,463,059	25,964,353	26,382,310	36,276,410	32,698,269



UGI PNG EXHIBIT HGB-3

UGI PNG
Budgeted Capital Expenditures

Budget

Group	Division	Budget Group Description	2017	2018
41M	PNG	Main Replacement- Leaks	\$1,707,000	\$1,750,000
43M	PNG	Main Replacement- Relocation	3,323,228	3,400,000
44M	PNG	Main Replacement- Bare Steel	6,169,509	6,500,000
45M	PNG	Main Replacement- Cast Iron	5,907,539	6,100,000
51M	PNG	Replacement Meters / ERTS	850,000	875,000
58M	PNG	Replacement services not associated with main	3,175,000	5,370,250
57M	PNG	Replacement Services associated with main	9,579,565	9,900,000
01O	PNG	Misc-Plant Equipment	474,300	490,000
09O	PNG	Regulator Station Enhancements/Replacements	1,696,000	1,750,000
11O	PNG	Corrosion Related Projects	3,115,000	3,210,000
12O	PNG	Distribution System Reliability Projects	466,000	6,000,000
		Subtotal Budgeted DSIC Expenditures	<u>\$36,463,141</u>	<u>\$45,345,250</u>
40G	PNG	New Business-Mains	\$31,553,394	\$7,500,000
50G	PNG	New Business-Services	1,339,451	1,400,000
51G	PNG	New Business-Meters	650,000	670,000
52G	PNG	New Business-Meter Installation	298,051	310,000
02O	PNG	Building/Building Improvements/Land acquisition	1,286,000	2,730,000
03O	PNG	Furniture and Office Equipment	75,000	78,000
04O	PNG	Fleet Capital and Related Equipment	2,500,000	2,800,000
07O	PNG	Operations Tool Blanket	806,900	830,000
12O	PNG	Distribution System Reliability Projects	29,000,000	-
01R	PNG	Remediation	245,000	272,936
49R	PNG	Cost of Removal-Mains	22,000	24,509
56R	PNG	Cost of Removal-Other	75,000	83,552
59R	PNG	Cost of Removal-Services	1,025,000	1,141,876
14S	PNG	IS Information Services	275,000	-
		Subtotal Budgeted Non-DSIC Expenditures	<u>\$69,150,796</u>	<u>\$17,840,873</u>
		Total Capital Expenditures	<u><u>\$105,613,937</u></u>	<u><u>\$63,186,123</u></u>

UGI PNG EXHIBIT HGB-4

UGI PNG EXHIBIT HGB-5

CO2 Emission Reductions Due to
PNG Natural Gas Vehicle Fleet Additions

Baseline Fleet

Class	Quantity	Lifespan	Annual Mileage	Fuel	miles/gal	Annual Fuel Usage (gal)	CO2 Emissions Factor (lb/gal)	CO ₂ Tons/Year	Fleet CO ₂ Tons/Year	Fleet Lifetime CO ₂ Tons
5 Yard Freightliner Dump Trucks (M2 106)	3	7	9,012	Diesel	6.28	1,435	22.38	16.06	48.17	337.22
Ford F-250 Utility Bodies.	7	5	12,246	Gas	10.51	1,165	19.64	11.44	80.09	400.47
Ford Transit 250 Cargo Vans	5	5	12,246	Gas	10.51	1,165	19.64	11.44	57.21	286.05
Chevrolet Equinox SUV	15	5	15,177	Gas	20.75	731	19.64	7.18	107.74	538.69
Fleet Total									293.22	1,562.43

Natural Gas Fleet

Class	Quantity	Lifespan	Annual Mileage	Fuel		Annual Fuel Usage (MMBTU)	CO2 Emissions Factor (Tons/BBtu)	CO ₂ Tons/Year	Fleet CO ₂ Tons/Year	Fleet Lifetime CO ₂ Tons
5 Yard Freightliner Dump Trucks (M2 106)	3	7	9,012	CNG		186	58.5	10.855479	32.57	227.97
Ford F-250 Utility Bodies.	7	5	12,246	CNG		134	58.5	7.8194234	54.74	273.68
Ford Transit 250 Cargo Vans	5	5	12,246	CNG		134	58.5	7.8194234	39.10	195.49
Chevrolet Equinox SUV	15	5	15,177	CNG		84	58.5	4.9085252	73.63	368.14
Fleet Total									200.03	1,065.27

CO₂ Reductions from NGV

Class								CO ₂ Tons/Year	Fleet CO ₂ Tons/Year	Fleet Lifetime CO ₂ Tons
5 Yard Freightliner Dump Trucks (M2 106)								5.20	15.61	109.25
Ford F-250 Utility Bodies.								3.62	25.36	126.79
Ford Transit 250 Cargo Vans								3.62	18.11	90.57
Chevrolet Equinox SUV								2.27	34.11	170.55
Fleet Total									93.19	497.16
Fleet Total Percent CO₂ Reduction									32%	32%

CNG 20,268 BTU/lb 18 Cars per year off the road
 CNG equivalent to gallon of gasoline 5.66 lb
 123.57 CF
 CNG equivalent to gallon of diesel 6.38 lb
 139.3 CF

CO2 emissions per passenger vehicle¹ 4.7 Metric Tons/yr
 5.18175 Tons/yr

FN1. <https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle-0>

UGI PNG STATEMENT NO. 11– NICOLE M. MCKINNEY

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Docket No. R-2016-2580030

UGI Penn Natural Gas, Inc.

Statement No. 11

**Direct Testimony of
Nicole M. McKinney**

Topics Addressed: Taxes and Tax Adjustments

Dated: January 19, 2017

1 **I. INTRODUCTION AND QUALIFICATIONS**

2 **Q. Please state your full name and business address.**

3 A. My name is Nicole M. McKinney. My business address is 2525 North 12th Street,
4 Suite 360, Reading, PA, 19612-2677.

5
6 **Q. By whom are you employed and in what capacity?**

7 A. I am employed by UGI Utilities, Inc. ("UGI") as Principal Tax Analyst. UGI is a
8 subsidiary of UGI Corporation ("UGI Corp."). UGI's subsidiaries include two
9 wholly-owned natural gas distribution companies, UGI Central Penn Gas, Inc.
10 ("UGI CPG"), and UGI Penn Natural Gas, Inc. ("UGI PNG"), that are regulated by
11 the Pennsylvania Public Utility Commission ("Commission" or "PA PUC").

12
13 **Q. What are your principal duties and responsibilities as Principal Tax
14 Analyst?**

15 A. My primary duties as the Principal Tax Analyst include the preparation of tax data
16 to be reported in UGI's various United States Securities and Exchange
17 Commission and regulatory filings, as well as its various federal and state income
18 and non-income tax return related filings. Additionally, I maintain the current and
19 deferred income tax accrual and expense accounts, perform tax research, and
20 assist UGI with tax matters as they arise.

21
22 **Q. What is your educational background?**

23 A. I received a Bachelor of Business Administration in International Business and
24 Management with a minor in Accounting from Villanova University in 2006. In

1 2007, I completed a Master's Degree of Accountancy from Villanova University. I
2 am also a Certified Public Accountant.

3
4 **Q. Please describe your professional experience.**

5 A. I began my career with Andersen Tax (formerly known as WTAS, LLC) in 2006.
6 In 2010, I joined Baker Tilly Virchow Krause, LLP (formerly known as
7 ParenteBeard, LLC) as a manager in their middle-market tax practice where I
8 managed tax compliance engagements, and international and special tax
9 projects. From 2012-14, I worked as the Federal Domestic Tax Manager for
10 Dentsply International Inc., overseeing the U.S. federal tax compliance and
11 income tax accounting processes. In March of 2015, I began working as the
12 Principal Tax Analyst for UGI.

13
14 **Q. Please describe the purpose of your testimony.**

15 A. I am providing testimony on behalf of UGI PNG. I will explain the Company's *pro*
16 *forma* tax adjustments to its principal accounting exhibits for the fully projected
17 future test year ending September 30, 2018 ("FPFTY"). I will also explain the tax
18 adjustments made to the results of UGI PNG's historic test year ended
19 September 30, 2016 ("HTY") and future test year ending September 30, 2017
20 ("FTY").

1 **Q. Ms. McKinney, are you sponsoring any exhibits in this proceeding?**

2 A. Yes. Together with other Company witnesses, I am sponsoring portions of UGI
3 PNG Exhibit A (Fully Projected), UGI PNG Exhibit A (Future) and UGI PNG
4 Exhibit A (Historic) that pertain to tax-related issues. These exhibits comprise
5 UGI PNG's principal accounting exhibits for the HTY, FTY, and FPFTY. I am
6 also sponsoring certain responses to the Commission's filing requirements and
7 standard data requests. Each response identifies the witness sponsoring it.

8

9 **II. TAX ADJUSTMENTS**

10 **Q. Please provide an overview of UGI PNG's principal accounting exhibits**
11 **relative to the proposed tax adjustments.**

12 A. As explained in the direct testimony of Kindra S. Walker (UGI PNG Statement
13 No. 2), UGI PNG's principal accounting exhibit is UGI PNG Exhibit A (Fully
14 Projected), which includes a presentation for the FPFTY ending September 30,
15 2018. Section D of UGI PNG Exhibit A (Fully Projected) presents necessary
16 adjustments to budgeted levels of expense items and revenues. The *pro forma*
17 adjustments related to taxes are summarized in Schedules D-31 through D-34.
18 These tax adjustments are used to derive UGI PNG's *pro forma* income at
19 present and proposed rates as set forth in Schedule A-1 of the same exhibit.

20 UGI PNG Exhibit A (Future) and UGI PNG Exhibit A (Historic) follow the
21 format of UGI PNG Exhibit A (Fully Projected), but reflect data for the HTY ended
22 September 30, 2016, and the FTY ending September 30, 2017. This information
23 is provided in an effort to comply with the Commission's filing requirements and
24 provides a basis for comparing UGI PNG's FPFTY claims with actual book

1 results from the HTY and adjusted FTY results. Section D to UGI PNG Exhibit A
2 (Historic), Schedule D-31, and UGI PNG Exhibit A (Future), Schedule D-31
3 include adjustments that share the same methodology as used in Schedule D-31
4 of UGI PNG Exhibit A (Fully Projected).

5
6 **A. TAXES OTHER THAN INCOME TAXES**

7 **Q. How was the provision for taxes-other-than-income taxes ("TOTI")**
8 **determined for the FPFTY?**

9 A. TOTI amounts were based on the plan year budget, as adjusted for reasonably
10 known and measurable changes to various payroll and other taxes, as well as
11 other changes due to changes in headcount as supported by the direct testimony
12 of Ms. Walker (UGI PNG Statement No. 2). Specifically, TOTI includes an
13 adjustment for the planned phase out of the capital stock tax in the 2016 tax
14 year. These adjustments are shown on UGI PNG Exhibit A (Fully Projected),
15 Schedule D-31. The net adjustment of (\$221,000) is brought forward to
16 Schedule D-3, page 2.

17
18 **B. INCOME TAXES**

19 **Q. Please discuss the Company's claim for income taxes.**

20 A. Income tax expense for the FPFTY at present and proposed rates is set forth in
21 UGI PNG Exhibit A (Fully Projected), Schedule D-33. Income taxes are
22 calculated using the procedures normally followed by the Commission, including
23 the use of debt interest synchronization, the normalization method for
24 accelerated depreciation used in the calculation of Federal income taxes, and the

1 flow through of accelerated depreciation benefits for state tax purposes. UGI
2 PNG is also proposing to normalize the tax repairs expense deduction for federal
3 tax purposes. For state tax purposes, UGI PNG proposes to flow-through the
4 repairs tax benefit over the tax useful lives of the asset that generated the
5 benefit, which is generally 20 years. The fully adjusted claim for the FPFTY
6 income tax expense is shown on UGI PNG Exhibit A (Fully Projected), Schedule
7 D-1.

8
9 **Q. Please describe the claim for income taxes shown on Schedule D-1, lines**
10 **18 and 19.**

11 A. The calculation of federal and state income taxes can be found on Schedule D-
12 33. Schedule D-33 shows the calculation of pro forma income taxes for the
13 FPFTY at present and proposed rates. Line 1 shows the revenue at present and
14 proposed rates, while line 2 shows the operating expenses at present and
15 proposed rates from Schedule D-1. Line 3 reflects operating income before debt
16 interest is deducted, by netting line 1 from line 2. Debt interest expense is
17 synchronized using the rate base claim from Schedule C-1, with the cost of debt
18 and the debt component of UGI PNG's capital structure recommended in the
19 direct testimony of Paul R. Moul (UGI PNG Statement No. 4) and shown on
20 Schedule B-7. The resulting interest expense on line 6 is subtracted from net
21 income before debt interest to calculate base taxable income on line 7.

22 In accordance with established Commission practice, lines 8 through 11 of
23 Schedule D-33 reduce the base taxable income, for state tax purposes, by the
24 total difference between accelerated tax depreciation shown on line 8 and the pro

1 forma book depreciation shown on line 9. The statutory state corporate net
2 income tax rate (9.99%) was then applied to determine the pro forma state
3 income tax expenses shown on line 13. Lines 14 through 19 show the federal
4 income tax expense calculation at current and proposed rates, while line 20
5 sums the state and federal tax expense amounts before application of Deferred
6 Federal and State Income Taxes. At lines 21 through 28, Deferred Federal and
7 State Income Taxes are used to increase the pro forma income tax expense at
8 present and proposed rates with the total calculated amount for income taxes
9 before the application of other adjustments shown on line 29. The amounts of
10 accelerated depreciation, cost of removal, repairs tax deduction, tax basis
11 adjustments to plant, straight line depreciation and book depreciation used in the
12 determination of income taxes used in this calculation are summarized on
13 Schedule D-34.

14
15
16 **Q. What is the total FPFTY income tax expense for UGI PNG?**

17 A. As shown on Schedule D-33 at line 31, the pro forma tax expense at present
18 rates is \$12.8 million and the pro forma tax expense at proposed rates for the
19 FPFTY is \$21.5 million. As explained below in Section II.E, this figure is not
20 reduced by a consolidated income tax adjustment.

21
22 **C. ACCUMULATED DEFERRED INCOME TAXES**

23 **Q. How are Accumulated Deferred Income Taxes (“ADIT”) calculated?**

1 A. Schedule C-6 shows the FPFTY ending balance for federal ADIT at September
2 30, 2018. This amount is deducted from rate base. The total shown on line 8
3 reflects the difference in income tax expense for book and tax purposes
4 attributable to the difference between the accelerated tax depreciation, inclusive
5 of bonus depreciation, and straight line book depreciation on test year plant
6 balances, net of offsets associated with contributions in aid of construction. Rate
7 base has been further reduced by the state regulatory liability associated with our
8 repairs tax method shown on line 6. As the state tax consequence of
9 accelerated depreciation is flowed through, there is no associated state ADIT
10 balance.

11

12 **Q. What is the amount of the ADIT offset to rate base?**

13 A. As shown on line 8 of Schedule C-6 and on line 6 of Schedule A-1, the ADIT
14 offset is \$118.4 million, which includes an amount related to the repairs tax
15 method explained below in Section D.

16

17 **Q. Has the calculation of the Company's ADIT rate base deduction been**
18 **calculated in compliance with the normalization requirements of the**
19 **Internal Revenue Code?**

20 A. Yes. The Company's calculation properly reflects the pro-rationing concept in
21 accordance with Treasury Regulation 1.167(l)-1(h)(6)(ii) that it must follow for
22 ratemaking purposes to be in compliance with IRS normalization requirements.
23 The pro-rationing concept requires that utilities pro-rate their rate base ADIT

1 deduction to account for the time during the fully projected future test year that
2 the ADIT for plant additions will be accrued by the company. This pro-rata
3 calculation is required by the IRS in order for a utility company to be permitted to
4 use accelerated depreciation and not have a normalization violation. As such,
5 the Company reflects a pro-rationing of the ADIT associated with its FPFTY plant
6 additions. This is in line with other public utility FPFTY presentations, including
7 that of UGI Gas, Columbia Gas of Pennsylvania and PPL Electric Utilities
8 Corporation. See UGI PNG Exhibit NMM-1 for the calculation of the pro-ration
9 adjustment.

11 **D. REPAIRS TAX METHOD**

12 **Q. Please explain UGI PNG's accounting treatment of the Repairs Tax Method.**

13 A. In its tax return for the year ended September 30, 2009, UGI adopted a tax
14 accounting method to expense as repairs certain items capitalized for book
15 purposes in accordance with federal tax regulations. As a result of adopting this
16 method, UGI PNG's federal tax expense for the year ended September 30, 2009,
17 was reduced by \$876,264.

18 UGI PNG has chosen to calculate its federal income tax expense claim,
19 inclusive of the repairs tax deduction, consistent with normalization. As a result,
20 the difference between using accelerated tax depreciation versus book
21 depreciation in the calculation of federal tax expense creates accumulated
22 deferred income tax. For state income tax purposes, solely with respect to the
23 repairs tax deduction, UGI PNG has chosen to flow-through the repairs tax
24 benefit over the tax useful lives of the assets generating the tax deduction. The

1 state ADIT balance associated with the repairs tax deduction is classified as a
2 regulatory liability, as it represents the repairs tax benefit that ratepayers have
3 not yet received. In both the federal and state instances, the ADIT balance
4 amortizes or unwinds over the remaining life of the asset.

5 As noted previously, the Company reduces rate base by the sum of the
6 federal ADIT balance and the state repair regulatory liability.

7
8 **E. CONSOLIDATED TAX BENEFITS**

9 **Q. Has the Company calculated a consolidated tax expense adjustment?**

10 A. Yes, but not for the purpose of flowing through as a ratemaking deduction to
11 federal income tax expense. It is my understanding that Act 40 of 2016 prohibits
12 the use of a consolidated tax adjustment for ratemaking purposes. However,
13 Section 1301.1(b) requires a public utility seeking to change rates to demonstrate
14 that it uses at least 50 percent of what would have been a consolidated tax
15 expense adjustment under the law prior to Act 40 for reliability or infrastructure
16 related capital investment. I have included a calculation of such an adjustment
17 using the modified effective tax rate methodology traditionally used by the
18 Commission prior to the enactment of Act 40 in the response to filing requirement
19 II-A-26. In PNG Statement No. 2, Company witness Ms. Kindra S. Walker
20 discusses how the Company's capital budgets satisfy the requirements of Act 40.

21
22 **Q. Does this conclude your direct testimony?**

23 A. Yes, it does.

UGI PNG EXHIBIT NMM-1

UGI Penn Natural Gas, Inc.
Calculation of Pro-Rata Accumulated Deferred Income Tax
(In Thousands)

Month	A Increase to Deferred Taxes	B # of Days	C = B/365 Pro-Rata %	D = C*A Pro-Rata Incr to Deferred Taxes	Per Treas.	
					Reg.1.167(l)-1(h)(6)(ii)	Accumulated Deferred Income Tax Balance
9/30/2017					\$	113,200
10/31/2017	676	335	91.78%	621		113,821
11/30/2017	674	305	83.56%	564		114,384
12/31/2017	1,565	274	75.07%	1,175		115,559
1/31/2018	406	243	66.58%	271		115,830
2/28/2018	646	215	58.90%	381		116,210
3/31/2018	1,178	184	50.41%	594		116,804
4/30/2018	1,581	154	42.19%	667		117,471
5/31/2018	652	123	33.70%	220		117,691
6/30/2018	1,418	93	25.48%	361		118,052
7/31/2018	562	62	16.99%	95		118,148
8/31/2018	3,220	31	8.49%	273		118,421
9/30/2018	4,363	1	0.27%	12	\$	118,433

UGI PNG STATEMENT NO. 12– THEODORE M. LOVE

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Docket No. R-2016-2580030

UGI PENN NATURAL GAS, INC.

Statement No. 12

**Direct Testimony of
Theodore M. Love
(Green Energy Economics Group, Inc.)**

**Topics Addressed: Energy Efficiency & Conservation Plan and
Total Resource Cost Implementation**

Dated: January 19, 2017

1 **I. INTRODUCTION**

2 **Q. Please state your name, occupation, and business address.**

3 A. My name is Theodore M. Love, and I am the Senior Analyst and Data Scientist at Green
4 Energy Economics Group, Inc. (“GEEG”), an energy consulting firm founded in 2005.
5 My office address is 147 South Oxford Street, Brooklyn, New York.

6

7 **Q. On whose behalf are you testifying in this proceeding?**

8 A. My testimony is submitted on behalf of UGI Penn Natural Gas, Inc. (“UGI PNG” or
9 “Company”).

10

11 **Q. Please briefly describe your qualifications.**

12 A. I have been involved in the review and preparation of gas and electric energy efficiency
13 plans, as well as potential studies and cost-effectiveness analysis, in nearly a dozen states,
14 two Canadian Provinces, and China, since I began working with GEEG in 2007. Most
15 relevant to this proceeding, I have been advising UGI Utilities, Inc. – Gas Division (“UGI
16 Gas”) on its Energy Efficiency and Conservation Plan since 2015 and Philadelphia Gas
17 Works (“PGW”) on its energy efficiency activities since August 2008. I have been
18 advising UGI PNG on its Energy Efficiency and Conservation Plan since mid-2016. My
19 full resume is attached as PNG Exhibit TML-1.

20

21 **Q. Have you presented testimony in rate proceedings before a regulatory agency?**

22 A. Yes. In 2016, I presented testimony on behalf of UGI Gas in support of the adoption of a
23 voluntary, five-year Energy Efficiency and Conservation Plan as part of that utility’s base
24 rate case at Docket No. R-2015-2518438. In 2015, I presented testimony on behalf of

1 PGW in support of the continuation of its demand-side management (“DSM”) gas
2 programs for a second five-year phase under Docket No. P-2014-2459362.

3
4 **Q. What is the purpose of your testimony?**

5 A. I will be describing the development of the UGI PNG Energy Efficiency and
6 Conservation Plan (“EE&C Plan” or “Plan”), provide an overview of the programs
7 proposed under the Plan, and provide details on the Plan’s benefits and costs.

8
9 **Q. Are you sponsoring any exhibits in this proceeding?**

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

- 11 • UGI PNG Exhibit TML-1 – Resume of Theodore M. Love; and
- 12 • UGI PNG Exhibit TML-2 – UGI PNG’s Five Year Energy Efficiency &
13 Conservation Plan.

14
15 **Q. Please summarize your testimony.**

16 A. In Section II, I summarize the Company’s EE&C proposal, explain why it is appropriate
17 and important for UGI PNG to implement natural gas energy efficiency and conservation
18 programs, and provide an overview of the development of the proposed programs. In
19 Section III, I discuss the benefits, costs and staging of the proposed portfolio of
20 programs. Section IV contains a detailed summary of each of the proposed programs.
21 Finally, I provide my conclusions and recommendations in Section V.

1 **II. OVERVIEW AND BACKGROUND**

2 **Q. Please summarize the Company’s EE&C Plan proposed in this proceeding?**

3 A. Over the next five years, UGI PNG proposes to invest \$15.4 million in six energy
4 efficiency (“EE”) programs and a Combined Heat and Power (“CHP”) program. If
5 implemented, the full EE&C portfolio is expected to provide \$15.8 million in net total
6 resource benefits with an overall Total Resource Cost (“TRC”) benefit-cost ratio
7 (“BCR”) of 1.29.

8 The EE programs are expected to cost \$14.0 million over five years and reduce
9 natural gas consumption by 4,161 Billion British thermal units (“BBtus”) over the
10 lifetime of the installed measures. The energy efficiency programs are estimated to
11 provide UGI PNG customers with present value of total resource benefits of \$23.4
12 million at cost of \$16.3 million, including participant investments, for a net benefit to
13 customers of \$7.2 million with a TRC BCR of 1.44. The proposed Combined Heat and
14 Power (“CHP”) Program is projected to cost \$1.4 million over the five-year period, to
15 produce a 12,739 BBTu reduction in net primary energy usage over the lifetime of the
16 installed CHP units, and to avoid the emission of approximately 85,000 tons of carbon
17 dioxide per year by the end of the five-year period. The CHP Program is estimated to
18 provide \$8.7 million in net total resource benefits with a BCR of 1.22.

19

20 **Q. Why is it appropriate for UGI PNG to implement energy efficiency and
21 conservation programs?**

22 A. Improving energy efficiency and addressing climate change in all end uses of our energy
23 resources is an increasingly important part of this nation’s energy, economic, and
24 environmental policy goals. Over the past decade, numerous nationwide initiatives have

1 focused on improving efficiency, including large portions of funding from the American
2 Recovery and Reinvestment Act of 2009 (“ARRA”) and the United States Environmental
3 Protection Agency’s Clean Power Plan. In Pennsylvania, the General Assembly has
4 embraced this view by the passage of Act 129, of 2008¹ (“Act 129”) that mandates,
5 among other things, the implementation of ratepayer-funded EE&C Plans to promote
6 electric energy conservation and efficiency improvements. Most recently, the
7 Commission directed the electric distribution companies to file Phase III EE&C Plans,
8 which began on June 1, 2016. This reaffirmation of support for Act 129 confirms the
9 value that utility-facilitated energy efficiency provides to the residents of Pennsylvania.

10 In recent years, the Commission has recognized that similar benefits can be
11 realized by Pennsylvania natural gas distribution companies (“NGDCs”) implementing
12 EE&C Plans. PGW has been successfully operating a voluntary portfolio of natural gas
13 energy efficiency programs for the past six years, the second phase of which was
14 approved in October of 2016 at Docket No. P-2014-2459362. PGW’s programs have
15 resulted in over 260 BBTus in incremental annual gas savings and a present value of TRC
16 net benefits of \$5.7 million from inception through August 31, 2014. PECO Energy
17 Company also offers customers rebates for energy efficient furnaces and boilers through
18 its Smart Ideas Program², and Peoples Natural Gas Company LLC has committed to the
19 preparation of a demand-side management (“DSM”) plan.³ In October 2016, the
20 Commission approved UGI Gas’s EE&C plan as part of its base rate case at Docket No.

¹ Act 129 of 2008, P.L. 1592, 66 Pa.C.S §§ 2806.1 and 2806.2.

² <https://www.peco.com/WaysToSave/ForYourHome/Pages/GasOverview.aspx>

³ See Paragraph 112 of the Joint Petition for Approval of Settlement of All Issues at Docket Nos. A-2013-2353647, A-2013-2353649, A-2013-2353651, which was approved by the Commission in its Order entered November 14, 2013.

1 R-2015-2518438. Both UGI Gas and the parties to its rate case were commended for
2 having developed a voluntary gas EE&C plan in the joint statement of Commissioners
3 Gladys M. Brown and David W. Sweet dated September 1, 2016.

4
5 **Q. Will the Plan, if implemented, benefit UGI PNG's customers?**

6 A. Yes, it will. The UGI PNG EE&C Plan is based on the recently-approved UGI-Gas
7 EE&C Plan. The UGI PNG EE&C Plan will allow UGI PNG's customers to receive
8 consistent support and messaging regarding energy efficiency opportunities and to benefit
9 from reduced energy bills and increased comfort levels while capitalizing on the
10 efficiencies realized by the collective management of the EE&C Plans for both UGI Gas
11 and UGI PNG. Section 1.3 of the EE&C Plan (UGI PNG Exhibit TML-2) describes UGI
12 PNG's core goals for the EE&C Plan as the following:

- 13 • Help customers save energy cost-effectively through a holistic approach to
14 energy efficiency and conservation;
- 15 • Avoid lost opportunities and provide deep levels of savings;
- 16 • Provide a wide range of services for UGI PNG's diverse customer base;
- 17 and
- 18 • Contribute to the economic welfare of its customers and The
19 Commonwealth of Pennsylvania.

20 UGI PNG is proposing to spend \$14.0 million towards energy efficiency programs, an
21 investment that will return a present value of net total resource benefits of \$7.2 million
22 and save customers 4,161 BBTus of gas over the lifetime of measures installed. For the
23 CHP Program, an investment of \$1.4 million is projected to return present value net total

1 resource benefits of \$8.7 million. Furthermore, although greenhouse gas emissions are
2 not factored into the TRC net benefits, another added benefit of the proposed UGI PNG
3 EE&C Plan is the anticipated avoidance of approximately 85,000 tons of carbon dioxide
4 emissions per year by the end of the five-year period.

5
6 **Q. How was the Plan developed?**

7 A. As described in Section 1.4 of UGI PNG Exhibit TML-2, the Plan was developed in three
8 stages and was based on the Commission-approved UGI Gas EE&C Plan. Stage one
9 involved the characterization of measure costs, savings, and cost-effectiveness of eligible
10 measures. Stage two required the development of an achievable scenario for each of the
11 cost-effective measures for the second stage. In the third stage, the programs were
12 designed and staged to meet budget goals and follow best practices in program and
13 portfolio design.

14
15 **Q. What kinds of opportunities does UGI PNG’s EE&C Plan target?**

16 A. The UGI PNG EE&C Plan is based on the Commission-approved UGI Gas EE&C Plan.
17 If approved, the Plan will implement a comprehensive portfolio of six natural gas
18 efficiency programs and a CHP Program to capture energy efficiency and conservation
19 opportunities available through four distinct types of market transactions. The first
20 market transaction, “natural replacement,” is the upgrading of new gas-using appliances
21 and equipment with more energy-efficient models when those appliances and equipment
22 require replacement. The second market transaction, “new construction and gut
23 renovation,” is the incorporation of energy efficiency measures in the initial design and

1 construction of new and renovated buildings. The third market transaction is increasing
2 the energy efficiency of existing buildings by retrofitting them with supplemental energy-
3 efficiency measures (like attic insulation) and with early replacement of inefficient
4 equipment with high-efficiency models (like boilers and furnaces). The retrofit market
5 also includes some larger opportunities to reduce overall net energy usage through fuel-
6 switching measures, such as CHP plants. The fourth market transaction is the reduction
7 in energy usage due solely to the alteration of customer behavior. UGI PNG's EE&C
8 portfolio is explicitly designed and planned to achieve cost-effective savings through all
9 four types of market transactions among residential and nonresidential customers.

10
11 **Q. What are the programs proposed for inclusion in the Plan?**

12 A. The following six natural gas energy efficiency programs are proposed for the five-year
13 portfolio:

- 14 1. Residential Prescriptive (RP)
- 15 2. Nonresidential Prescriptive (NP)
- 16 3. New Construction (NC)
- 17 4. Residential Retrofit (RR)
- 18 5. Nonresidential Retrofit (NR)
- 19 6. Behavior and Education (BE)

20 The Plan also includes a CHP Program, which is proposed as a separate fuel-switching
21 program, and a budget for portfolio-wide administrative costs. These seven programs
22 will be explained in more detail later in my testimony.

23

1 **Q. Has UGI PNG provided detailed plans for the proposed programs?**

2 A. Yes, Section 2 of UGI PNG Exhibit TML-2 provides a detailed plan for each of the
3 programs, including annual budgets, savings, and participation projections along with
4 more information on program design, eligible rate classes, target markets, incentive
5 approach, marketing, evaluation, measurement, and verification (“EM&V”), and
6 implementation.

7
8 **Q. Is UGI PNG’s EE&C Plan modeled on successful efforts elsewhere?**

9 A. Yes. UGI PNG’s proposed portfolio is based on the portfolio approved for UGI Gas and
10 incorporates many of the strategies proven effective around the country by program
11 administrators like National Grid USA Service Company, Inc. in Massachusetts and
12 PGW in Pennsylvania.

13
14 **Q. What best practices in program and portfolio design are incorporated in the Plan?**

15 A. Best practices include providing incentives to defray the efficiency cost premium for the
16 purchase of new high-efficiency equipment and ensuring that UGI PNG has the
17 flexibility to address changing market conditions as new technologies enter the
18 marketplace and as codes and standards are adopted that eliminate the least-efficient
19 equipment. These programs will also aggressively target market participants throughout
20 the supply chain. Some specific best practices that the UGI PNG will incorporate into its
21 programs are listed below:

- 22 • Prescriptive – UGI PNG will only incent high efficiency equipment, using
23 ENERGY STAR® as a minimum where possible and will stay ahead of

1 increasing federal standards. The prescriptive programs also will include high
2 levels of contractor, supplier, and retail partner engagement to make sure that
3 efficient equipment is available and that customers are aware of the benefits of
4 moving towards higher efficiency equipment. The programs will include online
5 applications and rebate tracking along with rigorous QA processes.

- 6 • New Construction - The most successful new construction programs take an
7 integrated approach to building efficiency. These programs coordinate the
8 multiple functions and stages associated with building construction with the array
9 of efficiency opportunities across building energy sources and end uses. Financial
10 incentives typically defray most or all of the incremental cost of high-efficiency
11 design, equipment, and construction over and above standard market practice.
- 12 • Retrofit - UGI PNG's program will target high-use customers while also allowing
13 self-selected participation. Low cost audits will require blower-door tests in order
14 to facilitate advanced air-sealing and insulation practices, as well as heating
15 system retrofits. Nonresidential retrofits will be sold to customers as financial
16 investments and technical assistance will be provided to ensure that all options are
17 explored and that a given project goes as deep as cost-effectively possible.
- 18 • Behavior Program - UGI PNG's Behavior Program will encourage high usage
19 residential heating customers to modify their natural gas usage behaviors. This
20 program is based on successful programs from around the country that have
21 proven effective at convincing large groups of customers to save small amounts of
22 energy, which adds up to a large pool of savings that traditional programs have
23 not captured. Similar programs have been adopted by Act 129 electric utilities.

- 1 • CHP - UGI PNG will be providing opportunities for medium to large commercial
2 and industrial customers to participate in a CHP Program. Any potential CHP
3 project will need to pass the TRC test.
4

5 **Q. How are low-income customers addressed by the Plan?**

6 A. Low-income customers are allowed to participate in any of the programs open to
7 residential customers. Although no program in the proposed EE&C portfolio specifically
8 targets this market segment, UGI PNG already has a Low Income Usage Reduction
9 Program (“LIURP”) that is addressed in the direct testimony of Chris A. Rossi (UGI
10 PNG Statement No. 9). As with the UGI Gas EE&C Plan, the UGI PNG will ensure that
11 customers interested in UGI PNG’s EE&C programs are notified that they may be
12 eligible for LIURP service and referred to LIURP if they are income qualified.
13

14 **Q. How does this plan differ from the UGI Gas EE&C Plan?**

15 A. While the Plan is based largely on the UGI Gas EE&C Plan approved by the Commission
16 at Docket No. R-2015-2518438, the program, project, and measure assumptions were
17 recalibrated for UGI PNG. This included scaling program participation to align with UGI
18 PNG’s customer base, modifying program budgets to synch with planned programs,
19 updating project and measure assumptions to account for new information, and updating
20 avoided costs to apply to UGI PNG’s service territory.
21

22 **Q. Does the UGI PNG EE&C Plan address the concerns expressed by parties to the**
23 **UGI Gas base rate proceeding?**

1 A. Yes. UGI PNG has incorporated into its EE&C Plan many of the UGI Gas base rate case
2 settlement items concerning UGI Gas’s EE&C Plan. Specifically, UGI PNG will: (1)
3 develop marketing materials for multi-family buildings (paragraph 39 of settlement); (2)
4 explicitly refer eligible customers to LIURP (paragraph 40 of settlement); (3) submit an
5 annual report to the Commission about the results of the EE&C Plan, which will include,
6 among other things, TRC calculations with and without the economic effects of demand-
7 reduction induced price effects (“DRIPE”) and the internalized market cost of carbon
8 (paragraph 41 of settlement); (4) use ENERGY STAR® as the minimum criteria for
9 prescriptive rebates (paragraph 43 of settlement); (5) limit the recoverable utility costs for
10 the N/NT rate-class portion of the NP, NR, and NC programs to 55 percent (55%) of the
11 overall cost to the customers undertaking efficiency projects (paragraph 42 of
12 settlement);⁴ and (6) hold an annual stakeholder meeting to review and discuss the Plan’s
13 progress, potential modifications to the Plan, and UGI PNG’s annual report (paragraph 45
14 of settlement).

15

16 **III. BENEFITS, COSTS, AND STAGING OF PROPOSED PLAN PORTFOLIO**

17 **Q. How did you assess the benefits and costs of UGI PNG’s proposed portfolio?**

18 A. Costs and benefits were compared from two perspectives: a total resource perspective
19 and the gas system administrator perspective. The primary test for the UGI PNG EE&C
20 Plan is the TRC test, which is the same as that used for the UGI Gas EE&C Plan,

⁴ This limit is aggregated over the five-years of the plan and other grant funding will be considered a source of participant funding. EE&C programs targeted at multi-family customers who take service under non-residential rate classes will be comparable to similar programs targeted at multi-family customers who take service under residential rate classes, in terms of the levels of participant contributions, incentives, program administration, marketing, inspection, and evaluation costs.

1 comparable to the test used by PGW for its Phase II plan, and similar to the test used by
2 the Commission for Act 129. This test compares the avoided cost of resources, including
3 natural gas, electricity, and water, against the incremental cost of pursuing efficiency
4 measures and any administration costs incurred under the programs.

5
6 **Q. What avoided cost values were used in the development of the UGI PNG EE&C
7 Plan?**

8 A. UGI PNG Exhibit TML-2 provides an overview of the avoided cost methodology in
9 Section 1.8.2 and tables of projected values in Section 3.1.

10
11 **Q. How does the assessment of the CHP Program differ from that of the energy
12 efficiency programs?**

13 A. The CHP Program will be evaluated using the same TRC cost-effectiveness criteria as the
14 energy-efficiency programs. However, individual projects also will need to demonstrate
15 that they will result in overall net primary energy reduction and meet the economic test
16 established by the final Commission's Order entered September 1, 2016, approving the
17 UGI Gas 2016 base rate case settlement. These reductions will be tracked separately
18 because the CHP Program will result in an increase in gas usage that should not be
19 conflated with the savings from the energy efficiency programs.

20
21 **Q. What are the lifetime costs and benefits you estimate from implementing UGI
22 PNG's EE&C Plan?**

1 A. The table below (Table 16 from UGI PNG Exhibit TML-2) shows the cost-effectiveness
 2 summary for the programs in UGI PNG’s EE&C Plan. The energy efficiency programs
 3 are projected to provide UGI PNG customers with present value of total resource benefits
 4 of approximately \$23.4 million at an estimated cost of \$16.3 million, including the
 5 participant investments, for a net benefit to customers of approximately \$7.2 million with
 6 a BCR of 1.44. The CHP Program is estimated to provide approximately \$8.7 million in
 7 net total resource benefits with a BCR of 1.22. The entire EE&C Plan is projected to
 8 provide approximately \$15.8 million in net total resource benefits with a TRC BCR of
 9 1.29.

Program	Total Resource PV Benefits	Total Resource PV Costs	Total Resource PV Net Benefits	Total Resource BCR
EE&C Total	\$71,094,222	\$55,274,321	\$15,819,902	1.29
EE Programs	\$23,414,005	\$16,260,533	\$7,153,472	1.44
Residential Prescriptive (RP)	12,631,980	8,073,598	4,558,382	1.56
Nonresidential Prescriptive (NP)	3,757,509	2,157,716	1,599,793	1.74
Residential Retrofit (RR)	2,732,813	2,170,980	561,833	1.26
Nonresidential Retrofit (NR)	1,652,681	954,121	698,560	1.73
New Construction (NC)	1,486,111	754,582	731,530	1.97
Behavior and Education (BE)	1,152,910	762,146	390,764	1.51
Portfolio-wide Costs	-	1,387,391	(1,387,391)	-
CHP Program	\$47,680,217	\$39,013,788	\$8,666,430	1.22

10
 11 If the values for DRIPE and CO₂ are included, then benefits go up significantly,
 12 especially for the CHP portion of the portfolio, as shown in the table below (Table 17a
 13 from UGI PNG Exhibit TML-2). The EE programs have TRC net benefits of
 14 approximately \$12.2 million, and the CHP Program has TRC net benefits of
 15 approximately \$43.0 million, equaling a total of approximately \$55.2 million in TRC net
 16 benefits with a BCR of 2.00.

Program	Total Resource PV Benefits	Total Resource PV Costs	Total Resource PV Net Benefits	Total Resource BCR
EE&C Total	\$110,419,999	\$55,274,329	\$55,145,671	2.00
EE Programs	\$28,437,833	\$16,260,533	\$12,177,300	1.75
Residential Prescriptive (RP)	15,806,977	8,073,598	7,733,379	1.96
Nonresidential Prescriptive (NP)	4,484,797	2,157,716	2,327,081	2.08
Residential Retrofit (RR)	3,272,041	2,170,980	1,101,061	1.51
Nonresidential Retrofit (NR)	1,904,427	954,121	950,306	2.00
New Construction (NC)	1,751,614	754,582	997,032	2.32
Behavior and Education (BE)	1,217,978	762,146	455,832	1.60
Portfolio-wide Costs	-	1,387,391	(1,387,391)	-
CHP Program	\$81,982,166	\$39,013,796	\$42,968,370	2.10

1
2 If values for DRIPE are included without CO₂, the benefits still go up
3 substantially, as shown in the table below (Table 17b from UGI PNG Exhibit TML-2).
4 The EE programs have TRC net benefits of approximately \$9.1 million, and the CHP
5 Program has TRC net benefits of approximately \$25.4 million. Thus, the TRC net
6 benefits total approximately \$34.5 million with a BCR of 1.62.

Program	Total Resource PV Benefits	Total Resource PV Costs	Total Resource PV Net Benefits	Total Resource BCR
EE&C Total	\$89,756,200	\$55,274,321	\$34,481,879	1.62
EE Programs	\$25,360,320	\$16,260,533	\$9,099,787	1.56
Residential Prescriptive (RP)	13,877,485	8,073,598	5,803,888	1.72
Nonresidential Prescriptive (NP)	4,008,883	2,157,716	1,851,167	1.86
Residential Retrofit (RR)	2,886,212	2,170,980	715,233	1.33
Nonresidential Retrofit (NR)	1,744,944	954,121	790,823	1.83
New Construction (NC)	1,571,836	754,582	817,255	2.08
Behavior and Education (BE)	1,270,958	762,146	508,812	1.67
Portfolio-wide Costs	-	1,387,391	(1,387,391)	-
CHP Program	\$64,395,880	\$39,013,788	\$25,382,093	1.65

7
8 **Q. Will these net benefits stimulate economic activity?**
9 **A.** Yes. The present worth of TRC net benefits represents a long-term injection of wealth
10 into the economy. For residential customers, the reduction in the total costs of gas
11 service translates to after-tax disposable income, which can be saved or spent. Likewise,

1 lower gas bills for business customers means some combination of increased profit
 2 margins and more competitive product and service pricing. Businesses will re-invest the
 3 resulting extra profits, distribute them to owners, or some combination of the two. Either
 4 way, the TRC savings will stimulate additional business activity.

5 Moreover, the amount of additional economic activity stimulated by the
 6 efficiency investment will end up being several times the net benefits due to re-spending
 7 within the local, state, and regional economies. While there is doubtless some “leakage”
 8 as some spending takes place outside Pennsylvania, the majority of the economic benefits
 9 stay at the state and local levels.

10 This economic activity generated by the net economic benefits of efficiency
 11 investment is in addition to the economic activity generated directly by expenditures on
 12 the part of both UGI PNG and program participants to install the efficiency measures.

13
 14 **Q. How much natural gas will UGI PNG’s customers save due to the energy efficiency
 15 programs?**

16 A. The natural gas efficiency programs are projected to save UGI PNG customers 4,161
 17 BBtus over the lifetime of all measures installed. The table below (Table 4 from UGI
 18 PNG Exhibit TML-2) shows the first year and lifetime gas savings associated with each
 19 sector over the five years of the proposed portfolio of natural gas efficiency programs.

20

Sector	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 - '22
First Year Gas Savings	15,138	75,957	91,108	95,686	95,686	373,576
Residential (R/RT)	12,367	65,439	72,962	74,219	74,219	299,205
Nonresidential (N/NT)	2,771	10,518	18,146	21,468	21,468	74,371
Lifetime Gas Savings	276,754	727,907	998,490	1,078,815	1,078,815	4,160,781
Residential (R/RT)	231,338	556,582	706,461	736,360	736,360	2,967,100
Nonresidential (N/NT)	45,416	171,325	292,030	342,455	342,455	1,193,681

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Q. What additional benefits do you project for UGI PNG customers from the energy efficiency portion of the EE&C Plan?

A. I estimate the proposed programs will produce lifetime savings of 48,817 MWh of electricity and 153 million gallons of water and will avoid the emission of approximately 284,000 tons of CO₂, which is the equivalent of removing over 10,800 cars from the road for five years. Section 1.5 of UGI PNG Exhibit TML-2 contains a more detailed breakdown of additional savings due to the proposed portfolio.

Q. What benefits do you project for UGI PNG customers from the CHP Program?

A. I estimate the CHP Program will reduce net primary energy consumed by 12,739 BBtus over the lifetime of the installed plants.

Q. Will the CHP Program result in the reduction of greenhouse gas emissions?

A. Yes. I project that UGI PNG’s CHP Program will reduce net generation emissions by over 85,000 tons of CO₂ by the end of the five-year plan, which is equivalent to taking approximately 3,200 cars off the road for five years. If the CPP is implemented as it is currently written, any efficiency or conservation measures that reduce the output of CO₂ from fossil-fuel fired electric generating units (“EGUs”), that are installed after 2012, and that are operational during the years covered by the CPP could be incorporated into a state implementation plan (“SIP”) to assist Pennsylvania achieve its CPP goals. The savings I project should persist through 2030, which should make them countable towards CPP goals.

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Q. How much additional employment do you estimate that the Plan will generate?

A. The Plan is projected to generate between 125 and 208 net additional new jobs over the lifetime of the efficiency measures installed. The majority of these jobs will stay close to where savings occurred due to: (1) most of the job creation being a product of the economic “multiplier” effect through the cycle of re-spending energy savings; and (2) the shift away from spending in the less-labor intensive energy sector towards more job-intensive sectors such as food service and production, as explained in Section 1.5.5 of UGI PNG Exhibit TML-2.

Q. How much will it cost to achieve these results?

A. The entire EE&C Plan is expected to cost \$15.4 million over five years (average of approximately \$3.1 million per year). For the natural gas energy efficiency programs, UGI PNG projects an investment of \$14.0 million, or approximately \$2.8 million per year. For the CHP Program, UGI PNG projects an investment of approximately \$1.4 million, specifically \$282,500 per year.

Q. How will these programs be staged to achieve the results you have identified?

A. Once final approval has been granted for the EE&C Plan, the three lost opportunity programs will be launched in FY 2018: (1) Residential Prescriptive (“RP”); (2) Nonresidential Prescriptive (“NP”); and (3) New Construction (“NC”). The RP and NP programs will be utilizing the same infrastructure as the similarly named UGI Gas programs that launched in FY 2017. The New Construction program will launch in

1 concert with the UGI Gas NC program in FY 2018. The Residential Retrofit (“RR”) and
 2 Nonresidential Retrofit (“NR”) programs will launch in FY 2019 and will benefit from
 3 the earlier launch of the UGI Gas RR and NR programs. The final program to launch in
 4 FY 2019 will be the Behavior and Education (“BE”) program in coordination with
 5 planned updates to UGI PNG’s customer information system as well as the UGI Gas BE
 6 program. All of the programs will ramp up over the initial three to four years until the
 7 portfolio reaches its full level of annual investment in the fourth year of the five-year
 8 portfolio. The CHP Program would be open to customers starting in FY 2018. The table
 9 below shows the projected annual nominal dollar investment by program.

Program	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 18 - FY 22
EE&C Total	\$1,729,750	\$2,835,700	\$3,440,500	\$3,738,300	\$3,688,300	\$15,432,550
Residential Prescriptive (RP)	650,000	1,045,000	1,287,000	1,298,000	1,273,000	5,553,000
Nonresidential Prescriptive (NP)	155,450	234,000	380,100	422,700	407,700	1,599,950
Residential Retrofit (RR)	100,000	400,500	519,000	569,400	569,400	2,158,300
Nonresidential Retrofit (NR)	25,000	151,300	190,600	271,900	261,900	900,700
New Construction (NC)	61,800	142,400	181,300	253,800	243,800	883,100
Behavior and Education (BE)	-	260,000	270,000	270,000	270,000	1,070,000
Portfolio-wide Costs	455,000	320,000	330,000	370,000	380,000	1,855,000
EE Total	1,447,250	2,553,200	3,158,000	3,455,800	3,405,800	14,020,050
CHP Program	282,500	282,500	282,500	282,500	282,500	1,412,500

10 The table below reflects projected nominal budgets for the entire portfolio, including
 11 CHP, for FY 2018, both by program category and broken out between rate classes.

<u>Program Category</u>	<u>R/RT</u>	<u>N/NT</u>	<u>DS</u>	<u>LFD</u>	<u>Total</u>
Customer Incentives	\$524,800	\$63,450	\$150,000	\$100,000	\$838,250
Administration	\$566,532	\$101,468	\$6,000	\$4,000	\$678,000
Marketing	\$114,915	\$51,085	\$9,000	\$6,000	\$181,000
Inspections	\$18,000	\$7,000	\$1,500	\$1,000	\$27,500
Evaluation	\$-	\$-	\$3,000	\$2,000	\$5,000
Total Expenses	\$1,224,247	\$223,003	\$169,500	\$113,000	\$1,729,750

12 Please see Section 1.9.1 of UGI PNG Exhibit TML-2 for additional details regarding the
 13 proposed program staging, as well as Section 2 for individual program descriptions.

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Q. Is UGI PNG proposing annual budget caps for the individual programs?

A. No. The proposal is an investment over five years of approximately \$3.1 million dollars per year. Although the previously described staging and budget levels represent anticipated funding levels, the utility should be allowed to move budget dollars between years and programs depending on market conditions and adoption rates, as long as program and portfolio cost-effectiveness are achieved while not exceeding the five-year total budget cap.

Q. Why is this flexibility important?

A. The ability to allocate funding effectively is crucial for a portfolio administrator, especially for a portfolio that is just starting up. The uncertainty inherent in launching and ramping up a new program or portfolio means that there can be faster or slower adoptions of efficiency measures. The ability to adjust budgets ensures that unspent funds from one lower demand area can be used to address the higher demands in other areas and helps provide continuity for customers, contractors, and suppliers. This flexibility must also extend to program design and implementation, such as increasing or decreasing incentives based on market conditions. Notwithstanding, as explained in Section 1.9.5 of the EE&C Plan (UGI PNG Exhibit TML-2), UGI PNG would file a revised EE&C Plan if a program was added or removed, additional funds over and beyond the five-year cap were required, or material changes were expected for portfolio-level cost-effectiveness projections.

1 **Q. How will UGI PNG report results?**

2 A. As described in Section 1.9.4 of UGI PNG Exhibit TML-2, UGI PNG will provide an
3 annual report every January, three months after the close of the program year, that will
4 provide verified savings and participation, costs committed to this activity, and the
5 resulting cost-effectiveness. Results for the previous year and progress towards the five-
6 year goal will be included. The annual report will also include highlights of program
7 activity and any significant improvements made to program delivery and design.

8

9 **Q. Please describe UGI PNG’s evaluation, measurement, and verification plans for the**
10 **portfolio.**

11 A. UGI PNG Exhibit TML-2 provides an overview of the EM&V planned for the EE&C
12 Plan (UGI PNG Exhibit TML-2, Section 1.10) as well as plans for each individual
13 program. Measures will require proof of purchase and must be tied to a valid UGI PNG
14 account. Third-party inspections will be performed on all complex projects and a subset
15 of prescriptive rebates, to make sure the correct equipment is installed and to solicit
16 customer feedback. Savings will be calculated using the technical reference manual
17 (“TRM”) that was developed for UGI Gas. Further, UGI PNG will coordinate TRM
18 updates with UGI Gas. UGI PNG also will develop a tracking system to store and
19 analyze program activity, spending, and inspection data. Finally, each program will
20 undergo regular impact and process evaluations approximately every two years.

21

1 **IV. SUMMARY OF PROPOSED PROGRAMS**

2 **A. RESIDENTIAL PRESCRIPTIVE PROGRAM**

3 **Q. Please describe the Residential Prescriptive Program.**

4 A. The Residential Prescriptive (“RP”) Program offers cash incentives for high-efficiency,
5 natural gas powered, residential-sized space and water heating equipment, which is the
6 largest lost opportunity market in UGI PNG’s territory. The program is expected to cost
7 \$5.6 million in nominal dollars over five years and save 2,163 BBTus of natural gas over
8 the lifetime of measures installed. The program is projected to provide present value
9 TRC net benefits of \$4.6 million with a BCR of 1.56.

10 The RP program specifically provides rebates for high efficiency furnaces,
11 boilers, combi-boilers, tankless water heaters and Wi-Fi-enabled thermostats. ENERGY
12 STAR® criteria will be used as the minimum efficiency level, when available. The
13 rebates for this equipment will be in line with the rebates offered by UGI Gas. A list of
14 the proposed measures and corresponding incentives can be found in the RP Program
15 Description Section on Financial Incentives in UGI PNG Exhibit TML-2.

16
17 **Q. Are there any key risk factors for the RP program?**

18 A. A key aspect of future program uncertainty involves the potential shift in baseline
19 efficiency levels for natural gas furnaces. Federal Standards are potentially moving
20 towards requiring condensing units with annual fuel utilization efficiencies (“AFUEs”) of
21 90 percent or more for the Northern region of the United States, which includes
22 Pennsylvania. While the current efficient condition for natural gas furnace incentives of
23 an ENERGY STAR ® rating would still exceed an anticipated baseline shift, savings and

1 incentive levels would be adjusted downwards. This downward adjustment may require
2 savings and/or spending goals to be adjusted accordingly.

3
4 **B. NONRESIDENTIAL PRESCRIPTIVE PROGRAM**

5 **Q. Please describe the Nonresidential Prescriptive Program.**

6 A. The Nonresidential Prescriptive (“NP”) Program offers incentives for a variety of natural
7 gas powered equipment used by UGI PNG’s small business and commercial customers.
8 The program is expected to cost \$1.6 million in nominal dollars over five years and save
9 780 BBtus of natural gas over the lifetime of measures installed. The program is
10 projected to provide present value TRC net benefits of \$1.6 million with a BCR of 1.74.

11 The program provides rebates for commercial-sized boilers, unit heaters, steam
12 traps, water heaters, and a few types of commercial kitchen equipment. Where possible,
13 ENERGY STAR® will be used as the minimum efficiency level. Incentives for these
14 measures match those offered by UGI Gas. A custom incentive track also is offered for
15 measures that are not currently covered by the prescriptive list, such as custom control
16 and heat recovery systems. A list of the proposed measures and corresponding incentives
17 can be found in the NP Program Description Section on Financial Incentives in UGI PNG
18 Exhibit TML-2. Delivery of the program is nearly the same as the RP program and will
19 utilize the same rebate processing vendor to maintain operational efficiency.

20
21 **C. NEW CONSTRUCTION PROGRAM**

22 **Q. Please describe the New Construction Program.**

23 A. The New Construction (“NC”) program aims to address natural gas efficiency in new
24 construction and gut rehabilitation projects. The program targets both the residential and

1 nonresidential sectors by providing incentives for going beyond code. The program is
2 performance-based and will provide participants with a greater incentive for combining
3 measures and going deeper than they would by upgrading only the space or water heating
4 system through the RP or NP programs.

5 The program is expected to cost \$883,100 in nominal dollars over five years and
6 save 266 BBtus of natural gas over the lifetime of measures installed. The program is
7 projected to provide present value TRC net benefits of \$0.7 million with a BCR of 1.97.

8
9 **Q. How does the NC program address residential projects?**

10 A. The program will provide a streamlined prescriptive rebate for customers who save at
11 least 20% in gas usage compared to a baseline house just meeting code. The incentive
12 will be designed to cover approximately 80% of the incremental costs.

13
14 **Q. How does the NC program address nonresidential projects?**

15 A. Since the nonresidential NC projects tend to be more complicated, the program will focus
16 first on providing technical assistance to potential projects to help include efficiency in
17 the initial design process. Nonresidential projects will then be eligible for an incentive
18 that gets larger as the savings increase. The program will have three tiers: greater than or
19 equal to 15% but less than 20%, at least 20% but less than 30%, and 30% or greater.

20
21 **D. RESIDENTIAL RETROFIT PROGRAM**

22 **Q. Please describe the Residential Retrofit Program.**

23 A. The Residential Retrofit (“RR”) program is designed to overcome market barriers for
24 existing residential customers to do comprehensive natural gas efficiency projects that

1 save money and increase comfort. The program specifically addresses the space and
2 water heating system, as well as improvements to the thermal envelope. The program is
3 expected to cost \$2.2 million in nominal dollars over five years and save 552 BBTus of
4 natural gas over the lifetime of measures installed. The program is projected to provide
5 present value TRC net benefits of \$0.6 million with a BCR of 1.26.

6 Interested customers will receive an energy audit from a qualified contractor that
7 includes a blower door test. The contractor will provide the customer with a list of
8 recommended actions based on the audit. The customer will then receive an incentive of
9 \$60 per first year MMBtu savings based on the measures installed by a qualified
10 contractor. The incentive is designed to offset most of the incremental cost of the higher
11 efficiency equipment and to provide a significant contribution to the cost of qualifying
12 thermal envelope improvements.

13
14 **Q. What does it mean to be a “qualified contractor”?**

15 A. The cornerstone of the RR program will be the approved contractor network. The
16 contractor network will have been started by UGI Gas and then shared and further
17 expanded for the UGI PNG Territory.

18 To become part of the network, a contractor must have certification from the
19 Building Performance Institute (“BPI”) and be trained in program protocols to ensure
20 quality business practices. Approved contractors must also employ site technicians and
21 site supervisors with BPI professional certifications appropriate to their duties. Once a
22 contractor passes initial approval, the first three projects performed by that contractor will
23 require confirmation of quality installation by an approved third party inspector before

1 the contractor moves from probationary status to full certification. Subsequent contractor
2 work will be sampled up to 10% of projects submitted. Protocols also will be put in place
3 to remove a contractor from the program for poor performance.

4 **E. NONRESIDENTIAL RETROFIT PROGRAM**

6 **Q. Please describe the Nonresidential Retrofit Program.**

7 A. The Nonresidential Retrofit (“NR”) Program will provide incentives for overcoming
8 market barriers for natural gas efficiency retrofits in existing commercial and multi-
9 family buildings; it also will be open to agricultural and small industrial applications.
10 Any measure that saves natural gas is eligible, with space heating, water heating, and
11 process heating expected to be the largest opportunities. The program specifically
12 addresses the space and water heating system, as well as improvements to the thermal
13 envelope. The program is expected to cost \$0.9 million in nominal dollars over five
14 years and save 244 BBtus of natural gas over the lifetime of measures installed. The
15 program is projected to provide present value TRC net benefits of \$0.7 million with a
16 BCR of 1.73.

18 **Q. Why are multi-family projects included in this program?**

19 A. Multi-family buildings technically are any housing other than single-family detached
20 structures, including duplexes and townhouses, as well as apartments. They must have at
21 least one surface defining a given housing unit that is shared by another unit within the
22 building and space or water heating equipment that can service more than one unit.
23 These considerations make multi-family structures difficult to administer within the RR
24 program, which is geared for stand-alone residential units. It is important that these types

1 of buildings are not left out of the Plan, as they present a unique opportunity for whole-
2 building energy efficiency and conservation.

3
4 **F. BEHAVIOR AND EDUCATION PROGRAM**

5 **Q. Please describe the Behavior and Education Program.**

6 A. The Behavior and Education (“BE”) program is designed to motivate a large group of
7 residential customers to save small amounts of energy by changing behavior through
8 education, outreach, and energy monitoring. The premise is that the delivery of timely,
9 salient, and personalized information allows for informed decision-making. The program
10 combines behavioral science with data analytics to provide clearly defined and actionable
11 information that motivates customers to lower their energy use. The program is expected
12 to cost \$1.1 million in nominal dollars over five years and save 156 BBtus of natural gas
13 over the lifetime of measures installed. The program is projected to provide present
14 value TRC net benefits of \$0.4 million with a BCR of 1.51.

15
16 **Q. How will savings be verified for this program?**

17 A. A solid evaluation is crucial for the success of this program. UGI PNG will engage an
18 evaluator to begin collecting data on the program as soon as it starts to be able to get as
19 much real time feedback as possible regarding the size and persistence of savings and
20 make sure that any early issues are caught quickly and addressed. The evaluation efforts
21 will be coordinated with those of UGI Gas, and the same evaluator will likely be used for
22 both programs to streamline processes and reduce costs.

1 **G. COMBINED HEAT AND POWER PROGRAM**

2 **Q. Please describe the CHP Program.**

3 A. The CHP Program provides incentives for CHP plants that have net-primary-energy
4 savings and are cost-effective under the TRC test. The program also seeks to promote
5 projects that would contribute CO₂ emission reductions. The program would offer an
6 incentive of \$750 per kW, with a per project cap of \$250,000 and no more than 50% of
7 CHP project cost. Over the five years of the portfolio, the CHP Program is projected to
8 cost \$1.4 million, in nominal terms, and provide 12,379 BBtus in net-primary-energy
9 savings over the lifetime of the installed projects, as well as reduce net CO₂ emissions by
10 approximately 85,000 tons by the end of the five-year plan. The program is expected to
11 have a present value of TRC net benefits of \$8.7 million with a BCR of 1.22.

12
13 **Q. What types of CHP projects will the program incentivize?**

14 A. The program will target large commercial and industrial customers with high thermal and
15 electric loads, such as hospitals, college campuses and multi-shift industrial customers.
16 Due to the current state of avoided costs, UGI PNG anticipates that only larger CHP
17 projects (over 1,000 kW) will be cost-effective. However, UGI PNG will continue to
18 monitor both the energy market and customer opportunities to address as wide a range of
19 CHP technology types and sizes as possible.

20
21 **H. PORTFOLIO-WIDE COSTS**

22 **Q. What do the portfolio-wide costs cover?**

23 A. The portfolio-wide costs cover development, design, tracking, reporting, and
24 administrative overhead that cuts across all the programs in the portfolio. The majority

1 of development costs for the portfolio occur in the first year as programs are designed
2 and reporting infrastructure is put in place. Costs then fall sharply in the second year
3 before climbing as the portfolio grows. Over the five-year period, they represent 12% of
4 the portfolio's expenditures.

5
6 **V. CONCLUSIONS AND RECOMMENDATIONS**

7 **Q. What conclusions do you reach?**

8 A. I conclude that UGI PNG's proposed portfolio of energy efficiency programs and CHP
9 Program will be cost-effective and economically beneficial to UGI PNG's ratepayers and
10 the economy of the UGI PNG territory and Pennsylvania.

11
12 **Q. On the basis of these conclusions, what are your recommendations to the
13 Commission?**

14 A. I recommend that the Commission approve implementation of UGI PNG's five-year
15 EE&C Plan. Any delay in implementation represents delay of the benefits that will
16 occur.

17
18 **Q. Does this conclude your direct testimony?**

19 A. Yes, it does.

UGI PNG EXHIBIT TML-1

Professional Experience

Green Energy Economics Group, Inc. – Cuttingsville, VT 2007 to Present

Senior Analyst and Data Scientist

Providing research and technical assistance relating to the design, analysis, and implementation of energy utility demand-side management (DSM) programs for electric and natural gas service providers around the world; including ten states, two Canadian provinces, and China. Currently focusing on building scalable tools to analyze everything from individual projects to programs to portfolios.

Alter & Rosen, LLP – New York, NY 2007 to 2010

Consultant

Managed the development of an online database management system for musical copyrights and brought on board paying beta users. Managed data entry, reporting, termination and reversion issues for transactions involving musical copyright catalogues valued at over \$100 million.

AllianceBernstein LP – White Plains, NY 2006 to 2007

Client Reporting Analyst

Oversaw the monthly and quarterly report process for clients domiciled outside the United States. Increased by 150% the amount of accounts that met a fifth business day deadline. Transferred firm's quarterly reporting process to new system.

Complex Integrated Systems, Inc. LP – Framingham, MA 2005 to 2006

Database Systems Consultant

Designed and implemented custom modules for metal fabrication and finishing business management software. Recruited and trained a team of developers to aid in Complex Integrated System's growth.

Education

Clark University – Worcester, MA

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

Kansai Gaidai University: Hirakata City, Osaka Japan.

Spring Semester 2005

General Assembly: New York City, NY

Data Science Intensive Course, 2015

Recent Project Experience

Research on Leading Energy Efficiency Portfolios

Green Energy Economics Group

(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;
- Published paper for the 2012 ACEEE Summer Study on Energy Efficiency in Buildings.

Development of Energy Efficiency and Conservation Plan

UGI Penn Natural Gas (“UGI PNG”)

(September 2016 – Present)

Reading, Pennsylvania

- Assist UGI PNG with the development and approval of Energy Efficiency and Conservation (EE&C) Plan including the development an achievable efficiency scenario and designing a five-year \$15 million energy efficiency and conservation portfolio.

Technical Assistance to Energy Efficiency Portfolio Administrator

UGI Utilities, Inc. – Gas Division (“UGI Gas”)

(June 2016 – Present)

UGI Utilities, Inc. – Electric Division (“UGI Electric”)

(September 2016 – Present)

Reading, Pennsylvania

- Assisting with the implementation of the UGI Gas EE&C Portfolio, including setting up tracking systems, assisting with the contractor RFP process, developing a TRM, evaluation procedures, regulatory reporting, and refining program design.
- Assisting with the implementation of the UGI Electric voluntary EE programs.

Development of Energy Efficiency and Conservation Plan

UGI Gas

(June 2015 – June 2016)

Reading, Pennsylvania

- Assisted UGI Gas with the development and approval of Energy Efficiency and Conservation (EE&C) Plan, including developing an achievable efficiency scenario and designing a five-year, \$27 million energy efficiency and conservation plan for UGI Gas.
- Submitted direct testimony on behalf of UGI Gas, Inc. on the design and implementation of the proposed plan (Docket No. R-2015-2518438)

Strategic Planning and Implementation of Five-year DSM Portfolio

Philadelphia Gas Works (“PGW”)

(August 2008 – Present)

Philadelphia, Pennsylvania

- 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.

Data Analysis and Planning Assistance for Energy Efficiency Portfolio

Exelon – PECO Energy Company ("PECO")

(September 2016 – Present)

Philadelphia, Pennsylvania

- Partner with ANB Systems Inc. and Innova Energy Group to provide tracking and reporting systems for the PECO Act 129 Energy Efficiency portfolio of programs
- Assist in development of dashboards, cost-benefit analysis, savings tracking and reporting, and future planning.

Technical Assistance for Energy Efficiency Program Planning

Green Mountain Power

(August 2012 – Present)

Vermont

- 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

(May 2011 – December 2015)

British Columbia, Canada

- 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.

Technical Assistance for Energy Efficiency Programs

Focus on Energy

(June 2011 – December 2014)

Wisconsin

- 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

(September 2008 – January 2013)

Chicago, Illinois

- 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.

Energy Efficiency Potential in Oklahoma

Sierra Club

(April 2011 – November 2011, December 2013 – January 2014)

Oklahoma

- 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.

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

(April 2012)

Austin, Texas

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

Nevada Power's Energy Efficiency Potential

Sierra Club

(November 2011 – June 2012)

Nevada

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

Comments on EmPower Maryland Programs

Sierra Club

(September 2011 – October 2011)

Maryland

- 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

(January 2011 – May 2011)

Ontario, Canada

- 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

(September 2009 – March 2010)

Arkansas

- 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

(August 2008 – September 2010)

United States and China

- 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

(November 2008 – June 2010)

Burlington, Vermont

- 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

(December 2008 – October 2009)

Burlington, Vermont

- 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

(August – October 2008)

Connecticut

- 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

(October 2008 – March 2009)

British Columbia, Canada

- 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).

Publications

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.

UGI PNG EXHIBIT TML-2

UGI Penn Natural Gas, Inc.

Five Year Energy Efficiency and
Conservation Plan

January 19, 2017

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1 Introduction and Background

1.1 Plan Overview

This plan provides a detailed description of the design and implementation of the energy efficiency and conservation portfolio (EE&C Portfolio or Portfolio) that UGI Penn Natural Gas, Inc. (“UGI PNG” or “Company”) is proposing to offer in its energy efficiency and conservation plan (“EE&C Plan” or “Plan”). The Plan will have a five-year duration, beginning in UGI PNG’s fiscal year (“FY”) 2018 through FY 2022,¹ and will include both energy efficiency (“EE”) programs and a combined heat and power (“CHP”) program.

UGI PNG’s EE&C Plan was developed based on the UGI Gas Utilities, Inc. – Gas Division (“UGI Gas”) EE&C Plan that was approved as part of the UGI Gas rate case filed in 2016.² As discussed in more detail below, the Plan utilizes the same types of programs, Technical Reference Manual (“TRM”), and Total Resource Cost (“TRC”) Test that was used for the UGI Gas EE&C Plan, including the modifications in the joint settlement that was approved by the Pennsylvania Public Utility Commission (“Commission”).³ Though UGI PNG is not mandated to enact an EE&C Plan under Act 129, both UGI PNG and UGI Gas’s voluntary EE&C Plans were developed using the guiding principles of the Commission’s Act 129 Phase III Implementation Order.⁴

Over the five years of the EE&C Plan, UGI PNG plans to spend \$15.4 million on six energy efficiency (EE) programs and one CHP program.⁵ Altogether, the EE&C Portfolio is cost-effective, providing \$15.8 million in net

¹ UGI PNG’s fiscal year runs October 1st to September 30th.

² See *Pa. PUC v. UGI Utilities, Inc.*, Docket No. R-2015-2518438 (Order entered Oct. 14, 2016) (“UGI Gas”).

³ See *UGI Gas*, pp. 9-11, 34-36.

⁴ See *Energy Efficiency and Conservation Program*, Docket No. M-2014-2424864 (Order entered June 19, 2015) (“Phase III Implementation Order”), clarified, Docket No. M-2014-2424864 (Order entered Aug. 20, 2015).

⁵ All dollars are nominal unless otherwise noted.

resource benefits with a TRC benefit-cost ratio of 1.29, increasing the economic wellbeing of UGI PNG's customers.

The six energy efficiency programs are projected to cost \$14.0 million and save 374 BBtus of natural gas during the first five years of the Plan, and 4,161 BBtus of natural gas over the lifetime of the measures installed. From a total resource perspective, the present value of benefits is \$23.4 million, with \$16.3 million in present value of costs, leading to a present value of net benefits of \$7.2 million and a TRC benefit-cost ratio of 1.44. Furthermore, the energy efficiency programs are expected to save 48,817 MWh of electricity, 152 million gallons of water, create between 125 and 208 jobs, and avoid the emission of CO₂ equivalent to over 10,800 cars being removed from the road for 5 years.

UGI PNG projects the cost of the CHP program to be \$1.4 million over five years. This program would provide net energy savings to customers over the five years of the Plan of 849 BBtus, and 12,739 BBtus over the lifetime of the CHP projects installed. The CHP program will provide present value of net benefits of \$8.7 million from a total resource perspective, with a TRC benefit-cost ratio of 1.22.

1.2 Natural Gas and Energy Efficiency

Natural gas is an abundant resource and an important component of the Pennsylvania economy. In 2014, Pennsylvania had the most shale gas proven reserves in the country, driven by the development of the Marcellus Shale,⁶ and over 90% of the natural gas UGI PNG delivers to its customers comes from the Marcellus Shale. As a result of this reliable, local supply, UGI PNG customers have seen bills decrease substantially since 2008.

Natural gas also has many important advantages as an end-use fuel source. When compared to the use of electricity generated from natural gas or most other fuels, the direct end-use of natural gas is more efficient and environmentally preferable. Natural gas has a source-to-site efficiency of 92%,

⁶ <http://marcelluscoalition.org/2015/11/pa-drives-increase-in-u-s-natural-gas-abundance/>

meaning the vast majority of the energy from natural gas is associated with on-site consumption. Electricity on the other hand, only has a source-to-site efficiency of 32%, meaning that less than one third of electric energy is used at the site.⁷

As natural gas has continued to grow in importance as a fuel source, natural gas energy efficiency programs have also shown steady growth activity. The American Council for an Energy Efficient Economy (ACEEE) State Energy Scorecard shows that spending on natural gas energy-efficiency programs has grown both nationally and in the states surrounding Pennsylvania. Nationally, the spending on natural gas energy efficiency programs has increased by more than five times to \$1.4 billion in 2015 from 2006 levels.⁸ For states close to Pennsylvania, the rise has been even greater, with New York more than tripling budgets to \$195 million between 2009 and 2015 and Maryland going from a few hundred thousand dollars a year in 2009 to \$16 million per year in 2015. Within Pennsylvania, a number of gas utilities have undertaken voluntary energy efficiency programs, including the recently approved UGI Gas EE&C Plan and the second phase of Philadelphia Gas Works (“PGW”) natural gas efficiency portfolio.

As the energy market is becoming increasingly customer driven, utilities around the country are recognizing the opportunity to drive economic growth and an efficient economy by sponsoring energy efficiency and conservation programs. For natural gas utilities, the opportunity to invest in helping customers save money, increase comfort, and reduce the impact they have on the environment is now a crucial component of joining the next generation of energy utilities and benefiting the communities that they serve.

⁷ Meyer, Richard. Dispatching Direct Use: *Achieving Greenhouse Gas Reductions with Natural Gas in Homes and Businesses*. American Gas Association: Washington, DC. November 11, 2015, p. 5.

⁸ ACEEE (American Council for an Energy-Efficient Economy), *The 2016 State Energy Efficiency Scorecard*, Weston Berg, et al, September 2016, p. 36.

1.3 Goals

UGI PNG has the following core goals:

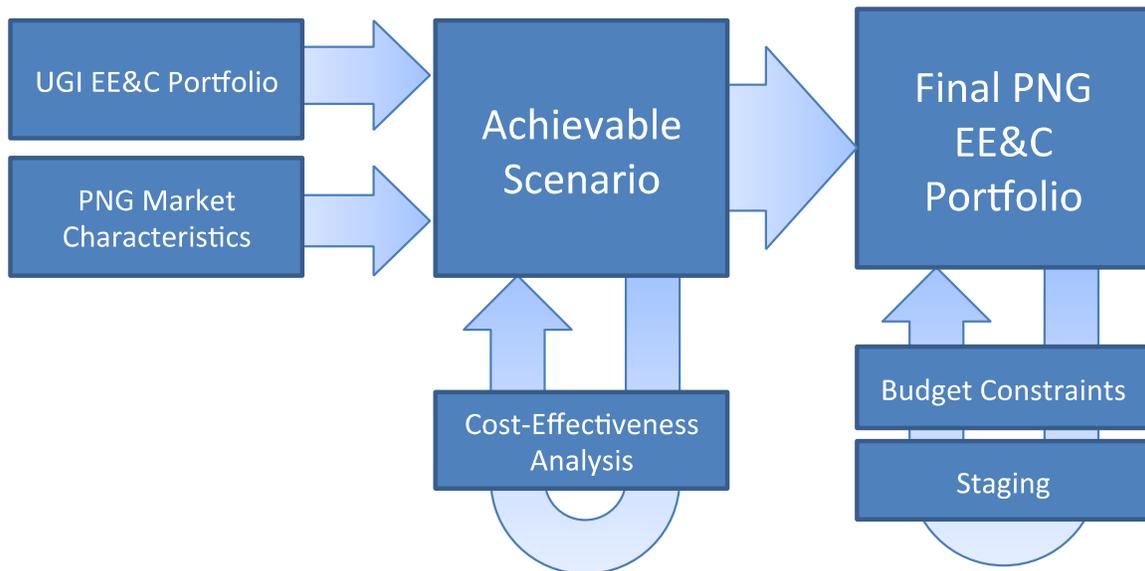
- Help customers save energy cost-effectively through a holistic approach to energy efficiency and conservation;
- Avoid lost opportunities and provide deep levels of savings;
- Provide a wide range of services for UGI PNG's diverse customer base; and
- Contribute to the economic welfare of its customers and Pennsylvania.

In order to reach these goals, UGI PNG will utilize energy efficiency programs and a CHP program. For its energy efficiency programs, UGI PNG plans to invest approximately \$14.0 million over five years with the goal of returning \$8.0 million dollars in present value of total resource net benefits to customers. As a secondary goal for efficiency programs, UGI PNG expects to save customers 4,160 BBTus of natural gas and 280,000 tons of CO₂ emissions over the lifetime of installed measures during the five-year portfolio.

For the CHP program, UGI PNG also plans to invest approximately \$1.4 million over five years with the goal of returning \$9.7 million dollars in present value of total resource net benefits to customers.

1.4 Plan Development

Figure 1. Plan Development Process



The UGI PNG EE&C Plan was developed as shown in Figure 1. UGI PNG market characteristics were developed, including avoided costs for natural gas and electricity, demographic, building stock, and equipment market characteristics. These were combined with the measure and project characterizations from the UGI Gas EE&C Portfolio for cost-effectiveness screening using the TRC test. The cost-effective measures and projects were then used to calculate achievable savings and participation levels. The achievable scenario was adjusted to allow for program ramp up, coordination with UGI Gas’s EE&C Portfolio, and budget constraints to come up with a final portfolio.

Following the UGI Gas EE&C Portfolio design, four types of market actions were then included in the portfolio. The first market action is at the time of “natural replacement,” which means helping customers replace broken equipment with equipment that has a higher efficiency than the market baseline. The second market action is in the new construction and gut rehabilitation

market, to make sure that new buildings go above code requirements to save energy. The third market action is in the retrofit market of existing buildings to make existing buildings more energy efficient. The final market action is in the behavioral side of energy consumption, through outreach and education. The natural replacement and retrofit markets were divided between residential and nonresidential programs in order to provide more effective program messaging, resulting in six separate energy efficiency programs. A stand-alone CHP program was established based on the program's unique market and reporting requirements. The seven resulting programs are set forth in the following table.

Table 1. Planned Programs

Abbreviation	Program Name	Market Intervention
RP	Residential Prescriptive	Natural Replacement
NP	Nonresidential Prescriptive	Natural Replacement
NC	New Construction	New Construction
RR	Residential Retrofit	Retrofit
NR	Nonresidential Retrofit	Retrofit
BE	Behavior and Education	Behavior
CHP	Combined Heat and Power	Retrofit

Incentive levels were set to be in-line with the UGI Gas EE&C Portfolio. Next, non-incentive budgets were developed to address fixed and variable costs associated with each program and the portfolio as a whole. A target annual investment level was determined, and the programs were weighted to maximize net benefits and avoid lost opportunities. The programs were then staged to reach the target year given operational constraints, and program and portfolio level metrics were checked to make sure they lined up with similar programs and portfolios, including the UGI Gas EE&C Portfolio. Finally, details regarding the implementation of the EE&C Portfolio were developed based on those approved

for the UGI Gas EE&C Portfolio, including those requirements established in the UGI Gas rate case settlement approved by the Commission.⁹

In particular consideration of settlement item 42 from the UGI Gas rate case, the recoverable utility costs for the N/NT rate-class portion of the NP, NR, and NC programs shall be limited to 55% of the overall cost to the customers undertaking efficiency projects. This limit is aggregated over the five-years of the plan. Other grant funding will be considered a source of participant funding. EE&C programs targeted at multi-family customers who take service under non-residential rate classes will be comparable to similar programs targeted at multi-family customers who take service under residential rate classes, in terms of the levels of participant contributions, incentives, program administration, marketing, inspection, and evaluation costs.

1.5 Efficiency Program Benefits

1.5.1 Natural Gas Savings

The following tables provide projected natural gas savings by program and sector for the energy efficiency programs in the EE&C Portfolio.

Table 2. Projected First Year Gas Savings by Program (MMBtus)

Program	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 - '22
Portfolio Total	15,138	75,957	91,108	95,686	95,686	373,576
Residential Prescriptive (RP)	12,254	21,755	27,448	27,124	27,124	115,705
Nonresidential Prescriptive (NP)	2,771	6,952	12,232	12,801	12,801	47,558
Residential Retrofit (RR)	-	4,158	5,544	6,652	6,652	23,006
Nonresidential Retrofit (NR)	-	1,893	3,786	5,679	5,679	17,038
New Construction (NC)	113	2,230	3,128	4,461	4,461	14,393
Behavior and Education (BE)	-	38,969	38,969	38,969	38,969	155,875

Table 3. Projected Lifetime Gas Savings by Program (MMBtus)

Program	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 - '22
Portfolio Total	276,754	727,907	998,490	1,078,815	1,078,815	4,160,781
Residential Prescriptive (RP)	228,747	406,097	513,573	507,074	507,074	2,162,565
Nonresidential Prescriptive (NP)	45,416	114,792	200,925	209,458	209,458	780,050
Residential Retrofit (RR)	-	99,786	133,048	159,658	159,658	552,150
Nonresidential Retrofit (NR)	-	27,129	54,259	81,388	81,388	244,163

⁹ See UGI Gas, pp. 9-11, 34-36

New Construction (NC)	2,591	41,134	57,717	82,268	82,268	265,977
Behavior and Education (BE)	-	38,969	38,969	38,969	38,969	155,875

Table 4. Projected Gas Savings by Sector (MMBtus)

Sector	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 - '22
First Year Gas Savings	15,138	75,957	91,108	95,686	95,686	373,576
Residential (R/RT)	12,367	65,439	72,962	74,219	74,219	299,205
Nonresidential (N/NT)	2,771	10,518	18,146	21,468	21,468	74,371
Lifetime Gas Savings	276,754	727,907	998,490	1,078,815	1,078,815	4,160,781
Residential (R/RT)	231,338	556,582	706,461	736,360	736,360	2,967,100
Nonresidential (N/NT)	45,416	171,325	292,030	342,455	342,455	1,193,681

1.5.2 Electric Savings

The following table shows electric savings for measures installed under the energy efficiency programs in the EE&C Portfolio. The electric savings are secondary savings from measures that primarily save natural gas, such as efficient natural gas furnaces with brushless fan motors and air-conditioning savings from higher insulation.

Table 5. Projected Electric Savings by Sector

Sector	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 - '22
First Year Energy (MWh)	254.6	464.1	587.3	596.2	596.2	2,498.3
Residential (R/RT)	254.6	464.0	587.2	596.1	596.1	2,497.9
Nonresidential (N/NT)	-	0.1	0.1	0.1	0.1	0.4
Lifetime Energy (MWh)	4,951	9,061	11,474	11,666	11,666	48,817
Residential (R/RT)	4,951	9,059	11,472	11,663	11,663	48,810
Nonresidential (N/NT)	-	1	2	2	2	8
Summer Peak (kW)	56	105	133	135	135	564
Residential (R/RT)	56	105	133	135	135	564
Nonresidential (N/NT)	-	-	-	-	-	-

1.5.3 Water Savings

This section contains projections for water savings due to the energy efficiency programs in the EE&C Portfolio.

Table 6. Projected Water Savings by Sector (Million Gallons)

Sector	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 - '22
First Year Water Savings	0.64	2.19	3.71	4.21	4.21	14.95
Residential (R/RT)	-	0.36	0.59	0.81	0.81	2.58
Nonresidential (N/NT)	0.64	1.83	3.11	3.40	3.40	12.38
Lifetime Water Savings	3.81	21.91	36.57	45.22	45.22	152.73
Residential (R/RT)	-	8.01	12.90	17.47	17.47	55.84
Nonresidential (N/NT)	3.81	13.90	23.68	27.75	27.75	96.89

1.5.4 Emission Reductions

This section contains projections for CO₂ emission reductions due to the energy efficiency programs in the EE&C Portfolio. The total savings of 284,000 tons of CO₂ is equivalent to removing 10,861 cars off the road for 5 years. The following table breaks out the emission reductions due to gas savings and electric savings. While the amount of emissions reductions were calculated, the main TRC test for the portfolio does not include any value for these emissions.

Table 7. Projected CO₂ Emission Reductions by Energy Source (Short Tons)

Sector	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 - '22
First Year Reductions	1,099	4,833	5,822	6,098	6,098	23,949
From Gas Savings	886	4,443	5,330	5,598	5,598	21,854
From Electric Savings	886	4,443	5,330	5,598	5,598	21,854
Lifetime Reductions	20,341	50,180	68,033	72,892	72,892	284,339
From Gas Savings	16,190	42,583	58,412	63,111	63,111	243,406
From Electric Savings	4,151	7,597	9,621	9,782	9,782	40,933

1.5.5 Job Creation

Investing in cost-effective energy efficiency creates jobs in two ways, one direct and the other indirect, as discussed in a 2012 white paper from the ACEEE.¹⁰ Direct job creation results from hiring related to implementing the programs. Indirect job creation results from the substitution of capital spent on natural gas with capital spent in the local economy. Several times more jobs are created by the indirect or income effect from cost-effective energy efficiency investment. Further, the net economic benefits from efficiency investment

¹⁰ "Energy Efficiency Job Creation: Real World Experiences" Bell, Casey J. American Council for an Energy-Efficiency Economy. October 2012.

reduce household and business gas bills and raise household disposable incomes and business profitability. Customers will tend to spend most of this additional money and save the rest. This additional spending creates a “multiplier” effect through the cycle of re-spending of the initial cost savings, which stimulates aggregate demand for goods and services. Satisfying increased demand for goods and services requires more labor. While some of the jobs created leak into the broader U.S. and global economy, a good portion (possibly higher than 80%) of jobs created due to energy efficiency stay within the Commonwealth. The approach of looking at net job creation through both direct means and with economic multiplier effects is endorsed in the 2012 white paper from ACEEE.¹¹

The number of jobs created from investments in energy efficiency directly relates to the total resource value of the energy that these measures save. Studies of employment impacts of Demand Side Management (“DSM”) use energy savings as a surrogate for total resource value. A recent meta-study of U.S. data found that estimates for the number of jobs created had a wide range, but that most studies estimate that between 30 and 60 net jobs are created by saving one TBtu.¹² In New York, New Jersey, and Pennsylvania, the ACEEE projected that 164,320 jobs, or 59 for every TBtu saved, could be attributed to EE in 1997 through 2010.¹³

As shown in the following table, UGI PNG estimates that its gas energy efficiency programs portfolio will generate between 125 and 208 net additional jobs over the lifetime of the efficiency measures installed over the next five-years. This range is based on assuming that each TBtu of gas savings creates between 30 and 50 full-time equivalent jobs in Pennsylvania.

¹¹ Energy Efficiency Job Creation: Real World Experiences” Bell, Casey J. American Council for an Energy-Efficiency Economy. October 2012.

¹² Laitner, Skip, and Vanessa McKinney. June 2008. *Positive Returns: State Energy Efficiency Analyses Can Inform U.S. Energy Policy Assessments*. Washington, D.C.: American Council for an Energy Efficiency Economy.

¹³ Nadel, Steven, Skip Laitner, Marshall Goldberg, Neal Elliott, John DeCicco, Howard Geller, and Robert Mowris. 1997. *Energy Efficiency and Economic Development in New York, New Jersey, and Pennsylvania*. Washington, D.C.: American Council for an Energy Efficiency Economy.

Table 8. Estimated Job Creation due to Energy Efficiency Programs

	30 Jobs/TBtu	40 Jobs/TBtu	50 Jobs/TBtu
Residential Sector			
FY 2018	7	9	12
FY 2019	17	22	28
FY 2020	21	28	35
FY 2021	22	29	37
FY 2022	22	29	37
TOTAL	89	119	148
Nonresidential Sector			
FY 2018	1	2	2
FY 2019	5	7	9
FY 2020	9	12	15
FY 2021	10	14	17
FY 2022	10	14	17
TOTAL	36	48	60
Total Portfolio			
FY 2018	8	11	14
FY 2019	22	29	36
FY 2020	30	40	50
FY 2021	32	43	54
FY 2022	32	43	54
TOTAL	125	166	208

1.6 Efficiency Program Costs

The following table provides an overview of the spending by year and by sector on energy efficiency (EE) programs. The EE programs will cost approximately \$2.8 million per year over the five year life of the EE&C Plan. The most spent in a single year is the penultimate year, FY 2021, with an approximate \$3.5 million budget, which is approximately 1.7% of UGI PNG’s FY 2017 budgeted revenue. This level is similar to the cap that Act 129 imposes on electric efficiency programs in Pennsylvania.¹⁴

Table 9. Projected Efficiency Portfolio by Budgets by Sector

Sector	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 - '22
Nominal	\$1,447,250	\$2,553,200	\$3,158,000	\$3,455,800	\$3,405,800	\$14,020,050
Residential (R/RT)	\$1,224,247	\$2,036,343	\$2,414,925	\$2,530,654	\$2,509,129	\$10,715,297
Nonresidential (N/NT)	\$223,003	\$516,857	\$743,075	\$925,146	\$896,671	\$3,304,753

¹⁴ See 66 Pa.C.S. § 2806.1(g) (limiting the total cost of an EDC’s EE&C Plan to 2% of the EDC’s total annual revenue as of December 31, 2006).

The following table shows the projected efficiency budgets by program.

Table 10. Projected Efficiency Portfolio Budgets by Program

Program	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 - '22
EE Total	\$1,447,250	\$2,553,200	\$3,158,000	\$3,455,800	\$3,405,800	\$14,020,050
Residential Prescriptive (RP)	650,000	1,045,000	1,287,000	1,298,000	1,273,000	5,553,000
Nonresidential Prescriptive (NP)	155,450	234,000	380,100	422,700	407,700	1,599,950
Residential Retrofit (RR)	100,000	400,500	519,000	569,400	569,400	2,158,300
Nonresidential Retrofit (NR)	25,000	151,300	190,600	271,900	261,900	900,700
New Construction (NC)	61,800	142,400	181,300	253,800	243,800	883,100
Behavior and Education (BE)	-	260,000	270,000	270,000	270,000	1,070,000
Portfolio-wide Costs	455,000	320,000	330,000	370,000	380,000	1,855,000

The portfolio-wide cost lines from the previous table are costs that apply to all programs in the EE portfolio. They are costs incurred at the portfolio level for program development, design, tracking, reporting, and administrative overhead. Development costs for the portfolio occur in the first year as programs are designed and reporting infrastructure is put in place. Costs then fall sharply in the second year before climbing as the portfolio grows. In the final year, the portfolio wide costs represent 11% of the portfolio total cost; however, over the five-year period they represent 13% of the portfolio's costs. The following table provides a portfolio-level look at costs by category.

Table 11. Projected Efficiency Portfolio Budgets by Category

Program	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 - '22
EE Total	\$1,447,250	\$2,553,200	\$3,158,000	\$3,455,800	\$3,405,800	\$14,020,050
Customer Incentives	588,250	1,703,200	2,256,000	2,424,800	2,424,800	9,397,050
Administration	668,000	571,000	619,000	694,000	704,000	3,256,000
Marketing	166,000	170,000	156,000	164,000	164,000	820,000
Inspections	25,000	59,000	82,000	93,000	93,000	352,000
Evaluation	-	50,000	45,000	80,000	20,000	195,000

1.7 CHP Program Benefits and Costs

The following table provides the net primary energy savings installed annually for the CHP Program.

Table 12. Projected Net Primary Energy Savings from CHP (MMBtus)

Savings	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 - '22
First Year Savings	169,855	169,855	169,855	169,855	169,855	849,276
Lifetime Savings	2,547,828	2,547,828	2,547,828	2,547,828	2,547,828	12,739,141

The following table provides the net CO₂ emission reductions due to the CHP Program.

Table 13. Net CO₂ Emission Reductions due to CHP (Short Tons)

Savings	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 - '22
Incremental Annual	17,155	17,155	17,155	17,155	17,155	85,776
Cumulative	17,155	34,310	51,466	68,621	85,776	85,776

The following table provides the annual projected budget for the CHP Program in nominal and real 2015 dollars.

Table 14. Projected CHP Program Budgets

Spending	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 - '22
Nominal	\$282,500	\$282,500	\$282,500	\$282,500	\$282,500	\$1,412,500

The following table provides the combined budgets for the EE Programs and CHP Program by category for FY 2018, which is used as the reference year in UGI PNG's base rate case filing.

Table 15. Reference Year (FY 2018) Budget by Category and Sector

<u>Program Category</u>	<u>R/RT</u>	<u>N/NT</u>	<u>DS</u>	<u>LFD</u>	<u>Total</u>
Customer Incentives	\$524,800	\$63,450	\$150,000	\$100,000	\$838,250
Administration	\$566,532	\$101,468	\$6,000	\$4,000	\$678,000
Marketing	\$114,915	\$51,085	\$9,000	\$6,000	\$181,000
Inspections	\$18,000	\$7,000	\$1,500	\$1,000	\$27,500
Evaluation	\$-	\$-	\$3,000	\$2,000	\$5,000
Total Expenses	\$1,224,247	\$223,003	\$169,500	\$113,000	\$1,729,750

1.8 Cost-Effectiveness Analysis

The following table provides cost-effectiveness projections for the EE&C Portfolio using the TRC Test, which is the primary metric by which UGI PNG evaluates the EE&C Plan.

Table 16. TRC Cost-effectiveness Summary of EE&C Portfolio (2016\$)

Program	Total Resource PV Benefits	Total Resource PV Costs	Total Resource PV Net Benefits	Total Resource BCR
EE&C Total	\$71,094,222	\$55,274,321	\$15,819,902	1.29
EE Programs	\$23,414,005	\$16,260,533	\$7,153,472	1.44
Residential Prescriptive (RP)	12,631,980	8,073,598	4,558,382	1.56
Nonresidential Prescriptive (NP)	3,757,509	2,157,716	1,599,793	1.74
Residential Retrofit (RR)	2,732,813	2,170,980	561,833	1.26
Nonresidential Retrofit (NR)	1,652,681	954,121	698,560	1.73
New Construction (NC)	1,486,111	754,582	731,530	1.97
Behavior and Education (BE)	1,152,910	762,146	390,764	1.51
Portfolio-wide Costs	-	1,387,391	(1,387,391)	-
CHP Program	\$47,680,217	\$39,013,788	\$8,666,430	1.22

While the portfolio is cost-effective using its primary TRC Test, if the values for demand-response induced pricing effects (“DRIPE”) and internalized market prices for carbon dioxide (“CO2”) are included, the portfolio shows substantially more benefits. In particular, net benefits for CHP are \$43.0 million, more than four times the main test. Energy efficiency programs TRC net benefits go up almost two times to \$12.2 million, and the TRC BCR for the entire EE&C portfolio goes from 1.29 to 2.00.

Table 17a. TRC Cost-effectiveness Summary of EE&C Portfolio (2016\$), including DRIPE and CO2

Program	Total Resource PV Benefits	Total Resource PV Costs	Total Resource PV Net Benefits	Total Resource BCR
EE&C Total	\$110,419,999	\$55,274,329	\$55,145,671	2.00
EE Programs	\$28,437,833	\$16,260,533	\$12,177,300	1.75
Residential Prescriptive (RP)	15,806,977	8,073,598	7,733,379	1.96
Nonresidential Prescriptive (NP)	4,484,797	2,157,716	2,327,081	2.08
Residential Retrofit (RR)	3,272,041	2,170,980	1,101,061	1.51
Nonresidential Retrofit (NR)	1,904,427	954,121	950,306	2.00
New Construction (NC)	1,751,614	754,582	997,032	2.32
Behavior and Education (BE)	1,217,978	762,146	455,832	1.60
Portfolio-wide Costs	-	1,387,391	(1,387,391)	-
CHP Program	\$81,982,166	\$39,013,796	\$42,968,370	2.10

Table 17b. TRC Cost-effectiveness Summary of EE&C Portfolio (2016\$), including DRIPE without CO2

Program	Total Resource PV Benefits	Total Resource PV Costs	Total Resource PV Net Benefits	Total Resource BCR
EE&C Total	\$89,756,200	\$55,274,321	\$34,481,879	1.62
EE Programs	\$25,360,320	\$16,260,533	\$9,099,787	1.56
Residential Prescriptive (RP)	13,877,485	8,073,598	5,803,888	1.72
Nonresidential Prescriptive (NP)	4,008,883	2,157,716	1,851,167	1.86
Residential Retrofit (RR)	2,886,212	2,170,980	715,233	1.33
Nonresidential Retrofit (NR)	1,744,944	954,121	790,823	1.83
New Construction (NC)	1,571,836	754,582	817,255	2.08
Behavior and Education (BE)	1,270,958	762,146	508,812	1.67
Portfolio-wide Costs	-	1,387,391	(1,387,391)	-
CHP Program	\$64,395,880	\$39,013,788	\$25,382,093	1.65

1.8.1 Cost-Effectiveness Analysis Methodology

The cost-effectiveness results reported in the Plan followed standard industry practices for utilizing the TRC Test for cost-effectiveness. The TRC Test methodology used is the same as that used by UGI Gas in its approved EE&C Plan filing and presents results from the standpoint of the entire service territory. To calculate benefits, projected natural gas, electricity, and water savings are multiplied by avoided costs, and this stream of future values is discounted to the present. For measures that have an increase in resource usage, such as CHP projects, the increase in usage may offset some, or all, of the positive benefit derived from resource savings. The cost side of the test consists of the present value of all incremental costs incurred by participants, including net operation and maintenance costs, and the non-incentive costs incurred by the portfolio administrator. If the benefits outweigh the costs (the benefit-cost ratio is above one), then the total cost of energy services for an average customer within the territory will fall and the portfolio is considered cost-effective. Results for the Program Administrator Cost (PAC) test are also included. The PAC only includes the costs for program administration and incentives, not additional customer costs. Since UGI PNG is a natural gas utility, the benefits for the PAC test are the natural gas savings. As per paragraph 41 of the UGI Gas rate case

settlement, UGI PNG will show the results of the TRC with and without the value of DRIPE and CO2.

The analysis used a real discount rate (RDR) of 6.27%. The RDR was calculated using an assumption of a nominal discount rate (NDR) of 8.4%, based on UGI PNG's weighted average cost of capital (WACC), and an inflation rate of 2.0%. UGI PNG employed an Excel spreadsheet-based tool to calculate the cost-effectiveness of the EE&C Portfolio.

1.8.2 Avoided costs

UGI PNG developed avoided costs following the approach used in the previous UGI Gas EE&C Plan filing and by the Commission in the Act 129 proceedings. Gas costs were based on the Henry Hub forwards for 2016–2019, followed by a mix of forwards and Annual Energy Outlook values through 2025, and the Annual Energy Outlook projections thereafter. The costs of baseload, winter storage and peaking capacity were added (paralleling the inclusion of generation capacity in the electric avoided costs), along with avoidable local distribution costs, using the same method employed by the Statewide Evaluator and adopted by the PUC in the Act 129 TRC proceeding.¹⁵

Evaluation of some gas-efficiency programs and CHP also requires estimates of avoided electric costs, which were taken directly from the analysis by the Statewide Evaluator for PPL Electric Utilities Corporation, the major EDC whose service territories overlap with UGI PNG's service territory, restated to constant 2016 dollars.¹⁶ These were blended with values for UGI Utilities, Inc. – Electric Division (“UGI-ED”), whose service territory also overlaps UGI PNG's service territory, stated in Phase II of UGI-ED's Energy Efficiency and Conservation Plan, approved at Docket No. M-2015-2477174 (Order entered June 9, 2016). Both the electric and gas avoided costs reflect the benefits of

¹⁵ See *2016 Total Resource Cost (TRC) Test*, Docket No. M-2015-2468992 (Order entered June 22, 2015).

¹⁶ Act 129 SWE Distributed Generation Potential Study, Docket No. M-2014-2424864 (February 13, 2015).

reduced supply prices and emissions. A table showing the annual values for gas and electric avoided costs is included in Appendix 3.1.

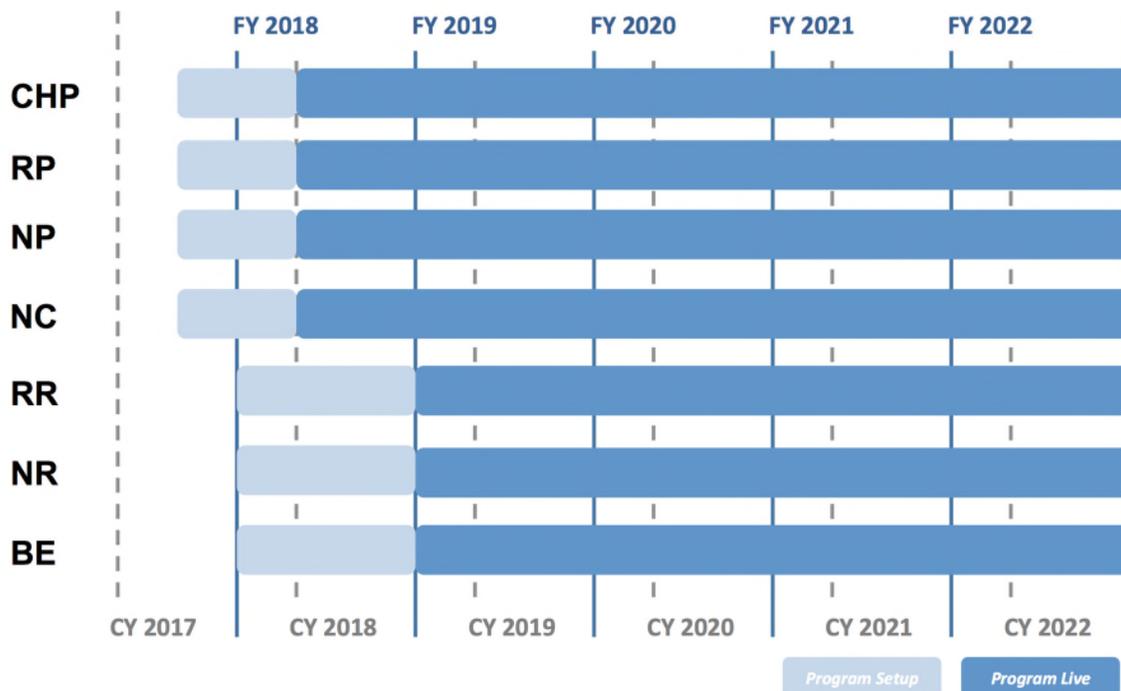
UGI PNG plans to use these avoided costs for the full five-year plan. However, future market volatility or a change in the regulatory environment may require that UGI PNG update some or all of the avoided costs. If so, UGI PNG will file an updated avoided cost document which includes details on the changes to avoided costs, establishes an effective date for the application of new avoided costs, and provides updated cost-effectiveness projections.

1.9 Implementation

1.9.1 Program Staging

The staging of the EE&C Portfolio is dependent on the approval of the Plan, which is anticipated to occur in mid-2017. Each program will require a setup period during which services are contracted through a competitive bidding process, protocols are put in place, reporting systems are established, and marketing initiatives are finalized before the program is officially launched and open for participation. It is anticipated that this process will be simplified and that the time required shortened by working with the infrastructure set up for the UGI Gas EE&C Plan. Once launched, each program will ramp up for three or four years before reaching full participation levels. Figure 2 provides a high-level overview of the planning and launching of each program in the portfolio.

Figure 2. Overview of Program Staging



Once the Plan has been approved, the initial focus will be on rolling out the lost-opportunity energy efficiency programs, with anticipated launch dates in January of 2018. These programs will largely be extensions of programs that will be operating in the UGI Gas territory and should be able to be rolled out relatively quickly. The CHP Program will be opened to UGI PNG customers as early as practical to account for the very long lead times required for CHP projects.

The RR and NR Programs require a longer setup phase since the programs are more complex than the two prescriptive rebate programs. The RR and NR Programs are anticipated to launch in October of 2018 and will benefit from the infrastructure developed internally from the launch of the same programs within the UGI Gas territory. However, they will still require extensive work to develop resources in the UGI PNG territory.

The BE program also is anticipated to start in October of 2018, in coordination with the BE program for UGI Gas and the Company's planned upgrades to its customer information systems. After all programs are launched,

they will continue to ramp up until the Plan reaches its maximum funding levels in FY 2021. Additional details on each program's staging can be found in the individual program description.

1.9.2 Marketing

The EE&C Plan has a two-pronged marketing approach consisting of raising general customer awareness through a campaign around a cohesive portfolio brand, combined with targeted outreach and strategic partnerships with community based organizations and trade allies. Marketing efforts will be coordinated at the program level to leverage opportunities for multiple programs at the same time and to focus on opportunities tailored to the customer, regardless of which program incentives will ultimately be offered.

A. General Awareness and Branding

UGI PNG will leverage much of the existing marketing infrastructure already established within the Save Smart EE&C Plan branding currently being utilized by UGI Gas and UGI Electric. This will create cost-effective and consistent messaging regarding UGI PNG's efficiency and conservation efforts and should translate into higher engagement levels and more customer participation. The general awareness campaign will be the top of the sales funnel, driving customers to more targeted opportunities (providing the "push"). The central component of the campaign will be a branded micro-website for the portfolio. To do this, the campaign will utilize many approaches including, but not limited to, print, radio, billboards, online ads, social media, bill inserts, trade ally outreach and residential canvassing efforts. Once a customer reaches the website, he or she will be funneled towards appropriate programs and incentives through activities and targeted links. While the website will be the center of the portfolio brand, it will be supplemented with additional marketing collateral such as flyers and application forms. These efforts are anticipated to be particularly important for driving residential sector participation.

B. Multi-family Outreach

UGI PNG will develop specific materials targeting residential multi-family customers and new multi-family residential construction, including master-metered multifamily residences. These efforts will be focus on residents, landlords, and management companies, regardless of the rate class structure of the property. In addition, efforts will be made to coordinate with the Pennsylvania Housing Alliance and the Pennsylvania Housing Finance Agency.

C. Low-income Customers

Customers who contact UGI PNG or its Conservation Service Providers with interest in participating in the EE&C Plan will be informed that they might qualify for the Low Income Usage Reduction Program (“LIURP”) if they are income qualified. Any interested customers will be referred to the UGI PNG LIURP program.

D. Targeted Outreach and Partnerships

The second prong of the marketing campaign is to engage customers through outreach efforts and strategic partnerships (providing a “pull”). These efforts are likely to be the best way to drive nonresidential participation. Successful activities involve all sectors within the community and may include such activities as:

- Partnering with local businesses and trade organizations (builders, contractors, electricians, plumbers, HVAC service providers, equipment suppliers, etc.) to familiarize them with program opportunities, energy efficiency practices and implementation requirements and to utilize them, where appropriate, as one of the program’s service delivery channels.
- Targeting equipment manufacturers, distributors, installation contractors and retailers/vendors to make sure they offer high-efficiency equipment and can make customers aware of available incentives.

- Connecting with local business organizations to provide opportunities to address their specific needs and translate them to their tenants, management, and facility operations personnel.
- Partnering with community-based organizations to develop outreach and program delivery strategies.
- Leveraging any available federal tax credits, if applicable, as well as supplemental consumer incentives (e.g., equipment manufacturers) as a means to increase consumer adoption of high efficiency heating equipment.
- Working with Act 129 electric administrators to combine marketing and delivery options and address all aspects of efficiency at the same time.

1.9.3 Administration

The UGI PNG EE&C Portfolio will be centrally managed by UGI Utilities, Inc. under the same umbrella as the UGI Gas EE&C Portfolio. This will help reduce overhead costs, streamline operations, and leverage institutional knowledge. The Plan Administrator will engage the services of various contractors to fulfill all the roles required to implement the Plan, and these implementation contractors may be the same ones as those that service the UGI Gas territory. The table below describes the main roles in the management of the EE&C Plan.

Table 18. Overview of Administration Roles

Role	Description
Plan Administrator	Primarily responsible for program and portfolio planning, management and reporting. Supervises and manages all other roles.
Implementation and Design Consultants	Provides assistance in the design and implementation of many different aspects of the portfolio, including, but not limited to, program design, reporting, marketing, and training. UGI PNG will leverage internal resources wherever possible to provide these services.

Implementation Contractor	Directly responsible for main aspects of program delivery, including but not limited to, customer engagement and retention, technical assistance, measure installation, rebate processing, program tracking, and reporting.
Third-party Inspector	Responsible for measure and project inspections separately from the implementation contractor.
Evaluator	Performs independent program and portfolio evaluations that are used to verify savings and guide future plans.

1.9.4 Reporting

UGI PNG will submit an annual report on the EE&C Plan each January, three months after the close of the program year. This report will provide information on activity for the previous year and progress towards five-year goals, including, but not limited to:

- First year and lifetime savings;
- Participation;
- Spending;
- Cost-effectiveness;
- Highlights of portfolio and program activity; and
- Updates to program delivery and design.

In order to tie savings and costs together as effectively as possible, results will be reported based on commitments made. Any measures that have been verified as installed within a program year along with any costs committed to these measures, including administration costs, will be counted for that Plan year. UGI PNG will also report on any participation by buildings with more than one unit. Likewise, as UGI Gas will do in accordance with paragraph 45 from the UGI Gas rate case settlement, UGI PNG will submit its annual report to stakeholders and discuss the report at the annual stakeholder meeting held by UGI Gas, starting after the first year of the portfolio, FY 2018, has passed.

1.9.5 Program Flexibility

To make sure that the EE&C Portfolio is able to address changing market conditions and improve service delivery as quickly as possible, UGI PNG requires flexibility in the allocation of budgets and implementation of program improvements. This plan document provides the principles and five-year goals that UGI PNG is seeking, but certain adjustments, such as providing incentives for new measures or moving budgets between years and programs, may be required to meet these goals. UGI PNG will include any such adjustments in its annual report, but does not anticipate seeking initial approval for such updates. However, UGI PNG will file an updated EE&C Plan in anticipation of material changes that may have a serious effect on five-year goals, such as:

- The addition or removal of a program;
- A need for total funding levels above those approved for the five-year period; and
- Significant changes to cost-effectiveness projections, such as an update to avoided costs or a large reduction in portfolio spending projections.

1.10 Evaluation, Measurement, and Verification

UGI PNG will monitor the ongoing progress of the EE&C Plan to provide the highest possible service to customers, while maintaining rigorous processes and controls to ensure that savings and costs are being properly accounted for. UGI PNG will closely track program data, perform independent inspections of completed projects, and perform periodic evaluations for all the programs.

1.10.1 Technical Reference Manual

To maintain consistency with existing gas efficiency programs in Pennsylvania, UGI PNG will utilize the same Technical Reference Manual (“TRM”) as the one used by the UGI Gas EE&C Portfolio. The TRM will calibrate certain measure assumptions to UGI PNG’s service territory (such as equivalent full load heating hours). Any results from program evaluations that affect deemed savings calculations will also be added to the TRM, and any future

updates to the TRM are expected to be done in concert with the UGI Gas EE&C Portfolio.

1.10.2 Tracking System

UGI PNG will require that Conservation Service Providers (“CSPs”) collect all relevant customer, application, measure, and contractor information and that this data is provided to UGI PNG in a timely fashion. UGI PNG will in turn maintain a program and portfolio-level aggregation of this information to be used for program management and assessment, as well as for annual reporting.

1.10.3 Third-party inspections

Each program will have a third-party inspector, separate from the contractor that performed the work, who will solicit customer feedback and will examine whether the work was done properly and whether the installed measures match the application data. Inspections for large, complex, and custom projects will be mandatory. Inspections rates for prescriptive programs will be designed to gather a statistically significant sample of program activity. See individual program plans for additional details.

1.10.4 Evaluations

With the exception of the BE (Behavior and Education) program, UGI PNG will evaluate each of its programs once adequate participation levels have been reached and a full 12 months of post-participation billing data has been collected. The program will be evaluated again after another two years have passed. Due to the unique nature of the BE program, evaluation activities will begin as soon as the program starts up and continue on an annual basis throughout the program’s existence. Efforts will be taken to combine evaluation efforts with the UGI Gas EE&C Portfolio to reduce costs and turnaround time.

As part of the initial program development, UGI PNG will work with the selected evaluator to establish the methodology and goals of the process evaluation. Initial objectives include:

- Verifying energy savings and associated costs;

- Assessing market attitudes towards the program, including contractors, customers, and efficient equipment suppliers; and
- Measuring the effectiveness of current program design, marketing, and service delivery.

The evaluation section of the individual program plans includes additional details on evaluation schedules and goals unique to that program.

2 Program Plans

2.1 Residential Prescriptive

Objective	The Residential Prescriptive (RP) program is designed to overcome market barriers to energy efficient space and water heating equipment in the residential sector through rebates and customer awareness. The objective of the program is to avoid lost opportunities by encouraging consumers to install the most efficient gas heating technologies available when replacing older, less efficient equipment. The program also aims to strengthen UGI PNG's relationship with HVAC contractors, suppliers, and other trade allies.						
Eligible Rate Class	R/RT, N/NT						
Cost Effectiveness	<i>Five-Year Cost-Effectiveness Results (2016\$)</i>						
	CE Test	PV Benefits	PV Costs	PV Net	BCR		
	TRC	\$12,631,980	\$8,073,598	\$4,558,382	1.56		
	PAC	\$11,008,792	\$4,040,601	\$6,968,190	2.72		
Savings Projections	<i>Five-Year Savings Projections</i>						
		FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 – FY '22
	Natural Gas (MMBtus)						
	First Year	12,254	21,755	27,448	27,124	27,124	115,705
	Lifetime	228,747	406,097	513,573	507,074	507,074	2,162,565
	Electric Energy (kWh)						
First Year	252,674	448,189	562,506	562,506	562,506	2,388,382	
Lifetime	4,906,833	8,703,243	10,924,089	10,924,089	10,924,089	46,382,345	

	Peak (kW)	55.7	98.7	123.9	123.9	123.9	526.1
	Water (Gallons)						
	First Year	-	-	-	-	-	-
	Lifetime	-	-	-	-	-	-
Budget Projections	<i>Five-Year Budgets (Nominal)</i>						
	Category	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 – FY '22
	Customer Incentives	\$518,000	\$919,000	\$1,165,000	\$1,151,000	\$1,151,000	\$4,904,000
	Administration	56,000	39,000	44,000	44,000	44,000	227,000
	Marketing	59,000	36,000	40,000	40,000	40,000	215,000
	Inspections	17,000	31,000	38,000	38,000	38,000	162,000
	Evaluation	-	20,000	-	25,000	-	45,000
Total	\$650,000	\$1,045,000	\$1,287,000	\$1,298,000	\$1,273,000	\$5,553,000	
Participation Projections	<i>Five-Year Participation Projections</i>						
		FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 – FY '22
	Furnace - ENERGY STAR	530	940	1,180	1,180	1,180	5,010
	Boiler - 94+ AFUE	40	80	100	100	100	420
	Combi Boiler - 94+ CAE	10	10	20	20	20	80
	Wi-Fi Thermostat	1,030	1,830	2,290	2,290	2,290	9,730
	Tankless Water Heater - ENERGY STAR	180	320	400	365	365	1,630
Total	1,790	3,180	3,990	3,955	3,955	16,870	
Program Rollout	<i>June 2017</i>	– Finalize program process and implementation details, select vendors, and					
	<i>December 2017</i>	develop initial marketing push.					
	<i>January 2018</i>	Launch Program.					
	<i>FY 2019 - FY 2020</i>	Continue engagement activities with customers and trade allies.					
	<i>FY 2020</i>	Reach full participation levels.					

<p>Program Design</p>	<p>The RP program follows the same design as the UGI Gas program of the same name, including the same list of qualified measures and incentive levels.</p> <p>The RP program offers mail-in rebates for qualifying residential-sized space and water heating equipment. Customers will be made aware of opportunities through traditional marketing efforts, such as bill inserts and media advertisements, as well as from installation contractors. For most measures, customers will have a contractor install the measure and receive a cash rebate to offset most of the incremental cost of the higher efficiency equipment. Smaller measures, such as Wi-Fi enabled thermostats, will only require a valid proof of purchase before a cash rebate is issued.</p> <p>UGI PNG will continue to examine other equipment for potential inclusion in the program, as well as the relative market adoption of equipment already receiving incentives. Any new equipment added to the program will have a TRC BCR above 1.0.</p> <p>If program funds begin to run low in a given year, incentive levels may be lowered or equipment removed from the program if additional budget adjustments cannot be made. UGI PNG will aim to provide as little interruption to customers as possible due to such adjustments.</p>
<p>Target Market and End Uses</p>	<p>The RP targets residential consumers who use natural gas to heat their homes and/or generate hot water. In general, the program aims to incentivize only the highest levels of efficient equipment on the market. The minimum level of efficiency for measures offered through the RP program will be ENERGY STAR®, when available, and in some cases may exceed ENERGY STAR®.</p> <p>On the space heating side, the program provides incentives for Wi-Fi enabled thermostats,</p>

	<p>ENERGY STAR® labeled furnaces, high efficiency boilers, and combination boilers. Wi-Fi enabled thermostats offer the potential for deeper savings than traditional programmable thermostats due to the wide range of features and feedback they offer. ENERGY STAR® requirements for furnaces drive customers toward the highest efficiency tier of condensing units (95+ AFUE) and also require efficient fans that save electricity. The program would also require boilers to go towards the highest efficiency tier with an AFUE of at least 94. Finally, offering incentives for combination space and water heating boilers addresses two types of end-use with one piece of equipment. These “combi boilers” also address issues with orphaned water heaters having existing atmospheric venting systems that are no longer adequate, when switching to condensing heating equipment. The program also addresses water heating by offering incentives for ENERGY STAR® tankless water heaters.</p>															
<p>Financial Incentives</p>	<p>Incentives were designed to be in line with other offerings in the region and/or cover approximately two-thirds of the incremental cost of the measure. The table below lists the proposed incentive schedule.</p> <p><i>Proposed Residential Prescriptive Program Rebates (Nominal)</i></p> <table border="1"> <thead> <tr> <th>Equipment</th> <th>Minimum Efficiency</th> <th>Proposed Incentive</th> </tr> </thead> <tbody> <tr> <td>Wi-Fi Thermostat</td> <td>N/A</td> <td>\$100</td> </tr> <tr> <td>Tankless Water Heater</td> <td>ENERGY STAR®</td> <td>\$400</td> </tr> <tr> <td>Furnace</td> <td>ENERGY STAR®</td> <td>\$500</td> </tr> <tr> <td>Boiler</td> <td>94+ AFUE</td> <td>\$1,500</td> </tr> </tbody> </table>	Equipment	Minimum Efficiency	Proposed Incentive	Wi-Fi Thermostat	N/A	\$100	Tankless Water Heater	ENERGY STAR®	\$400	Furnace	ENERGY STAR®	\$500	Boiler	94+ AFUE	\$1,500
Equipment	Minimum Efficiency	Proposed Incentive														
Wi-Fi Thermostat	N/A	\$100														
Tankless Water Heater	ENERGY STAR®	\$400														
Furnace	ENERGY STAR®	\$500														
Boiler	94+ AFUE	\$1,500														

	<p>obtain a statistically significant sample of activity. The inspection will consist of verifying that the rebated equipment is installed and operational and conclude with a short informational interview with the participant.</p> <p><u>Evaluations</u></p> <p>The program is expected to have enough activity to allow for an impact evaluation to start at the end of FY 2018 with a second evaluation scheduled for FY 2021, synching up with the evaluation for the same UGI Gas program. The initial evaluation will have a particular focus on Wi-Fi thermostats to determine the best way to utilize them as a measure.</p> <p>The RP evaluations will also include feedback from installation contractors and supply houses about current market conditions, such as availability and adoption of high efficiency technology, and awareness of the program.</p>
<p>Program Administration</p>	<p><u>Rebate Processing</u></p> <p>The rebate processor will accept customer applications, track and verify application information, notify the customer of any issues, maintain a call center, and report results to UGI PNG. UGI PNG will utilize the same contractor as UGI Gas for this program in order to streamline implementation and administration of the two RP programs.</p> <p><u>Marketing and Outreach</u></p> <p>The main marketing and outreach contractor in combination with the UGI PNG internal marketing</p>

	<p>team will handle marketing and outreach for the RP program.</p> <p><u>Inspector</u></p> <p>A separate contractor from the one installing any equipment will perform on-site inspections and collect customer feedback, and is expected to be the same as that utilized by UGI Gas in order to standardize inspection workflows and data collection.</p> <p><u>Evaluator</u></p> <p>A third-party evaluator will be retained to perform regular evaluations.</p>
<p>Special Notes</p>	<p>The program is currently designed so that a cash rebate will be offered for Wi-Fi thermostats. If initial evaluation, and participant and trade ally feedback are positive, UGI PNG will move towards offering upstream incentives for this technology. This could result in much higher levels of participation, but would have a lower impact on budgets due to the size of the incentive offered. In addition, there does not currently exist an ENERGY STAR® specification for Wi-Fi thermostats, but the process for determining one is underway.¹⁷ When ENERGY STAR® does finalize such standards, the program will require that they be met for eligible thermostats going forwards.</p> <p>A key risk factor for the program is a changing baseline for furnaces in the Northern United States. There is a possibility that new federal standards and/or a general market shift towards condensing furnaces may necessitate a higher baseline for high efficiency furnaces. While the current efficient</p>

¹⁷ https://www.energystar.gov/products/spec/connected_thermostats_specification_v1_0_pd

	condition for natural gas furnaces would still exceed an anticipated baseline shift, savings and incentive levels would be adjusted downwards and savings and/or spending goals may need to be adjusted accordingly.
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2.2 Nonresidential Prescriptive

Objective	The Nonresidential Prescriptive (NP) Program is designed to overcome market barriers to energy efficient equipment in the small business and commercial sector through rebates and customer outreach. The objective of the program is to encourage business owners to install the most efficient gas heating and process technologies available to replace older, less efficient equipment. The program also aims to strengthen UGI PNG's relationship with HVAC contractors, suppliers, and other trade allies.						
Eligible Rate Class	R/RT, N/NT						
Cost Effectiveness	<i>Five-Year Cost-Effectiveness Results (2016\$)</i>						
	CE Test	PV Benefits	PV Costs	PV Net	BCR		
	TRC	\$3,757,509	\$2,157,716	\$1,599,793	1.74		
PAC	\$3,457,639	\$1,148,606	\$2,309,034	3.01			
Savings Projections	<i>Five-Year Savings Projections</i>						
		FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 – FY '22
	Natural Gas (MMBtus)						
	First Year	2,771	6,952	12,232	12,801	12,801	47,558
	Lifetime	45,416	114,792	200,925	209,458	209,458	780,050
	Electric Energy (kWh)						
	First Year	-	-	-	-	-	-
	Lifetime	-	-	-	-	-	-
Peak (kW)							
First Year	-	-	-	-	-	-	
Lifetime	-	-	-	-	-	-	
Water (Gallons)							
First Year	635,645	1,495,655	2,517,725	2,517,725	2,517,725	9,684,475	
Lifetime	3,813,870	8,973,930	15,106,350	15,106,350	15,106,350	58,106,850	

Budget Projections	Five-Year Budgets (Nominal)						
	Category	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 – FY '22
	Customer Incentives	\$63,450	\$174,000	\$321,100	\$346,700	\$346,700	\$1,251,950
	Administration	45,000	21,000	22,000	22,000	22,000	132,000
	Marketing	40,000	16,000	16,000	16,000	16,000	104,000
	Inspections	7,000	13,000	21,000	23,000	23,000	87,000
	Evaluation	-	10,000	-	15,000	-	25,000
Total	\$155,450	\$234,000	\$380,100	\$422,700	\$407,700	\$1,599,950	
Participation Projections	Five-Year Participation Projections						
		FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 – FY '22
	C&I Custom Rebate	3	10	21	24	24	83
	Commercial Boiler - 85+ Et	8	17	29	29	29	112
	Commercial Boiler - 90+ Et	2	6	9	9	9	35
	Unit Heater (Warm Air)	21	51	85	85	85	327
	Steam Trap (<15 PSIG)	2	5	9	9	9	34
	Steam Trap (15<= PSIG < 75)	2	5	9	9	9	34
	Steam Trap (>= PSIG)	5	11	17	17	17	67
	Commercial Water Heater	12	29	48	48	48	185
	Commercial Gas Fryer	3	6	10	10	10	39
	Commercial Gas Fryer (Large Vat)	1	2	3	3	3	12
	Commercial Gas Steam Cooker	1	1	2	2	2	8
	WaterSense Pre-Rinse Spray Valve	5	9	15	15	15	59
	Total	65	152	257	260	260	995
Program Rollout	<i>June 2017</i> – Finalize program process and implementations details, select vendors, and develop initial marketing push.						
	<i>December 2017</i>						
	<i>January 2018</i> Launch Program.						
<i>FY 2019 - FY 2020</i> Continue engagement activities with customers and trade allies.							

	<i>FY 2021</i> Reach full program participation.
Program Design	<p>The RP program follows the same design as the UGI Gas program of the same name, including the same list of qualified measures and incentive levels.</p> <p>The NP program offers rebates for qualifying commercial-sized space heating, water heating, commercial kitchen, and custom applications. Customers will be made aware of opportunities through traditional marketing efforts, such as bill inserts and media advertisements, installation contractors, and supply houses. Customers will have a contractor install the measure and receive a cash rebate to offset most of the incremental cost of the higher efficiency equipment. Given the anticipated enrollment numbers, a comprehensive (multi-measure) prescriptive rebate form is a good choice for documenting and reporting measures to UGI PNG managers.</p> <p>UGI PNG will continue to examine other equipment for potential inclusion in the program, as well as the relative market adoption of equipment already receiving incentives. Any new equipment added to the program will have a TRC BCR above 1.0.</p> <p>If program funds begin to run low in a given year, incentive levels may be lowered or equipment removed from the program if additional budget adjustments cannot be made. UGI PNG will aim to provide as little interruption to customers as possible due to such adjustments.</p>
Target Market and End Uses	<p>The NP program will serve the small business and commercial market such as office buildings, restaurants, and agricultural facilities, and will target three main end-uses. The first and largest end-use targeted is space heating, through commercial boilers, unit heaters, and steam traps. The</p>

	<p>second target end-use is commercial water heaters. The last end-use is for addressing both cooking and hot water heating through gas fryers, steam cookers, and pre-rinse spray valves.</p> <p>The program also offers a custom application track for single-measure projects that are not already covered by prescriptive rebates. The custom track is expected to cover technology like heat-recovery systems, infrared heaters, controls, range-hood ventilation make-up air systems, and other more site-specific applications. The custom track will be a source for potential technologies to include as prescriptive rebates.</p>																														
<p>Financial Incentives</p>	<p>Incentives were designed to be in line with the UGI Gas program of the same name. The table below lists the proposed incentive schedule.</p> <p><i>Proposed Nonresidential Prescriptive Program Rebates (Nominal)</i></p> <table border="1"> <thead> <tr> <th>Equipment</th> <th>Minimum Efficiency</th> <th>Proposed Incentive</th> </tr> </thead> <tbody> <tr> <td>Commercial Boiler (>= 300MBh)</td> <td>85+ Et</td> <td>\$2 / MBh</td> </tr> <tr> <td>Commercial Boiler (>= 300MBh)</td> <td>90+ Et</td> <td>\$2 / MBh + \$2,000</td> </tr> <tr> <td>Unit Heater (Warm Air)</td> <td>90+ Et/AFUE</td> <td>\$2 MBh</td> </tr> <tr> <td>Steam Trap</td> <td><15 PSIG</td> <td>\$50</td> </tr> <tr> <td>Steam Trap</td> <td>15<= PSIG <75</td> <td>\$150</td> </tr> <tr> <td>Steam Trap</td> <td>>= 75 PSIG</td> <td>\$250</td> </tr> <tr> <td>Commercial Water Heater</td> <td>ENERGY STAR®</td> <td>\$4 / MBh</td> </tr> <tr> <td>Commercial Fryer</td> <td>ENERGY STAR®</td> <td>\$1,400</td> </tr> <tr> <td>Commercial Fryer (Large)</td> <td>ENERGY STAR®</td> <td>\$1,900</td> </tr> </tbody> </table>	Equipment	Minimum Efficiency	Proposed Incentive	Commercial Boiler (>= 300MBh)	85+ Et	\$2 / MBh	Commercial Boiler (>= 300MBh)	90+ Et	\$2 / MBh + \$2,000	Unit Heater (Warm Air)	90+ Et/AFUE	\$2 MBh	Steam Trap	<15 PSIG	\$50	Steam Trap	15<= PSIG <75	\$150	Steam Trap	>= 75 PSIG	\$250	Commercial Water Heater	ENERGY STAR®	\$4 / MBh	Commercial Fryer	ENERGY STAR®	\$1,400	Commercial Fryer (Large)	ENERGY STAR®	\$1,900
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	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Commercial Steam Cooker</td> <td style="width: 30%;">ENERGY STAR®</td> <td style="width: 20%; text-align: right;">\$600</td> </tr> <tr> <td>Pre-Rinse Spray Valve</td> <td>WaterSense®</td> <td style="text-align: right;">\$50</td> </tr> </table> <p>An application on the custom track will be analyzed for cost-effectiveness and a custom incentive will be offered based on the internal rate of return and simple payback of the project. The incentive will not be larger than the gas benefits or incremental cost of the project, and the maximum incentive allowed for a custom project will be \$25,000.</p> <p>All equipment must be powered by natural gas.</p>	Commercial Steam Cooker	ENERGY STAR®	\$600	Pre-Rinse Spray Valve	WaterSense®	\$50
Commercial Steam Cooker	ENERGY STAR®	\$600					
Pre-Rinse Spray Valve	WaterSense®	\$50					
Marketing Approach	<p>The NP marketing approach focuses on targeted outreach to trade allies and supply houses. Outreach efforts will attempt to reach the decision maker at the time of, and in advance of, the need for equipment replacement. UGI PNG will provide regular outreach and training sessions on efficiency opportunities with HVAC contractors, heating suppliers, kitchen equipment suppliers, local business organizations, and other parties that deal with commercial equipment to provide education on opportunities for engagement with the program, hand out rebate applications, and encourage the stocking of high efficiency equipment. Good penetration rates will rely heavily on an educated contractor network to understand how to up-serve participants with more efficient products when a service call is requested or new equipment is needed. Contractor training will be provided to those already part of the existing contractor network and qualified for commercial work.</p> <p>UGI PNG also will promote the program through its branded energy efficiency website and other</p>						

	online outreach activities.
Evaluation, Measurement, and Verification	<p><u>Quality Assurance</u></p> <p>All applications will require proof of purchase and a valid UGI PNG account number. All rebates will require proof of equipment installation, including information about the installing contractor. The rebate processor will verify that the equipment is eligible for the rebate based on the model number before issuing any rebate. The program’s rebate processor will maintain a real-time database of rebate activity, which will be periodically reviewed by UGI PNG and stored separately for long-term purposes.</p> <p>A third-party inspector will perform on-site inspections on all custom rebates and approximately five percent (5%) of all prescriptive rebates in order to get a statistically significant sample of ongoing activity. The inspection will consist of verifying that the rebated equipment is installed and operational and conclude with a short informational interview with the participant.</p> <p><u>Evaluations</u></p> <p>The program is expected to have enough activity to allow for an impact evaluation to start in FY 2019 with a second evaluation scheduled for FY 2021, synching up with the evaluation for the same UGI Gas program. The initial evaluation will have a particular focus on the accuracy of heating savings for varying customer types.</p> <p>The NP evaluations will also include feedback from installation contractors and supply houses about current market conditions, such as availability and adoption of high efficiency technology,</p>

	and awareness of the program.
Program Administration	<p><u>Rebate Processing</u></p> <p>The rebate processor will accept customer applications, track and verify application information, notify the customer of any issues, maintain a call center, and report results to UGI PNG. UGI PNG will utilize the same contractor as UGI Gas for this program in order to streamline implementation and administration of the two RP programs.</p> <p><u>Marketing and Outreach</u></p> <p>The main marketing and outreach contractor in combination with the UGI PNG internal marketing team will handle marketing and outreach for the RP program.</p> <p><u>Inspector</u></p> <p>A separate contractor from the one installing any equipment will perform on-site inspections and collect customer feedback, and is expected to be the same as that utilized by UGI Gas in order to standardize inspection workflows and data collection.</p> <p><u>Evaluator</u></p> <p>A third-party evaluator will be retained to perform regular evaluations.</p>
Special Notes	<p>Due to the complex nature of the nonresidential equipment market, the exact mix of measures and adoption of different technologies is not easily predicted. While UGI PNG is confident that the projected budget levels are appropriate, the exact mix of measures may vary.</p>

	<p>To relieve busy business owners of the paperwork barrier and reduce pressure on the program's rebate processor, UGI PNG will explore batching rebates and paying them directly to contractors, with the rebate amount clearly indicated on the participant's invoice.</p>
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2.3 New Construction

Objective	<p>The New Construction (NC) Program is designed to overcome market barriers to energy efficient space and water heating equipment, as well as high efficiency thermal envelopes, in both the residential and nonresidential new construction sector through rebates offered to builders and developers, and general potential buyer awareness. The objective of the program is to avoid lost opportunities by encouraging builders and developers to install the most efficient gas heating technologies available instead of less efficient baseline equipment, as well as promote thermal envelope best practices. The program also aims to strengthen UGI PNG's relationship with architects, builders, HVAC contractors, suppliers, and other trade allies.</p>						
Eligible Rate Class	R/RT, N/NT						
Cost Effectiveness	<i>Five-Year Cost-Effectiveness Results (2016\$)</i>						
	CE Test	PV Benefits	PV Costs	PV Net	BCR		
	TRC	\$1,486,111	\$754,582	\$731,530	1.97		
PAC	\$1,419,156	\$628,453	\$790,704	2.26			
Savings Projections	<i>Five-Year Savings Projections</i>						
		FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 – FY '22
	Natural Gas (MMBtus)						
	First Year	113	2,230	3,128	4,461	4,461	14,393
	Lifetime	2,591	41,134	57,717	82,268	82,268	265,977
	Electric Energy (kWh)						
	First Year	1,910	3,410	4,870	6,820	6,820	23,830
Lifetime	1,910	3,410	4,870	6,820	6,820	23,830	
Peak (kW)	0.3	0.6	0.8	1.1	1.1	4.0	

	<p>Water (Gallons)</p> <table> <tr> <td>First Year</td> <td>-</td> <td>118,382</td> <td>165,734</td> <td>236,763</td> <td>236,763</td> <td>757,643</td> </tr> <tr> <td>Lifetime</td> <td>-</td> <td>2,130,870</td> <td>2,983,218</td> <td>4,261,741</td> <td>4,261,741</td> <td>13,637,570</td> </tr> </table>	First Year	-	118,382	165,734	236,763	236,763	757,643	Lifetime	-	2,130,870	2,983,218	4,261,741	4,261,741	13,637,570																																			
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Program Rollout	<p><i>July 2017</i> – Finalize program process and implementations details, select vendors, and develop initial marketing. Start initial engagement with builders and architects and solicit projects to begin technical assistance process. Coordinate efforts with UGI Gas’s NC Program.</p> <p><i>December 2017</i></p> <p><i>January 2018</i> Launch program.</p> <p><i>FY 2018 - FY 2021</i> Continue engagement activities with customers reaching full program participation in FY 2021.</p>																																																	
Program Design	The NC program follows the same design as the UGI Gas program of the same name and will incorporate the same levels of incentives.																																																	

Addressing efficiency when a building is first built is the cheapest and longest lasting way to change energy consumption patterns. The NC program offers incentives to builders and/or developers for going beyond building code to reduce natural gas consumption. The program targets both residential and nonresidential projects. UGI PNG will provide a technical assessment provider that will review customer applications, assess the project plans, verify that each project meets program eligibility requirements and help the customer to achieve the highest feasible and cost-effective savings.

Residential Projects

The program offers a streamlined prescriptive approach for residential new construction projects to go beyond the opportunities offered under the RP program. The NC residential track is designed to offer builders a higher incentive than they would otherwise receive from just combining RP measures. It encourages participants to go as deep as possible by addressing the space heating system, water heating system, and building envelope.

Nonresidential Projects

Each nonresidential project will require building simulation modeling showing the gas usage for a baseline building just meeting code and another model with the proposed modifications. UGI PNG will offer an incentive based on the percentage difference in gas usage between the baseline and proposed building. The technical assessment provider will provide guidance and propose revisions, which may last several iterations, to fully incorporate efficiency in to the design process.

<p>Target Market and End Uses</p>	<p>The NC program targets all new construction projects (including “gut rehab”) contemplating use of natural gas to provide space and hot water heating. For the purposes of this program, gut rehabilitation is defined as a project where the interior space of the building exposes the studs or two or more of the mechanical systems are being replaced and are required to meet current energy code standards.</p> <p>In general, the program aims to incentivize only the highest levels of efficient equipment and construction practices on the market. The NC program takes a whole-building approach, acquiring savings from multiple measures compared to a baseline building just meeting code. For single family and small multi-family buildings, measures might include thermal envelope insulation, heating equipment, and water heating equipment and fixtures. Commercial or large apartment buildings might include HVAC equipment and controls, tighter and better-designed ducts, hot water heating equipment, and thermal envelope insulation.</p>
<p>Financial Incentives</p>	<p>Residential customers will receive a lump sum incentive for achieving 20% gas savings or greater, compared to a house only meeting code. The incentive amount will be designed to cover approximately 80% of the incremental cost.</p> <p>Nonresidential customers will receive an incentive calculated from a dollar per first-year MMBtu saved, depending on what percentage savings tier it falls in. The first tier will be greater than or equal to 15% but less than 20% savings, the second tier will be greater than or equal to 20% but less than 30%, and the third tier will be greater than or equal to 30% savings.</p>

Marketing Approach	<p>The NC program will focus on tailored messages for realtors, developers, and builders (including ENERGY STAR® builders) to ensure that high efficiency options are considered when engaging in major rehab projects as well as in new construction. UGI PNG also will explore ways in which to highlight the efficiency of homes to potential buyers, including through social media.</p>
Evaluation, Measurement, and Verification	<p><u>Quality Assurance</u></p> <p>All applications will require information confirming installation and proof of UGI PNG service for heating. Inspections will be performed on 25% of residential new construction projects and all nonresidential retrofit projects before a final rebate is issued. Inspections must verify that the measures proposed for the building were installed as planned and that savings targets have been met, and must conclude with a short informational interview with the owner and/or developer. The program’s rebate processor will maintain a real-time database of rebate activity, which will be periodically reviewed by UGI PNG and stored separately for long-term purposes.</p> <p><u>Evaluations</u></p> <p>The program is expected to have enough activity to allow for an impact evaluation to start at the end of FY 2019 with a second evaluation scheduled for FY 2021.</p> <p>The NC evaluations also will include feedback from installation contractors and supply houses about current market conditions, such as availability and adoption of high efficiency technology and building practices, and awareness of the program and its efficiency tiers.</p>

<p>Program Administration</p>	<p><u>Technical Assistance and Rebate Processing</u></p> <p>UGI PNG will engage a contractor to be the main program implementation contractor. The contractor will be responsible for technical review of projects as well as assisting potential customers with including efficiency in their project design. This role will also include accepting program applications, tracking and verifying application information, notifying the applicant of any issues, maintaining a call center, and reporting results to UGI PNG.</p> <p><u>Marketing and Outreach</u></p> <p>The main marketing and outreach contractor, in combination with the UGI PNG internal marketing team, will handle marketing and outreach for the NC program.</p> <p><u>Inspector</u></p> <p>A separate contractor will perform on-site inspections and collect customer feedback. The same firm responsible for providing technical assistance may perform this role.</p> <p><u>Evaluator</u></p> <p>A third-party evaluator will be retained to perform regular evaluations.</p>
<p>Special Notes</p>	<p>The new construction market is highly cyclical and participation levels in the program will be highly influenced by broader economic trends beyond the control of UGI PNG.</p>

2.4 Residential Retrofit

Objective	The Residential Retrofit (RR) Program is designed to overcome market barriers to energy efficiency in the existing residential sector through rebates offered either to customers undergoing a retrofit project or to their installation contractor(s). The program encourages improvements to the thermal envelope of the structure, particularly reductions in building air leakage and increases in insulation levels, as well as installation of the most efficient gas heating technologies. The program also aims to strengthen UGI PNG's relationship with HVAC contractors, suppliers, and other trade allies.						
Eligible Rate Class	R/RT, N/NT						
Cost Effectiveness	<i>Five-Year Cost-Effectiveness Results (2016\$)</i>						
	CE Test	PV Benefits	PV Costs	PV Net	BCR		
	TRC	\$2,732,813	\$2,170,980	\$561,833	1.26		
PAC	\$2,602,695	\$1,538,423	\$1,064,272	1.69			
Savings Projections	<i>Five-Year Savings Projections</i>						
		FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 – FY '22
	Natural Gas (MMBtus)						
	First Year	-	4,158	5,544	6,652	6,652	23,006
	Lifetime	-	99,786	133,048	159,658	159,658	552,150
	Electric Energy (kWh)						
	First Year	-	7,514	10,019	12,023	12,023	41,579
	Lifetime	-	180,344	240,459	288,550	288,550	997,903
	Peak (kW)						
First Year	-	5.4	7.2	8.6	8.6	29.8	
Water (Gallons)							
First Year	-	195,762	261,016	313,219	313,219	1,083,217	
Lifetime	-	4,698,289	6,264,385	7,517,262	7,517,262	25,997,197	

Budget Projections	<i>Five-Year Budgets (Nominal)</i>						
	Category	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 – FY '22
	Customer Incentives	\$-	\$256,500	\$342,000	\$410,400	\$410,400	\$1,419,300
	Administration	75,000	98,000	105,000	111,000	111,000	500,000
	Marketing	25,000	42,000	42,000	42,000	42,000	193,000
	Inspections	-	4,000	5,000	6,000	6,000	21,000
	Evaluation	-	-	25,000	-	-	25,000
Total	\$100,000	\$400,500	\$519,000	\$569,400	\$569,400	\$2,158,300	
Participation Projections	<i>Five-Year Participation Projections</i>						
		FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 – FY '22
Residential Retrofit	-	150	200	240	240	830	
Program Rollout	<i>October 2017</i> – Finalize program process and implementations details, select vendors, and develop initial marketing. Start initial engagement with contractors and provide initial training in protocols and program delivery. Coordinate efforts with UGI Gas RR program.						
	<i>September 2018</i>						
	<i>October 2018</i> Launch program.						
<i>FY 2018 - FY 2021</i> Continue engagement activities with customers, reaching full participation in FY 2021.							
Program Design	<p>The RR program follows the same design as the UGI Gas RR and will incorporate the same levels of incentives.</p> <p>The RR program offers incentives to customers retrofitting or weatherizing their homes by installing qualifying residential-sized space and water heating equipment, programmable thermostats (including Wi-Fi enabled), and making thermal envelope improvements through use of approved</p>						

	<p>contractors who may also receive an incentive to encourage comprehensiveness.</p> <p>Customers must have an in-home audit performed that includes a blower-door test. After the audit, the customer receives a list of recommended efficiency measures. The customer has a contractor perform the recommended measures, after which he or she receives an incentive. Audits and thermal envelope improvements must be made by a contractor previously selected by the program as meeting program standards for high quality and technical performance.</p> <p>The rebate will be given to the customer upon submission of suitable documentation. Thermal envelope improvement rebates will require submittal of pre-post blower door measurements to document leakage rate reductions, and pre-post R-values, along with affected square footage, to document insulation improvements.</p> <p>Program participation levels will dictate allocation of funds from year to year, as well as the incentive levels offered. Initially, both participating customers and contractors each will be given an incentive based on first-year MMBtu projected savings. UGI PNG will aim to provide as little interruption as possible to the general community due to any program adjustments made to accommodate market conditions.</p>
<p>Target Market and End Uses</p>	<p>The RR program targets all residential homes that can benefit from improved space and water heating efficiency by encouraging a whole house approach to consider the full implications of specific measures to the overall performance of the house. The program aims to incentivize only the highest levels of efficient equipment on the market and the overall reduction in gas usage,</p>

	<p>including the interactive effects of equipment efficiency and thermal envelope improvements.</p> <p>On the space and water heating side, the program effectively ties in closely with the RP program measures to provide incentives for installing such equipment as Wi-Fi enabled thermostats, ENERGY STAR® labeled furnaces, high efficiency boilers, and combination boilers as part of the home retrofit package. To qualify for even the lowest incentive tier, customers are guided toward the highest efficiency units (95+ AFUE) as well as envelope improvements. The highest incentive tier requires both the customer and the contractor to aggressively embrace the whole-house approach.</p>
<p>Financial Incentives</p>	<p>Incentives are designed to be in line with other offerings in the region and/or other companion programs in the UGI PNG portfolio such as the RP program. UGI PNG anticipates an incentive of approximately \$60 per first year MMBtu savings for eligible projects. This incentive is designed to offset most of the incremental cost of the higher efficiency equipment and to provide a significant contribution to the cost of qualifying thermal envelope improvements.</p>
<p>Marketing Approach</p>	<p>Customers will be made aware of the RR program through the general media and bill inserts, as well as through equipment distributors, HVAC and plumbing contractors, and others in a position to affect equipment installation and thermal envelope improvement choices.</p> <p>The contractor network will play a large role in generating program leads. Approved program contractors will be encouraged to do their own marketing to enlist high quality leads for promoting high lead conversion rates, and to up-serve comprehensive retrofit packages qualifying for the</p>

	<p>highest incentive tier(s). They will be supported in these efforts through training and the development of co-branding materials that the contractor can use to promote the program.</p> <p>UGI PNG also anticipates identifying qualified leads through an online audit tool. The tool will help homeowners identify opportunities for saving energy and put them in contact with a qualified contractor. Customers that have particularly large savings opportunities may be offered further rebates.</p>
<p>Evaluation, Measurement, and Verification</p>	<p><u>Quality Assurance</u></p> <p>A contractor approved by UGI PNG will supervise all audits and installation work. Requirements will be the same as for UGI Gas’s RR program, and it is anticipated that an “approved contractor” will be required to possess Gold Star Contractor certification from the Building Performance Institute (BPI) to ensure quality business practices. Approved contractors must employ site technicians and site supervisors with BPI professional certifications appropriate to their duties. The approved contractor also must be trained in program protocols, and the contractor’s first three projects will require confirmation of quality installation by an approved third party before moving from probationary status to becoming fully approved. Subsequent contractor work will be sampled up to 10% of projects submitted. Program infraction penalties can range from a return to probationary status to being removed from the program. In the event of a significant customer complaint, which has been verified, or failure of an inspection, contractors must provide satisfactory resolution within 15 business days or face termination from program participation or reversion to</p>

probationary status, depending on the severity of the infraction or the continuation of relatively minor infractions. An initially approved contractor may be barred from program participation upon documentation that the contractor has not met program requirements even when given the opportunity to correct failings consistent with the probationary process.

Rebate Processing

The rebate processor must verify that the contractor is eligible to participate in the program and that any issues brought to the program's attention either by a customer or by the third-party inspector has been resolved. The program's rebate processor will maintain a real-time database of program activity, including such metrics as leads and lead source, which will be periodically reviewed by UGI PNG and stored separately for long-term purposes.

Inspections must verify that the project meets the requirements for incentive level offered by the contractor to the customer.

Evaluations

The program is expected to have enough activity to allow for an impact evaluation in FY 2020, in concert with the UGI Gas RR program.

The RR program evaluations will also include feedback from installation contractors, participating customers and supply houses about current market conditions, such as availability and adoption of high efficiency technology, barriers to participation and awareness of the program.

<p>Program Administration</p>	<p><u>Contractor Network</u></p> <p>UGI PNG will put in place an approved contractor network that will perform energy audits, natural gas retrofit projects, and submit project and incentive application information to the program manager. This will be an extension of a similar contractor network that will be developed for UGI Gas.</p> <p><u>Program Manager</u></p> <p>UGI PNG will engage a program manager to oversee the contractor network, accept program applications, track and verify application information, communicate with customers if necessary, and report results to UGI PNG.</p> <p><u>Marketing and Outreach</u></p> <p>The main marketing and outreach contractor, program administrator, and contractor network will be responsible for the marketing and outreach of the RR program.</p> <p><u>Inspector</u></p> <p>A separate contractor will perform on-site inspections and collect customer feedback. The inspector may also spend a portion of their time directed towards onsite mentoring for contractors. The program manager may perform the inspection role.</p> <p><u>Evaluator</u></p>
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	A third-party evaluator will be retained to perform regular evaluations.
Special Notes	<p>UGI PNG will explore ways in which to encourage contractors to go after deeper savings. This may include setting aside a portion of incentives to go directly towards contractors in the form of a performance bonus.</p> <p>Where possible, UGI PNG will coordinate audit and installation activities with UGI Electric's Direct Install program to provide customers with a comprehensive package of cost-effective measures that address all the energy used in their homes through a single point of contact.</p>

2.5 Nonresidential Retrofit

Objective	The Nonresidential Retrofit (NR) Program will provide incentives for overcoming market barriers for natural gas efficiency retrofits in existing commercial and multi-family buildings.						
Eligible Rate Class	N/NT, R/RT						
Cost Effectiveness	<i>Five-Year Cost-Effectiveness Results (2016\$)</i>						
	CE Test	PV Benefits	PV Costs	PV Net	BCR		
	TRC	\$1,652,681	\$954,121	\$698,560	1.73		
	PAC	\$1,418,315	\$634,225	\$784,090	2.24		
Savings Projections	<i>Five-Year Savings Projections</i>						
		FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 – FY '22
	Natural Gas (MMBtus)						
	First Year	-	1,893	3,786	5,679	5,679	17,038
	Lifetime	-	27,129	54,259	81,388	81,388	244,163
	Electric Energy (kWh)						
	First Year	-	4,950	9,901	14,851	14,851	44,553
	Lifetime	-	99,006	198,012	297,018	297,018	891,053
	Peak (kW)	-	0.4	0.9	1.3	1.3	4.0
	Water (Gallons)						
First Year	-	380,715	761,429	1,142,144	1,142,144	3,426,431	
Lifetime	-	6,109,914	12,219,829	18,329,743	18,329,743	54,989,228	

Budget Projections	<i>Five-Year Budgets (Nominal)</i>						
	Category	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 – FY '22
	Customer Incentives	\$-	\$43,300	\$86,600	\$129,900	\$129,900	\$389,700
	Administration	10,000	43,000	61,000	79,000	79,000	272,000
	Marketing	15,000	55,000	34,000	39,000	39,000	182,000
	Inspections	-	5,000	9,000	14,000	14,000	42,000
	Evaluation	-	5,000	-	10,000	-	15,000
Total	\$25,000	\$151,300	\$190,600	\$271,900	\$261,900	\$900,700	
Participation Projections	<i>Five-Year Participation Projections</i>						
		FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 – FY '22
	C&I Retrofit Project	-	8	16	24	24	72
	MF Retrofit Project	-	1	2	3	3	9
Total	-	9	18	27	27	81	
Program Rollout	<i>October 2017 – September 2018</i> – Finalize program process and implementations details, select vendors, and develop initial marketing. Start initial engagement with contractors and provide initial training in protocols and program delivery. Coordinate efforts with UGI Gas NR program.						
	<i>October 2018</i> Launch program.						
	<i>FY 2018 - FY 2021</i> Continue engagement activities with customers, reaching full participation in FY 2021.						
Program Design	The NR program will follow the design of the UGI Gas NR program. It offers incentives to commercial buildings and multi-family projects that wish to upgrade some portion of the building's performance. A technical assistance provider will evaluate projects for both savings opportunities and cost-effectiveness. A custom package of measures will be determined that is cost-effective						

	and an incentive offer will be extended to the customer based on the project's financial characteristics. The customer then has a set amount of time to perform the upgrades and receive a test-out audit after which the incentive will be paid.
Target Market and End Uses	The NR program primarily targets commercial buildings and multi-family housing projects, but is also open to agriculture and small industrial applications. Any measure that saves natural gas is eligible, with space heating, water heating, and process heating expected to be the largest opportunities.
Financial Incentives	Incentives for NR projects will all be based on the financial characteristics of the project. UGI PNG will negotiate with the customer to find an incentive that makes the project attractive enough for the customer to pursue without paying. The first approach for calculating an incentive will be to determine an acceptable internal rate of return (IRR) for the project that the customer will accept. A secondary approach will be to buy down the project's simple payback to between 5 and 10 years. The incentive for a single project will be capped at the lesser of the project's gas benefits, incremental cost, or \$100,000.
Marketing Approach	Customers will be made aware of the NR program through the general media and bill inserts, as well as through equipment distributors, HVAC and plumbing contractors, housing program administrators, and others in a position to affect equipment installation and thermal envelope improvement choices.
Evaluation, Measurement, and	<u>Quality Assurance</u>

<p>Verification</p>	<p>The technical assistance provider will monitor all projects from the outset. This includes monitoring the installation specifications and practices as well as the final project inspection to verify that all program requirements have been met for issuance of the requested incentive.</p> <p><u>Evaluations</u></p> <p>The program is expected to have enough activity to allow for an impact evaluation, along with the UGI Gas NR program, to start at the end of FY 2019 with a second evaluation scheduled for FY 2021.</p> <p>Since the number of projects anticipated to be completed under the program is so small, evaluations will be more focused on a “case study” approach that verifies performance once a project is complete and sufficient post data is collected.</p>
<p>Program Administration</p>	<p><u>Technical Assistance Provider</u></p> <p>The technical assistance provider will be responsible for the initial project analysis and design assistance, ongoing project monitoring, and the final inspection of all projects.</p> <p><u>Evaluator</u></p> <p>A third-party evaluator will be retained to perform regular evaluations.</p>

2.6 Behavior and Education

Objective	The objective of the BE program is to motivate a large group of residential customers to save energy by changing their behavior through education, outreach, and energy monitoring. The premise is that the delivery of timely, salient, and personalized information allows for informed decision-making. Small changes with noticeable results pave the way for wider program participation and increased future savings.																																																																													
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Cost Effectiveness	<p><i>Five-Year Cost-Effectiveness Results (2016\$)</i></p> <table border="1"> <thead> <tr> <th>CE Test</th> <th>PV Benefits</th> <th>PV Costs</th> <th>PV Net</th> <th>BCR</th> </tr> </thead> <tbody> <tr> <td>TRC</td> <td>\$1,152,910</td> <td>\$762,146</td> <td>\$390,764</td> <td>1.51</td> </tr> <tr> <td>PAC</td> <td>\$1,152,910</td> <td>\$762,146</td> <td>\$390,764</td> <td>1.51</td> </tr> </tbody> </table>	CE Test	PV Benefits	PV Costs	PV Net	BCR	TRC	\$1,152,910	\$762,146	\$390,764	1.51	PAC	\$1,152,910	\$762,146	\$390,764	1.51																																																														
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Budget Projections	<i>Five-Year Budgets (Nominal)</i>						
	Category	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 – FY '22
	Customer Incentives	\$-	\$234,000	\$234,000	\$234,000	\$234,000	\$936,000
	Administration	-	16,000	16,000	16,000	16,000	64,000
	Marketing	-	-	-	-	-	-
	Inspections	-	-	-	-	-	-
	Evaluation	-	10,000	20,000	20,000	20,000	70,000
Total	\$-	\$260,000	\$270,000	\$270,000	\$270,000	\$1,070,000	
Participation Projections	<i>Five-Year Participation Projections</i>						
		FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 – FY '22
Participants	-	30,000	30,000	30,000	30,000	30,000	120,000
Program Rollout	<i>October 2017 – September 2018</i> – Finalize program process and implementations details, select vendors, and integrate energy reporting software with existing customer information system.						
	<i>October 2018</i> Launch program along with UGI Gas BE program.						
	<i>FY 2019</i> Initial pilot year. ¹⁸						
	<i>FY 2020 – FY 2021</i> Run full program.						
Program Design	The BE program will be the same program as the one offered to UGI Gas customers. The program pairs behavioral science with data analytics to provide clearly defined and actionable information that motivates customers to lower their energy use. An external vendor will be enlisted to deliver the service. The vendor will collect (from various sources) and analyze customer data including						

¹⁸ A single year pilot program will be performed to gauge the potential success of the program before it is rolled out to a wider customer base.

	<p>gas use, weather data, demographic and parcel information, and service interactions such as web visits and use of UGI PNG’s call center data. Insights will be gathered and analyzed for each customer to develop personalized content and messaging to participants.</p> <p>The program will follow an “opt-out” model in which customers will be automatically enrolled to receive the service, but subsequently may choose to decline participation. Participants will receive an energy report detailing their gas usage and how their use compares with neighbors or others in a similar demographic. The report offers insights into how the household uses gas, provides tips on how to lower consumption, provides billing analysis, and promotes other UGI PNG services. Customers are further engaged via access to a web portal that embeds the vendor’s analytics into UGI PNG’s webpages, and stays connected with the service in real time by setting and tracking goals, receiving alerts indicating high use trends, weather or utility events, and receiving periodic home energy reports by email which may also contain UGI PNG messaging.</p>
Target Market and End Uses	The program will target residential heating customers who are identified as high users based on usage per customer analytics.
Financial Incentives	The service will be delivered at no cost to customers.
Marketing Approach	UGI PNG will work with the selected vendor to produce a targeted rollout of the programs offerings. The program is expected to engage with a sub-section of UGI PNG’s highest usage heating customers.

<p>Evaluation, Measurement, and Verification</p>	<p>Since behavior programs are relatively new to gas efficiency in Pennsylvania, extra care will be taken with verifying and measuring program savings. UGI PNG will retain an evaluator at the same time as a vendor is selected to be the service provider. All three parties will work closely to ensure that proper systems are set up so that data can be collected from the start to ensure that savings are being properly accounted. Once the program launches, evaluation will be continuous. Some of the initial goals of the evaluation will be the following:</p> <ul style="list-style-type: none"> • Selecting a proper control group; • Quantifying savings across different market segments; • Accounting for the effects of participation in other efficiency programs to measure the “channeling” effect of the BE program and avoid double counting savings; and • Examining the persistence of savings beyond a single year.
<p>Program Administration</p>	<p><u>Service Provider</u></p> <p>UGI PNG will retain a service provider to provide the platform and analysis to deliver the energy reports and provide customer support.</p> <p><u>Evaluator</u></p> <p>A third-party evaluator will be retained to perform regular evaluations.</p>

Special Notes	Evaluation results from similar programs have had a wide range of savings. The assumptions used for this program are conservative; however, market conditions in UGI PNG's territory may be very different from those experienced in other locations with successful programs.
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2.7 Combined Heat and Power

Objective	The Combined Heat and Power (CHP) Program seeks to promote the installation of cost-effective and net-primary-energy-saving CHP projects and provide meaningful CO ₂ emission reductions. A CHP plant produces electricity at a commercial or industrial site while at the same time using the waste heat from the production of the electricity to serve a thermal load. Net efficiencies come from the recovered heat that is typically wasted in grid electricity production and avoided transmission and distribution losses from delivering the electricity from the generator to the customer site.						
Eligible Rate Class	DS, LFD						
Cost Effectiveness	<i>Five-Year Cost-Effectiveness Results (2016\$)</i>						
	CE Test	PV Benefits	PV Costs	PV Net	BCR		
Savings Projections	<i>Five-Year Savings Projections</i>						
		FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 – FY '22
	Net Primary Energy Savings (MMBtus)						
	First Year	169,855	169,855	169,855	169,855	169,855	849,276
	Lifetime	2,547,828	2,547,828	2,547,828	2,547,828	2,547,828	12,739,141
	Net Customer Gas Usage Increase (MMBtus)						
First Year	118,258	118,258	118,258	118,258	118,258	591,292	
Lifetime	1,773,876	1,773,876	1,773,876	1,773,876	1,773,876	8,869,380	

Budget Projections	<i>Five-Year Budgets (Nominal)</i>						
	Category	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 – FY '22
	Customer Incentives	\$250,000	\$250,000	\$250,000	\$250,000	\$250,000	\$1,250,000
	Administration	10,000	10,000	10,000	10,000	10,000	\$50,000
	Marketing	15,000	15,000	15,000	15,000	15,000	\$75,000
	Inspections	2,500	2,500	2,500	2,500	2,500	\$12,500
	Evaluation	5,000	5,000	5,000	5,000	5,000	\$25,000
Total	\$282,500	\$282,500	\$282,500	\$282,500	\$282,500	\$1,412,500	
Participation Projections	<i>Five-Year Participation Projections</i>						
		FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY '18 – FY '22
	3326 kW CHP	1	1	1	1	1	5
Program Rollout	<p><i>June 2017</i> – Finalize program process and implementations details, select vendors, and develop initial marketing.</p> <p><i>December 2017</i></p> <p><i>January 2018</i> Launch Program.</p> <p><i>FY 2018 - FY 2022</i> Continue engagement activities with customers.</p>						
Program Design	<p>The CHP program is a rollout of the same UGI Gas CHP Program to UGI PNG Customers. Customers that are considering CHP need to submit the project details including CHP installation costs, annual electricity production, and gas usage before and after the CHP project is completed. Based on the particular CHP project details, verified by UGI PNG or its contractor, UGI PNG will determine whether it is cost-effective from the TRC perspective, reduces net primary energy usage, and meets the economic test established by the Commission Order for approval of the UGI Gas</p>						

	<p>Settlement. If all of these criteria are met, then the CHP project is eligible for an incentive from UGI PNG.</p> <p>Though the customer has primary responsibility for developing the CHP costs, savings, and technical details, UGI PNG may provide some technical assistance, as well as business development for new projects.</p>
Target Market and End Uses	<p>The CHP Program targets large commercial and industrial customers with high thermal and electric loads. This program is most likely applicable to customers with year-round thermal requirements and high hours of use. Customer types that are likely candidates include hospitals, campuses and multi-shift industrial.</p> <p>Based on current avoided electric and gas avoided costs, only larger CHP projects (over 1,000 kW) are typically cost-effective from the TRC perspective. If avoided costs change or the costs for micro turbines decline, then some smaller projects may become cost-effective. UGI PNG will continue to closely monitor the CHP market and identify opportunities for all ranges of CHP technology and sizes.</p>
Financial Incentives	<p>\$750/kW with a maximum of \$250,000 per CHP project and no more than 50% of the CHP project cost.</p>
Marketing Approach	<p>UGI PNG will market its CHP program through a combination of the portfolio's mass-market awareness campaign and by contacting specific customers that are likely candidates for CHP. UGI PNG will work with its internal gas planning and marketing team to make sure that potential users</p>

	are aware of possible technical support and incentives for pursuing CHP projects.
Evaluation, Measurement, and Verification	<p>Every CHP project will be inspected and its receipts reviewed to ensure that the expected technology is correctly installed and operational.</p> <p>A third-party evaluator will be chosen to assess the actual versus projected electric and gas, generation and usage, respectively. Since the number of projects anticipated to be completed under the program is small, evaluations will be more focused on a “case study” approach that verifies performance once a project is complete and sufficient post data is collected.</p>
Program Administration	The CHP program may be implemented either solely by UGI PNG or with assistance from an independent contractor chosen through an RFP.
Special Notes	<p>The CHP Program’s costs and savings will be reported separately from the other efficiency programs, due to this program’s increase in gas usage, whereas the other efficiency programs decrease gas usage. This is similar to the separation made by PGW in its Phase II filing, as well as by other electric utilities that separate energy efficiency programs from load reduction programs.</p> <p>While UGI PNG is asking for general flexibility in annual program costs for the entire EE&C Portfolio, this flexibility is particularly important for the CHP program. CHP projects are complex and require long-term planning. Moreover, incentives represent a large percentage of the program budget. Because of these factors, it is difficult to predict the outcome for a single year. UGI PNG will limit its total spending to the five year projected total spending, and under-spending from one year may be carried over to the next year.</p>

3 Appendices

3.1 Avoided Cost Tables

Avoided Costs (2016\$)

Year	Natural Gas			Other			
	Baseload \$/MMBtu	Space heating \$/MMBtu	Water heating \$/MMBtu	Energy \$/kWh	Peak Capacity \$/kW-Yr	Capacity T&D \$/kW-Yr	Water \$/Gallon
2017	\$ 3.90	\$ 8.87	\$ 5.14	\$ 0.0514	\$ 69.438	\$ 17.372	\$ 0.0080
2018	\$ 3.83	\$ 8.68	\$ 5.04	\$ 0.0516	\$ 64.409	\$ 17.376	\$ 0.0080
2019	\$ 4.54	\$ 9.43	\$ 5.76	\$ 0.0530	\$ 60.746	\$ 17.373	\$ 0.0080
2020	\$ 4.83	\$ 9.71	\$ 6.05	\$ 0.0535	\$ 45.050	\$ 17.373	\$ 0.0080
2021	\$ 5.30	\$ 10.20	\$ 6.52	\$ 0.0540	\$ 59.911	\$ 17.376	\$ 0.0080
2022	\$ 5.81	\$ 10.73	\$ 7.04	\$ 0.0544	\$ 59.911	\$ 17.372	\$ 0.0080
2023	\$ 6.00	\$ 10.91	\$ 7.23	\$ 0.0544	\$ 59.911	\$ 17.370	\$ 0.0080
2024	\$ 6.35	\$ 11.26	\$ 7.57	\$ 0.0542	\$ 59.911	\$ 17.370	\$ 0.0080
2025	\$ 6.82	\$ 11.76	\$ 8.06	\$ 0.0657	\$ 59.911	\$ 17.371	\$ 0.0080
2026	\$ 7.52	\$ 12.51	\$ 8.77	\$ 0.0729	\$ 59.911	\$ 17.374	\$ 0.0080
2027	\$ 7.46	\$ 12.44	\$ 8.71	\$ 0.0752	\$ 59.911	\$ 17.372	\$ 0.0080
2028	\$ 7.51	\$ 12.47	\$ 8.75	\$ 0.0770	\$ 59.911	\$ 17.370	\$ 0.0080
2029	\$ 7.56	\$ 12.51	\$ 8.79	\$ 0.0797	\$ 59.911	\$ 17.369	\$ 0.0080
2030	\$ 7.55	\$ 12.49	\$ 8.79	\$ 0.0823	\$ 59.911	\$ 17.370	\$ 0.0080
2031	\$ 7.49	\$ 12.41	\$ 8.72	\$ 0.0837	\$ 59.911	\$ 17.371	\$ 0.0080
2032	\$ 7.52	\$ 12.43	\$ 8.75	\$ 0.0823	\$ 59.911	\$ 17.373	\$ 0.0080
2033	\$ 7.45	\$ 12.34	\$ 8.67	\$ 0.0797	\$ 59.911	\$ 17.375	\$ 0.0080
2034	\$ 7.42	\$ 12.30	\$ 8.64	\$ 0.0804	\$ 59.911	\$ 17.372	\$ 0.0080
2035	\$ 7.38	\$ 12.23	\$ 8.59	\$ 0.0810	\$ 59.911	\$ 17.375	\$ 0.0080
2036	\$ 7.36	\$ 12.20	\$ 8.57	\$ 0.0823	\$ 59.911	\$ 17.372	\$ 0.0080
2037	\$ 7.28	\$ 12.10	\$ 8.49	\$ 0.0836	\$ 59.911	\$ 17.375	\$ 0.0080
2038	\$ 7.21	\$ 12.01	\$ 8.41	\$ 0.0849	\$ 59.911	\$ 17.373	\$ 0.0080
2039	\$ 7.29	\$ 12.09	\$ 8.49	\$ 0.0870	\$ 59.911	\$ 17.370	\$ 0.0080
2040	\$ 7.30	\$ 12.09	\$ 8.50	\$ 0.0870	\$ 59.911	\$ 17.373	\$ 0.0080
2041	\$ 7.29	\$ 12.06	\$ 8.48	\$ 0.0870	\$ 59.911	\$ 17.375	\$ 0.0080
2042	\$ 7.27	\$ 12.04	\$ 8.47	\$ 0.0870	\$ 59.911	\$ 17.372	\$ 0.0080
2043	\$ 7.26	\$ 12.02	\$ 8.45	\$ 0.0870	\$ 59.911	\$ 17.373	\$ 0.0080
2044	\$ 7.25	\$ 11.99	\$ 8.44	\$ 0.0870	\$ 59.911	\$ 17.374	\$ 0.0080
2045	\$ 7.24	\$ 11.97	\$ 8.42	\$ 0.0870	\$ 59.911	\$ 17.374	\$ 0.0080
2046	\$ 7.23	\$ 11.95	\$ 8.41	\$ 0.0870	\$ 59.911	\$ 17.374	\$ 0.0080
2047	\$ 7.22	\$ 11.93	\$ 8.40	\$ 0.0870	\$ 59.911	\$ 17.374	\$ 0.0080
2048	\$ 7.21	\$ 11.91	\$ 8.38	\$ 0.0870	\$ 59.911	\$ 17.374	\$ 0.0080
2049	\$ 7.20	\$ 11.89	\$ 8.37	\$ 0.0870	\$ 59.911	\$ 17.374	\$ 0.0080
2050	\$ 7.19	\$ 11.87	\$ 8.36	\$ 0.0870	\$ 59.911	\$ 17.374	\$ 0.0080
2051	\$ 7.18	\$ 11.85	\$ 8.35	\$ 0.0870	\$ 59.911	\$ 17.374	\$ 0.0080
2052	\$ 7.17	\$ 11.83	\$ 8.34	\$ 0.0870	\$ 59.911	\$ 17.374	\$ 0.0080

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Avoided Costs including DRIPE (2016\$)

Year	Natural Gas			Other			Water
	Baseload	Space heating	Water heating	Energy	Peak Capacity	Capacity T&D	
	\$/MMBtu	\$/MMBtu	\$/MMBtu	\$/kWh	\$/kW-Yr	\$/kW-Yr	\$/Gallon
2017	\$ 4.85	\$ 9.81	\$ 6.09	\$ 0.0668	\$ 69.438	\$ 17.372	\$ 0.0080
2018	\$ 4.84	\$ 9.69	\$ 6.06	\$ 0.0724	\$ 64.409	\$ 17.376	\$ 0.0080
2019	\$ 5.59	\$ 10.48	\$ 6.81	\$ 0.0790	\$ 60.746	\$ 17.373	\$ 0.0080
2020	\$ 5.86	\$ 10.74	\$ 7.08	\$ 0.0832	\$ 45.050	\$ 17.373	\$ 0.0080
2021	\$ 6.31	\$ 11.21	\$ 7.53	\$ 0.0865	\$ 59.911	\$ 17.376	\$ 0.0080
2022	\$ 6.71	\$ 11.64	\$ 7.94	\$ 0.0891	\$ 59.911	\$ 17.372	\$ 0.0080
2023	\$ 6.79	\$ 11.70	\$ 8.01	\$ 0.0879	\$ 59.911	\$ 17.370	\$ 0.0080
2024	\$ 7.00	\$ 11.92	\$ 8.23	\$ 0.0825	\$ 59.911	\$ 17.370	\$ 0.0080
2025	\$ 7.40	\$ 12.34	\$ 8.63	\$ 0.0930	\$ 59.911	\$ 17.371	\$ 0.0080
2026	\$ 8.05	\$ 13.05	\$ 9.30	\$ 0.0943	\$ 59.911	\$ 17.374	\$ 0.0080
2027	\$ 8.00	\$ 12.97	\$ 9.24	\$ 0.0900	\$ 59.911	\$ 17.372	\$ 0.0080
2028	\$ 8.04	\$ 13.00	\$ 9.28	\$ 0.0864	\$ 59.911	\$ 17.370	\$ 0.0080
2029	\$ 8.09	\$ 13.04	\$ 9.33	\$ 0.0847	\$ 59.911	\$ 17.369	\$ 0.0080
2030	\$ 8.09	\$ 13.02	\$ 9.32	\$ 0.0846	\$ 59.911	\$ 17.370	\$ 0.0080
2031	\$ 8.03	\$ 12.95	\$ 9.26	\$ 0.0855	\$ 59.911	\$ 17.371	\$ 0.0080
2032	\$ 8.06	\$ 12.96	\$ 9.28	\$ 0.0841	\$ 59.911	\$ 17.373	\$ 0.0080
2033	\$ 7.98	\$ 12.87	\$ 9.21	\$ 0.0815	\$ 59.911	\$ 17.375	\$ 0.0080
2034	\$ 7.96	\$ 12.83	\$ 9.18	\$ 0.0822	\$ 59.911	\$ 17.372	\$ 0.0080
2035	\$ 7.91	\$ 12.77	\$ 9.12	\$ 0.0828	\$ 59.911	\$ 17.375	\$ 0.0080
2036	\$ 7.89	\$ 12.74	\$ 9.10	\$ 0.0840	\$ 59.911	\$ 17.372	\$ 0.0080
2037	\$ 7.82	\$ 12.64	\$ 9.02	\$ 0.0854	\$ 59.911	\$ 17.375	\$ 0.0080
2038	\$ 7.74	\$ 12.55	\$ 8.94	\$ 0.0866	\$ 59.911	\$ 17.373	\$ 0.0080
2039	\$ 7.82	\$ 12.62	\$ 9.02	\$ 0.0888	\$ 59.911	\$ 17.370	\$ 0.0080
2040	\$ 7.83	\$ 12.62	\$ 9.03	\$ 0.0888	\$ 59.911	\$ 17.373	\$ 0.0080
2041	\$ 7.82	\$ 12.60	\$ 9.01	\$ 0.0888	\$ 59.911	\$ 17.375	\$ 0.0080
2042	\$ 7.81	\$ 12.57	\$ 9.00	\$ 0.0888	\$ 59.911	\$ 17.372	\$ 0.0080
2043	\$ 7.80	\$ 12.55	\$ 8.99	\$ 0.0888	\$ 59.911	\$ 17.373	\$ 0.0080
2044	\$ 7.79	\$ 12.53	\$ 8.97	\$ 0.0888	\$ 59.911	\$ 17.374	\$ 0.0080
2045	\$ 7.78	\$ 12.51	\$ 8.96	\$ 0.0888	\$ 59.911	\$ 17.374	\$ 0.0080
2046	\$ 7.77	\$ 12.48	\$ 8.95	\$ 0.0888	\$ 59.911	\$ 17.374	\$ 0.0080
2047	\$ 7.75	\$ 12.46	\$ 8.93	\$ 0.0888	\$ 59.911	\$ 17.374	\$ 0.0080
2048	\$ 7.74	\$ 12.44	\$ 8.92	\$ 0.0888	\$ 59.911	\$ 17.374	\$ 0.0080
2049	\$ 7.73	\$ 12.42	\$ 8.91	\$ 0.0888	\$ 59.911	\$ 17.374	\$ 0.0080
2050	\$ 7.72	\$ 12.40	\$ 8.89	\$ 0.0888	\$ 59.911	\$ 17.374	\$ 0.0080
2051	\$ 7.72	\$ 12.38	\$ 8.88	\$ 0.0888	\$ 59.911	\$ 17.374	\$ 0.0080
2052	\$ 7.71	\$ 12.36	\$ 8.87	\$ 0.0888	\$ 59.911	\$ 17.374	\$ 0.0080

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Avoided Costs including DRIPE and CO2 (2016\$)

Year	Natural Gas			Other			
	Baseload \$/MMBtu	Space heating \$/MMBtu	Water heating \$/MMBtu	Energy \$/kWh	Peak Capacity \$/kW-Yr	Capacity T&D \$/kW-Yr	Water \$/Gallon
2017	\$ 4.85	\$ 9.81	\$ 6.09	\$ 0.0668	\$ 69.438	\$ 17.372	\$ 0.0080
2018	\$ 4.84	\$ 9.69	\$ 6.06	\$ 0.0724	\$ 64.409	\$ 17.376	\$ 0.0080
2019	\$ 5.59	\$ 10.48	\$ 6.81	\$ 0.0790	\$ 60.746	\$ 17.373	\$ 0.0080
2020	\$ 5.86	\$ 10.74	\$ 7.08	\$ 0.0832	\$ 45.050	\$ 17.373	\$ 0.0080
2021	\$ 6.31	\$ 11.21	\$ 7.53	\$ 0.0865	\$ 59.911	\$ 17.376	\$ 0.0080
2022	\$ 8.09	\$ 13.01	\$ 9.32	\$ 0.1108	\$ 59.911	\$ 17.372	\$ 0.0080
2023	\$ 8.25	\$ 13.16	\$ 9.48	\$ 0.1110	\$ 59.911	\$ 17.370	\$ 0.0080
2024	\$ 8.56	\$ 13.47	\$ 9.78	\$ 0.1069	\$ 59.911	\$ 17.370	\$ 0.0080
2025	\$ 9.04	\$ 13.98	\$ 10.27	\$ 0.1189	\$ 59.911	\$ 17.371	\$ 0.0080
2026	\$ 9.78	\$ 14.78	\$ 11.03	\$ 0.1216	\$ 59.911	\$ 17.374	\$ 0.0080
2027	\$ 9.82	\$ 14.79	\$ 11.06	\$ 0.1187	\$ 59.911	\$ 17.372	\$ 0.0080
2028	\$ 9.95	\$ 14.91	\$ 11.19	\$ 0.1165	\$ 59.911	\$ 17.370	\$ 0.0080
2029	\$ 10.09	\$ 15.04	\$ 11.33	\$ 0.1163	\$ 59.911	\$ 17.369	\$ 0.0080
2030	\$ 10.17	\$ 15.11	\$ 11.41	\$ 0.1175	\$ 59.911	\$ 17.370	\$ 0.0080
2031	\$ 10.27	\$ 15.19	\$ 11.50	\$ 0.1209	\$ 59.911	\$ 17.371	\$ 0.0080
2032	\$ 10.46	\$ 15.37	\$ 11.69	\$ 0.1221	\$ 59.911	\$ 17.373	\$ 0.0080
2033	\$ 10.55	\$ 15.44	\$ 11.77	\$ 0.1220	\$ 59.911	\$ 17.375	\$ 0.0080
2034	\$ 10.68	\$ 15.55	\$ 11.90	\$ 0.1251	\$ 59.911	\$ 17.372	\$ 0.0080
2035	\$ 10.79	\$ 15.65	\$ 12.00	\$ 0.1282	\$ 59.911	\$ 17.375	\$ 0.0080
2036	\$ 10.93	\$ 15.77	\$ 12.14	\$ 0.1320	\$ 59.911	\$ 17.372	\$ 0.0080
2037	\$ 11.01	\$ 15.83	\$ 12.22	\$ 0.1358	\$ 59.911	\$ 17.375	\$ 0.0080
2038	\$ 11.10	\$ 15.90	\$ 12.30	\$ 0.1396	\$ 59.911	\$ 17.373	\$ 0.0080
2039	\$ 11.34	\$ 16.13	\$ 12.54	\$ 0.1442	\$ 59.911	\$ 17.370	\$ 0.0080
2040	\$ 11.50	\$ 16.29	\$ 12.70	\$ 0.1467	\$ 59.911	\$ 17.373	\$ 0.0080
2041	\$ 11.65	\$ 16.43	\$ 12.84	\$ 0.1492	\$ 59.911	\$ 17.375	\$ 0.0080
2042	\$ 11.80	\$ 16.56	\$ 12.99	\$ 0.1517	\$ 59.911	\$ 17.372	\$ 0.0080
2043	\$ 11.94	\$ 16.69	\$ 13.13	\$ 0.1542	\$ 59.911	\$ 17.373	\$ 0.0080
2044	\$ 12.09	\$ 16.83	\$ 13.27	\$ 0.1567	\$ 59.911	\$ 17.374	\$ 0.0080
2045	\$ 12.24	\$ 16.97	\$ 13.42	\$ 0.1592	\$ 59.911	\$ 17.374	\$ 0.0080
2046	\$ 12.23	\$ 16.94	\$ 13.41	\$ 0.1592	\$ 59.911	\$ 17.374	\$ 0.0080
2047	\$ 12.22	\$ 16.92	\$ 13.39	\$ 0.1592	\$ 59.911	\$ 17.374	\$ 0.0080
2048	\$ 12.21	\$ 16.90	\$ 13.38	\$ 0.1592	\$ 59.911	\$ 17.374	\$ 0.0080
2049	\$ 12.20	\$ 16.88	\$ 13.37	\$ 0.1592	\$ 59.911	\$ 17.374	\$ 0.0080
2050	\$ 12.19	\$ 16.86	\$ 13.35	\$ 0.1592	\$ 59.911	\$ 17.374	\$ 0.0080
2051	\$ 12.18	\$ 16.84	\$ 13.34	\$ 0.1592	\$ 59.911	\$ 17.374	\$ 0.0080
2052	\$ 12.17	\$ 16.82	\$ 13.33	\$ 0.1592	\$ 59.911	\$ 17.374	\$ 0.0080

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3.2 Detailed Program and Portfolio Cost-effectiveness

Energy Efficiency Programs' Cost-effectiveness over Five-Year Portfolio (2016\$)

	Total Resource					Gas Energy System				
	Present Value		PV of Net Benefits [4]	Benefit-Cost Ratio [5]	Levelized Cost \$/MMBTU	Present Value		PV of Net Benefits [12]	Benefit-Cost Ratio [13]	Levelized Cost \$/MCF
	Benefit [2]	Cost [3]				Benefit [10]	Cost [11]			
Portfolio Total	\$23,414,005	\$16,260,533	\$7,153,472	1.44	8.34	\$21,059,507	\$10,139,845	\$10,919,662	2.08	5.20
Non-Measure Costs		\$3,415,321					\$3,415,321			
Total Measure Costs	\$23,414,005	\$12,845,212	\$10,568,793	1.82	6.59	\$21,059,507	\$6,724,523	\$14,334,983	3.13	3.45
Program										
Residential Prescriptive (RP)										
Program Total	\$12,631,980	\$8,073,598	\$4,558,382	1.56	8.10	\$11,008,792	\$4,040,601	\$6,968,190	2.72	4.05
Non-Measure Costs		\$482,953					\$482,953			
Total Measure Costs	\$12,631,980	\$7,590,644	\$5,041,336	1.66	7.62	\$11,008,792	\$3,557,648	\$7,451,143	3.09	3.57
Nonresidential Prescriptive (NP)										
Program Total	\$3,757,509	\$2,157,716	\$1,599,793	1.74	5.83	\$3,457,639	\$1,148,606	\$2,309,034	3.01	3.11
Non-Measure Costs		\$261,890					\$261,890			
Total Measure Costs	\$3,757,509	\$1,895,826	\$1,861,683	1.98	5.13	\$3,457,639	\$886,716	\$2,570,923	3.90	2.40
Residential Retrofit (RR)										
Program Total	\$2,732,813	\$2,170,980	\$561,833	1.26	9.77	\$2,602,695	\$1,538,423	\$1,064,272	1.69	6.93
Non-Measure Costs		\$541,716					\$541,716			
Total Measure Costs	\$2,732,813	\$1,629,264	\$1,103,549	1.68	7.33	\$2,602,695	\$996,707	\$1,605,988	2.61	4.49
Nonresidential Retrofit (NR)										
Program Total	\$1,652,681	\$954,121	\$698,560	1.73	7.82	\$1,418,315	\$634,225	\$784,090	2.24	5.20
Non-Measure Costs		\$365,125					\$365,125			
Total Measure Costs	\$1,652,681	\$588,996	\$1,063,685	2.81	4.83	\$1,418,315	\$269,100	\$1,149,215	5.27	2.21
New Construction (NC)										
Program Total	\$1,486,111	\$754,582	\$731,530	1.97	6.21	\$1,419,156	\$628,453	\$790,704	2.26	5.17
Non-Measure Costs		\$281,574					\$281,574			
Total Measure Costs	\$1,486,111	\$473,008	\$1,013,104	3.14	3.89	\$1,419,156	\$346,879	\$1,072,278	4.09	2.86
Behavior and Education (BE)										
Program Total	\$1,152,910	\$762,146	\$390,764	1.51	6.51	\$1,152,910	\$762,146	\$390,764	1.51	6.51
Non-Measure Costs		\$94,673					\$94,673			
Total Measure Costs	\$1,152,910	\$667,474	\$485,436	1.73	5.70	\$1,152,910	\$667,474	\$485,436	1.73	5.70
Portfoliowide Costs										
Program Total	-	\$1,387,391	\$(1,387,391)	-	-	-	\$1,387,391	\$(1,387,391)	-	-
Non-Measure Costs		\$1,387,391					\$1,387,391			
Total Measure Costs	-	-	-	-	-	-	-	-	-	-

Energy Efficiency Programs' Cost-effectiveness over Five-Year Portfolio (2016\$), including DRIFE

	Total Resource					Gas Energy System				
	Present Value		PV of Net Benefits	Benefit-Cost Ratio	Levelized Cost \$/MMBTU	Present Value		PV of Net Benefits	Benefit-Cost Ratio	Levelized Cost \$/MCF
	Benefit	Cost				Benefit	Cost			
	[2]	[3]	[4]	[5]		[10]	[11]	[12]	[13]	
Portfolio Total	\$25,360,320	\$16,260,533	\$9,099,787	1.56	8.34	\$22,409,115	\$10,139,845	\$12,269,270	2.21	5.20
Non-Measure Costs		\$3,415,321					\$3,415,321			
Total Measure Costs	\$25,360,320	\$12,845,212	\$12,515,108	1.97	6.59	\$22,409,115	\$6,724,523	\$15,684,592	3.33	3.45
Program										
Residential Prescriptive (RP)										
Program Total	\$13,877,485	\$8,073,598	\$5,803,888	1.72	8.10	\$11,683,331	\$4,040,601	\$7,642,730	2.89	4.05
Non-Measure Costs		\$482,953					\$482,953			
Total Measure Costs	\$13,877,485	\$7,590,644	\$6,286,841	1.83	7.62	\$11,683,331	\$3,557,648	\$8,125,683	3.28	3.57
Nonresidential Prescriptive (NP)										
Program Total	\$4,008,883	\$2,157,716	\$1,851,167	1.86	5.83	\$3,709,013	\$1,148,606	\$2,560,407	3.23	3.11
Non-Measure Costs		\$261,890					\$261,890			
Total Measure Costs	\$4,008,883	\$1,895,826	\$2,113,057	2.11	5.13	\$3,709,013	\$886,716	\$2,822,297	4.18	2.40
Residential Retrofit (RR)										
Program Total	\$2,886,212	\$2,170,980	\$715,233	1.33	9.77	\$2,746,165	\$1,538,423	\$1,207,742	1.79	6.93
Non-Measure Costs		\$541,716					\$541,716			
Total Measure Costs	\$2,886,212	\$1,629,264	\$1,256,949	1.77	7.33	\$2,746,165	\$996,707	\$1,749,458	2.76	4.49
Nonresidential Retrofit (NR)										
Program Total	\$1,744,944	\$954,121	\$790,823	1.83	7.82	\$1,500,488	\$634,225	\$866,263	2.37	5.20
Non-Measure Costs		\$365,125					\$365,125			
Total Measure Costs	\$1,744,944	\$588,996	\$1,155,948	2.96	4.83	\$1,500,488	\$269,100	\$1,231,389	5.58	2.21
New Construction (NC)										
Program Total	\$1,571,836	\$754,582	\$817,255	2.08	6.21	\$1,499,160	\$628,453	\$870,707	2.39	5.17
Non-Measure Costs		\$281,574					\$281,574			
Total Measure Costs	\$1,571,836	\$473,008	\$1,098,829	3.32	3.89	\$1,499,160	\$346,879	\$1,152,281	4.32	2.86
Behavior and Education (BE)										
Program Total	\$1,270,958	\$762,146	\$508,812	1.67	6.51	\$1,270,958	\$762,146	\$508,812	1.67	6.51
Non-Measure Costs		\$94,673					\$94,673			
Total Measure Costs	\$1,270,958	\$667,474	\$603,485	1.90	5.70	\$1,270,958	\$667,474	\$603,485	1.90	5.70
Portfoliowide Costs										
Program Total	-	\$1,387,391	\$(1,387,391)	-	-	-	\$1,387,391	\$(1,387,391)	-	-
Non-Measure Costs		\$1,387,391					\$1,387,391			
Total Measure Costs	-	-	-	-	-	-	-	-	-	-

Energy Efficiency Programs' Cost-effectiveness over Five-Year Portfolio (2016\$), including DRIPE & CO2

	Total Resource					Gas Energy System				
	Present Value		PV of Net Benefits [4]	Benefit-Cost Ratio [5]	Levelized Cost \$/MMBTU	Present Value		PV of Net Benefits [12]	Benefit-Cost Ratio [13]	Levelized Cost \$/MCF
	Benefit [2]	Cost [3]				Benefit [10]	Cost [11]			
Portfolio Total	\$28,437,833	\$16,260,533	\$12,177,300	1.75	8.34	\$24,870,918	\$10,139,845	\$14,731,073	2.45	5.20
Non-Measure Costs		\$3,415,321					\$3,415,321			
Total Measure Costs	\$28,437,833	\$12,845,212	\$15,592,622	2.21	6.59	\$24,870,918	\$6,724,523	\$18,146,394	3.70	3.45
Program										
Residential Prescriptive (RP)										
Program Total	\$15,806,977	\$8,073,598	\$7,733,379	1.96	8.10	\$13,028,481	\$4,040,601	\$8,987,880	3.22	4.05
Non-Measure Costs		\$482,953					\$482,953			
Total Measure Costs	\$15,806,977	\$7,590,644	\$8,216,332	2.08	7.62	\$13,028,481	\$3,557,648	\$9,470,833	3.66	3.57
Nonresidential Prescriptive (NP)										
Program Total	\$4,484,797	\$2,157,716	\$2,327,081	2.08	5.83	\$4,184,927	\$1,148,606	\$3,036,321	3.64	3.11
Non-Measure Costs		\$261,890					\$261,890			
Total Measure Costs	\$4,484,797	\$1,895,826	\$2,588,970	2.37	5.13	\$4,184,927	\$886,716	\$3,298,210	4.72	2.40
Residential Retrofit (RR)										
Program Total	\$3,272,041	\$2,170,980	\$1,101,061	1.51	9.77	\$3,119,197	\$1,538,423	\$1,580,774	2.03	6.93
Non-Measure Costs		\$541,716					\$541,716			
Total Measure Costs	\$3,272,041	\$1,629,264	\$1,642,777	2.01	7.33	\$3,119,197	\$996,707	\$2,122,490	3.13	4.49
Nonresidential Retrofit (NR)										
Program Total	\$1,904,427	\$954,121	\$950,306	2.00	7.82	\$1,648,375	\$634,225	\$1,014,150	2.60	5.20
Non-Measure Costs		\$365,125					\$365,125			
Total Measure Costs	\$1,904,427	\$588,996	\$1,315,431	3.23	4.83	\$1,648,375	\$269,100	\$1,379,276	6.13	2.21
New Construction (NC)										
Program Total	\$1,751,614	\$754,582	\$997,032	2.32	6.21	\$1,671,960	\$628,453	\$1,043,507	2.66	5.17
Non-Measure Costs		\$281,574					\$281,574			
Total Measure Costs	\$1,751,614	\$473,008	\$1,278,606	3.70	3.89	\$1,671,960	\$346,879	\$1,325,081	4.82	2.86
Behavior and Education (BE)										
Program Total	\$1,217,978	\$762,146	\$455,832	1.60	6.51	\$1,217,978	\$762,146	\$455,832	1.60	6.51
Non-Measure Costs		\$94,673					\$94,673			
Total Measure Costs	\$1,217,978	\$667,474	\$550,504	1.82	5.70	\$1,217,978	\$667,474	\$550,504	1.82	5.70
Portfolio-wide Costs										
Program Total	-	\$1,387,391	\$(1,387,391)	-	-	-	\$1,387,391	\$(1,387,391)	-	-
Non-Measure Costs		\$1,387,391					\$1,387,391			
Total Measure Costs	-	-	-	-	-	-	-	-	-	-

CHP Program Cost-effectiveness over Five-Year Portfolio (2016\$)

<i>PV 2016\$</i>	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Total
TRC Benefits	\$10,369,345	\$9,875,399	\$9,464,373	\$9,135,924	\$8,835,176	\$47,680,217
TRC Costs	8,781,057	8,262,129	7,773,876	7,314,483	6,882,243	39,013,788
Utility Costs	282,500	282,500	282,500	282,500	282,500	1,412,500
TRC Net Benefits	\$1,588,289	\$1,613,270	\$1,690,497	\$1,821,441	\$1,952,933	\$8,666,430
TRC BCR	1.18	1.20	1.22	1.25	1.28	1.22

CHP Program Cost-effectiveness over Five-Year Portfolio (2016\$), including DRIPE

<i>PV 2016\$</i>	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Total
TRC Benefits	\$14,605,110	\$13,733,425	\$12,859,666	\$12,017,843	\$11,179,837	\$64,395,880
TRC Costs	8,781,057	8,262,129	7,773,876	7,314,483	6,882,243	39,013,788
Utility Costs	282,500	282,500	282,500	282,500	282,500	1,412,500
TRC Net Benefits	\$5,824,053	\$5,471,296	\$5,085,790	\$4,703,360	\$4,297,594	\$25,382,093
TRC BCR	1.66	1.66	1.65	1.64	1.62	1.65

CHP Program Cost-effectiveness over Five-Year Portfolio (2016\$), including DRIPE and CO2

<i>PV 2016\$</i>	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Total
TRC Benefits	\$17,591,044	\$16,985,721	\$16,378,061	\$15,801,178	\$15,226,162	\$81,982,166
TRC Costs	8,781,057	8,262,130	7,773,877	7,314,485	6,882,246	39,013,796
Utility Costs	282,500	282,501	282,502	282,503	282,504	1,412,510
TRC Net Benefits	\$8,809,987	\$8,723,591	\$8,604,184	\$8,486,693	\$8,343,916	\$42,968,370
TRC BCR	2.00	2.06	2.11	2.16	2.21	2.10

UGI PNG STATEMENT NO. 13 – ANGELINA M. BORELLI

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Docket No. R-2016-2580030

UGI Penn Natural Gas, Inc.

Statement No. 13

**Direct Testimony of
Angelina M. Borelli**

Topics Addressed: Capacity Release Program

Dated: January 19, 2017

1 **I. INTRODUCTION AND QUALIFICATIONS**

2 **Q. Please state your full name and business address.**

3 A. My name is Angelina M. Borelli. My business address is 2525 North 12th Street, Suite
4 360, Reading, PA, 19612-2677.

5
6 **Q. By whom are you employed and in what capacity?**

7 A. I am employed by UGI Utilities Inc. (“UGI”) as Director - Gas and Electric Supply. UGI
8 has two separate operating divisions: UGI Utilities, Inc. - Gas Division (“UGI Gas”), a
9 natural gas distribution company (“NGDC”), and UGI Utilities, Inc. - Electric Division
10 (“UGI Electric”), an electric distribution company (“EDC”). UGI’s subsidiaries also
11 include two wholly-owned NGDCs, UGI Central Penn Gas, Inc. (“UGI CPG”) and UGI
12 Penn Natural Gas, Inc. (“UGI PNG” or the “Company”). In my testimony, UGI Gas,
13 UGI PNG, and UGI CPG will be referred to collectively as the “UGI NGDCs.”

14
15 **Q. What are your principal duties and responsibilities as Director – Gas and Electric
16 Supply?**

17 A. As Director – Gas and Electric Supply, I am responsible for gas and electric supply
18 planning, procurement, and scheduling for UGI Electric, UGI Gas, UGI PNG, and UGI
19 CPG.

20
21 **Q. What is your educational background?**

22 A. Please see my resume that is attached as Exhibit PNG-AMB-1.

23

24

1 **Q. Have you testified previously before the Pennsylvania Public Utility Commission?**

2 A. Yes. I previously provided testimony in 2016 for UGI Gas’s Base Rate Case, UGI
3 Electric’s Default Service Petition and each of the 2016 Purchased Gas Cost filings of
4 UGI Gas, UGI PNG and UGI CPG. Please see Exhibit UGI PNG-AMB-1 for the
5 specific Docket numbers.

6

7 **Q. What is the purpose of your testimony?**

8 A. I will explain UGI PNG’s proposed capacity release program for Rate DS (Delivery
9 Service) and certain Rate LFD (Large Firm Delivery Service) transportation customers.

10

11 **II. CAPACITY RELEASE PROGRAM**

12 **Q. Please describe UGI PNG’s gas procurement responsibilities.**

13 A. UGI PNG has a statutory Supplier-of-Last-Resort (“SOLR”) gas procurement
14 responsibility for certain small volume customers on its system served under Rates R
15 (Residential), RT (Residential Transportation), N (General Service – Non-residential) and
16 NT (General Service – Non-Residential Transportation) (collectively “core market
17 customers”). Specifically, UGI PNG must stand ready to provide natural gas supply
18 service to its core market customers, and to do so must procure a portfolio of gas supply
19 assets pursuant to a least-cost procurement policy capable of serving the gas supply
20 service requirements of these customers, including on design cold conditions. This
21 supply portfolio and associated Purchased Gas Cost (“PGC”) rates are subject to annual
22 review in PGC proceedings before the Pennsylvania Public Utility Commission (“PUC”
23 or the “Commission”).

1 Since Rates R and N customers have the right to procure their gas supply service
2 from alternative licensed natural gas suppliers (“NGSs”), UGI PNG releases pipeline
3 capacity and provides the functional equivalent of storage and peaking services to NGSs
4 serving pools of Rate RT and NT customers that elect to procure their own natural gas
5 supply service. This avoids the creation of stranded gas supply assets, enables long-term
6 gas supply assets to “follow the customer” and ensures that these assets may be recalled
7 and used in the event these core market customers return to PGC service. Affected NGSs
8 pay for such gas supply assets at the weighted average costs of UGI PNG’s PGC supply
9 portfolio to avoid cost shifting that could either disadvantage PGC customers or the
10 NGSs receiving the services.

11
12 **Q. What role do interstate pipeline contracts play in UGI PNG’s supply portfolio?**

13 A. They play a critical role. While UGI PNG and other shippers may be able to procure
14 natural gas commodity at supply points, including storage fields, on a relatively short
15 term basis, this commodity is of little or no value to core market customers if it cannot be
16 reliably delivered to UGI PNG’s system when needed to serve such customers. To
17 ensure such deliverability under all weather conditions, including design cold conditions,
18 UGI PNG must often enter into long-term (*i.e.*, multiple year) contracts with interstate
19 pipelines or others to ensure that there is sufficient so-called “primary firm” deliverability
20 into UGI PNG’s distribution system. Often these contracts are entered into to support
21 interstate pipeline expansion projects, and UGI PNG is often able under applicable FERC
22 and pipeline rules to negotiate favorable terms for these arrangements.

23

1 **Q. Why are primary firm delivery rights important?**

2 A. Primary firm delivery points are essential to ensure the reliability of natural gas supply.
3 Under applicable pipeline rules, shippers may have rights to delivery points that are not
4 primary (secondary delivery points), and on high-demand days nominations to such
5 secondary delivery points may be restricted as a result of nominations by shippers having
6 primary delivery rights. Also, operational issues on interstate pipelines may lead to the
7 issuance of flow directives and operational flow orders which limit non-primary firm
8 deliveries. As a result of recent trends in interstate pipeline use, the frequency of
9 restrictions on secondary deliveries has been increasing. More recently, an explosion on
10 the Texas Eastern Penn-Jersey System significantly reduced deliverability along this line,
11 and triggered pressure tests of other segments that may further restrict deliverability. Had
12 this reduced deliverability continued into the 2016-2017 winter season, it would have
13 resulted in an even larger loss of deliverability for those shippers using secondary
14 deliverability points. UGI Gas's possession of primary firm delivery rights on Texas
15 Eastern limited its exposure to this loss in deliverability. However, a similar event could
16 occur on the interstate pipeline systems serving UGI PNG.

17
18 **Q. Does UGI PNG have firm and interruptible transportation rate schedules for which
19 it does not currently procure gas supply assets?**

20 A. Yes, UGI PNG currently does not procure gas supply assets for four of its transportation
21 rate schedules, each of which are designed to meet the needs of different customer
22 classes. Rate DS is designed to meet the needs of smaller volume transportation
23 customers who find its rate design preferable to Rate NT. Rate LFD is designed to meet

1 the needs of higher volume transportation customers and Rate XD (Extended Large
2 Delivery Service) is designed to meet the needs of UGI PNG's largest volume customers.
3 UGI PNG also has Rate IS (Interruptible Service) for which it does not procure gas
4 supply assets.

5
6 **Q. Do Rate DS, LFD, XD and IS customers have the ability to seek service from UGI
7 PNG under Rates N or NT for which UGI PNG does procure gas supply assets?**

8 A. Under the definition section of UGI PNG's existing and proposed tariffs, and in particular
9 the definition of "Supplier of Last Resort", the Company is "under no obligation and
10 shall have no duty to serve as Supplier of Last Resort to any Rate DS, IS, LFD, or XD
11 customers." The Company does have a supplier of last resort obligation for Rate N and
12 NT customers, however, and to the extent a customer serviced under a rate schedule for
13 which UGI PNG does not have a Supplier of Last Resort ("SOLR") obligation were to
14 apply for service under these rate schedules, UGI PNG's proposed tariff language states
15 that Rate N and NT service "*will be supplied only where the Company's facilities and the*
16 *available quantity of gas are suitable to the service desired.*" Presumably, this language
17 would give the Company the right to deny service to customers seeking to move to Rate
18 N and NT service if the Company did not plan for and have available gas supply
19 resources to serve them. However, for the reasons which follow, UGI PNG believes it
20 would be in the public interest to, as UGI Gas currently does, procure certain pipeline
21 capacity for certain Rate DS and Rate LFD customers to reduce the possibility that there
22 could be a significant disruption of gas service to smaller transportation customers in the
23 event of curtailments of secondary delivery rights on interstate pipelines serving the

1 Company's system, placing the Company in the position of potentially having to
2 potentially deny requests from smaller transportation customers to migrate to Rate N or
3 NT service.

4 **Q. Historically, have Rate DS, LFD, XD, and IS customers migrated to Rates N or NT?**

5 A. No. However, the recent Texas Eastern restrictions have caused UGI PNG to realize that
6 if similar restrictions were to occur on the interstate pipelines serving its system, Rate DS
7 customers and some Rate LFD customers facing pipeline restrictions on the deliverability
8 of their gas supplies could face disputations in their current supply arrangements and
9 could attempt to apply for Rate N or Rate NT service to gain access to UGI PNG primary
10 firm delivery rights. If this shift in transportation customer rate elections were to occur,
11 UGI PNG might find it difficult to accommodate the increased demand for Rate N and
12 NT service, and might have to deny service requests from customers facing significant
13 disruptions to their business operations.

14
15 **Q. Is UGI PNG proposing a solution to this potential problem in this proceeding?**

16 A. Yes. UGI PNG is proposing to include the following in designing and procuring its
17 supply portfolio: (a) projected Rate DS customer demands up to their contracted
18 aggregate Maximum Daily Quantity ("MDQ") level and (b) projected Rate LFD
19 customer demands up to the aggregate elected Daily Firm Requirement ("DFR") levels of
20 those Rate LFD customers who mutually agree with UGI PNG to accept a release of UGI
21 PNG capacity. UGI PNG is also proposing to release pipeline capacity to all Rate DS
22 customers (or their designated NGSs) up to their MDQ, and to participating Rate LFD
23 customers (or their designated NGSs) up to their DFR, at the weighted average cost of

1 UGI PNG's cost of capacity to prevent cost shifting to or from PGC customers. All of
2 the revenues from such releases would be credited to UGI PNG's PGC and would not be
3 part of UGI PNG's revenue sharing incentive mechanism. These Rate DS and LFD
4 customers would continue to be required to procure their own natural gas commodity as
5 well as any storage or peaking services they might elect to procure.

6
7 **Q. Why would UGI PNG require all Rate DS customers to receive releases of UGI PNG**
8 **capacity, but not require all Rate LFD customers to do so?**

9 A. While the overall level of Rate DS service demand can reasonably be predicted, the
10 demand for UGI PNG capacity by Rate DS customers in the event such capacity
11 assignments were optional would be difficult to predict and could change significantly
12 based on prevailing market conditions. Moreover, Rate DS customers do not sign long-
13 term service contracts, thereby preventing UGI PNG from protecting itself from
14 unexpected changes in demand by contract. Thus, if UGI PNG does not make capacity
15 assignments mandatory, excess capacity could be created. On the other hand, UGI PNG
16 can reasonably predict the demand for capacity from its participating Rate LFD
17 customers through the execution of longer-term service contracts that bind the
18 participating Rate LFD customers to accept the release of UGI PNG capacity.

19
20 **Q. What pipeline capacities will actually be released to Rate DS and participating Rate**
21 **LFD customers?**

22 A. For system operational reasons, UGI PNG's system will be divided into three geographic
23 regions. Participating customers in the northern region or their designated NGSs would

1 receive a release of Tennessee capacity, those in the southern region or their designated
2 NGSs would receive a release of Transco capacity, and those in the central region or their
3 designated NGSs would receive a release of both Transco and Tennessee capacity
4 corresponding to the pipeline deliveries requirements for these customers (which are
5 currently 56 percent Transco and 44 percent Tennessee). As I previously mentioned,
6 however, all such releases will be at the weighted average cost of UGI PNG's
7 transportation capacity.

8
9 **Q. Are there any other natural gas distribution companies that similarly procure**
10 **capacity for certain of their transportation customers?**

11 A. Yes. UGI PNG's affiliate, UGI Gas, has done so for decades and this approach has
12 worked well on its system. We also expect to propose a similar approach on the UGI
13 CPG system in the future. Moving to a common approach among the UGI NGDCs will
14 reduce administrative complexity and not result in any cost shifting since pipeline
15 capacity will be assigned at the weighted average costs of UGI PNG's transportation
16 capacity.

17
18 **Q. Do you believe this proposal will facilitate or hinder retail customer choice on UGI**
19 **PNG's system?**

20 A. I believe it will facilitate retail choice by providing NGSs with access to pipeline capacity
21 having primary firm delivery rights to meet the needs of Rate DS customers and certain
22 Rate LFD customers. Certain NGSs may be serving such customers with capacity having
23 a lower priority of delivery rights, which potentially could expose such NGSs to

1 contractual or replacement supply cost risks in the event of interstate pipeline
2 deliverability restrictions. Other NGSs might not make service offerings at all because
3 they are unwilling to take such a risk. UGI PNG's proposal will help minimize this risk
4 by providing NGSs with access to pipeline capacity having primary firm delivery rights.
5

6 **Q. Why has the Company not proposed to acquire and assign pipeline capacity for**
7 **Rate XD, Rate IS and all Rate LFD customers?**

8 A. The Company believes that Rate XD and many Rate LFD customers, and their marketers,
9 have the required level of sophistication to manage their own supply arrangements.
10 Moreover, given the higher volumetric rates associated with the design of Rate N and NT
11 rates, the Company believes that Rate XD and larger Rate LFD customers would not find
12 Rate N or NT service an economically viable alternative and would be unlikely to apply
13 for such service in the event of interstate pipelines service restrictions. Also, the
14 Company does not believe it would be appropriate to acquire and assign pipeline capacity
15 to Rate IS customers, since they are receiving an interruptible service and could
16 presumably turn to alternative fuels or handle interruptions in service in the event of
17 interstate pipeline supply disruptions.

18 **Q. Does this conclude your direct testimony?**

19 A. Yes.

UGI PNG EXHIBIT AMB-1

Angelina M. Borelli
Director – Gas and Electric Supply

Work Experience

2015 – current	Director – Gas and Electric Supply UGI Utilities, Inc., Reading, PA
2014 – 2015	Director – Gas Supply UGI Energy Services, LLC. Wyomissing, PA
2009 – 2014	Manager – Gas Supply and Transportation UGI Energy Services, LLC. Wyomissing, PA
2006 – 2009	Administrator – Assets & Wholesale Services UGI Energy Services, LLC. Wyomissing, PA
2000 – 2006	Analyst – Gas Supply UGI Utilities, Inc., Reading, PA

Previous Testimony

Default Service Plan:	Docket Nos. P-2016-2543523, G-2016-2543527
Base Rate Case:	Docket-2015-2518438
2016 PGCs:	Docket Nos. R-2016-2543311 (UGI CPG); R-2016-2543309 (UGI Gas) and R-2016-2543314 (UGI PNG)

Education

M.S Finance from Penn State University, 2008
B.S. in Business Administration from Albright College, 2006
A.A.S in Law Enforcement Administration from RACC, 2000